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Simulation- what's the evidence?

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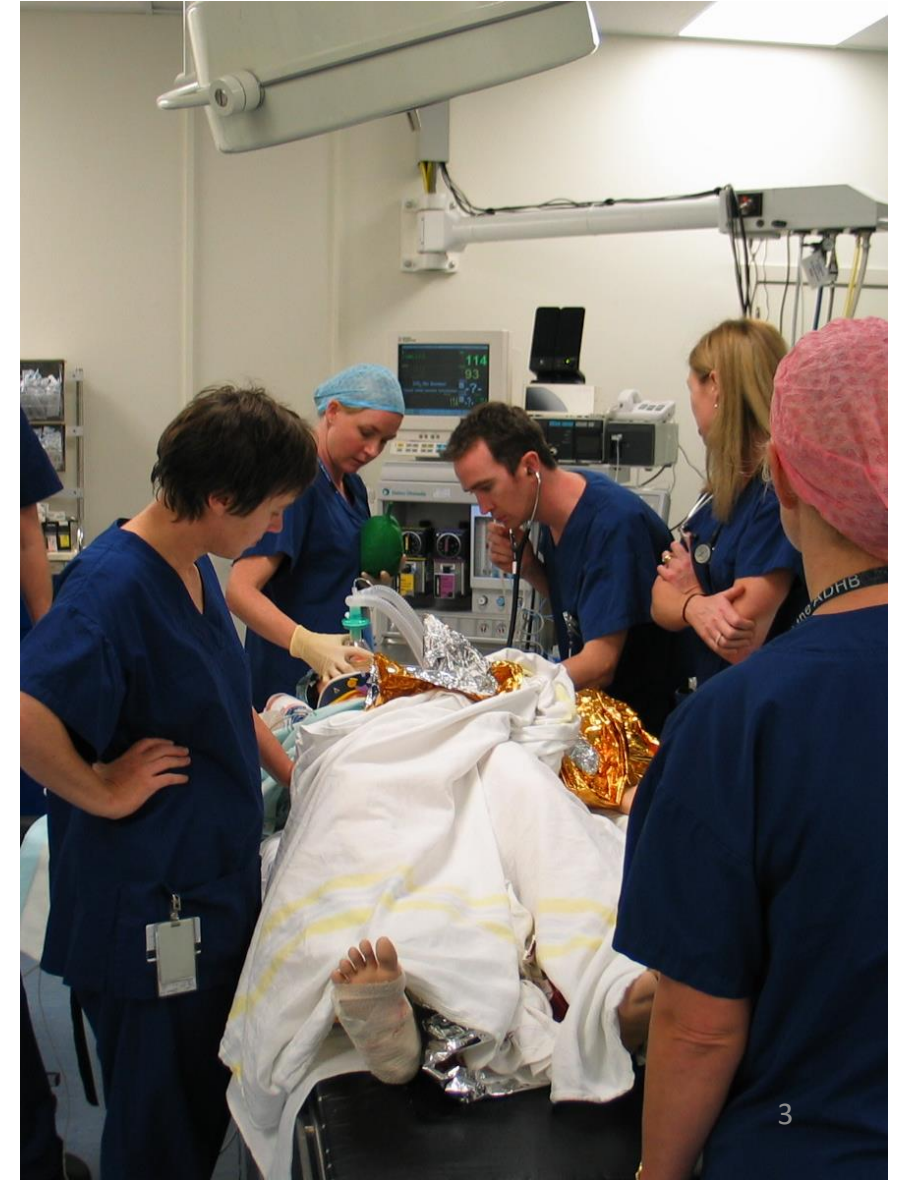
Overview of talk

- Rationale
- Simulation in ICM
- Evidence on Team Training
- NetworkZ – a case study on simulation-based team training in New Zealand



Rationale for simulation

- Active vs passive learning
- Experiential learning
- Deliberate practice
- Structured vs opportunistic



