Meeting Date	**28 November 2019**	**Agenda Item**	**3.4**
Report Title	**Major Trauma Network Programme Business Case South & West Wales, South Powys**		
Report Author	Julie Morse Principal Project Manager		
Report Sponsor	Siân Harrop-Griffiths Director of Strategy		
Presented by	Siân Harrop-Griffiths Director of Strategy		
Freedom of Information	Open		
Purpose of the Report	This report supports the attached paper and Programme Business Case, issued by the NHS Wales Health Collaborative, regarding the approval of the Major Trauma Network [MTN] Programme Business Case [PBC]. This paper identifies the particular issues for Swansea Bay UHB.		
Key Issues	The PBC is a wide-ranging document setting out the case for delivering the South & West Wales, South Powys MTN. The aim is for the MTN to launch in the spring of 2020. The PBC comes with a comprehensive executive summary focusing on: • Strategic Case • Case for Change • Clinical and operational model • Operational Delivery Network • Pre-Hospital Care and transfers • Major Trauma Centre • Health Board configuration • Financial Case • Economic Case • Management Case There are specific issues for Swansea Bay to consider, particularly the: • provision of specialised services through the Major Trauma Centre • hosting of the Operational Delivery Network (ODN)		

<table>
<tr><td></td><td colspan="4">• potential for support for future business cases to support the development of the Trauma Unit and landing pad.</td></tr>
<tr><td rowspan="2">Specific Action Required
(please choose one only)</td><td>Information</td><td>Discussion</td><td>Assurance</td><td>Approval</td></tr>
<tr><td>☐</td><td>☐</td><td>☐</td><td>☒</td></tr>
<tr><td>Recommendations</td><td colspan="4">The Board is recommended to:
• CONSIDER and APPROVE the report from the NHS Wales Health Collaborative

• CONSIDER the associated issues relating to Swansea Bay University Health Board and next steps.</td></tr>
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Major Trauma Network Programme Business Case
South & West Wales, South Powys

1. INTRODUCTION

This paper supports the attached report issued by the NHS Wales Health Collaborative which asks Health Boards to endorse the MTN Programme Business Case (PBC), as part of the ratification process through to Welsh Government. The PBC aims to enable a Network go live in spring 2020, when the new WAST Triage Tool comes into operation – changing the flow of patients experiencing major trauma in South Wales.

2. BACKGROUND

The PBC has undergone three Gateway Reviews, with the third on October 28th 2019 attributing an Amber/Green status, indicating that successful PBC delivery appears probable. However, the Review advised that constant attention will be needed to ensure risks do not materialise into major issues threatening delivery.

Whilst acknowledging the clear evidence that this new service will deliver significantly improved outcomes for patients suffering major trauma, and noting the report from the Collaborative, there are issues that Swansea Bay University Health Board (SBUHB) will need to take into account:

2.1 Recruitment to Support the MTC

SBUHB needs to recruit the Specialist Services Consultant and clinical fellow posts in plastic surgery to support the MTC. The job plans for the Specialist Services plastic surgery Consultant posts are being finalised; the elective activity components are currently being agreed. The funding for the five clinical fellow posts will be confirmed as part of final approval of the PBC.

It is not expected that there would be additional activity required to be undertaken in Swansea Bay UHB in relation to specialised services based on placing a 5 day plastic surgical service in the MTC. The flow of isolated lower limb fractures direct to Morriston will not be changed in year 1 – this will be reviewed at the end of year 1.

In parallel, the MTC in Cardiff & Vale University Health Board has embarked on a recruitment campaign to enable the MTC to become operational in April 2020. Welsh Ambulance Services Trust (WAST) also needs to resource its new Trauma Desk to align with the same date. There are significant challenges to fulfilling these key posts and it unlikely that all staff will be in place before April 2020.

2.2 Recruitment to support the Trauma Unit Landing Pad

Following the first Gateway Review it was agreed that Health Boards would establish reduced local Landing Pads in the first year, to enable the Network to operate. Key enabler posts to support patient flow and repatriation (Rehabilitation Coordinator, Trauma Practitioner and TARN Coordinator) were agreed for each Health Board Recruitment to these posts will commence if the PBC is approved.

The costs of these posts (£247,000) have been factored into the prospective financial plan for 2020/21.

Further business cases may be prepared during 2020/21 to fully staff the Trauma Units and Landing pads, which will enable the rehabilitation element of the Network to be fully operational. If these business cases are approved there will be a further financial implication for the Health Board to consider which will need to be addressed through future IMTPs/Annual Plans

2.3 Establishment of the Operational Delivery Network

It has previously been agreed that Swansea Bay UHB will host the Operational Delivery Network (ODN) for the Network. The governance arrangements for this are set out in the PBC, and the detailed operational arrangements are being worked up. The governance framework will be brought to the Board for approval in January, and will be based on similar arrangements to organisations already hosted by the Health Board, eg EMRTS.

Approval has been given to recruit to the Network Manager post, and the post has now been appointed to. There are 3 other posts to be recruited, however, this process cannot commence until the PBC has been approved. It is therefore unlikely that these posts would be in place before April/May 2020, and are crucial to supporting the establishment and effective operation of the Network.

A small revenue amount for hosting the ODN (5% of ODN costs) is included in the PBC to cover the costs to Swansea Bay Health Board of hosting the ODN.

2.4 MTN in operation: changes to patient management and flow

The acceptance/repatriation protocol dictates a 48 hour transfer window, once the decision to repatriate a patient from the MTC has been made. If not met, the MTC can deliver patients back to the receiving Emergency Department i.e. Morriston Hospital. The SBUHB project team has emphasised the need for all repatriations to be managed in this way, not just MTC transfers, to ensure more effective patient flow. The protocol is being developed with the Chief Operating Officers and will be tested before the end of the calendar year. The potential impact of changing patient flows across South Wales in an already pressured unscheduled care system will need to be carefully monitored by the ODN.

It should be noted, however, that there will be a slightly reduced number of patients attending the Morriston ED as major trauma cases will bypass the hospital and go straight to the MTC.

2.6 Evaluation of the MTN

There is significant reference to evaluation of the MTN to enable consideration of value for money and to support the development of further business cases (if

appropriate). The PBC has a section on post programme evaluation (12.8) after year 1. Peer Review of the whole system has been included as part of the WHSSC costs, and will be commissioned from NHS England (as Betsi Cadwaladr UHB does for North Wales services)

2.5 Timetable

A Programme checkpoint timeline has been produced as noted below:

Major Trauma Centre [MTC] readiness visits	Through Dec 2019
PBC sign off at Welsh Health Specialised Services Committee [WHSSC] Joint Committee	December 2019
PBC formal sign off by Welsh Government	January 2020
Welsh Ambulance Service Trust [WAST] readiness visits	Through Jan 2020
Trauma Unit [TU] readiness visits	Through Jan 2020
MTN policy sign off by MTN Board	Early Jan 2020
Gateway Review 4	Feb 10 2020
Decision on readiness to Go Live	Mar 7 2020

3. FINANCIAL IMPLICATIONS

The PBC details the finances required to support the MTN, particularly in advance of the launch on April 1st 2020. The PBC notes that the "*case for the MTC is front-loaded having learnt lessons from the implementation of networks in the rest of UK, which has reinforced the need to achieve quality indicators and service standards at an early stage. However, there are some elements of the MTC case that are phased. The resource requirements for the Trauma Units reflect a much more phased approach and subsequent business cases may be required (where appropriate) to meet service specification and quality indicators that cannot be met on Day One*".

The summary contribution for SBUHB is outlined below:

	19/20 £000	20/21 £000	21/22 £000	22/23 £000	23/24 £000
WHSSC funded costs (total) to include…					
MTC	922	10,579	11,222	11,222	11,222
Specialist Services	150	910	910	910	910
ODN	119	496	508	513	515
EASC funded costs - pre-hospital	58	1,201	635	640	640
TOTAL WHSSC/EASC COSTS	**1,536**	**14,465**	**14,553**	**14,562**	**14,564**
SBUHB contribution to WHSSC/EASC costs	230	2,432	2,445	2,450	2,450
SBUHB costs – Trauma Unit key enabler posts	51	246	250	246	247

Total SBUHB costs	**281**	**2,678**	**2,695**	**2,696**	**2,697**

The PBC notes that the "*costs have been derived through an iterative process of reviewing the gap between commissioning expectations and provider costs*". The MTC costs include 0.4 wte Rehabilitation Consultant time to support each Health Board.

4. RECOMMENDATION

The Board is recommended to:

- **CONSIDER** the report from the NHS Wales Health Collaborative.
- **ENDORSE** the PBC (as set out in the attached Report) and next steps in the preparations for MTN launch.
- **CONSIDER** the specific issues relating to Swansea Bay UHB, our readiness for implementation and mitigating actions

Governance and Assurance		
Link to Enabling Objectives ***(please choose)***	**Supporting better health and wellbeing by actively promoting and empowering people to live well in resilient communities**	
	Partnerships for Improving Health and Wellbeing	☒
	Co-Production and Health Literacy	☐
	Digitally Enabled Health and Wellbeing	☒
	Deliver better care through excellent health and care services achieving the outcomes that matter most to people	
	Best Value Outcomes and High Quality Care	☒
	Partnerships for Care	☒
	Excellent Staff	☒
	Digitally Enabled Care	☒
	Outstanding Research, Innovation, Education and Learning	☒
Health and Care Standards		
(please choose)	Staying Healthy	☐
	Safe Care	☒
	Effective Care	☒
	Dignified Care	☒
	Timely Care	☒
	Individual Care	☒
	Staff and Resources	☒

Quality, Safety and Patient Experience

The network will improve patient outcomes by saving lives and preventing avoidable disability, returning patients to their families, work and education. The network will be a partnership between participating organisations, working collaboratively to achieve this common goal and purpose. The aim is to develop an inclusive, collaborative, world leading trauma network, with quality improvement, informed through evidence-based medicine and lessons learnt from others.

Financial Implications

The costs related to the MTN are noted in section 3 above. Health Boards are expected to include costs within IMTPs.

Legal Implications (including equality and diversity assessment)

Not known

Staffing Implications

Recruitment to new posts is required as outlined in the paper. Review of staff resource to support the MTN in future years (especially Therapy and Rehabilitation resources) will need to be requested via the business case proves.

Long Term Implications (including the impact of the Well-being of Future Generations (Wales) Act 2015)

The proposals outlined in the PBC align with national and international strategic drivers for change, including:

A Heathier Wales (2018) sets out a long-term vision of a 'whole system approach to health and social care', underpinned by prudent healthcare and value-based healthcare principles. NHS Wales service change plans and the National Programme for Unscheduled Care. The establishment of trauma networks elsewhere in the British Isles, in response to building evidence of effectiveness: o NHS England implemented trauma networks between 2010 and 2012 (North Wales has been part of the North West Midlands Network since 2012), based on a number of strategic report (e.g. NCEPOD, NAO). Currently, there is no adult and paediatric network serving the population of South Wales, West Wales and South Powys. Evidence from the evaluation of networks in England indicates that the organisation of the trauma pathway through a network approach is associated with significant improvements in both the care process and outcomes of patients after severe injury.	
Report History	
Appendices	Appendix one and two.

A Major Trauma Network for South Wales, West Wales and South Powys *Programme Business Case*

Date: 18/11/19	**Version:** 1.0 (Final)

Purpose:

In March 2018, each of the six health boards serving the populations of South Wales, West Wales and South Powys formally agreed to recommendations for the development of a Major Trauma Network for the region, in line with the recommendations of an Independent Panel and following a period of formal consultation.

Since that time, a significant programme of work has been undertaken to develop the configuration of the network and the clinical and operational model. This has been enabled and supported through strong and effective clinical leadership and engagement, and taking account of patient experiences.

This work has culminated in the production of a Programme Business Case which describes the totality of the requirements for NHS Wales to establish the South Wales Trauma Network ('the network'), serving the population of South Wales, West Wales and South Powys. The case outlines the requirements for the network to become operational and, also, the trajectory of development over a five-year period.

Boards are asked to:

1. Receive and discuss the Programme Business Case for the network.
2. Note that there has been significant scrutiny of the case, including three formal Gateway Reviews and professional peer review by UK clinical experts.
3. Approve the overall network model described in the case (clinical, operational and governance), including the:
    a. role of the Operational Delivery Network (ODN)

b. role of the health board, as a provider of respective component of service model.

4. Note the importance of the repatriation policy and the importance of the ODN having the authority to implement this, completion of which will form a critical activity in planning network implementation.
5. Note that there will be other business cases over the next two to three years to further develop the major trauma centre and trauma units.
6. Approve the content of the Programme Business Case, subject to confirmation of the NHS resource allocation for 2020/21, the IMTP prioritisation process, and point 7 below.
7. Note that final commissioning decisions on prehospital services, the major trauma centre, relevant specialist services and the ODN, will be taken at meetings of the Welsh Health Specialist Services Committee (WHSSC) and the Emergency Ambulance Services Committee (EASC).

1 Introduction

The Programme Business Case (PBC) describes the requirements for NHS Wales to establish the South Wales Trauma Network, serving the population of South Wales, West Wales and South Powys. The PBC outlines the requirements for the network to become operational and, also, the trajectory of development over a five-year period of implementation.

This PBC represents the culmination of significant work to develop the configuration of the network and the clinical and operational model. This has been enabled and supported through strong and effective clinical leadership and engagement, and taking account of patient experiences.

2 Background

In March 2018, each of the six health boards in the region formally agreed to recommendations for the development of a Major Trauma Network for South Wales, West Wales and South Powys, in line with the recommendations of an Independent Panel and following a period of formal consultation:

1. A major trauma network for South and West Wales and South Powys with a clinical governance infrastructure should be quickly developed.
2. The adults' and children's major trauma centres should be on the same site.
3. The major trauma centre (MTC) should be at University Hospital of Wales, Cardiff.
4. Morriston Hospital, Swansea, should become a large trauma unit (TU) and should have a lead role for the major trauma network.
5. A clear and realistic timetable for putting the trauma network in place should be set.

Since that time, a significant programme of work has been undertaken, overseen by a Trauma Network Board, which has led to the production of the PBC and initial preparations for implementation of the network.

3 Network Structure

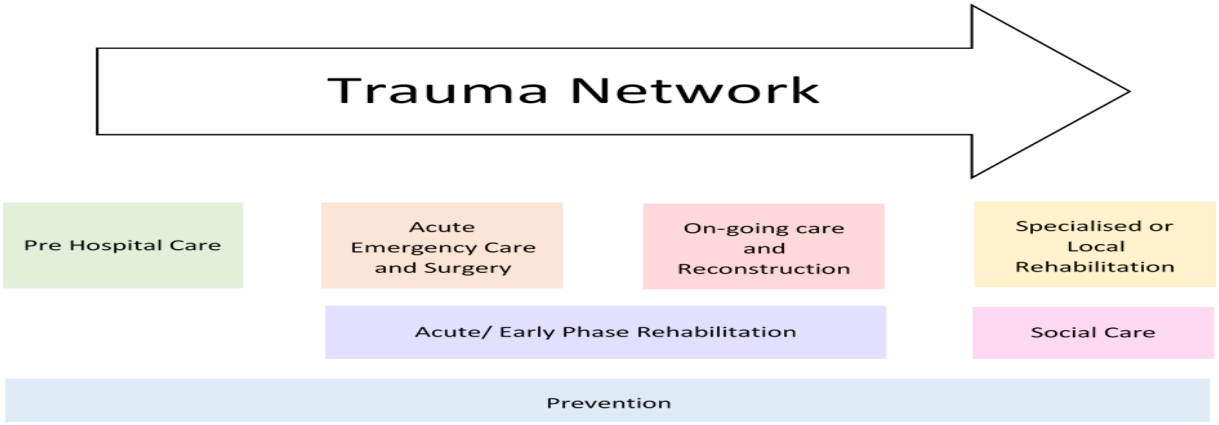
The structure of the South Wales Trauma Network will be comprised of the following elements:

- An **Operational Delivery Network (ODN**), to be hosted by Swansea Bay University Health Board, which will provide the management function for the network. It will be a collaboration between all providers of trauma care services in the region, and its governance arrangements will provide appropriate authority to ensure operational delivery.

- A **pre-hospital triage tool** will ensure major trauma patients are conveyed directly by the Welsh Ambulance Service (WAST) or the Emergency Medical Retrieval and Transfer Service Cymru (EMRTS), or other emergency providers, to the MTC or TUs.
- An **adults' and children's MTC at University Hospital of Wales** (UHW), Cardiff. It will have access to all specialist services relevant to major trauma and take responsibility for the acute care of all major trauma patients in the region via an automatic acceptance policy and manage the transition of patients to rehabilitative care.
- An **adult and paediatric TU, with specialist services, at Morriston Hospital**, Swansea. It will provide specialist support to the MTC and provide specialist surgery for patients who do not have multiple injuries, for burns, plastic, spinal and cardiothoracic surgery.
- **Six adult and paediatric TUs** at the following locations:
    - UHW, Cardiff
    - Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (until the Grange University Hospital is fully operational, planned for April 2021, at which point it will become the single designated TU for Aneurin Bevan University Health Board)
    - Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend
    - Glangwili General Hospital, Carmarthen.

  The TUs will provide care for injured patients and have systems in place to rapidly move the most severely injured patients to hospitals that can manage their injuries, in most cases the MTC. They will also receive patients back who require ongoing care in hospital.
- **Rural trauma facilities** at Bronglais General Hospital, Aberystwyth, and Withybush General Hospital, Haverfordwest, which will maintain the ability to assess and treat major trauma patients, given their unique geographical locations.
- A **Local Emergency Hospital** at Royal Glamorgan Hospital, Llantrisant. This hospital will not routinely receive acute trauma patients but, should this occur, it will ensure appropriate initial management and transfer to the MTC or nearest TU.

4 Clinical and Operational Model



Detailed work has been undertaken to develop the **clinical and operational mode**l for the network and to estimate changes in **patient flows**. There will be an increase of approximately 300 patients being treated per annum at the University Hospital of Wales due to its planned status as the MTC for the network (full details of estimated changes in patient flow across the network are provided in Chapter 4 of the PBC).

The planning work has led to the adoption of the NHS England quality indicators and service specification. Assessments have been undertaken to review current services against these indicators and the estimated changes in patient flows, which has informed the resource requirements for each component part of the network:

- **Pre-hospital services** (chapter 6) – Five indicators and investment required for new and additional journeys, additional training, establishment of a major trauma desk within the clinical contact centre, and for a transfer and discharge service. These requirements were endorsed by EASC in September 2019.
- **Major Trauma Centre** (chapter 7) – 52 indicators for adult services and 46 for children's services. 38 are currently not met, which form the basis for the required investment, five of which are not essential for 'Day 1' and implementation of which will be phased. Investment is sought for:
    - Emergency Department – quality of immediate response and stabilisation from 24/7 consultant trauma team lead, dedicated nursing and seven day paediatric trauma team lead until 10pm.
    - Theatres – additional theatre availability to improve timeliness of access to theatres.
    - Critical Care – additional capacity for predicted increase in demand.
    - Poly Trauma Unit – dedicated ward for acute admission and early targeted rehabilitation in readiness for discharge to local care.
    - Trauma and orthopaedics – additional surgical capacity to meet increased activity flow.

  - Hyper acute rehabilitation service – to provide early rehabilitation plans for trauma patients with intensive rehabilitation needs.
  - Specialist services – new local plastic surgery availability on site to deliver improved outcomes (through collaboration with Swansea Bay University Health Board).
  - MTC directorate – senior leadership to drive improvements in rehabilitation, clinical practice, and audit and outcomes.

- **Trauma Units** (Chapter 8) – 26 indicators, many are already being met or could be met through the provision of network policies and internal re-organisation of resources. The initial focus for additional resources is on key enabling posts to improve clinical governance, data collection and patient flow. Further resources will be required to meet standards in Years 2 and 3. The TU at Morriston Hospital will have a role in providing specialist services support to the network. The PBC includes costs for locating up to four plastic surgeons at the MTC.
- **Operational Delivery Network** (chapter 5) – investment required to manage the network and coordinate operational delivery.

Essential to the effective operation of the network will be **patient repatriation,** that is arrangements for patients to return to a suitable local hospital as soon as the acute phase of their trauma care is completed. This will enable patients to continue their treatment closer to home, reduce impact on family and carers, and help provide capacity for the MTC to automatically accept new patients. An automatic acceptance policy is proposed for repatriation of major trauma patients from the MTC, but within the context of supporting interventions. The policy is under development, draft principles for which are:

1. Acceptance of the principle that origin health boards are responsible for their patients, irrespective of where they are being treated.
2. Automatic acceptance will be treated in the same way in both directions (i.e. to the MTC and back to the TU).
3. Any delay in repatriation will lead to a delay in automatically accepting new patients to the MTC.
4. Key features of an All Wales Repatriation Policy will be included.
5. The ODN is given operational authority within the escalation procedures for delayed transfers of care.

There will be an opportunity to pilot the policy before the network goes live.

Rehabilitation services are vital to the care of patients following major trauma. Major trauma practitioners and rehabilitation coordinators will be new roles in the health boards and will be vital in ensuring seamless care and key points of contact for patients returning from specialist care to a TU or the community. A consultant in rehabilitation medicine will operate in

each health board on a weekly basis, playing a key role in coordinating the team, managing complex patients and facilitating discharge. In Years 2 and 3, and subject to approval of additional business cases, there will be further enhancement of local and community based rehabilitation including core therapy roles as well as some specialist roles, providing both in-reach and out-reach services. For complex patients who return from specialist care (e.g. traumatic brain injury, spinal injuries), a training and education programme for medical and nursing staff will ensure the skill set of the rehabilitation multidisciplinary team at TUs will be identical to the skill set of that based at the MTC.

Prevention is an essential component of an inclusive major trauma system and the network will be able to make a significant contribution to injury prevention programmes through data sharing, research and educational initiatives. The ODN will be responsible for ensuring attention to prevention activities and the benefits realisation plan described in the PBC commits the network to the development of an injury prevention strategy, in partnership with Public Health Wales.

5 Network Workforce

The PBC identifies significant additional workforce requirements, the majority of which will work within the MTC. This requires collaboration within system-wide arrangements. The network has developed workforce principles to mitigate the risk of destabilising services as a consequence of establishing the MTC. These principles include shared job plans, portfolio roles and rotational posts across the network.

Staff Group	**WTE**
Medical Staff	43.3
Healthcare Support Workers	37.65
Registered Nurses	85
Allied Health Professionals, Scientists and Technicians etc.	27.5
Administrative and Clerical staff	15
Total	**208.45**

6 Revenue and Capital Costs

The totality of the revenue and capital costs included in the PBC is set out in the tables below. This has been informed by significant scrutiny of the network requirements through the programme arrangements and, also, independently through clinical peer review and Gateway Reviews. Learning lessons from the establishment of major trauma networks in other parts of the UK has been of particular importance. This has informed the scale of the MTC requirements and also the enabling requirements for the pre-hospital services, trauma units and the rehabilitation pathway. This will ensure the maximum benefit for the most seriously injured patients, the majority of whom will go to the MTC. There are some elements of the MTC

case that are phased and, also, the resource requirements for the TUs reflect a more phased approach.

Summary of revenue costs

	2019/20	2020/21	2021/22	2022/23	2023/24
	£000s	£000s	£000s	£000s	£000s
MTC	£922	£10,579	£11,222	£11,222	£11,222
Specialist Services	£150	£910	£910	£910	£910
Trauma Units	£287	£1,278	£1,278	£1,278	£1,278
Operational Delivery Network	£119	£496	£508	£513	£515
Pre-Hospital Care	£58	£1,201	£635	£640	£640
Total	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

Summary of health board and trust funding shares

(Reflects local Trauma Unit / Rehabilitation costs plus share of Major Trauma Centre, Specialist Services and WAST Pre-hospital care)

	2019/20	2020/21	2021/22	2022/23	2023/24
	£000s	£000s	£000s	£000s	£000s
Aneurin Bevan	£353	£3,549	£3,571	£3,573	£3,574
Cwm Taf Morgannwg	£308	£2,743	£2,758	£2,759	£2,760
Cardiff and Vale	£247	£2,808	£2,826	£2,828	£2,829
Hywel Dda	£262	£2,462	£2,477	£2,479	£2,479
Powys	£27	£225	£226	£226	£226
Swansea Bay	£281	£2,678	£2,695	£2,696	£2,697
WAST (2019/20 funded by WG, Year 1 onwards by health boards)	£58	£0	£0	£0	£0
Total	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

7 Value, Cost Effectiveness and Benchmark Cost Comparison

The value of investment in major trauma is centred on the benefits from reducing mortality and in reducing the levels of disability in people who have experienced major trauma. Major trauma is one of the major causes of premature death. The NCEPOD report (2007) highlighted that 75 % of major trauma involved young men. Reducing mortality and improving function in this patient group, therefore, has the ability to produce material health gain for any investment. The National Audit Office report (2010) highlighted the potential to reduce mortality by 15 to 40%. This has subsequently been evidenced by the real world experience data from the introduction of the major trauma networks in England, which demonstrated a 19% improvement in case-mix adjusted mortality (Moran 2018).

There is international evidence that investment in major trauma is cost effective. The NHS Confederation (2010) reported the work of Nicholl (Sheffield University Health Economics) which indicated that, based on a

10% improvement in mortality, a health economy could invest £5m per annum per million population and achieve a quality gain cost effective at within the £20,000 per QALY standard. A comprehensive study from the United States (Mackenzie 2010) compared the outcomes in Level 1 trauma centres with non-trauma centres and quantified the cost effectiveness at $36,961 per QALY. When adjustments are made to translate into much lower UK health system costs, investment in major trauma compares well against common investment priorities such as hip and knee surgery.

The lack of a comprehensive baseline cost for the MTC makes comparison with other UK benchmarks problematic. However, the incremental unit cost for the MTC across ISS 9 to 15 and >15 (ISS being a score to measure injure severity) has been assessed to start at £15,190 in Year 1 falling to £13,573 by Year 3. The full cost of MTC activity delivered by an NHS England MTC for the North Wales population, based on real world data, has been calculated as £18,650 per case with a range of £23,576 for ISS>15 and £12,083 for ISS 9<15. It is anticipated that, if all baseline costs were included, the full cost of the new MTC would probably exceed the benchmark, but any financial gap will narrow when, as predicted, activity grows and wider system efficiencies from existing TUs begin to be realised.

8 Programme Assurance

Development of the clinical and operational model and the production of the PBC have been coordinated and overseen by the Trauma Network Board, with commissioner scrutiny provided by WHSSC and EASC. There was intensive scrutiny throughout the summer and autumn of 2019, including benchmarking of the MTC financial case against a lead English MTC, Gateway Reviews in July, September and October, and professional peer review by UK clinical experts in August. These have collectively informed the final PBC and the resource requirements to enable the establishment of the South Wales Trauma Network.

9 Next steps

Subject to approval of the content of the PBC and confirmation of funding, the South Wales Trauma Network is planned to go live in spring 2020. Some implementation has already commenced with recruitment to key enabling posts. The Gateway Review undertaken in October 2019 reported growing confidence that a go-live at or around April 2020 would be achievable, with a number of elements of the model being introduced in the first few months after this.

The Trauma Network Programme Board will be refocused on implementation, with a leaner membership once the PBC is approved. There will be some parallel running of the programme team and the new ODN, and full handover to the ODN prior to go-live. Arrangements are planned to hold critical readiness reviews for the MTC and TUs, which will focus on

recruitment and, within the MTC, on capital works. Also, the automatic acceptance policy for repatriation will need to be in place. This will inform decisions on the date from which the network will become operational, which will be signed off by WHSSC, as the lead commissioner.

10 Recommendations

Boards are asked to:

1. Receive and discuss the Programme Business Case for the network.
2. Note that there has been significant scrutiny of the case, including three formal Gateway Reviews and professional peer review by UK clinical experts.
3. Approve the overall network model described in the case (clinical, operational and governance), including the:
    a. role of the Operational Delivery Network (ODN)
    b. role of the health board, as a provider of respective component of service model.
4. Note the importance of the repatriation policy and the importance of the ODN having the authority to implement this, completion of which will form a critical activity in planning network implementation.
5. Note that there will be other business cases over the next two to three years to further develop the major trauma centre and trauma units.
6. Approve the content of the Programme Business Case, subject to confirmation of the NHS resource allocation for 2020/21, the IMTP prioritisation process, and point 7 below.
7. Note that final commissioning decisions on prehospital services, the major trauma centre, relevant specialist services and the ODN, will be taken at meetings of the Welsh Health Specialist Services Committee (WHSSC) and the Emergency Ambulance Services Committee (EASC).

GIG CYMRU NHS WALES

Rhwydwaith Thrawma De Cymru

South Wales Trauma Network

Serving the population of South Wales, West Wales and South Powys

Programme Business Case

18 November 2019

For reporting to Health Boards

Acknowledgements

The authors would like to thank all those who have contributed to the programme over the last five years and to the development of this Programme Business Case.

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Contents

South Wales Trauma Network

'Serving the Population of South Wales, West Wales and South Powys'

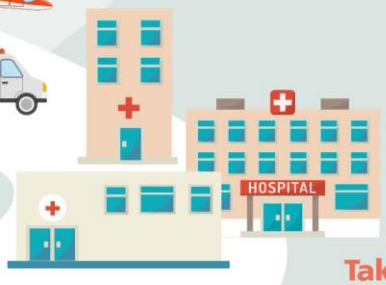
Our mission statement:
'Saving Lives,Improving Outcomes, Making a Difference'

Pre-hospital care

Treat me quickly and effectively

Acute emergency care and surgery

Recognise and treat my injuries quickly and **effectively**



Take me to the right hospital the first time

Explain to my family and me **what is happening at each step**

Manage my pain appropriately

Ongoing care and reconstruction

Give me and my family easy to **understand information to make sense of what happened to me,** my injuries and make choices about my care

Provide welfare support and advice to my family

Rehabilitation and social care

Explain to me **how my care is going to** change when I leave the **Major Trauma Centre**

Give me the best possible chance to **achieve my full potential after** I recover from my injuries

Be honest with me whether I will recover to my full potential

GIG CYMRU NHS WALES
Rhwydwaith Thrawma De Cymru
South Wales Trauma Network

1 Executive Summary

1.1 Introduction

This Programme Business Case (PBC) describes the totality of the requirements for NHS Wales to establish the South Wales Trauma Network ('the network'), serving the population of South Wales, West Wales and South Powys. The PBC outlines the trajectory of the programme over a five year period of phased implementation. It represents the culmination of significant work over seven years.

The trauma network board recommends that health boards, the Welsh Ambulance Service NHS Trust (WAST), commissioners and the Welsh Government approve and support this case, which will lead to improved survival and outcomes for patients.

1.2 Vision

The vision for the establishment of the network is to enhance patient outcomes and experience, across the entire patient pathway from the point of wounding to recovery and also including injury prevention. The network will improve patient outcomes by saving lives and preventing avoidable disability, returning patients to their families, work and education. The network will be a partnership between participating organisations, working collaboratively to achieve this common goal and purpose. The aim is to develop an inclusive, collaborative, world leading trauma network, with quality improvement, informed through evidence-based medicine and lessons learnt from others.

1.3 Background

The programme was established, following full endorsement by all six health boards in the region, of the following recommendations made by an independent expert panel, following a period public consultation:

- A major trauma network for South Wales, West Wales and South Powys with a clinical governance infrastructure should be quickly developed.
- The adults' and children's Major Trauma Centres (MTC) should be on the same site.
- The MTC should be at University Hospital of Wales (UHW), Cardiff.
- Morriston Hospital, Swansea, should become a large Trauma Unit (TU) and should have a lead role for the major trauma network.
- A clear and realistic timetable for putting the trauma network in place should be set.

The network board was established in May 2018 and significant work has since been undertaken to develop the clinical and operational model, the network structure and to plan for implementation.

1.4 Strategic Case

The proposals outlined in this case align with national and international strategic drivers for change, including:

- A Heathier Wales (2018) sets out a long-term vision of a 'whole system approach to health and social care', underpinned by prudent healthcare and value-based healthcare principles.
- NHS Wales service change plans and the National Programme for Unscheduled Care.
- The establishment of trauma networks elsewhere in the British Isles, in response to building evidence of effectiveness:

- NHS England implemented trauma networks between 2010 and 2012 (North Wales has been part of the North West Midlands Network since 2012), based on a number of strategic report (e.g. NCEPOD, NAO).
- the Scottish Trauma Network was established in 2018, supported by incremental investment from the Scottish Government,
- Both Northern Ireland and Republic of Ireland are making good progress with their respective developments.

Currently, there is no adult and paediatric network serving the population of South Wales, West Wales and South Powys. Evidence from the evaluation of networks in England indicates that the organisation of the trauma pathway through a network approach is associated with significant improvements in both the care process and outcomes of patients after severe injury.

1.5 Case for Change

The case for change is compelling, with the prospect of benefits aligned closely with key investment objectives of health gain, equity, clinical and skills sustainability, and value for money, including economic benefits. Thus, a value-based healthcare approach has been applied where appropriate.

Health gain – improving patient survival and outcomes

- Improving survival - NHS England showed an improvement of 19% over five years (1,645 more survivors, which exceeded expected numbers)
- Improving functional outcomes – an Australian study found more patients surviving with less disability burden (increase in disability free years by 28%). Early investments proposed in the rehabilitation model will incur the greatest impact on patient recovery and functional outcome
- Improving timely clinical care and patient experience
- Improving data collection - compliance with Trauma Audit Research Network (TARN) data collection, essential to quality improvement and evaluation
- Enhancing response at major incidents or mass casualty events – lack of a network presents a strategic risk to the region; trauma networks were key in the management of patients following the terrorist attacks in London and Manchester
- Enhancing injury prevention

Equity – people of highest health need prioritised

- Enhancing access to specialist care - the new trauma pathway will lead to an increase in direct and secondary access to specialist treatment and care
- Enhancing patient flow - there will be a requirement for automatic acceptance of patients by the MTC and the timely repatriation of patients for 'care with treatment closer to home'
- Improving system-wide care - learning lessons from England, investment in TUs is required to provide equity of access to improved standards of care
- Increasing equity of care for older people suffering trauma– the region has an ageing population and the group suffering the most major trauma are those aged over 65
- Increasing equity of care for veterans – a veterans trauma network, a collaboration with the MTC, will provide a single point of referral for medical care of veterans with complex physical injuries

Clinical skills and sustainability – reducing service and workforce vulnerabilities

- Enhancing multi-professional training and education – through a network-led programme crossing the entire patient pathway leading to enhanced knowledge and skill base across the network
- Enhancing workforce recruitment and retention – through a network-wide approach to maximise opportunities of joint and rotational posts and to minimise risk to de partments and organisations outside the MTC
- Developing new roles and ways of working – through expanded roles for allied health professionals and nurses; and promotion of new areas for training within Wales (e.g. trauma surgery as a specialty)

Value for money – demonstrating a cost effective way of generating the anticipated benefits

- Securing economic benefits – with approximately 14 additional lives saved across the network per year, this is likely to equate to a cost of lives saved of £17m/year. The proposed investment is cost effective and is significantly under the NICE Quality Adjusted Life Year (QALY) threshold for cost effectiveness of £20,000. It is also comparable with NHS England in relation to major trauma and other clinical interventions
- Achieving savings across the system – there will be fewer secondary transfers, less duplication of resources by patients being transferred to definitive care, and a fall in the length of stay in critical care
- Delivering value to other patient groups and networks - development of a new rehabilitation and orthogeriatric model will benefit a wider group of patients (e.g. stroke services and neck of femur fractures)
- Sharing knowledge and learning - including through the approach to and management of clinical and operational governance issues

1.6 Clinical and Operational Model

The scope of the trauma network is to provide seamless care to major trauma patients across all age groups. An inclusive trauma system (ITS) is responsible for all aspects of trauma care across the pathway, from the point of wounding to recovery, and also including injury prevention. It is based on a network structure and features a population-based approach to the assessment of need and the delivery of treatment. It includes a network-wide quality assurance framework covering each stage of care and underpinning providers' clinical governance processes. It also informs commissioning decisions to improve the quality of care.

Detailed work has been undertaken to develop the clinical and operational model for the network. This has led to the adoption of the NHS England quality indicators and service specification, with a phased approach to their introduction, in keeping with English trauma networks. This has included significant scrutiny through professional peer review and a series of Gateways reviews. The most recent Gateway review has provided a delivery confidence assessment of amber green. This indicates that 'successful delivery appears probable. However constant attention will be needed to ensure risks do not materialise into major issues threatening delivery.' The review recognised that two major activities were happening in parallel: the completion and approval process for the PBC and mobilisation for go live. It reported that, since the Assurance of Action Plan review, substantial progress had been made with both the PBC and implementation plans.

The trauma network board has overseen the development of the structure of the South Wales Trauma Network, comprised of the following:

- An Operational Delivery Network (ODN), to be hosted by Swansea Bay University Health Board, which will provide the management function for the network, and coordinate operational delivery
- A pre-hospital triage tool will ensure major trauma patients are conveyed directly by WAST or the Emergency Medical Retrieval and Transfer Service Cymru (EMRTS), or other emergency providers, to the MTC or TUs.
- An adults' and children's MTC at University Hospital of Wales (UHW), Cardiff. The MTC will have access to all specialist services relevant to major trauma. It will take responsibility for the acute care of all major trauma patients in the region via an automatic acceptance policy and manage the transition of patients to rehabilitative care. It will collaborate with and support other hospitals in the network.
- An adult and paediatric TU, with specialist services, at Morriston Hospital, Swansea. It will provide specialist support to the MTC and provide specialist surgery for patients who do not have multiple injuries, for burns, plastic, spinal and cardiothoracic surgery
- Six adult and paediatric TUs at the following locations:
    - UHW, Cardiff
    - Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (period until the Grange University Hospital is fully operational, planned for April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the Aneurin Bevan University Health Board)
    - Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend.
    - Glangwilli General Hospital, Carmarthen.
- The TUs will provide care for injured patients and have systems in place to rapidly move the most severely injured patients to hospitals that can manage their injuries, in most cases the MTC. They will have a role in receiving patients back who require ongoing care in hospital and will have a suitable 'landing pad' via an automatic acceptance policy
- Rural trauma facilities at Bronglais General Hospital, Aberystwyth, and Withybush General Hospital, Haverfordwest. Whilst there are no specific quality indicators for a rural trauma facility, Hywel Dda University Health Board is committed to ensuring these hospitals maintain the ability to assess and treat major trauma patients, given their relatively unique geographical locations
- A Local Emergency Hospital at Royal Glamorgan Hospital, Llantrisant. This hospital will not routinely receive acute trauma patients but, should this occur, it will ensure appropriate initial management and transfer to the MTC or nearest TU

As a consequence of opening the MTC, there will be changes in patient flow which will impact on all providing organisations across the health system. In order to plan for and manage these changes in flow, detailed modelling work has been undertaken to inform this business case and to ensure that the network plans to meet this new configuration.

1.7 Operational Delivery Network

The creation of the Operational Delivery Network (ODN), to be hosted by Swansea Bay University Health Board, is central to the development of the network. The ODN involves cross-organisation and multi-professional working through a whole system collaborative approach, ensuring the delivery of safe and effective services across the patient pathway. The role and responsibilities for the ODN are set out on in a service specification and quality indicators. To facilitate a phased implementation, these have been divided into 'essential', 'desirable' and 'aspirational'. It is essential that the ODN is established in advance of the network 'going live' in order to:

- Implement the clinical and operational framework and structure across the trauma pathway and work with all participating organisations to ensure a state of readiness for delivery of the network within agreed timelines
- Test clinical and non-clinical policies
- Ensure baseline TARN data collection is optimised
- Quality assure key components of the training and education programme
- Establish clinical informatics structures to allow appropriate data collection
- Oversee stakeholder communication and engagement

Key challenges for the network are anticipated as being maintenance of optimal patient flow between the MTC and the TUs and the inability to hold partner organisations to account. It will be essential that the ODN is provided with meaningful authority and this is provided through the design of the network governance structure, outlined in the management case.

1.8 Pre-hospital Care and Transfers

The Welsh Ambulance Service (WAST) is a critical enabler in the success of the South Wales Trauma Network. For the vast majority of patients who suffer major trauma, their first contact with NHS Wales will be with the ambulance service when they receive initial care at scene. The service will also play a critical role in taking patients either home following care in the secondary care setting or onwards for their specialist rehabilitation.

There are five quality indicators for pre-hospital care. Presently one is met, two are partially met and two are not met. All of these quality indicators will be met on Day 1. WAST has identified the following requirements to support the establishment of the network:

- Appropriate funding for the new and additional journeys its crews will be making
- Additional training for its staff
- The need for a major trauma desk within the Clinical Contact Centre, Cwmbran
- Resources to support a transfer and discharge service

For completeness and information, the case sets out the requirements for 24/7 availability of EMRTS in South Wales, aligned with the timeline for the network becoming operational. This development has been subject to a separate approval process and recruitment to posts has commenced.

1.9 Major Trauma Centre

The establishment of the MTC is pivotal to the development of the trauma network. The case for change identifies areas where investment will be required in order to deliver timely and improved quality of care. The investment required aligns to meeting national adult and children's MTC quality indicators and service specification and a predicted activity uplift of approximately 290 additional patients in year 1. Learning lessons from NHS England, the proposal requires some considerable frontloading, in order to demonstrate maximal benefit.

An analysis has been undertaken reviewing current Cardiff and Vale UHB services against the agreed national quality indicators for MTCs. There are 52 adult indicators and 46 children's indicators in total, with 20 key indicators not currently being met which form the basis of the required investment. The new investment will provide:

- Emergency Department – quality of immediate response and stabilisation from 24/7 consultant trauma team lead; dedicated nursing and seven day paediatric trauma team lead until 10pm.
- Theatres – additional theatre availability to improve timeliness of access to theatres.
- Critical Care – additional capacity to enable the predicted increase in demand.
- Poly Trauma Unit – dedicated ward for acute admission and early targeted rehabilitation in readiness for discharge to local care.
- Trauma & orthopaedics – additional surgical capacity to deliver increased activity flow.
- Hyper acute rehabilitation service – to provide early rehabilitation plans for trauma patients with intensive rehabilitation needs.
- Specialist services – new local plastic surgery availability on site to deliver improved outcomes particularly for debridement surgery and via joint operating. (Through collaboration with SBUHB).
- MTC directorate – senior leadership to drive improvements in rehabilitation, clinical practice and audit & outcomes via the Trauma Audit Research Network (TARN).

Furthermore, the existing arrangements and capacity for specialist rehabilitation at Rookwood Hospital and Neath Port Talbot Hospital will be maintained.

The MTC's role and responsibilities in relation to support and collaboration within the wider network are outlined below and will considerable value to the investment made by all health boards:

- **Clinical Advice & Leadership** - providing clinical advice to other providers within the network, including in pre-hospital stage and whilst patients are awaiting transfer to the MTC for definitive treatment or following acute care when the patient is discharged to on-going specialised or local rehabilitation services.
- **Training, Audit & Quality Improvement** – being actively engaged and contributing to the network, particularly in operational requirements, training, governance and audit, as part of an effective trauma Quality Improvement programme.
- **Rotational Posts & Joint Appointments** - ensuring the development of the MTC does not destabilise other health boards' services; aligned with the principles of workforce recruitment into the MTC.

- **Audit and Quality Improvement** - additional TARN coordinator roles will support the timely and quality entry of a large percentage of network data into the National Audit. This will be key for developing an audit programme for the MTC, in collaboration with the network.
- **Rehabilitation** - providing early/hyper acute rehabilitation as well as a managed transition to rehabilitation and the community. Key roles within this case such as the rehabilitation consultant, consultant AHP, lead therapist and nurse, and psychologists will integrate into the network to support wider programmes of quality improvement, training and education.
- **Collaboration with other Specialist Services** - there are a number of interdependent services and specialties required to work in partnership to deliver seamless and high quality care. In particular, services for major trauma patients with orthoplastic requirements will need close working between C&VUHB and SBUHB to ensure care delivered is to an excellent standard regardless of where the patient is treated.

1.10 Health Board Configuration

The structure of the trauma network will include TUs, LEHs and rural trauma facilities, as defined in section 1.6 above.

All TUs are already managing moderate and major trauma patients. In the trauma network, TUs will continue to provide initial assessment, imaging and treatment of trauma patients. They will also enhance existing systems to rapidly move the most severely injured to specialist centres that can manage injuries. In doing so, TUs will develop an effective quality improvement programme. By Day 1, all TUs will have undertaken the requisite level of medical and nursing training and education and embedded network policies within their systems. Organisational governance structures will have been established.

Major trauma practitioners and rehabilitation coordinators will be new roles in the health boards and will be vital in ensuring seamless care of major trauma patients and key points of contact for patients returning from specialist care to the TU or community. A consultant in rehabilitation medicine will operate in each health board on a weekly basis, playing a key role in coordinating the team, managing complex patients and facilitating discharge. Compared to NHS England, the network board have made a commitment to early enablers to improve the rehabilitation pathway, in keeping with the importance of improving functional outcome.

In years two and three, there will be further enhancement of local and community based rehabilitation including core therapy roles as well as some specialist roles (e.g. neuropsychology), providing both in-reach and outreach services.

For complex patients who return from specialist care (e.g. traumatic brain injury, spinal injuries), the network will develop a training and education programme for medical and nursing staff caring for these patients. Thus, the skill set of the rehabilitation multidisciplinary team based at the TU will be identical to the skill set of that based at the MTC.

There are 26 quality indicators for TUs; many are already being met or could be met through the provision of network policies and internal re-organisation of resources. Where additional resources are required, these will be introduced using a phased approach with the initial focus on key enabling posts to improve clinical governance, data collection and patient flow.

Within the network structure, there are two rural trauma facilities in West Wales which will need to maintain the ability to assess and manage major trauma patients. These facilities will be supported by:

- Trauma desk and network pre-hospital triage tool to guide decision-making
- Confirmation of 24/7 EMRTS availability, providing pre-hospital critical care and hyper-acute transfers
- Remote telemedicine to guide management of trauma teams in rural trauma facilities ahead of arrival of EMRTS
- An operational policy between the TU and rural trauma facilities, forming part of the network operational policy

The trauma unit at Morriston Hospital will also have a role in providing specialist services support to the network (e.g. orthoplastics, spinal surgery, level 1 rehabilitation). In addition the trauma unit in ABUHB provide a spinal service for some trauma patients.

1.11 Financial Case

The totality of the revenue and capital costs is set out below. The case for the MTC is front-loaded having learnt lessons from the implementation of networks in the rest of UK, which has reinforced the need to achieve quality indicators and service standards at an early stage. This will ensure the maximum benefit for the most seriously injured patients, the majority of whom will go to the MTC. However, there are some elements of the MTC case that are phased. The resource requirements for the TUs reflect a much more phased approach and subsequent business cases may be required (where appropriate) to meet service specification and quality indicators that cannot be met on Day 1.

Summary of Revenue Costs

	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
MTC Costs	£922	£10,579	£11,222	£11,222	£11,222
Specialist Services Costs	£150	£910	£910	£910	£910
Trauma Unit costs	£287	£1,278	£1,278	£1,278	£1,278
Operational Delivery Network Costs	£119	£496	£508	£513	£515
Pre-Hospital Care	£58	£1,201	£635	£640	£640
Total	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

The costs have been derived through an iterative process of reviewing the gap between commissioning expectations and provider costs.

The summary revenue contribution for each health board is outlined below:

Summary of funding of Trauma Network by Health Board					
Reflects local Trauma Unit / Rehabilitation costs plus share of Major Trauma Centre, Specialist Services and WAST Pre-hospital care					
	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
Aneurin Bevan	£353	£3,549	£3,571	£3,573	£3,574
Cwm Taf Morgannwg	£308	£2,743	£2,758	£2,759	£2,760
Cardiff and Vale	£247	£2,808	£2,826	£2,828	£2,829
Hywel Dda	£262	£2,462	£2,477	£2,479	£2,479
Powys	£27	£225	£226	£226	£226
Swansea Bay	£281	£2,678	£2,695	£2,696	£2,697
WAST (2019/20 funded by Welsh Government, year 1 onwards by Health Boards)	£58	£0	£0	£0	£0
Total NHS System Revenue	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

There are several factors which will impact on revenue costs and apportionment, including:

- Monitoring changes in RTA income during 2020/21 by health board
- Assessing the impact of the planned earlier repatriation of patients from the MTC to TU 'landing pads'
- Assessing and managing slippage
- Testing the assumption that capital charges will be funded by Welsh Government
- Further review of staffing plans for the MTC
- Monitoring operational efficiencies.

Capital costs will be met through the Welsh Government strategic capital route. Estate development and equipment has been identified by both Cardiff and Vale UHB and Hywel Dda UHB:

Programme Capital Requirements					
	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
MTC Cardiff & Vale (MTC Construction and Equipment)	£5,426				
Hywel Dda Trauma Unit (West Wales General)			£1,252		
Capital Total	**£5,426**	**£0**	**£1,252**	**£0**	**£0**

Future revenue and capital business cases will be prepared by the relevant organisations and a timetable is provided in chapter 9.

1.12 Economic Case

There is consistent national and international evidence indicating that the establishment of trauma networks is cost effective.

Within a mature trauma system, investment in the MTC in itself is cost-effective, with evidence of a five to 15 fold return on investment for each patient successfully returned to work. In terms of cost per life year saved, regionalised MTC care costs are cost-effective when compared with the provision of other medical interventions. A recent study from NHS England indicated that English trauma network have been cost effective, given that they are significantly under the NICE QALY threshold for cost effectiveness of £20,000. Based on the expected number of 'candidate' major trauma patients (2,112) across the entire South Wales Trauma Network, the investment is significantly below the NICE QALY threshold of £20,000 (£6,896 per additional QALY gained), comparable with the 2013 study from NHS England on cost effectiveness of trauma networks and with other interventions (e.g. hip and knee replacements).

In addition, approximately an extra 14 lives will be saved per year based on experience of enhanced survival in NHS England. For the given investment, this would equate to a cost of lives saved of approximately £17m per year. Thus, the service would pay for itself in terms of economic benefit.

Linked to cost effectiveness, value will come from realising benefits as outlined in a comprehensive benefits realisation plan. Whilst it is imperative that the network focuses on the key investment objectives of improving survival and functional outcomes, one of the areas that will be measured are the wider system benefits.

1.13 Commercial Case

The commercial case outlines the proposed procurement and capital requirements in respect of the preferred way forward. It should be noted that responsibility for the production, delivery and management of capital cases identified as part of this PBC will sit with the providing organisation but will need to be supported by the ODN and wider network.

1.14 Management Case

The management case sets out the actions required to ensure the successful delivery of the trauma network against the agreed investment objectives and timeline. To achieve this, it sets out the programme management arrangements and implementation plan. It gives details of the commissioning arrangements and considers how these will affect the organisational and clinical governance arrangements once the network is operational.

Since approval of the recommendations of the independent panel review by health boards in 2018, the programme and the development of this case has been overseen by the trauma network board, which is accountable to WHSSC Joint Committee.

The scope of the commissioning framework is summarised as;

- The ODN will oversee the delivery of trauma services to the population of South Wales, West Wales and South Powys.

- The ODN, Major Trauma Centre at University Hospital Wales and orthoplastic services at Morriston Hospital will be commissioned by WHSSC.
- The Emergency Ambulance Services Committee will commission WAST and the EMRTS.
- Health boards will be responsible for local commissioning.
- Existing trauma commissioning arrangements for Betsi Cadwaladr UHB will be retained.

As the network moves from its planning phase to implementation and operational delivery, hosting of the network will shift from the NHS Wales Health Collaborative to Swansea Bay UHB. A robust and methodological programme arrangement will continue to be applied, but the roles and representation across the programme will be amended as the focus moves from planning for implementation to mobilisation.

The operational governance structure will ensure clear lines of accountability and responsibility across the pathway in order to achieve the best possible outcomes and experience for patients. This will align with the network's mission statement of 'saving lives, improving outcomes, making a difference.'

Evaluation is an essential requirement and the ODN management team will manage the process in partnership with the lead commissioner (WHSSC) and will include participation in national peer review.

1.15 Summary and Recommendation

The network board has overseen the development of the structure of the network, comprised of the following elements:

- An Operational Delivery Network (ODN) hosted by Swansea Bay University Health Board
- Pre-hospital developments including WAST and 24/7 EMRTS
- An adult's and children's MTC at UHW, Cardiff
- An adult and paediatric TU with specialist services at Morriston Hospital, Swansea
- Six adult and paediatric TUs at the following locations:
    - UHW, Cardiff
    - Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (period until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the Aneurin Bevan University Health Board)
    - Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend
    - Glangwilli General Hospital, Carmarthen
- Rural trauma facilities at Bronglais General Hospital, Aberystwyth, and Withybush General Hospital, Haverfordwest
- A Local Emergency Hospital at Royal Glamorgan Hospital, Llantrisant

The network board has also developed a phased clinical and operational model, based on the NHS England quality indicators and service specification for major trauma services. All providers and relevant commissioning bodies have agreed this model and requisite resource requirements, following several tiers of internal and external reviews.

The case describes the delivery of absolute requirements for Day 1, but also the schedule of business cases that will follow as part of the phased introduction of the network. In doing so, the case also sets out a timeline for implementation of the network (and composite parts) on 1st April 2020, with the ODN management team being put into place in January 2020. Whilst this presents an ambitious timeline, the programme is committed to achieving this.

In order to manage implementation, the case describes a revised implementation structure, commissioning and organisational governance arrangements and workforce principles to maximise positive benefits of recruitment for the wider healthcare system. Finally, a focus is placed on giving the ODN operational authority, particularly in relation to the repatriation of patients from the MTC and maintaining patient flow across the network.

The network board recommends that health boards, commissioners and Welsh Government approve and endorse this Programme Business Case, the agreed structure and the requisite phased resource requirements for the establishment of the South Wales Trauma Network, serving the population of South Wales, West Wales and South Powys, so that it can proceed with implementation.

The programme team would like to thank all contributors for their time and advice in developing this complex and challenging Programme Business Case.

2 Strategic Case

2.1 Introduction

The purpose of this section is to explain how the scope of the proposed programme and investment aligns with national drivers, interdependent policies and the strategic vision for Wales. It also sets out how the programme supports and complements the existing business strategies of NHS Wales, local health boards (health boards), Welsh Ambulance Service NHS Trust (WAST), the Emergency Medical Retrieval and Transfer Service (EMRTS) Cymru, Welsh Government and NHS Wales as a whole. In doing so, it sets out the case for change, in terms of the existing and future operational needs of these organisations, pertaining to major trauma care.

In particular, this section of the Programme Business Case (PBC) demonstrates the strong links between policies, strategies and the drivers of joint working and how these can be used to deliver better trauma services, more efficiently for the people of South Wales, West Wales and South Powys.

The programme is also committed to delivering value for our patients, to provide the best patient outcomes through optimally directing our resources.

2.2 Strategic Context

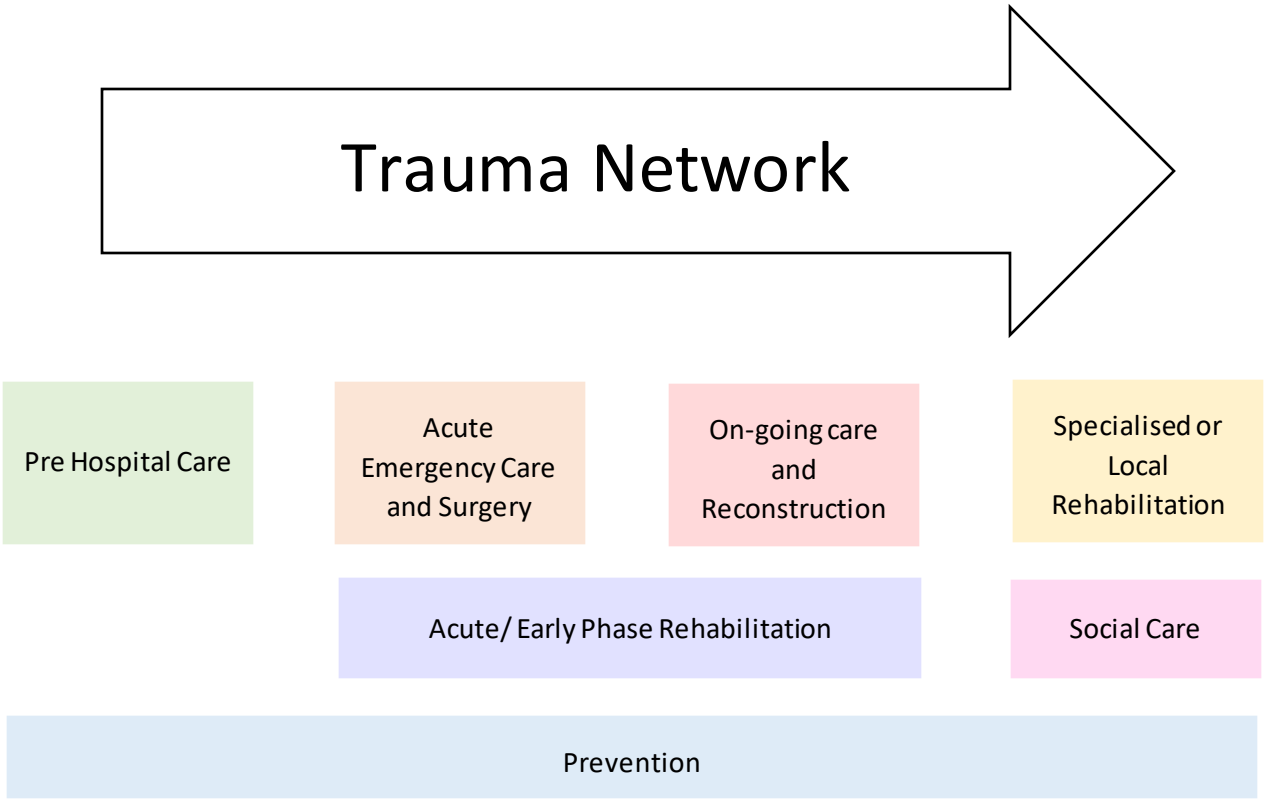
This section outlines the strategic context for the proposed change as follows:

- National drivers for change
- Key interdependent policies
- The local context – population and existing activity profiles
- An overview of the baseline position with respect to the trauma pathway

The vision for the establishment of a trauma network for the population of South Wales, West Wales and South Powys is to enhance patient outcomes and experience, across the entire patient pathway from the point of wounding to recovery and includes injury prevention. The network represents a partnership between participating organisations, each responsible for working collaboratively to achieve this common goal and purpose. The trauma network will improve patient outcomes by saving life and preventing avoidable disability, returning patients to their families, work and education.

A trauma network consists of a Major Trauma Centre (MTC), with a number of Trauma Units (TUs) and Local Emergency Hospitals (LEHs), and rehabilitation services. The trauma network ensures rapid transfer of patients who are most severely injured from the scene of an incident or other hospitals to the MTC, in order to benefit from timely and efficient specialist care. Care continues closer to home or in the community once specialist care is completed. Care closer to home is generally facilitated through rehabilitation. Indeed, the key to keeping the trauma pathway open is for specialist and local rehabilitation to be optimally organised and resourced, linking into continuing healthcare packages for patients who need them. Benefit for patients is realised across the network, not just in the MTC.

The trauma pathway consists of a number of component parts in the patient's journey, with the relationship between, and integrity of, component parts being critical to the successful delivery of the network. Each part has equal merit. This is summarised in the diagram overleaf.



2.3 National Drivers for Change

This section sets out the links between the proposed investment and key national drivers for change.

2.3.1 A Healthier Wales

A Healthier Wales (2018) sets out a long-term vision of a "whole system approach to health and social care". Underpinning this is the 'quadruple aim' of improving population health and wellbeing; better quality and more accessible health and social care service; higher value health and social care and a motivated and sustainable health and social care workforce. Thus, both Prudent Healthcare and Value-Based Healthcare principles underpin the plan. The development of the trauma network sits firmly within this strategic space, as it will deliver care in the right way and at the right time:

- A whole system approach with seamless coordination between health and social care – as reflected in the above trauma pathway
- An equitable system, which achieves the best health outcomes for all – equity of access to specialist care is an important investment objective for the trauma network
- Delivery of services as close to home as possible – this aligns with the requirements for a congruent health and social care model, so that once specialist care is complete, rehabilitation can be delivered within the community setting as soon as possible
- Using technology to support high quality, sustainable services – this is explored further in Chapter 5 on improving data collection on outcomes and experience

2.3.2 Strategic Drivers

The development of the trauma network aligns itself with a number of other strategic drivers specific to Wales:

- **NHS Wales Service Change Plans** – NHS Wales is undergoing a series of changes focusing on the reshaping of acute clinical services, with a view to changing the delivery of some services. This includes centralisation of specialist care (e.g. for patients who sustain cardiac arrests and regain a pulse), with the rationale of delivering improved clinical outcomes and ensure services remain sustainable in the face of challenges in the medical workforce. Each health

board will have its own clinical priorities. Specific examples include Hywel Dda University Health Board plans for Transforming Clinical Services and the development of The Grange University Hospital for specialist and clinical critical care services in Aneurin Bevan University Health Board (ABUHB).

- **National Programme for Unscheduled Care** – The aim of this programme is to redesign unscheduled care processes across the total patient journey and to alleviate pressure within the system including the National Collaborative Commissioning Unit's current programme of work in these areas (e.g. the Emergency Department Quality and Delivery Framework).

