Rendering of a Consolidated Medications Record

September 2023

Professional Guidance

FACULTY OF CLINICAL INFORMATICS

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Glossary

Acronyms used	Expansion
ADR	Adverse Drug Reaction
AMP	Actual Medicinal Product
CMR	Consolidated Medication Record
dm+d	Dictionary of medicines and devices
FHIR	Fast Healthcare Interoperability Resources
NPSA	National Patient Safety Authority
OTC	Over The Counter (medicines)
SNOMED CT	Systematized Nomenclature of Medicine Clinical Terms
VMP	Virtual Medicinal Product
VTM	Virtual Therapeutic Moiety

Contents

Purpose

1. This first iteration of professional guidance is for those designing and implementing a Consolidated Medication Record (CMR).

2. The definition of CMR in this guidance is a contemporaneous and accurate list of medicines an individual is taking in the community, which is assembled from more than one source. The CMR includes adverse drug reactions of which allergies are a subset.

3. The intent is that whilst the display will be human readable, it is underpinned by fully interoperable components. For example, this will allow the content of the record to be re-used during admission to hospital processes without the need to rekey information.

4. This guidance is for CMRs that will be used as part of the delivery of front-line care and users who have a knowledge of medicines management and are familiar with medicines lists.

5. The three initial information sources identified as being required in this iteration are medicines information in:
   - Primary care records
   - Medicines at transitions of care that are taken in the community but not yet prescribed in the primary care record (e.g., medicines on discharge from hospital)
   - Specialist medicines taken in the community but not prescribed in primary care[1] (e.g., chemotherapy medicines, 'Biologics', Homecare, Clozapine, Methadone, Outpatient-only medicines)

6. This guidance will describe core definitions and underpinning processes for rendering medication information in the health domain as a starting point. Further iterations should build from this point, through consolidating learning from multiple settings and with participation of all concerned parties. Due consideration should be given to the users, user interface and sources of medicines information in the development and design of CMRs.

[1] Implementation guidance will be required to identify appropriate and on-going medicines information.

Context

7. The primary objective of a CMR is to improve patient safety, acknowledging that due to the complexity of modern health and care delivery, any care record may not contain all an individual's medicines information.

8. The aim is to deliver a set of principles that should be adhered to when system vendors are creating and rendering CMRs to avoid unsafe variations; therefore, this iteration of guidance has been co-designed with clinicians and vendors. **The aim is for continued collaboration for future iterations.**

9. This guidance aims to lay out professional requirements related to safety and usability, owned by the professions, and expressed in clear English. It is not intended to act as either technical or user guidance.

10. It draws on existing standards and work across the UK and internationally.

11. It has been commissioned by NHS England, but as FCI is UK wide the consultation has been across the four nations with the aim of the guidance being applicable across the UK.

12. The guidance has been developed with input from clinical informaticians and vendors working with CMR early adopters and with Subject Matter Experts. Our thanks to all those who provided input to the work. Appendix D lists those involved.

Current Scope

13. Currently the CMR is the record of prescribed medication only. The scope does not at present include information on whether medications have been dispensed, administered, or bought over the counter. Nor does it cover whether patients have actually taken medication as prescribed. This is due largely to current limitations in the source systems. However, in the future, additional sources of medication information such as pharmacy records and patient portals may be relevant to include.

14. The following is in the scope of this version:

    - Rendering a CMR view for use by clinicians in an acute or community setting.
    - Current medications only.
    - Adverse drug reactions, which includes drug allergies.
    - Human readable display of medication.

15. The following are out of scope, at this stage:

    - Historic medications. Whilst they are important, further work is needed before recommendations can be made. Although out of scope for this version, in the short-term local approaches are being taken by early adopters through local configurability and local agreement.

- Records of medications prescribed during a hospital inpatient stay.
- Records of medications administered.
- Reconciliation of medication information (e.g., dose-based calculations, side effects vs. allergic reactions.).
- Vaccines, due to the complexity of immunisation scheduling, time limitations, considerations for child health records and self-administration in some circumstances.
- Medications accessed by patients for example bought over the counter (OTC) from a pharmacy, private prescriptions.

Sources of medicines data for consideration for inclusion in a CMR

16. The main sources of medicines data which it will be feasible to include in a CMR are general practice systems, and secondary care systems, including outpatient, hospital discharge and emergency department prescribing.

17. Other sources can be considered as soon as it is feasible to do so, such as urgent and emergency care centres, walk in centres, community pharmacies, dentists, optometrists, homecare services, drug and alcohol, and sexual health services.

18. As further information can be received from pharmacies about the dispensing of medicines, concordance data, or the over-the-counter medicines taken and submitted by the individual, this can also be taken into consideration in the future.

Definition of current medication

19. Regardless of the health care setting, 'current medication' is the totality of the medication that has been prescribed for the patient and which it is intended that the patient should now be taking. This also fits with the World Health Organisation's definition of a 'Best Possible Medicines History'.
    - This should include medications prescribed in general practice, on discharge from hospital, and outpatient prescriptions. As further digital prescriptions become available, they should also be included, e.g. drug and alcohol services.
    - It excludes inactive medications that may have been prescribed in the past and which it is NOT intended that the patient should now be taking, and all acute inpatient medications.
    - When looking at medications prescribed in general practice, this includes both single issue (acute) prescriptions and repeat prescriptions (the set of medications that would typically be re-authorised as multiple issue).

