



The Barriers and Opportunities for the Use of Digital Tools in Medicines Optimisation Across the Interfaces of Care.

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This report was commissioned by the Academic Health Science Network North East and North Cumbria (AHSN NENC) and Digital First Primary Care Regional group in response to the present context in which pharmacy and medicines optimisation services are delivered:

- The digital agenda for pharmacy and medicines optimisation is increasingly complex with communication between the different pharmacy sectors challenging. A variety of different clinical and operational systems are being used for different pharmacy and medicines optimisation services.
- Lack of consistent approach which results in variations at local level and introduction of short term workarounds, lack of integration between systems leads to increased workload, duplication, increased risk of error.
- Range of new services introduced to support patients to optimise their medicines.
- The PCN Direct Enhanced Service has introduced pharmacy professionals into primary care to provide structured medication review and other medicines optimisation support.
- GP referral service to community pharmacy (CPCS) for minor conditions management.
- Community Pharmacy Discharge Medicines Service (DMS) enabling referral of patients on hospital discharge to community pharmacy for medicines optimisation support.
- Interoperable systems to increase adoption and spread of these services are key to improving patient outcome.

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Executive Summary

This report outlines the current landscape of medicines optimisation services delivered across North East and North Cumbria (NENC) that are supported by digital tools and explores the facilitators, challenges and future opportunities in this area.

The findings from a scoping search and qualitative study of 23 clinical and IT stakeholders, identified significant complexity in terms of the number of different systems used throughout the NENC and how information was transferred between care settings. Organisations were found to routinely rely on third party solutions or bespoke tools to support information transfer. PharmOutcomes for example was commonly used in primary and secondary care, while another digital tool was developed to support monitoring and management of patients prescribed high risk immune modifying drugs (IMDs) as part of a shared care agreement across a limited number of GP practices.

Digital standards are crucial for effective information transfer. Work is currently underway to define the digital standards for information held in health records across the NHS and a recent information standard, which sets out the definitions/ terminology related to medication, allergy/ intolerance data (DAPB4013: Medicine and Allergy/Intolerance Data Transfer) should be adopted by all NHS organisations by March 2023.

Participants revealed a number of difficulties around transfer of care, which centred around incomplete patient records. For example, data was held in silos with ineffective data flow between them, thereby reducing efficiency and safety. Challenges associated with the use of digital tools were also described; participants revealed how they would interact with multiple different IT systems in the process of caring for patients, which placed additional workflow demands on the user with the potential to increase cognitive burden and decrease user satisfaction. There were also interoperability issues, because information could not be effectively transferred between care settings in a usable way, thus failing to harness the safety benefits of clinical decision support systems. Thirdly, a range of digital gaps and 'blind spots' were identified, where information was either not held in a digitised format (i.e., paper notes and prescribing/ administration records used in care homes) or was only partially digitised (i.e., a scanned PDF of a medication record rather than a coded list of medicines). This had implications on shared care solutions such as the GNCR, and clinical decision support, which required information to be in a coded and structured format. Fourthly, there were issues related to how services were delivered and the wider IT systems supporting these. Participants described frustrations around the need to develop IT solutions at an individual organisational level, with the potential for unnecessary duplication of costs, resource and 'reinvention of the wheel'. It was felt that there was a need for standards that mandated the minimum functional requirements of commercial system suppliers. Finally, participants commented on the importance of personal and organisational factors when implementing change, emphasising the importance of leadership and a shared vision across a workforce.

Participants revealed several ambitions for the future of digital medicines optimisation services, though the need for a single shared consolidated medication record, allowing data to be accessed and used in real-time was a clear priority. This would involve widening access of existing shared care records, such as GNCR, to the community pharmacy and social care sector. Furthermore, there were calls to move beyond read-only access to the data and instead consider how the data can support better workflow and clinical handover between care settings and secondary uses of the data.

We outlined a series of recommendations arising from this work that are relevant to both digital tools and healthcare system as a whole. This includes considering factors necessary for development of an effective patient centred consolidated integrated health record, supporting adoption of medication standards across NHS organisations within the region, and addressing any digital gaps. There is also a need to identify a shared future vision for pharmacy services and support realisation of this through appropriate strategic workforce planning and funding arrangements. The number of digital systems used across the region to optimise medications should also be reviewed and rationalised, where possible. There should also be an emphasis on identifying and sharing evidence of good practice across the region through targeted approaches to ensure all stakeholders are aware of their responsibilities and how these can be accomplished.

1.0 Introduction

Medicines are the most common therapeutic intervention in the NHS. However, it is estimated that between 30-50% of medicines prescribed for long term conditions are not taken as intended.(1). More than a quarter of the adult population in England lives with two or more conditions(2) and around 15% of people in England are taking five or more medicines a day, with 7% on eight or more.(3) Furthermore, it is estimated that the prevalence of multi-morbidity will increase substantially and the proportion of those with 4+ diseases will almost double to 17% by 2035.(4) It is therefore important that individuals can get the maximum benefit from their medicines, whilst minimising harm. Medicines Optimisation (MO) has been defined as ‘a person-centred approach to safe and effective medicines use, to ensure people obtain the best possible outcomes from their medicines’.(5) Effective MO contributes to improved health outcomes, improved patient care, safety and satisfaction, improved efficiency and use of resources, making better use of professional skills and deliver clinical governance.(6)

People with long term conditions frequently transition between care settings and consequently, information about a patient’s medicines is regularly transferred or translated between systems. However, the point at which patients transfer across different interfaces of care is error prone and is associated with unintentional changes to medications, errors and miscommunication.(7) These can have consequences for patients, healthcare professionals, and the health system as a whole.(8)

A range of services are available to support MO activities, including some that target transitions in care. For example, the Discharge Medicines Service, New Medicines Service and the NHS Community Pharmacist Consultation Service (CPCS).(6, 9, 10) There are also further aspirations to roll out the electronic prescription service (EPS) to secondary care and other care settings and the creation of patient centred consolidated medication records.(11) A description of several key services has been given below.

1.1 Transfer of Care Around Medicines (TCAM) and Discharge Medicines Service

When a patient leaves hospital some individuals may benefit from support taking their medicines due to changes to their regular medications, to prevent avoidable harm. To address this, the TCAM project involved hospital pharmacy staff (e.g., pharmacists or technicians) identifying patients who may benefit from a follow-up consultation with a community pharmacist following their discharge from hospital, and then with the patient’s permission, referring the patient via a web-based platform (e.g., PharmOutcomes) to a community pharmacy of the patient’s choice. The community pharmacist could then ‘accept’ or ‘reject’ the referral and if in the case of acceptance would contact the patient to arrange a follow-up consultation and provide additional support.(12) This scheme was piloted between July 2014 and June 2015, and was associated with reduced rates of hospital

readmissions and shorter hospital stays that served as a catalyst for similar work nationally. For example, sharing hospital discharge letters with a patient's community pharmacy (via fax),(13) or other web-based platforms.(14, 15)

Two recent reviews have been conducted around current Transfer of Care (ToC) systems used within the UK. Nazar et al's review, identified 10 studies describing hospital to community pharmacy transfer of care (ToC) services in England and James et al, compared four services: the National Discharge Medicines Review Referral System used in Wales and the Refer to Pharmacy, PharmOutcomes and Help for Harry services, which are used in certain parts of England.(16) A range of approaches for notifying community pharmacies of a referral were identified, including messages via fax, NHS email or the specific web-based platform and an optional 'alarm' style USB device (pharmalarm) that flashes upon receipt of a notification, serving as a visual prompt that a referral had been received.(17) James et al., also revealed significant variation in the interoperability of different digital referral systems. The Welsh DMR referral system for example, was interoperable with 'Choose Pharmacy' thus information flowed directly to the community pharmacy system, where it could be accessed and reviewed without the need to transcribe information or access a separate standalone system. Referrals via PharmOutcomes however, could be made via a web-based platform (which would require the pharmacy staff to log on and review the system for referrals) or via an integrated version, which linked directly to the pharmacy IT system.(17) A lack of interoperability between the hospital and community IT systems was identified as a barrier to system engagement, due to the need to log into a separate system to gather information and then manually transcribe this information between systems.(17) It was posed that the additional steps taken could result in transcription errors, disrupt workflow and create additional work for users, which can reduce satisfaction and engagement with systems.(18) Nazar et al., review also highlighted how community pharmacists felt that a lack of medical history data hindered post-discharge consultations.(16)