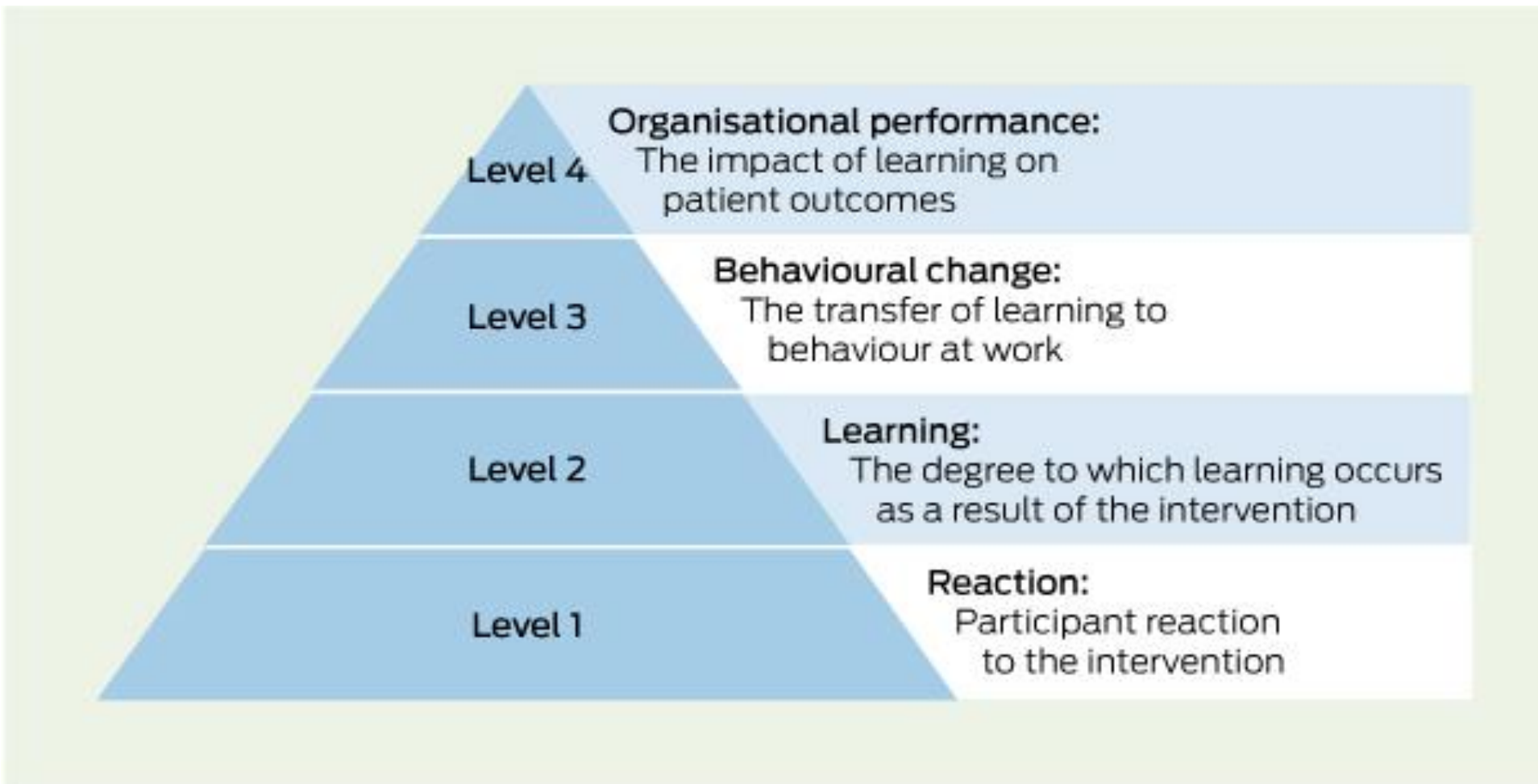
Simulation in Critical Care

Journal of Critical Care 2018, Low at al. *The effects of team-training in intensive care medicine: a narrative review*

- Clinical skills – e.g. vascular access, advanced airway management, ECMO
- CRM – ALS, ECMO initiation, sepsis, trauma
- Teamwork – team training initiatives



Kirkpatrick: evaluative framework



The effects of team-training in intensive care medicine: a narrative review - Results

Reaction	Widely reported positive responses, satisfied, viewed as relevant to practice
Learning	Increased scores in tests of clinical knowledge
Behavioural change	Improved scores for teamwork behaviours (communication, role clarity, situational awareness, negotiation, adherence to clinical guidelines)
Patient Outcomes	Fewer studies . Increased survival in a paed ICU following team training; reduced time to initiation of ECMO, intubation success rates

Low et al conclusions

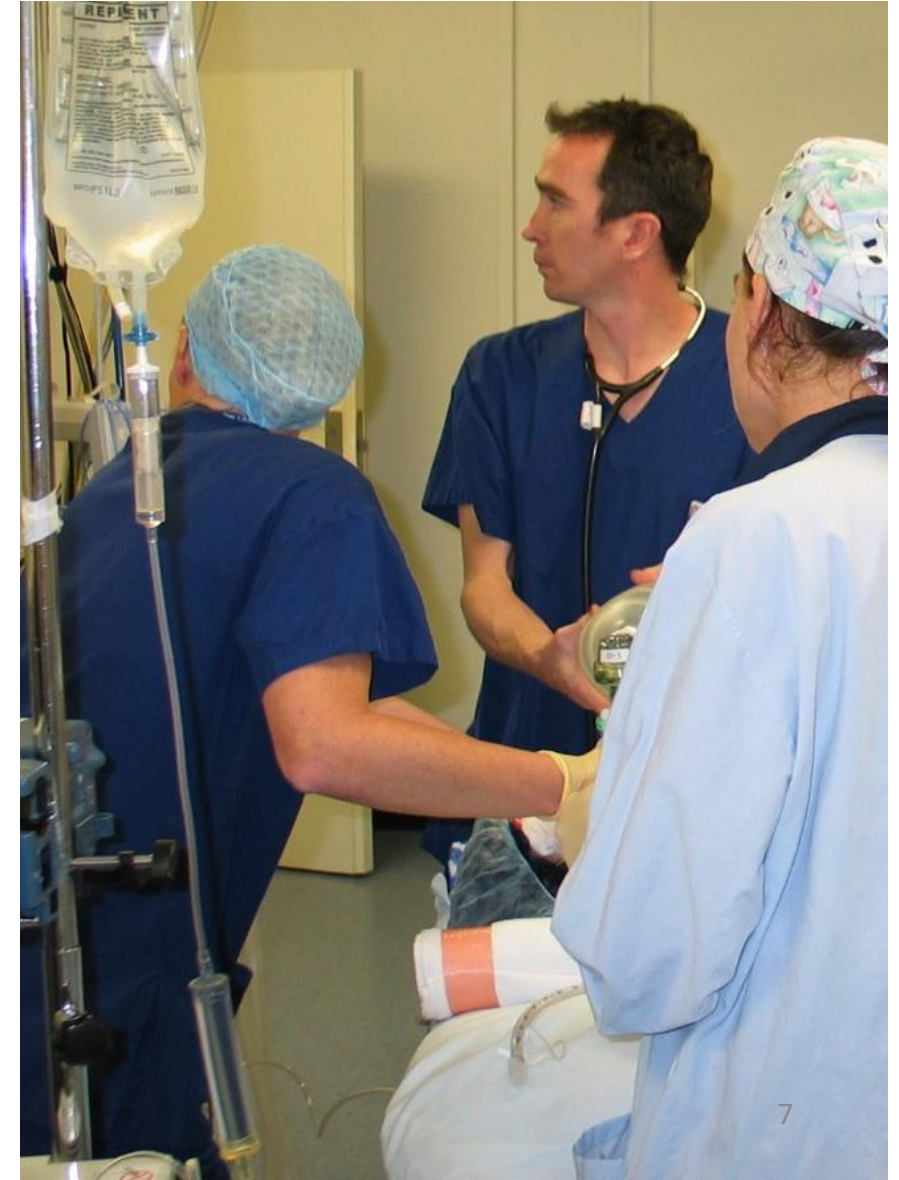
Good evidence supporting sim-
based team training in ICM
Less evidence available on
clinical outcomes