2.3.3 Trauma Specific National Drivers

There are a number of trauma specific national drivers relevant to the development of the trauma network, which will increasingly have an impact on the delivery of health services across Wales. The points below summarise these drivers:

- **National Reports** – the National Audit Office (2010) report on major trauma care in England and the *National Confidential Enquiry into Patient Outcome and Death* (2007) were key reports highlighting deficiencies in trauma care in the UK and resultant negative impact on survival and outcomes for patients suffering major trauma. These reports identified that services achieve better care and outcomes when formal trauma networks are in place.
- **Trauma Networks in the UK and Ireland** – based on the above, NHS England established regional trauma networks. In 2010, London introduced its pan-regional major trauma system, consisting of four trauma networks, each with an MTC. Following this, regional trauma networks were established in the rest of England, now consisting of 11 adult MTCs, 5 children's MTCs and 11 combined adult and children's MTCs. Delivery of these networks occurred simultaneously in April 2012 and have taken five years to develop and mature. In 2018, the Scottish Trauma Network was established, with four regional trauma networks and MTCs in Aberdeen and Dundee, as part of a phased five-year development. The Scottish Government is making an incremental new investment of £27 million per year into major trauma services. Furthermore, both Northern Ireland and the Republic of Ireland are making good progress with their respective developments.
- **Trauma Network in North Wales** – since 2012, North Wales has formed part of the North West Midlands and North Wales Trauma Network, with patients from TUs in Ysbyty Gwynedd, Ysbyty Glan Clwyd and Wrexham Maelor Hospital going to the MTC at Royal Stoke University Hospital.
- **Service Specification and Clinical Standards** – a hallmark report, NHS Clinical Advisory Groups (CAG) Report (2010) *Regional Networks for Major Trauma*, underpinned the development of the above networks, which provides detailed recommendations for the delivery of trauma services across the patient pathway. This report formed the basis of the NHS England service specification and quality standards. The North Wales service already aligns with the position set out in this report. Furthermore, there are number of evidence-based clinical guidelines that support the service specification (e.g. National Institute of Clinical Excellence *Trauma Guidelines* – 2018, British Society of Rehabilitation Medicine *Core Standards for Specialist Trauma Rehabilitation* – 2014).

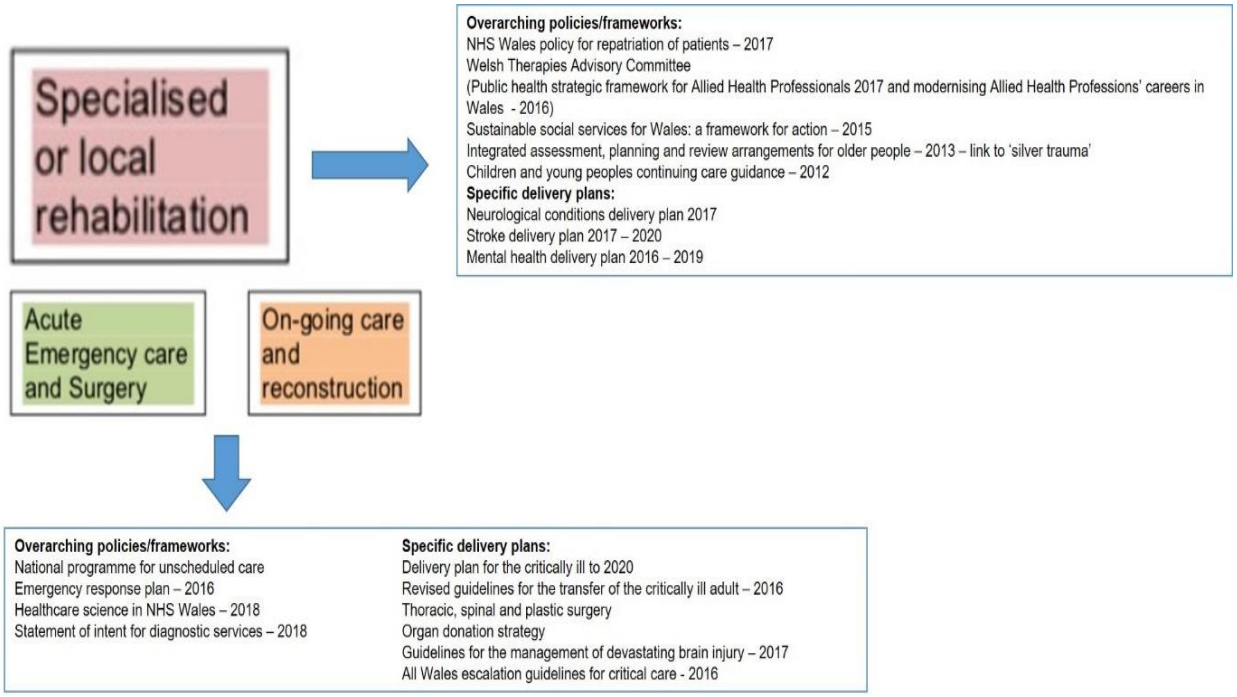
In March 2018, based on the above and the work undertaken since 2012 to develop a trauma network (see subsequent chapters for details), all six health boards covered by the proposed trauma network fully endorsed the recommendations of an independent expert panel review, which indicated that:

- A major trauma network for South and West Wales and South Powys with a clinical governance infrastructure should be quickly developed
- The adults and children's MTCs should be on the same site

- The MTC should be at University Hospital of Wales, Cardiff
- Morriston Hospital should become a large TU and should have a lead role for the major trauma network
- A clear and realistic timetable for putting the trauma network in place should be set

2.4 Key Interdependent Policies

There are a number of clinical and non-clinical polices developed and endorsed by Welsh Government that align with the development of the trauma network as shown below:



2.4.1 Critical Care

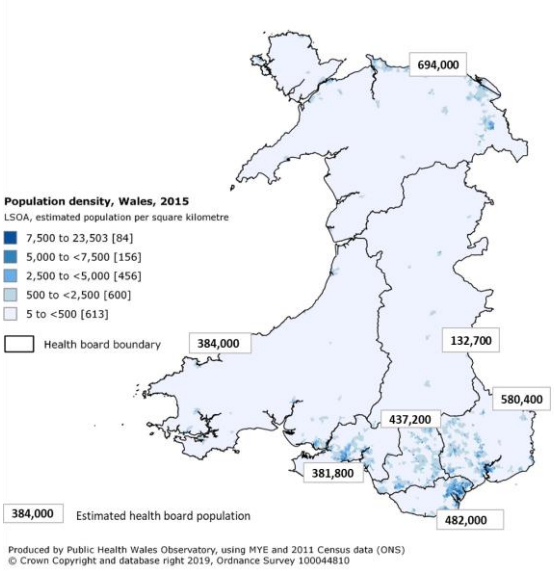
The Welsh Government *Critical Care Task and Finish Group Report*, published in July 2019, set out a national directed programme, which looks strategically at the issues and challenges for critical care services across Wales. The approach builds on the work already being taken forward with the implementation of the delivery plan for the critically ill. The report is honest about the challenges facing critical care, and provides a strategic view on the steps necessary to ensure services for people who are critically ill are fit for the future.

The report makes a number of recommendations that will benefit the establishment of the trauma network. These include the establishment of a non-emergency transfer service for critically ill adults, the development of a long-term ventilation unit, some additional critical care capacity within regional services as well as supporting the development of local services such as post-anaesthetic care units (PACU) and critical care outreach. This work will not replace the need for investment in critical care services, which are necessary for major trauma patients within the MTC.

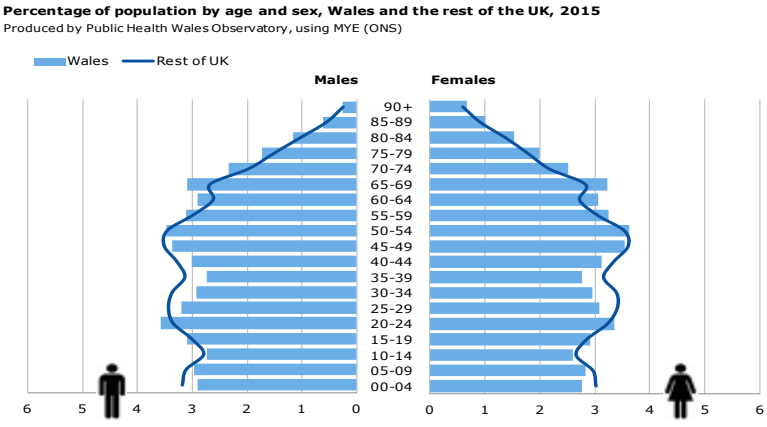
2.5 Population and Existing Activity Profiles

2.5.1 Population Profile

In 2015, the total population of Wales was approximately three million people, excluding transient populations. The population of South Wales, West Wales and South Powys was 2.4 million people. The map below shows population density and breakdown per health board (Note a boundary change took effect from April 2019):



The above graphic illustrates that the population of South Wales is concentrated in the densely populated urban areas of Cardiff, Newport and Swansea, with a spread across more sparsely populated rural areas. It is likely that major trauma would follow this distribution, being concentrated in more urban areas of higher population density.



The above figure demonstrates that Wales has a similar population structure to the rest of the UK, but with slightly more older people and fewer younger working age adults aged 25-50 years. Furthermore, the age structure of the population varies across South and West Wales, with Pembrokeshire, Monmouthshire and Swansea (in that order) demonstrating a higher proportion of older people compared to Cardiff. Moreover, in the last 10 years, the population of Wales has become older with a 54% increase predicted in the over 65s by 2036. This provides evidence for considering the design of the trauma network, taking into account the changing population.

Paediatric major trauma is most common in children under the age of one year, with this peak in incidence often being accounted for by non-accidental injury. Across all paediatric age groups, road

traffic collisions are the commonest mechanism of injury and head injuries are the predominant injury type. Severely injured children present mostly in daytime hours with a peak in the evenings and at weekends. Paediatric major trauma after midnight is rare. It should be recognised that a significant number of children with major trauma arrive at emergency departments by car and therefore may continue to attend their nearest hospital.

2.5.2 Existing Activity Profiles

Fewer than 0.1% (1/1000) patients who arrive at an emergency department will have major trauma. Based on the population of South Wales, West Wales and South Powys this equates to approximately 2,400 cases per year. In 2016, approximately 750,000 people attended an emergency department and the Welsh Ambulance Service attends approximately 800 emergency calls across Wales per day. Thus, major trauma represents a small proportion of the unscheduled care workload.

Furthermore, the incidence of paediatric major trauma is even lower. However, the face of major trauma is changing. Whilst the overall incidence of major trauma has not increased in the UK, the incidence of major trauma in older people greatly exceeds earlier predictions in NHS England. Rather than being something that afflicts young men, the majority suffering major trauma are now older than 65 years of age. This is likely to hold true for Wales, given the population profile described above.

The table below illustrates the expected number of cases per year modelled on the Trauma Audit Research Network (TARN) data reported for 2016-2017, using hospitals with good TARN data collection. The data is broken down according to Injury Severity Score (ISS) – see glossary of terms:

Site	Moderate Trauma ISS 9-15	Major Trauma ISS>15	'Candidate' Major Trauma Total
Morriston Hospital	227	147	374
Princess of Wales Hospital	91	59	150
Aneurin Bevan UHB	255	166	421
University Hospital Wales	181	335	516
Prince Charles Hospital	97	63	160
Royal Glamorgan Hospital	84	55	139
Bronglais General Hospital	41	27	68
Glangwili General Hospital	111	72	183
Withybush General Hospital	65	42	107
Total	**1,146**	**966**	**2,112**

Finally, a TARN report for the region from 2017-2018, demonstrated that falls from greater than two metres were the commonest mechanism of injury (56%), followed by road traffic collisions, falls from

less than two metres and penetrating trauma (e.g. shootings and stabbings). Falls from less than two metres demonstrate no seasonal variation whilst the peak time for road traffic collisions/falls from height appears to be between 3pm-6pm, with the lowest period of activity between 12am-6am.

2.6 Overview of the Current Position – The Trauma Pathway

Currently there is no adult and paediatric trauma network serving the population of South Wales, West Wales and South Powys. Whilst there are examples of good clinical and operational governance within participating organisations, there is no oversight of strategic planning, operational delivery, local advice, maintaining quality and standards of care and partnership development. NHS organisations in South Wales, West Wales and South Powys have undertaken the following to assess the value gap and level of confidence in the existing trauma pathway.

2.6.2 Pre-hospital Care and Secondary Transfers

Welsh Ambulance Service NHS Trust (WAST)

The main provider of pre-hospital care and secondary transfers for major trauma patients is WAST, which is commissioned by the Emergency Ambulance Services Committee (EASC). However WAST is supported by a number of organisations including the Emergency Medical Retrieval and Transfer Service (EMRTS) Cymru, health boards, the Critical Care Network, paediatric retrieval services and third sector organisations.

As part of WAST's quality strategy (2016-2019) there have been a number of advances with respect to trauma management, including improvements in guidelines, equipment, and administration of Tranexamic acid. In 2015, WAST introduced a new clinical response model to identify those patients who require an immediate life-saving response, to receive the highest priority response in the fastest time possible, which was evaluated as part of the Amber Review in 2018.

Presently, a number of patients are taken by WAST directly to specialist units. This includes patients suffering from an ST elevation myocardial infarction (heart attack) and cerebrovascular accident (stroke). However, in the absence of pre-hospital enhanced care, ambulance crews take many patients suffering major trauma to the nearest emergency department (ED), rather than directly to specialist definitive care. Whilst a pre-alert process exists for informing EDs about critically injured patients, this is not consistently undertaken and delivered across the regions. There is also variation in the handover of these patients on arrival at the ED.

Emergency Medical Retrieval and Transfer Service (EMRTS) Cymru

In April 2015, EMRTS went live from its South and Mid Wales bases. EMRTS represents a collaboration between NHS Wales and the Wales Air Ambulance Charity Trust (WAACT). The service is hosted by Swansea Bay University Health Board and commissioned by the Emergency Ambulance Services Committee (EASC). It is a consultant led, consultant delivered, road and air based service providing the following:

- Pre-hospital critical care for all age groups (advanced airway management and anaesthesia, surgical interventions and advanced haemorrhage control including blood products).
- Time critical adult and paediatric inter-hospital transfers.
- Coordination of above and provision of advice to WAST through a National Air Support Desk staffed by an EMRTS Critical Care Practitioner (CCP) and allocator, with remote support by a 'Top Cover' consultant.

The above has allowed enhanced decision-making for major trauma patients to bypass their local hospital and be taken directly to specialist centres at University Hospital of Wales, Cardiff and Morriston Hospital, Swansea. The service has robust operational and clinical governance in place and

a number of best practice Standard Operating Procedures related to major trauma. Major trauma represents approximately half of the service's workload.

In 2017, the service expanded to include North Wales. In addition, the WAACT provided a charity funded service from Cardiff Heliport for Paediatric/Neonatal retrieval teams and long distance repatriations.

The EMRTS is currently only a 12 hour service (8am-8pm). Outside of these hours, voluntary organisations (including. BASICS schemes in South and Mid Wales) provide a doctor at the scene on an ad hoc basis to provide a variable level of care for major trauma patients outside standard ambulance service practice.

The service is undergoing a phased temporal and geographical expansion as part of the ongoing programme of service development. The first phase of this expansion will be the introduction of a South Wales overnight service with effect from April 2020. (See chapter 6)

Third Sector and Commercial Organisations

For the provision of extrication and initial management of trauma patients in austere environments, there are six Mountain Rescue services and several Royal National Lifeboat Institute Coastguard services. In addition WAST provides a tier of volunteer Community First Responder, who will frequently be first on scene at an incident.

Since 2015, Bristow has run commercial helicopter operations from Caernarfon airport and RAF St Athan in Cardiff, providing Search and Rescue services. The service is principally for rescue and recovery, but will frequently take patients to nearest accessible Emergency Department. Requests from health boards for support with transfers, regardless of urgency, are not guaranteed to be undertaken and are chargeable. In recent years, the service has developed a close working relationship with WAST and EMRTS.

Adult and Paediatric Critical Care Transfers

In the absence of the EMRTS, health boards are required to undertake adult critical care transfers for patients that require definitive care in specialist centres, using WAST to access an ambulance. These transfers are overseen by the Wales Critical Care and Trauma Network (principally it is a trauma network due to the already-established Trauma service for North Wales), who provide oversight of clinical and operational governance. Health boards also perform time-critical paediatric transfers in the absence of the EMRTS. In addition, the Wales and West Acute Transport for Children Service (WATCh), based in Bristol undertake paediatric critical care transfers that do not require immediate onward transfer.

2.6.3 Acute Emergency Care and Surgery

Overview of Provision

There are six health boards covering the region of South Wales, West Wales and South Powys. Across the region, 10 emergency departments currently receive major trauma patients. Variation exists in the seniority of trauma team leaders and the threshold for activation of trauma teams. The composition of trauma teams also differs, but all hospitals have access to anaesthetists, intensive care physicians, general surgeons and trauma and orthopaedic surgeons. The rapid availability of blood products is achieved through activation of hospital massive transfusion protocols. There is also access to CT scanning, emergency theatres and intensive care, but variable access to MRI scanning.

Historically, University Hospital of Wales (UHW) and Morriston Hospital have been the main centres for receiving major trauma patients in the regions.

University Hospital of Wales (UHW), Cardiff

UHW (Cardiff and Vale University Health Board – C&VUHB) has established a major trauma directorate, which since 2016 has been overseeing the development of a cohesive plan for a high quality trauma

service for patients. Activities have included establishing major trauma service models, clinical governance, training, patient experience, pathways and protocols. So far, this has been overseen by a clinical lead and deputy lead, trauma manager and two major trauma practitioners.

Patients arrive by road or by air (at a co-located 24 hour lit helipad) and receive treatment in the emergency unit. The unit has the following features: a seven bedded resuscitation room including a dedicated paediatric bay equipped with advanced airway equipment; ultrasound; rapid blood transfusers; and a co-located CT scanner allowing selected patients to be transferred direct to the scanner by the EMRTS. There is a tier of consultants in emergency medicine and paediatric emergency medicine, supported by a multidisciplinary team.

Radiology is supported by 24-hour access to interventional radiology following the centralisation of vascular surgery in South East Wales and 24 hour access to MRI scanning. UHW also has two 24 hour emergency theatres and a trauma and orthopaedic theatre. Several surgeons currently have a specific interest in trauma surgery.

In addition to the services outlined above, UHW provides the following specialties pertaining to emergency trauma surgery:

- Neurosciences – 10 neurosurgeons provide the single adult and paediatric neurosurgery unit for the region, including two neurosurgical theatres.
- Cardiothoracic surgery – the service is delivered by five cardiac and three thoracic surgeons. The service includes repair of blunt and penetrating injuries, aortic injuries (including endovascular repair) and rib fixations. There are three dedicated cardi othoracic theatres.
- Welsh Centre for Spinal Trauma and Surgery – provided by seven spinal surgeons with access to emergency and trauma and orthopaedic theatres.
- Vascular/endovascular Surgery.
- Oral and maxillofacial surgery, urology, ENT surgery and obstetrics.

In addition to the above the trauma and orthopaedic unit provides specialist care for patients with pelvic and acetabular trauma and complex extremity trauma. However, there is no dedicated plastic surgery service.

UHW is host to the Noah's Ark Children's Hospital for Wales, which includes a paediatric intensive care unit, neonatal intensive care unit, general paediatric medicine, specialist paediatric medicine, paediatric surgery, paediatric trauma and orthopaedics, children's theatres and children's x-ray department.

Morriston Hospital, Swansea

Morriston Hospital (Swansea Bay University Health Board - SBUHB) has an emergency department with a five-bedded resuscitation room, with patients arriving by road and by air at a 24 hour lit helipad. In addition to the services outlined above, Morriston Hospital provides the following specialties pertaining to trauma surgery:

- Welsh Centre for Burns and Plastic Surgery – the centre provides tertiary care for plastic surgery for South Wales, West Wales and South Powys. Adult burns care is provided for both South Wales and South West England. The service consists of dedicated burns and plastics theatres and an intensive care unit, led by specialist multidisciplinary teams. This forms part of the regional Burns Network for adults, with transfer of paediatric major burns to the Bristol Children's Hospitals.
- Cardiothoracic surgery – five cardiac surgeons and two thoracic surgeons. Following a recent independent review of thoracic surgery in 2017 and a public consultation process, Health Boards have recommended a single thoracic centre at Morriston Hospital.

- Trauma and orthopaedics – one consultant with an interest in orthoplastic surgery, pelvic surgery, complex extremity surgery and rib fixations.
- Spinal surgery – three spinal surgeons provides urgent but not emergency spinal surgery for trauma.
- Oral and maxillofacial surgery, urology and ENT surgery.

All Other Health Boards

The following hospitals currently provide acute emergency and predominantly non-specialised surgery for major trauma patients:

- Aneurin Bevan University Health Board (ABUHB) – The Royal Gwent Hospital, Newport (with some urgent pelvic and spinal surgery) and Nevill Hall Hospital, Abergavenny. This is pending the opening of The Grange University Hospital in Cwmbran (Spring 2021) which will result in a single acute hospital site within the health board.
- Cwm Taf Morgannwg University Health Board (CTMUHB) – Prince Charles Hospital, Merthyr Tydfil, Princess of Wales Hospital, Bridgend (following Health Board boundary changes in April 2019) and Royal Glamorgan Hospital, Llantrisant.
- Hywel Dda University Health Board (HDUHB) – Glangwili General Hospital, Carmarthen, Withybush General Hospital, Haverfordwest and Bronglais General Hospital, Aberystwyth.

Of note, Powys Teaching Health Board (PTHB) does not have an acute hospital. In the absence of the EMRTS, WAST conveys major trauma patients in South Powys to Bronglais General Hospital, Prince Charles Hospital, Nevill Hall Hospital and Hereford County Hospital (which is a TU).

All health boards include a number of minor injury units to which major trauma patients may infrequently self-present, but are rapidly transferred to the one of the above hospitals.

All health boards have the ability to transfer radiology images using the PACS (Picture Archiving and Communications Systems).

Major Incidents

WAST is a 'Category 1 responder' under the auspices of the Civil Contingencies Act 2004, with responsibilities at a major incident or mass casualty event for co-ordinating health resources, casualty triage, treatment, and casualty removal from scene. Augmenting this responsibility is a tiered response from the EMRTS and hospital based MERIT teams. All health boards have emergency planners and hospital major incident plans in place. Strategically, there is a national framework in place for mass casualty events including capacity planning in the event of a major incident.

2.6.4 On-going Care and Reconstruction

Intensive Care Medicine

All of the hospitals proposed for MTC, TU or LEH status have intensive care units providing Level 2 (high dependency) and Level 3 (intensive care) ongoing care for major trauma patients.

UHW has a 33-bedded adult intensive care unit supporting a number of regional trauma tertiary services including neurocritical care, spinal injuries, oral and maxillofacial surgery, vascular, and thoracic Surgery. It has the presence of consultants delivering a 24 hour resident service. It has recurrent funding to staff 28 Level 3 beds. In addition, UHW has a dedicated cardiac intensive care unit and paediatric intensive care unit.

Morriston Hospital has a 22-bedded adult intensive care unit, a cardiac intensive care unit and an adult burns intensive care unit.

Surgery and Ward Care

Presently, UHW provides regional neurosciences services including an 18 bedded high care ward with a further 35 general neurosurgical beds. Facilities also exist for the management of craniofacial trauma spinal trauma and hand surgery.

In the present system, patients who require definitive surgery for orthoplastic trauma are transferred to Morriston Hospital, which has facilities for managing complex orthoplastic surgery, peripheral nerve injuries, and hand injuries. Specialist burns management is also provided.

None of the receiving health boards has dedicated trauma services that directly admit major trauma patients. Currently, patients are admitted under the speciality that covers the predominant injury or the one requiring operative intervention. Whilst all health boards have orthogeriatric input into the care of patients with neck of femur fractures, there is variable input into the care of older major trauma patients.

Repatriation ('Care Closer to Home')

An NHS Wales policy, endorsed by all health boards, outlines the process for repatriating individual patients for 'care closer to home' once specialist care is complete. This consists of an operational process, escalation procedures and the requirements to complete a repatriation database including delayed transfer of care.

WAST undertakes transfers of patients from specialist care to their local hospital including use of the Non-Emergency Patient Transfer Service (NEPTS).

2.6.5 Rehabilitation

The Welsh Health Specialist Services Committee (WHSSC) commissions adult and paediatric rehabilitation for spinal injury, brain injury and paediatric rehabilitation and health boards provide services for older people and for musculoskeletal rehabilitation. WHSSC commissioned services provide equitable access across the geographical region covered by the planned trauma network. The services provided by the health boards are varied and there is no current agreed service model.

WHSSC commissions 26 spinal injury beds and 22 acquired brain injury beds based at Rookwood Hospital in Cardiff. Both teams provide a weekly in-reach service to review acute referrals and provide advice to the University Hospital of Wales. Both teams review approximately three times the number of individuals than they admit to their beds. There is provision at Llandough Hospital for managing individuals with spinal injury requiring ventilation, but this is not a formally commissioned service.

There are 12 acquired brain injury beds at Neath Port Talbot hospital. These beds would be defined as a Level 1 unit by the English definition of rehabilitation services: serving a population of over a million people and led by a consultant in rehabilitation medicine. There are no English definition Level 2 units commissioned by WHSSC or the health boards. Community services are patchy, with no agreed model and centre on brain injury provision. The region currently has consultants in adult rehabilitation medicine, supported by neurology consultants and a senior speciality doctor. There is one rehabilitation medicine trainee in Wales based at Rookwood Hospital, rotational neurology trainees and three junior posts at Rookwood Hospital.

There are community neurological rehabilitation teams in all of the health boards but there are no common referral criteria or service models. There is a community brain injury service in C&VUHB, CTUHB and SBUHB, but again with different service models and referral criteria.

The paediatric rehabilitation commissioned at the Children's Hospital for Wales provides inpatient rehabilitation. This Phase 1 provision has avoided the need for external specialist placements (e.g. Tadworth) but the resources do not allow formal outreach services provision to the other health boards. There is no Certificate of Completion of Training (CCT) in paediatric rehabilitation and a paediatric neurologist with an interest in this area leads the team.

With respect to psychology and neuropsychology for adult and paediatric patients that experience major trauma, there is a variable and complex provision across the region, which is complex. In C&VUHB, patients with spinal injuries have access to inpatient psychological support at Rookwood Hospital or during their care in Intensive Care, but not on the spinal ward or in the community. This also applies to patients who go to SBUHB, there is a community traumatic brain injury service with a one whole time equivalent (WTE) clinical psychologist and the same in HDUHB. There are no acute or in-reach neuropsychological assessments or treatment in the health board.

A number of third sector organisations work alongside the healthcare sector (e.g. Headway).

Trauma Prevention Programmes

In Wales, prevention programmes are led through Public Health Wales. In 2011, a report by Public Health Wales was published on the burden of injury in Wales and outlined a series of recommendations. The main interventions that have occurred are in relation to preventing falls in older patients.

2.6.6 Clinical and Operational Governance

Training and Education

There have been a number of improvements in the awareness of trauma management by WAST, predominantly through local educational initiatives and EMRTS engagement events. In relation to acute emergency care, each health board has developed its own approach to trauma training. In 2012, Morriston Hospital established the Trauma Resuscitation Education and Training Sessions (TREATS) for a multidisciplinary audience. TREATS has now been adopted by Hywel Dda University Health Board. UHW runs an equivalent course (titled the Cardiff Trauma Course). A number of locally run courses exist for trauma team leader training and emergency trauma anaesthesia. In addition to this, all health boards are providers for and/or have access to the Advanced Trauma Life Support Course (ATLS), Advanced Paediatric Trauma Life Support (APLS) or the European Paediatric Life Support Course (EPALS). There are no providers of the European Trauma Course (ETC) in the region. Some senior nurses across the network have attended the Trauma Nursing Core Course (TNCC). In addition, there is senior nursing representation on the National Major Trauma Nurses Group, which informs standards and competencies for nurses across trauma networks. Finally, training in Damage Control Surgery is outsourced to the Definitive Surgical Trauma Skills (DSTS) Course.

In 2018, Health Education and Improvement Wales (HEIW) was established as a new special health authority in Wales, bringing together the Wales Deanery, NHS Wales' Workforce Education and Development Services (WEDS) and the Wales Centre for Pharmacy Professional Education (WCPPE). There is a material link with supporting the development of trauma training and education across the network.

Trauma Audit and Research Network (TARN) and Research

TARN is the national clinical audit for traumatic injury across England, Wales, Ireland and a number of hospitals across Europe. It holds the second largest global trauma registry and has become a key national provider for the delivery of evidence of quality of trauma care for both clinical and commissioning purposes, providing and supporting the functionality for hospitals to collect individual patient data. TARN delivers information in the form of national clinical reports and dashboards to support hospitals in their governance of trauma care. Its data has been the driver for commissioning of trauma services in England and is hosted by Manchester University.

Five health boards across the region contribute to TARN, but case ascertainment and accreditation within health boards varies considerably. One health board contributes to TARN Patient Reported Outcome Measures (PROMS) and Patient Related Experience Measures (PREMS). Two health boards have dedicated TARN coordinators (hosted by clinical audit departments) to identify cases and submit

entries to TARN. All participating health boards have non-dedicated support for data collection (e.g. clinicians).

There are a number of opportunities for research in the area of trauma management across the region and examples from both UHW and Morriston Hospital (incl. the Welsh Centre for Emergency Medicine Research). Furthermore, Swansea University has a long history of supporting trauma research at an international level through the Secure Anonymised Information Linkage (SAIL) database.

Clinical Informatics

Currently, clinical informatics support for the various stages of the patient pathway is provided by health board informatics departments, WAST and the NHS Wales Informatics Service (NWIS). Whilst much progress has been made at a national level to create a single integrated patient record accessible through the Welsh Clinical Portal (WCP), there exists a number of opportunities to further enhance the linkage and transfer of information between care providers. WAST and EMRTS maintain pre-hospital records, and these are available in both paper and electronic form. Health boards maintain a combination of paper based and electronic records. Local informatics departments support the work of those who collect TARN data locally by producing reports of potential major trauma patients facilitating access to results of investigations and tracking of patient notes. The current process is labour intensive, but could be improved through the linkage and improved use of routinely collected data.

WAST and the EMRTS already work together to improve the data quality feeding of national audits (e.g. National Cardiac Arrest Registry), and are both working to improve accessibility to patient data to improve healthcare delivery across the range of patients seen (e.g. ongoing national WCP trials). As already mentioned, one health board already collects PROMS for TARN, in addition to existing PROMS data collection by EMRTS as part of its ongoing service evaluation.

A number of systems currently support patients who suffer from major trauma at various stages in their patient journey. These include: MIS C3 Ambulance control system; WAST Anoto e-Pen system; EMRTS Clinical database; Emergency department systems; Welsh Care Records Service (WCRS); Welsh Clinical Portal (WCP) Welsh Patient Referral Service (WPRS); Welsh Results Reports Service (WRRS); Welsh Patient Administration System (WPAS); Welsh GP Record; and TARN data collection system.

3 Case for Change

3.1 Introduction

This chapter sets out a comprehensive case for establishing a trauma network for the population of South Wales, West Wales and South Powys. It should be recognised that major trauma patients are already being managed across our healthcare system including in specialist centres; therefore, the development of a trauma network represents a significant service change, but not a new service development. Thus, the programme has been developed based on strengthening existing clinical services through re-organisation, introducing new pathways and enhancing clinical and operational governance. Furthermore, requirements for additional resources have been considered within the context of enhancing existing service specifications to meet national standards for major trauma.

Building on the current position described in chapter two, details are provided on the difficulties and service gaps associated with existing organisations against the trauma pathway, compared to what is occurring in regions with established trauma networks.

Furthermore, key benefits are identified using an evidence-based approach and lessons learnt from both national and international experience. An emphasis is placed on the added value of developing a trauma network to wider NHS clinical services. In doing so, this chapter makes a strong case for benefits being realised, against the key investment objectives outlined below, to ensure NHS Wales leads the way in the provision of excellent trauma care through establishing the network.

Finally, this chapter describes the value to individual organisations and how the network development aligns with their strategic plans.

3.2 Investment Objectives

The overarching investment objective of a trauma network for the population of South Wales, West Wales and South Powys can be summarised by the network's mission statement:

'Saving Lives, Improving Outcomes, Making a Difference'

Furthermore, key investment objectives defined by Welsh Government are referenced throughout this business case with added value that could be delivered. These include:

- **Health gain**: improving patient experience and outcomes.
- **Equity**: where people of highest health needs are targeted first.
- **Clinical and skills sustainability**: reducing service and workforce vulnerabilities and demonstrating solutions that are flexible and robust to a range of future scenarios.
- **Value for money**: demonstrating the least costly way of generating the anticipated benefits.
- **Affordability**: given the revenue assumptions, there should be an explicit reference to reducing revenue costs. This will be discussed in section chapter 10 – the economic case.

During the development of the programme, the network board recognised the importance of all of the above investment objectives, however, health gain for the population was deemed most important and aligns with the mission statement of the network.

A fundamental rationale is to improve patient outcomes through organising services into a trauma network and enhancing services through a phased investment and working towards meeting national standards. The table below summarises these benefits against key investment objectives which are expanded on in this chapter, chapter 12 and evidenced by a recent literature review focused on the value of major trauma networks (see Appendix 1):

Investment objective	Benefits
Health gain	Improving survival Improving functional outcomes Improving timely clinical care and patient experience Improving data collection Enhancing response at major incidents or mass casualty events Enhancing injury prevention
Equity	Enhancing access to specialist care Enhancing patient flow System wide improvements in care Equity of care for trauma in older people Veterans trauma network
Clinical and skills sustainability	Enhancing multiprofessional training and education Enhancing recruitment and retention of workforce Developing of new roles and ways of working
Value for money	Economic benefits Savings across the system Value to other patient groups and networks

3.3 Summary of Service Opportunities

Following on from the key investment objectives, the intention of the programme is to establish a model of care, using a phased approach, aligned with quality indicators and service specification. These are summarised below and developed further in chapters five - eight:

- There is an opportunity for new investment in major trauma services in South Wales, West Wales and South Powys to clearly improve the outcomes in major trauma.
- In doing so, there is an opportunity to develop an adult and paediatric trauma network covering the region of South Wales, West Wales and South Powys.
- There will be a designated adult and/or paediatric MTC to serve the region of South Wales, West Wales and South Powys.
- There is an opportunity to implement and develop designated regional TUs to serve the region of South Wales, West Wales and South Powys.
- Consistent clinical standards and specifications will be put into place for the management of seriously injured patients across the region. Furthermore, there will be a network management structure overseeing how care is being coordinated or provided.

- WAST will be able to develop and utilise a pre-hospital trauma triage tool to identify patients requiring specialist centres. The opportunity to develop a trauma desk facility will enable coordination and remote clinical incident support.
- The EMRTS will become a 24 hour service in April 2020 as part of its phased development. There will be dedicated access to pre-hospital critical care or transfer capability for major trauma patients.
- There will be a single point of access and an automatic acceptance policy into specialist centres in the region. Referrals have previously been often made to multiple teams in the receiving centres for those patients requiring hyper-acute transfers. The development of the network will directly avoid delays in access to treatment.
- Pathways for patients requiring urgent transfer for injuries that require operative intervention in specialist centres will be developed.
- The network will ensure there is an end to variation in seniority of trauma team leaders and the composition of hospital trauma teams across the region, responsible for reception and resuscitation.
- Specialist centres will be able to guarantee the presence of a consultant trauma team leader 24 hour a day. Furthermore, there can be consistency in initial and ongoing clinical assessment and treatment, imaging and documentation. In particular, systems can be established to recognise and manage trauma in older people.
- There is an opportunity to eliminate the variation in the anaesthetic and surgical approach to managing trauma patients with significant haemorrhage.
- There is an opportunity for specialist centres to have major trauma service or ward under which patients are admitted and managed. This will be addressed with the network approach to major trauma. Currently, patients are often admitted under several specialties.
- There is an opportunity to improve access to hyper-acute rehabilitation and develop an early rehabilitation plan for trauma patients.
- Patients will have better and more rapid access to specialist neuro and spinal rehabilitation than they currently do. There will be automatic repatriation of trauma patients from specialist centres to their local hospital or coordination across health boards.
- Hospital and community rehabilitation services will be configured to support recovery, rehabilitation and re-enablement of trauma patients.
- There is the opportunity to develop consistent and robust clinical and operational governance processes (including training and education) in place and improve sharing of learning from clinical issues is variable.
- There will be full participation from the health boards in TARN. TARN data entry relies on retrospective review of case notes following clinical coding which has and investment in this function will provide alleviation of stretched clinical audit staff.
- There will be 'live' identification of patients at all points of the pathway. Data can then be routinely shared between health boards even when the patient crosses these multiple boundaries
- There will be a more uniform approach to incident reporting systems and an opportunity to remedy the issue of data being manually shared when an incident crosses over multiple organisations.

- There will be development of a mechanism to conduct multi-disciplinary trauma quality improvement in either the specialist centres or other hospitals and a regional quality improvement structure to address issue that cross between providers.
- There will be development of a mechanism to ensure that innovation in trauma care is fostered in the region and to ensure that innovations adopted by one provider is compatible with systems of care in other providers who may treat the same patient.

3.4 Health Gain

3.4.1 Improving Survival

The following case illustrates the current situation in South Wales, West Wales and South Powys (no patient identifiable information to maintain confidentiality):

> A young male was assaulted late at night in a rural part of Wales. He sustained a significant head injury and was unconscious at the scene. A paramedic ambulance was deployed and the patient was taken to the local acute hospital. On arrival in the emergency department, his windpipe was obstructed and his oxygen levels were very low. A junior emergency department doctor and anaesthetist managed him and after some delay, the patient was transferred to the CT scanner.
>
> A CT scan demonstrated an extensive bleed with pressure on the brain and a significant chest injury. After delays in a referral being accepted, the hospital transfer team transferred the patient to the nearest neurosurgical facility eight hours after the injury. Unfortunately, he deteriorated *en route* and, despite emergency neurosurgery, had a poor outcome.

There is a significant body of evidence that demonstrates that patients who suffer major trauma and are treated within a trauma network generally have better outcomes and a greater chance of survival. Evidence shows that severely injured patients are 15%-20% more likely to survive their injuries if they are admitted to an MTC (Celso *et al*, 2006). MTCs have 24 hour access to consultant trauma team leaders, available on arrival of the patient in the emergency department with rapid coordination of initial assessment, resuscitation and imaging. All key surgical specialties are available, performing multidisciplinary management of patients and provision is made for these patients to receive early operative management and ongoing surgery. Patients are also cared for under the umbrella of the major trauma service, with multidisciplinary input. It is difficult to isolate which part of the MTC system contributes most to improvements in survival.

Improvements in survival have been substantiated by a large national longitudinal study of 110,863 patients using the TARN dataset, which demonstrated that in the first five years after the launch of the English trauma networks, there has been a significant (19%) improvement in survival for patients alive on arrival at hospital, with 1,656 more survivors than would be expected based on historical performance (Moran *et a*l, 2018). This is ahead of the target of 450-600 additional survivors that NHS England predicted. Scaling these results to the relevant population, an estimated 70 additional trauma patients over five years would survive in South Wales, West Wales and South Powys if the trauma network were implemented.

This benefit was conferred across trauma networks and not just in the MTCs, as a significant proportion of major trauma patients continue to be appropriately managed locally. Furthermore, the trend towards improving survival is consistent with international studies (e.g. McDermott *et al*, 2007 and Gabbe *et al*, 2011).

Locally, the picture has been similar for North Wales with patients being treated at the MTC in Royal Stoke University Hospital; approximately 900 patients were transferred to the MTC since 2013, with 18 more survivors from major trauma than expected.

Therefore, evidence indicates that patients in South Wales, West Wales and South Powys are set to benefit from improvements in survival from major trauma through the establishment of a network. It can be concluded that more patients are currently dying compared to other regions in the UK that have trauma networks in place, including North Wales.

As illustrated in the one-year evaluation of the EMRTS (2016), there is an intrinsic relationship between pre-hospital critical care and acute hospital care in improving health gain for trauma patients, strengthened further in the presence of a trauma network. The EMRTS has made significant progress in demonstrating the benefit of early critical care interventions at the scene of the incident, transfer of more trauma patients to definitive specialist care and setting patients on the correct trajectory (e.g. taking patients direct to CT imaging at UHW). Furthermore, international evidence indicates improvements in survival of major trauma patients taken to MTCs by physician-led Helicopter Emergency Medical Services compared to paramedic-led transfer (Engel *et al*, 2010). However, the full benefit of the EMRTS will only be realised within the context of an integrated trauma system.

3.4.2 Improving Functional Outcomes

The following cases illustrate the current situation in South Wales, West Wales and South Powys (no patient identifiable information to maintain confidentiality):

> A young boy was a pedestrian in a road traffic collision and sustained a severe traumatic brain injury. He had a protracted stay in hospital, followed by specialist neuro-rehabilitation. His mother described his acute care and specialist rehabilitation as excellent, but on discharge home there was a lack of appropriate discharge planning and awareness of her son's acquired brain injury. There was a lack of consideration given to adaptations at home, integration back into education and long-term rehabilitation. Furthermore, there was a lack of support for the mother as his main carer.
>
> Whilst the boy's mother managed to cope due to good family support, she fears others may not cope if placed in a similar situation.

> A 20 year old female had a fall from a significant height and sustained a severe traumatic brain injury and multiple fractures. She was admitted for emergency neurosurgery and spent several weeks in the specialist centre before being discharged. She was promised ongoing rehabilitation but nothing materialised. The patient was left with no hearing in the left ear, left sided weakness and severe hip pain. It took 26 calls over 6 weeks to arrange follow-up for these problems. The patient felt that she had been forgotten about once she left the specialist centre and believes that this had an impact on her ability to return to work sooner and on her psychological wellbeing.

Functional outcomes define results of patient care focused on physical ability. The two main ways to determine a patient's physical ability is either to ask about abilities (Patient Related Outcome Measures - PROMS) or to observe physical ability (Performance Measures). A good functional outcome is often best defined by a level of physical ability that matters to the patient. For example, TARN PROMS measures change in ability to work and other activities six months after injury, reporting extreme problems and a visual analogue score on how they rate their health at six months. Currently, only one hospital contributes to TARN PROMS, making it challenging to objectively understand the current levels of functional outcome and the impact any interventions might have.

As illustrated by the above patient stories, rehabilitation is key to improving functional outcome. The British Society of Rehabilitation Medicine (2013) defines rehabilitation is a process of assessment, treatment and management with ongoing evaluation by which the individual (and their family/carers) are supported to achieve their maximum potential for physical, cognitive, social and psychological

function, participation in society and quality of living. This has to be inclusive of hyper-acute, specialist, TU and community based rehabilitation of trauma patients.

Since 2010-12, there have been significant advances in acute care of trauma patients in NHS England. Despite the NHS Clinical Advisory Groups (CAG) Report (2010) clearly indicating the importance of the rehabilitation pathway, there was a lack of new investment in rehabilitation in NHS England and this is one of the main lessons that has been learnt through the establishment of regional trauma networks. To date, no national functional outcome data have been published, which is likely to reflect the significant variation in rehabilitation capability across the English networks. Consequently, in 2014, the British Society of Rehabilitation Medicine published core standards for trauma rehabilitation, indicating a substantial body of trial-based evidence to support the effectiveness of trauma rehabilitation, in particular for patients with traumatic brain injuries. These guidelines form the basis for the development of clinical and operational service modelling for all trauma networks.

In contrast, a site visit to Scotland in October 2018, revealed that the Scottish Trauma Network has identified trauma rehabilitation as a key enabler for improving functional outcome and patient flow. Their mission statement is 'saving lives, bringing life back.' In doing so, the network will be providing resources for an additional 30 rehabilitation allied healthcare professionals (AHPs) and 17.6 trauma coordinators between 2018-2022. NHS Scotland are learning the lessons from NHS England in focusing on improving rehabilitation capacity from the outset.

Internationally, there is a body of evidence demonstrating improvements in functional outcome in trauma systems that have incorporated rehabilitation across the pathway from the outset. Gabbe *et al* (2012) reported that following the formation of the Victorian State Trauma Service in Australia, risk-adjusted functional outcomes improved significantly. That is, not only were more patients surviving, they were doing so with less disability. Furthermore, a 10-year study from this trauma system demonstrated that years of life lost decreased by 43% and lost disability-adjusted life years fell overall by 28% over the period. This indicates that enhanced survival associated with trauma networks does not necessarily result in an overall increase in non-fatal injury burden (Gabbe *et al*, 2015). A systematic review of multidisciplinary rehabilitation in major trauma patients revealed the importance of early recognition and initiation of rehabilitation in this group, which was associated with improved functional outcomes (Khan *et al*, 2012).

Furthermore, service providers for rehabilitation echoed the views of patients with respect to current trauma rehabilitation in South Wales, West Wales and South Powys at a rehabilitation workshop in December 2018. Providers raised concerns about the lack of rehabilitation services within health boards, especially for rural areas. There was a recognition that health boards are not sufficiently resourced or experienced to accept complex trauma patients back from specialist centres. Providers felt that they currently lacked the expertise in managing these patients and in meeting their rehabilitation requirements. This is compounded by the inability to access outreach rehabilitation support from the specialist centres. Finally, providers indicated that 'without investment in the back door there was not value in investing in the front door.' They saw the benefit of improvements in rehabilitation as not only giving patients the best possible experience and chance of a good functional recovery, but as a vehicle for improving patient flow across the system.

3.4.3 Improving Timely Clinical Care and Patient Experience

The following case illustrates the current situation in South Wales, West Wales and South Powys (no patient identifiable information to maintain confidentiality):

> A 72 year old male presented overnight to an emergency department having fallen down three to four steps at home. He was seen by a junior doctor several hours later and received an x-ray of his neck, chest and pelvis. The next morning, he was seen by a consultant, who organised CT scans, which demonstrated multiple injuries. With some difficulty, the patient was admitted under the trauma and orthopaedic team. Over the course of next few weeks, the patient moved wards at least four times, developed delirium secondary to a urine infection and was eventually placed in a residential home. There was no multidisciplinary review of the case. Furthermore, the health board did not contribute to TARN, making it challenging to understand the extent of the problem.

The above case illustrates a common problem with trauma care in South Wales, West Wales and South Powys. In the presence of a trauma network, the patient may still not have been taken direct to the MTC, but would have received a pre-alert to the local TU and been received by the hospital trauma team. There would have been early recognition of significant injuries with whole body CT on arrival and a detailed secondary survey undertaken for detection of smaller injuries. The initial review would include an assessment of cognition and frailty. Clear network operational procedure would have guided the admitting speciality. Early orthogeriatric review and referral to a care-of-the-elderly physician may have reduced the number of moves to different wards, whilst improving patient recovery. Furthermore, in the event of an adverse event, this case would be subject to TU multidisciplinary case review and escalated to the network clinical governance structure, to ensure lessons learnt were shared transparently and widely.

From patient experience and rehabilitation workshops, one of the key reasons given for a poor experience by trauma patients and their families or carers was the lack of good quality communication and coordination across the pathway. All patients interviewed cited this issue as important to them. Patients talked about delays in treatment and how these were not adequately explained to them. Information was not shared in simple language that could be easily understood. There was a lack of consistent information conveyed between healthcare providers (particularly between specialist centres and local hospitals and community healthcare). Variation in clinical informatics systems has been given as a reason for this. Furthermore, the expectations of patients and their families or carers were not well managed, with a lack of support provided by specialist centres once patients were discharged. Finally, practical support for families and carers was often overlooked (e.g. accommodation for those travelling some distance, signposting financial/legal advice and welfare services). Monitoring of patient experiences is limited with only one health board contributing to TARN PREMS. Thus, the workshops have provided a useful insight into current issues to ensure patient experience is considered in the design of the network.

3.4.4 Improving Data Collection

There are significant improvements in health gain that can be achieved by improving data collection. It is recognised that there is a lack of consistent TARN data collection across the region, despite contribution to TARN being a mandatory audit for health boards in the annual national clinical audit and outcome review annual plan as illustrated by the TARN network report, 2018 overleaf.

Case Ascertainment & Accreditation

If case ascertainment is low then the analysis in the rest of the report may not be reflective of true practice.

Trust / Hospital	01 April 2017 to 31 March 2018				01 April 2016 to 31 March 2017			
	N	E	C (%)	A (%)	N	E	C (%)	A (%)
ABM University Health Board	**600**	**663 - 787**	**76.2 - 90.5**	**95.6**	**643**	**663 - 787**	**81.7 - 97**	**95.2**
Morriston Hospital	595	474 - 559	100+	96	594	474 - 559	100+	95.2
Princess of Wales Hospital	5	189 - 228	2.2 - 2.6	89	49	189 - 228	21.5 - 25.9	95.9
Aneurin Bevan Local Health Board					**1**	**530 - 634**	**0.2 - 0.2**	**54.8**
Cardiff and Vale University Health Board	**627**	**709 - 843**	**74.4 - 88.4**	**95.7**	**687**	**709 - 843**	**81.5 - 96.9**	**94.9**
University Hospital Llandough	12	51 - 68	17.6 - 23.5	95	23	51 - 68	33.8 - 45.1	92.6
University Hospital of Wales	615	658 - 775	79.4 - 93.5	96	664	658 - 775	85.7 - 100+	95.0
Cwm Taf Health Board	**373**	**373 - 452**	**82.5 - 100+**	**85.5**	**444**	**373 - 452**	**98.2 - 100+**	**87.0**
Prince Charles Hospital	156	200 - 242	64.5 - 78	72	254	200 - 242	100+	81.5
Royal Glamorgan Hospital	217	173 - 210	100+	95	190	173 - 210	90.5 - 100+	94.3
Hywel Dda Health Board	**186**	**444 - 546**	**34.1 - 41.9**	**95.8**	**195**	**444 - 546**	**35.7 - 43.9**	**91.0**
Bronglais General Hospital	149	82 - 105	100+	98	144	82 - 105	100+	97.9
Glangwili General Hospital	8	230 - 277	2.9 - 3.5	78	50	230 - 277	18.1 - 21.7	71.2
Withybush General Hospital	29	132 - 164	17.7 - 22	89	1	132 - 164	0.6 - 0.8	85.7

N The number of approved submissions for the period
E The expected number of submissions for the period (from HES / HIPE / PEDW)
C The case ascertainment % for the period
A The accreditation % for the period

This indicates that case ascertainment (i.e. completion of the dataset) was 54.8-65.7% (average 60%). This is below the target of 80%, making subsequent data analysis difficult to interpret. Nonetheless, data accreditation (i.e. quality of entry) at 93.5% was acceptable, but still below the target of 95%. In England, most networks now have case ascertainment and data accreditation exceeding the target threshold, owing to the deployment of TARN coordinators across the network and enhanced 'live' case identification, which South Wales, West Wales and South Powys currently lacks. Furthermore, the total number of cases submitted to TARN increased from 23,211 in 2011/12 to 44,059 in 2016/17.

The absence of TARN data available to health boards has resulted in a number of problems. Firstly, it has led to an inability to objectively determine the current level of clinical care and gaps. Secondly, it has affected both the deliverability and impact of any quality improvement interventions. Thirdly, it has made it difficult to identify outlier cases for further evaluation and longitudinal review. Fourthly, as a network has not yet been established, TARN does not produce dashboards for each hospital to provide comparison with English hospitals or North Wales. Finally, it has made predicting future changes in patient flow particularly challenging.

It is recognised that the network will need to have informatics systems established to ensure both TARN data and data that fall outside the remit of TARN is collected and available for quality improvement, commissioning and research, which will allow the development of an effective data-driven system to improve patient outcomes.

A work programme will be established to implement a central trauma-specific electronic patient administration system. The system will aim to identify patients at the earliest opportunity, ideally pre-hospital, or in the emergency department, and start to track the patient's journey through the pathway. It will integrate with local and national systems in use across NHS Wales (including the Value Based Healthcare Programme and National Data Resource Plans) providing the relevant near real-time information to all involved in the management of the pathway. This includes clinicians, managers, clinical audit, and administrative staff. It will also link with systems used to communicate with patients to facilitate TARN PROMS/ PREMS. A cohort of the patients who are TARN eligible will then be fed into the TARN database. This approach will allow Wales to hold its own trauma registry for operational management, with potential for service evaluation, additional audits and research. With a scope wider than the TARN criteria, it will provide unique opportunities to improve service delivery and facilitate injury prevention activities. The system will also support clinical governance processes through tracking of case reviews.

3.4.5 Enhanced Response at Major Incidents or Mass Casualty Events

The Health Prepared Wales conference in 2017 demonstrated the benefit of having trauma networks during the recent terror attacks in London and Manchester, where patients were effectively managed across several MTCs and TUs. System knowledge and coordination allowed pre-hospital teams to appropriately triage patients and subsequently minimise the number of patients needing transfer later to MTCs. For the London terror attacks, the London Trauma System effectively turned a mass casualty event into several smaller incidents that fell well within the capacity and capability of the receiving hospitals.

Whilst there have been significant improvements due to the creation of a national framework for mass casualty events including capacity planning, there is scope to go further. The establishment and integration of a regional trauma network into the national framework will be a key enabler for the successful management of a major incident or mass casualty event. South Wales and, in particular, Cardiff host many large, high-profile sport and music events every year. The region remains a potential target for terrorist activity now and in the future. The lack of a trauma network presents a significant strategic risk to the region and its population. Furthermore, there is currently a lack of alignment with England, leading to an inability for NHS Wales to provide an effective mutual aid response to NHS England as part of the national response to a major incident.

3.4.6 Enhancing Injury Prevention

In Wales, most injury prevention strategies are coordinated through Public Health Wales. Road traffic collision prevention is coordinated by multiple agencies including local authorities and the police service. In the future, the trauma network could make a significant contribution to injury prevention programmes through data sharing, research and educational initiatives (e.g. motorcycle safety, wearing cycle helmets). Opportunities also exist to access funding to prevent serious knife and gun crime. Furthermore there is a material link between the establishment of the trauma network and the national falls prevention programme being undertaken by Public Health Wales.

3.5 Equity

The benefits that the trauma network can deliver in improving equity can be explored through a number of lenses.

3.5.1 Enhanced Access to Specialist Care

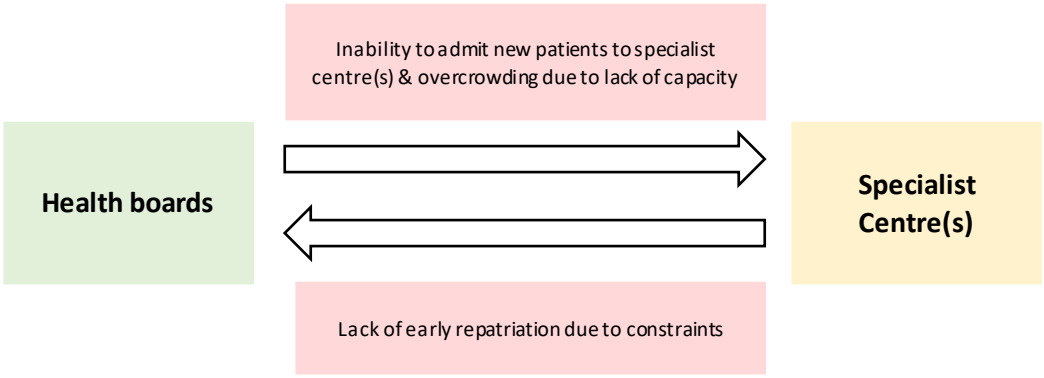
Equity of access to specialist trauma care remains an issue for patients who are injured outside the normal catchment area of specialist centres and, in particular, for rural areas (e.g. in Mid and West Wales). The presence of the EMRTS since 2015 has helped improve equity and timeliness of access to definitive specialist trauma care. The one year evaluation demonstrated 58% of patients being transferred directly to specialist care. EMRTS is currently only a daytime service but plans have been agreed to expand to 24/7 from the South Wales base from April 2020. Overnight and when the service is busy, major trauma patients continue to be taken to their local hospital. This is compounded by a lack of a pre-hospital triage tool and WAST trauma desk facility to coordinate the transfer of patients to specialist centres. Sinclair *et al* (2018), who introduced a clinician-staffed trauma desk as part of the Scottish Trauma Network, have highlighted the benefit of this approach. They demonstrated a significant increase in the sensitivity for identifying major trauma from 11.3% to 25.9%.

In the absence of a regional MTC and the lack of an automatic acceptance policy to support both direct admissions and secondary transfers, a significant proportion of trauma patients who could benefit from specialist care currently do not. This is illustrated by the fact that the assumed current position for moderate and major trauma going direct or being transferred to UHW is low and pre-dates 2011 from NHS England (see Appendix 2).

Evidence from NHS England (see Appendix 2) indicates an increase in the proportion of moderate and major trauma cases taken direct to the MTCs from 2011 to 2013, after which a steady state was reached. For major trauma, there was a decrease in transfers from TUs to MTCs, owing to enhanced pre-hospital triage. Overall, this resulted in a significant increase in the proportion of patients having an MTC as an initial (53% to 72%) or final (73% to 82%) care destination. Thus, in the presence of a trauma network, more trauma patients from South Wales, West Wales and South Powys are set to benefit from specialist care, reducing inequity of access. Currently, geographical inequity exists across Wales, with trauma patients in North Wales benefitting from accessing MTC care at the Royal United Hospital, Stoke.

3.5.2 Enhanced Patient Flow

To reduce inequity, a number of requirements are important in the design of the network. Firstly, 24 hour availability of the EMRTS, with pre-hospital triage and a remote facility to support decision-making by paramedics. Secondly, the MTC will need to maintain an automatic acceptance policy, but this will be determined by the ability of the MTC to maintain sufficient capacity and this depends upon the timely repatriation of patients for 'care with treatment closer to home.' Currently, there are significant delays in the transfer of care for patients who have completed specialist care, where ongoing care could be managed locally whilst waiting for discharge home or specialist rehabilitation. Data on the magnitude of the problem is sparse, as the NHS Wales Repatriation database is frequently not completed; however, local data indicates a 6-8 week delay in the transfer of patients with head and spinal injuries from UHW to health boards. As part of the network development, a patient flow workshop was undertaken in February 2019 to explore the reasons for delays. This is summarised in the process map illustrated below:



Constraints included a lack of an automatic repatriation policy and coordination, a lack of local rehabilitation services for trauma patients and an inability to manage complex patients (e.g. tracheostomy care, bowel and bladder care, behavioural disorders). System wide issues were also

raised including a lack of bed capacity due to poor access to packages of social care and pressures on unscheduled care. Finally, the current fragmented commissioning of services pertaining to major trauma was considered to be a key problem. These issues are not isolated to NHS Wales. In NHS England, some regional trauma networks have developed escalation procedures for patients in MTCs to be transferred back to their local Emergency Department; however, this forced measure has rarely been enacted.

3.5.3 System-Wide Improvements in Care

Leading on from the above, a key lesson from the English trauma networks relates to a lack of new investment in TUs compared to MTCs. Given that, in 2017, 61% of moderate trauma and 36% of major trauma remained in English TUs, this lack of investment was an oversight. To address this, NHS England are in the process of developing a best-practice tariff for TUs, similar to that developed for MTCs. For patients who remain in TUs and LEHs in South Wales, West Wales and South Powys, there should be equity of access to improved standards of care and this will require some additional investment. Without this additional investment in TUs, LEHs and community-based rehabilitation, all patients who are treated in the region are set to be disadvantaged in achieving the best functional outcomes possible. Furthermore, patient flow will not be maintained without getting the 'landing pad' (see section 8.4.2) at the TUs optimised for patients discharged from the MTC. This will have a direct impact on the ability of the MTC to accept new patients from across the network.

3.5.4 Equity of Care for Trauma in Older People

Equity must also be considered in the context of the patient's age, given population profiles (chapter 2). A further lesson learnt from the establishment of English trauma networks, was a lack of planning in relation to the 'changing face of trauma' (Kehoe *et al*, 2015). In 2017, TARN produced a report based on data from England and Wales, indicating that the majority of major trauma occurs in patients older than 65 years. The commonest cause of death was traumatic brain injury and falls from standing height were the commonest mechanism of injury. Existing pre-hospital tools were not good at identifying older major trauma patients. Consequently, there was a lack of activation of hospital trauma teams and seniority of initial assessment. There was a higher mortality in this group. Nonetheless, those that did survive major trauma did not have a higher incidence of disability compared to younger people. Thus, it is imperative that network design takes into consideration the specific requirements of older patients to ensure equity for this population group.

3.5.5 Veterans Trauma Network

Finally, the establishment of the trauma network lends itself to supporting the Veterans Trauma Network (VTN). The VTN exists to ensure that the needs of veterans with complex physical injuries are met. It is specifically focused on those who sustained complex physical injuries because of military service. The VTN has been successfully established in NHS England, based upon a collaboration with the MTCs. It provides a single point of referral for all stakeholders who are concerned about the medical care of a veteran with complex physical injuries, including patients, clinicians (from both physical and mental health services in primary or secondary care) and third sector agencies. Equity of access to ongoing surgical care and rehabilitation for those injured through military conflict would be an important benefit.

3.6 Clinical and Skills Sustainability

3.6.1 Enhanced Multi-Professional Training and Education

Presently, there is no regionally agreed training and education programme. Existing arrangements for the delivery of training and education pertaining to trauma can be divided into nationally/internationally recognised resuscitation courses or locally developed solutions. Resuscitation courses are expensive and thus often only accessible to doctors. Currency is often

challenging, with one 'candidate' TU reporting that only half of its Emergency Medicine consultants were current. Whilst locally developed solutions are cost effective and accessible to a wider audience, they vary in content, quality assurance and delivery. Discussion with trainees indicates variations in practice between hospitals, leading to inconsistencies in key educational messages and consequently patient care. To date, there has been no formal evaluation of these latter courses. Furthermore, all trauma courses focus on pre-hospital care and initial emergency care of trauma patients. There is less emphasis on the rest of the trauma pathway including surgical skills, critical care, ongoing care (especially for local hospitals receiving patients back from specialist care) and rehabilitation. The establishment of a trauma network also enhances training in the psychological aspects of physical trauma including supporting victims, their families and providers.

In England, each regional trauma network has taken a different approach to training and education, but there has been no determination of which strategy is most effective. Several programmes have aligned with national nursing competencies as defined by the National Major Trauma Nursing Group, to give nurses career progression opportunities. Furthermore, Scotland are in the early stages of developing a network wide training and education programme, but with no answer on the best approach.

There is an exciting opportunity to develop a network wide educational programme using a combination of established courses and those developed through the network. The programme will need to be multi-professional, aligned with national competencies and bridge the entire patient pathway. There is an opportunity work in collaboration with Health Education and Improvement Wales as a new, innovative health authority, in order to ensure that the programme is firmly linked with the network governance structure and is subject to formal evaluation. This will lead to an enhanced knowledge and skill base across the network.

Finally, learning from a site visit to the Scottish Trauma Network, the establishment of an annual event, bringing together healthcare professionals from across the network was seen as a key step in sharing best practice, stakeholder engagement and driving interest in the development. Currently there are no conferences specific to major trauma held in Wales, but as the network develops there is an opportunity to explore this further as part of its establishment.

