Professional Record Standards Body

Better records for better care

TRANSFER OF CARE

DISCOVERY REPORT

April 2023

Document Management

Revision History

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Glossary of Terms

Term / Abbreviation	What it stands for
API	Application Programming Interface
CQC	Care Quality Commission
FHIR	Fast Healthcare Interoperability Resource
GP	General Practitioner
HRO	Human Readable Object
IT	Information Technology
ITK	Interoperability Toolkit
MESH	Message Exchange for Social care and Health
PID	Project Initiation Document
SRO	Senior Responsible Owner
ToC	Transfer of Care
XML	Extensible Markup Language

Term	Definition
Application programming interface	A set of defined rules that enable different applications to communicate with each other.
ITK3	API standards for a set of generic messaging components using FHIR STU3 to create a unified approach to NHS message and document flows across England
MESH	The Message Exchange for Social care and Health (MESH) is a secure service for direct electronic transmission of information.
Minimum viable product	A product with enough features to attract early-adopter customers and validate a product idea early in the product development cycle
XML	Text format that establishes a set of rules to structure messages as both human- and machine-readable records

Contents

1 Executive summary 6
2 Background 8
3 Aim and objectives 8
4 Scope 8
5 Benefits 9
6 Methodology 9
6.1 Project Advisory Group 9
6.2 Evidence Review 9
7 Findings 10
7.1 Literature review 10
7.2 Related initiatives - What can we learn from others? 13
7.3 Current state of adoption 14
7.3.1 Overview 14
7.3.2 Readiness of supplier and in-house systems 14
7.4 General practice experience, needs and priorities 16
7.4.1 General Practice survey results 16
7.4.2 General practice experience 18
7.4.3 General practice needs and priorities 18
7.4.4 Medication information 19
7.5 Secondary care experience, needs and priorities 20
7.5.1 Survey 20
7.5.2 Perception and priority of discharges 20
7.5.3 SNOMED CT and coded information 21
7.5.4 Use of forms/templates and local configuration 21
7.5.5 Paper and duplicate copies 21
7.6 Patients' experience and needs 21
7.7 Information standard structure and content 23
7.7.1 DAPB 4042 e-Discharge Summary Information Record Standard and related standards 23
7.7.2 Relationship to other standards 25
7.7.3 'Must haves' 26
7.7.4 SNOMED CT 26
7.8 Technical standards, tools and services to support implementation 27
7.8.1 FHIR technical messages and release management 27

7.8.2 Supporting technical documentation and implementation guidance 27
7.8.3 National architecture, services and guidance – current 27
7.8.4 National architecture – future plans 28
7.9 Software suppliers and assurance processes 28
7.9.1 Technical assurance processes and certification 28
7.9.2 Information record standard assurance processes 31
7.9.3 Conformance assessment and accreditation – future plans 31
7.9.4 Software suppliers 32
7.10 National policy and leadership 34
7.10.1 Leadership and national policy 34
7.11 Levers and incentives 35
7.11.1 Statutory levers 35
7.11.2 NHS procurement frameworks and guidance 36
7.11.3 Assurance and accreditation of software suppliers and care provider organisations 36
7.11.4 Levers and incentives not utilised 37
7.12 Other transfers of care 38
8 Conclusions and Recommendations 38
8.1 Conclusions and recommendations – in summary 38
8.2 Conclusions and recommendations – in summary 42
9 Appendices 46
9.1 Appendix A References 46
9.2 Appendix B Stakeholder consultation list 48
9.2.1 Interviews 48
9.2.2 Group Feedback 49
9.3 Appendix C - Literature review summary 50

1 Executive summary

The information record standard for e-discharge (DAPB 4042) was first published in 2015. Despite significant investment in programme initiatives on Transfers of Care (e-discharge plus outpatient letters and discharge from emergency departments and mental health inpatient units) since publication, the widespread adoption and achievement of the anticipated benefits of standardised discharge summaries across the system remains disappointingly low.

The review identified the following challenges that have inhibited widespread adoption of the e-discharge and delivery of the anticipated benefits:

People

- Secondary care providers (or their IT system providers) **do not see the imperative or have an incentive** to change their current ways of working hence most transfers of care are sent as unstructured documents often with low quality information.
- The value to GPs of the information transferred is **limited and not coded** in a way that meets their needs or that could improve their workflow.
- **Patients do not consistently receive discharges** and the information they contain is not always useful or accessible to them.
- Suppliers and providers are frustrated by the lack of clear guidance and **clarity and consistency on what is expected of them** and moving goalposts. Examples include FHIR release policy, lack of clarity of the relationships between programmes and conflicting advice (e.g. medications programme and ToC), uncertainty regarding national architecture.

Process

- ToC has been repeatedly under-estimated and lacked the consistent and **enduring leadership** needed to resolve the problems and successfully deliver. It has been approached **technically** and in a **piecemeal** way, rather than addressing a need to improve patient care and outcomes across an **Integrated Care System**.
- **Use of SNOMED CT is universally poor (in many cases not used and where it is used, often inappropriately or inconsistently)** meaning that unstructured or inappropriately coded data is shared that makes it difficult to work with
- The business case for transfers of care and the infrastructure that supports them have shifted significantly over the years since development –benefits are considerable but need refreshing based on today's needs and context.

Technology

- There is a complex legacy and mixed economy of standards (semantic, interoperability and terminology), implementation guidance and architectures that suppliers and implementers have found hard to navigate.
- **Assurance** of technical implementation is overly **complex and time-consuming.**
- Both primary and secondary care **systems need to be uplifted** to reflect user needs for discharges

In combination, the factors above mean that it has been difficult, slow and costly for local organisations to deliver discharges that meet user needs and deliver the promised benefits. A different approach is needed.

This report makes 7 broad recommendations:

Recommendations regarding e-discharge

1. Adapt General Practice systems, processes and workflow to better meet GP needs.
2. Drive wider adoption of the standard in Secondary Care.
3. Encourage joint system working (primary care, secondary care, patients) facilitated by ICS's.
4. Improve e-discharge standards and documentation to make it easier for suppliers and implementers to follow.
5. Review and streamline assurance and conformance processes.
6. Establish a programme, strong leadership, governance and incentives to lead the change programme required.
7. Recommendations for other related programmes

In addition, recommendations for other transfers of care and for standards and interoperability generally are included in the detailed recommendations below.

The recommendation is to move this work forward in **an agile way** that can build momentum through a series of **rolling pilots/demonstrators** delivering early benefits and finding pragmatic solutions to the problems described and sharing/scaling them for national benefit.

The pilots would be located in willing Integrated Care Systems with the support and co-operation of relevant suppliers engendering more local ownership and ensuring solutions that work in practice.

The scope and number of pilots would be subject to discussion with the key stakeholders and dependent on the investment available but for example could include:

- Whole system review process between primary and secondary care and patients i.e. get the business process working before any technical adaptations are made
- Focus on sending priority items identified by GPs (diagnoses, medications, actions) and accurately coded in SNOMED CT i.e. leave the current flow of discharge 'documents' and focus on minimal structured message for key items only
- Delivery of e-discharge using an event-based architecture approach
- E-discharge with revised GP workflow i.e. working with GPs, design and model primary care systems with a workflow that recognises and extracts priority items and enables efficient review and processing in a way that meets GP needs i.e. detailed user design of how discharge data should flow and be processed within GP systems alongside the information specification

Deliverables will likewise be dependent on the agreed scope of pilots but could, for example, include:

- A toolkit for joint system review and continuous improvement for Integrated Care Systems
- Guidance and case studies/benefits evaluation for implementing SNOMED CT in discharge information.
- Feedback and learning for new architectural approaches.
- Uplifted GP systems that deliver quantified benefit and reduction in burden for GP systems

The key features of the proposed approach are listed below:

- Collaborative leadership and governance including all key stakeholders (ICS, NHS E and programme teams, software suppliers, PRSB, techUK, INTEROPen) and taking an 'whole-system' approach
- Strong involvement from Integrated Care Systems ensuring local ownership and fir for purpose solutions.
- Focus on clinical continuity and better outcomes for patients.
- Clinical and technical support to enable problem solving and rapid removal of barriers.
- Pilot deliverables will be assured and shared for national benefit.

2 Background

Standards for Transfers of Care (ToC) (inpatient discharge, mental health discharge, emergency department discharge and outpatient letters) have been published for some years and mandated through the NHS contract. However, widespread implementation of the standards has been slow.

Successive initiatives have attempted to tackle the problem and made progress but have been limited in their impact due to constrained scope and focus on only part of the problem.

At the same time, the whole standards eco-system and infrastructure has evolved and matured and the case for effective e-discharge today has shifted considerably from the original intention to remove paper from the system.

The PRSB has been contracted to undertake a discovery project to review the reasons for limited progress on e-discharge and to make recommendations on how the position could be improved. The work considers e-discharge specifically with reference to other transfers of care where relevant.

In two linked pieces of work, the focus has been firstly on understanding GP's need for semantically interoperable data into primary care systems and secondly to understand why there is a low adoption rate and what plans and actions are needed to move this work forward.

NHS Digital have undertaken comprehensive work and testing in the last 18 months to ensure primary care suppliers are able to receive electronic messages and the findings and learning from that project have informed this work.

3 Aim and objectives

The overarching aim of the NHS England team is to drive better, safer, more efficient care through widespread adoption of consistent standards and interoperable sharing of data. The accurate and timely sharing of information between secondary and primary care at the point of 'transferring care' is of crucial importance and the aim of this work is to enable that to happen consistently between all secondary and primary care provider organisations in England.

The aims of this discovery and user-design phase are:

- To review the current state of adoption of transfer of care messages between secondary care senders and primary care receivers of transfers of care and identify reasons for the low uptake to date.
- To understand GP's needs and priorities for ingesting semantically interoperable data into primary care systems, e.g., diagnosis, procedure, medications.
- To make recommendations for what needs to happen to enable widespread adoption that supports the needs of GPs to deliver safer patient care.

4 Scope

4.1 Scope inclusion

Scope for this discovery and user-design phase includes:

- Focus primarily on inpatient discharges and gathering lessons and making recommendations for other forms of transfer of care (Emergency Dept. discharge, mental health inpatient discharge, outpatient letters) where appropriate.
- Identification of the required changes at secondary care 'sending' organisations to enable specified requirements at primary care 'receiving' organisations in harmony.
- Assess General Practice needs and priorities for discharge information including how information should be ingested into systems.
- Transfers of care in England although any implications for cross-UK border transfers will be considered.

4.2 Scope exclusion

Out of scope for this discovery and user-design phase:

- Transfers of care to other settings
- Benefits evaluation (covered by previous projects/business cases)
- Wider communications and awareness raising (should be picked up in following phase depending on recommendations)

5 Benefits

Whilst benefits evaluation is out of scope of this review, it is important to note that:

- Whilst there have been several initiatives which have looked at potential benefits for automation of ToC data, the landscape and the priorities for transfers of care and e-discharge in particular, have changed considerably (i.e. from a means of getting rid of paper and fax to a need for better safety and continuity of care and in particular to enable more efficient and effective processing in primary care) making a moving target for benefits realisation
- We found no evidence of evaluation of benefits but recognise this would have been difficult given the shifting goal posts.
- In any future initiative, it will be key to keep benefits and realisation of benefits including patients at the forefront of the agenda.

The benefits of the revised model for e-discharge described in this document would have very significant benefits for effective safety and continuity of patient care and for efficiency and time saving in General Practice. The 'whole learning system' approach advocated would also offer benefit for secondary care in avoiding readmissions to hospital, 'failed discharges' and duty of care. Both would contribute considerably to better outcomes for patients and improved safety.

6 Methodology

6.1 Project Advisory Group

At an early stage in the project, PRSB establish an expert advisory group to provide expert advice and guidance:

Nilesh Bharakhada	Clinical Lead	Clinical Director and GP, PRSB
Ann Slee	Expert Advisor	
Mike Moore	Advisor	Project Manager NHSE
Charlie McCay	Technical Lead	
Annette Gilmour	Supplier engagement Lead	Lead assessor, PRSB

Regular meetings were held with the advisors during the Discovery Phase to review findings, provide expert advice and inform recommendations.

6.2 Evidence Review

1. Evidence reviews and research (Appendix A list references)

- A comprehensive literature review was undertaken alongside research and analysis of related projects, previous approaches and initiatives including the NHSX Interoperability enablers project (including Transfers of Care) and NHS Digital's delivery of GP Foundation IT system capability and the Medicines Management programme.

2. Stakeholder consultation and engagement (Appendix B Stakeholder consultation list)

    - stakeholder-specific interviews that captured the current state of play and challenges faced by clinical providers and system suppliers implementing the Transfer of care standard were undertaken.
    - A cross-discipline discussion was undertaken with PRSB Advisory Board
    - Interviews were undertaken with:
        - Sender suppliers
        - Receiver suppliers
        - Providers
        - Other interested parties
    - A survey was developed from consultation findings and recommendations and sent to organisations that send and receive discharge summaries (Appendix C shows survey results)

3. General practice needs analysis and user design

    - Interviews with the RCGP leadership (Chair, Chair RCGP Scotland and Honorary Secretary)
    - GP focus groups undertaken
    - Joint GPIT group discussion
    - RCGP Health Informatics Group
    - Synergy Primary Care Network
    - Academics in General Practice

7 Findings

7.1 Literature review

The most pertinent points from the literature review are summarised below. Full synthesis included in Appendix C.

Current challenges of discharge summaries identified by GPs

Three main barriers identified by GPs within poor discharge summaries were the contents failed to contain the information given to the patient (33.3%), reasons for medication changes (26.9%) and medical jargon (Weetman et al., 2021). Over 70% of the letters consisted of unexplained uncommon acronyms and medical jargon. GPs said acronyms pose a substantial barrier and should be avoided for both primary and secondary care providers, and patient understanding.

