



**PWYLLGOR ADNODDAU CYNALIADWY
SUSTAINABLE RESOURCES COMMITTEE**

DYDDIAD Y CYFARFOD: DATE OF MEETING:	27 August 2024
TEITL YR ADRODDIAD: TITLE OF REPORT:	Patient Flow and eObservations Full Business Case
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SWYDDOG ADRODD: REPORTING OFFICER:	Anthony Tracey, Digital Director Peter Skitt, County Director Ceredigion/SRO TUEC Programme

Pwrpas yr Adroddiad (dewiswch fel yn addas) Purpose of the Report (select as appropriate)
Er Sicrwydd/For Assurance

**ADRODDIAD SCAA
SBAR REPORT**

Seyllfa / Situation

The purpose of the report is to seek assurance from the Committee on the Full Business Case (FBC) for Electronic Patient Flow and Electronic Observation solution for onward consideration through to the Board in September 2024 for approval.

In summary:

- Current processes and digital solutions within the Health Board are not optimised for patient flow, with an over reliance on paper systems
- There is no electronic observations system available which could add value to the implementation of the Welsh Nurse Care Record
- Optimising patient flow management can help best utilise limited resources
- Hywel Dda would be the first Health Board to implement patient flow and eObs across Acute, Community and Integrated Care, improving the digital maturity of the organisation and moving towards our aim of Healthcare Information and Management Systems Society (HIMMS) Level 5, again a Wales first.
- Progresses the Transforming Urgent and Emergency Care (TUEC) agenda, supporting handover, patient flow and discharge management
- The cost of the business case is circa £8.5m. Recurring revenue costs will be in the region of £0.6m per annum for implementing both e-Flow and e-Obs. However, based on the assumptions set out in Section 2.3.1 of FBC it is expected that the solution could deliver a total economic benefit of approximately £20.6m over the 7 years including a cash releasing saving of £16.4m based on the low-risk model.
- The payback period for the investment will occur in Year 4 / 5 of the programme, with the full cash releasing benefits in Year 5 onwards.

Cefndir / Background

Patient flow is the movement of patients through a healthcare facility, which involves the medical care, physical resources and internal systems needed from admission to discharge¹. When patient flow is not well managed in hospitals, this is associated with long wait-times and overcrowding in A&E, as well as inefficient scheduling in surgical departments. Poorly managed patient flow can lead to adverse health outcomes, including increased re-admissions and mortality rates². Optimising patient flow management can help best utilise limited resources, ensure patients move through care pathways efficiently, and reduce the length of hospital stays.

Electronic Observation (eObs) technologies can automatically capture and analyse patients' vital signs and notify clinicians when required. This automation of routine tasks can free up time to enable better patient care, increase accuracy in capture and transmission of information and improve decision-making. Patient Flow technologies encompass a range of functionality to help with better patient flow, including patient handover, bed capacity management and task management. More streamlined patient flow results in reduced wait-times, an improved staff and patient experience, and increased patient safety.

Current processes in Hywel Dda University Health Board (HDdUHB) are not optimised, as most of the information is recorded manually on paper records, and communication channels are slow and time-consuming (for example, phone calls). Some digital systems have been introduced in previous years, but feedback suggests that information remains 'siloes', and staff do not feel that they can access the correct information easily and in a timely manner when they need it. This poses a significant risk to patient safety. This combined with ongoing workforce challenges makes it even more crucial to increase efficiencies, so that limited resources are utilised in the best way.

The deployment of new technologies to support patient observations and patient flow aligns with the strategic goals of the Health Board, both locally and nationally. It focuses on improvements towards a more digitally mature healthcare system in Wales, with the aim of enhancing patient safety. Furthermore, these technologies will support the Health Board's plan for a new Urgent and Planned Care Hospital by enabling HDdUHB to integrate them into current ways of working.

eObs and Patient Flow technologies have previously been implemented by the NHS across the UK, and their clinical value has been established. Evidence from case studies suggests that patient flow technology can significantly increase efficiencies in hospitals, providing a better experience for both staff and patients. They have been shown to reduce the length of hospital stays, reduce patient harm, including a reduction in the number of cardiac arrests, and increase time for care. Ultimately, these improvements lead to better experiences for patients and staff, and enable the provision of high quality, safe care. The development of this Outline Business Case (OBC) has included direct engagement with several reference sites to validate the benefits and clinical value of this technology.

Asesiad / Assessment

On 30th March 2023, following the submission of an OBC to the HDdUHB Public Board, the Board agreed to proceed to a FBC, with the identification of a preferred supplier with no commitment to a specific supplier to be made until a further review to confirm that the recommended investment decision is appropriate has been conducted; before the contract is placed with a supplier or partner (or a work order placed with an existing supplier or other delivery partner).

Due to the financial investment required it was agreed this will need to be brought back to the Board for final approval. The Five Case Business Model has been used to develop the FBC.

¹ <https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0289>

² <https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0289>

The Board also asked that further staff engagement be undertaken to fully understand the requirements of such solutions and ensure the organisation fully explored the opportunities to improve delivery of care and reduction of harm as well delivering efficiencies across the organisation which was completed during the summer of 2023.

The FBC has been very well received, with various colleagues providing further comments and feedback for inclusion in the final FBC. There have been no objections to the FBC but wide support across Acute and Community senior representatives.

Feedback from stakeholders is that the implementation of eFlow and eObs is a critical success factor and a key enabler in delivering the major reconfiguration needed to deliver our roadmap to a more sustainable Health Board.

A summary of key points that were highlighted during discussions with the Operational Groups are as below:

Key Point	Response
Sufficient devices for clinical areas	£500k has been allocated in the FBC for devices, this includes electronic whiteboards. The Digital Team will also be working with the clinical teams to discuss the most appropriate device to purchase to improve the user experience.
What impact might this have on admin staff time to update the system	<p>Feedback from clinicians during staff engagement sessions highlighted that excessive time is spent on admin. Time and motion studies which suggest that there are many inefficiencies in current processes. Currently clinical staff spend much of their time working across different systems and paperwork trying to pull together the patient picture. The solution has been identified to reduce this inefficient way of working.</p> <p>Furthermore, feedback from the Value Business Partners indicates that there has been a significant increase in appointment of administrative staffing since COVID – implementation of these solutions will contribute to the Health Boards aim to reduce such costs. The objective is to reduce administration time required overall.</p>
Currently have issues with data quality will this deteriorate further with a new system	It is recognised that data needs to be utilised more “smartly” i.e. pulling or pushing the information from various systems & tools to reduce the manual effort. The implementation of these solutions will provide more visibility to colleagues i.e. dashboard reporting and one source of information. Feedback from staff indicated that data is often captured that is not necessarily “valued” by staff. The solution has been designed to ensure that the data works for user and provides tools and information that help and not hinder day to day working and therefore should improve data quality if the user “values” the information as it supports the job at hand.
Will the Wi-Fi be sufficient?	Several improvements have been completed over the last 12 months and further work on the Wi-Fi and connectivity is being undertaken during 2024/25 in readiness. However, before deployment of the new solution, a Wi-Fi and devices audit will be undertaken to ensure readiness for transformation.

<p>Recommendation that operational staff are involved in the Governance of the programme</p>	<p>A critical success factor in the successful implementation of the programme will be staff ownership of the programme. Governance arrangements will ensure that operational and clinical teams have oversight and are fully involved in the deployment plans and delivery method as well as supporting key decisions and risk management.</p>
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Procurement

A competitive tender exercise has resulted in the preferred supplier being identified as Alcidion. Standstill letters have now been issued by procurement to the successful and unsuccessful bidders.

Alcidion have been notified that it is our intention to enter into the contract with them after a 10-day standstill period has elapsed (the standstill period ends at midnight at the end of 24 June 2024). Due to the value, the award of contract is subject to approval by Hywel Dda’s Public Board on 26 September 2024 and Welsh Government by December 2024 and the contract can only be entered into once approvals are received.

Financial Case

The financial case has been completed and costs now stand at £8.5m over a 7-year period, equivalent to £1.2m per year for a solution that will support all acute and intermediate care services across HDdUHB. This period includes a 6-month contracting and recruitment stage, 3-year implementation programme and 3-year Business as Usual (BAU) period.

A 3-year implementation programme has been allotted to allow for the deployment of what are two systems: Flow and Observations. The Observations aspect will require clinical engineering and infrastructure changes that will need to be scheduled in order to avoid disruption to patient areas. Time has also been factored into account for supporting the creation and deployment of “virtual” wards in communities, which will require governance, SOP’s, workforce input, that will determine delivery timings. However, with the possible appointment of the Strategic Partner to assist with transformation with digital at the heart, these timescales may be reduced.

The costs included within the business case, are as follows:

- **Additional devices** – to ensure clinical teams have access to solutions required to complete their tasks digitally.
- **Integration costs** – to ensure data from other key clinical systems is incorporated into the solutions to reduce duplication and support clinical decision making.
- **Network upgrades** – to ensure the network is able to support the network traffic and provide a reliable service, in particular the wi-fi estate.
- **Staff resources** to ensure implementation across the organisation and to ensure support is available both during and after this period i.e. business as usual.
- **Supplier costs** for the provision of the Electronic Patient Flow and Electronic Observations system. Including licences, installation and annual support and hosting.

Cost Line	Cost type	Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Device Purchases	NRC	£0	£249,000	£149,400	£99,600	£0	£0	£0	£498,000
Network Upgrades	NRC	£37,350	£0	£0	£0	£0	£0	£0	£37,350
HDUHB Deployment Team	NRR	£257,625	£774,879	£798,125	£781,030	£0	£0	£0	£2,611,659
HDHUB BAU Team	RR	£0	£0	£0	£0	£222,672	£229,353	£236,233	£688,258
Non pay Misc	RR	£5,000	£5,000	£5,000	£5,000	£0	£0	£0	£20,000
DHCW integration – Interface support	NRR	£40,295	£94,021	£0	£0	£0	£0	£0	£134,316
DHCW integration charges - Annual support	RR	£0	£8,100	£18,900	£27,000	£27,000	£27,000	£27,000	£135,000
Patient flow & e-Obs - Licence	RR	£0	£159,381	£164,162	£169,087	£174,160	£179,385	£184,766	£1,030,941
Patient flow & e-Obs - Installation / Implementation	NRC	£251,500	£100,000	£0	£0	£0	£0	£0	£351,500
Patient flow & e-Obs - Annual support and hosting	RR	£0	£329,823	£338,817	£348,062	£357,564	£367,331	£337,371	£2,078,968
Total		£591,770	£1,720,204	£1,474,404	£1,429,779	£781,396	£803,069	£785,370	£7,585,992
<i>Breakdown by cost type</i>									
Cost Line		Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Non recurring Capital TOTAL		£288,850	£349,000	£149,400	£99,600	£0	£0	£0	£886,850
Non Recurring Revenue TOTAL		£302,920	£873,900	£803,125	£786,030	£0	£0	£0	£2,765,975
Recurring Revenue Total		£0	£497,304	£521,879	£544,149	£781,396	£803,069	£785,370	£3,933,167
VAT		£57,770	£167,641	£130,476	£123,350	£106,345	£109,343	£104,427	£799,352
Contingency based on 8%		£6,809	£32,074	£15,854	£11,722	£2,160	£2,160	£2,160	£72,939
Grand total		£656,349	£1,919,918	£1,620,734	£1,564,850	£889,901	£914,572	£891,958	£8,458,283

Economic Case

The economic case and benefits analysis has calculated and reviewed by the Value Business Partners; areas of opportunity included are in summarised in the table below, but full details are in the FBC. The table below illustrates the potential Economic Benefit Cost summary based on the evidence and assumptions in the FBC. Furthermore, it is noted that realisation of benefits is multi-factorial therefore confidence in delivery of the benefits must be assessed and reflected in what can be achieved. Therefore, a value has been attributed as follows:

High probability of delivery	=	Low risk (min value)
Medium probability of delivery	=	Medium risk (med value)
Low probability of delivery	=	High risk (high value)

The total value represents a figure that is based on 2023/24 financial data and is what could be achieved in a year where the systems have been successfully deployed across the organisation. The figures provided in the financial case are based on a **low-risk model**, and show the proposed annual savings following full adoption.

Benefit Reference	Summary	Low risk	Medium risk	High risk	Economic impact
EFLOW-IE-009	Reduction in Length of Stay due to efficiencies in discharge planning and hospital flow	£3,368,210	£5,389,136	£6,736,429	Cash releasing
EOBS-IPO-003	Cost avoidance due to reduce patient escalation and reduction in admissions to ICU	£565,022	£1,130,045	£2,034,080	Cash releasing
EOBS-IPO-001a	Reduce risk of harm due to a reduction in hospital based cardiac arrest	£36,870	£69,438	£112,250	Efficiency gains
EOBS-IPO-001b	Reduction in hospital acquired infections	£59,774	£139,472	£199,245	Efficiency gains
EFLOW-IE-008	Reduction in staff time wasted due to not being	£768,011	£1,414,045	£1,685,108	Efficiency gains

	able to access real time patient information or bed state information				
EFLOW-IE-010	Reduce cancelled surgeries due to better bed management	£27,895	£44,632	£55,790	Efficiency gains
		Low risk	Medium risk	High risk	Economic impact
	Total opportunity	£3,933,237	£6,519,188	£8,770,510	Cash releasing
		£892,551	£1,667,587	£2,052,393	Efficiency gains
	Total savings per year at BAU Stage (Year 4)	£4,825,788	£8,186,775	£10,822,903	Value

The Committee should note that the Economic Case has been developed alongside already established savings plans and the Opportunities Framework, to ensure that there is no duplication of savings. There were several additional benefits, both cash releasing and efficiency gains, identified during the business case development, but they have not been included within the case to remove, where possible over inflation of return on investment.

The table below illustrates that the seven-year Total Economic Cost for HDdUHB. Recurring revenue costs will be in the region of £0.5m per annum for implementing both e-Flow and e-Obs represents the highest total economic cost. However, based on the assumptions set out in Section 2.3.1 of FBC it is expected that combined implementation of these solutions (could deliver a total economic benefit of approximately £21m over the 7 years including a cash releasing saving of £6.5m

The assumption is that the majority of this benefit would be delivered from patient flow technology improving bed capacity management and movement of patients through the system. The Return on Investment (ROI) calculation provided below is based on the Low-Risk delivery model as noted above and as described in section 2.3.1 of FBC.

Total Economic Cost – Return On Investment (RoI)

Cost Line	Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Non recurring Capital TOTAL	£288,850	£349,000	£149,400	£99,600	£0	£0	£0	£886,850
Non Recurring Revenue TOTAL	£302,920	£873,900	£803,125	£786,030	£0	£0	£0	£2,765,975
Recurring Revenue Total	£0	£497,304	£521,879	£544,149	£781,396	£803,069	£785,370	£3,933,167
VAT	£57,770	£167,641	£130,476	£123,350	£106,345	£109,343	£104,427	£799,352
Contingency based on 8%	£6,809	£32,074	£15,854	£11,722	£2,160	£2,160	£2,160	£72,939
Grand total	£656,349	£1,919,918	£1,620,734	£1,564,850	£889,901	£914,572	£891,958	£8,458,283
Cash Releasing Savings	£0	£0	£1,662,462	£3,060,271	£3,893,905	£3,893,905	£3,893,905	£16,404,448
Efficiency Releasing Savings	£0	£142,520	£528,415	£883,626	£883,626	£883,626	£883,626	£4,205,437
Total potential Economic Benefit	£0	£142,520	£2,190,877	£3,943,897	£4,777,530	£4,777,530	£4,777,530	£20,609,884
Return on Investment (ROI)	-£656,349	-£2,576,268	-£2,534,540	-£1,039,119	£1,964,885	£4,944,218	£7,946,165	

Affordability

Funding is sought to enable HDdUHB to purchase and implement the FBC on the basis of the qualitative and quantitative benefits listed in section 2.3. Over the period of the project it is anticipated that the project will generate circa £20.6m in benefit over the 7-year period. Of this £16.4m will be cash releasing and £4.2 efficiency gains.

It is anticipated that cash releasing savings will not be generated until Year 3, investment is required to fund the delivery in Years 1 and Year 2 totalling of £2.6m. However, by Year 3 the programme will generate sufficient cash releasing savings to cover the annual costs and thereafter each year will enable further savings over the annual costs to be achieved. The total cost over the 7-year period being £8.5m, but total cash releasing savings £16.4m, providing a net return of £7.9m.

The ROI over a 7-year period is based on the low-risk model described in Section 2.3 of the business case.

The investment relies on it being viewed as an enabler to the delivery of the health board's longer term strategic aspirations for change. The Healthier Mid and West Wales strategy has embedded within it the principle that acute hospital care is not appropriate for many patients to receive care within, especially those with chronic conditions, frailty or other illness that is amenable to care outside hospital. In addition, as the demographic changes related to an ageing population - that inexorably leads to an increase in the demand for care over the next 20 years. It is imperative that the health board recognises that care for people in their place of residence will become an increasingly vital aspect of care delivery.

For Hospital@Home / virtual wards to meet the forecast increased demands, as well as to enable transformational change within our acute hospitals to focus on patients with the most acute or complex needs, it is necessary to ensure they are properly resourced. This includes not only the appropriate level of staffing, with adequate clinical oversight and management, but modern, effective, and robust clinical and data systems to sustain the service. By investing in this information solution, a key barrier to significantly increasing the level of community-delivered care would be overcome and facilitate the transformation of acute hospitals to a smaller, but more effective, bed base. But to do so, it will require digital systems that can provide the communication and coordination tools desperately needed to deliver this safely.

Whilst the HDdUHB faces difficult financial decisions the advice from Government and independent studies is that investment in IT infrastructure is seen as a key factor in overcoming the challenges the NHS faces as digital infrastructure can improve productivity.

User Journeys and spotlight on opportunities to improve

To provide a greater understanding of how the above economic case opportunities can be achieved, user journeys (**FBC, Appendix C**) and a Spotlight document (**FBC, Appendix E**) will be used to help articulate what currently happens and what the future state might look like are provided within appendices of the FBC.

The **Full Business Case** is attached (**Annex 1**) for review.

Argymhelliad / Recommendation

The Sustainable Resources Committee asked to:

- **SCRUTINISE** and **RECOMMEND** onward approval to the Board, pending the successful resolution of a funding model to address the investment requirement in initial years until the savings begin to be realised through bridging funding.

Amcanion: (rhaid cwblhau)

Objectives: (must be completed)

Committee ToR Reference: Cyfeirnod Cylch Gorchwyl y Pwyllgor:	2.3 To scrutinise and provide oversight of financial and revenue consequences of capital investment planning and significant business cases (both short term and in relation to longer term sustainability).
Cyfeirnod Cofrestr Risg Datix a Sgôr Cyfredol: Datix Risk Register Reference and Score:	Not Applicable
Parthau Ansawdd: Domains of Quality Quality and Engagement Act (sharepoint.com)	7. All apply 1. Safe 2. Timely 5. Equitable
Galluogwyr Ansawdd: Enablers of Quality: Quality and Engagement Act (sharepoint.com)	3. Data to knowledge 4. Learning, improvement and research 5. Whole systems perspective
Amcanion Strategol y BIP: UHB Strategic Objectives:	3. Striving to deliver and develop excellent services 5. Safe sustainable, accessible and kind care 6. Sustainable use of resources All Strategic Objectives are applicable
Amcanion Cynllunio Planning Objectives	5c Digital Strategy 6a Clinical services plan 6b Pathways and Value Based Healthcare 3a Transforming Urgent and Emergency Care programme
Amcanion Llesiant BIP: UHB Well-being Objectives: Hyperlink to HDdUHB Well-being Objectives Annual Report 2021-2022	1. Plan and deliver services to increase our contribution to low carbon

Gwybodaeth Ychwanegol: Further Information:

Ar sail tystiolaeth: Evidence Base:	Contained within the report
Rhestr Termau: Glossary of Terms:	Contained within the report
Partïon / Pwyllgorau â ymgynhorwyd ymlaen llaw y Tîm Cyfarwyddwyr: Parties / Committees consulted prior to Executive Team:	Digital Oversight Group Sustainable Resources Committee Executive Team Quality, Safety and Experience Committee (QSEC) Board

Effaith: (rhaid cwblhau) Impact: (must be completed)

Ariannol / Gwerth am Arian: Financial / Service:	The introduction of the patient flow system will have benefits not only the staff, patients, but will improve efficiencies of the wards and staff. Releasing more time
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	for staff to treat patients. Early indication is that the cost will be £8.5m over 7 years, but the full economic cost impact, with value propositions such as efficiency savings and cost avoidance will be provided within the full business case.
Ansawdd / Gofal Claf: Quality / Patient Care:	The lack of a patient flow system presents a significant risk to patient safety and negatively impacts staff, who are working under extreme pressures. There is a clear need to improve efficiencies, particularly with regards to managing patient flow, and introducing technologies to support staff are a first important step in this journey.
Gweithlu: Workforce:	The improvement in digital solutions will provide efficiencies for staff, who will be able to see the right information at the right time when treating the patient. The combination of approaches and system will also reduce the effort required to transcribe as system will be fully integrated.
Risg: Risk:	The patient safety risk from that lack of Automation of routine tasks, such as calculating the NEWS2 score, frees up time for staff to look after the patient and reduces the risk for errors. The provision of real-time data, which can help improve clinical decision-making and reduce the risk of harm, while providing patients and their families with confidence that they are monitored appropriately.
Cyfreithiol: Legal:	The introduction of both systems could lead to a reduction in legal claims due to the reduction errors.
Enw Da: Reputational:	Having resilient and robust systems for the treatment of patients will enhance the reputation of the Health Board and will also improve opportunities to recruit.
Gyfrinachedd: Privacy:	Not Applicable
Cydraddoldeb: Equality:	If the system is approved to progress a full equality approach will be adopted

Hywel Dda University Health Board

Electronic Patient Flow and Electronic Observations

Full Business Case

June 2024



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Change Log

Revision History

Version	Date	Source of Changes	Author(s)
0.1	1 May 2024	First Draft	Carolyn Williams, Caryl Jones, Carys Phillips, Alexia Fletcher, Caroline Jeremy
0.2	28 May 2024	Second draft incorporating changes from reviewers	Carolyn Williams, Caryl Jones, Carys Phillips, Alexia Fletcher
0.3	31 May 2024	Third draft incorporating changes from reviewers	Carolyn Williams, Caryl Jones, Carys Phillips, Alexia Fletcher
0.4	21 June 2024	Fourth draft incorporating changes from Exec review, OPDG and operational groups.	Carolyn Williams, Alexia Fletcher, Caroline Jeremy
0.5	27 June 2024	Fifth draft incorporating changes from ALG	Carolyn Williams, Alexia Fletcher
0.6	12 July 2024	Feedback and amendments to investment model, changes to table and figure numbers	Carolyn Williams, Carys Phillips

Executive Summary

Introduction

On 30th March 2023, Hywel Dda University Health Board (HDdUHB) Board agreed to proceed with the development of a Full Business Case (FBC) for an Electronic Patient Flow (e-Flow) and Electronic Observation (e-Obs) Solution. This process would include the procurement and subsequent identification of a preferred supplier with no commitment to a specific supplier to be made until a further review to confirm that the recommended investment decision is appropriate has been conducted. Due to the financial investment required it was agreed this will need to be brought back to the Board for final approval. The Board also asked that further staff engagement be undertaken to fully understand the requirements of such solutions and ensure the organisation fully explored the current and future state.

Therefore, this document sets out the FBC for the investment in an e-Flow and e-Obs solution for HDdUHB. The purpose of this business case is to articulate the strategic rationale for the programme, outline its scope and breadth, and provide the costs associated with delivery and expected benefits. The document has been prepared in accordance with HM Treasury Green Book guidance for the five-case model.

1. Strategic Case

The need for improved digital solutions was identified by both clinical and operational staff across the Health Board and the Outline Business Case set out this requirement in 2022. However, since this time, the demand for technology has become an essential requirement as the complexity of pathways and models of care delivery have expanded. Intermediate Care teams, Same Day Emergency Care and collaboration with Community Teams to support the objectives of the Home First approach, have since developed and yet our digital systems have not at the same pace. As a result, these teams are unable to work in real-time with the teams as the systems to support this do not currently exist in HDdUHB. Aspirations to further expand the ability to safely care for and manage patients in their own home or place of residence, through the utilisation of virtual wards or Hospital@Home pathways cannot be realised until investment in the systems to support clinically safe solutions are in place.

Feedback from stakeholders is that the implementation of e-Flow & e-OBS is a critical success factor and a key enabler in delivering the major reconfiguration needed to deliver our roadmap to a more sustainable HDdUHB.

e-Obs technologies can automatically capture and analyse patient's vital signs and notify clinicians when required. This automation of routine tasks can free up time to enable better patient care, increase accuracy in capture and transmission of information and improve decision-making.¹ Patient flow technologies encompass a range of functionality to help with a better patient flow, including patient handover, bed capacity management and task management. More streamlined patient flow results in reduced ambulance wait-times, and improved staff and patient experience, and increased patient safety.

Most importantly such technologies facilitate communication, coordination and collaboration across both operational and clinical teams to improve patient outcomes and experience.

The following investment objectives have been identified:

- **Timeliness/ Efficiency:** To use integrated digital technology to capture, present and use real-time patient pathway information to improve the timeliness of care and reduce the length of stay.
- **Effectiveness and Patient Safety:** To achieve measurable improvement of patient outcomes by using mobile digital technology to standardise and reduce variation in the management of acute patient

¹ Clinical and technical evidence | National Early Warning Score systems that alert to deteriorating adult patients in hospital | Advice | NICE

deterioration (e.g. Sepsis, Acute Kidney Injury, Hospital Acquired Thrombosis), patient nutrition and hydration, tissue viability and continence.

- Equity of care: To measurably improve admitted patient experience of care by ensuring patients are in the right bed at the right time to meet their needs.
- Patient Experience: To improve admitted patient experience by freeing staff time to care using mobile technology.
- Economy: To avoid unnecessary hospital inpatient costs by improving local ability to match acute bed capacity with unscheduled care demand.
- Staff experience: To improve staff satisfaction by providing them with the digital tools and technology they need to undertake their work more effectively.

2. Case for Change

Current processes in HDdUHB are not optimised, as most of the information is recorded manually on paper records, and communication channels are slow and time-consuming (e.g. phone calls). Some digital systems have been introduced in previous years, but the feedback is that information remains siloed, and staff do not feel like they can access the correct information easily and in a timely manner when they need it. This poses a significant risk to patient safety. A high number of vacancies mean that staff need to work as efficiently as possible so that limited resources are utilised in the best way possible.

The deployment of new technologies to support patient observations and patient flow aligns with the strategic goals of the Health Board, both locally and nationally. It focuses on improvements towards a more digitally mature healthcare system in Wales, with the aim of enhancing patient safety. Currently the digital maturity level for HDdUHB stands at level 1 and will not progress to Level 4 and above without such key systems. Furthermore, these technologies will support the Health Board's strategy "A Healthier Mid and West Wales: Our future generations living well" by enabling HDUHB to implement new ways of working across acute and community.

The need for investment in this system should be viewed as an integral aspect of the wider savings delivery across the health board. It is not possible to separately identify all the level of savings that would be delivered (or not delivered) as a result of the approval of this investment case. Whilst the HDdUHB faces difficult financial decisions the advice from Government and independent studies is that investment in IT infrastructure is seen as a key factor in overcoming the challenges the NHS faces, as digital infrastructure can improve productivity².

E-Flow and e-Obs technologies have previously been implemented by the NHS across the UK, and their clinical value has been established. Evidence from case studies suggests that patient flow technology can significantly increase efficiencies in hospitals, providing a better experience for both staff and patients. They have been shown to reduce the length of hospital stays, reduce patient harm, including a reduction in the number of cardiac arrests, and increase time for care. Ultimately, these improvements lead to better experiences for patients and staff, and enable the provision of high quality, safe care. The development of this FBC has included direct engagement with several reference sites to validate the benefits and clinical value of this technology.

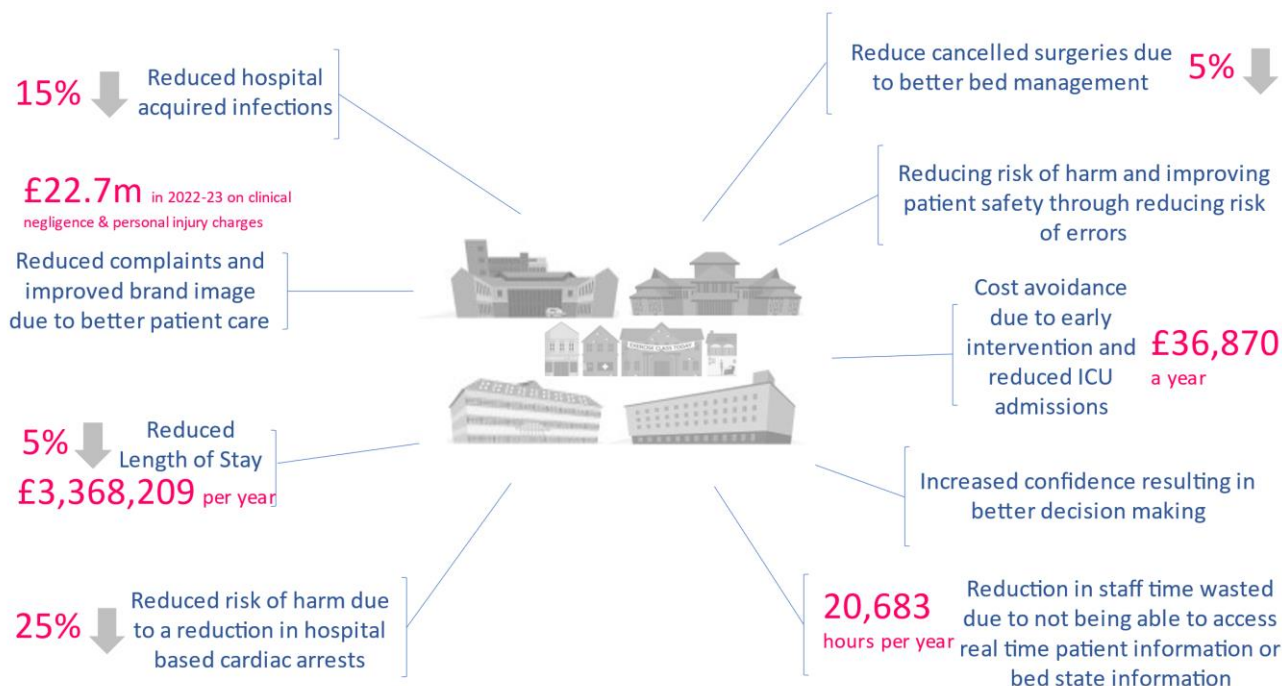
3. Economic Case

The benefits and outcomes have been identified collaboratively through workshops and engagement with stakeholders from across the Health Board (see Appendix A for further details of stakeholders engaged with). Further research was then undertaken to ascertain the experiences of other NHS organisations that had implemented such technologies and what impact if any had on care and productivity. Published reports and local data was used to contextualise this for HDdUHB. Calculations and forecasts were supported, and peer reviewed

²<https://www.health.org.uk/publications/reports/the-unsustainable-is-not-sustained-productivity-future-NHS>

by the Finance partners. Local time and motion studies and local data sources further informed the basis for the calculations used within the financial model and ultimately the return on investment shown below.

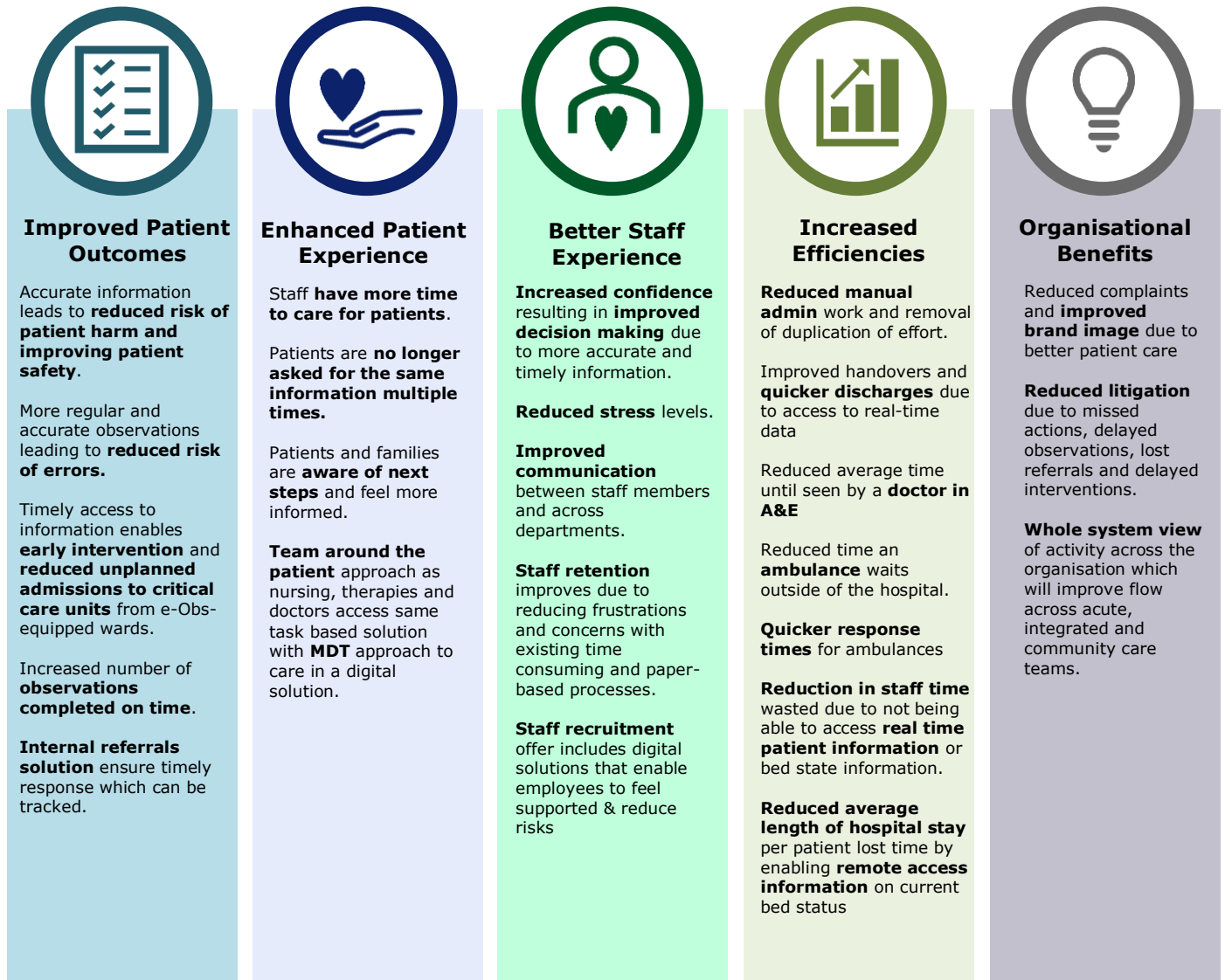
Figure 1: ROI



4. Benefits Assessment

In line with the value-based healthcare programme, this project is expected to improve the patient experience and lead to better patient outcomes. The key benefits that are expected to be realised by e-Flow and e-Obs solutions are set out below in Figure 12.

Figure 1: Key benefits



5. Preferred Option

Following the submission of an outline business case (OBC) to the Board, which included a full options appraisal, the Digital Services team obtained approval from HDdUHB during the meeting on the 30th March 2023 to proceed to a Full Business Case, with the identification of a preferred supplier to implement two electronic platforms to implement e-Flow and e-Obs solutions to optimise the movement of patients throughout HDdUHB hospital sites, wards, specialties, functions, and departments. The option that was selected by HDdUHB was to incrementally implement both e-Flow and e-Obs solutions across acute and community hospitals with a configurable “off the shelf” e-Obs and patient flow solution. This solution will also support patients at home by providing the option to create virtual wards (known as the Enhanced Community Care Model in Wales) within the one solution, which is included in the Intermediate Care Action Plan. The systems will support clinical decision making and multidisciplinary working across the organisation.

Due to challenges with resourcing, a growing elderly population and additional pressures introduced by COVID, the health service has struggling to meet demand. HDdUHB staff described overflowing emergency departments with patients spending up to 5 days in A&E, because they could not be admitted to a ward. The Welsh Ambulance Service (WAST) is currently losing between 70 and 85 hours per day per acute hospital in HDUHB, as ambulances

wait outside, due to handover delays.³ In turn, the ambulance service is unable to respond to emergency calls. This presents a significant risk to patient safety and negatively impacts staff, who are working under extreme pressures. There is a clear need to improve efficiencies, particularly with regards to managing patient flow, and introducing technologies to support staff are a first important step in this journey.

During the OBC benefits assessment, it was found that implementing both e-Flow and e-Obs received the highest weighted benefit score, reflecting that introducing both solutions would result in the biggest efficiency increases and improvements in staff and patient experience. This is in line with user needs identified during research sessions.

6. Financial Case

The full economic cost has been calculated for over a 7-year period for HDdUHB and is based on a number of principles and assumptions detailed within the main body of the FBC (Section 2.5). Year 1 is primarily setting up governance and contracting arrangements, years 2-4 are deployment of the solution and years 5-7 are when it is anticipated it will be Business As Usual (BAU).

Table 1: Total Economic Cost

Cost Line	e-Obs + Patient Flow
Non-Recurring Capital (NRC) Total	£886,850
Non-Recurring Revenue (NRR) Total	£2,765,975
Recurring Revenue (RR) Total	£3,933,167
VAT	£799,352
Contingency	£72,939
Total with Contingency & VAT	£8,458,283

Implementing e-Flow and e-Obs has a Total Economic Cost of £8.5m. It is expected that the implementation of these solutions could deliver a total economic benefit of £21m over the 7 years, section 2.3.1 provides a detailed breakdown.

A financial appraisal based on a number of assumptions outlined in Section 3.1. has been undertaken to illustrate the estimated affordability and economic benefit of the proposal.

The table below illustrates that the total financial cost to HDdUHB, when allowing for costs associated with VAT, capital charges, VAT and contingency. These bring the total estimated cost to £8,458,283 over a 7-year period.

³ 20230317GlangwiliED-Full-EN_0.pdf (hiw.org.uk)

Table 2: Consolidated Financial Considerations

Capital Expenditure Profile

Capital	Cost type	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Device Purchases	NRC	£ -	£ 249,000	£ 149,400	£ 99,600	£ -	£ -	£ -	£ 498,000
Network Upgrades	NRC	£ 37,350	£ -	£ -	£ -	£ -	£ -	£ -	£ 37,350
Patient flow & e-Obs - Installation / Implementation	NRC	£ 251,500	£ 100,000	£ -	£ -	£ -	£ -	£ -	£ 351,500
	VAT	£ 57,770	£ 69,800	£ 29,880	£ 19,920	£ -	£ -	£ -	£ 177,370
	Contingency @8%	£ 3,586	£ 23,904	£ 14,342	£ 9,562	£ -	£ -	£ -	£ 51,394
	Total	£ 350,206	£ 442,704	£ 193,622	£ 129,082	£ -	£ -	£ -	£ 1,115,614

Revenue Expenditure Profile

Revenue	Cost type	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
HDUHB Deployment Team	NRR	£ 257,625	£ 774,879	£ 798,125	£ 781,030	£ -	£ -	£ -	£ 2,611,659
HDHUB BAU Team	RR	£ -	£ -	£ -	£ -	£ 222,672	£ 229,353	£ 236,233	£ 688,258
Non pay Misc	RR	£ 5,000	£ 5,000	£ 5,000	£ 5,000	£ -	£ -	£ -	£ 20,000
DHCW integration - Interface support	NRR	£ 40,295	£ 94,021	£ -	£ -	£ -	£ -	£ -	£ 134,316
DHCW integration charges - Annual support	RR	£ -	£ 8,100	£ 18,900	£ 27,000	£ 27,000	£ 27,000	£ 27,000	£ 135,000
Patient flow & e-Obs - Licence	RR	£ -	£ 159,381	£ 164,162	£ 169,087	£ 174,160	£ 179,385	£ 184,766	£ 1,030,941
Patient flow & e-Obs - Annual support and hosting	RR	£ -	£ 329,823	£ 338,817	£ 348,062	£ 357,564	£ 367,331	£ 337,371	£ 2,078,968
	VAT	£ 0	£ 97,840.80	£ 100,595.80	£ 103,429.80	£ 106,344.80	£ 109,343.20	£ 104,427.40	£ 621,981.80
	Contingency @8%	£ 3,223.58	£ 8,169.70	£ 1,512.00	£ 2,160.00	£ 2,160.00	£ 2,160.00	£ 2,160.00	£ 21,545.28
	Total	£ 306,144	£ 1,477,214	£ 1,427,112	£ 1,435,769	£ 889,901	£ 914,572	£ 891,958	£ 7,342,669

7. Commercial Case

For the Commercial Case a range of approaches was considered and discussed with the HDdUHB Procurement Team. Given the resources and time required to build a bespoke solution from scratch, the decision was made to procure an existing, 'tried and tested' solution that can be configured to meet local needs for both the e-Flow and e-Obs solution. The aim is to implement these solutions incrementally.

