

# HERSTON INFECTIOUS DISEASES INSTITUTE

## How can a tool for observation of nurses' medication practice improve infection prevention control: knowledge translation

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# Background

- Patient harm reported in 3.5% administration mistakes
- 31% of medication related deaths related to omissions
- 55% Medical Emergency activations medication errors
- 11% from omissions

Research in Social and Administrative Pharmacy 15 (2019) 858–863

Contents lists available at ScienceDirect

Research in Social and Administrative Pharmacy






journal homepage: [www.elsevier.com/locate/rsap](http://www.elsevier.com/locate/rsap)

Administration errors and mortality: Incidents reported in Wales between 2007–2016

Franklin<sup>a,\*</sup>, Katri Vehviläinen-Julkunen<sup>b</sup>, Trevor Murrells<sup>c</sup>, Anne Marie Rafferty<sup>d</sup>

**ORIGINAL RESEARCH**

**Medication-related Medical Emergency Team activations: a case review study of frequency and preventability**

Bianca J Levkovich <sup>1,2</sup>, Judit Orosz<sup>3</sup>, Gordon Bingham <sup>4</sup>, D James Cooper <sup>3,5</sup>, Michael Dooley<sup>1,2</sup>, Carl Kirkpatrick <sup>1</sup>, Garyl A Jones <sup>5,6</sup>

# Peripheral Intravenous Catheters (PIVC)

- 70% hospitalised patients PIVC
- 1/3 fail requiring reinsertion for treatment
- IV antibiotics failure x 2 HR 1.26
- IV flucloxacillin phlebitis/irritation HR 2.58
- Omissions, delayed doses
- Sub therapeutic treatment
- Increasing LOS



Intravenous antimicrobial administration through peripheral venous catheters – establishing risk profiles from an analysis of 5252 devices

Emily N. Larsen<sup>a,b,c,d,e</sup>, Nicole Marsh<sup>a,b,c,d,h</sup>, Gabor Mihala<sup>a,e</sup>, Michelle King<sup>a,f</sup>, Matthew Zunk<sup>a,f</sup>, Amanda J. Ullman<sup>a,b,c,g,i</sup>, Samantha Keogh<sup>a,b,h</sup>, Tricia M. Kleidon<sup>a,b,g,i</sup>, Claire M. Rickard<sup>a,b,c,i,j</sup>

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<sup>b</sup>Nursing and Midwifery Research Centre, Royal Brisbane and Women's Hospital, Brisbane, Queensland, Australia



## The Effects of Missed Doses of Antibiotics on Hospitalized Patient Outcomes

Chandni N. Patel, BS,<sup>a</sup> Michael D. Swartz, PhD,<sup>a,b</sup> Jeffrey S. Tomasek, MD,<sup>a</sup> Laura E. Vincent, RN,<sup>a</sup> Wallace E. Hallum, RN,<sup>c</sup> and John B. Holcomb, MD<sup>d,e</sup>

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## ORIGINAL RESEARCH

### Observational Study of Peripheral Intravenous Catheter Outcomes in Adult Hospitalized Patients: A Multivariable Analysis of Peripheral Intravenous Catheter Failure

Nicole Marsh RN, BN, MAdvPrac<sup>1,2,3\*</sup>, Joan Webster, RN, BA<sup>1,2,4</sup>, Emily Larsen, RN, BN, GDipHlthRes<sup>1,2,3</sup>, Marie Cooke, RN, PhD<sup>2,3</sup>, Gabor Mihala, MEng (Mech), GCert (Biostat)<sup>2,3,5,6</sup>, Claire M. Rickard, RN, PhD<sup>1,2,3</sup>

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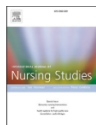
International Journal of Nursing Studies 124 (2021) 104095



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### International Journal of Nursing Studies

journal homepage: [www.elsevier.com/ijns](http://www.elsevier.com/ijns)



### Peripheral intravenous catheter failure: A secondary analysis of risks from 11,830 catheters

Nicole Marsh<sup>a,b,c,g,i,j</sup>, Emily N Larsen<sup>a,b,c,f,i</sup>, Mari Takashima<sup>a,c,f,i,j</sup>, Tricia Kleidon<sup>a,b,c,f,g</sup>, Samantha Keogh<sup>a,b,g</sup>, Amanda J Ullman<sup>a,b,c,f,i</sup>, Gabor Mihala<sup>a,d,e,f,i</sup>, Vineet Chopra<sup>a,h</sup>, Claire M Rickard<sup>a,b,c,j</sup>