A recent focus group of GPs (Spencer et al., 2019) found discharge summaries often contained inappropriate follow up actions, e.g., request for GP to chase hospital results, increasing the workload burden. Furthermore, referrals and tests requested from secondary care was reported in four harm cases in a focus group of GPs. There was frequent frustration reported regarding the accuracy of medicine reconciliation, particularly with the introduction of new drugs without specifying cessations of previous medications, leading to scepticism (Spencer et al., 2019).

A study (Weetman et al., 2021) revealed that junior doctors writing discharge letters led to a low proportion of successful letters. Acute medicine, cardiology and nurses/ advanced clinical practitioners produced the highest

proportion of successful letters. In addition, time pressures, writing letters retrospectively from patient notes and template restrictions on computer systems were reported to contribute to incomplete and unsuccessful documents.

GP time spent processing discharges

A recent study identified that 5% of GPs time was negatively impacted by operational failures (Sinnott et al., 2022) including lack of information from sources outside of the practice such as discharges. This causes GPs and practice staff causes stress, anxiety, frustration and distracts from time for clinical care. General Practice are having to spend significant amounts of time chasing information which is costly and labour intensive (Spencer et al., 2019).

Patient harm due to inadequate discharge communication

An analysis of nationally collected safety incident reports from general practices arising from hospital discharge (Williams et al., 2015) **found most (77%, n=463) of reports related to 'discharge' inflicted harm** to the patients.

151 of the reports had errors in discharge communication or lacked important clinical information such as diagnosis of a severe, life-threatening illness. 54% described patient harm, including 9% (n=13) as moderate harm or worse. The contributory factors were organisational factors, such as discharge letters lost or delayed, and staff errors due to illegible handwriting or missing information in the letter.

Patient involvement in discharge

Healthwatch England, 2015 found 57 different guidance documents amongst the trusts surveyed with wide variance and inconsistencies. Patients, friends and families reported feeling inadequately prepared and unsafe when discharged from hospital**. A lack of patient participation in the discharge process** was found, leading to lack of knowledge and support following their treatments and greater risk of harm was present in vulnerable people.

Current challenges of electronic prescribing and medicine administration (ePMA)

Healthcare Safety Investigation Branch, 2019 highlighted risks associated with electronic prescribing and medicines administration (ePMA) systems with prescribing medicines for patients during a stay in hospital and on discharge. This may have resulted in a patient inadvertently receiving two anticoagulant medications at the same time, possibly causing an episode of gastrointestinal (digestive tract) bleeding and death 18 days after discharge from hospital.

The investigation found there was no standardised discharge process with medication information, as there was no interface with the ePMA. Furthermore, there was a lack of interoperability between primary and secondary care electronic prescribing systems, between secondary facilities, between secondary and tertiary care, and between secondary care and community pharmacy. **In addition, the concurrent use of paper and electronic systems increased clinical risk**.

Systems and infrastructure barriers to effective electronic discharge summaries

One-way communication system

A recent study (Boddy et al., 2022) explored multiple stakeholders within a hospital to gain a wider understanding of the context of communication, administrative and infrastructural staff on both side of primary-secondary care interfaces. **The process of discharge summaries was largely a one-way communication** system structure, with communication between primary and secondary care progressively strained as care

became more complex. The overarching barriers in a largely one-way 'open loop' system resulted in **a lack of team mentality** and a '**divide' between hospital and general practice**. The **rarity of feedback** and sharing of insights between stakeholders hinders the appreciation of each other's perspectives and needs, exacerbating the problems and increasing the risk of patient harm and unsafety.

Unresolved conflicts between standards for direct care versus standards for secondary uses.

The national programme Getting It Right First Time (GIRFT) advocates for improving medical care within the NHS by reducing unwarranted variations. GIRFT for Orthopaedics advise clinicians to use OPCS codes, regarded as the statistical classification for clinical coding for hospital interventions and procedures by the NHS (*Getting It Right First Time (GIRFT). Orthopaedic Surgery*, n.d.) whereas the NHS also encourages the use of the international standard SNOMED CT for electronic health records to ensure concise and accurate data exchange (*NHS Digital. SCCI0034: SNOMED CT*, n.d.).

Similarly, the mental health dataset collected for secondary uses has unresolved conflicts with the inpatient discharge from mental health creating confusion and a burden and a barrier for software suppliers and local organisations in implementing the standards.

Barriers to adoption

The adoption of health information standards in healthcare organisations is influenced by a set of complex dimensions, including technology, organisation, environment, and inter-organisational relationships (Han et al., 2020).

Technical - Healthcare organisations that lack the necessary technical expertise may be less likely to adopt health information standards. Organisations are more likely to conform to implemented standards if the adopted standard is **compatible with existing technologies**, consistent with past experiences of the organisation. Also, there is an increased likelihood if the adopted standard has significant observable benefits, which reduce the perceived risk.

Organisation - Small- and medium-sized enterprises were being more effective and more conducive to adopting new technologies because of their efficient top-down introduction process; however large enterprises have relatively greater funds, talent and research and development capacity surfacing perceived benefits quickly after adoption.

Environment - A combination of external pressure and support can encourage the adoption of health standards by providing financial incentives to support meeting specific performance metrics.

Inter-organisation - Effective inter-organisational relationships are essential for successful uptake of standards. By building trust, communication, and shared resources, healthcare organisations can work together to implement TOC standards effectively and improve the quality of care provided to patients.

Healthcare organisations with a **culture that values innovation and collaboration** are more likely to adopt health information standards than those with a more traditional or hierarchical culture.

NASSS

The non-adoption, abandonment, scale-up, spread and sustainability (NASSS) framework provides a holistic approach to evaluating the implementation of new technologies or interventions, considering the technology and context(Greenhalgh et al., 2017).

The potential barriers to adoption of health technology development are often characterised by **misalignment between supply-side and demand-side value**. The most common barriers in electronic patient records and electronic prescribing technology involved a range of barriers including technology, patient, staff, team, business and financial, and governance and regulatory barriers. Furthermore, the identified reasons for non-adoption and abandonment included the intended users of the technology had plausible personal or professional reasons to resist or reject it. In addition, the complexity of implementation involving external

issues, such as financial, regulatory, legal, policy) with involvement of reimbursement, reduced mainstreaming and spread of the program.

To improve implementation and sustainability of the intervention in an organisation requires a combination of **adaptability, widespread support** with a strong tension for change, and systematic assessment of implications, with emphasis **on extensive transparent communication to harmonise the social values, mindsets, and engagement.**

7.2 Related initiatives - What can we learn from others?

Scotland

The Royal College of General Practitioners (RCGP) has focused on the collaborative effort between primary and secondary care staff at the discharge interface (Royal College of General Practitioners Scotland, 2017). They developed a training module designed to help GPs and consultant colleagues identify and provide solutions to problems that exist at the primary/secondary care interface. It provides a quality improvement method for approaching these problems and a means of improving care and patient experience as well as improving efficiency. Anticipated benefits include improvements in patient safety, patient satisfaction and time to diagnosis and treatment as well as strengthened relationships and mutual understanding of roles between primary and secondary care.

North Wales

A healthcare quality improvement project focused on improving the quality of electronic discharge summaries in medical wards in North Wales (Davies et al., 2021). This involved a multidisciplinary team (MDT) of healthcare professionals who worked together to identify areas for improvement and implement changes to the electronic discharge process. The plan, do, study, act (PDSA) cycle consisted of two retrospective audits with interventions to address the gaps and drive improvement with intervening e-discharge workshops. Local general practitioners were involved in identifying areas for improvement and assisted with the workshops. Crib sheets were emailed to all junior staff and posted on all medical wards. The reasons for shortfalls in e-discharge standards included lack of knowledge on expected standards, lack of skills and inability to grasp the patient's clinical journey from the documented notes due to complexity, lack of continuity of care, time pressure, low prioritisation, and demand in the ward to maintain patient flow. Those who attended the workshops produced better quality e-discharges. The feedback from the workshops included several comments regarding how valuable the GP perspectives were.

Acute Medicine and Quality improvement, Lewisham and Greenwich NHS Trust, London

The project reached its goal of 95% (baseline 55%) compliance of discharge summaries with 10 core criteria (based on the PRSB guidance) in January 2021, 5 months ahead of the target date, and this improvement has been sustained since (Scarfield et al., 2022). A multi-disciplinary-team was formed with a junior doctor as project lead and acute medical consultant as the project sponsor and included doctors, nurses, and hospital/community pharmacists, as well as a patient representative, to ensure active patient co-design. The patient representative was invaluable in maintaining a patient-centred focus and ensured that specific aspects of discharge summaries remained a priority for improvement, which improved patient understanding of their care plan and promoted shared decision-making. The problem was scoped by asking GPs to provide feedback via surveys and process mapping.

Change ideas were developed by the MDT and were tested using PDSA cycles that included additional pharmacy support, a discharge summary template and individualised feedback.

- They developed a checklist to ensure that all necessary information was included, accurate and up to date.

- They developed a standardised discharge process and implemented reminders and follow-up procedures to ensure that EDS are completed in a timely manner.
- In addition, a feedback mechanism was implemented to allow healthcare professionals to provide feedback on the electronic discharge summaries, which enabled continuous improvement and ensured the process remained effective and efficient.

The project expanded to a second acute medical unit ward in May 2021. The expanded project reached its goal of 90% compliance within 6 weeks and maintained sustained improvement with further PDSA cycles. A standard operating procedure has been created to help embed the changes on these wards. Behavioural change has been key in the success of this project.

7.3 Current state of adoption

7.3.1 Overview

There is no readily available, objective source of evidence or progress in adoption of e-discharge across the country. However, the NHS Digital Solutions Assurance team (now part of NHS England) have undertaken extensive work with both General Practice and secondary care software suppliers including testing between provider organisations which gives a good indication of the level of adoption. Confirmation of the technical capability of supplier systems to deliver a ToC FHIR messaging capability can be measured by those suppliers who have successfully achieved conformance certification as devised by the Solutions Assurance team at NHS Digital/NHS England.

It is important to note that the basis of conformance includes receipt of a FHIR message and presentation of the message as a document within GP systems, more limited functionality than is advocated in this report to be of maximum use to General Practice.

The tables set out below show the software systems and organisations who have undertaken comprehensive assessment and been certificated as conformant.

7.3.2 Readiness of supplier and in-house systems

All significant General Practice software suppliers can demonstrate conformant solutions for all ToC standards and have been awarded ITK3 (see 7.8.1) conformance certification by NHS Digital.

In addition, sixteen supplier organisations have achieved ITK3 conformance certification by Solutions Assurance for their sender side systems.

Organisation	Category	Inpatient Discharge	Emergency Dept Discharge	Outpatient Clinic Letter	Mental Health inpatient Discharge
General Practice Systems					
TPP					
EMIS					
Vision					
Secondary Care (EPR) Systems					
Cambridge University Hospitals	Acute Hospital				

Dorset County Hospital	Acute Hospital				
Independent System Integrators	Middleware				
Oxford Health	Mental Health				
Enovacom	Middleware Supplier				
The Leeds Teaching Hospitals	Acute Hospital				
Mersey Care (Informatics Merseyside)	Mental Health				
Devon Partnership	Mental Health				
Essex Partnership	Mental Health				
The Mid Yorkshire	Acute Hospital				
InterSystems	Middleware Supplier				
Cambridge Data Engineering	Middleware Supplier				
NerveCentre Software	EPR / Specialist				
EMIS Health (Symphony)	EPR / Specialist				
Streets Heaver (Compucare)	EPR / Specialist				
Advanced (Docman)	EPR / Specialist				

In addition, there are currently several prominent EPR providers who are seeking conformance certification by engaging with Solutions Assurance for the IP Discharge use case. These suppliers include Oracle (Cerner Millennium), InterSystems (TrakCare) and Altera Health (Sunrise).

This means that the majority of GP systems can receive a discharge message which is compliant with the specification provided to them. However, the specification only requires that an unstructured document is received and presented to the GP system I.e. it does not enable coded and priority information (such as medication changes and GP actions required) to be easily identified and extracted, significantly reducing the value and the opportunity for more efficient processing.

7.3.3 State of adoption in General Practice

All established GP Practice IT Foundation systems are enabled to receive all four ToC FHIR messages. This has been achieved by delivering the functionality in the application and then reconfiguring the validation rules of the MESH Mailbox of the GP Practice to receive any of the four ToC FHIR messages and respond back to the message initiator. Subsequent MESH mailbox adjustment of the ToC FHIR validation rules is restricted and not under the unilateral control of the GP Practice to remove it.

Prior to any enabling of the ToC FHIR capability each GP Foundation IT supplier provided notice that this was going to happen and provided user guidance materials to their customer base. There is no distinction between GP Practices being technically capable and business ready, otherwise the ToC initiative ceases to be a national solution. The state of adoption in General Practices using established GP Foundation IT systems is therefore 100%.

It is understood, however, that currently senders who do utilise FHIR use the **unstructured** rather than the structured option and so the receiving systems create documents from those.

7.3.4 State of adoption and usage in secondary care practice

The following table below shows the status of **live usage** of ToC FHIR messaging by use case in a selection of secondary care organisations who are generally more advanced and who were willing to work with NHS Digital.