20. See appendix A for a detailed definition of current medication pertaining to general practice systems.

Medications with long-acting clinical effects

21. Some medications have ongoing clinical effects extending beyond the medication period, which should be taken into account in current clinical decision making but fall outside the definition of current medications given above. Such medications could have been prescribed in any health care setting, and may include depot injections, hormone-releasing implants, vitamin B12 injections, biologics such as Rituximab or certain chemotherapy agents.

22. At present there are no defined inclusion criteria for such medications and in the absence of such criteria they are at the time of writing deemed out of scope. Further work is needed to establish these criteria (see Recommendations for Future Work section below).

CMR content

23. This guidance is relevant for CMRs that are primarily for community use, supporting the handovers of responsibility for prescribing that take place on admission and on discharge. The display will be human readable but the aim over time should be, as far as possible, for this to be underpinned by fully interoperable components that will allow the content of the record to be re-used, for example during admission to hospital processes. See appendix B for more technical information about interoperability components.

24. Where a patient is on current medications, or has adverse drug reactions recorded, these should be displayed in distinct sections. In the table below the elements that must, should or could be displayed in medication or adverse drug reaction lines are enumerated. The definitions for Must, Should and Could are as follows:

    - **Must** – element must be included in every medication or adverse drug reaction line
    - **Should** – element must be included in a medication or adverse drug reaction line wherever the information for that element is available
    - **Could** – element may be included in a medication or adverse drug reaction line wherever the information for that element is available

25. We know that the direction of travel is for all information about medications being transferred across the health and care system to be coded wherever possible using dm+d with messaging and integration by means of agreed UK core FHIR standards. Therefore, wherever possible, we have mapped the elements required to existing FHIR resource nodes with the intention that their precise definitions will be exactly as stated for the related FHIR resource nodes. (See appendix B for details).

26. **Note that there is an overarching professional requirement that all elements necessary to fully support prescription including dose syntax must be made available to the CMR.**

They should be in a form that is processable as far as possible while understanding that there will be elements that are unstructured. As the utility of the CMR develops it is expected that unstructured elements will increasingly become structured and processable. It is possible to provide a clinically useful CMR without every element of the record being structured at the outset. We would therefore advocate starting now with simple rendering and over time building on this incrementally

CMR: Elements that must / should / or could be included in every medication line to meet professional requirements[2]

Must – element must be included in every medication line
Should – element must be included in a medication line wherever the information is available
Could – element may be included in a medication line wherever the information is available

Element	Must/Should/Could	Notes
Medication Name	Must be included	Display name / original term text for drug name
Medication Form	Should be included for VTM or Trade Family name. Not required for AMP or VMP.	
Route	Should be included	
Dose Instruction	Must be included	Original human readable dose instruction as created at the time when prescribed
Additional Instruction	Should be included where available	Supplemental instruction or warnings to the patient
Status	Should be included	Current options available include: Active / stopped / completed
Supply Type	Should be included	Current options available include: Continuous long-term therapy / short course (acute) therapy / Continuous long term (repeat dispensing)

[2] Please see paragraph 25, above. Detailed implementation guidance will be needed, particularly around the coded and uncoded information available.

Element	Must/Should/Could	Notes
Start date	Should be included	
Stop date	Should be included where available and relevant	
Responsible prescriber	Should be included	The individual / their role / organisation responsible for prescribing
Last issued date	Could be included	
Last dispensed date	Could be included	When prescribed product was handed out
Source of information	Could be included	Currently only includes 'prescribed at GP Practice' or 'prescribed by another organisation' but this is extensible and should include generic settings, for example, prescribed in outpatients, prescribed at discharge, prescribed in ED, etc.

See appendix B for more information on currently available FHIR resources.

Adverse Drug Reactions (ADR)

27. The term ADR is used to encompass any adverse drug reaction, including allergic drug reactions in recognition that the distinction between these terms is poorly captured in existing clinical practice and information systems.

28. Therefore, ADRs that have been recorded in CMR source systems will include a wider range of reactions than just drug allergies. Also, these records may not be complete or accurate. Clinicians are advised to validate ADRs with the patient and other sources. If no ADRs are recorded it should not be assumed that there are no ADRs.

29. ADRs should be displayed as recorded in the originating system, by source.

30. **No attempt should be made to reconcile them automatically**.

31. Not every source system will use the same information models so information such as severity may not be present. Additional items such as free text comments (which may indicate severity) should be displayed as text.

CMR: Elements that must / should / or could be included in every adverse drug reaction line [3]

Must – element must be included in every ADR line
Should – element must be included in an ADR line wherever the information is available
Could – element may be included in an ADR line wherever the information is available

Element	Must/Should/Could	Notes
Causative agent	Must be included	Display name / original term text for causative agent name
Date of most recent event	Should be included	
Status	Should be included	Intended to provide indication of certainty about propensity for a reaction to the identified substance
Clinical symptoms and/or signs that are observed or associated with the adverse reaction event	Should be included	Clinical symptoms/signs associated with the ADR event
Notes about manifestation	Should be included	Additional text about the adverse reaction not captured elsewhere
Severity	Should be included	Intended to provide indication of level of risk to patient
Source of information	Should be included	Source of the information
Comment	Should be included	Any other structured information must be brought across as a text string and included in the rendering.

[3] Please see paragraph 25, above. Detailed implementation guidance will be needed, particularly around the coded and uncoded information available.

