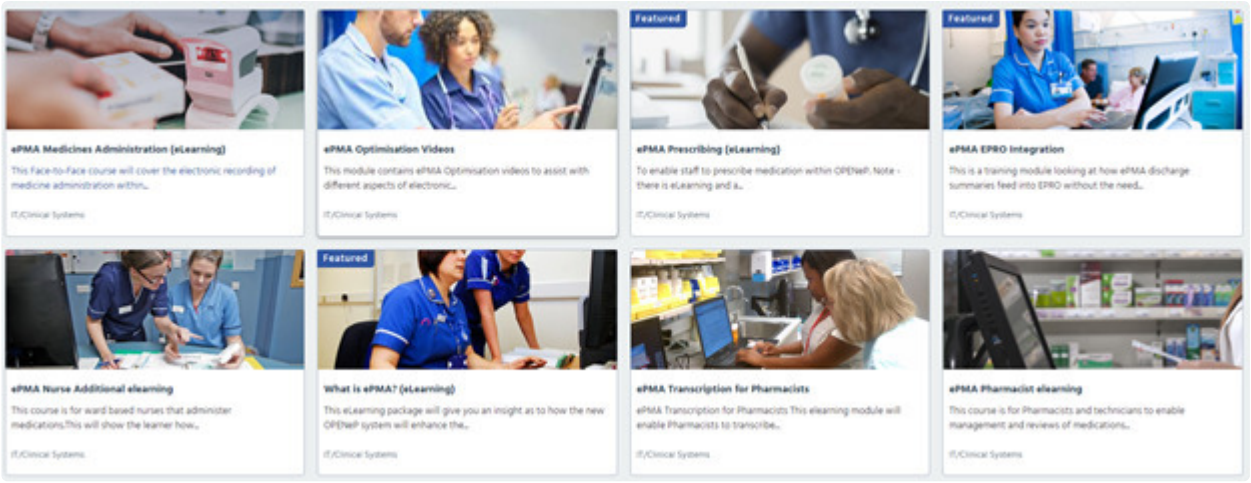
Blueprint

The Utilisation of dm+d Native Digital Clinical Systems

By utilising dm+d the Trust is able to unlock the benefits of interoperability between clinical systems. This includes the elimination of transcriptions of medications from ePMA to our electronic discharge summaries and improved medicines ordering through electronic ordering and integration with the pharmacy stock control system.

In addition to interoperability benefits, utilising dm+d natively for our ePMA system (Better Meds) allows for structured application of the UK default rules for medicines structure without having to configure it ourselves and allows for application of specific configurations to be applied to different levels of prescribing and allows for the customisation of drug files without changing the underlying data structure.



Last updated Kasia Janowska 6 Aug 2021

Background & Context

Organisation Description

Somerset NHS Foundation Trust (''the Trust'')provides care and specialist services for around 544,000 people across Somerset. The Trust covers the acute secondary care setting, community hospitals and mental health. The acute hospital has over

630 beds across 34 wards and 15 operating theatres with community and mental health covering 3 GP practices, 13 community hospitals (covering 190 inpatient beds) and 7 minor injuries units. It provides secondary care services for adult surgery and medicine, paediatrics, oncology, critical care, emergency medicine and maternity as well as a number of specific specialist regional services. The Trust employs over 9,000 staff.

Project Overview

In the last 2 years, there has been a national drive towards making digital systems interoperable in order to minimise medication errors at transfer of care and inpatient medicine supply as well as enable the delivery of new digital functions such as the secondary care electronic prescription service. Underpinning all of this work is the need to work to a defined standard for the structure of the messages that are sent between systems – dm+d (dictionary of medicines and devices) is this standard used for the coding of medicines. SCCI0052 outlines the requirements that a dm+d enabled system must adhere to in order to support interoperability involving the latest FHIR standards.

Utilisation of dm+d standards for the native structure of medication files to unlock the benefits of interoperability between digital systems including:

- Removal of transcription from ePMA to discharge documents.
- Improved speed of ordering and dispensing, reducing the time it takes for medicines to arrive on the ward for discharge through integration with the pharmacy stock control system.
- Ability to provide outpatient prescriptions to the electronic prescription service.
- Alignment of drug files to clinical decision support.

In addition to the benefits of interoperability, the utilisation of dm+d allows for greater configurability of drug files without changing the underlying structure. As a result, this has brought the following benefits:

- Application of UK core rules for drug file structure without having to manually configure each file.

Easier configuration of drug files to improve adherence to prescribing standards e.g. forcing prescribing to brand.

Why the Blueprint is important

Having a structured medicines dataset through the utilisation of dm+d equips the Trust with the potential to achieve its goal of producing a truly interoperable shared care system for medicines management across the county by allowing the sharing

of standardised medicines data between care settings and systems. It enables key drivers in the improvement in transfers of care around medicines by enabling integration between our ePMA system and our discharge prescriptions which provides an accurate list of medications and the changes that have taken place whilst in hospital. It will also be a key enabler to future work such as the ability to directly pull GP prescription data into the ePMA system to speed up and improve the accuracy of prescribing on admission.

