# How to be a clinician-scientist

## Lessons from the frontline

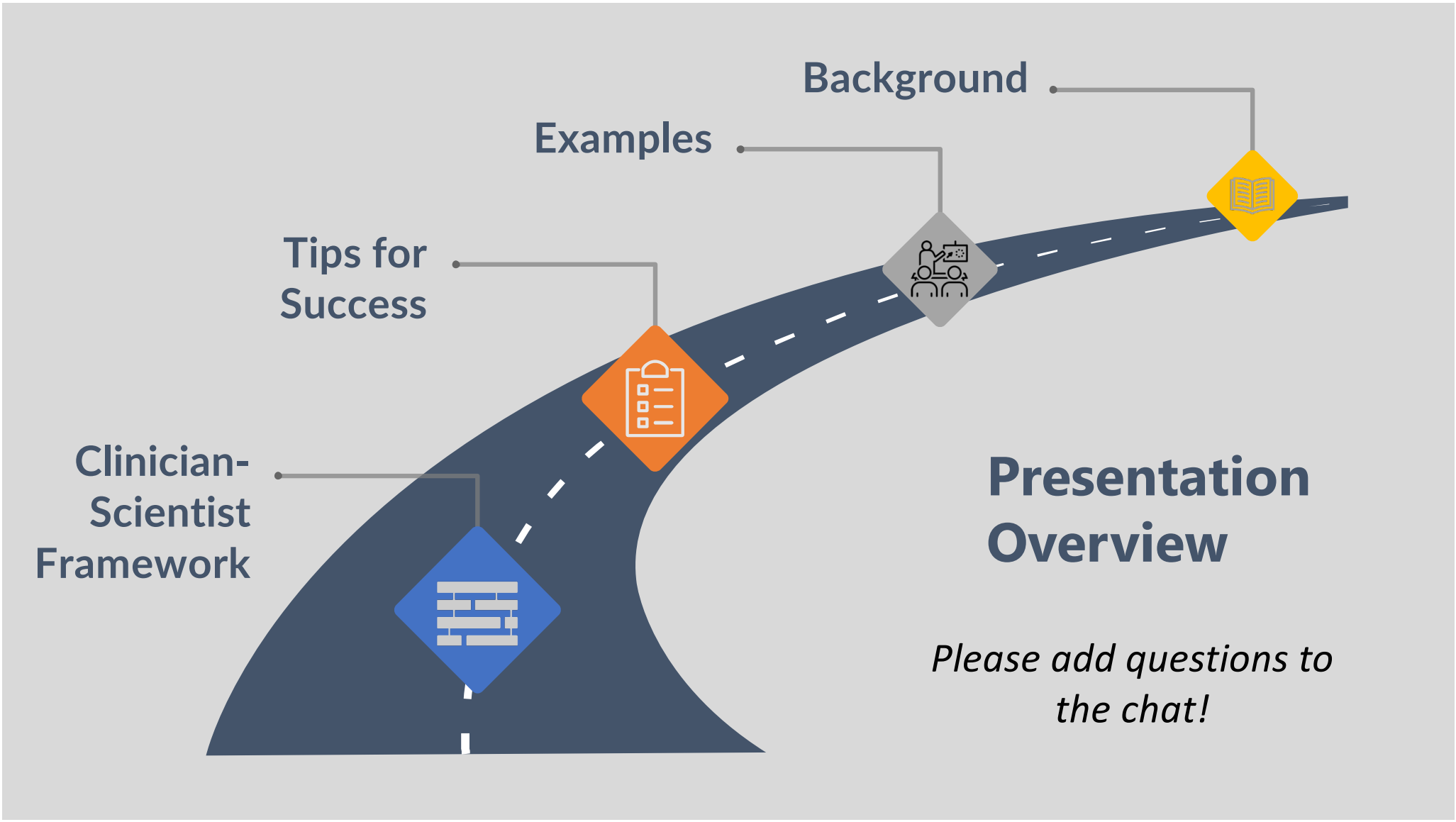
Michelle Kho, PT, PhD

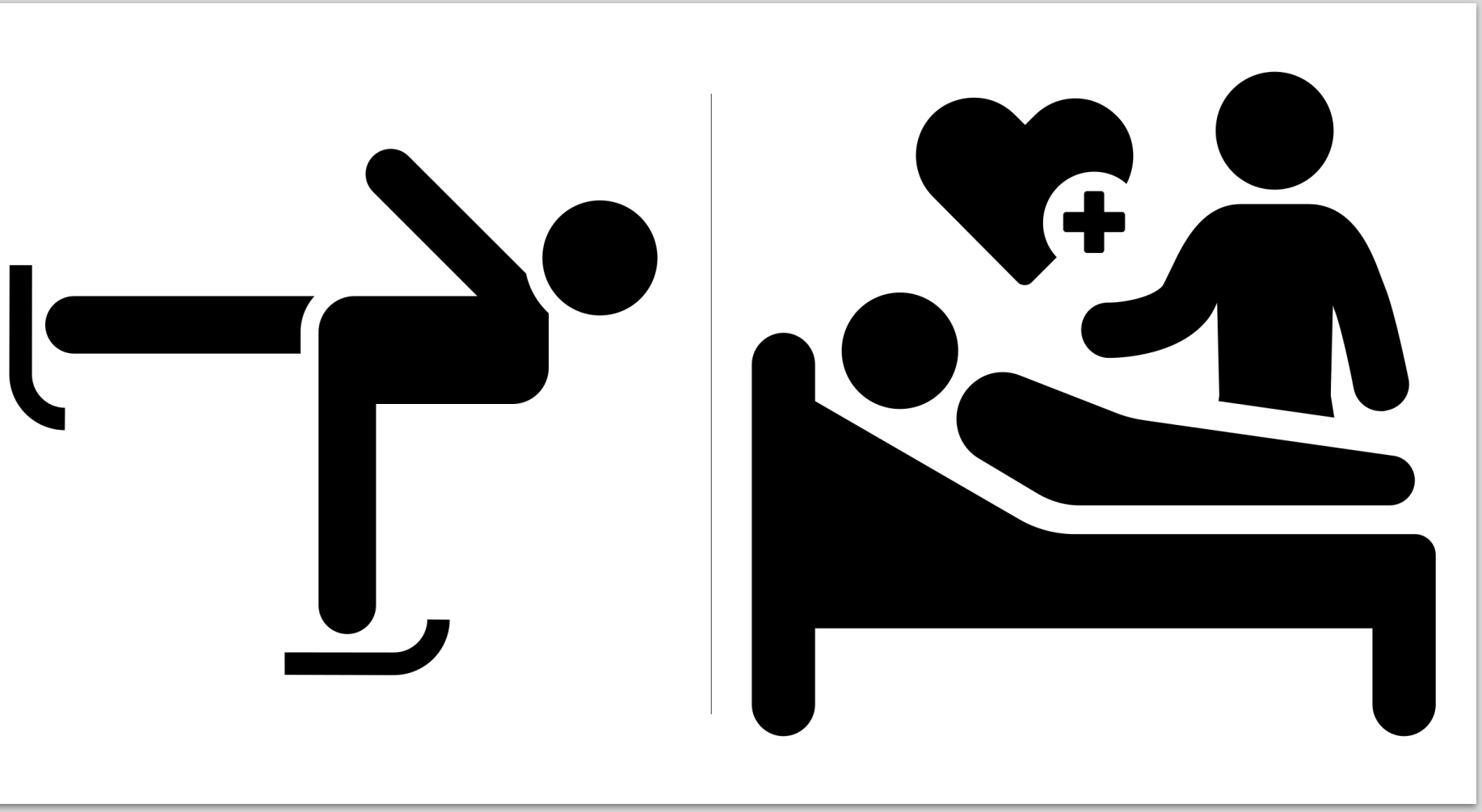
April 10, 2024

Associate Professor, School of Rehabilitation Science, McMaster University

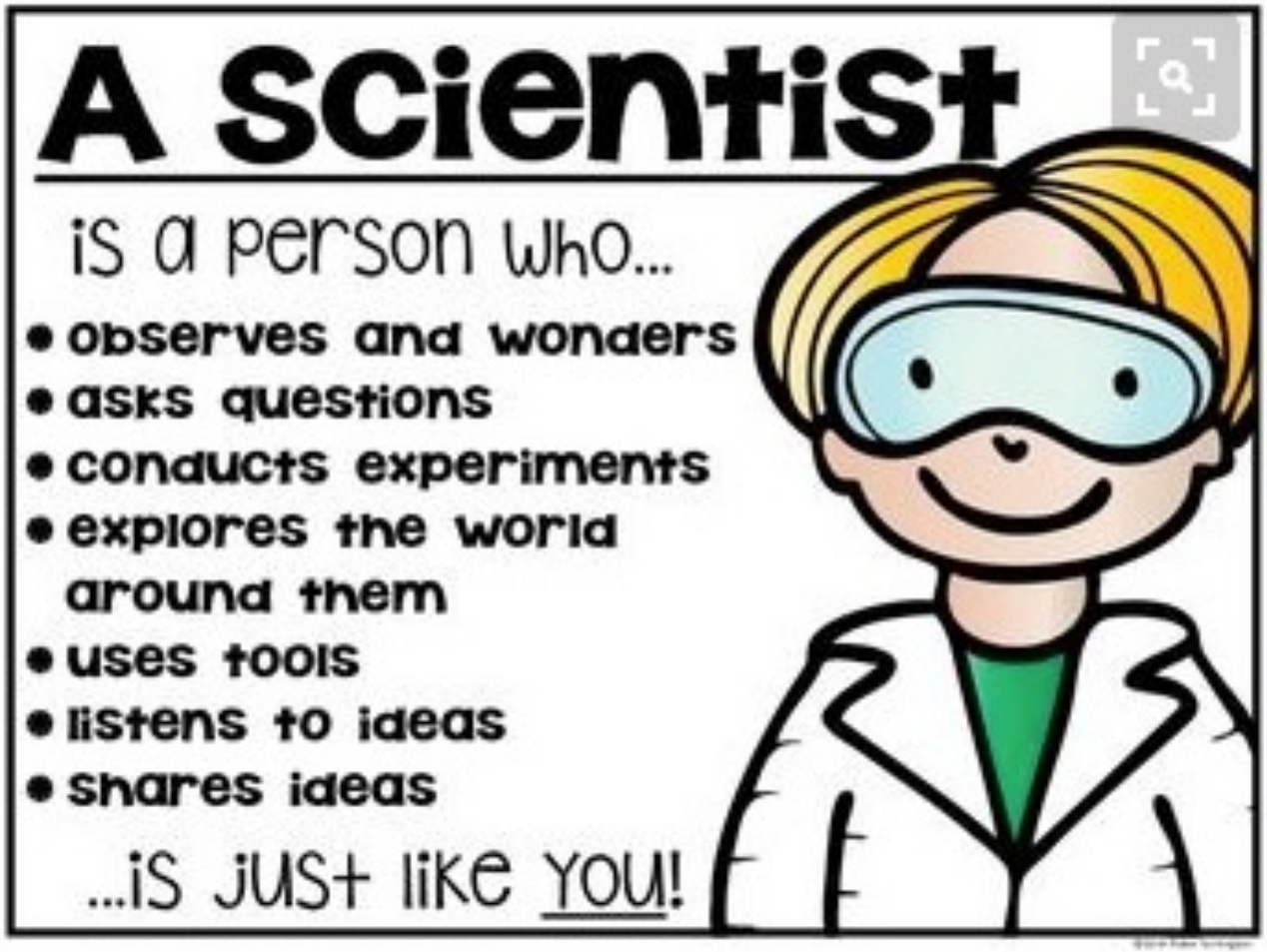
University Scholar

# Land Acknowledgement


Background
Examples
Tips for Success
Clinician-Scientist Framework
Presentation Overview
Please add questions to the chat!



https://1st-bfa.weebly.com/what-is-a-scientist.html



# What is a clinician-scientist?


Kaur et al., American Journal of Health Research. 2021; 9(6): 246-268

# Benefits of engaging clinicians in research

- Understands the contemporary clinical environment
- Identify barriers and facilitators

- Increase research uptake
- Implement results more quickly in patient care

## How can scientists help facilitate clinicians' research participation?

- Empowering others
- Frame the question
- Interpret the evidence
- Apply research to clinical practice