User interface

32. The National Patient Safety Agency – 'Design for patient safety Guidelines for safe on-screen display of medication information' was published in 2010 and remains extant for the majority of uses in discrete systems. It is recommended that an extension to this be produced to cover the rendering of multiple sources of information into a CMR.

Recommendations for further work

33. This section provides recommendations for further work. These have taken account of the outputs from the workshops and survey (see appendix C). They are organised into short term (those which are a priority and can be completed relatively quickly) and longer-term actions (which will take longer to carry out and will necessarily evolve as experience of implementation progresses).

34. FCI representatives on the UK FHIR board will support work to update any FHIR resources.

35. **Recommendations for short-term action**:

- Extend and update the NPSA guidance 'Design for patient safety Guidelines for safe on-screen display of medication information' to cover the rendering of multiple sources of information into a CMR.
- Clarify responsible prescriber and source of information. Distinguish which information should be used to meet the professional requirements for:
    - Responsible Prescriber (which could be said to relate to Provenance) and
    - Source of Information (which could be said to relate to the type of organisation that is the source of the prescription)

The FHIR elements to which these are mapped seem to offer a number of options.

- Ensure that all relevant FHIR components are available within the required resources. The current expectation is that CMRs will obtain information using the MedicationStatement resource. There are six elements that are listed in the requirements that are not carried in MedicationStatement but are available in other FHIR resources. Guidance/resources must be updated to ensure that these are available and hence to avoid incompatibility where different solutions adopt different implementations of this resource. The elements are:
    - Medication Form
    - Supply Type
    - Responsible prescriber
    - Last administered date (could be deferred to longer term)
    - Last dispensed date (could be deferred to longer term)
    - Source of Information (as above)

- Clarify what information is covered by the AllergyIntolerance FHIR Resource and details for rendering this information in the CMR
- Ensure that human readable dose string content is mandatory for all messaging

36. Recommendations for longer-term action:

- Structured dose syntax. Continue to identify all the elements essential to support structured dose syntax and identify the means of making these safely available to CMRs as work progresses on delivery. Note that visualisation of the CMR can be achieved now without this.

- Extend guidance to cover semantic interoperability and related safety aspects. Provide clear guidance for system configuration and use to ensure that translation between dose and product-based prescribing is managed in a safe and consistent manner.

- Clarify definition of 'medications with long duration of relevance to clinical safety'. These are medicines that have a clinically relevant pharmacological effect that extends beyond their time of prescription and final dose that would not be considered 'current'. Examples include chemotherapy agents and biologics. There are several components required:

    - Definition required
    - List to be compiled in a computable form, maintained and published
    - Determine how to render in CMR

- Status (of ADR line) - refuted and entered in error. Thought should be given to how these FHIR vocabulary options should be handled as it could be confusing if the context was missed, i.e. that it is safe to give the medication.

- Develop further guidance for other sources of prescribing information and use cases as they become feasible to include in CMR. These include the items deemed out of scope at this stage and other sources and use cases (for the full list see appendix C)

Appendix A | Detailed definition of current medications in general practice systems

The source of the definition below originates from an AAH Meditel document dated July 1998, which provides a definition of current medication. This definition has been updated with reference to current general practice systems.

Broadly current medication will encompass acute and repeat medications which can be defined as follows:

Acute (single issue) Medication is current if:

- A prescription has been issued with an end of medication period date set but the end date for the medication period has not yet passed.
- If a prescription has been issued within the last 2 years, but with no end date.

Repeat Medication is current if:

- The number of prescriptions authorised is greater than number issued and there is no end date set for the medication period
- The number of prescriptions authorised is greater than number issued, and the medication period end date is on or after the index date (e.g., today)
- The number of prescriptions authorised is zero or null and there is a medication period end date which is on or after the index date (e.g., today)

For any of the above a repeat medication will NOT be considered current unless:

- The authorised date or last issued date is within the last two years (whichever is later)
- In the GP domain, medications are clearly identified as being either Acute (single prescription issue) or Repeats (multiple prescription issues). For repeat medications some systems can count the number of prescriptions issued and allow the user either to set a maximum permissible number of prescriptions or else a date after which no further prescriptions may be issued – or a combination of both. For systems that have no means of counting the number of prescriptions issued the above definitions should still work if the prescription count component is ignored – i.e., as follows:
    - There is no end date set for the medication period
    - The medication period end date is on or after the index date (e.g., today)
    - For any of the above a repeat medication will NOT be considered current unless:
    - The authorised date or last issued date is within the last two years (whichever is later).

Appendix B | Technical definition of CMR content – medications and adverse drug reactions

The purpose of this appendix is to provide clear definition for all the elements required for medication and adverse drug reaction lines in the CMR by reference to FHIR resources which are well established national / international standards. Note that this reference is purely a device to provide clear and unambiguous definitions for this professional requirement. Precisely how these resources might actually be employed in real world implementations will be down to those developing solutions. It should be further noted that whilst the Consolidated Medication Record display will be human readable, it should be underpinned by fully interoperable components. For example, this will allow the content of the record to be re-used during admission in hospital processes.