Provider/ Supplier	1st Live Usage	Inpatient Discharge	Emergency Dept Discharge	Outpatient Clinic Letter	Mental health inpatient Discharge
Dorset County Hospital/ Independent System Integrators	May 2020				
Oxford Health/ Enovacom	Oct. 2020				
Devon Partnership/ Cambridge Date Engineering	April 2021				
Leeds Teaching Hospitals/ InterSystems	May 2021		Testing in live expected March 2023		
Cambridge University Hospitals/ Epic	Jan. 2022				
The Mid Yorks/ InterSystems	Jan. 2023				

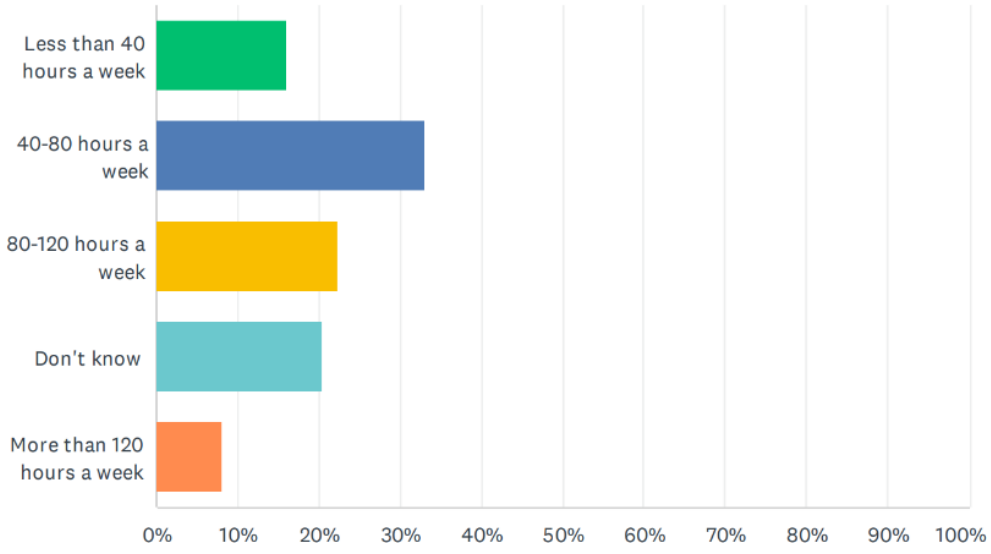
7.4 General practice experience, needs and priorities

7.4.1 General Practice survey results

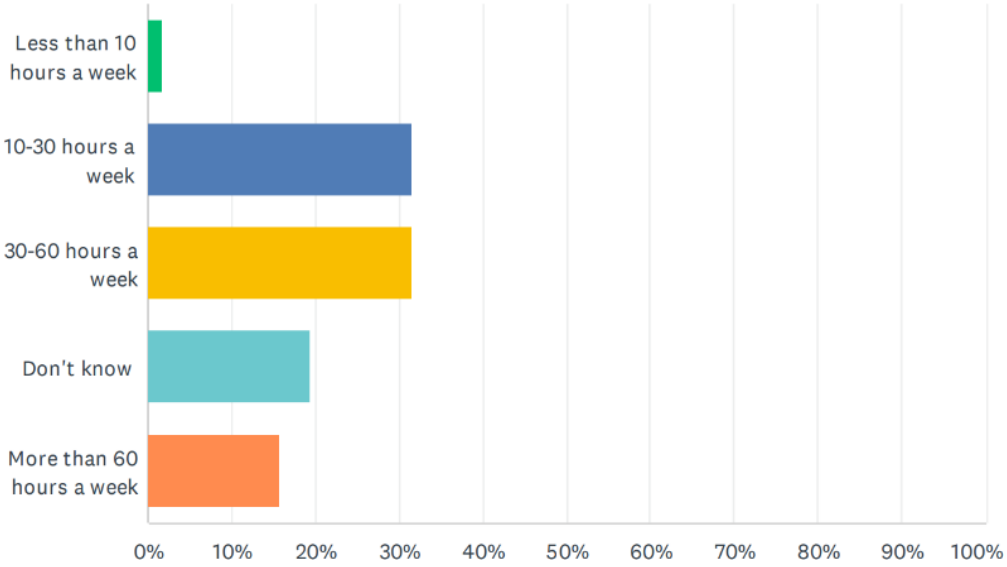
Of the 146 respondents from organisations receiving ToC, 20 were general practice managers and 81 were GPs. Most respondents had a practice size between 7,501 and 10,000. The questions, responses and analysis are available in a separate document on request. A summary of key points is shown below.

In terms of formats in which discharge correspondence is received, most respondents receive a high volume of digital correspondence, with the majority indicating that less than 20% was paper or paper and digital (where the information was duplicated). Document management systems are commonly used.

There were 112 responses to the question regarding approximate hours per week of administrative staff time across the practice team was used to process inbound discharge correspondence or letters. The majority of respondents indicated between 40-80 hours a week (n=37), followed by 80-120 hours per week (n=25).



There were 114 responses to the question regarding approximate hours per week of administrative staff time across the practice team was used to process inbound discharge correspondence. 36 respondents indicated between 10-30 hours a week, and 36 respondents indicated between 30-60 hours a week.



Significant amount of both administrative and clinical time is spent manually processing discharges, with most practices spending between 1 and 4 person days on administrative and 0.5 to 2 person days of clinical time per week.

There was strong support (over 80%) for discharge correspondence to contain structured codes that could update the GP record; there was a low level of confidence that high quality, accurate coding would be sent or how the code (particularly for medications) would be treated.

In answer to the question of prioritisation of information required to update the GP record, the highest rankings were:

- Medication list
- Diagnosis / Problem list
- Allergies
- Procedures
- GP actions

The main reasons given for these priorities were:

- Clinical safety
- GP requirements / priorities
- Workload burden
- Accuracy of shared information

7.4.2 General practice experience

Through extensive interviews and focus groups with GPs and practice staff, the following picture of their current experience emerged:

General Practice receive a large volume of discharge correspondence from secondary care and community services. These are received in numerous ways – e.g. electronically via clinical correspondence software such as Docman, directly into the EPR, via email, fax and in the post. Sometimes the same correspondence is received by multiple routes e.g. electronically via Docman and also by post.

Whatever the route of receipt, most clinical correspondence is received as **free-text documents**. These documents contain little to no metadata or coding. As a result, many hours are spent in General Practices coding diagnoses, updating medication manually, and organising onward referrals and tests. One respondent told us - "we are drowning in information but not the right information".

'Processing' discharge correspondence in this way is labour intensive taking large amounts of both administrative and clinical time. This is compounded by significant 'waste' that is generated because of the burden of duplicate correspondence being received by multiple routes.

Additionally, there are quality and safety considerations with the manual nature of current processes. In a typical practice, discharge summaries are received by administrative teams who may be trained to 'code' diagnoses or procedures. The correspondence may then be "work-flowed" to a clinical pharmacist who would reconcile the patient's discharge medication with the GP record. Thereafter, the summary may be "work-flowed" to a GP to consider referring to another service or calling the patient in for a review. The manual nature of these steps can lead to transcription errors and delays with prescribing medication to patients following an inpatient admission.

Discharges are also often updated and re-sent from secondary care which may cause problems for General Practice in identifying a new versus an updated discharge and for updates, identifying what the changes are.

Transfers of care are not always received when needed – the standard that discharges should be received within 24 hours of a person's discharge is not met consistently and is variable across geographies, sending organisations and departments.

General Practice consistently reported huge variability in the quality of discharges received. They are frequently poorly structured and inconsistent with key information missing or inaccurate. Key information (e.g. medications, diagnoses) and required actions are often hard to identify and extract from lengthy text. GPs, pharmacists and practice staff commit excessive man hours in finding and processing the information they need leading to high risk of missed information and potential patient harm.

During the consultation, PRSB sought to understand whether implementation of DAPB 4042 had improved the experiences of GPs. Most GPs were unable to comment as currently the FHIR messages are converted to human readable objects by the system suppliers. A typical GP is not always able to discern the "Human Readable Object" generated from a FHIR message, from a free-text discharge summary.

7.4.3 General practice needs and priorities

The outcomes from interviews with the RCGP and the focus group are that **100% of GPs surveyed,** interviewed or those who were part of the focus group felt it would be of significant advantage if discharge summaries were received as structured, coded messages which could update the GP record following review**.** When asked what

information from discharge correspondence would be most important/valuable, practices reported the following in order of priority:

- Medication List
- Diagnoses/ Problem list
- Procedures
- Allergies
- Care Plans
- Safeguarding information
- DNAR decisions
- Information on referrals made to other services

Given the significant amount of both administrative and clinical time spent manually processing discharges, as reported in the survey, there would appear to be the potential for significant cost savings if this manual burden was removed, together with the opportunity presented by the reduction in this burden.

The most important and commonly cited unmet needs identified by GPs and practice staff are:

- **Actions** to be **clearly flagged** enabling prompt follow up and documents requiring no actions to be immediately filed enabling improved and more efficient workflow.
- Diagnosis, procedure and medication information to be provided in a fully coded format to enable a more efficient and accurate review and record update, particularly supporting timely medicines reconciliation.
- Identification of important changes to inform their actions and effective continuity of care outside hospital.

Discharge information also needs to be available to out of hours services.

7.4.4 Medication information

The current rendering of the medication information into a human readable document, whilst providing a more consistent format, does not readily support the medication reconciliation process.

As stated above, medication information in discharges is highlighted by GPs and primary care pharmacists as very high priority. The current practice is to manually transcribe discharge medication information into the primary care systems. This is labour intensive, prone to error and often of poor quality.

The requirements outlined to improve the current situation are:

1. Access to fully structured medication information delivered into the GP record to support medicines reconciliation. This should be made available in such a manner as to allow practice staff to review each item and process as appropriate, for example update repeat prescriptions, add or remove items, etc.
2. Changes to medicines should be clearly identified to support the reconciliation process allowing easier identification of items started, stopped, or altered.

GPs and practice staff (pharmacists, administrators etc.) expend significant manual effort in extracting and processing information for medicines reconciliation specifically:

- New Medication – must be transcribed with dose instructions manually in the record
- Discontinued medication – medication not on discharge summary may be discontinued. Some discharge summaries have a section which says “discontinued” which is helpful. For others, the absence of a medication might imply intentional discontinuation. However, it may also be oversight – GPs frequently have to manually check with secondary care which it is when this happens
- Amended medication – dose changes need to be made manually

Individual practices report several hours taken up with manually processing medication changes by GP's and/or practice pharmacists leading to patients experiencing delays in prescription changes or errors where information is delayed or inaccurate.

7.5 Secondary care experience, needs and priorities

7.5.1 Survey

The full results of the survey are available as a separate document on request. The small number of respondents means that little of significance can be assumed from the results. This may, however, be indicative of the fact that this is a low priority area for secondary care, with current mechanisms believed to be adequate.

When asked the question what was most challenging about implementing the PRSB e-discharge standard, the following response were given:

- Issues getting doctors to use SNOMED CT.
- Issues agreeing on how information is recorded in the record amongst multi-disciplinary teams.
- Messaging out of area and to pharmacies is unavailable.
- How to handle irrelevant headings for certain use cases
- The software
- Time required to engage with everyone who needs to be involved.
- Too much information in the standard.
- Difficulties with EPR suppliers.

7.5.2 Perception and priority of discharges

Secondary care (including Independent Sector providers) face an overwhelming need to discharge patients as quickly as possible to free bed capacity. For the most part, secondary charge organisations believe that discharge processes in place are adequate and there is little incentive for change.

Great variation of systems exists within NHS Foundation Trusts, which has impacted the internal clinical workflow with sending and receiving discharge summaries. Within one NHS trust, inpatient, emergency, urgent care, and outpatient departments used separate systems which worked in isolation. Furthermore, another separate system is implemented for medications. This has exacerbated the vast variability of data recording and sharing.

We found little evidence that the positive impact of good discharge information on secondary care (avoiding readmissions) was understood, the main benefits were seen to accrue to primary care. Generally the perception is held that discharge summaries are adequately transferred as a PDF and that there is little perceived benefit for secondary care providers to invest in upgrading this capability. Organisations frequently cite competing priorities set by NHS England as a barrier to change.

Discharges are usually completed by junior doctors or nurses with minimal training and frequently limited knowledge of the patient concerned and no visibility of the consequences on their organisation, the system or the patient of inadequate discharge information.

Secondary care organisations are often unclear if discharges have been sent or received and hence often send duplicates or paper versions as back-up inadvertently creating more work for themselves and significant work in primary care to identify and deal with duplicates.

The fragmentation of services and siloed working in different settings, together with budget allocation, does not provide an incentive to take a whole system approach to implementation of the e-Discharge summary. In isolation, there is little perceived benefit within secondary care of investing in the development of structured messaging when a paper copy can be provided, or a PDF sent by email.

7.5.3 SNOMED CT and coded information

Discharges are very often completed as unstructured 'free text'. Despite being a mandated national standard, SNOMED CT is not regularly or consistently used for recording of coded information. This is out of step with General Practice where SNOMED CT has been adopted and misses the opportunity of more seamless integration between systems.

Secondary care has expressed concerns about the challenges associated with using SNOMED CT and many clearly do not fully understand how it can best be used and the benefits that accrue. There are a small number of 'exemplar' sites, for example Barts and UCLH that are using SNOMED CT and might provide opportunities for proof-of-concept work.

Common problems described include the use of the incorrect hierarchy, overly complex hierarchies being presented to clinicians leading to mis-selection, confusing synonyms and problems with expired codes. Large system suppliers believe that they are able to support the use of SNOMED CT as they have provided forms and templates for sites to build from and believe that their customers are responsible for implementing these in a manner that supports their workflow i.e. putting the onus on end users to configure their systems appropriately. There are also variable methods of maintaining the codes in systems many of which require manual processes to update codes resulting in challenges with out-of-date codes being used. Nationally it is believed that around **10-20% of SNOMED CT codes being used in secondary care are incorrect**.