HDdUHB's preferred option is to purchase a software-only solution hosted in a Cloud environment. The recommendation was to procure the software solutions via an existing framework and as a result, a competitive tender was conducted via an invitation to tender ("ITT") via eTenderWales, using the Public Contract Regulations 2015 (PCR15) framework mini competition procedure, inviting bids from prequalified suppliers.

A competitive tender exercise has resulted in the preferred supplier being identified as Alcideon.

8. Management Case

The Management Case addresses whether the preferred option is 'achievable'. Its purpose is to set out in more detail the actions that will be required for successful delivery in accordance with good practice.

To realise the benefits of these solutions, HDdUHB needs strong governance and processes in place. The overall project will be managed by a Programme Lead, who will lead the implementation team during the first three years. The local implementation team will work closely with the supplier to implement the solution incrementally across all sites. The roles for both the implementation and Business As Usual (BAU) teams are detailed in the main body of the FBC (Section 5.1.1).

The recommendation is to set up a User Design Group, consisting of representatives from all clinical and operational departments, to ensure the requirements of the solution meet the needs of the users. Furthermore, the rollout will be supported by a digital inclusion plan, training plan as well as clinical staff who will support their colleagues in adopting the new technologies. Deployment and delivery planning will develop with the assistance of both operational and clinical teams to minimise disruption and maximise successful transformation.

Implementation will start with a pilot (the pilot site will be confirmed in due course through discussions with clinical and operational leads), followed by incremental implementation across HDdUHB (site by site, ward by ward), prioritising acute hospitals before moving to the community. The Digital Roadmap sets out four phases to ensure successful implementation:

- **Phase 1 – Establish:** Setting up governance processes and infrastructure (incl. integration) to ensure solutions can be successfully adopted.

- **Phase 2 - Enabling Patient flow:** Rollout of patient flow functionality to increase efficiencies, starting with electronic patient handover and bed capacity management.
- **Phase 3 - Electronic Observations:** Introducing e-Obs capture across sites, followed by escalation and alerts functionality.
- **Phase 4 – Target state:** Building on phases 2 and 3 to roll out remote monitoring across all sites, as well as predictive capacity planning.

Introduction

This document sets out a high-level Full Business Case (FBC) for investment in e-Flow and e-Obs Technology for Hywel Dda University Health Board (HDdUHB).

The document has been prepared in accordance with HM Treasury Green Book guidance and is structured into five main sections as set out below with further information provided in appendices:

1. the **Strategic Case** considers the key strategic drivers and the case for change.
2. the **Economic case** sets out the options and option short-listing process, benefits and risks, cost assumptions, and the total economic cost of the preferred option.
3. the **Financial Case** sets out the financial appraisal and funding options for the preferred option.
4. the **Commercial Case** provides an overview of the recommended procurement process; and
5. the **Management Case** describes the governance structure, project plan, risk management arrangements and benefit realisation approach.

A 6th section has also been included in addition to the above, in response to The Board's request for further staff engagement to be undertaken to fully understand the requirements of such solutions and ensure the organisation fully explored the current and future state "**Section 6: Staff Engagement and Feedback**".

1. Strategic Case

1.1. Introduction

In this section the background to the project is set out alongside the strategic drivers and the case for change.

1.1.1. Background

Patient flow is the movement of patients through a healthcare facility, which involves the medical care, physical resources and internal systems needed from admission to discharge⁴. HDdUHB has implemented a number of improvements to improve flow across its Acute and Community sites however there continues to be a number of areas where this continues to be a challenge and the lack of digital infrastructure is compounding this. When patient flow is not well managed in hospitals, this is associated with long wait-times and overcrowding in A&E, as well as inefficient scheduling in surgical departments due to surging into planned care beds and challenges with successful discharge and transfer of care planning. Poorly managed patient flow can lead to adverse health outcomes, including increased re-admissions and mortality rates⁵. Optimising patient flow management can help best utilise limited resources, ensure patients move through care pathways efficiently, and reduce the length of hospital stays.

Electronic patient flow management is the application of digital technology to provide the information needed to effectively manage patient flow. Patient flow technology joins up clinical and operational data in daily use to provide real time data for immediate clinical and operational decision making. This can significantly improve patient flow management in acute and community settings. It is important to note that patient flow does not end with discharge from hospital. To deliver truly integrated care that enables the best outcomes for patients, we need to create systems that provide seamless integration across all healthcare services, including community and at-home care.

There are a variety of digital capabilities to consider for electronic patient flow management, which include:

- **Workflow solutions** that provide a real-time overview of bed capacity and facilitate communication.
- **Electronic whiteboards** that capture key patient data made available through connected devices (e.g. tablets, PCs, smartphones).
- A **Control Centre**, which provides a clear view of timeframes for beds becoming available and provides the hospital's dashboard.
- **Mobile apps** that visualise key information and help staff communicate with colleagues.
- **Analytics solutions** to increase operational understanding, pinpoint bottlenecks and improve performance; and
- **Real Time Locating Systems (RTLS)** using RFID technology to optimise asset management and help track patients through the system.

⁴ <https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0289>

⁵ <https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0289>

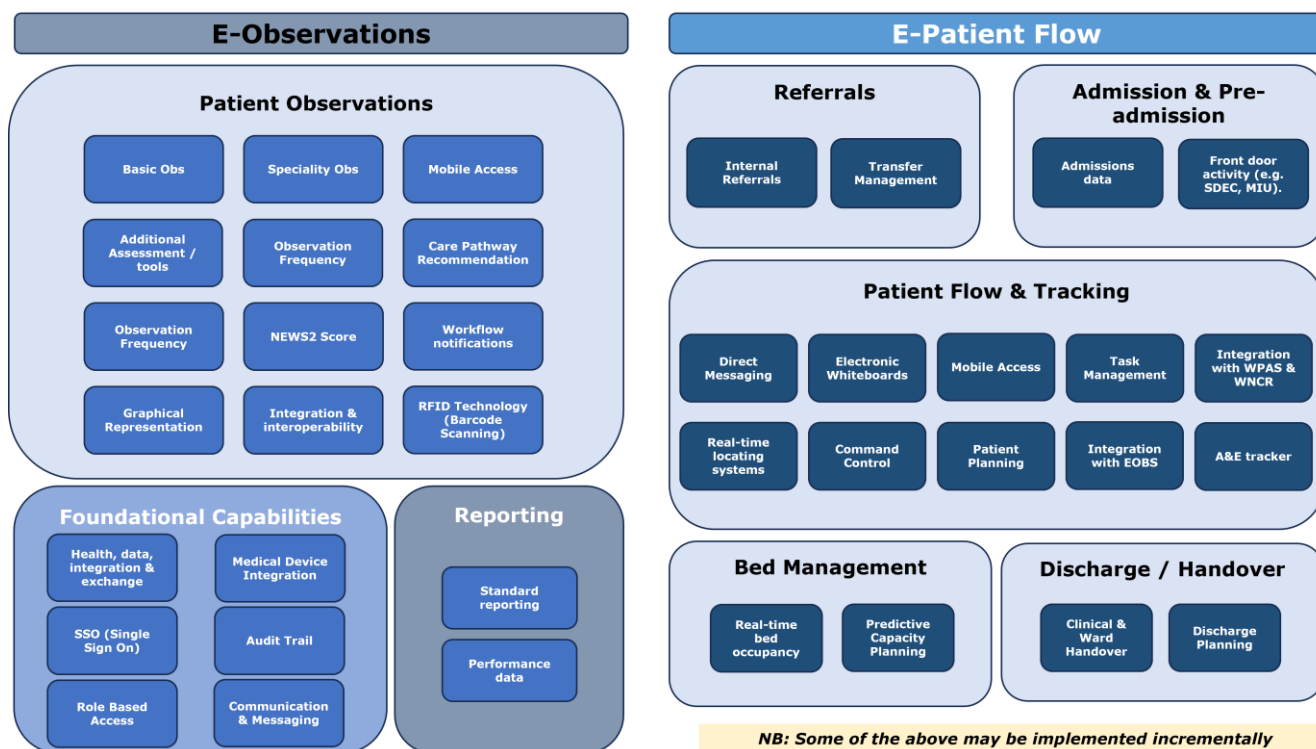


Figure 3: Capabilities

When patients are admitted to hospital, clinical staff record patient observations that help them assess whether a patient is improving or deteriorating, such as vital signs (e.g. temperature, blood pressure, Oxygen saturation) or assessments (e.g. dementia etc.). Without digital systems in place, this data is captured manually and cannot be easily shared, negatively impacting workflow efficiencies and patient safety.

An e-Obs system allows clinical staff to record their patient observations digitally. In an acute and community setting, staff can use mobile devices to record data, which can be accessed remotely by other clinicians. Such systems automatically calculate the National Early Warning System (NEWS2) score, which reflects whether a patient’s condition is improving or deteriorating and provide clinicians with relevant alerts. According to Digital Health Intelligence, 71% of acute trusts in England have an e-Obs system in place⁶. This data feeds into the patient flow system and can “travel” with the patient through the care system, supporting clinical decision making. Furthermore, in a community setting, e-Obs can provide the ability to remotely monitor patients, allowing clinicians to discharge patients and safely provide care at home.

There is evidence from Health Boards across the UK that the introduction of electronic capture of patient observations and other digital systems for electronic patient flow management can be hugely beneficial to healthcare systems. However, it is important to note that in order to succeed, introducing such technology will require the appropriate support and training for staff, as well as change management to enable the switch from paper-based systems.

1.1.2. Current challenges

HDdUHB is facing several key challenges:

- There is a **shortage of skilled health and social care staff** – this is currently the biggest limitation.
- An **increase in demand** for healthcare services and concurrently cost is being driven by a large and growing ageing population, an increased incidence of chronic disease, and the demand for more costly, complex and advanced procedures.

⁶ <https://www.digitalhealth.net/2020/08/special-report-electronic-observations-and-vital-signs/>

- There is a **lack of IT equipment to access** systems on some wards and none of the wards have interactive whiteboards.
- A lack of knowledge, training and system problems has resulted in a **low uptake of digital solutions** to-date.
- Many of the **existing systems do not support patient flow** across the organisation, and some ICT systems are unsuitable as they are unsupported or lack key functionality.
- There is **no single, shared patient record (paper or electronic)**; which in turn means that admin and nursing staff have to check and update multiple systems (WNCR, WCP, PAS, Frontier, etc). This also results in additional admin time for both clinical and non-clinical staff.
- HDdUHB remains largely paper based and as a result **information is duplicated, kept in silos** and there is a **lack of real-time data**.
- It remains challenging to ensure service delivery across a **rural geography**, with services having to cover large areas, and a lack of mobile phone signal in some rural areas; and
- There are significant **differences in health outcomes** between advantaged and disadvantaged groups within the Health Board.

Examples of how the above issues impact the day-to-day experiences of staff and patients can be found in the User Journey profiles at appendix C.

1.2. Case for Change

1.2.1. Strategic Landscape in Wales

A Healthier Wales

'A Healthier Wales' sets out the long-term plan for health and social care in Wales. Fundamentally, it advocates for a shift from reactive hospital-based care and treatment to proactive community-based, person-centred care focused on health, wellbeing and prevention.⁷ This is aligned to the principles of prudent healthcare, which shape the work of the NHS in Wales and call for changing the model of outpatients by shifting care to the community and improving digital connectivity.⁸ Improving patient flow is a first step to ensuring that patients receive the best care and spend only the time needed in hospital. In the long-term, e-Obs can then enable remote monitoring in communities, supporting to shift care from hospitals.

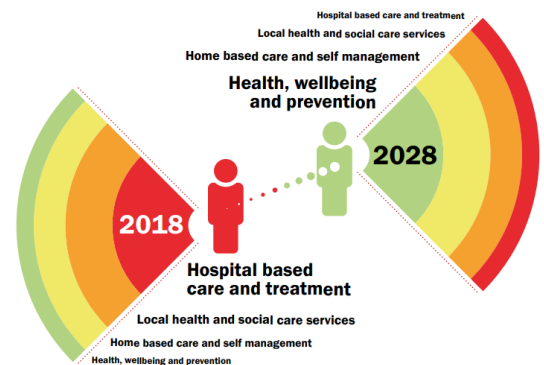


Figure 4: A Healthier Wales Vision

Annual Plan

The HDdUHB Annual Plan for 2024/25, sets out ten key planning objectives for the year to provide a strong foundation for areas of change to address current challenges⁹. The E-Flow and E-Obs capabilities as outlined in this FBC will support the following key objectives and aims to deliver benefits which will address the key challenges currently faced in HDdUHB.

- *Financial Stability: This year is about strengthening our financial footing. We plan to reverse the downtrend and move closer to meeting our control total by year two, marking a significant step towards lasting financial sustainability.*
 - By enabling efficiencies and reduction in costs in some areas of opportunity.

⁷<https://gov.wales/sites/default/files/publications/2021-09/a-healthier-wales-our-plan-for-health-and-social-care.pdf>

⁸<https://gov.wales/sites/default/files/publications/2019-04/securing-health-and-well-being-for-future-generations.pdf>

⁹ Hywel Dda University Health Board Annual Plan 2024/25

- *Transforming Urgent and Emergency Care: Our Urgent and Emergency Care programme is advancing into its second year. We will expand the Withybush Hospital frailty model throughout the Health Board and aim to improve patient flow by minimising long stays, contributing to the efficiency of our 80-bed target.*
 - By enabling our clinical and operational teams to work more effectively whilst reducing clinical risks to patients.
- *Primary and Community Care Strategic Plan: A new strategic plan for primary and community care will be developed through the year. This strategic plan is key to bringing resilience to our primary and community services and our commitment to preventive care and community-based service delivery.*
 - By providing intermediate care teams with digital tools enable them to work seamless with other teams across HDdUHB and by providing the enabler to community care through technology.

Planning Objective 1: Workforce Stabilisation

Through the improvements proposed in this FBC process will become more efficient, duplication can be removed, and data will be available in real time. Currently, a large number of staff hours is dedicated to plan for patient flow, bed management and to obtain data that quickly becomes out of date. The capabilities of E-Flow will release capacity and remove some administrative tasks that are currently completed by clinical staff which will allow staff more time and capacity to provide care to their patients.

Planning Objective 3: Transforming urgent and emergency care

The capabilities described in this FBC will work towards and support improving the flow of patients by minimising long stays and reducing ambulance handovers by freeing beds and releasing staff capacity to support patient care and reduce delays. Bed management will improve through the use of E-Flow through providing a consistent system for Patient Flow Meetings, Board Rounds and Patient Safety Huddles with accurate and up-to-date data at a click of a button.

Planning Objective 7: Primary and community strategic plan

The project will support patients to be treated in their homes and in the community while providing joined up processes, removing duplication and ensuring that patient information is available to support decision making. This will support the strengthening of community capacity to facilitate care at home and to prevent unnecessary hospital admissions.

Six Goals for Urgent and Emergency Care

The Six Goals, co-designed by clinical and professional leads, span the urgent and emergency care pathway and reflect the priorities in Welsh Government's Programme for Government 2021–2026, to provide effective, high quality and sustainable healthcare as close to home as possible, and to improve service access and integration.

The launch of the Six Goals for Urgent and Emergency Care policy is an important early marker in the delivery of our Programme for Government 2021–2026. It sets out our expectations for health, social care, independent and third sector partners for the delivery of the right care, in the right place, first time for physical and mental health. This will be achieved through consistent and integrated delivery of six goals for urgent and emergency care to help achieve the best possible clinical outcomes, value and experience for patients and staff involved in the delivery of care.

The six goals approach aligns with the commitments of A Healthier Wales (2018), the Workforce Strategy for Health and Social Care (2020), the Programme for Government (2021) and the National Clinical Framework (2021). We want to ensure through a joined up, whole system approach people have access to the right health and social care services to help them stay well, to get better when they are ill, or to live as independently as possible with any long-term conditions.

Implementing an e-Flow and e-Obs system specifically aligns with Goals 5 and 6, which are being progressed as a priority.

Goal 1: Co-ordination planning and support for populations at greater risk of needing urgent or emergency care.

To help prevent future urgent or emergency care presentations, populations at greater risk of needing to access them should expect to receive proactive support through enhanced planning and coordination of their health and social care needs. This should support better outcomes, experience and value.

Goal 2: Signposting people with urgent care needs to the right place, first time.

When people need to access urgent care, they can access a 24/7 urgent care service, accessible via NHS 111 Wales, providing advice online or over the telephone and where necessary are signposted or referred to the right community or hospital-based service, first time. Service users are involved in shared decision making and experience coordinated care with clear and accurate exchange of patient level information between relevant health and social care professionals.

Goal 3: Signposting people with urgent care needs to the right place, first time.

People with urgent or emergency care needs can access appropriate and safe care close to home, and with as much continuity of care, as possible. Admission for ongoing care to an acute hospital bed should only occur if clinically necessary.

Goal 4: Rapid response in a physical or mental health crisis.

The fastest and best response provided for people who are in imminent danger of loss of life; are seriously ill or injured; or in mental health crisis.

Goal 5: Optimal hospital care and discharge practice from the point of admission

The aim of this goal is to prevent unnecessary escalation of care where possible, by providing proactive support, and to enable access to the right care, in the right place, first time for people who have a need for urgent or emergency care.

Goal 6: Home first approach and reduce the risk of readmission.

People will return home following a hospital stay – or to their local community with additional support if required – at the earliest and safest opportunity to improve their outcomes and experience, and to avoid deconditioning.

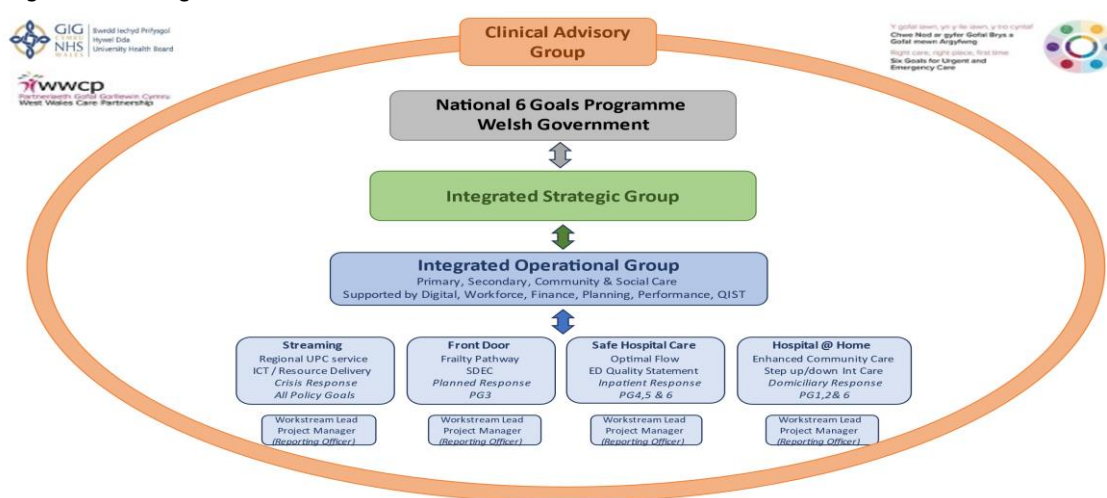


Figure 5: Six Goals for Urgent and Emergency Care - A policy handbook 2021–2026

This FBC will support the four workstreams below which support the delivery of the National 6 goals Programme in HDdUHB (further detail in Fig. 6 as below).

1. **Clinical Streaming Hub** – by providing a key enabler to reducing ambulance handover delays and reducing LOS across sites.
2. **Front Door (Frailty Model and SDEC)** by providing **clinically safe alternatives to hospital**.
3. **Safe Hospital Care** – by enabling improved patient flow, early detection of a deteriorating patient and reduced LoS.
4. **Hospital @ Home** – by providing the digital solutions to enable a virtual MDT approach to care.

Figure 6: UEC Programme Workstreams



The Value in Health Programme

The Value in Health programme’s strategy highlights the importance of achieving this in a financially sustainable way, ensuring that interventions maximise the outcomes that matter to people.¹⁰ To achieve this we are proposing an incremental roadmap that takes an agile approach and starts by focusing on areas where technology can have the highest impact.

Enabling person-centred, preventative care requires health and care services to make better use of existing resources and leverage available data and information to improve decision making. Staff need to be able to have access to real-time data and share it to enable collaboration across the whole system. Key Welsh Government sponsored report recommendations seek improvements in the domains of patient safety, flow management and a person’s experience in hospital.¹¹ Digital technologies, such as e-Obs and technologies that support patient flow, play a key role in making this possible.

Duty of Quality

The Duty of Quality ¹² provides that an organisation has a legal responsibility to work to try and improve the standard of services. The duty of quality applies to everything we do in NHS Wales, whether we work in clinical roles or non-clinical services.

¹⁰ <https://vbhc.nhs.wales/files/our-strategy-to-2024/>

¹¹ National ePatient Flow Management Outline Business Case (Dec 2018)

¹² <https://hduhb.nhs.wales/about-us/governance-arrangements/quality-and-engagement-act/duty-of-quality/>

Good quality health care services are:

- safe
- provided at the right time
- effective
- well organised
- fair
- person centred

As evidenced by the Datix reports (see 1.2.4. Discharge, Referrals and Handover, Datix Data), implementing a e-Flow and e-Observation system will contribute and support the improvements required to improve the standards of HDdUHB services.

Digital Strategy for Wales

The [Digital Strategy for Wales](#) describes how we will use digital, data and technology to improve the lives of people in Wales. It is for anyone creating, designing, providing or using digital tools and services. The strategy identifies a series of priorities under 6 missions:

- digital services
- digital inclusion
- digital skills
- digital economy
- digital connectivity
- data and collaboration

There are a number of areas where the delivery of the of E-Flow and E-Obs in HDdUHB will contribute to the overall Digital Strategy for Wales. This includes supporting our workforce to adopt new ways of working using the new digital system to improve their digital literacy by utilising tools and mechanisms provided by our Digital Inclusion team to train users to become more digitally confident. The solution will provide overall accuracy when it comes to reporting at service, hospital and Welsh Government level by producing real-time data capture which will enable us to identify areas of improvement by reviewing data trends and insights into resource and capacity. This information can be used to drive forward further strategic transformation in key areas. Such solutions can improve data sharing across public services to inform analysis, decision making and research across the Health Board and Wales.

New digital ways of working can build consistency across services. Most importantly, this leads to a reduction in clinical variation and fewer clinical errors. It can improve communication across the Health Board and enable us to securely share information and resources amongst employees.

The solution can provide digital care coordination which can offer clinicians and service managers the tools to manage patient flow more efficiently and effectively, leading to better patient and staff outcomes. The digital solution will serve as a valuable tool and a facilitator in communication, collaboration and employee engagement across of the HDdUHB region.

Once For Wales

The 'Once for Wales' approach sets standards and expectations that promote interoperability between systems, and access to structured electronic records in all care systems.¹³ It is important to note that the Welsh Government is currently refreshing the strategy for Wales and while the 'Once for Wales' approach will not be

¹³ <https://dhw.nhs.wales/systems-and-services/>

carried forward, HDdUHB currently use many of these national systems. Therefore, any technology introduced in the future needs to be interoperable with the existing solutions.

HDdUHB's Digital Response and Digital Operational Plan

HDdUHB's vision is "to become the most digitally integrated care organisation in NHS Wales" while empowering "patients and staff to securely access information anytime, anyplace and on any device".¹⁴ The strategy to achieve this vision is outlined in the Digital Response, and further supported by the Digital Operational Plan, which provides detailed, annual plans.

In line with this, four key themes underpin the future vision of the digital response:

- **Digitally connected patients:** Empower patients to actively manage their health and care.
- **Digitally enabled workforce:** Enable staff to access shared health and care records.
- **Business Intelligence & Analytics:** Insight driven culture to improve quality, outcome and research
- **Digital Infrastructure:** Provide secure access and interoperability.

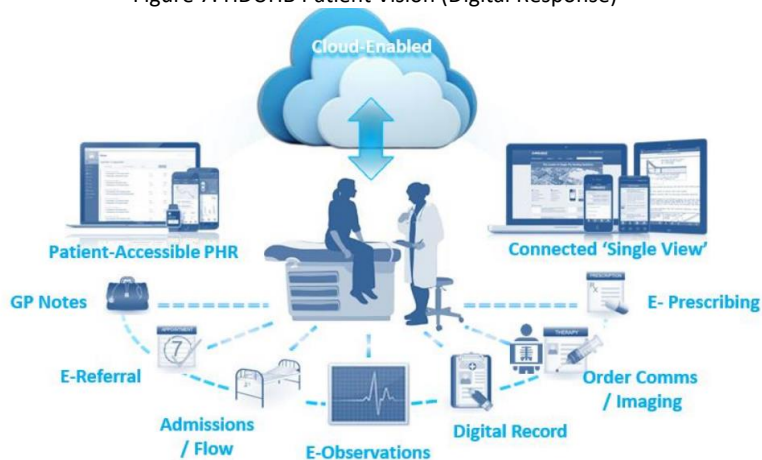
Making patient observations available digitally, so that staff can access them anytime, anywhere as required is a first step towards a more digitally enabled workforce. This data can then for example be used in conjunction with information from location tracking technologies to provide key insights for clinical and operational management. Furthermore, introducing patient flow technology will support the Health Board in its aim to operate its four acute hospitals as one by providing a system that ultimately enables the management of beds across the entire organisation. It will also remove inefficiencies, increasing capacity and therefore realising the strategic aim to provide more timely access to acute secondary care treatments.

The deployment of new technologies to support patient observations and patient flow aligns with the strategic goals of HDdUHB, both locally and nationally. It focuses on improvements towards a more digitally mature healthcare system in Wales, with the aim of enhancing patient safety. Currently the digital maturity level for HDdUHB stands at level 1 and will not progress to Level 4 and above without such key systems. Furthermore, these technologies will support HDdUHB's strategy "A Healthier Mid and West Wales: Our future generations living well" by enabling HDdUHB to implement new ways of working across acute and community.

Digital Enablement Plan

In 2022, HDdUHB and its three locally serving local authorities undertook an assessment of its readiness deliver a vision, strategy and target operating model for a truly integrated, person-centred health and care service across the region. The outcome of which then formed the development of digital enablement plan to provide the structure and actions required to deliver the "A Healthier Mid and West Wales; Our Future Generations Living Well Strategy".

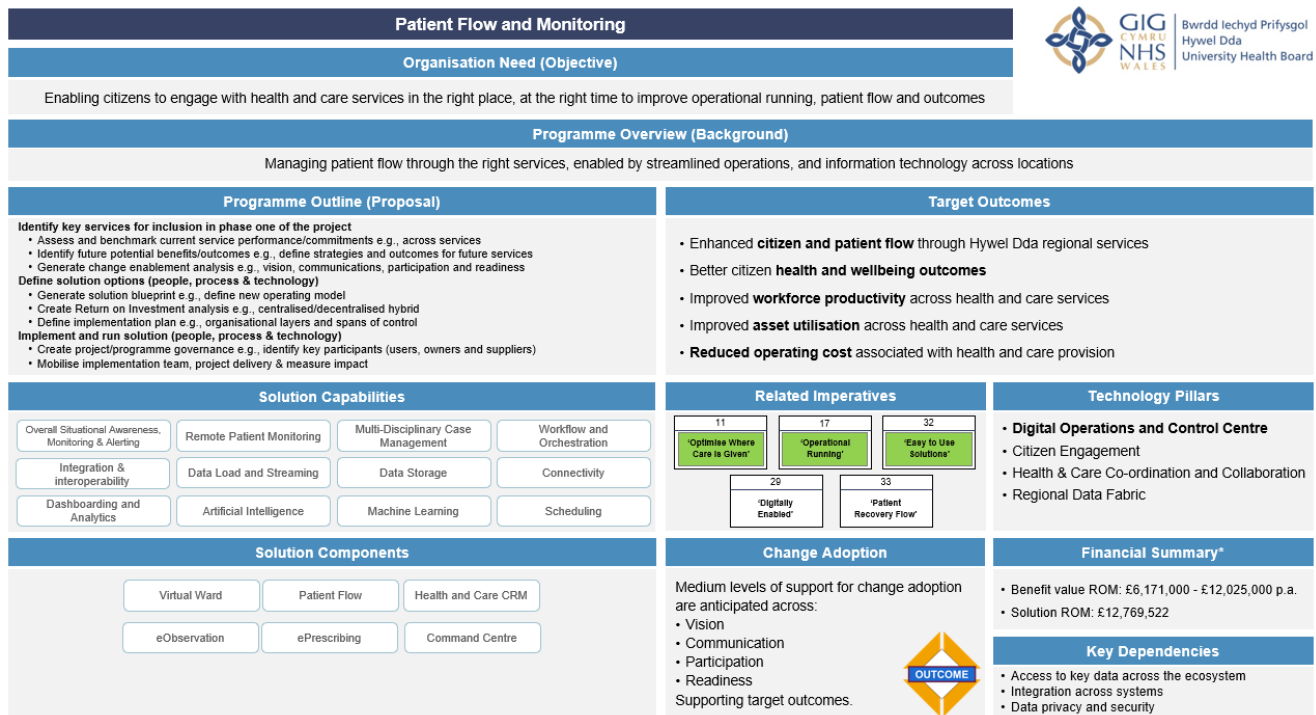
Figure 7: HDUHB Patient Vision (Digital Response)



¹⁴ <https://hduhb.nhs.wales/about-us/your-health-board/board-meetings-2021/board-agenda-and-papers-27-january-2022/agenda-and-papers-27-january-2022/appendix-11-digital-strategy/>

A key component of this enablement plan included key and essential, underpinning architecture that were crucial to building upon this layer to reach the ambitions and potential of this strategy. E-Flow and e-Obs were part of this target infrastructure in order to meet business imperatives for the Mid and West Wales region.

Figure 8: Digital Enablement Plan



1.2.2. Clinical & Service Value

There are several national strategies and programmes aimed at improving clinical care and patient safety. The Health and Care Standards framework provided by NHS Wales establish a basis for improving the quality and safety of healthcare services.¹⁵ There is specific reference to safety and dignified care for older patients in response to the recommendations made through the Andrew’s report, the Older People’s commissioner report ‘Dignified Care’ and the provisions of the Nurse Staffing Act 2016. The NHS Wales Delivery Framework and Reporting Guidance 2021-22¹⁶ lays out the aim to ensure that people in Wales “have better quality and more accessible health and social care services, enabled by digital and supported by engagement”. Similarly, the six goals for urgent and emergency care published by the Welsh Government call for optimal hospital care following admission.¹⁷ Furthermore, the NICE 50 guidance ‘Acutely Ill Patients in Hospital’¹⁸ and the Public Ombudsman Wales report ‘Out of hours: Time to Care’¹⁹ highlight the need to improve care of deteriorating patients. As outlined below, the introduction of e-Obs and patient flow technology can lead to improved and safer care for patients.

¹⁵ <https://nwssp.nhs.wales/a-wp/governance-e-manual/putting-the-citizen-first/health-care-standards/>

¹⁶ <https://hduhb.nhs.wales/about-us/performance-targets/performance-documents/2021-22-nhs-wales-delivery-framework-amp-guidance-pdf/>

¹⁷ <https://gov.wales/written-statement-six-goals-urgent-and-emergency-care-and-expectations-system>

¹⁸ <https://www.nice.org.uk/guidance/cg50>

¹⁹ <https://www.ombudsman.wales/wp-content/uploads/2018/03/Out-of-Hours-Time-to-Care.pdf>

e-Obs technology enables:

- Remote monitoring, allowing doctors and nurses to access data from anywhere without the need to physically see the patient. This can save time and reduce the risk of cross-infection including up to a 90% reduction in norovirus incidents²⁰.
- Automation of routine tasks, such as calculating the NEWS2 score, frees up time for staff to look after the patient and reduces the risk for errors.
- Early intervention can reduce patient harm and a 70% reduction in hospital based cardiac arrests²¹
- Automated alerts remind staff to take actions when patients are deteriorating, supporting early intervention and reducing unplanned admissions up to 54% Intensive Care Units²²
- Better communication with the patient by creating visuals that can be shared. For example, staff can share how treatment has impacted an individuals' vital signs over time.
- The provision of real-time data, which can help improve clinical decision-making and reduce the risk of harm, while providing patients and their families with confidence that they are monitored appropriately supporting 'Martha's Rule'²³

Patient flow technology is associated with increased patient safety, time savings and efficiency benefits by optimising the use of existing resources and facilitating holistic oversight and coordination:

- Such technology prevents the same information from being recorded multiple times in different locations (e.g. whiteboards, spreadsheets, ward books, site manager records etc.) and repeatedly across wards.
- It can improve cross-department communication.
- It provides operational and management information available in real-time. For example, by enabling staff to remotely access information on current bed status, and estimated discharge dates, "dead bed" time can be reduced.

Reference Site Evidence

A 2019 study found that roll-out of e-Obs was associated with approximately 10% reduction in total unplanned admission to critical care units from e-Obs-equipped wards and patient contact time as more than doubled (2.9% to 7.3%).²⁴ Whereas one study in Croydon found that unplanned admissions to intensive care units reduced by 54%.²⁵ In line with the significant clinical value of these systems, Digital Health Intelligence research shows 71% of England's acute trusts (100 out of 104) now have an e-Obs system in place.²⁶

Similarly, evidence from case studies suggests that patient flow technology can significantly increase efficiencies in hospitals, providing a better experience for both staff and patients:

- **Reduction in the length of hospital stays** by 12-30%^{27,28} and NHS Lothian have reported an increase the number of patients discharged by 11am by 40%²⁹;
- **Reduction in patient harm:** 50-70%^{30,31} reduction in hospital cardiac arrests, 16% reduction in unplanned critical care bed days³² and 90% reduction in norovirus incidence³³; and

20 Delivering the benefits of digital health care February 2016 - delivering-the-benefits-of-digital-technology-summary-web-final.pdf (nuffieldtrust.org.uk)

21 VitalPAC helps Croydon cut cardiac arrests | Digital Health

22 Clinical and technical evidence | National Early Warning Score systems that alert to deteriorating adult patients in hospital | Advice | NICE

23 NHS England » NHS to roll out 'Martha's Rule'

24 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6425312/>

25 Clinical and technical evidence | National Early Warning Score systems that alert to deteriorating adult patients in hospital | Advice | NICE

26 <https://www.digitalhealth.net/2020/08/special-report-electronic-observations-and-vital-signs/>

27 Nervecentre. October 2016. A Whole-Hospital Mobile Solution-Nervecentre Support for Efficient Patient Flow

28 Allocate Software - NHS Wales ePatient Flow Management programme PIN (Presentation)

29 National ePatient Flow Management Programme FBC (Dec 2018)

30 <https://www.alcidion.com/success-stories/central-manchester-university-hospitals-nhs-foundation-trust/>

31 <https://www.digitalhealth.net/2015/11/vitalpac-helps-croydon-cut-cardiac-arrests/>

32 Nervecentre. October 2016. A Whole-Hospital Mobile Solution-Nervecentre Support for Efficient Patient Flow

33 National ePatient Flow Management Programme FBC (Dec 2018) – Appendix 11

Increased time for care: By reducing time spent on administrative tasks using a mobile device can release up to 66 minutes of nursing time per 12-hour shift. Similarly, organisations have seen a 50% time saving in Multi-Disciplinary Team meetings.³⁴ Further work in this area has been undertaken locally and identified significant waste due to clinicians repeating administrative task numerous times per day which could be released to time to care.

Further details on what this equates to in HDdUHB has been provided at section 2.3.

The development of the OBC included direct engagement with a number of reference sites in order to validate the benefits and clinical value of this technology. At Aneurin Bevan University Health Board, System C's e-Obs module was introduced in 2017 and is now live across ninety wards at seven hospital sites. The Health Board has benefited from a reduced time for observations, a quicker identification of deteriorating patients and a reduced likelihood of errors, improving patient safety overall. Similarly, NHS Lanarkshire benefitted from introducing Alcideon's Patientrack e-Obs module, which has contributed to improved patient safety and increased the number of complete observations from 31% to 100%. *"We surveyed staff and the majority agreed that ease of use was a strength of the system. The survey also revealed that staff perceived an improvement in patient safety due to the availability of timely and accurate vital signs, which would suggest an increased likelihood of earlier identification of those patients who are deteriorating."*³⁵

English health boards and trusts have seen an increase in delayed hospital discharges with the number of patients remaining in hospital overnight who no longer meet the criteria to remain equating to an estimated £1.7 billion a year.³⁶ Research suggests that digital solutions can equate to an increase in patient safety and a reduction in the length of hospital stays, provided that staff receive the appropriate digital literacy training.³⁷ Evidence suggests that patients acquiring hospital based infections such as C.diff are likely to require an additional six days in hospital.³⁸ Ultimately, these improvements lead to better experiences for patients and staff, and enable the provision of high quality, safe care. These clinical benefits are further explored in the Economic case.

1.2.3. User Need

Further to the Boards approval of the OBC in 2023, the Board requested further engagement with a broader group of stakeholders to support the production of the FBC and to support with the development of the tender specification (see section 6 for a detailed list of engagement activities).

Engagement with the Senior Nursing Management Team and feedback exercises were undertaken. The appetite for implementing an e-Flow and e-OBS system was extremely well received. Engagement with staff/users provided input to a user centred designed solution, instead of having a system not fit for purpose imposed on them was greatly welcomed and encouraged interaction.

To develop the FBC, staff across the Health Board were engaged in a consultation and specification design process. The aim was to understand the as-is processes and current issues, as well as their needs with regard to the new technology. For further detail, see the User Journeys in Appendix C.

Across all sites, clinical and operational staff conveyed some key needs that should underpin the implementation of any new technology. They also highlighted key issues that they are currently facing:

- **A lack of available beds** limits patient flow across the Health Board. This is as a result of a number of issues including staffing and inefficiencies in patient transfers/ handovers / discharges which leads to delays. There is also a number of patients that are ready to leave and medically fit but are awaiting a provision

³⁴ National ePatient Flow Management Programme FBC (Dec 2018) – Appendix 11

³⁵<https://www.nhslanarkshire.scot.nhs.uk/success-of-hi-tech-system-to-spot-when-hospital-patients-are-getting-sicker/>

³⁶The Hidden Problems Behind Delayed Discharges | The King's Fund (kingsfund.org.uk)

³⁷ Shephard, E. *et al.* (2018) 'E-referrals: improving the routine interspecialty inpatient referral system', *BMJ Open Quality*, 7(3), p. e000249. doi:10.1136/bmjopen-2017-000249.

³⁸ The effect of hospital-acquired infection with *Clostridium difficile* on length of stay in hospital - PMC (nih.gov)

of care. This has a significant negative impact on health services with ambulances waiting outside Emergency Departments, patients spending up to 5 days in A&E without being admitted to a ward, and surge beds opened regularly. Furthermore, when there are not enough acute beds this can impact planned care with beds being re-allocated, which increases waiting times even more.

- **Ineffective communication** with regards to sharing patient records and bed capacity management, handover and sharing of information between teams and the clinical workforce is a key issue.
- A **lack of real-time information** leads to slow handovers, transfers and discharges. This also presents a key risk to patient safety. *“You feel as a clinician that you are working blind... We’re making life and death decisions without all the information.”*
- **Patient observations are not always completed fully or on time** and there can be inappropriate escalation.
- **The local infrastructure requires improvements** as current systems lack interoperability, lack key functionality and are often slow.

A questionnaire to gather user feedback was distributed to Subject Matter Expert (SME) colleagues who attended the supplier demonstrations and reviewed the tender responses. The purpose of the questionnaire was to review the potential impact that the implementation of the solution may have on future processes.

The feedback was gathered from a range of clinical experts including Acute Medical Leaders, GPs, Senior Resus and Deterioration Nurse, Pharmacy Lead, Paediatric Nurse, Informatics Nurses, and Labour Ward Coordinator and more.

The responses have been gathered to convey the significance these electronic solutions will have on new ways of working to benefit them, their team, and service and ultimately, the patients right at the centre.

The below questions were asked to various services:

1. What impact would a digital **Patient Flow solution** have on your service?
2. What impact would a digital **Electronic Observations solution** have on your service?
3. What impact would a digital **Virtual Wards (enhanced community care)** solution have on your service?
4. What are the **dis-benefits** that you think the solution could **negatively impact** you and your service that you'd like us to be aware of?

The responses can be found at Appendix B e-Flow and e-Obs - SME and Scorer Feedback Data. Overwhelming respondents saw the positives of such solutions with few disbenefits being identified.

User Journeys

Further work in this area then sought to capture and illustrate the user journey from both a staff and patient perspective by providing details of the “as is” current processes and “to-be” processes across a range of experiences and is available within Appendix C.

Given the current resourcing constraints, it is clear that HDdUHB could benefit significantly from technology that supports ways of working by increasing efficiencies. There seems to be a particular need for technology that improves how patient flow is managed across the Health Board. Key functionality to enable this are detailed below:

Task Management

The Health Board is currently lacking a complete single digital solution for effective task management, an essential prerequisite for the efficient management and co-ordination of a patients journeys through their relevant care pathways.