CMR: Elements that must / should / or could be included in every medication line

Must – element must be included in every medication line
Should – element must be included in a medication line wherever the information is available
Could – element may be included in a medication line wherever the information is available

NB Links in table may change. Please use description to find appropriate site (Simplifier.net) if link broken

Element	FHIR element	Must/Should/Could	Notes
Medication Name	MedicationStatement.medication For details: Go to Simplifier.net page for UK Core Release 4	Must be included	This is a codeable concept with reference to UKCoreMedicationCode. The requirement for rendering is the associated display name / term text or plain text
Medication Form	Medication.form For details: Go to Simplifier.net page for UK Core Release 4	Not required for AMP or VMP. Should be included for VTM or Trade Family name	This is a codeable concept with reference to UKCoreMedicationForm. The requirement for rendering is the associated display name / term text or plain text
Route	MedicationStatement.Dosage.Route For details: Go to Simplifier.net page for UK Core Release 4	Should be included.	Route is required for VTM, form is not as useful and not typically captured. With VMP and AMP the route of administration cannot always be inferred.
Dose Instruction	MedicationStatement.dosage.text For details: Go to Simplifier.net page for UK Core Release 4	Must be included	The rendering requirement is for the full original human readable dosage text generated in the source system at the time that the prescription was created to be displayed in the CMR.

Element	FHIR element	Must/Should/Could	Notes
Additional Instruction	MedicationStatement.dosage.additionalInstruction For details: Go to Simplifier.net page for UK Core Release 4	Should be included	This is a codeable concept with binding to SNOMEDCTAdditionalDosageInstructions. The rendering requirement is for the associated display name / term text or plain text
Status	Medication.Statement.status For details: Go to Simplifier.net page for UK Core Release 4	Should be included	Active, stopped, complete etc. This is a codeable concept with binding to Medication status codes. The rendering requirement is for the associated display name / term text or plain text
Supply Type	MedicationRequest.courseOfTherapyType For details: Go to Simplifier.net page for UK Core Release 4	Should be included	FHIR vocabulary options: Continuous long term therapy / Short course (acute) therapy / Continuous long term (repeat dispensing) This is a codeable concept with binding to UKCoreMedicationRequestCourseOfTherapy (extensible) codes The rendering requirement is for the associated display name / term text
Start date	MedicationStatement.effective For details: Go to Simplifier.net page for UK Core Release 4	Should be included	Rendering requirement would be for textual representation of start and end dates respectively
Stop date	MedicationStatement.effective For details: Go to Simplifier.net page for UK Core Release 4	Should be included	

Element	FHIR element	Must/Should/Could	Notes
Responsible prescriber	MedicationRequest.requester For details: Go to Simplifier.net page for UK Core Release 4	Should be included	This is about provenance / responsibility Minimum rendering requirement is for role plus organisation but over time and depending on local implementation circumstances more specific detail could be added.
Last issued date	UKCore has extension MedicationStatementLastIssueDate For details: Go to Simplifier.net page for UK Core Release 4	Could be included	Further work may be needed to extend this to systems other than General Practice. Rendering requirement would be textual representation of date
Last administered date	MedicationAdministration.effective[x] For details: Go to Simplifier.net page for UK Core Release 4	Could be included	Not currently a professional requirement but added as a placeholder for possible future usage
Last dispensed date	MedicationDispense.whenHandedOver For details: Go to Simplifier.net page for UK Core Release 4	Could be included	Rendering requirement would be textual representation of date

Element	FHIR element	Must/Should/Could	Notes
Source of information	Possible match to UKCore extension MedicationprescribingOrganisationType For details: Go to Simplifier.net page for UK Core Release 4	Could be included	The requirement here is for the type of organisation responsible for authorising and issuing a medication (eg, GP, Hospital outpatients, hospital discharge). Currently there is: Extension-UKCore-MedicationPrescribing Organisation – available as extension to MedicationStatement with binding to UKCoreMedicationPrescribingOrganisation Currently this only supports 'prescribed at GP practice' or 'prescribed by another organisation' but this is marked as extensible. Further work is required incrementally over time to extend this

Structured dose syntax and dose instruction

Currently GP systems do not use structured dose syntax but that will change over the next few years as they become compliant with DAPB 4013 (https://digital.nhs.uk/data-and-information/information-standards/information-standards-and-data-collections-including-extractions/publications-and-notifications/standards-and-collections/dapb4013-medicine-and-allergy-intolerance-data-transfer) and records are gradually updated. In the short term, they can be expected to continue to export dose instructions as a human-readable text string – separate from 'Additional Instruction'. In contrast, hospital systems over time are expected increasingly to utilise structured dose syntax. From a clinical safety perspective, systems using structured dose syntax should provide a complete human readable rendering of that structured dose syntax and it is understood that an algorithm is available to enable that to be generated. Both GP systems and Hospital systems should populate the MedicationStatement.dosage.text element with a human readable text string representing dose, as described in the above table.

The longer-term aim is to ensure that all of the elements required to support structured dose syntax will be made available for CMRs to support translation in both directions between dose based and product-based prescriptions and further work will be done to achieve this. The initial intention, supported by this guidance, is to achieve the rendering of a human readable CMR.

CMR: Elements that must / should / or could be included in every adverse drug reaction line

Must – element must be included in every ADR line
Should – element must be included in an ADR line wherever the information is available
Could – element may be included in an ADR line wherever the information is available

Element	FHIR element	Must/Should/Could	Notes
Causative agent	AllergyIntolerance.code For details: Go to Simplifier.net page for UK Core Release 4	Must be included	Codeable concept with binding to UKCoreAllergyCode (extensible). The requirement for rendering is the associated display name / term text or plain text
Date of most recent event	AllergyIntolerance.lastOccurrence For details: Go to Simplifier.net page for UK Core Release 4	Should be included	Requirement is for date of most recent event to be displayed when available. Rendering requirement would be textual representation of date.