Many Trusts use the national datasets as required within contracts e.g. the mental health data set, the emergency care data set, these are focused on the provision of information for national reporting and payment. The data contained within them is not necessarily appropriate to support a clinical narrative and indeed the complexity of some of them means that clinicians sometimes choose to 'manipulate' their use so that they are not tied to computer screens.

Clinical coding is undertaken as a separate exercise (often several weeks after the episode of care) by specialist coders by scanning notes and extracting codable items and recording them using ICD codes used for the basis of payment. It is unclear if this is expected to change as modern EPRs enable faster and more accurate coding at the point of care. There is an unresolved conflict between coding for payment versus coding for quality of care.

7.5.4 Use of forms/templates and local configuration

Most Secondary Care software suppliers provide modules to allow information to be pulled through from the core EPR to the discharge record and local organisations are then able to configure templates to suit their own requirements. This leads to high levels of variability and inhibits the likelihood of a 'best practice', conformant discharge being sent.

Templates are a source of concern to both suppliers and care provider organisations.

7.5.5 Paper and duplicate copies

Secondary Care are concerned to ensure that important discharge information reaches General Practice. This sometimes results in sending duplicate and paper copies of discharges generating unnecessary work at both ends.

Discharges are often updated and re-sent to General Practice.

7.6 Patients' experience and needs

Most providers acknowledged that discharge summaries are not consistently sent to patients and that the content is not necessarily accessible for a lay audience.

Good discharge correspondence means that patients and clinicians can better make informed decisions and the outcome and experience of the person's experience with health and care services is likely to be better than it would without all the information required to inform on-going care.

Vignette: Feedback from a carer on discharge information relating to her mother

- Discharge summaries received from two different hospital trusts within the space of a month were so very different and led to very different experiences, one extremely poor.
- The discharge summary was extremely confusing and provided little useful information either for the patient or carer, notwithstanding how it was actually completed.
- For instance, it states responsible clinician(s) rather than Discharging consultant, which makes clear the role of the consultant in discharge.
- 'Significant history of diagnoses and co-morbidity' is not a useful heading for the lay person and a more simple Diagnosis: Acute problems; Diagnosis: Chronic Problems would be much easier to understand with an explanation of what acute and chronic mean.
- Investigations should list the name of the investigation and the date it was done and should not be a cut and paste of the results of investigations and blood tests which mean nothing to the patient or carer. Any pending investigations should be listed with the date ordered.
- There should be a brief clinical summary of what has happened over the course of the patient's stay in hospital in full sentences intelligible to the lay person.
- It should contain what the GP should do on discharge and any additional support the patient will need if discharging home. If a patient is independently mobile on admittance, for instance, but not after the hospital stay or has newly acquired
- The medication list should state clearly if any new drug has been prescribed that the patient was not using on admittance and also if any drug they were using has been stopped.
- Any other headings should be a minimum to avoid confusion and to aid clarity.
- There should be a brief, clear guidance put alongside each Discharge Summary document to state how it should be filled out.
- oxygen needs this needs to be clearly documented.
- The medication list should state clearly if any new drug has been prescribed that the patient was not using on admittance and also if any drug they were using has been stopped.
- Any other headings should be a minimum to avoid confusion and to aid clarity.
- There should be a brief, clear guidance put alongside each Discharge Summary document to state how it should be filled out.

7.7 Information standard structure and content

7.7.1 DAPB 4042 e-Discharge Summary Information Record Standard and related standards

The current e-Discharge Summary information record standard (V2.1) is summarised below. The full standard and associated implementation guidance and safety case is published on the PRSB web site e-Discharge summary v2.1 and the NHS England standards directory:

Section Name	Data items in group	Value sets (instructions for completion/ sending the information)	'Must have' fields in system	Priority data for GPs
PATIENT DEMOGRAPHICS	▪ Person details, NHS number, important professional and personal contacts for person	NHS Data Dictionary	8	√
GP DETAILS	▪ GP details and practice identifier	NHS Data Dictionary	2	
REFERRER DETAILS	▪ Referrer metadata, type of referral	Text, NHS Data Dictionary, coded text (SNOMED CT)	None	
SOCIAL CONTEXT	▪ Person's household composition, occupation, and education history	Text, coded text (SNOMED CT)	1	
INDIVIDUAL REQUIREMENTS	▪ Reasonable Adjustments as per NHSE Accessibility Standard (e.g., communication, cognitive, mobility)	Text, coded text (SNOMED CT)	1	
PARTICIPATION IN RESEARCH	Name of research study person is enrolled in, if applicable.	Text	None	
ADMISSION DETAILS	▪ Administrative and clinical admission details (e.g., reason for admission, source, date/time)	Text, NHS Data Dictionary, coded text (SNOMED CT)	2	
DISCHARGE DETAILS	▪ Discharge administrative details (e.g., discharging consultant, location, date/time, destination)	Text, NHS Data Dictionary, coded text (SNOMED CT)	7	
DIAGNOSES	▪ Confirmed diagnoses (or symptom); active diagnoses being treated, stage of disease, supporting text	Text, coded text (SNOMED CT)	3	√
PROCEDURES	▪ Details of procedures performed during the admission (e.g, name, complications, anaesthesia issues)	Text, coded text (SNOMED CT)	6	√

Section Name	Data items in group	Value sets (instructions for completion/ sending the information)	'Must have' fields in system	Priority data for GPs
CLINICAL SUMMARY	▪ Succinct medical summary of the admission, (e.g., interpretation of findings and results; differential diagnoses, opinion, actions performed)	Text	1	
INVESTIGATION RESULTS	▪ Record of the important results to communicate to GP, the person and others continuing their care	Text, pathology standard for reporting results	1	
ASSESSMENT SCALE	▪ Record of essential assessments to share with GP, the person and others continuing the person's care after discharge	Text, structured assessment scales, coded text (SNOMED CT)	1	
LEGAL INFORMATION	Legal information captured relating to patient care, such as: ▪ Consents, mental capacity assessments, advance decision to refuse treatment (ADRT), lasting power of attorney (LPA) details, safeguarding issues	Text, Coded text (SNOMED CT)	4	
SAFETY ALERTS	▪ Record of risks the person may have such as risk to themselves, from others to others etc.	Text, Coded text (SNOMED CT)	3	√
MEDICATIONS AND MEDICAL DEVICES	▪ Details of and instructions for medications and medical devices the person is using on discharge; medications changed and stopped since admission including reasons; medical devices not listed in dm+d	Text, Coded text (SNOMED CT)	27	√
ALLERGIES AND ADVERSE REACTIONS	▪ Allergies, intolerances, adverse reaction details including causative agent, type and severity of reaction	Text, Coded text (SNOMED CT)	4	√
PATIENT AND CARER CONCERNS, EXPECTATIONS AND WISHES	▪ Records, where applicable, of person's concerns, expectations and wishes; Advance statement; information and advice given	Text	1	√

Section Name	Data items in group	Value sets (instructions for completion/ sending the information)	'Must have' fields in system	Priority data for GPs
PLAN AND REQUESTED ACTIONS	▪ Instructions for GP, other care professionals and the person about actions needed for care continuity ▪ Details of planned investigations, procedures, and treatments	Text	4	√
PERSON COMPLETING RECORD	▪ Meta data of who completed the record including contact details	Text	5	
DISTRIBUTION LIST	▪ A list of other individuals to receive a copy of the communication.	Text	None	

The information content is appropriate and recognised as 'best practice' by most care professionals we talked to. However, most agreed that it does not sufficiently highlight the priority information and how it should be used and the implementation guidance does not adequately explain how standards need to fit into workflow to be fully useful to system designers – for example how GPs wish to identify and process the highest priority information in the discharge.

The E-discharge Summary Standard achieved ISN status in February 2022 as DAPB 4042.

7.7.2 Relationship to other standards

DAPB 4013 Interoperable Medication standard

Patient's discharge medicines information was identified as a core component of the discharge standard from its inception. It was reinforced as being a core requirement following the HSIB enquiry[1] into medication discharge errors where both a transfer of care and interoperable medication standard were recommended for development/implementation.

The requirement has been refined as the standard has evolved to now require that medicines information is provided in a fully structured and coded manner as shown in the 'Medications and Medical Devices' section of the DAPB 4042 information standard. This has been utilised to develop the technical implementation guidance outlined in DAPB 4013, the interoperable medication standard which is mandated from April 2023. This medicines standard is integral to the ToC standard and is semantically aligned to it.

The medicines standard (DAPB 4013) and the Transfer of Care standard (DAPB4042) do however utilise different versions of FHIR and the ToC standard does not require fully structured dose information to be made available as part of the message information causing a disconnect between the two.

The guidance for structured dose in DAPB 4013 was found to be open to interpretation. Specifically, the allowance of free text information within what should be, as far as possible, a coded structured has been

[1] Electronic prescribing and medicines administration systems and safe discharge HSIB

highlighted as potentially allowing suppliers to avoid providing any form of structure for dosing. Whilst this is undoubtedly included to support a transitional state during what will probably be a protracted implementation phase, the suggestion is that the wording should be tightened to add clarity to structured information being the only acceptable mechanism within a given timeframe.

Structured dose syntax is optional in the R4 message. It contains *both* free text and structure, and they are both optional. It is possible to have a message which contains neither, one or the other, or both quite legally.

The first part of the description of the free text dosage field is a good example of confusing documentation:

Free text dosage instructions can be used for cases where the instructions are too complex to code. The content of this attribute does not include the name or description of the medication. When coded instructions are present, the free text instructions may still be present for display to humans taking or administering the medication. It is expected that the text instructions will always be populated

According to that paragraph all of these things are simultaneously true about the free text field:

- it's to be used where it's too complex to code the dosage
- it may be present where the coded dose is included
- it should always be there

Core Information standard, other PRSB standards and PRSB reference library of re-useable components

The PRSB ToC specifications were developed before work started on the Core Information Standard and reference library of re-useable components and the relationships between them are not defined.

As the body of standards has grown, there is increasing use of common components but there are different versions used in different standards. The approach to standards development has been driven by individual projects with insufficient time and investment in keeping the re-usable components up to date and their usage aligned across all standards.

7.7.3 'Must haves'

PRSB recognise that moving towards full adoption of standards is challenging and a journey both for software suppliers and organisations providing care. For this reason, a minimum acceptable level of conformance that represents a safe and clinically useful instance of the standard has been defined including both critical data items and associated business rules associated with the standard.

PRSB's Partner Scheme for software suppliers assesses suppliers' conformance with the information record standard using the 'must haves' as the minimum which must be reached to be considered semantically and functionally conformant and to be awarded the 'Quality Mark'.

The 'must haves' have not yet been published on the PRSB web site but the intention is to do so.

7.7.4 SNOMED CT

ToC standards include information coded using SNOMED CT. The review has identified that there are concerns about the extent and accuracy of SNOMED CT use in secondary care as described in 7.6.3.

The exception is a small number of 'exemplar' sites, for example Barts Health NHS Trust, Leeds Teaching Hospital NHS Trust and University College London Hospitals NHS Foundation Trust (UCLH) that are using SNOMED CT and their experience can be used to highlight best practice and to support the business case and benefits for use of SNOMED.

NHSE is building open APIs that can be used by suppliers and presumably Trusts to enable assessment and validation of codes being used. This could also be used to bring together code sets to enable a more consistent approach across a locale.

7.8 Technical standards, tools and services to support implementation

7.8.1 FHIR technical messages and release management

FHIR technical messages, aligned to the information record standard, are published and can be with associated technical guidance at Technology Reference Update Distribution (TRUD).

The ToC FHIR messages have been developed in FHIR release 3. The current HL7 FHIR version is release 4 with plans to move to release 5 in due course.

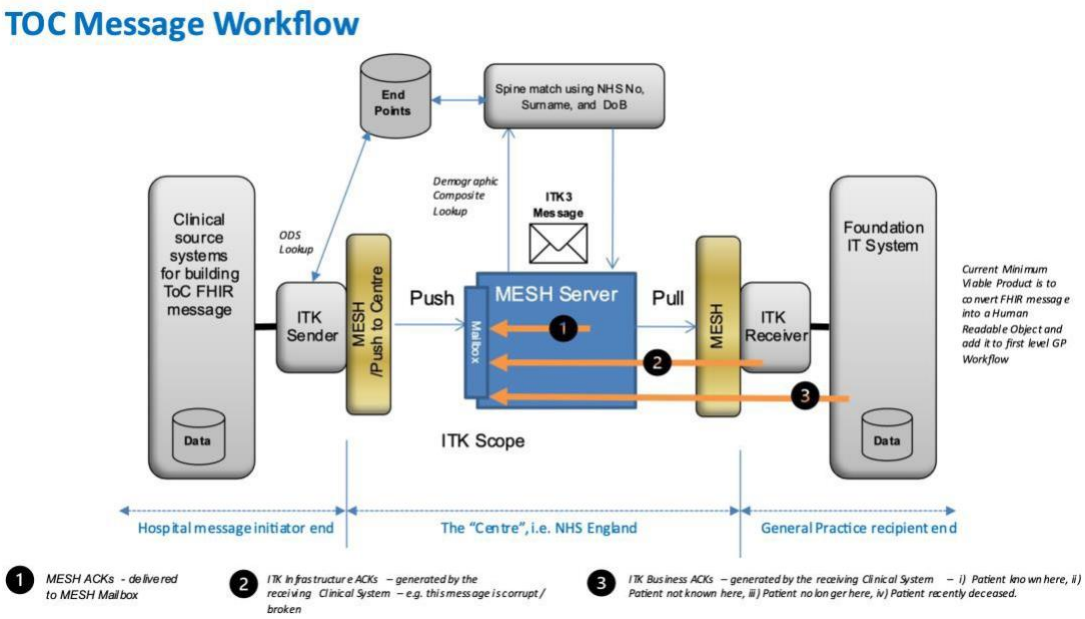
There is a recognised disparity between the ToC DAPB 4042 standards (FHIR R3) and the medications standard DAPB 4013 (FHIR R4); plans for convergence on the work schedule for IOPS are currently on hold. Furthermore, there is not a well-established and enforced process for maintaining alignment between information record standards and the technical standards needed to implement them making effective maintenance of standards unachievable and causing confusion and uncertainty for key stakeholders – clinicians, software suppliers and local implementers.