Beneficial features of the digital tools were also described, for example both reviews noted the importance of outcome reporting/ feedback from the community pharmacy back to the referring hospital, which is currently lacking within existing digital systems. In addition, automated prompts, designed to inform pharmacy staff within the referring hospital about patients who may benefit from the service, e.g., those using a monitored dosage system (MDS) on admission.(17) Some systems described were also capable of directly referring patients onto different healthcare providers, such as anticoagulation clinics, mental health services or domiciliary pharmacy support services who could arrange home visits for those who were housebound or unable to visit the community pharmacy.(17)

In February 2021, the TCAM this service was established as part of the NHS Discharge Medicines Service (DMS), a new essential service to be provided by all pharmacy contractors. This intends to support the delivery of an integrated approach to medicines reconciliation and optimisation following discharge.(19)

The DMS service in particular aims to:

- Optimise the use of medicines, whilst facilitating shared decision making;
- Reduce harm from medicines at transfers of care;
- Improve patients' understanding of their medicines and how to take them following discharge from hospital;
- Reduce hospital readmissions; and
- Support the development of effective team-working across hospital, community and primary care networks pharmacy teams and general practice teams and provide clarity about respective roles.

The 2022/23 Commissioning for Quality and Innovation (CQUIN) target (*CCG7: Timely communication of changes to medicines to community pharmacists via the Discharge Medicines Service*) also financially incentivised hospitals to refer patients to a community pharmacy according to the minimum requirements outlines in the cross-sector NHS DMS Toolkit.(20) Individual NHS Trusts are responsible for ensuring that appropriate patients are referred to community pharmacy within 24-48 hours following discharge to receive support with medicines reconciliation and MO. With consent from the patient, a referral is sent from the NHS Trust to a community pharmacy via a secure electronic message. The DMS toolkit outlines a three-stage process for pharmacy contractors providing the service, with fees payable for provision of each stage provided. **Stage 1:** on receipt of the referral the community pharmacy should then perform a pharmacist clinical check of the referral within 72 hours. The pharmacist or pharmacy technician will then conduct a medicines reconciliation and take steps to clarify any details, update records, review prescriptions currently awaiting supply. **Stage 2:** When the community pharmacy receives the first prescription following discharge the pharmacist or pharmacy technician will review the prescription to determine whether all necessary changes have been accounted for. The pharmacy will also notify other relevant healthcare professionals (if appropriate) and determine whether further referral is needed (e.g., further discussion with the general practice or Primary Care Network (PCN) pharmacy team). **Stage 3:** The pharmacist or pharmacy technician should also engage with the patient to establish their understanding of their conditions, medications and identify any additional needs or support required to ensure individuals can get all the optimum benefits from their treatment.(20)

The roll out of the TCAM/ DMS is still in its infancy with some hospitals within the NENC region yet to adopt a digital platform to support ToC activities instead relying on NHS email to transfer referral information.(17, 21) NHS England and NHS Improvement recently provided £1.2million funding (~£6,000 per trust) to ensure organisations have appropriate software solutions to send DMS referrals that meet the minimum requirements. As the service embeds and is adopted it will be important to properly evaluate the uptake, efficiency, satisfaction and patient and economic outcomes.(16, 22)

To provide high quality care that is tailored to the individual, there is an increasing need to access, exchange, integrate and use information efficiently and consistently across health and social care.(23) Furthermore, there

is a growing emphasis on using digital technology to deliver healthcare services, enabling patients to quickly and easily access the right advice, support and treatment to manage their own health. However, contemporaneous and accurate information is often not available, with significant local variation in practice, which can result in increases in workload, duplication of tasks and errors.(24, 25) There is currently a complex network of different systems that contain patient health record data in distinct ‘silos’ throughout a patient’s journey and effective data sharing between them is a challenge due to a range of social, organisational and technical reasons.(25) Consequently, MO activities are hindered, which has implications on patient care and costs.

1.2 Shared Care Records

Efforts to address this are emerging, for instance, there has been a national increase in the development and use of Shared Care Records that include information from multiple care settings (e.g., GP practice, secondary care, social care).(26) These records may contain important information about an individual, such as blood test results or information about why a medication was stopped or started, and goes beyond the level of information that can be accessed from a Summary Care Record. Such tools facilitate timely access to key clinical information that can be used to optimise care and may also support the integration of a wider range of health care providers, within a local health and social care system.(26) Dorset for example, have a shared care record including data from GP and hospital records that community pharmacists can access and utilise to support their consultations. This has had a direct impact on patients, who were able to have discussions with their community pharmacists about medicine related issues. For example, a patient was able to confirm the follow-up plan relating to eye drops that were prescribed after an ophthalmology appointment rather than waiting to speak to a GP.(26) This also has huge potential to enhance community pharmacists ability to engage patients in shared decision making by providing them with information that they can use to educate and empower their patients. Similarly, Greater Manchester have a shared care record – ‘Greater Manchester Care Record’ that serves the region’s 2.8m citizens and has facilitated MO for patients who are reviewed across the region’s different hospitals. When considering new interventions and strategies it is important to firstly understand what systems are currently in place, how effective they are and the context in which they operate. This will allow for learning and development of new processes that are informed by a thorough evaluation of the potential consequences resulting from any change or interventions.

1.3 Interoperability standards

Within the digital tools described above there are varying levels of interoperability. The Government recognises the need for information to be collected once and then shared between providers to meet an individual’s needs. Interoperability has been defined as: *“the ability of two or more systems or components to exchange information and to use the information that has been exchanged”*.(27) To achieve interoperability, data must be moved between two systems (*technical interoperability*), this is not dependent on the type of information or

mode of delivery method. Therefore, may include transfer of information via USB device or by email. The second element concerns ensuring that each system can understand the information (*semantic interoperability*).⁽²⁸⁾ For this, information should be used and interpreted without ambiguity, so that for example, clinical decision support can continue to work reliably on imported data. This requires specific coding and messaging schemes, or data standards. A range of work is underway nationally to enhance interoperability within health and social care settings, as outlined in a recent policy paper: *Data saves lives: reshaping health and social care with data*, which highlights commitments to introducing clear and open standards to make it easier to share data safely and efficiently.⁽²⁹⁾ Standards and interoperability are critical to achieving joined up, person-centred care across care settings. Specifically, better information flow will support integrated care systems (ICSs) to improve the health of people living and working in the North East and North Cumbria by ensuring that the right data is available at the right time to the right person to make decisions. Care providers are often required to re-input information across multiple systems or repeat tests in different care settings, which is error-prone and inefficient. In October 2021 a new information standard relating to medicines was published for the NHS. This specified the definitions that must be used when a healthcare professional sends or receives patient medication and allergy/ intolerance information, by computer system, between care settings. All NHS care providers that are involved in the prescribing, dispensing or administration of medicines must comply with the standard by 31st March 2023, with exceptions for organisations that need to procure and install suitable systems.⁽³⁰⁾ The standards require transfer of medication information using the newest UK version of FHIR (Fast Healthcare Interoperability Resources), approved dose syntax to transfer the amount of medication per dose as a simple coded quantity and SNOMED CT and dm+d codes for allergy/intolerance information. This will support shared medication records, better medicines reconciliation, the electronic prescription service and secondary uses of data for population health management. However, there are a range of barriers to the adoption of standards including a lack of cohesive national-scale digital health system, funding and support for standards, knowledge and infrastructure related, such as the impact on pre-existing workflows and lack of usage of a consistent patient ID.^(31, 32)