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# Practice Gaps

- Standards and guidelines
- Poor adherence to flushing and administration of medicines
- Poor device securement and dressings
- Increasing failure rate of PIVC device
- Reinsertion PIVC
- Impacting patient care outcomes
- Increasing cost of IV consumables e.g., 100 mL bags and lines
  - \$8 per dose compared to \$1 per dose
  - ~\$800,000 per year fluids alone

Keogh et al. BMC Medicine (2020) 18:252  
<https://doi.org/10.1186/s12916-020-01728-1>

BMC Medicine

RESEARCH ARTICLE Open Access

Implementation and evaluation of short peripheral intravenous catheter flushing guidelines: a stepped wedge cluster randomised trial



Samantha Keogh<sup>1,2,3\*</sup>, Caroline Shelverton<sup>2,3</sup>, Julie Flynn<sup>1,2</sup>, Gabor Mihai<sup>1,2,3</sup>, Nicole Marsh<sup>1,2,3</sup> and Claire M. Rickard<sup>2,3,7</sup>

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 DOI: 10.1111/jan.14565

REVIEW

JAN WILEY

Peripheral intravenous catheter non-infectious complications in adults: A systematic review and meta-analysis

Nicole Marsh<sup>1,2,3</sup> | Joan Webster<sup>1,2</sup> | Amanda J. Ullman<sup>1,2,3</sup> | Gabor Mihai<sup>2,4,5</sup> | Marie Cooke<sup>2,3</sup> | Vineet Chopra<sup>2,6</sup> | Claire M. Rickard<sup>1,2,3</sup>

## Infusion Therapy Standards of Practice

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Mary E. Hagle, PhD, RN-BC, FAAN

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AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE



The Lancet

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Articles

Effect of infusion set replacement intervals on catheter-related bloodstream infections (RSVP): a randomised, controlled, equivalence (central venous access device)-non-inferiority (peripheral arterial catheter) trial

Prof Claire M Rickard PhD<sup>a b c d e</sup>, Prof Nicole M Marsh PhD<sup>a b c</sup>, Emily N Larsen PhD (Cand)<sup>b</sup>, Prof Matthew R McGrail PhD<sup>a</sup>, Prof Nicholas Graves PhD<sup>a</sup>, Naomi Runnegar FRACP-FRCPA<sup>a d</sup>, Prof Joan Webster BA<sup>b c</sup>, Amanda Corley PhD (Cand)<sup>a b c e</sup>, David McMillan PhD<sup>b</sup>, John R Gowardman FCICM<sup>a c</sup>, Debbie A Long PhD<sup>b f</sup>, Prof John F Fraser PhD<sup>a b e</sup>, Fenella J Gill PhD<sup>b j</sup>, Prof Jeanine Young PhD<sup>h</sup>, Marghie Murgu MNurs<sup>l</sup>, Evan Alexandrou PhD<sup>b m n o p</sup>, Md Abu Choudhury PhD<sup>b</sup>, Prof Raymond J Chan PhD<sup>b d f</sup>, Nicole C Gavin PhD<sup>a b c f</sup>, Azlina Daud PhD<sup>q</sup>, Prof E Geoffrey Playford PhD<sup>a d</sup>

**Management of Peripheral Intravenous Catheters**  
 Clinical Care Standard  
 May 2021



	Clinical Governance Standard
	Partnering with Consumers Standard
	Preventing and Controlling Healthcare-Associated Infection Standard
	Medication Safety Standard
	Comprehensive Care Standard
	Communicating for Safety Standard
	Blood Management Standard
	Recognising and Responding to Acute Deterioration Standard



*“ensure **competent clinicians** safely prescribe, dispense and administer appropriate medicines to informed patients and carers”*

*(NSQHS p.34)*

*Leaders of a health service organisation describe, **implement and monitor systems to prevent, manage or control healthcare-associated infections and antimicrobial resistance**, to reduce harm and achieve good health outcomes for patients. **The workforce uses these systems.***

*(NSQHS p.22)*

# Medication Administration Evaluation and Feedback Tool (MAEFT)

## 2 Sections / 22 checks

- 11 Clinical
  - 6 rights (pt., drug, dose, route, time, refuse)
  - Discrete, observable criteria
- 11 Procedural
  - Monitoring, hand hygiene, ANTT, administration technique, labelling, 2 person check, patient engagement, signing after giving
- Self Assessment Scale
- Yes/No/NA Evaluation
- If no, why – provide comment

### Infection Prevention Strategies

- 5 Moments of Hand Hygiene
- Aseptic Technique (ANTT)
- Correct administration technique
- Checking antibiotic allergies
- Monitoring antibiotic levels
- Correct antibiotic dose