# The Clinician Scientist: How Rehabilitation Fares — A Scoping Review

**Inderjit Kaur[1, *], Xiao Xi Elsa Pang[1], Mindy Liang[1], Chi Xuan Zhang[1], Ashley Turgeon[1], Jessica Yeung[1], Dina Brooks[1, 2, 3, 4, 5], Julie Vaughan-Graham[1, 2]**

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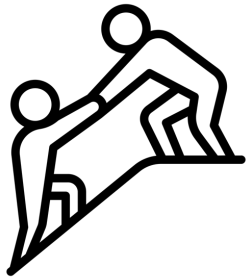
- Time (clinical & research)
- Finances, Funding
- Work-life balance
- Gender roles
- Career progression
- Administrative support
- Mentorship



- Training
- Funding opportunities
- Role models
- Mentorship

BMJ Open

# Characterising the research profile of the critical care physiotherapy workforce and engagement with critical care research: a UK national survey

Bronwen Connolly,[1,2,3,4] Laura Allum,[1] Michelle Shaw,[5] Natalie Pattison,[6] Paul Dark[7]

Connolly et al., BMJ Open 2018;8:e020350

- N=268; 50% academic, 41% community
- 85% research experience; 12% post-graduate research training

**Common roles:**

- Data collection
- Protocol development
- Recruitment

**Training needs:**

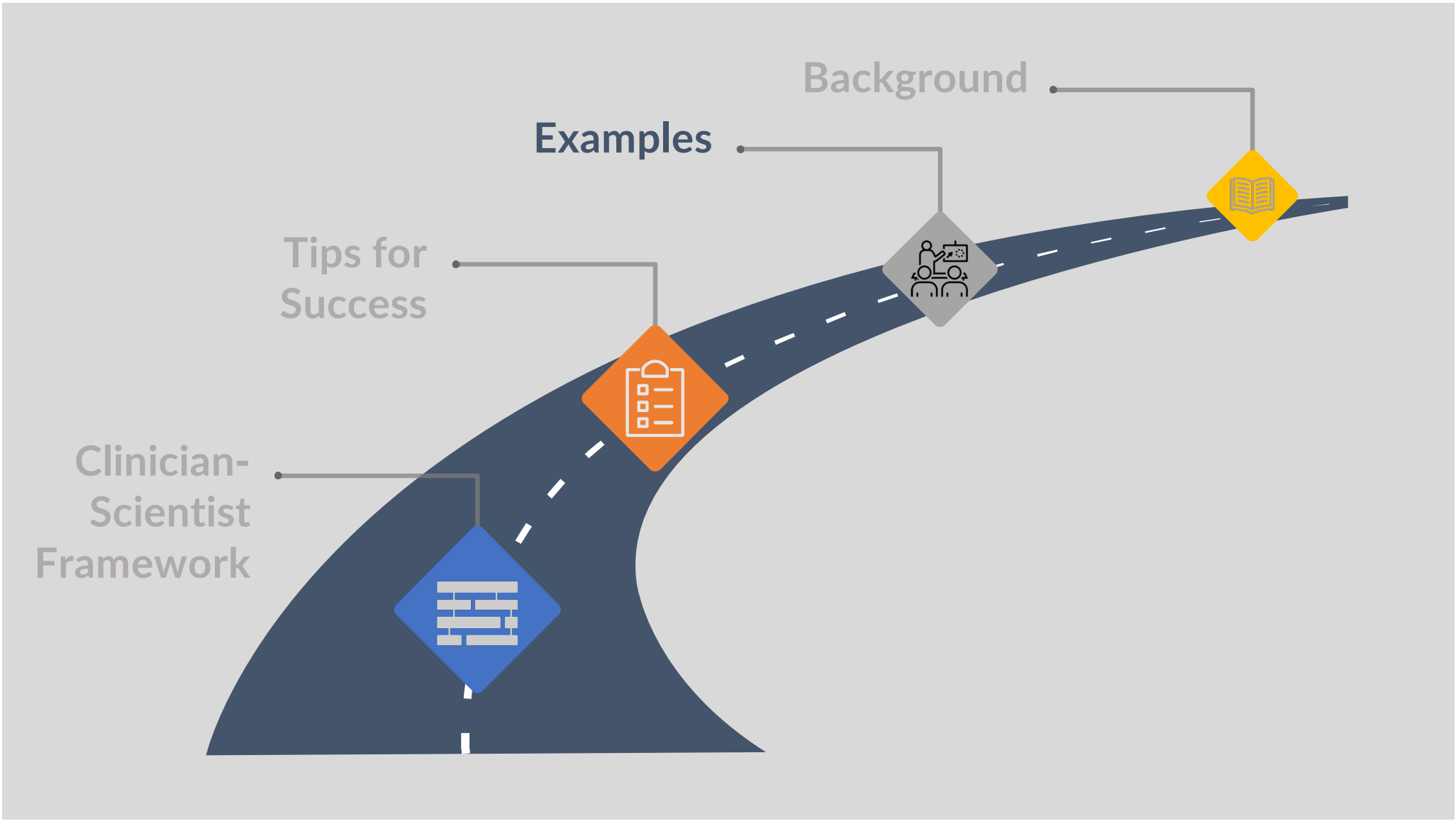
- Statistics
- Research methods
- Protocol development

