Making Closed Loop Medicines Supply a Reality

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Conflicts of Interest

- No personal conflicts of interest

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- NHSx

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- JAC/Wellsky/CMM

- Trust Teams
    - IT Integration and Server Team
    - Pharmacy Finance & IT
    - Dispensary Staff

Content

- Context
- Project
- How Does it Work?
- Lessons Learned
- The Future

What is UHDB?

- Acute Foundation Trust covering 5 sites
- Merged Trust in 2019
- 1700 beds
- Patient Population over 750,000
- 13,500 staff

Derby Sites (RDH & FNCH)
- Migrated ePMA from iCM to Lorenzo in November 2020
- One Main IP Dispensary
  - CMM Dispensing System
- > 1000 IP px items/day
- Outsourced OP Dispensary services

The Problem

Px
- Prescriber prescribes medication

Contact
- Healthcare team contacts Pharmacy to supply medication

Dispense
- Transcribe order into dispensing system
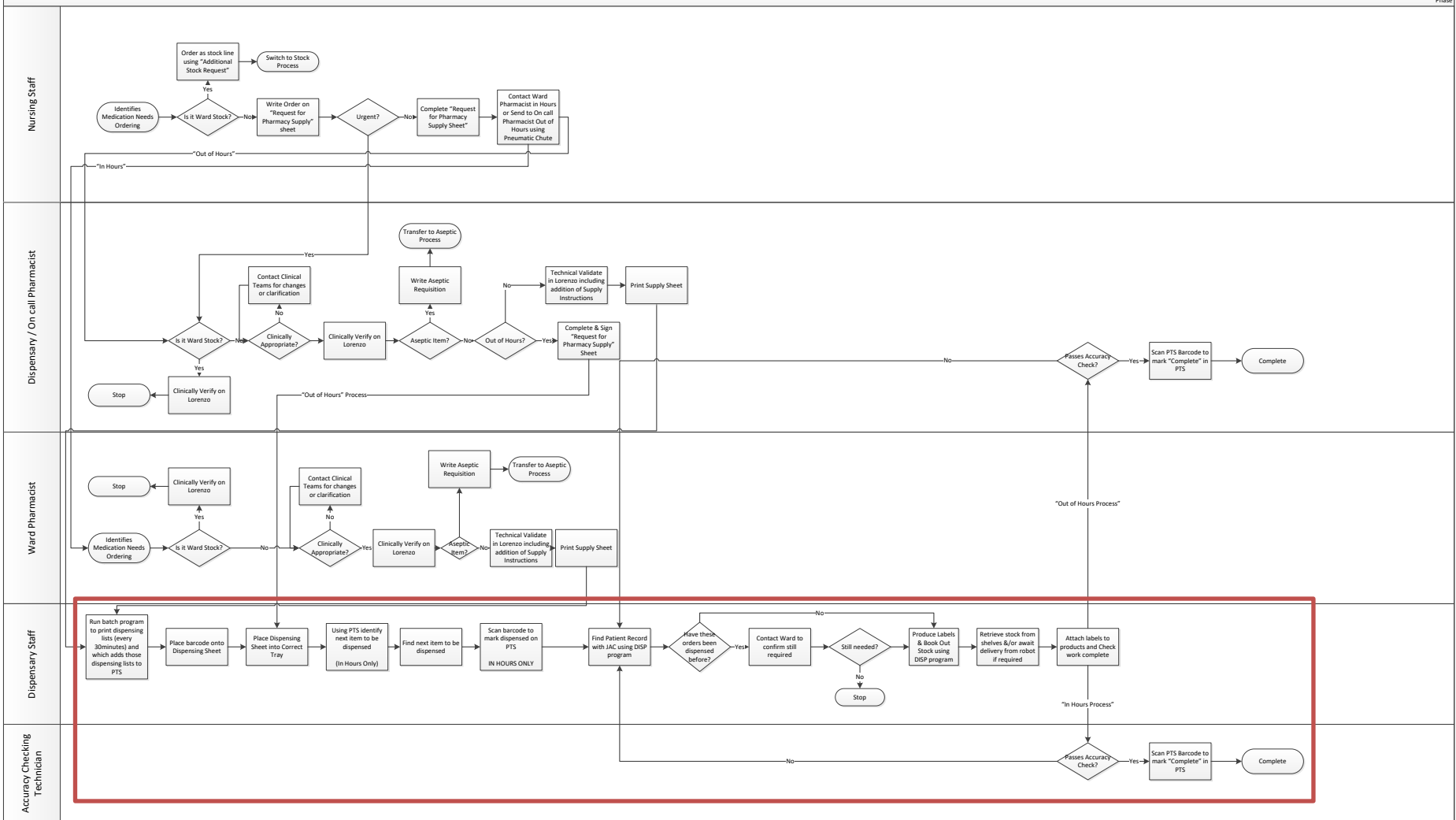- Dispense and label items