Baseline data for the accuracy of our discharge summaries showed that only approx. 30% of were produced with no errors relating to medication changes since admission. Through utilisation of dm+d to share structured data with our discharge summary system, it is thought that we can increase the accuracy of our discharge summaries. A brief audit on discharge summaries utilising the integration with ePMA has shown that there are no inaccuracies in the prescription data provided from the ePMA system to the discharge summary, however due to inconsistent use of the medicines reconciliation function within our ePMA system, the change status of prescription items is often inaccurate and the integration is only being used approximately 50% of the time, highlighting the need for users to utilise all elements of the system and have a focus on accurate data entry (rather than speed of completing a task) to truly realise this benefit.

By having our drug files structure in line with dm+d standards, we are also provided a great level of configurability to enhance our ePMA system. We are able to create specific clinical decision support alerts at each dm+d level, force AMP prescribing (where indicated) and improve user experience through renaming drug files without changing their underlying properties allowing for interoperable working despite having non-aligned drug names (amongst other things).

By utilising dm+d we are adhering to NHS guidance on digital data standards and enabling our Trust to be able to move forward rapidly with future developmental work in the field of digital medicines.

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Technical Prerequisites

Digital systems that utilise medicines data in the dm+d format or at a minimum are able to configure drug files to have dm+d codes assigned to them.

GDE Blueprinting Team

Development Lead:

David Chalkley - Associate CCIO (Chief clinical information officer), Clinical Delivery and Innovation Lead and Clinical Safety Officer.

Subject Matter Experts:

Digital Medicines Lead (Pharmacist)

Pharmacy System's Manager (Pharmacy Technician)

IT Development Manager

Executive Sponsor:

CCIO

Director of Strategic Development

Planning & Preparing

System Selection

Why?

The needs of both the organisation and the wider health system is ever evolving with an increasing emphasis on the transfer of care and associated information across the integrated care system. A clear vision for a future state of digitally enabled care was key to defining our needs, which ultimately underpinned system selection. There was significant emphasis placed during system selection on capabilities that would enable a long-term vision that was not solely focused on the existing bricks and mortar-based model of care.

System selection incorporating interoperability, standards adoptions and “enabling capabilities” enabled a weighted assessment of future potential alongside the immediate needs of a hospital.

With the core of provider level digitisation complete, there selection of a standards-based, interoperable solution has allowed project focus to pivot to the integration of medicines data across the care system in a way that will connect care solutions, eliminate transcription, consolidate provider records and unlock system wide analytic potential.

Who?

The determination of needs, structuring of the system selection process and coordination of completion was managed as follows:

An EPMA Steering Group was formed and led by the (EPMA) Project Lead (originally recruited as the EPMA lead) for the digital team in collaboration with the Trust CCIOs and CNIO, and supported by the Project Manager. This comprised of a broad range of stakeholders, including technical leads for the Trust.

The system needs were split as defined below, **Note:** specific emphasis was placed on integration.

Specification	Document lead	Reviewers

EPMA functional	Project Lead (Pharmacist)	Clinical Leads, EPMA Steering Group
Technical Infrastructure	Technical Lead	Programme manager
Technical Integration	Integration Lead	Technical lead
User access and security	IG Lead	Technical lead
Service management and support	Systems manager	Programme manager
Implementation	Programme manager	Project manager

This translated in into the following weighting criteria during the system selection process:

Criteria	**Weighting**
User acceptance - usability	20%
Functional integration*	15%
Technical integration	15%
Implementation	15%
Customer - supplier partnership	10%
GDE alignment	10%
Benefits	10%
Product development	5%

*Although functional integration sounds technical, this relates to workflow and the ability for clinicians to meaningfully contextualise different clinical data within EPMA

processes and EPMA data within other systems.

How?

During a market research stage prior to initiating the formal procurement process project leads had identified a number of potential enabling capabilities through discussion with other Trusts, subject matter experts (such as central teams) and gleamed from demonstrations.

Technical leads provided accurate descriptors of integration need and expectations and clinical leads supported in providing a narrative to translate this into practical examples to share with wider teams. Co-developing a broader vision beyond just the particular needs of any given area of staff group was a significant enabler for the multidisciplinary group that support system selection as it helped align everyone with a future state rather than just a “here and now” need.

At the time of system selection, document production, national guidance and specification standards were still relatively immature by today’s standards, if this exercise was to be repeated there is significant resource available from the central team (NHSx and NHS digital) that would be used to base need around, thus avoiding and potential inadvertent localisation of integration need.

Key Learnings & Advice

- Ensure the **future vision of digitally enabled care looks beyond the boundaries of your health organisation**, the future of safe, high quality care will be dependent on seamless care transition and an ability to support the needs of the patient outside of traditional care boundaries.

