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Improve Parenteral Drug Preparation and Administration Using Barcode Assisted Medication Preparation (BAMP)

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Introduction & Background

Errors involving intravenous (IV) medications (e.g. wrong patient, wrong drug, wrong dosage, etc.) can be potentially dangerous to the patient as they are administered directly into the blood stream.

KBMA (Knowledge Based Medication Administration) is used to administer medications in CGH and the process of parenteral drug preparation is complex. Few gaps in the medication preparation process were identified:

- Nurses prepare medication in batches based on the information transcribed from SCM (Sunrise Clinical Manager) on to-do-lists
- Hand written label for IV medication takes time and is susceptible to labelling errors, incomplete information and illegibility issues
- Nurses having to retain barcode of original drugs packaging for KBMA scanning e.g. broken ampoule
- Nurses entering the flow rate of IV medication in infusion pump based on recalled memory last seen on SCM

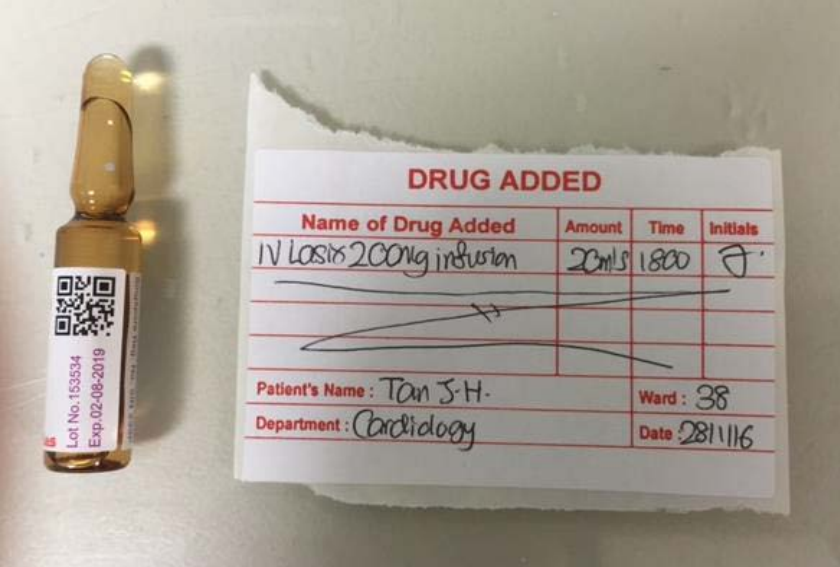
Aim

The aim of the project is to enhance Parenteral Drug Preparation and Administration through improved labelling and preparation. The project beneficiaries are nurses and patients.

Methodology & Changes

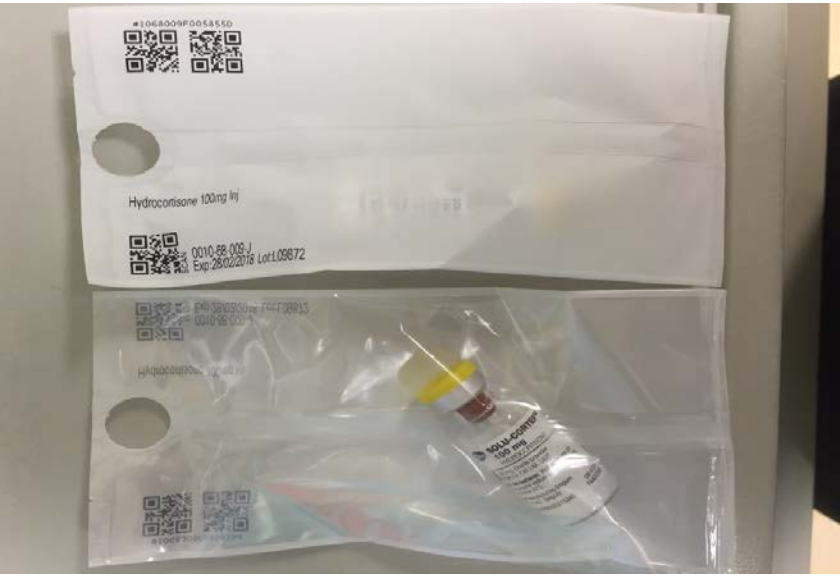
As a proactive effort to address the potential risks and improve the process, Healthcare Failure Mode and Effects Analysis (HFMEA) was used to study the entire preparation and administration process. Possible failures in the current process were identified with improvement efforts prioritised.