1.4 Transitions of Care

Individuals are cared for and encounter providers in a range of settings, between: Primary Care, Secondary Care, Tertiary care and Community Health. This is especially true for those with multiple long terms conditions, who are more likely to be taking multiple medicines. Each interaction with a healthcare professional may result in medication or treatment changes. Problematic polypharmacy may then occur whereby multiple medicines are prescribed inappropriately or where the intended benefits of the medications prescribed are not realised.⁽³⁾ In the North East and North Cumbria, 12.38% of patients are receiving 8 or more medicines, which is above the figure for England (10.8%), rates of patients taking 3 or more medicines causing hypotension or classified as having a moderate to high anticholinergic burden are also both higher than the national figures. The Department of Health and Social Care report *Good for you, good for us, good for everybody*, highlighted that to reduce

overprescribing that there is a need for better shared decision-making with patients, better guidance and support for clinicians; more alternatives to medicines, such as physical and social activities and talking therapies; and more Structured Medication Reviews (SMR) for those with long-term health conditions.(3) There is evidence, for example that integrating pharmacy professionals into care homes to perform medication reviews improved patient's quality of life, reduced emergency hospital admissions and contributed to cost savings.(3) However, these goals and initiatives must be supported by effective digital systems that are interoperable and equip healthcare professionals with the right information to optimise a patient's medications.

2.0 Aim

The aim of this research is to engage with key MO and IT stakeholders across the North East and North Cumbria Integrated Care System (NENC ICS), to scope out current systems relating to the transfer of information across interfaces of care. In addition, we will seek to identify the challenges and potential opportunities for more effective cross sector working, to inform future priorities.

3.0 Methods

Key stakeholders in MO and IT were invited to take part in a semi-structured interview to gather their perspectives on the current MO services provided, the digital tools used to support these activities, including detail about the flow of health information exchange and level of interoperability reached. In addition, stakeholders were asked to provide their opinions on the barriers and potential opportunities for more effective MO across sectors.

3.1 Eligibility Criteria

We included all clinicians, managers, commissioners and stakeholders who are/ have been:

- Involved in commissioning, developing and delivering MO related activities;
- Expertise in IT, clinical informatics and digital health solutions used within the NHS;

3.2 Recruitment

We used a snowball sampling approach to identify suitable participants. In the first instance the researcher was introduced to an initial set of contacts by the Senior MO Pharmacist and NENC Academic Health Science Network (AHSN) MO Workstream Lead, and the Digital Transformation Director for the AHSN for the NENC. The researcher emailed potential participants and invited them to take part in a semi-structured interview. This email also included attachments to a participant information leaflet (PIL) and consent form. Individuals were advised to read over the material provided and to contact a member of the research team if they had any questions. Participants were required to provide consent via an online consent form prior to taking part in the study. We proactively aimed to engage with individuals from a range of professional backgrounds and levels of experience, to ensure the data gathered was rich and representative.

3.3 Data Collection

Semi-structured interviews were conducted between Jan 2022 and March 22 to explore stakeholder's perspectives on the current MO services provided in the region, the digital tools used to support these activities, including detail about the flow of health information exchange and level of interoperability reached. In addition, stakeholders were also asked to provide their opinions on the barriers and potential opportunities for more effective MO across sectors. Interviews lasted approximately 1-hour and were conducted via video-call by a researcher with qualitative data collection experience at a mutually convenient time and place with each participant. All interviews were recorded and transcribed verbatim together with accompanying field notes.

Analysis (Interviews): Qualitative data collection and analysis was iterative, allowing emerging themes to be explored and identify disconfirming evidence.⁽³⁴⁾ Different data sources e.g., interviews with a range of participants facilitated triangulation, to identify where and how different data converge and diverge. Main and subthemes were identified using the constant comparative analysis.⁽³⁴⁾ The 'constant comparison' technique was used to move backwards and forwards between the data to evolve explanations for the recurring patterns and associations. Themes were discussed among team members, and continually refined and applied systematically to the whole dataset using computerised software QSR N-Vivo. All data were analysed by suitably qualified members of research staff.

4.0 Results

A total of 22 interviews were conducted with 23 different participants lasting between 38-75 minutes; this included pharmacists (n=19) working across community (n=4), hospital (5), primary care (GP practice, Primary Care Network, CCG (n=5), North East Ambulance Service (1+1), NHS England & NHS Improvement) (n=5) and GPs (n=2).

Through these discussions and a scoping online search, a simplified overview of the key systems relating to medicines, across primary, secondary/ tertiary and social care across the NENC was developed (Figure 1) This is not intended to provide a comprehensive overview of all systems used throughout the region but instead illustrates the complexity of how data is stored and moved between settings. For instance, there are several different core systems that are used in General Practice (e.g., the patient record supplied by EMIS, SystemOne and Vision), which may be different to the system used by the community health team that is providing home-based care to a patient and these systems are not directly interoperable. Furthermore, a range of different community pharmacy patient medication record (PMR) systems also exist with no ability for direct communication with GP systems. There are 10 hospital Trusts across the region, using eight different electronic prescribing and medicines administration (ePMA) systems, it also important to note that some hospitals do not use ePMA and still prescribe and record drug administration on paper. Transfer of information between different

systems and care settings is largely facilitated through bespoke solutions delivered by third party companies in response to a particular problem- for example a digital referral as part of the discharge medicines service (DMS) from one hospital to a community pharmacy is typically either sent using NHS Mail or a website/ integrated web platform such as PharmOutcomes, or Cegedim. Information contained within the referral is either automatically populated from the hospital electronic health record (EHR) or manually entered into a structured template or uses a combination of both approaches and is then sent to the community pharmacy to support patient care. The information flow is typically one-directional and does not effectively support two-way communication. The social care sector however largely uses paper based patient health and medication records, which limits the ability to digitally transfer information between settings.