- Ensure **senior clinical leadership are invested** in a digital transformation vision that meets future needs.

- **Make dm+d compliance a critical and non-negotiable componen**t of system selection, without this you are significantly limiting the integration potential of your organisation.

- **Make adoption of core medication FHIR resources critical and non-negotiable** component of system selection, without this you are significantly limiting the integration potential of your organisation.

Key Decisions

- We chose to place significant emphasis on a future vision, **centred on interoperability rather than immediate functional need.**
- **We embedded technical teams within the system selection process and co-created a vision of integrated care**.
- **We invested in significant market research and knowledge share** with others, ensuring that we had learnt from the experiences of colleagues across the NHS.

Artefacts & References

- See GDE blueprint "Conceptualising and Initiating an Effective EPMA Project" for additional details on system selection taken by this Trust.

Initial Drug Dictionary Configuration

Timeframe: 11/18-01/19

Why?

This activity was done for 2 main reasons:

1. To make the vast quantity of dm+d data more streamlined and usable for the clinicians that will be using the system. By completing this activity you are able to reduce the number of initially selectable drug files (through application of the Trust's formulary and stockholding) and ensure that drug files have all appropriate routes configured for them and appear in the appropriate section of the drug chart.
2. To improve the quality of data that is obtained from the ePMA system regarding the use of drug files with specific properties e.g. formulary adherence, missed doses of medicines that are deemed critical, unlicensed medicine/route usage etc.

Who?

Primarily completed by the ePMA Lead Pharmacist and Pharmacy Technician in the ePMA team. Support was obtained from the Pharmacy Department for an extract of the Trust's online formulary.

Oversight of the task fell to ePMA Lead Pharmacist.

How?

A spreadsheet containing all currently available VMPs (virtual medicinal products e.g. Paracetamol 120mg/5ml oral solution) and AMPs (actual medicinal products e.g Calpol Infant 120mg/5ml oral suspension) in the dm+d dictionary was provided by the ePMA supplier. Within the sheet, those completing the task were able to define whether the medication was formulary, what the default route of administration should be, if any additional routes were required to be configured, if any drug files or routes were unlicensed, if the drug was a critical drug or if the drug was a blood product.

To complete these configuration elements required a digital copy of the Trust's formulary, knowledge of various unlicensed clinical practice and an understanding of what drug file would be a blood product or a critical medication. The criticality of a medication was defined previously by the Trust Pharmacy department and so this list was transposed into the dm+d spreadsheet. To maintain accurate configuration status in relation to formulary, criticality etc. a Digital Medicines Improvement Group was established with representation from the Pharmacy department to ensure updates agreed by the Trust were reflected in the ePMA system.

To minimise the amount of data entry required, it was agreed that where a VMP was flagged with a particular property, this should also be inherited by their associated AMPs unless otherwise specified (e.g. to force AMP prescribing of particular medicines).

This was an arduous task with approx. 8 weeks of time allocated to completing it between the 2 clinicians and because there was only one "master" spreadsheet with such a large amount of data, it became very difficult to both be working on it at the same time. To this end, the spreadsheet was split into two separate documents to be worked upon (with one person taking the top half and the other the bottom so as to not duplicate work), however looking back, it may have been worth using a web-based spreadsheet to allow simultaneous working on the document.

Key Learnings & Advice

- Whilst **engaging with whoever maintains the Trust formulary**, this would be a prime opportunity to ensure that they provide regular updates on changes to the formulary, as the ePMA team may not be informed of them otherwise, which will make system maintenance more difficult.

- Ensure that if this task is done between more than one person, that both are **fully aware of how the document is to be completed** and which sections they are completing so that there aren't configuration conflicts.

- **Be aware of what reports may need to be done** and what the impact on the end user is based on this data to stress the importance of getting this right.

- **Don't overcomplicate things** by trying to match drug files to formulary and stockholding, this will create too much overhead maintenance in the future.

- **Don't worry about getting all additional routes configured at this stage** as you will undoubtedly encounter others throughout deployment and BAU that you weren't aware of, focus on the common ones e.g. medicines via gastroenteral routes or injections that can be used orally, any others discovered can be added at a later date.

Key Decisions

- **We chose to primarily focus on VMP drug files** rather than both VMP and AMP (with notable exceptions that had to be prescribed at AMP level) to speed the process up.

- We could have taken a copy of another Trust's configuration, however **formularies aren't usually matched between Trusts.** Instead we used the other Trust's configuration as a template for our own to speed up the process.

Artefacts & References

- Blank dm+d data spreadsheet (note dm+d files in this were accurate as of Sept 2018)

Implementing

Practical Implication

Timeframe: Ongoing

Why?