Check
- Dispensed item and label checked to ensure accuracy against the order and it meets relevant professional and regulatory standards

Process Map

NHS
University Hospitals of Derby and Burton
NHS Foundation Trust

Current Process –
Inpatient Ordering (New Medication) & Re-Ordering

Phase

Nursing Staff

- Identifies Medication Needs Ordering
- Is it Ward Stock? — Yes → Order as stock line using "Additional Stock Request" → Switch to Stock Process
- No → Write Order on "Request for Pharmacy Supply" sheet
- Urgent? — No → Complete "Request for Pharmacy Supply Sheet" → Contact Ward Pharmacist in Hours or Send to On call Pharmacist Out of Hours using Pneumatic Chute
- "Out of Hours"
- "In Hours"

Dispensary / On call Pharmacist

- Is it Ward Stock? — Yes → Clinically Verify on Lorenzo → Stop
- Contact Clinical Teams for changes or clarification
- Clinically Appropriate? — No → Contact Clinical Teams for changes or clarification — Yes → Clinically Verify on Lorenzo
- Aseptic Item? — Yes → Write Aseptic Requisition → Transfer to Aseptic Process
- No → Out of Hours? — No → Technical Validate in Lorenzo including addition of Supply Instructions → Print Supply Sheet
- Yes → Complete & Sign "Request for Pharmacy Supply" Sheet
- "Out of Hours" Process
- Passes Accuracy Check? — No / Yes → Scan PTS Barcode to mark "Complete" in PTS → Complete

Ward Pharmacist

- Identifies Medication Needs Ordering
- Is it Ward Stock? — Yes → Clinically Verify on Lorenzo → Stop
- No → Clinically Appropriate? — No → Contact Clinical Teams for changes or clarification — Yes → Clinically Verify on Lorenzo
- Aseptic Item? — Yes → Write Aseptic Requisition → Transfer to Aseptic Process
- No → Technical Validate in Lorenzo including addition of Supply Instructions → Print Supply Sheet
- "Out of Hours Process"

Dispensary Staff

- Run batch program to print dispensing lists (every 30minutes) and which adds those dispensing lists to PTS
- Place barcode onto Dispensing Sheet
- Place Dispensing Sheet into Correct Tray
- Using PTS identify next item to be dispensed (In Hours Only)
- Find next item to be dispensed
- Scan barcode to mark dispensed on PTS IN HOURS ONLY
- Find Patient Record with JAC using DISP program
- Have these orders been dispensed before? — No / Yes → Contact Ward to confirm still required
- Still needed? — No → Stop — Yes → Produce Labels & Book Out Stock using DISP program
- Retrieve stock from shelves &/or await delivery from robot if required
- Attach labels to products and Check work complete
- "In Hours Process"

Accuracy Checking Technician

- Passes Accuracy Check? — No / Yes → Scan PTS Barcode to mark "Complete" in PTS → Complete

CLMS Philosophy

"Best of Breed"

- Lots of bespoke software very good at what it does
- Requires interoperability to work effectively
  – Requires messaging to allow information use in other systems
  – Manual transcription if not done well!
- Separate teams for each software product
- Derby sites approach

"Vertically Integrated"

- Single vendor provides all modules AND handles integration
- Usually allows use of information from one part of the system in any other
- Requires a much more integrated approach to configuration and team setup
- Burton sites approach

What did we hope for?