Workflow before BAMP implementation



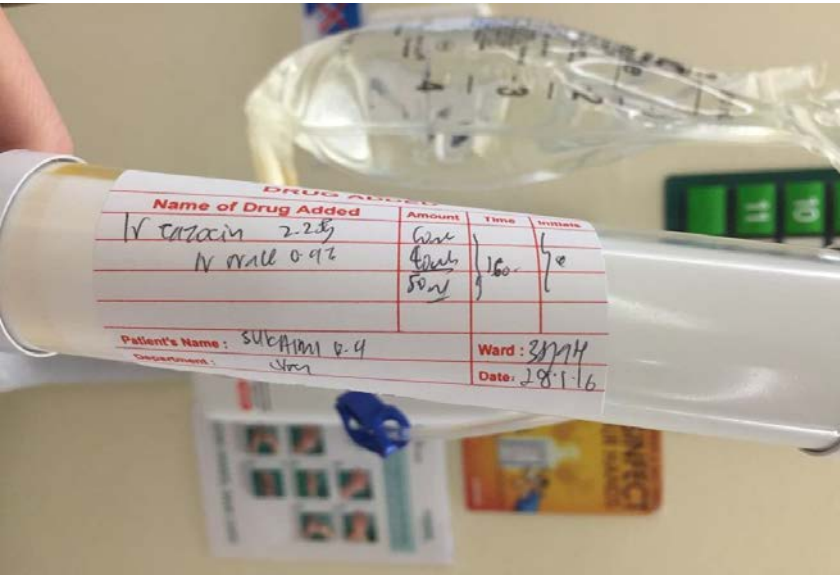
Ampoule affix with QR code

After preparing the drug, broken ampoule (that are separated from the medication) have to be retained for scanning, which can increase the risk of sharp injury.



Ampoule without QR code affix

After preparing the drug, there is a need to retain the sachet (with printed QR code) for scanning. There is a risk of administering the wrong medication as QR code is not on the prepared medications.