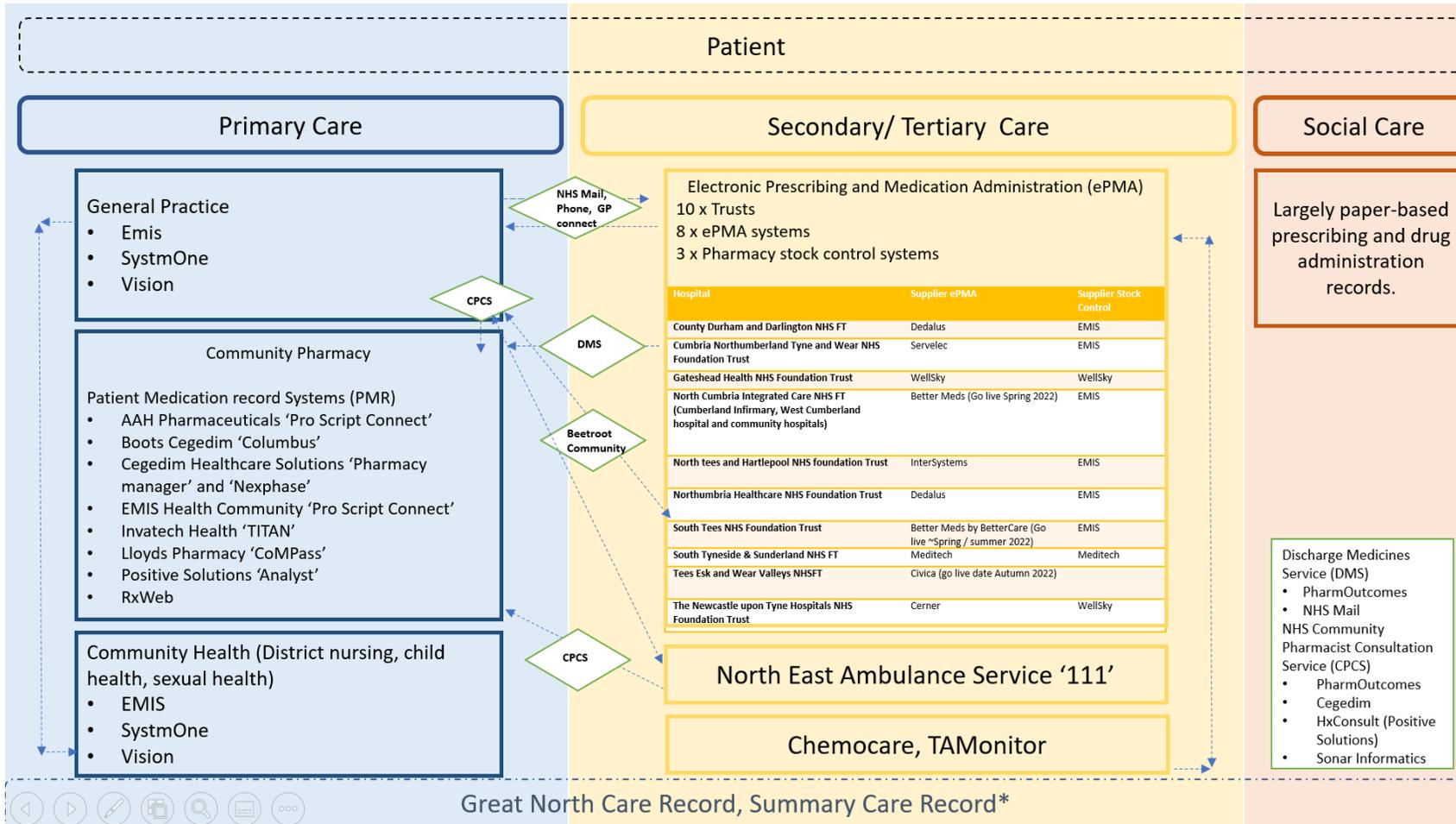


Figure 1: Simplified overview of digital tools used across NENC

In addition to the digital tools used to support MO services across transitions of care (e.g., PharmOutcomes, HxConsult), one organisation has recently commenced the implementation of a digital solution called 'beetrootCOMMUNITY' to monitor patients who are prescribed IMDS as part of a shared care agreement (SCA). This is the primary care version of a system used in some secondary care Rheumatology Departments, called TAMonitor(beetroot) system. When a patient is prescribed a IMD in secondary care, the GP is typically informed via an email or letter, the practice staff then take responsibility for updating the patient's medication record. However, there have been serious incidents where there have been delays or failures to update the GP held medication record, resulting in prescribing of contraindicated drug combinations. There are also risks associated with monitoring and acting on out of range blood test results and recognising deteriorating trends . The beetrootCOMMUNITY system consists of a digital platform that holds data about patients who are prescribed IMDs as part of a SCA with an electronic feed directly from laboratory test result systems. The system performs automated checks on the data to identify and alert a team of primary care pharmacy staff about any out-of-range results, deteriorating trends or patients who 'did not attend' (DNA) for their monitoring. In the case that no clinical issues are identified by the system, a 'safe to prescribe' certificate is automatically generated, in contrast, if any issues are identified a clinical team is informed via the digital platform, who can then liaise with a specialist team for advice. This provides a safer process with better monitoring and management of patients and supports the GP prescriber with their responsibilities for ensuring the patient is adhering to monitoring guidance and appropriate clinical monitoring arrangements are in place. Figures 2 and 3, show examples of the information flow when a patient is initiated on a IMD in secondary care and then transferred to primary care for monitoring and management through a SCA before(Figure 2) and after (Figure 3) the beetrootCOMMUNITY automated digital tool was implemented. Capability to use beetrootCOMMUNITY to facilitate the process of requesting and accepting the sharing of care, between secondary and primary care, is currently being developed. This will provide an auditable digital trail between the primary and secondary care interface, and enhanced ability to control the timeliness of receipt and response of SCAs. Further uses of such tools warrant exploration, for example to support the monitoring of other medicines with a narrow therapeutic index (e.g., Lithium) .

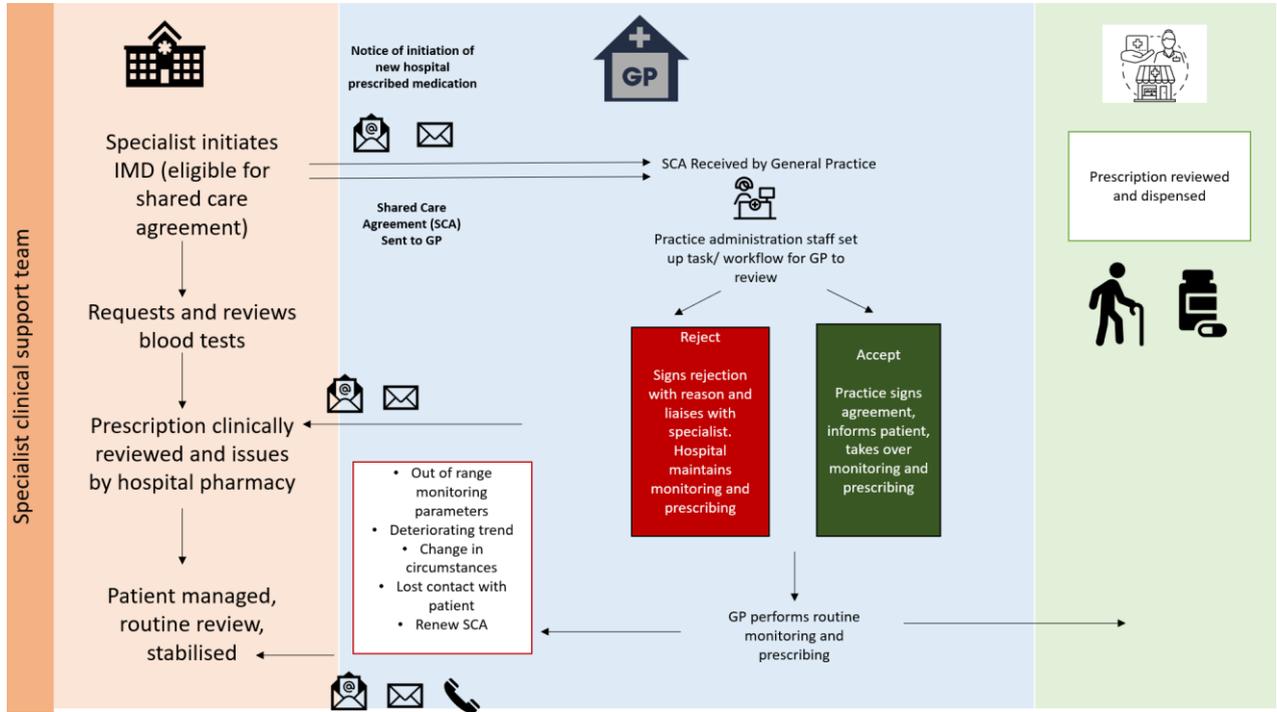


Figure 2: Simplified overview of IMD SCA information flow between hospital, GP and Pharmacy