This step ensures that the dm+d dictionary is set up to optimise the end user experience whilst also providing assurance to the Trust that the ePMA system's configuration can be altered to respond to incidents that may have occurred and lead prescribers down the preferred, safest route of prescribing.

By having a standard, structured dataset to work through that the Trust has the ability to configure themselves, it can make optimisation of the system easier and application of warnings easier to manage e.g. if you needed to identify all drug files for a particular drug to add a warning to, it is structured in such a way that this is a simple task.

Who?

The ePMA team are all trained in making the end changes to the system, however the governance and decision making around changes that should (or shouldn't) be made is comprised of a 3-tiered governance structure:

1. The Digital Medicines Improvement Group (DMIG) – this group handles most immediate requests for changes from end users that have little to no wider impact on clinical safety e.g. the addition of an extra route in the system for a particular drug file and maintenance of formulary status. This is comprised of representation from: the various ePMA user professionals (senior prescriber, senior pharmacist and senior nurse), clinical safety, testing and training, the improvement team, the ePMA team, the pharmacy dispensary, the formulary pharmacist and from the database/clinical informatics team.
2. The Digital Medicines Board (DMB) – this group would be the ones that determine the actions that should be taken in response to clinical incidents that the ePMA system could mitigate against and also provides the steer for functional developments as well as providing assurance and escalating issues to the Medicines Governance Committee. This is comprised of CCIO and Associate CCIO representation, the ePMA Lead Pharmacist, the IT Technical Lead for digital and representation from the Medicines Governance Committee.
3. Medicines Governance Committee - A pre-existing committee that provides assurance to the Trust on matters relating to medicines management, governance and safety.

How?

Feedback from various professionals on what is working in the system and what might need to be changed is received via 2 main routes: emails to a shared ePMA inbox and feedback from end user representation at the DMIG which meets monthly. These requests are reviewed at the DMIG and actioned where appropriate (be that action to make a configuration change, refuse the change or escalate the decision higher to the DMB).

Where requests are simple changes to the dm+d dataset (e.g. an additional route is required to be configured) these are actioned by a member of the ePMA team without the need for approval from the DMIG/DMB. Where requests may have a wider, significant impact on end users/system (e.g. an additional drug file needs to be added to the dm+d dataset or an additional warning is required to be added to all of a particular drug type in response to an incident or configuration edits to improve quality of life for one speciality may have an impact on another e.g. dose unit adjustments for paediatrics) then these decisions will be discussed and approved at the DMIG.

Changes are actioned via the ePMA system's configuration module. From this module, the dm+d standard data for each VTM, VMP and AMP is presented and can be added to, removed or edited in order to improve quality of life. Within this data set, all elements of dm+d data can be altered and additional data can be added to various elements. All changes are actioned in a test environment first before being applied to the live system.

Key Learnings & Advice

- **Establish the governance structure in advance of deployment,** this will help you in determining some of the data configuration that needs to be in place prior to go-live and provide assurance that the system is configured in line with how the Trust wishes it to be (or at least have agreed it to be) rather than sitting squarely on the ePMA team to make some of those potentially difficult decisions.

- **Utilise feedback** received from users during the pilots to establish where configuration may need to be changed in advance of a wider rollout and continue to gather that feedback throughout business as usual.

- **Ensure that during your system selection process you establish that there is a structured but also highly configurable drug file dataset.**

Key Decisions

- **Ensuring the right level of representation and expertise in the governance structure**. We needed to ensure that those present would be enabling the development of the ePMA system and also providing information that could not be readily obtained by the digital team themselves. We could have easily selected a nurse from within our team to represent the nursing body; however it was key to us to ensure we had someone who was actively

working with the system on the wards to provide legitimate feedback.

- **Determining the roles of the various governance groups** – we could have had a single group however this would have meant prolonged monthly meetings reviewing everything together when actually the majority of day to day configuration work did not need the CCIO and other senior clinicians to be aware of.

Artefacts & References

- Example of the configuration module structure and possible configurable items
- Digital Medicines Improvement Group ToR

Optimising User Experience

Timeframe: Ongoing

Why?

The need for staff to be able to use and adopt best practices in the system was paramount to the trust.

Staff adoption of training ensured safe transition from paper based prescribing and administration through to a dm+d compliant web based software improving medicines safety. The full functionality of the system is explored to prevent misuse, i.e. Dictionary of Medicines and Devices training was incorporated within the wider ePMA training, and not as a separate issue.

Who?

This was led by the Systems manager, with assistance from Training team lead. Training structure and content was defined by Systems Manager. Content was added to framework by training team member and reviewed and signed off by the System manager prior to going to delivery group for final review. This process was repeated for each module.

How?

The modules are aimed at specific user groups to build understanding of the usage of the system and the benefits it can bring to both staff and patients. The modules

are:

- What is ePMA

A ten minute walkthrough of the platform and ePMA system aimed at all members of the hospital staff force. This is more of an overview than an intense training session.