**Barriers:**

- Protected time
- Funding
- Experience

**Facilitators:**

- Local studies
- Research involvement
- Training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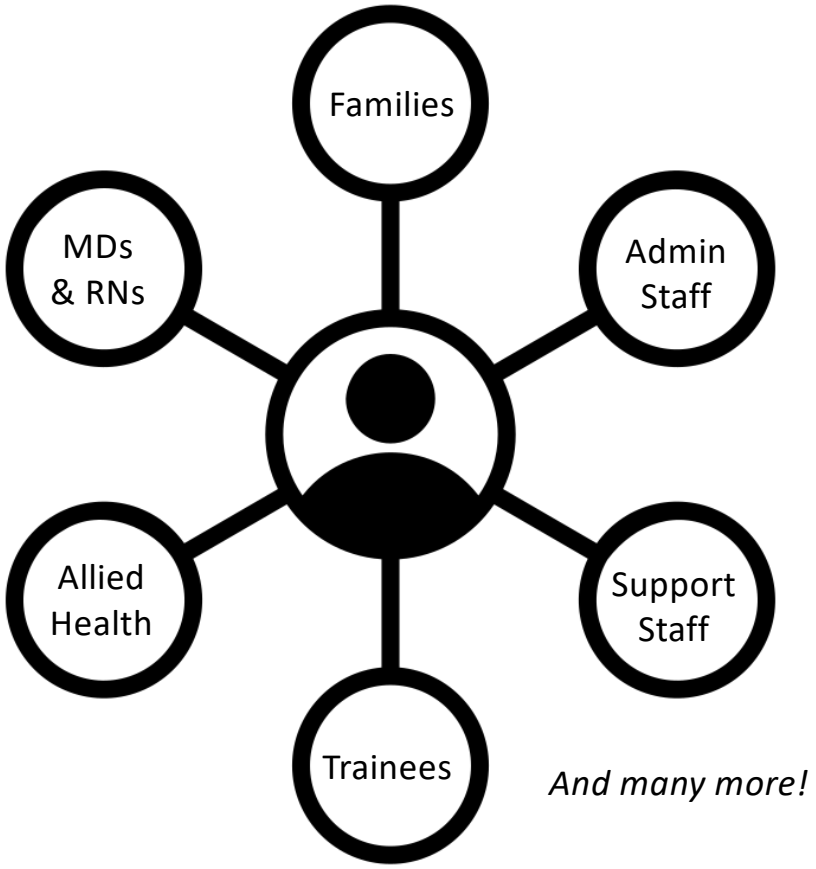
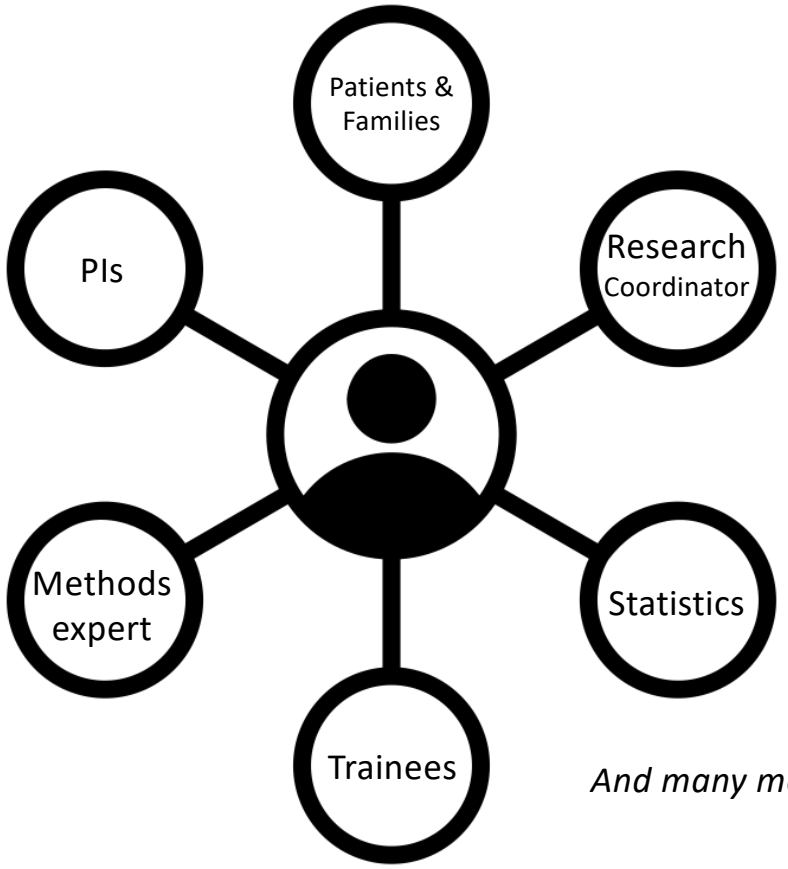
# Healthcare Team




*And many more!*

# Research Team

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# Examples of engaging clinicians in research

| Example | Learner Type | Commitment |
|---|---|---|
| Role-emerging clinician scientist clinical placement | Clinical trainees (e.g., MSc PT or OT) | 6-8 weeks |
| Evidence-based practice projects | Clinical trainees (e.g., MSc PT or OT) | 8 months + publication |
| Clinician-initiated projects | Front-line clinicians | 1-2 years |
| Interventionists, outcomes assessors, research team | Front-line clinicians | Project-dependent |
| Graduate studies | Front-line clinicians | 2-5 years |

# Development, Implementation, and Outcomes of an Acute Care Clinician Scientist Clinical Placement: Case Report

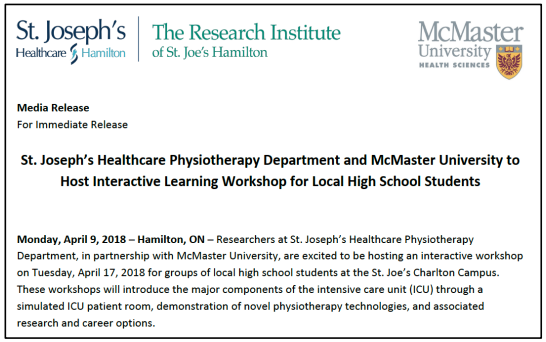
*Sarah Wojkowski, PhD cand., PT;[*] Janelle Unger, MSc(PT);[*†]*
*Magda McCaughan, MSc(PT), PT;[‡] Beverley Cole, MSc, MBA, PT;[‡]*
*Michelle E. Kho, PhD, PT[*‡]*

Wojkowski et al., Physiotherapy Canada. 2017;69(4):318-322.