Inconsistent approaches to various administration processes, procedures, duplication, and potential oversight of tasks across the organisation does not provide best value for money. It adds increasing pressure on already stretched resources, poses unnecessary risks to the effective and safe management of the patient throughout their care pathway journey and impacts upon quick discharge practices.

“It will streamline my working and make reporting simplified. There will be reduced duplication, improved communication and support timely actions.” Aysha Davies Senior Nurse Manager / Discharges

A digital solution will provide a range of functionalities to allow for a more streamlined management of flow in one place, replacing current varied interim and manual measures implemented throughout departments i.e., spreadsheets, handwritten notes carried by individuals and incomplete manual notes displayed on whiteboards.

Configured digital alerts will notify individuals of their tasks including those that are overdue. Realtime data will be available on a dashboard allowing for effective monitoring of tasks statuses and resource allocation. Internal messaging will enable Clinicians to message each other directly regarding patient care, reducing the risk of data breaches whilst providing an improved secure communications trail, replacing current messaging facilities whereby Clinicians rely on their personal devices to use certain communication platforms e.g. WhatsApp groups.

Benefit Reference:

EFLOW-ISE-003 Improved communication between staff members and across departments

EOBS-ISE-005 Increased confidence resulting in improved decision making

Handover

There is currently no digital solution in place to support handover across the Health Board. The handover approach relies purely on paper-based patient lists which are kept by the individual as opposed to a central location and are referred to by the relevant Clinician during handover meetings.

Handover meetings are an essential element to safe patient care, bed management and appropriate resource allocation. Whilst the existing process has been in place for numerous years, it has been highlighted on several occasions that this is an inefficient, unsafe, and high-risk practice and has caused several Information Governance breaches due to lost and misplaced handover notes. There have been instances of handover papers containing patient information being mislaid with incomplete notes, illegible handwriting making it difficult to communicate accurate patient updates, posing a significant risk to patient safety. The current manual handover process does not have scope for task management or follow up procedures. As Clinicians handwrite their patient notes and actions on their patient lists, if these paper records get mislaid, there is no assurance that the recorded patients' tasks have been performed, this poses a risk to safe patient care and can impact effective discharge planning.

The current process used for patient handover by doctors has been subject to a number of concerns. During 2023 there were 8 Information Governance breaches due to misplaced / lost handwritten handover documents.

Poorly structured or informal handovers are often rushed and done in a haphazard fashion, which can lead to confusion and errors. This causes patients to stay in hospital longer than necessary due not only to delays but increased morbidity. Lack of clarity and poorly conveyed information can contribute to vital information being forgotten or missed, leading to delays in care, extended hospital stays and confusion between staff members involved. A digitalised system replacing the current manual paper-based handover and patient transfer process would provide a more secure, accurate, efficient solution to task management, reducing the risk to patient safety and confidentiality whilst enhancing existing resource, bed and discharge planning.

“Improve patient safety, workforce efficiency, communication and coordination of care, hugely impactful to get us where we should be in terms of service delivery” - Karen Brown Hywel Dda UHB - Health Board Clinical Lead for Acute Medicine.

Benefit Reference:

EFLOW-IE-004 Improved handovers and quicker discharges / Reduced handover time

Internal Referrals

Across the organisation there are multiplicity of ways to internally refer a patient from one department to another (i.e., from ward to ward, service to service, consultant to consultant). These referrals can be in various formats i.e., email, handwritten requests, letter, internal memo, phone calls, paper slips - all of which carry unnecessary elements of risk. Email referrals can get overlooked by the recipient or left unactioned within a mailbox. Handwritten requests may be illegible, left unactioned on a desk / in-tray, or become lost in transit with the same applying to an internal memo. Letters can cause increased postal costs and unnecessary delays. Phone calls can

impact upon the Clinicians time, especially if there have been several attempts to get through over the phone and there is a risk of there being no record of this referral being made, resulting in no audit trail or accountability. These inconsistent internal patient referrals made by all services across the Health Board demonstrate inefficient, outdated, and unreliable practices which potentially increase the scope for inaccurate data reporting, unactioned / overlooked referrals, referrals being made to the incorrect department and ultimately the potential to compromise timely and may compromise safe patient care.

“It will facilitate joined up care, connecting services and teams to streamline patient care journeys. It will mean that patients are not "missed" off lists - on call/ team/ referrals. I will not receive paper referrals posted under my door 5 days late (if not at all). I can be confident that the care I want my patients to receive will be delivered. It will ensure a safe system for patients to be cared for within and the digital system governance for staff to trust a patient in to.” – Karen Brown, Acute Medicine Clinical Lead

A single patient flow digital solution would offer a standardised method for the internal referrals process. It would provide visibility in one place of all acute/community/intermediate care patient referrals and care plans, enabling a more efficient and organised way of prioritising and tracking workflow/referrals, which would be beneficial to managing those patients who have several open care pathways. This would also have a positive effect upon data security, accountability, and enhanced data reporting all of which would be beneficial to the timely administration, safe patient care at the right time and right place. Referrals made in a timely manner that enable patient rehabilitation whilst in the community or discharge planning to begin promptly can improve the patient’s experience of care during their hospitalisation and reduce length of stay.

Benefit References:

EOBS-ISE-005 Increased confidence resulting in improved decision making.
EOBS-IE-006 Reduced manual admin work and removal of duplication of effort
EFLOW-IPE-001 Increased time to care for patients.
EFLOW-IPE-002 Reduced stress levels

Alerts & Notifications

Currently, there is no digital solution in place to alert and notify staff that there outstanding tasks associated with the care of a patient. Existing processes are manual and often flagged up during ward rounds and bed meetings. As a result, the discharge process is not as effective as it could be. In addition to this, patient observations are manual and NEWS scores are not available remotely which does not support agile working across clinical teams, particularly for those patients who are outliers on wards and the respective consultant is on another ward area.

The clinical engineering team and nursing informatics team in HDdUHB have reported issues with clinicians miscalculating NEWS2 scores putting the patient at risk. This could be avoided with e-Obs.

Having one digital system which specifically caters for electronic notifications/alerts including for the facilitation of e-Obs would significantly contribute to a safer, streamlined and more efficient way of delivering patient care.

Clinicians should have the functionality to set individual patient plans, observation requirements / NEWS, triggering real time alerts / notifications directly to the clinician for timely follow up action or escalation as necessary. Readings would be undertaken automatically via electronic devices allowing for immediate real time data whilst reducing the risk of manual error. For example, some patients may require more frequent observations than others or some patients NEWS scores / observations may be normal for a particular individual but problematic for another patient. The electronic system will allow for Clinicians to configure alerts and notifications tailored each patient. A centralised dashboard would provide oversight and management of timely observations. This will also facilitate escalation to the Acute Outreach team who can then intervene and reduce the deterioration of patients and reduce the admission to ICU.

“It will identify deteriorating, unwell patients earlier and trigger an escalation and therefore a response in a more timely manner.” - David Wastell Hywel Dda UHB - Senior Nurse for Resuscitation and Acute Patient Deterioration.

An electronic alerts and notifications functionality would be instrumental to contributing towards safe effective and efficient patient care, via remote monitoring including community virtual wards, which in turn would have a positive impact on patient flow across acute and community sites, bed management and discharge plans.

An electronic solution would provide staff with the ability to assign and prioritise tasks, set alerts and manage workflow more effectively. Electronic alerts will notify Clinicians of allocated tasks, highlight any actions/referrals that are outstanding and allow for tasks to be re-allocated when staff are absent. Providing assurance that tasks are followed up and completed efficiently, with all departments contributing to a holistic approach by working towards quicker and safer discharge of their patients.

Benefit Reference:

EOBS-IPO-002 Reduced risk of errors (e.g. due to more regular, accurate observations)

EFLOW-ISE-002 Reduced stress levels

EOBS-IPO-003 Reduced unplanned admissions to critical care units from e-Obs-equipped wards

Bed Management

The current bed management process involves up to three to four calls per day between site managers, ward sisters, community nursing and discharge planning teams, to determine the bed capacity and expected discharges per day. A bed management module is available within WPAS, however, there are limitations to its capabilities and does not meet our requirements. As a result, patient flow and bed management are managed by using a Word or Excel document. Site managers spend time calling wards or walking around to gain a better understanding of capacity. This often means that reported information is inaccurate due to lack of real-time information which leads to slow handovers, transfers and discharges. Whilst the Bed Management Module in WPAS is used in some areas, it does not have capacity to support all the functionality required and it is not designed to support Community Virtual Ward activity.

“Currently to have oversight of the management of flow is challenging. It requires access to multiple systems, spreadsheets, databases, paperwork to get the needed information. It is also requires multiple meetings where the information obtain will quickly out of date. I spend a significant amount of time pulling data to inform reports related to flow. Operationally, when the site is escalated, I can spend all day trying to coordinate discharges with information taken verbal, through meetings, different systems.

On some occasions, I would have done all that work only to find the individual has already been discharged. Having a system like this would allow me to concentrate on the improvements in the flow pathways based on robust information.” - Jessica Svetz, Assistant General Manager

An electronic bed capacity management will reduce the number of in-person meetings and time spent by clinical site managers walking around the hospital to identify free beds. The system provides real-time insights into bed information, enabling healthcare teams to optimise capacity planning and make data-driven decisions. This includes a broad overview of bed type and availability in each hospital site, such as baseline bed occupancy, surge bed occupancy, ICU bed occupancy and prioritisation of single rooms or isolation rooms to support infection control. This ensures efficiently assigning patients to beds in the appropriate departments, taking into account the medical needs of the patients while keeping the number of patients in the different departments balanced where beds in specialist wards are a scarce resource.

A whole system digital solution will provide a range of functionalities. For example, it would facilitate the ability to produce electronic ward transfer lists, provide real time data for bed management, requests for beds including the tracking of patient transfers across the system. This functionality alone would improve the management of demand and capacity at the front doors by incorporating real time tracking of ambulances and their patients stationed outside of A&E, freeing up much needed resources at the front line to provide patient care.

“Real time data reduces the need for lengthy site meetings / whole site/caseload reviews, and the number of staff required to attend such meetings. These meetings currently use data that is hours out of date and therefore meaningless as the patient's status may have changed.” Nicholas Evans, Physiotherapy Lead

Benefit References:

EFLOW-IPE-001 Increased time to care for patients.

EFLOW-IPE-002 Reduced stress levels

EFLOW-IPE-003 Improved communication between staff members and across departments

EFLOW-IPE-004 Improved handovers and quicker discharges / Reduced handover time

EFLOW-IPE-005 Reduced average time until seen by doctor in A&E

EFLOW-IPE-006 Reduced time an ambulance waits outside of the hospital.

EFLOW-IPE-007 Quicker response times for ambulances

EFLOW-IPE-008 Reduction in staff time wasted due to not being able to access real time patient information or bed state information

EFLOW-IPE-009 Reduced average length of hospital stays per patient

EFLOW-IPE-010 Reduced cancelled surgeries due to better bed management

EFLOW-ISE-002 Reduced stress levels

Command and Control

At present, hospital wide SITREP is produced and managed through the collation of information via both clinical operational managers. The information is collated in a spreadsheet and data shared and transferred via bed management meetings at each site. However, this does utilise a significant amount of staff time across all sites. In addition to this, the data is not in real-time and often by the time it is reported at hospital / organisation level, it is out of date and the position has changed.

The plan is therefore to provide a solution with real-time demand and capacity bed management data, enabling provision of a command-and-control function that will provide a HDDUHB overview of the capacity and demand across the whole organisation. Staff will be able to access and use real-time data across wards, A&E, and each site for the entire organisation and use it to manage capacity planning. Encompassing Hospital-at-a-Glance information to provide a real-time dynamic display of inpatient activity as well as virtual. This reduces inefficiencies by reducing time spent on data collection and allows staff to focus on the priorities.

The overall patient journey is made visible to downstream clinical units and services can then act to “pull” the patient along the care pathway – a major paradigm shifts from the traditional “pushing” of patients up the care chain. Bed allocation decisions are better informed by a patient’s clinical needs giving bed managers readily available access and visibility of all patient movement across the whole hospital with command centre capability. It provides visibility of current/expected occupancy, patient outliers, resource mismatches such as un-resourced beds, under/over resourced wards and expected discharges.

A significant amount of time is spent by staff chasing information to understand the bed position on wards etc. However, Operational staff will have access to this information which will support better decision making and reduce wasted time by both clinical and admin staff searching for information that is not up to date or held in one location.

Benefit Reference:

EFLOW-ISE-003 Improved communication between staff members and across departments

EFLOW-IPE-008 Reduction in staff time wasted due to not being able to access real time patient information or bed state information

EFLOW-ISE-002 Reduced stress levels

Patient Transfers and Hospital Transport

The current method of inter and intra-ward transfers is a manual process which involves several telephone calls to and between wards and hospital sites, written paper requests and email communication. There is currently no system in place which details patients awaiting transfer from acute to community sites, or vice versa, as well as any patient movement between other Health Boards, Trusts, or regional / tertiary centres. This means insufficient visibility between teams and sites to acknowledge transfer requests causing poor communication which lead to

transfer delays resulting in increased costs, and higher mortality. Overall, the patient transfer process is vulnerable to deficiencies in communication that can impact patient safety.

Manual referrals for patient transport can also get overlooked, causing delays for the patient and whole discharge process.

To assist in the patient pathway, an accurate real-time view of all planned patient movements is critical including admissions, direct admissions, inter and intra ward transfers, inter and intra hospital transfers as well as confirmed and potential discharges.

A digital solution will enable staff to create a transfer bed request electronically and communicate the requirements to the Bed Managers/Patient Flow Coordinators. This provides an accurate real time view of all planned patient movements including ED Attendances and Admissions, Elective Admissions, Direct Admissions, Inter and Intra Ward Transfers, Inter and Intra Hospital Transfers, and Confirmed and Potential Discharges. In addition to this, real-time bed capacity will assist with understanding current open / closed beds and nursing resourcing. This provides an overall demand vs capacity view which can be viewed at ward, division, hospital, or organisation levels.

Improving patient flow should relieve A&E by enabling faster transfers of patients to wards. In turn this should allow ambulances to offload patients more quickly and improve WAST handover times.

Benefit Reference:

EFLOW-ISE-003 Improved communication between staff members and across departments

EOBS-IE-006 Reduced manual admin work and removal of duplication of effort

EFLOW-IE-004 Improved handovers and quicker discharges / Reduced handover time

EFLOW-ISE-002 Reduced stress levels

Logistic Management

Hospital porters and cleaners play an integral role in supporting the daily operations of hospitals. Porters provide support to clinicians by making sure crucial goods and items are delivered where they are needed most. They also make sure patients are at the right place at the right time to get the treatment they need. Domestic cleaners carry out routine daily and weekly cleaning tasks as well as responding to emergency spills. Domestic cleaners work as part of the ward team, making sure that patients have a pleasant, safe stay in hospital.

Often, porters and cleaners are working in silos. Some are allocated to specific departments, while others work throughout the hospital. Service managers and clinicians find it difficult to maintain an overview of available porters and coordination of resources and tasks.

Many patients need intensive logistical support within a short period of time, for example to prepare a bed and organise admission. The more patients that require this at any one time, the more difficult it becomes to manage resource and capacity, making it challenging for hospitals to assess and improve the efficiency of porter and cleaning operations - but for these patients, even small changes in length of stay and bed turnaround time can have a very significant impact on overall flow.

Tracking technology using the e-Flow solution can facilitate holistic oversight and coordination across a hospital – completely transforming how flow is managed. The e-Flow system provides an insight into daily operations and improved collaboration between their porters and nurses and provides insight for managers into daily tasks and identifying peak and lower demand periods for porters. This means they can prioritise the cleaning and turnover of beds based on the case load of patients waiting to be admitted – pushing particular jobs to porters and cleaning teams across the hospital, enabling holistic oversight of occupancy and where cleaning and resource is required.

The e-Flow solution data provides a clear view of timeframes for beds becoming available, and the logistical services work together to seamlessly support a better flow of patients through the hospital by prioritising tasks and managing assignments, improving patient experience and flow, clinical support, resulting in positive patient outcomes.

Virtual Wards & Hospital@Home (H@H)

At present, HDdUHB is unable to deploy a virtual ward / H@H model as the digital systems to support this approach are not in place. However, it has been identified that it is crucial to supporting the 6 Goals programme.³⁹ Virtual wards / H@H solutions provide safe management and organisation of patient care and help to reduce avoidable hospital admissions and support the earlier safe discharge of patients from hospital. Virtual wards and H@H care models allow patients to get hospital-level care at home safely and in familiar surroundings, helping speed up their recovery while freeing up hospital beds for patients that need them most. They can provide an alternative to admission or facilitate earlier discharge from hospital.

Patients on a virtual ward are cared for by a multidisciplinary team who can provide a range of tests and treatments enabled by technology including remote monitoring.

Virtual wards allow patients to get the care they need at home safely and conveniently, rather than being in hospital, resulting in avoidable admissions to further boost efforts to reduce waiting times.

Hospital @ Home provides intensive, hospital-level care for patients who have acute conditions that would normally require an acute hospital bed, in a patient's home for a short episode provided by multidisciplinary healthcare teams.

The Hospital @ Home model can provide hospital-level diagnostics and interventions through daily input from multidisciplinary teams.

Virtual wards and hospital at home care models provides co-ordinated, multi-disciplinary, and integrated care in the home for people who would otherwise be admitted to hospital.

The solution provides a full end-to-end virtual care solution to remotely monitor patients and observations recorded both on and off-site when delivering virtual care in the community.

This enables the patient to receive treatment and care in a more comfortable home environment. Keeping patients in a place where they would prefer to be cared for in future.

Benefit Reference:

EFLOW-ISE-003 Improved communication between staff members and across departments

EFLOW-ISE-002 Reduced stress levels

EOBS-ISE-005 Increased confidence resulting in improved decision making.

1.2.4. Datix Risks and Issues

The Quality Assurance Information System team (QAIST) is part of the Quality Assurance and Safety Team. The QAIS Team ensures that Datix Cymru (the Once for Wales Concerns Management System) meets the organisation requirements with a system to support concerns and risk management.

The QAIS Team supports the Complaints Team, Legal Team, Safeguarding Teams, and Risk Assurance Team in their utilisation of the Complaints, Claims, Patient Experience and Risk Register modules on the system, and supports the capture and management of Serious Incidents, No Surprises and Never Events.

The definition of a patient safety incident is "an unintended or unexpected occurrence which could have, or did, lead to harm for one or more patients receiving healthcare". Reporting them supports our Health Board to develop learning and to take action to keep patients safe.

³⁹ Six goals for urgent and emergency care: policy handbook for 2021 to 2026 | GOV.WALES

HDdUHB staff are supported to minimise patient safety incidents and drive improvements in safety and quality.

Having interrogated recent data and following points raised by staff, incidents specifically relating to discharge, handover and referrals have been reviewed. A summary of the numbers along with common themes are shown as below.

Discharge

The various themes for issues during discharge included communication issues between acute & community teams, inappropriate / unsafe / unknown discharges, delayed discharges due to being unable to move patient to another bed/location and delayed transport at discharge.

Various opportunities were identified where the E-Flow and/or E-Obs system could support reduction of such issues in the future:

Handover

The various themes for issues during handover included incomplete handover information, important patient information frequently missed by clinician at handover, no notes / audit trail which leads to inappropriate care / treatment plan for patients, missing patient information i.e., medicine charts are cause for concern.

Referrals

The various themes for issues throughout the referral process include referrals not being made between relevant departments and services resulting in the patient being "lost" in the system causing potential delays for patient diagnostic and treatment plans. These incidents usually surface when a GP or the patient contacts the service themselves or presents themselves at the respective Department.

Referrals for patient transfers from hospitals inside or outside of HDdUHB are made by phone calls, no electronic referrals and no paper referral trail established. This also happens from transfers within acute settings e.g., no notifications made from A&E to CDU.

Table 3: Incidents

Discharge Incidents		Handover Incidents		Referrals Incidents	
Year	Number of reported incidents	Year	Number of reported incidents	Year	Number of reported incidents
2023	126	2023	7	2023	10
2024 (mid-year)	57	2024 (mid-year)	5	2024 (mid-year)	2
Total reported	183	Total reported	12	Total reported	12

1.2.5. Becoming More Carbon Efficient

Finally, the Welsh Government has committed to a NetZero target by 2050.⁴⁰ In February 2022, HDdUHB issued a statement highlighting that decarbonisation and establishing energy efficient systems is a priority for the Board.⁴¹ In healthcare, the use of digital technology provides many opportunities to reduce the carbon impact of health and care services. For example, in the 12 months to June 2021 virtual appointments are estimated to have the saved carbon equivalent to taking 40,000 cars off the road for a year, and remote monitoring technologies

⁴⁰ <https://gov.wales/net-zero-wales>

⁴¹ <https://hduhb.nhs.wales/news/press-releases/our-commitment-to-carbon-reduction-and-environmental-sustainability/>

are estimated, over the next 3 years to reduce patient travel by 28 million miles.⁴² Introducing e-Obs and other systems that enable electronic patient flow are a first step towards building more efficient health and care services that can support these net zero targets.

1.2.6. Conclusion

This strategic case builds on existing work conducted as part of the national FBC for electronic Patient flow for NHS Wales. The national FBC, released in December 2018, advocated for a large investment for developing a national patient flow system in line with the 'Once for Wales' approach. The investment was considered too high at the time, and it has since been highlighted that a 'Once for Wales' approach does not meet the needs of local Health Boards. Instead, developing national standards and frameworks that can then be locally applied is seen as the most appropriate approach.

This FBC sets out a template for Health Board in Wales to introduce e-Obs and Patient flow systems. As outlined in the Management Case, HDdUHB will capture the benefits of introducing these systems, which other Health Boards in Wales can build upon. Ultimately, it is expected that patient flow technology, in particular, will help healthcare staff effectively manage resources and free up time for patient care, enabling the Welsh Government to meet key national targets, such as the 4-hour A&E waiting time target.

Whilst significant progress has been made to introduce digital systems, the NHS in Wales remains a long way from reaching its full potential and ensuring equal service provision across the country. Patients are currently experiencing the longest wait times for treatments seen in decades⁴³ and patient flow management is critical in releasing capacity to treat patients and protect beds for non-acute care. In January 2024, there were 584,000 patients waiting for planned care in Wales, a 40% increase since February 2020.⁴⁴ Issues with patient flow impact bed availability for planned care, creating further delays. We are currently presented with a unique opportunity to drive change across NHS organisations: A move to digital working during the COVID-19 pandemic has set a unique starting point with strong clinical support on the ground. The user research conducted as part of this work shows unilateral clinical buy-in and a clearly defined user need for implementing e-Flow and e-Obs solutions. These key strategic drivers are summarised in Figure 99 below.

Feedback from staff gathered during the engagement sessions across both acute and community sites, identified a lack of joined up working due to a lack of a digital solution and frustration caused by excessive and unnecessary admin as a result of manual and in the main paper-based tasks and not being able to locate all the required clinical information in one system to support the patient pathway and clinical decision.

Since this time, staff who were part of the tender evaluation have described the opportunity this business case presents as being truly "transformational" and having seen what could be achieved, staff are waiting in hope that this will become a reality in Hywel Dda University Health Board.

⁴² <https://www.nhs.uk/blogs/the-role-of-digital-technologies-in-meeting-nhs-net-zero-targets/>

⁴³ <https://www.bma.org.uk/advice-and-support/nhs-delivery-and-workforce/pressures/nhs-backlog-data-analysis>

⁴⁴ <https://www.audit.wales/news/concerted-action-needed-nhs-wales-tackle-waiting-times-backlog-planned-care>

Figure 9: Summary of strategic drivers



In summary, introducing e-Flow and e-Obs technologies aligns to all key digital and national strategies and will support COVID recovery as NHS organisations work to meet the increasing demand.

1.3. Investment Objectives

Based on the strategic context and the national business case, the following investment objectives have been identified:

- **Timeliness/ Efficiency:** To use integrated digital technology to capture, present and use real-time patient pathway information to improve the timeliness of care and reduce the length of stay.
- **Effectiveness and Patient Safety:** To achieve measurable improvement of patient outcomes by using mobile digital technology to standardise and reduce variation in the management of acute patient deterioration (e.g. Sepsis, Acute Kidney Injury, Hospital Acquired Thrombosis), patient nutrition and hydration, tissue viability and continence.
- **Equity of care:** To measurably improve admitted patient experience of care by ensuring patients are in the right bed at the right time to meet their needs.
- **Patient Experience:** To improve admitted patient experience by freeing staff time who will have essential information readily available to make decisions regarding their care using mobile technology.
- **Economy:** To avoid unnecessary hospital inpatient costs by improving local ability to match bed capacity with unscheduled care demand and to support care in the community where it is clinically safe to do so.
- **Staff experience:** To improve staff satisfaction by providing them with the digital tools and technology they need to undertake their work more effectively.

2. Economic Case

2.1. Approach

This section summarises the value for money assessment, including an overview of the benefits, risks and associated costs.

The Economic Case, particularly the benefits and risks, were developed working closely with key stakeholders throughout workshops and 1-1 user research sessions. A number of workshops and research sessions were held during the Outline Business Case development period, and further staff engagement sessions were held during 2023/24 as outlined below:

- **Workshop 1: Tech and Strategy Review** – A workshop to review the As-Is technology and agree the strategic case for this business case.
- **Workshop 2: Options Discussion** – A workshop to discuss the available options for introducing the new solutions, including the procurement approach.
- **Workshop 3: Benefits & Risks Identification** – A workshop to validate the relevant benefits and risks identified previously and review a draft digital roadmap.
- **Workshop 4: Assessing the solution options** – A workshop to review the implementation approach, validate the shortlist of options, and assess each option against the benefits and risks.
- **User Research Sessions:** 1-1 user research sessions with clinical and operational staff to better understand the As-Is processes, identify relevant pain points and user needs for implementing the new solution.

See Appendix A for a list of the stakeholders that were engaged in the consultation.

2.2. Selected Option

The implementation approach and type of solution selected by the HDdUHB Board was to incrementally implement both e-Obs and patient flow solutions across all sites. Details for each of these approaches and solutions are shown in the tables as below.

Table 4: Solution type: selected option

Principle	Description	Rationale
e-Flow and e-Obs	Implement both e-Obs and patient flow technology.	<ul style="list-style-type: none"> ✓ Addresses all needs (such as increasing efficiencies, improving communication and automating tasks where possible) highlighted by staff. ✓ Implementing both provides a seamless journey of digital information, removing need for time consuming manual input, and giving a more complete view of the patient’s health history. ✓ Maximises benefit.

Table 5: Implementation approach: selected option

Option	Description
Incrementally implement both e-Flow and e-Obs solutions across all sites	Configurable “off the shelf” e-Obs and patient flow solutions are procured and implemented across acute and community hospitals. These will also support patients at home.

2.3. Benefit Assessment

This section describes the appraisal of the shortlisted options in relation to non-financial benefits. It describes the benefits framework employed and presents the results of the appraisal of the shortlisted options against this framework.

Several benefits have been identified for both the e-Flow technology and e-Obs solution. To manage these benefits five high level benefits have been identified and more detailed and specific benefits sit beneath each high-level benefit. In line with the model currently used in Digital Services, each benefit will be baselined prior to implementation and measured and post implementation to ensure that the impact of the technology can be tracked and reported. Many of the benefits are interdependent, for example an efficiency benefit will have a positive impact on the patient and staff benefits.






However, all of the listed benefits are subject to and with the caveat that this is on the basis that the solutions are fully utilised by staff across the Health Board in order to maximize the potential value and outcomes.

The five high level benefits are:

- 1. Improved Patient Outcomes**
- 2. Enhanced Patient Experience**
- 3. Better Staff Experience**
- 4. Increased Efficiencies**
- 5. Organisational Benefits**

The key benefits identified that are expected to be realised by e-Obs and electronic patient flow solutions are described in Table 6 below and further demonstrated in Appendix E. These benefits outline how replacing the current paper-based processes will provide improved clinical value, improved and sustainable operations and help management teams effectively manage demand. Discussions during the workshop highlighted the importance of retaining a focus on people-centred communication, where technology does not seek to replace in-person interactions.

Table 6: Qualitative Benefits

Benefit Category	Benefit Reference	Description
 Improved Patient Outcomes	EOBS-IPO-001a, 001b 002, 003 & 004	<ul style="list-style-type: none"> • Accurate information leads to reduced risk of patient harm, improving patient safety. • Timely access to information enables early intervention. <p>Improved efficiencies in bed management leading to less cancelled surgeries.</p>
 Enhanced Patient Experience	EFLOW-IPE-001a, 001b, EFLOW-IE-009	<ul style="list-style-type: none"> • Patients are no longer asked for the same information multiple times. • Staff have increased time to care and feeling less stressed. • Patients and families are aware of next steps and feel more informed. • Improved patient flow leading to less time patients spend in the Emergency Department waiting list • Reduced length of stay and quicker discharges for patients
 Better Staff Experience	EOBS-ISE-005, EFLOW-ISE-002, 003 & 004	<ul style="list-style-type: none"> • Clinicians feel increased confidence due to access to more accurate information. • Improved decision-making due to access to timely and accurate information. • Reduced admin time releases time to care for patients, reducing stress levels. • Remote and easy access to up-to-date information.
 Increased Efficiencies	EOBS-IE-006 & EFLOW-IE-004, 005, 006, 007, 008, 009 & 010	<ul style="list-style-type: none"> • Access to electronic patient information that is synchronised across systems leads to reduced manual admin work and removes duplication of effort. • Access to real-time data leads to faster bed turnover. • Bed and patient data is available at ward, hospital and organisation-wide level to better manage capacity, ensuring the right person is at the right place at the right time and reducing wait times. • Easy access to up-to-date data on patient status leads to improved handovers and quicker discharges. • Quicker response times for ambulances due to reduced time waiting at the hospital. • Time savings due to reduced admin time and improved decision-making. • Time savings due to remote monitoring and automation of tasks.
 Organisational Benefits	EOBS-PE-007 & 008	<ul style="list-style-type: none"> • Increase in compliance due to more accurate, up-to-date data and increased efficiencies. • Reduced complaints and improved brand image due to better patient care. • Improved transfer of reliable information. • Improved decision making for senior teams. • Data is readily available for audits in a structured format.

Any quantitative savings will likely be the result of reduction in administrative activities, increased clinical capacity through more efficient processes and ultimately better outcomes for patients. Specific benefits that may result in a financial impact include the following – further details on this are detailed below and in section 2.3.1:

- [Benefits ref: EFLOW-IE-009](#) Reduction in length of stay due to efficiencies in discharge planning and hospital flow
- [Benefits ref: EOBS-IPO-003](#) Cost avoidance due to reducing patient escalation and reduction in admissions to ICU
- [Benefits ref: EOBS-IPO-001a](#) Reduce risk of harm due to a reduction in hospital based cardiac arrests
- [Benefits ref: EOBS-IPO-001b](#) Reduction in hospital acquired infections
- [Benefits ref: ELOW-IE-008](#) Reduction in staff time wasted due to not being able to access real time patient information or bed state information
- [Benefits ref: EFLOW-IE-010](#) Reduce cancelled surgeries due to better bed management

**Above Economic Benefits described in more detail in Section 2.3.1*

2.3.1. Economic Benefit

As outlined in the strategic case, evidence from case studies suggests that e-Flow and e-Obs solutions can result in improved efficiencies, better patient care and ultimately economic benefit. These economic benefits are outlined in Table 7 below. It is important to highlight that we believe these benefits will not result in cash-releasing financial benefit. Instead, they represent the possibility of reinvesting resources into the Health Board.

Table 7: Potential Economic Benefit Impact

Relevant benefit(s)	Evidence and assumptions	Potential impact	Financial Impact
EFLOW-IE-008 Reduction in staff time wasted due to not being able to access real time patient information or bed state information	<p>By reducing time spent on administrative tasks using a mobile device can release up to 66 minutes of nursing time per 12-hour shift.⁴⁵</p> <p>A large part of bed management involves several calls and meetings through the day at each site. Each site will have at least two or three of these meetings a day and staff are required to obtain data to provide an update at each meeting. Due to the time limitations, for the purpose of this FBC time and motion studies were limited to</p>	<p>Current systems are slow and there is a limited number of desktop devices. Furthermore, as most processes are paper based with significant duplication of effort, staff spend lots of time on administrative tasks. For example, doctors have difficulty knowing where their patients are as there is no clear overview for bed management and spend lots of time walking around between wards to see patients. Similarly, to view a patient’s observations, clinical staff have to go to a patient’s bed and view the physical chart at the end of the bed. Being able to access such data on a mobile device would allow staff to easily review relevant data without s pending time to physically find the information.</p> <p>A patient flow solution will provide staff with information at a click of a button. It is anticipated that preparation time for patient flow meetings can be reduced as well as the duration of the calls</p>	Efficiency Gains

⁴⁵ National ePatient Flow Management Programme FBC (Dec 2018) – Appendix 11

Relevant benefit(s)	Evidence and assumptions	Potential impact	Financial Impact
	site Patient Flow meetings only and found that 224 staff hours each day is dedicating to attending and preparing for patient flow meetings.	themselves. Due to the time associated with preparing and attending these Patient Flow meetings it is anticipated a digital solution can result in an efficiency saving of 20,683 to 45,382 hours per year.	
EFLOW-IE-009 Reduced average length of hospital stay per patient	<p>Evidence from case studies suggests that the length of hospital stays for patients can be reduced by 12-30%.^{46,47}</p> <ul style="list-style-type: none"> • Mean Length of Stay for Patients in HDdUHB in 2022/23: 7.3days • Number of admissions in HDdUHB in 2022/23: 89,300⁴⁸ • Estimated bed day cost (acute): £359 • Assume that hospital stays are reduced for 10% of the population. • Assume reduction in length of stay is a minimum of 5% for the cohort of patients waiting over 21 days. 	By enabling early detection of issues through automated, regular capture of patient observations, clinicians can intervene and prevent deterioration and incidents, such as heart attacks or sepsis, and improve the patient's experience. Furthermore, if remote monitoring is implemented, this not only provides significant benefit for patient safety ⁴⁹ but may also allow clinicians to discharge people earlier and continue to monitor them in their own homes. At the same time technologies that support patient flow help clinical staff manage handovers and transfers more effectively, which results in reducing the time it takes until a patient is ready for discharge. Based on the assumptions outlined in this table, it is estimated that if mean Length of Stay could be reduced to 6.5 days for 10% of the target patient population, the efficiency saving would be the equivalent of ~£5.8m in bed day costs annually, by reducing patient's length of stay, and as such the number of hospital bed days. Note that this assumes that both e-Flow and e-Obs solutions are implemented.	Cash Releasing
EOBS-IPO-003 Reduced unplanned admissions to critical care units from e-Obs-equipped wards	A study has shown that e-Obs and Patient flow technology (handover systems) can lead to a 10% ⁵⁰ reduction in total unplanned admissions to critical care units	e-Obs enables automated escalation when patients deteriorate by calculating a risk score (e.g. NEWS) and assessing patients for their risk of sepsis (and other potential issues). The Sepsis Trust estimates that sepsis costs 48,000 lives in the UK annually. If a patient presenting symptoms of sepsis is not properly examined,	Cash Releasing

⁴⁶ Nervecentre. October 2016. A Whole-Hospital Mobile Solution-Nervecentre Support for Efficient Patient Flow

⁴⁷ Allocate Software - NHS Wales ePatient Flow Management programme PIN (Presentation)

⁴⁸ PEDW data 2022/2023 dhcw.nhs.wales/information-services/information-delivery/annual-pedw-data-tables/hospital-admissions-publications-tables/headlines-figures-hywel-dda-ulhb-provider-2022-23/

⁴⁹ <https://jamanetwork.com/journals/jama/article-abstract/2789635>

⁵⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6425312/>

Relevant benefit(s)	Evidence and assumptions	Potential impact	Financial Impact
	<p>from e-Obs-equipped wards. Similarly, following e-Obs implementation Nottingham University Hospital experienced a 16%⁵¹ reduction in unplanned critical bed care days in ICU/ITU.</p>	<p>misdiagnosed, or not treated in a timely manner if properly diagnosed, there may be a case of negligence caused by medical malpractice. This can lead to significant litigation cost for NHS organisation. According to the Sepsis Trust earlier identification and treatment across the UK would save 14,000 lives and result in 400,000 fewer days in hospital for patients every year.⁵² E-Obs systems provide automated sepsis assessments that can help alert clinicians if a patient may be suffering from sepsis and thus enable early identification and treatment. This means clinicians intervene early and are able to prevent significant incidents. Similarly, electronic patient handover systems ensure that errors are minimised (e.g. due to illegible handwriting). As a result, fewer patients are admitted to intensive care units, where beds carry a significantly higher cost.</p> <p>Once e-Obs is rolled out into the community for effective Remote Patient Monitoring, it is likely that this will also contribute to reducing acute care use. Research has shown that Remote Monitoring can reduce acute care use for patients with cardiovascular disease and COPD.⁵³ However, it is important to note that a systematic literature review found that effectiveness varies within and between populations, as well as conditions.</p>	
<p>EOBS-IPO-001a Reduced risk of patient harm and improving patient safety</p>	<p>Reduce risk of harm due to a reduction in hospital based cardiac arrest</p>	<p>Early intervention has proven to be able to prevent patients from unnecessarily deteriorating. An e-Obs solution will calculate the NEWS scores automatically avoiding human error, and it will alert and notify staff and teams to be able to intervene at the right time to avoid patient harm. As patients deteriorate, the cost and resources to care for the patient will inevitably increase. Research suggests that an e-Obs solution can reduce up to 70% of</p>	<p>Efficiency Gains</p>

⁵¹ Nervecentre. October 2016. A Whole-Hospital Mobile Solution-Nervecentre Support for Efficient Patient Flow

⁵² <https://sepsistrust.org/wp-content/uploads/2019/01/UKST-volunteer-speaker-notes-2019.pdf>

⁵³ <https://bmjopen.bmj.com/content/11/3/e040232>

Relevant benefit(s)	Evidence and assumptions	Potential impact	Financial Impact
		hospital based cardiac arrests with up to a £2,004 ⁵⁴ efficiency saving per case. ^{55 56} Data has been obtained from local systems to understand the current situation and to determine the number of cardiac arrests that could potentially be avoided in the future.	
EFLOW-IE-010 Reduced cancelled surgeries due to better bed management	Less cancelled surgeries due to better bed management	Currently, approximately 197 surgeries are cancelled every year due not having a bed available for the patient with a typical surgery costing £2,832. Through the improvement of flow across sites and improving bed management it is anticipated that the proposed technology will solve the root cause problem and there will be a reduction in cancelled surgeries saving HDdUHB valuable time and money that can be repurposed elsewhere ⁵⁷ .	Efficiency Gains

Whilst a reduction in staff costs is not identified as specific benefit for this programme of work, it is anticipated that this will be an enabler to reducing locum and agency costs that are in a cost reduction plans for the HDdUHB.

Table 8 below illustrates the potential Economic Benefit Cost summary based on the evidence and assumptions listed above. As described, different sources report some variances, and this has been taken into consideration along with HDdUHB data sources.

Furthermore, it is understandable that as human factors very much play a part in the successful deployment of the e-Flow and e-Obs solutions – confidence in delivery of the benefits must be assessed and reflected in what can be achieved. Therefore, a value has been attributed as follows:

- High probability of delivery = Low risk (min value)
- Medium probability of delivery = Medium risk (med value)
- Low probability of delivery = High risk (high value)

The total value represents a figure that is based on 2023/24 financial data and is what could be achieved in a year where the systems have been successfully deployed across the organisation.

⁵⁴ 2022/2023 Costing Returns for HRG codes EB05A, EB05B & EB05C

⁵⁵ <https://www.alcidion.com/success-stories/central-manchester-university-hospitals-nhs-foundation-trust/>

⁵⁶ <https://www.digitalhealth.net/2015/11/vitalpac-helps-croydon-cut-cardiac-arrests/>

⁵⁷ Evaluating factors associated with the cancellation and delay of elective surgical procedures: a systematic review | International Journal for Quality in Health Care | Oxford Academic (oup.com)

Table 8: Potential Economic Benefit Costs (note costs are based on 2023/24 costs and do not include inflation).

Benefit Reference	Summary	Low risk	Medium risk	High risk	Economic impact
EFLOW-IE-009	Reduction in Length of Stay due to efficiencies in discharge planning and hospital flow	£3,368,210	5,389,136	£6,736,429	Cash releasing
EOBS-IPO-003	Cost avoidance due to reduce patient escalation and reduction in admissions to ICU	£565,022	£1,130,045	£2,034,080	Cash releasing
EOBS-IPO-001a	Reduce risk of harm due to a reduction in hospital based cardiac arrest	£36,870	£69,438	£112,250	Efficiency gains
EOBS-IPO-001b	Reduction in hospital acquired infections	£59,774	£139,472	£199,245	Efficiency gains
EFLOW-IE-008	Reduction in staff time wasted due to not being able to access real time patient information or bed state information	£768,011	£1,414,045	£1,685,108	Efficiency gains
EFLOW-IE-010	Reduce cancelled surgeries due to better bed management	£27,895	£44,632	£55,790	Efficiency gains
		Low risk	Medium risk	High risk	Economic impact
	Total opportunity	£3,933,237	£6,519,188	£8,770,510	Cash releasing
		£892,551	£1,667,587	£2,052,393	Efficiency gains
	Total per year at BAU Stage	£4,825,788	£8,186,775	£10,822,903	Value

The financial impact of the above benefits and when they are anticipated to be realised is provided in the table below over the 7-year period. Noting the above values are based on a perfect year and all aspects of the solution are fully deployed.

