Machine readable medications instructions using SNOMED CT

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SNOMED CT Expo 2019
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INTRODUCTION

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Abstract

A project was set up by NHS Digital and NHS X with the purpose of providing a way in which medication dosage information can be shared between health and care systems in a standard machine-readable format. This would enable data to be transferred and translated into the appropriate syntax allowing healthcare professionals to review and action appropriately in the receiving system.

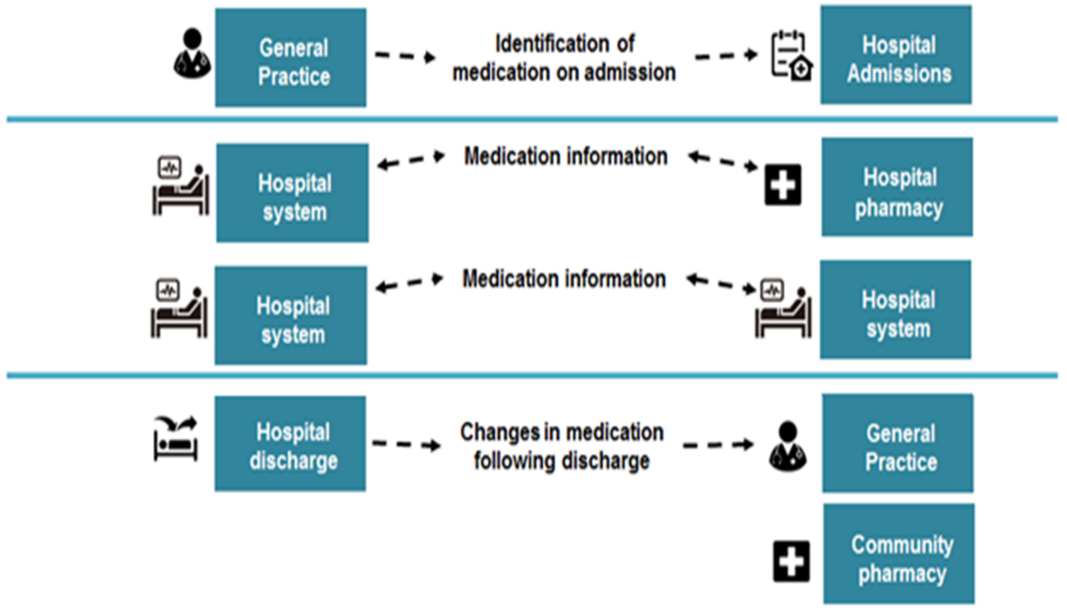
The project was focused specifically on the complexities of describing medication dosage instructions and timings in a standardised way that can be understood by different systems.The ultimate goal is to support all medication instructions however due to complexity of the subject the aim of this project was to enable around 80-90% of prescriptions to be sent in a machine-readable format.

Background

The manual translation and re-keying of data from one system to another is both a potential source of error and ambiguity as well as being resource intensive. By reducing the need for re-keying of information we should be able to provide safer care for patients and more efficient reliable information for healthcare professionals. The NHS has had the ability to send messages from prescribing to dispensing systems and from hospitals to General Practitioners for many years however up until now the medication instructions have been sent as free text.

Potential use cases for interoperable medications data.

- The communication of medications information between GPs and hospitals
- Electronic transfer of medicines information between hospitals
- Electronic transfer of medicines information within hospitals between electronic prescribing and medicines administration (ePMA) and hospital pharmacy stock control (HPSC) systems
- Hospital discharge to general practice or community pharmacy