Element	FHIR element	Must/Should/Could	Notes
Status	AllergyIntolerance.verificationStatus For details: Go to Simplifier.net page for UK Core Release 4	Should be included	This acts as indicator of certainty for example FHIR vocabulary options: unconfirmed | confirmed indicating low level of certainty about propensity / high level of certainty about propensity Codeable concept with binding to AllergyIntoleranceVerificationStatusCodes. The requirement for rendering is the associated display name / term text or plain text.
Clinical symptoms and/or signs that are observed or associated with the adverse reaction event	AllergyIntolerance.reaction.manifestation For details: Go to Simplifier.net page for UK Core Release 4	Should be included	Codeable concept with binding to UKCoreAllergyManifestation (extensible). The requirement for rendering is the associated display name / term text or plain text.
Notes about manifestation	AllergyIntolerance.note For details: Go to Simplifier.net page for UK Core Release 4	Should be included	Annotation. The requirement for rendering is simply to display the text

Appendix C | Outputs from the CMR workshop and survey

Output from working group workshop on 24 January 2022

The output from the workshop is provided in the attached document

SMR workshop outputs v02.pdf

User groups – output from the second CMR workshop held on 28 mm,February 2022

Identify the users

List all potential users (people who will interact with the consolidated medications record directly). Mark each of these as readers, writers, or both.

User group	Readers	Writers
ED prescribers and nurses	☒	☐
Secondary Care Inpatient prescribers (doctors and non-medical prescribers)	☒	☒
Secondary Care Outpatient Prescribers	☒	☒
GP's and non-medical prescribers	☒	☒
Dentists	☒	☒
Optometrists	☒	☒
Private Prescribers(?)	☒	☒
Hospital Pharmacists	☒	☒
Hospital Pharmacy Technicians	☒	☒
Community Pharmacists	☒	?
Community Drug and Alcohol Team	☒	☒
Community Mental Health Teams	☒	?
Community nurses	☒	☐
Sexual Health Clinics	☒	☒
Prison Service (Health & Justice Services)	☒	☒

User group	Readers	Writers
Out of Hours Services	☒	☒
NHS111	☒	☐
Ambulance Service	☒	?
Maternity Services	☒	☒
Allied health professionals	☒	☐
Complementary health professionals	☒	☐
Care Home managers	☒	☐
Social workers	☒	☐
Patients/Clients / carers	☒	☐
Healthcare At Home	☒	?
Public Health Team?	☒	☐
Academia	☒	☐

Identify affected non-users

Identify non-users who will be affected by a consolidated medications record indirectly. This might be people who the users work with, or people who will benefit from the product without interacting with it directly. Make note of why/how they're affected, especially if it's not clear just from listing them.

Non-users	Why/how they're affected?
Patients	Safer care based on better information about existing medication
Society / taxpayers	Less wastage of medication, less costs from adverse effects of medication
Community Carers	Use clients patient facing record to check medication if they help patients with administration compliance
Next of Kin	As above. Reduced stress of incorrectly medicated patients following transfer of care.

Non-users	Why/how they're affected?
Administrative staff in Hospitals, GP Practices and care homes	Reduced workload supporting chasing for information when it can't be found in paper records or disparate system. Less stress trying to find urgent updates when a patient transfers from one care setting to another

Survey responses from 6 individuals, members of the working group, to specific questions to resolve around content of consolidated medication view

Please could you think about the current medications list

a. What could be the definition of current medications to be used in single consolidated medication view?

Please keep in mind that the consolidated medication view will be used in primary, secondary and community care settings. Therefore, what is strictly deemed as current in primary care may not be suitable and safe for hospital use, e.g. medication that was dispensed two weeks ago but is still pharmacologically active. What also needs to be considered for such high-risk medication that is not current but recent and clinically relevant?

i	Acute and Regular/Repeat GP medicines Recently ceased GP medicines Community Drugs team medicines e.g. methadone Current (and recently stopped) chemotherapy and associated adjuvant medicines Homecare medicines Hospital Outpatient medicines – NB these sometimes migrate to the GP and recently ceased ones – ideally pick up on tertiary centre prescribing too. Clinical Trials medicines (or at least some indication someone was on a trial Mental health prescriptions especially depot injections and clozapine Medicines prescribed in prisons Dental prescriptions Any out of hours issued prescriptions (may not be available electronically, but possibly reconciled via a community pharmacy dispensing system Some thought needs to be applied to how to view hospital and hospice discharge letters which contain prescribed medicines, which have not yet made into the GPs' records I'm not sure where OTC, herbal and 'recreational' medicines would fit as the patient is the likely source and may not be reliable

ii	Have a consistent definition of 'current medication' and enable users to seek earlier medication / modify the search if needed. All currently active repeat prescription templates, with dates last issued Acute prescriptions issued in the last year From GP source and other sources if possible Include information about structured medication reviews if available Include access to previous versions of prescriptions (e.g. if a dose instruction was subsequently changed)
iii	I would split it in two Current medications – All medications that a patient should be taking and/or have ongoing access to. Clinically relevant medications – All medications prescribed/administered/taken that may influence subsequent prescribing and/or administration decisions.
iv	This seems to be very difficult to define based on research with clinicians so far. Possible answer: Medication which does not have a stopped or end date recorded against it – problem: EPMA systems use logic to state an item is stopped and this seems to be flawed currently investigating Any item with a defined duration of treatment either course of treatment of length of activity for a depot or slow-release product where the period from initiation point+ duration length has not been exceeded – again a stopped flag could be an issue as above Repeat prescription where the number of repeats has not been exceeded and there is no stopped flag