3.6.2 Enhance Recruitment and Retention of Workforce

Currently health boards across South Wales, West Wales and South Powys struggle to recruit to key disciplines pertaining to major trauma such as Emergency Medicine, Intensive Care Medicine, Rehabilitation Medicine and surgical specialties. For many senior trainees interested in major trauma, the absence of a trauma network clearly factors in their decision-making and choice of consultant posts. Whilst there is a paucity of evidence to quantify the impact of a trauma network on recruitment, it is likely that its development will positively contribute to both recruitment and retention of medical personnel. It is likely that the MTC will benefit most from this; the challenge will be to ensure this applies across the network, to include TUs and LEHs. This could be overcome by ensuring that all new posts in the MTC are made as joint appointments with other health boards, where appropriate, ensuring a network approach to the workforce strategy. This will also help mitigate against depletion of workforce from health boards outside the MTC.

Appropriate resourcing of the entire network will be required to prevent the development of an MTC focused approach, as was demonstrated in England. Improved consistency of clinical governance and standards across the network will benefit trainees who rotate across the health boards. The enhancement of recruitment and retention can also be extended to include allied health care professionals (e.g. nurses, paramedics, theatre staff, therapists), reinforced by the development of new roles working across the network including major trauma practitioners and rehabilitation coordinators.

The establishment of the EMRTS, which placed clinical and skills sustainability as an important investment objective, demonstrated enhanced recruitment and retention. Since its establishment, the service has recruited four consultants in Emergency Medicine to Wales and contributed to enhanced retention. This is a trend that is likely to be mirrored in-hospital once the trauma network is established, through the creation of attractive and varied job plans.

3.6.3 Development of New Roles and Ways of Working

The establishment of the network presents an opportunity for the development of new roles and ways of working. There will be an opportunity for allied health care professionals to engage in new roles included in an extended scope of practice (incl. tertiary assessments, frailty/cognitive assessments) traditionally undertaken by the medical profession. For therapists there is an opportunity to expand their remit of practice to include a broader range of presentations. Nursing staff in health boards are likely to benefit from training offered by rehabilitation specialists in line with developing the right conditions for patients returning for 'care with treatment closer to home.' This includes tracheostomy care, bowel and bladder care and behavioural management.

The development of the network as a platform for training and education will promote new areas of training, previously not considered in Wales. For example, the adoption of the curriculum for training in trauma surgery, fellowships in trauma surgery and the creation of trauma surgery as a speciality in Wales.

3.7 Value for Money

3.7.1 Economic Benefits

With enhanced investment across the trauma pathway (including rehabilitation), there is evidence of improvements in functional outcome and, therefore, reducing ongoing healthcare requirements and improving ability to return to work. Gabbe *et al* (2015) demonstrated that after 10 years of introducing the Victorian State Trauma Service, there was a cost saving per case of $633,446 in 2010-2011, compared with 2001-2002, owing to increased disability free years.

Taylor *et al* (2012) demonstrated that Helicopter Emergency Medical Services working within the context of a mature trauma system resulted in a reduction in hospital mortality leading to a cost per life saved of $1,566,379, $533,781 and $519,787 in all patients, patients with serious injury and patients with traumatic brain injury respectively. The cost savings are not just related to additional patients who survive, but to all patients who survive. With improvements in rehabilitation, enhancements in functional recovery will be seen across a wide group of patients.

Furthermore, there are a number of studies demonstrating cost effectiveness of rehabilitation interventions. Wood *et al* (1999) demonstrated an estimated lifetime saving in the cost of care of over £1 million per patient receiving neuro-rehabilitation with good functional outcome. The same trend has been demonstrated in other studies related to the provision of neurorehabilitation.

With 14 additional lives saved across the network per year, this is likely to equate to a cost of life saved of approximately £17 million, with the economic benefits from improving functional outcomes to be quantified as part of the benefits realisation plan.

Furthermore, national and international trauma networks have demonstrated costs effectiveness in terms of Quality Adjusted Life Years (QALYs). This is explored further in the economic case.

3.7.2 Savings across the System

There are savings across the system through the introduction of the network. Firstly, five years' experience from England indicates that through the introduction of enhanced pre-hospital triage and enhanced pre-hospital care the proportion of moderate and major trauma transferred directly to

MTCs has increased. Thus, overtime the number of acute secondary transfers has fallen, by taking the 'right patient to the right place in the right time.' The effects on hospital personnel required to undertake these transfers should not be underestimated, particularly out of hours. Furthermore, there is an impact on WAST due to increased secondary transfers. Thus, there is a direct cost-saving to hospitals and WAST in not having to undertake these transfers but these benefits will take time to be realised.

It is possible that this benefit will be largely due to pre-hospital enhanced care and decision-making provided by the EMRTS and support provided to WAST by a trauma desk facility. However, by delivering patients direct to definitive care, there will be less duplication of trauma team activation, assessment and investigations (including imaging and pathology). Furthermore, patients are likely to require fewer operations if managed with definitive surgical care from the outset. For example, a local study demonstrated that 80% of patients requiring operative intervention for open fractures required two procedures or fewer in the first 12 months after injury if managed by specialists compared to 28% in whom surgery was less well coordinated.

Whilst there are likely to be more emergency department attendances, increased operative requirements and requirements for critical care/ward-based care at the MTC (Yip *et al,* 2016), by contrast TUs and LEHs will see and admit less moderate and major trauma. Although major trauma represents a small proportion of overall unscheduled care workload, patients are often complex with a median length of stay in hospital of nine days. Thus, centralisation of trauma care is likely to allow TUs and LEHs to focus more on routine unscheduled care and create space for elective operative workload to support referral-to-treatment times.

Savings can also be demonstrated through collaboratively commissioning patient pathways, with new approaches leading to maximum utilisation of allocated resources and effective monitoring.

Finally, whilst there was no significant reduction in the length of stay of trauma patients since the introduction of the English trauma network, the median length of stay for critical care fell from 4 to 3 days (Moran *et al*, 2018).

3.7.3 Value to other Patient Groups and Networks

The development of an appropriate rehabilitation model across the network with additional resourcing is likely to benefit a wider group of patients with non-traumatic problems, as the knowledge and skill base of allied healthcare professionals will extend beyond trauma. This includes strokes and complex neurological problems. Enhancement of orthogeriatric trauma will lead to improvements in the care of patients with fractured neck of femurs, an area where there is a variability of input from orthogeriatricians across health boards.

Once the network is established for South Wales, West Wales and South Powys, developing a national position will bring benefits to North Wales. Initially, the availability of national trauma desk will allow enhanced support and coordination of trauma cases directed to the TUs or MTC in Stoke-on-Trent. Later, there will be enhancement of clinical and operational governance, and the opportunity to support the development of a trauma rehabilitation model, with learning from the experiences in South Wales.

If successful, there will be significant learning from the operational capability of the network for other networks (e.g. the approach taken to clinical governance and repatriation for patients for 'care with treatment closer to home'). Whilst patient groups will be different, the system challenges will be the same. Thus, there will be an opportunity to learn from new and innovative practice. This benefit also extends to how we commission clinical services and specialist clinical services in the future, through commissioning differently.

3.8 Local Health Board and WAST/EMRTS Specific Benefits

In this section, organisational specific benefits are described, with an emphasis on how additional resources may provide wider benefits and align with the organisations strategic plans.

3.8.1 Cardiff and Vale University Health Board (C&VUHB)

The mission for the health board is 'Caring for People, Keeping People Well.' The vision is 'a person's chance of leading a healthy life is the same wherever they live and whoever they are.' These statements align with the aims for the trauma network.

The development of an adult and paediatric MTC at UHW presents an exciting time for C&VUHB. There are clear links between the establishment of the MTC and C&VUHB Strategic Goals in its 'Shaping our Future Wellbeing Strategy 2015-2025.' The Strategy sets out objectives that link directly with the delivery of a MTC:

- Reduce health inequalities
- Have an emergency care system that provides the right care, in the right place, first time.
- Be a great place to work and learn.
- Work better together with partners to deliver care and support across care sectors, making best use of our people and technology.
- Excel at teaching, research, innovation and improvement and provide an environment where innovation thrives.

The establishment of the MTC will address a number of service gaps specific to UHW that need to be addressed which will be explored further in Chapter 7:

- There is currently no MTC for adult or paediatric patients in the South Wales, West Wales and South Powys region.
- There is no single point of access into C&VUHB as a specialist centre for major trauma cases. There is limited repatriation or transfer of patients to their local hospital following specialist treatment.
- Consultant led trauma team leaders are not 24/7 in the Emergency Unit.
- There is limited capacity for treating the current number of seriously injured patients who are brought to C&VUHB. This is evident in areas such as the Emergency Unit and theatres.
- There is no dedicated ward or area where multiply injured patients are managed and cared for as a cohort.
- There is a lack of consistent coordinated care and clear communication with seriously injured patients and their families/carers.
- There is no multidisciplinary approach to governance, quality improvement, research and audit at present.
- Seriously injured patients are not currently provided with any rehabilitation plan/prescription.
- The critical care unit at UHW is recognised as being under strain.

In addition to those benefits detailed in this chapter, the expected quality benefits for attending the MTC are set out below:

- Patients will receive a service that delivers the highest possible care for patients 24 hours a day, seven days a week.

- Reduction in preventable deaths, in particular enhancing the rate of unexpected survivors.
- Improved functional outcome, from early rehabilitation interventions.
- Improved patient and carer experience through increased coordination of care and communication around expected pathway and ongoing care plan.

3.8.2 Swansea Bay University Health Board (SBUHB)

SBUHB recognises the pivotal role it plays in the delivery of major trauma services to patients and their families in South West Wales, as well as providing wider-scale specialist services in relation to burns and plastics. The establishment of the trauma network lends an opportunity for the community to see the same improvement in standards of care for trauma patients as delivered elsewhere in the UK and globally. To achieve the national quality indicators for major trauma requires an increase in staff and service capacity to deliver an effective pathway from before the 'front door', through to the patient returning for rehabilitation and back into the community. Through a multi-disciplinary approach, embracing clinicians, therapists and managers, SBUHB has benchmarked against best practice to identify where the investment will add most value.

Admittedly, there are constraints on space at Morriston Hospital, which will be addressed through opportunities for collaboration with HDUHB via the ARCH programme, optimising the use of existing workforce and infrastructure assets across South West Wales and addressing potential areas for improvement in patient pathways and shared learning. Swansea Bay has acknowledged the need to redistribute some of the work currently undertaken at Morriston Hospital, which will require investment, over and above that linked to the delivery of the network. For example, when neurosurgery moved from Swansea to Cardiff, the remaining spinal services at Morriston Hospital were funded on an elective basis and so additional resources will be needed to deliver this service to support the emergency aspects of the network. With the implementation of the network and subsequent capacity constraints at Cardiff, there may be a further impact on patient pathways relating to urgent, not emergency, spinal surgery. Investment in spinal services will support delivery of care for some spinal trauma patients as well as an opportunity to improve the management of non-traumatic conditions such as cauda equina syndrome and malignant spinal cord compression.

The focus on the importance of creating the 'landing pad' at Morriston Hospital (to enable early repatriation from the MTC to a more local treatment and care facility) has identified extra capacity within the inpatient setting, with a concomitant uplift in the number of therapy and nursing staff. The coordination of care for major trauma patients – ensuring seamless transition from acute care into recovery and rehabilitation – is seen as key to the efficient delivery of the network, given the range of services that will require synchronisation to deliver best outcomes. Isolated open lower limb fractures and transfers of patients needing orthoplastics intervention, will require wider trauma coordinator input than the average TU. The network will need to ensure that there is a robust plastics surgery presence on both the Morriston Hospital and UHW sites to deliver a proactive surgical service. Thus, there is an opportunity to build a foundation for better collaboration between the two sites, which is part of a wider strategy on tertiary service partnerships. The network will provide the best opportunity to deliver gold standard care to improve survival and outcomes for major trauma patients and fits with the longer-term vision for Morrison Hospital being the site to support this goal.

3.8.3 Aneurin Bevan University Health Board (ABUHB)

ABUHB welcomes the development of a unified Trauma network across South Wales, West Wales and South Powys that will ensure that patients receive prompt specialist trauma care when needed.

When the trauma network is established, it is less likely that patients will require a secondary ambulance transfer to a specialist centre and the resources previously devoted to managing these patients within the health board will be able to be directed towards other ABUHB patients. When significantly injured patients do present to emergency departments in ABUHB, there will be a simple and clear pathway to facilitate transfer to the MTC.

The health board currently accepts major trauma patients into its two emergency departments at The Royal Gwent Hospital and Nevill Hall Hospital sites, from where patients often require a secondary ambulance transfer to UHW in order to receive specialist treatment not available at ABUHB. These transfers lead to delays in patients receiving definitive care and depletion of resources at the referring hospitals as well as reducing WAST resources available for the local community.

The health board actively engaged in the consultation process in relation to major trauma and more latterly, the TU designation process outlined in chapter four.

The expected benefits of the major trauma network for the ABUHB population, the health boards and partner services are as outlined in the benefits outlined in this chapter.

3.8.4 Cwm Taf Morgannwg University Health Board (CTMUHB)

CTMUHB sets patients and the delivery of quality services at the heart of everything that they do. The health board is focused on exploring opportunities to further develop their population healthcare system into one that is more preventative and person-centric. The proposals developed by the health board are to take forward the implementation of its TUs as part of the network, within the context of the health board's Integrated Medium Term Part (IMTP) to ensure that:

- There is provision of high quality care as locally as possible where it is safe and sustainable.
- Services provided are accessible and sustainable into the future.
- Service delivery will be innovative, reflect the principles of prudent healthcare and promote better value for users.
- District general hospitals will work together.
- Emergency services will be provided across district general hospitals with a focus on early comprehensive assessment driving care in the right setting.
- There is development of local and regional hospital service planning and delivery where appropriate.
- The health board continues to improve scheduled and unscheduled patient care, patient flow and urgent care processes.

The main benefits of enhancement of rehabilitation services will add considerable value and will have a positive impact on wider health care delivery within the health board, in particular as part of the ongoing redesign of trauma and orthopaedic services. Provision of care of the elderly and orthogeriatric physicians will add value to both major trauma patients as well as those with fractured neck of femurs. Finally, improvements in TARN data collection leading to better opportunities for quality improvement.

3.8.5 Hywel Dda University Health Board (HDUHB)

HDUHB faces a significant challenge in delivering equitable health care to a geographically spread population with large remote and rural catchment areas. Key to improving timely access and equity for people living further away from the MTC are:

- Provision of a 24/7 EMRTS response.
- Provision of a triage trauma tool.
- High quality advice for paramedics and hospital clinicians through the trauma desk.
- Streamlined early acceptance for transfer to specialist care.

Maintaining clinical governance standards across a large geographical area is also challenging. Co-ordination, information gathering and sharing is key. Although there is an exemplar in Bronglais Hospital, Aberystwyth, TARN completeness is generally poor, with heavy reliance on clinician time to enter data. The appointment of TARN coordinators and major trauma practitioners will be vital to improving information to allow proper understanding of performance and identify areas for improvement. Additionally, the provision of training and value for money via a network-training programme will improve the ability to keep distributed workforce skilled.

There is a significant gap in rehabilitation provision for patients. Regular local access to a rehabilitation consultant, the development of inpatient rehabilitation beds, the presence of a rehabilitation co-ordinator and some skilled assistant practitioner resource will enable quality local teams, such as the established community neuro-rehabilitation team, to work more effectively and in a more co-ordinated way both in hospital and the community. There will also be potential benefits for complex rehabilitation needs beyond trauma. In line with the health boards strategy of increasing care closer to home where possible, the addition of a rehabilitation coordinator role will improve the ability to deliver quality community based care and greater access to specialist rehabilitation clinics within the health board. Previously, patients may have had to travel out of area.

3.8.6 Powys Teaching Health Board (PTHB)

The reality of rurality within Powys generates considerable challenges for managing trauma (and indeed just about any other hospital-based care pathway) in that, with no secondary care facility in Powys, all hospital admissions occur out of county. This generates issues that impact in many areas: equity, effectiveness, convenience, accessibility and continuity for both patients and their family and wider support networks. The drive to develop a trauma network for South Wales, West Wales and South Powys is a very welcome development for the people of South and Mid Powys and will address some of the issues, although time and distance from the TUs will remain an enduring issue in terms of equity and outcome.

It is acknowledged that Powys' principle contribution to maintaining patient flows through the network pathways will be by providing rehabilitation services. Expansion of the therapy service will also allow Powys the opportunity to develop new services that will help to deliver against the broader agenda of the Healthier Wales strategy by providing more complex services closer to home.

3.8.7 Welsh Ambulance Service NHS Trust (WAST)

WAST is a critical enabler in the success of the trauma network for South Wales, West Wales and South Powys. For the vast majority of patients who suffer major trauma their first contact with NHS Wales will be with the ambulance service as care is initially provided to them at scene and then during their journey to either a MTC or TU.

The service will also play a critical role either in taking these same patients home or for local or specialist rehabilitation.

The role that the ambulance service is being asked to play within the new network aligns seamlessly with the organisation's recently agreed long-term strategy for ambulance services in Wales - Delivering Excellence. A strategy, which articulates a desire by 2030 to:

- Ensure quality is at the heart of everything we do.
- Providing the right care, in the right place wherever and whenever it is needed.
- Enable our people to be the best they can be.

WAST's and EASC's 2019/20 IMTPs both articulate a commitment to develop an all Wales transfer and discharge service. Such a service, which will not only be critical to the success of the network but will also help support improvements in wider system flow in time. It will also act indirectly as a 'spring board' to the wider strategic development so that it can, in time, support the transfer and discharge needs of other strategic service changes, most notably the opening of the new Grange University Hospital in ABUHB, which will flow circa twelve months after the trauma network becomes operational.

3.8.8 EMRTS

As a national service, EMRTS already has experience of working within the North West Midlands and North Wales Trauma Network. Therefore, the service has a familiarity with the operational and clinical governance arrangements provided by a trauma network and its role as a provider within that structure. The service has seen the value of these both in terms of receiving feedback on all major trauma patients taken to the MTC in Stoke and participation in network clinical activities.

The development of the trauma network in South Wales, West Wales and South Powys is seen as a key driver for the expansion of EMRTS to provide a 24/7 response. The expansion of the service will benefit wide groups of patients with both critical illness and injury, and will support health boards make decisions about reconfiguration of their acute services.

The establishment of the network will also bring maximal benefit from the interventions undertaken and triage decisions made by the service, as other components of the trauma pathway will start to align. Ultimately, this will allow EMRTS to realise many of the benefits outlined during its inception, particularly improvements in functional outcome, which will come from optimisation of the entire pathway and not just pre-hospital elements.

4 Clinical and Operational Model

4.1 Introduction

This chapter sets out the detailed work undertaken to develop the clinical and operational model for the trauma network for South Wales, West Wales and South Powys over the last seven years. It describes the historical context, with the establishment of the major trauma project and clinical reference groups, leading to a non-financial options appraisal for the location of the MTC, an independent panel review and the subsequent public consultation on the decision to establish a trauma network and the chosen site for the MTC. Subsequently, a description is provided of the designation process for TUs and LEHs. This section also presents a summary of the work undertaken to understand the predicted change in activity across the region.

A summary is also provided of recent peer reviews of business case submissions by all providers, in order to deliver the robust clinical and operational model presented here.

Subsequent chapters summarise baseline assessments for the MTC, TUs and pre-hospital providers against the agreed quality indicators and service specification including where these are already being met, could be met through internal re-organisation, or where additional resources will be required. This section also provides details of the phasing of the quality indicators and service specification over a five-year period in developing the clinical and operational model. The approach is aligned with recommendation derived following clinical peer review.

Finally, based on the above and on the predicted change in activity, additional resource requirements are quantified and justified in line with the phased introduction of the model for the following:

- Operational Delivery Network - ODN (including clinical informatics as well as training and education requirements) – Chapter 5.
- Pre-hospital provider (WAST and EMRTS) - for EMRTS this is provided for reference only, as resourcing for EMRTS expansion has been subject to a prior separate business case process – Chapter 6.
- Adult and paediatric MTC – Chapter 7.
- Morriston hospital – TU with specialist services – Chapter 8.
- Health boards (including TUs and LEHs) – Chapter 8.

The provision of rehabilitation and repatriation for 'care with treatment closer to home' will be incorporated into the above where appropriate. The results will inform the schedules presented in the financial case (Chapter 9) and make the case for the establishment of a trauma network for South Wales, West Wales and South Powys, with the benefits that this will bring as described in Chapters 3 & 12.

4.2 Chronology of Developing the Model

The following table outlines the stages of developing the clinical and operational model for the trauma network. Subsequent sections describe each of these stages in more depth.

Date	Key Decision Milestones
October 2012	Workshop held to discuss development of trauma network
May 2015	Service model agreed by Major Trauma Project Group & Clinical Reference Group
June 2015	Options appraisal for MTC location (UHW and Morriston Hospital taken forward)
March 2017	Recommendations from independent panel review published on MTC location
November 2017 – February 2018	Full public consultation on recommendation of independent panel review
March 2018	Recommendations of independent panel review endorsed by all six health board chief executives
November 2018	Designation of TUs endorsed by health board chief executives
September 2019	Designation of TU in HDUHB

4.3 Initial Service Modelling

4.3.1 Defining Quality Indicators and Service Specification

In 2012, the South Wales Programme (SWP) was established to develop clinically safe and sustainable service models in consultant-led maternity and neonatal care, in-patient children's services and emergency medicine for the population of South Wales and South Powys. The SWP covered Cardiff and Vale University Health Board, the former Abertawe Bro Morgannwg University Health Board, the former Cwm Taf University Health Board, ABUHB and PTHB. The programme did not specifically consider major trauma but as part of the work reviewing emergency medicine services, clinicians identified the need to develop a trauma network as a priority, following the establishment of the English trauma networks between 2010-12.

Following the conclusion of the SWP, NHS Wales Chief Executive Officers (CEs) asked the South Wales Health Collaborative (superseded by the NHS Wales Health Collaborative) to develop a service model for the trauma network. A project board was established, supported by a clinical reference group (CRG). Both groups comprised representatives from each of the health boards in the region, WAST, EMRTS and WHSSC. The scope was widened to include Hywel Dda University Health Board, which had not been involved previously in the SWP.

In England, quality indicators and a service specification were developed from the national service specification for major trauma (NHS England D15/S/a 2013) and the NHS clinical advisory group report

of major trauma workforce (CFWI, March 2011). These support the NHS England quality surveillance programme for major trauma services, enabling quality improvements, both in terms of clinical and patient outcomes. The indicators cover adult and paediatric major trauma services across the whole trauma pathway from point of wounding to recovery. They include sections for the Operational Delivery Network (ODN), pre-hospital care via ambulance services, adult and paediatric MTCs and TUs. There are no quality indicators or service specification for LEHs. The quality indicators are provided in Appendix 3. Presently the English clinical reference group oversees the review and development of the quality indicators with a cohort of national experts led by Professor Chris Moran (national director, major trauma, NHS England).

The CRG decided that the development of the service model would align with the quality indicators for NHS England for the following reasons:

- Quality indicators and service specification led to the effective establishment and delivery of major trauma services in England.
- Subsequently, these formed the basis of the national evidence-based clinical guidelines for major trauma (e.g. National Institute of Clinical Excellence *Trauma Guidelines* – 2018, British Society of Rehabilitation Medicine *Core Standards for Specialist Trauma Rehabilitation* – 2014).
- North Wales had already adopted these quality indicators and service specification as part of the North Wales and North West Midlands Trauma Network. Establishing a different set of standards would create inequity with North Wales.
- Data from TARN was being used to support the review of the quality indicators and health boards already had a mandate to contribute to TARN, thus allowing comparison with other networks. Establishing a different set of standards would necessitate creating a separate audit process and registry.
- Allow participation in the English peer review process.

The major trauma project board endorsed this decision in 2015 and the standards formed part of the supporting documentation for the consultation in 2017/18. In March 2019, CEs via WHSSC Joint Committee re-confirmed their support for adopting the NHS England quality indicators and service specification, but indicated their preference for a phased approach to their introduction, in keeping with the English Trauma Networks. It was noted that the development of the trauma network based on these quality indicators would not affect existing arrangements in place in North Wales.

4.3.2 Purpose of the Service Model

In considering the development of the service model, a number of principles were defined by the CRG to underpin subsequent processes, which align with the key investment objectives for establishing the network. These principles are outlined as follows:

To improve quality and safety of care for patients (health gain) by:

- Providing a comprehensive system of specialist care for people who have suffered serious injury (major trauma) through the delivery of a trauma network for all age groups.
- Improving the functionality, health and psychological well-being in those patients who survive their traumatic injuries, increasing their quality of life.
- Ensuring that services meet agreed national clinical and workforce standards.
- Always meeting fundamental standards of care.

- Valuing patient experience as much as clinical effectiveness.
- Ensuring responsibility for each patients care is clear and communicated.
- Providing effective and timely access to care, including appointments, tests, treatments and moves out of hospital.
- Ensuring robust arrangements for transferring care are in place ('care with treatment closer to home').
- Tailoring services to meet the needs of individual patients, including vulnerable patients and older people.
- Supporting staff to ensure that they have the appropriate skills, experience and commitment to provide effective assessment, advice and/or treatment.
- Ensuring the quality of the system is monitored and subject to a process of continuous quality improvement.
- Reducing avoidable deaths in the population of patients who would previously have died of their injuries.

To improve access for patients (equity) by:

- Delivering a system based on a pathway of care from the pre-hospital phase through acute care, ongoing care and rehabilitation and a return to socio-economic functioning.
- Ensuring effective triage and assessment of emergencies to enable conveyance by the most appropriate means to the most appropriate destination according to agreed criteria.
- Improving information and support to patients and families to encourage them to be active participants in their care.

To improve the sustainability of services to patients (clinical and skills sustainability) by:

- Providing robust staffing arrangements that comply with employment legislation (e.g. working time directive) and meet the requirements for clinical training and supervision where appropriate.
- Developing clinical roles to provide future workforce flexibility, enhancing recruitment and retention.
- Ensuring the population has access to major trauma services within a reasonable timeframe.
- Planning capacity to meet demand and providing appropriate resources across the network.
- Ensuring the network is kept under continuous review and responds to changes in relevant strategies, standards and policies.

The above principles have been taken forward in the planning phases of trauma network.

4.3.2 Outline of Scope and Structure of the Trauma Network

The scope of the trauma network is to provide seamless care to major trauma patients, characterised by an Injury Severity Score (ISS >15) and most patients with moderately severe trauma (ISS>8), from the point of injury to recovery. This includes all age groups.

An inclusive trauma system (ITS) is responsible for all aspects of trauma care across the pathway, from the point of wounding to recovery, and injury prevention. Each ITS comprises one or more trauma network and features a population-based approach to assessment of need and treatment, a role for every hospital and provider of care and provision of rapid transfer to the MTC. It includes a quality

assurance structure that penetrates across the region at each stage of care, underpinning providers' clinical governance processes and identifying inadequate performance in order to support its correction. It also informs commissioning about quality of care being delivered.

A trauma network is the name given to the collaboration between all providers commissioned to deliver trauma care services in a geographical area. The trauma network for South Wales, West Wales and South Powys will have the following structure:

- **Pre-hospital providers** – pre-hospital triage tool to convey patients directly to the MTC or TUs. These include WAST, EMRTS, Search and Rescue Services and voluntary agencies.
- **MTC** – a multispecialty hospital, on a single site, optimised for the provision of trauma care for all types of injuries through the provision of consultant level care. It will have access to all major trauma specialist services relevant to major trauma. It will provide a managed transition to rehabilitation and the community. It will take responsibility for the care of all patients with major trauma in the region covered by the network via an automatic acceptance policy. In addition to an active, effective quality improvement programme, it will collaborate and support other hospitals in the network. The adult and paediatric MTC for the region will be at UHW.
- **TUs** – there will be a number of TUs in the trauma network that provide care for injured patients and will be optimised for definitive care of injured patients. They will provide a managed transition to rehabilitation and the community. They will run an active, effective quality improvement programme. In addition, they will have systems in place to rapidly move the most severely injured patients to hospitals that can manage their injuries, in most cases, the MTC. TUs will have a role for receiving patients back who require ongoing care in hospital and have a suitable 'landing pad' via an automatic repatriation policy. See chapter 8 for TU designation.
- **TU with specialist services** – in addition to the above specification for TUs, Morriston Hospital will provide specialist services support to the MTC and provide specialist surgery for patients who do not have multiple injuries, given the presence of burns, plastic, spinal and cardiothoracic surgery.
- **LEHs** – these will be hospitals within the network, which do not routinely receive acute trauma patients, however, they must have processes in place to ensure that should this occur, there is appropriate initial management and transfer to the MTC or nearest TU. See chapter 8 for operational model for Hywel Dda University Health Board.
- **Rehabilitation** – hyper-acute rehabilitation will be initiated early at the MTC with local rehabilitation occurring in hospitals (TUs/LEHs) and the community within each health board. Specialist rehabilitation will continue to be managed at Rookwood Hospital, Cardiff and Neath Port Talbot Hospital.

Overseeing the above will be an Operational Delivery Network (ODN), hosted by SBUHB, which will comprise the management function of the network, in order to undertake strategic planning, operational delivery, tactical and local advice to commissioners, improve quality and standards of care and partnership development.

4.3.3 Summary of Service Model

The major trauma project board approved the work of the CRG in May 2015. Details of this are provided in Appendix 4. Pathways for care were derived from the Regional Networks for Major Trauma, NHS Clinical Advisory Groups (CAG) Report (2010), which formed the basis of the development of quality indicators and service specification in NHS England. The pathways included

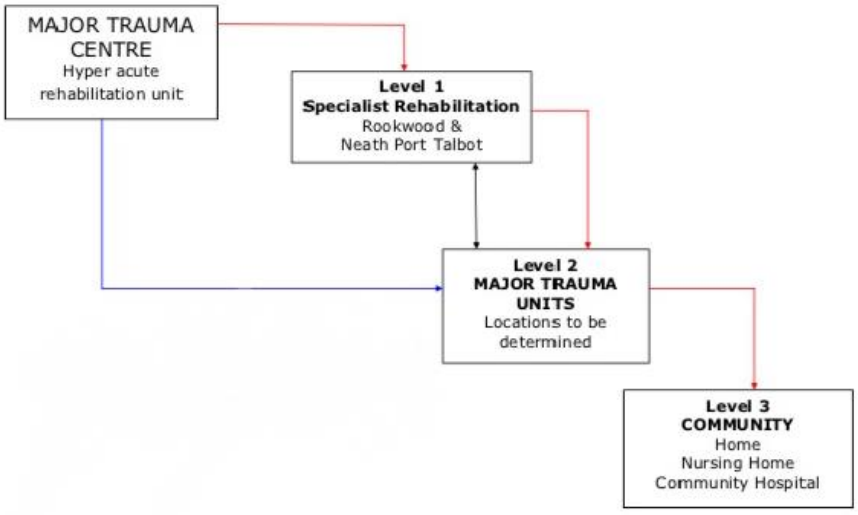
quality indicators and service specification for pre-hospital care, referral and the MTC (i.e. emergency care and surgery, diagnostics and radiology, ongoing care and reconstruction). It also included early and hyper-acute rehabilitation, specialised and local rehabilitation, network delivery, discharge planning and continuing care. In addition, there were sections on patient transfer, communication, audit, data management, governance and quality improvement.

The work undertaken by the CRG was refreshed in October 2018, when baseline assessments for all participating organisations were undertaken against the NHS England quality indicators and service specification. A detailed map of the service model is provided in Appendix 4. Thus, the service model developed by the CRG has been referenced here in order to note the historical context and as a demonstration of the breadth of work that has been undertaken incrementally since 2015.

4.3.4 Summary of Rehabilitation Service Model

The CRG was also tasked to develop the rehabilitation model. Throughout the work to develop the model, clinicians consistently highlighted rehabilitation as a key part of the patient pathway commencing at admission, continuing through the inpatient phase to discharge from the MTC or TU out into the community. It is believed that this is a true enabler to achieving the best outcomes for the patient and improving patient flow across the system. Details of this are provided in Appendix 5. The aim of the rehabilitation model is to ensure patients have appropriate, timely access to reliable, safe, high quality and sustainable trauma rehabilitation services at all points along their care pathway, in line with best practice. Paediatric rehabilitation is discussed within the context of the final operational model, as this did not form part of the historical work undertaken.

The structure of the rehabilitation model is based on the British Society of Rehabilitation Medicine Core Standards for Specialist Trauma Rehabilitation – 2014 and is illustrated below:



Hyper Acute Rehabilitation

Rehabilitation will start as soon as is appropriate after admission, ideally in the critical care setting and in line with NICE guideline CG83: rehabilitation after critical illness in adults (2014). The hyper-acute service will enable early rehabilitation input to patients who have intensive rehabilitation needs. Patients with poly-trauma, head injuries, spinal injuries or multiple fractures will be co-located within a designated ward/unit area within the MTC site allowing enhanced co-ordination from the multi-disciplinary team involved in their care.

Level 1 – Specialist Rehabilitation

A small number of very complex trauma patients will require the skills and facilities of a Level 1 specialist rehabilitation facility. These patients will typically present with complex disabilities and a range of medical, physical, sensory, cognitive and behavioural problems. The patients will require input from a wide range of rehabilitation disciplines, including trained nurses, physiotherapy, occupational therapy, dietetics, speech and language therapists, psychology and artificial limb and appliance services (ALAS).

Specialist rehabilitation input will be initiated early during the patient's journey. This may commence when the patient is in ITU and will continue beyond this phase of treatment. Rehabilitation input will commence with the initiation of a rehabilitation plan within 72 hours, which will define the rehabilitation needs of patients and identify how these needs will be addressed. A rehabilitation consultant, through a specialist rehabilitation plan, will provide access to specialist rehabilitation.

When the patient is ready to move from a hyper acute rehabilitation facility, they may be transferred to a Level 1 facility according to their needs. In some cases, patients will be transferred to their nearest TU or back into the community whilst waiting for specialist rehabilitation, thus maintaining patient flow across the system.

Level 2 – Acute Ongoing Rehabilitation in TUs

For the majority of patients whose needs will be less complex and at a lower level, acute and ongoing rehabilitation will be provided in a TU near their area of residence. They may be directly admitted to the TU or as a 'landing pad' via the MTC. The patients will require input from a wide range of rehabilitation disciplines, including trained nurses, physiotherapy, occupational therapy, dietetics, psychology and ALAS. Rehabilitation input will commence with the initiation of a rehabilitation plan within 72 hours and will be overseen by a consultant in rehabilitation medicine, helping to manage risk and expedite discharge. The TU rehabilitation team will have the capacity and skill set to advise the community teams and local rehabilitation hospitals and provide outreach to local hospitals or units for patients with ongoing rehabilitation needs.

Level 3 – Ongoing Rehabilitation in the Community

As patients improve and no longer require care within an acute setting, they will be transferred into a community setting to continue their rehabilitation. The local model of care, which will be different across the network area depending on rural or urban localities, will contain vocational/social participation and third sector support as necessary. Many patients will return home from the MTC and have community based rehabilitation needs. A consultant in rehabilitation medicine will maintain an overview and patients will be reviewed and managed within the community. There will be links with GPs, the wider primary care team and third sector organisations. Specialist community teams such as those working in acquired brain injury and spinal Injury will support primary care teams with a seamless approach between community and specialised care.

TU rehabilitation coordinators will have important role in ensuring patients returning to the community have appropriate involvement in planning in their care journey, including the interface with social care.

4.4 Non-financial Options Appraisal for MTC Location 2015

In June 2015, a workshop led by clinicians considered the options available to support the development of a trauma network for South Wales, West Wales and South Powys and specifically the

location of the MTC. A detailed report of the work is provided in Appendix 6. The workshop comprised representatives from health boards throughout the region, WAST and EMRTS. Patient representatives were invited through the third sector support groups and the community health councils (CHC) in an observer capacity. The workshop incorporated a non-financial option appraisal process and concentrated on the clinical benefits of the different options. In doing so, delegates were asked to consider the infrastructure requirements for the number of MTCs in a sustainable system and siting of major trauma services, based on the clinical service model and proposed activity developed by the CRG. Furthermore, consideration was given to co-located and interdependent services required at the MTC and scoring of each option against a series of benefits criteria.

A 'long list' of options was considered as illustrated below:

Investment objective	Description
Option 1 – Do nothing	This option described the current situation and clinical pathway delivery and was used as the baseline comparator. Currently there is no trauma network serving South Wales, West Wales and South Powys and no hospitals have been designated MTC or TU.
Option 2 – Single site, UHW	This option proposed the development of a single-site MTC at the UHW, Cardiff. This would mean the designation of UHW as the MTC serving South Wales, West Wales and South Powys with other consultant-led emergency departments acting as TUs within the trauma network structure, some providing specialist services.
Option 3 - Single site, Morriston Hospital	This option proposed the development of a single-site MTC at the Morriston Hospital, Swansea. This would have meant the designation of Morriston Hospital as the MTC serving South Wales, West Wales and South Powys with other consultant-led emergency departments acting as TUs within the trauma network structure, some providing specialist services.
Option 4 – Dual site	This option proposed the development of an MTC delivered across two sites: UHW and Morriston Hospital. This would have meant that the full requirements for a MTC would not be provided on each site. One of these sites would be the designated lead for the trauma network. Some specialist services would need to be provided from Morriston to UHW (e.g. burns and plastics) and from UHW to Morriston (e.g. neurosurgery) through emergency outreach clinical teams. The remaining consultant-led emergency departments would act as TUs within the trauma network structure.
Option 5 – Outsourced service (no MTC in South Wales)	This option proposed that a MTC was not established within South Wales but that this service would be commissioned from a provider partner outside Wales. This would have meant the designation of a MTC in England serving South Wales, West Wales and South Powys with the consultant-led emergency departments in South and West Wales acting as TUs within the trauma network structure, some of which may provide specialist services.

The following benefit criteria were used to score each option at the workshop. These criteria were aligned with those used for other national programmes and were given a weighting, agreed by the CRG and project board:

- **Quality and safety** – 35%
- **Equity** – 10%
- **Strategic fit** – 10%
- **Sustainability/future proof** – 25%
- **Access** – 15%

Details of the methodology and outcomes are provided in Appendix 7, which included sensitivity analysis of the outcomes.

The outcome of the analysis was that the option to do nothing and continue with the South Wales area remaining as the only region not being supported by a trauma network was quickly eliminated. It was also agreed that to support a population of approximately 2.4 million the network would need to be supported by a MTC located within the region. This was in keeping with similar sized populations being supported by networks in England. Thus, the outsourcing option was ruled out.

The potential for a dual site solution was seriously considered but subsequently eliminated because the critical mass for sustainability could not be delivered through such an arrangement and experience of some English trauma networks, which had operated a dual site solution and encountered significant operational problems.

UHW and Morriston Hospital were the only two hospitals in the region identified as having the potential to meet the necessary quality indicators and service specification for a MTC. This was due to the specialist nature of the trauma service itself and the need for co-location with other specialist services.

Thus, the preferred option from the non-financial options appraisal was to develop a trauma network for South Wales, West Wales and South Powys that contained a number of TUs supported by a single site MTC.

These options were taken forward through an independent panel review and public consultation.

Following the options appraisal, an Equality Impact Assessment was completed to support engagement with key stakeholders.

4.5 Independent Panel Review

Building on the work of the project board and the outcome of the clinical workshop, the NHS Wales Health Collaborative Executive Group (chief executives) agreed with the recommendation to establish a trauma network with the MTC located in either UHW or Morriston Hospital.

To facilitate the decision on the preferred location of the site for the major trauma centre, NHS Wales CEs meeting as the Collaborative Executive Group proceeded to recommend that an independent, expert clinical panel be commissioned to review the available evidence and provide advice. The proposed process for the independent panel was endorsed through individual public board meetings. CHC chief officers were also briefed as part of this process.

Professor Chris Moran chaired the independent panel, with support from a group of eight experts selected to be part of the panel based on their national and international reputations as experts in trauma care and the development of trauma systems.

The panel was provided with all the relevant information required to enable them to consider the position for the region. This included a high-level financial appraisal of the indicative capital and revenue requirements for either option and WAST resources (see Appendix 8). This appraisal did not include an assessment of capital and revenue requirements for TUs or the ODN. Furthermore, isochrone maps were developed indicating the proportion of the population within 60 minutes of the MTC for both UHW and Morriston Hospital (see Appendices 9 & 10). Clear terms of reference were provided to inform the assessment.

In February 2017, a session was convened with the panel where representatives from across the region and other key stakeholders were invited to attend. This included: clinical representatives from all participating health boards; Public Health Wales; Welsh Government; CHCs; EMRTS; WAST; WHSSC and EASC. Colleagues from UHW and Morriston Hospital gave presentations.

When considering the location of any new service, the Independent Panel determined that there were three main factors that need to be taken into consideration:

- **Clinical interdependencies (services that must be located together)** - the independent panel advised that one of the most important factors in the effective management of major trauma is the immediate availability of key specialist services. Most of those specialist services were already provided in both UHW and Morriston Hospital. However, specialist neurosurgery was only provided in UHW and burns and plastics services only in Morriston Hospital. Given that approximately 60% of major trauma cases require support for head injuries, the panel advised that same-site provision of specialist neurosurgical services (adult and paediatric) should be a key requirement for the location of the MTC. The panel also recognised the importance of the burns and plastics service as part of the trauma network and identified that whilst co-location was not a critical factor, it was imperative that the burns and plastics centre worked very closely with the MTC to make sure patients receive the care they need.
- **Critical mass** – it was recognised that neurosurgery and burns and plastics services were so specialist they could only be provided from one hospital site for the population of South Wales, West Wales and South Powys. The same held true for the establishment of a single MTC for the region.
- **Travel times** - the panel considered the geography of Wales and made it clear that an inclusive trauma system is expected to improve mortality in all geographical regions of South Wales, West Wales and South Powys regardless of the transport time to the MTC. They recognised that irrespective of the location of the MTC, at either Morriston Hospital or UHW, some parts of the population in Hywel Dda and Powys will be a considerable distance from the MTC. This was not an unusual situation and most trauma networks in England supported services that were a considerable distance from the MTC. The panel did not believe that either Morriston Hospital or UHW as a MTC would have any significant advantage over the other in terms of geography. Working as part of a network, most ambulance services in England operated a bypass system of up to one hour. This meant that patients identified as having suffered major trauma by ambulance personnel would be taken directly to the major trauma centre if it were within one-hour travelling time. This time could be extended after advice was taken. Patients with more immediate needs would be transported to a TU and stabilised prior to transfer. Only a small proportion of trauma patients required immediate surgery and this was likely to be achieved more rapidly in the MTC, mitigating any increase in transport times. The wider network model (including trauma units, automatic acceptance at the MTC, enhanced triage

decision making and 24 hours availability of EMRTS) had a key role to play in managing patients who may be further away from the MTC.

Considering all three factors, in March 2017, the independent panel produced a report (see Appendix 11) of their findings making the following unanimous recommendations for consideration by the constituent health boards:

- A major trauma network for South Wales, West Wales and South Powys with a clinical governance infrastructure should be developed quickly.
- The adult's and children's MTCs should be on the same site.
- The MTC should be at University Hospital of Wales, Cardiff.
- Morriston Hospital should become a large TU and should have a lead role for the major trauma network.
- A clear and realistic timetable for putting the trauma network in place should be set.

It is significant that in making recommendations of the development of the wider network, the independent panel recommended that Morriston Hospital should be a large TU. As a large TU, Morriston Hospital is likely to be able to manage some conditions that other trauma units will not, due to the specialist services it already provides. This means that following clinical assessment a more complex patient may not need to be transferred to the MTC (within agreed protocols) and will continue to be managed within Morriston Hospital. This may be different for other TUs in the region, which do not have such specialist services. The term 'large TU' is defined as a TU with specialist services in the remainder of this document for consistency of nomenclature with NHS England.

The panel also specified that Morriston Hospital should take the leadership role in the major trauma network, hence the decision for SBUHB to host the ODN. This follows the model in England where the leadership for the network is often, but not always, provided from a hospital other than the hospital where the MTC is located. A lead hospital is necessary to ensure the trauma network works in a coordinated way and makes sure the patient and the complete patient pathway is the focus rather than the MTC itself.

4.6 Public Consultation Process and Recommendations

The recommendations from the independent panel were reviewed through the Collaborative governance arrangements (Collaborative Executive Group and Leadership Forum) and the benefits for the population of South Wales, West Wales and South Powys associated with developing a trauma network fully considered. Health boards also considered and agreed in principle to the recommendations and for a period of consultation. Whilst the development of the trauma network represented a service change and not a service development, health boards recognised that a period of public engagement and consultation was required to ensure a clear understanding of the role of network and its component parts.

In accordance with this, the NHS Wales Health Collaborative team developed consultation documentation with individual health boards engaging with their local CHC to facilitate the local consultation exercise to seek views on the development of the trauma network and the implementation of the recommendations of the independent panel (see Appendix 12). In doing so, a clear scope was defined for the consultation process and three questions that would be asked of stakeholders:

- Do you agree or disagree that a major trauma network should be established for South Wales, West Wales and South Powys?
- Do you agree or disagree that the development of the major trauma network for South Wales, West Wales and South Powys should be based on the recommendations from the independent panel?
- If we develop a major trauma network for South Wales, West Wales and South Powys is there anything else we should consider?

A detailed stakeholder mapping exercise was undertaken with key groups identified as NHS Wales staff, CHCs, the public, national bodies/organisations, third sector, local authorities and elected members, people with protected characteristics and specialist groups. The consultation started in November 2017 and was completed by February 2018. All documentation including historical work was made available via the Public Health Wales website; consultation documentation was developed and shared with all participating organisations and public engagement sessions were held in each health board (see Appendix 12).

Responses were analysed by the NHS Wales Health Collaborative and themes identified. This information was shared with CHCs to enable production of a formal response. A report was produced which included the findings of the consultation (see Appendix 13). This was considered by health boards in their public board meetings in March 2018.

In relation to the consultation, each CHC provided feedback to their health board in relation to the consultation and whether individual CHCs were in a position to support the recommendations of the independent panel. In general, CHCs were unable to agree or disagree with the recommendations contained in the report. Common themes in the concerns raised by CHCs were:

- A lack of public engagement prior to formal consultation.
- A lack of detailed information about the overall design of the network, including the location of TUs.
- Insufficient financial information and a lack of an assessment of the impact on other services of investing in the network.
- A lack of space and capacity at UHW.
- Arrangements for patient transfer outside the operational hours of the EMRTS.

Despite this and based on the evidence of the positive benefits of a trauma network, in March 2018 all six health boards across South Wales, West Wales and South Powys approved the recommendation to establish the trauma network in line with the independent panel report.

Subsequently, a 'lessons learnt' exercise was held in September 2018, with involvement of CHCs. The network clinical lead and director of the NHS Wales Health Collaborative took the opportunity to meet with CHC Chief Officers on a number of occasions and produced update reports, providing mitigations to the above concerns. At the time of writing, CHCs from two health boards have agreed to the recommendations of independent panel review, with ongoing positive engagement by the health boards with respect to seeking agreement from remaining CHCs. It is anticipated that this dialogue will continue once the network is operational. Furthermore, all of the issues outlined above have been discussed in the context of this Programme Business Case.

4.7 Designation of Trauma Units

Having completed the process for designation of the adult and paediatric MTC at UHW, Morriston Hospital as a TU with specialist services and the ODN function being hosted by the SBUHB, a process was established to designate Tus. This process coincided with the establishment of the trauma network board (June 2018) and confirmation that WHSSC would be the principle commissioner for the network.

4.7.2 Designation Process

To support health boards to make choices in relation to TU designation, the network board confirmed a process in August 2018, as follows:

- The network board requested that health boards complete a baseline assessment against NHS England quality indicators and service specification for hospitals proposed as 'candidate TU's.' Information was provided as to which indicators needed to be met for day one and which could follow once operational.
- The network clinical lead wrote to directors of planning of each health board requesting meetings to discuss baseline assessments.
- Meetings were held September to October 2018 with all health boards. These meetings were chaired by the network clinical lead, some of which supported by the director of the NHS Wales Health Collaborative. Health board representation included directors of planning or a nominee and clinical and managerial network leads. In addition, the network interim rehabilitation lead provided health boards a useful insight into TU service specification from a rehabilitation perspective.
- The purpose of these meetings was to discuss the baseline assessments against a series of questions:
    - Where gaps exist, how could these be quantified? In the first instance, how could the gap be closed through internal re-organisation? This was used as a starting point for all discussions in relation to quality indicators.
    - Where there is a need for additional resources above what can be achieved through internal reorganisation, what are the implications of this?
    - With additional resources, will it be possible to meet the quality indicators?

These baseline assessments form the basis of the resource requirements set out in Chapters 8 & 9.

- The above questions were used to inform final submissions for all 'candidate TUs,' based on those that could most closely meet the quality indicators. In addition, health boards were asked to indicate whether the 'candidate' TU would be adult and paediatric or adult only, justification for their choice and to consider how patients would be served in regions without a nearby TU.
- Following endorsement by the network board in October 2018, a paper was taken through the WHSSC management structure and to WHSSC Joint Committee to make a recommendation in November 2018, followed by approval of TU designation by each health board in January 2019. In most part, choices were in keeping with the result of the SWP, in terms of future location of emergency departments.
- The network board recognised the need for informing and engaging CHCs with respect to TU designation, recognising that health boards would be principally responsible for this through normal processes, supported by trauma network board members. All health boards confirmed the location of their TUs with their CHCs.

- It was recognised that the designation of TUs would be reviewed after the first year of being operational and national annual trauma peer review.

4.7.3 Trauma Unit Locations

The following hospitals were approved as adult and paediatric TUs, following a recommendation by WHSSC Joint Committee and endorsed by health boards:

- UHW, Cardiff – TU function for its own population.
- Morriston Hospital, Swansea – TU with specialist services
- Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (period until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the health board)
- Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend.
- Glangwili General Hospital, Carmarthen (section 4.7.4).

In relation to LEHs, the following hospital will be a LEH within the network structure:

- Royal Glamorgan Hospital, Llantrisant.

As described below, Bronglais General Hospital, Aberystwyth and Withybush General Hospital, Haverfordwest will be rural trauma facilities for the purposes of major trauma.

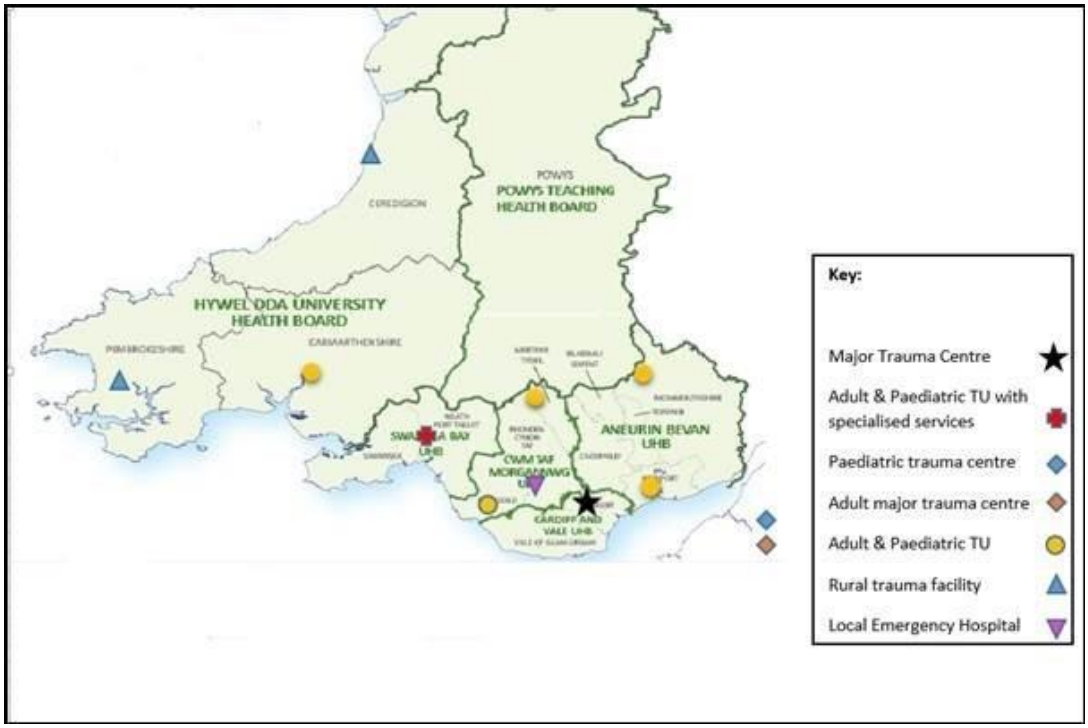
4.7.4 Proposed Structure in Hywel Dda University Health Board

Following full public consultation in 2018 as part of its *Transforming Clinical Services Strategy*, the health board confirmed its intentions to develop a new urgent and planned care hospital within the region, which in the future will function as the TU and main emergency department for the health board. In addition, Bronglais General Hospital will be a rural provider of urgent and planned care, including the presence of acute services. Glangwili General Hospital and Withybush General Hospital will become GP led Minor Injury Units alongside community beds and outpatient facilities.

Following a period of public engagement in June and July 2019, the health board has designated Glangwili General Hospital as the TU in the years preceding the development of the new hospital. This, along with the role of the remaining hospitals is being worked through as part of a public engagement process.

With respect to Bronglais General Hospital and Withybush General Hospital, a baseline assessment demonstrated that both hospitals fell significantly short of the quality indicators compared to other TUs, and it was unlikely the 'gap' could be closed easily, even in the presence of additional resources. However, given the rural nature of the catchment areas of both hospitals and concerns in relation to the term LEH it has been proposed that for the purposes of the trauma network, both hospital will be termed rural trauma facilities in recognition of this strategic importance. Whilst as for LEHs there are no specific quality indicators for a rural trauma facility, the Health Board is committed to ensuring these hospitals maintain the ability to assess and treat major trauma patients, given their relatively unique geographical location. In addition, they will need to maintain the ability to rapidly transfer patients to the MTC at UHW, TU with specialist services at Morriston Hospital or the TU in Glangwili General Hospital.

4.7.5 Proposed Map of Trauma Network



4.8 Predicted Change in Patient Flow

Early predictions on the change of flow of moderate and major trauma patients was captured as part of the consultation process in 2017, with an estimated 1,500 moderate and major trauma cases across the region. Historically, basic modelling was also undertaken as part of the EMRTS Strategic Outline Programme using a population-based approach in 2014.

Subsequently, the network board identified the need to undertake a more in-depth analysis of current and predicted activity to inform the planning of the network. A number of strategies have been adopted to achieve this. It was recognised that it would be challenging to solely use baseline data from TARN given the significant variation in completeness and quality across the region. Consequently, the network board enlisted the support of Gareth John, NWIS, and Andrew Nelson, C&VUHB. A detailed presentation of the methodology used, key assumptions and results are presented in Appendix 2.

Essentially, patient episode data for Wales (PEDW) was obtained from NWIS for 2017 to calculate current activity. ICD-10 codes were translated into TARN codes, in order to present a breakdown by ISS. Furthermore, hospital spells were used rather than number of cases, as a more accurate metric for making planning assumptions. A complex modelling algorithm was developed in order to inform the data presented for current activity and this was developed on 5 years of C&VUHB data.

Further analysis was undertaken to predict the change in flow, in line with the assumed current position for South, Mid and West Wales and using the proportions for the English trauma networks (derived from TARN) for 2011, 2012 and 2013, represented as year 1, 2 and 3 respectively below:

ISS	'Patient pathway'	Assumed current position	Year 1	Year 2	Year 3 & steady state
9-15	% direct to MTC	22	25	28	31
9-15	% transfer TU to MTC	0	7	7	8
9-15	% TU only	78	68	65	61
>15	% direct to MTC	32	35	39	42
>15	% transfer TU to MTC	6	25	25	22
>15	% TU only	62	40	36	36

The above table demonstrates that the current position in the region pre-dates that of the year 1 of the establishment of the English trauma networks. Furthermore, the proportion of moderate and major trauma subjected to direct and secondary transfer to the MTC increased and then reached a steady state in year 3. However, the total number of cases reported to TARN continues to rise.

The table below illustrates the predicted change in first spell presentations to the MTC for moderate and major trauma. One hospital spell covers the activity whilst a patient remains within that hospital for a continuous length of time:

ISS 9-15 – moderate	Assumed current position	Year 1	Year 2	Year 3
Direct to MTC	154	206	231	256
Transfer TU to MTC	11	58	58	66
% TU only	660	561	536	503
Total	825	825	825	825
ISS >15 – major	**Assumed current position**	**Year 1**	**Year 2**	**Year 3**
Direct to MTC	284	306	341	368
Transfer TU to MTC	49	219	219	193
% TU only	542	350	315	314
Total	875	875	875	875

ISS >9 – candidate	Assumed current position	Year 1	Year 2	Year 3
Direct to MTC	438	512	572	624
Transfer TU to MTC	60	277	277	259
% TU only	1202	911	851	817
Total	**1,700**	**1,700**	**1,700**	**1,700**
Combined Direct to MTC & Transfer TU to MTC	**498**	**789**	**849**	**883**

Subsequent analyses were undertaken to determine the change in flow for all other receiving hospitals in the region and bed capacity requirements. This included a subgroup analysis for paediatric trauma, bed requirements for patients returning to a 'landing pad' following care at the MTC and further work undertaken within HDUHB. From these, a number of observations can be made:

- The total moderate and major trauma workload of 1,700 spells per year correlates well with earlier predictions.
- In year 1, it is predicted that moderate and major trauma spells will increase by 290 per year once UHW becomes an MTC. By year 3, predicted number of spells will reach a steady state. The main reason for the increase relates to the increase in the proportion of transfers to the MTC of major trauma from TUs. The programme team at UHW have used this data to inform subspecialty specific analyses, ward bed/critical care bed capacity planning and theatre capacity planning.
- It is predicted that all other hospitals in the region will see a fall in admitted moderate and major trauma, owing to increased flows to the MTC. Overall TUs will retain 68% of moderate trauma and 40% of major trauma in year 1. Thus, overall acute bed capacity requirements will fall in these hospitals.
- Approximately 20-34% of patients will return from the MTC and require access to a 'landing pad' in their health board. This largely represents new flow of patients. Requirements will vary from ongoing medical care, hospital care whilst awaiting social care packages, level 2 rehabilitation and a small proportion awaiting specialist rehabilitation. Current practice is that these patients rarely experience timely transfer back their local hospital. For all regions, it is predicted that bed requirements for the 'landing pad' will not exceed the overall fall in acute bed requirements. Thus, the totality of beds required in each hospital (except UHW) will not increase.
- The exception to this is for Glangwili General Hospital, which has been designated a TU. Further local analyses predict a maximum of 1-2 extra patients per week attending the TU acutely from regions served by Bronglais General Hospital and Withybush General Hospital. Furthermore, Morriston Hospital is predicted to see some additional patients acutely due specialist services provided (e.g. orthoplastics).
- The data have indicated the need for additional ambulance journeys (both for direct and secondary transfers to the MTC) and repatriation. This has informed planning assumptions for WAST (see chapter 6).

- Finally, small increases in moderate and major paediatric trauma will be observed at the MTC.

The work undertaken was reviewed and scrutinised by all health boards and was approved by the network board as a single data source for all health boards/WAST when undertaking service planning and informing additional resource requirements outlined in subsequent chapters.

4.9 Summary of Review of Clinical and Operational Service Model

Following the business case submissions from each organisation to inform this programme business case, the following levels of review were undertaken:

- Verbal and written feedback from the NHS Wales Health Collaborative programme team (ind. the network clinical lead). Face-to-face meetings with network board representatives from all organisations with programme team.
- Internal health board scrutiny and review of all submissions.
- A presentation and review of all submissions at the trauma network board in June 2019.
- A professional clinical review of the MTC case, C&VUHB and orthoplastic case, SBUHB by Professor Chris Moran, National Clinical Director, Major Trauma, NHS England on the 2nd July 2019.
- Review of the MTC and orthoplastic business cases by the WHSSC management team.
- Review of the WAST business case by the EASC Management team.
- OGC Gateway review 0 of the entire case 8-10 July 2019.

One of the recommendations of the Gateway review 0 was to undertake a critical scrutiny of all business case submissions in order to close out the gap between the programme team specification of minimum Day 1 requirements and submissions. This include further development of the planning assumptions for each phase to progressively meet quality indicators and service specification.

In response to this, the NHS Wales Health Collaborative organised a one day professional peer review event, bringing together experts from across the UK to undertake a review of the entire system including proposals from WAST, C&VUHB (MTC), SBUHB (specialised services), TUs and the ODN. This also included reviews of the rehabilitation model. A subsequent review of therapy requirements and the spinal trauma case were remotely undertaken and the outcome shared with organisations.

The review was informed by a series of questions generated by an Executive Strategic Group formed following the Gateway 0 review. Following a successful and positively supported event, which took place on 13 August 2019, the Executive Strategic Group generated, a series of recommendations based the discussions that had taken place and these were shared with the network board to consider on 19th August 2019. The network board supported in principle recommendations pertaining to the MTC and specialised services, but fully supported recommendations pertaining to WAST, TUs and the ODN. Appendix 14 provides a summary of recommendations made.

Following this, C&VUHB and SBUHB were asked to consider the recommendations in the context of their revised submissions. With the support of an OGC Gateway Assurance of Action Plan review (undertaken on the 9 September 2019), further work was undertaken between these organisations and WHSSC to agree an appropriate position described in subsequent chapters.

5 Operational Delivery Network

5.1 Introduction

The creation of a trauma Operational Delivery Network (ODN) is central to the development of a trauma network for South Wales, West Wales and South Powys. A Trauma ODN involves cross-organisation and multi-professional working through a whole system approach, ensuring the delivery of safe and effective services across the patient pathway. Under an ODN, patient pathways pertaining to trauma are coordinated between providers over a wide geographical area to ensure equity of access to specialist resources and expertise. Its aims align with the key investment objectives outlined in Chapter 2 and 3 in order to improve patient outcomes, patient experience and quality standards from the point of wounding to recovery.

This chapter provides a description of the purpose of the ODN, its phased implementation against service specification and quality indicators and the resource requirements for the ODN management team. Furthermore, it describes the parallel arrangements for the Veterans Trauma Network (VTN). The commissioning and governance arrangements for the ODN are described in the management case (Chapter 12).

Finally, details are provided of the clinical informatics and training and education requirements for ODN using a phased approach.

5.2 What is a Trauma Operational Delivery Network (ODN)?

A Trauma ODN involves cross-organisation and clinical multi-professional working, through a whole system collaborative approach, ensuring delivery of safe and effective services across the patient pathway. Under an ODN, patient pathways pertaining to trauma are coordinated between providers over a wide geographical area to ensure equity of access to specialist resources and expertise. Thus, its aims are to improve patient outcomes, patients experience and quality standards from the point of wounding to recovery.

