

## Safer and More Efficient Medication Systems through Standardisation

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### Why Invest in Medication Safety?

- Medication is second only to staff costs in state health budgets
- Most patients will receive a medication during their hospital stay
- Older patients (>65yrs) receive ~ 4 regular medications each day
- Medication error is second only to falls in reported clinical incidents in healthcare

### Why Invest in Medication Safety?

Estimated admissions/year in Australia

- 140,000 medication related
- 88,500 angina
- 37,500 myocardial infarction

Consumers more aware of glaring deficiencies in our current health care system, and consequently are demanding safer and more reliable healthcare.

In an effort to both conform to current regulations and respond to pressure to improve health care outcomes, quality organisations are standardising a variety of clinical care processes.

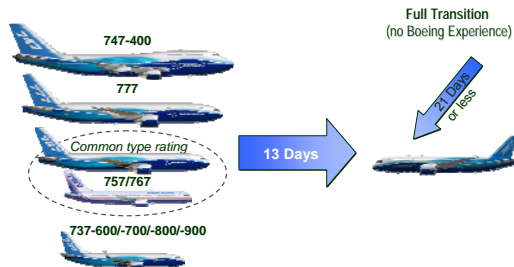
### New Flight Deck Balances Commonality and Innovation



### “The 787’s new design provides balance”

- Best features from 737 and 777
- Functional capabilities that offer:
  - Enhanced safety
  - Increased operational capability and efficiency
  - Reduced upgrade costs

## 787 Flight Training Courses



## Standardisation

- warranted if a single process has been conclusively shown to be both more effective and more safe
- very few such clinical opportunities exist and when they do, standardisation attempts usually fail
- usually, no single 'right' process but several possible
- often, lack of infrastructure to support the process.

## Standardisation

- A single standardised care process requires all staff to be trained to use it
- Assessment of the efficacy of care is easier
- Detection and evaluation of defects in care is easier
- By contrast, multiple processes make the recognition of defects and their correction difficult

## Standardisation of Systems

- Means doing the same thing in the way in the same circumstance. Benefits include:
  - improvement in safety and efficacy of systems
  - increased familiarity when staff rotate
  - reduction in opportunities for patient harm
- Should be evidence based
- Enables effective education and training of specific tasks and procedures

## Selected Initiatives in standardisation

## Medication Action Plan (MAP)

### Issues:

- A QH baseline audit in 2004/2005 showed that up to 5 medication histories documented per patient per admission
  - Duplication of effort
  - Medication lists do not correspond and most incomplete
  - Documented on 9 possible QH forms

### Solution: MAP form

- One place to capture complete & accurate medication history on admission
- Facilitates medication reconciliation
- Form kept in bedside folder near active medication chart for easy access
- Currently implemented in ~90% QH beds

MAP form

Medicine	Dose	Frequency	Indication (confirm with patient)	How long or when started	Date, initials, profession or Change
PRazosin	5mg bcd		blood pressure	4 yrs	✓
VERAPAMIL SR	240mg	mane	blood pressure	4 yrs	✓
COVERSH PLUS	5mg/12.5mg	i mane	blood pressure	4 yrs	✓
OMEPRazole	20mg	bcd	reflux	6 months	ADJ ✓
ATORVASTATIN	20mg	nocte	cholesterol	2 years	W
ASPIRIN	100mg	mane	reduce stroke rates	4 yrs	W
PARACETAMOL 500mg	i-ii	qid prn	pain	4 yrs	X

### Results: Snapshot Audit

	Pre	Post
Patients with <b>all</b> medicines documented completely (name, dose and frequency)	49% (56/114)	93% (110/150)
Patients with <b>all</b> medicines reconciled (admission medication history matching prescribed medicines)	39% (47/120)	63% (93/148)
The number of discharge medication records given to patients documenting changes made to medications	63% (36/57)	82% (78/95)
Clinicians (medical officers, nurses, pharmacists) thought it to be a useful tool to communicate medication issues to other clinicians	N/A	83% (95/114)

### Statewide Inpatient Medication Chart

The inpatient medication chart is the tool used to communicate information for treatment, administration and supply of medication for a patient

Issue:

- Prior to 2003, within just 6 QH hospitals in Brisbane, more than 20 different medication charts in use were identified

### Solution: Develop and implement one Statewide Inpatient Medication Chart

- A Plan, Do, Study, Act (PDSA) quality cycle project was initiated within these 6 QH hospitals
- A single medication chart was designed incorporating safety features
- After successful trials, the chart was rolled out to all Queensland Health facilities
- Chart subsequently adopted as a basis for National Inpatient Medication Chart