v	Secondary care Secondary care has the option to suspend medication which we must bear in mind. Current medication = active medication – this must include anything which is temporarily suspended. STATs – these could be awaiting administration, or could have been administered and still be in the patient's system – this always prompts discussion about how long these should be considered as active. PRN medication which may/may not be taken frequently must be included. Time of last administration would be helpful. Primary care Active medication is all medication on acute and repeat. Last issued prescription date might be helpful but could cause confusion if it is assumed that this means the patient actually collected it from pharmacy. Actual collection date from the pharmacy would be more useful. GP surgeries often put antidepressants on acute so this is very important. Community – current medication Drug misuse clinics e.g. methadone, naloxone Specialist clinics e.g. dementia, clozapine
vi	A current medication list reflects the list of medications a person is currently taking. It is reflective of where a person is residing and who they are under the care of. For those people not admitted for an inpatient episode of care, the current medication list in most cases will be a combination of what is prescribed by their GP (primary care), hospital outpatient(s) and bought OTC medication. For those under the care of an inpatient episode, the current medication list reflects what they are being administered under the care of the NHS Trust. A current medication list differs from a medication history where there is interpretation required to identify what is current.

b. What would be the minimum content of current medications?

i	Not sure what this means – all of the above can still be found and captured in a medicines reconciliation session, but can take some considerable time to seek and confirm from all sources.
ii	As above (previous question)
iii	Current medications – All medications that a patient should be taking and/or have ongoing access to across care settings, including dosing instructions, intended duration/stop date, source of information, date of last update to record Clinically relevant medications – All medications not within the current list prescribed/administered within the last X weeks/months (TBD based on most reasonable scenario).
iv	Prescribed product name (active ingredient/drug/product name) Form Route of administration if defined Number of doses prescribed/qty of product Dosage instruction ideally in dose syntax but free test acceptable until dose syntax better supported Date requested (ideally date issued but unlikely to get this) Prescriber details **Point of controversy** Indication
v	Active medication which the patient has on the acute /repeat list including PRN medication. STAT medication which is prescribed and not yet given STAT medication which has been given in the last X hours Medication which is active but infrequently used e.g. PRN Medication which is suspended (secondary care)

vi	Needs to be a single list of medications which gives the end user a clear trail and view as to how this list has been compiled/calculated to be the current list. Minimum content at an individual medication level is: Start date Last issue date Stop date Medication name Dose Route Frequency Latest source of information i.e. Organisation

c. What dates are important to be displayed? E.g. dates of prescribing / dates started/ dates last given / dates of last review, etc. What else needs to be considered in terms of dates?

i	Last date of issue is the standard go to date, but when something was started can be useful, and certainly stop dates are really useful when viewing recently ceased medicines, or being able to tell when a dose has changed
ii	Repeat prescriptions: Date commenced, date authorised until, date last issued, end date or duration (if available) Acute prescriptions: Date prescribed, end date or duration (if available)
iii	Last review/update, intended stop date (if known), start date, next review (if scheduled) If dispense data available, then date of dispense If administration date available, then date and time of last administration If pharmacist review dates, then date of last review
iv	Date of prescribing Date dispensed or issued – easier in secondary care difficult in primary care but this is where linking EPS data to prescribing data would be great – was it ever received by patient? Date last administered -unlikely in community – but in secondary would be good with who administered If stopped date of last dose or date stopped – who stopped and reason why Date last reviewed (and by whom)
v	Date first commenced, whether it has been started/stopped/started ie is it continuous Intended duration Date of dispensing Date of last review (primary care)
vi	It is useful to have Encounter (Episode) start and stop dates. It is useful to have medication stop dates. As well as prescribing dates, it is useful to have last issued date.

d. What should be considered in terms of reason for starting and stopping medication (indication)?

i	THERE SHOULD BE ONE!! This is a real source of frustration to me in secondary care. We have put an awful lot of effort in our paper systems to capture the reasons for starting and stopping medicines, and changing doses, and at transfer of care (discharge) we have a good record of making this visible to GPs or whomever is next looking after the patient. It is reliant on good practice from prescribers which is infrequent. We go electronic in November and I'm going to mandate an indication field, albeit it will be free text, so not codable as the nature of starting some medicines is that a prescriber may be covering more than pone possible indication. IT WOULD BE GREAT IF ALL PRESCRIBING SYSTEMS MANDATED THE CAPTURE OF A (LIKLELY) INDICATION and forced the capture of reasons for changing doses and stopping medicines. It is how things should be.
ii	This will depend on how it is recorded in systems. There should be the capability to link to problem list items to denote the indication / reason, or alternatively a standalone diagnosis code or free text. If there is access to link to other parts of the GP record, ideally create an automatic link to the consultation in which the prescription was stopped / started so that the reason can be searched for if not explicitly stated.
iii	Where diagnosis is not confirmed it might need to be linked to a symptom or presenting complaint but need aligning to a defined condition at a later date.
iv	YES YES YES missing indication is cited by everyone I speak to!! A lot of time is spent chasing after this information as often patients don't know why they are receiving meds and at a transfer of care it seems the receiving clinician often is in the same position Similarly reason for stopping – need to remove confusion caused by EPMA algorithms wrongly attributing a medication as stopped
v	Is indication captured, and also is reason captured for starting medication Reason for stopping – clinical reason
vi	Yes, indication Also - Medication switches, ADRs, allergies.