Category	Check	Self Assessment	Checked	If not, example and comment
Right Patient	1. Asked the patient to state their name and date of birth (DOB).	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		
	2. Checked the patient name, DOB and the hospital record number (HRN) against the identification (ID) band and the medication record ID.	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		
	3. Asked the patient if they have any allergies or previous adverse drug reactions (ADRs) to any medicines and checked the patient response against the allergies section on the medication record and confirmed they are not allergic to the medicine or similar class of medicine.	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		
	4. If required, updated the allergies section of the medication record and / or discussed discrepancies with the prescriber.	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		
Right Medication	5. Checked the medication against the medication order and confirmed the medication name and formulation are correct.	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		
	6. Confirmed the medication is indicated for the patient diagnosis and checked there are no duplicate orders of the medicine or of similar class of medicine.	Rarely	Yes / No / NA	
		Sometimes		
		Usually		
		Consistently		
		Not applicable		

#### References:

- Davies, K., et.al. (2022). Medication Administration Evaluation and Feedback Tool: Longitudinal cohort observational intervention. *Collegian*.
- Davies, K., et.al. (2021). Medication administration evaluation and feedback tool: Inter-rater reliability in the clinical setting. *Collegian*.
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- Davies, K., et.al. (2019). Medication Administration Evaluation and Feedback Tool: Simulation reliability testing. *Clinical Simulation in Nursing*.
- Davies, K., et.al. (2018). Medication administration evaluation tool design: An expert panel review. *Collegian*.
- Davies, K., et.al. (2015) The role of observation and feedback in enhancing performance with medication administration. *Journal of Law and Medicine*.

# Feedback

Discuss opportunities for improvement

Both with the nurse and observer process

Feedback Action Plan:	What criteria needs addressing	How? What needs to be done differently to achieve the criteria?	When
	1.		
	2.		
	3.		
	4.		
	5.		
Assessee Name:		Assessee Signature:	Date:
Assessor Name:		Assessor Signature:	Date:

# Multi-site Stepped-wedge Cluster Randomised Trial (n=90)

**Statistically significant improvement in practice using the MAEFT**

## 22 MAEFT Criteria

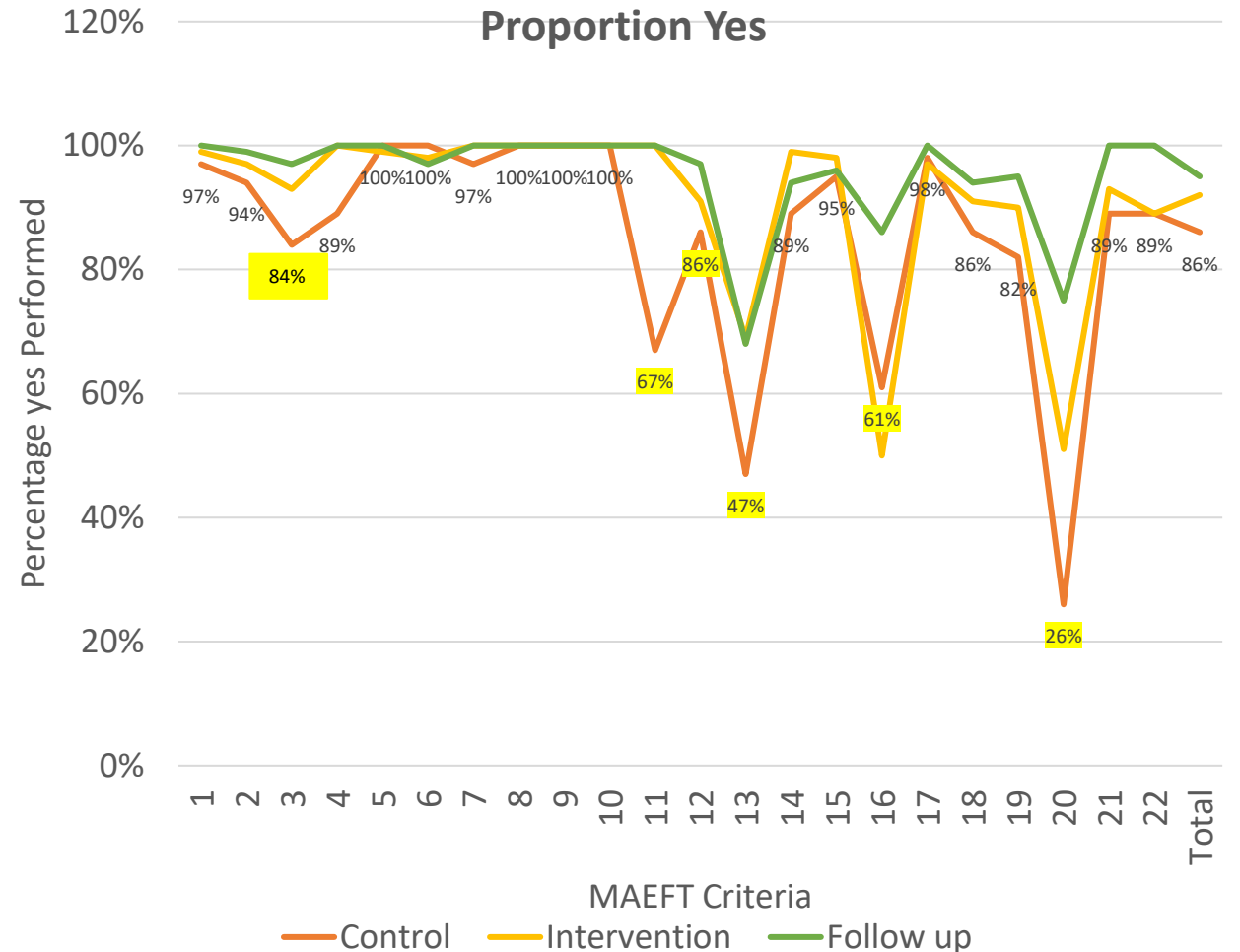
### Improvement:

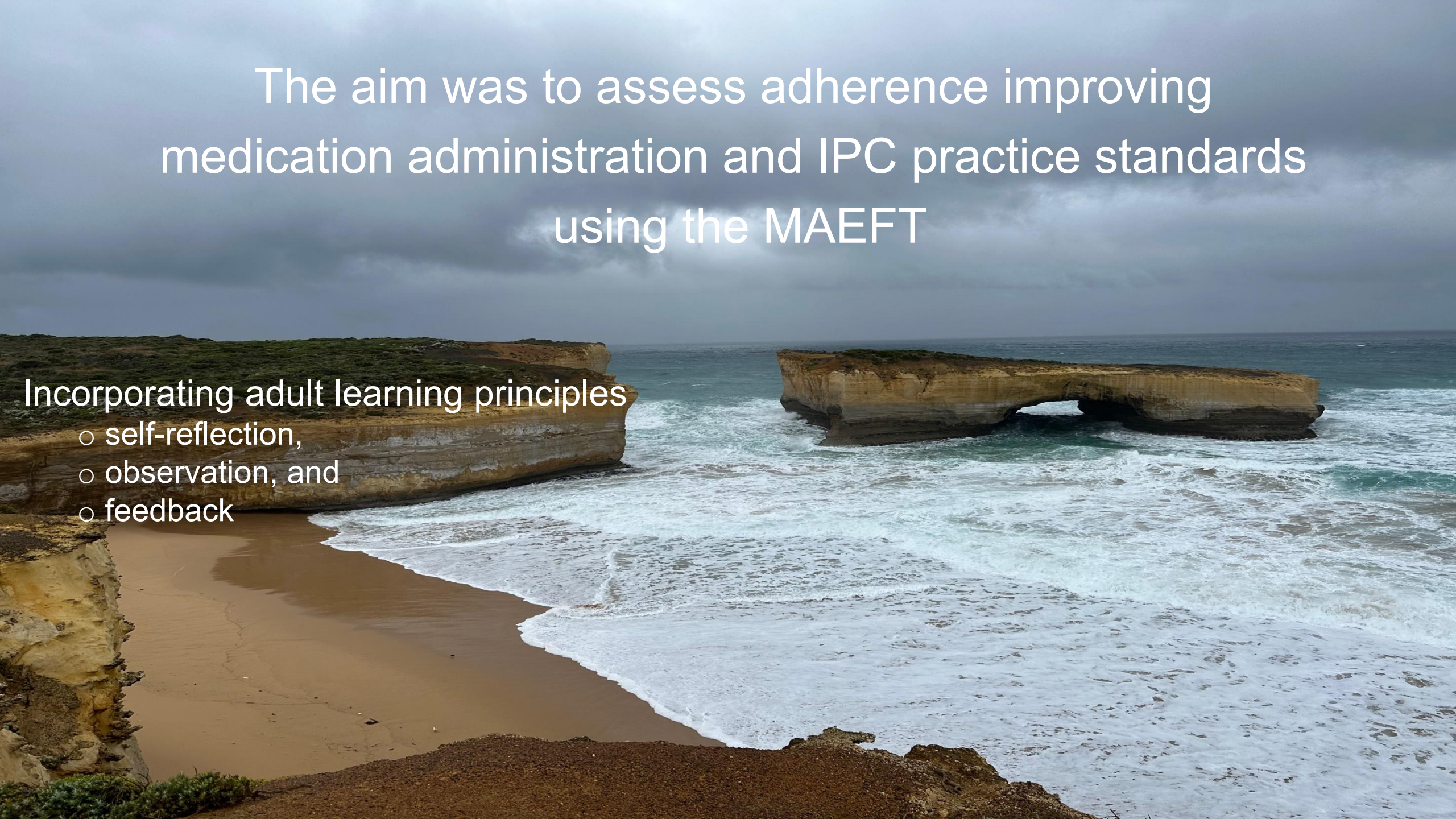
- 3. ADR (13%)
- 11. Refusal (33%)
- 12. Monitoring (11%)
- 13. Hand hygiene (21%)
- 16. Labelling (25%)
- 20. Asking open questions (49%)