- Prescriber Training and Assessment

Demonstrates system usage focusing on using dm+d mapped products to safely prescribe medications using decision support and configured warnings. Highlighting the different levels of prescription that could be utilised within the dm+d structure and the pros and cons of using each e.g. prescribing at VTM (virtual therapeutic moiety e.g. “Paracetamol”) allows seamless route changes if doing IV to oral switch, but comes at a cost of not being product specific say for patients that require an oral liquid preparation due to poor swallow.

Completion of the assessment allowed for a record to be generated and appropriate role in the system assigned.

- Medicines Administration Training

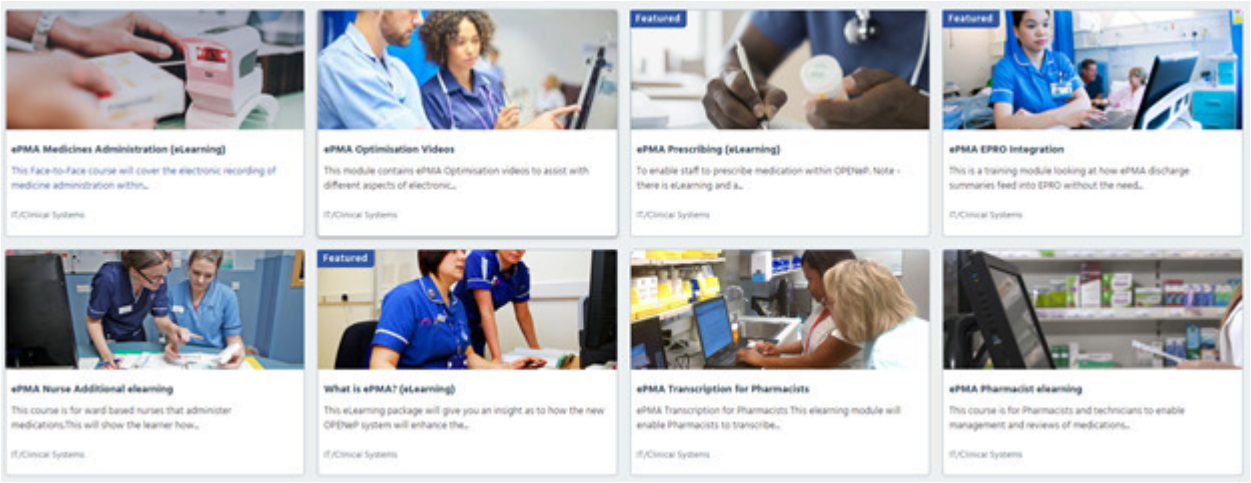
Showed the nursing teams how to record dm+d and SNOMED CT mapped allergies in the system. As well as demonstrating how to administer a medication in the system and record additional information.

- Pharmacist Training

Used to show how to review medications prescribed on the electronic chart and refer any clinical findings back to the prescriber.

- Optimisation Videos.

Used to give quick snapshots of new functionality and difficult scenarios or frequently asked questions of the ePMA team.



An additional module was made available after phase one of roll out which allows for the interoperability between the discharge summary within the ePMA system and the discharge summary software to remove the need transcription of medications.

Key Learnings & Advice

- **Listening to user feedback enabled rewriting and reformatting of information** held in the training courses and optimisation videos to increase uptake.

- **Face to face** clinician training on a clinical system cannot be completed without clinical support (i.e. a clinician familiar with the ePMA system) due to the nature of the system and the complexity of the processes delivered through it.

- **Time allocated to training is short** in the current climate and as such it is essential that either training is concise, yet explanatory of all features relevant to the professional completing, or that the Trust invests in ensuring staff are trained to the fullest by providing time to complete comprehensive training in the system.

- **The training is made up of screenshots and as such it is imperative the users are aware that a click must be completed exactly as instructed.**

Key Decisions

- **Format of learning** – eLearning as preference then face to face

optimisation.

- **Additional optimisation videos** for new functionality or frequently asked questions. Short YouTube videos 1min 30 maximum.

- **Reconstruction of eLearning** based on feedback from clinicians and length of time taken to complete.

- **Changing the format** so that users can pop in and out of training modules without having to complete in a particular order, allowing for knowledge refreshers.

Interoperability Workstreams

Timeframe: Ongoing

Why?

In parallel to the ePMA main deployment workstream, we established a number of parallel workstreams, focused on laying the foundations for future interoperability potential. These were:

- Discharge medication lists – FHIR enabled population of discharge summary from separate ePMA system.
- Translatable medication orders – FHIR enabled ordering from ePMA to Pharmacy Stock Control (PSC).
- Regional Medicines Platform – FHIR enabled transfer of structured medicines data between providers.
- Secondary Care to EPS – FHIR enabled integration of secondary care ePMA into the EPS system.