In September 2018, WHSSC Joint Committee agreed that an ODN will be established to oversee the delivery of trauma services to the population of South Wales, West Wales and South Powys and that a health board should host the ODN; SBUHB was agreed as the host organisation for the ODN.

It was also agreed that the ODN and MTC at UHW will be commissioned by WHSSC. EASC will commission WAST and the EMRTS. Health boards will be responsible for local commissioning of TUs. In addition, existing major trauma commissioning arrangements for BCUHB will be retained.

5.3 Purpose of the Operational Delivery Network

The term 'ODN' was developed in NHS England in 2012, to reflect the shift in the function of some clinical networks to focus on coordinating patient pathways between providers over a wide area to ensure access to specialist resources and expertise. Thus, trauma networks developed as ODNs with a focus on operational delivery. As defined by the service specification below, the network board and WHSSC agreed to the formation of an operational delivery network. In NHS England, provider organisations host Trauma ODNs in order to ensure optimal delivery of the service specification. In keeping with this and aligning with recommendations of the independent panel, a provider, SBUHB, will host the trauma ODN for South Wales, West Wales and South Powys.

The ODN will represent a collaboration between all providers commissioned to deliver trauma care services (both specialised and non-specialised), focused initially on the population of South Wales, West Wales and South Powys. Providers will include the pre-hospital services (WAST and the EMRTS), MTCs, TUs, LEHs and rehabilitation services. The ODN will also have appropriate links to social care and the third sector.

The key responsibilities of the ODN can be summarised as follows (adapted from the Intercollegiate Group for Trauma Standards, 2009):

- A focus on improving functional outcome and patient experience from the outset.
- Ensuring injured patients are delivered to the MTC for definitive care quickly and safely.
- Maintaining patient flow across the region, ensuring timely 'care with treatment closer to home' once specialist care completed.
- Clinical responsibility for a seriously injured patient anywhere in region and ensuring clinicians maintain a responsibility extending outside their traditional health board boundaries.
- Adopting a culture of integrated multi-disciplinary working across health boards through specialist and professional groups.
- Acute and ongoing rehabilitation services to improve outcomes and restore patients back to productive roles in society.
- Adopting a population based approach; in particular developing pathways for trauma in older people (see section 5.4.4).
- A continuous process of system evaluation, governance and performance improvement.
- Develop multi professional training and education across the patient pathway.
- Supports active injury prevention programmes to reduce the burden of injury for the network population.
- Active development of an audit and research programme and support of research into trauma and its effects, to improve outcomes.
- Integration with multi-agency mass casualty planning in the region.

These are expanded further in the next section on service specification and quality indicators.

5.4 Phased Implementation

The baseline position is that currently there is no trauma ODN serving the population of South Wales, West Wales and South Powys. Only some aspects of network wide service specification or quality indicators exist.

Two sources have been used to develop the model for the phased implementation of the trauma ODN. Firstly, the NHS England commissioning service specification D15a, Trauma ODN 2012/13. Secondly, the NHS England network quality indicator document, 2013. The rationale for adopting these is presented in chapter 4. The proposed model is further divided into those elements that are essential, desirable and aspirational. Phasing of essential elements has been undertaken including specification and quality indicators that need to be in place before the ODN is operational (i.e. before day 1) and those that will develop in year 1, 2 and 3.

5.4.1 Service Specification

All specifications will need to be in place before the ODN becomes operational (i.e. before Day 1) unless indicated below. Each element will be ongoing from the point of implementation, unless otherwise stated.

Essential

These aspects are considered essential and are critical to the successful delivery of the ODN and its key investment objectives.

Strategic planning

- Provide professional and clinical leadership across the network.
- Undertake comparative benchmarking and audit across the network through TARN – supporting the enhancement of data collection.
- Effective linkage into commissioning groups – in this case, WHSSC and EASC.
- Hosting a risk register and undertaking risk management across the network.
- Produce quarterly and annual reports – Year 1.
- Develop an annual working plan for the network to deliver against the quality and delivery framework – Year 1.
- Contribute to evaluation of the network – Year 2.
- Develop a longer-term plan going out 5-10 years to ensure new capabilities can be brought into core operations in quickly and efficiently as possible – Year 2.

Operational delivery

- Develop coordinated patient clinical pathways between services over a wide area to ensure access to specialist major trauma care.
- Develop a comprehensive system of delivery through A) a pre-hospital triage tool and criteria for immediate inter-hospital transfer and transfer within 48 hours of referral; B) Automatic acceptance and repatriation policies; and C) rehabilitation pathways.
- Ensure improved access and equity of access to trauma services – Year 1.
- Responsible for monitoring of day-to-day capacity across the network, agreeing and working to an escalation plan (with agreed thresholds for escalation triggers) both within and across network to monitor and manage surges in demand – Year 1.
- Support capacity planning and activity monitoring for collaborative matching or demand and supply (e.g. through implementing a trauma tracking system) – Year 1.
- Ensure appropriate repatriation for ongoing 'care with treatment closer to home' – Year 1.
- Ensure the quality of the network is monitored and subject to a process of continuous quality improvement through clinical audit – Year 1.

Tactical (local) advice and support to commissioners

- Provide local information, data and intelligence to support performance monitoring of the network (i.e. TARN clinical reports, process measures, key performance and quality indicators, case-mix standardised outcomes, workforce data) – Year 1.

- Support national annual trauma peer review and assurance of the MTC, TUs/LEHs and pre-hospital services with commissioners – Year 1.
- To provide ongoing programme management of a phased implementation across the network – Year 1.
- Support local implementation of products produced by the national trauma clinical reference group (NHS England) as appropriate – Year 1.

Improved quality and standards of care

- Develop and implement network protocols for trauma patients.
- Deliver a clinical governance framework with the MTC, TUs, LEHs, pre-hospital services and rehabilitation services including a process for incident reporting with follow up action plans and network morbidity and mortality review. This includes collaborative serious incident investigation.
- Deliver a network-wide training and education programme encompassing the whole patient pathway prioritising key areas (see section 5.6)
- Implement a clinical informatics system for the network – Year 1 (see section 5.5)
- Ensuring on-going service improvements and best practice models are embedded and contribute to improved quality performance (i.e. dashboard measures) – Year 1 and ongoing.
- Monitoring of MTC and TU dashboard measures and provide advice on improvements to clinical services and commissioners – Year 1.
- Use clinical process and clinical outcome measures to compare and benchmark providers – Year 1
- Deliver an annual quality improvement and audit programme – Year 1.

Partnership development

- Engagement with third sector organisations.
- Linkage with other relevant networks (e.g. North Wales and North West Midlands Trauma Network).
- Embed communication strategy and key communication deliverables – Year 1.
- Monitoring and performance management of active engagement by members in the network to improve performance against agreed outputs – Year 1.
- Participation in relevant national policy or guideline development – Year 2

Desirable and Aspirational

Some aspects are considered desirable or aspirational. Whilst not critical to the successful implementation of the ODN, they represent future areas of development:

- A research programme focused on all parts of the trauma pathway, as a vehicle for driving improvements in patient outcome and experience. Enhanced profile of the region through sharing knowledge nationally and internationally (e.g. publications and presentations).
- An injury prevention programme in association with Public Health Wales (e.g. knife crime prevention, motorcycle safety, wearing cycle helmets).
- Sharing successful components of the ODN development with other networks, bringing benefits of the programme to other areas of healthcare.

- Utilising local knowledge and experience to support the development of trauma networks in less developed parts of the world.

The programme will consider these opportunities at future points in its development.

5.4.2 Quality Indicators

Essential quality indicators for the ODN are presented in the table below. For each quality indicator, a code is assigned, in order to cross-reference (Appendix 3). All quality indicators will need to be in place before the ODN becomes operational (i.e. before Day 1) unless indicated below. Six out of 13 quality indicators are already being met.

Quality Indicator	Currently met/unmet
T16-1C-101 - Network configuration The network structure should be identified in the network operational policy including pre-hospital services, hospitals and rehabilitation services.	✓
T16-1C-102 - Network governance structure A clinical governance structure that includes a network manager, clinical lead and a number of leadership roles, identified in the network operational policy.	✓
T16-1C-103 – Patient transfers Review of patient transfers from year 1 to include the following: • The number and proportion of patients transferred directly to MTC, including cases of significant under and over pre-hospital triage. • The number and proportion of patients that have an acute secondary transfer (within 12 hour) from a TU to MTC. • The proportion of urgent transfers that occur within two calendar days. • The number of patients with ISS ≥15 managed definitively within a TU. • The number of patients where repatriation from MTC exceeds 48hrs from when referred.	X
T16-1C-104 - Network Transfer Protocol from TUs/LEHs to MTC There should be a network protocol for the safe and rapid transfer of patients to specialist care with the following components: • A pre-hospital triage tool with specific criteria for triage of patients, based on mechanism, injury pattern and clinical condition to ensure direct transfer to the MTC or nearest TU. • A protocol for the transfer of adult patients specifying that transfers should be carried out by teams trained in the transfer of patients. This standard is already being met by the Designed for Life, Welsh Guidelines for the Transfer of Critically Ill Patients, 2016. • A protocol for the transfer of paediatric patients. This standard is already being met by the Wales and West Acute Transport for Children Service (WATCh) based in Bristol.	X ✓ ✓
T16-1C-105 - Teleradiology services There should be teleradiology facilities between the MTC and all TUs/LEHs in the network allowing immediate image transfer 24/7. This standard is already being met.	✓

Quality Indicator	Currently met/unmet
T16-1C-106 - Network wide TARN review The MTC, TUs and LEHs should participate in the TARN audit, with at least 1 year of back dated baseline data before network operational. Data should meet the following standards:	Partially met
Case ascertainment – patients submitted to TARN compared to expected based on Patient Episode Data for Wales (PEDW) dataset –target of 80% across the network by end of year 1.	X
Case accreditation - this is the proportion of key fields used in this report that are filled in for each patient submitted to TARN –target of 95% across the network by end of year 1.	X
The standards set are to ensure subsequent TARN metrics can be meaningfully interpreted.	
TARN audit should be discussed at the network audit meeting at least annually and distributed to all constituent members of the network.	X
A working plan has been produced to enhance TARN data collection including appointment of TARN coordinator(s) in health boards where gaps exist.	X
Develop strategies for undertaking TARN PROMS and PREMS in year 1.	
T16-1C-107 – Trauma management guidelines There should be network agreed clinical guidelines for the management of: • Standardised patient care. • Emergency anaesthesia and emergency surgical airway. • Resuscitative thoracotomy. • Abdominal injuries. • Severe traumatic brain injury. • Open fractures. • Compartment syndrome and vascular injuries. • Penetrating cardiac injuries • Spinal cord injury. • Severe pelvic fractures including urethral injury. • Chest drain insertion. • Pain relief for chest trauma with rib fractures. • CT imaging and imaging for children. • Interventional radiology. • Non-accidental injury in the child.	X
T16-1C-108 - Management of severe head injuries All patients with a severe head injury should be managed according to NICE guidance (Head injury: assessment and early management, 2014)	X
T16-1C-109 – Management of spinal injuries There should be a network protocol for the following: • Assessment and imaging of the spine. • Resuscitation and acute management of spinal cord injury linked with a Spinal Cord Injury Centre (SCIC) at the MTC. • Emergency transfer of spinal patients.	X

Quality Indicator	Currently met/unmet
T16-1C-110 - Emergency planning The network should have an emergency plan for dealing with a mass casualty event that is reviewed and updated annually. The integration of the All Wales Mass Casualty Plans into the network operational policy.	✓
T16-1C-111 – Network rehabilitation director There should be a network lead for rehabilitation with experience in trauma rehabilitation. The director should have an agreed list of responsibilities and time specified for the role. This has been achieved through appointment of the network rehabilitation lead	✓
T16-1C-112 - Directory of rehabilitation services, referral guidelines and education programme To form part of the network operational policy in year 1.	X
T16-1C-113 – Patient transfer policies There should be following network policies in place: • Automatic acceptance policy to the MTC for patients who are transferred from scene or arrive in a TU/LEH and need urgent transfer to the MTC. • Automatic repatriation policy ('care with treatment closer to home'). Further detail is provided in chapter 8 which covers the 'landing pad' configuration.	X

5.4.3 Collaborative Working with North Wales

In contrast to North Wales, there currently is no trauma network serving the population of South Wales, West Wales and South Powys. Therefore, there is an immediate requirement for an ODN to be established here. As the Network in South Wales is established, every opportunity will be taken to work closely with colleagues in North Wales to share good practice, benchmark and work towards equity of quality of care for the whole population of Wales. The South Wales Network will work with colleagues in the North West Midlands and North Wales Trauma Network to forge strong links and establish regular opportunities to share learning and processes.

5.4.4 Specific Patient Groups

Trauma in Older People

Given that older people represent the largest group sustaining major trauma (see chapter 2), it is important that the ODN is proactive rather than reactive. In doing so, it will take a population based approach, tailored to the ageing population of South Wales, West Wales and South Powys. Many of the principles of assessment and care are similar to those of existing fractured neck of femur pathways. Furthermore, the NHS England CRG for major trauma has recently introduced standards for the management of trauma in older people.

The development of robust systems will ensure that older people that are appropriate for specialist care will have equity of access to the MTC, whilst the majority could be managed to a higher standard and a better experience in TUs/LEHs, based on comorbidity and frailty. The table below summarises the essential additions to the ODN service specification and quality indicators above, mirroring that of the NHS England and has been approved by the network board:

Quality Indicator	Currently met/unmet
The network will develop a 'silver' trauma triage tool as an addendum to the 'standard' pre-hospital triage tool supported by trauma desk to enhance identification, leading to early senior involvement in Emergency Departments – in place before year 1.	X
Network guidelines on trauma in older people including assessment, specific sections in trauma patient record for documentation of assessment (e.g. cognition/frailty/nutritional status) and care bundle – in place before year 1.	X
Review by a ST3/equivalent or above in orthogeriatric medicine, geriatric medicine or care of elderly medicine as soon as possible and definitely within 72hrs of admission – in place years 3 - 5.	X
Early brief educational/training interventions for WAST/ED (triage nurses/trauma teams/team leaders) as part of initial programme – in place before year 1.	X

Desirable aspects include establishment of a 'silver' trauma working group within the network specifically looking at additional rehabilitation requirements, enhancing outcome assessment and a bespoke educational programme.

Veterans Trauma Network

The Veterans Trauma Network (VTN) provides a single point of referral for all stakeholders who are concerned about the medical care of a veteran with complex physical injuries, including patients, clinicians (from both physical and mental health services in primary or secondary care), third sector agencies and others. Patients eligible for management by the VTN are ex-service personnel who sustained complex physical trauma due to their service. The VTM is principally concerned with ongoing rather than acute care. Patients will be referred to the VTN when there is concern that the complex nature of their injuries means that the normal pathways in primary, secondary and tertiary care are unable to deliver the appropriate treatment.

To establish the VTN in Wales, the following will be required:

- Creation of a single point of referral for all eligible NHS Wales patients.
- Appointment of VTN clinical lead and deputy.
- Nomination of a Veterans Trauma Centre (VTC). As the MTC for most of NHS Wales, C&VUHB is the natural choice to be the VTC.
- Hosting arrangements for the VTN will be C&VUHB until the trauma ODN is established, at which point it will be hosted within the ODN management structure and SBUHB.
- Infrastructure to allow secure communication between VTN Wales and the VTN in England.
- Referral pathways for the management of identified clinical issues.
- Appropriate linkages between VTN Wales and leads for veteran's affairs in all health boards.
- Suitable governance and reporting structures to be provided by the ODN.
- Communication and stakeholder engagement strategy.

As such, it is anticipated that VTN Wales will deal with less than one patient per month once fully established. Costs of running the VTN/VTC are minimal. There will be some costs to health boards and WHSSC in terms of treatments that will be delivered once issues have been identified. However, these

will all be standard treatment costs for these conditions (or subject to individual patient funding requests if not). The cost to the ODN will be minimal. The lead and deputy will offer their clinical time from their 'military protected time'. Support functions will be absorbed within the ODN management infrastructure. Further details are included in.

5.5 Clinical Informatics Model

Informatics support is essential to improving patient outcomes through both direct support for patient care and indirectly through improving efficiency of the administration of the patient pathway. Making use of existing systems, and harnessing ongoing developments and the future plans of NHS Wales, the informatics programme seeks to reduce the burden of data entry on clinicians and administrative staff, and ensure timely, accurate information is available to patients, clinicians, and management structures, as well as commissioners.

The work stream will seek to work with health boards, trusts, and NWIS to assess the current situation, including mapping information flows relating to major trauma patients, and look at the short, intermediate and long term expectations of the network and how informatics can support this. It will also reach out to the wider UK and internationally to look at best practice and the lessons learned.

In the context of Wales informatics, significant progress has been made recently with the roll out and expansion of national systems allowing cross boundary access to patients records. This provides a unique opportunity to build on existing technologies, and use routinely collected data to track trauma patients in the network.

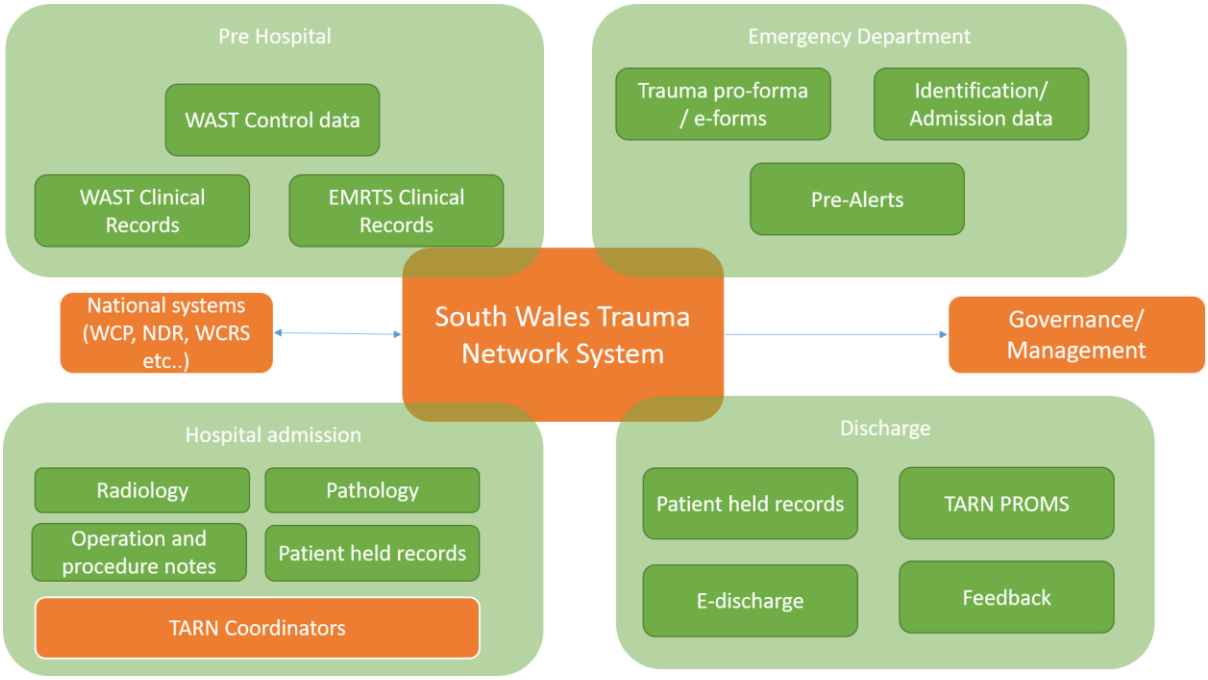
The following areas will be facilitated through the work programme:

- Implementation of a trauma clinical system
- Implementation of a central incident reporting short form, and integration with systems
- Provision of call recording to support governance process
- Development of a network wide information repository / "app"
- Integration of patient held records to support quality discharge
- Supporting training, education, quality improvement and research activities as required.

5.5.1 An Overarching Trauma Informatics System

C&VUHB are developing a bespoke clinical system to improve data collection and aid the tracking of patients across the network pathways. The informatics work programme will seek to implement this across the network, and provide a single point of access for those in involved in the care of trauma patients.

A high level overview of the anticipated landscape of the systems is included in the figure overleaf:



It is recognised the work plan is ambitious given the short time frames to 'go-live', and ongoing existing work streams in an already stretched informatics landscape. In addition, although important, major trauma makes up a very small proportion of the overall workload in NHS Wales, and will be competing with other established projects which impact far greater number of patients (e.g. introduction of new emergency department systems, implementation of electronic records in WAST).

Thus, a phased approach will need to be taken, and phased over five years. An illustration of the essential and desirable deliverables are included below, subject to change once formally handed over to the ODN.

Year	Essential	Desirable
19/20 (in place for day 1)	• Data sharing agreements in place • Pre-hospital patient reports from WAST & EMRTS to be available to TARN coordinators & Network office no more than 4 weeks following incident • WAST/EMRTS to be flagging potential major trauma cases on control systems • Up to date pre-hospital operational data available for interrogation and business intelligence dashboards • Network information "app" live • Trauma tool "app" live • All TU's to upload trauma pro-forma to document management systems that interface with national repository • CAV to be using the network trauma information system pro-actively	• Patient held records (for rehabilitation prescription) functioning • Capture of additional trauma cases in systems that are not TARN eligible, but of interest for injury prevention and service planning e.g. death at scene in HB's that have capacity (i.e. are already up to date with retrospective data collection)

	• Network incident reporting system short form live and process in place for handling cross boundary/ organisational incidents • Call recording available for non-emergency case discussions/ referrals • All TARN coordinators to have access to national instance of Welsh Clinical Portal • Network data analyst in post (training/ development with stakeholders)	
20/21	• Integration with national systems complete (to include operation notes, emergency department systems, all radiology, pathology results) • Transition to electronic clinical data capture in emergency department (replacement of trauma paper pro-forma) CAV • Patient held records (for rehabilitation prescription) functioning for MTC patients	• Transition of other TU's to electronic data capture • Export of year 1 • & year -1 data to SAIL
21/22	• Patient held records (for rehabilitation prescription) functioning for MTC patients + 2 TU's	
22/23	• Patient held records (for rehabilitation prescription) functioning for MTC patients + 4 TU's	• Patient held records (for rehabilitation prescription) functioning for 6 TU's
23/24	TARN integration 1 TARN to have direct access to the network trauma information system data including all relevant linked data to complete a TARN submission. 2 Network to have direct link to TARN data to augment data already available within NHS held datasets e.g. addition of Ps, ISS etc… in operational dashboards. 3 PROMS data to be linked back into welsh systems, and in turn into National data repository 4 Export of dataset to SAIL with 3 complete years of network operation, and to include PROMS, and TARN metrics.	• Patient held records (for rehabilitation prescription) functioning for all 8 TU's

5.5.2 Estimated Resource Requirements

An estimate of resource requirements are provided here to aid planning, and is subject to change as the work progresses with formal project management. It should be noted that work is not in established work plans, and crosses multiple stakeholders with complex integration work required in some areas. Each stakeholder may also incur additional resource requirements to complete the work, not detailed here.

Resource

Estimated resource to implement the 3 year plan are illustrated, and it is anticipated they would start 6 months prior to network go-live.

Resource	WTE	Level	Duration
Clinical Informatics support	0.1	8b	2 years

Further details around the informatics requirements for the network can be found in Appendix 15.

5.6 Training and Education Model

The development of the training and education programme for the network is being undertaken in partnership with HEIW. This will provide an excellent opportunity for the network and HEIW to implement an innovative approach to the programme both being new organisations within the landscape of NHS Wales. The principles of developing the training and education models are as follows:

- A focus on multidisciplinary training across health care providers
- The opportunity to support the development of new roles within NHS Wales (e.g. the extended role of allied health care professionals)
- Prioritise training and education in areas of highest risk and acuity
- A blended approach to the delivery of the programme using a combination of ODN led and provider led deliverables
- A strong emphasis on the evaluation of the training and education programme to inform subsequent refinements as the programme evolves

Training has been organised using the main structural elements of a trauma network organisation:

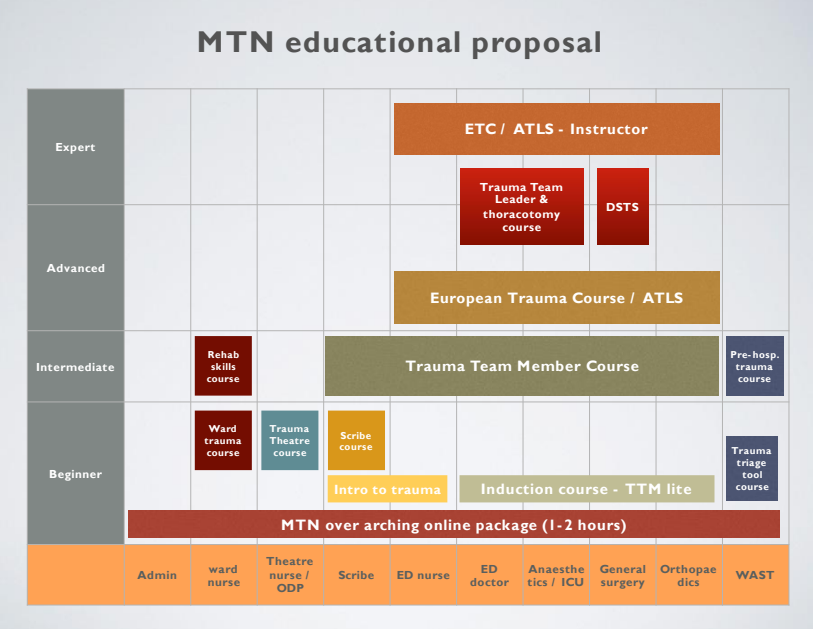
- Prehospital
- Hospital reception
- Definitive care
- Rehabilitation

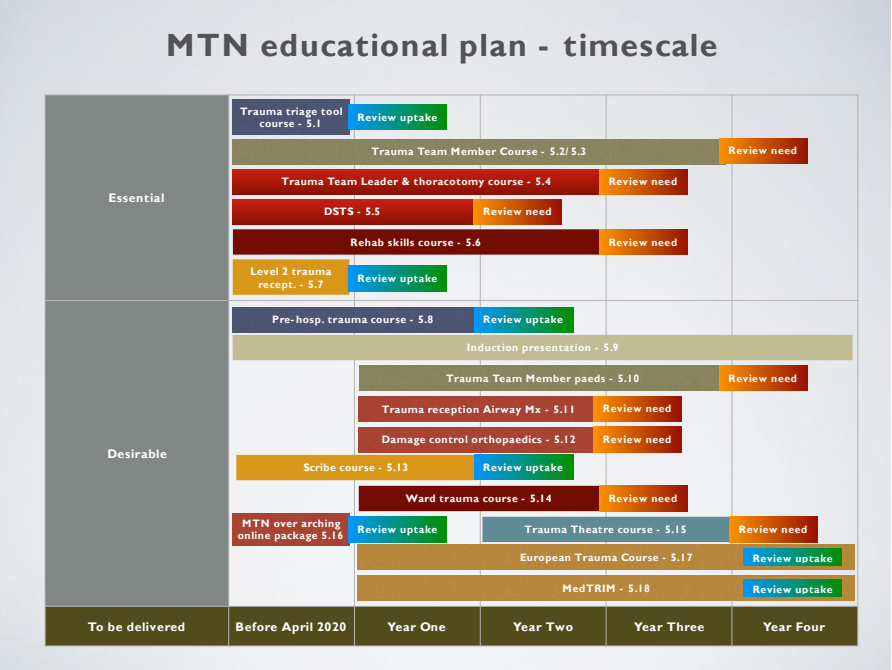
5.6.1 Learning Package Summary

Facet		Modality	Description	Governed by	Priority
5.1	**Trauma triage tool**	On-line learning	Online training package created by onclick	WAST	Essential before April 2020
5.2	**Trauma team member course on-line learning environment**	On-line learning	On line learning material to support a one day course for nurses and doctors working in trauma reception	Network	Essential before April 2020
5.3	**Trauma team member face to face course**	Classroom and scenario based learning	One day course format similar to intermediate trauma life support course	Network	Essential before April 2020
5.4	**Trauma team leader course**	Classroom and hands on learning	One day course to cover human factors and resuscitative thoracotomy	Network	Essential before April 2020
5.5	**Definitive Surgical Trauma Skills**	Classroom and dissection room course	Two day course to cover elements of damage control surgery for trauma surgeons	Network	Essential before April 2020
5.6	**Landing pad course**	Classroom based course supported by the on-line learning environment	Course for nurses working in trauma units and local emergency hospitals to aid landing pad arrangements	Network	Essential to start before April 2020
5.7	**Level 2 training for nurses working in trauma reception**	TNCC and/or APLS	National Trauma Standards recognised courses to fulfil level 2 competencies	To be managed by health boards	Essential to have 24/7 staffing before April 2020 in MTC and TU's
5.8	**Trauma skills course for prehospital staff**	Classroom and scenario based learning	One day course delivered by WAST. Train the trainers by EMRTS and quality assurance by network	WAST	To start before April 2020 in certain vulnerable areas. To be completed in year one of the network.

Facet		Modality	Description	Governed by	Priority
5.9	**Lecture given to doctors at induction**	Presentation given to doctors at their induction	To be created by the working group. Delivered to doctors working in trauma reception	Network	Desirable to deliver before April 2020
5.10	**Trauma team member course for paediatric staff**	Classroom and scenario based learning	A one day paediatric themed trauma intermediate life support course	Network	Desirable to deliver before April 2020. Essential component for year one
5.11	**Trauma course for trauma team Airway management**	Classroom and scenario based learning	A one day or half day session to support staff intubating patients in the trauma reception environment	Network created. Delivered within HB's	Desirable component for year one
5.12	**Trauma course for orthopaedic surgeons working in trauma teams**	Classroom and scenario based learning	A one day or half way session to support staff practicing damage control orthopaedics	Network created. Delivered within HB's	Desirable component for year one
5.13	**A trauma scribe course**	Classroom based learning	A one day or half day session to train HCP's to work as scribes for a trauma team	Delivered by Public Health Wales	Desirable before April 2020 and year one
5.14	**A course for ward staff looking after trauma patients**	Classroom and scenario based learning	A one day course to support nurses working on the major trauma ward	Delivered by MTC nurse educator with support from the Major trauma nurse practitioners	Desirable for year one and two
5.15	**A course for theatre staff looking after trauma patients**	Classroom and scenario based learning	A one day course to support theatre staff	Delivered by the MTC with support from the Network	Desirable for year one, two and three
5.16	**Overarching package for managers**	Online learning	An online course to support management staff	created by the network	Desirable before April 2020
5.17	**European Trauma Course**	A national gold standard course	A gold standard course	Delivered by the national group and local faculty creation	Desirable for year one onwards

Facet		Modality	Description	Governed by	Priority
5.18	**MedTRIM course**	Classroom based course	A course to promote resilience of staff working in the network	Delivered by HEIW. With support from the network.	Desirable for year one onwards
5.19	**TARN coordinator training**	Classroom based course	A course to teach TARN data collection	Delivered by TARN	Essential before April 2020 with ongoing commitment
5.20	**Trauma Practitioner training**	Classroom and scenario based learning	A course to train TU trauma practitioners	Delivered by major trauma practitioners with support from the Network	Desirable before April 2020 with ongoing commitment
5.21	**Therapists / rehabilitation co-ordinator training**	Classroom based course	A course to train therapists and rehabilitation co-ordinators	Delivered by the network	To be undertaken before March 2020





The resource requirements for in year, year one and year two will be described in the financial case see chapter 9.

5.7 Resource Requirements

In order to deliver the service specification and quality indicators outlined above, there will requirements to establish a trauma ODN management team. This represents a new component within the structure of the network and will be required to be in place in-year (i.e. 2019/20) in order to ensure the following:

- Implementation of a clinical and operational framework across the trauma pathway and work closely with all participating organisations to ensure a state of readiness for delivery of the network within the agreed timelines (see chapter INSERT).
- Suitable governance and reporting structures in place.
- Test clinical and non-clinical policies as indicated above.
- Baseline TARN data collection optimised.
- Quality assurance of key components of the training and education programme.
- Early clinical informatics structures in place to allow appropriate data collection.
- Oversee stakeholder communication and engagement.

The ODN management team will be hosted by SBUHB. Further details in relation to organisational governance are provided in management case (chapter 12). The following table summarises and provides justification for additional resource requirements, which have been developed to align with comparable networks in the UK. It highlights new posts as key enablers for the network and existing posts, where there is currently non-recurrent funding and ongoing resource requirements. In view of the requirements for in year funding of these posts, in line with the timeline for implementation of the network, a proposal has been concurrently submitted for early release of funding through the WHSSC Integrated Commissioning Plan (ICP) prioritisation process.

Role	Purpose	WTE*	Band
Network clinical director (to develop as a national role subject to agreement for ODN taking on a national function)	The network clinical lead is already in place – ongoing resources required to fund this post at point of handover to the ODN. The resource requirement is from August 2020. The purpose of this role can be split up to the following: **Strategic planning:** Provide strategic vision and direction to the entire network from a clinical perspective. Provide professional and clinical leadership across the network. Service senior clinical representative (4 Nations and Welsh Government level). Support the phased implementation of the network from a clinical perspective (including the development of an all Wales approach). **Operational delivery:** Oversee the co-ordination of patient clinical pathways between services over a wide area to ensure access to specialist major trauma care. Ensure the quality of the network is monitored and subject to a process of continuous quality improvement. **Tactical (local) advice and support to commissioners:** Provide leadership in national review and assurance of the MTC, TUs and pre-hospital services with commissioners. Support local implementation of products produced by the National Trauma Clinical Reference Group (NHS England) as appropriate. Advise commissioners on all clinical issues pertaining to major trauma services. **Improved quality and standards of care:** Oversee the clinical governance framework with the MTC, TUs, LEHs, pre-hospital services and rehabilitation services. Ensure on-going service improvements and best practice models are embedded and contribute to improved quality performance. **Partnership development:** Clinical team development and oversee the activity of network clinical lead positions and health board clinical leads. Partnership working in national clinical policy development.	0.3	Consultant

Role	Purpose	WTE*	Band
Network Manager (to develop as a national role subject to agreement)	There is a requirement to have a dedicated full time operational network manager in place – this post is new and ongoing resources required to fund this post in year to facilitate lead into the ODN. This resource is required in year. The purpose of this role can be split up to the following: **Strategic planning:** Lead on the annual working plan for the network to deliver against the quality and delivery framework Undertake comparative benchmarking and audit across the network through the Trauma Audit and Research Network (TARN). Support the phased implementation of the network from an operational perspective (including the development of an all Wales approach). **Operational delivery:** Managerial responsibility for the ODN and senior support for network clinical director. Senior responsible officer for monitoring of day to day capacity across the network, agreeing and working to an escalation plan (with agreed thresholds for escalation triggers) for both within and across network to monitor and manage surges in demand. Support capacity planning and activity monitoring for collaborative matching of demand and supply (e.g. through implementing a trauma tracking system). Work with very senior health board management to maintain necessary flow and support to nationally co-ordinated delivery. Development and monitoring of network operational policies. **Tactical (local) advice and support to commissioners:** Provide local information, data and intelligence to support performance monitoring of the network Oversee ongoing programme management of a phased implementation across the network. Senior Manager representative for the Network at relevant national commissioning functions **Improved quality and standards of care:** Lead for quality and safety. Monitoring of MTC and TU dashboards and provide advice on improvements to clinical services and commissioners**.** Use clinical process and clinical outcome measures to compare and benchmark providers **Partnership development:**	1.0	8C

	Monitoring and performance management of active engagement by members in the network to improve performance against agreed outputs.		
Sessional clinical leadership	These posts are funded non-recurrently until end of March 2020. Ongoing funding required as these roles are critical to clinical governance of the network Clinical lead functions for: Governance – policy development, assess and review all clinical governance issues, provide recommendations to the wider network. Training and education – oversee and evaluate the phased model for multidisciplinary training and education programme across the pathway. Paediatric trauma - policy development, assess and review all clinical governance issues, provide recommendations to the wider network. Quality improvement, innovation and research – improve TARN data collection as a platform for developing a QI and research programme Rehabilitation – oversee and advise on the delivery of rehabilitation services across the pathway including hyper-acute, specialist, local and community based rehabilitation.	0.1 x 5	Consultant
Network administrative support	This post is new and ongoing resources required to fund this post to facilitate lead into the ODN. This resource is required in year. The purpose of this role can be split up to the following: Administrative support, general admin duties (supporting training events, audit, communications activity etc.).	1.0	4
Programme manager	This post is funded non-recurrently until end of March 2020. Ongoing funding required. The purpose of this role can be split up to the following: Business and operational support to network clinical director and operational network roles. Senior manager responsible for line management of admin and TARN co-ordinators. Lead for network communications and engagement, with key deliverables. Lead for financial and budgetary management. Performance management lead. Responsible for all programme and project management relating to major trauma service development in Wales, as part of their phased implementation.	1.0	8B

Role	Purpose	WTE*	Band
Senior Data analyst and service improvement manager	This post is new and ongoing resources required to fund this post to facilitate lead into the ODN. This resource is required in year. Reporting and analysis of all data sets pertaining to trauma across the network (incl. TARN, operational data) for QI, research and commissioning purposes. Production of data sets and necessary development. Enabling of national and local level reporting and self-reporting. Production of routine and targeted data audits. Supporting health boards in the development of and reporting on TARN data.	1.0	7

*WTE – whole time equivalent

5.8 Key Challenges

From the above the following themes have emerged:

- The maintenance of optimal patient flow between the MTC and TUs is critical to ensuring the network can deliver its benefits realisation plan.
- Complex commissioning arrangements with multiple commissioning bodies involved, leading to a lack of accountability across the pathway. There is a risk that no one commissioner has oversight or commissioning influence over the entire patient pathway.
- The inability of the trauma ODN board to hold organisations to account since it will not have a direct commissioning remit and will be acting in a professional capacity in relation to developing responses to clinical and operational governance issues. An inability to be effective at maintaining 'operational delivery', given the complexity of commissioning arrangements and multiple providers.
- The design must recognise that NHS Wales's policy is to follow a route of planning and partnership working instead of incentivisation and an internal market.

5.9 Issues Arising for Resolution

- Management of and responsibility for escalation
- Management of and responsibility for interventions
- Management of and responsibility for workforce development
- Provision of coordination, advice and professional steer for workforce related matters
- Management and responsibility for service improvement

5.10 Options to the give the ODN Meaningful Operational Authority

In the interim options to give the ODN, operational authority include:

- The ODN (and therefore the 'host' organisation) – has some financial responsibility for contracting and managing aspects of performance or delivery of the pathway in order to maintain authority.

- The ODN Board could, with the correct membership and 'Terms of Reference', discharge an effective commissioning and performance management support function – would require EASC and WHSSC to be appropriately represented and engaged.

Arrangements for the delivery and management of the ODN are described in the management case (see chapter 12).

6 Pre-Hospital Care and Transfers

6.1 Introduction

This chapter sets out the case for improvements in the delivery of pre-hospital care and inter-hospital transfers of major patients, as part of establishing the trauma network. It summarises the service specification and quality indicators in relation to the current position of services.

Building on this, the chapter describes in detail the resource implications for WAST in terms of increased ambulance journeys resulting from direct and secondary transfers to the MTC. The chapter also considers the requirements for ensuring timely repatriation for 'care with treatment closer to home' within this context. The preferred option for online and phased face-to-face training of ambulance service personnel is discussed, expanding on section 6.3.5. Finally, this chapter describes the development of a dedicated trauma desk facility as a key coordinating function within the network structure.

The details provided here in relation to the WAST case have been considered within the context of the professional peer review that took place on the 13th August 2019.

For completeness and information, this chapter also sets out the requirements for 24/7 availability of EMRTS in South Wales aligned with the timeline of the network becoming operational. At the time of writing, EMRTS 24/7 development in South Wales had been approved and recruitment of posts had commenced. Whilst the resource requirements for this are not provided in this case, the delivery of the service is a pivotal development and has the support of the network.

6.2 Service Specification and Quality Indicators

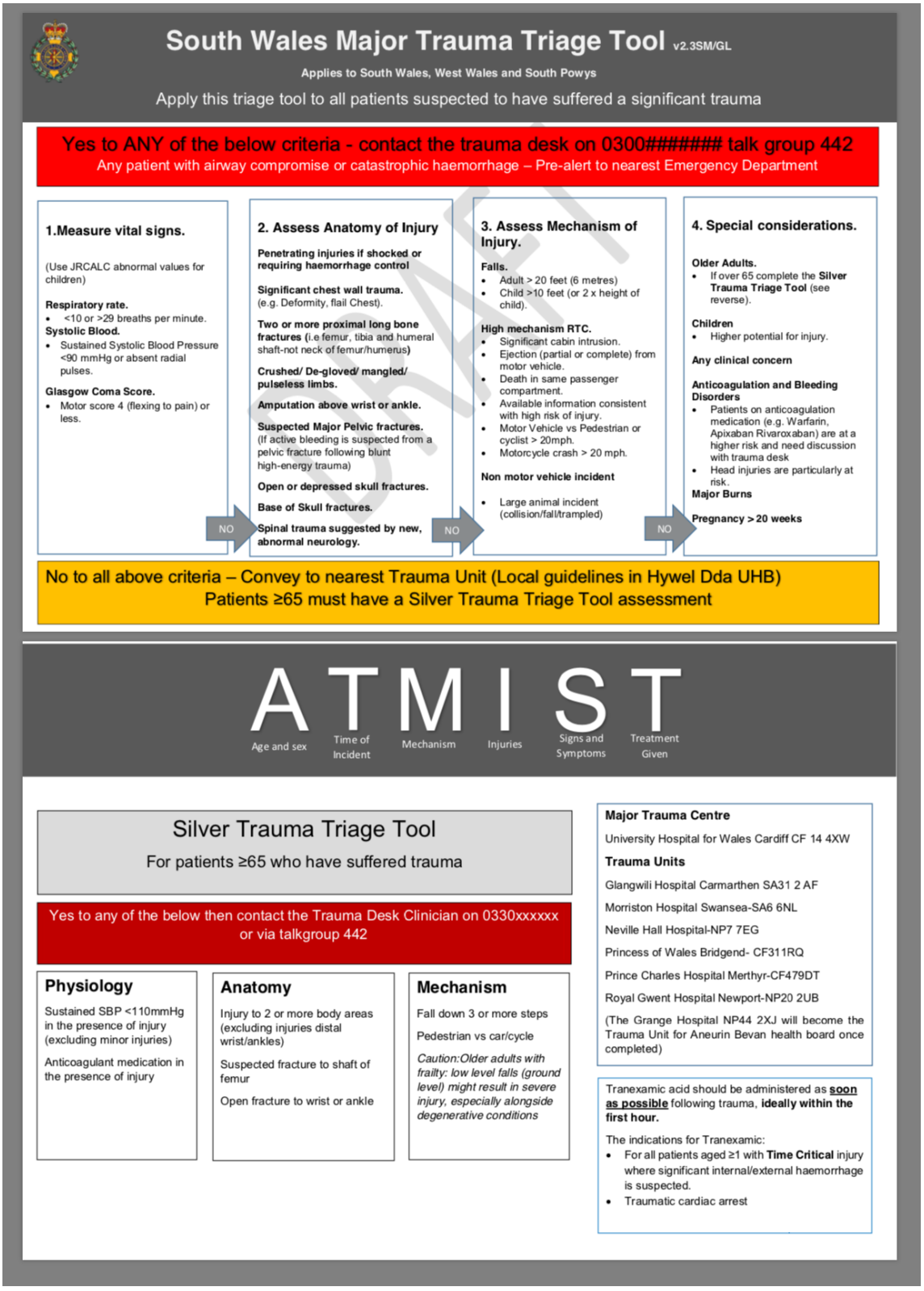
6.2.1 Pre-Hospital Care

Pre-hospital Trauma Triage Tool

The introduction of a network pre-hospital triage tool at the scene of incidents will bring about a significant change in triage decision-making by all pre-hospital providers. The purpose of a pre-hospital triage tool is to make informed decisions in relation to disposition, based on the mechanism of injury, injury pattern and clinical condition of the patient. In many cases, this will support providers to bypass the local emergency department and take the patient directly to the MTC at UHW, TU with specialist services at Morriston Hospital, or the nearest TU. Whilst EMRTS currently bypasses local emergency departments and take patients directly to specialist care, there is no mechanism for other providers such as WAST to undertake this consistently. This concept is not new to WAST in other clinical instances given that ambulance crews routinely convey heart attack and stroke patients over significant distances direct to specialist care.

Currently there is no standardised national pre-hospital triage tool available, although work has started to develop one. Current pre-hospital triage tools are all similar in terms of their triage accuracy; however, a key difference is whether a time-to-MTC rule is applied. Using this rule, if a patient is triage tool-positive (i.e. is a 'candidate' major trauma patient) and is within 60 minutes by road from the MTC, the patient is taken there directly. Outside 60 minutes, the patient goes to the nearest TU. The exception to both these rules is if the patient has signs of airway compromise and/or catastrophic haemorrhage. In these cases, the crew will take them to the nearest emergency department. With the development of a national trauma desk facility (see below), there is opportunity to support providers make individualised decisions about the disposition of patients that are less based on the time to MTC rule. For example if a patient is triage positive and 70 minutes from the MTC, logically they should go

direct to the MTC. The copy of the proposed network triage tool is provided below, for which decision-making is supported by the presence of a trauma desk facility:



South Wales Major Trauma Triage Tool v2.3SM/GL

Applies to South Wales, West Wales and South Powys

Apply this triage tool to all patients suspected to have suffered a significant trauma

Yes to ANY of the below criteria - contact the trauma desk on 0300####### talk group 442

Any patient with airway compromise or catastrophic haemorrhage – Pre-alert to nearest Emergency Department

1.Measure vital signs.

(Use JRCALC abnormal values for children)

Respiratory rate.
- <10 or >29 breaths per minute.

Systolic Blood.
- Sustained Systolic Blood Pressure <90 mmHg or absent radial pulses.

Glasgow Coma Score.
- Motor score 4 (flexing to pain) or less.

NO

2. Assess Anatomy of Injury

Penetrating injuries if shocked or requiring haemorrhage control

Significant chest wall trauma. (e.g. Deformity, flail Chest).

Two or more proximal long bone fractures (i.e femur, tibia and humeral shaft-not neck of femur/humerus)

Crushed/ De-gloved/ mangled/ pulseless limbs.

Amputation above wrist or ankle.

Suspected Major Pelvic fractures. (If active bleeding is suspected from a pelvic fracture following blunt high-energy trauma)

Open or depressed skull fractures.

Base of Skull fractures.

Spinal trauma suggested by new, abnormal neurology.

NO

3. Assess Mechanism of Injury.

Falls.
- Adult > 20 feet (6 metres)
- Child >10 feet (or 2 x height of child).

High mechanism RTC.
- Significant cabin intrusion.
- Ejection (partial or complete) from motor vehicle.
- Death in same passenger compartment.
- Available information consistent with high risk of injury.
- Motor Vehicle vs Pedestrian or cyclist > 20mph.
- Motorcycle crash > 20 mph.

Non motor vehicle incident
- Large animal incident (collision/fall/trampled)

NO

4. Special considerations.

Older Adults.
- If over 65 complete the **Silver Trauma Triage Tool** (see reverse).

Children
- Higher potential for injury.

Any clinical concern

Anticoagulation and Bleeding Disorders
- Patients on anticoagulation medication (e.g. Warfarin, Apixaban Rivaroxaban) are at a higher risk and need discussion with trauma desk
- Head injuries are particularly at risk.

Major Burns

Pregnancy > 20 weeks

No to all above criteria – Convey to nearest Trauma Unit (Local guidelines in Hywel Dda UHB)
Patients ≥65 must have a Silver Trauma Triage Tool assessment

A Age and sex
T Time of Incident
M Mechanism
I Injuries
S Signs and Symptoms
T Treatment Given

Silver Trauma Triage Tool

For patients ≥65 who have suffered trauma

Yes to any of the below then contact the Trauma Desk Clinician on 0330xxxxxx or via talkgroup 442

Physiology

Sustained SBP <110mmHg in the presence of injury (excluding minor injuries)

Anticoagulant medication in the presence of injury

Anatomy

Injury to 2 or more body areas (excluding injuries distal wrist/ankles)

Suspected fracture to shaft of femur

Open fracture to wrist or ankle

Mechanism

Fall down 3 or more steps

Pedestrian vs car/cycle

Caution:Older adults with frailty: low level falls (ground level) might result in severe injury, especially alongside degenerative conditions

Major Trauma Centre

University Hospital for Wales Cardiff CF 14 4XW

Trauma Units

Glangwili Hospital Carmarthen SA31 2 AF

Morriston Hospital Swansea-SA6 6NL

Neville Hall Hospital-NP7 7EG

Princess of Wales Bridgend- CF311RQ

Prince Charles Hospital Merthyr-CF479DT

Royal Gwent Hospital Newport-NP20 2UB

(The Grange Hospital NP44 2XJ will become the Trauma Unit for Aneurin Bevan health board once completed)

Tranexamic acid should be administered as **soon as possible** following trauma, **ideally within the first hour.**

The indications for Tranexamic:
- For all patients aged ≥1 with **Time Critical** injury where significant internal/external haemorrhage is suspected.
- Traumatic cardiac arrest

WAST have developed an adult and paediatric triage tool, which has been approved and will be owned by the ODN. Furthermore, and in keeping with the ODNs aims of adopting a population-based

approach to its design, this includes a triage tool specifically for trauma in older people, otherwise termed a 'silver triage tool.' It is widely recognised that generic pre-hospital trauma triage tools are poor at identifying trauma in older people. By incorporating factors like low mechanisms of injury, differences in vital signs and presence of anticoagulation, a 'silver triage tool' increases identification of major trauma in older people. This has the effect of improving pre-alerting to receiving hospitals and activation of trauma teams, without over triage to the MTC.

All pre-hospital providers will adopt the pre-hospital trauma triage tool across the region (including Search and Rescue Services). As the tool will change patient flow, the tool will come into use at the time the ODN becomes operational and the MTC/TUs are in a state of readiness. In the meantime, familiarisation training for all WAST personnel will commence as described below.

Quality Indicators

In addition to the above specification, there are a number of essential quality indicators presented in the table below. Each quality indicator has an assigned code in order to cross-reference (Appendix 3). All quality indicators will need to be in place before the ODN becomes operational (i.e. before day 1) unless indicated below. Presently these quality indicators are only being partially met.

Quality Indicator and how met	Currently met/unmet
T16-2A-101 – Pre-hospital care clinical governance The pre-hospital providers should be part of the clinical governance structure for the network and send a representative to the network governance meetings. This will be met through the introduction of the ODN as described in the management case (see Chapter 12)	X
T16-2A-102 – 24/7 senior advice for the ambulance control room There should be an advanced paramedic or a critical care paramedic present in the ambulance control room 24 hours a day. This senior clinician should have 24/7 telephone access to pre-hospital consultant advice. This standard is partially met through the availability of the EMRTS air support desk (ASD) and remote 'Top Cover' consultant support, albeit 12 hours/day. The 'Top Cover' consultant support is limited overnight. As indicated in the WAST case below, plans will be put in place to develop a national trauma desk facility, co-located with the existing ASD. The desk will serve the following roles: • Notified by providers of all triage positive and triage equivocal cases to support decision making on assessment, management and disposition. • Interface between providers and receiving hospital for passing pre-alert information. • Retrieval coordination role for all moderate and major trauma transfers. • Major incident/mass casualty coordination. The ASD Critical Care Practitioner (CCP) and remote EMRTS 'Top Cover' consultant will support the desk. Benefit will come from a national approach, serving both regional trauma networks. The ASD will subsume the trauma desk function overnight as part of the expansion of the EMRTS operational hours	Partially met

Quality Indicator and how met	Currently met/unmet
T16-2A-103 – Dedicated enhanced care teams available 24/7 Enhanced care teams should be available in the pre-hospital phase 24/7 to provide care to the major trauma patient. This standard is already being provided 12 hours/day (8am-8pm) by the EMRTS and ad hoc overnight by voluntary doctors. It has been agreed that the service will be expanded to 24/7 in line with the network becoming operational. The configuration will remain consultant led and delivered, with CCPs responding by air or road from South Wales. Provision will be made for overnight ASD cover to support tasking.	X
T16-2A-104 – Clinical management protocols There should be protocols in place for the pre-hospital management of major trauma patients which includes: • Airway management. • Chest trauma. • Pain management for adults and children including advanced. analgesia options (i.e. ketamine) • Management of major haemorrhage including: the administration of tranexamic acid, application of haemostatic dressings, application of tourniquets and application of pelvic binders All providers already manage patients who have sustained major trauma in line with national standards (Joint Royal Colleges Ambulance Liaison Committee) and therefore meet all of the above already. However given increased distances over which patients will be conveyed, WAST will be undertaking some refresher training on the above. It should be noted that WAST paramedics do not routinely provide advanced analgesia with ketamine, although this is being identified as an area of development. Currently, EMRTS and voluntary doctors provide this.	✓
T16-2A-105 - Hospital Pre-Alert and Handover There should be a network wide agreed pre-alert system with effective communication between pre-hospital and in-hospital teams. This should include documented criteria for trauma team activation and patient handover. Although the above exists, delivery is not consistent across the region. The pre-alert communication system will be built into the pre-hospital triage tool function and trauma desk capability. Standard trauma team activation criteria will be developed by the ODN.	Partially met

6.2.2 Inter-Hospital Transfers

There will be no change to existing arrangements for inter-hospital transfers. EMRTS or the hospital to transfer team will continue undertake critical care transfers by air or road. These transfers will continue to be monitored and quality assured by EMRTS and the Critical Care Network, respectively. Through the availability of resources from the Critical Care Implementation Group, opportunities exist to develop a non-urgent critical care transfer service as described in Chapter 2. WAST will continue to manage non-critical care transfers and repatriations. Increased ambulance journeys have been reflected in the WAST case below.

The availability of 24/7 EMRTS and trauma desk facility for coordination and delivery of trauma transfers will enhance the quality of these transfers and reduce the pressure on hospital transfer teams.

6.3 Welsh Ambulance Service

6.3.1 Context

The internal and wider context for WAST as a critical enabler for the success of the network is described in Chapter 3. However, the ambulance service will be unable to play this leading role within the network unless appropriately resourced. Whilst the anticipated numbers of patients being cared for within this new model are not expected to change from historic numbers, the new clinical model for major trauma will result in the ambulance service making many more 'new' journeys; journeys which may often involve significant distance. Existing resources may be taken out of their local area for much longer periods.

These longer journeys will also result, in some cases, patients needing to be cared for by ambulance crews for much longer. This will be a significantly different way of working for WAST staff and they will need support to ensure they can care for their patients to an optimal level. Failure to ensure both these aspects are fully acknowledged and commissioned will ultimately result in the erosion of wider operational performance and patients not being conveyed to the right location first time.

WAST makes ongoing commitments within its integrated medium term plans (IMTPs) to be a full and active partner in supporting the successful delivery of a major trauma network for South Wales, West Wales and South Powys. However, as a commissioned service through EASC current and future plans will stop short of being able to offer assurance on the service being fully funded from an ambulance perspective until all of the elements of the new service have been agreed and funded by the commissioners.

6.3.2 Description of the Clinical and Operational Model for WAST

WAST's clinical and operational model that will support the major trauma network will be complementary to the organisations nationally agreed clinical model as shown below:

Designed with permission using the CAREMORE® 5 Steps. Copyright, 2017 WAST.

Step Two – Answer my call

All calls that the Ambulance receives via 999 are classified as follows:

RED – BLUE LIGHTS	**Immediately life-threatening calls**	Multiple dispatch Blue light emergency response
AMBER – BLUE LIGHTS	**Life-threatening / Serious calls**	Blue light emergency response
GREEN 2 and 3– NORMAL ROAD SPEED	**All other calls**	Face to face response Clinical telephone assessment

The vast majority of major trauma cases will be classified as a red response – immediately life threatening.

Step Three – Come to see me

Effective pre-hospital decision-making will take place within this step and decisions will be taken about the most appropriate response to send to each case - WAST, EMRTS or both.

This decision process would be facilitated by a trauma desk facility located within the Ambulance Services Clinical Contact Centre and co-located with the EMRTS ASD.

It is the assumption of this business case that EMRTS will be a 24/7 service by the time the trauma network goes live.

Step Four – Give me treatment

WAST has developed a pre-hospital triage tool in conjunction with the network, which will be used to support pre-hospital decision making at this step with regard to direct transfer from scene to the MTC in appropriate cases. Good discussions have taken place with all stakeholders and refinements have been made to the tool following the professional peer review.

This tool will be supplemented with live clinical decision support of a major trauma desk (see section 6.3.6) for more borderline cases.

Step Five – Take me to hospital

Decision taken in step 4 guided by the effective use of the two major trauma triage tools will then determine if in this stage patients are conveyed to the nearest TU or directly to the MTC.

6.3.3 Phased Implementation

In an approach that is complementary to an underlying principle of the wider trauma network board, WAST is taking a 'phased approach' in regards to support of the network. WAST are committed to ensuring that the network is safe and effective on delivery and that from this point forward the service will be on a trajectory of continued improvement and maturity.

In this respect, a phased approach is outlined below:

	Activities	Why?	Additional Resource Required
Essential in place For Day 1	• Trauma Triage Tools	Supports patients being apparently triaged and conveyed to most appropriate location	See section 6.2.1
	• Online training for staff in relevant geographical areas	Further supports paramedic triage of patients and convey of patient to most appropriate location	See section 6.3.5
	• Trauma Support Desk / Expansion of EMRTS Desk to fulfil this function	Final line of support in triage of patient by offering clinical leadership to on scene paramedics. Ensures	See section 6.3.6

	(including recruitment of relevant posts)	most appropriate on scene car is provided and plays a system co-ordination role	
	• Agreement on commissioned activity levels for year 1	Ensures WAST is deploying the most appropriate amount of resources on any given day and that the go live of the network does not destabilise wider WAST operational performance and its ability to attend other non-major trauma cases in the community.	See chapter 12
Essential in Year 1	• Commencement and completion of 'face to face' staff training • Governance structure in place both network wide and internal to WAST (where relevant) to support decision-making. • Transfer and discharge service		See section 6.3.5
Essential in Year 2-3	• Ongoing data collection • Dedicated EMRTS vehicle		
Essential in Year 4-5	• Ongoing data collection		
Desirable & aspirational goals	• It is desirable for some face to face training to begin prior to go live		

The following specific governance arrangements have been agreed for training and are reflected in the management case:

Pre-hospital triage tool –the network will 'own' this tool as indicated above:

- Responsibility – WAST will be responsible for developing the tool.
- Accountability – Network board will approve the tool. Monitoring of the tool through the ODN Board on behalf of WHSSC/EASC, however this will require data from WAST on compliance/health board issues.
- Consulted – WAST clinical governance/EMRTS/network governance subcommittee.
- Informed – Providers (online & face-to-face training).

Online & face-to-face training:

- Responsibility – WAST will be responsible for developing both of these elements.
- Accountability – EASC.

- Consulted – WAST learning and development and network training and education lead
- Quality Assure – EMRTS (as preferred provider).
- Informed – Providers.

6.3.4 Additional Resource Requirements for Increased Ambulance Journeys

WAST have identified that the development of a trauma network will have a significant impact on its resources. In beginning to quantify and understand these implications, a number of existing policies, Welsh Health Circulars and agreed stances of EASC have been considered. These include:

- WHC (2017) 008 NHS Wales Policy for Repatriation of Patients.
- Designed for Life Welsh Guidelines For The Transfer Of The Critically Ill Adult.
- Developing a Once for Wales approach to quantifying the impact of Health Board strategic service changes (26 June 2018).

In noting the documented implications on the Ambulance Service in these papers, it is important to note that it has been necessary to use a number of assumptions over and above those used in the production of the dataset approved by the network board, which is the basis of the whole networks planning.

Individual assumptions used for particular areas are clearly documented in the relevant section of this paper. An executive decision of the organisation was taken that where assumptions need to be used that 'worst case scenario' assumptions should be used.

In light of this, it is highly recommended that after year one of the service when accurate 'actual' activity has been collected that further commissioning discussions are held regarding pre-hospital conveyance, secondary conveyance, repatriations and follow up rehabilitation activity.

Emergency Conveyance Times (job cycle times)

The implication here derives from the fact that traditional suspected major trauma cases would have been conveyed from scene to the nearest appropriate hospital. The new model will see the patient either conveyed to the nearest TU or direct to the MTC at UHW, Cardiff.

The following assumptions are made:

- NHS Wales is collectively unable to determine exactly where suspected major trauma incidents take place. To mitigate this an assumption has been made that they all happen at the hospital site to which they would have been conveyed under the existing model. This is clearly not reality.
- Because existing incident locations are not known, existing conveyance distances/times have not been able to be deducted to understand the 'new' element of activity.
- HDUHB have engaged with the public on the status of Bronglais General Hospital and Withybush General Hospital within the new model. It has been confirmed that both sites will become rural trauma facilities for the purposes of major trauma. On the basis of this, the WAST submission assumes that the forecast of activity for these hospitals will initially be conveyed to Glangwili General Hospital only.
- It has been agreed between WAST, EMRTS and Office of the Chief Ambulance Service Commissioner that there should be no attempt to split the total activity requiring conveyance between WAST and EMRTS and that instead it is clinically appropriate to model on the basis that WAST will have a role to play in all initial 999 major trauma calls.

Secondary Transfers (transfer from TU to MTC)

The implication for the ambulance services derives from the fact that in some cases it will be appropriate for the patient to be conveyed to the MTC via a TU, for example for stabilisation.

Within the traditional model it would have been unlikely for the patient to have ever been moved from the destination of their first conveyance thus this re presents new activity for WAST.

Repatriations (back to TU and/or patients local district general hospital (DGH), to specialist rehabilitation, home or home of a carer)

Whilst repatriations will have been a feature of current service provision there are 'new' implications for WAST in that there will now be a greater number of people in UHW that will need repatriation for 'care with treatment closer to home.'