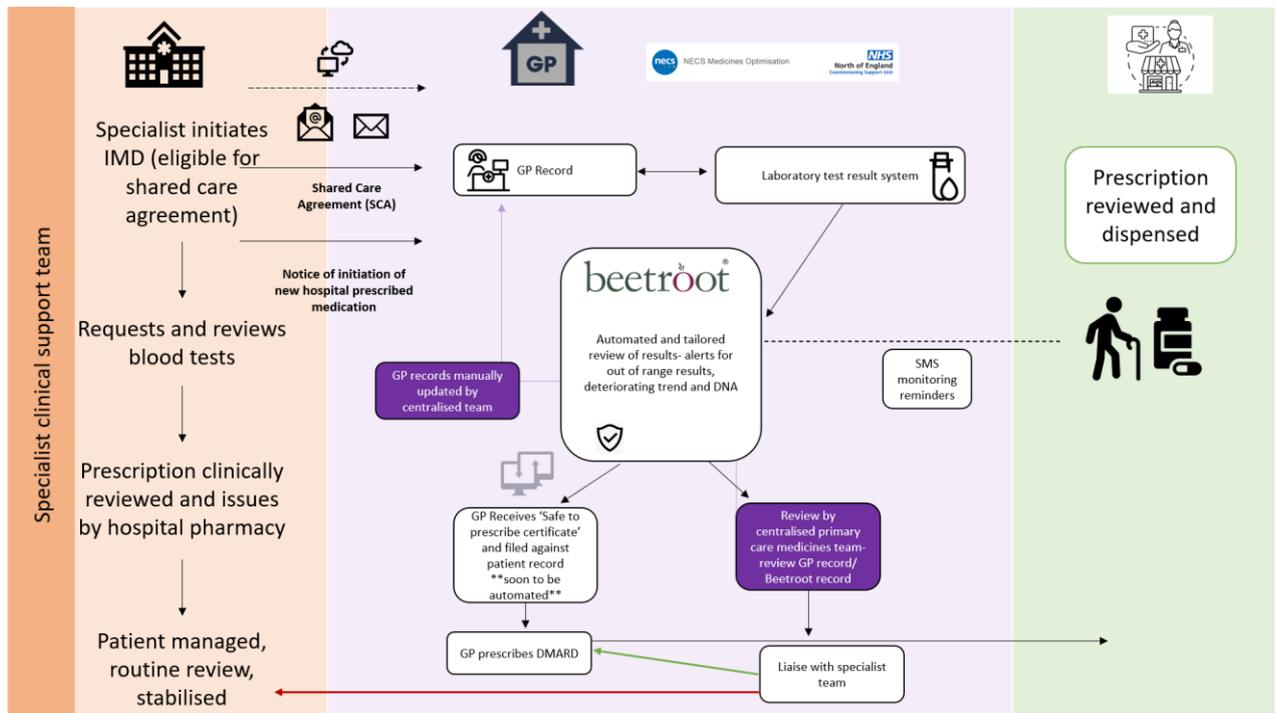


Figure 3: Simplified overview of IMD SCA information flow between hospital, GP and Pharmacy using beetrootCommunity

4.1 Transfer of Care Issues

Incomplete Patient Records			
Data silos	Ineffective data flow	Reduced Efficiency	Reduced Safety

Participants highlighted several factors that contributed to issues relating to the transfer of care, including problems associated with having data held in separate ‘silos’ such as the GP, secondary care providers or a community pharmacy, with ineffective data flow between these, resulting in reduced efficiency and safety. These issues centred around the absence of an accurate and up-to date patient record containing information about all medicines that a patient was prescribed and taking. Participants also discussed a range of clinical incidents associated with incomplete patient records, such as discrepancies between the allergy status recorded in different clinical systems and omissions due to poor communication and clinical handover. In addition, incomplete records may make it difficult to identify patterns of behaviour that would warrant further investigation or management for example *“if someone's getting emergency contraception on a regular basis [from a community pharmacy], actually that should be flagging up a risk” (...)* or even a three-year-old that’s having regular consultations for a cold, well, actually, do we need the health visitor just to do a little bit of education around self-management so that they’re not seeking advice every single time?” (GP, 006)

Efforts have been made to improve access to a patient’s medication record through the summary care record (SCR), (an electronic record of patient information e.g., current medicines, allergies and some details about long-term conditions, compiled from the GP’s medical records) that can be accessed by authorised staff beyond the patient’s GP practice. However, there are limitations to the SCR’s effectiveness. Firstly, only a relatively small amount of medical information is available within the SCR and detailed information about a person’s past medical history may be missing. Secondly the SCR *“doesn't necessarily capture activity from every part of the system”*, for example one pharmacist explained how they could *“walk into a community pharmacy and buy a pharmacy medicine that could, under different circumstances, have been prescribed by a GP, [and] might interact with various other things, but it's not going on my record anywhere. So, if I then end up in A&E tonight, they don't know that I've got another drug in my system”* (Pharmacist, 003). The SCR also does not automatically include specialist medicines that are prescribed in secondary care unless they have been manually transcribed from a hospital clinic letter into the GP system. Failing to maintain a complete record of the patient’s medicines can result in serious safety issues, for instance, a GP recalled a *“significant incident where the GP hadn't put down [methotrexate] or- on the GP record was not methotrexate, and they [the patient] ended up in an ITU in Wales and [the staff] didn't know that the patient was on methotrexate and had actually accidentally overdosed* (GP, 006). A pharmacist also described how a terminally ill patient in a care home environment experienced delays to receiving end of life supportive medications due to ineffective data flow between disparate systems used by

different members of the patient's care team. The pharmacist recalled how carers who were responsible for administering medications were using a system that *"wasn't keeping up with the speed of the changes to the patient's prescription"*, and thus were only permitted to administer medications based on an outdated prescription, furthermore *"the district nurses didn't have access to the system that the carers were using and therefore couldn't help either and were working to a different prescription again"* (002, Pharmacist). This highlights the avoidable patient harm and suffering that may result from having a current and comprehensive medication record and systems that do not effectively transfer information. It is also worth noting that such technical limitations also cause distress for any family members and health professionals who are frustrated by the inability to effectively manage patients.

4.2 Challenges of Digital Tools

Alongside the general issues experienced when patients transition between care settings, participants discussed some specific challenges associated with the use of digital tools. These included: the use of multiple systems and workflow implications, interoperability, digital gaps and blind spots, IT systems management and Person/Organisational Factors and Change Management, which are discussed in more detail below.

4.2.2 Multiple Systems and Workflow

Participants working across all settings described the need to interact with multiple different IT systems when caring for patients. Those working in general practice for example used their main electronic health record system alongside systems for viewing additional information that was not present in the main GP record, such as the Great North Care Record (GNCR). Community pharmacists also described using an array of different systems to fulfil different tasks and purposes.

"on a Sunday, I do a COVID clinic, so I've got Q-Flow open, which is the appointments booking system (...) I've got PharmOutcomes open for CPCS referrals via 111. I've got PharmOutcomes open for other things, any other bits and pieces that might come. I've got Outcomes4Health, which is the sister platform. That's open for recording the COVID vaccinations. Then we've got the... What else is there? There are half a dozen different things there. Of course, in the pharmacy clinical system, we [they] use Positive Solutions Analyst, but we'd have that open as well" (Pharmacist, 007).