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introduction

methods

implemen

in conclusion

SNOMED CT and the Messaging Profile

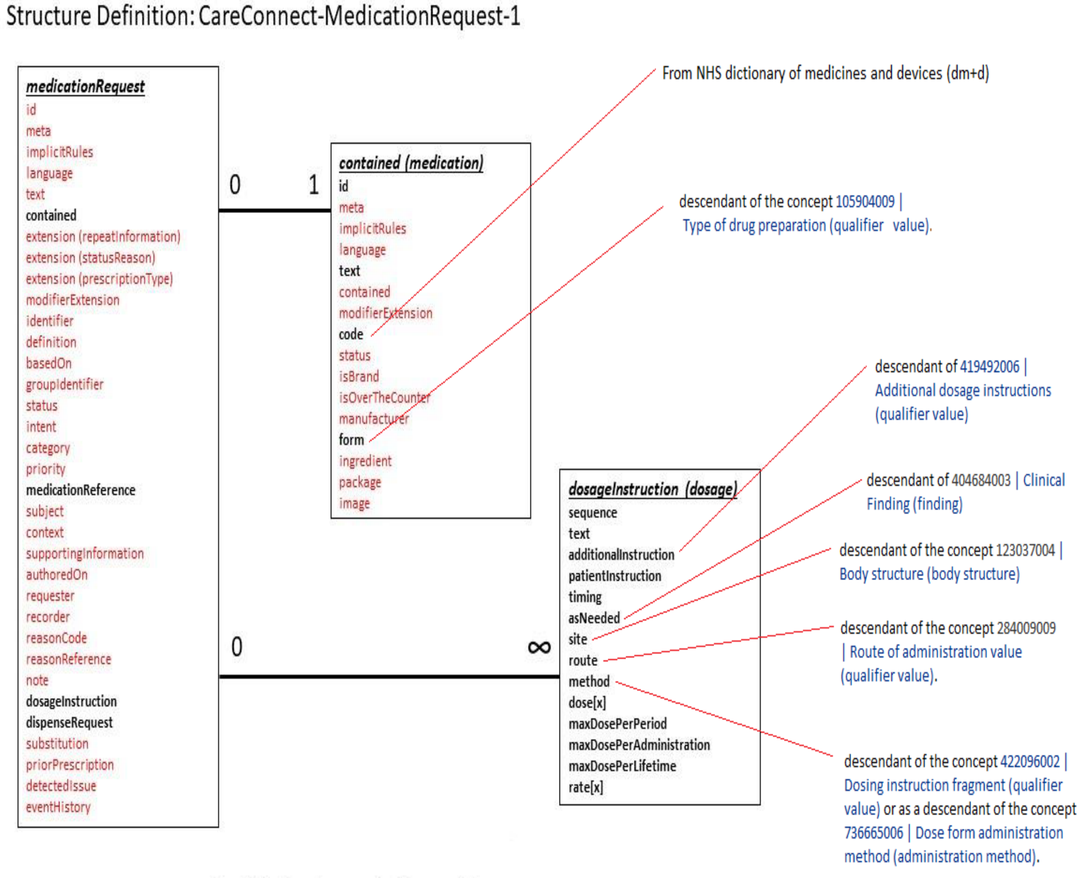
Fast Healthcare Interoperability Resources (FHIR) is a standard for exchanging healthcare information electronically and is the strategic interoperability standard between systems within the NHS. The international FHIR standard is published by HL7. A set of UK specific profiles known as the UK Care Connect FHIR Profiles which are based upon the FHIR STU3 set of resources have been developed. This project worked to develop implementation guidance focussed on the messaging of structured dosing information within the NHS in the UK

A messaging standard alone is not enough for this to work, there is also a requirement to reference other terminologies and or value sets.

SNOMED CT is the NHS Terminology of choice for clinical information and since 2003 within the NHS for drugs this has been the NHS Dictionary of Medicines and Devices (dm+d). This is a SNOMED CT coded drug dictionary that uses a fixed 5 box structure to support prescribing within the NHS. It now has extensive usage within the NHS Electronic Prescription Service but up until now all medications instructions have been sent as text strings. dm+d is expected to be the source of the Medication Item although the messaging standard does support usage of additional concept classes from the SNOMED CT UK Drug Extension as the medication item.

Data elements additional to those that identify the prescribed item may also required in the Care Connect FHIR message to support interoperable medication instructions data.

The areas where SNOMED CT content is utilised in the message to provide interoperability are shown in the diagram on the right along with the sources identified in the implementation guidance developed.