The following assumptions are made:

- Some data exists to project the proportion of patients who will die as a result of their injuries whilst in UHW and those who will require repatriation or transfer to specialist rehabilitation sites (and thus these numbers are built into modelling).
- No data exists to indicate that when a patient is ready to be discharged home/nursing home/ home of carer etc. how they return to these places. It has therefore been assumed that WAST will undertake all of these transfers.
- In addition to the above, existing places of residence and other key data information that determine where patients might need to be conveyed to does not exist. Therefore, modelling is always based on returning to the patient's local DGH. This will not reflect reality.
- A lack of data means it is not possible to understand existing repatriation distances/times and to deduct it in order to understand the 'new' element of repatriation activity.
- Repatriations will be undertaken by the WAST Urgent Care Service and Non-Emergency Patient Transfer Service crews in line with existing NHS Wales policy.

6.3.5 Staff Training and Education

Background and Proposed Approach

The system of major trauma network proposed for South Wales, West Wales and South Powys will require the transport of patients with identified injuries to the MTC. A trauma triage tool (and where appropriate 'silver' triage tool) would be used to identify patients who fall into the major trauma category and these patients would be taken directly to a MTC for optimal care.

This may require WAST Emergency Medical Service staff to manage patients with serious traumatic injuries for longer periods of time. This will require training in the management of trauma patients using the current trauma equipment supplied by WAST. It will also be necessary for staff to undertake training in using the pathway and familiarisation with the trauma network.

Whilst many of the organisations Emergency Medical Service colleagues get 52 hours continuous professional development time, others receive less (it is hoped that this allocation will be standardised across all staff in this group once an internal roster review exercise has been complete). In addition there is a long standing agreement with the organisations trade union partners that only 15 hours of total CPD time is 'directed' by the organisation

The organisation recognises that the annual CPD programme for WAST colleagues would usually be the best option for delivery of such training, however, the directed 15 hours' time for the next year

has been ring-fenced for the Band 6 education process (which has been planned since 2017) and other standard mandatory training which staff are required to undertake.

Mandating staff to also use their CPD hours for the required major trauma training would require detailed conversations with our trade union partners to extend the number of CPD hours which the organisation currently ring-fences. Early discussions with trade union partners have begun but at this moment in time, negotiations are ongoing. This business case is therefore predicated on the assumption that CPD hours cannot be utilised as this represents the worst-case scenario financially for commissioners to plan against.

WAST is the only provider of emergency transport in Wales, operating in a complex environment in terms of geography and topography. Whilst the establishment of the trauma network presents many benefits and opportunities, it should be recognised that it compounds existing service delivery challenges. WAST must ensure that practitioners are fully equipped in terms of decision making and clinical intervention skills to fully support this initiative.

WAST currently operates from 105 sites across Wales meaning that education and training of colleagues is not a straightforward task. It is important that we recognise and utilise the expertise of EMRTS colleagues in relation to trauma in order to ensure quality of learning. Support is therefore required from EMRTS colleagues in relation to delivering "train the trainer" sessions for our staff and quality assurance of our delivery.

Potential delivery options have been reviewed in collaboration with the network clinical lead and network training and education lead and the preferred option is set out below:

- All colleagues complete the eLearning module (1 hour) before the network goes live. This learning will be provided in workbook format for those colleagues who require it.
- EMRTS have agreed to carry out 'Train the Trainer' training and quality assurance for WAST as part of their business as usual. Following this colleagues will then receive a 1-day (7.5 hours), face-to-face trauma network training session delivered by the recruited trained WAST tutors. These roles will need to be filled on a secondment basis, as the existing small education and training delivery team in WAST is fully committed to a challenging workforce/training plan. Additionally, there will be a need to recruit a trauma network lead tutor to oversee delivery, recording and reporting.

The team would comprise:

- 1 x lead tutor (responsible for overseeing project delivery and reporting and delivery of training) – 12 month secondment at band 7.
- 3 x tutors (responsible for delivery of training) – 3 x 7 month secondments (delivery of South Wales training) and 3 x 5 month secondments (delivery of Mid and North Wales training) all at band 7.

WAST recognises that whilst the face-to-face training is a one-off cost it will still represent a significant investment from the wider system which commissions Ambulance Services in Wales. Detailed conversations have taken place not only internally but also with the network board, commissioners and through the external peer review exercise as to the most appropriate way to roll out this training.

Discussions allowed three options to be considered:

- Do nothing – have no face-to-face training.

- Conduct face-to-face training of all staff during 2020/21 with a prioritisation of staff in the most geographically important areas of Wales during quarter 1.
- Phase training over three years with a prioritisation of staff in the most geographically important areas of Wales during 2020/21.

Option one was immediately discounted because of the significant impact of quality of service provision and the wider implications this would have for the success of the network.

A SWOT analysis of options two and three were subsequently undertaken. This has resulted in option 2 being the preferred option.

Benefits of this approach:

- Timely delivery
- High quality training
- Appropriately skilled workforce
- Existing training plan is not adversely affected – ensure business continuity
- Enhanced trauma management skill set for colleagues across Wales
- Fully supports the Trauma Network initiative.

Online Training

The preferred supplier is Onclick, as WAST is already using this company for other eLearning. Onclick is building a good portfolio of eLearning packages and remains competitive in this field. The eLearning will include design and development of interactive major trauma triage tool, for installation on the WAST Learnzone. It will include instructional design and copywriting of content, custom graphic design and eLearning build. There will also be a bank of multiple choice questions, case study-based assessment to be built within a learning platform, with certification on successful completion. Further signposting and resources to be embedded within WAST Learnzone. A scheduled report to be set up for WAST and South Wales Trauma Network. The duration of eLearning will be 1 hour. Back fill costs will be required for this.

Face-to-Face Training

The total number of staff requiring training is 1434 including:

- Paramedics (band 6): 949.
- Advanced Paramedic Practitioners (band 7): 19.
- Advanced Emergency Medical Technician / Emergency Medical Technician (band 5): 92.
- Emergency Medical Technician 1 / Emergency Medical Technician 2 (band 4): 374.

Costs are provided in the financial case for one lead tutor (band 7), three tutors (band 7) and backfill costs for staff. Equipment costs are also presented here for the training sessions.

Risks, Issues and Dependencies

This training requires the full support of WAST operational teams and resource departments to ensure staff attendance to maximise educator-to-student ratio. Support is required from EMRTS in terms of "train the trainer" delivery and quality assurance. Support from area managers (WAST) is required in relation to accessing suitable teaching spaces at existing WAST sites. Success is dependent on availability of funding and allocation in a timely manner. The model requires full support of WAST

operations directorate to release four colleagues to facilitate this training (lead tutor and tutor roles) on a secondment basis. Full support from the clinical and medical directorate is required, in terms of provision of advice, guidance and support from health board clinical leads/consultant paramedics. Support from and collaboration with trade union partners is also required, as well as engagement from staff.

6.3.6 Trauma Desk Facility

In order for step two of our clinical model to operate as effectively as possible in the context of major trauma, new arrangements within WASTs Clinical Contact Centres are required and an effective major trauma desk is an absolute requirement from day one of a live network.

A field visit was made in 2019 to the West Midlands Ambulance Service Trauma Desk, who have been supporting their major trauma networks for five years. That visit has enabled us to see how best a major trauma desk is configured for the Welsh context.

Options considered included:

1. The status quo. No changes to existing practices and should paramedics on scene have queries regarding a patients suitability for conveyance to the MTC then dialogue directly with on-call MTC consultants takes place.

2. There is suitable expansion of the EMRT Air Support Desk (ASD) in order for this service to co-ordinate the pre-hospital element of the network.

3a. The creation of a separate 'WAST' major trauma desk which works conterminously with the existing EMRTS ASD, is staffed by a band 7 clinician and operates 24/7.

3b. As above but with reduced operational hours. 14/7 (hours of the day being 0800-2200) and the function 'falling back' to the EMRTS ASD out of hours.

4a. The creation of a separate 'WAST' major trauma desk, which works conterminously with the existing EMRTS ASD, staffed by an additional allocator band 5 role and operates. 24/7.

Here the clinical decision-making would rest with the EMRTS Critical Care Practitioner on the desk with the band 5 freeing up the CCP to make the clinical decisions, rather than undertaking non-clinical communication duties.

4b. As above but with reduced operational hours. 14/7 (hours of the day being 0800-2200) and the function 'falling back' to the EMRTS desk out of hours.

Option 3b has been identified as the preferred option.

The creation of a separate 'WAST' major trauma desk which works conterminously with the existing EMRTS ASD, is staffed by a band 7 senior paramedic and operates 14/7 (hours of the day being 0800-2200) and the function 'falling back' to the EMRTS ASD out of hours.

EMRTS have confirmed that they are supportive of this preferred approach and it is recognised that the working relationship with the ASD staff is vital to the success of the desk.

To support the operation of the WAST Trauma Desk it is essential that the clinicians maintain their clinical skills within a face-to-face role. Therefore, to facilitate this rotation between the Trauma Desk and operational setting, it is vital to create capacity in the clinician's roster hours to enable patient

contact and the maintenance and development of clinical skills. Therefore, whilst draft versions of this business case have shown a necessity for 3.48 WTE this has been scaled up to 4 WTE to allow the aforementioned rotation.

6.3.7 Transfer and Discharge Model

With many more journeys relating to Major Trauma taking place across South Wales, West Wales and South Powys the establishment of a function to effectively and efficiently co-ordinate these journeys will be critical.

An expanded additional call handler/dispatcher resource will provide the required capacity to ensure the safe delivery of journey co-ordination. However, the need for an effective and efficient co-ordination of journeys function is not limited to the changes planned for major trauma. It will play an equally critical role in the success of other strategic developments across NHS Wales such as the opening of the Grange University Hospital in Aneurin Bevan University Health Board.

In recognising this both the WAST and EASC IMTPs make the commitment to develop a proposal for All Wales Transfer and Discharge service within 2019/20. The creation of the trauma network has been identified as being the ideal 'spring-board' for the potential creation of this test service that can be trialled and evaluated prior to wider rollout across Wales. A wider piece of work is being taken forward by WAST, EASC and Health Boards to determine what the preferred model could look like. However, for the purposes of this business case an assessment has been made as to what funding maybe required supporting transfer and discharging service for major trauma. The figure represented in the business case for this part of the service represents the additionality in activity that is forecast to be created by the network.

6.4 Emergency Medical Retrieval and Transfer Service (EMRTS)

This section provides an outline of a review undertaken to allow the phased 24/7 development of the EMRTS. t is referenced here for completeness and for information only, as the first phase of expansion has already been approved and the service model and timeline is congruent with the network development. There is a key dependency on service expansion and the network development as illustrated by the above quality indicators. This case does include the financial case for the service expansion as this has been considered separately by EASC.

The purpose of this review was to explore the options for the proposed expansion of the EMRTS in response to the Welsh Government Gateway Review in May 2017 and correspondence from the Chief Executive Officers, NHS Wales in June 2018.

This review provided comprehensive information on the establishment of the EMRTS in April 2015, an organisation overview and details of the current service model. Following discussion with stakeholders, it was agreed that the scope of the project would include:

- Extension of EMRTS operating hours.
- The ASD to operate in line with EMRTS operating hours.
- Options that address the main peak of unmet demand.

The key investment objectives, agreed with stakeholders, align with those of the network and describe what the project was seeking to achieve and provide a basis for post-project evaluation.

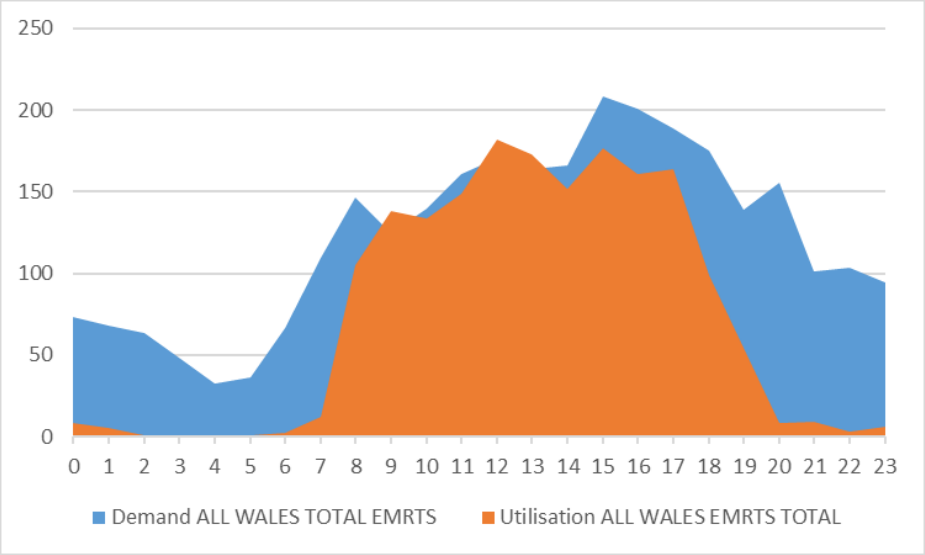
A three-year evaluation report builds on this work and will be published in 2019. This will provide a detailed analysis of the benefits delivered by EMRTS against the benefits set out in the relevant Strategic Outline Programme and Business Justification Cases and set out an approach for the robust management of benefits going forward. The three-year report will provide a more robust assessment, analysing three-years of data and supported by established data linkages.

Key strategic drivers for the expansion of the EMRTS are described along with details of how the project both aligns with and enables them. Key drivers are to address:

- Unmet critical care need in the target population in uncovered and existing operating hours.
- The critical care and time critical transfer needs created by key service changes such as the development and requirements of the major trauma network and other national and regional planning initiatives.

The unmet need data provided indicated that, with the current 12-hour service model, EMRTS is reaching 70% of the predicted demand for pre-hospital critical care, and 63% of demand for time-critical transfers for the whole 24-hour period. This is not just exclusive of major trauma, but also includes medical emergencies.

The analysis utilised data from multiple sources and suggests unmet need of 1,796 cases (meeting EMRTS service specification and appropriate for EMRTS intervention per annum across 24 hours. 991 cases were during the 2000hrs - 0800hrs period (when EMRTS is not currently operational) and 805 cases relate to current EMRTS operating hours of 0800hrs – 2000hrs. These latter cases related to the main peak of demand from early afternoon when there are insufficient EMRTS assets to cover demand. The overall level of unmet need was greater than anticipated. The graphic below shows the total demand compared to EMRTS activity over a 24-hour period (April 2017 – March 2018):



TYPE	0800-2000hrs	2000-0800hrs	Total
Time Critical Transfers	n/a	82	82
Trauma	668	497	1,165
Medical	137	412	549
Total	**805**	**991**	**1,796**

Further analysis was carried out, broken down by health board.

In addition, key principles and implications of air and road response for night operations were developed. It was clear that, due to the additional risks and restrictions, air response would be utilised less at night and the reliance on road response would be even greater. For this reason, it was confirmed that, whilst details relating to both air and road responses and the respective population coverages were provided, the options appraisal process utilised road response figures due to this increased role at night.

From the analysis the following conclusions were reached:

- The main peak of unmet demand was between 1500hrs and 0000hrs, and was most significant in the South East Wales area. A twilight rapid response vehicle shift was therefore explored as a key part of the option appraisal.
- The bases at Caernarfon and Welshpool airports have relatively poor population coverage and that any option that only included a base at Welshpool airport or Caernarfon airport or an option that only provided a combination of them would not provide equity in terms of effective population or geographical coverage.
- No single base could provide the required national population coverage and that at least two bases would be required overnight to provide the required population and geographical coverage within agreed response times thereby ensuring equity.
- The preferred option would include a base in North Wales and a base in South Wales. This would ensure an equitable and effective air and road responses and maximise health gain.
- Road responses wold continue to forward-locate to central locations close to key road links in order to maximise population coverage and peaks in activity in order to ensure greater equity and health gain.

It should also be noted that the ASD would need to be extended to provide this important support and coordination function across all operational hours.

An options appraisal defined the scope of the project, main benefits, risks, constraints, dependencies and assumptions, and was agreed with stakeholders. Members of the trauma network board gave input to this process. A long list of options was reduced to a short list of options using key indicators. A shortlist of five options was carried forward to the economic appraisal to evaluate in further detail. The 'Do Minimum' and 'Do Maximum' options were also included for reference.

A number of factors relating to the agreed investment objectives were used to determine the preferred option including capital, revenue and transitional costs, cost per case, unmet demand and population coverages for each option.

The preferred option was then presented as follows:

- 2000hrs – 0800hrs: Consultant and CCP at a South Wales base with a rapid response vehicle (RRV).
- Double pilot crew and aircraft available at the South Wales base to support either.
- 2000hrs – 0800hrs: Consultant and CCP at Caernarfon airport with a RRV.
- RRV including a Consultant and CCP operating 1400hrs - 0200hrs along the M4 corridor to meet the main peak of unmet demand.

The preferred option includes three operational rotas and indicative implementation timelines were developed as set out below:

Project Phase	Year 1	Year 2	Year 3
Introduction of first 24/7 base in South Wales and 24/7 ASD coverage	Phase 1		
Introduction of second operational rota		Phase 2	
Introduction of third operational rota			Phase 3

The year 1 implementation has commenced and has an indicative timeline of April 2020 to be operational.

7 Major Trauma Centre

This chapter provides an overview of the extensive work undertaken by Cardiff and Vale University Health Board (C&VUHB) and the network board in developing a comprehensive and robust business case for the adult and paediatric Major Trauma Centre (MTC) at University Hospital of Wales, Cardiff (UHW). The position described here follows a number of internal and external reviews, including feedback received from a recent professional peer review. The principles are supported by commissioners. The approach to the reviews is described in Chapter 4.

The complete MTC business case is presented in Appendix 16. Where references are made to sections in the MTC business case, these are stated below.

7.1 Overview

The MTC business case seeks to demonstrate the need for investment in services for seriously injured adults and children for the population of South Wales, West Wales and South Powys. Investment will be crucial across full pathways of care for those patients treated at C&VUHB in order to establish an MTC for the South Wales Trauma Network and realise the improvements in outcomes and quality of care for this diverse and complex group of patients. The establishment of the MTC is pivotal to the development of the trauma network.

The MTC business case sets out a compelling case for change and identifies areas where investment will be required in order to deliver timely and improved quality of care. The investment required aligns to meeting national adult and children's MTC quality indicators/service specification and/or a predicted activity uplift.

The case has been separated between adult and paediatric MTCs to highlight the requirements for both. Where possible, proposed models combine investment across both adult and paediatric patients in order to minimise the cost impact.

The MTC business case provides an overview of each core specialty in the patient pathway identifying current models of care and a proposed model based on meeting the relevant MTC quality indicators over years one and two, as well as meeting the predicted activity uplift. This is in keeping with a phased approach to the establishment of the network, but, in line with MTCs in NHS England, requires some considerable frontloading, in order to demonstrate maximal benefit.

The case for increased provision should be considered in relation to delivery of the MTC quality indicators/service specification and the totality of major trauma activity. Where there are requirements to increase service provision relating to activity only, this has been clearly identified in the specific sections of the MTC business case. Furthermore, both capital and revenue costs are outlined in each section of the MTC business case and a schedule detailing workforce and associated costs provided as an Appendix to the business case submission (see Appendix 16).

Finally, C&VUHB demonstrate a positive approach and contribution to collaborating with the wider network across the patient pathway as evidenced below.

7.2 National Major Trauma Quality Indicators

The development of the trauma network aligns itself with a number of national drivers as summarised in Chapter 2.

More specifically, there are clear links between the establishment of an MTC and C&VUHB Strategic Goals in its 'Shaping our Future Wellbeing Strategy 2015-2025.' The Strategy sets out objectives that link directly with the delivery of an MTC:

- Reduce Health inequalities.
- Have an emergency care system that provides the right care, in the right place, first time .
- Be a great place to work and learn.
- Work better together with partners to deliver care and support across care sectors, making best use of our people and technology.
- Excel at teaching, research, innovation and improvement and provide an environment where innovation thrives.

7.3 Case for Change

The overarching investment objective of a trauma network can be summarised by the network's mission statement **'Saving Lives, Improving Outcomes, Making a Difference'.**

Furthermore, key investment objectives defined by Welsh Government are referenced throughout this business case with added value that could be delivered. These include:

- **Health gain**: improving patient experience and outcomes.
- **Equity**: where people of highest health needs are targeted first.
- **Clinical and skills sustainability**: reducing service and workforce vulnerabilities and demonstrating solutions that are flexible and robust to a range of future scenarios.
- **Value for money**: demonstrating the least costly way of generating the anticipated benefits.

These investment objectives align with C&V UHB strategic vision to deliver the MTC for the South Wales Trauma Network.

7.3.1 Investment in MTC Services in Wales

The investment in services proposed in the MTC business case for patients from across the Network from day 1 would deliver:

- A designated adult and paediatric MTC to serve the region of South Wales, West Wales and South Powys, providing patients with direct access to specialist teams and state-of-the-art equipment to ensure that they receive immediate treatment, 24 hours a day, seven days a week.
- A single point of access into UHW as a specialist centre for major trauma cases.
- A Consultant led service for the reception and resuscitation of patients 24/7 allowing for immediate senior decision making and consultant led care from the outset.
- Multispecialty trauma teams including dedicated paediatric trauma teams and mobilisation of supporting departments and services such as transfusion, radiology and surgery.
- Enhanced capacity in the emergency unit to allow for access to effective and timely lifesaving interventions.
- Enhanced capacity in theatres to ensure timely access for a variety of complex injuries.

- Improved capacity in the critical care unit at UHW.
- A dedicated ward where multiply injured patients are managed and cared for as a cohort.
- A designated consultant available to contact seven days a week who has responsibility and authority for the hospital trauma service and leads the multidisciplinary team care.
- Availability of hyper-acute rehabilitation for seriously injured patients.
- Provision of a rehabilitation plan/prescription for all seriously injured patients.
- Consistent and coordinated care with a named member of staff and clear communication with seriously injured patients and their families/carers and ongoing care provider.
- Improved information and communication of discharge and enhanced repatriation and transfer of patients to their local hospital following specialist treatment to avoid unnecessary delays for patients awaiting care with treatment closer to home.
- An MTC Directorate to oversee and drive the governance agenda.
- Enhanced audit data submission into the national audit (TARN) to be met within 25 days from discharge.
- A multidisciplinary approach to governance, quality improvement, research and audit.
- A Network wide approach to training and education including rotational posts for the network through the MTC.

In addition to those benefits detailed in the case for change section of the network programme business case, the expected quality benefits extended to those attending the MTC are as set out below:

- Patients will receive a service that delivers the highest possible quality of care for patients 24 hours a day, seven days a week
- Reduction of 20% in preventable deaths as measured by the National Trauma Audit Research Network (TARN).
- Improved functional outcomes
- Improved patient and carer experience through increased coordination of care and communication around expected pathway and ongoing care plan.

7.4 Workforce Summary

The full national major trauma quality indicators are provided in Appendix 3.

7.4.1 MTC Indicators

An analysis has been undertaken reviewing current C&VUHB services against the agreed national quality indicators for MTCs. There are 52 adult indicators and 46 Children's indicators in total. The analysis has shown that a number of indicators are currently achieved by C&VUHB as a regional specialist centre. Those not met are listed below and form the basis of the required investment.

There are 20 key indicators that are not currently met:

1. T16-2B-101/201 – 24/7 Consultant Trauma Team Leader
2. T16-2B -103/203 - Emergency Trauma Nurse

3. T16-2B-107 – CT reporting
4. T16-2B -113 - 24/7 Access to Consultant Specialists
5. T16-2B-115/213 Provision of Surgeons and Facilities for Fixation of Pelvic Ring Injuries
6. T16-2B-118/216 - 24/7 Specialist Acute Pain Service
7. T16-2C-102 Major Trauma Service (Consultant)
8. T16-2C-103 /202 Major Trauma Coordinator Service
9. T16-2C-104/203 Major Trauma MDT Meeting
10. T16-2C-105 Dedicated Major Trauma Ward or Clinical Area
11. T16-2C-110 /209 Management of Musculoskeletal Trauma
12. T16-2C-113 /212 Management of Maxillofacial Trauma
13. T16-2C -118/215 Specialist Dietetic Support
14. T16-2C-121/218 - Patient Experience – Trauma Audit Research Network (TARN) PROMS and PREMS
15. T16-2D-101/201 Clinical Lead for Acute Trauma Rehabilitation
16. T16-2D-103 /203 Rehabilitation Coordinator
17. T16-2D-105/205 Keyworker
18. T16-2D-106 /206 Rehabilitation Assessment and Prescriptions
19. T16-2D-102/202 Specialist Rehabilitation Team
20. T16-2D-109 Clinical Psychologist for Trauma Rehabilitation

The ability to meet the above will place CAV UHB in a strong position to deliver the benefits as outlined in chapter 4 of this programme business case.

Similar to MTCs in England, there are a number of indicators of the 20 above that will not be met on day 1. They are as follows:

1. T16-2B-201 – Paediatric 24/7 Consultant Trauma Team Leader
2. T16-2B -203 – Paediatric Emergency Trauma Nurse
3. T16-2B-107 – CT reporting, this will be monitored during year 1
4. T16-2B-118/216 - 24/7 Specialist Acute Pain Service

This case clearly indicates relevant MTC quality indicators throughout the pathway service specification and how plans will ensure these are met over the first 2/3 years of MTC launch.

7.4.2 Trauma Unit indicators

A review of TU standards demonstrates that C&V UHB already meets 86% of the national TU standards. Those that are not met are as follows:

1. T16-2C-301 Major Trauma Lead Clinician
2. T16-2C-303 Major Trauma Coordinator Service

3. T16-2D-301 Rehabilitation Coordinator
4. T16-2D-303 Rehabilitation Prescriptions

A plan has been developed to meet the above indicators as a part of the local UHB IMTP process for 2019. The additional resource requirements for this are outlined in Chapter 8.

Note: Resources for plastic surgery are not included in the MTC business case.

7.5 Predicted Activity Uplift

Appendix 1 details the current and expected trauma activity that has been used as a basis for service planning. This was taken from an agreed set of data assumptions commissioned by the trauma network and signed off at the network board in February 2019. This modelling utilised NWIS and TARN data as well as observed changes in English network flows to provide a predicted model for use in planning.

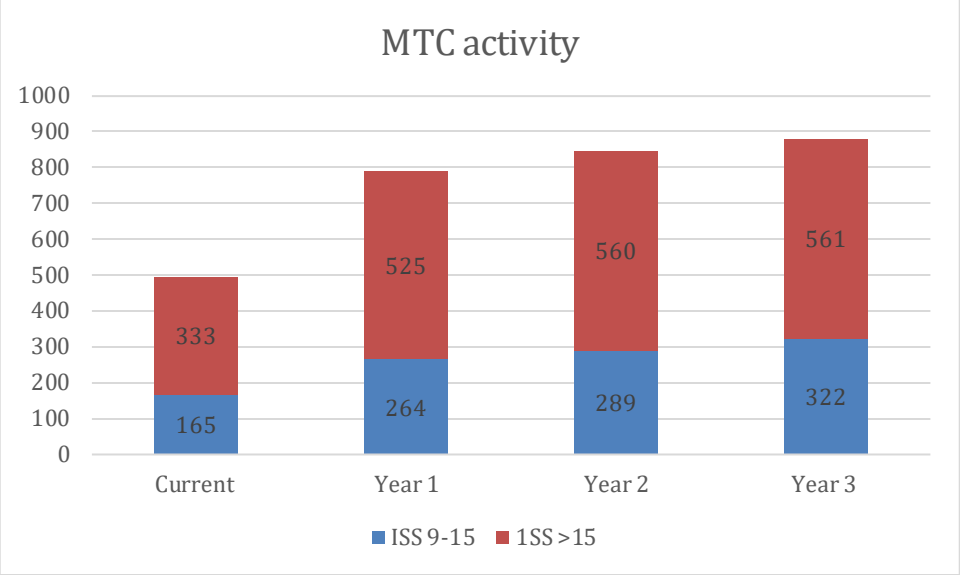
In relation to CAV UHB, current activity is modelled at 385 Major Trauma patients and 164 moderate trauma. The first year predicts an overall uplift of 294 candidate major trauma patients. This can be broken down into 193 Major Trauma patients with an additional 101 patients classified as 'overtriage' in the first year after go live. Overall, this equates to a 50% uplift in Major Trauma patients with a 35% 'overtriage' rate.

'Overtriage' is a term used to describe patients who arrive directly at the MTC from scene, who otherwise could have been treated locally. It is recognised that an element of 'overtriage' is acceptable to avoid missing major trauma cases that could benefit from the MTC; however, the exact rate for the network cannot be predicted at this stage. The effectiveness of the trauma desk should enhance triage decisions and will be evaluated in year one.

Further specialty level activity modelling has been challenging to obtain due to the complex nature of the clinical injuries and pathways for this patient group and lack of TARN data submitted across all of the Health Boards.

7.5.1 Activity Assumptions and Profile

CAV UHB currently receives and treats around 40% of all major trauma (Injury Severity Score (ISS) >15) patients within the network region. This equates to approximately 300 cases, with a further 200 cases treated who are moderately injured (ISS 9-15). Network modelling suggests that in its first year as an MTC, C&VUHB will treat 54% more patients, an additional 294 candidate trauma patients. These candidate major trauma patients can be broken down into two categories, Major Trauma (ISS>15) and moderate trauma (ISS 9-15) which is often described as 'false positive' or 'overtriage'. Year 2 and 3 data modelling suggests a smaller incremental increase in activity:



Predicted activity increase to the MTC Years 1 – 3

Network data analysis shows changes in network flow in the first three years, with the number of patients bypassing directly to the MTC rather than transferring increasing as the network develops:

ISS 9-15 – moderate	Assumed current position	Year 1	Year 2	Year 3
Direct to MTC	154	206	231	256
Transfer TU to MTC	11	58	58	66
% TU only	660	561	536	503
Total	825	825	825	825
ISS >15 – major	**Assumed current position**	**Year 1**	**Year 2**	**Year 3**
Direct to MTC	284	306	341	368
Transfer TU to MTC	49	219	219	193
% TU only	542	350	315	314
Total	875	875	875	875
ISS >9 – candidate	**Assumed current position**	**Year 1**	**Year 2**	**Year 3**
Direct to MTC	438	512	572	624
Transfer TU to MTC	60	277	277	259
% TU only	1202	911	851	817
Total	1,700	1,700	1,700	1,700
Combined Direct to MTC & Transfer TU to MTC	498	789	849	883

Predicted change in activity flows for network, predicted data activity for the trauma network

Due to the complex nature of the clinical pathways and the lack of TARN data submitted across all of the health boards it is difficult to predict the predominant specialty of patients with multiple trauma, including impact on specialties in terms of workload in theatres. Discussions (supported by Professor Moran) with other MTCs in England and benchmarking against Nottingham and Bristol MTCs show that this increase is variable but that a large percentage of the increased workload impacts on Trauma and Orthopaedics. This is reflected in the case and will be reflected in the theatres utilisation plan.

Paediatric MTC Activity

The predicted uplift in paediatric Major Trauma cases is shown a as 'sub set' of the above data and is shown below:

	Assumed current position	Year 1	Year 2	Year 3
ISS 9-15	22	27	30	33
ISS >15	53	55	56	60

Predicted data activity for the Wales Trauma Network 2019

There are significant problems with the paediatric data captured in TARN in relation to:

- Capturing all paediatric trauma cases.
- The injury severity score (ISS) is an adult tool that fails to accurately reflect the pattern of paediatric injuries.

We can therefore assume that activity may be more than predicted, as reflected by experiences within the Bristol Royal Hospital for Children, and shared at the professional peer review panel. During the first year, an analysis of TARN data will be undertaken by both the network and MTC to assess both under and overtriage of patients for transfer to the MTC. This will provide an indication of whether activity modelling in the planning phase was accurate, and allow further planning for year two.

Additional Factors Impacting on MTC Activity

It is important to highlight that there has been an increase in major trauma activity in UHW since the establishment of the EMRTS. The one-year evaluation demonstrates that this has helped improve equity and timeliness of access to definitive specialist trauma care for patients brought to UHW. During this time, 58% of patients were transferred directly to specialist care. Nonetheless, this change in flow has impacted on C&VUHB services.

An estimated additional 64 patients with major and moderate trauma were predicted to flow to UHW per annum. Since the launch of this new service there has been no investment in critical services such as Emergency Unit, Theatres and ward capacity in relation to the care of seriously injured patients, this is expected to increase by a further 100 patients upon the extension of the service next financial year.

7.5.2 Capacity Requirement Assumptions – ward beds, theatre sessions and critical care beds

Following the overarching network data modelling, further local data analysis was undertaken to identify capacity requirements for year one. This was based both on total numbers but used a number of local data sources including Ward Watcher, TheatreMan and a number of specialty specific clinical databases (e.g. Neurosurgery, Maxillofacial Surgery) plus some specific clinical reviews of health board TARN data.

Due to the variable nature of unscheduled care activity, modelling has necessarily taken account of not only average attendances but peaks in flow (particularly for the emergency unit and theatres) and also current delays for major trauma patients accessing theatres.

Ward Beds

The table below shows the modelled current and predicted bed occupancy relating to major trauma patients. The number of beds by percentile, shows the number of beds needed for major trauma patients for that percentage of days of the year. For example, it is modelled that, for current activity levels, 30 dedicated beds would be enough for major trauma patients 50% of the time and that 38 beds would be enough 95% of the time.

Modelled current and predicted bed occupancy (LOS ≥3days)

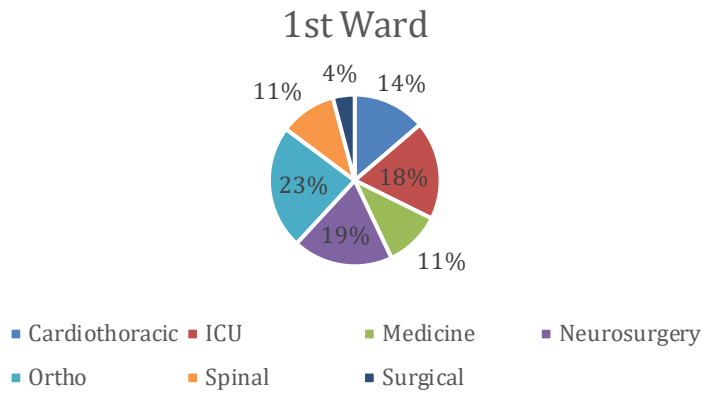
	Beds Occupied - Current			Year 1			Year 2			Year 3		
	5%ile	50%ile	95%ile*	5%ile	50%ile	95%ile	5%ile	50%ile	95%ile	5%ile	50%ile	95%ile
University Hospital Of Wales	23	30	38	42	47	53	45	50	56	46	52	58

Predicted data activity for the Wales Trauma Network 2019 – excludes critical care beds.

Comparing the beds required for Year 1 suggests an increase of between 15 (5th centile) and 19 beds (95th centile) in Year 1 with a further 3 beds in Year 2. Note that this has been based upon current LOS for all ISS >9 patients at UHW. Published evidence shows that a reduction in length of stay (LOS) was not seen in the English MTCs post MTC launch and introduction of an automatic acceptance and repatriation system. Overall median length of stay in acute care was unchanged from initially 10 (IQR 5–21) to finally 9 (5 to 19) days (Moran *et al*, 2018). Therefore, a reduction has not been factored into bed calculations at UHW based on MTC status.

One should not consider length of stay in isolation, the impact of repatriation within and outside the network will play an important role in determining the efficacy of the polytrauma unit. There is an All Wales Repatriation Policy currently in place and the issues around operationalising the policy are well recognised. Whilst it is recognised that work is ongoing at network level to improve repatriations, this falls outside of the sole remit of C&VUHB and cannot be relied upon to have any definite impact upon length of stay until it is realised and understood. It is important to note, therefore, that the 14 beds modelled on an 18 day length of stay are the minimum requirement to admit seriously injured patients to an appropriate location in a safe and timely manner.

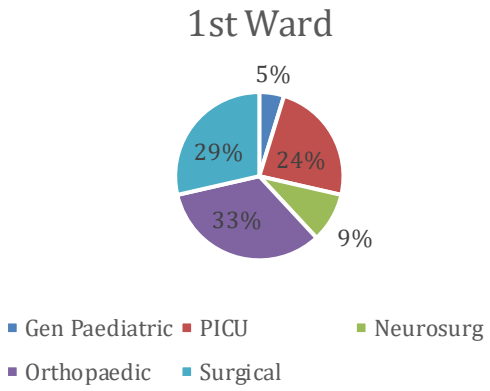
The largest uplift in patients is expected to occur in the first year particularly as EMRTS has been approved to extend to 24/7 cover in line with the MTN go live. It is anticipated that the uplift in beds and critical care capacity will be needed for day one. An analysis of the 2018 UHW dataset from TARN provided a baseline for where seriously injured patients are currently being treated in UHW:



2018 adult UHW TARN data, first ward

Around 20% of the current major trauma patients treated at UHW have significant multiple injuries and require polytrauma unit care, this equals six beds. As highlighted, it is a challenge to accurately predict activity by specialty. It would not be sensible to apply the percentage uplift to all specialties, for example, as UHW currently receives the large majority of major trauma patients requiring neurosurgical intervention. After discussion with MTCs in England, it is assumed that UHW will predominantly see an increase in patients with multisystem injuries requiring multispecialty input as well as an increase in those patients with severe isolated orthopaedic injuries. Therefore, from a total expected uplift (based on 50th percentile) of 17 beds a pragmatic approach has been taken for year 1 to start with 14 beds and that these be placed together to collocate care on the adult polytrauma unit.

Paediatric TARN data shows a large proportion of orthopaedic and surgical patients with a much smaller percentage of patients care for under neurosurgical wards. Due to the smaller number of patients predicted in year 1, it is not expected this percentage split will change dramatically, but this will be audited:



2018 Paediatric UHW TARN data, first ward

Theatre Sessions and Critical Care Beds

It was recognised within the network data paper that further analysis would be required in relation to impact on critical care and theatres. This was undertaken following a health board review of Ward Watcher.

The table below shows the modelled requirements for current major trauma activity at UHW and compares it to the modelled requirements in year one and year two.

		Current	Year 1	Increase	Year 2	Increase
		Predicted Median	Predicted Median	Increase on 2017-18 (Median)	Predicted Median	Increase on 2017-18 (Median)
Theatre time (weekly)	Cases (patients)	7.8	12.6	4.4	13.0	5.2
	Hours operating	26.7	43.7	14.4	43.8	17.2
CriticalCare	Total Beds	3.0	5.8	2.8	6	3

Local UHB data review April 2019

The modelling suggests that on average an additional 14.4 hours of theatre sessions (median) will be required based on average operating for theatre cases. A review of the range between 5th percentile and maximum from current shows a range of between 6.39 and 9.24 sessions. A total of 9 sessions has been planned to account for increased activity and to protect existing theatres during peak times of activity.

There will be further work required to review where the sessions will be timetabled and against which specialty.

Critical care modelling has estimated an uplift by 3 beds. The sections on theatres and critical care, which follow, explain what has been planned for in these areas.

7.6 Workforce Summary

Based on both meeting the quality indicators/service specification and the uplift in predicted activity, an additional 191 staff will be required to establish CAV UHB as an MTC in April 2020, with the largest groups being Nursing, Healthcare Support Workers and Medical Staff. This has reduced substantially from the first submission of the MTC business case, following internal and external reviews. Whilst MTC status should attract and help to retain staff, it is recognised that this is a significant challenge to the delivery of the MTC by April 2020. There is a recruitment strategy being developed led by the head of workforce and detailed planning work underway at a specialty level. A full time recruitment support post has been recruited to, supported by the head of workforce and OD to drive the recruitment strategy and ensure Clinical Boards are supported fully throughout the recruitment process.

An overview of this is presented in the MTC case in Appendix 16.

Staff Group	WTE
Medical Staff	29.5
HCSW	37.65
Registered Nurses	85
AHPs, Scientists & Techs etc.	27.5
Admin and Clerical	11
Total	**191**

In addition, CAVUHB recognises the potential impact upon recruitment and retention of staff in other health boards and thus is committed to collaboration as part of a network to ensure that skills and development of staff can be maximised within the network. There is a network workforce group

supporting development of recruitment principles/plans and this will include a number of cross health board joint appointments and rotational posts to ensure that skills and training can be maximised across the network (see Chapter 13).

7.7 Benefits and Risks

The networks benefits realisation plan provides a robust foundation to evaluate the effectiveness of the MTC and will be considered in the context of data collection and analysis in year one.

There are a number of risks in relation to both the delivery of the network and MTC. These include significant risks related to workforce and capacity detailed in the MTC business case (Appendix 16) and in the network risk register.

In considering this case, the risks to go live should be carefully considered against the benefits that have been highlighted.

7.8 Planning and Assurance Process

Planning Process for Specialties

This case has been developed with strong involvement from all core specialities. Service planning templates have been completed by each of the specialties at C&V UHB along with face to face meetings with the MTC project team. This has supported the Directorates to review their current service and supported planning against:

- The expected increase in activity following Network 'go live.'
- The relevant national MTC quality indicators/service specification.

The planning templates completed covered both adult and paediatric indicators. However, a separate template was completed by the paediatric team and signed off by Women and Children's Clinical Board for indicators specific to paediatric major trauma.

Internal Assurance and Approval

In order to provide assurance to the Network Board, WHSSC and Welsh Government that the MTC components of this programme business case have been internally scrutinised, the following were agreed and have taken place:

- Clinical Board sign off

  Completed templates have been signed off by the relevant Clinical Board. By signing, the Board provided assurance that due diligence has been undertaken in completion of the template, and that the revenue implications of the pathways are understood and relate solely to the national MTC quality indicators for the totality of major trauma patients and/or uplift in major trauma activity.

- C&V UHB Executive Assurance panel

  A panel was convened to ensure overarching assurance of Clinical Board elements of the business case before the full case is submitted to an internal major trauma business case approval group.

- MTC Business Case Approval

  Final internal sign off of the business case at combined Major Trauma Project Board/ Business Case Approval Group meeting.

- Further Business case revisions based on external feedback

  A number of external reviews of the case have now taken place and all feedback has been considered by Clinical Boards and submitted for discussion at an Executive UHB panel. The changes following feedback are highlighted in green in the financial tables of the case.

- Executive Scrutiny Panels

  There have now been three panels convened who have reviewed each round of revisions to the case and provide any further challenge and scrutiny as well as discussions around assurance and risks to revisions and reductions to areas of the MTC case.

7.9 Financial Summary

Revenue Costs

A detailed financial schedule is provided in the MTC business case, with a summary provided in financial case (Chapter nine).

The health board believes that the costs identified represent the minimum current investment that is required to allow the health board to deliver the additional modelled volumes and standards expected of an MTC.

It is expected that the costs within the case will present a loss when reviewed against income comparisons from NHS England. This is comparable to other MTC designations. Two similar combined adult and paediatric MTCs in Oxford and Southampton both confirmed they launched with a gap between costs required to go live as an MTC and the expected income through activity and Best Practice Tariff.

This is also evidenced in standalone paediatric MTCs where incidence of major trauma are small and therefore income related to this, not sufficient to support the delivery of MTC standards.

Efficiencies

The modelling within this document is based on current efficiencies and working practices. Further opportunities to deliver improvements in productivity and efficiency within the major trauma patient pathway through new ways of working and streamlined patient pathways have been reviewed and it is agreed that there has been significant work undertaken by the health board to date and any further efficiencies may not be realised immediately.

Anecdotally, there is recognition that other MTCs in England have delivered improvements in efficiency, such as theatre times and, in some specific patient groups, length of stay. It should be noted that these improvements have been realised five years post implementation of networks and as systems develop and improve.

A review of length of stay efficiencies was undertaken as part of a review of the proposed Polytrauma Unit. Published evidence shows that a reduction in LOS was not seen in the English MTCs post MTC launch and introduction of an automatic acceptance and repatriation system (C Moran, 2018). Therefore, starting with a bed base that is lower than the modelled 50th percentile is a risk for MTC capacity upon go live and agreements for increase in bed capacity in year will be required.

The design and delivery of service improvements will form a fundamental part of the on-going clinical governance of the MTC. Service improvements will be informed by and defined at a network level. Post implementation service efficiency and productivity will also be reviewed via benchmarking with other Centres.

Capital Costs

In line with a phased implementation approach there are developments within the current timelines that are an absolute requirement for operational readiness and those that can be safely enabled once the MTC is operational; the former are listed below:

- Sufficient adult resuscitation capacity
- Additional theatre capacity
- Poly Trauma Ward capacity
- Uplift in Critical Care capacity

Accepting that not all the capital and estates timelines are aligned to an April 2020 'go live', an assessment of alternative solutions to each of the absolute requirements for operational readiness has been discussed at the MTC Project Board, UHB Management Executive and Network Board.

It has been agreed that the solutions proposed for all workstreams are acceptable in principle, as an interim solution for year one starting April 2020. With this in mind there will be a requirement for a release of funds 'in year' in order to begin the capital works. Along with these, equipment costs have been identified, and together these are detailed in the finance case and in the Appendix 16.

Year 2

In order to ensure sufficient operating capacity, a capital business case is being developed, alongside a programme of work for vascular services, to deliver a new theatre from April 2021. This will deliver a dedicated operating space to ensure that Major Trauma cases can be treated safely in a timely manner as the activity increases, and to meet all national guidelines and standards. The timescales for the case is as follows:

- February 2020 – OBC
- September 2020 – FBC
- Construction completion – June 2021

There will be further requirement to expand the polytrauma ward to meet standards including IP&C. A separate business case will be submitted to Welsh Government in year 1.

The estimated future capital requirement for the MTC theatres at the time of publication is in the region of £20-25m. Note that this is an integrated capital scheme which includes the vascular hybrid theatres.

7.10 The Major Trauma Centre Role within the wider Network and Opportunities for Collaboration

As a part of its role within the network, it is crucial that the MTC effectively collaborates with all other organisations within the trauma network system in order to ensure benefits for patient's right across the pathway.

Experience in England has demonstrated that Trauma Units (TUs) have, over time, become deskilled in major trauma. This is a situation that the South Wales Trauma Network is keen to avoid and the role of the MTC will important in supporting and developing the network as it matures. The MTC's key role and responsibilities are set out in the 2013 Major Trauma Service Specification (D15/S/a) and in relation to support and collaboration within the wider network include:

Clinical Advice & Leadership Roles

The MTC will provide clinical advice to other providers within the network. This will include; in pre-hospital stage and whilst patients are awaiting transfer to the MTC for definitive treatment or following acute care when the patient is discharged to on-going specialised or local rehabilitation services.

There are a number of roles within this business case that will be key enablers to ensure that effective advice and support is available 7 days a week. These include, Trauma Team Leaders, Advanced Nurse Practitioners and Rehabilitation Consultant, Consultant AHP and Coordinators. The MTC recognises the value of sharing experience across the Network and is committed to the provision of posts which allow for rotation through both TUs and the MTC. There are clear opportunities within the Rehabilitation posts for providing outreach and support to TUs.

Training, Audit & Quality Improvement

The MTC will commit to being actively engaged and contributing to the Trauma Network, particularly in operational requirements, training, governance and audit. The MTC has a role to ensure that all organisations within the network are actively engaged and supported as a part of and effective trauma Quality Improvement programme.

There are a number of opportunities for the MTC to act as a hub for training provision within the network, working with the Network lead for training. This will be vital to minimise impact of deskilling in local Trauma Units over time.

This includes the development of leadership and faculty for key 'in house' training programmes including Trauma Team Leader and Trauma Team member, nursing and scribe training as well as ward skills and rehabilitation. There is also an opportunity to develop outreach programmes to deliver training locally and host annual events similar to those delivered by other MTCs within England and Scotland.

Trauma Team Leaders working as a part of a network model, will also be key to the continued development of trauma team skills within trauma units. These shifts within the MTC will provide clinicians working in TUs with regular exposure to trauma cases (see below).

Rotational Posts & Joint Appointments

Joint appointments in key areas will be considered in order to ensure the development of the MTC does not destabilise other Health Boards services and this is aligned with the principles of workforce recruitment into to the MTC. This will bring benefits to the wider network, which C&VUHB is committed to as part of its critical role in the network.

There is also an opportunity for rotational posts within the Polytrauma Unit. This would include staff employed both within C&V UHB and within Trauma Units to ensure expertise can be spread to the network. The Polytrauma Unit will be key in providing delivery of training and up skilling staff in the definitive care of seriously injured patients.

The ability for Major Trauma Practitioners and Rehabilitation coordinators from around the region to spend time in the MTC will ensure that good links can be made between teams that will support the effective flow of patients within the Network

Audit and Quality Improvement

The additional TARN coordinator roles within the business case will support the timely and quality entry of a large percentage of network data into the National Audit. In turn, this will be key for developing an audit programme for the centre, which develops in collaboration with the network and organisations within it. There is also a role for TARN coordinators at the MTC to support colleagues within the network in relation to training and development.

Rehabilitation

The MTC will provide early/hyper acute rehabilitation as well as a managed transition to rehabilitation and the community. Key roles within this case such as the rehabilitation consultant, Consultant AHP, lead therapist and nurse for Major Trauma as well as psychologists will integrate into the network to support wider programmes of quality improvement, training and education.

Collaboration with other Specialist Services

There are a number of interdependent services and specialties required to work in partnership to deliver seamless and high quality care. In particular, the services delivered for Major Trauma patients with orthoplastic requirements will need close joint working between C&VUHB and SBUHB to ensure the care delivered is to an excellent standard regardless of where the patient is treated. It is proposed that one of the Major Trauma Practitioners will be recruited with an interest in Orthoplastics to ensure a strong link with the Regional Centre for Burns and Plastics in Morriston and enabling collaborative rotational working, training and education between the two centres.

Patient Flow and Access to Services

The MTC is committed to ensuring that patient flow is maximised to ensure that the quality benefits set out in section 6 of the case can be realised. This includes commitment to an automatic acceptance policy ensuring 24/7 access to specialist services. It is essential this is aligned with an automatic repatriation/transfer of care policy.

The MTC also supports a network approach and its role in the delivery of care closer to home following completion of the MTC phase of treatment. This includes clear and timely information to both health boards, patients and their families as well as a clear point of communication including escalation so that patient flow can be maintained, pull back to the originating HB is promoted and patient experience is maintained.

The MTC will take part and lead in governance around this which includes collecting accurate and timely data so that this can be utilised to inform governance and recognises the importance of the ODN having operational authority in the escalation processes and that commissioning will support this in a timely way.

8 Local Health Board Configuration

8.1 Introduction

In 2018, health boards undertook a process of confirming Trauma Units (TUs) and Local Emergency Hospitals (LEHs) as part of defining the network structure.

The following hospitals were approved as adult and paediatric TUs, following a recommendation by WHSSC Joint Committee and approval by health boards:

- Cardiff and Vale University Health Board: University Hospital Wales (UHW), Cardiff – TU for its own population.
- Swansea Bay University Health Board: Morriston Hospital, Swansea – TU with specialist services
- Aneurin Bevan University Health Board: Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the health board)
- Cwm Taf Morgannwg University Health Board: Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend.
- Hywel Dda University Health Board: Glangwili General Hospital, Carmarthen (subsequently confirmed following a period of public engagement)

In relation to LEHs, the following hospital will be a LEH within the network structure:

- Royal Glamorgan Hospital, Llantrisant.

As described below, within Hywel Dda University Health Board, Bronglais General Hospital, Aberystwyth, and Withybush General Hospital, Haverfordwest, will be rural trauma facilities for the purposes of major trauma.

This chapter sets out the requirements for health boards by providing an outline of baseline assessments against the agreed quality indicators and service specification, in order to illustrate those that are already being met, those that could be met through internal re-organisation and those that require additional resources. A description is also provided of the configuration of local and community based rehabilitation and requirements for the 'landing pad' for patients returning from the MTC for 'care with treatment closer to home.' This follows on from developing a more phased approach to implementation of quality indicators and service specification over five years following the recent Gateway review.

Furthermore, a summary is provided of each health board business case against this phased model, outlining additional resource requirements.

Although Powys Teaching Health Board does not have a TU itself, the health board's model and resource requirements are also described here.

Finally, an outline is given of the clinical and operational models for specialist services supporting the MTC (i.e. orthoplastic surgery, spinal trauma surgery, thoracic trauma surgery and pelvic trauma surgery).

8.2 Overview of the Model

The composition of health boards in the context of the trauma network will include TUs, LEHs, rural trauma facilities (in Hywel Dda University Health Board only) and community-based rehabilitation. The latter will require close working with social care.

All 'candidate TUs' are already managing moderate and major trauma patients. In the trauma network, TUs will continue to provide initial assessment, imaging and treatment of trauma patients. TUs will be optimised to provide definitive care and admit major trauma patients. However, they will also enhance existing systems to rapidly move the most severely injured to specialist centres that can manage injuries. In doing so, TUs will develop an effective quality improvement programme. By day one, all TUs will have undertaken the requisite level of medical and nursing training and education (supported by the network programme) and embedded network policies within their systems. Organisational governance structures will be established, consisting of an operational manager (from an existing directorate), clinical lead, major trauma practitioners, rehabilitation coordinators and TARN coordinators. There will be a named executive lead. The team will work closely with the equivalent team in the MTC and the trauma ODN management team. These roles are considered key enabling roles in-year.

Major trauma practitioners and rehabilitation coordinators will be new roles in the health boards and will be vital in ensuring seamless care of major trauma patients and key points of contact for patients returning from specialist care to the TU or community. In particular, rehabilitation coordinators will provide a link to community resources, allowing early notification of individuals who require support, facilitating discharge and managing patient and family expectations. They will be seen as the 'flight controllers' of the system. This will be augmented by the availability of a consultant in rehabilitation medicine operating in each health board on a weekly basis, playing key roles in coordinating the team, managing complex patients and facilitating discharge.

In years two and three, there will an enhancement of core therapy roles as well as some specialist roles (e.g. neuropsychology), providing both in-reach and outreach services within the health board. Opportunities will exist for these specialist therapy roles to work across neighbouring health boards.

For complex patients who return from specialist care (e.g. traumatic brain injury, spinal injuries), the network will develop a training and education programme for medical and nursing staff caring for these patients. Thus, the skill set of the rehabilitation multidisciplinary team based at the TU will be identical to the skill set of that based at the MTC.

This model will not just benefit major trauma patients returning to TUs and the community, but also those admitted locally and other patients groups with complex rehabilitation requirements. It will lead to the establishment of TUs as level two rehabilitation facilities and an enhancement of a level three community based rehabilitation response. By ensuring health boards are appropriately prepared and supported, they will be in a position to provide an optimised 'landing pad' for patients returning from specialist centres (e.g. the MTC). This timely repatriation of patients from specialist care has been termed 'care with treatment closer to home' or CWTCH by the network.

Within the network there will be one LEH as indicated above. This hospital will not routinely receive acute trauma patients; however, they will retain processes to ensure that, should this occur, there is appropriate initial management and transfer to the MTC or nearest TU. Given the proximity to the MTC and TU, this will be a rare occurrence. In Hywel Dda University Health Board, Bronglais General Hospital and Withybush General Hospital will be termed rural trauma facilities. Whilst, as for LEHs, there are no specific quality indicators for a rural trauma facility, the health board is committed to ensuring these hospitals maintain the ability to assess and treat major trauma patients, given their

relatively unique geographical location and distance from the MTC and nearest TU. Furthermore, the health board's organisational structure will need to ensure appropriate oversight of clinical and operational governance activities in these hospitals. The TU team described above, together with an enhancement in therapists and consultants in Rehabilitation Medicine will have a key role in supporting these rural trauma facilities.

Finally, a key risk of establishing the network, as evidenced in NHS England, is deskilling hospitals outside the MTC in acute and ongoing care of major trauma patients. The risk of this will be mitigated in several ways including a commitment of the network to deliver quality improvement equitably across the region and evidence of collaboration of the MTC with the wider network.

8.3 Quality Indicators

As part of the TU designation process, each health board undertook a baseline assessment against essential quality indicators. Quality indicators for TUs and a summary of the baseline assessments are presented in the table below. For each quality indicator, a code is assigned, in order to cross-reference to Appendix 3. The table also indicates where quality indicators could be met through internal re-organisation or network support (indicated in italics) and where additional resource requirements are needed. Furthermore, an indication of phasing of quality standards is provided (i.e. in place for Day 1, year 1 – 3) as agreed by the network board.