- 2nd year student
- Shared supervisory model (½ clinical; ½ research)
- Student, clinician, and scientist perspectives
- **Success factors**: preparation, planning, matching, communication
- **Current status**: Assistant Professor (after PhD and CIHR fellowship)

# Role-emerging clinician-scientist placement projects

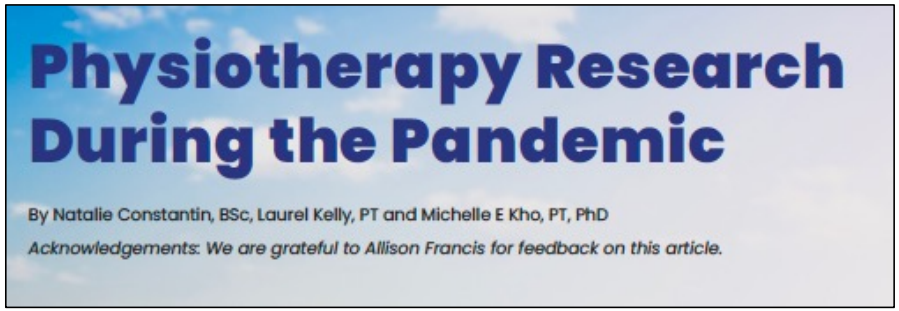
| |
|---|
| Invited submission to Physiotherapy Practice |
| Development of teaching video for CYCLE standardized outcome |
| Development of interactive high school teaching session |
| Invited submission to Ontario Physiotherapy Association Newsletter |
| Summary of ICU COVID-19 outcomes |
| Literature review of facial injuries and proning in mechanically ventilated patients (OT) |



St. Joseph's Healthcare Hamilton | The Research Institute of St. Joe's Hamilton | McMaster University Health Sciences

**Media Release**
For Immediate Release

**St. Joseph's Healthcare Physiotherapy Department and McMaster University to Host Interactive Learning Workshop for Local High School Students**

**Monday, April 9, 2018 – Hamilton, ON** – Researchers at St. Joseph's Healthcare Physiotherapy Department, in partnership with McMaster University, are excited to be hosting an interactive workshop on Tuesday, April 17, 2018 for groups of local high school students at the St. Joe's Charlton Campus. These workshops will introduce the major components of the intensive care unit (ICU) through a simulated ICU patient room, demonstration of novel physiotherapy technologies, and associated research and career options.



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# Evidence-based practice projects


2022 Critical Care Canada Forum

ARTICLE IN PRESS

Australian Critical Care xxx (xxxx) xxx

Contents lists available at ScienceDirect

Australian Critical Care

journal homepage: www.elsevier.com/locate/aucc

Review paper

## Arm cycle ergometry in critically ill patients: A systematic review

Lauren Vanderlelie, BSc, MSc, PT [a, **], Sandra Bosich, BSc, MSc, PT Resident [a], Heather O'Grady, BSc, PhD [a], Karim Azizi, BSc, MSc, PT [a], Jasdeep Lally, BSc, MSc, PT [a], Sarah Micks, BA, MSc, PT [a], Saheb Sandhu, BSc, MSc, PT [a], Bailey Whyte, BSc, MSc, PT [a], Michelle E. Kho, PT, PhD [a, b, *]

[a] School of Rehabilitation Sciences, McMaster University, Hamilton, ON, Canada; [b] St. Joseph's Healthcare Hamilton, Hamilton, ON, Canada

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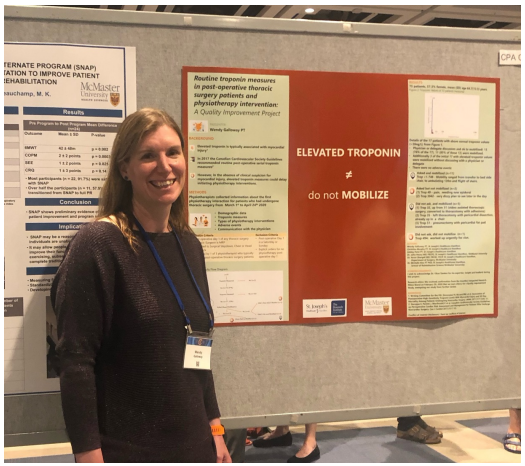
# Clinician-initiated projects




Routine troponin measures in post-op thoracic surgery patients and physiotherapy interventions

**Lead:** Wendy Galloway, PT


Facial pressure injuries in mechanically ventilated proned patients

**Lead:** Stefanie Piatek, OT

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Co-PIs:


# revive

Frailty, Rehabilitation, and Outcomes in Critically Ill Adult and Pediatric Survivors of COVID-19

**Design:** 900 patient, multicenter, national cohort study

**Population:** Adult (n=750) and Pediatric (n=150) ICU survivors

**Exposures:** ICU interventions, ICU and ward rehabilitation activities

**Primary Outcome:** Frailty at hospital discharge

School of Rehabilitation Science REACHING FURTHER | McMaster University | CIHR IRSC | CCCTG Canadian Critical Care Trials Group | St. Joseph's Healthcare Hamilton | The Research Institute of St. Joe's Hamilton

**Design:** 360-patient, multicenter, international open-label randomized trial

**Population:** Medical-surgical adults within the first 4 days of mechanical ventilation

**Intervention:** 30 minutes/ day of in-bed cycling + Usual physiotherapy

**Comparison:** Usual physiotherapy

**Primary Outcome:** Physical Function ICU Test @ 3 days post-ICU discharge by blinded outcomes assessors

CYCLE

McMaster University HEALTH SCIENCES

CCCTG Canadian Critical Care Trials Group

Chaires de recherche du Canada Canada Research Chairs

Canada

CIHR IRSC

ACT AEC Accelerating Clinical Trials Accélérer les Essais Cliniques

# CYCLE: Critical Care Cycling to Improve Lower Extremity Strength

**CYCLE**
Preparation phase

**ICAN Rehab**

Survey development: pt, family, clinician satisfaction with rehab ✓ ***Pilot & Feasibility Studies 2019***

**CYCLE-R**

Systematic Review ✓ ***Annals of ATS 2020***

**Uni-CYCLE**

Retrospective chart audit ✓ ***JCC 2015***

**TryCYCLE:**
Phase II open label study

1 center, 33 pts prospective cohort
- Design the intervention; select outcomes; assess fidelity, safety, satisfaction, and acceptability ✓ ***PLoS One 2016***

**CYCLE Pilot RCT:**
Phase II pilot randomized trial

7 center, 66 pts Feasibility ✓ ***BMJ Open 2016 (protocol); BMJ Open Resp Res 2019 NCT02377830***

**CYCLE Vanguard** Pilot RCT *(added)*

6 center, 46 pts Refinement; Internal pilot ***Finished recruitment NCT02377830***