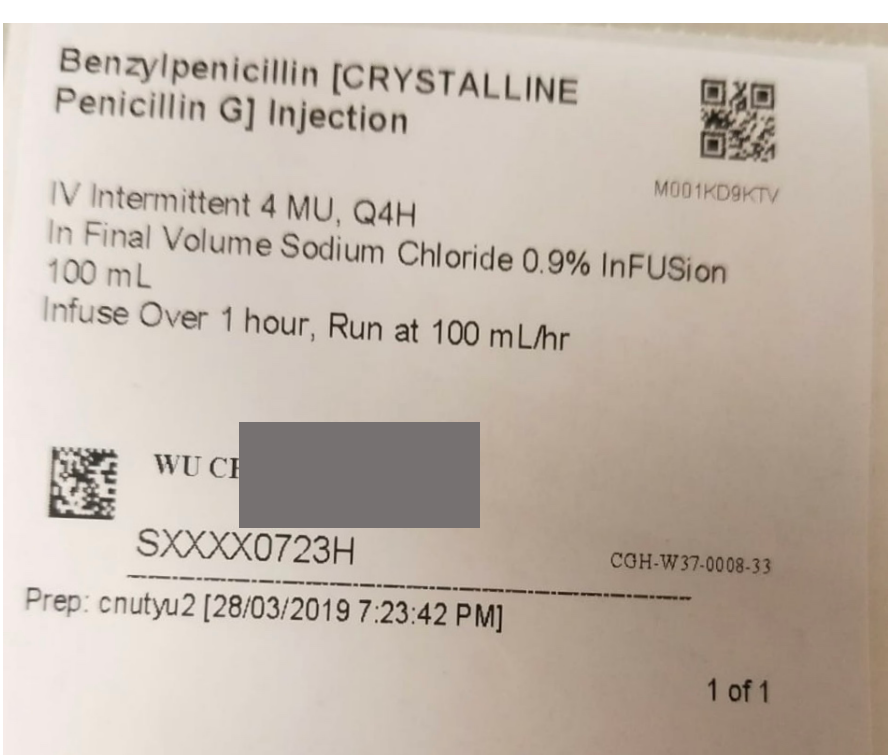
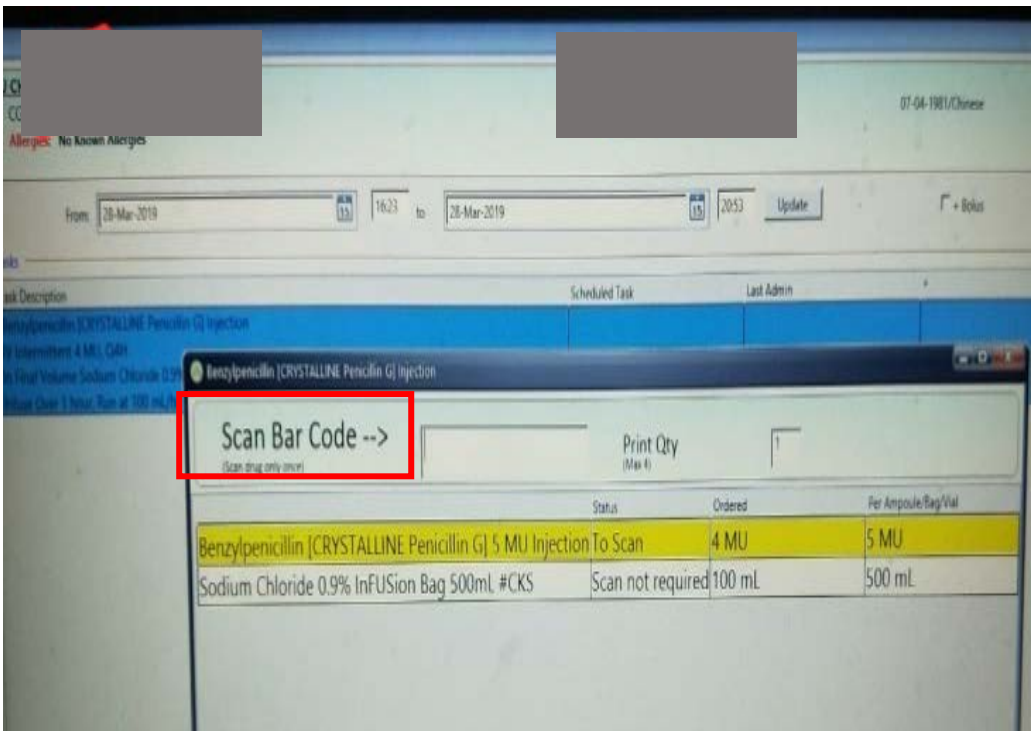
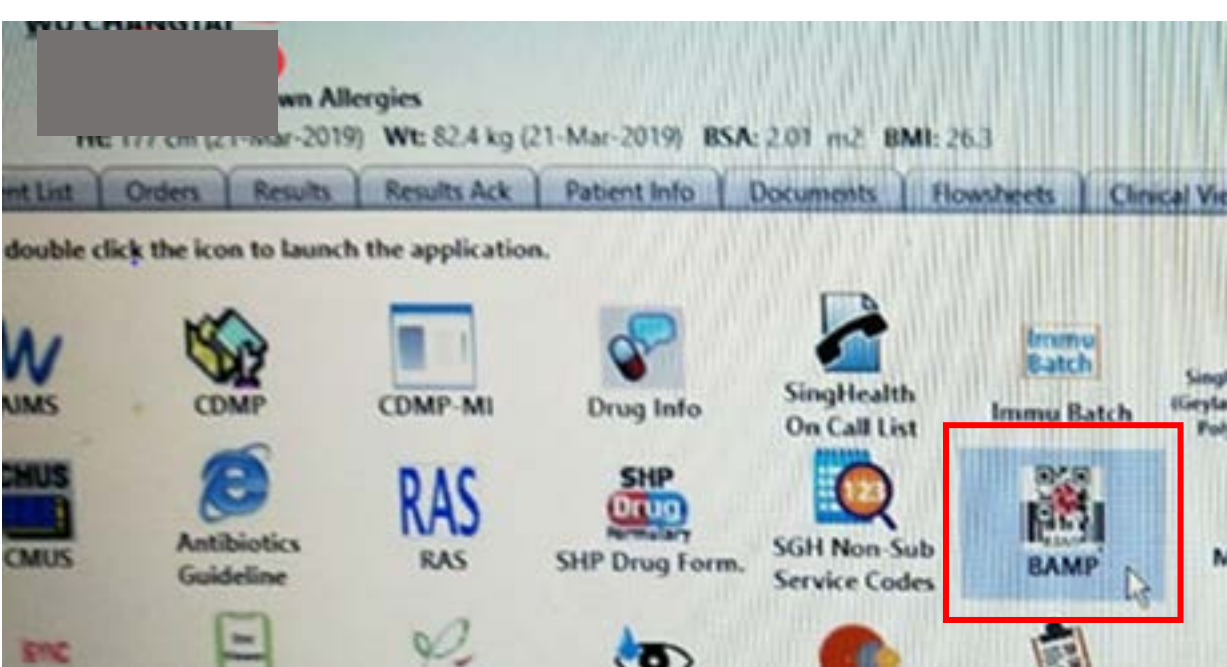