At the time of workstream initiation it was recognised that several of the enabling technical capabilities, namely the underpinning FHIR resources and standards were still in development. However, the organisation identified the need to establish these workstreams early for the following reasons:

1. To ensure that the project would be able to unlock this capability at the earliest possible point.
2. To proactively support central teams in evaluating and defining provider need.
3. Engage supplier(s) in discussion as early as possible so that they could factor this work into their road maps.

Who?

Workstreams were established by the associate CCIO (Pharmacist) overseeing the digital medicines strategy.

Each workstream was supported by the ePMA project manager and the IT Development Manager (Technical Lead), with a working group established to support delivery. The membership of these working groups was expanded as the solutions matured and progressed towards a deployable endpoint. The IT Development Manager and/or a clinical member of the project team have also supported any corresponding national workstreams via NHSD or NHSX, providing stakeholder representation and feedback.

Suppliers are encouraged to participate directly in both the local workstreams and national delivery groups. Fortunately, suppliers have taken a proactive approach to engaging with this agenda and as such have had significant roles to play in shaping the outcomes.

How?

The creation of these workstream has been facilitated by the following enabling capabilities:

1. Selection and use of digital medicines that are dm+d compliance
2. Selection of systems and suppliers that have the capability and willingness to interoperate with other systems and develop to the latest interoperability standards (FHIR)
3. Investment in internal capabilities and expertise to lead and facilitate interoperability discovery sessions

Working groups have been established since the signing of the ePMA system contract as it was recognised that the journey to the realisation of a fully interoperable record would be long and complex. Most workstreams met at least once a month and several of the groups meet on a near weekly basis, the frequency of the meetings has been dictated by the speed of progression and the complexity of the work.

Progression of each working group is dependent on accurate and timely communication between stakeholders, this is coordinated by the project manager in most instances, although it is important to ensure that technical leads, suppliers and the national teams have direct communication channels and are not inhibited by overly formalised structures and communication processes.

Key Learnings & Advice

- **Interoperability ambitions would be nearly impossible without dm+d compliance;** this is critical to any sustainable ambition.

- **Suppliers need to be engaged as early as possible** with regards to future interoperability aims, as development timeframes are not quick.

- **National teams have made significant progress in maturing the FHIR standards and have a raft of support available for suppliers and NHS organisations.**

Key Decisions

- **Starting interoperability workstream early.** This may have consumed resource away from some of the shorter-term ambitions of the project but it ensured that the Trust was in a good position to take advantage of interoperability opportunities when they arose.

- **Selecting a system that uses dm+d natively for their drug files**. This has saved countless hours/days/weeks of dm+d mapping.

- **Investment in knowledgeable technical resource** as part of the project team has enabled our programme to be well represented at national discussion and provide meaningful contributions to the shaping of technical delivery.

Artefacts & References

- See GDE blueprint "Conceptualising and Initiating an Effective EPMA Project" for additional details on system selection taken by this Trust.

Sustaining

Innovation Opportunities

Timeframe: Ongoing

Why?

An aim of the Trust digital programme has been to facilitate and support innovation within digital. A vision for a future state of digitally enabled care remains a focus of the digital medicines strategy and therefore a component of supplier and system selection has focused on the future potential of systems and the underpinning technology capabilities that they have.

Innovation within the digital health space is considered important not only to improving the safety and quality of care, but in also unlocking the potential for seamless care transition, facilitation of care and monitoring in patients' homes and the associated empowerment of patients to self-manage, supported by personalised intuitive technology.

The Trust has therefore actively sought to collaborate with innovators within the digital medicines space.

Who?

The identification of innovation opportunities within the digital medicines space has been led by the CIO, CCIO and Associate CCIO (aCCIO) (pharmacist) and consists of the following primary mechanisms for identifying opportunity:

- Collaboration with regional academic centres and formalisation of partnership.
- Frequent contact and discussion with national medicines leads.
- Contact and networks established through the NHS Digital academy .
- Exploration of opportunities and partnerships with suppliers.

Potential opportunities for innovation are initially managed by the CCIO or aCCIO with any formal approval for incorporation with the digital project portfolio taken via the Digital Programme board.

How?

The process for any innovation opportunity varies depending upon the nature of the project. However, the process below is illustrative of how an innovation opportunity has progressed from introduction to realisable solution.

1. CCIO introduced to an innovation hub leader as part of NHS Digital Academy.
2. Follow up discussion identified a shared interest in problem solving within the digital medicines space.
3. aCCIO visited innovation and research hub to share ideas and look at design research within medicines clinical decision support.
4. aCCIO identified a potential collaboration opportunity between suppliers based on overlapping problem space and underpinning use of dm+d standards and

FHIR.

5. aCCIO facilitated a meeting between innovation hub and ePMA supplier.
6. Suppliers explored opportunities and collaboration potential. NOTE: This was only possible due to the use of shared standards (dm+d & FHIR).
7. aCCIO facilitated onsite workshop with suppliers to explore problem space.
8. Clear and deliverable innovation opportunity identified.
9. Inclusion into digital portfolio formally requested via Programme Board.