Issues:

- study quality
- hard to measure events
- attribution
- study size

Remaining questions

- Sustained improvement?
- Alternative, less costly approaches?



Saving Lives: A Meta-Analysis of Team Training in Healthcare. **Hughes et al. 2016 J Appl Psychol.**

Team training

- surpasses employees' satisfaction and utility expectations
- Induces learning
- Learned material is transferred to the job
- Improves organizational and patient results:
 - Safety climate
 - Hospital stay
 - Patient satisfaction
 - Patient mortality



Transforming health care one team at a time: Ten observations and the trail ahead. Salas et al. 2018. Group Org Mgmt

Narrative synthesis of studies from 2013-2018

1. Teamwork is the foundation for resilience and reducing medical error
2. Leadership matters – team leadership is necessary
3. Psychological safety matters
4. Medical team training works
5. Simulation is a powerful tool to enhance teamwork



NetworkZ: an example of simulation-based team training

- National initiative
- Insurer funding
- Unique whole team training opportunity
- Evidence-based
- In situ
- World leading focus on surgical fidelity





Supporting organisations

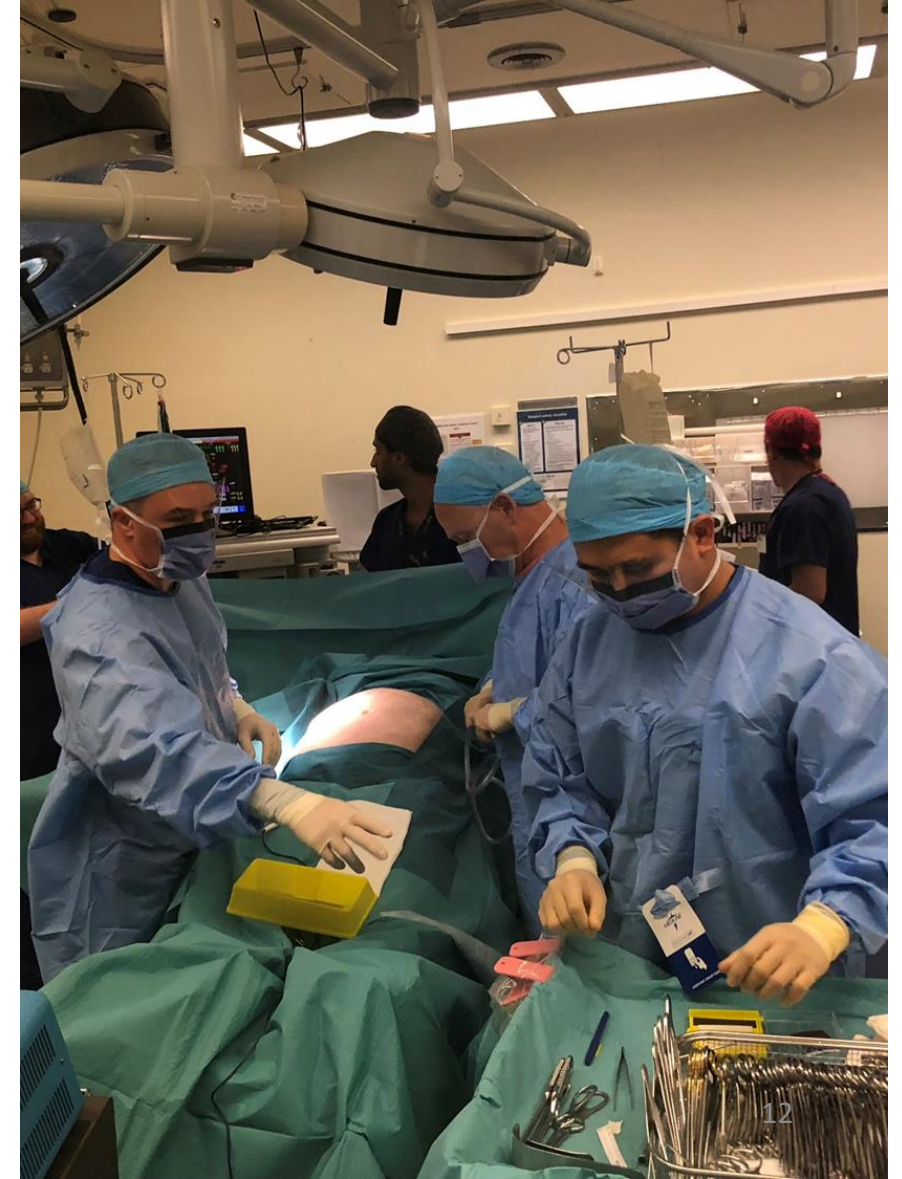
- Accident Compensation Corporation
- Health Quality and Safety Commission
- University of Auckland
- ANZCA
- RACS
- Nursing Council
- NZATS