**CYCLE RCT:**
Phase III randomized trial

Multicenter RCT ✓ *under review* ***NCT03471247***

**CYCLE$**

Economic evaluation *In progress*

**BICYCLE**

KT Behavioural Intervention

**Trial methodology questions:**

Pilot RCT 5 lessons learned ✓ *Trials 2019*

Barriers and facilitators to physiotherapist trial involvement *See I CAN Rehab*

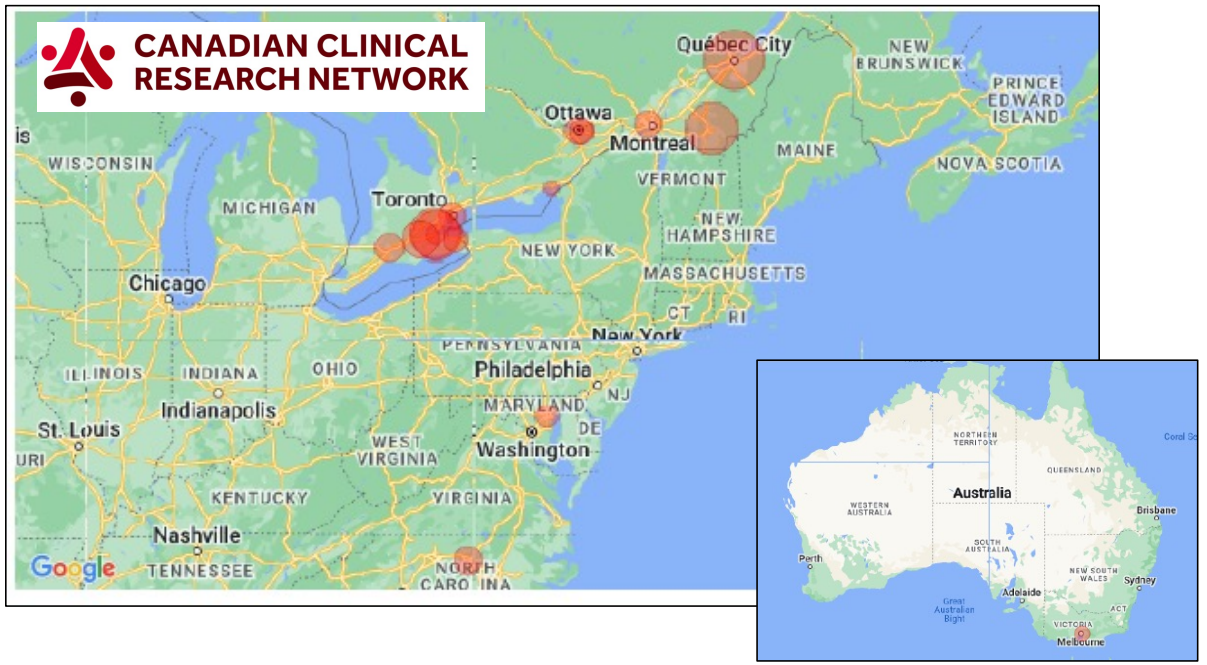
CYCLE Pandemic response ✓ *Trials 2022*

**Initial thoughts 2011 – RCT results presentation 2024 (13 years!)**

# Clinicians as interventionists, outcomes assessors

**Engagement & Training**:

- >80 ICU PT interventionists
- >170 acute care outcome assessors
- >100 research personnel
- 18 centres, 3 countries
- Academic and community hospitals



# Critical Care Reviews Meeting 2024

## The Best Critical Care Trials in the World

## CYCLE Trial Results

A Randomized Clinical Trial of Early In-bed Cycling for Mechanically Ventilated Patients

CYCLE

Chief Investigator Michelle Kho
Hamilton, Canada

Livestream results
June 12, 2024 11:00 am ET

Register at
https://criticalcarereviews.com

June 12-14th, 2024, Titanic Belfast

Belfast · Tourism Northern Ireland · visit Belfast · HSC Belfast Health and Social Care Trust — caring supporting improving together

RESEARCH Open Access

# Therapist perceptions of a rehabilitation research study in the intensive care unit: a trinational survey assessing barriers and facilitators to implementing the CYCLE pilot randomized clinical trial

Julie C. Reid[1*], Devin S. McCaskell[2] and Michelle E. Kho[1,2]

Reid et al. Pilot and Feasibility Studies (2019) 5:131

**Therapist-reported barriers:**

1. Equitable care for all patients
2. Prioritizing cycling over other activities
3. Skills to transcribe data onto research forms
4. Patient fatigue during outcomes
5. Time to conduct cycling, outcome measures

**Potential facilitators:**

1. Strategies for caseload management
2. Ethical imperative to provide randomized intervention
3. Support for data transcription
4. Guidance to prioritize outcomes
5. Peer- and- management support for research activities, research budget

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Frailty (J Frailty Aging, 2021)

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**CYCLE Vanguard**
Pilot RCT *(added)*

6 center, 46 pts Refinement; Internal pilot *Finished recruitment NCT02377830*

Study fidelity (Crit Care Med, 2024)

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Phase III
randomized trial

Multicenter RCT *In progress NCT03471247*

**CYCLE$**

Economic evaluation *In progress*

**BICYCLE**

KT Behavioural Intervention

Usual Care (Crit Care Explor 2023), Frailty (Trials, 2022)