There is not currently a published FHIR release policy and schedule that is shared with software suppliers and implementers.

7.8.2 Supporting technical documentation and implementation guidance

Software suppliers consistently reported that supporting technical information is held in many different places and is inconsistent (both internally and with information record standard guidance) and has with some known errors. Suppliers frequently cited problems finding the information they need and with navigating the whole set of required guidance.

7.8.3 National architecture, services and guidance – current



The MESH service provides store and forward messaging capability for NHS systems. It is widely used for transfer of care messages. The MESH service can be used to move any sort of digital payload between organisations that have a MESH mailbox. The format of the payload is determined by the manifest associated

with the payload. This is a flexible service that allows different types of transactions and associated payloads to be defined. The ITK3 FHIR e-Discharge message specification uses MESH as its transfer mechanism.

There are other API-driven approaches to transferring data between systems. Many of the shared record systems support FHIR APIs for submitting information.

7.8.4 National architecture – future plans

The architecture team are developing proposals to split health information into three categories:

- Records: information that needs to be available in the record for finding when relevant
- Events: these can be "subscribed" to by those involved in the care of patients.
- Requests: this is a directed request or instruction where the intent is to get someone else to do something for the patient.

This distinction between what is a request and what is being provided as information for the record is intended to reduce the flood of documentation that a GP needs to see. The "event" notification would allow others in the health system to track when a patient is transferred. This may be relevant to care services, pharmacists, and others who provide routine care to the patient – but are not currently receiving the discharge letter directly.

It may be that the information that is needed to act on a request or an event notification would not be wrapped up with the request or event but would be made available in a record. Thus, the ToC "message" could become delivered as a virtual communication – with the information being posted to a shared record that is accessible and findable (maybe using a record locator service) by the GP or other professional receiving the request or event notification.

For this event-based architecture to work the set of events need to be defined, and it is not clear how specific the event would be for a transfer of care. It could simply be "Transfer of Care" or could be finer grained "Discharge from Hospital", or "Discharge from Maternity Dept", or any other level of detail.

7.9 Software suppliers and assurance processes

7.9.1 Technical assurance processes and certification

General Practice systems

For any GP Foundation IT supplier, national level assurance for all four ToC FHIR APIs, including receipt and subsequent workflow support is mandatory.

A major element of the assurance work is live (real patient) usage with a limited number of GP Practices and volunteer secondary care providers acting as message initiators. This is known as the national First of Type (FoT) activity.

The availability of appropriate senders has determined if the national First of Type (FoT) can be completed simultaneously for all four use cases, or whether it needs to be staggered to accommodate the readiness of a sender covering a particular use case. Once a GP Foundation IT supplier completes a national FoT for each use case, then it does not need to be done again provided the technical specifications remain stable.

The overall assurance completed by NHS Digital for EMIS Web and TPP SystmOne to assess the suitability of the ToC FHIR API implementations consisted of the following simplified sequence of steps.

Activity	Purpose	Prerequisites	Parties Involved	Outputs

Witness Testing	This is an early prototype review given by the GP IT supplier, so the programme can identify any concerns as early as possible.	Development progressed sufficiently by supplier (e.g. supplier has started conformance certification). Test script and message pack made available from NHS Digital programme.	Supplier side developers and test specialists. NHS Digital Programme staff, including clinical representation.	Witness Testing Report containing test results and any further actions, e.g. additions to clinical risk log.
(ITK3) Conformance Certification	To prove a good level of technical capability has been achieved.	A process defined by Solutions Assurance which includes a requirements spreadsheet and testing tools. Stable technical specifications.	Supplier side personnel complete spreadsheet by including statements, evidence, and test results. Solutions Assurance and Programme respond to any supplier queries.	Conformance certificate for the product potentially with caveats.
Initial end-to-end testing in a Path-To-Live (PTL) environment	To test the entire application technology stack, without disruption to live services	Sender and receiver side solutions stood-up in a PTL environment. Sender determines their own test script.	Secondary care provider / supplier and primary care supplier.	Sender and receiver confirm to programme readiness for live usage.
Preparation for entry into FoT	Identify any concerns and mitigations. Gain approval from all relevant parties internally within NHS Digital.	Conformance certificate for receiver, and ideally conformance certificates for sender(s). Documentation supporting approval help relevant parties with their decision.	Programme, Live Service Clinical Drop-In Group, Clinical Safety Group and Live Services Senior Leadership	Agreed FoT success criteria. First of Type Development Milestone Achievement Certificate (DevMAC).
National First of Type	Monitor live usage. Achieve, FoT exit targets. Any identified issues requiring application fixes to be applied and validated.	FoT DevMAC. Final end-to-end testing in live. Completion of initial clinical assurance testing.	GP Foundation IT supplier, GP Practice staff. One or more volunteer senders and their Project team staff potentially working with local CCG.	Draft FoT Closure Report.

Preparation for exiting FoT	Assess the evidence regarding risk to patient safety and burden to GP Practices. Assess impact on live services support.	Draft FoT Closure Report. Hazard Logs and Safety Cases from suppliers. Feedback from participants.	Programme, Live Service Clinical Drop-In Group, Clinical Safety Group and Live Services Senior Leadership	Full Rollout Approval (FRA) DevMAC.
Live enablement	Enable for live usage the entire GP estate of the supplier.	User guidance materials and notification by supplier to customer base. FRA DevMAC.	National Service Desk / Spine Products GP Foundation IT supplier. Programme.	Enablement of local switches / configurations within application by supplier. Adjustment of any MESH Mailbox configurations by NHS Digital.

For the national FoTs for TPP and EMIS Health, the following exit criteria were used:

- *Generate a minimum of 1000 business level responses (all use cases combined). Of which, a minimum of 15% (150) of target should be contributed from each use case apart from Mental Health Discharge which need only contribute 3% (30) due to this event being significantly less frequent than the other use cases.*
- *Where FoTs must run separately for a specific use case, the minimum message volumes should meet the percentage volumes indicated above.*
- *The duration of any FoT is 45 calendar days. Where a significant issue is encountered with the GP Foundation IT system, then the application would receive a fix and the count would restart again at zero days.*

TPP SystmOne achieved FRA DevMAC for 3 of the 4 use cases in August 2020, and then for the missing Mental Health Discharge use case in Nov. 2021. EMIS Health achieved FRA DevMAC for all four uses cases in Dec. 2021. The duration of the national FoTs proved to be much longer than expected, and the COVID-19 pandemic, which brought with it a reprioritisation of work, was a contributing factor to the delay.

By January 2022, more than 99% of GP Practices in England could receive any of the 4 ToC FHIR messages when MESH Mailbox reconfiguration for the EMIS GP estate was completed. By February 2023, all GP Practices in England were enabled for transfer of care information when Vision was allowed to enable their entire GP estate for their entry into national FoT.

Secondary Care systems

Implementers of solutions using the ToC FHIR APIs in secondary care have typically been in-house developments or commercial suppliers whose products can be categorised as middleware, clinical and administrative systems, or both. Live ToC FHIR solutions often consist of elements that are dependent on both commercial solutions and bespoke, in-house components.

There is currently no mandatory requirement to undertake technical conformance certification of solutions in secondary care. The rationale is that receiver side conformance certification is mandatory, and therefore substantial error checking and validation happens in live usage. Also, practically, the range of solutions and combinations of in house and commercially provided elements would make this complex and labour intensive.

The Solutions Assurance team at NHS England however have defined a conformance certification process for secondary care software suppliers. As for GP systems, this is based on the use of a Practice To Live (PTL) environment, completion of a requirements spreadsheet and use of a test harness (FHIR validator) configured to act like a compliant GP Practice Foundation IT system. There is no requirement to participate in a national FoT. Any assurance outside of conformance certification is treated as a local FoT.

7.9.2 Information record standard assurance processes

PRSB offer suppliers the opportunity to be independently assessed for their conformance with any standard. The assessment includes examination at element level and against relevant business rules and demonstration of the system in a sand box environment. Suppliers must achieve conformance with the 'must haves' as a minimum to be considered conformant.

To date IMS Maxims are the only supplier to be assessed as compliant with the e-discharge summary standard. IMS Maxims have not yet undertaken technical solutions assurance.

It is unclear if the secondary care suppliers who have been certificated following the technical assurance process are semantically and functionally conformant with the standard as assessed by the PRSB process. Anecdotally, it is unlikely – for example Epic have stated their intention not to work on conformance until later this year.

PRSB have also more recently launched a scheme for care organisations to help and support them to successfully implement standards locally and if required, to assess their conformance.

7.9.3 Conformance assessment and accreditation – future plans

NHS England have publicised plan to introduce legislation in 2024 to compel software suppliers to comply with standards where there is a published ISN. The intention is that conformance assessment should be end to end and include semantic, functional and technical conformance.

Whilst this has been in the public domain for some time, we found a surprisingly low level of awareness amongst suppliers and care organisations of the legislation or its potential implications.

7.9.4 Software suppliers

The following themes emerged from interviews with software suppliers:

Complexity of business readiness verses technical

There was a call for a focus on business changes as current standards and initiatives focus on technology and neglect the business change. Suppliers suggest the transfer of care technical solution is easy to do but the business change and readiness that pre-empt the implementations is lacking. A safe and effective solution already exists, that satisfies requirements, for sending discharge letters to GPs therefore there is no incentive to change the process with all the associated business change and risk this would involve.

Healthcare IT supplier return on investment

The effective return on resources employed, for enabling this technology, is sub-optimal for suppliers unless the supplier specialises in this product. This is borne out by the evidence which shows that most provider organisations that successfully implemented and use the technology engaged third party suppliers for this function. One specialist supplier stated it took seven years to get to their current position which included large financial, time and human capital investment.

Therefore, it is reasonable to assume that it would not be in the interests of all EPR suppliers to invest in enabling this technology unless it was core to their business. However, it is reasonable and expected that all relevant EPR suppliers (for sender and receiver healthcare provider organisation) should be able to accommodate the specialist suppliers that enable this functionality for provider organisations.

There is no current perceived customer demand. **There is a perception that sites are already delivering information via other means and therefore this is not a priority.**

Healthcare provider organisations return on investment

Return on investment for provider organisation, enabling this technology, is also perceived as sub-optimal due to lack of current benefit compared to overall investment, including business change etc. The technology would have to be useful in more use case/ scenarios, to flow data around the system, than just this one scenario from a provider (sender) perspective. It was suggested that the solution needs to be system wide for all stakeholders to benefit not just one party (GP practices). This includes thinking beyond current ways of working; for example, sending notifications of patient discharge to recipient with availability of correspondence on GP connect/ SPINE services and incoming referrals to hospital to use the same transfer of care technology. It was also perceived that enabling the sending and receipt of the minimum viable product (MVP) does not add much value to the system but if the full message were enabled then that would be true interoperability and could be very beneficial. The booking and referral system (BARS) was suggested as a good example of what can be achieved in terms of structured information and beneficial functionality for all stakeholders.

Consistency in approach and communications from the Centre

There is a call for consolidation at the centre so there are clear communications with consistent messages to suppliers. Currently the onus is on the provider to request changes to the system and some suppliers suggested that the ‘centre’ doesn’t communicate with them (as an entity).

Traditionally there are different NHSE programmes and teams giving different messages about priorities and requirements e.g. NHSE IOPS team, INTEROPen and FHIR, International patient record team, secondary uses services, transfer of care team.

Different FHIR versions and upcoming release of UK Core is causing uncertainty and inhibiting adoption. Care Connect FHIR API standards have been implemented and are seen as successful but if there is a requirement to implement using UK Core then it would be better to wait rather than spending time and effort on resources that may be obsolete.

There is already a versatile accredited generic solution developed and tested which can accommodate different versions of FHIR for senders and receivers which overcomes the technical uncertainties of suppliers. More training and communications to enhance knowledge and expertise in the art of the possible would alleviate the noise and promote productive discussion and actions to get this technology implemented and used at scale.

Rationalise and join up priorities for implementation

Keeping up with the standards is an issue in terms of volume, updates and the sheer length of standards, for example the inpatient letter was viewed as a long document to implement and with the extra bundles on top for functionality etc.

The ISNs are seen as incentives but there are too many and their relative importance and the added value of some of them is questioned. Suppliers respond to customers requests to implement the requirements. Consequently, they put them on their roadmap to implement alongside other priorities.

Suppliers assert that incentives and sanctions are different for primary care and secondary care providers which means implementations and priorities are not consistent across the sectors; there was a call for consistency in levers and incentives across the whole system.

SNOMED CT coding implementation requires joined up national strategy

The issues with SNOMED CT result in many of the benefits of coded data not being realised. There is a need to review SNOMED CT implementation across the systems, find the major problems and work out solutions and have a whole systems strategy for pragmatic implementation. Many coding systems operate in this space and there is a need for a joined up approach to ensure they work together for clinically safe interoperability.

The SNOMED CT code lists varies between ED as in primary care – they have less granular lists in ED (ED codes are dictated by ECDS requirements for secondary uses data flows) than are available in primary care; searching and trying to find things is difficult – they don't have families, semantic tags. For example the semantic tags available in primary care are different to what is used/ available in ED.