This is an illustration of the benefit realisation plan phased with the cost of each benefit. It should be noted that the realisation of these benefits is dependent on the deployment plan (see section 5) and the sequence and order of where the solution is deployed and therefore this is subject to change.

Table 9: Benefits Realisation Costs

	Low risk model	Total benefits - by benefit category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
			24/25	25/26	26/27	27/28	28/29	29/30	30/31	
Low risk model	EFLOW-IE-008	Reduction in staff time wasted due to not being able to access real time patient information or bed state information	£ -	£ 142,520	£ 488,455	£ 760,331	£ 760,331	£ 760,331	£ 760,331	£ 3,672,300
	EOBS-IPO-003	Cost avoidance due to reduce patient escalation and reduction in admissions to ICU	£ -	£ -	£ 559,372	£ 559,372	£ 559,372	£ 559,372	£ 559,372	£ 2,796,860
	EFLOW-IE-010	Reduce cancelled surgeries due to better bed management	£ -	£ -	£ 16,040	£ 27,616	£ 27,616	£ 27,616	£ 27,616	£ 126,505
	EFLOW-IE-009	Reduction in Length of Stay due to efficiencies in discharge planning and hospital flow	£ -	£ -	£ 1,103,090	£ 2,500,899	£ 3,334,533	£ 3,334,533	£ 3,334,533	£ 13,607,588
	EOBS-IPO-001	Reduce risk of harm due to a reduction in hospital based cardiac arrest	£ -	£ -	£ 9,126	£ 36,502	£ 36,502	£ 36,502	£ 36,502	£ 155,135
	EOBS-IPO-001	Reduction in hospital acquired infections	£ -	£ -	£ 14,794	£ 59,176	£ 59,176	£ 59,176	£ 59,176	£ 251,497
	Total			£ -	£ 142,520	£ 2,190,877	£ 3,943,897	£ 4,777,530	£ 4,777,530	£ 4,777,530
Mid risk model	Medium risk model	Total benefits - by benefit category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
	EFLOW-IE-008	Reduction in staff time wasted due to not being able to access real time patient information or bed state information	£ -	£ 271,377	£ 899,332	£ 1,399,904	£ 1,399,904	£ 1,399,904	£ 1,399,904	£ 6,770,327
	EOBS-IPO-003	Cost avoidance due to reduce patient escalation and reduction in admissions to ICU	£ -	£ -	£ 1,118,744	£ 1,118,744	£ 1,118,744	£ 1,118,744	£ 1,118,744	£ 5,593,720
	EFLOW-IE-010	Reduce cancelled surgeries due to better bed management	£ -	£ -	£ 25,664	£ 44,186	£ 44,186	£ 44,186	£ 44,186	£ 202,408
	EFLOW-IE-009	Reduction in Length of Stay due to efficiencies in discharge planning and hospital flow	£ -	£ -	£ 1,764,945	£ 4,001,439	£ 5,335,252	£ 5,335,252	£ 5,335,252	£ 21,772,140
	EOBS-IPO-001	Reduce risk of harm due to a reduction in hospital based cardiac arrest	£ -	£ -	£ 17,186	£ 68,744	£ 68,744	£ 68,744	£ 68,744	£ 292,161
	EOBS-IPO-001	Reduction in hospital acquired infections	£ -	£ -	£ 34,519	£ 138,077	£ 138,077	£ 138,077	£ 138,077	£ 586,826
Total			£ -	£ 271,377	£ 3,860,390	£ 6,771,094	£ 8,104,907	£ 8,104,907	£ 8,104,907	£ 35,217,582
High risk model	High risk model	Total benefits - by benefit category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
	EFLOW-IE-008	Reduction in staff time wasted due to not being able to access real time patient information or bed state information	£ -	£ 392,140	£ 1,071,728	£ 1,668,256	£ 1,668,256	£ 1,668,256	£ 1,668,256	£ 8,136,894
	EOBS-IPO-003	Cost avoidance due to reduce patient escalation and reduction in admissions to ICU	£ -	£ -	£ 2,013,739	£ 2,013,739	£ 2,013,739	£ 2,013,739	£ 2,013,739	£ 10,068,696
	EFLOW-IE-010	Reduce cancelled surgeries due to better bed management	£ -	£ -	£ 32,079	£ 55,232	£ 55,232	£ 55,232	£ 55,232	£ 253,009
	EFLOW-IE-009	Reduction in Length of Stay due to efficiencies in discharge planning and hospital flow	£ -	£ -	£ 2,206,181	£ 5,001,799	£ 6,669,065	£ 6,669,065	£ 6,669,065	£ 27,215,175
	EOBS-IPO-001	Reduce risk of harm due to a reduction in hospital based cardiac arrest	£ -	£ -	£ 27,782	£ 111,128	£ 111,128	£ 111,128	£ 111,128	£ 472,293
	EOBS-IPO-001	Reduction in hospital acquired infections	£ -	£ -	£ 49,313	£ 197,253	£ 197,253	£ 197,253	£ 197,253	£ 838,323
Total			£ -	£ 392,140	£ 5,400,823	£ 9,047,408	£ 10,714,674	£ 10,714,674	£ 10,714,674	£ 46,984,392

2.4. Risk Assessment

A benefits and risks workshop focused on identifying the risks and potential mitigations. Table 10 details the risks identified.

Table 10: Risks and Mitigations

Risk	Description	Mitigations
Change Management: Staff adoption	Implementing e-Obs and patient flow technology will require significant change management, whereby clinicians and nurses will be required to change existing processes and adapt to new processes and technology. Staff may lack willingness to adopt new systems and processes	<ul style="list-style-type: none"> • Prior to implementation of the technology assess the staff needs at each site and determine what changes in processes and policies are required. • Engage staff in the procurement process. • Identify local champions
Change Management: Training	There is a risk that inadequate training for the new systems will be provided, and staff lack the digital skills to use the technology. This would result in low adoption of the tools, which means benefits would not be realised.	<ul style="list-style-type: none"> • Make adequate training available to staff - ensure that suppliers provide training materials and embed this as part of existing training processes (nurse induction training, including ongoing updates for current staff, staff returning from long term sick, maternity leave and for those already in post). • Ensure staff have time to attend training sessions by considering this when preparing rotas. • Provide access to ongoing support as required. During implementation ensure support staff is available on site. • Ensure that usability is a key requirement during the procurement process. • Identify local digital champions and enable clinicians training other clinicians;
Change Management: Meeting local needs	The acute and community hospitals at HDdUHB have different processes and systems and there is a risk that the solution will not meet the needs of local sites.	<ul style="list-style-type: none"> • Ensure that the technology can be configured to meet local needs. • Provide adequate time and resource for change management processes. • Involve representatives from all sites in the procurement process
Change Management: Lack of Ownership	A lack of ownership leads to delays in implementation.	<ul style="list-style-type: none"> • Involve key stakeholders in the procurement process. • Provide clear ownership of workstreams to individuals. • Ensure stakeholders outside of the digital team are involved throughout the process
Data	Risk that data entry and standards may deteriorate during the transition period	<ul style="list-style-type: none"> • Ensure there is data validation process in place • Utilise existing data governance procedures to support data quality requirements • Ensure all staff receive training • Monitor staff feedback for areas of improvement.
Funding: Implementation	Lack of funding to support implementation of technology.	<ul style="list-style-type: none"> • Ensure that the project is supported by the Director of Finance;

Risk	Description	Mitigations
Funding: Rollout	Lack of funding to support rollout, including training, and additional time required by digital nurses.	<ul style="list-style-type: none"> • Include additional rollout costs into the financial model;
Funding: Ongoing costs	Lack of funding to support ongoing revenue costs associated with the technology	<ul style="list-style-type: none"> • Ensure that the project is supported by the Director of Finance. • Get the business case approved by the agile business group and ensure they are supportive. • Consider external sources of local funding (e.g. DPIF funding). • Include in the Integrated medium-term plan (IMTP)
Funding: Integration	Additional funding to integrate e-Obs technology with monitors/ devices may be required.	<ul style="list-style-type: none"> • Ensure funding for integration is included in financial model
Implementation: Staff resourcing	There is a risk that the staff required to support these new processes will not be available due to challenges with recruitment.	<ul style="list-style-type: none"> • Clearly identify staff requirements for implementation and rollout. • Identify digital nurses/ local champions from existing staff
Implementation: Dual-running site	There is a risk that as the solution is implemented a site may be dual running with some wards using the new digital technologies and some using traditional manual approaches. This can result in problems during handovers and when managing patient flow through the hospital.	<ul style="list-style-type: none"> • Quick rollout of e-Obs to minimise the dual-running time at sites. • Trial implementation during pilot to identify best way to implement and roll out technology. • Liaise with site management teams to identify roll-out plans across services and wards that minimise the impact on dual-running
Implementation: Supplier delivery	The supplier is unable to deliver a fit for purpose solution within the required timescales.	<ul style="list-style-type: none"> • Work with the supplier to develop a realistic timescale for the implementation. • Carefully assess supplier capabilities, including site visits where possible
Implementation: Delay	System implementation takes longer than planned due to lack of resources.	<ul style="list-style-type: none"> • Work with the supplier to develop a realistic timescale for the implementation. • Ensure NHS resources are available as required. • Identify digital nurse and digital medical/AHP champions to support rollout
Implementation: Inappropriate solution	The system does not meet the needs of the users.	<ul style="list-style-type: none"> • Ensure requirements are defined with clinical staff from relevant disciplines. • Involve staff from all sites in the procurement process. • Build on requirements identified in the national FBC as these were developed in conjunction with staff
Implementation: Estates Capability	Lack of estate capabilities to install any required hardware e.g. whiteboards.	<ul style="list-style-type: none"> • Involve estates team early on in development of implementation plan
Infrastructure: Lack of space	There is a lack of space for electronic whiteboards on wards.	<ul style="list-style-type: none"> • Assess wards to determine what space is available to install new technology. • Consider utilising an electronic whiteboard as a noticeboard, too, so that both types of boards use the same space. • Empower staff to identify where they could install this technology on their wards;

Risk	Description	Mitigations
Infrastructure: Disruption to BAU	Any disruption to the ward operations when power and cooling are being provisioned.	<ul style="list-style-type: none"> Minimise time of disruption as much as possible. Develop implementation plan in conjunction with wards
Infrastructure: Number of devices	There may not be enough devices available for staff to use the technology.	<ul style="list-style-type: none"> Assess current situation on wards to understand what is available and what is needed. Enable staff to use their own devices. Consider iPad on lanyards for clinicians
Infrastructure: Cyber incident	There is risk that the technology fails, for example due to a national cyber incident.	<ul style="list-style-type: none"> Develop robust disaster recovery plan. Develop robust business continuity plan
Infrastructure: Network coverage	Lack of wireless network on some wards means there will be a coverage gap and mobile devices may not be accessible.	<ul style="list-style-type: none"> Assess infrastructure needs for each site. Consider technology that can work offline. Install network/ Wi-Fi as required on all wards. Command rooms updated at Worthybush hospital
Information Governance: Patient confidentiality	There is a risk to information governance with patient data made available via a whiteboard in the ward.	<ul style="list-style-type: none"> Switch off whiteboard when not in use. Enable proximity login using ID badges
Interoperability: National systems	Difficulties of two-way interfaces with WPAS means that some data may have to be re-keyed into WPAS at discharge by the ward clerk.	<ul style="list-style-type: none"> Identify integration opportunities for both pushing and pulling data. Work with suppliers to ensure integration is possible
Interoperability: Delay in integrations	Digital Health and Care Wales (DHCW) lack capacity to enable integration with national systems.	<ul style="list-style-type: none"> Ensure support of national teams, which can lobby to prioritise work completed by Digital Health and Care Wales. Escalation through SITREP meetings. Submit integration requests as early as possible. Engage with DHCW during the procurement process. Consider possibility of funding local interface support that work within DHCW but are focused on HDdUHB
Interoperability: Connectivity to monitors/ devices	There is a risk that the e-Obs technology does not link in with monitors/ devices.	<ul style="list-style-type: none"> Ensure any system purchased can link in with Welsh Allyn monitors. Review integration requirements with the Clinical Engineering Team to ensure the system is future proofed. Ensure devices that are purchased in the future are compatible
Interoperability: Futureproofing	The Welsh Intensive Care Information System (WICIS) delivered by ASCOM, which connects diagnostics and medical devices, is to be implemented at HDdUHB in 2024. This implementation will have dependencies on e-Obs and patient flow.	<ul style="list-style-type: none"> Involve WICIS team in procurement process. WICIS will integrate with Welsh Clinical Portal - ensure e-Obs integrates with Welsh Clinical Portal so full information available in clinical portal
Delay of benefits realisation	There is a risk that if there is any delay to delivery milestones and user adoption this may result in an impact on the benefits realisation plan	<ul style="list-style-type: none"> Closely monitor delivery ensure appropriate governance is in place Stakeholder buy-in Staff engagement

A risk log will be created upon commencement of the project and the above risks will be transferred to the log and monitored in order to mitigate the probability and impact during the lifetime of the project.

2.5. Assumptions

The assumptions that underpin the cost model are outlined below.

2.5.1. Implementation Timeline

The full draft implementation plan and approach is set out in Section 5.2. Implementation will follow an incremental approach with the technology being rolled out site by site and ward by ward. Note that the timeline is currently a draft version and subject to change. The priority and sequence for the sites needs to be agreed and the pilot site still has to be confirmed. It is possible that the first acute hospital will be a site that has an A&E department (for example WGH, GGH or BGH). An indicative deployment plan is shown as below:

- **Pilot:**
 1. South Pembrokeshire Hospital
- **Acute Hospitals**
 1. Withybush Hospital
 2. Prince Philip Hospital
 3. Glangwili Hospital
 4. Prince Philip Hospital
 5. Bronglais Hospital
 2. Withybush Hospital
- **Community Hospitals**
 6. Amman Valley Hospital
 7. Llandovery Hospital
 8. Ty Bryngwyn Mawr
 9. Llandovery Hospital
 10. Tregaron Hospital
 11. Park House Court Hospice
- **Mental Health**
 12. Mental Health Wards*
**patient flow only solution to be implemented, separate e-flow business case and solution for MH wards to be produced*

2.5.2. Hardware

The hardware costs are included in the financial cost plan. The assumption was made that devices would be purchased on a rolling programme over the first 2 years (equal split). This is because a one of capital investment is risky given that implementation is happening over a period of 3 years, devices are upgraded regularly, and hardware can be procured when required.

Portable Devices

The availability of devices is crucial to successful delivery and therefore costs have been included to add further devices areas where this solution will be deployed. The costs for laptops, tablets, smartphones and carts are based on an existing hardware framework used by HDdUHB. The costs for charging stations have been estimated based on online pricing.

Electronic Whiteboards

The following assumptions were made to calculate the cost of electronic whiteboards:

- Each ward will require one electronic whiteboard.
- There are 83 wards in total across all acute, community and mental health sites.
- Currently there are no electronic whiteboards in HDdUHB.

- The cost per whiteboard (based on market analysis and assumed touch screen functionality) is £2000 however we need to account for wall brackets and installation costs therefore £3750 per ward has been accounted for in the budget profile.

2.5.3. Network Upgrade

Network upgrades are currently being carried out across all acute sites in HDdUHB. In order for the proposed solutions to function, these will be essential. We have therefore included a cost estimate for network upgrades. However, these are not considered part of the core costing for this business case and may be covered by separate funding.

Wi-Fi Access Points

- There are currently an estimated 3 access points per ward.
- An additional 2 access points per ward are required.
- There are 83 wards.
- The cost per access point is £450 for a dual port.

2.5.4. Integration

We identified that three key interfaces with existing national systems would need to be developed to enable integration with the e-Obs/ e-Flow solutions:

A list of required integrations were included in the specification of functional and technical requirements for the solution:

National Systems
The Patient flow & E-Observation systems MUST provide the ability to interface with National applications such as but not limited to:
1. Welsh Clinical Portal (WCP)
2. Welsh Intensive Care Information System (WICIS)
3. Welsh Radiology Information System (WRIS)
4. Welsh Nursing Care Record (WNCR)
5. Welsh Community Care Information System (WCCIS)
6. Welsh Patient Administration System (WPAS)
7. Welsh Laboratory Information Management System (WLIMS)
8. Welsh Clinical Communications Gateway
9. Welsh Ambulance Services (WAST)

Based on previous costs provided by Digital Health and Care Wales (DHCW) for building these interfaces, the costs were estimated as follows:

- Cost per interface: £14,924
- Annual recurring cost per interface: £3,000

For reference, below is a list of local integrations (which would not incur DHCW integration costs):

Local Systems
The Patient flow & E-Observation systems MUST interface with local systems to obtain and share information such as but not limited to:
1. General Practitioner Consultation data (e.g. Vision Anywhere)
2. General Practitioner activities out of hours (e.g. ADASTRA)
3. Information on the care provided by Local Authority partners i.e. Social Care (e.g., Eclipse)
4. Scheduling information for medical staff and rostering/workforce management (e.g., Allocate)
5. Mental health related information (e.g. Care Partner)
6. Pharmacy Tracking System (PTS)
7. Electronic Prescribing (ePMA)

8. Decision & Intelligence platform (Frontier)

2.5.5. Supplier Costs

The supplier costs for the Patient flow & e-Obs are split in to three categories:

1. Licence costs

- The license costs are for an upfront enterprise-wide licence model.

2. Installation / Implementation costs

- The implementation costs include integration and configuration.
- The costs are added on across the seven-year implementation period based on the implementation timeline.

3. Annual support and hosting costs

- The LPP framework contract provides a delivery milestone payment structure, which links costs to agreed dates / activities. This is subject to agreement once the contract has been awarded.
- The budget has been profiled on the basis that Annual Support and Hosting costs will start once a site goes live and that costs are added in as each site goes live according to the implementation timeline, however, the payment structure will be confirmed post contract award.
- Costs include cloud hosting by the supplier.
- Annual support and hosting costs are per site based on the size of the site, which was calculated on the relative number of wards.

2.5.6. NHS Resourcing

Implementation Team

The table below shows all roles required for implementing the e-Flow and e-Obs solutions. Details of each role can be found in section 5.1.1 Project Team.

Table 11: Implementation Team Costs for implementing both e-Flow and e-Obs

Role	Band	WTE for project duration
Clinical Lead (and Senior Responsible Officer)	9	0.2
Programme Lead	8a	1
Project Manager	7	2
Application support trainers	5	2
Technical implementation lead	7	1
Project support officer	5	1
Business Change design officer	6	1
Designer/Digital content	6	0.5
Nursing informatics lead	7	2
Medical lead	CT3/ST3	0.2
Senior Clinical Technologist	6	1
Clinical Safety Officer	7	0.5
Service Desk (from year 2 onwards)	3	1

BAU Team

The table below shows all roles required for BAU running of the e-Flow and e-Obs solutions.

Table 12: BAU Team Costs for implementing both e-Flow and e-Obs

Role	Band	WTE for BAU
Application support trainers	5	1
Nursing informatics lead	7	1
Senior Clinical Technologist	6	1
Service Desk (from year 2 onwards)	3	1

2.5.7. Contingency

In this business case contingency adjustments have been applied across the following cost lines as follows:

- **A contingency figure of 8%** has been applied to all hardware, network infrastructure and DHCW integration annual support.
- **A contingency figure of 0%** has been applied to the Implementation and BAU teams, as these reflect the highest level of resourcing that is expected to implement the solution. A 0% figure has been applied to the supplier costs as they have been quoted under a competitive tender exercise and are therefore a true reflection of the market cost.

This equates to an additional c£70,059 over the 7-year period.

2.6. Total Economic Cost

The economic cost of the implementation option has been calculated based on the assumptions outlined in the previous section. These are the full costs for a 7-year period.

The table below represents the total economic costs for the following scenario:

- **Hardware and infrastructure:** Includes hardware and infrastructure costs
- **NHS resourcing:** Shows full economic costs for the BAU and implementation teams
- **Solution options:** Includes both the e-Flow and e-Obs solutions
- **Capabilities:** Represents the cost for purchasing the full functionality for both e-Flow and e-Obs solutions.

The table below illustrates that the seven-year Total Economic Cost for HDdUHB. Reoccurring revenue costs will be in the region of £0.5m per annum for implementing both e-Flow and e-Obs represents the highest total economic cost. However, based on the assumptions set out in Section 2.3.1 it is expected that combined implementation of these solutions (could deliver a total economic benefit of £21m over the 7 years. The assumption is that the majority of this benefit would be delivered from patient flow technology improving bed capacity management and movement of patients through the system. The Return on Investment (ROI) calculation provided below is based on the Low-Risk delivery model as described in section 2.3.1.

Table 133: Total Economic Cost, ROI

Cost Line	Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Non recurring Capital TOTAL	£288,850	£349,000	£149,400	£99,600	£0	£0	£0	£886,850
Non Recurring Revenue TOTAL	£302,920	£873,900	£803,125	£786,030	£0	£0	£0	£2,765,975
Recurring Revenue Total	£0	£497,304	£521,879	£544,149	£781,396	£803,069	£785,370	£3,933,167
VAT	£57,770	£167,641	£130,476	£123,350	£106,345	£109,343	£104,427	£799,352
Contingency based on 8%	£6,809	£32,074	£15,854	£11,722	£2,160	£2,160	£2,160	£72,939
Grand total	£656,349	£1,919,918	£1,620,734	£1,564,850	£889,901	£914,572	£891,958	£8,458,283
Cash Releasing Savings	£0	£0	£1,662,462	£3,060,271	£3,893,905	£3,893,905	£3,893,905	£16,404,448
Efficiency Releasing Savings	£0	£142,520	£528,415	£883,626	£883,626	£883,626	£883,626	£4,205,437
Total potential Economic Benefit	£0	£142,520	£2,190,877	£3,943,897	£4,777,530	£4,777,530	£4,777,530	£20,609,884
Return on Investment (ROI)	-£656,349	-£2,576,268	-£2,534,540	-£1,039,119	£1,964,885	£4,944,218	£7,946,165	

*Note that it has been assumed that the full Economic Benefit would only be delivered once implementation is complete at each site. The deployment plan can be found at section 5.2.3 which has been used to calculate the impact and outcomes provided above.

3. Financial Case

3.1. Financial Assumptions

A number of additional financial assumptions have been included in the business case as outlined below.

Accounting Treatment. It has been assumed that the initial purchase devices, network upgrades, will be a capital expenditure. Additional services provided by the supplier, as well as the annual support, maintenance and hosting fees and costs for the implementation and BAU team have been treated as revenue expenditure.

Inflation has been included and incorporated into staff costs.

VAT Position. It has been assumed in the cost model that VAT will be payable at the standard rate of 20% on all hardware and infrastructure costs (device purchases and network upgrades), as well as all supplier costs (licence costs, supplier implementation support, and ongoing support). Initial discussions with VAT advisors suggest the VAT may be recoverable on both the solution and the devices associated the deployment. The total VAT is currently estimated to be £799,352. A decision on this from HMRC, will need to be sought to determine whether VAT can be recovered upon approval of the FBC however initial feedback on this is provided below. However initial advice from the external VAT consultants (Ernst and Young), is provided the below:

VAT Advice Note

Key VAT Accounting and Treatment Considerations

Below are the high-level observations of the potential VAT treatment that may be possible given the nature, development and structure of this digital solution. The VAT observations are based upon discussions to date and a high-level review of HDdUHB's tender documentation in relation to the solution. As soon as the procurement concludes and a contract is awarded, to achieve this potential VAT recovery position, it is recommended that the HDdUHB begins to construct a robust and compelling VAT recovery case that would stand up to any potential future challenge or scrutiny from HMRC in the future:

- The core digital solution to be supplied by the preferred bidder, could potentially be structured as an arrangement that should qualify for VAT recovery under Heading 14 of the Contracted Out Services ("COS") Direction. This is due to the extensive technical work required in order to design, develop and specify the software solution that would meet HDdUHB's specific requirements.
- The digital expenditure that is integral to the deployment of the digital solution to make it operate as required should be eligible for VAT recovery under the current interpretation of Heading 14 of the COS Direction. This may include ancillary software such as APIs, storage solutions, security software, additional clinical software licences. It could potentially extend to costs relating to legacy systems that must work throughout the implementation phase.
- The ancillary digital expenditure may include digital software, digital hardware and infrastructure, and digital services and consultancy staff. HDdUHB will be required to evidence the link between each of these supplies and the digital solution to support any VAT recovery position. This means that as long as there is a clear link that the solution is a digital infrastructure designed, developed and implemented to the HDdUHB's specifications there should be a compelling argument for VAT recovery under Heading 14 of the COS Direction.
- There is a further condition when seeking to reclaim the VAT incurred on digital consultancy staff. The individuals must be working under the day-to-day control and direction of a third party (i.e. the supplier) and not HDdUHB.
- There should be scope for VAT recovery on the project related expenditure under the various headings under the COS Direction. The exact scope for VAT recovery will depend on the nature of each service procured by the Board. This would include elements such as storage services, security services, legal advice, professional services etc.

Subject to approval to proceed further discussions will recommence to secure an agreement with HMRC.

3.2. Financial Cost

All financial costs have been calculated based on the following:

- **Hardware and infrastructure:** Includes hardware and infrastructure costs
- **NHS Resourcing:** Includes additional costs only for the BAU and implementation teams
- **Integration:** Includes DHCW costs to enable integration with National systems
- **Supplier costs:** Represents the cost for purchasing the full functionality for both e-Flow and e-Obs solutions.

The table below illustrates that the total financial cost to HDdUHB, when allowing for costs associated with VAT, capital charges inflation and contingency. These bring the total estimated cost to £8.5m over a 7-year period.

NRC = Non reoccurring Capital

NRR = Non reoccurring revenue

RR = Reoccurring revenue

Table 14: Total Financial Cost

Cost Line	Cost type	Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Device Purchases	NRC	£0	£249,000	£149,400	£99,600	£0	£0	£0	£498,000
Network Upgrades	NRC	£37,350		£0	£0	£0	£0	£0	£37,350
HDUHB Deployment Team	NRR	£257,625	£774,879	£798,125	£781,030				£2,611,659
HDHUB BAU Team	RR	£0	£0	£0		£222,672	£229,353	£236,233	£688,258
Non pay Misc	RR	£5,000	£5,000	£5,000	£5,000				£20,000
DHCW integration – interface support	NRR	£40,295	£94,021	£0	£0	£0	£0	£0	£134,316
DHCW integration charges - Annual support	RR		£8,100	£18,900	£27,000	£27,000	£27,000	£27,000	£135,000
Patient flow & e-Obs - Licence	RR	£0	£159,381	£164,162	£169,087	£174,160	£179,385	£184,766	£1,030,941
Patient flow & e-Obs - Installation / Implementation	NRC	£251,500	£100,000	£0	£0	£0	£0	£0	£351,500
Patient flow & e-Obs - Annual support and hosting	RR		£329,823	£338,817	£348,062	£357,564	£367,331	£337,371	£2,078,968
Total		£591,770	£1,720,204	£1,474,404	£1,429,779	£781,396	£803,069	£785,370	£7,585,992
<i>Breakdown by cost type</i>									
Cost Line		Year 1 24/25	Year 2 25/26	Year 3 26/27	Year 4 27/28	Year 5 28/29	Year 6 29/30	Year 7 30/31	Total
Non recurring Capital TOTAL		£288,850	£349,000	£149,400	£99,600	£0	£0	£0	£886,850
Non Recurring Revenue TOTAL		£302,920	£873,900	£803,125	£786,030	£0	£0	£0	£2,765,975
Recurring Revenue Total		£0	£497,304	£521,879	£544,149	£781,396	£803,069	£785,370	£3,933,167
VAT		£57,770	£167,641	£130,476	£123,350	£106,345	£109,343	£104,427	£799,352
Contingency based on 8%		£6,809	£32,074	£15,854	£11,722	£2,160	£2,160	£2,160	£72,939
Grand total		£656,349	£1,919,918	£1,620,734	£1,564,850	£889,901	£914,572	£891,958	£8,458,283
Cash Releasing Savings		£0	£0	£1,662,462	£3,060,271	£3,893,905	£3,893,905	£3,893,905	£16,404,448
Efficiency Releasing Savings		£0	£142,520	£528,415	£883,626	£883,626	£883,626	£883,626	£4,205,437
Total potential Economic Benefit		£0	£142,520	£2,190,877	£3,943,897	£4,777,530	£4,777,530	£4,777,530	£20,609,884
Return on Investment (ROI)		-£656,349	-£2,576,268	-£2,534,540	-£1,039,119	£1,964,885	£4,944,218	£7,946,165	

3.3. Affordability

Funding is sought to enable HDdUHB to purchase and implement the FBC on the basis of the qualitative and quantitative benefits listed in section 2.3. Over the period of the project it is anticipated that the project will generate circa £21m in benefits over the 7-year period. Of this £16.4m will be cash releasing and £4.2 efficiency gains.

As cash releasing savings will not be generated until year 3, investment is required to fund the delivery in years 1 (£591k) & year 2 (£1.7m) a total of £2.3m. However by year 3 the investment will generate sufficient cash releasing savings to cover the annual costs and thereafter each year will enable further savings over the annual costs to be achieved. The total cost over the 7-year period being £8.5m, but total cash releasing savings £16.4m.

The ROI over a 7-year period is based on the low-risk model described in section 2.3 above.

The investment relies on it being viewed as an enabler to the delivery of the health board's longer term strategic aspirations for change. The Healthier Mid and West Wales strategy has embedded within it the principle that acute hospital care is not appropriate for many patients to receive care within, especially those with chronic conditions, frailty or other illness that is amenable to care outside hospital. In addition, as the demographic changes related to an ageing population - that inexorably leads to an increase in the demand for care over the next 20 years. It is imperative that the health board recognises that care for people in their place of residence will become an increasingly vital aspect of care delivery.

For Hospital@Home / virtual wards to meet the forecast increased demands, as well as to enable transformational change within our acute hospitals to focus on patients with the most acute or complex needs, it is necessary to ensure they are properly resourced. This includes not only the appropriate level of staffing, with adequate clinical oversight and management, but modern, effective, and robust clinical and data systems to sustain the service. By investing in this information solution, a key barrier to significantly increasing the level of community-delivered care would be overcome and facilitate the transformation of acute hospitals to a smaller, but more effective, bed base. But to do so, it will require digital systems that can provide the communication and coordination tools desperately needed to deliver this safely.

There is significant published literature that demonstrates Hospital@Home to be significantly more cost effective than hospital-delivered care – typically a saving of between £250 - £450 per day compared to the costs of a stay in a hospital setting. The Health Board in creating a roadmap to becoming more financially sustainable has identified that it must reduce the number of beds that we provide from acute and community hospitals, instead investing in more affordable model of community-based care. Accordingly, the need for investment in this system ought to be viewed as an integral aspect of the wider savings delivery across the health board. It is not possible to separately identify all the level of savings that would be delivered (or not delivered) as a result of the approval of this investment case.

Whilst the HDdUHB faces difficult financial decisions the advice from Government and independent studies is that investment in IT infrastructure is seen as a key factor in overcoming the challenges the NHS faces², as digital infrastructure can improve productivity³.

4. Commercial Case

4.1. Introduction

The Commercial Case outlines the proposed procurement in relation to the preferred option outlined in Section 2.2. It considers a range of procurement elements required to deliver e-Flow and e-Obs solutions, including scope, procurement procedure, approach and timetable. Following approval of this FBC these considerations should be further developed and detailed in the procurement strategy.

4.2. Required Services

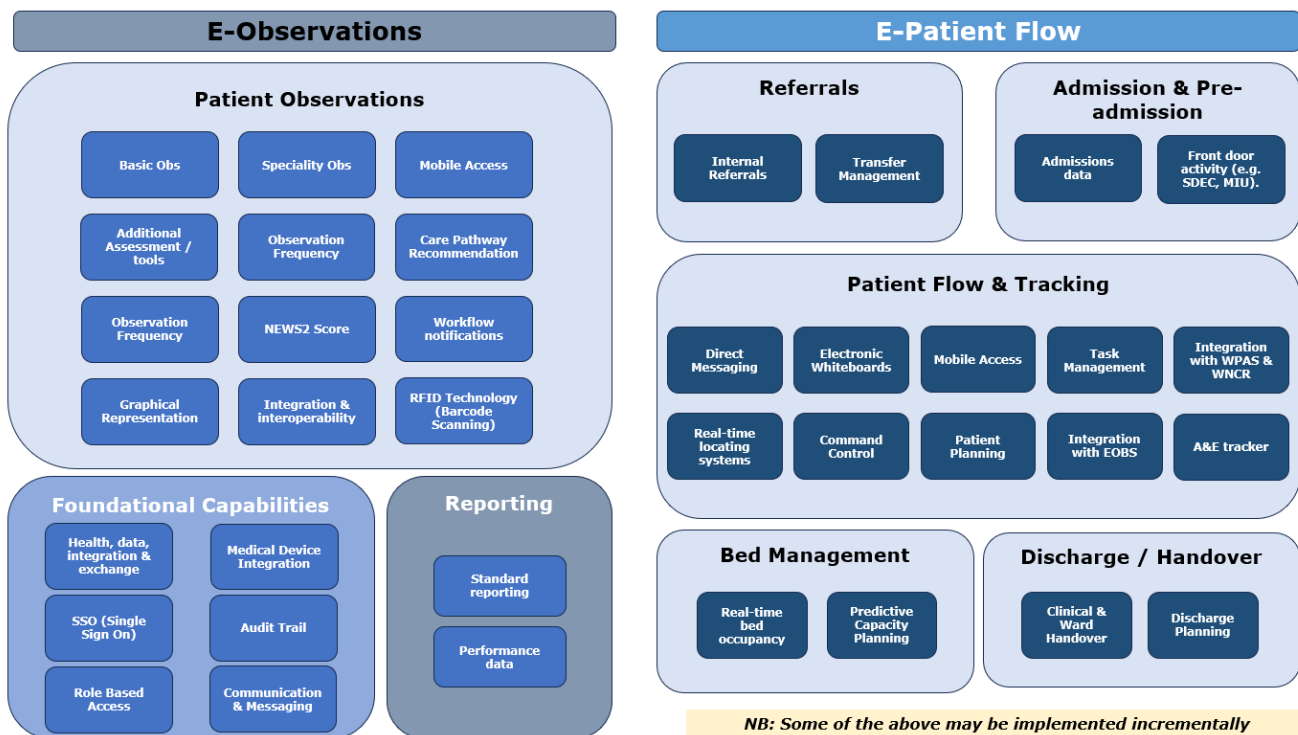
Since producing the OBC, a detailed specification has been produced as part of the tender and procurement process. The procurement scope included the following key components:

- e-Obs software
- e-Flow software
- Support/ Application Delivery Services
- Hosting (Note that the preferred option is to host the solution on the HDdUHB own Cloud system)

The chosen solution includes supplier hosting as well as annual support and maintenance (i.e. Software as a Service (SaaS), this may be considered a managed service. This was confirmed during the procurement process.

The diagram below lays out the various functions, capabilities, that would be required in each of these areas.

Figure 10: Procurement Scope



The new systems will need to integrate with the existing, national systems currently in use at HDdUHB and this has been included as part of the supplier specification. It is also important to note that the e-Obs system will need

to have MHRA accreditation if it performs functionality that classifies it as 'software as a medical device'.⁵⁸ Again this has been included in the tender specification.

The scope set out above was developed based on user research carried out during the OBC. The specification was developed and finalised following extensive user research with staff across the Health Board (see section 6) and signed off by the e-Flow and e-Obs Procurement Group in January 2024. The evaluation criteria were also developed and signed by this group which included representation from:

- Nursing
- Medical
- Therapies
- Pharmacy
- Operations
- Community
- Digital
- Clinical Engineering
- Quality Improvement

4.3. Procurement Approach

For the Commercial Case a range of approaches was considered and discussed with the HDdUHB Procurement Team. Given the resources and time required to build a bespoke solution from scratch, the decision was made to procure an existing, 'tried and tested' solution that can be configured to meet local needs for both the e-Flow and e-Obs solution. The aim is to implement these solutions incrementally.

HDdUHB's preferred option is to purchase a software-only solution hosted in a Cloud environment.

The recommendation was to procure the software solutions via an existing framework and as a result, a competitive tender was conducted via an invitation to tender ("ITT") via eTenderWales, using the Public Contract Regulations 2015 (PCR15) framework mini competition procedure, inviting bids from prequalified suppliers.

The mini competition was initiated utilising the London Procurement Partnership ("LPP") Clinical Digital Solutions Framework Agreement under Lot seven (7) Patient Support System Solutions. This framework included potential suppliers who had achieved inclusion onto the framework following a compliant qualification process. All interested providers on the framework under Lot seven (7) were invited to respond to HDdUHB requirements.

The framework suppliers are shown below:

- Advanced Digital Innovation (UK) Ltd
- Advanced Health and Care Limited
- Alcidion UK (Formally Extramed)
- Ascom (UK) Ltd
- BT Enterprise
- Cambio Healthcare Systems Ltd
- CGI IT UK Limited
- Civica UK Ltd
- DH OpCo UK Ltd (Dedalus)

⁵⁸https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/999908/Software_flow_chart_Ed_1-08b-IVD.pdf

- Epic Systems Corporation
- Graphnet Health Limited
- Extramed
- Insight Direct (UK) Ltd
- Insource Ltd
- IQVIA
- Orion Health Ltd
- Patients Know Best
- RioMed Ltd
- Access UK Limited, formerly Servelec Healthcare
- Solidsoft Reply
- UKElsevier

The ITT provided prospective tenderers with more detail of the Health Board’s requirements and incorporated, amongst other information:

1. Health Board’s requirements (Specification)
2. Request for commercial proposals
3. The award criteria will cover Value for Money and Social value

The specification was compiled and circulated for review via a working group including clinicians nursing, operations, as well as colleagues from Therapies and Pharmacy and community.

Providers were invited from the framework to submit a bid which was evaluated at the technical and commercial stages in order to ensure that it meets the Health Board’s requirement.

Four suppliers were invited to provide demonstrations to HDdUHB, these were:

1. Alcidion
2. Cambio Healthcare System
3. Insight Direct
4. RioMed

The procurement process has resulted in the preferred supplier being identified as **Alcidion**.

Award criteria

Most economically advantageous compliant offer received with checks on financial stability of proposed successful tenderer.

Table 15: Award Criteria

Criteria	Weighting Applied
Quality (Clinical Requirements)	45%
Quality (Technical Requirement)	25%
Social Value	10%
Commercial	20%
Total weighting	100%

Commercial - 20% Weighting

Providers were required to submit a fixed cost to provide an enterprise license (including all implementation, training, and support) cost for the entire Health Board. In order that a comparison between providers could be made, as part of the assessment of responses.

The enterprise licence cost is based on the number of beds within HDdUHB and the number of staff.

The Provider with the lowest total cost was allocated 20% and the remainder, the appropriate proportionate score in relation to the lowest offer.

Final Score

The final score awarded to each of the suppliers is the sum of their weighted Technical, Social Value and Price score, calculated to 2 decimal places. For the avoidance of doubt, the third decimal place will be rounded to the nearest second decimal. Where the third decimal place is a five it will be rounded up.

All suppliers were ranked in accordance with their final score. The Contract will be awarded to the supplier with the highest final score.

A timeline for the procurement process of the software solutions is outlined in the table below:

Table 16: Procurement Timeline

Milestone	Estimated Timeline	Status
Notify Financial Control Group (FCG) for informational purposes of intention to issue	10 th January 2024	Completed
Notification issued to Welsh Government to the Minister at the planning stage pre-tender (Allow 10 working days)	12 th January 2024	Completed
ITT issued	29 th January 2024	Completed
ITT closing date	28 th February 2024	Completed
Consensus evaluation moderated by NWSSP	11 th March 2024 to 15 th March 2024	Completed
Supplier demonstrations and complete evaluations	19 th March 2024 to 21 st March 2024	Completed
Board receives update on position including upper and lower bid values	28 th March 2024	Completed
Present SBAR outline costs / FBC summary to Exec	15 th May 2024	Completed
Digital Oversight Group	11 th June	Completed
Operational Planning, Governance and Performance meeting (OPGP)	11 th June	Completed
Weekly OPs meeting	20 th June	Completed
Acute Leadership Group	26 th June 2024	Completed
Present FBC update to Exec	3 rd July 2024	In progress
A Healthier Mid and West Wales (AHMWW Group)	3 rd July 2024	In progress
Quality, Safety & Experience Committee (QSEC)	15 th August 2024	In progress
Sustainable Resource Committee (SRC)	27 th August 2024	In progress

Obtain approval to award contract from Board	26 th September 2024	In progress
Obtain approval to award contract from Welsh Government	Oct/Nov 2024	In progress
Issue Standstill Notices	June 2024	Completed
Contract award	TBC	In progress
Contract commencement start date	Nov 2024	In progress

4.3.1. Hardware

The required hardware will be procured separately using existing hardware frameworks that HDdUHB is currently utilising. To mitigate the risk of devices requiring upgrading, these will be procured on a rolling basis as implementation is carried out across the Health Board.