Essential Quality Indicator	Currently met/unmet/partially met
T16-2B-301 – Trauma team leader – in place for Day 1	
There should be a trauma team leader of ST3 or above or equivalent non-consultant career grade doctor (NCCG), with an agreed list of responsibilities available within 5mins, 24/7 – in TUs where this cannot not be entirely achieved through Emergency Medicine, a trauma team leader could be sought from Intensive Care or a surgical specialty.	**Partially met and could be fully met through internal re-organisation**
There should also be a consultant available in 30 minutes.	**Met**
The trauma team leader should have been trained in advanced trauma life support (ATLS) or equivalent – this could be achieved through existing in house training and network training and education programme.	**Partially met and could be fully met as described**
There should be a clinician trained in advanced paediatric life support (APLS) available for children's major trauma – this could be achieved by ensuring paediatric registrar or consultant on call on paediatric trauma team.	**Partially met and could be fully met through internal re-organisation**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2B-302 – Emergency trauma nurse/allied healthcare professional (AHP) – variable timeline In place for Day 1 - All nursing/AHP staff caring for a trauma patients should have attained the competency and educational standard of level 1. In units that accept paediatric major trauma, this should include the paediatric trauma competencies (as described in the National Major Trauma Nursing Group guidance) – overlapping with Royal College of Nursing competencies and supported by network training and education programme. End of Year 1 plan and deliver Year 2 – 3 - There should be a nurse/AHP available for major trauma 24/7 who has successfully attained or is working towards the adult competency and educational standard of level 2 as described in the National Major Trauma Nursing Group guidance – phased approach and supported by network training and education programme. In units that accept children: there should be a paediatric registered nurse/AHP available for paediatric major trauma 24/7 who has successfully attained or is working towards the paediatric competency and educational standard of level 2 as described in the National Major Trauma Nursing Group guidance - phased approach and supported by network training and education programme. (It is acknowledged that recruitment of paediatric nursing staff can be difficult. If the emergency department does not have a paediatric nurse with Level 2 equivalent trauma training available 24 hours a day, then it is suggested that a senior paediatric ward nurse bleep holder could attend all paediatric trauma calls. Note that APLS has been recognised as Level 2 compliant, as well as the Advanced Trauma Nursing Course (ATNC), the Trauma Nursing Core Course (TNCC), the European Trauma Course (ETC).)	**Partially met and could be fully met as described** **Unmet and could be fully met as described** **Unmet and could be fully met as described**
T16-2B-303 – Trauma team activation protocol – in place for Day 1 There should be a trauma team activation protocol – all health boards agreed to follow network trauma team activation protocol aligned with major trauma and 'silver' trauma triage tools. The trauma team should include medical staff with recognised training in paediatrics and paediatric trained nurses with experience in trauma – this could be achieved by ensuring paediatric registrar or consultant on call on paediatric trauma team and by nursing competencies outlined above.	**Met but will be required to adopt network protocol** **Partially met and could be fully met through internal re-organisation**
T16-2B-304 - Network Transfer Protocol from TUs/LEHs to MTC – in place for Day 1 The TUs/LEHs should agree the network protocol for the transfer of patients from trauma unit to MTC – all health boards agreed to follow this protocol.	**Will be fully met with network protocol**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2B-305 - 24/7 CT Scanner Facilities – in place for Day 1 There should be CT scanning available within 60 minutes of the trauma team activation. Whilst 24/7 access to MRI is not a pre-requisite for TUs, it will be desirable that all health boards move towards having this provision by year 2 to support the spinal clinical service model.	**Met** **Unmet**
T16-2B-306 – CT reporting – in place for Day 1 There should be a protocol for trauma CT reporting that specifies there should be a provisional report within 60 minutes.	**Met**
T16-2B-307 – Teleradiology facilities – in place for Day 1 The TU should have an image exchange portal that enables immediate image transfer to the MTC 24/7.	**Met**
T16-2B-308 – 24/7 access to surgical staff – in place for Day 1 The following staff should be available within 30 minutes 24/7: • A general surgeon ST3 or above, or equivalent NCCG. • A trauma and orthopaedic surgeon ST3 or above or equivalent NCCG. • An anaesthetist ST3 or above or equivalent NCCG.	**Met**
T16-2B-309 - Dedicated orthopaedic trauma operating theatre – in place for Day 1 There should be dedicated trauma operating theatre lists with appropriate staffing available 7 days a week. The lists must be separate from any other emergency operating. In TUs that run 5 days a week, a 7 days a week service could be achieved by prioritising trauma cases on the emergency theatre list as is practiced in some English TUs.	**Partially met and could be fully met through internal re-organisation**
T16-2B-310 - 24/7 access to emergency theatre and surgery – in place for Day 1 There should be 24/7 access to a fully staffed and equipped emergency theatre. Patients requiring acute intervention for haemorrhage control should be in an operating room or intervention suite within 60 minutes.	**Met**
T16-2B-311 - Trauma management guidelines – in place for Day 1 The TU should agree the network clinical guidelines specified in T16-1C-107 The TU should include relevant local details. These are listed in Chapter 5 and health boards agreed to implement guidelines	**Unmet and will be fully met as described**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2B-312 - Transfusion protocol – in place for Day 1 There should be a protocol for the management of massive transfusion in patients with significant haemorrhage.	**Met**
T16-2B-313 - Administration of tranexamic acid – in place for Day 1 Patients with significant haemorrhage should be administered tranexamic acid within 3 hours of injury and receive a second dose according to CRASH-2 protocol - network protocol to be followed. Evidence now points to administer within 1hr, thus, this has become a pre-hospital care standard. WAST carry tranexamic acid and have a protocol for administration.	**Met**
T16-2C-301 – Major trauma lead clinician – in place for Day 1 There should be a lead clinician for major trauma, who should be a consultant with managerial responsibility for the service and a minimum of 1-programmed activity specified in their job plan - network board provided sample job description and personal specification. Achieved across health boards through programme resource.	**Partially met and ongoing resource requirements from April 2020**
T16-2C-302 – Organisational governance structure – in place for Day 1 The TU should have a trauma group that meets at least quarterly - all health boards have established health board trauma project groups with a template terms of reference provided by the network board. This will form a TU committee once operational. The TU should have a lead executive and named operational manager (from a suitable directorate overseeing the service and TU team	**Met** **Could be met through nominations by each HB**
T16-2C-303 - Trauma coordinator service – in place for Day 1 There should be a trauma coordinator service available Monday to Friday for the co-ordination of patients; this will be provided by major trauma practitioners (suggested 1.5 whole time equivalent (whole time equivalent)/TU) The coordinator service should be provided by nurse or allied health professionals. Network board provided sample job description and personal specification. New key enabling roles in the health boards and will have the following responsibilities: • Developing a structure/strategy for identifying all patients treated within health boards (including those transferred to and from an MTC). • Coordinate care for this patient group, identify and highlight gaps in care. • Act as the key point of contact for patients and their families and be an advocate for patients (incl. issues such as safeguarding).	**Not met and requires additional resources**

• Deliver information for patients appropriately incl. ensuring that the patients are provided (if appropriate) with a rehabilitation prescription and that this is updated prior to discharge and on return from the MTC. • Work with major trauma practitioners in the MTC to support patients transferring back from the MTC to ensure timely, safe and smooth transfer of care. • Promote and highlight this patient group across the health board with relevant specialities and staff groups and alongside clinical and managerial leads act as a champion for this patient group developing improved pathways and care. • A core member of the TU committee. • Take an active role in governance for this patient group, highlighting possible cases for review and taking part in morbidity and mortality meetings. Support the TARN coordinator(s) with life case identification for TARN and TARN PROMS/PREMS. • Support relevant training and education (formal and informal) across staff groups linking with national and network initiatives.	
T16-2C-304 – Management of spinal injuries – in place for Day 1 The TU should agree the network protocol for protecting and assessing the whole spine in adults and children with major trauma. There should be a linked Spinal Cord Injury Centre (SCIC) for the MTC which provides an out-reach nursing and/or therapy service for patients with spinal cord injury within 5 days of referral.	**Will be fully met with network protocol** **See section 8.12.2**
T16-2C-305 - Management of multiple rib fractures – in place for Day 1 There should be network agreed local management guidelines for the management of multiple rib fractures including: • Pain management including early access to epidural. • Access to surgical advice.	**Will be fully met with network protocol and thoracic trauma clinical service model**
T16-2C-306 – Management of musculoskeletal trauma – in place for Day 1 There should be guidelines for: • Isolated long bone fractures. • Early management of isolated pelvic acetabular fractures. • Peri-articular fractures. • Open fractures. • The guidelines should include: • Accessing specialist advice from the MTC. • Imaging and image transfer. • Indications for managing on site or transfer to the MTC.	**Will be fully met with network protocols and orthoplastic/pelvic trauma clinical service model**
T16-2C-307 - Designated specialist burns care – in place for Day 1 Burns care should be managed through a designated specialist burns network. There should be a clinical guideline for the treatment of burns. This should include the referral pathway to the specialist burns centre. This is already in place in conjunction with the regional burns centre at Morriston Hospital	**Met**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2C-308 - Trauma unit agreement to the network repatriation policy – in place for Day 1 The TU should agree the network repatriation policy There should be a protocol in place for identifying a specialty team to accept the patient. The protocol should include the escalation process in the event of there not being access to a specialty team.	**Will be fully met with network protocol**
T16-2C-311 - The trauma audit and research network (TARN) – variable timeline In place for Day 1- The TUs and LEHs should participate in the TARN audit, with at least 1 year of back-dated baseline data before network operational. Data should meet the following standards: Case ascertainment – patients submitted to TARN compared to expected based on Patient Episode Data for Wales (PEDW) dataset –target of 80% across the network by end of year 1. Case accreditation - this is the proportion of key fields used in this report that are filled in for each patient submitted to TARN –target of 95% across the network by end of year 1. The standards are to ensure subsequent TARN metrics can be meaningfully interpreted. TARN audit should be discussed at the network audit meeting at least annually and distributed to all constituent members of the network. A working plan has been produced to enhance TARN data collection including appointment of TARN coordinator(s) in health boards where gaps exist. In year 1 - Develop strategies for undertaking TARN PROMS and PREMS. New TARN coordinators required. Network board provided health boards a sample job description and personal specification. As a guide, 1 day per week of a TARN coordinators time is required per 100 expected cases per annum. Network board provided approximate whole time equivalents.	**Partially met and could be fully met with additional resources**
T16-2C-310 - Discharge summary – in place for Day 1 There should be a discharge summary which includes: • A list of all injuries. • Details of operations (with dates). • Instructions for next stage rehabilitation for each injury (including specialist equipment such as; wheel chairs, braces and casts. • Follow-up clinic appointments. • Contact details for ongoing enquiries. Electronic discharge record already in place, enhanced through clinical informatics development and patient held record.	**Partially met and could be fully met through clinical informatics development**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2D-301 - Rehabilitation coordinator – in place for Day 1 There should be a rehabilitation coordinator who is responsible for coordination and communication regarding the patient's current and future rehabilitation including oversight of the rehabilitation prescription. Service provided Monday to Friday. This rehabilitation coordinator should be a nurse or allied health professional (suggested 1.5 whole time equivalent/TU), maybe split role between therapists, with some clinical commitment. Network board providing sample job description and personal specification. New key enabling roles in the health boards and will have the following responsibilities: • Responsibility for the rehabilitation planning process for TU patients and review for patients who are repatriated from the MTC maintaining 'pull.' • To provide advice and work as part of the MDT to ensure appropriate management of TU patients and those repatriated from the MTC. • To develop and maintain links with the MTC and TUs across the network incl. the network rehabilitation lead. • Develop links across neighbouring health boards. • To continue developing a map of other relevant services in the region, including early links with acute, community resource, primary healthcare and social care services and agencies, ensuing the rehabilitation requirements of discharged TU and MTC patients are being met. • To provide training, education and advice within the MDT in relation to the development of the rehabilitation plan. • To work closely on service development and evaluation with the clinical lead for the TU, Major trauma practitioner(s) and TARN coordinator(s) • To be a member of the therapy teams working within the TU service and work closely with rehabilitation consultants providing outpatient reviews and outreach services in the health board.	**Unmet and requires additional resources**
T16-2D-302 - Access to rehabilitation specialists – Year 2-3 There should be the following allied health professionals with dedicated time to support rehabilitation of trauma patients: • Physiotherapist. • Occupational therapist. • Speech and language therapist. • Dietician. • Pyschologist	**Unmet and requires additional resources**

Balanced teams are required between the above therapies as traumatic injuries present with an extensive range of conditions. Therefore the therapeutic expertise required needs to be comparable with that of the MTC. This includes complex cognitive and communicative assessment and multiple limb injuries. It is unlikely that traumatic injuries as an isolated speciality will provide the necessary expertise and it will be essential for teams to provide cover for neurological conditions to ensure that the expertise necessary is provided within the team. This model will support the repatriation of other complex neurological conditions for 'care with treatment closer to home.'	
T16-2D-302 - Access to rehabilitation specialists In place for day 1 - Availability of a consultant in Rehabilitation Medicine providing outreach in all TUs, including interest in spinal - and neuro-rehabilitation (including telephone advice to rehabilitation coordinators and therapists) Key roles include: • Management of complex conditions in adults of working age. • Special interest in musculoskeletal, amputee medicine, spinal injury and neurological rehabilitation. • Manage risk and facilitating complex discharge. • Coordinate the team goals working with physiotherapy, occupational therapy, psychology, speech and language therapists, nutrition team, orthotists, prosthetist etc. • Assess capacity and managing behavioural issues after injury. • Usual to link with many specialities – including palliative care. • Provide community support including benefits and advice around home adaptations. • Vocational rehabilitation support. • Support specialist nursing home placements. Rehabilitation consultants will provide 4 sessions support for the TUs. This will consist of a ward round, a multidisciplinary team meeting, outpatient clinic with time to support relatives and relevant SPA. HDUHB, SBUHB, CTMUHB and ABUHB will require 4 sessions each. PTHB will require support within outpatient services as no inpatient facility. C&VUHB TU to be met from within MTC rehabilitation service. This equates to 17 additional sessions for TUs. 10 sessions would be provided from the additional appointment and 7 sessions from reorganisation of existing sessions. There is currently one trainee and HEIW have agreed to support the proposal to appoint an additional trainee. It is anticipated that trainees would rotate between the specialist rehabilitation units and the TUs. Additionally, North Wales currently has no dedicated rehabilitation facility and expansion of trainees may provide trained consultants for development of this model. This would strengthen support to the trauma units and provide a variety of expertise.	**Unmet and additional resources required**

Essential Quality Indicator	Currently met/unmet/partially met
T16-2D-302 - Access to rehabilitation specialists – in place for Day 1 Directory and referral guidelines for rehabilitation services (to be provided locally and supported by network) including: • Pain management. • Psychology/neuropsychology. • Mental health/psychiatry. • Specialised rehabilitation. • Specialised vocational rehabilitation. • Surgical appliances. • Orthotics and prosthetics. • Wheel chair services.	**Unmet and will be fully met through network protocol**
T16-2D-302 - Access to rehabilitation specialists – Year 2 – 3 Input of psychology/neuropsychology providing both an in-reach and outreach service to patients in the Health Board. It is accepted that psychological support for patients and families is a core component of a major trauma service for adults and children and that it is essential that it be embedded within the team rather than a standalone service. The network requires a visible psychological model of care and a component of the care should provide support for the staff within the service. There is an established network of peer support for psychology across the region and this should provide a solid platform on which to develop psychological services within the trauma units. The support for patients and families after trauma requires expertise across a wide clinical field from Post-Traumatic Stress Disorders to detailed neuropsychological assessment. It is essential that the relevant expertise be contained within the network to cover the broad range of psychological presentations. Linking with local rehabilitation services is essential to achieve the breadth and depth of complexity expertise required to support all patients and families affected by trauma. This service will add value to wider presentation other than major trauma. The need for psychological support was integral to the aftermath of a number of mass casualty events in the UK over the last few years.	**Partially met and could be fully met with additional resources**
T16-2D-303 – Rehabilitation plan – in place for Day 1 All patients should receive a rehabilitation assessment including barriers to return to work. Where a plan is required, this should be completed within 72 hours. The plan should be updated prior to discharge and a copy given to the patient All patients repatriated from the MTC should have their plan reviewed and updated at the trauma unit. Requires additional resources (i.e. rehabilitation coordinators and therapists). Standardised plan being developed by rehabilitation working group.	**Unmet and could be fully met through network protocol and additional resources**

Essential Quality Indicator	Currently met/unmet/partially met
Additional standard – Orthogeriatric review – Year 3 - 5 Review by a ST3/equivalent or above in orthogeriatric medicine, geriatric medicine or care of elderly medicine as soon as possible and definitely within 72hrs of admission. In keeping with the case for change, health boards have been asked to consider how this could be achieved (e.g. reviews undertaken by major trauma practitioners under supervision of care of the elderly consultant, given shortage of orthogeriatric workforce).	**Unmet and could be fully met by additional resources**

8.4 Additional Service Specification

8.4.1 'Care with Treatment Closer to Home' (CWTCH)

A key early priority for the network board is the development of 'care with treatment closer to home' (CWTCH). As described in the case for change, timely repatriation of patients to an appropriate environment remains an issue in NHS Wales. Without adequate patient flow out of specialist centres, the MTC at UHW and TU with specialist services at Morriston Hospital will struggle to automatically accept new patients. The constraints to timely repatriation were considered as part of a patient flow workshop. The next steps are described below which will need to be in place for Day 1 (unless otherwise stated):

- Acceptance of the principle that origin health boards are responsible for their patients, irrespective where they are being treated. Automatic acceptance will be treated in the same way in both directions.
- Early communication between major trauma and rehabilitation coordinator services across the system, giving notification of patients that need repatriation and their requirements. Single point of access for repatriations. Thus, helping to create a 'pull' rather than a 'push' model.
- Use of clinical informatics to enhance patient held records (e.g. discharge and rehabilitation plan) and trauma tracking (Year 1).
- A simple, easy-to-use policy with escalation measures, in which the ODN is given operational authority, augmenting any revisions undertaken to the All Wales Repatriation Policy. The network policy will require endorsement by the Chief Executive Officer of each health board.
- Building confidence in medical and nursing staff accepting patients back from specialist care, through creation of an appropriate 'landing pad' as described below. This will form the basis of a further workshop in 2019.

If the above package of interventions is successful in delivering timely repatriation whilst ensuring the highest level of patient outcome and experience, its principles could be scaled up to other areas where repatriation is currently a problem.

8.4.2 'Landing Pad' Configuration

The 'landing pad' describes the environment to which major trauma patients will return once their specialist care is complete (e.g. at the MTC). It includes the structures in place to support and enhance the confidence of medical and nursing staff in managing patients in the recovery, rehabilitation and

re-enablement phases of their journey. This will include patients who return to a local hospital or community. A small group of patients with complex conditions will return from the MTC to the 'landing pad' whilst waiting for specialist rehabilitation and once specialist rehabilitation is complete.

In deciding the location of the 'landing pad,' the programme team (including the network rehabilitation lead) have undertaken a number of meetings with all health boards and have provided the following guidance on the requirements for a 'landing pad':

- Inpatient beds with appropriate medical and surgical ward cover including out of hours. Surgical input to include availability of orthopaedic and general surgical review. Input from other specialties may also be required (e.g. ENT, ophthalmology and urology). Access to input from care of the elderly services will be essential.
- Access to diagnostics (e.g. CT and MRI), to aid detection of complications.
- The presence of the multidisciplinary team as indicated above supporting the 'landing pad' including consultants in Rehabilitation Medicine, major trauma practitioners, rehabilitation coordinators and balanced therapy teams.
- Network led training and education for medical and nursing staff in tracheostomy management, spasticity management, bowel and bladder care and management of behavioural disorders. Face-to-face training augmented by online delivery.
- A low stimulation environment is important to consider, with an ability to dim lighting and nurse in a low-level bed. This environment can reduce the need for additional nursing support.
- A meeting space for multidisciplinary team/family meetings.
- Appropriate wheelchair provision for short-term loans.

In considering the 'landing pad,' health boards were asked to consider the following points:

- In most cases and based on the specification for a 'landing pad' provided above, health boards were asked to consider that their TU(s) become the 'landing pad' for the health board. If not, consideration needed to be given to suitability of an alternative location in line with the guidance already provided, with appropriate mitigations. Whilst the aspiration is to have a single ward for these patients, allowing a concentration of expertise, this is unlikely to be possible by year one.
- In accordance with the All Wales Repatriation Policy, patients should already be returning to health boards (except a few with complex conditions); therefore, these do not represent new patients in the system and does not necessarily represent new capacity. Of course, this needs to be carefully balanced against the unprecedented pressures on unscheduled and social care, and the impact on capacity.
- Most TUs will see fewer patients in totality (as the number of acute patients from health boards to MTC will exceed the number of patients returning from the MTC to the health boards). Therefore, in most cases there will be no requirement for new capacity. There are some exceptions to the above, but uplift in these health boards should be proportionate to the need.
- The data presented in Appendix 1 on the bed requirements for the 'landing pad' represents a worst-case scenario. This represents the maximum number of beds required at the landing pad within existing TU capacity. Most patients will go for specialist rehabilitation from the MTC, so transfers of these patients from the MTC to the 'landing pad' will be minimum. A minimal number of patients may also go from specialist rehabilitation to the 'landing pad.'

- The true size of the 'landing pad' could be accurately quantified at this stage of the programme to determine any additional infrastructure and nursing requirements but in year one, the picture is likely to become clearer.

Based on the above, a phased approach to the development of a 'landing pad' has been agreed, where's health boards identify beds within key admitting specialties (e.g. care of the elderly, stroke, neurology, and trauma and orthopaedics), with the multidisciplinary team providing outreach. In year one, accurate data will be collected to objectively quantify the need for a single 'landing pad' and this will be subject to future planning (see Appendix 17).

8.4.3 Paediatric Rehabilitation

With respect to specialist paediatric rehabilitation, this is described in the MTC case. It consists of multidisciplinary team led by a neurologist with an interest in rehabilitation at the Noah's Ark Children's Hospital of Wales, Cardiff. This team supports admissions requiring complex rehabilitation and works closely with neurology, paediatric intensive care and general paediatrics. Rehabilitation for children with non-neurological injuries at UHW is less formalised and is led by either therapy services, general paediatricians or trauma and orthopaedics. The function of this rehabilitation model will be reviewed in year one to assess whether additional resources may be required. Currently there is no capacity for organised outreach and this is a recognised as a service need. However, most children will be repatriated home from the MTC and not the hospital 'landing pad.' Additional resources for consultants in rehabilitation medicine will allow outpatient reviews as part of the outreach service, linking in with the specialist paediatric rehabilitation team in Cardiff.

Children will be repatriated to local paediatric services and supported by existing community paediatric services. The additional rehabilitation support planned for TUs will support transition of affected children in the TUs back to the community. The coordinator role will be important here. In year one and two as new therapists are introduced, health boards will develop a broader skill mix with these therapists to manage children with specific rehabilitation requirements.

8.5 Summary of Quality Indicator Assessment and Information Requests

As part of the TU designation process, an initial summary of key gaps against quality indicators and service specification was provided to Chief Executive's in November 2018, at the WHSSC Joint Committee.

From the analysis, a number of quality indicators are already being met by the TUs or could be met through the provision of network policies and internal re-organisation of resources. Where additional resources are required as indicated above, these resources will be introduced using a phased approach. The analysis revealed that there was commonality between all TUs with respect to additional resource requirements.

Following the Gateway review, a phased introduction of additional resources is summarised below, with details provided in Appendix 18:

In place for Day 1	Year 1 – business case development (implemented years 2 – 3)	Year 2 – business case development (implemented years 3 – 5)
health board trauma clinical lead – already in place	Balanced therapies: Physiotherapy Occupational therapy Speech and language therapy Dietetic Podiatry Orthotics	Orthogeriatric review
Major trauma practitioner(s) - Band 7 - 1.5 WTE/TU (5 day service)	Psychologist/neuropsychologist	
Rehabilitation coordinator(s) – Band 7 - 1.5 WTE/TU (5 day service)	Level 2 training requirements for nurses	
TARN coordinator(s) – Band 4 – 1.0 WTE/TU		
Additional rehabilitation consultant for network (4 sessions/HB/week, PTHB – 1 session/week)		

Subsequently, all health boards were asked to develop their submissions for the Programme Business Case and any associated cases based on the above.

In order to provide assurance that the TU components of the Programme Business Case were internally scrutinised, the programme team provided written and verbal feedback on initial submissions from health boards, followed by further challenge at a network board meeting on 24 June 2019. Following the Gateway review, face-to-face meetings were held with all health board network board members to discuss and agree the key enabling requirements and approach to the 'landing pad.' Subsequent to each meeting, a summary of the discussion was sent to each health board. It was agreed that health boards would consider and provide a written response to the proposals and to confirm their intentions to appoint in-year to the key enabler roles to include in 2020/21 and subsequent Integrated Medium Term Plans (IMTPs) and to address in year resourcing.

At the time of writing, all health board network board members have confirmed their support for the key enabling requirements and approach to the 'landing pad' and discussions are underway in relation to inclusion in IMTPs and in year resourcing.

8.6 Cardiff and Vale University Health Board

The following is a summary of the health board's resource. The health board's TU is the University Hospital of Wales. The resource requirements set out here are because UHW already meets most of the TU quality indicators and service specification outlined above, through existing resources and staffing.

0.1 whole time equivalent clinical lead from March 2020 (consultant) for TU capability 0.5 whole time equivalent major trauma practitioners (band 7) 0.5 whole time equivalent rehabilitation coordinators (band 7)
Landing pad – UHW, no new additional resources for day 1

8.7 Swansea Bay University Health Board

The following is a summary of the health board's resource. The health board's TU is Morriston Hospital. Specialist services are considered in section 8.12.

0.1 whole time equivalent clinical lead from March 2020 (consultant) 1.5 whole time equivalent major trauma practitioners (band 7) 1.5 whole time equivalent rehabilitation coordinators (band 7) 1.0 whole time equivalent TARN coordinators (band 4) in addition to 0.5 WTE (band 4) already in place
0.4 whole time equivalent rehabilitation consultant
Landing pad – Morriston Hospital, no new additional resources for day 1

8.8 Aneurin Bevan University Health Board

The following is a summary of the health board's resource requirements. The health board's TUs are the Royal Gwent Hospital and Nevill Hall Hospital. The health board is taking a pragmatic approach ahead of the planned centralisation to a single TU site with the opening of the Grange University Hospital in 2021.

0.1 whole time equivalent Clinical lead from March 2020 (consultant) 1.5 whole time equivalent major trauma practitioners (band 7) 1.5 whole time equivalent rehabilitation coordinators (band 7) 1.0 whole time equivalent TARN coordinators (band 4)
0.4 whole time equivalent rehabilitation consultant – the requirement for consultant rehabilitation resource will be considered as part of the second phase review of clinical models including the overarching rehabilitation model and therefore not included here
Landing pad – Royal Gwent Hospital and Nevill Hall Hospital in the interim, no new additional resources for day 1

8.9 Hywel Da University Health Board

The following is a summary of the health board's resource requirements. The health board's TU is Glangwili General Hospital (GGH).

0.1 whole time equivalent Clinical lead from March 2020 (consultant) 1.5 whole time equivalent Major trauma practitioners (band 7) 1.5 whole time equivalent Rehabilitation coordinators (band 7) 1.0 whole time equivalent TARN coordinators (band 4)
0.4 whole time equivalent Rehabilitation consultant
Landing pad – GGH, no new additional resources for day 1 (although the health board aspires to develop a 10 bedded dedicated landing pad in future years
In addition for day 1, the health board aspires to provide an additional 1 session for clinical leadership, 2.5 whole time equivalent physiotherapists (band 6) and 1 extra theatre session/week in anticipation of the increased flow to GGH within the health board

Bronglais General Hospital and Withybush Hospital have been designated rural trauma facilities by the health board and within the context of the network, some of which will be patients from Powys. These facilities will need to maintain the ability to assess and manage major trauma patients. Given their rural geographical location, the following measures will be put in place once the network is operational:

- A network pre-hospital triage tool to guide decision-making and trauma desk facility to provide remote support and prioritisation of face-to-face training for ambulance personnel operating in these regions. The pre-hospital triage tool will provide a safety net that patients with airway compromise or catastrophic haemorrhage will be taken to the nearest Emergency Department. Nonetheless, the above measures will support ambulance personnel taking some patients, where appropriate, to the TU at GGH.
- Confirmation of 24/7 availability of EMRTS, providing pre-hospital critical care, supporting local trauma teams and retrieval of patients to the MTC at UHW or TU with specialist services at Morriston Hospital.
- Remote telemedicine to guide management of trauma teams in rural trauma facilities ahead of arrival of EMRTS.
- An operational policy between the TU and rural trauma facilities, forming part of the network operational policy.

It is anticipated that rural trauma facilities will have a vital role to play in the network. With the above measures in place, it is expected providers will be supported and major trauma patients will receive a higher standard of care than they do currently.

8.10 Cwm Taf Morgannwg University Health Board

The following is a summary of the health board's resource. The health board's TUs are Prince Charles Hospital and Princess of Wales Hospital. Additional resource requirements for the two TUs have been combined below.

0.1 whole time equivalent Clinical lead from March 2020 (consultant) 3.0 whole time equivalent Major trauma practitioners (band 7) 3.0 whole time equivalent Rehabilitation coordinators (band 7) 1.0 whole time equivalent TARN coordinators (band 4)
0.4 whole time equivalent Rehabilitation consultant
Landing pad – Royal Glamorgan Hospital - no new additional resources for day 1

8.11 Powys Teaching Health Board

Powys Teaching Health Board has no acute hospital. All of the health board's major trauma cases will be managed by an MTC or TU outside of the health board's geographical catchment area. The health board's contribution to maintaining the trauma network will be through enabling repatriation of trauma cases for rehabilitation. Rehabilitation services in the health board are currently geared towards the elderly and those with chronic diseases. Trauma rehabilitation requires a subtly different approach and holistic organisation, which may not be best served by managing trauma patients alongside elderly and chronic disease patients. The health board may well be seeking to commission a 'landing pad' from neighbouring health boards, albeit patient numbers will be small. This remains a work in progress.

In relation to community-based rehabilitation, the health board has identified the following additional resources, augmenting existing services.

0.5 whole time equivalent Rehabilitation coordinators (band 7)
0.1 whole time equivalent Rehabilitation consultant

8.12 Specialist Services Support to the Major Trauma Centre

The following specialist services have been considered within the context of Morriston Hospital, as a TU with specialist services and the role it will play within the network to support the MTC to meet specific quality indicators.

8.12.1 Orthoplastic Surgery

The Welsh Centre for Burns and Plastic Surgery is located at Morriston Hospital. Currently there is no routine provision of emergency surgery by a plastic surgeon at UHW. A number of major trauma patients taken to the MTC will require the input of plastic surgeons. This is in keeping with requirements of a consultant plastic surgeon to be available for emergency cases within 30 minutes of the patient's arrival (T16-2B -113). Furthermore, the MTC should provide a comprehensive musculoskeletal trauma service and facilities to support all definitive fracture care and allow joint emergency orthoplastic management of severe open fractures as specified in British Orthopaedic Association Standards for Trauma and Orthopaedics (BOAST 4) guidelines (T16-2C -110).

In summary, the quality indicators indicate that for open fractures:

- A combined orthopaedic and plastic surgical approach should be undertaken for the initial debridement of the wound and stabilisation of the fracture.
- Heavily contaminated wounds require immediate debridement. Within 12 hours for isolated high energy, open fractures. Within 24 hours for all other low energy, open fractures.
- Definitive soft tissue closure or coverage should be achieved within 72 hours of injury if it cannot be performed at the time of debridement, again using a combined orthopaedic and plastic surgical approach.

Performance against these standards is monitored by TARN. In response to this, both UHW and Morriston Hospital have worked collaboratively to develop and agree a clinical service model, supported by the network board:

- Multi-system trauma patients with concurrent orthoplastic requirements – will be taken to the MTC (direct as informed by the pre-hospital triage tool or transferred from TU/LEH). Recommendations made following the professional peer review indicated that the provision for a plastic surgical presence at the MTC was an absolute day 1 requirement.
- Patients with isolated crush injury/ mangled limb/ partial or complete amputation (above wrist or ankle)/ major degloving – will be taken to Morriston Hospital (direct as informed by the pre-hospital triage tool or transferred from TU/LEH).
- Patients with isolated open lower limb (tibia/ankle/foot) fracture – recommendations derived from the professional peer review indicated that this element of the pathway could be phased for the following reasons:
    - In year 1 – the current pathways will be maintained and there will be no change in patient flow. The transfer of isolated open lower limb fractures will not be included in the pre-hospital triage tool. The reasons for this include that whilst this is an important patient

group, they are not major trauma patients and the provision of plastic surgical input into multi-system trauma patients at the MTC takes priority. Furthermore, historically, English trauma networks phased this aspect of service development. A significant proportion of isolated open lower limb fractures are transferred to Morriston Hospital already either directly or by secondary transfer.

- End of year 1 – consideration will be given to additional resource requirements to allow direct transfer of significant isolated open lower limb fractures direct from scene to Morriston Hospital. This will take into consideration any capacity released through the increased major trauma workload at the MTC, which would previously have been undertaken at Morriston Hospital.

Activity data was used to determine the resource requirements to deliver a plastic surgical presence at the MTC. Based on population data, the level of orthoplastic surgery cases requiring admission to the MTC is likely to be approximately 24 cases +/- six per annum. However, as evidenced by other MTC's there may be wider plastic surgical input once the service is established. Hendrickson *et al* (2016) demonstrated that 14% of MTC cases required plastic surgical input. Furthermore, of 227 patients an average of 3.7 procedures were carried out per admission. Given the wider benefit of establishing a plastic surgical service at the MTC it is likely that the number of cases predicted above is underestimated.

Initially the presence of a plastic surgeon will be provided for 5 days per week for 12 hours per day, in order to undertake combined orthoplastic cases, multidisciplinary team meetings and complex fracture clinics. It is accepted that this provision does not meet the quality indicators; however, out of hours and at weekends, the orthopaedic surgeon at the MTC will discuss all cases as appropriate with the plastic surgeon on call at Morriston Hospital. Patients requiring soft tissue closure or coverage either will receive this at the MTC or be transferred to Morriston Hospital, based on their clinical presentation.

The resource requirements to establish the plastic surgery service at the MTC is 4.0 WTE consultant plastic surgeons and 5.0 WTE middle grades as assessed by the professional peer review process.

8.12.2 Spinal Trauma Surgery

Currently there are three hospitals that provide spinal surgery: UHW, Morriston Hospital and the Royal Gwent Hospital. Following discussions between the three sites, a clinical service model for spinal trauma surgery was agreed as summarised below:

- All patients with suspected or confirmed spinal trauma and new neurology (paralysis) – direct or transfer from TU/LEH to the MTC (Spinal Cord Injury Centre). This is being addressed through the MTC case.
- Spinal fractures that require operative fixation with no neurology:
  - UHW – refer to respective spinal team locally for operative fixation.
  - Morriston Hospital and Royal Gwent Hospital – refer to respective spinal teams at Morriston Hospital and Royal Gwent Hospital.
  - Patients in Hywel Dda University Health Board hospital – refer to Morriston Hospital spinal team (transfer within 48hrs from initial admission).
  - Patients from Cwm Taf Morgannwg Health Board hospital – refer to UHW spinal team (transfer within 48hrs from initial admission).

The only change in current flows will be to Morriston Hospital. This is reflected in the Swansea Bay University Health Board case and opens up the opportunity to improve the emergency provision of

spinal surgery as a whole for South West and West Wales, which is supported by the network board and will further decompress the UHW, for non-traumatic spinal emergencies that it is otherwise currently expected to manage.

8.12.3 Thoracic Trauma Surgery

The current provision of thoracic surgery is split across Morriston Hospital and UHW. Following an independent panel review and public consultation in relation to the future provision of thoracic surgery across the region, it was concluded that Morriston Hospital should be a single site for thoracic surgery. This decision post-dated the designation process for the MTC in Cardiff and questioned the ability for the standard to be met that a thoracic surgeon to be available within 30 minutes for an emergency case at the MTC (T16-2B -113). There are a number of clinical scenarios, which may require the input of a thoracic surgeon. WHSSC have agreed an interim solution (see Appendix 16) and this will ensure adequate thoracic surgical presence at the MTC for emergency cases, as the MTC is likely to be operational prior to the centralisation of thoracic surgery. Now a decision has been reached on this provision, the network board will work with both health boards to develop a clinical service model for emergency, urgent and subacute cases. Within this, consideration will be given as to the model for rib fixation and referral for complications of thoracic trauma.

8.12.4 Pelvic Trauma Surgery

Current provision of urgent (i.e. next day) definitive fixation of the pelvis across the region is limited. UHW (based on self-assessment) have two surgeons with interest in pelvic surgery. Morriston Hospital has one with recognition that recruitment has been challenging. None of the other health boards has dedicated pelvic surgeons. The network board has recommended that all urgent isolated pelvic and acetabular fractures as referred to the MTC and the MTC accepts transfers as clinically appropriate for definitive fixation, noting that most of these will be next day referrals. The additional resource requirements have been confirmed in the MTC case.

9 Financial Case

9.1 Introduction

The purpose of this section is to set out the totality of costs (revenue and capital) and proposed funding arrangements to enable NHS Wales and Welsh Government to assess the total amount required, as well as the phasing of the service and supporting capital requirements. The section sets out the required investment in work towards meeting the quality indicators and service specification standards for major trauma, as well as the uplift of activity at the Major Trauma Centre (MTC).

9.2 Context

The Welsh Government issued clear planning guidance and financial direction to all health boards in a report to the NHS Wales Executive Board in December 2018. This formed part of the financial settlement from 2019/20 onwards, as outlined below:

Welsh Government directions:

- It is our expectation that the NHS in Wales will view the establishment of a trauma network and MTC as a significant priority. As such, we will be expecting Health Boards to invest strategically in this service. We are aware that provision has not been made so far within the WHSSC prioritisation for the recurrent revenue funding requirements for the service. The Health Boards have been provided with an uplift in their funding from 2019/20 and it is the expectation that this uplift will enable the implementation of strategic service developments such as major trauma to be supported.
- To aid the development of this work, we have established an internal Welsh Government policy board to facilitate cross department working, scrutiny and challenge. We are conscious there are significant time and resource constraints in relation to the delivery of this project and we expect the internal policy board to be utilised to provide collective advice and scrutiny to assist the trauma network as it develop its programme business case, policies etc. We do of course accept that it will not be possible to deliver the entirety of the project by 2020 and we will look to work with NHS colleagues to agree a sensible programme, which can deliver benefits to patients in a phased way.
- We have provided advice to the trauma network on the structure and business case process to deal with both the capital and revenue consequences arising from the Major Trauma programme. There is an expectation that an overall programme business case will be developed setting out the case for change, as well as the high-level service and revenue consequences. This does not negate the need for individual health boards to develop any individual capital business cases required to support local implementation – where known, these are reflected within the programme business case; these should be flagged with capital and estates officials within Welsh Government, as soon as possible, in line with normal processes including within health board IMTPs.
- There is an expectation set out in the national audit programme that all Health Boards should submit data to the Trauma Audit Research Network **(TARN)**. Historically, Health Board participation rates in the audit have been variable. Participation in this audit is vital to the successful implementation of the trauma network. As such, Welsh Government will be paying much closer attention to this audit and we expect all health boards to review their participation and make the improvements necessary to ensure their full participation.

- The trauma network and MTC must be developed within the NHS Wales **policy context** and as such, account must be taken of existing and emerging policies such as the national work on transfers for critically ill patients. This will avoid duplication of effort within the project.
- It is also important that any service development relating to the trauma network such as investment in rehabilitation services be considered in the **wider service context** such as the development of neuro-rehabilitation and services to support patients with a prolonged disorder of consciousness.
- Finally, we understand there have been discussions about the future commissioning model for major trauma services in South Wales, West Wales and South Powys. The NHS in Wales operates as a planned healthcare system, and it would be **inappropriate for an internal market approach** such as tariffs to be used to support this development. Any commissioning mechanisms or framework must therefore work within the NHS Wales context and should not be unnecessarily bureaucratic.

9.3 Phasing

In assessing the need for investment in the development of the network, significant consideration has been given to the need for phasing, for both financial and operational reasons.

There is a difference between the MTC and the TUs in terms of phasing. Investment in the MTC needs to be more frontloaded, because of the need to achieve quality indicators and meet the service specification at an early stage, in order to provide the maximal benefit to the most seriously injured patients, the majority of whom will go to the MTC. By contrast, the TU resource requirements will reflect a much more phased approach, where subsequent business cases may be required, where appropriate, to meet quality indicators and elements of the service specification that cannot be met from day one.

The frontloading of resources at the MTC is also a reflection of the shift in learning and evidence base, from trauma systems nationally and internationally. This includes the need from day 1 for 24/7 trauma team leadership in the MTC, the presence of a poly trauma unit and hyper acute rehabilitation. C&V UHB will also be providing a combined adult and paediatric MTC, thus there are two sets of quality indicators to be met, with some areas of overlap and others requiring distinct resources.

It is evident that in the seven years since the establishment of the English trauma networks, there has been a substantial increase in pressure on unscheduled care. Thus, the financial case presented here is a reflection of a system already under strain, where demand often outstrips resources, leading to resources being depleted to undertake existing work.

Within the MTC case there is phasing for workforce against incremental changes in predicted activity. This is not reflected in the totality of the network revenue implications, as after year one, WAST revenue costs fall significantly.

Finally, all health boards (except C&V UHB as the MTC) will see less moderate and major trauma in totality. Whilst it is difficult to quantify releasable workforce, it is possible for health boards to consider releasable Emergency Department admissions, ward bed days, theatre sessions and critical care bed days, in terms of accepting the financial position.

9.4 Revenue Costs

9.4.1 Summary of Revenue Costs

Following the provision of information against the agreed phasing of clinical and service standards, Health Boards prepared an estimate of revenue costs and these are summarised in the table below:

Summary of Revenue Costs

	2019/20	2020/21	2021/22	2022/23	2023/24
	£000s	£000s	£000s	£000s	£000s
MTC Costs	£922	£10,579	£11,222	£11,222	£11,222
Specialist Services Costs	£150	£910	£910	£910	£910
Trauma Unit costs	£287	£1,278	£1,278	£1,278	£1,278
Operational Delivery Network Costs	£119	£496	£508	£513	£515
Pre-Hospital Care	£58	£1,201	£635	£640	£640
Total	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

The revenue implications are further broken-down below:

Summary Revenue Costs of Network					
	2019/20	2020/21	2021/22	2022/23	2023/24
	£000s	£000s	£000s	£000s	£000s
Aneurin Bevan (Trauma Unit)	£51	£205	£205	£205	£205
Cwm Taf Morgannwg (Trauma Unit)	£103	£471	£471	£471	£471
Cardiff and Vale Major Trauma Centre	£922	£10,099	£10,594	£10,594	£10,594
Cardiff and Vale Major Trauma Paediatrics	£0	£481	£629	£629	£629
Cardiff and Vale (Trauma Unit)	£0	£69	£69	£69	£69
Hywel Dda (Trauma Unit)	£62	£247	£247	£247	£247
Swansea Bay (Trauma Unit)	£62	£247	£247	£247	£247
Swansea Bay Operational Delivery Network	£119	£496	£508	£513	£515
Swansea Bay Specialist Services	£150	£910	£910	£910	£910
Powys (Repatriation and Rehabilitation Facility)	£10	£40	£40	£40	£40
WAST	£58	£1,201	£635	£640	£640
Total NHS System Revenue	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

The above costs have been derived through an iterative process of reviewing the gap between commissioning expectations and provided costs. It is important to stress that the TU costs presented do not include all of the costs associated with moving in a phased manner to full TU compliance with quality indicators and all aspects of the service specification. Such additional costs, which are not currently known, will need to be subject to additional TU specific business cases over the period of implementation.

The local trauma unit costs for Hywel Dda UHB reflect the key enabling posts for Day 1, however the Health Board aspires to invest in an additional clinical leadership session, 2.5 whole time equivalent physiotherapists and an additional theatre session per week to meet an anticipated demand upon GGH. Further rehabilitation investment has also been identified. The Health Board are looking to develop 10 landing pad beds, which will be phased in year 1 and year 2. The revenue costs that the Health Board have identified locally for staffing of these additional rehabilitation and landing pad staffing costs over and above the costs in the case is £8k in 2019/20, £268k in 2020/21 and £1,457k in 2021/22.

Furthermore, SBUHB have confirmed that the ongoing cost for expanding the South West Wales Spinal Service will be managed between HDUHB and SBUHB.

The above costs include recurring funding already released in-year (as part year costs) during 2019/20 for key enabling posts and preparation for Day 1. This funding, as shown below, has been approved in two tranches through the WHSSC Joint Committee process (therefore signed-off by all Health Board Chief Executives):

Tranche	2019/20 part year funding (£000s)	Full year funding from 2020/21 (£000s)
Tranche 1	675,000	1,993,000
Tranche 2	441,000	3,006,000
Total	**1,116,000**	**4,999,000**

***** Released subject to approval of the programme business case to allowed recruitment processes to commence in the meantime

The preferred MTC model also creates the potential for further efficiencies to be delivered at the trauma units who will in future be transferring current activity to the MTC. Further work will be undertaken by the finance group to assess how such opportunities can be realised in practice. Possible opportunities include reduced in patient stays and reduced front door activity. It will be important that health boards have systems in place to capture these potential benefits as they will need to re-deploy resources internally into improved landing pad activities to enable timely repatriation from the MTC.

9.4.2 Summary of Revenue Funding Arrangements

The finance sub group agreed that the figures in the sub section above would form the basis of the initial distribution, subject to further work to determine if there was an appropriate direct contribution to the MTC costs in relation to the C&VUHB's own trauma unit costs. The distribution would then be subject to review in the light of actual utilisation patterns experienced in year one and beyond and the subsequent application of the agreed risk sharing principles for regional services.

9.4.3 Benchmarking

The costs of the MTC were benchmarked against real world finance and activity data from the flow of the North Wales population to the Stoke MTC. The method to determine this benchmark used detailed actual charges for a complete financial year for a whole population in order to base it on a reliable and representative case mix. The charges included in the comparator included the full costs of critical care, all procedure costs from core specialty activity and the best practice tariff charges payable under the English PBR system. All charges were at 2018/19 prices and reflected national tariff rules together with any variation needed for local prices. The resulting dataset only included those cases that ultimately attracted major trauma best practice tariffs to ensure a like for like comparison. The dataset comprised 105 cases which included 45 for MTC level 1 and 60 cases for the higher severity level MTC level 2. The average unit prices were £23,576 per case for MTC level 2 (ISS>15) and £12,083 per case for MTC level 1 (ISS 9<15) with an overall average of £18,650 per case. These benchmark units' costs have been applied to business case activity as follows to illustrate a range of expected values:

ISS 9-15 – moderate	Assumed current position	@ Average Tariff Cost £	Year 1	@ Average Tariff Cost £	Year 1 Additional Cases	Additional Cases @ Average Tariff Cost £	Year 2	@ Average Tariff Cost £	Year 3	@ Average Tariff Cost £
Direct to MTC	154	1,860,782	206	2,489,098	52	628,316	231	2,791,173	256	3,093,248
Transfer TU to MTC	11	132,913	58	700,814	47	567,901	58	700,814	66	797,478
Total	165	1,993,695	264	3,189,912	99	1,196,217	289	3,491,987	322	3,890,726
ISS >15 – major	Assumed current position		Year 1				Year 2		Year 3	
Direct to MTC	284	6,695,584	306	7,214,256	22	518,672	341	8,039,416	368	8,675,968
Transfer TU to MTC	49	1,155,224	219	5,163,144	170	4,007,920	219	5,163,144	193	4,550,168
Total	333	7,850,808	525	12,377,400	192	4,526,592	560	13,202,560	561	13,226,136
ISS >9 – candidate	Assumed current position		Year 1				Year 2		Year 3	
Direct to MTC	438	8,556,366	512	9,703,354	74	1,146,988	572	10,830,589	624	11,769,216
Transfer TU to MTC	60	1,288,137	277	5,863,958	217	4,575,821	277	5,863,958	259	5,347,646
Combined Direct to MTC & Transfer TU to MTC	498	9,844,503	789	15,567,312	291	5,722,809	849	16,694,547	883	17,116,862

The new MTC will be delivering the full range of activities across ISS 9<15 and ISS>15 and hence both should be taken together in comparing to expected costs for the MTC. In making a like for like comparison with the MTC business case the following also needs to be taken into account:

- The existing cost base for the MTC at UHW. Including baseline costs for trauma, emergency care department costs and critical care.
- The majority of isolated neurosurgery cases will be dealt with as per the current pathway under the neurosciences contract.
- The major trauma pathway from the Stoke centre includes agreed standards for appropriate discharge back to local services within the BCUHB area. Patients with an ISS>15 had an

average length of stay of 10.9 days (non-neurosurgery cases excluding critical care). Critical care length of stay averaged 4.0 days.

- The new UHW MTC will be meeting the requirements for increased activity which is anticipated to rise each year. The value of additional activity delivered over the period would be equivalent to circa £5.7m to year 1 (+291 cases); £6.8m to year 2 (+291+60 cases); and £7.5m to year 3 (+291+60+34 cases).

- The new UHW MTC total activity including baseline will deliver activity valued at £15.6m (year 1 - 789 cases); £16.7m (year 2 - 849 cases), £17.1m (year 3 - 882 cases).

Unit Costs

The costs forecast for the MTC, Specialised Services and ODN components of the business case total £11.984m in year 1, £12.640m in year 2 and £12.645m in year 3. Activity is forecast to increase to 789 cases by year 1, 849 by year 2 and 883 by year 3. Resulting incremental units costs are therefore £15,189 for year 1, falling to £14,888 for year 2 and £14,320 by year 3. These incremental costs are within the comparator derived from the costs of the benchmark service of £18,650 per case. However, inclusion of baseline costs set out below are likely to take the gross overall unit cost to above the benchmark level.

The baseline contracting currencies used by CVUHB to contract for major trauma lack detail, vary between health boards and it is difficult to match TARN activity data retrospectively to contracting data. Hence it has not has been possible for CVUHB to place an accurate value on the current baseline. However, the following baseline unit cost data is useful in comparing the above incremental cost of the MTC to the benchmark comparator:

- CVUHB current non elective trauma unit prices average at £3,960 per case.

- CVUHB critical care unit prices average £1,935 per day with a marginal rate of £1,225 per day.

- Emergency unit contracts are on a block basis hence no unit cost data is available.

9.4.4 Financial Risk Sharing

The financial risk share arrangements for the Major Trauma Centre, Swansea Bay Specialist Services and Wales Ambulance Services NHS Trust are based on WHSSC standard formula, the impact of which is outlined below:

Health Board	Risk Share
Cardiff and Vale UHB	20.77%
Swansea Bay UHB	18.44%
Cwm Taf Morgannwg UHB	17.23%
Aneurin Bevan UHB	25.36%
Hywel Dda UHB	16.80%
Powys THB	1.40%
Total	**100.00%**

The required revenue funding from each health board on the risk share basis, plus all currently known local costs for the development of the TUs is reflected below:

Summary of funding of Trauma Network by Health Board					
Reflects local Trauma Unit / Rehabilitation costs plus share of Major Trauma Centre, Specialist Services and WAST Pre-hospital care					
	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
Aneurin Bevan	£353	£3,549	£3,571	£3,573	£3,574
Cwm Taf Morgannwg	£308	£2,743	£2,758	£2,759	£2,760
Cardiff and Vale	£247	£2,808	£2,826	£2,828	£2,829
Hywel Dda	£262	£2,462	£2,477	£2,479	£2,479
Powys	£27	£225	£226	£226	£226
Swansea Bay	£281	£2,678	£2,695	£2,696	£2,697
WAST (2019/20 funded by Welsh Government, year 1 onwards by Health Boards)	£58	£0	£0	£0	£0
Total NHS System Revenue	**£1,536**	**£14,465**	**£14,553**	**£14,562**	**£14,564**

EASC have confirmed that the funding for the 2019/20 costs for the WAST business case will be funded by Welsh Government. The risk share calculations are assumed to be the same as WHSSC. Year 1 revenue implications are being considered within the context of this programme business case.

9.4.5 Outstanding Issues Impacting on Revenue Costs and Apportionment

The costs and funding shares above do not take account of the several factors outlined below, as sufficient information is not yet available:

- Increased RTA income to C&VUHB resulting in lower net costs, offset by equivalent reduced RTA income to other health boards. This has no net overall effect to NHS Wales, but does result in a change to the financial impact on each health board. The planned approach to reflect this is to monitor changes in RTA income during 2020/21 by the health board, and adjust net costs and commissioning flows to reflect the changes identified.
- The impact of the planned earlier repatriation of patients from the MTC to TUs/'Landing Pads' for repatriated patients is taken account of in the business case in respect of the projected additional patients triaged to the MTC, but is not taken into account in respect of earlier repatriation of existing major trauma patients treated at UHW. Therefore, if the implementation of the repatriation protocol and pathway is fully successful, there would be a reduction to bed requirements within the MTC from that assumed in the business case. Conversely, if earlier repatriation is not achieved, there would be an increase in the bed requirement. The level and timing of repatriation will be monitored during year one, and consideration given whether the bed planning and associated resourcing plans need to be amended in year two.
- The phasing of costs is based on a 1 April 2020 implementation, with all additional year 1 staffing being in place by this date. It is inevitable that there will be a degree of slippage which will reduce year 1 costs to some extent. Tracking of the additional costs during year 1 will be put in place until all staff and associated costs are being incurred, and only actual costs incurred will be funded.
- The costs do not include capital charges associated with capital expenditure (see also below). It is assumed that these will be funded directly by the Welsh Government as with all capital schemes.
- There are areas within the MTC business case where further review of detailed staffing plans and costs is still being undertaken (largely around ED consultant numbers). These could

potentially impact year 2, but would not impact on year 1. The final outcomes of this review will then be reflected in the year 2 costs.

- There may be further operational efficiencies resulting from the introduction of the Paediatric TU which could reduce local beds requirements within UHW. It is important that these potential further efficiencies are tracked and benefits shared appropriately.
- The costs included in the SBUHB case for specialised services include the significant overhead of locating up to four plastic surgeons at the MTC. In practice, in order to fully utilise this resource, there is likely to be a change the balance of activity undertaken at the current SBUHB plastic surgery service and at the MTC. This may result in an offset in costs from a reduction in activity and cost at the SBUHB service, but this cannot be accurately determined at this time until the actual case mix of the MTC activity becomes clearer.
- The SBUHB specialised services business case includes the cost of five middle grades at 100%, assuming no deanery funding. This has not been approved in principle by WHSSC Joint Committee at this point, but is included for planning purposes.
- The Cardiff MTC case reflects additional revenue costs of £352k that are expected to arise following submission of the capital case to Welsh Government. These figures have not been approved in principle by WHSSC Joint Committee at this point but are included for planning purposes.

9.5 Contracting Arrangements

WHSSC, working with the finance sub group of Health Boards, will continue to develop contracting arrangements that will determine an appropriate contracting and funds flow model that will replace the current trauma income flows into C&VUHB. A system will be designed which will continue to provide baseline income which is not duplicated by the addition of the MTC business case funding. This will be a complex process as there is significant uncertainty as to the value of current income flows and the overlap of these with MTC designated activity.

9.6 Capital Costs

9.6.1 Summary of Capital Costs

Strategic capital funding of £6,414m through Welsh Government (rather than locally funded through discretionary capital) is outlined below:

Programme Capital Requirements					
	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
MTC Cardiff & Vale (MTC Construction and Equipment)	£5,426				
Hywel Dda Trauma Unit (West Wales General)			£1,252		
Capital Total	**£5,426**	**£0**	**£1,252**	**£0**	**£0**

C&VUHB has identified the following 2019/20 capital requirements for estate and equipment:

Cardiff & Vale Capital Requirements 2019/20

	Construction	Equipment	Total
	£000s	£000s	£000s
Emergency Unit - Resus Bay Equipment Costs	£0	£134	£134
Extension, resus, streaming and triage bay refurbishment	£436	£0	£436
Room alterations to provide additional minors capacity	£150	£0	£150
Interim refurbishment of Poly trauma Unit (PTU) 14 beds	£1,109	£383	£1,492
Critical Care bed expansion – Equipment only	£0	£194	£194
Theatres – Capital equipment inc plastics	£0	£1,100	£1,100
Theatres - Image Intensifier	£0	£120	£120
Replacement scanner for Emergency Unit	£600	£1,200	£1,800
	£2,295	**£3,131**	**£5,426**

Further C&VUHB capital requirements for the construction and equipping of a major trauma theatre are being developed by the Health Board. The expected timeline for submission of these detailed cases is reflected in the timetable of business cases. The estimated future capital requirement for the MTC theatres at the time of publication is in the region of £20-25m. Note that this is an integrated capital scheme which includes the vascular hybrid theatres and this will considered within a full business case submission by C&VUHB.

Hywel Dda University Health Board has identified £1,252k for the development of a 10 bedded 'landing pad' in year 2 (2021/22) at Glangwilli Hospital, Carmarthen. However, it is envisaged that the year 1 approach will be in keeping with all other Health Boards, with consideration given to a dedicated 'landing pad', as appropriate, following a period of evaluation of actual activity.

9.6.2 Capital Charges

C&VUHB has indicated that there will be a summary of capital charges once the Capital, Estates and Facilities Division of Welsh Government has confirmed the final capital award. C&VUHB expect that that there will be Welsh Government funding for these capital charges.

9.7 Timetable of Future Business Cases

The timetable of future revenue and capital business cases that will be prepared by the appropriate organisations is outlined below and is further considered in the management case chapter. Whilst at this stage it is difficult to quantify, this gives an indication of the potential cases that would need to be considered as part of the phased network development.

Timetable of Business Cases - Major Trauma Network

	Indicative Capital and Revenue Cases																							
	2019/20			2020/21				2021/22				2022/23				2023/24				2024/25				
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Cardiff and Vale Health Board																								
Cardiff Interim Capital Case																								
MTC Capital Build																								
MTC Business Case - Adults																								
MTC Business Case - Paediatrics																								
TTL																								
Polytrauma Unit																								
Orthogeriatrics																								
Therapies																								
Trauma Unit Costs																								
Swansea Bay Health Board																								
Initial Specialist Services - Swansea Bay																								
Operational Delivery Network Clinical Informatics																								
Orthoplastics Support to MTC																								
Orthoplastics Support for Isolated Open Lower Limb Fracture Model																								
Acute Spinal Services Model																								
Wales Ambulance Services Trust																								
WAST Business Case																								
Aneurin Bevan, Cwm Taf, Hywel Dda, Swansea Bay and Powys Health Boards																								
Key enabling TU Posts																								
Therapy / Neuropsychology and Level 2 training nursing resource requirements																								
Orthogeriatric Requirements																								
Hywel Dda Landing Pad capital requirement																								
NHS Wales Health collaborative																								
Key enabling ODN posts																								
Operational Delivery Network																								
Key																								
Current planned business cases																								
Business cases to be considered in the future																								

10 Economic Case

10.1 Introduction

There are two sections in this Economic Case, the first describing the costs effectiveness and value for money of establishing a trauma network for South Wales, West Wales and South Powys, based on evidence from comparable systems. The second section of this chapter summarises the range of options considered as part of the historical work undertaken to develop a preferred operational model for achieving the stated investment objectives, offering the best value for money, based on both qualitative and quantative analysis. This was undertaken in accordance with HM Treasury guidance. Within the context of this, a 'do nothing' option was considered.

More recently, it is important to note that in relation, to developing the stated clinical service model, the approach has been based largely on phasing of pre-defined quality indicators and service specification over a period, rather than considering a range of options per se. This is mainly because the development of quality indicators and service specification lends itself better to a phased approach rather than an options appraisal. Furthermore, as decisions were taken in March 2018 to proceed with the development of the network and decisions were then taken in relation to the location of the MTC, it was not possible to consider a 'do nothing' option moving forward.

Nonetheless, the programme has where possible, looked at options in the context of individual business case submissions. Examples of this include considering a range of options in terms of developing a consultant trauma team leader rota at the MTC (see Appendix 16), plastic surgical provision at the MTC and SWOT (strength, weakness, opportunity, threat) analyses in relation the configuration of trauma desk function and face-to-face training by the Welsh Ambulance Service.

Thus, this chapter sets out the case based the best available evidence and both current and historical options appraisal of operational and clinical modelling.

10.2 Evidence from Established Trauma Systems

Major trauma networks in England have resulted in an 18% increase in the probability of surviving trauma for the 54 million population of England. This equates to around 500 additional survivors per year. Pre-hospital triage and transfer protocols have resulted in a significant increase in patients treated at an MTC from 13,358 in 2011 to 26,486 in 2016. Networks have also facilitated rapid dissemination of evidence-based practice. Independent, socioeconomic analysis has calculated the cost effectiveness of the system at £2,500 per Quality Adjusted Life Year (QALY).

With enhanced investment across the trauma pathway (including rehabilitation), there is evidence of improvements in functional outcome, a reduction in ongoing healthcare requirements and improving ability to return to work. Gabbe *et al* (2015) demonstrated that 10 years after introducing the Victorian State Trauma Service, there was a cost saving per case of $633,446 in 2010-2011 compared with 2001-2002, owing to increased disability-free years.

Taylor *et al* (2012) demonstrated that Helicopter Emergency Medical Services working within the context of a mature trauma system resulted in a reduction in hospital mortality leading to a cost per life saved of $1,566,379 in all patients: $533,781 in patients with serious injury and $519,787 in patients with traumatic brain injury. The cost savings are not related to just additional patients who survive, but to all patients who survive. With improvements in rehabilitation, enhancements in functional recovery will be seen across a wide group of patients.

Furthermore, there are a number of studies demonstrating cost effectiveness of rehabilitation interventions. Wood *et al* (1999) demonstrated an estimated lifetime saving in the cost of care of over £1 million for each patient receiving neuro-rehabilitation with good functional outcome. The same trend has been demonstrated in other studies related to the provision of neurorehabilitation.

With an estimated 14 additional lives saved across the network per year, this is likely to equate to a cost per life saved of approximately £17 million, with the economic benefits from improving functional outcomes to be quantified as part of the benefits realisation plan.

A critical question that the network board has considered is whether the establishment of the network will be a cost effective intervention and bring value. Given the required additional investment to improve quality of care through meeting higher standards of care, this is an important question to consider. This issue can be considered through two distinct, but related, lenses:

- For a given investment, what is the likely return on that investment?
- For a given investment, what is the value that the network will bring?

In demonstrating the above, it is important to demonstrate how these elements will be measured in the context of major trauma.

10.3 Cost Effectiveness

In relation to the return on investment, there is consistent national and international evidence indicating that the establishment of trauma networks is costs effective.

Durham *et al* (2006) evaluated the cost effectiveness of mature trauma system in Florida, and demonstrated costs per lives saved comparable to or lower than other major public health expenditures.

Rotondo *et al* (2009) demonstrated a similar experience. It is important to note that these early studies focused on the economic benefit of lives saves and not necessary on the whether those patients that survived had a poor functional outcome and the refore increased the burden of disease. However, it is clear from more recent evidence that survival does not necessarily increase the disability burden. With enhanced investment across the trauma pathway (incl. rehabilitation), there is evidence of improvements in functional outcome and therefore, reducing ongoing healthcare requirements and improving ability to return to work. Gabbe *et al* (2015) demonstrated that after 10 years of introducing the Victorian State Trauma Service, there was a cost saving per case of $633,446 in 2010-2011, compared with 2001-2002, owing to increased disability free years.

If the focus turns to an MTC, within a mature trauma system, then investment in the MTC in itself is cost-effective, with evidence of a 5 to 15 fold return on investment for each patient successfully returned to work. In terms of cost per life year saved, regionalised MTC care costs significantly less than the provision of renal dialysis, breast cancer treatment or the percutaneous or surgical management of coronary artery disease and is cost-effective when compared with the provision of other medical interventions (Mackenzie *et al*, 2010, Seguin *et al*, 1999, Zarzaur *et al*, 2010). Mackenzie *et al* prospectively demonstrated cost effectiveness of MTC's in the United States with a Quality Adjusted Life Years (QALY) of $36,961 (US system costs).

Whilst mature international systems give a clear signal towards cost-effectiveness, the challenge remains of how comparable are they with trauma systems in the UK, which will be more similar to the South Wales Trauma Network. A recent UK based study sheds some light on this issue. An NHS England economic evaluation of regional trauma networks was published in 2013. Over the period of the study, there was an increase in the number of patients surviving major trauma and QALY increased as a

result. It also noted that, on average, the NHS investment appears to range between £5,241 - £5,679 per additional QALY gained. This suggests that the introduction of English trauma networks has been cost effective, given that it is significantly under the NICE QALY threshold for cost effectiveness of £20,000. Based on the expected number of 'candidate' major trauma patients (2,112) across the entire South Wales Trauma Network, the investment is significantly below the NICE QALY threshold of £20,000 (£6,896 per additional QALY gained), comparable with other interventions (e.g. hip and knee replacements). Whilst comparison with NHS England is challenging, given differences in how healthcare is commissioned, there is a clear signal that, by applying the NHS England quality indicators and service specification, to a comparable level of costs effectiveness in NHS Wales based on the NICE QALY threshold could be achieved.

It should also be noted that, in the 7-9 years that have elapsed since the English trauma networks have been developed, there has been ongoing investment and incentivisation of the system, based on lessons learnt. These investments have been slow to progress, but started in rehabilitation and TUs. There have been further enhancements in standards (e.g. Orthogeriatric assessments, poly-trauma wards). It is clear that with investment planned across the pathway for the South Wales Trauma Network, it is predicted that there will be a greater gain in terms of returning survivors to higher levels of function and this will allow them to contribute positively to the economy. Therefore, the cost effectiveness demonstrated in England is likely to be further enhanced. There is also a range of benefits to wider rehabilitation services as the investments and raising of standards in rehabilitation, driven by the establishment of the South Wales Trauma Network, will positively impact a wider range of patients and services.

As discussed in chapter three and based on experience of enhanced survival in NHS England, approximately an extra 14 lives will be saved per year, over and above the current position. For the given investment, this would equate to a cost of lives saved of approximately £17 million per year. Thus, the service will pay for itself in terms of economic benefit. What is more challenging to understand, is the totality of improvement in functional outcomes for all survivors with investment across the pathway, and how this could lead to cost avoidance in long term rehabilitation and social care. Whilst predicting that the network will be cost effective, how this could be objectively measured needs further consideration.

With investment across the pathway and the requisite clinical informatics requirements, development of the South Wales Trauma Network presents a unique opportunity to evaluate the cost effectiveness of the whole system and not just its component parts in isolation. The development of a research programme, not just including TARN and TARN PROMS/PREMS data, but longer term outcomes, will give the network an opportunity to identify reductions in health and social care utilisation, leading to a broader evaluation of economic value. Material links with academic centres such as Swansea University already exist, through the Secure Anonymised Information Linkage (SAIL) Databank, and network opportunities with the Victorian State Trauma Service (above), present attractive opportunities for the network. Of course, some key aspects need to be in place in order to be able undertake a long-term evaluation of any system. Firstly, a strong appetite for research, with a robust platform for collecting high quality data, secondly, time for a stable and mature system to develop and finally, getting the building blocks in place for the system to work collaboratively and in synchrony. These are key aims of the network and align with key investment objectives.

10.4 Value of the Network

Linked to cost effectiveness of the network, value will come from realising benefits, which form a significant part of chapter three and has been developed further in the management case, into a

comprehensive benefits realisation plan. Whilst it is imperative that the network focuses on the key investment objectives of improving survival and functional outcomes, one of the areas that will be measured are the wider system benefits. This will focus on the enhancing and adapting of existing and new roles within the workforce, cross health board working arrangements, the development and deployment of highly specialised posts and natural improvements in other areas of healthcare (e.g. spinal surgery, plastic surgical capability, and rehabilitation of non-traumatic complex neurological problems). It is helpful that there will be a fundamental shift in the way networks operate in Wales, with the opportunity for others to benefit from the learning that will take place during the lifetime of the programme and beyond. Whilst difficult to quantify, qualitative analysis of these benefits will be undertaken to demonstrate wider value.

10.5 Options in Developing the Operational Model

10.5.1 Development of options/recommendations for the location of the Major Trauma Centre

Initial work

In late 2014, the NHS Wales Health Collaborative was asked by the Chief Executives in NHS Wales to develop a service model for a major trauma network for South Wales, West Wales and South Powys.

North Wales and North Powys were not included in the project. Betsi Cadwaladr University Health Board was already part of the North West Midlands and North Wales Major Trauma Network, with patients in North Wales having access to the major trauma centre in North Staffordshire. Patients in North Powys also benefit from being part of the North West Midlands and North Wales Major Trauma Network and access treatment and care via the trauma unit in Shrewsbury. Some patients in Powys are also served by the Birmingham, Black Country, Hereford and Worcester Trauma Network.