- Improved safety and quality of medication order and administration; and their documentation
  - Adverse drug reaction history visible on every page
  - Administration times entered by prescriber reduced error rates 5-fold
  - Standardisation of Warfarin prescribing section reduced incidence of INRs > 5 steadily and consistently from 1.91% to 1.26% statewide from 2006 to 2008
  - Section for PRN medications increased clarity of dose, frequency, maximum daily dose and indication
- Overall reduction in orders with prescribing errors per patient from 20% to 15.8%

BJCP British Journal of Clinical Pharmacology

**Pilot of a National Inpatient Medication Chart in Australia: improving prescribing safety and enabling prescribing training**

Ian D. Coombes,<sup>1,2</sup> Carol Reid,<sup>1</sup> David McDougall,<sup>3</sup> Danielle Stowasser,<sup>4</sup> Margaret Dulguird<sup>5</sup> & Charles Mitchell<sup>2</sup>

## Insulin

### Issues:

- Poor management of blood glucose levels (BGL) with insulin identified
- Poor processes related to inadequate notification of and response to unacceptable BGLs
- Seen with both intravenous infusions & subcutaneous regular therapy

### Solution:

- Two charts developed
  - BGL monitoring and intravenous insulin chart
  - BGL monitoring and subcutaneous insulin administration chart
- Processes demonstrated to be safer
  - IV insulin infusion rates documented incorrectly decreased from 10.4% to 5.6% (p=0.0004)
  - Improvements in clarity of Insulin prescribing. Opportunity for error as a result of unclear order decreased from 41.8% to 12.2% (p<0.0002)
  - Improvements in notification of BGL out-of-range

## Version 0\_1

DIABETES RECORD AND SUBCUTANEOUS INSULIN ORDER FORM

Medical History Summary: HYPERTENSIVE MANAGEMENT SUMMARY: BGL less than 3.5 mmol/L

DOCTOR'S ORDERS

REGULAR INSULIN ORDERS

VARIABLE/SUPPLEMENTAL INSULIN

STAT INSULIN ORDERS

## Version 0\_14 (Focus Group)

BLOOD GLUCOSE RECORD AND SUBCUTANEOUS INSULIN ORDER

MONITORING AND ADMINISTRATION RECORD

Medical Officer Prescription

MONITORING AND ADMINISTRATION RECORD

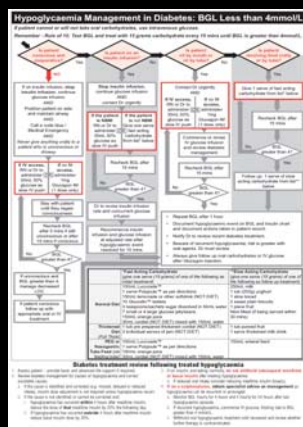
## Version 0\_30 (trialled)

## Version 0\_38 (trialled)

## Recent changes

- Statewide forms implemented in Queensland Health Hospitals between 2007- 2010
- Good compliance except nurses not calling docs with out-of-range BGLs
- Recent development of the 'Children's Early Warning Tool' (CEWT) and the Adult Deterioration Detection Scale (ADDS)
- Insulin Forms Version 3 has borrowed from this methodology

## Hypo Protocol



## Guidelines Page

## Other forms

- Fluid & Electrolyte prescribing and administration
- Heparin
- Graseby Syringe Subcut Administration
- PCA
- Epidural/regional anaesthesia
- Regional anaesthesia monitoring
- Mental Health Depot Administration
- Clozapine Titration

## Safe Medication Practice Tutorials

- 8 week tutorial for final year medical students
- Focused on safe prescribing practices in specific inpatient areas<sup>4</sup>
  - Medication history taking and confirmation
  - General prescribing safety, antibiotics, ADRs
  - Prescribing of anticoagulants (warfarin and heparin)
  - Prescribing of insulin
  - Prescribing of fluid and electrolytes
  - Prescribing of opioids
  - Prescribing at discharge
  - Human Error Awareness and Graded Assertiveness
- Assessed in written and OSCE examinations
- Now adopted by UQ, Griffith and JCU

## And other educational activities

- Nursing
    - UG
    - Fit-for-practice
    - In-service
  - Medical
    - UG
    - PGY 1 & 2
    - Consultants
    - IMGs
- National initiatives, including NPS

## Nurse Medication Risk Awareness

### Issues:

- Nursing medication-related competencies often only included numeracy testing
- Relatively few medication-related errors have relationship to a calculation
- Nurses often do not identify common errors

## Nurse Medication Risk Awareness

### Solution:

- Initially, 6 scenarios, based on the 6 administration rights that examined nurses' ability to identify potential medication error and knowledge of how these may be avoided
- Now 36 scenarios available - general medicine(23) and surgery, intensive care(2), maternity(2), paediatrics(2), mental health(5), rural/remote(2)
- Used in over 100 QH hospitals
- Now, on-line