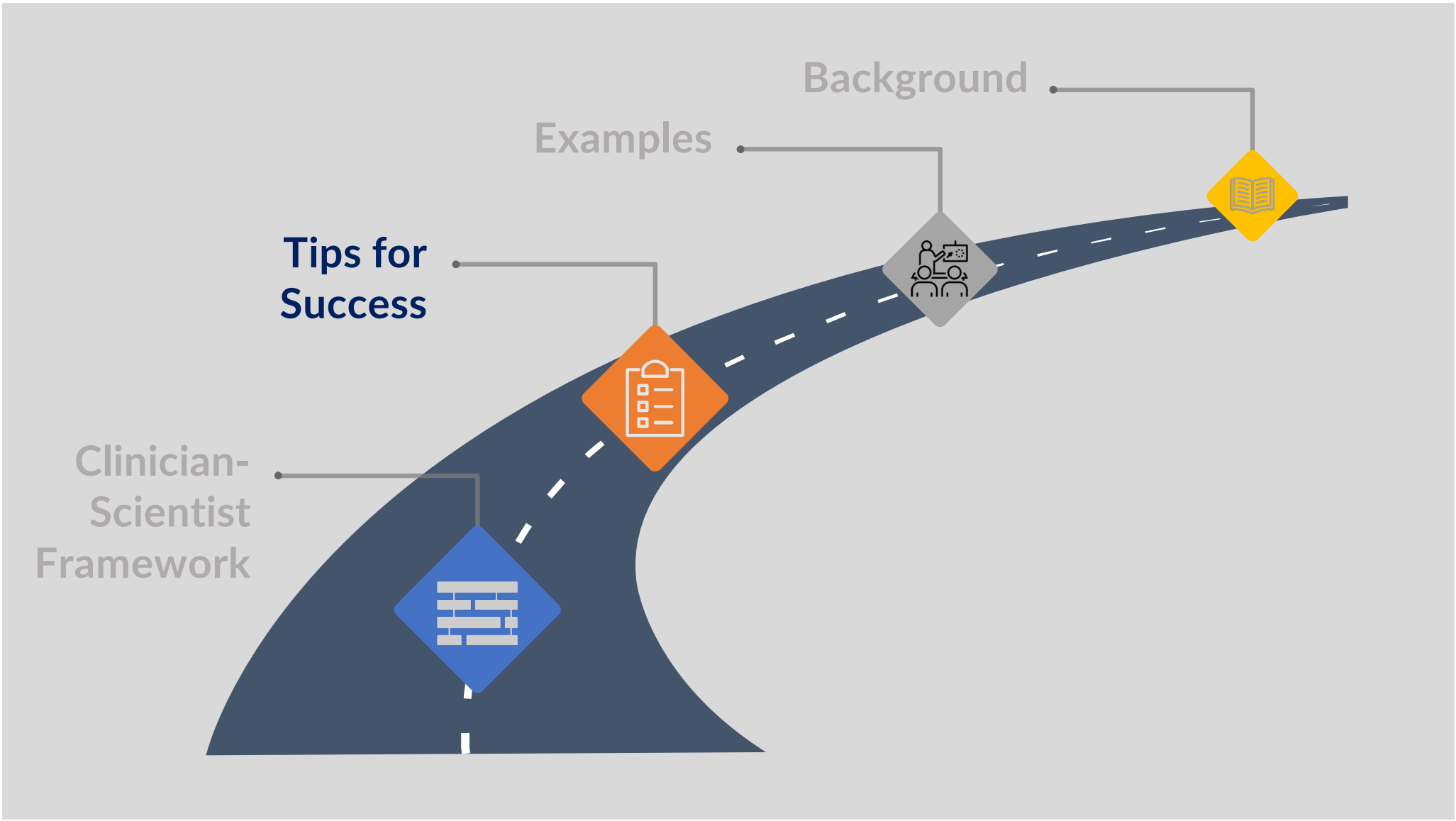
**Trial methodology questions:**

Pilot RCT 5 lessons learned ✓ *Trials 2019*

Barriers and facilitators to physiotherapist trial involvement *See I CAN Rehab*

Scoping review of ICU Rehab interventions ✓ *Journal of Intensive Care 2018*

ICU Rehab in Pediatrics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# *Clinician* attributes for successful participation in research

Clinical experience in the research area

Curiosity to study the area

Willingness to learn

Strategies to address barriers to research conduct

Personal development goals

# Tips for *clinicians* interested in research

Identify opportunities to try research activities

Identify a research question

Determine if the question is answerable

Identify resources – time, funding, people

Discuss with your manager

# Tips for *managers* to support clinicians in research

Brainstorm strategies with clinicians to identify time to participate in research

Promote opportunities to develop research skills

Identify existing models of clinical research

# Tips for *mentors and researchers* to engage clinicians in research

Communicate with clinical manager(s) to explain and negotiate clinician engagement

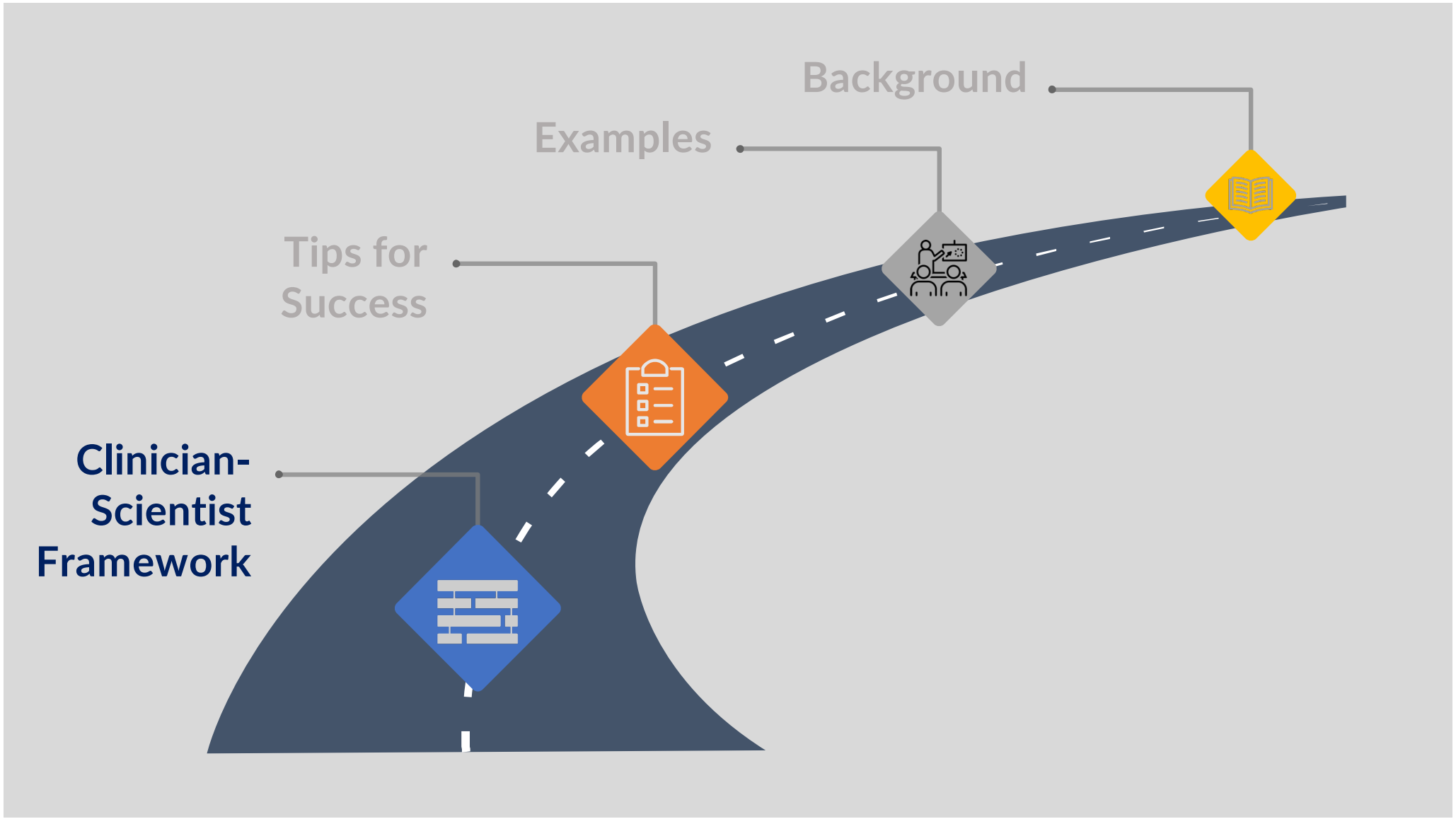
Understand clinicians' background, experience, education