The cost of unsafe surgical care

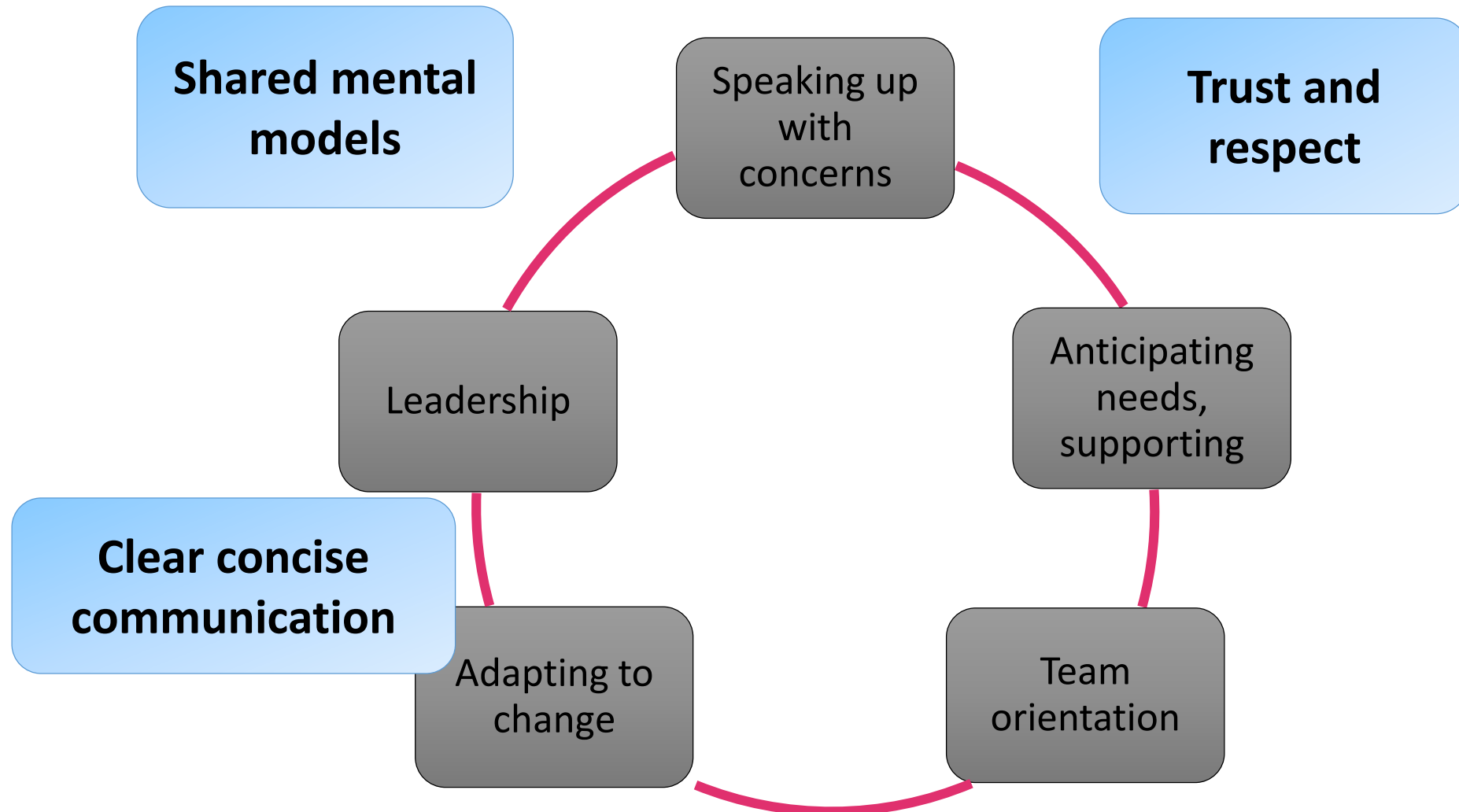
- Almost \$30,000,000 for new and existing claims in 2017
- 7,300 ACC claims related to injuries in patients undergoing surgery in NZ public hospitals in the last 5 years.
- Around half of perioperative surgical events are considered avoidable.
- Failures in teamwork and communication are an important contributing factor.