e. What should be recorded about the provenance or source of the information?

i	In a CMR there should be a way of identifying the source
ii	Source, last updated / refreshed
iii	Ideally you would be able to establish the provenance based on the consolidated history
iv	If possible, it would be good to have timestamp of updates and a userID or user details to be able to trace who made a change
v	Which system it came from e.g. GP, clinic, ePMA
vi	Organisation name at a minimum including ODS code. Practitioner ideally as well. For episodes of care under a hospital, useful to have the lead Practitioner details (i.e. Consultant)

f. What else needs to be considered for current medications?

i	Just the full drug name, dose and frequency to be clear – and preferably in an interoperable form It would be REALLY useful to flag medicines which are Critical Medicines e.g. Parkinson's, antiepileptic, anti-rejection drugs etc. so they are high-Viz and interoperably could trigger ePR systems in ED and Admission areas to flag patients arriving who are on such medicines so dose are not omitted. Similarly displaying the anticholinergic burden (ACB)score for affected drugs will help with medicines reviews wherever a patent presents (and especially at a hospital where the adverse drug reactions of medicines with a high ACB have caused the admission)
ii	-
iii	Infrequently used items that a patient may have at home, issued historically with no identifiable period of treatment but still in use e.g. creams for dermatological conditions, pain killers kept for just in case use (possible for completely unrelated indication to what they were initially prescribed for) Current medication from currently untraceable sources – self prescribed, Private practice, paper-based clinics Important that a consolidated record identifies the sources that are actively being represented an reminds a user that further research is important

iv	Patient preference documented e.g. formulation Additional notes and expanded dosage information e.g. complex or titration dosing Type of prescription e.g. one off Origin Indication Source of supply (if available)
v	How changes of medications over time are represented. No-one will trust a black box that produces a flat list of medications that they cannot interrogate. Needs to be clear how the information is compiled. It may not be just one view / visualisation that provides this information.
vi	Consideration needs to be given to conflicts in the data such as when the patient is issued their GP repeat medication whilst they are an inpatient What are the data quality issues such as no coded information for frequency, route and dose that will make it difficult to reflect medication changes. Discontinued and changed medication not accurately reflected on discharge from hospital.

Please could you think about the definition of historical medications list

a. How would you define historical medications?

i	Anything that is no longer actively taken by the patient
ii	All medications ever recorded for the patient in the system
iii	Medications not considered to be current
iv	Any medication not currently in active use or which previously used no longer has an active pharmacological effect on the patient
v	Any medication which has been prescribed for the patient in the past regardless of whether supply was obtained or not.
vi	Historical medications is everything a patient has ever been prescribed or bought with dates of when these medications were issued.

b. What would be the minimum content of these? This should be aligned as much as possible with current medications, but are there any specific considerations?

i	The date of cessation and the reason for cessation (unless it was a short course or an acute Rx)
ii	Where prescriptions are modified, there should be the capability to store this information rather than record separate prescriptions for the changed items.
iii	Drug, dose, frequency, reason for discontinuation
iv	Pretty much all details for current medications but Stopped date – with details of why stopped and by whom End date of prescribed treatment period for course based prescribing Last prescribed date Last issued / dispensed date Last administered date (if/where possible) For depot drugs it would be great to be able to display expected end of pharmacological effect (not sure how this could be achieved)
v	Date prescribed and by whom i.e. GP /specialist/hospital Reason discontinued – may also be useful to know who discontinued it e.g GP or hospital Supply/dispensing history – relevant in primary care Last dose administered e.g. depot injections PRN medication – how frequently used/requested

vi	Everything a patient has ever been prescribed with dates of when these medications were issued. Information regarding stopped medications should also be present Minimum content at an individual medication level is: Start date Last issue date Stop date Medication name Dose Route Frequency

c. Should there be consistency between historical and current medications in terms of dates? What needs to be considered in terms of differences?

i	The main difference is you are interested in the cessation date – sometimes it may be useful to see when the ceased medicine was started e.g. if investigating an ADR
ii	Dates / display should be consistent as far as possible
iii	Ideally the only difference would be the stop date, discontinuation reason
iv	May need current clinician input on this but my view would be treat the same
v	Historical medications need to have stop date and reason for stopping, as well as start date. Also whether it was restarted and stopped etc so the user can see where the same medication was retried. Supply (dispensing) dates are important for both so you can see whether the patient actually ever had the medication in their possession. Current medications need start date and any breaks in treatment dates and reasons.
vi	A current medication list has logic to determine what is currently active. A historical list of medications could just show all medication issues. The consistency should be that a current medication list is compiled from the information contained in a medication history.

d. If these are linked to current disease process – does that impact how these are rendered?

i	I don't think so
ii	Link to problem list entry, potentially allow link to the consultation in which the medication was modified Link to a potential diagnosis based on a knowledgebase of drug indications (e.g. automatically show a diabetes medication as related to a diabetes diagnosis that the patient has)
iii	Ideally medications would be linked via VTM, disease, therapeutic class
iv	-
v	It is helpful to match medications to diagnoses so you can see which medications were started for which diagnosis. A timeline view is very useful and saves much 'legwork'.
vi	Potentially, a clinician may want to see medications grouped by therapeutic group so they can see medication changes over time. Mental health clinicians may want to see the mental health drugs separated out and again review the medication changes over time.