Px
- Prescriber prescribes
- Computer delivers relevant alerts from FDBE catalogue

Pharmacy
- Verify the prescription is safe/effective/appropriate
- Select appropriate product to dispense
- Confirm products required for dispensing

Dispense
- Automatic transmission of the order into Pharmacy system
- Human picks next item to dispense from pick list in Pharmacy system
- Automated label directions from Medication request message

Check
- Use of barcoded checking system
- Human checks product against "Supply Sheet" from ePMA if fails

Distribution
- Nurse comes to the hatch to collect

What Does it Look Like?
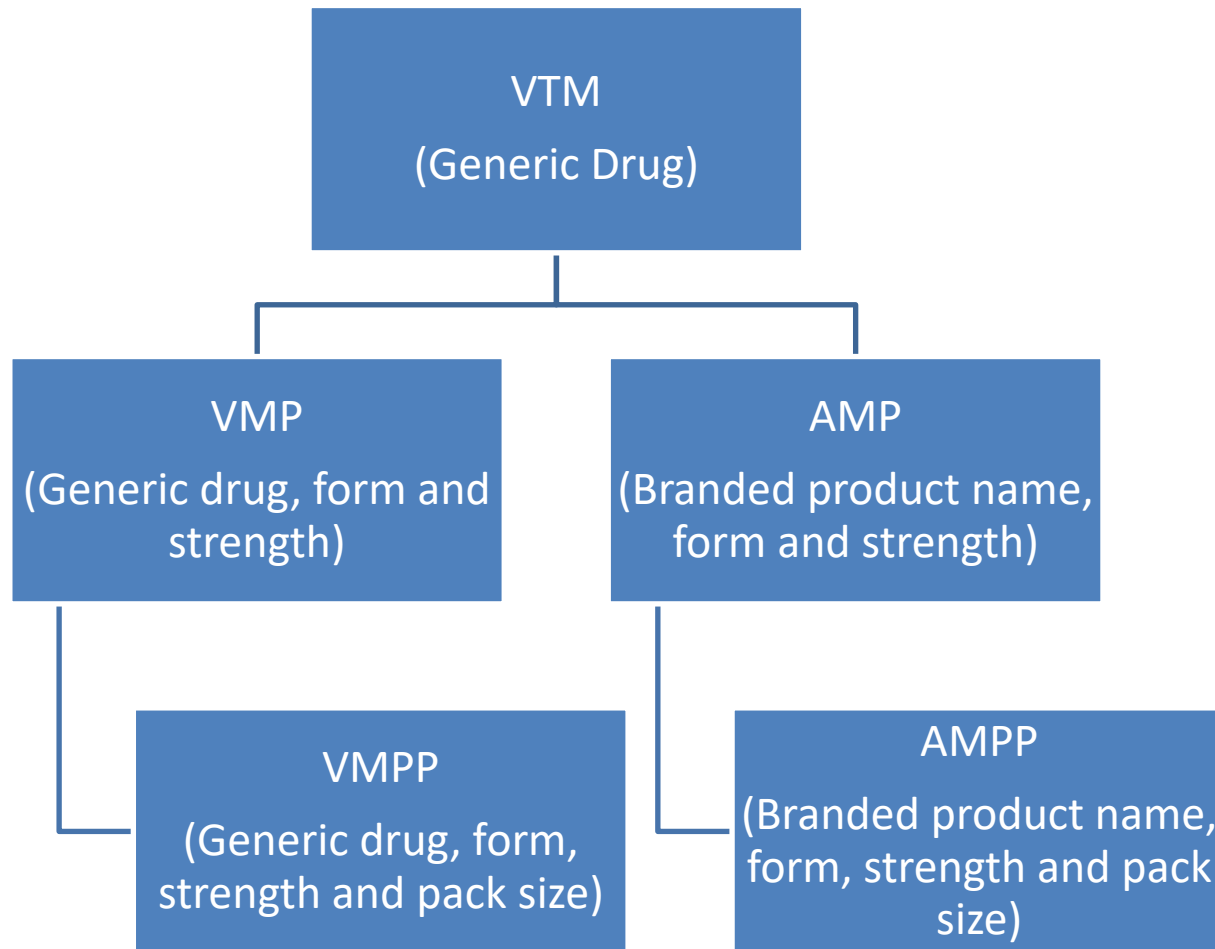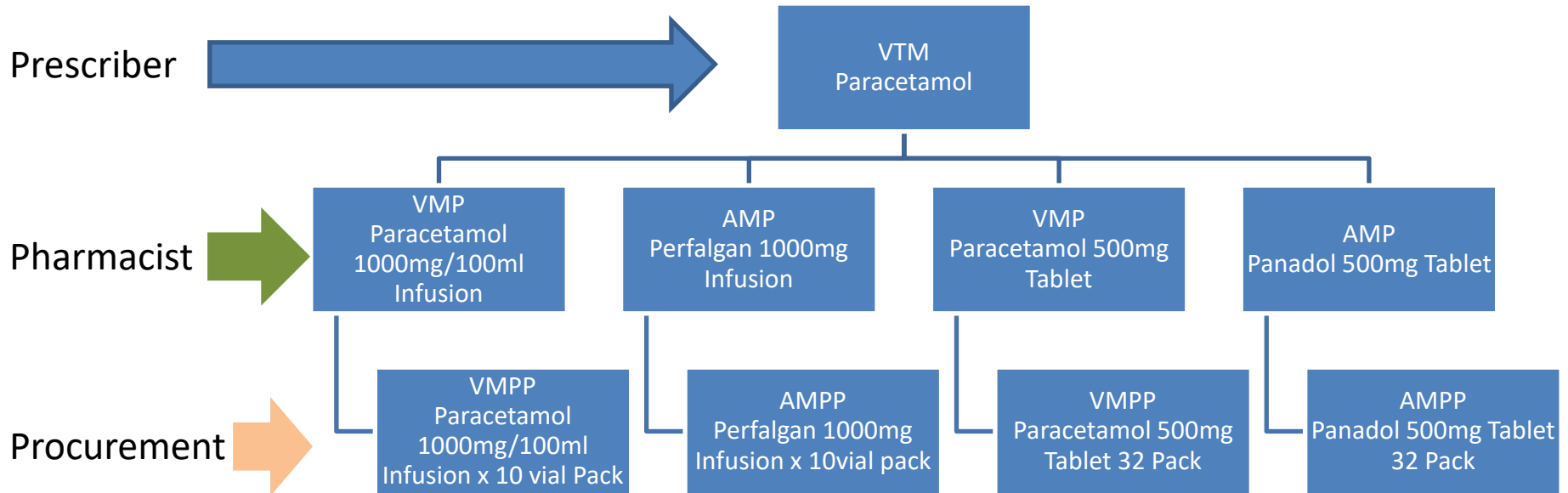
Standards