The OR tribes



The features of effective teams



National programme, ACC funded

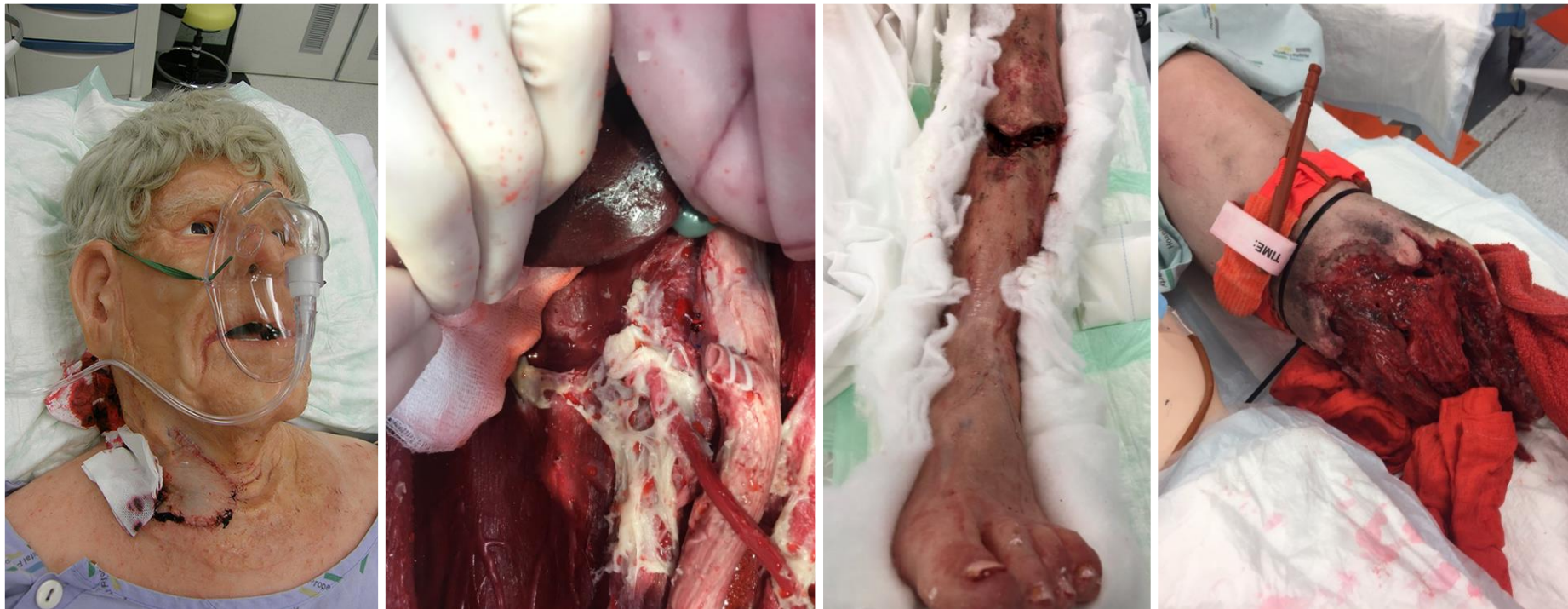
One-day simulation-based course, for whole OR teams

Debriefs – learning from the collective experience, taking it back to practice.

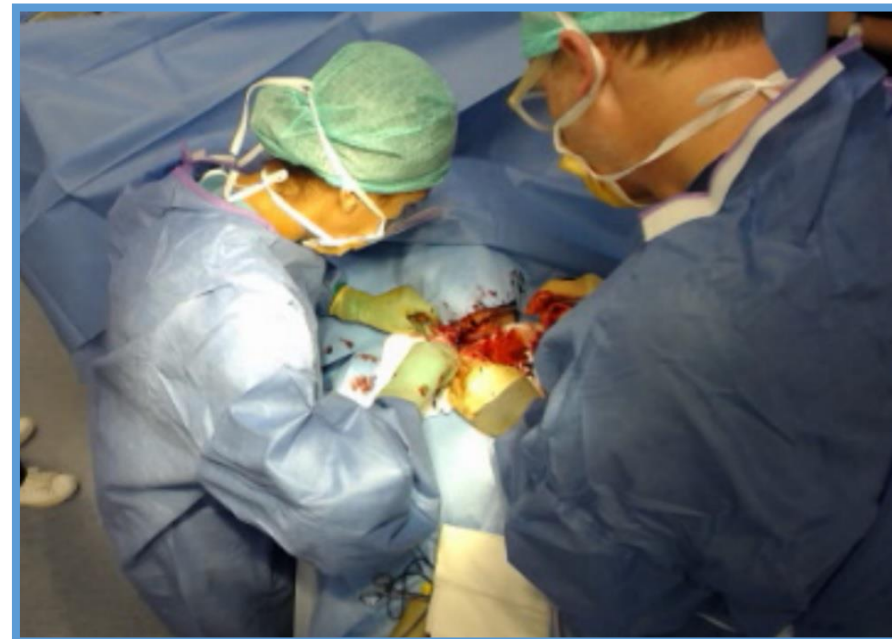
Communication skills:

- Briefings/ time out
- Structured Recap
- Speaking up
- Closed loop





Bespoke surgical
models Integrated
with a Laerdal 3G
simulator



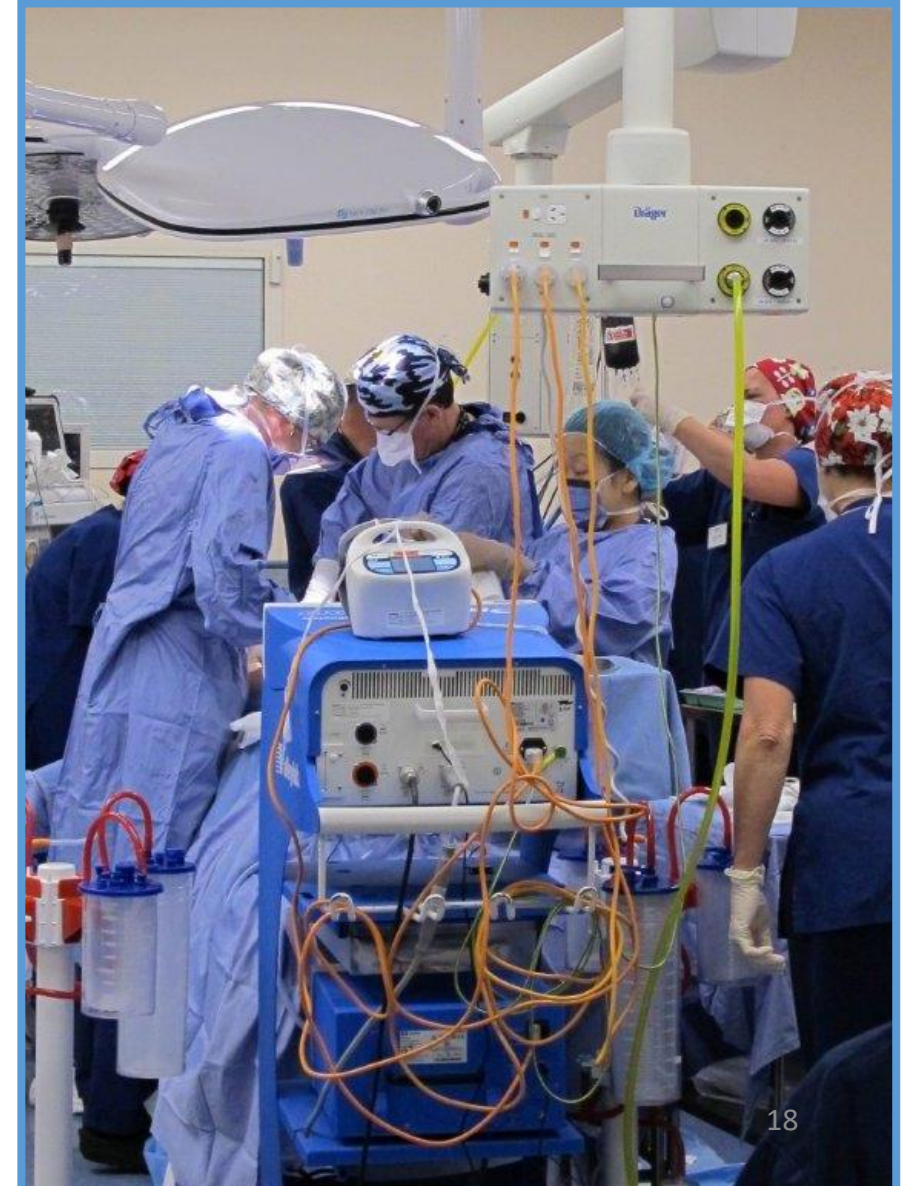
Psychological fidelity





In situ

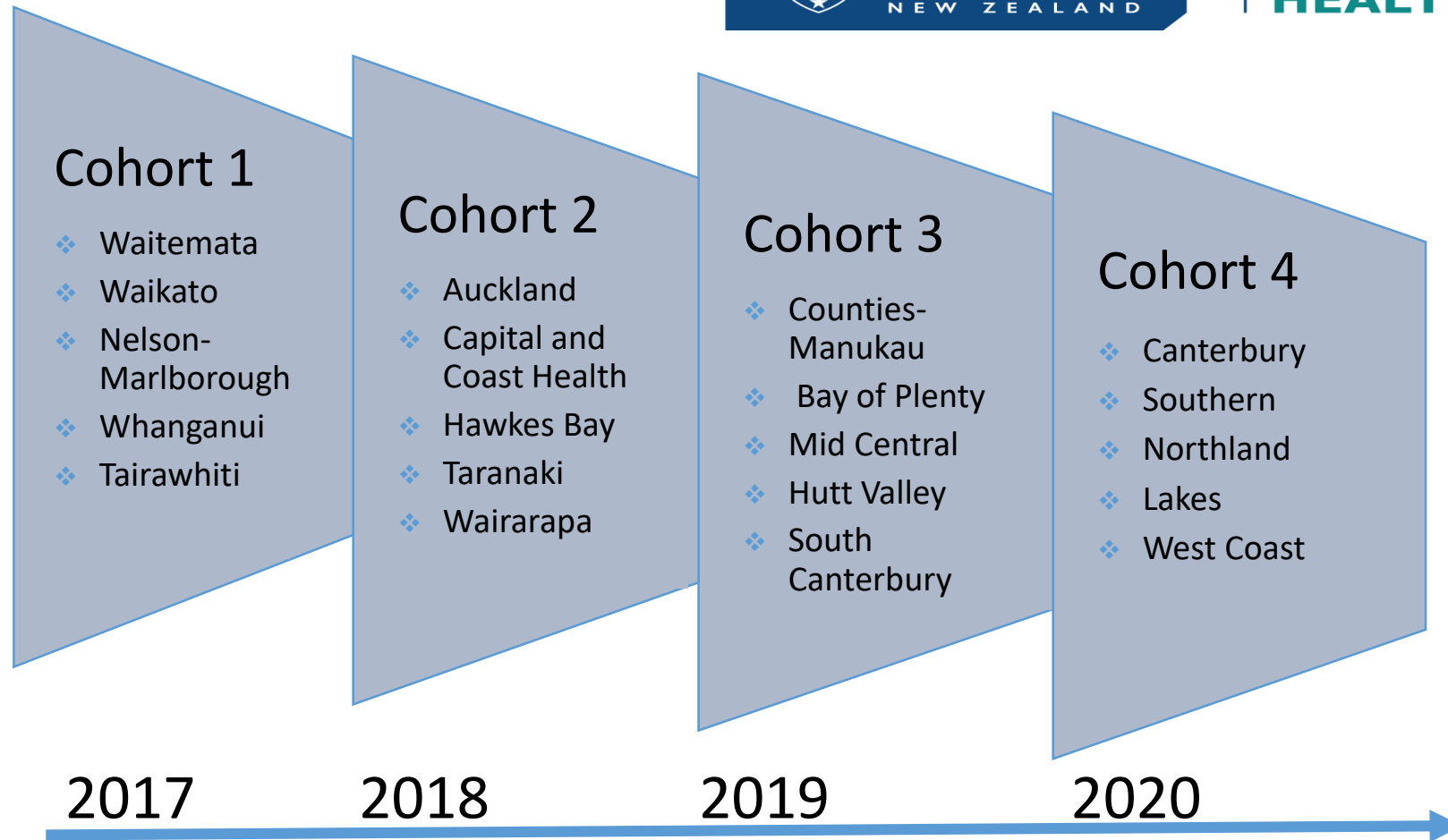
- Own theatre
- Own team
- Own system responses