Outcome: The Trust has the opportunity to be first of type pilot site for a new CDS tool as a result of this interaction, the majority of the work and risk falls to the suppliers.

Key Learnings & Advice

- **The use of dm+d and FHIR has been key to unlocking multiple innovation** opportunities as interested innovation partners do not need to create bespoke/localised solutions

- **Creating the "space" for innovation is key to its success**, without investment and time to take it forward delivery is very difficult.

- **There needs to be the capacity for, and acceptance of failure.** Not all innovation opportunities will materialise into delivered solutions, but nearly all will deliver learning that can be built upon.

Key Decisions

- **Provide digital leaders with sufficient time and scope and opportunity to explore options,** ideas and potential partnerships away from the day to day delivery of projects and digital strategy. This investment has unlocked a wide range of potential that would otherwise not have been available

- **Choosing technology with a future state potential,** i.e. not just for today. The future of sustainable healthcare will be dependent of technology that is interoperable, patient centred and supports personalised self-management. The technology decisions that we have taken as a Trust have not created barriers to that future state.

Maintenance of dm+d Dataset and Configuration

Timeframe: Ongoing

Why?

For the vast majority of interoperable work relating to drug information, it requires the various systems that are utilising the data to be aligned and to be up to date. Although there is functionality within the ePMA system to produce an unstructured prescription when the dm+d dataset is not up to date, this comes at the cost of poorer data quality for reporting purposes, a negative impact on the efficiency of the prescriber and the potential introduction of ambiguous prescriptions.

By not maintaining the dm+d dataset you can also introduce clinical risk where systems that rely on dm+d data to work appropriately do not function correctly e.g. a misalignment between the clinical decision support dm+d dataset and the ePMA system dataset.

Who?

This process is completed by the IT technical team and a member of the ePMA team. Oversight of the process sits with the ePMA lead pharmacist.

The dm+d update data and a spreadsheet containing the dm+d data set (and the changes that will be made to existing drug files) is sent from the ePMA supplier/ implementation partner.

How?

Monthly dm+d data sets are compiled and provided by the ePMA supplier for the drug dictionary data. These are then imported into the system by the IT technical team and synchronised with the existing drug dictionary via the ePMA configuration module by a member of the ePMA team.

Once synchronised, the upload is interrogated for any potential suboptimal configuration that may have been introduced by the data set e.g. a new enema product is included that has the default dose of “mg” instead of “enemas”. If any subsequent configuration changes are required, these are then made by a member of the ePMA team. The downside of this process is that identifying suboptimal configuration is very difficult to do in advance of the synchronisation process and even when it is identified in advance, there is no way to make the relevant changes to the dataset until the synchronisation process is done; therefore there is a short period of time where users could be presented with suboptimal (and therefore potentially confusing/ambiguous) drug data when prescribing. This can be mitigated by identifying affected drug files during the dm+d upload to the test

system prior to taking the dm+d dataset upload to the live environment.

The time taken for this activity varies depending on the amount of data that is to be synchronised, if done monthly, the synchronisation process takes approximately half an hour.

Key Learnings & Advice

- **Try to (wherever possible) to take the updates monthly,** as the process becomes much longer the more data you have to upload (you can't skip a month, and uploads have to be done chronologically).
- **Ensure that when updating the dataset** for the ePMA system (drug dictionary), **you have any other systems/functions that require dm+d codes to be aligned** (e.g. clinical decision support and pharmacy stock control) with your drug dictionary, otherwise you will start getting errors/ functionality not working.
- **Ensure the impact of not keeping data sets aligned is understood** and articulated in any clinical safety documentation.
- **Ensure that users of the system are trained** in how to prescribe when a dm+d drug file is not available and are aware of the risks associated with this process.

Key Decisions

- **Frequency of dm+d dataset updates.**
- **How best to identify and correct suboptimal data.**

Data Analysis

Timeframe: Ongoing

Why?

Having the medicines data natively in a dm+d format helps in the timely analysis of prescription data as data can be grouped together based on their dm+d hierarchy or based on their structured nomenclature.

All prescription data is aligned to the dm+d structure and therefore it is very easy to

interpret drug usage compared to free text prescribing. It also allows us to readily identify where the free text prescribing function is used, which in turn allows us to make configuration changes/ target training based on these system interactions.

By having the potential to group prescribed medications by hierarchy or other characteristics the Trust are able to identify prescribing trends, how some decision support warnings are being interacted with, (potentially running data analysis via robotic process automation) and ultimately use the data to improve the care that is provided to patients.

Who?

Data analysis is done primarily by the ePMA team with assistance from the database analytics team; however the reporting dashboard can be made available to anyone who wishes to use it for analysis of prescription data.

Validation of the data presented is done by the ePMA prior to releasing access to the data to other clinicians to ensure reported data/ data analysis activities are based on accurate data.