"Drug Added" handwritten label

There is a possibility of labelling error, incomplete information and illegibility issues. Label does not have flow rate required for infusion pump programing.

Workflow after implementation of BAMP system

BAMP, an application with barcode scanner and label printer was introduced to CGH inpatient wards in July 2018. It allows parenteral drug retrieved to be validated using barcode scanning at the point of preparation and generates drug labels that are specific to both patient and medication order. Relevant information is also available on the label to facilitate preparation and checks during administration instead of relying on recalled memory.



Medication label generated and printed with patient information, SCM dilution and administration instruction and QR code (specific to order and patient) upon scanning of actual vial/ampoule. Use of BAMP also fulfils national drug labelling requirements.

Measures

User experience and perception survey was conducted after BAMP was implemented. There were a total of 5 questions and 40 nurses participated in the survey. Survey results showed:

RESULT	
Question 1	
The parenteral drug preparation process has improved with BAMP because:	
It validates that the correct drug is retrieved at the point of preparation	80%
It generates a barcode medication label that is tied to a patient	90%
The generated label provides medication administration instructions	83%
I do not have to spend time writing on the "Drug Added" label	68%
The information is real-time in BAMP application – I do not have to refer to any other sources during drug preparation	48%

Question 2	
60% nurses (n=24) agreed that with BAMP, they spend a shorter time on IV drug preparation , 38% neutral and only 3% disagreed	

Question 3	
68% nurses (n=27) agreed that it is safer to use BAMP in the preparation of parenteral orders , as opposed to not using, 25% neutral and 8% disagreed	

Question 4	
Recall an occasion where you did not use BAMP for drug preparation:	
Technical – label not printing, misalignment of label	48%
Resource – printer in use by others	20%
Time – scanning of drugs in BAMP is time-consuming	15%
Knowledge – did not initially know how to use BAMP	3%

Question 5	
Overall, 95% nurses (n= 38) prefer using BAMP over the "Drug Added" labels	

RESULT	
Time saving during drug preparation when using BAMP takes only 10 sec to scan and print the table.	
Time-saving	
Average time spent on writing a label	40 sec
Time to scan and print a label	10 sec
Time savings	30 sec
Average number of IV medications per day	900
Time saving per year	2337.5 hours
Time saving in full-time equivalent (FTE)	1.41

Conclusion

BAMP enhances medication safety by validating the drug product during preparation and ensuring clear and accurate drug labelling by replacing handwritten labels. It makes information more accessible during drug preparation and programing infusion pumps. It also reduces effort and time taken need for handwritten labels.

This is a one-time enhancement to the system with cost recovery through man-hours saved and reduction of medication errors.

To further enhance the value of BAMP, infrastructure resource issues are currently being looked at.