National implementation

- Stepped roll-out across all 20 NZ DHBs.
- 3G simulator and surgical models to each DHB, standardized course package.
- Instructor Training program.
- Staged support for DHBs to run courses.
- Goal – simulation-based team training established as BAU.







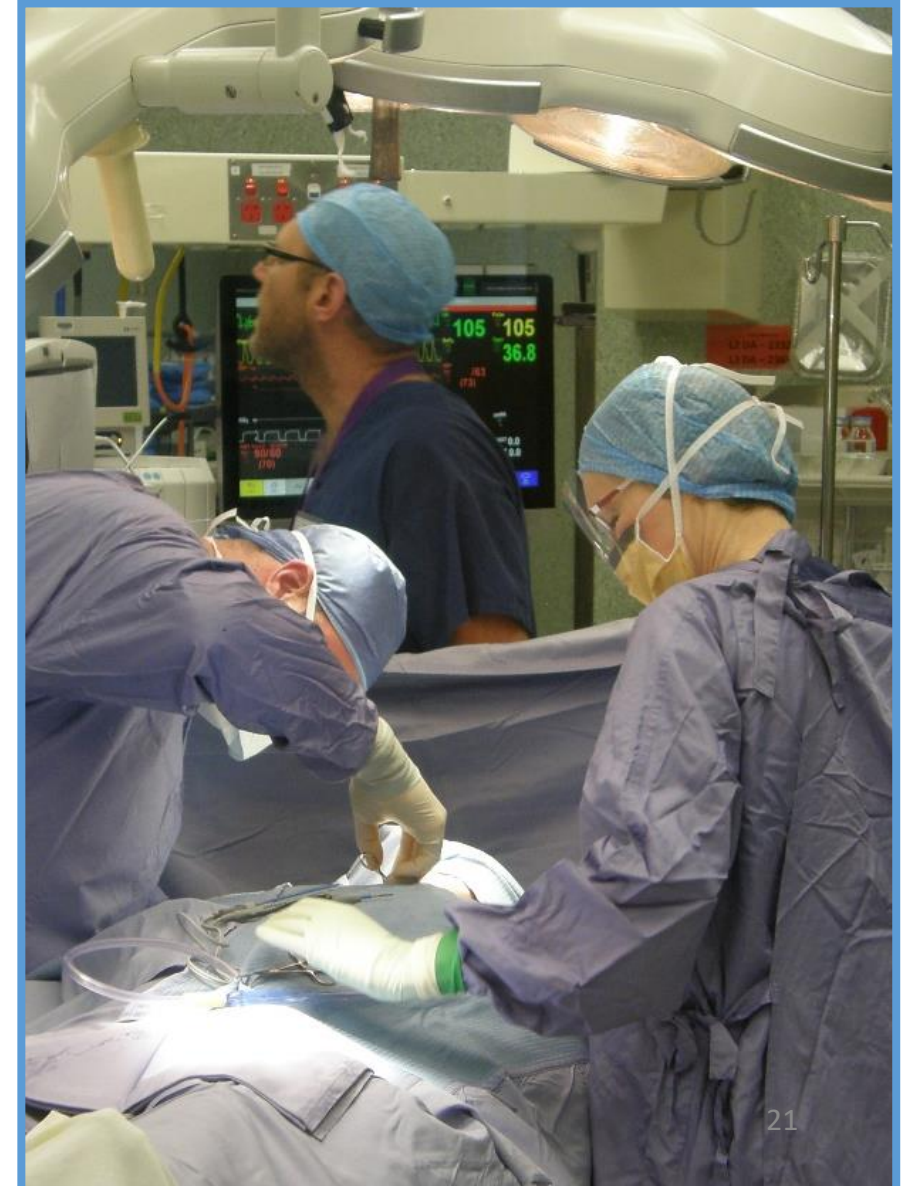
Evaluation: patient outcomes

Stepped wedge cluster design

Days alive and out of hospital (NMDS)