4.3.2. Software, Support/ Application Delivery Services & Hosting

A number of factors were considered in developing the procurement approach for the software and support/ application delivery services.

Existing vs Build Your Own solution

HDdUHB are looking to implement a tried and tested existing solution rather than developing their own solution. This is because there is significant risk associated with being responsible for your own solution, and there are potential issues with getting the required software registered as a medical device. Hence the approach has been to secure an existing solution that has been utilised in other health care organisations and the required standards including ensuring systems comply with medical device and cyber security regulatory requirements.

Hosting

Cloud hosting has a number of benefits, such as enabling services to scale up and down to meet changing demand, and as such is the preferred approach. HDdUHB's preferred option was to procure a software-only solution that can be hosted in a Cloud environment. This is because it makes it easier to manage integration with existing systems.

Contract Duration

Given that it is estimated that implementation across HDdUHB will take 3 years, the proposed contract duration terms are 3+2+2:

The proposed contract duration terms are 3+2+2:

Proposed Initial Term – 1st November 2024 to 31st October 2027

With the option to extend up to:

First extension period - 1st November 2027 to 31st October 2029

Second extension period - 1st November 2029 to 31st October 2031

5. Management Case

This section outlines the proposed governance approach, digital roadmap and high-level implementation plan for the project.

5.1. Governance

The overall project will be managed by a Programme Lead, who will lead the project team set up in Section 5.1.1 below. The project team will work closely with clinical and operational staff from all sites to ensure that requirements of the solutions meet the needs of users.

5.1.1. Project Team

During the first three years of the project, the project will be run by an Implementation team. Once implementation is complete, the Business As Usual (BAU) team will take over.

During the first three years, the implementation period, there will be two Project Managers: one to lead the e-Flow rollout and one to lead the e-Obs rollout. Both will report to the Programme Lead, who reports to the Senior Responsible Officer. The table below outlines the full Implementation team.

Table 17: Implementation Team

Role	Description
Senior Responsible Owner	To represent the project at an executive level. To advise on how project needs to meet strategic goals of the organisation. Final escalation point within project governance.
Programme Lead	Overall day-to-day responsibility for project. Managing project managers. Engage and communicate at executive level within Health Board.
Project Manager(s)	Manage daily project activities. Provide Trust wide project co-ordination. Communicate project status issues and events to Trust leadership. Provider Leadership to Project Team.
Business Change Design Officer	Oversee change requirements of the project and assess impact on change plan within the organisation. Support gap analysis, 'as is' process capture and future state process mapping. Deliver Change Action Plan. Support Benefits workstream as appropriate.
Clinical Safety Officer	Validate clinical risks and issues.
Configuration and Implementation - Clinical Lead	Responsible for providing input into solution design and configuration from a clinical perspective.
Technical Implementation Lead	Responsible for providing input into solution design and configuration from a system administration perspective.
Nursing informatics leads	To provide input into solution design and configuration from a nursing perspective.
Senior Clinical Technologist	To lead on the e-Obs solution and connected medical devices from a clinical engineering perspective and liaising with clinical and digital colleagues

Role	Description
Application Support Trainers	Responsible for training strategy and approach. Management of trainers. Engagement with operational managers to coordinate and schedule training for operational staff to support business requirements. Sign-off training collateral and localised environment
Project Support Officer	Project support for project team, PMO duties

The implementation team, outlined in the table above, are the resources required to deploy the systems to support an expected implementation period of three years. Given that this technology will be used by frontline staff and directly impact patient care, this is the recommended team size. Using a reduced staffing profile would add to the risk profile by extending timescales and possibly compromising the quality of the delivery and minimise the benefits output.

Note the implementation team will be supported through a collaborative governance approach that will ensure that operational and clinical staff are fully involved in the deployment and delivery planning.

Once implementation is complete, the BAU team will take over. The table below outlines the BAU team which is funded as part of this business case:

Table 18: BAU Team

Role	Description
Application Support	Setting up new users and their Role Based Access Control (RBAC) access rights, including the periodic synchronisation of Active Directory staff lists with solution staff registers. Updates of national and organisational reference files (e.g. Postcode, GP). Data quality activities such as Master Patient Index (MPI) duplicate checking and management of patient merges. Maintenance of print queues. Support of any reports and dashboards created by the Health Board using the tools provided by the Supplier. Raise tickets/manage all issues as follow on from the issues raised with the Health Board service desk. Technical analyst for the management of iPods/iPads/hand held digital devices for solution and all front-end PCs. Carry out any ongoing testing required.
Nursing Informatics Lead	Whilst not a requirement for the support and maintenance of the system, the Health Board nonetheless will be undertaking an ongoing programme of clinical content design, capture, and maintenance, including Clinical Narrative forms, care pathways and tasks. Continued support for the nursing teams will continue to be a need.
Senior Clinical Technologist	Provide evidence-based specialist training on all high risk Medical devices, focusing on Medical device safety, quality, and embedding change within clinical practice. Develop training strategies for identified high risk medical devices. Provide evidence-based training on defined medical devices. Develop, plan and coordinate the training programme for all identified medical devices. Ensure that all training and assessments are recorded via the Health Board ESR/OLM systems. Evaluate and report on provision and attendance on training. Develop, supervise and support current and new work-based trainers.
Service Desk	The service desk team are responsible for logging incidents, service requests and provide first line technical support.

5.1.2. User Design Group

To ensure that the requirements of the solution meet the needs of users, clinical and operational staff were involved throughout the procurement and will remain engaged throughout the implementation process. An Evaluation User Group was set up which consisted of representatives from clinical departments across acute and community sites as well as operational and admin staff, in order to ensure local needs are met. The Procurement evaluation sub-group supported the development of the procurement process and have continued to offer support throughout the tender evaluation in order to ensure that the user needs the focus throughout, this will form the basis of the User Design Group going forward who will ensure that the Acute and Community teams needs are met.

5.2. Implementation Plan

This section sets out the digital roadmap and architecture map for the e-Flow and e-Obs solutions. It also describes the implementation approach and provides a suggested timeline.

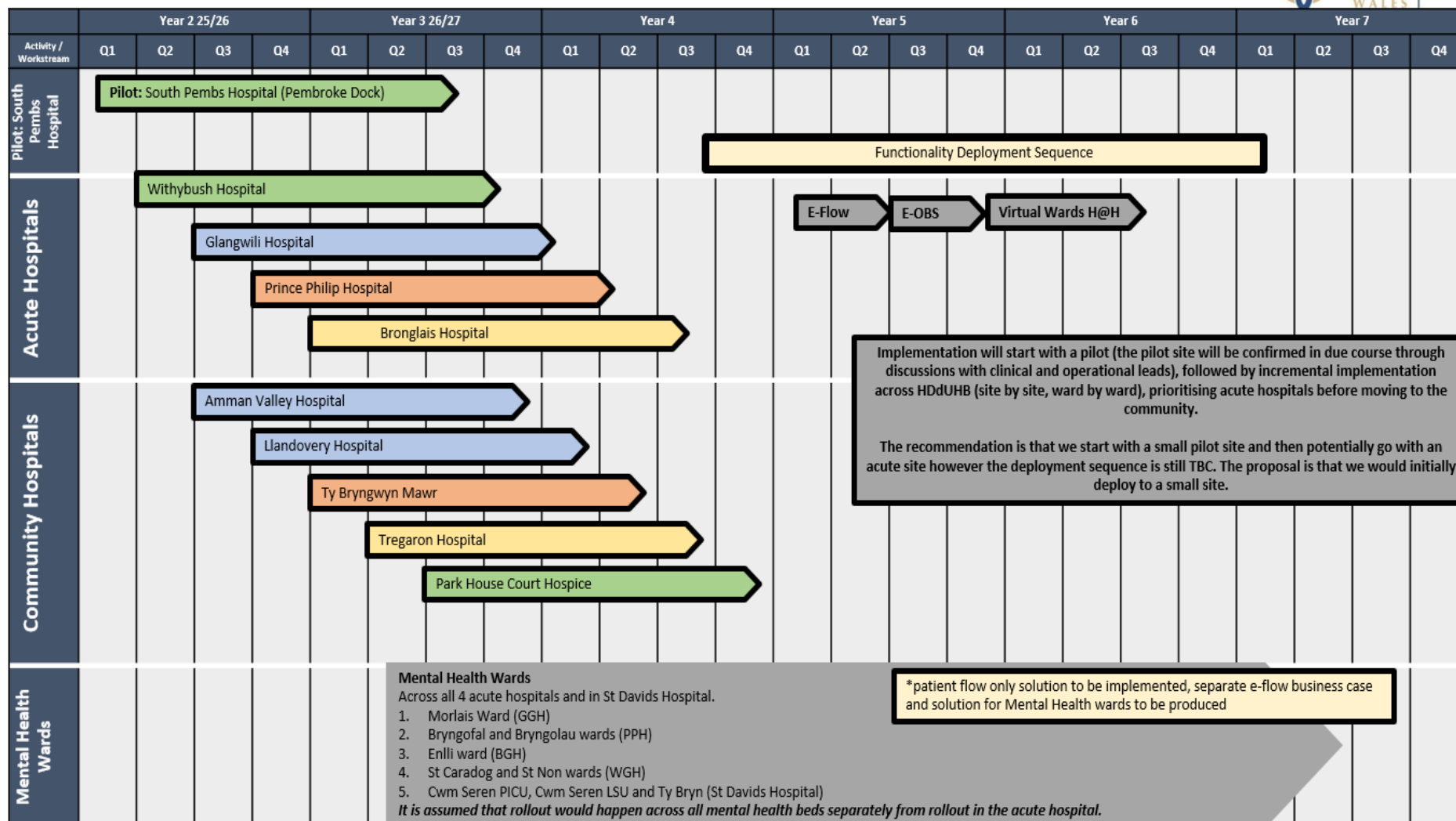
The implementation will follow an incremental approach with the technology being rolled out site by site and ward by ward. The plan is to pilot the technology at a Community Hospital. Before starting implementation, work to enable integrations will need to be carried out.

Implementation will be prioritised at acute sites before moving into community hospitals. Mental Health wards will be offered the opportunity to deploy the e-Flow solution only as the standard e-Obs system would not be appropriate in these clinical areas. Further work to identify a solution for observations in this specialty would require a separate business case owing to the complexity. Acute sites will be prioritised as they are currently facing the biggest challenges with regards to patient flow with ambulances waiting outside emergency departments, unable to admit patients to hospitals.

A high-level deployment plan can be found at 5.2.3.

E-OBS & E-Flow Implementation Plan EXAMPLE DEPLOYMENT PLAN

dates are indicative & are not baselined – subject to contract signature & internal governance approvals



Implementation will start with a pilot (the pilot site will be confirmed in due course through discussions with clinical and operational leads), followed by incremental implementation across HDdUHB (site by site, ward by ward), prioritising acute hospitals before moving to the community.

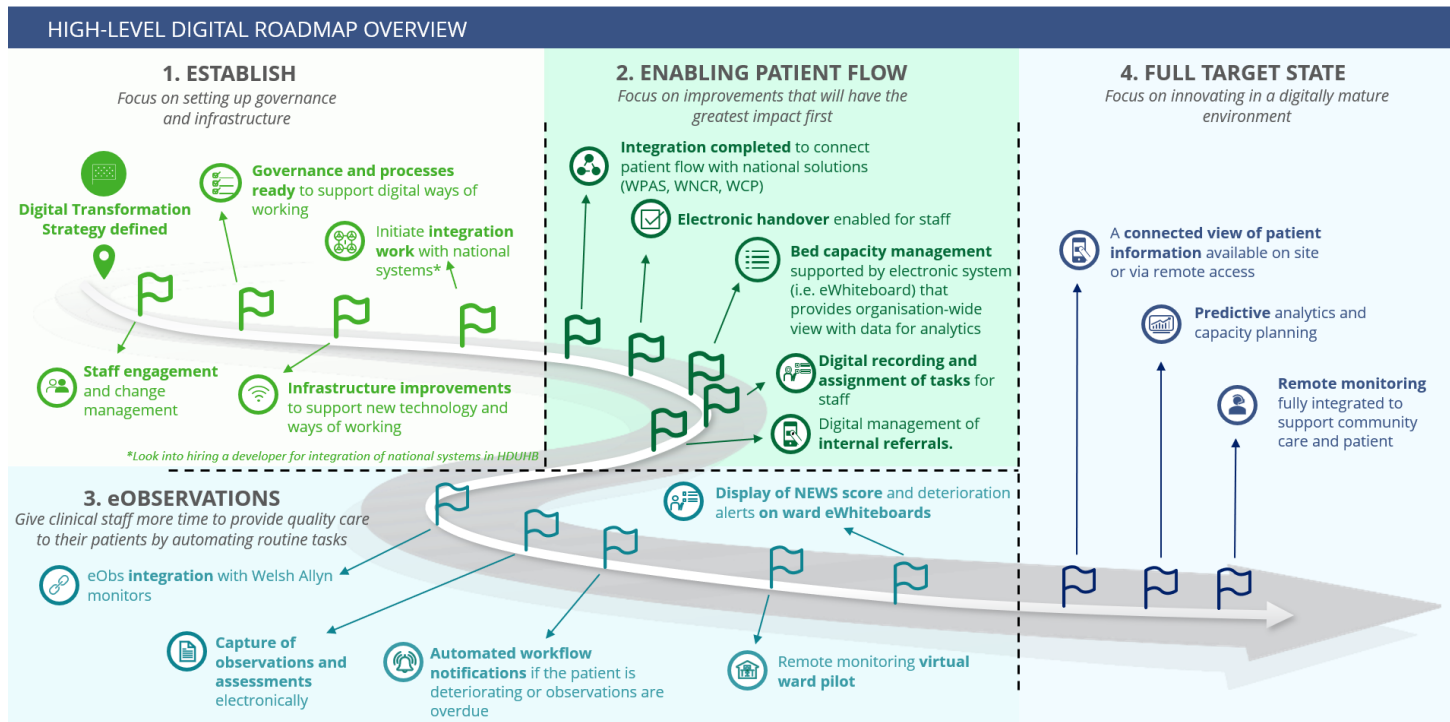
The recommendation is that we start with a small pilot site and then potentially go with an acute site however the deployment sequence is still TBC. The proposal is that we would initially deploy to a small site.

Figure 11: Deployment plan

5.2.1. Digital Roadmap and Architecture Map

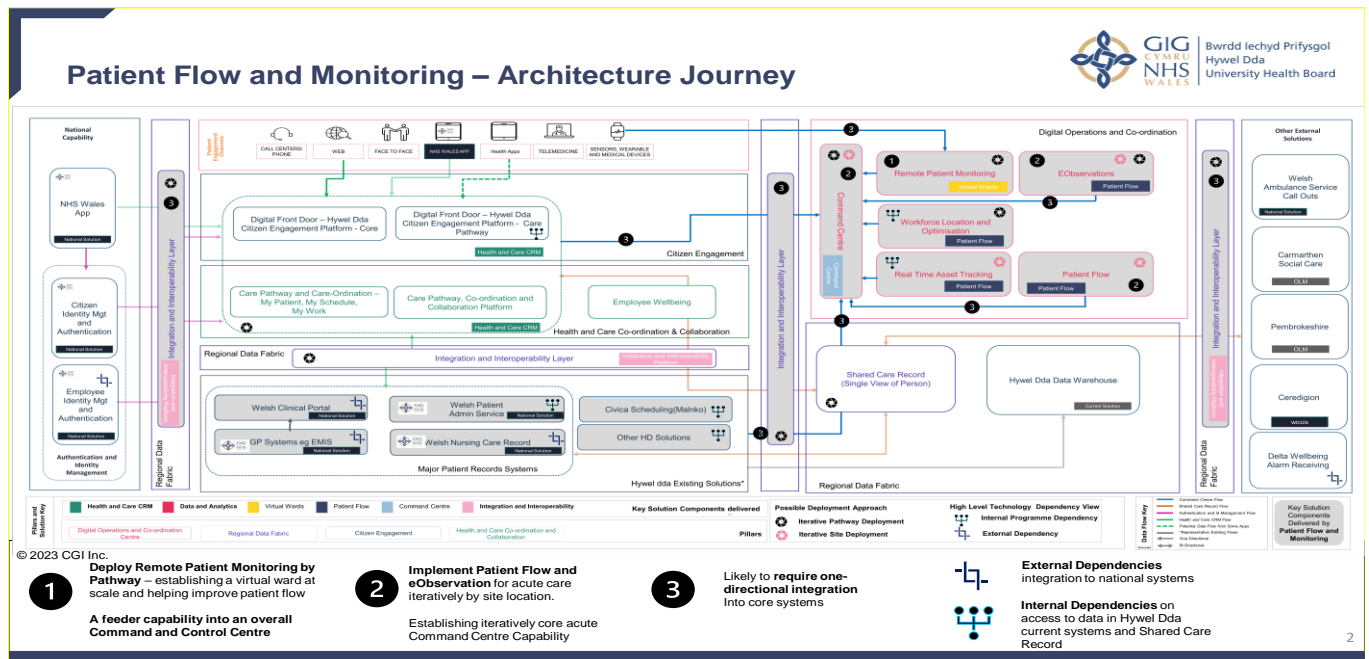
The Digital Roadmap visualises the rollout of the e-Flow and e-Obs solutions across four phases. The first phase focuses on setting up governance and processes, preparing the local infrastructure, and engaging staff on all levels, with communication and training. During phase 2 technology to support patient flow are introduced. Patient flow is being improved with digital tools, and their integration with existing systems. The third phase introduces improvements that build on existing capabilities. The focus is on giving clinical staff more time to provide quality care to their patients by automating routine tasks. The fourth and final phase makes HDdUHB reach their full target state for this project. It builds on the technology set up in previous phases. This phase is about innovating with digitally mature e-Obs and patient flow technologies. Learnings from phases 2 and 3 will influence the vision of the full target state. An agile approach will enable HDdUHB to make changes as required.

Figure 12: High Level Digital Roadmap



To understand how the e-Flow and e-Obs solutions will interact with existing local and national systems in use across HDdUHB, an architecture map was developed. The map in 9 below shows the future vision of how data will flow across some of the Board's foundation systems. This architecture map shows data flow, but the recommendation is that it is facilitated by a single enterprise integration layer, in order to minimise point-to-point connections, provide more efficient end-point management and enable greater scalability as the architecture is scaled out and new systems come into scope.

Figure 13: Integration Architecture Map - Data Flow



5.2.2. Implementation Approach

Phase 1: Establish (Year 1)

During this phase the processes, governance and infrastructure to enable a successful implementation of e-Flow and e-Obs technology will be established. The workstreams in this phase include:

- **Staff engagement:** Communicate with clinical and operational staff to inform them of the planned changes via email or staff meetings. Run a Q&A session prior to implementing changes at local sites. Identify and establish local champions.
- **Staff training:** Offer IT basics training to staff, where digital literacy is low, to set a baseline of knowledge and make staff feel comfortable with the thought of introducing new systems. Educate staff on the benefits of new systems and how they will help improve patient care. Provision of digital inclusion support will be crucial to overcoming issues with capability and confidence, see section 5.5.
- **Infrastructure assessment and set up:** Assess the Wi-Fi network, and existing hardware (number of available devices, speed of PCs etc). Ensure Welsh Allyn monitors are available for e-Obs. Upgrade existing infrastructure as required.
- **Governance assessment and set up:** Review current ways of working and assess existing processes, such as ADT (admission, discharges, transfers) compliance and policies support the introduction of new technology. Set up governance if required.
- **Integrations:** Prepare for integration of e-Obs and patient flow systems with existing systems, including WPAS, WNCR, Welsh Clinical Portal and Welsh Allyn Monitors. As required submit requests to DHCW. Plan for integration of future systems, such as the paging app for e-Obs alerts and WICIS.

Phases 2-3: Solution Rollout (Years 2-4)

- **Phase 2 – Enabling e-Flow:** In this phase, technology to support patient flow will be implemented. This includes electronic whiteboards that will display key information from several systems. The implementation will start with a pilot at South Pembrokeshire Community Hospital. Initially, electronic handovers are enabled, followed by bed capacity management, task management and electronic referrals.
- **Phase 3 – e-Obs:** In this phase electronic capturing of observations, assessments and alerts will be rolled out across the acute and community sites. Initially, the solution will be piloted at South Pembrokeshire Community Hospital to develop a detailed implementation plan for sites. There is an opportunity to pilot remote monitoring at home with a small cohort of patients.

Phase 4 – Full Target State BAU (years 5-7): Technology to enable remote monitoring of patients in their own homes will be implemented, as well as more advanced data analytics to enable predictive capacity planning.

The solution rollout phases 2-4 will involve the following:

- **Finalise integrations:** Prior to rollout, all key integrations should be enabled. User research has highlighted the need for systems to integrate in order to deliver the expected benefits.
- **Configure solution:** Configure the solution to meet local needs (site and service needs) as appropriate.
- **Staff training:** Train staff on use of new solution.
- **Implement solution:** Implement technology.
- **Post Go-Live support:** Provide on-site support for staff following implementation including ongoing training due to staff returning from long term sick leave/maternity/paternity leave, etc and new members of staff.

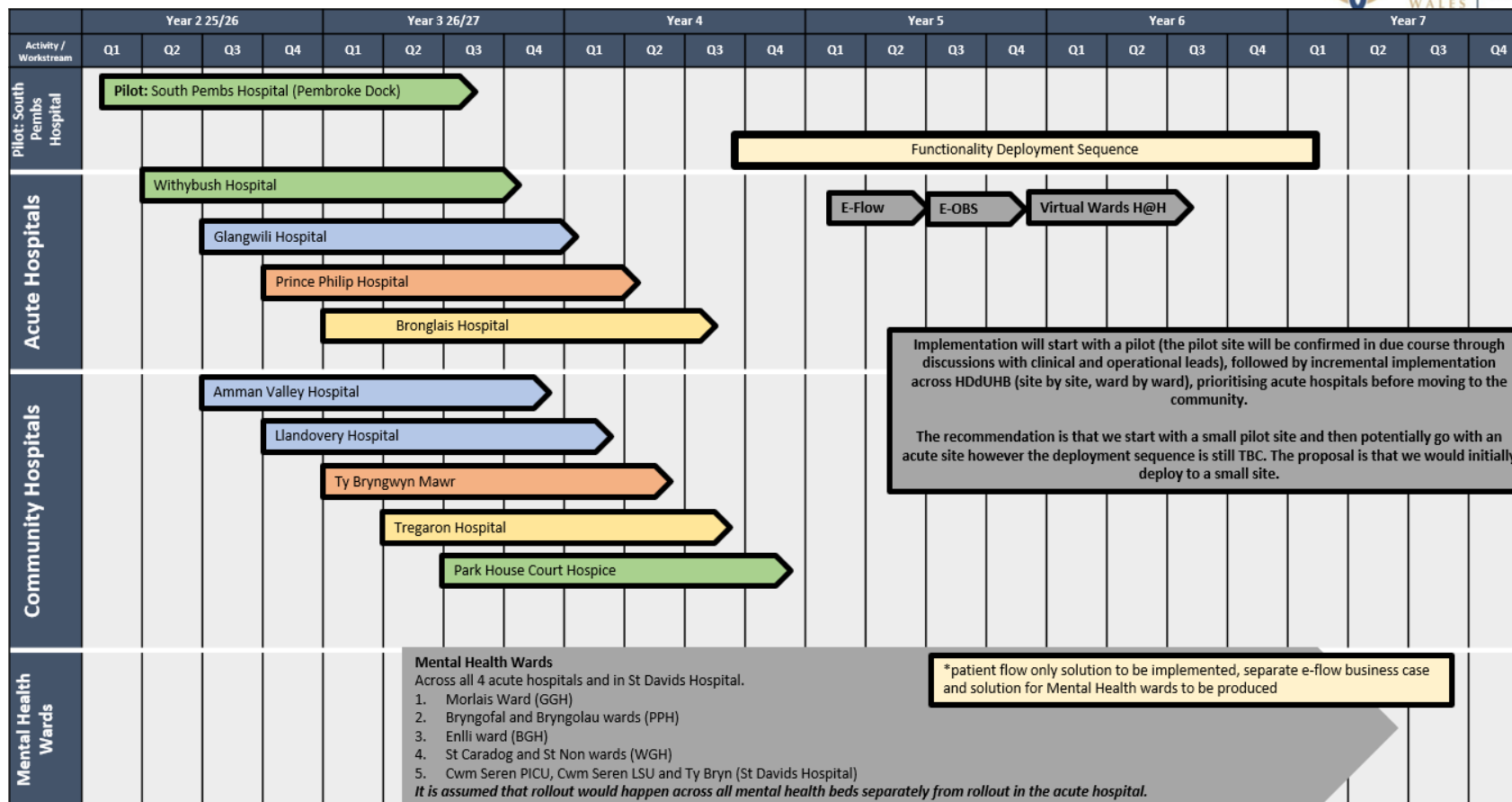
5.2.3. Draft Implementation Timeline

The figure below sets out the suggested implementation timeline, which sees the rollout and e-Obs completed across the Acute sites by Year 3 . Note this for illustration purposes and it is fully anticipated that the rollout order may change once approval is given to proceed and detailed discussions held with the sites and associated leadership teams.

Figure 14: Provisional Draft Implementation Timeline

E-OBS & E-Flow Implementation Plan **EXAMPLE DEPLOYMENT PLAN**

dates are indicative & are not baselined – subject to contract signature & internal governance approvals



Implementation will start with a pilot (the pilot site will be confirmed in due course through discussions with clinical and operational leads), followed by incremental implementation across HDUJHB (site by site, ward by ward), prioritising acute hospitals before moving to the community.

The recommendation is that we start with a small pilot site and then potentially go with an acute site however the deployment sequence is still TBC. The proposal is that we would initially deploy to a small site.

The following assumptions were made when developing the timeline:

- **Phase 1: Establish Integrations** – Engagement with DHCW and will involve recruitment of a Technical Implementation Lead. It is expected that this will take up to 6 months.
- **Phase 1: Establish site** – This is estimated to take between 3 and 6 months for all sites other than Withybush. We have assumed that as the rollout progresses across HDdUHB this will take less time, as governance/ processes required are established at initial sites.
- **Phase 2: Enabling e-Flow Pilot** – Based on work at NHS Lanarkshire and the capabilities included, we have assumed that the pilot will take between 4 and 6 months.
- **Phase 2: e-Flow Rollout** – This will vary depending on the capabilities rolled out. We have assumed this include patient handover, bed capacity management, task management and referrals. Based on information provided by suppliers this is estimated to take 3 to 4 months per site. This includes on-site support of 2-3 weeks based on the WNCR Rollout.⁵⁹
- **Phase 3: e-Obs Pilot** – The e-Obs Pilot is split into ‘e-Obs Capture and Assessments’ and ‘Alerts’. This is based on experience captured from the NHS Lanarkshire reference site and information provided by the supplier. Each pilot phase is expected to last 2-3 months.
- **Phase 3: e-Obs Rollout** – Similarly to the pilot the rollout is split into ‘e-Obs Capture and Assessments’ and ‘Alerts’. Based on supplier and reference site information rollout at each site is expected to take 2-3 months. As the solutions are rolled out across HDdUHB it is expected that speed of implementation will increase.
- **Phase 3: Virtual Ward / H@H Pilot** – This pilot is expected to last 3-4 months to provide enough time to test the technology with citizens in the community and develop relevant governance and processes.
- **Phase 4: Virtual Ward / H@H Rollout** – The rollout is expected to take between 3 and 6 months. It is expected that it may take longer initially to establish the technology with faster implementation in the community. It is likely that remote monitoring will be rolled out on a speciality basis as is considered appropriate (i.e. specialities such as respiratory, cardiology and frailty, where observations are key are likely to roll this out as part of managing patients in virtual wards). It is assumed that remote monitoring would not be rolled out for the Hospice (Park House Court) or the mental health wards.
- **Phase 4: Predictive Capacity Planning** – Once all sites are set up and using the bed capacity management solution, predictive capacity planning can successfully be implemented.
- **Mental Health Wards** are found across all 4 acute hospitals and in St Davids Hospital. They include Morlais Ward (GGH), Bryngofal and Bryngolau wards (PPH), Enlli ward (BGH), St Caradog and St Non wards (WGH) and Cwm Seren PICU, Cwm Seren LSU and Ty Bryn (St Davids Hospital). It is assumed that rollout would happen across all mental health beds separately from rollout in the acute hospital.

A more detailed implementation plan has been provided by the preferred supplier however this will need to be validated and confirmed post contract award.

5.3. Risk Management

Risk identification and management will be a continual process in the programme to monitor the level of exposure to risk at any point and keep unwanted outcomes to a minimum, particularly given the proximity of these systems to patient care. A risk register has been developed as part of this FBC and is set out in Section 2.4. The Project Team will ensure that the following risk processes are in place:

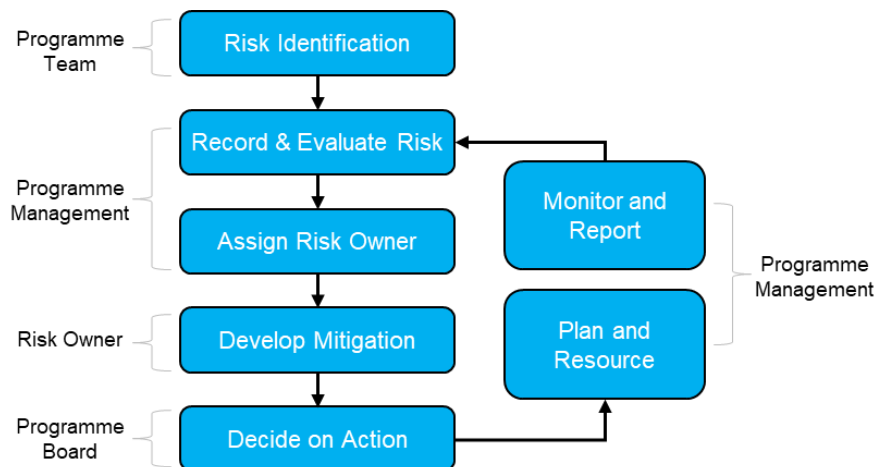
- up-to-date risks register open to anyone to review. Formal updates will be made by designated individuals only;
- all risks will be reviewed regularly by the team, and key risks escalated to the Programme Lead for management by exception.
- significant risks will have mitigation plans developed and will be formally reviewed.

⁵⁹ Jones, L. et al. (2022) Lessons Learnt from the Implementation of the Welsh Nursing Care Record (WNCR).

- a decision-making process supported by a framework of risk analysis and evaluation; and
- processes in place to monitor risk.

The proposed risk management approach is outlined in Figure 15. It will be the responsibility of all team members to identify risks as and when they become aware of them, and to use the risk management processes. These processes ensure that the risks are logged and assigned to owners to manage and continually review the individual risks. The project managers will have a key role in monitoring, reviewing and managing action delivery to mitigate or resolve risks.

Figure 15: Best Practice Risk management approach



5.4. Change Management

The implementation of this technology is expected to have significant impact on frontline staff, and it will be important to minimise any negative impact during the implementation period.

Effective change management and visible leadership will be critical to the success of the project in order to.

- achieve buy-in across stakeholder groups from all sites and departments.
- gain commitment from users, recognising potential disruption to services and additional effort required during the implementation period.
- support the changes in working practices that the new arrangements will require; and
- realise the benefits of implementing e-Flow and e-Obs technology, as outlined in Section 2.30.

To ensure effective change management HDdUHB will develop the following:

- Change Management Strategy: to include an assessment of the potential impact of the proposed change on the culture, systems, processes, and people. An underpinning communication strategy for affected disciplines and staff will also need to be defined.
- Change Management Framework: this sets out the organisational structure and personnel required to direct, manage, implement, and evaluate the change, along with details of roles and responsibilities, and to support staff through the change; and
- Change Management Plans: this defines the communication required for the implementation phase.

Furthermore, the team will include a Change Design Officer to oversee change requirements of the project and assess impact on change plan within the organisation, as well as local Digital Champions to support engagement and training of clinical and operational staff.

5.5. Digital Inclusion

Digital exclusion continues to be an area of importance locally and nationally and is a clear priority for Welsh Government as services continue to digitalise their ways of working and engaging with the population and as

digital continues to be of emphasis. We know from Welsh Government statistics that 7% of Wales continue to be completely excluded from the digital world, and approximately 22% of the Welsh population lack the essential digital skills required including members of the health and care workforce.

HDdUHB is committed to tackling digital exclusion and ensuring that the right opportunities are available to promote and develop the digital skills, confidence and motivation of the workforce, which in turn will naturally cascade into the wider population that HDdUHB serves.

HDdUHB acknowledges that without a fully capable and enabled workforce, the implementation and success of delivering a programme of this calibre will be at risk of not meeting its full potential. HDdUHB is passionate and committed on ensuring that the level of digital skills and confidence of the workforce is understood, and the right support opportunities are available to develop a confident and capable workforce and population for the future. It is important to remember that enhancing the digital skills and confidence of the workforce will support the benefits realisation and objectives of the e-Flow and e-Obs project proposed, and also, the wider strategic delivery of the service for the future.

With this in mind, HDdUHB has become the first health board in Wales to introduce a digital inclusion support service which focuses on improving the digital skills and confidence of the workforce and aims to:

- Ensure that all staff and volunteers have the opportunity to develop basic digital skills and confidence and take advantage of this opportunity.
- Ensure that digital inclusion principles are embedded into the day-to-day activities of the service and to promote and support the role that digital tools play in managing health and wellbeing.
- Encourage and support staff and volunteers to help others to use technology and have the confidence to develop basic digital skills.

Why is Digital Inclusion of significance?

We know that our staff need to feel comfortable, equipped and competent in using digital solutions. A lack in confidence can create barriers to engagement in digital technology and slow down or even prevent the uptake of such opportunities to deliver care differently. It can also stagnate service transformation and reduce the efficiency that can be gained from changes in our current processes. It is vital within all new potential digital solution such as e-Flow and e-Obs that digital inclusion is seen as an enabler to the success of delivering high quality care in the modern digital world and to ensure the digital readiness of our workforce and population for the future. It is important to highlight that from the support already provided and engagement that has taken place with the workforce around digital inclusion to date, 76.7% of those engaged with the service indicated low level digital skills and confidence work within clinical areas, which highlights the need for digital inclusion support to be embedded within the proposed projects.

Considerations

To support the success of the e-Flow and e-Obs project, careful consideration will need to be taken in understanding the readiness of the workforce. It is proposed that the digital inclusion team will work closely with the project implementation team and offer expertise in engaging and understanding the basic digital skills and confidence needs of all clinical staff involved in the roll out of the new digitalised way of working.

It is important that assumptions are not made about the level of digital skills, confidence and motivation among the workforce and to be aware that the reluctance from staff to move from a traditional to digital way of working is a potential reflection of personal barriers, fear and concerns about service quality, job security, as well as organisational and practical issues and a lack of understanding of the benefits that digitalisation can offer.

The key considerations needed from a digital inclusion perspective to support the implementation of the proposed projects are:

- To develop an understanding of the basic digital skills and confidence needs of the staff. This will be essential when developing an implementation plan for the programme to ensure the right support to develop the skills and confidence needs of the workforce are met.
- The workforce confidence and capability in using the device and system proposed within the implementation of the programme, and what support is required to ensure full functional use of the devices by the workforce.
- The accessibility requirements of using digital technology that will support and enhance the workforce to engage with digital comfortably and confidently. Consideration must be given to accessibility needs, if not, this may result in reluctance or barriers to the projects.
- Identifying key collaborators within the HDdUHB that will provide the relevant support beyond the digital inclusion team's remit. This will allow for effective signposting to develop on workforce resilience and empowerment.
- Ensuring that there ongoing support opportunities are available for staff to access pre and post implementation of the e-Flow and e-Obs systems and that staff feel confident and are aware of what support is available to them.
- The digital inclusion team will work closely with the project implementation team to ensure that the right support and resources are embedded into the implementation plan for the rollout of the programme. The flexible and proactive approach of the digital inclusion team offers the opportunity for engagement and support to be offered to all services involved within the proposed projects.
- The digital inclusion team will follow the rollout plan developed by the implementation team, ensuring engagement and bespoke support is offered pre rollout of the new systems and will be available to all teams involved across all sites within HDdUHB.
- The digital inclusion team in its nature, is an open and self-referring support opportunity therefore, all staff can and will have the opportunity to continue to access support if and when needed post implementation of the projects.

Training and Resources

It is proposed that the following opportunities will be available to support and prepare for the implementation of the e-Flow and e-Obs systems:

- The Digital Inclusion team will sensitively engage with the workforce to complete a Digital Skills Capability Audit prior to rollout offering an understanding of current skills and confidence levels of the staff. The audit will also gather the relevant information required relating to workforce confidence and skills in using specific devices as per the project proposal.
- The outcome of the audit will allow for a clearer focus on identified areas of need and the digital inclusion team will provide relevant training sessions, which will ensure that all staff engaging with the proposed project have the opportunity to develop on their basic digital skills and confidence.
- Staff identified in needing more substantial support will be offered the opportunity to be signposted to other relevant support through a variety of avenues based on their levels of need, i.e. further digital inclusion support such as bespoke 1:1 support, drop-in sessions, signposting to learning and development, available training opportunities and guidance materials provided by the system supplier.
- The development of Digital Champions within staff groups to act as peer-to-peer support within teams who will work closely with the digital inclusion team to offer a signposting opportunity and refer individual members to access relevant support will also be essential to ensure an all-rounded collaborative approach to supporting the staff involved in the projects. The digital inclusion team will ensure digital champions have the knowledge of all support opportunities available through the digital inclusion team and will act as the cascading support for the workforce.
- Adopting a collaborative approach to supporting skills and confidence development of the workforce pre and post implementation will develop positive cultural behaviours and views of the use of digital tools within health and care and support workforce uptake and adoption of the digital tools available. Offering the support network mentioned above we believe will effectively contribute to the overall success of implementing the e-Flow and e-Obs system and will meet the strategic objectives proposed within the project.

5.6 Training

The supplier of the solution will provide quick start guides for the solution along with train the trainer materials as part of the installation and implementation costs. The Application Support team will supplement these materials to make them relevant to Hywel Dda users of the application and identify and document how these systems are expected to work in conjunction with our existing suite of digital applications.

The proposed training approach would follow a tried and tested method of an incremental go-live where a pilot group of appropriate wards on one acute site would initially be implemented followed by a community site(s) and then a non-physical site(s)/team(s). Following the review of the pilot sites its anticipated that the pace of further roll out to other sites and areas would increase as lessons are learnt and a rhythm established, with the Health Board taking greater ownership and responsibility of the implementation as the programme progresses.

During all stages of pre implementation, go-live and post go-live, training would be delivered and offered in several methods, face to face, remotely via tools like MS Teams and heavily supplemented by support materials and bespoke user guides for user roles and teams across the Application Support Intranet site and made available to those teams who may not have ready access to the existing platform.

The Application Support team along clinical informatics nurses will carry out an extensive programme of floor walking before during and after the go-live process for each individual area, ward or team to ensure that any potential operational issues are dealt with the appropriate urgency, and this will continue until there are assurances that the teams are comfortable and proficient with the new application. This will cover in hours and out of hours teams, ensuring groups such as night shift workers are not disadvantaged.

During the implementation programme there will be a bespoke pathway on the IT helpdesk to ensure calls related to e-Flow and e-Obs given an appropriate priority during the go-live process.

Standard dashboards, outputs and reports will be established and circulated specifically for the go-live period to support the identification of potential data quality issues and hotspots that might require further investigation or investment of time and attention to ensure new processes are adopted and embedded as expected.

Once the application has been fully implemented and embedded into a business-as-usual model, ongoing training will be offered and provided in line with existing processes for the digitally managed applications.

Implementation into new areas not covered in the original scope of the programme will be managed and prioritised through a product backlog approach. Ensuring maintenance of Hywel Dda data standards and assurance that both local and national recording and reporting requirements are maintained and aligned across the suite of digital applications available to the end user.