How?

A reporting dashboard was created by the Trust's database analytics team to allow interpretation of prescription data held within the EHR platform's reporting database. This data is automatically updated every 24hrs by the ePMA system.

Through the use of the reporting dashboard, the ePMA team and clinicians are given access and are able to extract the data into a variety of formats for point of care analytics, trends analysis and clinical research.

Key Learnings & Advice

- **Ensure there is sufficient dedicated database analyst resource** to create a tool to present the data collected by the ePMA system.

- **Engage with stakeholders (clinicians and suppliers) early** to identify reporting needs and use this to influence improvements to the reporting functionalities provided by the ePMA system.

- **Consider including in your ePMA business case the need for a dedicated clinical informatics team** to run reports and interpret prescribing data on behalf of the Trust as this is not something that the ePMA team will have time to do themselves.

Key Decisions

- **Which reports to focus on initially** – this can be done through identifying current paper-based reports that could be better captured through structured ePMA data.

Artefacts & References

- An example of reporting data extracted to look at whether the dose unit of risperidone needed adjusting based on any prescription errors identified

Benefits & Outcomes

Core Capabilities

Transfers of care

Enables standards-based integration unlocking the following estimated non-cash releasing benefits release (depending on system and maturity):

>90% reduction in transcription during medication history taking and discharge.

>50% reduction in time taken create medicines on admission list.

(Not yet realised, ongoing interoperability work required)

Medicines Management & Optimisation

Configuration of drug dictionary via dm+d ensures reduced time configuring drug files and allowing for prescribing links only to medications contained in the database enabling formulary conformity and reducing unknown drug prescribing.

dm+d enables the consistent build of drug files and addition of relevant documents to medications to enable safe administration to patients.(inc monographs)

Enables interoperability between systems allowing for future deployment of closed-loop administrations.

(Non-cash releasing, partly realised)

Decision Support

1. Able to tailor decision support alerts to different levels within the dm+d structure to reduce alert fatigue
2. Can utilise dm+d structure to attach clinical guidelines to drug files (inc. BNF links)

(Non-cash releasing, realised)

Clinical & Business Management

1. Easier production of structured reports and dashboards
2. Up to date drug files (provided dm+d data set is updated regularly) meaning reduced time configuring new drug files and up to date decision support (provided decision support is kept aligned to the latest dm+d update)

(Non-cash releasing, realised)

Interoperability, Data & Standards

Local data-sharing

Utilisation of dm+d enables future sharing of drug data between care settings which is expected to improve efficiency and accuracy at the points of transition between care settings, thereby improving the care that can be provided to patients.

(Non-cash releasing,ongoing interoperability work required)

Open APIs

Enables full FHIR resource utilisation.

Provides standardised integration mechanisms based on national s=data standard for development of future APIs.

(Non-cash releasing, realised)

Structured data

Data structured in a standardised format facilitating consistent adherence to clinical data structures.

Enables consistency of data mapping and linkages across care settings for the purposes of data analysis.

(Non-cash releasing, partly realised – local data analysis)

SNOMED CT

Using dm+d enables integration with SNOMED CT defined clinical systems e.g. clinical decision support to provide improved decision making information to clinicians at the point of care.

(Non-cash releasing, realised)

dm+d

dm+d native ePMA systems can be integrated with other systems utilising dm+d data (e.g. Pharmacy stock control systems) to provide seamless information between systems thereby improving accuracy of tasks through elimination of transcription exercises which in turn reduces potential harm to patients.

(Non-cash releasing, partly realised – only integrated with our electronic discharge summary system so far resulting in the elimination of transcription errors in discharge summaries when the integration is used.)

System Transformation

Integrated care

Unlocks the potential for data sharing and direct re-use between care providers, eliminating the need to re-key information.

Enables evolution of the regional medicines platform concept beyond “view only” to bi-directional data exchanges and a consolidated medicines record view.

(Non-cash releasing)

Reducing unwarranted variation

Having a dm+d based drug dictionary allows for consistency of prescribed items allowing for accurate reporting against prescriptions.

A dm+d native system also allows for consistency of drug alignment with the nationally accepted drug dictionary and standardised nomenclature for prescriptions across the organisation creating clearer prescriptions for staff.

Both of these points improve the safety of patients and the Trust’s ability to identify trends in prescribing that could have interventions made to improve patient care.

(Non-cash releasing, realised).

Care and Operational Delivery

Resource Sustainability

dm+d allows for quick updates of the drug dictionary in the ePMA system reducing workload on the ePMA team through the removal of manual drug file creation.

Depending on how the drug dictionary is curated, initial loading of drug file configuration can be done in bulk instead of against each individual drug file.

(Non-cash releasing, realised)

The **digital version of this document** is available on FutureNHS, the national sharing platform for the health and social care community. **https://future.nhs.uk**