

# Pharmacist Led Therapeutic Drug Monitoring (TDM) Impact of education and competency based assessment on Paediatric patient care

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## BACKGROUND

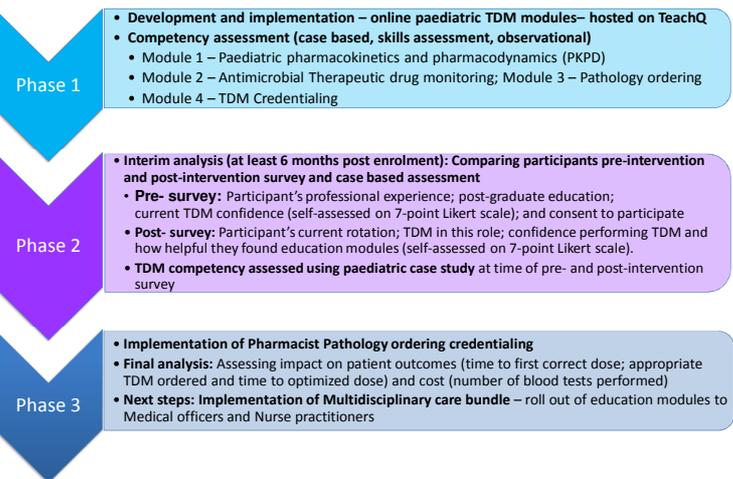
Tobramycin, gentamicin and vancomycin are in the top 10 commonly used antibiotics at the Lady Cilento Children's hospital (LCCH). The complexity of dosing and monitoring associated with use of these high risk medicines in children, have previously led to delays in appropriate TDM resulting in significant harm. It's expected that improving a pharmacist's ability to perform TDM is likely to ensure every patient receives the correct initial dose for their age and weight; reduce the number of blood tests patients require to reach their optimal therapeutic target; increase the number of appropriate drug levels taken; and overall reduce the patient's length of stay, thus reducing the fiscal cost of treating TDM patients. This is key component of the National Competency Standards Framework for Pharmacists in Australia(1). Similar studies have been performed in adults(2), but not children.

## OBJECTIVES AND AIMS

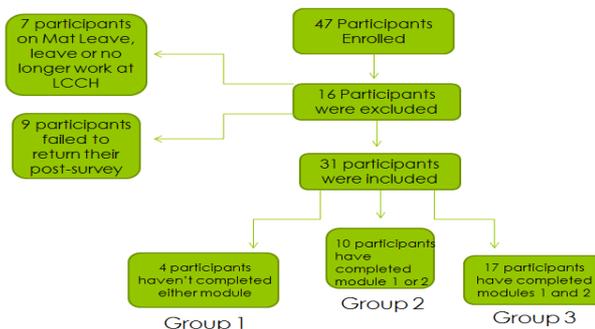
To compare and contrast pre- and post-intervention surveys, as well as case-based assessment to determine whether the online competency-based education and assessment impacted pharmacist's TDM competence and confidence.

- Competency based assessment assessing 4 key areas:
  - History taking;
  - Pharmacokinetic and –dynamic (PKPD) knowledge;
  - Correct first dose recommendation;
  - TDM recommendation
- Self-assessed confidence level using 7-point Likert scale

## STUDY DESIGN AND METHODS



## RECRUITMENT AND PARTICIPANT FLOW



- Group 1 – participants enrolled but not commenced the modules.
- Group 2 – participants enrolled and commenced either module 1 or 2, but not completed either.
- Group 3 - participants enrolled and completed modules 1 and 2.

## REFERENCES:

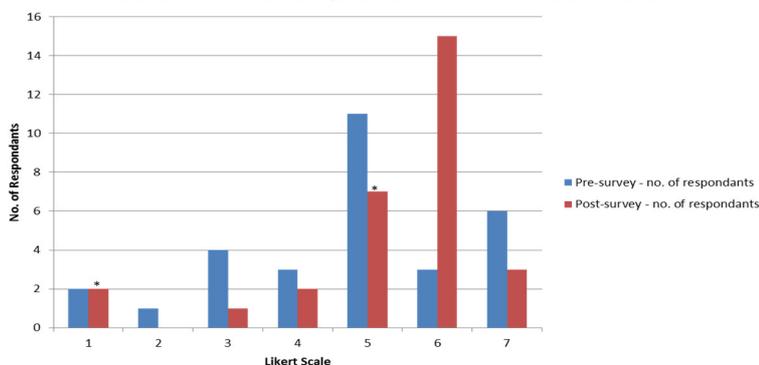
1. National Competency Standards Framework for Pharmacists in Australia. 1st ed. ACT: Pharmaceutical Society of Australia (PSA) [Internet]. 2010. [cited 2017 Mar 17].
2. Newham R, Thomson A, Semple Y, Dewar S, Steedman T, Bennie M. Barriers to the Safe and Effective Use of Intravenous Gentamicin and Vancomycin in Scottish Hospitals, and Strategies for Quality Improvement. *European Journal of Hospital Pharmacy* 2014;1(22):32-37.
3. Effect size: Hattie J. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Oxon: Routledge; 2009



## RESULTS

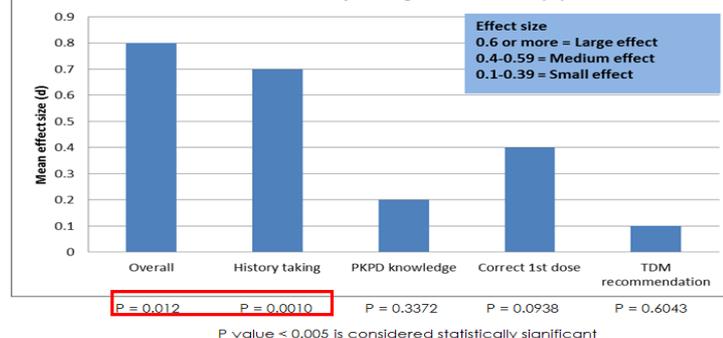
- The response rate of the post-survey was 31 of 47 (66%) of participants enrolled in the study.
- Predominantly female (77%, n=24)
- Ranging from newly registered to over 10 years' experience
- More than half have completed or are in the process of completing post-grad study
- Four of every 5 participants (80%, n=25) perform TDM in their current role
- 84% participants (n=26) assessed their confidence performing TDM post-intervention as 'somewhat (5)' to 'entirely (7)' comfortable.

### Confidence Performing TDM Pre- vs Post-Intervention



Confidence performing TDM based on Likert scale responses increased from a mean value of **4.74 pre-intervention** (SD 1.44, 95% CI) to **5.29 post-intervention** (SD 1.69, 95% CI) (p-value 0.0089)

### TDM education package Effect size (d)



## DISCUSSION AND CONCLUSION

The TDM education package, in conjunction with clinical experience and mentoring, is likely to improve outcome measures across the 4 domains.

On average, pharmacist's confidence and competence increased upon completion of the modules, with improvement in some outcome measures.

This is the first part of a greater study.

Next steps:

- Phase 3 will explore the impact on patient outcomes post implementation of pharmacist led TDM credentialing and pathology ordering
- Implementation of Multi-disciplinary care bundle and roll out of education package to Medical officers and Nurse practitioners.



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