A Project Board was established, supported by a Clinical Reference Group (CRG). The service model for major trauma services for adults and paediatrics was developed by the CRG, in line with the NHS England standards for major trauma, and approved by the Project Board in May 2015, with further work on phasing undertaken more recently.

Option Appraisal

In June 2015, an option appraisal workshop, led by clinicians, was undertaken which identified the need for a major trauma network with a major trauma centre based in the region to support the population of South and West Wales and South Powys.

The workshop included health boards, the Welsh Ambulance Service NHS Trust (WAST) and invited patient representatives from voluntary and charity support groups, and the Community Health Councils were also invited to observe.

The workshop considered five options:

- Do nothing
- No major trauma centre in the region, but patients would access services in England (Bristol)
- One major trauma centre for the region based at Morriston Hospital, Swansea
- One major trauma centre for the region based at University Hospital of Wales (UHW), Cardiff
- Two sites, based at Morriston Hospital and University Hospital of Wales (UHW).

The benefit criteria applied at the workshop were:

Benefit Criteria	Definition/Coverage	Weighting %
Quality & Safety	Meets agreed clinical, quality and safety standards; Compliance with legislation, regulations and accreditation standards / performance; Supports rapid adoption of best practice; Clinical effectiveness, including:- • Delivers improved outcomes for patients; • Supports R&D; • Improves consistency in clinical practice	35
Equity	Service meets potential differential impact on protected groups. Timeliness of access to specialist care for all patient groups / improvements in standards for specific patient groups	10
Strategic fit	Services delivered within network of integrated care; In line with outcomes of the South Wales Plan and other emerging service models. Does not destabilise other clinical services / developments;	15
Sustainability /Future proof	Availability of appropriately trained and skilled workforce; Service provided by a workforce which is "fit for purpose", re European Working Time Directive (EWTD) and clinical training standards; Attracts and retains an excellent workforce across all staff groups; Delivers the critical mass required to achieve full benefit from resources and investment; Does not destabilise other clinical services / developments; Provides business continuity and service contingency in the event of a major incident, etc.	25
Access	Access to services is optimised. Service capacity will meet demand in a timely way Service will be delivered in an appropriate environment Suitable and timely transport for transfers between the MTC and trauma units; Avoidable transfers minimised.	15
Total		**100**

The participants in the workshop determined that the preferred option was a MTC on a single site based within the region and supported by a number of TUs:

Option	Base option appraisal (out of 200)	Reverse weighting		Equal weightings (out of 200)	Non average scores for detailed sub benefits (out of 1,020)	Non average scores AND equal weightings (out of 920)	Individual group scores		Add 5% to option 2 (up to maximum) (out of 200)
		a. With Strategic Fit weighted higher (out of 200)	b. With Access weighted highest (out of 200)				Groups 1 / 3 / 5 (out of 200)	Groups 2 / 4 / 6 (out of 200)	
1. Do nothing	34.2	43.3	45.0	40.0	167.5	180.0	18.5	49.8	34.2
2. Single site - UHW	176.5	169.4	168.8	172.0	910.0	800.0	177.3	175.7	184.9
3. Single site - Morriston	179.7	176.8	177.1	177.3	922.5	820.0	180.3	179.0	179.7
4. Dual site - UHW & Morriston	107.7	118.1	123.8	118.0	527.5	530.0	94.5	120.8	107.7
5. Outsourced service	89.8	84.3	88.3	86.3	472.5	410.0	94.7	84.8	89.8

Full sensitivity analyses are included in Appendix 7.

The workshop did not result in a recommendation on a preferred location for the MTC. However, in identifying the preference for a single site, Morriston Hospital, Swansea and University Hospital of Wales (UHW), Cardiff, were assessed to be the only two hospitals in the region that could potentially meet the criteria for a major trauma centre, due to the specialist nature of the service and the need for it to be co-located with relevant specialist services. This aligns with the analysis presented the above table.

The workshop agreed that, to support a population of approximately two million (deemed the minimum critical mass for sustainability) the network would need to be supported by a MTC located within the region. This ruled out the option of relying on services from the Bristol MTC. The potential for a dual site solution was considered, but eliminated because the critical mass for sustainability could not be delivered through such an arrangement.

The Independent Panel

Building on the earlier work, an Independent Panel of specialists from across trauma and rehabilitation services in the UK ('the Independent Panel') was commissioned by the Collaborative Board (Chief Executives), on behalf of health boards in the region, to review the information and evidence available and make a recommendation on the preferred location of a MTC in the region.

Health boards in the region considered a formal report in January 2017. This report asked boards to note the arrangements for the Independent Panel to consider the evidence regarding the establishment of the proposed major trauma centre and to bring forward a recommendation of a preferred option for public consultation. This was supported by all health boards in the region.

The Independent Panel convened in February 2017, chaired by the National Clinical Director for Trauma to NHS England. The Independent Panel comprised representatives from across major trauma services in the UK. Panel members were selected based on their national and international reputations as experts in trauma care and the development of trauma systems and having previously been involved in the development of regional major trauma systems.

Representatives were invited to attend from health boards, Public Health Wales, the Welsh Government, Community Health Councils (as observers), Emergency Medical Retrieval and Transfer Service (EMRTS), Welsh Ambulance Service Trust (WAST), Welsh Health Specialist Services Committee (WHSSC) and the Emergency Ambulance Services Committee (EASC).

The Independent Panel was asked to undertake the following:

- Review the service model and specification for major trauma services for adults and paediatrics, across the region.
- Consider supporting evidence from Abertawe Bro Morgannwg UHB and Cardiff and Vale UHB for the provision of a MTC at Morriston Hospital, Swansea or the University Hospital of Wales (UHW), Cardiff as part of the major trauma network for the region
- Provide an independent view on the two options for the location of the MTC.
- Provide a view on the phasing of any implementation requirements and priorities for investment within a MTC.
- Advise on the impact on remaining services at Morriston Hospital and UHW Hospital in the event they are not identified as the MTC.
- Advise on the preferred location of a MTC for the region.

Recommendations from the Independent Panel for a Major Trauma Network

After considering the evidence, the Independent Panel made the following five recommendations in their report:

- A major trauma network for South and West Wales and South Powys with a clinical governance infrastructure should be quickly developed.
- The adults and children's major trauma centres should be on the same site.
- The major trauma centre should be at University Hospital of Wales, Cardiff.
- Morriston Hospital should become a large trauma unit and should have a lead role for the major trauma network.
- A clear and realistic timetable for putting the trauma network in place should be set.

In making their recommendations, the panel identified three main factors that should shape the design of a major trauma network:

- Clinical interdependencies, i.e. the services that need to be available at the location of the MTC, as set out in the relevant standards
- Critical mass, i.e. the minimum number of people needed to make a service, in this case major trauma, sustainable.
- Travel times: The Panel considered the geography of Wales and concluded that, with the provision of a major trauma centre in the region, individuals would be more likely to survive a major trauma, regardless of the time it takes to travel to the MTC.

The panel concluded that providing specific highly specialist services, such as neurosurgery and paediatric neurosurgery, on the same site as the major trauma centre was the main factor in deciding where to locate the centre. It is important to have these specialist services available immediately if you suffer a major trauma. Providing these services on the same site is a minimum requirement.

health boards formally received a copy of the report from the Independent Panel alongside their recommendations for consideration at their board meetings in September 2017. They were asked to agree, in principle, to the recommendations from the Independent Panel, and, in doing so, agree to a period of consultation on the recommendations of the Independent Panel. All health boards agreed,

in principle, to the above recommendations of the Independent Panel as the basis for a formal consultation.

Consultation Process

As the proposals were deemed as substantial service change, a full consultation of twelve weeks was required. The process was designed in accordance with the 'Guidance on Engagement and Consultation on Changes to Health Services'. The Collaborative Leadership Forum considered the process, the six health boards in the region and the six Community Health Councils. As a collaborative process, Health Boards and Community Health Councils (CHCs) agreed that a consistent approach should be taken by all, ensuring equality of opportunity for all populations groups regardless of geographical location.

The consultation process took place between November 2017 and February 2018.

The outcome of the consultation was analysed and the recommendations developed as a result, i.e. to support the recommendations of the independent panel (detailed above), were reported and approved by the six health boards in the region in March 2018.

10.5.2 Designation of Trauma Units

With clarity on the location of the Major Trauma Centre (MTC) at University Hospital Wales, a decision was made by Network Board to commence the process for Trauma Unit (TU) designation, in order to inform programme-planning, preparation for delivery and ensure rapid implementation.

In May 2018, the network board requested that Health Boards complete a baseline assessment against NHS England quality indicators for those hospitals that were being proposed as 'candidate Trauma Units.' Information was provided as to which indicators needed to be met for day one and which could follow once operational.

Following due diligence and scrutiny, recommendations for TU designation were made in November 2018 to WHSSC Joint Committee and endorsed. In respect of Hywel Dda, a period of engagement was undertaken from June to August 2019 on TU designation, which resulted in recommendations being reported to and supported by the health board in September 2019.

TU designation has been based on which hospitals most closely comply with the NHS England quality indicators and service specification, and achieve alignment with health boards existing and future plans, as follows:

Cardiff & Vale University Health Board	
University Hospital Wales (UHW) - Adult and Paediatric TU	Rationale: it is important that in addition to being an MTC, UHW's TU capability is considered separate from its MTC capability. UHW has been chosen due to availability of onsite services and specialities that are not available at Llandough hospital.

Swansea Bay University Health Board	
Morriston Hospital – Adult and Paediatric TU (with specialised services to be considered in subsequent programme planning)	Rationale: the independent panel review indicated that Morriston Hospital would be a large TU. The designation is in line with the current local and regional role in providing trauma care and in line with the emerging clinical strategy for the Health Board.

Aneurin Bevan University Health Board	
Royal Gwent Hospital – Adult and Paediatric TU	Rationale: Royal Gwent Hospital and Nevill Hall Hospital will be designated TUs to cover the interim period until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the Health Board. As such, a pragmatic approach will be required on how additional TU requirements are met during the short interim period and this will form part of the implementation phase of the network development. The Health Board has indicated that they will consider, in principle, the impact on patients within the region without a nearby TU and how this could be managed through network protocols.
Nevill Hall Hospital – Adult and Paediatric TU	
Grange University Hospital – Adult and Paediatric TU	

Cwm Taf Morgannwg University Health Board	
Prince Charles Hospital – Adult and Paediatric TU	Rationale: Prince Charles Hospital is the only potential site between South Powys and the M4 corridor. The area covered by the Health Board is often sites of high-speed road traffic collisions and major trauma.
Princess of Wales (POW) Hospital – Adult and Paediatric TU	Rationale: in anticipation of the move the management of POW hospital from the former ABM UHB to Cwm Taf Morgannwg UHB from April 2019, both outgoing and incoming Health Boards supported the designation of POWH as a TU.

Royal Glamorgan Hospital will be a Local Emergency Hospital for the purposes of major trauma.

Hywel Dda University Health Board	
Glangwilli General Hospital – Adult and Paediatric TU	Rationale: this is the only hospital available with all the requisite specialities and support services on site. There is a longer-term plan for a single TU within the Health Board to be developed at a new hospital on a site between St Clears and Narberth. The designation of Glangwilli General Hospital as the interim TU was approved in September 2019 following a period of engagement conducted by Hywel Dda UHB

Bronglais General Hospital and Withybush General Hospital will be rural trauma facilities for the purposes of major trauma.

Powys Teaching Health Board	
No TU	Rationale: there are no acute hospitals in Powys Teaching Health Board. Trauma patients will utilise existing patient flows into neighbouring Health Boards and England (e.g. TU at Hereford General Hospital). The development of Prince Charles Hospital and Nevill Hall Hospital as TUs will support Powys patient flows pertaining to the management of major trauma patients. The expansion of the EMRTS will also support this population.

The designation of TUs will be reviewed after the first year of being operational and national annual trauma peer review.

11 Commercial Case

This section of the Programme Business Case (PBC) outlines the proposed procurement requirements in respect of the preferred way forward, as determined by the South Wales Major Trauma Network service configuration.

Establishment costs that are not capital are all under £50,000 and will be subject to NHS Standing Financial Instructions. All expected procurements in 2019/20 are likely to be based on closed tenders or three quotations. The procurement route for all equipment identified within the Cardiff and Vale UHB case will be through existing All-Wales framework agreements.

Capital infrastructure cases for the Major trauma Centre (MTC), Hywel Dda Trauma Unit and any requirements from Swansea Bay UHB for specialist supporting services will follow Welsh Government capital investment processes agreed directly between Welsh Government and the relevant health board.

The capital identified by the health boards is outlined in the table below:

Programme Capital Requirements					
	2019/20	**2020/21**	**2021/22**	**2022/23**	**2023/24**
	£000s	**£000s**	**£000s**	**£000s**	**£000s**
MTC Cardiff & Vale (MTC Construction and Equipment)	£5,426				
Hywel Dda Trauma Unit (West Wales General)			£1,252		
Capital Total	**£5,426**	**£0**	**£1,252**	**£0**	**£0**

The Cardiff and Value UHB capital requirement is outlined below:

Cardiff and Vale UHB Capital Requirements 2019/20

	Construction	**Equipment**	**Total**
	£000s	**£000s**	**£000s**
Emergency unit - Resus bay equipment costs	£0	£134	£134
Extension, resus, streaming and triage bay refurbishment	£436	£0	£436
Room alterations to provide additional minors capacity	£150	£0	£150
Interim refurbishment of Polytrauma Unit (PTU) 14 beds	£1,109	£383	£1,492
Critical Care bed expansion – equipment only	£0	£194	£194
Theatres – Capital equipment including plastics	£0	£1,100	£1,100
Theatres - image intensifier	£0	£120	£120
Replacement scanner for emergency unit	£600	£1,200	£1,800
	£2,295	**£3,131**	**£5,426**

The enabling infrastructure development in Cardiff and Vale UHB will be procured via a separate contract arrangement through Cardiff and Vale UHB and Welsh Government. The total value of these works is approximately £5.4m, with the largest contract element being £1.2m. These contracts will be awarded following procurement processes that will be managed by the procurement and capital estates function of Cardiff and Vale UHB.

The estimated future capital requirement for the MTC theatres at the time of publication is in the region of £20-25m. Note that this is an integrated capital scheme which includes the vascular hybrid theatres.

Hywel Dda UHB has identified £1.25m for the development of a 10 bedded landing pad in Year 2 (2021/22) at Glangwili General Hospital, Carmarthen. However, it is envisaged that the Year 1 approach will be in-keeping with all other health boards, with consideration given to a dedicated landing pad, as appropriate, following a period of evaluation of actual activity.

11.1 Risk Transfer

This section provides an assessment of how the associated risks might be apportioned between the service and contractors. Cardiff and Vale UHB will develop a full risk-transfer matrix through the capital infrastructure business cases that will be required for the final MTC business solution.

11.2 Procurement strategy

The approach to procurement is set-out above, with the acquisition of capital assets to be discharged through existing NHS Supply Chain frameworks.

11.3 IFRIC 12 / FRS5 Accountancy Treatment

This business case describes the totality of investment required for the establishment of the South Wales Major Trauma Network. The purchase and construction of assets within the network will be held on the balance sheet of each purchasing organisation.

11.4 HM Treasury Guidance.

It is recommended that Cardiff and Vale UHB take guidance from the HM Treasury relating to IFRIC 12, which is guidance only applying to infrastructure.

Because the programme will not have any ownership of assets deployed across the network there will be no need to apply Treasury Guidance on treatment of the assets and whole life costs through this business case. The schedule of capital equipment/schemes identified as requirements by Cardiff and Vale UHB and Hywel Dda UHB will need to take account of the requirements of the HM Treasury rules.

12 Management Case

12.1 Introduction

The management case sets out the 'achievability' of the programme. Its purpose, therefore, is to build on the preceding chapters by setting out, in more detail, the actions required to ensure the successful delivery of the trauma network against the agreed investment objectives and timeline. To achieve this, it sets out the programme management arrangements and implementation plan. It gives details of the commissioning arrangements and considers how these will affect the organisational and clinical governance arrangements once the network is operational.

This chapter also sets out the current programme management arrangements, handover arrangements to the Operational Delivery Network (ODN) and post programme assurance and evaluation. Finally, it describes the arrangements for benefits realisations and risk management over the programme timeline in detail.

12.2 Current Programme Management Arrangements

12.2.1 Programme Sponsorship

The NHS Wales Health Collaborative (the Collaborative) has hosted the programme for the implementation phase, which includes programme planning and preparation for delivery. It has been agreed that Swansea Bay University Health Board, will host the ODN, in keeping with the recommendations of the independent panel review. The WHSSC Joint Committee confirmed this decision at its meeting on 26 March 2019.

In order for the Collaborative to enable health boards to successfully deliver this service change, it has taken the following approach in the organisation and management of the programme:

- The programme has adopted the general principles of PRINCE-2 methodology in managing the programme's activities and outputs and will meet the requirements of the WHC (2006): 001, Capital Investment Manual, NHS and Treasury Guidance, and any subsequent guidance that may be issued during the programme's lifespan.
- The project has used NHS standard documentation and products, where these are available, and has sought to benefit from experience and best practice from other NHS programmes.
- Specialist professional and technical advisers were employed for those activities where the necessary skills and experience were not otherwise available within the programme. The transfer of skills and knowledge from specialist advisers to the programme team was achieved, wherever possible and appropriate.

The above approach will continue to be utilised as the programme progresses. In managing the programme, the Collaborative aims to:

- Deliver the programme on time.
- Ensure effective and proactive lines of accountability and responsibility for the programme deliverables.
- Establish stakeholder involvement at all stages.

12.2.2 Programme Structure and Reporting

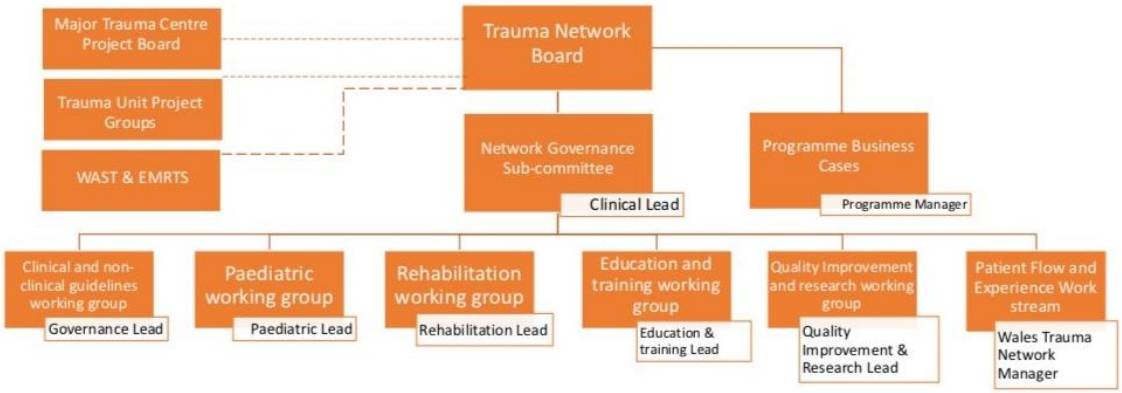
Trauma Network Board and Overarching Structure

Following approval of the recommendations of the independent panel review by health boards, the trauma network board was established in May 2019 and meets monthly (see Appendix 19 for terms of reference and full membership). The Senior Responsible Officer (SRO) for the programme is Tracy Myhill, Chief Executive Officer, Swansea Bay University Health Board. The SRO and Dr Mark Ramsey, Medical Director, Morriston Hospital, jointly chair the network board. The network board is made up of senior clinical and managerial representation from all participating organisations including health boards, WAST and EMRTS. It also has representation from WHSSC, EASC, therapies and Welsh Government.

The network board is responsible for:

- Establishing and delivering a programme for the development of a high quality, safe and effective trauma network for the population of South Wales, West Wales and South Powys.
- Providing strategic direction and advice to the programme.
- Delivering the programme on time and to budget.
- Ensuring effective and proactive lines of accountability and
- Ensuring programme deliverables, including approval of pathways, policies and procedures.
- Ensuring that decisions are taken through correct channels and that wider communication with senior NHS management is functional.
- Ensuring continuing commitment to stakeholder support.
- Monitoring and risk management of the programme.
- Establishing user involvement at all stages of the programme.

The network board is accountable to, and reports to, the WHSSC Joint Committee for the activities outlined above. The figure below illustrates the governance arrangements of the programme:



Internal Programme Governance Structure

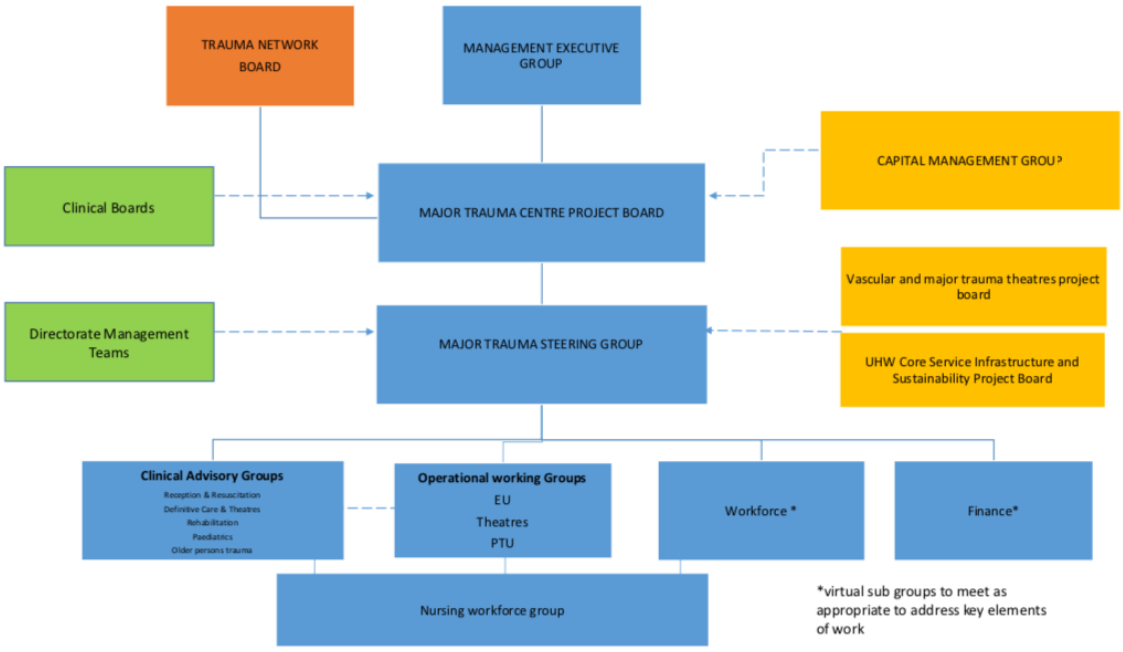
Within the internal governance structure, all members of the team are accountable to the Director of the Collaborative. A programme business case team has been created, consisting of the network clinical lead, head of planning for the Collaborative, programme manager and administrative support. In addition, a number of working groups have been created, led by respective network leads. The

groups draw upon the experience of clinicians and managers from across the region. Responsibilities of these groups include:

- Clinical and non-clinical guideline working group – development of trauma management guidelines.
- Paediatric working group – development of paediatric specific guidelines, addressing safeguarding issues and input into paediatric trauma education and training.
- Rehabilitation working group – operational planning, key workforce enablers, rehabilitation plans and advising on the 'landing pad' configuration.
- Education and training working group – developing a strategy in partnership with HEIW as well as development and quality assurance of products (see chapter 5).
- Quality improvement and research working group – supporting improvement in TARN data collection, as a platform for quality improvement and research initiatives. Developing metrics for quality assurance and commissioning.
- Patient flow and experience working group – specific focus on 'care with treatment closer to home'.

The working groups report to the monthly network governance subcommittee, chaired by the network clinical lead (see Appendix 20). The governance subcommittee consists of the network leads, MTC/TU clinical leads, pre-hospital representatives, senior managers and external peer representation from North Wales and NHS England. The purpose of the committee during the implementation phase is to provide review and scrutiny of the work undertaken by working groups. The subcommittee is accountable and responsible to the network board. It reports to the network board through the network clinical lead.

MTC Programme Governance Structure



The MTC programme structures indicated above are operational and report to the network board in respect of programme delivery and, within Cardiff and Vale University Health Board, to the Management Executive Group. The Executive Director for Planning is the SRO for the MTC programme. The network clinical lead sits on the MTC project board.

Health board and Pre-Hospital Programme Governance Structures

Each health board has established a trauma project group to support implementation of trauma services within its catchment area, which reports to the network board. A member of the health board's executive team chairs the group in most cases. In order to ensure consistency of the scope of each group, the network board supplied each health board with generic terms of reference. Each health board has also established a rehabilitation group, feeding into the network rehabilitation working group. Finally, a joint rehabilitation group has been established between Swansea Bay University Health Board and Hywel Dda University Health Board to determine how a collaborative rehabilitation model could be developed.

In relation to pre-hospital services, the governance arrangements for the Welsh Ambulance Service NHS trust (WAST) sit within the planning directorate and for EMRTS with its clinical and operational board. These also report to the network board. WAST has also nominated individuals to all relevant working groups. Internally, WAST has established a major trauma project group, which is constituted of all personnel who represent the organisation at the above external boards and task and finish groups. This project group will meet monthly until the network goes live.

The network has asked all participating organisations to provide a structured written report to each network board meeting. Each report outlines progress towards developing the service specification and quality indicators, confirms adherence to the network implementation plan and highlights key areas of local risk. These reports enable the network board to understand the cumulative risk and support health boards to mitigate specific risks.

Welsh Government Trauma Policies Group

In November 2018, a trauma policies group was established, bringing together policy leads relevant to major trauma services and including representation from NHS capital and revenue finance teams. The policies group meets monthly, chaired by Professor Chris Jones, Deputy Chief Medical Officer, Welsh Government. The meetings provide a forum in which the Collaborative programme team, WHSSC and the MTC programme team have an opportunity to present aspects of the development with policy leads, who provide support, challenge and scrutiny. All information presented at the policy group is discussed first at the trauma network board.

Programme Resource

In order to progress the development of the trauma network, resources were secured from Welsh Government in order to appoint into a number of key enabling posts in December 2018. Welsh Government has funded these posts and appointments have been made to them on a non-recurrent basis until the end of March 2020. This is reflected in the financial case (Chapter 9). The requirements for ongoing resources are described within organisational requests (Chapters 5, 6, 7 & 8). The table below provides an outline of existing appointments and additional posts, with additional posts being funded from the resources secured through Welsh Government:

Collaborative	Network clinical lead – existing fixed term appointment Critical care and trauma network manager (CCTN) – existing appointment Project support officer – existing appointment Programme manager – additional post, appointed Network lead positions (governance, paediatric, rehabilitation, training and education, quality improvement and research) – additional posts, all appointed

MTC	Programme director – additional post, appointed Clinical lead and deputy clinical lead HR support – additional post General manager Administrator
All other Health Boards/WAST	Programme manager and project support officer – SBUHB and HDUHB, additional posts Programme manager and project support officer – CTMHB, ABUHB and PTHB, additional posts health board clinical leads (2 for CTMUH), additional posts, partially appointed WAST planning officer, additional post, appointed
WHSSC	Planning lead – additional post, appointed Finance lead – additional post

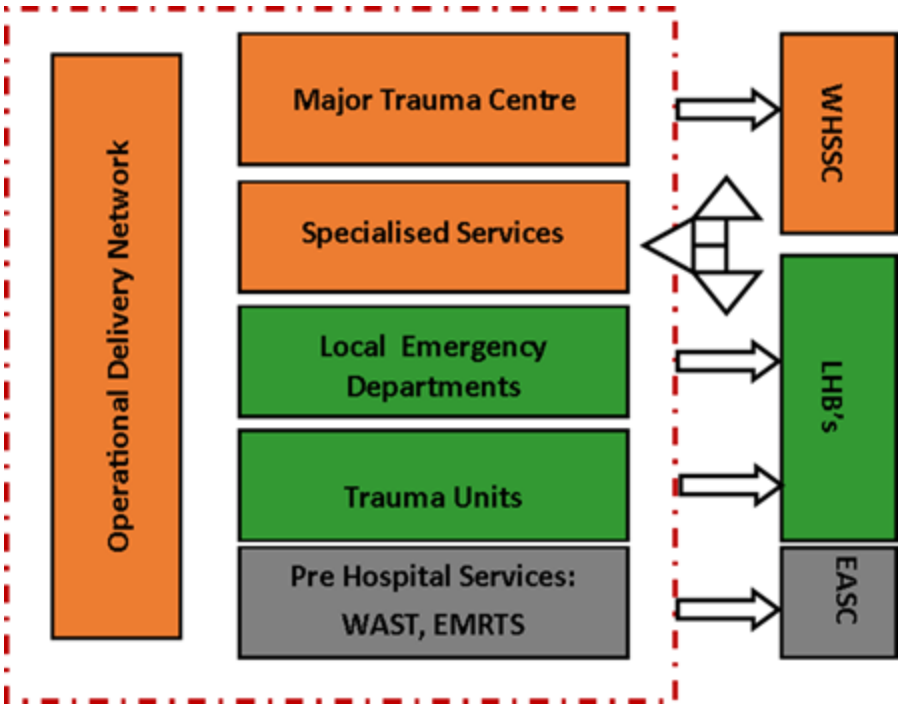
In addition to the above programme, resource was secured for early deliverables in relation to training and education, specifically in relation to surgical skills training. This is outlined in Chapter 5.

12.3 Commissioning Arrangements

At the September 2018 meeting of the WHSSC Joint Committee, members agreed the scope of the commissioning framework for Major Trauma (MT) which can be summarised as:

- An Operational Delivery Network (ODN) to be established to oversee the delivery of trauma services to the population of South Wales, West Wales and South Powys.
- The ODN and Major Trauma Centre at University Hospital of Wales will be commissioned by the Welsh Health Specialised Services Committee.
- Emergency Ambulance Services Committee (EASC) will commission WAST and the EMRTS.
- Health boards will be responsible for local commissioning.
- Existing trauma commissioning arrangements for Betsi Cadwaladr University Health Board will be retained.

The commissioning responsibilities for the major trauma functions held by NHS organisations within the network is illustrated in the diagram overleaf.



As illustrated above, the health boards retain the commissioning responsibility for the Trauma Units.

Under this model, the performance management arrangements would mirror those of services currently commissioned by the two Joint Committees of WHSSC and EASC respectively (see below).

12.3.1 Commissioning Responsibility for Pre-hospital Services

The Emergency Ambulance Services Committee (EASC) commissions WAST and the EMRTS. EASC includes the National Collaborative Commissioning Unit as one its functions. EASC consists of a joint committee that acts on behalf of all health boards in undertaking its function.

Ambulance commissioning in Wales is a collaborative process, underpinned by a national collaborative commissioning quality and delivery framework. All seven health boards have signed up to the framework. Emergency ambulance services in Wales are provided by a single national organisation, WAST.

The framework puts in place a structure that is clear and directly aligned to the delivery of better care. The framework introduces clear accountability for the provision of emergency ambulance services and sees the Chief Ambulance Services Commissioner (CASC) and EASC acting on behalf of health boards and holding WAST to account as the provider of emergency ambulance services.

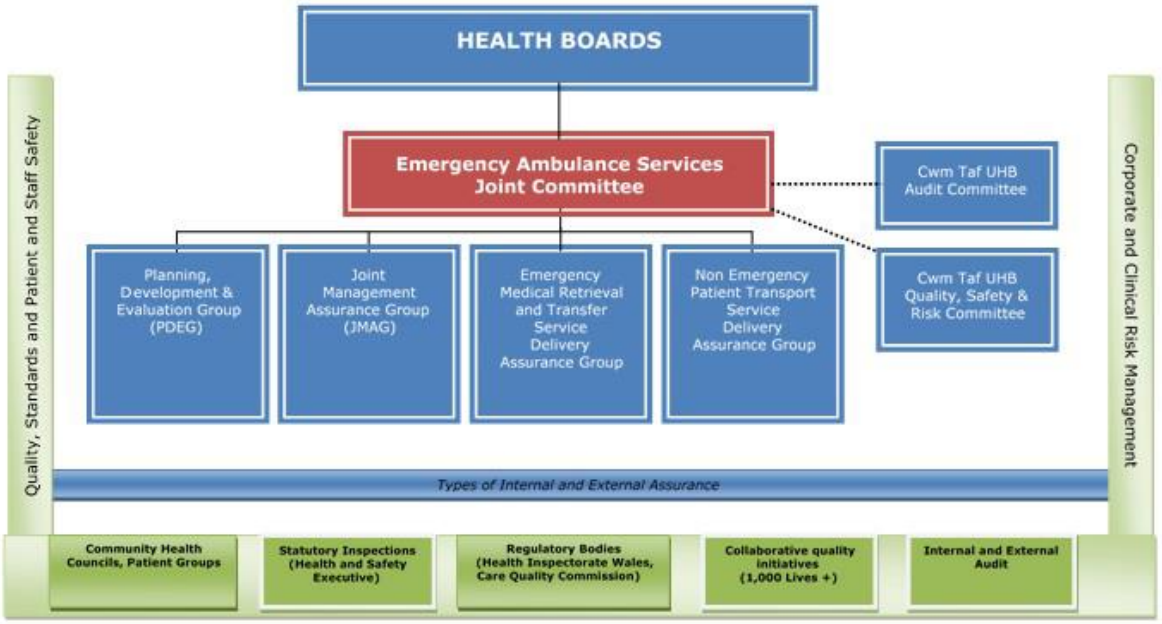
The Emergency Ambulance Services Committee ("Joint Committee") is made up of the chief executives of the seven health boards, **Chief Ambulance Service Commissioner** (CASC) and an independent chair, both appointed ministerially.

The seven health boards in Wales are required under legislation to work jointly to exercise functions relating to the planning and securing of emergency ambulance services. The CASC exercises these duties on behalf of the Joint Committee. EASC supports the commissioning intentions and the financial envelope required to improve and deliver ambulance services across Wales.

The National Collaborative Commissioning Unit (NCCU) is responsible to the CASC for the delivery of services to EASC. This entails ensuring that safe, effective and timely services are delivered. It also includes the creation, development, operation, refresh and evaluation of National Collaborative

Commissioning: Quality & Delivery Frameworks for ambulance services within NHS Wales covering Emergency Ambulance Services, Non-Emergency Ambulance Services and Emergency Medical Retrieval Transport Services.

EASC Governance Framework



12.3.2 Local Health Board Commissioning Responsibility

Each health board will retain the commissioning responsibility for its local trauma services.

The following hospitals were approved as adult and paediatric TUs, following a recommendation by WHSSC Joint Committee and health boards:

- UHW, Cardiff – TU function for its own population.
- Morriston Hospital, Swansea – TU with specialist services
- Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (period until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the Aneurin Bevan University Health Board)
- Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend.
- Glangwili General Hospital

Royal Glamorgan Hospital, Llantrisant, will be a local emergency hospital (LEH) within the network structure

Bronglais General Hospital, Aberystwyth and Withybush General Hospital, Haverfordwest will be rural trauma facilities for the purposes of major trauma.

The commissioning arrangements for the Major Trauma Centre at UHW and the Trauma Unit at Morriston Hospital are complex, as within both of these hospitals there are specialised services,

commissioned by WHSSC on behalf of health boards, and non-specialised services, directly commissioned by the health boards. This is illustrated in the tables below.

Commissioning Responsibilities for Acute Phase

	Acute phase (continuum into ongoing care and reconstruction)																
	Emergency radiology ED	MRI 24/7	Teleradiology MTC <>TUs	General Surgery	Ophthalmology	ICU	Theatres / Anaes	Orthopaedic surgery	Plastic surgery	24/7 Interventional radiology	Vascular/ endovasc surgery	Cardiothoracics	Max-facial surgery	Neurosurgery	Spinal surgery	Liver surgery	Burns
MTC	**H**	**M**	**H**	**H**	**H**	**M**	**M**	**H**	**W**	**M**	**H**	**W**	**H**	**W**	**H**	**W**	**W**
TU	**H**	**M**	**H**	**H**	**H**	**M**	**M**	**H**	**W**	**M**	**H**	**W**	**H**	**W**	**H**	**W**	**W**

Commissioning Responsibilities for Ongoing Phase and Reconstruction

	Ongoing care and reconstruction									
	Radiology – MRI, IR, angiography	Critical care	Rehabilitation	Specialist rehabilitation	Specialist acute pain service	Craniofacial trauma support	Haematology	Obs/gynae	Respiratory physiotherapy (for pneumothoraces, chest drain and thracheostomies)	Complex peripheral nerve support
MTC	**M**	**M**	**H**	**W**	**M**	**W**	**H**	**H**	**H**	**H**
TU	**M**	**M**	**H**	**W**	**M**	**W**	**H**	**H**	**H**	**H**

Key

W	WHSSC
H	Health Board
M	Mixed – elements of WHSSC and Health Board commissioning

12.3.3 Commissioning of the Operational Delivery Network

The ODN team hosted by Swansea Bay UHB will be commissioned by WHSSC through an agreed SLA, and underpinned by quality and performance indicators. Managerial/executive responsibility is provided by the chief executive of the host organisation.

Each organisation participating in the trauma network will discharge its clinical and managerial responsibilities within its own organisational structures.

In addition, the ODN will be performance managed and benchmarked through national peer review and TARN submissions (TARN submission is mandatory for all Health Boards under the annual national clinical audit and outcome review annual plan).

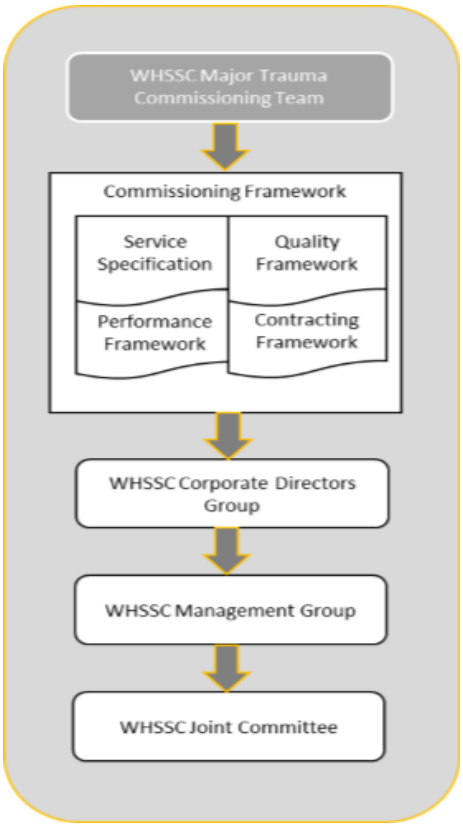
12.3.4 WHSSC Organisational Structure

The **WHSSC Joint Committee**, whose membership is made up of an independent chair, independent members, the seven Health Board Chief Executives and other officers, has overall responsibility for the joint planning of specialised services and financial performance of WHSSC on behalf of health boards. Requests for approval of decisions at Joint Committee level are often informed by the **WHSSC Management Group**, which is made up of commissioners and finance representatives from each health board and provides a scrutiny and assurance function to items such as performance reports and business cases requesting funding.

Internally, the **WHSSC Corporate Directors Board** meets monthly to monitor performance and assess cases before progressing to Management Group and/or Joint Committee.

Beneath this, the WHSSC planning function is delivered through a speciality-based model of commissioning teams with representatives from planning, finance, quality and medical representatives. A **major trauma commissioning team** has been established and will work alongside the other commissioning teams, which include neurosciences, cardiac and the renal network, which is a commissioning network hosted by WHSSC.

The diagram below illustrates the WHSSC decision making process.



The Joint Committee is established as a Statutory Sub Committee of each of the health board in Wales. It is led by an Independent Chair, appointed by the Minister for Health and Social Services, and membership is made up of three Independent Members, one of whom is the Vice Chair, the chief executives of the Local Health Boards, Associate Members and a number of Officers.

Whilst the Joint Committee acts on behalf of the seven health boards in undertaking its functions, the responsibility of individual health boards for their residents remains and they are therefore accountable to citizens and other stakeholders for the provision of specialised and tertiary services.

12.3.5 Roles and Responsibilities of Commissioners

The table below sets out the roles for WHSSC, EASC, and the Major Trauma Network in developing and implementing the core elements of the commissioning framework.

	WHSSC	**EASC**	**Trauma Network**
Commissioning	Scrutinising and approving the business cases for the Major Trauma Centre Scrutinising business cases for Trauma Units and rehabilitation services, to ensure alignment with MTC and Network – providing advice to the commissioning health boards Monitoring the quality and performance framework for the MTC, TU, Network and Rehabilitation Services Clarifying and developing the role of Morriston Hospital as a large trauma unit and provider of national and regional specialised services Developing financial framework Developing contracting framework across the network Developing commissioning policies and future service specifications for the MTC, TUs, and the Network	Scrutinising and approving the business cases for WAST and EMRTs Performance monitoring/management of WAST and EMRTs	Supporting the development of business cases for the Major Trauma Centre, WAST and EMRTs Supporting the implementation and monitoring of the quality and performance framework Ensuring compliance with the commissioning policies

			and service specifications across the Network
Operational and Governance	Approving the operational and governance structure for the wider network including the TUs Boards Approving the designation criteria for TUs		Developing the operational and governance structure for the network and Trauma Unit Boards Designating of TUs
Delivery	Scrutinising and approving (through the WHSSC Joint Committee in partnership with EASC) the pathways for: • Pre-hospital assessment • Acute trauma care • Acute rehabilitation • Rehabilitation and re-ablement	Working in partnership with WHSSC to scrutinise and approve (as appropriate) the pathways for: • Pre-hospital assessment • Acute trauma care • Acute rehabilitation • Rehabilitation and re-ablement	Developing the pathways for: • Pre-hospital assessment • Acute trauma care • Acute rehabilitation • Rehabilitation and re-ablement

12.3.6 Contracting Framework

As part of the commissioning framework, WHSSC will develop a contracting framework for the MTC, with health boards retaining the responsibility for developing their own contracting arrangements for the Trauma Units.

WHSSC is responsible for implementing the contracting framework for both the MTC and the trauma ODN. This framework will ensure that health boards appropriately contribute to the cost of the MTC and the trauma ODN and that there is appropriate 'risk sharing' between health board commissioners and the providers for the operating costs of the MTC which will include adjustment for variation in performance and cost of delivery.

The WHSSC Finance sub group, made up of representatives from the seven health boards, considered options for contracting the MTC and agreed that a block contract with variations would be the preferred method in the formative years of the MTC.

This option sees an agreed block fee to cover the availability of the service, varied by agree d rebates for under-performance and/or any service unavailability or cases declined.

Once there is more certainty around staff appointment profiles, which are the most significant component of MTC costs, and clear outcomes from submission of data including through TARN, the preference of commissioners is to move to a cost and volume contract that would initially be tested in shadow form. The fixed component would be designed to recognise the importance of availability of key service inputs. The variable component would ensure a method that adapts the payments by commissioners to account for actual cost of delivery and performance level variation.

In both phases of implementation of the contracting framework, there will have to be clear information available to commissioners detailing actual staffing levels. Failure to recruit or retain staff at funded levels would trigger an appropriate financial adjustment.

12.3.7 WHSSC Quality and Performance Monitoring

Commissioning teams are responsible for developing service specifications and policies that guide individual services and outline the key performance and quality indicators and standards that the service is expected to adhere to. WHSSC is responsible for the service specifications for both the MTC and the ODN.

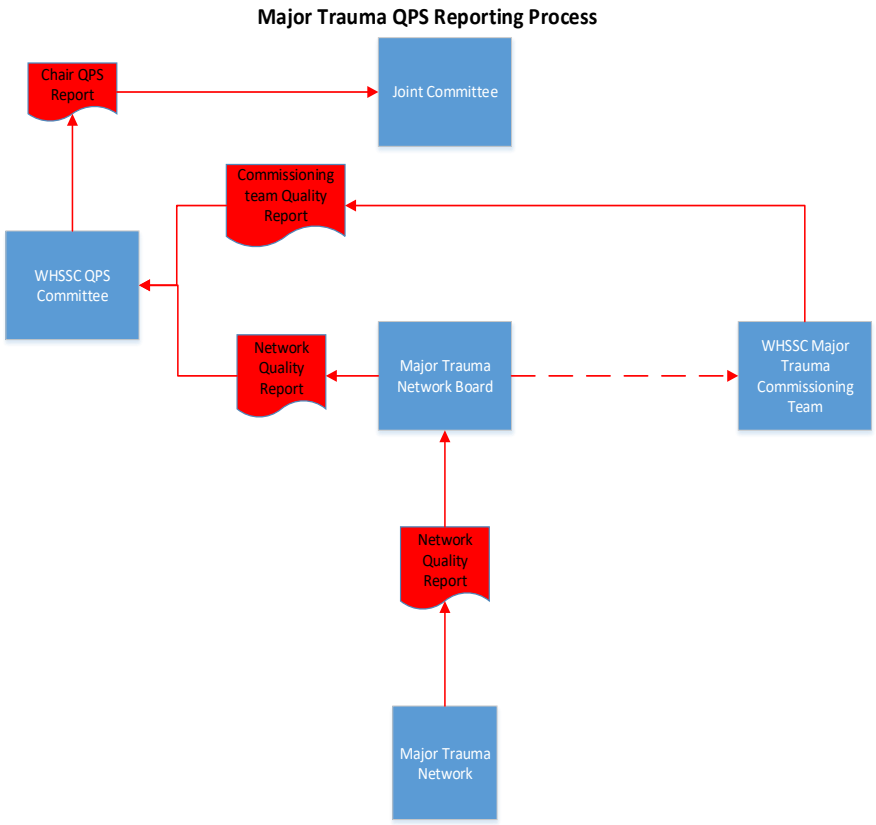
Service specifications are important in clearly defining the core requirements that WHSSC expects to be in place for providers to offer evidence-based, safe and effective services and importantly ensure equitable access to services for Welsh patients. They describe the service to be provided, and the quality of service that WHSSC expects to be delivered. The specification also sets out the way in which the quality of the service will be measured, and how it will be monitored by WHSSC.

The consultation on the Major Trauma Network was informed by the NHS England Outcome Measures, with the assumption that these will be adopted upon implementation. These outcome measures are based upon the NHS England Service Specification which was developed by the NHS England Clinical Reference Group for Major Trauma.

Joint Committee, following the advice of the Major Trauma Network Board, has agreed to develop a service specification and outcome measures that are appropriate for NHS Wales but informed by the NHS England Outcome Measures.

The development of the service specification and outcome measures will be undertaken through the established WHSSC processes, using the policy and service specification consultation process, the WHSSC Management Group scrutiny process, and approval through the Joint Committee.

The WHSSC Major Trauma Commissioning team will work with the ODN to establish regular performance meetings and monitoring returns so that the network and MTC performance against these specifications can be monitored and shared as part of the monthly performance reports to Management Group and quarterly performance reports to Joint Committee.



WHSSC will work closely with Swansea Bay University Health Board (SBUHB) as the host of the trauma ODN, to ensure that major trauma is a standing item on the regular executive-led meetings that it holds with SBUHB to discuss quality, finance and performance issues.

12.4 Implementation and Mobilisation

12.4.1 Implementation Planning Activity

The independent panel recommended that a trauma network with a clinical governance infrastructure should be quickly developed, and that a clear and realistic timetable should be put in place to ensure it was established. In the Autumn of 2018, the network board developed an implementation plan.

There are multiple component parts to the Trauma Network and as part of the implementation and preparation for go live, tranches of funding have been released in order that recruitment can take place for MTC capability to be in place before the triage tool is made live. It is the triage tool that will determine which patients should go to the MTC and so until the system is ready, the tool remains inactive.

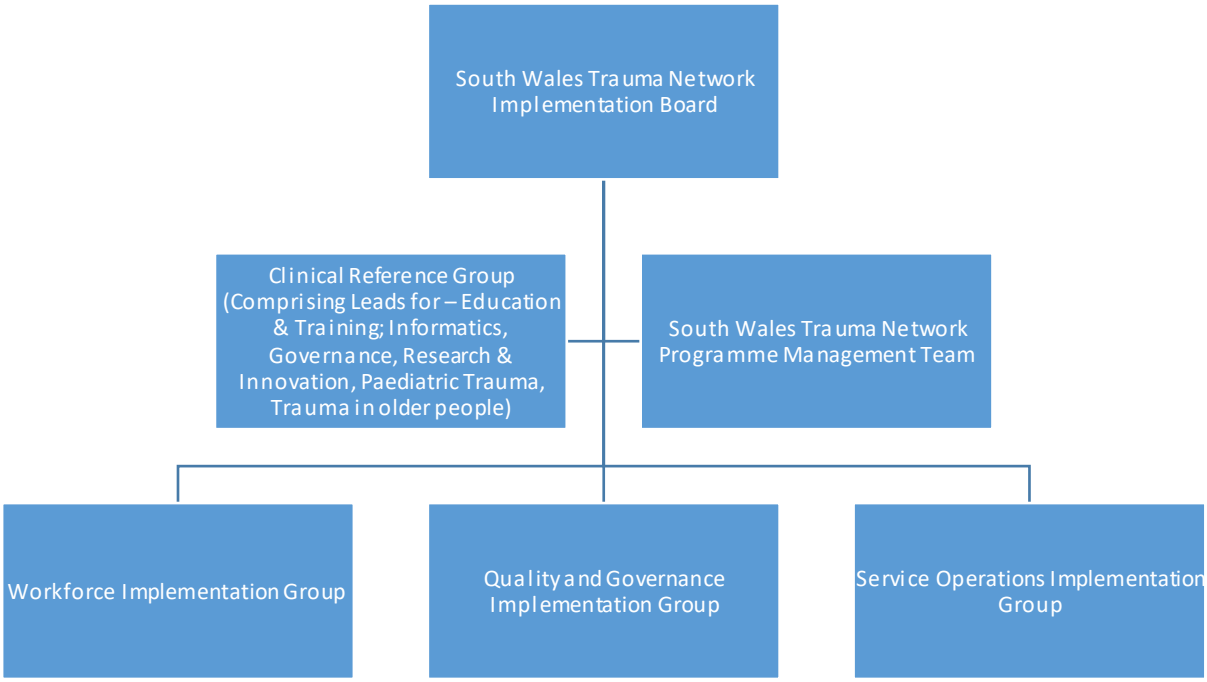
The ambition is for the network to go live on the 1st April 2020. However, final confirmation of this will be determined through the structure set out below and then agreed and signed off in conjunction with the lead commissioner by the implementation board.

12.4.2 Implementation Structure and Management Arrangements

As the network moves from its planning phase to implementation and operational delivery, hosting of the network will shift from the Collaborative to SBUHB. Draft implementation arrangements are illustrated below:

A robust and methodological programme arrangement will continue to be applied but the roles and representation across the programme will need to be amended as the focus moves from planning to execution.

The organisational structure for implementation is shown below:



12.4.3 Populating the Structure

The personnel involved in supporting and delivering implementation need to be balanced between seniority, service operational representation and ensuring all participating organisations are equitably represented.

Nominated Membership for Implementation

Implementation Board:

Meeting Frequency: 6 weekly

Chair: Tracy Myhill, Chief Executive SBUHB

Membership: One executive member representing each of the following:

- WHSSC
- EASC
- EMRTS
- Aneurin Bevan UHB

- Cardiff and Vale UHB
- Cwm Taf Morgannwg UHB
- Swansea Bay UHB
- Powys THB
- Hywel Dda UHB
- Welsh Ambulance Services NHS Trust
- Network Manager
- Programme Manager
- National Clinical Lead

Programme Team:

Frequency: Monthly

Chair: Network Manager

- Programme Manager
- 5 x sub group managerial leads
- 5 x clinical leads (incl. Network clinical lead)

Each Subgroup:

Frequency: Monthly

- 1 x clinical chair
- 1 x managerial lead (deputy chair)
- 1 x rep from each of the six health boards and WAST
- Programme Manager

Each participating organisation will be asked to identify up to five representatives, in order to ensure each sub group is appropriately representative of the system.

12.4.4 Critical Path

Following agreement of the indicative timeline, the network board set out a critical path in relation to the development of the programme business case and associated health board business case information.

The current implementation plan has been further developed and is in keeping with detailed implementation plans for the different elements.

For trauma units, these will be developed as part of the next phase of implementation , based on the overarching principles.

The timeline for approval of the Programme Business Case is outlined below:

Workstream	Task Name	Responsibility	Finish Date	07/10/2019	14/10/2019	21/10/2019	28/10/2019	04/11/2019	11/11/2019	18/11/2019	25/11/2019	02/12/2019	09/12/2019	16/12/2019	23/12/2019	30/12/2019
Approval Timeline	Final review / scrutiny of draft PBC in readiness for reporting to Network Board; engage with HB/WAST reps as required	Executive Strategy Group	14/10/2019													
	Sign-off final PBC and draft IMTP content; prepare for combined HB/WAST Board Briefing	Trauma Network Board	21/10/2019													
	Progress update and briefing on arrangements for HB/WAST Board Briefing	Collaborative Executive Group	22/10/2019													
	Brief on the content of the PBC, service phasing, quality, cost, risks, mitigations, in preparation for formal receipt at Board Meetings in November.	Combined Health Board / WAST Board Briefing	23/10/2019													
	Final review of PBC / preparation for reporting to Boards / Welsh Government	Executive Strategy Group	w/c 28/10/2019													
	Welsh government Scrutiny	Welsh Government	W/C 21/10/2019 and W/C 28/10/2019													
	Gateway 3 Review	Programme Team	28/10/2019													
	Briefing for CHC	Programme Team	w/c 04/11/2019													
	Receive final PBC / preparation for Board meetings / internal briefings within Health Boards / WAST	Health Board/WAST - Executive / internal governance meetings	w/c 04/11/2019 and w/c 11/11/2019													
	Papers issued by Health Boards / WAST for Board meetings	Health Board/WAST Board meetings	w/c 18/11/2019													
	Health Boards / WAST to receive PBC for approval and draft IMTP sections for approval	Health Board/WAST Board meetings	w/c 25/11/2019													
	Special meeting to agree commissioning for pre hospital component of PBC	EASC (Note - consider joint meeting for EASC and WHSSC JC)	w/c 02/12/2019 or 09/12/2019													
	Special meeting to agree commissioning for MTC, specialised services and ODN	WHSSC Joint Committee	w/c 02/12/2019 or 09/12/2019													

The current implementation plan for the South Wales Major Trauma Network:

Workstream	Task Name	Responsibility	Sep-19					Oct-19				Nov-19				Dec-19					Jan-20				Feb-20				Mar-20					
			02/09/2019	09/09/2019	16/09/2019	23/09/2019	30/09/2019	07/10/2019	14/10/2019	21/10/2019	28/10/2019	04/11/2019	11/11/2019	18/11/2019	25/11/2019	02/12/2019	09/12/2019	16/12/2019	23/12/2019	30/12/2019	06/01/2020	13/01/2020	20/01/2020	27/01/2020	03/02/2020	10/02/2020	17/02/2020	24/02/2020	02/03/2020	09/03/2020	16/03/2020	23/03/2020	30/03/2020	06/04/2020
ODN Implementation	Appointment of key in-year enabling posts for ODN	SBUHB																																
	Confirmation of funding for year 1 and ingoing posts for ODN	WHSSC																																
	Handover plan for ODN	Programme																																
	ODN Governance arrangements finalised	Programme																																
	ODN Management Team in place and infrastructure established	SBUHB																																
	ODN operational policy developed	Programme																																
	Patient Flow - 'care with treatment closer to home' policy approved	Programme / ODN																																
	Clinical and non clinical policies produced and approved	Programme / ODN																																
	Paediatric policies and pathways produced and approved	Programme / ODN																																
	Training and Education for go live	Programme / ODN																																
	Training resource for year 1 onwards	WHSSC																																
	Rehabilitation including prescription approved and directory of services ready	Programme / ODN																																
	Clinical informatics requirements ready	Programme / ODN																																
	QI, audit and research - all HBs completed TARN dataset (backdated 1 year from go live) and all Health Boards completing respective dashboards.	Health Boards																																
	MTC readiness visit																																	
	TU readiness visits																																	
	Pre-hospital readiness visit																																	
Pre-hospital	Senior Paramedic - Trauma Desk Begin Employment	WAST																																
	E Learning go live	WAST																																
	All staff trained and E learning training completed	WAST																																
Trauma Units with specialist services ie Morriston Hospital	Recruitment of key enabling posts in order to meet Day1 service specification and quality indicators																																	
	Identified 'landing pad' for repatriating patients within existing infrastructure																																	
	Agree internal organisational governance structure																																	
	Implement network policies and pathways																																	
	Training and education to reach to Day 1 requirements																																	
	Recruitment of additional plastic surgical staff to support MTC (Consultants and Middle Grades)																																	
	Phased implementation of South West Wales spinal service model in year 1 and 2																																	
All other Trauma Units	Recruitment of key enabling posts in order to meet Day1 service specification and quality indicators.																																	
	Identified 'landing pad' for repatriating patients within existing infrastructure																																	
	Agree internal organisational governance structure																																	
	Implement network policies and pathways																																	
	Training and education to reach to Day 1 requirements																																	
	Operational arrangements in HDUHB with rural trauma facilities																																	

12.4.5 Summary of Critical Enablers for 'Go Live'

Chapter 5 provides details of the minimum requirements that need to be completed and/or in place before the ODN can become operational. These are summarised at a high level below and will inform the assurance process undertaken by the programme team and the collation of a detailed cross-organisational implementation plan. This will also assist with understanding the cumulative programme risk.

ODN	Transition and handover of ODN to SBUHB Agree organisational governance structure and role of ODN ODN management team Day 1 requirements for the following undertaken and/or in place: • Service specification and quality indicators (see chapter 5) • Clinical informatics requirements (see chapter 5) • Training and education products (see chapter 5)
Commissioners	WHSSC contracting arrangements Quality assurance framework
Pre-hospital	24/7 EMRTS in South Wales (phase 1 development) Trauma desk capability (covering peak hours of activity) Pre-hospital triage tool and 'silver trauma triage' tool Online training on triage tool Resource availability for additional ambulance journeys
MTC (UHW)	Interim additional infrastructure requirements (emergency unit, poly-trauma ward, theatre capacity and critical care) Recruitment of key enabling posts in order to meet Day 1 service specification and quality indicators (see chapter 7) Agree internal organisational governance structure Implement network policies and pathways Clinical informatics requirements Training and education to reach to Day 1 requirements
TU with specialist services (Morriston Hospital)	Recruitment of key enabling posts in order to meet Day 1 service specification and quality indicators (see chapter 8) Identified 'landing pad' for repatriating patients within existing infrastructure Agree internal organisational governance structure Implement network policies and pathways Clinical informatics requirements Training and education to reach to Day 1 requirements

	Recruitment of additional plastic surgical staff to support MTC (Phased implementation of spinal and orthoplastic model in year 1 and 2)
All other TUs	Recruitment of key enabling posts in order to meet Day1 service specification and quality indicators (see chapter 8) Identified 'landing pad' for repatriating patients within existing infrastructure Agree internal organisational governance structure Implement network policies and pathways Clinical informatics requirements Training and education to reach to Day 1 requirements Operational arrangements in HDUHB with rural trauma facilities

12.5 MTC/Health Board TUs/Pre-Hospital Readiness for Go Live

All quality assurance processes should include a mechanism to gather qualitative data from services to support identification of unforeseen issues as well as to ensure that all staff from front line through to senior management feel supported by the programme team in implementing the required changes. The process will also afford TU teams an opportunity to ask questions and seek clarification directly from clinical and managerial leads working in or on behalf of the programme team.

It is proposed that unit readiness visits are conducted as a collaborative exercise to enable individual health boards to receive constructive feedback on their state of readiness. This will enable the programme team to better understand each local service and specific issues, as well as being able to identify network wide issues that need resolution or escalation.

Consideration of the terms of reference for such visits will be needed. It is proposed that structuring visits around the patient pathway will provide a practical way of tangibly assessing local readiness. There should be enough time and space to enable free discussion of local issues and risks and how they might be resolved or mitigated.

12.6 Post Go Live: Operations and Governance

12.6.1 Challenges of Designing the Organisational Structure

There are a number of key challenges for the ODN in relation to the above organisational structure that the network board will need resolve before it transitions into an ODN board, and prior to the network becoming operational. The network governance subcommittee has explored these. A number of hypothetical scenarios that could arise help to illustrate the challenges and the role of the ODN board within the proposed organisational structure. These reflect challenges to the system raised through the process of peer and programme assurance reviews:

MTC acceptance variation

The ODN is alerted to an issue of significant variation of acceptance of patients from scene to the MTC, despite the presence of an automatic acceptance policy. The issue has been raised by the ambulance service. On discussion with MTC colleagues, it is suggested that the quality of the information conveyed to the MTC on passing a pre-alert is the cause of the problem. Despite some intervention by the ODN to improve the situation, the issues persist. The ODN escalates the issue to the respective commissioning bodies, but no single entity can confirm responsibility. The ODN is left with no influence over the problem and the issue remains unresolved.

Urgent transfer to the MTC

A TU contacts the ODN stating that a 45 year old male with an isolated pelvic fracture has been waiting four days for an urgent transfer to the MTC. The standard states that the patient should have been transferred within two calendar days. Despite the patient being accepted for transfer, bed capacity in the MTC appears to be constrained due to significant winter pressures in the unscheduled care system. The ODN tries to contact the Chief Operating Officer in the MTC on behalf of the TU, but the issue remains unresolved.

Delay in transfers of care

The MTC manager contacts the ODN stating that over the last two months they have had several delayed discharges of care to one particular TU. Currently, five patients at the MTC have been waiting in excess of two weeks for transfer from the time of completion of specialist care. This is causing considerable pressure on beds for new patients at the MTC. Despite the presence of an automatic repatriation policy agreed by all health boards, patient flow is becoming an increasing problem. The ODN discusses the issue with the Chief Operating Officer in the TU and learns that there are no appropriate beds available and, as such, the hospital is no longer able to accept patients back to their 'landing pad.' The ODN discusses the issue with WHSSC, but as commissioning of beds in the TU falls outside their remit they are unable to help, despite trying to intervene. The ODN is unable to resolve the issue and the problem continues, with a detrimental impact on patients and their families.