Navigating between different systems is error prone; one GP recalled how it was not possible to view a discharge letter containing information about medication changes alongside the patient's active medication list. Therefore, in order to review what medicines a patient should be taking after being discharged from hospital the GP would have *"two instances of EMIS open or you have to print out the [medication] list in order to check it and, actually, printing out the list is the safest option, because you can then highlight as you're going along, which you can't on the system"* (GP, 006). In addition, a hospital pharmacist described how one of the key challenges with using PharmOutcomes for sending DMS referrals was that it was *"another stand-alone system. It's more interfaces, it's more opportunities not just for information to have to be re-transcribed but actually alert tasks to get dropped because the right people can't see [what needs to be done]"* (Pharmacist 010)" he emphasised how *"the more you're having to step out of your day-to-day workflows and go, "Oh my goodness, I really must remember to send a DMS referral for this thing." You're just not going to do it"* (Pharmacist, 010). The use of multiple systems and the need to navigate between them contributes to additional workflow demands and cognitive burden on the user.(18) This can pose a safety risk, as information must be retrieved and transcribed across multiple systems, with each step introducing the risk of manual human error.(35) Furthermore, research has shown a link between poor IT usability and clinician burnout, which has been associated with reduced job satisfaction, quality and safety of care and costs.(36)

4.2.3 Interoperability and safety

A GP described how community nurse practitioners do not have access to the full electronic health record for certain patients in their care. This occurred because the community nurses were employed by the local hospital rather than the GP practice, and the two organisations used different IT systems, which did not share data in real time. Consequently, automated checks such as drug-laboratory or drug-interaction checks were not performed on a full and accurate record of the patient's history with the risk that clinically important issues may have been missed.

"If I prescribe nitrofurantoin it will pull up the patient's GFR (glomerular filtration rate). If their GFR is below 30 it will give me[him] a big red alert to say, "By the way, are you sure you want to do this?" When they [community nurses] do that they don't have the blood results in their system so they will not get that warning, so they may merrily go ahead and prescribe that (...) Then conversely, if they've prescribed a drug, I don't know that the interactions are there now." (GP, 012).

The potential for harm is further increased because patients who are cared for at home are more likely to be frail and elderly, thus more susceptible to the negative effects associated with medication errors. Participants also described issues associated with the limited interoperability between different modules of the same IT

system. For example, a primary care pharmacist recalled how they were able to add information into a separate community module of the core GP system, which could also be viewed by other members of the practice team. However, the information was not fully integrated into the main GP record and so if they had *“diagnosed something which needs clinically coding on the records, they [the GP practice] have got to transcribe that [into the core system]”* which was described as *“clunky”* (Pharmacist, 004). Furthermore, because the information was in a separate community section of the GP record *“there was[is] a chance that something may have happened that you may have missed”* (Pharmacist, 004). At the time of writing, developments are underway to integrate the two components of the system so that *“anything that would be written in the community module would be transcribed into the- automatically dropped into the GP record”*, which would mean that *“medications that are started by these external services will also become part of the main GP record”* (Pharmacist, 004) making the information more visible, and therefore usable.

4.2.4 Digital gaps and ‘blind spots’

Participants revealed *digital gaps and blind spots* across the region; these are gaps in the availability of digital health data, which cannot be easily shared or utilised by healthcare professionals without additional manual effort, such as transcribing information from an electronic document into the core electronic system. These gaps have implications on immediate care delivery, for instance determining whether a patient has started a new medication, or facilitating secondary uses of the data, such as population health management. The GNCR aims to be a complete shared health record for those living in the North East and North Cumbria allowing health and care workers access to current medical information. However, one GP highlighted how their local acute hospital trust only imported some *“very, very, primitive data” into the GNCR, and so was not “hugely valuable”* (GP, 012) at providing information about a patient’s hospital stay. In addition, data from social care e.g., care homes, were also not imported into the GNCR, which meant that *“any changes that are made there are not displayed on the HIE [health information exchange (HIE (GNCR))”* (GP, 005). In contrast however, more digitally advanced hospitals, were already transferring a greater quantity of information from their EHR into the GNCR, which was *“more useful”* (GP, 012). Interestingly though, as one GP pointed out, because that hospital was already using a *“decent system”* data were already quickly and easily transferred directly into the GP record, thus reducing the need to access the GNCR. Consequently, participants described using the GNCR as one source of information, alongside others to form a complete picture of the patient’s medical record.

Certain professional sectors were unable to access the GNCR, which made it *“really difficult”* to maximise use of that workforce and *“shift patients away from some of those higher acuity services like ED[Emergency departments], and minor injuries units, and even general practice, to an extent, into community pharmacies, as a first port of call”* (Pharmacist, 003). Furthermore, the information governance arrangements around accessing multiple systems was considered problematic. One community pharmacist described how he would routinely access a patient’s SCR on receiving a CPCS referral rather than wait for the patient to arrive at the pharmacy and

provide explicit consent. This pharmacist was *“slightly more cavalier with my[their] attitude to Summary Care Records than some of the other pharmacists who stick rigidly to the, “Do I have authorisation? No, therefore, I won’t look at it” (Pharmacist, 014).* He believed this was justified so that they could prepare for the patient consultation and be more informed for example when dealing with a patient request for pain relief via the ‘NHS 111 service’ but who was already taking several analgesics.

As discussed, data must be in a coded, structured format, such as using SNOMED or dm+d terminologies for effective data sharing. Although medication standards have been defined by NHS England specifying how medicines should be described within NHS digital systems, this research revealed how *“a lot of trusts don’t use dm+d” (Pharmacist, 002)* and many hospitals are *“not using SNOMED at the moment” (GP, 006).* Without adoption of the standards, large initiatives such as shared patient medication records are *“not going to work” (Pharmacist, 002).* A recent document from NHS Digital further highlighted a range of barriers to adopting dm+d standards including aspects relating to internal priorities, interface/interoperability issues, IT infrastructure, supplier issues and service level agreements, terminology and lack of resources.(37)

A further digital gap described by participants was the roll out of certain pharmacy services without a supportive digital infrastructure. For example, the national hypertension case finding service in community pharmacy was recently rolled out to identify individuals in the community with a high risk of hypertension. However, *“although it’s a national service, they haven’t got a national system for reporting it [blood pressure results and follow up] between the two” (Pharmacist, 011).* Consequently, a range of different communication techniques, including email, letter or pilot digital platforms e.g., PharmOutcomes, were being used depending on local arrangements between community pharmacy providers and GP practices, which can contribute to additional complexity in the workplace. In addition, because the data was not collected in a standardised digital format it could not be transferred between care settings in an interoperable way. A GP raised an interesting point that the organisations *“that are [digitally] further behind are the ones that... The Great North Care Record doesn’t help”(GP, 012).* Digital inequities between health care providers and organisations, may result in a widening gap in safety and service delivery, between those that are able to harness the benefits of digital tools to support patient care and those who cannot.

4.2.5 IT Systems Management

IT systems management in this context describes the organisation, management and monitoring of IT systems. As shown in figure 1, a range of different IT systems are currently used across the region to support direct care and delivery of medication optimisation related services. Furthermore, there are examples of one national service, such as DMS, being delivered using a range of different approaches (e.g., Pharmoutcomes, NHS Mail or bespoke solutions developed ‘in-house’). Participants suggested that a lack of minimum standards or mandating

how services are technically delivered is problematic and contributes to low adoption and delays rolling out these services.

*“So pharmacy DMS transmissions, we launched the DMS service but pharmacies [are] not seeing many of them because yes you can do it by snail mail and NHS Mail, but that’s not good enough. **We shouldn’t launch a service without a platform to deliver it on.** So every hospital should be told, “You can have your own, but we’re launching this new service and **you must be able to provide a digital solution that’s integrated.**” (Pharmacist, 005)*

For example, some sites in the region have spent time *“investigating all the options and solutions”* (Pharmacist, 005) and worked with their own IT departments and third-party suppliers to develop automated ways of sending DMS referrals with functionality to automate the documentation process to improve end-user experience. This was important because *“the more you’re having to step out of your day-to-day workflows and go, “Oh my goodness, I really must remember to send a DMS referral for this thing.” You’re just not going to do it”* (Pharmacist, 010).