ACC claims database – number and cost

NMDS post-operative complication





Evaluation: culture and team processes

- End of course evaluations / reports
- Quality of administration of the Surgical Safety Checklist
- Pre-post teamwork / safety culture survey
- Staff Interviews



NetworkZ implementation

NetworkZ uptake

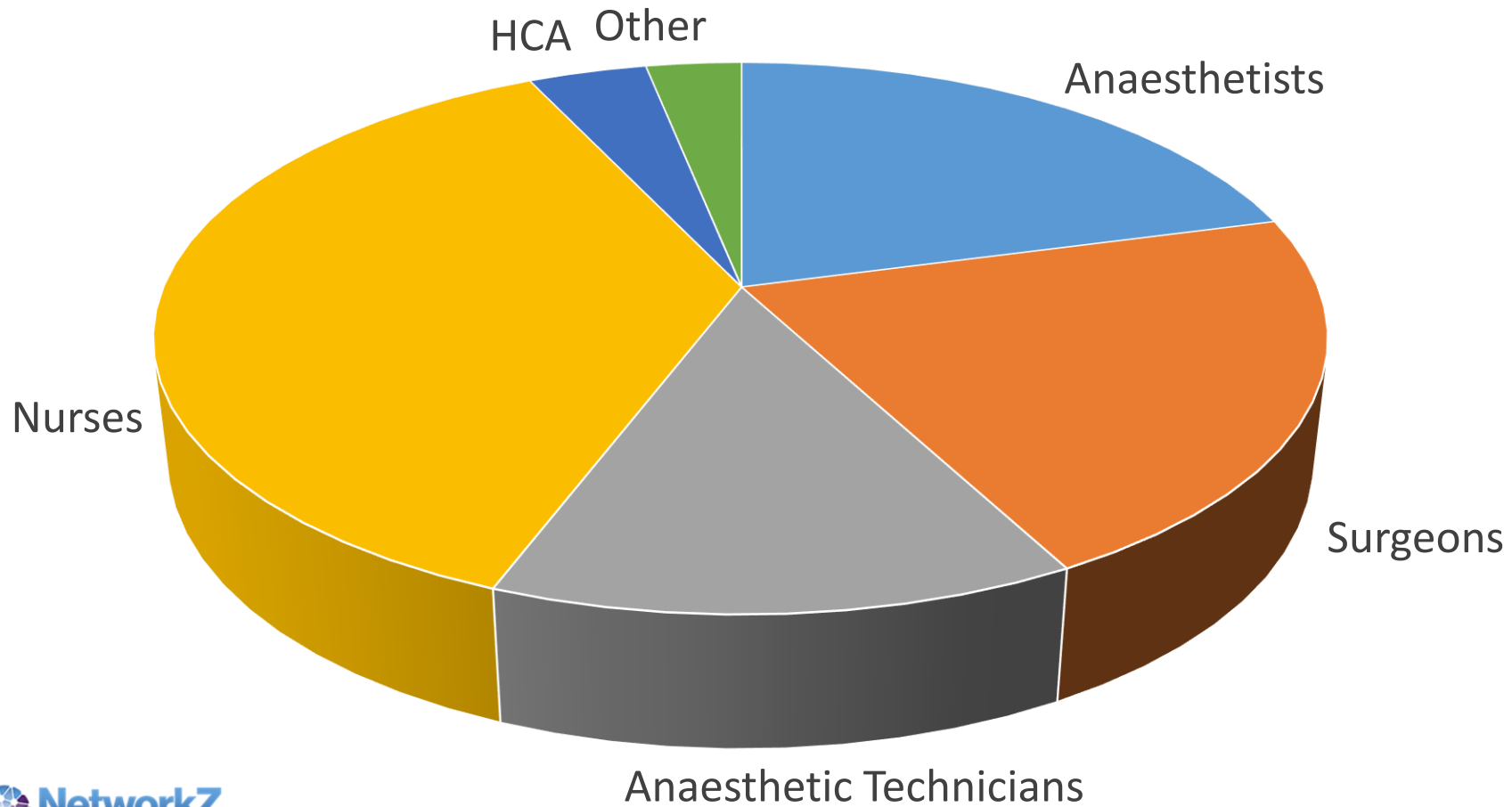
>700 course participants since March 2017
160 Instructors trained or part trained.

Participant reaction

98% agree / strongly agree on value and
quality of course.



Staff Training Makeup



Post-course reports

Communication

Staff names – need to be visible.

Institute briefings

Gaps in knowledge and skills

ACLS / defibrillator

MTP protocol

Clarifying roles

Clarify staff roles and capabilities

Crisis response

Surgical staff unaware of crisis cognitive aids

Equipment and resources

Broken equipment, lack of equipment

Systems issues

Adrenaline ampoules in two different concentrations

Anaphylaxis box 'misplaced'



Interviews: Cohort 1

- Existing culture influenced implementation, but NetworkZ influenced culture towards improved relationships.
- Motivation - strong interest, learning, local evidence of change in practice.
- Structure - resources, support, fidelity of simulations important.
- Infrastructure - support from senior management is critical.





Culture

*People are happier to speak up,
they're happier to raise a
concern,*

*I get a feeling that it improves
theatre morale.*

*It's created a lot of talk about
things that they can do better
and I think it has improved
some relationships around the
place."*



Beyond the OR

- Simulation capacity in each DHB
Instructor training available
Moving beyond the OR
- Trauma Network team training
 - O&G
- Opportunity to work across boundaries





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