FHIR

- Message structure

- Determines which fields are available

- Determines how those fields are structured

- Various iterations but R4 will be current UK standard
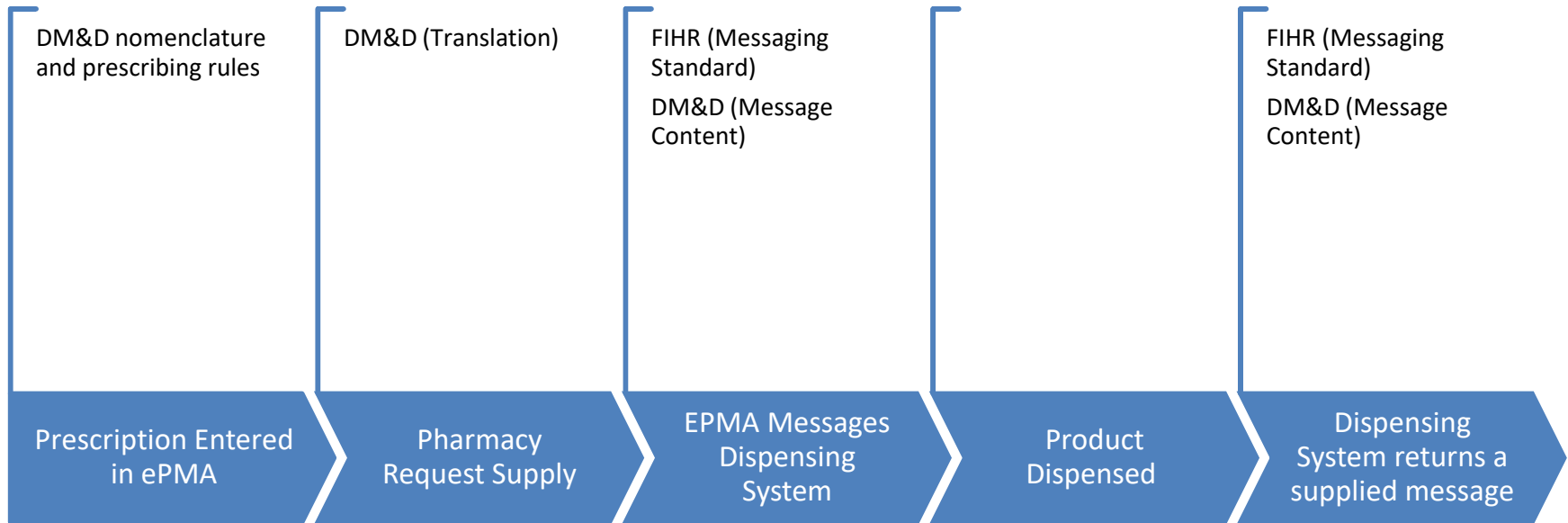
- Continually evolving
  - Good thing!

HL7 FHIR

paracetamol - 500mg - tablet - Oral - DOSE 1000 mg - FOUR times a DAY.xml

Standards

Standards

How Does It Fit Together?

DM&D nomenclature and prescribing rules

DM&D (Translation)

FIHR (Messaging Standard)

DM&D (Message Content)

FIHR (Messaging Standard)

DM&D (Message Content)

| Prescription Entered in ePMA | Pharmacy Request Supply | EPMA Messages Dispensing System | Product Dispensed | Dispensing System returns a supplied message |

What Have We Got?

- A working interface!
- >1000messages successfully sent every day
- 80% success rate for message interpretability by the CMM system
- Anecdotal benefits already seen
  - Reduced transcription errors
  - Dispensing teams feel this is "safer"
  - Very useful second check if workload fails to arrive/print in dispensary
- Formal benefits appraisal undertaken once Technical Check is available

Challenges

- Data
  - DM&D doesn't cover everything hospital Pharmacy dispenses
  - Are your Pharmacy and ePMA catalogues mapped?
  - FDBE mapping and lag compared to TRUD
  - Message construction best practices still evolving
  - Pharmacy cost centres not always easy translation of wards or Consultants

- Software
  - Dispensing solution an evolving product
    - Built at speed to enable this work to complete
  - Technical check, localities, manufacturing, CD & HC roadmap

- Locations
  - Not all NHS Sites work the same way!
  - Safety Assurance

The Future

- Looking at resolving outstanding challenges
- Better understand our new processes
- Partnership working with all stakeholders
- More automation!
  - ?Dispensing cabinets
  - ?Unit dose dispensing machines
  - ?Blister Pack filling machines
  - ?Aseptic automation
  - ?Automated Dispensing, Labelling & Checking
  - ?Infusion pumps

- How could this apply to your ICS?
  - Centralised dispensing hubs?
  - Forwarding messages if meds out of stock in one "place" and no common dispensing system?

Summary

- It's here, it works because of the standards
- Improved accuracy of patient name and drug transcription by removing the need to do it
- Some challenges remain but to be resolved through partnership working models
- The future is bright, probably robotic and not as far away as you think!

Questions / Contact Us

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