In addition, there are cost, and resource implications because each organisation must determine how best to deliver a service and then undertake a procurement exercise to obtain and implement the digital tool. There is therefore the potential for *“reinventing the wheel every single time (...) and there is a cost to that for [the software developer] to write the programme.”* (Pharmacist, 020). Another Pharmacist remarked that *“it would have been much better if there had been a national digital solution rolled out alongside DMS rather than just inviting trusts to procure a licence at a relatively high cost from a private sector supplier”* (Pharmacist, 015). Participants made similar remarks about other services such as the hypertension case finding service, CPCS and pilot projects in development such as a new respiratory service between general practice and community pharmacy in a PCN. Related to this, one participant was also concerned that there was the potential for duplication of some medicine’s optimisation services. For example, a pharmacist based in a GP practice described how the community pharmacy delivered DMS service could duplicate work that she was already doing in general practice as part of their ‘business-as-usual’. There was also the chance that the community pharmacist and practice pharmacist were working to *“two different documents”* (Pharmacist, 013) because of the lack of digital data transfer.

Participants acknowledged how individual systems often worked well in isolation, for a specific purpose, but were less suited to adapting to change, which was very problematic in terms of keeping up with the pace of healthcare delivery. A need was identified to rationalise the number of digital systems used, create clear expectations for suppliers and develop clear standards and frameworks that outline how services should be digitally enabled.

“Then the solution would be better commissioning, better frameworks, better incentives, and better management of suppliers in a marketplace that is relatively closed by NHS England and NHS Digital and people like that” (Pharmacist 001)

Participants suggested that ideally there would be a transition from the creation of bespoke digital solutions or integration projects for the purpose of sharing information between different care settings towards development of a shared medication record. This would mean that *“rather than sending information [a referral], you give community pharmacy, or any other healthcare professional, access to a patient's record. And that's the direction of travel that will make this all so much easier” (Pharmacist, 019)*. Direct data sharing between systems was acknowledged to be technically possible but practically difficult; instead, the vision was *“rather than doing a direct to direct [data transfer], the information goes [from different systems] into a shared medication record in a fully interoperable way” (Pharmacist, 002)*, which can then be accessed and utilised by healthcare professionals. For this to occur, the adoption of *“standards become[s] incredibly important” (Pharmacist, 002)* so that different systems are able to communicate. A further Pharmacist added that there was also a need to *“mandate minimum standards” (Pharmacist, 005)*, in terms of how services and supporting digital tools are delivered, such that when a new service, such as the hypertensive case finding service is rolled out, there are clear directions and specifications that must be *“in place by service launch” (Pharmacist, 005)*. Some felt that more pressure should be placed on commercial system suppliers to meet the needs of their users rather than resorting to workarounds or costly bespoke solutions.

“I think there needs to be a suite of expectations that everybody needs to have and it's the same with hospitals, you can't have a hospital system that doesn't do these 10 things. We've got to have what messages need to be transmitted, and every system needs to that by a certain deadline” (Pharmacist, 005)

4.2.6 Person/Organisational Factors and Change Management

Person/ organisational factors and clinical leadership are important for health IT adoption.(38, 39) This is important, because certain improvements in the delivery of MO services hinge on key technological developments, thus advances require efficient adoption of new ways of working. As discussed, certain organisations are yet to adopt the appropriate medication information standards that were specified in Autumn 2021. One pharmacist acknowledged that although the standards have now been defined *“the hard bit is to come, which is the adoption and more importantly the transformation around that. There's also a Hearts and Minds piece. A lot of trusts don't use dm+d. Without using dm+d and being committed to using dm+d, then this is not going to work” (002, Pharmacist)*.

Similarly, participants described concerns around data sharing, for instance one pharmacist described “*how if you suggest [data sharing] to some general practices, they'll say, "no chance. Nobody should have access to that data." But once you get over that barrier, and there's a bit of trust built into it, then you can start adding to it.*” (Pharmacist 003). Instead, there is a need for all healthcare professionals to work together to “*best serve the needs of the patients*” (Pharmacist, 019). There may also be patient concerns around sharing their personal data with a seemingly limitless number of healthcare professionals. However, there was evidence from participants that the perceptions around data sharing have significantly changed in recent years during the Covid19 pandemic, with a move towards “*sharing the data for the good of the patient, and not to get too bogged down in GDPR and information governance issues*” (Pharmacist, 012).

A further barrier related to using digital tools to support MO activities was the need for cross-sector and multi-discipline collaboration, requiring engagement from clinical, IT and finance teams. One pharmacist described the challenges involved in getting ‘buy-in’ from different sectors and reflected on how it was “*not easy to innovate in the NHS. It is like turning an oil tanker around*” (Pharmacist, 020) Therefore, as prior research has also shown, solid leadership was considered crucial for digital MO services.(40) (38)

“If you’ve got a committed approach to it and it’s got good leadership, there is learning still to do, but it can be done. These areas are starting to demonstrate the way forward, but everybody has to buy in. You need that. It’s the usual stuff with transformation, good leadership, good vision, everybody is committed towards delivery and a reasonable time to deliver the programme around it.” (Pharmacist, 002)

5.0 Future Hopes and Opportunities

This section outlines several key areas where stakeholders highlighted potential opportunities for the future.

5.1 Consolidated Integrated Care Record

Participants revealed several ambitions for the future of digital MO services, though the need for a single shared consolidated medication record where the data could be accessed and used was a clear priority, and reflected different healthcare professionals working across care settings.

*“One record across all organisations, that’s the blue sky thinking. The data would sit in a data repository that would be **coded and accessible**, via APIs, via front-end systems that could be **customised to be targeted** to how GPs work, targeted too how secondary care clinicians work, targeted for acute and outpatient mental health. Fundamentally, **all the data would be held in one central repository for that patient and all of the systems can pull in all that data.** A patient, for example from a prescribing basis, would have **one prescribing record**. That prescribing record would continue out of hospital, into hospital.”(012, GP)*

It was revealed that work is currently underway at a national level to support creation of local shared medication records allowing data to be *“held in a shared medication record in a fully interoperable way (...).That becomes the consolidated medication record, if you like, that can then be used to actually support admission or discharge or whatever else is going on”* (Pharmacist, 002). This record would contain a comprehensive and up to date record of all medicines that a patient was taking and would be advantageous because *“everybody [would] interact[s] with that and use[s] that as the single source of truth”, “open[ing] up a number of opportunities”* (Pharmacist, 002) in terms of how care is delivered. Principally, the time saved from manually reconciling medication records at different transitions of care would create an *“opportunity for optimisation and proper management of patients and overprescribing”* (Pharmacist, 002). Furthermore, by identifying and utilising a common digital architecture such records may be linked in the future. One pharmacist also mentioned that it would be helpful to have a system that *“could collate where [medication] stock is, because I[they] can spend half an hour trying to find a pharmacy that has got X medication for this little baby or whatever so they can have what they need”* (Pharmacist, 009).

5.2 Widening access to shared care records

Participants also felt it was important to give all sectors the ability to access and contribute to shared care records, such as the GNCR. Specifically, primary care should not be limited to general practice and must encompass *“optometry, dentistry, pharmacy, podiatry, [they] all need to come into the fold if they're providing NHS services”* (GP, 006) as they contribute complementary information. For example, whereas the GP medication record holds data about what a patient was prescribed, the community pharmacy holds data about what medicines the patient collected, which may be different and provides further information about how a patient is managing their conditions. To meet patient’s needs, harness the skills of the available workforce, and in response to reforms to the education and training of pharmacists there will be a growing emphasis on delivery of clinical services, such as *“managing and monitoring drug treatment”* (Pharmacist, 003). For this, all pharmacy staff, including those working in community pharmacy are *“going to need access to some more information”* (Pharmacist, 014) and *“be able to read those [patient] records, but ideally (...) directly write into those records as well”* (Pharmacist, 003).