There is a need to go back to basics for the areas of priority to ensure that there are agreed, and use refsets rather than the current mishmash of local requirements and some wide range of code sets.

It was stated that solving coding is down to Trusts (providers) and suppliers as it should be in the system. However, there were many barriers identified to implementation and use of SNOMED CT coding in provider organisations which results in under and inefficient implementation and use in supplier systems and benefits not being realised. **Suppliers were ambivalent about the status of SNOMED CT coding and found it challenging to implement in a usable format and to train customers on how to use it in the system**.

Assurance

Assurance for ToC requires dual live running of systems which is not seen as helpful in today's climate - persuading GP practices to support this is seen as unlikely.

Supplier summary and conclusions

Overall findings, from suppliers, suggest that the transfer of care (toc) technical implementation was very successful where implemented and is ready for efforts to be steered towards wide scale implementation if there was clear direction and commitment that this is the way forward. The technology could and should be implemented as the interoperability solution for many more correspondence and information flow scenarios to fully exploit its potential and make it viable and beneficial for providers and suppliers to implement.

There are very good reasons for the sluggish uptake to date, most important is that the 'wider system' was not ready to understand, adapt and fully exploit the potential of the technology. The technology itself is only a single piece, of the puzzle, in making the project work and for realising system benefit.

From a supplier's perspective the overall requirements going forward are for overall clarity in and effective communication of national strategy and how all the pieces fit together, addressing the clinical and business change required by providers, and joining up the disparate NHSE programmes so that clear and consistent messaging, expectations and requirements, from the centre, are disseminated to all suppliers and care provider organisations.

7.10 National policy and leadership

7.10.1 Leadership and national policy

High quality, timely, digital discharge summaries have long been recognised as a critical enabler of safe and continuous care when people leave hospital. Effective discharges also reduce the likelihood of readmissions to hospital within a 30-day period and hence help reduce the burden on secondary care and keep people cared for at home or in the community, in line with the aims and objectives of the NHS Long-Term Plan.

Despite their criticality, the discharge summary and other transfer of care messages have not received the level of dedicated leadership and focus as other areas. Efforts have focused on parts of the problem with no obvious clinical champion to lead the drive for successful end to end implementation across secondary and primary care. The problem has been tackled consistently through a purely technical lens and failed to take a more holistic approach considering and investing in addressing the human, cultural and process changes and need for collaborative working across settings that is needed alongside the technological fixes that are required for this to work and to provide enduring practical support and guidance to support local implementation.

Previous initiatives and national drives have advanced the cause and had success within their limited scope but without addressing the whole problem, progress remains disappointing.

Research and reviews have repeatedly stated that addressing the technical problem in isolation will not lead to successful implementation and widespread adoption and yet there is little evidence to suggest that that the need for a different approach is recognised by NHS England or that structures and processes are being adopted to support it. Examples of research supporting the need for a different approach are summarised below:

The most recent report on digital transformation compiled by the expert panel to the House of Commons Health and Social Care Select Committee Public Accounts committee gave a damning report care on standards and interoperability and their progress in digitising the NHS.

Chair Professor Dame Jane Dacre commented:

Much of the evidence we heard indicated that **progress towards National standards** and frameworks within the NHS is happening but is **too slow** overall.

Providers have not received the resource and support they need from Government. In social care, lack of direct support or funding was a frequently mentioned concern. While several commitments contained appropriate targets, these were not always realistic.

Overall the evidence led us to rate the Government's progress in this area as 'inadequate'.

Report of expert panel to Select Committee for Health and Social Care 2023

Technical vs Adaptive Change (Ron Heifetz)

Technical; simpler, linear changes with reasonably mechanical and predictable steps

Adaptive; change requires new learning; key to success is role played by followers; involves perception of loss and sometimes grieving for established practices; can challenge values

*"One of **the commonest failures of leadership is to apply a technical fix to an adaptive challenge**" Heifetz*

"We know that unless frontline staff are engaged in agreeing the content of structured records and collaborating on the usability of systems their introduction will not succeed. That is the experience of NPfIT."

Professor Robert Wachter

"insufficient understanding of, and support from, key stakeholders such as clinicians and the need for adaptive change (changes in the way people work), alongside technological change"

*"But national programmes are still **more focused on technology than adaptive change**"*

*"**little national support available for local implementation** of systems and the corresponding adaptive change required by trusts' workforces…..trusts felt they lacked central support to implement"*

"must take account of the varied readiness of organisations"

*"**strengthen the incentives and levers to encourage local organisations**"*

NAO Report 2020

7.11 Levers and incentives

We found no overarching approach that sets out NHS England's policy on use of levers and incentives and how they should be applied or evidence of which levers or combinations of levers is most likely to deliver the required result. Where levers have been applied, they have tended to be 'hard' levers that compel stakeholders at an organisational level to comply and do not consider some of the 'soft' levers that are often more impactful in particular on those who actually have to make the changes such as individual clinicians at a local level.

7.11.1 Statutory levers

Information Standards Notices (ISNs)

The Data Alliance Partnership Board (DAPB) assures the quality of information standards and Information Standards Notices (ISNs) are published to announce new or changes to information standards published under section 250 of the Health and Social Care Act 2012.

The Data Standards Assurance Service (DSAS), hosted by NHS Digital, publish the approved ISNs on the NHS Digital website along with supporting documentation - a Requirements Specification, Implementation Guidance and Change Specification (where applicable).

The ISN will include confirmation of the standard details, implementation date, whether it is mandated or voluntary, the legal or contractual basis upon which the data are being requested and details of key contacts

An ISN for the discharge summary was published in February 2022 with implementation mandated by October 2022. It is too early to see any impact of this recent addition.

Software suppliers have historically paid more regard to ISNs as a more reliable indication of the future direction their customers will be required to take.

The DAPB 4042 information standard for medications is published under section 250 of the Health and Social Care Act 2012. Conformance with this standard is a requirement of the NHS Standard Contract, Service Condition 11.

The lack of progress and the inability for organisations to overcome the barriers to implement without national action, has led to a diminution of the impact of its inclusion in the national contract at all and it appears to be largely disregarded.

7.11.2 NHS procurement frameworks and guidance

We found inconsistent approaches to if/how/which standards are reflected in frameworks and seem to have been driven independently by individual project teams or policy areas. For example, often the reference is only to technical standards and APIs making them hard for most users to understand and missing the important link to user-defined and endorsed content.

GP IT Futures

General Practice systems are purchased through the GP IT Futures Framework. The framework includes a development roadmap and suppliers must meet the specified criteria to be included. The requirement to receive a digital discharge in FHIR format was added more than 2 years ago. However, it only requires presentation of the FHIR message to GP systems as a document rather than as coded data items that could be incorporated directly into the system.

Other commonly used EPR frameworks

The NHS England Commercial Strategy is seeking to drive convergence to fewer purchasing frameworks and use these frameworks to help ensure standards conformant systems are procured. The HSSF framework and London Procurement Partnership both fall within this drive.

'What Good Looks Like' (WGLL)

The WGLL framework provides advice and guidance to ICS and to local provider organisations. The PRSB Core Information Standard for shared care records and the PRSB Personalised Care and Support Plan are both explicitly referenced but **transfers of care are not**. This is a missed opportunity particularly in the case of ICS who are ideally placed to drive the whole system working required.

7.11.3 Assurance and accreditation of software suppliers and care provider organisations

NHS England does not currently operate an end-to-end approach (spanning semantic, functional and technical aspects) to assurance and accreditation of conformance to standards or a consistently applied approach to testing and piloting. The Front-Line Digitisation programme has plans to do this in line with supporting legislation, the DCMS Bill, being introduced in 2024 with ISNs being the statutory instrument to indicate which standards apply. We found awareness of this impending legislation low amongst both suppliers and care provider organisations. This change should significantly impact the market in terms of compliance with standards.

The comprehensive approach to technical assurance by the Solutions Assurance team and First of Type testing undertaken by the Solutions Assurance team and resulting in certification/accreditation has been described in section 7.8.1. GP suppliers must undertake this process under the terms of the GP IT Futures framework but secondary care suppliers co-operate voluntarily and there is no compulsion for them to take part.

The PRSB Standards Partnership Scheme Quality Mark provides objective and independent evidence of a supplier's semantic conformance with a given information standard. Publication of their conformant status by the PRSB and the ability to display the 'Quality Mark' on their web sites and collateral is proving a strong incentive to suppliers as it helps differentiate them from competitors and asserts their credentials for interoperability.

7.11.4 Levers and incentives not utilised

The following sections summarise some of the key levers that could potentially have a high impact on driving adoption of transfers of care but which have not been employed to date:

Commissioning for Quality and Innovation Framework (CQUIN)

The CQUIN scheme operated by NHS England since 2009 provides financial incentives to approximately 2.5% of the value of all commissioned services. CQUIN makes a proportion of healthcare providers' income conditional on demonstrating improvements in quality and innovation in specified areas of care.

System alignment and regulation

A PRSB review in 2017 found that a strong driver or priorities and incentives in secondary care was regulation – work is prioritised in line with the focus of the regulator and to improve organisational assessment results and regulatory attention.

There have been numerous drives to align regulation with conformance with standards and the CQC State of Care report on discharging patients identifies many shortcomings. In terms of poor quality of information at discharge and the problems this leads to.

In the case of the discharge, an organisation that can demonstrate conformance with best practice in discharge should be compelling evidence for the regulator reducing the burden of regulation and inspection for the organisation whilst reducing the workload for hard-pressed regulatory inspectors and improving the quality of their evidence.

Despite this, we have not been able to find any evidence of alignment of regulatory regimes with standards or plans to do so. The new CQC guidance to be launched imminently is intending to reference PRSB standards in guidance for Adult Social Care but this is a relatively partial and diluted effort compared to the potential driver of fully aligning regulation.

NHS Resolution

NHS Resolution handle negligence claims on behalf of the members of NHS organisations via the indemnity schemes they manage

NHS compensation payouts in 2021/22 amounted to **£2.4 billion.** As a result, NHS Resolution want to incentivise good, safe care that minimises indemnity payments. We have held initial discussions with NHS Resolution which indicates that subject to case study evidence of the safety benefit provided by a compliant e-discharge, they would substantially reduce indemnity premiums for organisations able to evidence their good practice, providing a powerful financial incentive to change.

Soft levers and incentives

Most levers and incentives are weak or disconnected at the front-line where most change occurs, and incentives often have unintended consequences that can militate against professional values. Little attention has been

made to the motivations of the front-line to act for example through peer pressure, awareness of case studies and examples of good practice and improvements in patient care, publication of comparative performance.

End-to-end system working and feedback loops

Successful outcomes from digital discharges (or any transfer of care from one setting to another) are dependent on effective collaborative working across the system between secondary care 'senders' and primary care 'receivers'. We found few examples of effective collaboration between primary and secondary care or mechanisms for review and feedback loops that could help improve the system-wide process and outcomes for patients and for improved care. We found no evidence of any incentives that encouraged such 'whole system' working.

7.12 Other transfers of care

Other transfer of care standards include:

- Mental Health Inpatient Discharge
- Emergency Department discharge
- Outpatient Letter

These are planned to go through the DAPB approval process during 2022/23.

The emergency care discharge may be more advanced due to its close association with and population from the emergency care dataset and use of SNOMED coding is likely to be more consistently used. Several specialist ED EPRs would be relevant to future work on the emergency department discharge.

The challenge and cultural change in mental health to move away from long narrative documents to more coded information is significant. Specialist MH EPR suppliers would also be important in further exploration of this ToC.

Outpatient letters also have a unique set of challenges in educating, training and encouraging clinicians across multiple specialties to write letters in an accessible form for patients.

The PRSB referral standard is an anomaly as it was developed but requisite changes to electronic prescribing systems never scheduled, invalidating its use.

There are many other existing and needed standards which share the same characteristics of 'transfers of care' including between other settings (community pharmacy, social care, local authorities and inter-trust transfers). They are currently approached in a piecemeal way through individual project teams, and this has caused inconsistency and problems for implementers.

8 Conclusions and Recommendations

8.1 Conclusions and recommendations – in summary

The recent report of an expert panel to the Health Select Committee on digitisation within the NHS concluded that "**progress towards National standards** and frameworks within the NHS is happening but is **too slow** overall". Chair of the expert panel, Professor Dame Jane Dacre commented:

"We heard about **issues with interoperability** between systems and providers, making it **difficult for all parts of the system to communicate effectively**, leading to delays and efficiency losses."

"The aspirations to transform the NHS, supported by the right digital foundations, are to be applauded, however, our report finds evidence mainly of opportunities missed."

These findings exemplify the experience with the e-discharge standard and transfers of care but this doesn't tell the whole story or recognise the efforts of teams who have worked on the standards over several years. The opportunity now is to build on the learning and progress made to date and to use the newly established ICS to co-ordinate and facilitate efforts to make the final leap to achieve full interoperability and all the benefits that could deliver for patients and the system as a whole.

This report makes wide-ranging recommendations across several different dimensions where change is required to successfully implement the e-discharge including clinical engagement, leadership, national policy and technical/infrastructural changes. Our conclusions and the recommended actions we believe are needed as a result are captured in detail in the tables below. Many of the recommendations would not only address issues with e-discharge, they would also address key issues for any transfer of care or other standards and could help produce a more successful model for interoperability generally.

Our key conclusions have been categorised into 3 broad themes:

People

- Secondary care providers (or their IT system providers) **do not see the imperative or have an incentive** to change their current ways of working hence most transfers of care are sent as unstructured documents often with low quality information.
- The value to GPs of the information transferred is **limited and not coded** in a way that meets their needs or that could improve their workflow.
- **Patients do not consistently receive discharges** and the information they contain is not always useful or accessible to them – they are under-utilised as a powerful driver of change and improvement.
- Suppliers and providers are frustrated by the lack of simple guidance and **clarity and consistency on what is expected of them.** The moving goalposts have inhibited progress. Examples include FHIR release policy, lack of clarity of the relationships between programmes and conflicting advice (e.g. between medications programme and ToC), uncertainty regarding national architecture.