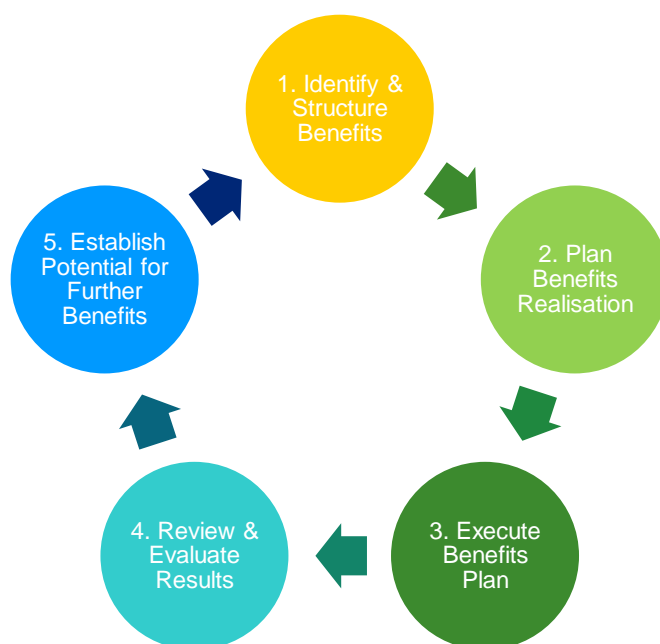
5.6. Benefits Realisation and Measurement

The economic section identified a number of non-financial benefits to be delivered by the implementation of e-Obs and electronic patient flow solutions.

Prior to implementation, HDdUHB intends to carry out further analysis of current processes in order to develop detailed baseline measures against which to monitor and assess performance and outcomes.

These KPIs should be built into the benefits realisation plan, where owners are assigned to each outcome. A proposed approach for benefits realisation is shown in Figure 16 below.

Figure 16: Proposed Benefit Management Approach



HDdUHB has a dedicated Benefits Realisation Manager who has joined the Digital Team. They will lead on assessing whether the benefits outlined in Section 0 are realised, and work with local teams to manage benefit realisation. As part of their role, they will assign owners to each identified benefit. Note that the preferred supplier will also provide capability to support benefit realisation and measurement.

The learning from other health systems in the UK and abroad who have implemented similar solutions has been supplemented by local consideration of benefits.

The benefits identified are themed as follows:

- **Improved Patient Outcomes (IPO)**
 - EOBS-IPO-001a Reduce risk of harm due to a reduction in hospital based cardiac arrests
 - EOBS-IPO-001b **Reduced risk of harm due to a reduction in hospital acquired infections**
 - EOBS-IPO-002 Reduced risk of errors (e.g. due to more regular, accurate observations)
 - EOBS-IPO-003 Reduced unplanned admissions to critical care units from e-Obs-equipped wards
 - EOBS-IPO-004 Increased number of observations completed on time
- **Enhanced Patient Experience (IPE)**
 - EFLOW-IPE-001 Increased time to care for patients
- **Better Staff Experience (ISE)**
 - EFLOW-ISE-001 Increased confidence resulting in improved decision making
 - EFLOW-ISE-002 Reduced stress levels
 - EFLOW-ISE-003 Improved communication between staff members and across departments
- **Increased Efficiencies (IE)**
 - EOBS-IE-006 Reduced manual admin work and removal of duplication of effort
 - EFLOW-IE-004 Improved handovers and quicker discharges / Reduced handover time
 - EFLOW-IE-005 Reduced average time until seen by doctor in A&E

EFLOW-IE-006 Reduced time an ambulance waits outside of the hospital

EFLOW-IE-007 Quicker response times for ambulances

EFLOW-IE-008 . Reduction in staff time wasted due to not being able to access real time patient information or bed state information

EFLOW-IE-009 Reduced average length of hospital stays per patient

EFLOW-IE-010 Reduce cancelled surgeries due to better bed management

- Organisational Benefits & Patient Experience (PE)**

EOBS-PE-007 Reduced complaints and improved brand image due to better patient care

EOBS-PE-008 Reduced litigation

Prior to implementation, HDdUHB intends to carry out further analysis of current practice in order to develop detailed baseline measured for local benefits already identified.

A number of metrics will be further developed to track the delivery of the benefits post implementation. It is recognised that post implementation benefits realisation activities are difficult to resource; however, it will be important to drive value out of the system and have specific metrics tracked and monitored.

It is important to note that which benefits are realised is dependent on the e-Obs and patient flow capabilities that are implemented and are utilised fully operationally. Several key metrics will need be developed to track the delivery of benefits post implementation. These should include:

Table 19: Suggested KPIs

Benefits Ref.	Suggested KPI measure	Current situation	Relevant benefits	How and when will these benefits be realised
EFLOW-IE-009	<p>Reduced average length of stay per patient.</p> <p><i>*Note a key limiting factor is the lack of Community support.</i></p>	<p>Currently transfers of patients from A&E to wards and between wards are slow. The clinical site management team have to manually identify available beds. Sites can at times have upward of 20-30 patients who are 'medically fit' for discharge.</p> <p>Patient are remaining in hospital longer than required, this leads to backlogs and increasing the risk of infection and further hospital stays.</p>	<ul style="list-style-type: none"> • Access to real-time data leads to faster bed turnover. • Easy access to up-to-date data on patient status leads to improved handovers and quicker discharges. • Reduced risk of patient harm and improving patient safety through avoiding infections 	<p>How? Real-time data on bed status across sites and an electronic referral system support faster transfers and discharges. Clinical site management team can focus on solving key flow problems, such as liaising with social care. Using the system, information on why these patients cannot be discharged becomes visible and can be used to target these areas. Furthermore, e-Obs enable early intervention.</p> <p>When? From Year 2 onwards.</p>

Benefits Ref.	Suggested KPI measure	Current situation	Relevant benefits	How and when will these benefits be realised
EOBS-OB-008	Reduced litigation cost.	In 2022-23 HDdUHB paid out £22.7m in clinical negligence and personal injury charges. ⁶⁰	<ul style="list-style-type: none"> • Reduced complaints and improved brand image due to better patient care. 	<p>How? Reduction in errors (e.g. due to more regular, accurate observations) and earlier intervention leads to reduced litigation.</p> <p>When? Years 4 & 5.</p>
EOBS-IPO-002	Reduced number of incidents.	Managing handovers on paper and manually calculating the NEWS score can easily result in errors.	<ul style="list-style-type: none"> • Accurate information leads to reduced risk of patient harm, improving patient safety. • Timely access to information enables early intervention. • Improved transfer of reliable information. • Improved decision-making due to access to timely and accurate information. • Reduced occurrence of Cardiac Arrests within the hospital setting 	<p>How? Reduced risk of errors (e.g. due to lack of handwritten notes, automatic NEWS calculation), early intervention (automated alerts), reduced risk of cross infection (remote data access) and up-to-date information for decision-making.</p> <p>When? From Year 2 onwards.</p>
EFLOW-IE-005	Reduced average time until seen by doctor in A&E.	<p>The operational standard is that at least 95% of patients attending A&E should be admitted, transferred or discharged within 4 hours. Currently, a lack in resources and beds results in long wait times with some patients spending their entire stay in A&E.</p> <p>A HIW inspection indicated that in 2023 the average ambulance 'off load' time for the 24 hours period was 6 – 8 hours.⁶¹</p>	<ul style="list-style-type: none"> • Access to electronic patient information that is synchronised across systems leads to reduced manual admin work and removes duplication of effort. • Time savings due to remote monitoring and automation of tasks. 	<p>How? By reducing the administrative burden for clinical staff and freeing up their time, they can attend to patients more quickly.</p> <p>When? From Year 2 onwards.</p>
EFLOW-IE-006	Reduced ambulance	17% of handovers in April 2024 were completed within the 15-minute WAST target	<ul style="list-style-type: none"> • Access to real-time data leads to faster bed turnover. 	<p>How? Improving patient flow should relieve A&E by</p>

⁶⁰ <https://gov.wales/sites/default/files/publications/2022-04/atish16159%20doc1.pdf>

⁶¹ [20230317GlangwiliED-Full-EN_0.pdf](https://www.hiw.org.uk/20230317GlangwiliED-Full-EN_0.pdf) (hiw.org.uk)

Benefits Ref.	Suggested KPI measure	Current situation	Relevant benefits	How and when will these benefits be realised
	turnaround time.		<ul style="list-style-type: none"> • Quicker response times for ambulances due to reduced time waiting at the hospital. 	<p>enabling faster transfers of patients to wards. In turn this should allow ambulances to offload patients more quickly.</p> <p>When? From Year 2 onwards.</p>
EFLOW-IE-004	Reduced handover time.	<p>Every ward has a daily bullet round (20-min meeting) where every patient is discussed by key staff. Information is added to or amended on the ward whiteboard. Hywel Dda has 64 wards across 4 acute hospitals. If 15min is spent each day by a senior nurse as well as two other professionals, this equates to 1920min daily.</p>	<ul style="list-style-type: none"> • Easy access to up-to-date data on patient status leads to improved handovers and quicker discharges. • Improved transfer of reliable information. 	<p>How? Electronic Whiteboards could streamline bullet rounds and save 50% of time per day (960min). In addition, by enabling electronic handovers that pull information from relevant systems (e.g. WNCR) staff don't have to manually compile this information.</p> <p>When? From Year 2 onwards.</p>
EFLOW-IE-008	Reduction in staff time wasted due to not being able to access real time patient information or bed state information	<p>There are currently three bed management meetings every day attended by the clinical site team and ward managers. Site managers spend time calling wards or walking around to gain a better understanding of capacity.</p>	<ul style="list-style-type: none"> • Bed and patient data is available at ward, hospital and organisation-wide level to better manage capacity, ensuring the right person is at the right place at the right time. 	<p>How? Electronic bed capacity management will reduce the number of in-person meetings and time spent by clinical site managers walking around the hospital to identify free beds.</p> <p>When? From Year 2 onwards.</p>
EOBS-IPO-004	Increased number of observations completed on time.	<p>Staff currently don't have enough time to always complete all required observations on time.</p>	<ul style="list-style-type: none"> • Time savings due to remote monitoring and automation of tasks. 	<p>How? Automating the process of capturing observations and/ or enabling reminders for staff to take observations ensures that observations are taken on time. Evidence at Croydon Health Services NHS Trust shows observations taken</p>

Benefits Ref.	Suggested KPI measure	Current situation	Relevant benefits	How and when will these benefits be realised
				<p>on time increased from under 60% to over 85%. Sicker patients received more frequent observations and at night observations increased from 40% to 100% of those required.</p> <p>When? From Year 2 onwards</p>

e-Flow and e-Obs technologies are tried and tested systems. Throughout this consultation process, HDdUHB have built relationships with two reference sites (NHS Lanarkshire and Aneurin Bevan University Health Board), and the Health Board will collaborate with them to understand lessons learned with regards to benefit realisation from implementing these solutions.

6. Staff Engagement and Feedback

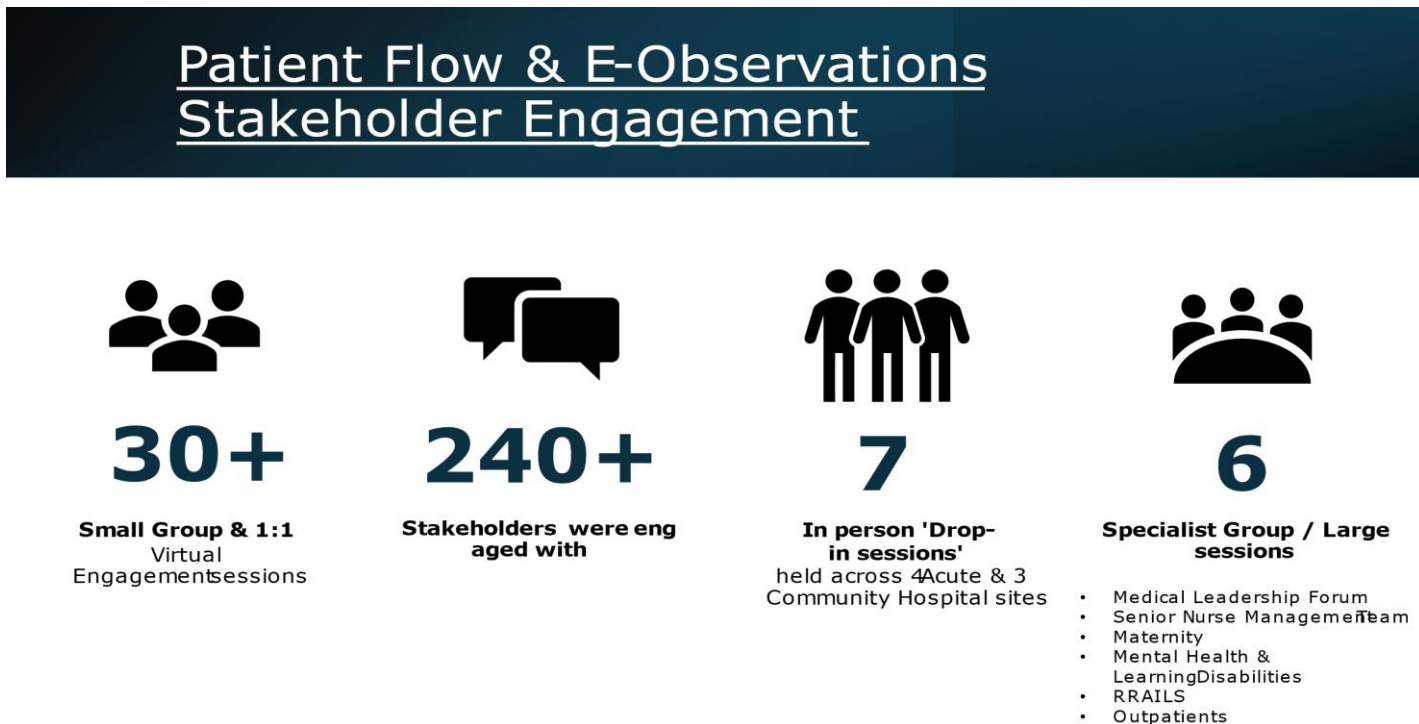
Further to the Boards approval of the OBC in March 2023 to implement both an e-Flow and e-Obs system, the Board requested that further engagement with broader group for stakeholders to support the production of the FBC and to develop the tender specification. A summary is shown below in Fig.16 as below (see Appendix A for a list of stakeholders we have engaged with).

6.1.1. Methods of Engagement

To obtain a diverse and rich source of staff feedback from across the organisation; whilst valuing operational pressures, it was agreed to undertake various types of staff engagement exercises throughout April-August 2023. This enabled a far wider reach across our services whilst providing staff with opportunities to provide their valued input. These engagement methods were advertised broadly via Global messaging, at Management meetings and via the intranet.

- Questionnaire & signposting to the dedicated intranet pages
- 1-2-1 appointments
- Small group discussions
- Various meetings were attended either face to face or via Teams e.g., Senior Nurse Management Team
- “Drop In “Face to Face Staff Engagement events; these were carried out across the following Health Board sites during a week:
 - ✓ Glangwili General Hospital
 - ✓ Withybush General Hospital
 - ✓ Bronglais General Hospital
 - ✓ Prince Phillip Hospital
 - ✓ Amman Valley Hospital
 - ✓ Tregaron Community Hospital
 - ✓ South Pembrokeshire Hospital

Figure 17: Patient Flow and E-Obs Stakeholder Engagement



The “drop in” sessions provided staff with an opportunity to turn up at an event at a time and location that suited their work schedules / demands.

Dedicated representatives from the Project Team were available at each session, providing staff with information regarding the purpose of the event, answer appropriate questions, provide support and to capture staff feedback.

Copies of various patient pathways / journeys were displayed for staff to discuss and consider. These pathways were compiled with input from various clinicians, ensuring the accuracy of the patient journey. These events were an ideal opportunity for staff to ask any questions, provide feedback in relation to how the new solution would fit into the pathway, articulate any concerns or issues, and identify key elements essential to the new solution.

Various services were well represented at the drop-in sessions, i.e., Therapies, Radiology, Pathology, Midwifery, Pharmacy, Consultants, Senior Nurses, Nurses, Health Care Support Workers, Administrative Staff, Ward Clerks, Discharge Nurses, Informatics Nurses, Service Delivery Managers.

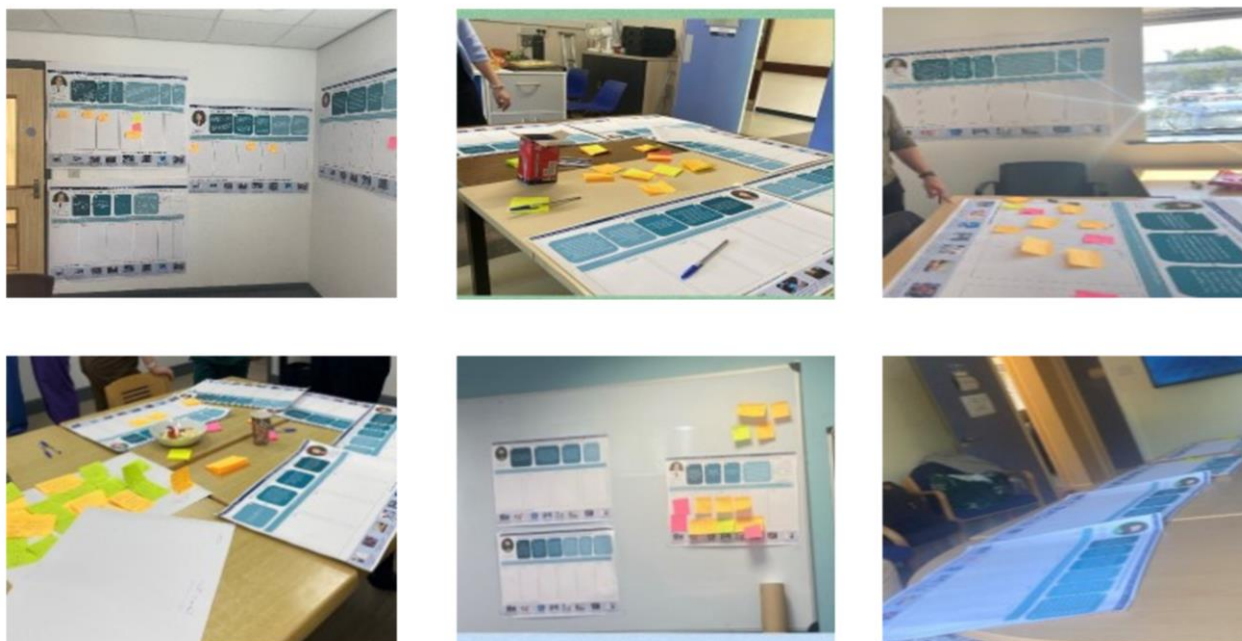
The general feeling from staff regarding these events was very positive, they valued the Boards request to seek wider staff engagement, being listened to was important, they were pleased to have the opportunity to provide input for a Digital solution that would fit their needs as opposed to buying an off the shelf solution that may not fit appropriately.

6.1.2. “Drop In” Engagement Sessions

Following each event, analyses of the feedback was undertaken and combined with the staff feedback from all other forms of engagement activities, key themes were identified as outlined below.

The key themes & relevant staff feedback were incorporated into the technical and procurement specification documents, which formed an integral part of the market research and procurement process.

Figure 18: “Drop In” Engagement Sessions

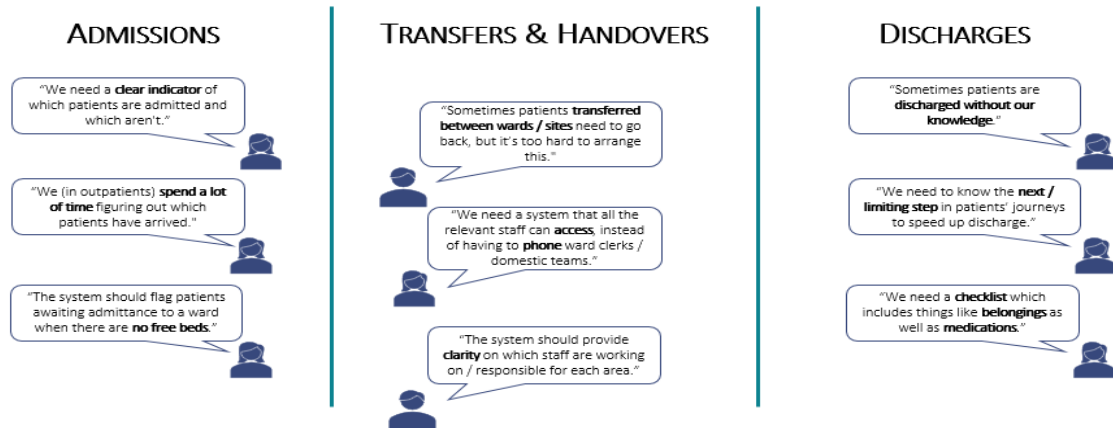


6.1.3. E-Flow Key Themes

The key themes for e-Flow and e-Obs were identified and are outlined below:

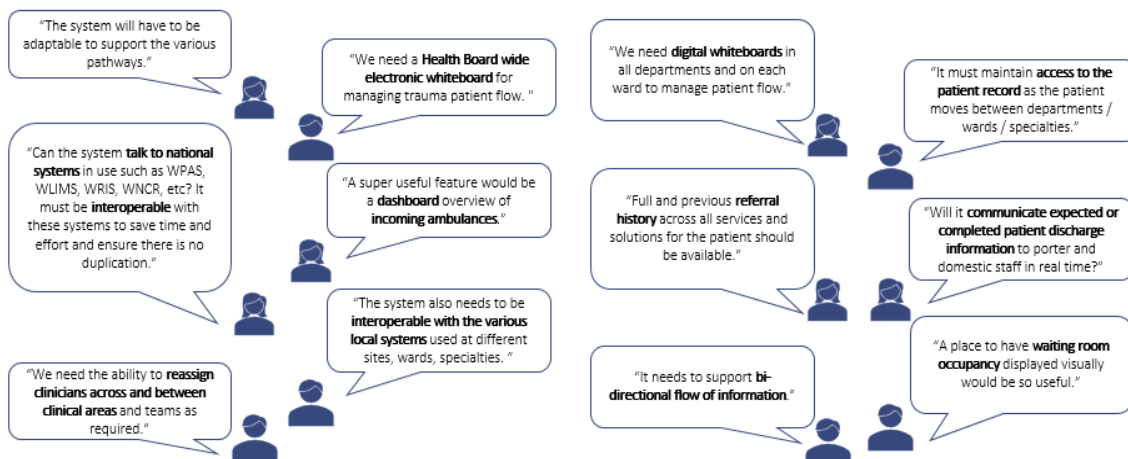
Figure 19: Key themes for e-Flow and e-Obs

E-Flow



*Note: these are not direct quotes. The text is used to encapsulate broad, recurring themes stemming from multiple interviews. They are representative and have not been directly taken from any individual.

Planning



*Note: these are not direct quotes. The text is used to encapsulate broad, recurring themes stemming from multiple interviews. They are representative and have not been directly taken from any individual.

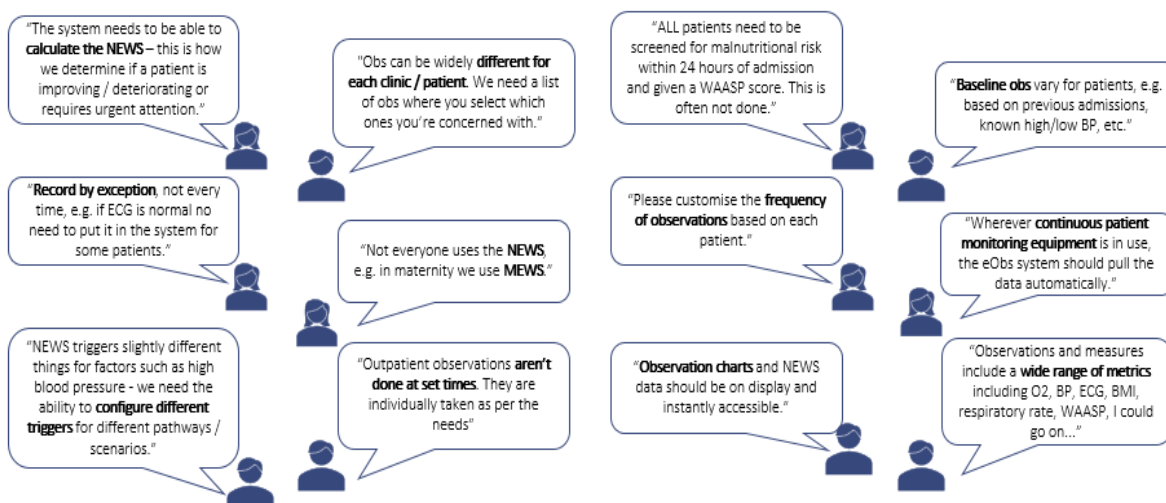
Patient Care



*Note: these are not direct quotes. The text is used to encapsulate broad, recurring themes stemming from multiple interviews. They are representative and have not been directly taken from any individual.

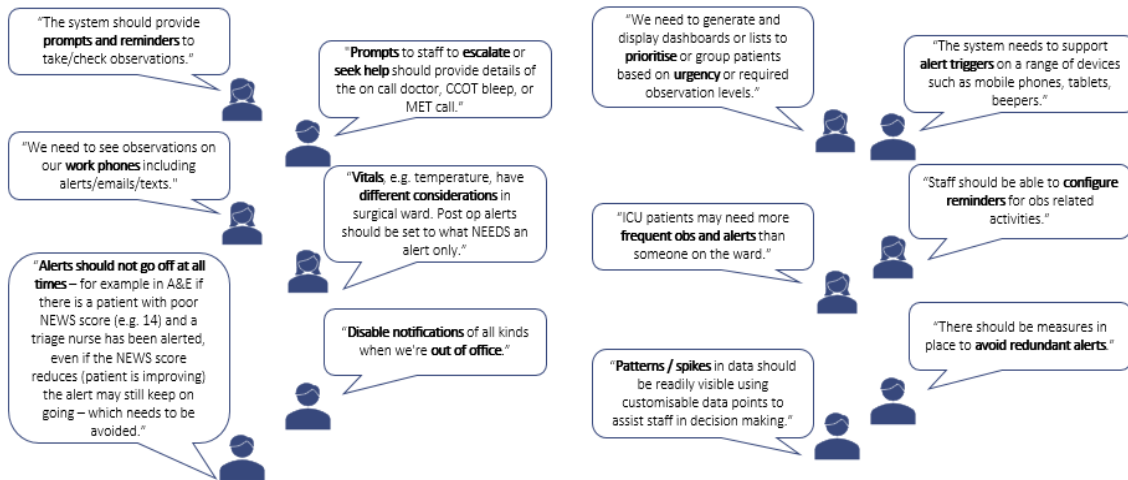
6.1.4. e-Obs Key Themes

Patient Measurement



*Note: these are not direct quotes. The text is used to encapsulate broad, recurring themes stemming from multiple interviews. They are representative and have not been directly taken from any individual.

Alerts & Notifications



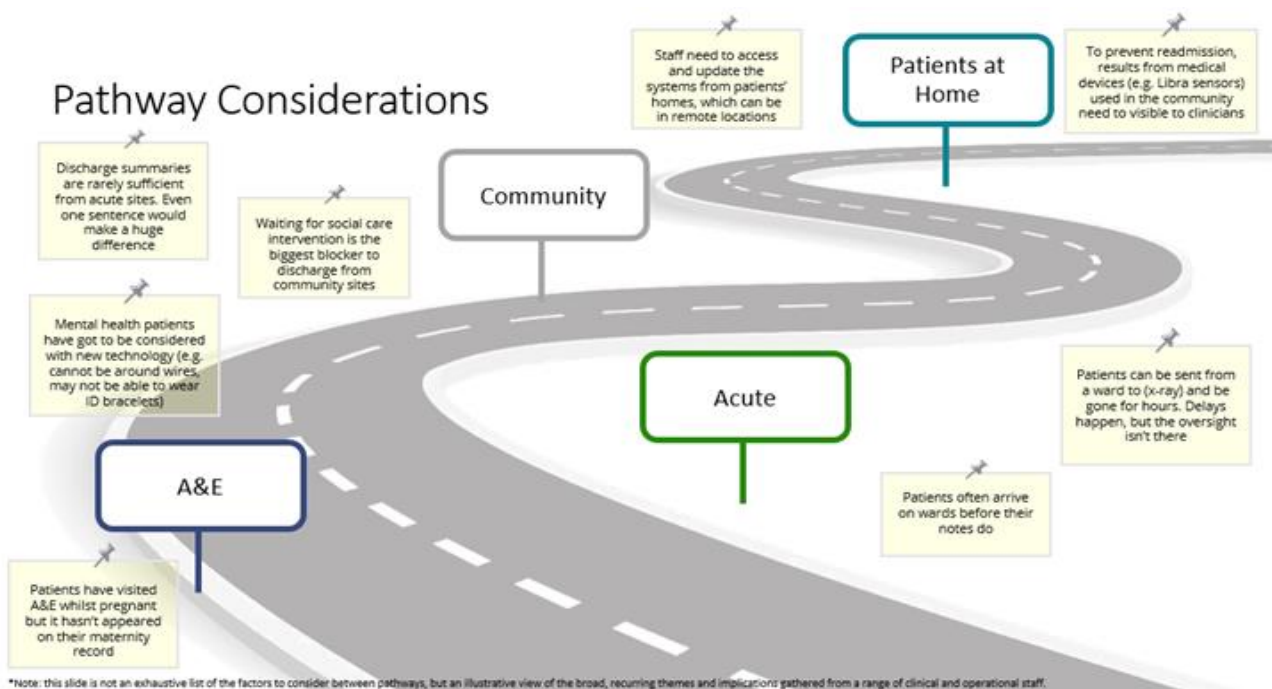
*Note: these are not direct quotes. The text is used to encapsulate broad, recurring themes stemming from multiple interviews. They are representative and have not been directly taken from any individual.

6.1.5. Staff Concerns

Throughout the staff engagement exercises the following were identified as potential “blockers” to the pathways and a safe patient journey. The image below demonstrates some of these “blockers”.

For example, a recurrent theme of not having one consistent internal referral process throughout the organisation means there is an elevated risk of losing patients in the system. Referrals are currently made to various Departments via several methods i.e., email, handwritten notes, which can be overlooked, unactioned or lost.

Figure 20: Pathway considerations



*Note: this slide is not an exhaustive list of the factors to consider between pathways, but an illustrative view of the broad, recurring themes and implications gathered from a range of clinical and operational staff.

Additionally, staff concerns overwhelmingly highlighted the following fundamental Digital & Operational Considerations which need to be met to secure the successful introduction of an essential e-Flow and e-Obs IT solution.

6.1.6. Digital Considerations

The following points have been considered and incorporated into the solution requirements and project costings, as well as adding key aspects to the risk assessment.

- **Wi-Fi** is terribly slow, and it takes a very long time to get online, blackspots/no coverage
- **Hardware** is due an upgrade, some equipment has been around for decades
- **Lack of available devices** – Staff often must queue up to use a computer
- **Too many login credentials required**
- **Lack of integration between several systems**
- **Lack of printers**
- **WPAS needs to be interoperable with the new solution**
- **Lack of access to essential systems by Clinicians**
- **Adequate training is essential**

6.1.7. Operational Considerations

- Hospitals need a **notification screen or dashboard** to know when ambulances are on their way or are awaiting handover.
- Staff throughout **HDdUHB** are nervous to start using new systems until the network is stabilised.
- Site teams have **4 calls per day** to compare notes around bed capacity and discharges.
- Ward clerks don't work weekends, so any **report generated over the weekend or Monday is incorrect.**
- It's very difficult to report ongoing or **trends in delays / bottlenecks** without adequate data to back it up.
- Being able to **access** information on their **work or personal smartphone is key.**
- **Site managers do not have access to the same systems**, they need to be phoned / contacted to let them know a bed need changing – this process takes up a lot of time and resource.

Appendix A: Stakeholder Engagement

Staff involved in the consultation process that informed the tender specification and full business case is provided below.

Table 20: Stakeholders involved in consultation

Name	Site	Role
Abbi Daniel-Thomas	Glangwili General Hospital	ITU Senior Nurse
Alison Jones	Glangwili General Hospital	Midwifery Lead GGH
Alun James	Across Sites	Procurement Manager
Amber Mackintosh	Glangwili General Hospital	T&O CNS GGH
Amy Newell	Prince Philip Hospital	Health Care Support Worker
Andrea Hughes	Bronglais General Hospital	Practice & Professional Development Nurse
Andrew Murray	Withybush General Hospital	Clinical Site Manager
Angela Puffett	Withybush General Hospital	Consultant Medicine Frailty WGH
Angie Lewes-Gee	Tregaron Hospital	Ward Clerk
Anna Thomas	Prince Philip General Hospital	Service Delivery Manager Unscheduled Care
Anne Evans	Amman Valley	Health Care Support Worker
Annette Snelling	Bronglais General Hospital	Hospital Director / Consultant BGH
Anthony Smith	Withybush General Hospital	Consultant Anaesthetist and Intensive Care Consultant
Anthony Tracey	Across Sites	Digital Director
Anwen Cleaton	Tregaron Community Hospital	Ward Sister
Anwen Pearce	Across Sites	Finance Business Partner
Arlynn Dimas	Withybush General Hospital	Discharge Specialist Nurse WGH
Aysha Davies	Prince Philip Hospital & Glangwili General Hospital	Nurse Manager Discharge
Bethan Andrews	Withybush General Hospital	Service Delivery Manager
Blanche Sutton	Bronglais General Hospital	Practice & Professional Development Nurse
Carol Thomas nee Bevan	Withybush General Hospital	Head of Nursing WGH
Caroline Jeremy	Across Sites	Senior Project Manager
Carolyn Williams	Across Sites	Head of Digital Innovation & Transformation
Caryl Bowen	Glangwili General Hospital	Service Delivery Manager Unscheduled Care GGH
Charlotte Adams	Withybush General Hospital	Senior Sister Critical Care WGH
Chris Hopkins	Across Sites	Head of Clinical Engineering, Consultant Clinical Scientist
Claire Hathaway	Across Sites	Trauma Lead Manager
Claire George	Withybush General Hospital	Service Delivery Manager
Claire Grehan	South Pembrokeshire	Team Lead ART & Care Homes
Clive Waft	Across Sites	Head of Digital Programmes
Colin Hopcroft	Prince Philip Hospital & Glangwili General Hospital	Senior Nurse Manager
David Wastell	Across Sites	Acute Deterioration & Resuscitation Lead (RRAILS)

Name	Site	Role
Dave Wilson	South Pembrokeshire Community Hospital	GP
David Harrison	Bronglais General Hospital	Clinical Site Manager
Dawn Jones	Bronglais General Hospital	Head of Nursing BGH
Diane Knight	Across Sites	Service Delivery Manager Theatres/DSU/PAC GGH
Dr Ananda Wickrammaarcchi	Withybush General Hospital	Clinical Fellow
Dr Miranda Rees	South Pembs	Intermediate & CPC G.P.
Eiry Edmunds	Glangwili General Hospital	Hospital Director / Consultant GGH
Elin Howell	Glangwili General Hospital	Senior Sister A&E
Emma Cottrell	Withybush General Hospital	Clinical Lead Nurse - Community
Emma Hickman	Glangwili General Hospital	Senior Sister A&E
Gareth Beynon	Across Sites	Head of Information Services
Gemma Brown	Across Sites	Informatics Nurse
Gemma Deverill	Across Sites	Procurement
George Eltom	Glangwili General Hospital	Consultant Physician A&E (working in SDEC unit)
Heidi Blofield	Prince Phillip & Glangwili General Hospitals	Discharge Liaison Nurse
Helena Dunne	Across Sites	Pharmacy Lead
Helen Munro	Across Sites	Consultant Sexual Health / Chair RRAILS
Helen Thomas	Across Sites	Lead Nurse Specialist for Informatics
Ian Robins	Same Day Emergency Care WGH	Intermediate Care Therapy Leads
Iona Evans	Glangwili General Hospital	Deputy Head of Nursing
Janice Cole-Williams	Withybush General Hospital	General Manager Unscheduled Care
Jessica Svetz	Withybush General Hospital	Service Delivery Manager Urgent & Intermediate Care Pembrokeshire
Johanna Jones	Across Sites	Partnership & Governance Manager
John Evans	Pembrokeshire	County Director
Jon Wilson	Across Sites	Clinical Engineering
Judith Bowen	Across Sites	Informatics Nurse
Karen Barker	Across Sites	Head of Nursing Scheduled Care - GGH
Kate Tennant	Across Sites	Therapies Lead
Katharine Fletcher	Across Sites	Procurement Lead
Kathryn Greaves	Across Sites	Head of Midwifery
Katie Stapleton	Carmarthenshire	WAST Locality Manager
Laura Froggatt	Prince Phillip Hospital	Discharge Liaison Nurse
Laura Holmes	Withybush General Hospital	Sister – Acute Response Team WGH
Laura Jenkins	Prince Philip Hospital	Occupational Therapist
Lisa Humphrey	Across Sites	Women's, Childrens & Cancer Services GM
Lesley Jones	Across Sites	Head of Nursing for Digital and Professional Standards
Lynwen Williams	Glangwili General Hospital	Senior Operational Liaison Officer – Unscheduled Care
Marilize Du Preez	Across Sites	Improvement and Transformation Lead
Matthew Willis	Bronglais General Hospital	General Manager
Meinir Jones	Across Sites	Associate Medical Director for Transformation and Value Based

Name	Site	Role
		Healthcare, National Clinical Lead MSK & Long-term Arthritis
Meinir Williams	Prince Philip Hospital	Nurse Management PPH
Mindy Hawkins	Withybush General Hospital	CLM Urgent & Intermediate Care ART/WGH
Nerys Davies	Glangwili General Hospital	ITU Senior Nurse
Nicola Zroud	Withybush General Hospital	Senior Nurse
Olwen Morgan	Glangwili General Hospital	Hospital Head of Nursing
Owain Ennis	Across Sites	Clinical Lead Trauma and Orthopaedics
Paula Evans	Across Sites	Directorate Nurse Paediatrics GGH
Paul Solloway	Across Sites	Deputy Digital Director
Peter Skitt	Ceredigion	County Director Ceredigion
Prem Kumar Pitchaikani	Glangwili General Hospital	Consultant Paediatrician, Clinical Director of Child and Maternal Health
Rachel Cornish	Prince Philip Hospital	Physiotherapist
Rebecca Richards	South Pembs	CLN Community Hospitals
Rebecca Temple-Purcell	Across Sites	Assistant Director of Nursing MHL D
Robbie Ghosal	Prince Philip Hospital	Hospital Director / Consultant
Rowena Canning	Withybush General Hospital	Intermediate Care Therapy Lead
Sally George	Withybush General Hospital	Discharge Coordinate for the DST
Sarah Parker	Prince Philip Hospital	Specialist Nurse – Complex Discharges
Sarah Perry	Glangwili General Hospital and Prince Philip Hospital	General Manager Unscheduled Care
Sarah Williams	Glangwili General Hospital	Senior Nurse Manager GGH
Sharon Morris	Across Sites	Project Manager
Sioned Richards	Across Sites	G.P
Stephanie Hire	Across Sites	General Manager Scheduled Care
Stephen Farrington	Across Sites	Medical Device Co-ordinator
Stuart Bancroft	Prince Philip Hospital & Glangwili General Hospital	General Manager PPH & GGH
Teresa Goldbach	South Pembs	Clinical Lead Therapy – Community Hospitals
Tracey Evans	Ceredigion	Head of Community Nursing BGH
Theresa Van Doorn	Across Sites	Procurement Business Manager

The list of below contains the names of the staff that participated in the tender panel.

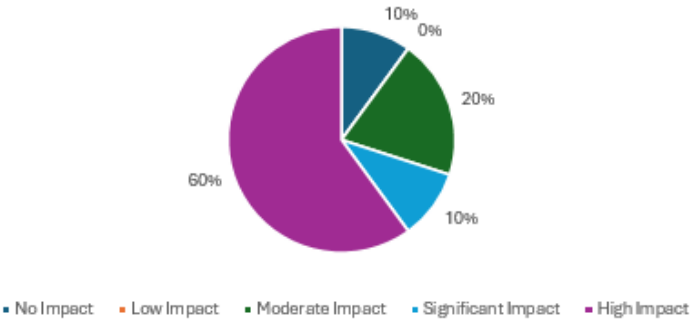
Name	Role	Tender panel role
Anna Thomas	Service Delivery Manager	Panellist
Anthony Tracey	Digital Director	Observer
Aysha Davies (N)	Nursing/Discharge	Panellist
Carolyn Williams	Digital	Panellist
Caryl Jones	Senior Digital Project Manager	Observer
Clive Waft	Head of Digital Programmes	Observer
Dafydd James	Pharmacy	Panellist
Daniel Owen	Cyber Security Manager	Panellist
David Wastell	S Nurse Resus/Acute Patient	Panellist
Erin Bonwick	Nurse/ Lead Patient Flow	Panellist
Gareth Beynon	Head Information Services	Panellist
Gavin Jones	Head of Digital Operations	Panellist
Gemma Brown	E- Prescribing Nurse Facilitator	Panellist

Helen Thomas	Nursing Informatics	Panellist
Jazz Walker- Baker	Medical/Community/ MIU	Panellist
Jessica Svetz	Urgent/Intermediate care	Panellist
Karen Brown	Urgent/SDEC	Panellist
Katharine Fletcher	Deputy Head of Procurement	Panellist
Lewis Wells	Procurement Business Manager	Panellist
Lisa George	Maternity	Panellist
Marilize De Preez	TUEC Reporting	Panellist
Meinir Jones	National Clinical Director Planned Care/ AMD/CCIO HDdUHB	Panellist
Mike Burns	Clinical Engineering	Panellist
Nicholas Evans	Therapies	Panellist
Patrycja Duszynska	IG	Panellist
Richard Jones	Digital	Panellist
Sian Perry	Nursing/Paediatrics	Panellist
Stuart Bancroft	Assistant General Manager	Panellist
Valerie Evans	Project Support Officer Digital	Observer

Appendix B: e-Flow and e-Obs SME and Scorer Feedback

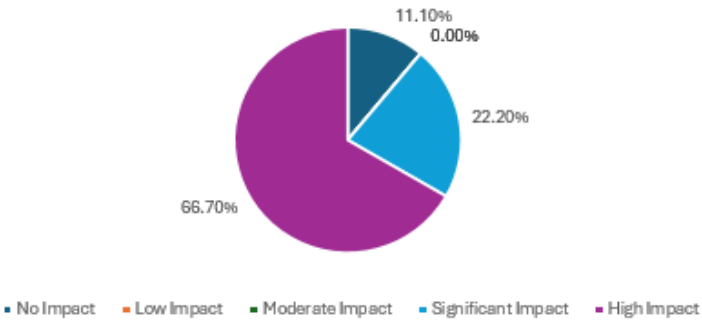
What impact would a digital Patient Flow solution have on your service?