“So, there's something about allowing community pharmacy to fly. So, a big safety issue, big quality improvement for patients, and actually, politically and professionally, making community pharmacy part of the healthcare team because they've got access to the same conversation as everybody else does”. (Pharmacist, 019)

Some participants however, were worried that community pharmacists could have *“too much information, to make a decision on”* because *“you could spend hours and hours and hours trailing back through communications and stuff that gets put onto records, [which] it’s probably completely inappropriate to the query”* (Pharmacist, 018). A number of participants therefore suggested that it was important to involve users in the design of these tools because *“unless community pharmacists are involved in the design, it will be made for a different sector”* (Pharmacist, 020). Another pharmacist added that for *“a sector and a workforce like community pharmacy, I think it’s big enough to warrant having a bespoke solution developed for it”* (Pharmacist, 001).

Some pharmacists however highlighted financial barriers to community pharmacy access to shared care records to support delivery of clinical services, commenting on the reality that as lots of pharmacies are understaffed, provision of clinical services that detracts from dispensing may be less commercially attractive due to the current community pharmacy contract funding model.(41) A pharmacist suggested that some services, *“need to be paid [for] in a different way to enable us to employ people who are ready to do these services at scale rather than drip fed in one this month, two next”* in other words *“the funding model needs to be ahead of the work”* (Pharmacist, 005).

Finally, social care was also found to lack the digital infrastructure to effectively share data between care settings. There was however acknowledgement of work underway nationally to digitise social care, which will include implementation of electronic medication records in nursing or residential homes, which are still largely paper based.(42) There will then be scope to explore medicines reconciliation and MO to improve the safety, quality, and efficiency of care in this sector, which is crucially needed, as research has shown that a large proportion of medication errors occur in care homes.(43)

5.3 Usable Information

Participants frequently referred to the need for shared data to be usable, and some key areas were mentioned around (a) enabling workflows across care settings and (b) population health management.

Many participants felt that interoperability should enable better data sharing and information transfer to support clinical handover workflows. There were hopes that digital tools could support more efficient working, for example by sending a coded list of a patient’s medications from one system to another so that a clinician only has to *“go click, click, click, and it populates the prescribing system”* (Pharmacist, 010) with the most recent prescription rather than transcribing this information. A GP also felt this functionality would be useful adding that *“the ideal for me [him] (...) is that the medication comes down as a coded message that is readable by the computer and it can check it against the existing medication and then highlight the differences”*. He *“would rather it over highlighted, so it notes that we have prescribed, I don’t know, sertraline 50 milligrams, twice a day, two tablets. The hospital have said sertraline, 100 milligrams once a day and it highlights that difference”* (GP, 006). Additionally, to support better interprofessional working and better continuity of care, participants thought it would be good if they could send a *“request where you’ve got specific things that you want following*

up” (Pharmacist, 010) alongside any information and context about a patient’s medication directly between systems, such that any actions could be identified and actioned from within the system they were working in.

Participants also discussed how development of a comprehensive shared patient record could serve as a “population health platform” (Pharmacist, 002), it would then be possible to “start interrogating the information at a patient level, but [also] at a population level” (Pharmacist, 002). Local areas would then be equipped with the information to target public health challenges such as “overprescribing, opiate prescribing, valproate [prescribing in pregnancy]” (Pharmacist, 002). For example, one pharmacist noted how individuals who move into a care home are particularly prone to medication related issues because “if you’re on four blood pressure tablets, you don’t take them and you end up in the care home and suddenly you get 100% compliance, you’re going to feel really ill really quickly, aren’t you?” (Pharmacist, 016). Therefore, new care home residents should be targeted for a medication review, however the current challenge was identifying which patients to review with limited resource available.

“The detail is really important. If you’ve got 100 Primary Care Network pharmacists delivering a structured medication review every year or so, that’s 1,000 reviews a week. How do you know which 1,000 patients put in for those slots? How do you caseload? That’s really important.”
(Pharmacist, 016)

Patient data repositories could enable clinicians to develop robust searching strategies to identify patients more efficiently, to avoid “each practice pharmacist going out and trying to design their own searches” (Pharmacist, 013). It was clear that there are significant opportunities arising from more effective data sharing and as one pharmacist remarked- there are likely innovations that healthcare professionals haven’t even started to dream about. The NHS England Transformation Directorate have identified the need to overcome challenges associated with collecting and analysing data for secondary use and have emphasised the importance of adopting consistent terminology and standards for data. Clear and aligned governance approaches are also needed to permit use of the data for a range of purposes from direct care to secondary uses including, audit, service improvement, population health and research.

6.0 Recommendations

This research has identified a number of key recommendations and areas of further work that are applicable to the digital tools and the healthcare system as a whole and are summarised in the table below. This includes considering factors necessary for development of an effective patient centred consolidated integrated health record, prioritising the local adoption of medication standards across NHS organisations within the region, and addressing any digital gaps. There is also a need to identify a shared future vision for pharmacy services and support realisation of this through appropriate strategic workforce planning and funding arrangements. The number of digital systems in use across the region to optimise medications should also be reviewed and rationalised, there should also be an emphasis on monitoring, identifying and sharing evidence of good practice across the region through targeted approaches to ensure all stakeholders are aware of their responsibilities and how these can be accomplished.

Digital Tool	
Recommendation	Specific Objectives
Development of a patient centred consolidated integrated health record	<p>In-depth exploration of concerns around data sharing and governance considerations with key clinical, and IT stakeholders, and patients and members of the public.</p> <p>Creation of local multi-stakeholder working groups to ensure effective team-work and 'buy-in' from the start of a project.</p>
Adoption of medication standards across NHS (i.e., dm+d and SNOMED CT)	<ul style="list-style-type: none"> • Identify what is the level of dm+d adoption across the region. • Explore the local facilitators and barriers to adoption of standards • Prioritise communication around need to adopt standards locally • Support sites through the transformation process, utilising tools from NHSX/ Faculty Clinical Informatics (FCI).
Address 'digital gaps' across region	<ul style="list-style-type: none"> • Community Pharmacy access to GNCR and explore need for a tailored solution • Digitisation of social care e.g., implementation of ePMA in care homes • Adoption of digital solutions across NENC region's hospitals
IT System and NHS service management	
Identify the future vision for pharmacy services	Support realisation of the vision through appropriate strategic planning and funding arrangements e.g., Community Pharmacy Contractual Framework
Rationalising number of systems and services to reduce unnecessary repetition	<ul style="list-style-type: none"> • Mapping process to identify services provided across sectors and highlight duplication & gaps • Identify clinical services that would benefit from digitisation in the community pharmacy sector and to support service provision and service management/ audit
Development of frameworks and minimum standards outlining how services should be delivered using digital means at a local and national level.	Monitor guidance and toolkits from NHS organisations (e.g., NHS Transformation Directorate) and publish updates, bulletins, organise workshops to increase awareness of an organisation's responsibilities and share lessons from across the region.
Working with suppliers to develop integrated solutions to avoid unnecessary development of bespoke solutions	<ul style="list-style-type: none"> • Share lessons across organisations about successful collaborations with suppliers on innovation projects. • Harness insight from existing projects to support scale up of innovations (e.g., broadening use of BeetrootCOMMUNITY to wider number of medications)

Table 1: Recommendations arising from the report relating to digital tools and IT system and NHS service management

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