## Let's standardise

### How difficult can it be?

- Most improvement activities use elements of standardisation, but standardisation is looked at as the end of the improvement process rather than as a start of the learning process
- When standardisation lacks customisation and improvement methods & presented as the final word, standardisation may be seen as little more than loss of autonomy in caring for the special needs of unique patients, and a victory for 'cookbook medicine'

Roger Resar, 2005

### 1. Define the problem

- Establish the current state of affairs by observing, identifying problems and drilling for the root causes. Describe the ideal or target condition using evidence from the literature, knowledge of the local environment, and any other available systems
- Let as many as possible know its coming – "Stop what you're doing and join us!"

### 2. Decide what and how to measure

- Define and implement a practical measurement system for testing change and measuring long term outcomes.
- Include both process and clinical outcomes

### 3. Write the protocol

- First draft of the protocol should be written by experts, using others' examples if available
- Initial protocol should reflect the views of the experts willing to try the first version in their units
- Requires flexibility with ability to make changes rapidly and often
- Only the most mature and best resourced organisations should attempt complex protocols

### 4. Get rapid reviews

- Begin (or continue) the processes of 'buy in' and improvement in the safety and robustness of the protocol or standardised process by sending early drafts out to stakeholders for comment
- Insist on short turn-around times

## 5. Test early drafts

- Initially in focus groups, including juniors
- Use common hypotheticals
- Then, test with a few patients, under close observation
- Debrief relevant staff
- Determine what worked well and what needs to be changed
- Agreed changes should immediately be incorporated into the protocol for the next series of tests

## 6. Gradually disseminate

- Once the protocol has been initially tested and modified, it should be given out to all other clinicians and staff who will eventually be expected to use it, and they should be asked for input. That information should then be used to remodel the protocol, as appropriate.
- The remodelled protocol should be tested and repeatedly remodified as needed.

## 7. Establish rules for use

- Before release, an understanding should be reached that all clinicians will either use the protocol or will explain when they opt out
- Educate - all clinicians need to understand the components of system and underlying rationale
- Issues and adverse events must be recorded → Issues Register

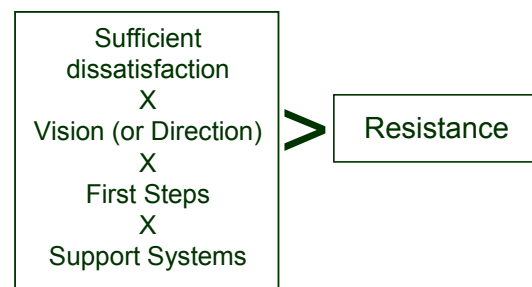
## 8. Identify an owner

- Absolutely essential
- Responsible for:
  - Obtaining and assessing new literature
  - Gathering and analysing data on compliance and clinical outcomes
  - Keeping and managing "Issues Register"
  - Arranging further meetings of expert team, both regularly and as required

## 9. Modify protocol

- Based on issues and new knowledge
- An ongoing process
- No protocol will ever be final; it will always be in the design (or redesign) stage
- Changes may be frequent, particularly in initial stages

## To Achieve Change



## Conclusion

- Standardisation does not have to be perfect. If initial design expected to deal with all possible clinical events, the initial product will be too complex.
- Better to start with a simpler version and continually modify to address defects
- The methods of achieving standardisation may be more important than the standardisation itself.

## Conclusion

- Make processes of testing, measuring and improving as inclusive & transparent as practical
- Gets more buy-in and confidence in product
- No single method is consistently successful
- However, the combination of the described approach, involving of the whole clinical team develops the culture necessary to bring about and sustain system changes

## References

- Coombes ID, Heel C, Stowasser D, Reid C, Henderson A, Mitchell C. A prospective study of the incidence of nurse self-reported identification of medication errors during a novel, simulated ward, medication safety orientation program. *J Pharm Pract Res* 2005; 35: 190-4.
- Coombes I, Mitchell C, Stowasser D. Safe Medication Practice Tutorials: a practical approach to preparing prescribers. *Clin Teacher* 2007; 4: 128-34.
- McLeod S, Lum E, Mitchell C. Value of medication reconciliation in reducing medication errors on admission to hospital. *J Pharm Pract Res* 2008;38:196-9.
- Coombes I, Stowasser D, Reid C, Mitchell C. Impact of a standard medication chart in prescribing errors: a before and after audit. *Quality and Safety in Health Care*. 2009; 18:478-485.
- McIver F, Mitchell C, Finn C, Kamp M. Standardising practices through form design and education improves insulin management. *Aust Health Rev* 2009; 33 (3): 434