Pre-hospital trauma triage

A lack of adherence to the triage tool in a region has led to a concern from the MTC to the ODN. Despite several educational interventions, the problem persists. The reasons seem to be multifactorial, due to the inappropriate triage by ambulance personnel and advice given by the nearby TU. This is affecting patients, who are subject to delayed transfer to the MTC. The ODN attempts to investigate the issue through facilitation, but both the ambulance service and TU deny that they are the cause. In the proposed structure, whilst the ODN gives a view on the issues and develops an action plan, this advice is not followed. Given the commissioning arrangements in place, no single entity can confirm responsibility. The ODN has no further influence on the matter. Subsequently there is a serious adverse incident, which could have been prevented had the ODN been able to ensure practice changed.

Community rehabilitation and ongoing care

Despite the placement of rehabilitation coordinators and therapists in a TU as part of the network development, the MTC makes the ODN aware of several patients who have returned from the MTC to the community with ongoing rehabilitation needs that have received no community rehabilitation. On further assessment, it appears that the TU's resources put in place for major trauma are mostly used for other patients groups (e.g. isolated neck of femur fractures, strokes). The ODN discusses the issue with the directorate manager in the TU, but does not manage to convince the manager that the position should change. Furthermore, adherence to TARN PROMS/PREMS is limited. Despite making suggestions to improve the situation, the ODN has no influence over the outcome and the problems continue.

TARN case completeness and quality

Despite resourcing a full time TARN coordinator, case ascertainment and accreditation in a TU remains poor. TARN informs the ODN that the TU is an outlier for mortality and would like to understand if this is an issue of data completeness. Despite several requests for further information from the TU, TARN has not managed to make progress. WHSSC are concerned that this may be affecting MTC performance, but are unable to help, as this falls outside their remit of specialist commissioning. The ODN approaches the TU to find that the TARN coordinator is used to undertake other audits in the clinical audit department and therefore is only available two days a week for TARN. On suggesting that the TARN coordinator is full time on TARN data collection, the TU state that this is not possible. The problem continues and the ODN has no way of determining the performance of the TU.

The above scenarios are hypothetical and not exhaustive but represent a sample of issues that are likely to arise, with an impact on the effectiveness of the network and on trauma patients. They provide a compelling case for optimising organisational structure from the outset. From these scenarios, the following themes have emerged:

- Complex commissioning arrangements with multiple commissioning bodies involved, risking a lack of accountability across the pathway. There is a disconnect between these and the ability to visualise the entire patient pathway.
- The ineffectiveness of the trauma ODN board acting solely in a facilitative/advisory capacity in relation to clinical and operational governance issues. An inability to be effective at maintaining 'operational delivery', given the complexity of commissioning arrangements and multiple providers.

The design must recognise the system of incentivisation and internal market forces does not exist in NHS Wales. It has also been confirmed that incentivisation and internal market forces will not be utilised as part of the commissioning framework of the trauma network.

12.6.2 Overview of Structure

The organisational governance structure must ensure clear lines of accountability and responsibility across the pathway in order to achieve the best possible outcomes and experience for patients. This should align with the network's mission statement of 'saving lives, improving outcomes, making a difference.'

The arrangements must create an environment in which all components of governance are delivered openly and transparently. In addition, all providers must contribute equally and positively to the governance activities of the network.

Whilst some aspects of the organisational governance arrangements are clear, others present a level of complexity, which will challenge the effectiveness of the network to deliver as a whole and across the trauma pathway. The following outlines the current position with respect to organisational governance:

Three commissioning bodies:

- WHSSC – principal commissioning body, commissioning and performance management of the ODN, MTC and other specialist services supporting the MTC.
- EASC – commission and performance manage WAST and EMRTS.
- LHB Commissioner – commission and performance manage health boards.

Mechanisms will need to be in place to ensure accountability across the pathway. Following consideration of the scale of the challenge for operations in a live scenario, the need to embed the network within a robust structure that is owned at an executive level, the following arrangements have been derived. They reflect the views of the network board and service partners. They also reflect similar arrangements for managing trauma networks in the UK and beyond.

The network clinical governance structure will consist of the following boards/groups. This structure has been based on comparable networks in England and Scotland. Full details will be included in the network operational policy.

- Trauma Network Delivery Assurance Group (DAG) - top level system oversight and ownership, meets bimonthly in first year and quarterly thereafter. Chaired by WHSSC or independent member, accountable through WHSSC Joint Committee.
- Trauma Network Clinical & Operations Board (COB) - operational delivery, and responsible for ensuring timely escalation, management and resolution of operational issues. Meets monthly, chaired by a lead Chief Operating Officer. Will have a performance management function and maintain operational authority.

These two key groups will ensure delivery against the commissioning framework, the escalation of issues, learning and achievements into the senior leadership structure of the NHS. These groups are supported by the following core groups, through which the COB and DAG can discharge and commission their responsibilities.

- Network Governance Group
- Network Workforce Group
- Network Informatics Group

These Groups will oversee, support and receive outputs from a number of workstreams.

- Network work streams:
    - Clinical and non-clinical policies.
    - Paediatrics.
    - Education and training (in partnership with HEIW).
    - Rehabilitation.
    - Quality improvement, innovation and research.
    - Trauma in older people.
    - Injury prevention.

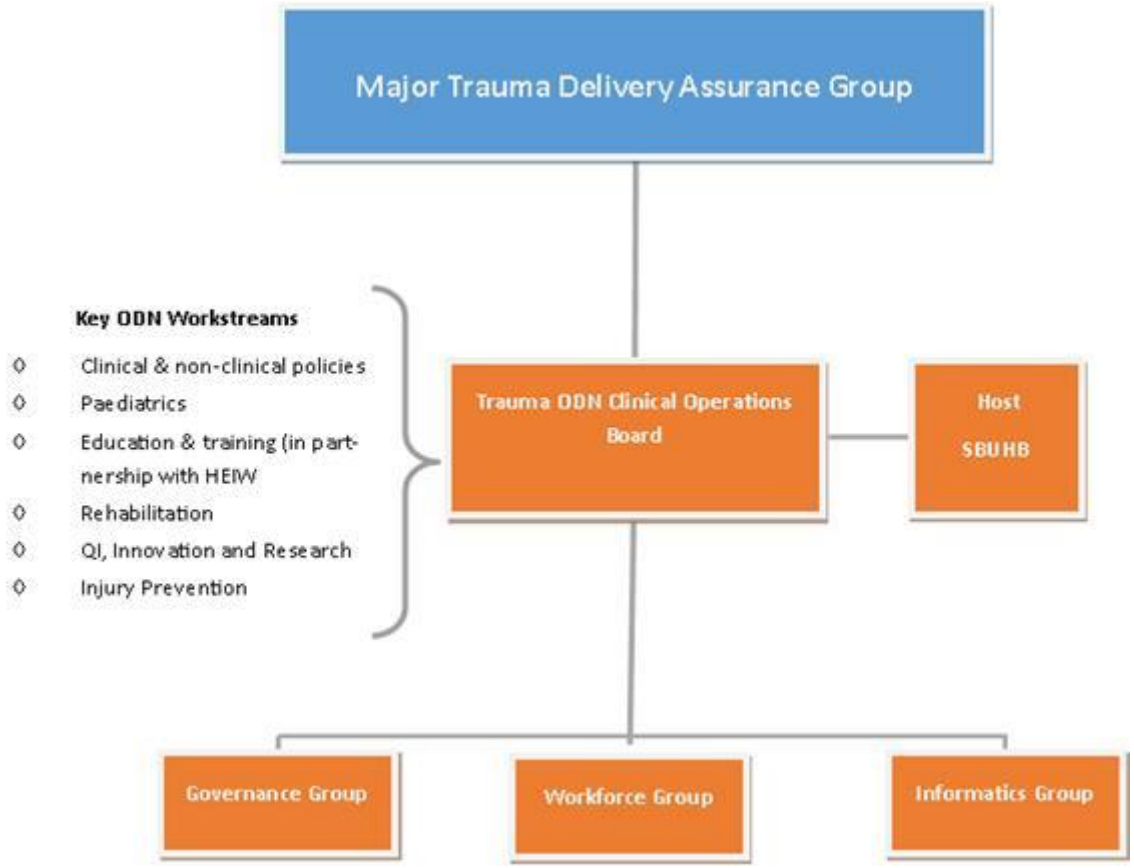
- Weekly teleconference between ODN and MTC clinical and operational management team.
- Monthly network teleconferences with ODN and network clinical and operational management teams.

Swansea Bay UHB will host the ODN. Swansea Bay will provide all organisational supporting arrangements and so the ODN will escalate, through Swansea Bay UHB, matters which pertain to enabling or support functions for the delivery of the network. These include (but are not restricted to):

- HR and workforce
- Financial and procurement
- Project and programme management
- Health and safety
- Statutory and mandatory training for ODN staff
- Risk and incident management
- Planning and managerial support

The ODN is, through the Delivery Assurance Group, accountable to WHSSC Joint Committee and the DAG will escalate directly to Joint Committee through the WHSSC structure, matters that pertain to commissioning and service delivery, planning and performance or any wider system related issues (e.g. patient flow, workforce risks and issues, approval for service change).

ODN Operating Structure:



12.6.3 Trauma Network Delivery Assurance Group (DAG)

The trauma network DAG will meet bimonthly in the first year and then quarterly thereafter and be accountable for and oversee the delivery of whole patient pathway on behalf of the relevant commissioning bodies. The board will be responsible for ensuring effective clinical pathways of care between all providers in the network. In doing so, it will receive reports from the network Clinical Operations Board and Governance Group. The board will approve all work undertaken by providers and network working groups, pertaining to clinical governance.

Furthermore, in aligning with the NHS England service specification and quality indicators, the board takes its steer from the NHS England clinical reference group (CRG), a national forum of experts on trauma care. Presently, Wales is not represented on the national CRG and it is an important step for the programme to seek representation.

12.6.4 Trauma Network Clinical Operations Board

The trauma network COB will meet monthly and oversee operational delivery of the whole pathway. It will actively manage performance and operational matters, being responsible for the development of the necessary plans and strategies to ensure ongoing sustainable service delivery. It will ensure that the schedule of business cases identified in this programme business case are delivered. It will oversee the closure and post programme evaluation and benefits realisation plan, as well as being responsible for developing the workforce and facilitating the development of network wide roles and ways of working.

12.6.5 Network Governance Group

The network governance group will meet quarterly after the adult and paediatric clinical quality review meeting. The group will review themes emerging from all reporting in to the network structure (including risk management). It will generate lessons and recommendations to share across the network and check that these are completed. It will also provide review and challenge to all work undertaken by providers and network working groups, prior to approval by the COB. Finally, the group will review governance issues pertaining to the Veterans Trauma Network.

The following list outlines minimum reporting criteria to the network governance group (this list is not exhaustive and providers will be encouraged to report any issues pertaining to clinical governance):

- All cases discussed in provider Morbidity and Mortality (M&M) meetings.
- All unexpected survivors and unexpected deaths.
- All cases where a complaint or concern is raised within a provider organisation.
- All cases discussed in adult and paediatric clinical quality reviews.
- All clinical incidents and serious adverse incidents raised by providers (minimum criteria set through network central incident reporting using the DATIX incident reporting system). These will still be reported through health board governance processes.
- TARN MTC and TU dashboards (incl. TARN PROMS/PREMS).
- Specific operational data impacting on clinical effectiveness and patient safety.
- The number and proportion of patients transferred directly to MTC, including cases of significant under- and over-triage in a pre-hospital setting.

- The number and proportion of patients that have an acute secondary transfer (within 12 hours) from a TU to MTC.
- The proportion of urgent transfers that occur within two calendar days.
- The number of patients with ISS ≥15 managed definitively within a TU and details of outliers.
- The number of patients where repatriation from MTC exceeds 48 hours from referral.
- Feedback of other networks relevant to major trauma (e.g. critical care)
- Peer review – the ODN has confirmed its intention to participate in the NHS England annual trauma peer review outlined below.

The frequency will be defined in the network operational policy, linked with the network informatics procedures.

The following outlines the outputs of the network governance sub-committee:

- Quarterly network report for network board and commissioning bodies. (Including performance and quality reviews)
- Annual internal and external facing network report.
- Quarterly lessons learnt bulletin from themed reviews, incident and serious adverse incident reporting shared with all providers.
- Urgent clinical and operational alerts (including changes in pathways and polices).
- Annual peer review report.
- Annual MTN conference.
- Annual performance and quality reviews with commissioners.

12.6.6 Adult and Paediatric Clinical Quality Review Meetings

These quarterly meetings aim to provide an open forum for sharing and discussion of clinical cases amongst multidisciplinary health care professionals who have been involved or wish to attend and learn. They will immediately precede the network governance group meeting. Specific themed criteria will be developed, but any provider in the patient's journey with concerns or questions (from the point of injury to rehabilitation and/or discharge) will be able to highlight cases for discussion.

These meetings will generate outcomes requiring input from the MTC and TU governance structures and network working groups, which will be agreed through the network governance group.

The ODN will also provide representation at the MTC clinical quality review meetings (or equivalent).

12.6.7 MTC Clinical Governance Structure

The MTC trauma board will oversee the activity of the MTC critical care huddle, TARN assessment meetings, morbidity and mortality meetings and the clinical governance, audit and quality committee. These will feed into the network governance group as indicated above.

12.6.8 TU Clinical Governance Structure

The TU trauma boards will oversee the activity of TARN assessment and morbidity and mortality meetings. The TU clinical governance structure will be responsible for overseeing the clinical governance of LEHs within the health board as appropriate. These will feed into the network governance group as indicated above.

12.6.9 Pre-Hospital Trauma Governance Group

Given the number of providers involved in the delivery of pre-hospital trauma care across the region, a pre-hospital trauma governance group will be established to oversee clinical governance issues pertaining to major trauma. This group will review the effectiveness of the pre-hospital triage tool, trauma desk and manage any issues raised by providers pertaining to pre-hospital care. WAST is the main pre-hospital provider for the network and provides a named representative to report into the network governance group as well as responses to the adult and paediatric clinical quality review meetings held by the network.

12.6.10 Weekly/Monthly Teleconferences

A weekly teleconference will be held between the ODN and MTC clinical leads and respective managers. Once a month these will occur between the ODN and network clinical and operational management teams. These will be used an opportunity to identify immediate clinical governance issues which require immediate clinical and operational alerts or sign post further discussions within provider organisations or the network structure. A structure will also include monthly conference calls with the North West Midlands and North Wales Trauma Network and an opportunity to undertake joint governance meetings at least six-monthly. This will set the trajectory for collaborative working and future planning.

12.6.11 Trauma Peer Review Process

Participation in the annual peer review process will be an important component of the quality assurance process and a key marker for whether additional investment in major trauma services across the region delivers improvements in clinical effectiveness and governance, and areas for improvement. The NHS England annual peer review process, undertaken by the quality surveillance team, has a record for delivering successful reviews in England and Northern Ireland. It is recommended that the NHS England review process be adopted for the South Wales Trauma Network for the following reasons:

- The review is carried out consistently in line with NHS England quality indicators and service specification for major trauma, which the network will be adopting with appropriate variation for the Welsh system. This provides an opportunity for benchmarking with networks elsewhere.
- It aligns with North Wales, who participate in peer review as part of their quality assurance process with the North West Midlands and North Wales Trauma Network.
- It is a driver for service development and quality improvement.
- It provides focus on coordination within and across organisations, following the patient pathway.
- It is clinically led with user and carer involvement from the outset.

The process has three phases – a pre-review visit, review day and post review. Pre-review requires completion of a self-declaration against quality indicators and an evidence upload. This is followed by a five-hour review day. Post peer review, a report is written with a categorisation of review findings. This is sent to the provider and relevant commissioners. If any serious concerns are raised, separate notification is sent directly to the chief executive of the provider and copied to relevant commissioners.

The first review of the ODN, MTC, TUs and pre-hospital providers is expected to be undertaken at the end of year 1, with further reviews guided by the results of the first.

12.6.12 Collaborative Working with North Wales

There is significant learning from the experiences from North Wales, which is part of the North West Midlands and North Wales Trauma Network.

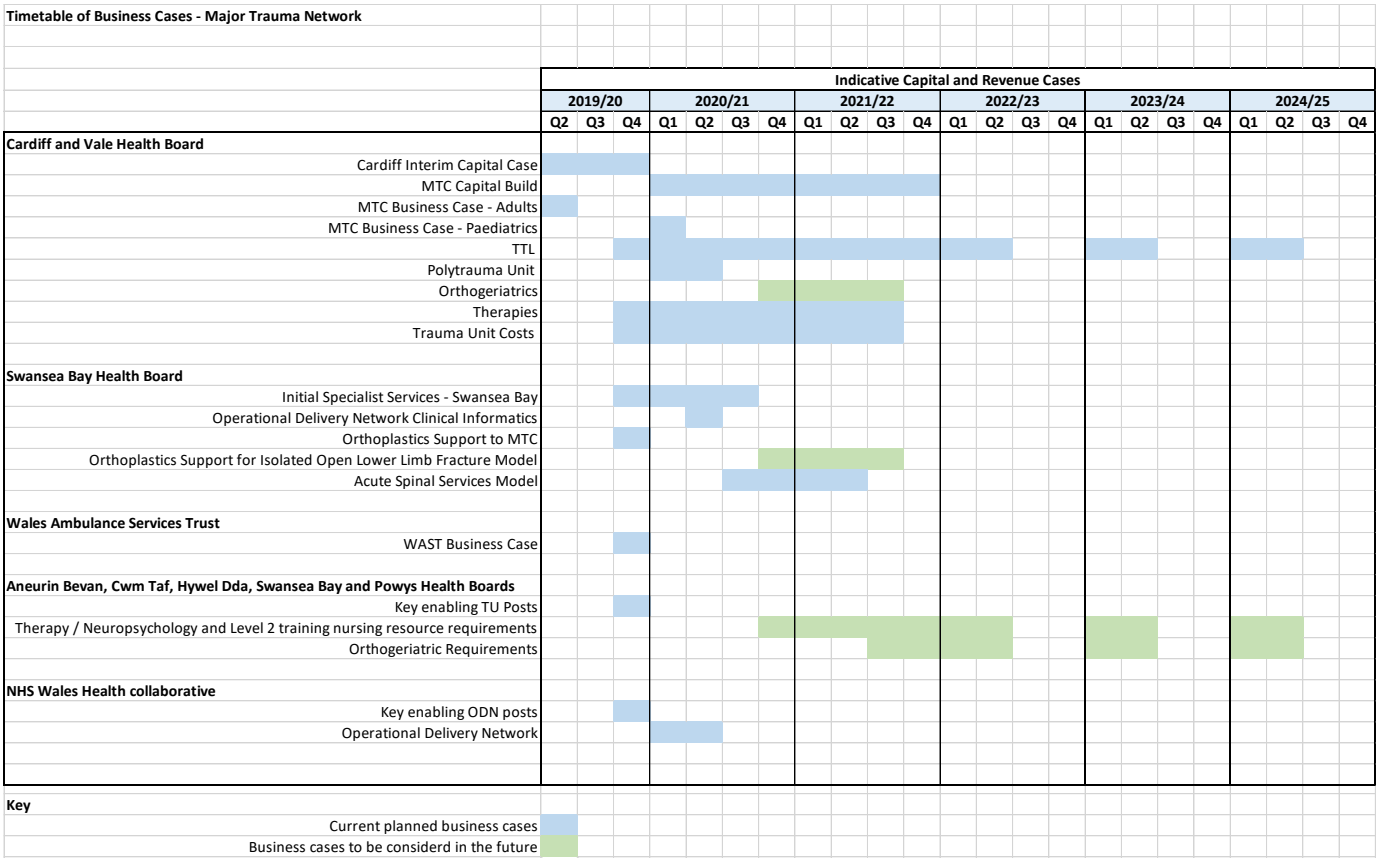
There are opportunities for improving governance including shared learning from both good and sub-optimal practice. This includes improving quality of care and learning from processes in this network even where processes may vary slightly but where pathways and solutions may be transferable. The same is true for network pathways and polices. This also includes good practice and methodologies in relation to TARN data and analysis. Furthermore, North Wales has had experience of participation in national peer review and the South Wales trauma network to participate in this process, but also learn from the experiences in North Wales, to explore challenging areas at the outset. The training and education working group for the network will also gain an understanding from North Wales in relation to key deliverables. North Wales currently runs a two day trauma team course, which has helped TUs comply with nursing standards for trauma training. North Wales has also looked at strategies for improving patient satisfaction and capturing feedback from trauma patients, especially those who go through the MTC.

Finally, in terms of the development of the rehabilitation model in South Wales, learning will be shared with North Wales in terms of the development of their local model.

12.7 Business Cases Supporting Implementation and Achievement of Standards

12.7.1 Schedule of Business Cases

The PBC provides a framework for all associated major trauma business cases. The following schedule shows the quantum of anticipated business cases expected:



The above schedule reflects the position as at September 2019 and will be subject to change. The future plans for business cases from the health boards are difficult to forecast and articulate at this stage. The change in patient flows to health boards will impact on demand for cases such as rehabilitation and the impact can only be fully understood when the network has gone live and TARN data has been collected.

12.8 Evaluation – Post Implementation

12.8.1 Post Programme Assurance and Evaluation

The outline arrangements for post implementation review (PIR) and project evaluation review (PER) have been established in accordance with best practice and are as follows:

Post-project evaluation is a mandatory requirement for all NHS bodies who are undertaking a project of this scope and scale.

This section of the PBC sets out the plans, which, the programme team has put in place to undertake a thorough and robust post-project evaluation.

12.8.2 Framework for Post-Project Evaluation

Following the handover of the network to SBUHB the Collaborative is committed to ensuring that a thorough and robust post-project evaluation (PPE) is undertaken at key stages in the process to ensure that positive lessons can be learnt from the programme that will be of value for wider system learning. The lessons learnt will be of benefit to:

- The Collaborative – in using this knowledge for future projects.
- Health boards, pre-hospital services and commissioners – to inform their approaches to future major projects.
- The NHS more widely – to test whether the approaches used in this programme have been effective.

PPE also sets in place a framework within which the agreed benefits realisation plan can be tested to identify which benefits have been achieved and which have not.

NHS guidance on PPE has been published and the key stages, which are applicable for this project, are:

- Evaluation of the various processes put in place during implementation.
- Evaluation of the project in use shortly after the development is operational.
- Evaluation of the project once the developments are well established.

Once the handover is completed the ODN will draw up detailed plans for evaluation at each of these stages in consultation with its key stakeholders. This section will also set out how these arrangements will be managed, how information will be disseminated and on what timescale.

12.8.3 Evaluation – Implementation

The objective of this stage is to assess how well and effectively the project was managed from the time of PBC approval through to the commencement of operational commissioning.

It is considered that this should be undertaken six months following operational commissioning of the development.

The evaluation at this stage will examine:

- The effectiveness of programme management.
- Communications and involvement during implementation.
- The effectiveness of the working arrangements established by the network board.
- Support during this stage from other stakeholder organisations – Welsh Government, health boards, WHSSC and EASC.

12.8.4 Evaluation – Project in Use

It is proposed that this stage of the evaluation be undertaken up to 12 months after the completion of operational commissioning of the scheme in order that as many of the lessons learnt are still fresh in the minds of the programme team and other key stakeholders.

The objective of this stage will be to assess how effectively the project was managed during the operational commissioning phase and into the actual operation of the new development.

The evaluation at this stage will examine:

- The effectiveness of programme management.
- Communications and involvement during commissioning and into operations.
- The effectiveness of the working arrangements established by the programme board.
- Support during this stage from other stakeholder organisations – Welsh Government, health boards, WHSSC and EASC.
- Overall success factors for the project in terms of cost and time.
- Extent to which it is felt the development meets users' needs – from the point of view of patients and staff.

It should be noted that in order to provide an appropriate comparator to the final point in this section, a similar survey should be undertaken and compared to staff and patient engagement exercises undertaken during the course of the programme. This will help the service to gauge the level of satisfaction with the existing service. In this way, increases in satisfaction can be directly measured, although it is recognised that a direct comparison will not be possible as the exact respondents will not be the same.

12.8.5 Evaluation – Project is Well Established

It is proposed that this evaluation is undertaken about two to three years following initiation of commissioning. The objective of this stage will be to assess the effectiveness of project management during the implementation of the new development. The evaluation at this stage will examine:

- The effectiveness of the working arrangements established by the lead commissioner (WHSSC) and the ODN.
- Extent to which it is felt the development meets users' needs, from the point of view of patients and staff.

It is envisaged that participation in national peer review of the whole system at the end of Year 2 will form part of this evaluation.

12.8.6 Management of the Evaluation Process

The ODN will manage the process in partnership with the lead commissioner (WHSSC).

All evaluation reports will be made available to all participants in each stage of the evaluation once the ODN and WHSSC management processes have endorsed the report.

The ODN management team will undertake the majority of the work.

The costs of the final post-project evaluation, once the new working practices are fully established, will be borne by the ODN and are not included in the costs set out in this PBC.

The ODN will seek to ensure that they keep abreast of projects that have been fully evaluated when in use and which have utilised the latest PPE guidance. The ODN will then take a view of the extent to which external support is required.

12.9 Programme Assurance

The South Wales Trauma Network is planned to go live operationally in April 2020. Health board services are currently finalising the resource requirements that they will need to invest in service change to meet the phased quality indicators and service specification over the next five years as set out by the trauma network board. They are also working through the requirements of their own designated TUs. Go live carries a high degree of risk. National changes to patient flow will occur because of the implementation of this service change.

12.9.1 Aspects of Assurance

There are three key elements to providing robust assurance so that the service can launch. These are:

- Programme Business Case – as a blueprint for implementation and a record of the decision making process and governance (planning diligence).
- MTC/TU/pre-hospital state of readiness for launch.
- Testing of the network's business continuity plan.

Based on the outputs of these elements, the network board will report to the WHSSC Joint Committee in February 2020, to seek the authority to go live in April 2020.

12.9.2 Gateway Review of Programme Business Case (PBC)

The OGC Gateway Review 0: Strategic Assessment took place in July 2019. There were 11 clearly outlined actions were identified by the Gateway Team that had to be taken-forward to address an overall delivery confidence assessment of Red / Amber. The recommendations are outlined below:

Ref. No.	Recommendation	Urgency (C/E/R)	Target date for completion	Status/Comment
1.	The Programme Board and Programme Team should assess whether the current phasing and go-live date is affordable and achievable.	C- Critical	Do now	Closed/Complete
2.	Close out the gap between the programme team specification of minimum day 1 requirements and current Health Board Business Cases and further develop planning assumptions for each phase to progressively meet Trauma Standards.	E- Essential	Do by end 10/19	Closed/Complete
3.	Undertake a critical scrutiny of all current Health Board and WAST Business Cases and design the process for the preparation and scrutiny of revised submissions.	E- Essential	Do by end 10/19	Closed/Complete
4.	Ensure the PBC sets out all capital requirements, including all proposed new MTC investment.	E- Essential	Do by end 10/19	Closed/Complete
5.	Confirm with Health Boards their commitment to funding of this programme via WHSSC (for the MTC and ODN) and their own direct investment (in TUs and rehabilitation).	C- Critical	Do by end 10/19	Closed/Complete
6.	Clearly set out the composite approval process for the PBC and associated revenue and capital funding including the roles of WG, WHSSC, EASC and Health Boards and document this as part of an integrated approval and assurance plan for the programme.	E- Essential	Do by end 09/19	Closed/Complete
7.	Secure additional leadership capacity in the Programme Team to drive even more whole system collaborative working and the delivery and integration of the Major Trauma Network.	C- Critical	Do now	Closed/Complete
8.	Develop on a collaborative basis a detailed plan for the full implementation of the programme and its constituent projects, including dependencies milestones and critical path up to the point when major trauma standards are being met.	E- Essential	Do by end 10/19	Closed/Complete (programme phasing)
9.	Review the Programme Board structure which will be needed to drive forward the implementation phase, following approval of the PBC	E- Essential	Do by end 10/19	Complete
10.	The Programme should develop a co-ordinated and collaborative approach to developing a skilled network workforce, including recruitment, training and development, rotations, shared appointments and short term requirements.	C- Critical	Do now	Complete – Principles agreed and published
11.	Develop the governance structure and operational authority for the Operational Delivery Network (ODN) and clear lines of accountability between the MTC and the ODN, and between them and the HBs.	E- Essential	Do by end 10/19	Governance and accountability arrangements described in ODN chapter

To support this, the Executive Strategy Group was formed, with executive planning, finance and workforce input, in support of the programme team and to provide assurance to the SRO. An action plan was drafted and, where appropriate), working groups were formed to directly address the 11 actions. A professional peer review was arranged to review the MTC, Specialist Services, Trauma Units, Pre-hospital care and Operational Delivery Network planned to consider appropriate phasing.

The Gateway Assurance of Action Plan (AAP) took place in September 2019. Whilst significant progress had been made and acknowledged against the actions outlined in the Strategic Assessment that took place in July a delivery confidence assessment of Red/ Amber was concluded by the Gateway Team. Since this review the outstanding critical recommendations below have been addressed in the context of this business case. The full recommendations are outlined below:

Ref. No.	Recommendation	Urgency (C/E/R)	Target date for completion	Status
1.	Establish whether all the relevant recommendations derived from the Professional Peer review have been accurately reflected in the latest Major Trauma Centre and SBUHB Specialist Services Business Cases.	C- Critical	Do now	Complete
2.	Seek an approach to close any gap in the initial service specification and affordability expectations between WHSSG and the Major Trauma Centre and SBUHB Specialist Services.	C- Critical	Do now	Complete
3.	Model the timing of recruitment to assess the service specification to which the network can operate from 1st April 2020 and include in the PBC.	E- Essential	Do by 15/10/19	Key enabling posts identified, funded and out to recruitment
4.	Determine the operating, accountability and governance structure for the ODN.	E- Essential	Do by 15/10/19	Proposals drafted and out for consultation/agreement between Chief Operating Officers, Chief Executives and Trauma Programme Board.

Following the AAP review, outstanding critical actions were completed and remaining actions were noted to be progressing well as outlined above. The Gateway 3 Review: Investment Decision took place between the 28 - 30 October 2019. This Gateway review has provided a delivery confidence assessment of amber green. This indicates that 'successful delivery appears probable. However constant attention will be needed to ensure risks do not materialise into major issues threatening delivery.' The review recognised that two major activities were happening in parallel: the completion and approval process for the PBC and mobilisation for go live. It reported that, since the AAP review, substantial progress had been made with both the PBC and implementation plans.

The review team made the following recommendations:

Ref No.	Recommendation	Urgency (C/E/R)	Target date for completion	Status
1.	Establish the timeline and plan for achieving the standards for TARN data recording on a timely basis across the network.	Recommended	Do by 01/20	Working plan developed and signed off by network board (see Chapter 5) and risk assessment. Significant progress being made
2.	Set out in the PBC the likely scale of future capital investment needed in the new MTC trauma theatre.	E- Essential	Do now	Complete. Estimated capital range included in updated PBC.
3.	Provide guidelines for each HB on the specific commitments being entered into by them in approving the PBC.	E- Essential	Do now	To be confirmed via core board report
4.	Confirm the processes for Swansea Bay SS, TU and ODN, and other HB TUs to self-assess their readiness to proceed with operational mobilisation and go-live of the MTN.	E- Essential	Do by 12/19	Detailed requirements of evidence for readiness have been drafted and visits to Health Boards are being planned.
5.	Identify, map out and regularly communicate those elements of the new MTN which will be in place at initial go-live and those which will be added in the period following go-live.	E- Essential	Do by 12/19	This is highlighted in the PBC and will be part of the implementation arrangements and communication plan
6.	Publish a timetable and arrangements for implementation, including the standing down of the existing programme structure and the standing up of new mobilisation and implementation structure.	E- Essential	Do by 12/19	Included in PBC and to be adopted in Health Board plans
7.	Establish the detailed clinical decision making process to confirm that the MTN is safe to take live, together with the final MTN Board decision making process.	E- Essential	Do now	Meeting held with MDs to give steer, and will be agreed via Joint Committee
8.	Expand the approach to the management and reporting of recruitment to include the Plastic Surgeons and other posts in the Trauma Network.	E- Essential	Do by 12/19	Confirmed at the Executive Strategy Group and led by the Workforce Group
9.	Develop more clarity about how the MTC and each TU, working with the ODN, will practically operationalise the policy to repatriate patients from the MTC.	C- Critical	Do now	Draft document developed, consultation underway with network board, COOs and MDs. Following which will be

Ref No.	Recommendation	Urgency (C/E/R)	Target date for completion	Status
				discussed with Welsh Government, with a plan to test in Jan/Feb 2020

12.9.3 MTC/Health Board TUs/Pre-Hospital Readiness for Go Live

All quality assurance processes should include a mechanism to gather qualitative data from services to support identification of unforeseen issues as well as to ensure that all staff from front line through to senior management feel supported by the programme team in implementing the required changes. The process will also afford TU teams an opportunity to ask questions and seek clarification directly from clinical and managerial leads working in or on behalf of the programme team.

It is proposed that unit readiness visits are conducted as a collaborative exercise to enable individual health boards to receive constructive feedback on their state of readiness. This will enable the programme team to better understand each local service and specific issues, as well as being able to identify network wide issues that need resolution or escalation.

Consideration will be needed on the terms of reference for such visits. It is proposed that structuring visits around the patient pathway would provide a practical way of tangibly assessing local readiness. This would require support by both a structured set of service aspects to cover, in order that the approach of the visits is consistent. There should also be enough time and space to enable free discussion to afford sufficient time and focus on local issues and how they might be resolved, or risks appropriately mitigated.

12.9.4 Testing of Business Continuity Arrangements

One of the critical tasks for the programme team will be to coordinate the development of comprehensive contingency arrangements for the network board to deploy if necessary on day 1. This will be informed by the visits and documented contingencies as well as with wider national strategic considerations (e.g. fit with Civil Contingencies Act and Welsh Government national Emergency Planning functionality).

A timetable for the programme assurance process is provided below:

Aspect	Activity	Lead	Due date for completion
PBC gateway review	Planning of review scope and terms of reference with Welsh Government Investment and Infrastructure planning colleagues	Rhys Blake, NHS Health Collaborative Ian Gunney, Welsh Government	End of May 2019
	MT Network Board agree Terms of Reference and Scope	Tracy Myhill, SRO, programme	June 2019

	Execution of review	Gateway team	July 2019
State of readiness visits (subject to ODN readiness)	Planning of visit scope, required documentation and process	Dindi Gill, Network Clinical Lead Jennifer Thomas, Network Rehabilitation Lead Jeremy Surcombe	End of October 2019
	Approval of scope of and process for visits	Network Board	November 2019
	Undertake visit - MTC	Programme Team and any specialist advisors recommended through the board	Mid December 2019
	Undertake visits – TUs/pre-hospital	Programme Team and any specialist advisors recommended through the board	January - February 2020
	Produce visit report also to inform business continuity test exercise	Programme Team	End of February 2020
Business continuity plan testing	Planning of test exercise	Programme Team & external facilitator	End of December 2019
	Approval of ToR	Network Board	December 2019
	Undertake exercise	Network	January 2020
Contingency Planning for Go Live	Define principles of contingency planning for the network and trigger points for activation	Programme Team & Network Board	November 2019
	Activation of contingency plan depending on feedback from organisations as appropriate	Network Board	January – March 2020

12.10 Benefits Realisation Plan

In the case for change chapter, a list of benefits was described against key investment objectives. These investment objectives included health gain, equity, clinical and skills sustainability and value for

money. In May 2019 a benefits realisation workshop was held, involving a broad group of stakeholders. These included representation from pre-hospital services, health boards, commissioners and Welsh Government. Using information gathered from the workshop, a comprehensive benefits realisation plan has been developed. The plan is divided into the four overarching strategic themes, based on the investment objectives. These are broken down to identify key supporting actions, timeframes for delivery and responsibility/accountability for delivery and review of benefits. Each measurable benefit has been assigned a unique number for recognition and monitoring purposes. The timeframe given indicates the earliest that data will be available to determine whether a benefit has been realised or not. The benefits realisation plan will be used in a number of ways:

- Formal evaluation of the network.
- Subsequent quality assurance and/or peer review processes.
- Commissioning framework.

Strategic Benefit – Health Gain

Strategic Benefit	Benefits Number/Description	Actions Necessary to Realise Benefits	Measurement	Target date for demonstrating benefit	Responsible for delivering benefits	Accountable
Health Gain	001/Improving survival	Introduction of inclusive trauma network Improve TARN data collection to ensure accurate survival scoring Ensure at least 1 year of baseline data collection before ODN operational	TARN probability of survival (quarterly/annual reports for network wide and all providers) Additional survival rate TARN case ascertainment and accreditation	March 2023	ODN providers	WHSSC/EASC/health board commissioning
	002/Improving functional outcomes	Develop an inclusive trauma network with a focus on all aspects of the rehabilitation pathway Improve TARN PROMS data collection to ensure baseline data available	TARN PROMS (quarterly/annual reports network wide and all providers) PROMS baseline data (1 years) before rehabilitation model operational	March 2025	ODN providers (specifically rehabilitation providers)	WHSSC/health board commissioning

Health Gain			Example provided in Appendix 21 & Appendix 22			
	003/Improving timeliness and quality of clinical care.	Establish network policies and pathways (incl. automatic acceptance policy to MTC)	TARN MTC and TU dashboards/ quarterly and annual reports. Quarterly and annual network TARN reports Focused TARN quarterly and annual reports (e.g. orthoplastics, paediatrics) Benchmarking against national average	March 2021	ODN providers	WHSSC/EASC/health board commissioning
	004/Improving patients experience	Multiple levels of intervention through introducing the inclusive trauma network (based on learning from patient experience workshop)	TARN PROMS/PREMS (patient experience component) Example provided in Appendix 23. Frequency on usage of patient centred communication tool (e.g. application)	March 2023	ODN providers	WHSSC/EASC/health board commissioning

			Patient surveys (themed annually)			
	005/Enhancing injury prevention	Development of injury prevention strategy in conjunction with Public Health Wales	Number of injury prevention schemes undertaken Quantify prevention of injury/death/ disability	March 2023	ODN providers	Welsh Government
	006/More coordinated response at incidents or mass casualty events	Integration of mass casualty plans in to network operational structure	Record of debriefs and learning from table top/live exercises undertaken with network	March 2022	ODN providers	WHSSC/EASC/health board commissioning
	007/Improved data collection.	Implement TARN working plan	Network wide improvement of TARN case ascertainment to 80% and accreditation to 95% (incl. all providers) Contribution of all providers to TARN PROMS/PREMS	March 2021	ODN providers	WHSSC/EASC/health board commissioning

Strategic Benefits - Equity

Strategic Benefit	Description	Actions Necessary to Realise Benefits	Measurement	Target/ Date	Responsible for delivering benefits	Accountable
Equity	008/Equity of access to specialist care	Implementation of pre-hospital triage tool and automatic acceptance policy to MTC (incl. rapid secondary transfer)	TARN data: The number and proportion of patients transferred directly to MTC/TU with specialist services. The number and proportion of patients that have an acute secondary transfer (within 12 hour) from a TU to MTC/TU with specialist services. The proportion of urgent transfers that occur within two calendar days. The number of patients with ISS ≥15 managed	March 2021	ODN providers	WHSSC/EASC/health board commissioning

			definitively within a TU.			
	009/More appropriate patient flow	'Care with treatment closer to home' policy Landing pad configuration in health boards	All wales repatriation database: Number of repatriations exceeding 48hrs from when ready by origin health board.	March 2021	ODN providers	WHSSC/EASC/health board commissioning
	010/Equity of care for trauma in older people	Trauma in older people pathways developed and early geriatric assessment	Number of patients 65yr and over who have a clinical frailty score documented by a geriatrician within 72 hours of admission.	March 2023	ODN providers	WHSSC/health board commissioning
	011/Equity of care for veterans returning to Wales in line with England	Implement the veterans trauma network in Wales	Number of veterans referred and reviewed by the network	March 2021	ODN management	WHSSC/health board commissioners

Strategic Benefit: Clinical Skills and Sustainability

Strategic Benefit	Description	Actions Necessary to Realise Benefits	Measurement	Target/ Date	Responsible for delivering benefits	Accountable
Clinical Skills & Sustainability	012/Improved multiprofessional training and education	Implementation of network training and education programme	Number of training and education events held split by type Number of online modules completed by providers Number of users of triage tool and trauma APP Number of calls made to trauma desk (where decision making supported)	March 2021	ODN providers	WHSSC/EASC/health board commissioners
	013/Enhanced engagement of the MTC with the wider network	Strategy for supporting wider network	Number of engagement sessions led by MTC	March 2021	MTC	WHSSC
	014/Enhance new recruitment across the region	Implementation of an inclusive network Workforce strategy	Identified staffing recruited Number of joint appointments made	March 2020 onwards March 2020 onwards	ODN providers ODN management	WHSSC/EASC/health board commissioners

			Number of rotational appointments made Publication of strategy			
	015/Improved staff retention	Workforce strategy	Turnover rates	March 2021	ODN providers	WHSSC/EASC/health board commissioners

Strategic Benefit: Value for Money

Strategic Benefit	Description	Actions Necessary to Realise Benefits	Measurement	Target/ Date	Responsible for delivering benefits	Accountable
Value for Money	016/Economic benefits of enhanced survival, functional outcome and return to work	Develop an inclusive trauma network with a focus on all aspects of the rehabilitation pathway	TARN PROMS (quarterly/annual reports network wide and all providers) Economic output (e.g. quality adjusted life years – using the secure online data linkage bank	March 2025	ODN providers	WHSSC/EASC/health board commissioners
	017/Reduced secondary transfers (observed over time, but not initially)	Implementation of pre-hospital triage tool and automatic acceptance policy to MTC	Secondary transfer ambulance conveyance rates Number of secondary trauma transfers undertaken by EMRTS/hospital transfer team Cost savings from above	March 2023	WAST/EMRTS/health boards	EASC/health board commissioners

	018/Reduced length of stay in critical care	Implementation of MTC	Reduced length of stay (TARN/ICNARC datasets)	March 2023	ODN	WHSSC/EASC/health board commissioners
	019/Flexible working across health boards boundaries	Agree HR protocols to enable cross-health boards working	Number of new posts created working across organisations and joint policies	March 2021	ODN providers	WHSSC/EASC/health board commissioners
	020/Benefits to other part of the healthcare system	Development of an inclusive network overlapping with other areas of strategic development	Number of other services directly benefitting from investment in major trauma services	March 2021	ODN providers	WHSSC/EASC/health board commissioners

12.11 Risk Management Plan

Programme risks are managed through each network board where an updated risk register is presented at each meeting. As the programme transitions towards go live and services begin to mobilise, risk management will continue to be an important governance element of the new implementation structure.

12.11.1 Future Risk Profile and Plan

There are a number of sources of risk identification as a consequences of the activities of programme planning for implementation. A number of key activities will follow the submission of this case to WHSSC Joint Committee. These are:

- **Risk plan to manage non delivery or overachievement of benefits realisation plan**

  NHS Wales is making a substantial investment in this service, so it is imperative that the benefits undergo a full risk assessment. That risk assessment will then be signed off by the network board and shared with commissioners and will be formally logged as a handover document to the ODN.

- **Risks emerging from Trauma Unit site visits**

  TU readiness is essential to the maintenance of effective patient flow and achievement of benefits and improved outcomes. Each TU will receive a tailored report and an assessment on the escalation of additional risks identified through site visits will be made in advance of the final business continuity test (which may serve to mitigate or remove some of those risks).

- **Risks identified through business continuity exercise**

  Staff working in EDs are managing services under an acute degree of strain. Winter will invariably bring significant pressures on the teams expected to deal with repatriation and management of their own cases not determined as MTC referrals by WAST. The business continuity exercise will test a number of scenarios already set out as case vignettes in this chapter. A full report of the business continuity exercise will include risk assessments from site visits, benefits plan analysis and business continuity testing.

12.12 Communication/Stakeholder Engagement Plan

A comprehensive communication/ stakeholder engagement plan was developed in 2018, indicating key stakeholder groups and how communication would be managed, both during the implementation and operational phases of the programme. The schedule of stakeholders was developed from the work undertaken to identify stakeholders as part of the public consultation process. Feedback in relation to this document has been received from health board engagement leads. Integral to the strategy is the responsibility for health boards to regularly update their respective local stakeholders in relation to this development. Currently an action plan is being developed to support the broader strategy. This includes a division of key stakeholder groups e.g. patients, families and carers, health boards, pre-hospital services, commissioning bodies, Welsh Government, academic institutes and colleges and third sector organisations. Within the context of each stakeholder, a description will be provided of key activities and messages, the modality through which these will be communicated, sequencing of the plan and identification of the lead organisation.

12.13 List of Specialist Advisors

Given the specialist nature of this strategic development, the programme has made extensive use special advisors throughout its work programme. The special advisors listed below have been fundamental to assurance of the programme and in addition to network board membership.

- Pre network board establishment
- Clinical Reference Group Membership
- Independent Panel Membership
- Post network board establishment
- National
    - Professor Chris Moran – National Clinical Director, Major Trauma NHS England
    - Professor David Lockey – Clinical Director, Severn Trauma Network and Interim Clinical Lead, South Wales Trauma Network (2017-2018)
    - Dr Martin McKechnie – National Clinical Director, Scottish Trauma Network
    - Kate Burley – Associate Director, Scottish Trauma Network
    - Dr Sally Lewis – National Clinical Lead for Value-Based and Prudent Healthcare
- Orthoplastic Trauma
    - Professor Ian Pallister – T&O consultant, Morriston Hospital
    - Mr Dean Boyce, Consultant Plastic Surgeon, Morriston Hospital
    - Mr Hywel Dafydd - Consultant Plastic Surgeon, Morriston Hospital
    - Mr James Lewis – Trauma & Orthopaedic Consultant, UHW
- Spinal Trauma
    - Mr Navin Verghese, Spinal Consultant, Morriston Hospital
    - Mr Sashin Ahuja, Spinal Consultant, UHW
    - Mr James Cordell-Smith, Spinal Consultant, Royal Gwent Hospital `
- Spinal Rehabilitation
    - Mr Sreedhar Kolli – Spinal Rehabilitation Consultant, Rookwood Hospital
- Thoracic Trauma
    - Mr Douglas West, Thoracic surgery consultant, University Hospitals of Bristol
- TARN
    - Antoinette Edwards – Executive Director, TARN
    - Laura White – Operations Director, TARN
    - Professor Fiona Lecky – Research Director, TARN
- Evidence based review
    - Dr Rowenna Morris-Clarke – Anaesthetist, Swansea Bay UHB

August 2019 Peer Review

The August 2019 Professional Peer Review had input from the following:

- **Major Trauma Centre Case**
  - Mr Rob Faulconer, Consultant Vascular Surgeon, Plymouth Hospitals NHS Foundation Trust
  - Dr Ben Walton, Consultant ICM and Anesthetics, North Bristol NHS Trust
  - Dr Richard Hall, Consultant in Emergency Medicine, University Hospital of North Midlands NHS Trust
  - Dr Steve Novak, Consultant in Rehabilitation Medicine, North Bristol NHS Trust
  - Dr Judith Allanson, Consultant in Neurorehabilitation, Cambridge University Hospitals NHS Trust
  - Dr Giles Haythornthwaite, Consultant in Paediatric Emergency Medicine, Clinical Lead for the Paediatric Major Trauma Centre, Named Doctor For Child Safe-Guarding
- **Specialist Services**
  - Mr Shehan Hettiaratchy - Plastic and Reconstructive Surgeon, Imperial College, Trust trauma lead and lead surgeon; consultant plastic, hand and reconstructive surgeon, Imperial College Healthcare NHS Trust
  - Miss Loz Harry, Consultant Plastic Surgeon, Queen Victoria Hospital
  - Mr Mark Wilson, Consultant in Neurosurgery and Pre-Hospital Care Specialist, Imperial College Hospital
- **Trauma Units**
  - Dr Ash Basu, Consultant Emergency Physician, Betsi Cadwaladr University Health Board
  - Dr Adam Wolverson, Consultant in Intensive Care Medicine and Anaesthesia, United Lincolnshire Hospitals NHS Trust
  - Dr Steve Novak, Consultant in Rehabilitation Medicine, North Bristol NHS Trust
- **Pre-Hospital**
  - Dr Phil Cowburn, Acute Care Medical Director, South West Ambulance Services NHS Foundation Trust
- **Operational Delivery Network**
  - Mr Steve Cooke, Network Manager, West Midlands Trauma Network
  - Dr Louisa Stacey, Major Trauma Centre Manager and Thames Valley Trauma, Vascular, and Spinal Networks Manager, Oxford University Hospitals
- **Therapies**
  - Donna Pike, Therapies Service Line Cluster Manager, University Hospitals Plymouth NHS Trust
  - Jenny Coe, Major Trauma Rehabilitation Coordinator, Brighton and Sussex University Hospitals NHS Trust
  - Justine Theaker, Consultant AHP, Manchester Hospitals NHS Foundation Trust
  - Dr Lisa Robinson, Consultant Allied Health Professional – Major Trauma Rehabilitation, The Newcastle upon Tyne Hospitals NHS Foundation Trust

13 Conclusions and Recommendations

This Programme Business Case (PBC) describes the totality of the requirements for NHS Wales to establish the South Wales Trauma Network, serving the population of South Wales, West Wales and South Powys. The PBC outlines the trajectory of the programme over a five year period of phased implementation. It represents the culmination of significant work over seven years.

The vision for the establishment of the network is to enhance patient outcomes and experience, across the entire patient pathway from the point of wounding to recovery, and also includes injury prevention. The trauma network will improve patient outcomes by saving lives and preventing avoidable disability, returning patients to their families, work and education. The aim is to develop an inclusive, collaborative, world leading trauma network, with quality improvement informed through evidence-based medicine and lessons learnt from others.

The programme was established, following full endorsement by all six health boards in the region, of the following recommendations made by an independent expert panel, following a period public consultation:

- A major trauma network for South Wales, West Wales and South Powys with a clinical governance infrastructure should be quickly developed
- The adults' and children's Major Trauma Centres (MTC) should be on the same site
- The MTC should be at University Hospital of Wales (UHW), Cardiff
- Morriston Hospital should become a large Trauma Unit (TU) and should have a lead role for the major trauma network
- A clear and realistic timetable for putting the trauma network in place should be set

The network board was established in May 2018 and set out a robust case, aligning with both national and international strategic drivers for change. The case for change is compelling, with the prospect of benefits realisation aligned closely with key investment objectives of health gain, equity, clinical and skills sustainability, and value for money, including economic benefits. Thus, where indicated, a value-based healthcare approach has been applied.

The network board has overseen the development of the structure of the network, comprised of the following elements:

- An Operational Delivery Network (ODN) hosted by Swansea Bay University Health Board
- An adult's and children's MTC at UHW, Cardiff
- An adult and paediatric TU with specialist services at Morriston Hospital, Swansea
- Six adult and paediatric TUs at the following locations:
    - UHW, Cardiff
    - Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny (period until the Grange University Hospital is fully operational from April 2021, at which point the Grange University Hospital will become the site of a single designated TU for the Aneurin Bevan University Health Board)
    - Prince Charles Hospital, Merthyr Tydfil and Princess of Wales Hospital, Bridgend
    - Glangwili General Hospital, Carmarthen

- Rural trauma facilities at Bronglais General Hospital, Aberystwyth, and Withybush General Hospital, Haverfordwest
- A Local Emergency Hospital at Royal Glamorgan Hospital, Llantrisant

The network board has also developed a phased clinical and operational model, based on the NHS England quality indicators and service specification for major trauma services. All providers and relevant commissioning bodies have agreed this model and requisite resource requirements, following several tiers of internal and external reviews, as outlined below:

- An ODN and management team hosted by Swansea Bay University Health Board. This includes requirements set out for network clinical informatics and training and education.
- Pre-hospital requirements for the Welsh Ambulance Service NHS Trust (WAST), including additional ambulance conveyances, the development of a national trauma desk function and an educational programme. The agreed first phase of the Emergency Medical Retrieval and Transfer Service Cymru (EMRTS) expansion to 24/7, from April 2020, is described within this case for completeness.
- Requirements for the combined adult and paediatric MTC at UHW, including the 24/7 presence of a consultant trauma team leader, the establishment of a polytrauma ward, additional theatre/critical care capacity, a plastic surgical service and a model of hyper-acute rehabilitation.
- Key enabling resources for TUs and an approach to the 'landing pad' for patients returning from the MTC for care with treatment closer to home.

The case describes the delivery of absolute requirements for Day 1, but also the schedule of business cases that will follow as part of the phased introduction of the network. In doing so, the case also sets out a timeline for implementation of the network (and composite parts) on 1 April 2020, with the ODN management team being put into place in January 2020. Whilst this presents an ambitious timeline, the programme in committed to achieving this.

In order to manage implementation, the case describes a revised implementation structure, commissioning and organisational governance arrangements and workforce principles to maximise positive benefits of recruitment for the wider healthcare system. Finally, a focus is placed on giving the ODN operational authority, particularly in relation to the repatriation of patients from the MTC and maintaining patient flow across the network.

The network board recommends that health boards, commissioners and the Welsh Government endorse this Programme Business Case, the agreed structure and the requisite phased resource requirements for the establishment of the South Wales Trauma Network, serving the population of South Wales, West Wales and South Powys, so that it can proceed with implementation.

The programme team would like to thank all contributors for their time and advice in developing this complex and challenging Programme Business Case.

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Abbreviations

ABUHB	Aneurin Bevan University Health Board
AHP	Allied Healthcare Professional
AIS	Abbreviated Injury Scale
APLS	Advanced Paediatric Life Support
APP	Advanced Paramedic Practitioner
AEMT	Advanced Emergency Medical Technician
ASD	Air Support Desk
ATLS	Advanced Trauma Life Support
BCUHB	Betsi Cadwaladr University Health Board
BOAST	British Orthopaedic Association Standards for Trauma and Orthopaedics
CAG	Clinical Advisory Group
CCC	Clinical Contact Centre
CCP	Critical Care Practitioner
CHC	Community Health Council
CRG	Clinical Reference Group
CT	Computerised Tomography
CTMUHB	Cwm Taf Morgannwg University Health Board
C&VUHB	Cardiff and Vale University Health Board
CWTCH	Care with Treatment Closer to Home
DGH	District General Hospital
DSTS	Definitive Surgical Trauma Skills
EASC	Emergency Ambulance Service Committee
ED	Emergency Department
EMRTS	Emergency Medical Retrieval and Transfer Service Cymru
EMT	Emergency Medical Technician
EPALS	European Paediatric Advanced Life Support
ETC	European Trauma Course
HDUHB	Hywel Dda University Health Board
HEIW	Health Education and Improvement Wales
ICD-10	International Classification of Diseases, Tenth Revision
IMTP	Integrated Medium Term Plan
ITS	Inclusive Trauma System
ISS	Injury Severity Score

LEH	Local Emergency Hospital
MRI	Magnetic Resonance Imaging
MTC	Major Trauma Centre
NEPTS	Non-Emergency Patient Transfer Service
NHSWHC	National Health Service Wales Health Collaborative
NMTNG	National Major Trauma Nursing Group
NWMNWTN	North West Midlands and North Wales Trauma Network
NWIS	National Health Service Wales Informatics Service
ODN	Operational Delivery Network
PACU	Post-Anaesthetic Care Unit
PBC	Programme Business Case
PEDW	Patient Episode Database for Wales
PER	Project Evaluation Review
PIR	Post-implementation Review
PPE	Post-project Evaluation
PTHB	Powys Teaching Health Board
PREMS	Patient Reported Experience Measures
PROMS	Patient Related Outcome Measures
QI	Quality Improvement
SBUHB	Swansea Bay University Health Board
SCIC	Spinal Cord Injury Centre
SRO	Senior Responsible Officer
SWP	South Wales Programme
SWTN	South Wales Trauma Network
TARN	Trauma Audit and Research Network
TNCC	Trauma Nursing Core Course
TTL	Trauma Team Leader
TTM	Trauma Team Member
TU	Trauma Unit
UHW	University Hospital of Wales
VTN	Veterans Trauma Network
WAACT	Wales Air Ambulance Charity Trust
WAST	Welsh Ambulance Service NHS Trust
WATcH	Wales and West Acute Transport for Children Service
WCP	Welsh Clinical Portal
WCRS	Welsh Care Records Service

WHSCC	Welsh Health Specialised Services Committee
WPAS	Welsh Patient Administration System
WPRS	Welsh Patient Referral Service
WRRS	Welsh Results Reporting System

Glossary of Terms

Case Ascertainment

Proportion of patients submitted to Trauma Audit and Research Network (TARN) compared to expected number based on Patient Episode Database for Wales (PEDW) dataset. Marker of data completeness.

Case Accreditation

Proportion of key fields completed for each patient and submitted to TARN. Marker of quality of data submitted.

Computerised Tomography (CT)

A scanning technique that uses x-rays to take highly detailed images of the body.

Critical Care

Refers to two related processes. Firstly, 'critical' refers to discernment or recognition of a crucial and a decisive turning point, the deterioration of the patient's condition, followed, secondly, by 'care' (i.e. intervention including resuscitation and transport to a critical care service). Critical care resuscitation and treatment interventions include a complex range of general and specialty procedures, supports and diagnostic procedures. Thus, the critically ill patient benefits from appropriate and timely critical care in the health system with a greatly increased probability of survival.

Definitive Care

The care that is rendered to conclusively manage a patient's condition, such as full range of preventive, curative acute, convalescent, restorative, and rehabilitative medical care.

Injury Severity Score

An anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned an Abbreviated Injury Scale (AIS) score and is allocated to one of six body regions (head, face, chest, abdomen and extremities including pelvis, external). Only the highest AIS score in each body region is used. The three most severely injured body regions have their score squared and added together to produce the ISD score. An ISS of 9-15 implies moderate trauma and an ISS>15 implies major trauma. An ISS>9 implies 'candidate' major trauma.

The ISS is calculated retrospectively once the patient's injuries are fully known.

Inter-Hospital Transfer

Primary Transfer

A transfer where a patient is retrieved from a pre-hospital environment.

Secondary Transfer

A planned transfer of a patient to a local facility as a result of capacity issues or for the ongoing repatriation of the patient.

Hyper- Acute Secondary Transfer

A transfer where a patient is retrieved from a hospital environment. This is for a time critical, life threatening condition. This may occur when a patient has acutely deteriorated or following a patient self-presenting or being transported to the hospital due to the paramedic crew making the decision that further ongoing transport would have endangered the life of the patient. This is also known as a delayed primary transfer.

Landing Pad

The environment to which major trauma patients will return once their specialist care is complete (e.g. at the MTC). It includes the structures in place to support and enhance the confidence of medical and nursing staff in managing patients in the recovery, rehabilitation and re-enablement phases of their journey.

Level 1 and 2 Trauma Nursing Competency

The levels of competency required for nurses engaging in the care of adult and paediatric major trauma patients. These have been developed by the National Major Trauma Nursing Group.

Local Emergency Hospital

A hospital in a Trauma Network that does not routinely receive acute trauma patients. It has processes in place to ensure that, should this occur, patients are appropriately transferred to a Major Trauma Centre or Trauma Unit.

Major Incident

A significant event, which demands a response beyond the routine, resulting from uncontrolled developments in the course of the operation of any establishment or transient work activity. The event may cause, or have the potential to cause either:

- Multiple serious injuries, cases of ill health (either immediate or delayed), or loss of life.
- Serious disruption or extensive damage to property, inside or outside the establishment.

Major Trauma

Serious, and often multiple, injuries where there is a strong possibility of death or disability.

Major Trauma Centre

A multi-specialty hospital, on a single site, optimised for the provision of trauma care, integrated with the rest of the Trauma Network.

Mass Casualty Incident (MCI)/

Any incident in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. Sometimes called a multiple-casualty incident or multiple-casualty situation.

Pre-hospital Care

Covers a wide range of medical conditions, medical interventions, clinical providers and physical locations. Medical conditions range from minor illness and injury to life threatening emergencies. Pre-hospital interventions, therefore, also range from simple first aid to advanced emergency care and pre-hospital emergency anaesthesia. Care providers may be lay first responders, ambulance professionals, nurses or physicians of varying backgrounds. All of this activity can take place in urban, rural or remote settings and is generally mixed with wider out-of-hospital and unscheduled care.

Probability of Survival

This is calculated for each injured patient and retained on the TARN database. This allows comparative outcome analyses for hospitals and for other groups of patients to be performed.

Reablement

A short and intensive service, usually delivered in the home, which is offered to people recovering from an injury to promote and maximise independence.

Rehabilitation

A process of assessment, treatment and management with ongoing evaluation by which the individual (and their family/carers) are supported to achieve their maximum potential for physical, cognitive, social and psychological function, participation in society and quality of living.

Rehabilitation Plan

A plan used to document the rehabilitation needs of severely injured patients (ISS score ≥9) and identify how they will be addressed.

Retrieval

The use of expert medical teams to assess, stabilise, package and subsequently transport a patient from one site to another. The aim is the delivery of critical care equivalent to that provided at a major hospital facility.

Rural Trauma Facility

Used to describe the role of Bronglais General Hospital and Withybush General Hospital as part of the Trauma Network. These hospitals do not meet the quality indicators and service specification of a Trauma Unit, however, given their relatively rural location, will receive disproportionally more major trauma compared to a Local Emergency Hospital. These hospitals will need to maintain the ability to assess and treat major trauma patients, before onward transfer to the Major Trauma Centre or nearest Trauma Unit, as appropriate.

Specialist Rehabilitation

The total active care of patients with complex disabilities by a multiprofessional team who have undergone recognised specialist training in rehabilitation, led/ supported by a consultant trained and accredited in rehabilitation medicine.

Trauma

Physical injuries of sudden onset and severity, which require immediate medical attention.

Trauma Care Pathway

The process through which care is provided for patients who have suffered Major Trauma. Specifically, it describes the location and capability of each facility within the inclusive trauma system and outlines the ambulance bypass protocols and thresholds for transferring patients to more specialist units. The pathway has several stages, including pre-hospital care, acute care and surgery, ongoing care and reconstruction and specialised and local rehabilitation. Within the pathway, hyper-acute rehabilitation starts early. Two additional components have been added: injury prevention and social care.

Trauma Network

The collaboration between the providers commissioned to deliver trauma care services in a geographical area. The term is interchangeable with the terms 'Trauma Operational Delivery Network' and 'Inclusive Trauma System'.

Trauma Unit

A hospital in a Trauma Network that provides care for most injured patients.