### Reduction in “no” not performed errors

- 198 down to 65 (33%) using MAEFT

Observer Assessment per MAEFT Criteria:





The aim was to assess adherence improving medication administration and IPC practice standards using the MAEFT

Incorporating adult learning principles

- self-reflection,
- observation, and
- feedback

# Methods

- The study was a hybrid II effectiveness-implementation pre/post design with
  - Three phases:
    - control, intervention, and follow-up intervention
- Community Rehabilitation Inpatient Facility
  - Three wards
  - 87 consented nurses
- The intervention used the MAEFT for nurses to
  - self-assess their performance before
  - being observed administering medications and
  - provided formative feedback on their medication administration and IPC performance
- Participant acceptability was measured with a 10-question survey

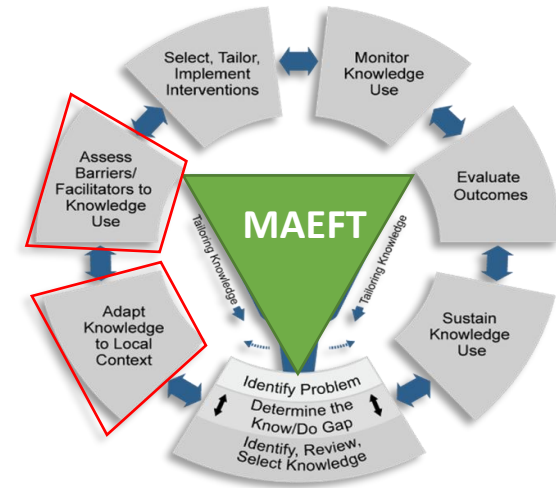
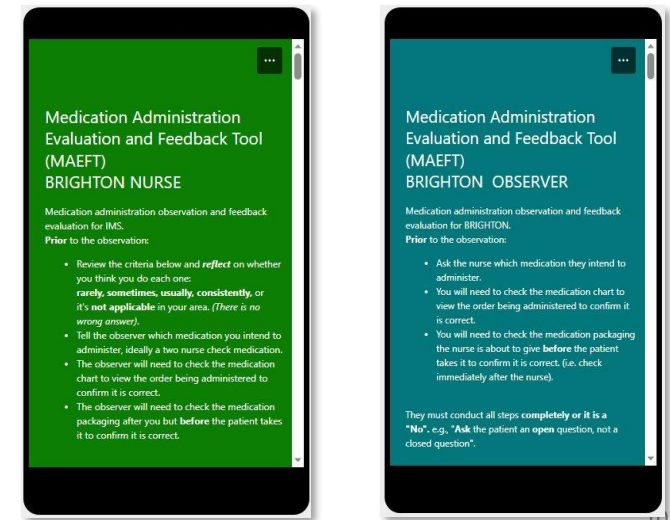


Figure 1: The Knowledge-to-Action Framework



Metro North Health

# Medication Administration Evaluation and Feedback Tool (MAEFT)

## Module 1: Why do we need the MAEFT?

 Please note: this module takes approximately 10 minutes to complete

 Using a smart device?  
Convert to landscape format

Start


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# Medication Administration Evaluation and Feedback Tool (MAEFT)

## Module 2: How to use the MAEFT

 Please note: this module takes approximately 10 minutes to complete

 Using a smart device?  
Convert to landscape format

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# Medication Administration Evaluation and Feedback Tool (MAEFT)