e. Is provenance/source required for these?

i	The same as before
ii	Yes
iii	If possible
iv	Provenance and source would always be beneficial to aid resolving queries but may not be essential for MVP
v	Yes, the source is very useful, although sometimes GP is acting on instructions from a consultant , this would be useful to know.
vi	Yes

f. Are there any other considerations of historical medications?

i	I can't think of any
ii	-
iii	-
iv	-
v	Reasons for discontinuation Supply history Allergy/intolerance Patient preference
vi	-

How should acute medications be defined?

i	Any discrete short course or once only medicine. Sometimes you see medicines marked as 'Acute'; in the GP record but when you look at the pattern of issues, they are to all intents and purposes Repeats. Not sure why this is, unless the GP is worried about someone is abusing such medicines
ii	-
iii	Medications with defined course lengths
iv	Medications which have not been placed on repeat for the patient to request again without a review first.
v	-
vi	-

Actively discontinued medications – does anything specific need to be considered around these? And their related dates and the reason?

i	Not sure what this means – but I'd always want the reason for stopping something captured
ii	-
iii	-
iv	It would be good to be able to flag active discontinuation separately from logical discontinuation
v	Some medications remain in the human body for weeks after discontinuation, which is very relevant when prescribing, so the date of administration is important. Some discontinued medications are STAT doses which are only discontinued because of their single dose nature so these need to be differentiated.
vi	Use this information to compile the Current Medication List

Special medications. What considerations should be given to specialist medications, mental health meds (eg depot injections), trial medications.

i	I've mentioned these in the first question – I think they should not be considered special – just stuff someone gets from another place
ii	Need to decide: • which medications are routinely pushed to the GP record or made available in the current meds view (e.g. depot injections, annual infusions etc.) • whether this info is pushed to the GP record (which becomes the source of truth for the medication view) or is retrieved from the source system, or both (with an ID linking the records to prevent duplicate display) • clinical community needs to curate a list of intermittent long-acting medications which are displayed in this way, alternative is for a secondary care prescriber to 'push' the medicines to the GP record. This means that a special trial medication or chemotherapy may be pushed but routine meds given in hospital are not pushed.
iii	Might consider visual differentiation based on certain type of medication (injectables or frequency > X)
iv	Depots – covered above need to ensure these are not missed because they are too far down the list but are still active (Currently working on how best to do this) Issue of how to record and share uncoded specialist drugs and trail meds – these would need some mechanism to alert if interoperable exchanges occur

v	Source of supply Origin of prescription and intended duration Who manages it e.g. monitors it Date of last administration Does patient self-administer? Who administers it
vi	That it may be difficult to obtain a clear picture as to whether they are still active or not. Information about whether they have been stopped may not be explicit.

Dose syntax. What considerations should be given to the display of dose syntax.

i	Ideally wants to be standardised, especially if intending to be interoperable
ii	Display as per source system, but eventually move to the FHIR / openEHR model
iii	Might need to consider how to display complex reducing / increasing / variable dose regimens
iv	Ideally a consolidated record would, where structured dose syntax is available, convert to the most appropriate view for the current users setting.
v	Multi-route prescriptions e.g. IV/oral/IM prescribed for the same drug used in secondary care Multiple strengths of the same medication e.g. warfarin 1mg/3mg/5mg all supplied Where brand name is important, the total dose of all the brands should be added together e.g. Tacrolimus total dose to be taken by patient is 3.5mg but must be taken as Adoport 3x1mg capsules plus Adoport 500mcg capsule. Site of administration e.g. left eye Complex dosing/loading/titrations/reducing doses Special instructions
vi	Represent this as structured information when it is sent in such a way

Allergies. What considerations should be given to the display of allergies and adverse reactions.

i	The nature of the specific reaction should be overtly displayed. Also when it occurred. PRSB requests severity is stated, but there is no national guidance on defining this – I'm going for mild (i.e. where you'd give it if you had to) and severe (where you wouldn't) as options in our ePMA system There should be a method of cancelling allergies when they are erroneous or if a re-challenge does not produce a reaction
ii	-
iii	How to handle same allergen but different albeit similar reaction e.g different type of rash How to handle conflicting records
iv	Currently under debate – at the moment the consensus seems to be – show everything that is available that way nothing will be missed– some systems require acknowledgement that these have been viewed to enable access to the meds record
v	Whether the allergy is suspected or confirmed Who entered the allergy data, source of allergy data Whether it is an allergy/intolerance/adverse reaction When it was updated and by whom
vi	-

Allergies. What is the minimum information that should be included about allergies and adverse reactions.

i	Drug (or causative agent) Classification of reaction Nature of the reaction Severity (see comments above) When it occurred
ii	-
iii	Allergen, reaction, date added to record. Ideally source Substance Reaction Severity Possibly category [drug/Food/Metal/flora/Fauna] Clinicians have suggested …Challenged, Erroneous and reason why
iv	Allergen/group of allergens Whether an allergy/adverse reaction/intolerance Allergy status e.g. confirmed, suspected Source of information Type of reaction
v	-
vi	-

Appendix D | Acknowledgements

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