Process

- ToC has been repeatedly under-estimated and lacked the consistent and **enduring leadership** needed to resolve the problems and successfully deliver. It has been approached **technically** and in a **piecemeal** way, rather than addressing a need to improve patient care and outcomes across an **Integrated Care System**.
- **Use of SNOMED CT is universally poor**, meaning that unstructured or inappropriately coded data is shared that makes it difficult to work with.
- The business case for transfers of care and the infrastructure that supports them have shifted significantly over the years since development – benefits are considerable but need refreshing on the basis of today's needs and context.

Technology

- There is a complex legacy and mixed economy of standards (semantic, interoperability and terminology), implementation guidance and architectures that suppliers and implementers have found hard to navigate.
- **Assurance** of technical implementation is overly **complex and time-consuming.**
- Both primary and secondary care **systems need to be uplifted** to reflect user needs for transfers of care.

In combination, the factors above mean that it has been difficult, slow and costly for local organisations to deliver discharges that meet user needs and deliver the promised benefits. A different approach is needed.

To make progress, we recommend an agile approach building momentum through a series of **rolling pilots/**demonstrators (see note below for examples of potential scope of pilots) delivering early benefits and finding pragmatic solutions to the problems described and sharing/scaling them for national benefit.

The pilots would be located in willing Integrated Care Systems with the support and co-operation of relevant suppliers engendering more local ownership and ensuring solutions that work in practice.

We made 7 broad recommendations regarding e-discharge as well as recommendations regarding other transfers of care and general recommendations regarding lessons learned and their applicability to standards and interoperability generally:

Recommendations regarding e-discharge

1. Adapt General Practice systems, processes and workflow to better meet GP needs.
2. Drive wider adoption of the standard in Secondary Care and specialist providers of care (e.g. gender identity clinics).
3. Encourage joint system working (primary care, secondary care, patients) facilitated by ICS's.
4. Improve e-discharge standards and documentation to make it easier for suppliers and implementers to follow.
5. Review and streamline assurance and conformance processes.
6. Establish programme, leadership, governance and incentives to lead the change programme required.
7. Recommendations for other related programmes.

Recommendations for other transfers of care and for standards and interoperability generally are included in the detailed recommendations below.

To be successful, the proposed approach must include the following key features:

- Collaborative leadership and governance including all key stakeholders (ICS, NHS E and programme teams, software suppliers, PRSB, techUK, INTEROPen) and taking a 'whole-system' approach.
- Strong involvement from Integrated Care Systems ensuring local ownership and fir for purpose solutions.
- Focus on clinical continuity and better outcomes for patients.
- Clinical and technical support to enable problem solving and rapid removal of barriers.
- Pilot deliverables will be assured and shared for national benefit.

Section 8.2 describes the recommendations in more detail.

Note regarding approach to proposed pilots/demonstrators

The scope and number of pilots would be subject to discussion with the key stakeholders and dependent on the investment available but for example could include:

- Whole system review process between primary and secondary care and patients i.e. get the business process working before any technical adaptations are made
- Focus on sending priority items identified by GPs (diagnoses, medications, actions) and accurately coded in SNOMED CT i.e. leave the current flow of discharge 'documents' and focus on minimal structured message for key items only
- Delivery of e-discharge using an event-based architecture approach
- E-discharge with revised GP workflow i.e. working with GPs, design and model primary care systems with a workflow that recognises and extracts priority items and enables efficient review and

processing in a way that meets GP needs i.e. detailed user design of how discharge data should flow and be processed within GP systems alongside the information specification

Deliverables will likewise be dependent on the agreed scope of pilots but could, for example, include:

- A toolkit for joint system review and continuous improvement for Integrated Care Systems.
- Guidance and case studies/benefits evaluation for implementing SNOMED CT in discharge information.
- Feedback and learning for new architectural approaches.
- Uplifted GP systems that deliver quantified benefit and reduction in burden for GP systems.

8.2 Conclusions and recommendations – in summary

1.	**Adapt General Practice systems, processes and workflow to better meet GP needs**
	Prioritise **system changes to GP systems** to enable the most important information required to support clinical practice (diagnoses, medications, actions and identification of changes to them) to be delivered in a fully structured format that can be easily extracted and acted upon in a workflow that supports GP needs to review and process this information. Work with suppliers and GPs to provide 'best practice' **templates** for e-discharge that support adoption of the standard and ensure conformance assessment for suppliers and providers includes assessment of template compliance. Explore synergies with **GP Interoperability programme** and other routes to deliver the required changes. Pilot and validate with GPS at scale. Clarify the date for delivery and roll-out including testing and assurance.
2.	**Drive wider adoption of the standard in Secondary Care**
	Run a **targeted campaign** to encourage adoption of the standard with particular focus on **secondary care EPR suppliers** (profile IMS Maxims as a conformant EPR to create peer pressure). Consider using e-discharge/transfers of care as the early pilot for testing the effectiveness of the new legislation
	Prioritise and incentivise the implementation of the **discharge standard in secondary care** organisations, supported by a major education, training and awareness campaign regarding the importance of effective discharge information and a toolkit to guide implementation.
	Support implementers to implement **SNOMED CT** accurately by: • Providing master code sets for the small set of priority items important to discharges • Providing guidance and case studies as part of a wider toolkit for supporting implementation of e-discharge including local configuration • Work with EPR suppliers to incorporate and reinforce this approach and ensure their systems are SNOMED conformant
	Support implementers by development of 'best-practice', clinically **endorsed templates** for e-discharge and assess template conformance as part of assurance
3.	**Encourage joint system working facilitated by ICS**
	General Practice and **Secondary Care** with **patient** representation, to be supported and incentivised by **Integrated Care Systems to work collaboratively** to improve the quality of discharge information with feedback loops and joint review. Develop a methodology, tools and guidance including key quality metrics and outcomes and pilot the joint review process in one hospital department/ICS with a Primary Care Network supported by technical and clinical teams and patients including: • Collection of data/audit sample of discharges to populate the key metrics dashboard

	• Joint working and review with an aim to stopping paper and duplicate discharges; improving quality and timeliness of content including coded information; improving outcomes. • Joint action plans for improvement include quality of data, accurate coding, removal of duplicates and paper
4.	**Improve e-discharge standards and documentation to make it easier for suppliers and implementers to follow**
	Review and update the information record standard and guidance to highlight the most critical information and how it should be used.
	Identify re-usable components and maintain in a separate, normalised form with versions controlled and guidance developed to determine how data collected according to one version of a component should be dealt with in systems that support later (or earlier) versions of the component. Note, current business case being considered which supports this work which is generalisable to all standards. Test the approach with Transfers of Care.
	Maintain ToC valueset definitions alongside the information model rather than in the FHIR implementation guidance, since they need to be adopted across all relevant technologies for the collection, storage, analysis and transmission of the data (principle for all standards).
	The medications standard should be published on PRSB's web site and on the standards directory as a common component. The relationship to it should be clarified within the e-discharge and all transfer of care documentation.
	Develop a documentation framework (potentially based on WHO guidance) for all standard types and agree a policy and process for establishing and maintaining consistency and documenting agreed relationships between information record standards, technical standards and release management of both. Following the policy and process, create and assure an aligned set of TOC standards with defined relationships to each other.
	NHS England should develop a clear policy on release management of versions of FHIR technical messages and supporting processes enabling a mixed economy of versions to co-exist with defined migration paths. This should be produced with the engagement and agreement of software suppliers.
	Where possible the NHSE (or HL7 UK Core) FHIR specifications should be internationally approved standards with a "UK Veneer" applied, rather than be constructed de novo from UK Core FHIR resources. The process for developing FHIR UK Core profiles should include an explicit step to identify and establish a known relationship with international projects addressing similar use cases.
	Produce clear documentation and guidance on current national architecture as part of pack of implementation documentation described above and communicate future changes and migration path in due course.
5.	**Review and streamline assurance and conformance processes**
	NHS England should undertake a review of current conformance processes (including semantic conformance) and criteria and investigate options for a more joined-up and stream-lined approach (potentially devolving more responsibility to ICS) and test the improved model for e-discharge. Note, Business Case for a programme to address this issue being developed by Front-line Digitisation programme. If approved, this work should be leveraged.

6.	**Establish programme, leadership, governance and incentives**
	A national programme in collaboration with ICS's should be established and adequately funded to oversee the recommendations made through this report and to track ongoing delivery, continuously reviewing and evaluating and removing new barriers as they emerge. Knowledge and skills from previous initiatives should be secured to support the project where possible to ensure learning is not lost. A baseline should be established and progress monitored against it.
	Establish strong leadership and inclusive governance and build a coalition for change including NHS England, PRSB and multi-disciplinary and patient leads, ICS, NHS Providers, HEE and suppliers.
	The business case for future investment should be refocused on the proposed revisions in this document (priority, structured information being delivered to primary care) and taking a 'whole system' approach to benefits delivery and realisation.
	A programme of case studies and evaluation should be initiated to harvest the learning and increase momentum of change.
	Private sector providers should be considered within the scope of the programme and mandated to comply with standards for NHS funded work and encouraged/incentivised to conform for privately funded activity.
	Review the potential levers and incentives and re-design an evidenced based set more likely to deliver the change desired
	Prioritising the most influential and recommended frameworks identified by the NHS England Commercial team (HSSF, LPP) impose a complete and consistent approach to conformance with the discharge and transfer of care standards and where possible, seek evidence of conformance.
	Publish conformant suppliers on NHS England Standards Directory and create a competitive pressure to comply.
	Train regional teams to support and task them with monitoring and reporting compliance in their patch.
	Develop a route map of change with incremental delivery of benefits and communicate widely.
7.	**Recommendations for other related programmes**
	Front-line digitisation programme should ensure new EPRs support structured discharges and specify use of SNOMED.
	Guidance on the medications standard regarding use of structured or free text for dose information should be tightened and clear direction and a date set for sending structured information.
8.	**Recommendations for other Transfers of Care**
	Publish ISNs for all TOC with realistic dates for suppliers and providers.
	The referral standard should be reviewed and firm plans established and communicated for how it will go forward aligned to ERS.

	Summarise requirements for other TOC standards to inform the business case and to establish priorities and communicate plans for when they will be addressed.
	Further analysis of the specific issues relating to MH inpatient discharge, Emergency Dept discharge and outpatient letters should be considered.
9.	**General recommendations for Standards and Interop**
	Publish the 'must haves' on PRSB web site and Standards Directory. NHS England to communicate and endorse their use (for ToC and all standards).
	The terminology to be used for each data item should be defined alongside the information model – so that alternative terminologies can be used that reflect the capabilities of local systems and communicating communities. This would also allow the versioning of the valueset definitions to take account of retired concepts, and evolving understanding of SNOMED best practice.
	Develop a strategy to define the inter-relationship of standards and coding for secondary uses versus direct care and an approach to resolution of the issues this gives rise to.
	NHS England S&I team should clearly communicate and enforce the need for a full set of related artefacts to support achievement of interoperability.
	NHS England should recognise and promote conformance and encourage providers to seek affirmation with their suppliers and in contracts.
	Set out clear national direction and priority of e-discharge with clear stated relationships between Transfers of Care and other NHSE programmes (e.g. shared care records, medicines management). Consider collaboration/merger with such programmes where appropriate.

9 Appendices

9.1 Appendix A References

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9.2 Appendix B Stakeholder consultation list

9.2.1 Interviews

Note: to be updated

Name	Role	Organisation
Receivers		
Dr Nilesh Bharakhada	GP Partner	Central Uxbridge Surgery
Mike Moore	Project Manager	NHS Digital
Jo Wadey	Director	Institute of General Practise Management
Dr Rachel Spencer	Academic GP	University of Warwick
Dr Michael Mulholland	Honorary Secretary	Royal College of General Practitioners
Dr Chris Williams	Chair – Scotland	Royal College of General Practitioners
Professor Kamila Hawthorne MBE	Chair	Royal College of General Practitioners
Haidar Samiei	Clinical Director	EMIS
Ben Lawman	Hospital Software Specialist	TPP
Debbie Brown	Director of GPN	Queen's Nursing Institute
Melanie Gearing	Practise Manager	Alconbury and Brampton Surgeries
Dr Alistair Walling	CCIO	Leeds City and NHS Leeds
Debra Parkinson	Data Quality Manager Primary Care	NHS Humber Teaching NHS Foundation Trust
Rebecca Rowe	Head of Systems and Estates	NHS Humber Teaching NHS Foundation Trust
Senders		
Ian Woodburn	CNIO	Northern Care Alliance NHS Foundation Trust
Matthew Butler	CNIO	South West London and St George's Mental Health NHS Trust
Nicola Cranfield	Clinical Solutions Lead / CSO	IMS Maxims
Jo Stanton	Clinical Solutions Lead / CSO	IMS Maxims
Ben McAlister	Senior Solutions Strategist	Oracle
Gary England	Developer	InterSystems
David Coleman	Project Manager	InterSystems
Michael Chapman	EMEA Solutions Programme Manager	Altera Digital Health
Steve Marsh	Integration Consultant	Dedalus
Dr Afzal Chaudhry		EPIC/ Cambridge University Hospitals
Lisa Franklin	CIO	NHS Hampshire and the Isle of Wight Integrated Care System
Gareth Thomas	Digital Innovation Director	Greater Manchester Health and Social Care Partnership

Dr James Reed	CCIO	Birmingham and Solihull Mental Health NHS Foundation Trust
Dr Nikhal Premchand	Consultant Physician	Northumbria Healthcare NHS Foundation Trust
TBC	TBC	Dorset County Hospital
TBC	TBC	The Mid Yorkshire
David Reilly	Head of Interoperability	Alder Hey Children's NHS FT
Others		
Helen Hughes	CEO	Patient Safety Learning
Ann Slee	Medicines Advisor	Self Employed
Mike Moore	Project Manager	NHS Digital
Jonathan Telfer	Lead Interoperability Standards Architect	NHS England
Alistair Grenfell	Implementation Delivery Lead	NHS England
Robert Gooch	Principal Technical Architect	NHS England
Mark Sutton	Chief Digital Officer	CQC
Ian Ellis	Primary Care, Community Services and Strategy Directorate	NHS England

9.2.2 Group Feedback

PRSB Advisory Board

Joint GP IT Committee

RCGP Health Informatics Group

Finance Leadership Council

Synergy Primary Care network

9.3 Appendix C - Literature review summary

GPs and hospital clinicians' perspectives on discharge summary letters

GPs, in recent studies (Weetman et al., 2020, 2021), stated that adequate discharge summaries adhered to national standards, and included diagnosis, follow-up plan, medication changes and reasons, clinical summary, investigations and/ or procedures and outcomes, and what information has been given to the patient. In addition, GPs reported in favour of the inclusion of a "follow-up" plan however emphasised the importance of delegating appropriate staff members in accordance with guidelines and standards to ensure appropriateness.