## Module 3: MAEFT scenarios

 Please note: this module takes approximately 20 minutes to complete

 Using a smart device?  
Convert to landscape format

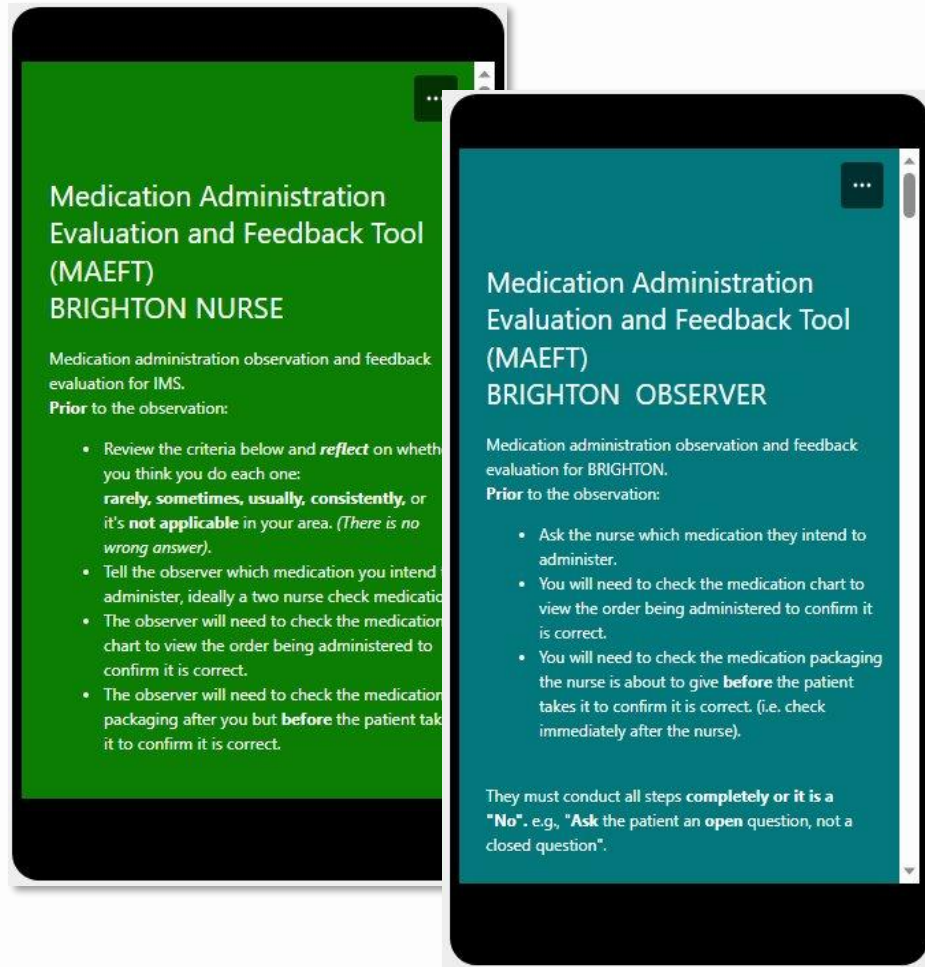
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# Train the Trainer Model

- NE & CNCFs
  - Train to be observers with MAEFT
- CN's & RNs
  - Trained to be observers with MAEFT
- Data entered and monitored in QH Microsoft Forms



## Results – IPC non-adherence improvement using MAEFT

Criteria Number	MAEFT Criteria	Pre MAEFT (NO) ^	MAEFT Intervention (NO) ^	Post MAEFT (NO) ^	Percentage Improvement
1.	Ask patient name	13%	0%	0%	13%
2.	ID check	7%	0%	0%	7%
3.	ADR checked	40%	4%	33%	<b>7%</b>
6.	Indication checked	7%	2%	0%	5%
7.	Expiry checked	13%	2%	0%	<b>13%</b>
13.	Hand hygiene all 5 moments	93%	42%	44%	<b>49%</b>