Inter-hospital and inter-service referrals

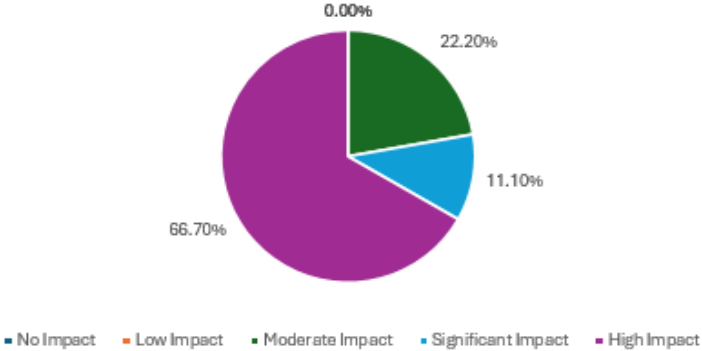


'Better understanding of system pressures and enable more strategic decisions to be made across the Health Board' – Meinir Jones Hywel
**Dda UHB National Clinical Director
 Planned Care and AMD and CCIO**

Alerts and Notifications

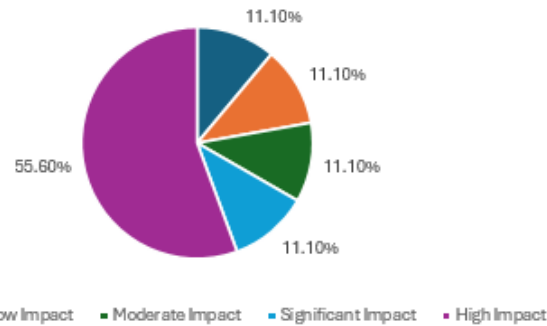


Electronic Whiteboards

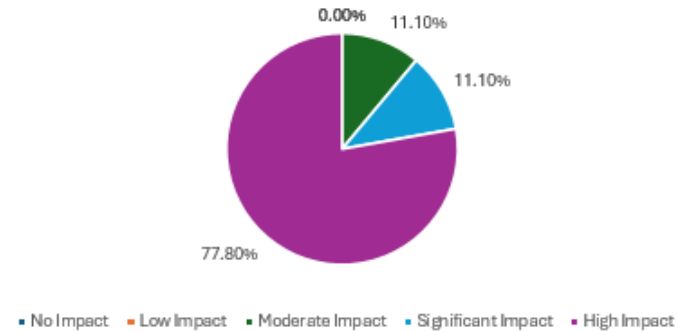


What impact would a digital Patient Flow solution have on your service?

Transfers and repatriations



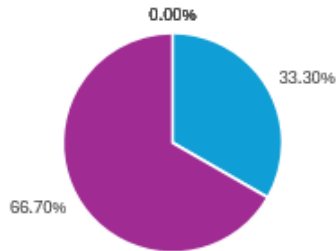
Discharge planning



'From an on-call manager perspective, this will greatly improve oversight for off-site managers. Operational Support Managers are having to support teams based on verbal updates. This system would allow OSM to visually see where patients are in the hospital, the acuity of those patients and be able to make informed decisions based on evidence-based data.' - **Jessica Svetz Hywel Dda UHB - Service Delivery Manager Urgent and Intermediate Care**

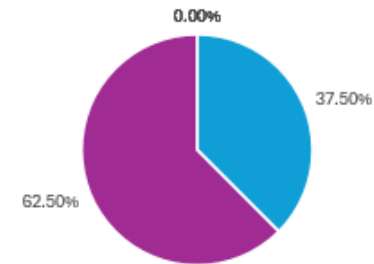
What impact would a digital Patient Flow solution have on your service?

Handovers



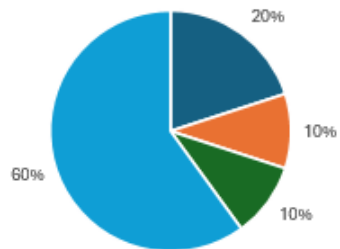
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Task Management



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

Bed management & capacity



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact

'Improve patient safety, workforce efficiency, communication and coordination of care, hugely impactful to get us where we should be in terms of service delivery.' - **Karen Brown Hywel Dda UHB - Health Board Clinical Lead for Acute Medicine**

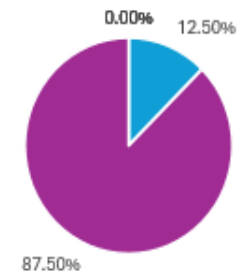
What impact would a digital Patient Flow solution have on your service?

ED and admissions



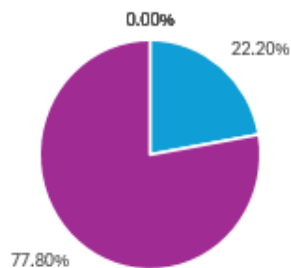
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Direct Messaging



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Mobile Device Access

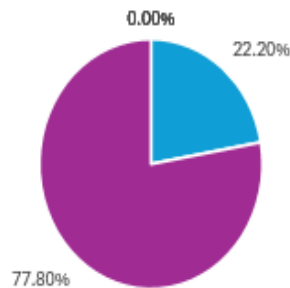


■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

'As a manger, I need to know if we have maternity patients in other areas. I want to know who needs to be seen and reviewed as a priority. It will help reduce handover times, ensuring staff are not working on past their shift times - which happens every day! Free up more of my time and staff time as everything will be in one place.' - **Lisa Jayne George Hywel Dda**
UHB Labour Ward Coordinator

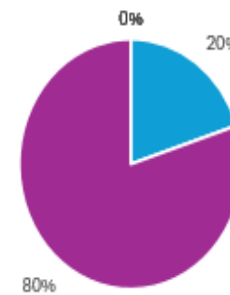
What impact would a digital Patient Flow solution have on your service?

Reporting



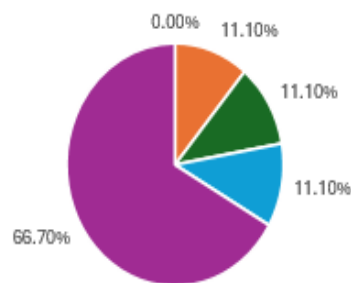
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Continuous Patient Record Update



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

Shared MDT Overview

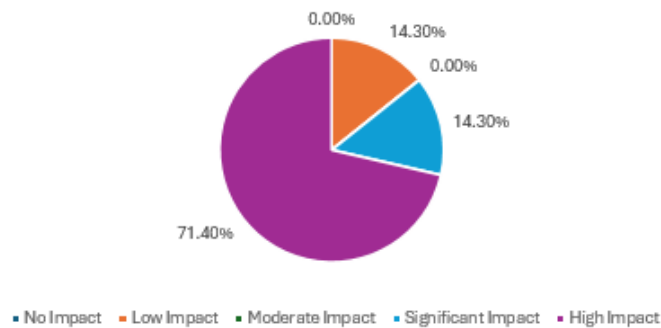


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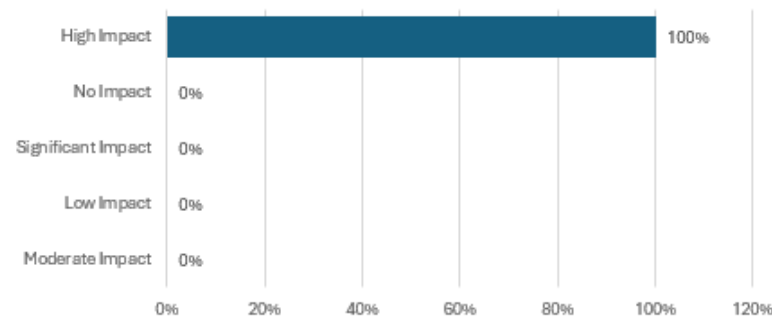
'In A&E and SDEC, it will free up clinician time. Patient flow will save Nurse time - a lot of time spent on the phone to see if beds are available for the patient to be transferred out of the department. Nurses must leave patients to gather the information and physically attend the Huddle to give an update on the bed status regarding potential free beds.' - **Jazz Walker-Baker Hywel Dda UHB - GP Clinical Editor and CIO**

What impact would a digital Electronic Observations solution have on your service?

Manual Observations Capture



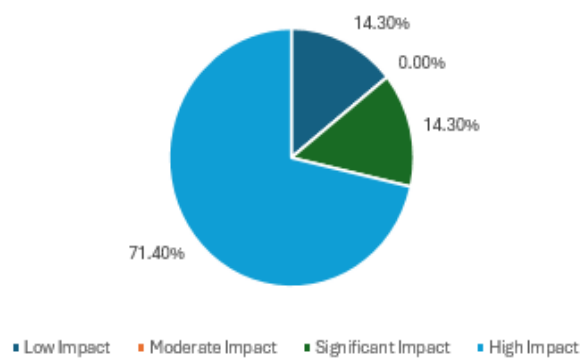
Alerts & Notifications



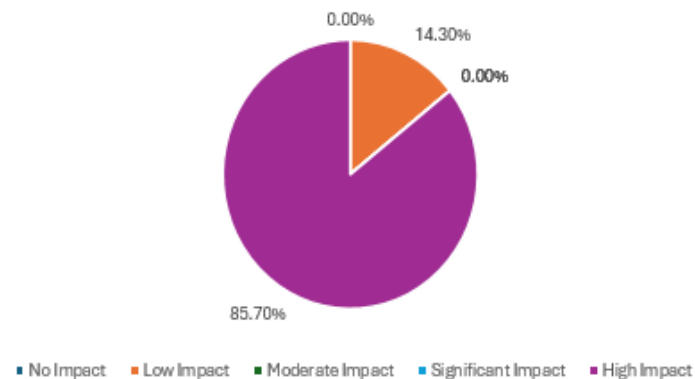
'The solution would lead to shorter waiting times for patients to review tests, treatments or medications. This could result in faster diagnosis and treatment, improving patient outcomes. The built in alerts could reduce the risk of adverse events, improving patient safety. Better communication and coordination by healthcare providers which leads to cohesive care.' **Jessica Svetz Service**
Delivery Manager Urgent and Intermediate Care Hywel Dda University Health Board

What impact would a digital **Electronic Observations** solution have on your service?

Auto Calculations of NEWS2, MEWS & PEWS



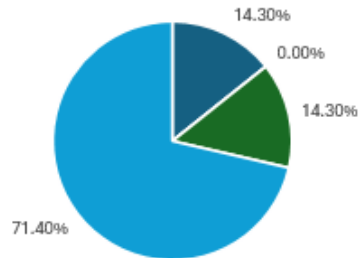
Observations Frequency



It will identify deteriorating, unwell patients earlier and trigger an escalation and therefore a response in a more timely manner. - David Wastell Hywel Dda UHB - Senior Nurse for Resuscitation and Acute Patient Deterioration

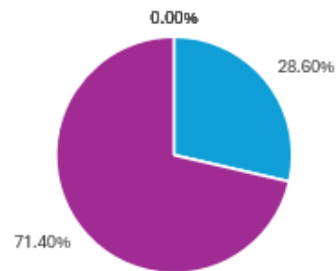
What impact would a digital **Electronic Observations** solution have on your service?

Mobile Device Access



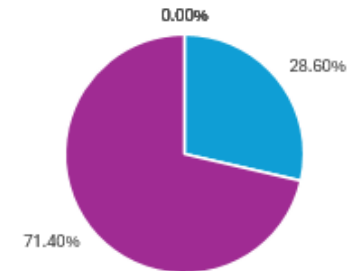
■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

Continuous/ Automatic Patient Monitoring Equipment



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

Graphical Representations



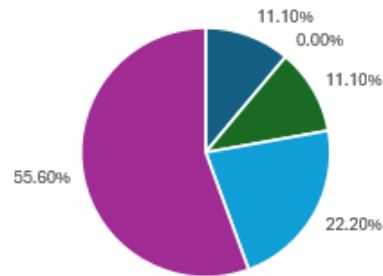
■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

'It will modernise and streamline the eObs part of the project. We will look with interest to see what other Medical Devices (other than Connex Spot Monitors) can be added to the system in the future.' **Mike Burns Hywel Dda UHB - Clinical Engineering Department)**

'From my perspective it will be invaluable to be able to manage demand and capacity of the pharmacy service. Ensuring that resource can be allocated appropriately and be able to identify trends in activity for a more planned approach.' **Dafydd James Hywel Dda UHB - Pharmacy Lead for Informatics, Analytics, Digital Innovation & Quality)**

What impact would a digital Virtual Wards (enhanced community care) solution have on your service?

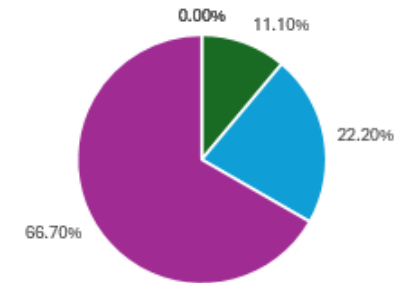
Referral Management



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

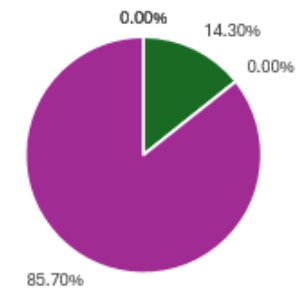
'It will be much easier to access and visualise vital information about patients i.e. PEWS score, referrals, etc. In particular, using the digital version of the NHS England system wide pediatric observation tracking will make recording observations and escalating either clinician or parental concerns to the most appropriate team easier and in line with current RCPCH best practice. It will also give clinical leaders an accurate overview of the patients under their care so that scarce resources can be allocated safely.' - Sian Perry Hywel Dda UHB - Paediatric Clinical Informatics Nurse

Capture Observations



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

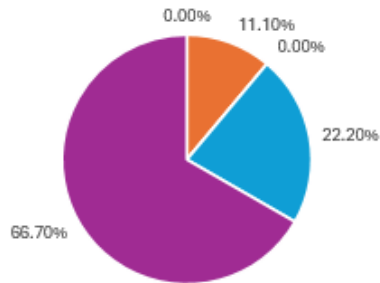
Patient Identification



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

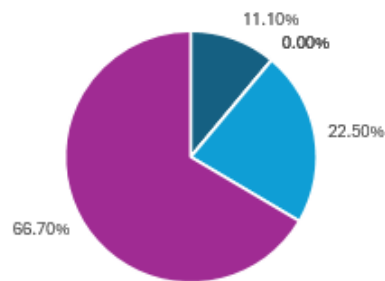
What impact would a digital **Virtual Wards (enhanced community care)** solution have on your service?

Continuous Patient Record Update



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

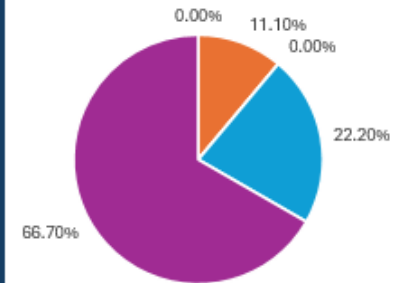
MDT Careplan Oversight



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

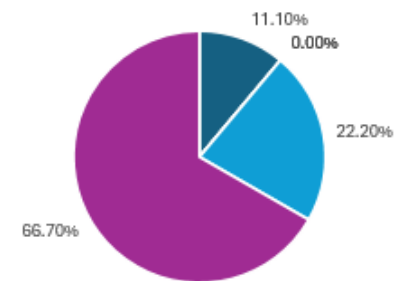
The benefits of managing patients in the Acute sites are very well considered and documented. More and more complex care is now provided to patients as outpatients and monitored remotely. Pharmacy teams are now managing more and more patients cohorts in this area and need to have access to the appropriate technology to this safely and effectively. - Dafydd James Hywel Dda UHB - Pharmacy Lead for Informatics, Analytics, Digital Innovation & Quality

Off-site Decision Support



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

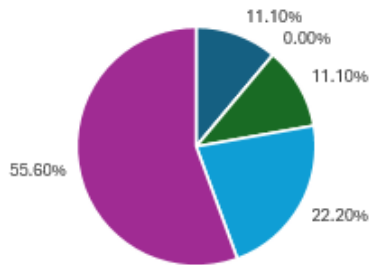
Task Management



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

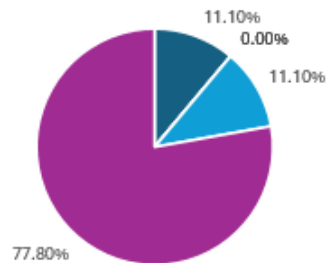
What impact would a digital Virtual Wards (enhanced community care) solution have on your service?

Discharge Planning



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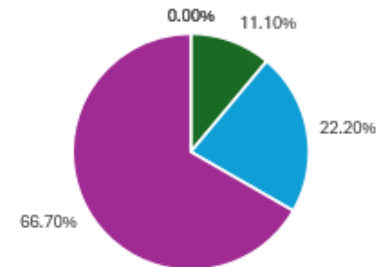
Shared Monitoring Between Services



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

'Use of portable devices allows for real-time documentation, referral management and communication with the wider team across both Acute and Community settings, allowing for the development of Virtual wards and remote management of patients by the most appropriate clinicians, from both a Therapies and Medical perspective' – Nicholas Evans Hywel Dda UHB – Physiotherapy Lead

Mobile Device Access



■ No Impact ■ Low Impact ■ Moderate Impact ■ Significant Impact ■ High Impact

What are the dis-benefits that you think the solution could negatively impact you and your service that you would like us to be aware of?

Ensure Wi-Fi is up to speed and available devices to utilise

Partial implementation /acceptance of the system could prove detrimental to users, service and patients. There will be a risk of systems running in parallel and having multiple processes in place creating additional administrative burden and has the potential for it not being used in real time due to access to the system/technology in a timely manner.

The only issue is being able to access the solution without signal, but it is still a massive improvement on the current system.

Would not want to remove Clinical judgement from the escalation process and not solely rely on an Electronic system

Not having adequate Wi-Fi / network capacity within and around the HDUHB sites to use the digital systems, lack of space to store and charge the mobile devices and lack of digital confidence and competence within our workforce.

There is the possibility that staff near retirement age may be swayed to retire rather stay on than have to make changes to decades long way of working.

Capacity to train staff and adoption/implementation. However, this is short term and would provide significant benefits in the longer term

Appendix C: User Journeys

The below User Journey slides have been compiled following several in-person observations, inferences, and shared case studies to provide a true reflection and accurate portrayal of the types of scenarios our clinicians and service managers are faced with every day.

The pathway journeys show the highs and lows of the process from the patient and clinicians' perspective based on real events and scenarios and allows us to identify which parts of the e-Flow and e-Obs digital solution that can be used to alleviate some of the low points on the Pathway.

Summary:

1. Patient Flow/E-OBS – ED

- a) Hospital Transfer Journey: Nurse in Charge/ Ward Navigator
- b) Journey using Electronic Patient Flow solution: Patient transfer between sites
- c) A&E Journey: Staff Nurse
- d) A&E Journey: Patient
- e) A&E Journey: Medical Registrar

2. Patient Flow: Community

- a) Community Journey
- b) Community Journey: Patient referral and discharge
- c) Community Journey using Patient Flow and Electronic Obs solution

3. Patient Flow: Handover

- a) Handover Journey: Ward Clerk and Ward Sister (Navigator)

4. E-OBS: Labour Ward

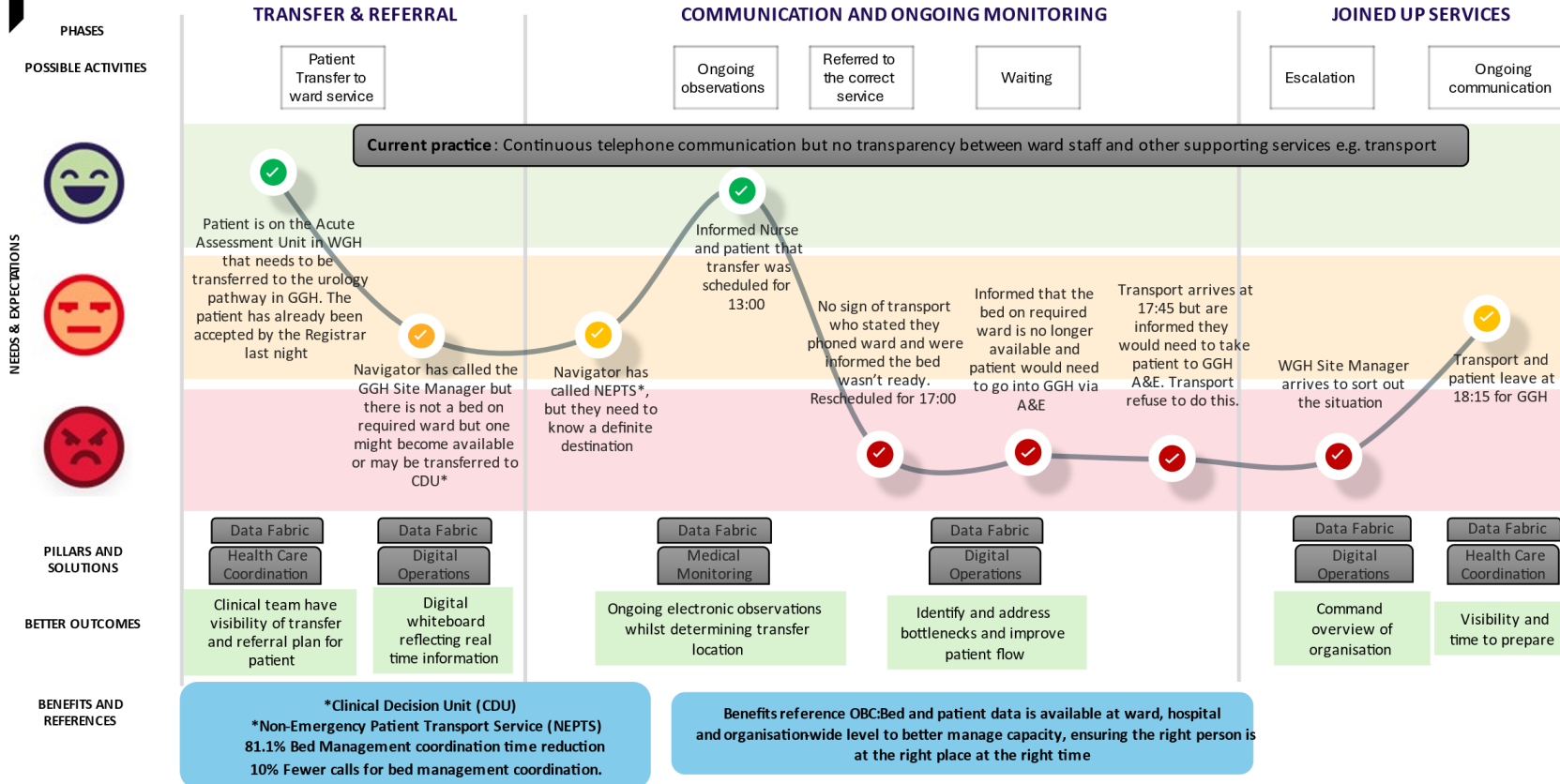
- a) Labour Ward Observations: MDT Gynaecology

5. Obs: Resus & Deterioration

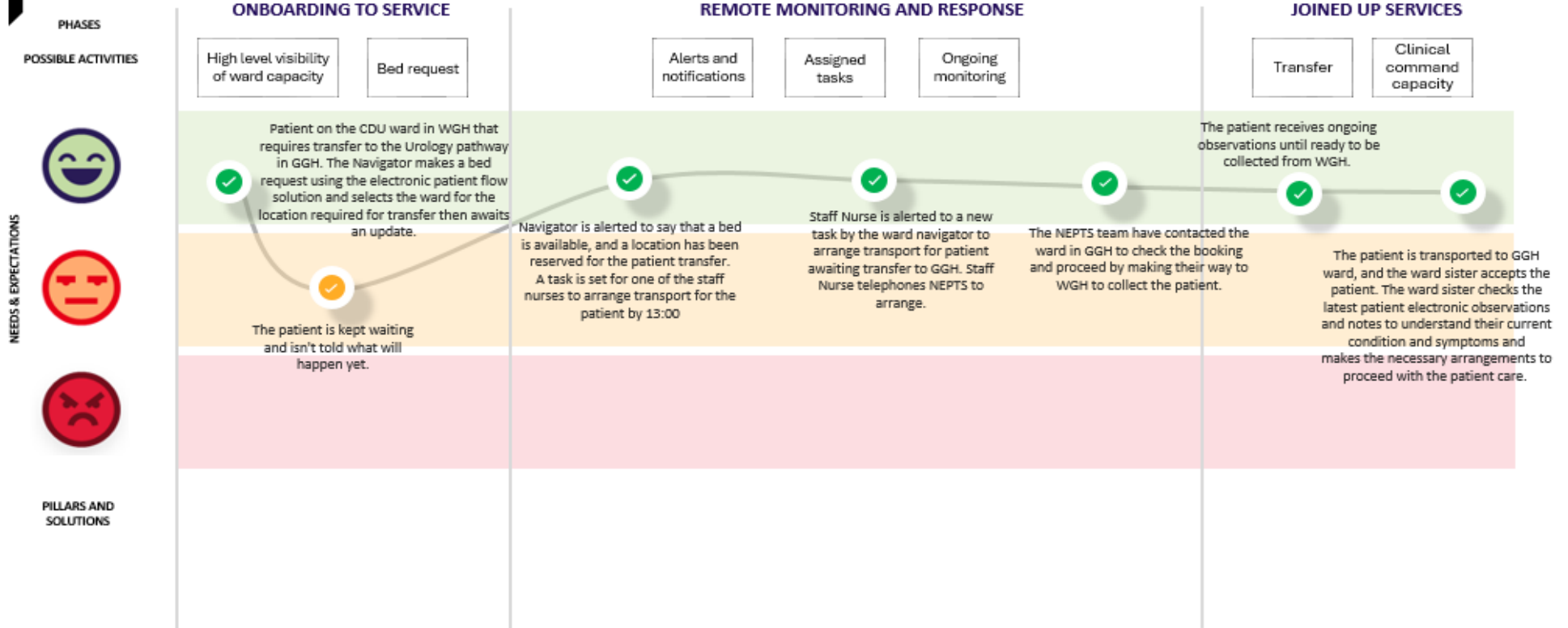
- a) Resus and Deterioration Team: Senior Nurse
- b) Journey using Electronic Observations solution: Outreach resus and deterioration team

Hospital Transfer Journey: Nurse in Charge/ Ward Navigator

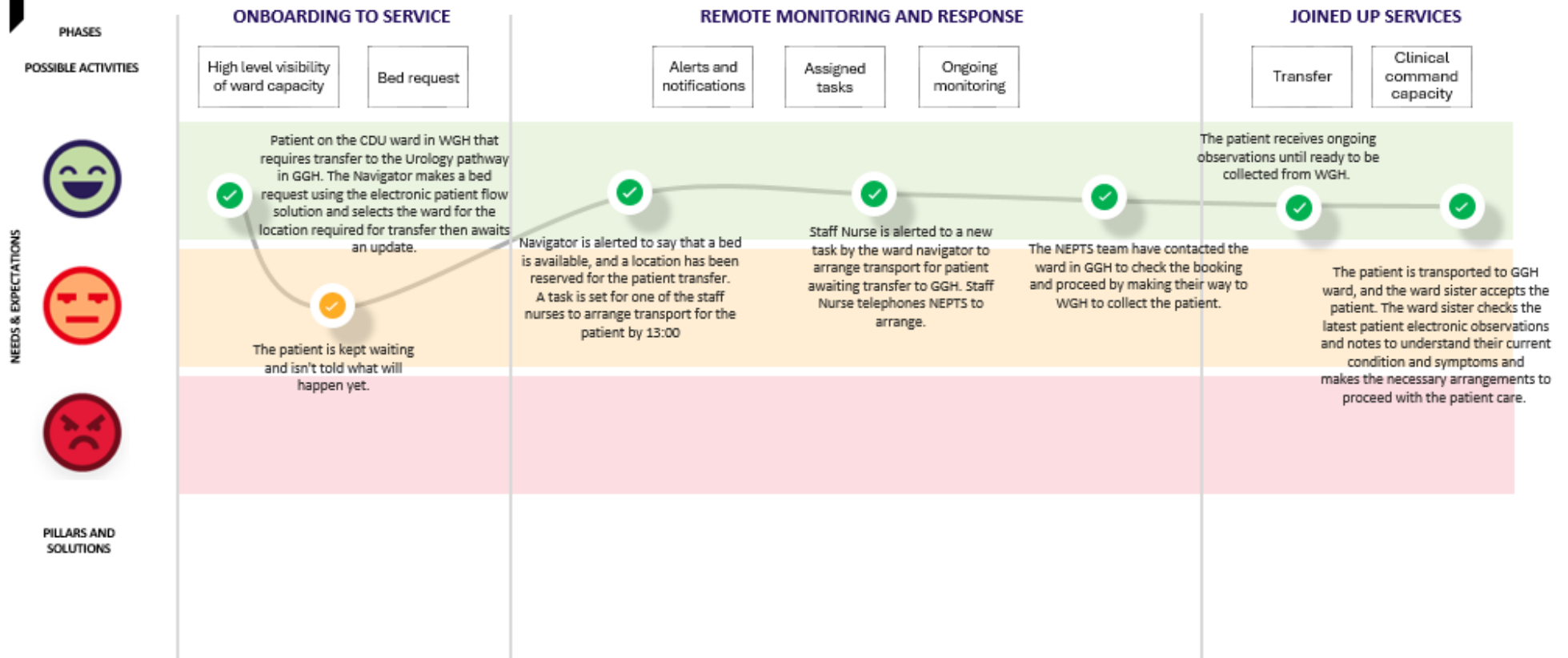
Joni is the Nurse in Charge/Navigator on the Acute Assessment Unit in WGH is responsible for arranging transfers and keeping an overall overview of bed capacity on ward.



Journey using Electronic Patient Flow solution: Patient transfer between sites

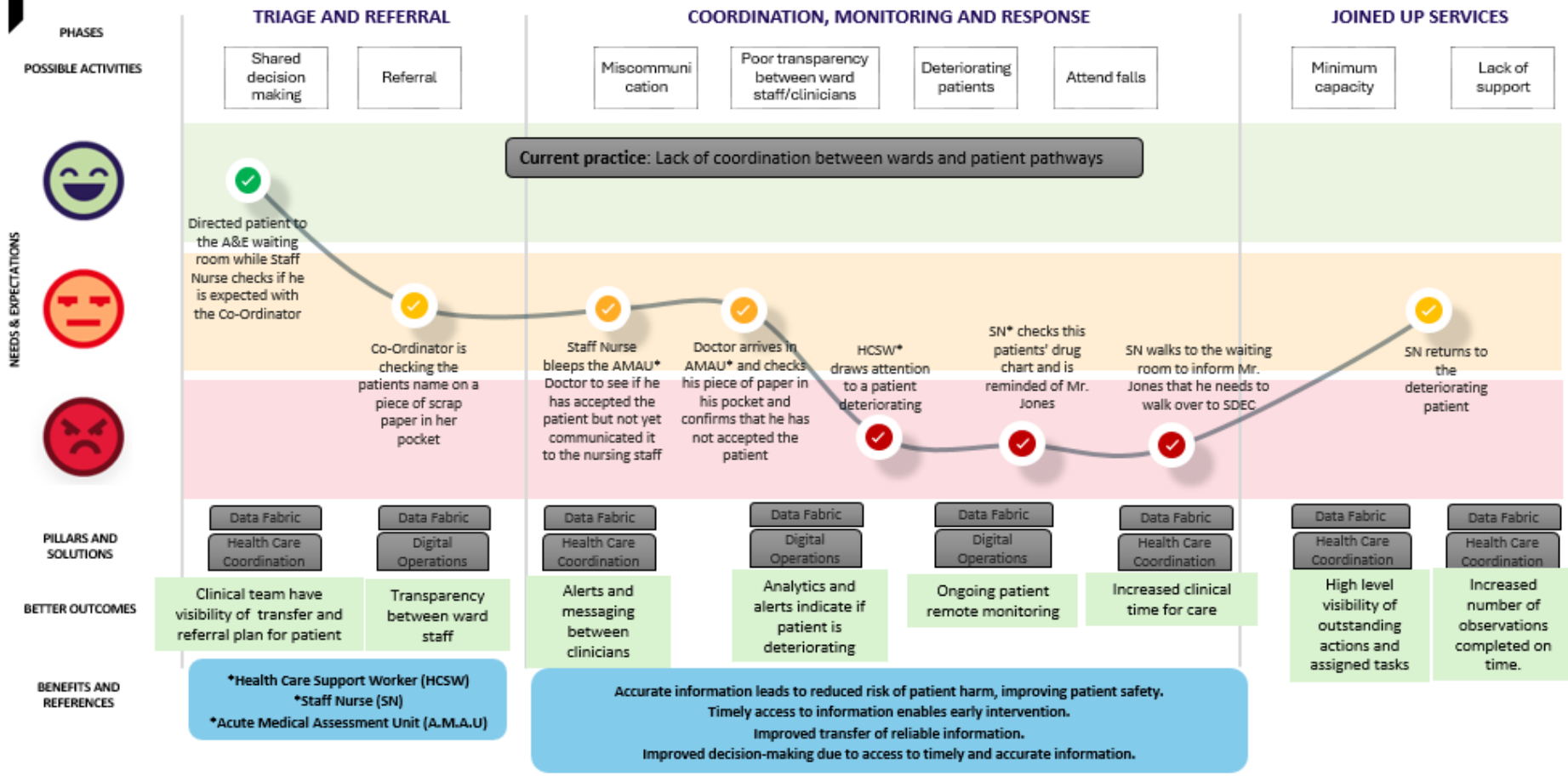


Journey using Electronic Patient Flow solution: Patient transfer between sites

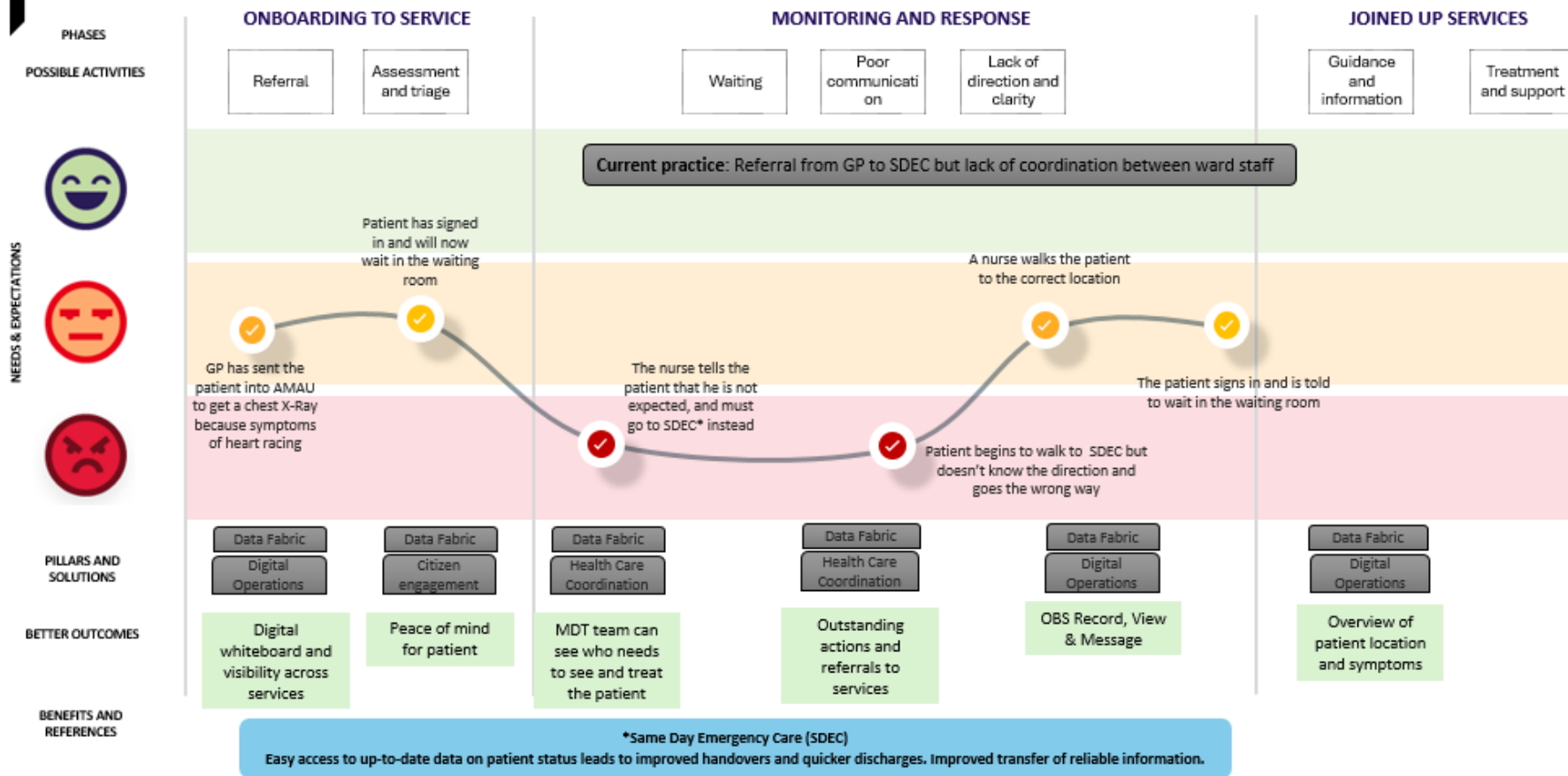


A&E Journey : Staff Nurse

The Staff Nurse is responsible for assessing care needs and the planning, delivery and evaluation of individual care. The Staff Nurse often must coordinate patients to the required pathway/location.