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IMPLEMENTATION

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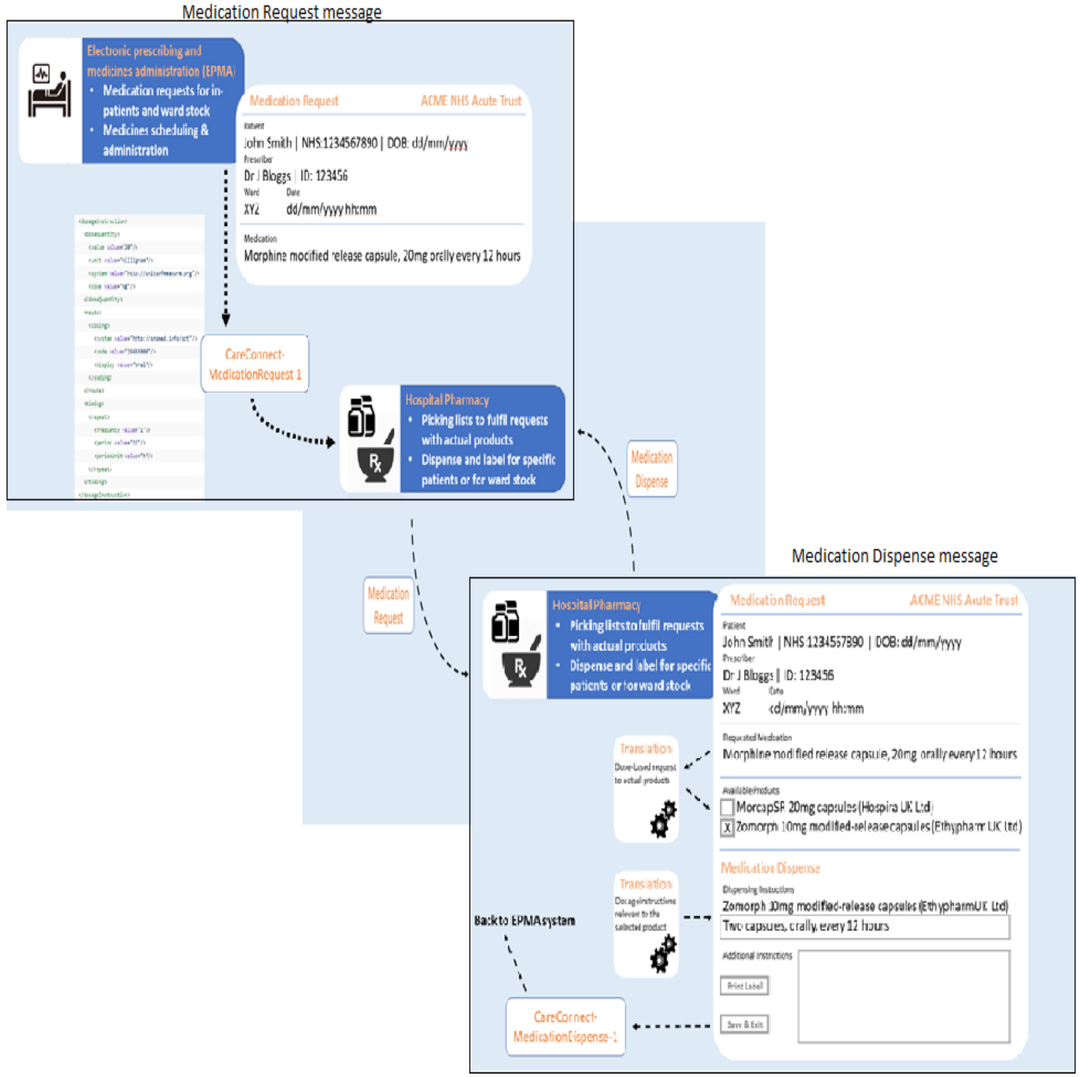
introduction
methods
impleme
in conclusion



Implementation

ePMA to Stock control

This uses the FHIR STU3 MedicationRequest message with a return MedicationDispense message.
The development work has been completed as collaboration between ePMA suppliers, pharmacy system suppliers and NHS Trusts as well as internal NHS Digital & NHSX teams. The Proof of Concept has been completed & demonstrated between an ePMA system and a Pharmacy stock control system using a cloud hosted environment. This is now being opened to other suppliers to connect and test with their systems. Implementation of First of Type is planned for late 2019

Hospital ePMA to Hospital ePMA

This uses the FHIR STU3 MedicationStatement message.

Work on Proof of Concept for Hospital ePMA to Hospital ePMA has successfully passed dose messaging between the same ePMA system as in the ePMA to Stock control work to a separate NHS Hospital Trust's 'FHIR' engine.
Next steps for the hospital transfer workstream are currently being finalised with the planned implementation of a First of Type early 2020

Approval as a Standard.

The implementation guidance for dose syntax has been approved in the UK as a Public Records Standards Body standard.

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IN CONCLUSION

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introduction
methods
implemen
in conclusion

Benefits

Removal of the need for the transcription of orders between ePMA and HPSC Systems	•Removal of potential transcription errors between the ePMA and HPSC systems. •Better communication and workflow. •Supports the timely supply of in patient medicines and hence may reduce missed medicines doses in secondary care. •Improves a trusts' digital maturity. •Supports the timely preparation of discharge medicines and hence may encourage more timely discharge of patients.
Inclusion of Structured Dose Syntax in the message	•Dose syntax can be computationally and mathematically manipulated by the HPSC System so that volume/quantity of medication over the period of the request can be derived thereby enabling better, more automated, stock control options.
The sending of a "dispense" message to an ePMA System	•Clinical staff on wards and in other areas of the hospital will quickly be made aware when a medicine / device has been dispensed via their ePMA System. This will potentially lessen the need for staff to phone pharmacies to find out the status of a medicines order.

Future Work

Translation of messages to text narrative

Further work to translate the machine-readable message and provide the text narrative is planned.

Translation of dose-based prescriptions to product

Work to support the translation of dose-based prescriptions to provide suggestions for product-based options is going forward.

Further Information

https://theprsb.org/projects/digitalmedicationinformation/

https://developer.nhs.uk/apis/dose-syntax-implementation/

https://theprsb.org/wp-content/uploads/2019/04/Non-technical-guidance-v1.2.pdf.

https://fhir.hl7.org.uk/StructureDefinition

https://apps.nhsbsa.nhs.uk/DMDBrowser/DMDBrowser.do

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