# Hand Hygiene Improvement *Statistically Significant*

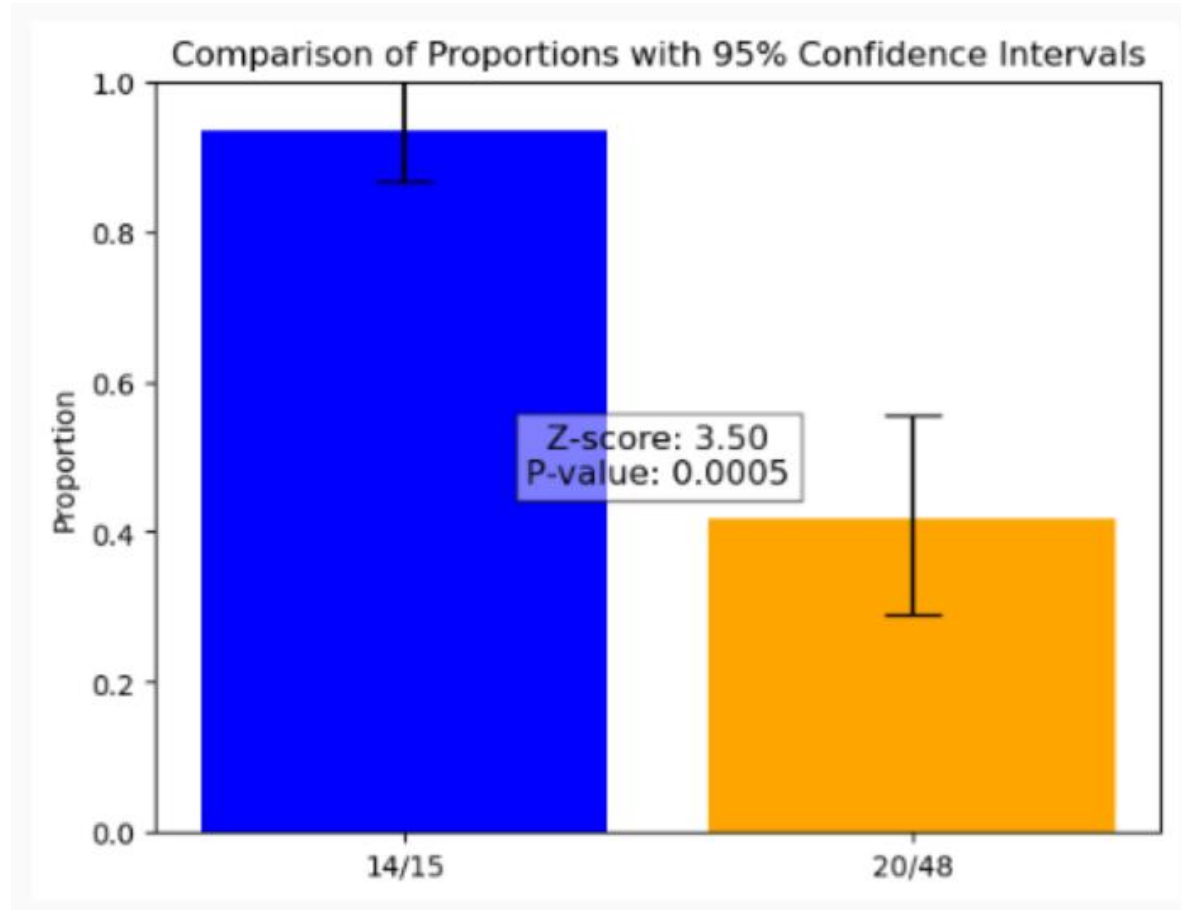


Figure 2. Two-proportion z-test - Hand Hygiene Improvement



## Feedback

## What they most enjoyed

### Nurse

n=4/48 (8%)

*"administering meds in the right way"*

*"Gaining insights into detailed practice"*

*"thank you. I enjoyed reviewing it"*

### Patient

*"I'm very happy that you are checking that the nurses are doing things the right way"*