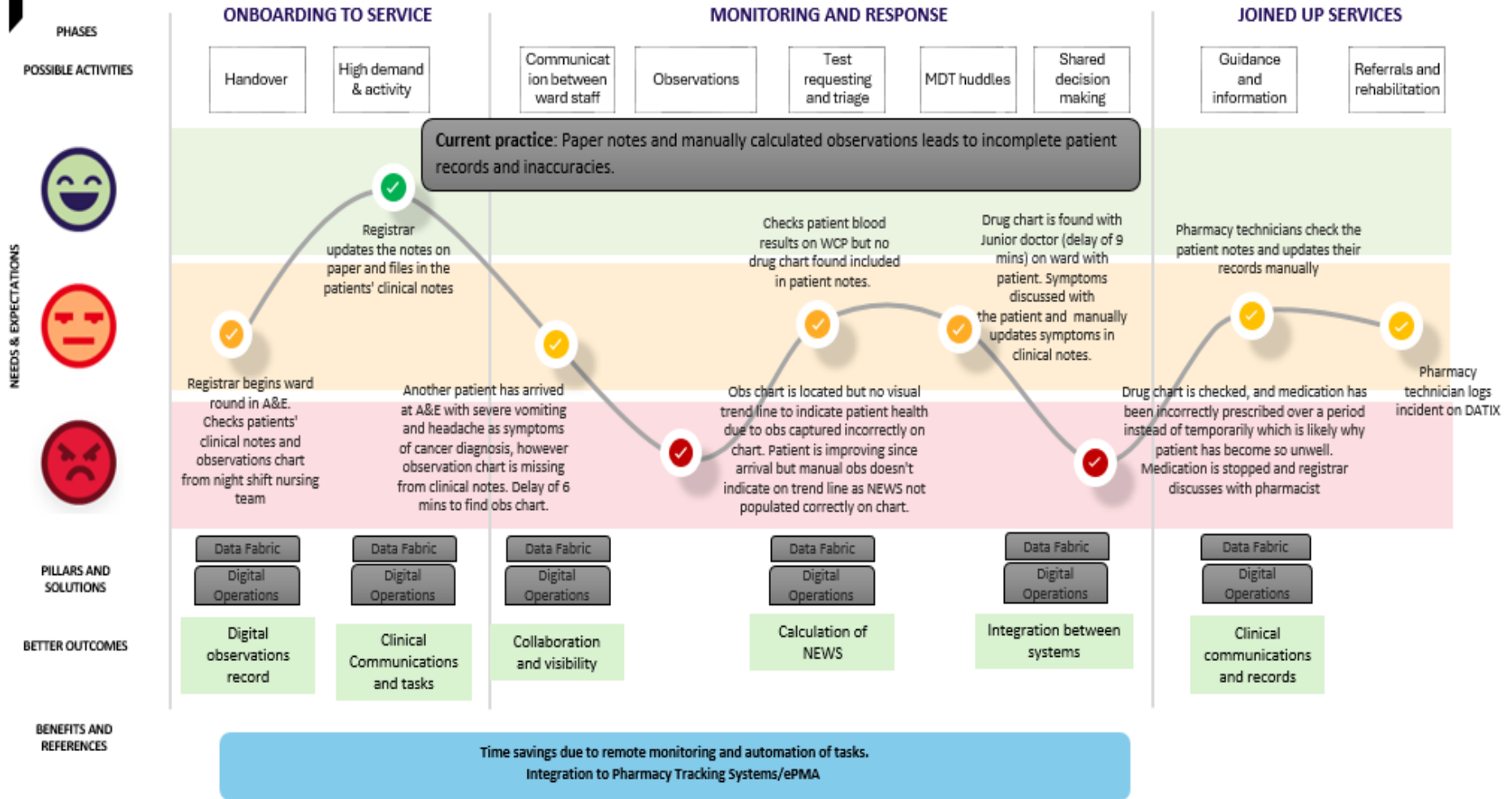


A&E Journey : Patient



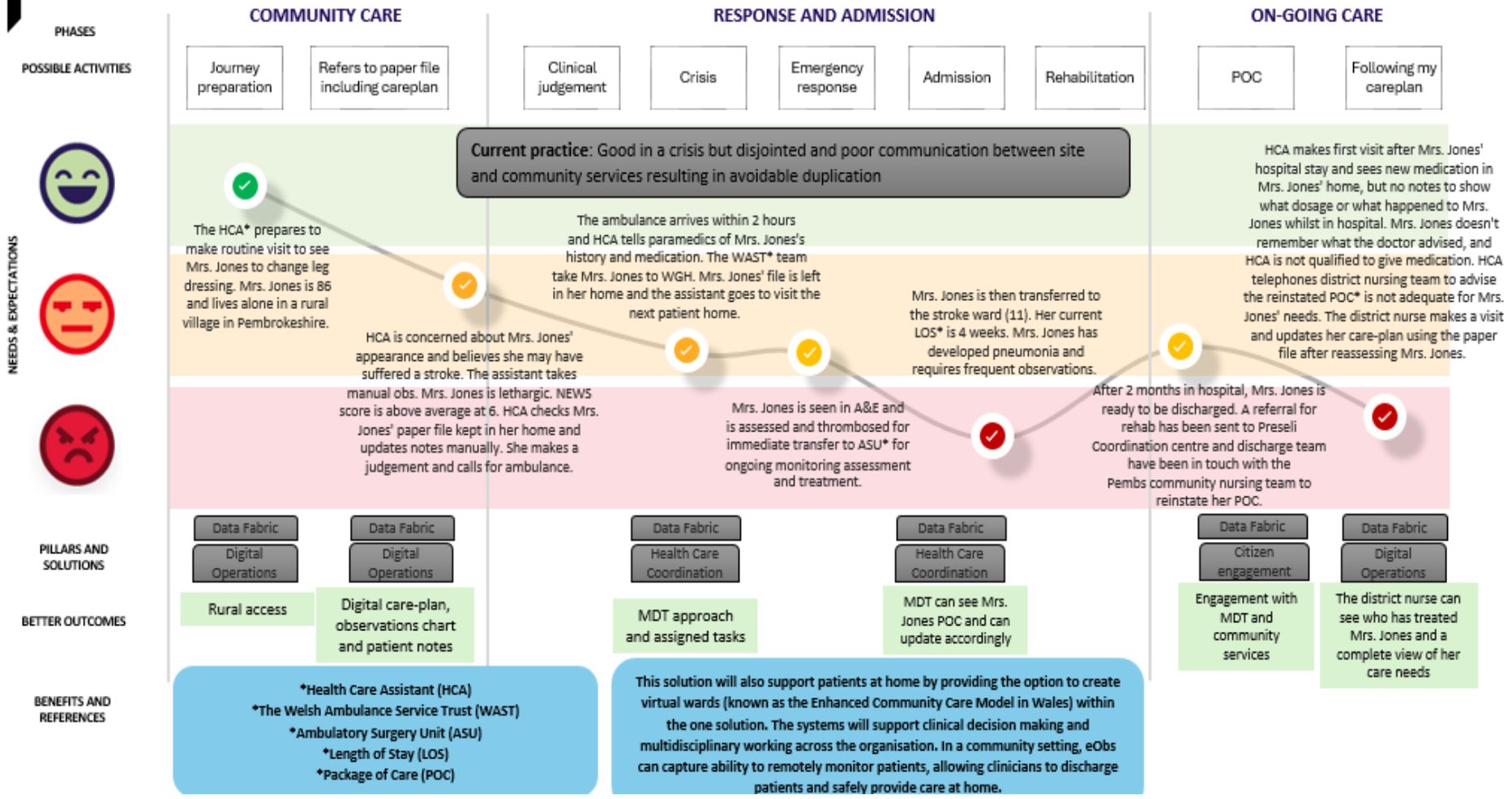
A&E Journey: Medical Registrar

Victor is the Medical Registrar on the A&E ward in WGH and is responsible for providing clinical leadership and oversee care for patients with acute and complex medical problems.



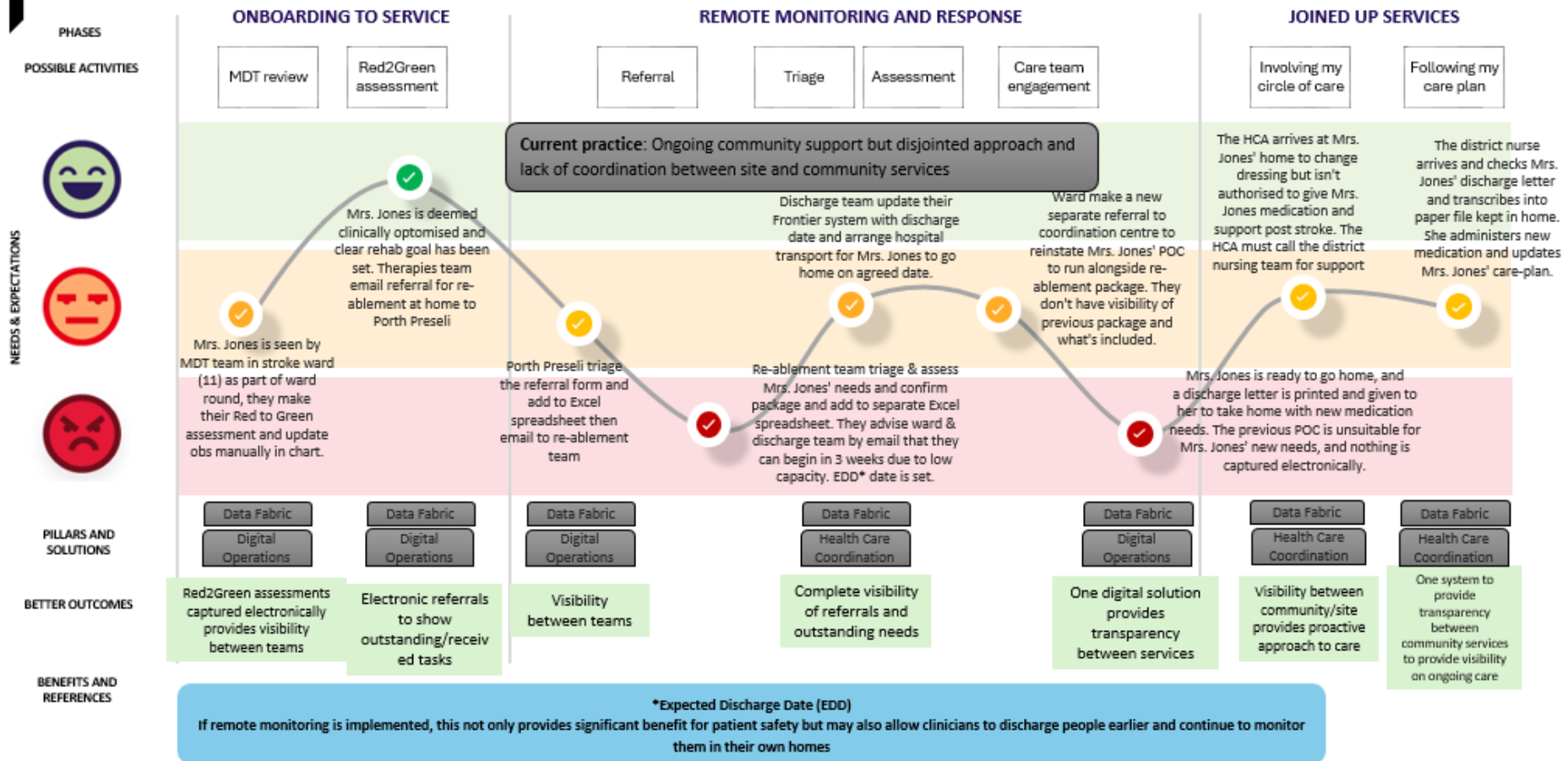
Community Journey

The Health Care Assistant and District Nurse provides care to patients in their own homes and in residential care homes. District nurses play an important role in keeping hospital admissions and re-admissions to a minimum. On this occasion, the HCA and district nurse is responsible for seeing Mrs Jones in her home.

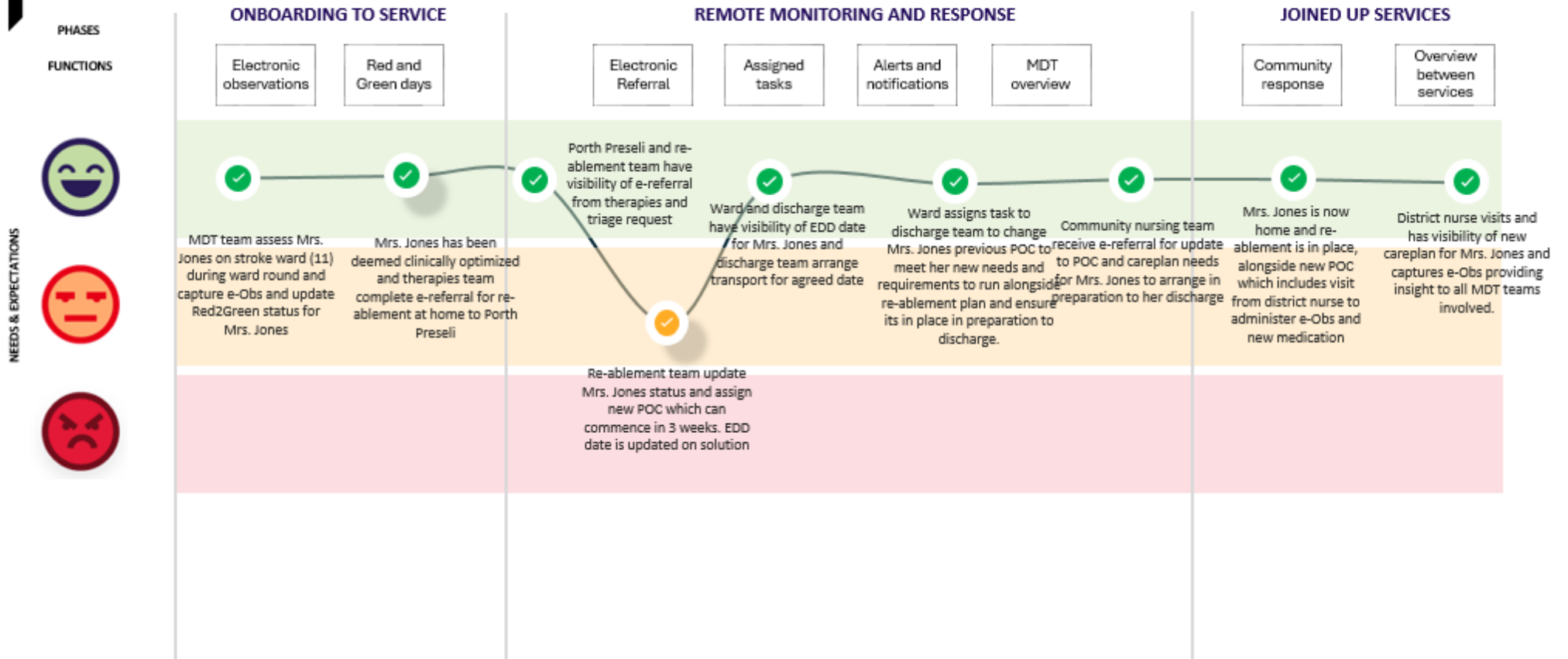


One of the Porth Preseli team's responsibilities is coordinating and organising referrals for packages of care and re-ablement to arrange safe discharge for patients back into the community.

Community Journey: Patient referral and discharge

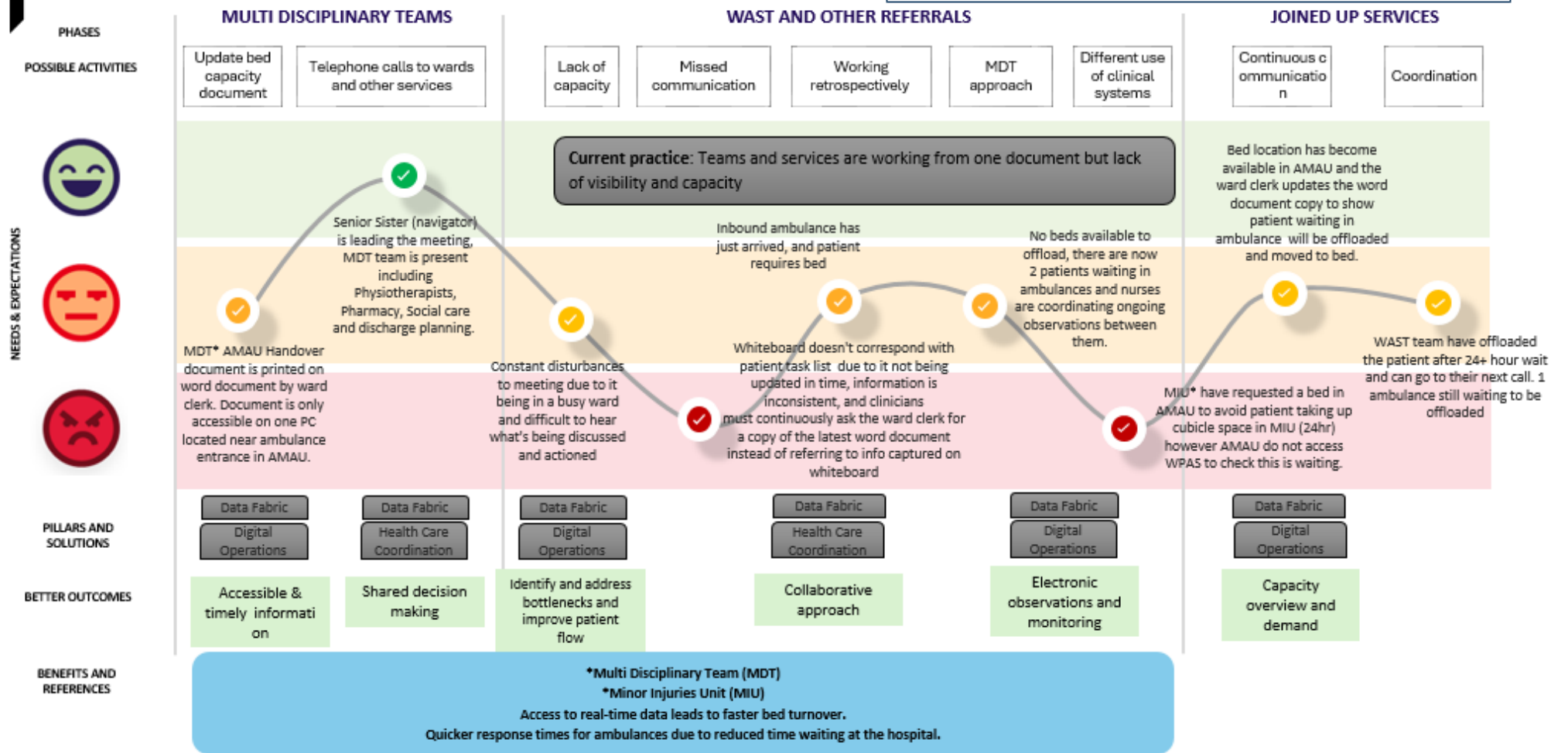


Community Journey using Patient Flow and Electronic Obs solution



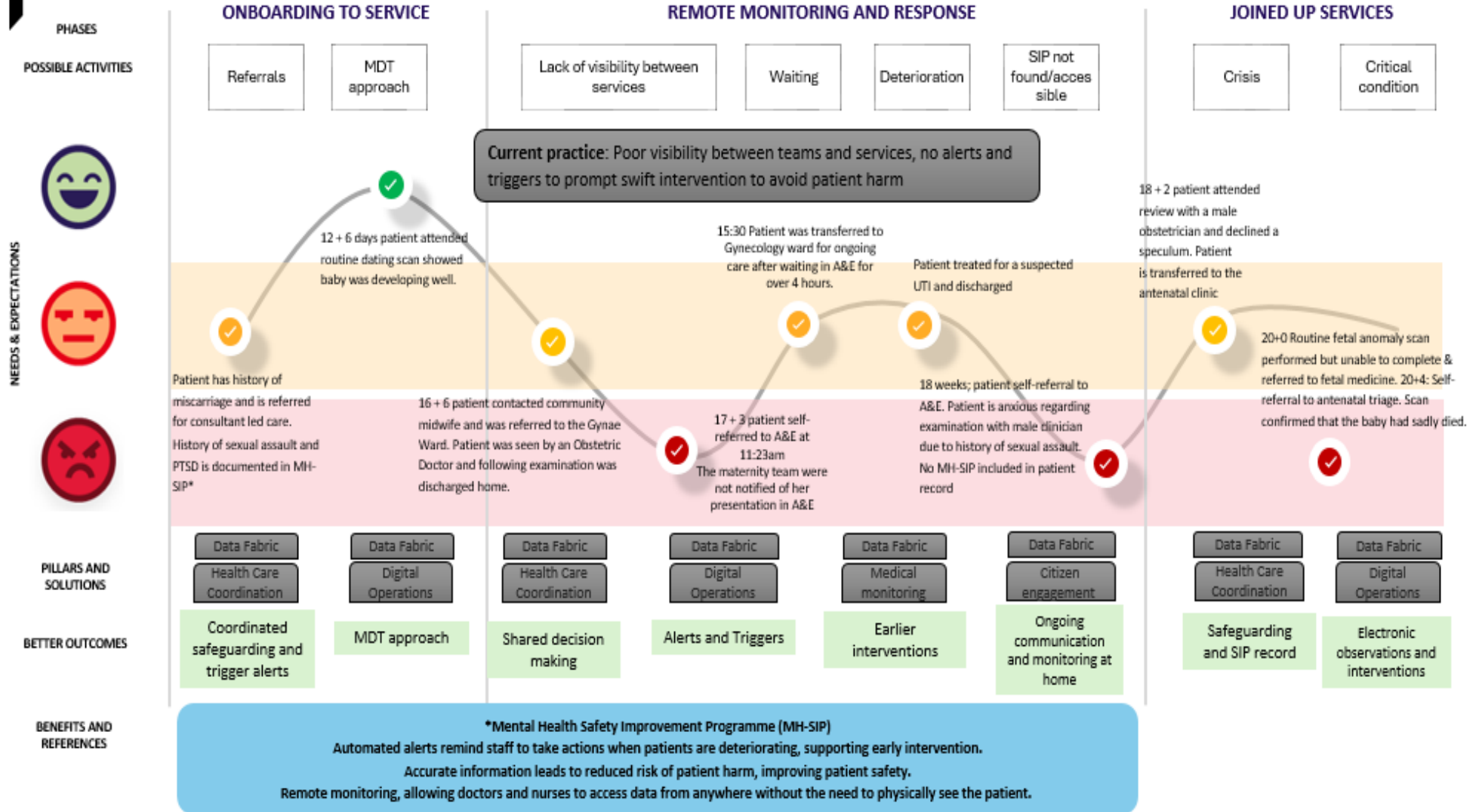
Handover Journey: Ward Clerk and Ward Sister (Navigator)

Jayne is the Wark Clerk on AMAU in PPH and Becca is the Senior Sister and Navigator on AMAU in PPH. Jayne is responsible for providing the latest information in relation to bed capacity and patient care to Becca and other nurses. Becca is responsible for the overall running the unit and for standards of nursing care. Becca is required to regularly update other teams around bed capacity and discharges to ensure swift and continuous movement of patient flow.



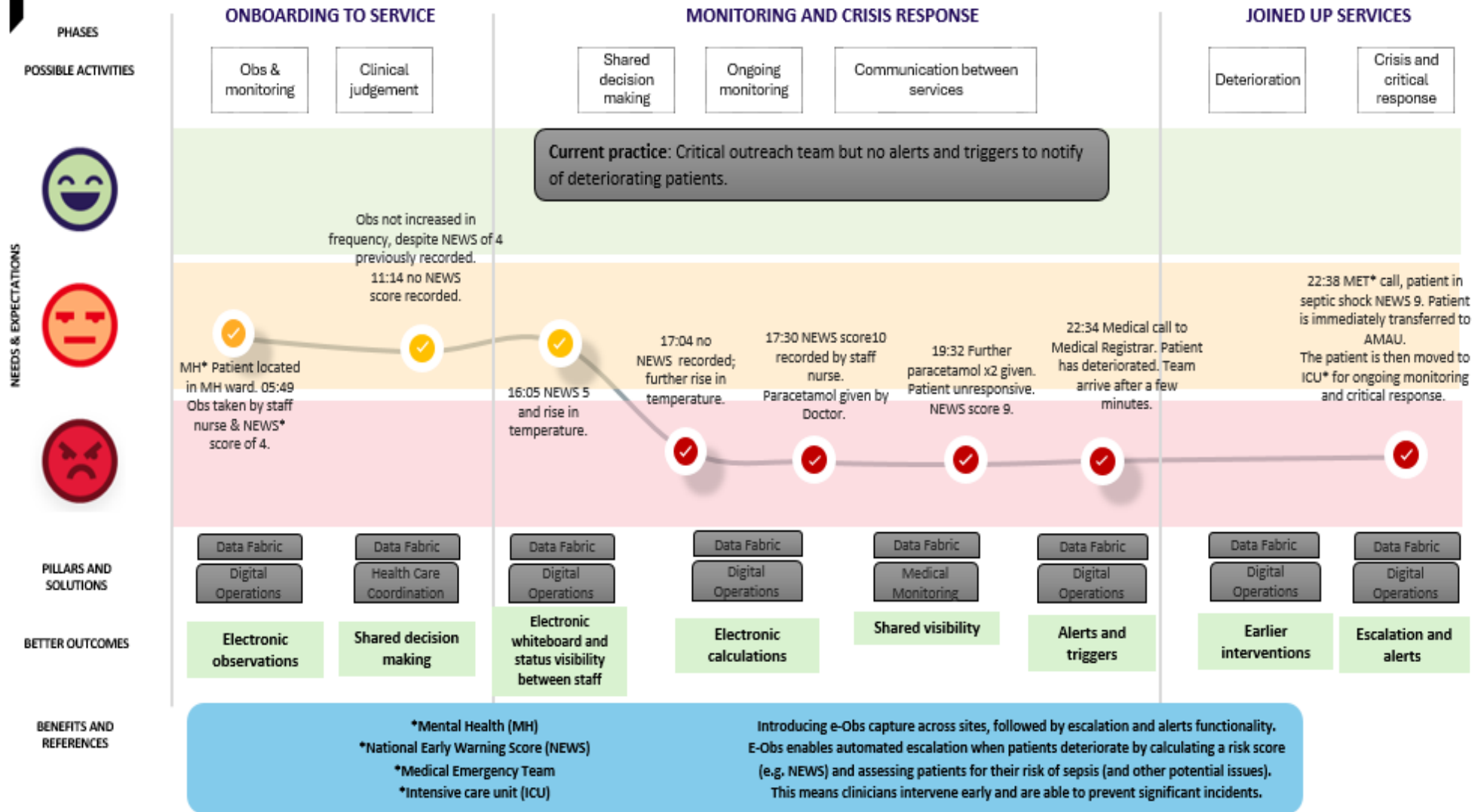
Labour Ward Observations: MDT Gynecology

This journey has been shared by the Labour Ward Coordinator. Their role involves allocating resources to match the needs of the individual woman and baby. They critically record, appraise, and evaluate maternity safety data via systems such as the Maternity Dashboard and the Intrapartum Forum to consistently lead and improve quality and safety

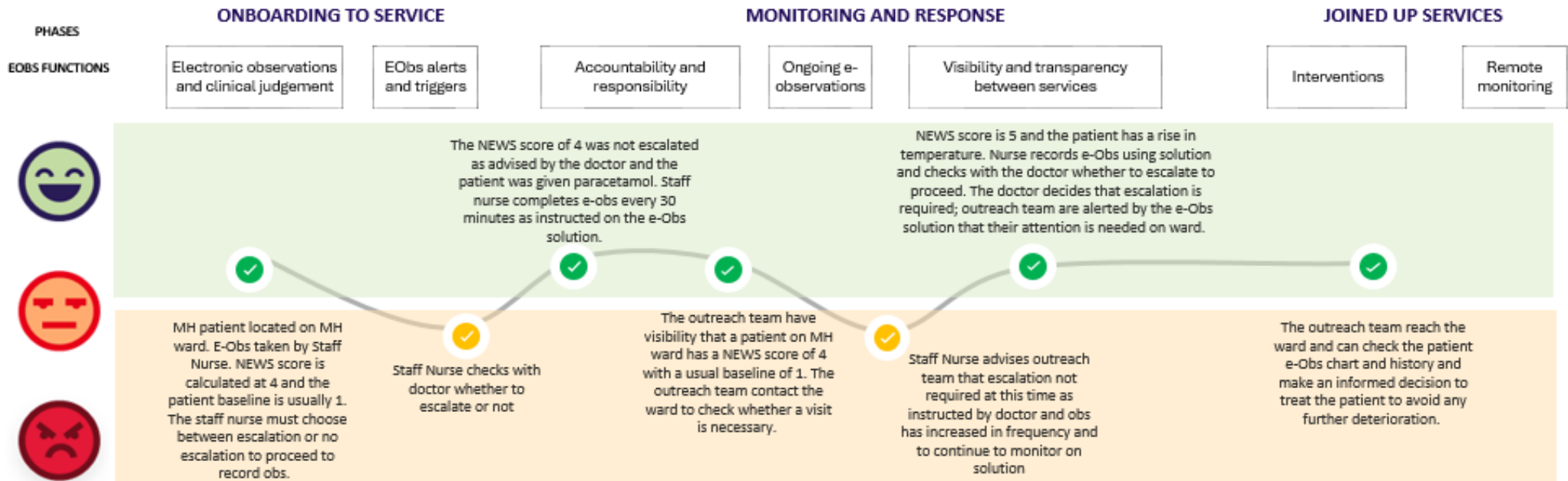


Resus and Deterioration Team: Senior Nurse

The Senior Nurse plays a key role in the management of in-hospital cardiac arrest.



Journey using Electronic Observations solution: Outreach resus and deterioration team



By providing early interventions in response to avoidable patient deterioration associated to NEWS scores, HDUHB could save on average £46,562.97 per annum*
 (*This data is indicated by reducing >9 scores to cost associated to 6-8. 6-8 scores to cost associated to 3-5 and 3-5 for cost associated to 0-4)
 There were 112 cardiac arrests recorded in 2023, however 52 were due to deterioration on ward and could have potentially been avoided. The solution could provide a potential 25% reduction in deterioration which equates to £36,870 per year (reduction source [VitalPAC helps Croydon cut cardiac arrests | Digital Health](#))

Appendix D: Capabilities

E-Obs

- ✓ **Alerts:** Alerts on patient deterioration e.g., NEWS2 score or sepsis risk
- ✓ **Additional assessments/tools:** Ability to record additional assessments/ tools, such as SBAR, fall risk, MUST and sepsis
- ✓ **Barcode scanning:** Scanning of barcodes to identify patients
- ✓ **Basic observations:** Captures basic observations (Blood Pressure, Heart Rate, Temperature, Respiratory Rate and Oxygen Saturation) required for NEWS2 score calculation
- ✓ **Care Pathway Recommendation:** System automatically provides recommendations for care pathways, e.g. the Sepsis Six Tool, based on observations
- ✓ **Graphical representation:** Data is represented graphically to show trends over time
- ✓ **Integration & Interoperability:** Ability to integrate with other systems (PAS, clinical portal etc.), wearable devices, and monitors for continuous monitoring of patients
- ✓ **Mobile Access:** Observations data can be accessed on mobile devices through app
- ✓ **NEWS2 score:** Automatic calculation of the NEWS2 score (or PEWS score)
- ✓ **NEWS2 score levels:** Ability to set the NEWS2 score levels depending on patient requirements
- ✓ **Observations frequency:** The ability to define the frequency of observations for each patient
- ✓ **Reminders:** Reminders for staff that observations are due
- ✓ **Speciality observations:** Ability to capture additional observations for specialities as required, e.g. neurological observations

E-Flow

- ✓ **Admissions data:** Statistics on number of patients admitted, including details about patient status
- ✓ **A&E Tracker:** To monitor the flow of patients from A&E to inpatient beds. This is a process tracker for A&E patients for whom bed requests have been made. Displays real-time KPIs from A&E. Three panels showing patient details: awaiting allocation of a specific bed by the ward staff, bed allocated but not ready, bed allocated and ready. Updated interactively by changes made on Ward Whiteboard.
- ✓ **Check-in for appointment:** Self-check in systems for patients
- ✓ **Command Control:** Central control centre, where staff can see data for the entire organisation and use it to manage capacity planning. Includes Hospital at a Glance information to provide a real-time dynamic display of inpatient activity.
- ✓ **Direct Messaging:** Direct messaging between staff via mobile devices
- ✓ **Discharge summaries:** Automated creation of discharge summaries
- ✓ **Discharges/ Transfers data:** Statistics on number of patients discharged/ transferred, including details about patient status
- ✓ **Electronic Whiteboards:** Electronic Whiteboards used to present key patient information on wards.
- ✓ **External Referrals/ Transfer management:** System to manage external referrals and/ or transfers
- ✓ **Handover:** Handover responsibility for care of a patient to another carer. SBAR functionality.
- ✓ **Internal Referrals/ Transfer management:** System to manage internal referrals and/ or transfers
- ✓ **Integration with e-Obs:** Ability to integrate with electronic observations system to display NEWS2 score and other key information about patient status
- ✓ **Integration with PAS:** Integration with existing Patient Administration System (PAS) to pull and push information as required
- ✓ **Mobile Access:** Ability to access patient information on mobile devices
- ✓ **Patient Planning:** System to create and store patient plans
- ✓ **Predictive Capacity Planning:** Analytics to plan capacity

- ✓ **Real-time bed occupancy:** Real-time data to show current status of beds. This includes bed requests and bed state. A single display of all bed requests from all sources. Displayed together with the hospital and ward level summary bed state. Interactive to enable assignment of a patient to a ward.
- ✓ **Real-time locating systems:** A system to locate patients, staff, and/or assets in real-time (e.g., via wearable devices)
- ✓ **Task management:** System to manage patient level tasks that can be assigned to users. Grouped on Ward Whiteboards.

Appendix E: Benefit Spotlights



Improved Patient Outcomes

An e-Observation (e-Obs) system allows clinical staff to record their patient observations digitally. In an acute setting, staff can use mobile devices to record data, which can be accessed remotely by other clinicians. Such systems automatically calculate the (NEWS2) score, which reflects whether a patient's condition is improving or deteriorating and provide clinicians with relevant alerts. Remote monitoring will allow doctors and nurses to access data from anywhere without the need to physically see the patient which will save them time and also reduce the risk of cross-infection. The provision of real-time data will help improve clinical decision-making and reduce the risk of harm, while providing patients and their families with confidence that they are monitored appropriately. E-Obs will provide more accurate and regular observations that will provide early identification of risks to the patient, such as, sepsis. Automated alerts will remind staff to take actions when patients are deteriorating and supports early intervention.

Impact of a Digital Solution

- Accurate information leads to reduced risk of patient harm, improving patient safety.
- Timely access to information enables early intervention.

Current Challenges & Risks

- Lack of real time data
- Impact on patient safety
- Cross-infection
- NEWS2 scores being calculated incorrectly



Reduced risk of patient harm and improved patient safety which can result a **90%** reduction in norovirus incidents. Evidence suggests that patients that acquire hospital based infections, for example C.Diff, are likely to require an additional six days in the hospital costing the health board between **£1,308 - £2,154** for each incident.

a 15% reduction could lead to an annual saving of
£59,773

"People sometimes have difficulties adding up the NEWS score and there is incorrect scoring."

Reduced risk of errors (e.g. due to more regular, accurate observations)

E-Obs will provide more accurate and regular observations that will provide early identification of risks to the patient, such as, sepsis. Automated alerts will remind staff to take actions when patients are deteriorating which supports early intervention. Automation of routine tasks, such as calculating the NEWS2 score, frees up time for staff to look after the patient and reduces the risk for errors.

"It's the system that is limiting us clinically."

Reduced unplanned admissions to critical care units from e-Obs equipped wards

15%

reduction in the number of unplanned admissions to critical care units wards equating to a saving of

£565,022 per annum

Reduced risk of patient harm and improving patient safety

Through having access to the correct information easily and in a timely manner this will reduce the risk of harm to patients and improve their safety. It's anticipated that the number of cardiac arrests for patients will reduce by **50 - 70%**.

based on a
25%
reduction in the number of in hospital cardiac arrests which could mean an annual saving of up to approximately
£36,870

Increased number of observations completed on time

E-Obs technology will result in an increase in the number of observations completed on time.

Better Staff Experience



Electronic Patient Flow (e-Flow) technology will assist in cross-departmental communication through providing up to date information about a patient that will aid in immediate clinical and operational decision making. With remote digital access to information, and automated notifications, communication becomes easier. It is expected that this will result in a lot less phone calls, which will remove dependencies on staff being available to answer the phone for example for transfers or handovers. Digital notes are also expected to be more easily legible. E-Obs will provide clinicians with up to date and accurate information that will aid their confidence when conducting routine tasks in the workplace.

Impact of a Digital Solution

- Improved decision-making due to access to timely and accurate information
- Remote and easy access to up-to-date information
- Reduced admin time releases time to care for patients, reducing stress levels
- Clinicians feel increased confidence due to access to more accurate information

"If I could change one thing I would try and improve the communication between the emergency department (where most patients go out of) and the ward areas"

Increased staff confidence resulting in improved decision making

Current Challenges & Risks

- Lack of up to date data
- Duplication
- Delays



Improved communication between staff members and across departments

E-Flow will assist in cross-departmental communication through providing up to date information about a patient that will aid in immediate clinical and operational decision making.

"...communication is the biggest problem. Especially when moving between specialities."

Reduced stress levels for staff

It is anticipated that the introduction of e-Flow will improve staff wellbeing and reduce stress levels by removing duplicate tasks and freeing up time on their shifts

Organisational Benefits



In the long term, the patient, staff and efficiency benefits will lead to wider organisational impact including a reduction in complaints and an improved brand image.

Impact of a Digital Solution

- Improved processes will lead to better patient outcomes and an improved reputation for the health board
- Improved transfer of reliable information.
- Data is readily available for audits in a structured format

Reduced litigation

The reduction of patient harm and the reduction in complaints due to the use of e-Observations will potentially result in the reduction of litigation for the health board potentially savings **millions of pounds** each year.

"more accuracy developing a timeline when dealing with complaints/DATIX"

Current Challenges & Risks

- Human error can lead to mistakes
- Lack of real time data that can be easily accessed for audits and reviews
- Delays in treatment



Reduced complaints and improved brand image due to better patient care.

Improved decision-making for senior teams.

Increase in compliance due to more accurate, up-to-date data and increased efficiencies.



Increased Efficiencies

A more efficient process would create capacity. It would also better the patient journey and transfers would run much faster and smoother when you remove the need to scan notes and wait to confirm bed allocation. For staff, they will be able to do more in other areas if we make processes more efficient. It is anticipated that e-Obs will free up time for nursing staff while patient flow solutions are expected to release time for clinical site teams to facilitate flow in a more efficient and proactive way. By removing duplication and digitising manual processes it is expected that staff capacity will increase which could result in a reduction of overtime spend.

Impact of a Digital Solution

- Easy access to up-to-date and real-time data leads to improved handovers and quicker discharges.
- Synchronised electronic information leads to reduced manual admin work and removes duplication of effort.
- Bed & patient data is available to better manage capacity and reduce wait times.
- Time savings due to reduced admin time, remote monitoring & task automation
- Improved efficiencies in bed management leading to less cancelled surgeries.

Improved handovers and quicker discharges

Patient flow will allow more efficient handovers on wards, when patients move location and assist in quicker discharges allowing more patients to be discharged before midday. Currently 15% of discharges take place before midday.

Reduced manual admin work and removal of duplication of effort

Through the utilisation of remote monitoring and the automation of tasks there will be a reduction in duplication, data will be easily shareable across the health board

Reduced time spent by clinical site manager to identify available beds

Patient flow technology will aid in reducing the time required for clinical site managers to spend identifying available beds. Clinical site management teams can focus on solving key flow problems, such as liaising with social care

Current Challenges & Risks

- 5% of patients make up 53% LOS
- No real time data or overview of available beds
- Discharge delays and transfers



Reduced average length of hospital stay per patient

5% reduction in patient length of stay through using e-Flow which will aid in ensuring that patients are treating at the right time and right place leading to an annual saving of **£3,368,210**

“real time data reduces the need for lengthy site meets / whole site / caseload reviews, and the number of staff required at such meetings”

➔ **960 &** further time can be saved through improving the efficiency of bed management meetings with **£7,463,520** in efficiency gains per year
minutes per day across the health board

“a lot of time spent on the phone to see if beds are available for the patient to be transferred out of the department”

Improved bed management resulting in less cancelled surgeries due to inefficient scheduling in surgical departments

5% reduction in cancelled surgeries due to bed availability leading to an annual efficiency gain of **£27,895**



Increased Efficiencies continued.

“currently to have oversight...it requires multiple systems, spreadsheets, databases, paper-work...multiple meetings where the information obtained will be quickly out of date”

Quicker response times for ambulances

As ambulances will be available to respond quicker to emergency calls as a result of improving patient flow and reducing the need for ambulances to wait outside A&E. Currently **41.12%** of red calls are responded to within 8 minutes.

Reduced time an ambulance waits outside of the hospital

It is anticipated that the improvements in e-Flow processes will reduce the requirement for ambulances to wait outside of A&E to handover a patient. Ambulances currently lose between **70 and 85 hours per day per site** at the four acute hospitals.

Reduced average time patients wait until seen by doctor in A&E

It is expected that e-Flow technology will help healthcare staff effectively manage resources and free up time for patient care, enabling the Welsh Government to meet key national targets, such as the 4-hour A&E waiting time target stating that **95% of patients** attending A&E should be admitted, transferred or discharged within 4 hours. Currently this is around **70%**.



Enhanced Patient Experience

The current processes lack real-time information which leads to slow handovers, transfers and discharges. This also presents a key risk to patient safety whereas the electronic patient handover systems ensures that errors are minimised, for example, due to illegible handwriting. Patients are able to receive the right treatment and intervention at the right time avoiding deterioration. As a result, fewer patients are admitted to intensive care units, where beds carry a significantly higher cost. Delays caused by inefficiencies in processes, including handovers, leads to a significant negative impact on health services with ambulances waiting outside Emergency Departments, patients spending up to 5 days in A&E without being admitted to a ward, and surge beds opened regularly.

Impact of a Digital Solution

- Patients are no longer asked for the same information multiple times.
- Staff have increased time to care and feeling less stressed.
- Patients and families are aware of next steps and feel more informed.
- Improved patient flow leading to less time spent in Emergency Department waiting room.
- Reduced length of stay and quicker discharges.

“the management of flow is essential to the effectiveness of the service.”

“It’s about providing high quality care for patients. And providing it at the right

Improved communication between staff members and across departments



Increased confidence resulting in improved decision making



Improved outcomes and experience for patients

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