Manage scope of research project

Consider clinicians' schedules

Budget clinician salary support

*(if appropriate)*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*PhD training is typically required to lead larger-scale research studies. For healthcare professionals without a PhD or research training to lead research activities, we recommend seeking a research mentor with content and methodological expertise.

Kho et al. *Crit Care Clin. 2023*

# How to be a clinician-scientist (You can do it!)

*YOU can choose your own adventure!*

1. Identify <u>your</u> *why* and *how*
2. If it doesn't exist, ***ask***
3. Nurture relationships
4. Identify opportunities to increase your research skills (outside rehab?)
5. Look in your clinical environment – identify gaps, look in the literature, and identify your contribution
6. Consider scale and scope
7. Develop your track record
8. Prepare your elevator pitch

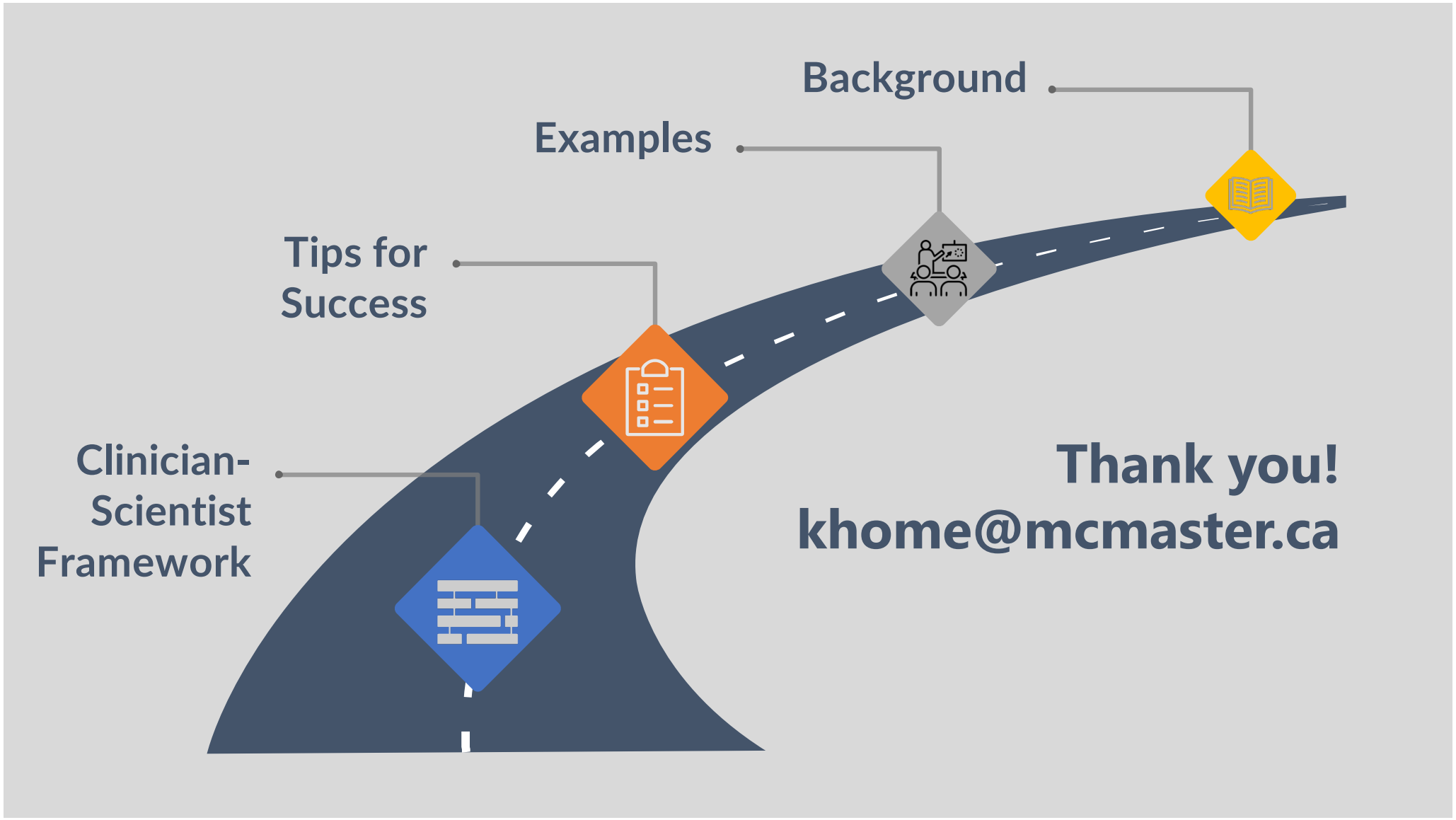
ORIGINAL ARTICLE

# Early Active Mobilization during Mechanical Ventilation in the ICU

The TEAM Study Investigators and the ANZICS Clinical Trials Group*

DOI: 10.1056/NEJMoa2209083

**Research Question:** In mechanically ventilated adults, does early, goal-directed mobilization compared to usual care improve # days alive and out of hospital by day 180?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Thank you!
khome@mcmaster.ca