*"This is a very good tool I am happy it is being used"*

# Practice Change - Governance Support

Project Team



- Project Lead
- Implementation Scientists

Workshops



- Implementation change management
- MAEFT

Facility Implementation Support Team



- **N/Leadership**
- Implementation Practitioner
- **Consumer Advocate**



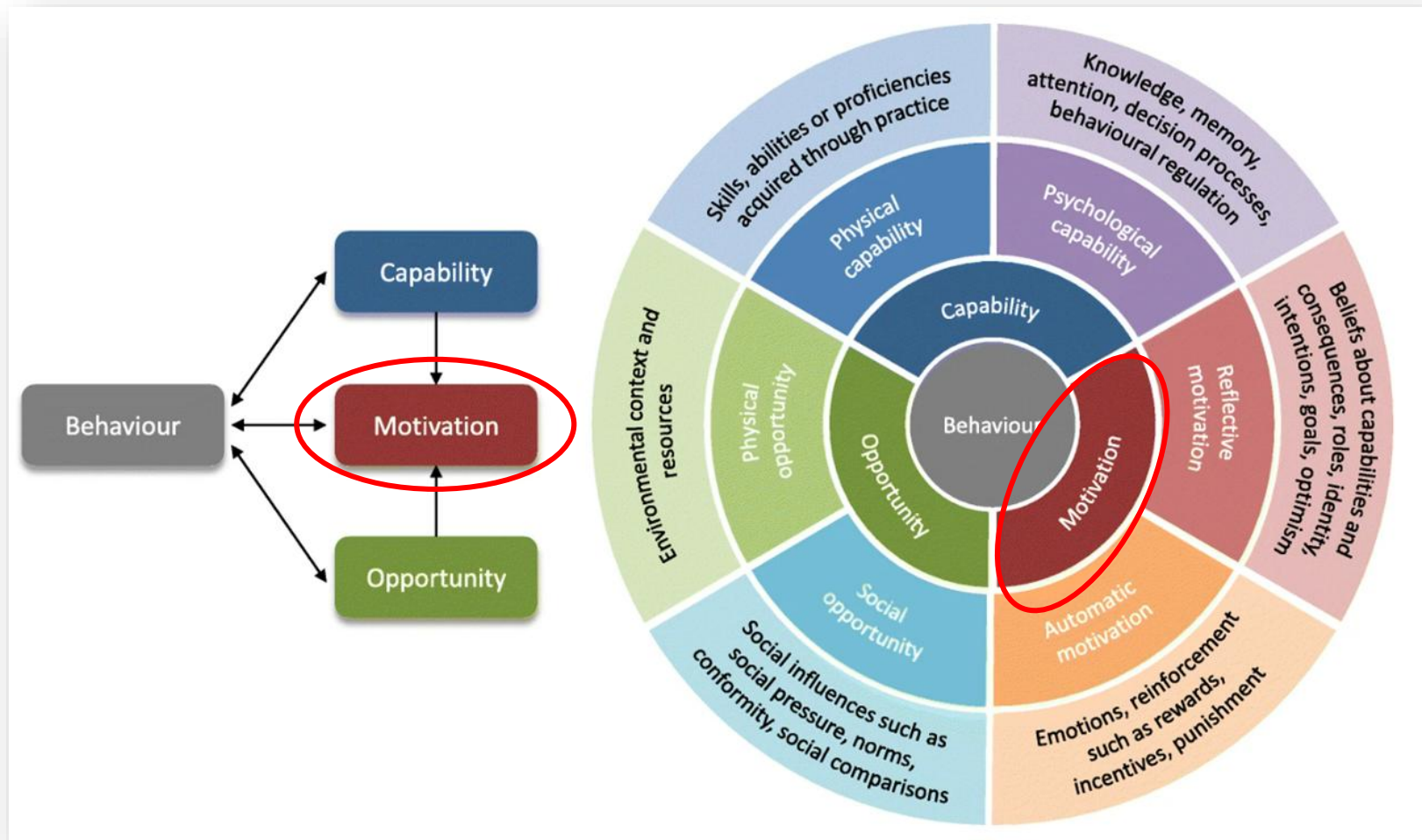
Local Change Champion Teams

- Adapt locally
- Identify barriers
- Monitor progress of implementation



- Evaluate outcomes and sustainability

# Behaviour Change





# Medication Administration Evaluation and Feedback Tool (MAEFT): Implementation Knowledge Translation

- **Implementation across MN sites**
  - Brighton Health Campus
  - RBWH
  - Kilcoy Hospital
  - TPCH
  - Surgical Treatment and Rehabilitation Service (STARS)
- **MAEFT as Microsoft App for all QH**
- **MN Online training module**
- **UQ SONM curriculum 2023**
- **QH**
  - South West Hospital Health Service
  - Darling Downs Health Service
- **International**
  - Missouri University USA
  - Philadelphia Children's Hospital USA
  - Los Angeles USA
  - Cleveland Ohio US Department of Veteran Affairs Healthcare USA
  - Arizona USA
  - North Georgia University USA
  - California USA
  - Philippines

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  - SWIFT Grant
  - Community and Oral Health Innovation and Research Centre Grant
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- Clinical Pharmacology Royal Brisbane and Women's Hospital (RBWH)
- Helix Hub



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  - Professor Ian Coombes
  - Professor Samantha Keogh
  - Dr Peter Donovan
- Research Support
  - Professor Jason Roberts
  - Professor Claire Rickard
  - Professor Nicole Marsh
- All Nurses involved
- Consumer Advocate
  - Dale Trevor





# *Questions?*

*Each of us is accountable for our own practice and the difference we make to patient outcomes!*