Current challenges of discharge summaries identified by GPs

Three main barriers identified by GPs within poor discharge summaries were the contents failed to contain the information given to the patient (33.3%), reasons for medication changes (26.9%) and explained medical jargon (Weetman et al., 2021). In addition, recent studies (Weetman et al., 2020, 2021) found over 70% of the letters consisted of unexplained uncommon acronyms and medical jargon, which is an important barrier to address for healthcare cohesion. The types of acronyms used in written communication were generally very specific, including locations; remedying these misinterpretations was also time-consuming. GPs expressed acronyms should be avoided, aligning with national guidelines, for both primary and secondary care providers, and patient understanding, as they pose a substantial barrier for patient letter accessibility and GPs unfamiliar with the speciality, driving a greater emphasis on standardising writing styles within discharge summaries.

A recent focus group of GPs (Spencer et al., 2019) deemed poor discharge summaries to contain inappropriate follow up actions, e.g., request for GP to chase hospital results, which increased the workload burden. Furthermore, referrals and tests requested from secondary care was reported in four harm cases in a focus group of GPs. In addition, the mismatch between electronic document management systems (EDMS) and clinical IT systems was highlighted often by GPs resulting in errors and harm on the delivery of care and GP workload. There was frequent frustration reported regarding the accuracy of medicine reconciliation, particularly with the introduction of new drugs without specifying cessations of previous medications, leading to scepticism (Spencer et al., 2019).

A study (Weetman et al., 2021) revealed that junior doctors writing discharge letters was a barrier in effectively delivering discharge summaries. Junior doctors were responsible for a low proportion of successful letters. Acute medicine, cardiology and nurses/ advanced clinical practitioners produced the highest proportion of successful letters. In addition, time pressures, writing letters retrospectively from patient notes and template restrictions on computer systems were reported to contribute to incomplete and unsuccessful documents.

The same findings were present in a qualitative study of the secondary-to-primary care communication system (Boddy et al., 2022); Less experienced junior doctors struggled with completing discharge summaries in context of the patient, as they were unconfident. This indicates that professional clinical experience may play a role in the delivery of successful discharge letters, irrespective of letter format, suggesting medical training could improve the delivery of discharge summaries and healthcare cohesion.

How much time are GPs spending on other tasks?

A recent study identified that 5% of GPs time across 238 hrs and 4 mins was negatively impacted by operational failures (Sinnott et al., 2022). Other studies have shown the most common operational failures are caused by the lack of information from sources outside of the practice e.g., discharge information (Sinnott, Georgiadis, & Dixon-Woods, 2020). The impact of this on the GPs and their staff causes stress, anxiety, frustration and negatively impacts on relationships with patients, as compensatory labour is underestimated and unaccounted for in scheduling or reward systems, as they involve mundane tasks that remove them from clinical care(Sinnott, Georgiadis, Park, et al., 2020). The heterogeneity of discharge information means that GPs and their staff are having to spend significant amounts of time chasing information which is costly and labour intensive (Spencer et al., 2019). Consequently, GPs reported additional actions to compensate for inadequate discharge information, which have led to cumulative time losses.

Patient harm upon inadequate discharge communication

An analysis of nationally collected safety incident reports from general practices arising from hospital discharge (Williams et al., 2015) found most (77%, n=463) of reports related to 'discharge' inflicted harm to the patients, ranging from low, moderate, or worse. Most harm was described as 'low harm', which is indicative of the overall struggle patients experience due to staff errors and organisational errors.

151 of the reports had errors in discharge communication, that resulted from discharge documents not being sent by hospital teams, delayed, contained erroneous content, or lacked important clinical information such as diagnosis of a severe, life-threatening illness. Of which, 54% described patient harm, including 9% (n=13) as moderate harm or worse. The contributory factors were organisational factors, such as discharge letters lost or delayed, and staff errors due to illegible handwriting or missing information in the letter.

73% (n=99) of 136 reports related to quality and reliability of referrals to community nursing staff, social care, or health visitors results in patient harm. Of which, 15% described moderate harm or worse, because of sending an incomplete referral or not recognising a patient would need community care and confusing referral criteria or difficult to follow referral protocol.

Patient safety after discharge

A report (Healthwatch England, 2015) found a variety of 57 guidance documents were reported amongst the trusts which manifested huge variance and inconsistencies, with association of patients, friends and families feeling inadequately prepared and unsafe when discharged from hospital. A lack of patient participation in the discharge process was found, leading to lack of knowledge and support following their treatments and greater risk of harm was present in vulnerable people.

The Care Quality Commission (CQC) State of Care (Care Quality Commission, 2022) reported that there has been better collaboration and information sharing between services since the 'discharge to assess' model for managing transfers of care within NHS Trusts in England 2016. However, a report from Healthwatch England and British red cross found some concerning factors from the first six months of the pandemic in 2020, such as people experiencing inadequate support after discharge, particularly amongst the disabled and chronically ill (consistent to findings from Healthwatch England 2015). Positive impact of the model on patient following discharge includes an overall better experience and decreases the risk of emergency re-admissions as they were able to identify problems and act earlier. However, patients are still experiencing negative outcomes following discharge.

Recently, Healthwatch (HealthWatch, 2022) reported that 82% of respondents did not receive a follow-up visit and assessment at home and almost one in five of these reported an unmet care need. Some people felt their discharge was rushed, with around one in five (19%) feeling unprepared to leave hospital. Over a third (35%) of people were not given a contact who they could get in touch with for further advice after discharge, despite this being part of the guidance. This may suggest that despite improved bureaucracy between health and social services, there remains a need for greater clarity on who's responsible for each step of the process and staff arrangements through improved data-sharing to optimise collaboration between GPs and hospital clinicians and improve care and support after discharge.

Current challenges of electronic prescribing and medicine administration (ePMA)

A report (Healthcare Safety Investigation Branch, 2019) highlighted some of the risks associated with electronic prescribing and medicines administration (ePMA) systems with prescribing medicines for patients during a stay in hospital and on discharge. This may have resulted in a patient inadvertently receiving two anticoagulant medications at the same time, possibly causing an episode of gastrointestinal (digestive tract) bleeding and death 18 days after discharge from hospital.

The investigation found there was no standardised discharge process with medication information, as there was no interface with the ePMA. Furthermore, there was a lack of interoperability between primary and secondary care electronic prescribing systems, between secondary facilities, between secondary and tertiary care, and between secondary care and community pharmacy. In addition, the concurrent use of paper and electronic systems increased clinical risk. Medication reconciliation by pharmacists did not occur, as it was a weekend, reinforces the need for structured data exchange to lessen the burden on the workforce.

HSIB identified that the reference event could have occurred with/ without the ePMA system due to the errors in communication between providers as different systems were used for patient records and prescriptions. They did highlight that a well-configured ePMA system could have prevented the error through the implementation of transfer of care initiatives to improve communication, which reinforces the need for structured data exchange and adherence to national guidelines.

Systems and infrastructure barriers to effective electronic discharge summaries

One-way communication system

A recent study (Boddy et al., 2022) explored multiple stakeholders within a hospital to gain a wider understanding of the context of communication, administrative and infrastructural staff on both side of primary-secondary care interfaces. The process of discharge summaries was largely a one-way communication system structure, with communication between primary and secondary care progressively strained as care became more complex. The overarching barriers in a largely one-way 'open loop' system resulted in a lack of team mentality and a 'divide' between hospital and general practice. The rarity of feedback and sharing of insights between stakeholders hinders the appreciation of each other's perspectives and needs, exacerbating the 'open loop' system and negatively impacting the holistic delivery of care. Suboptimal system performance between primary and secondary care stakeholders can potentially increase the risk of patient harm and unsafety.

Isolated technical implementations

Updates to existing systems have been completed in isolation amongst proprietary IT systems (Barr et al., 2013) , which enable higher flexibility compared to vendor-provided systems. The positive results, consequently, are limiting and contribute to the vast intra-variability between healthcare systems.

Unresolved conflicts between standards for direct care versus standards for secondary uses.

Due to conflicting policies and standards within healthcare organisations and providers, semantic interoperability remains a barrier of the uptake of implementing the TOC standard. The national programme Getting It Right First Time (GIRFT) advocates for improving medical care within the NHS by reducing unwarranted variations. However, national policies are contributing to the existing variation within healthcare systems, due to different priorities, e.g., GIRFT for Orthopaedics advise clinicians to use OPCS codes, regarded as the statistical classification for clinical coding for hospital interventions and procedures by the NHS (*Getting It Right First Time (GIRFT). Orthopaedic Surgery*, n.d.). Whereas the NHS also encourages the use of the international standard SNOMED CT for electronic health records to ensure concise and accurate data exchange (*NHS Digital. SCCI0034: SNOMED CT*, n.d.). Consequently, the intra-variability in healthcare leads to inconsistencies and misinterpretations, which exacerbates the barriers to communication in the transfer of care between primary and secondary care interfaces, which negatively impacts the delivery of patient care.

Another example is the secondary uses collections in MH, which provide valuable insights into the effectiveness of different treatments and interventions, as well as trends in MH outcomes, but this process may cause delays in providing necessary information to patient and follow-up plan (Lelliott, 2003). However, the discharge standard in MH is prioritises timely and accurate communication between providers and patient to receive appropriate follow-up care and support, rather than data collection for secondary uses. To navigate these conflicting policies, healthcare organisations and providers need to prioritise their goals and objectives based on their specific context and needs to implement common policies and standards for data exchange. A holistic balance and understanding can steer the TOC process to enable meaningful, efficient, and accurate communication of patient information between healthcare organisations.

Barriers to adoption

The adoption of health information standards in healthcare organisations is influenced by a set of complex dimensions, including technology, organisation, environment, and inter-organisational relationships (Han et al., 2020).

Technical

The technical factors of the adopted standards are the primary consideration for the adoption of health information standards, inclusive to the micro and macro-levels of an organisation. Healthcare organisations that lack the necessary technical expertise may be less likely to adopt health information standards. Organisations are more likely to conform to implemented standards if the adopted standard is compatible with existing technologies, consistent with past experiences of the organisation. Also, there is an increased likelihood if the adopted standard has significant observable benefits, which reduce the perceived risk.

Organisation

Organisational size plays a role in the adoption of standard, with small and medium sized enterprises being more effective and more conducive to adopting new technologies because of their efficient top-down introduction process; however large enterprises have relatively greater funds, talent and research and development capacity surfacing perceived benefits quickly after adoption.

Environment

The environment includes external sources, such as the government, industry, and other sources, such as suppliers, customers, regulatory agencies and professional associations. A combination of external pressure and support can encourage the adoption of health standards by providing financial incentives to support meeting specific performance metrics.

Inter-organisation

Effective inter-organisational relationships are essential for successful uptake of standards. By building trust, communication, and shared resources, healthcare organisations can work together to implement TOC standards effectively and improve the quality of care provided to patients.

Healthcare organisations with a culture that values innovation and collaboration are more likely to adopt health information standards than those with a more traditional or hierarchical culture.

NASSS

The non-adoption, abandonment, scale-up, spread and sustainability (NASSS) framework provides a holistic approach to evaluating the implementation of new technologies or interventions, considering the technology and context (Greenhalgh et al., 2017). The framework consists of five domains:

- The condition or illness being addressed
- The technology or intervention being implemented
- The value proposition or benefits of technology or intervention
- The individuals or staff involved in the implementation
- The broader organisational and wider context in which the technology or intervention is being implemented.

Each domain is further disaggregated into sub-domains, which are used to evaluate different aspects of the intervention implementation.

The most common barriers in electronic patient records and electronic prescribing technology involved a range of barriers including technology, patient, staff, team, business and financial, and governance and regulatory barriers. Furthermore, the identified reasons for non-adoption and abandonment included the intended users of the technology had plausible personal or professional reasons to resist or reject it. In addition, the complexity of implementation involving external issues, such as financial, regulatory, legal, policy) with involvement of reimbursement, reduced mainstreaming and spread of the program.

To improve implementation and sustainability of the intervention in an organisation requires a combination of adaptability, widespread support with a strong tension for change, and systematic assessment of implications, with emphasis on extensive transparent communication to harmonise the social values, mindsets, and engagement.