


Conférence scientifique

Le vendredi 23 mai de 12h30 à 13h30

 **En salle - IRGLM - Saputo**

 **En direct sur Zoom + rediffusion aux inscrits**

Dr. Chester Ho, MD

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Division of Physical Medicine & Rehabilitation, Department of Medicine.
Faculty of Medicine & Dentistry. University of Alberta, Canada



Improving Lives After SCI: A Unified Approach integrating clinical, research and administrative practices

CRIR
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Québec 

IMPROVING LIVES AFTER SCI: A UNIFIED APPROACH INTEGRATING CLINICAL, RESEARCH & ADMINISTRATIVE PRACTICES

Chester Ho, MD

**Professor & Spinal Cord Injury Research Chair University
of Alberta**

**Facility Medical Director
Rehabilitation Hospital, Edmonton, AB**

Glenrose



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Objectives of this presentation

- **To share my current SCl practice and responsibilities**
- **To review two of my current research projects**
- **To discuss opportunities for collaboration**

About me

- **Physical Medicine & Rehabilitation specialist with an interest in research and administrative leadership in Alberta, Canada.**
- **Goal: to improve the lives of persons with spinal cord injury (SCI) through my integrated clinical, research and administrative practices.**
- **Research foci:**
 - **Promotion of neurorecovery through early rehabilitation interventions (e.g. FES cycling)**
 - **Healthcare delivery for persons with SCI**
 - **Management of complications following SCI (e.g. pressure injury)**

My clinical practices

- **Clinical**

- **Acute care SCI consultations at the University of Alberta Hospital 4 mon/year**
 - **Co-management of SCI Medicine issues with acute care teams**
 - **Collaboration with allied health teams for rehabilitation planning**
 - **Prognostication of SCI**
 - **Planning for inpatient rehabilitation where necessary**
- **Weekly SCI continuity clinic at the Glenrose Rehabilitation Hospital**
 - **SCI annual evaluation**
 - **Ongoing management of SCI Medicine issues**
 - **Rehabilitation assessment and recommendations**
 - **Collaboration with remote/rural rehabilitation teams for co-management**



My administrative practices

- **Administration**

- **Facility Medical Director at the Glenrose Rehabilitation Hospital – one goal is to develop a clinical research focus at the hospital**
- **Provincial leadership as medical co-lead of the Neurosciences & Stroke Program Improvement Network – current project supports the development of an evidence-based 24-hour decompression time after SCI in Alberta**
- **Development of the Neurorehab Innovation Centre at the University of Alberta Hospital (to be opened late 2025)**
- **Co-chair of the Alberta Health Services Provincial Pressure Injury Prevention committee**

My research

- **Promotion of neurorecovery through early rehabilitation intervention**
 - **Early functional electrical stimulation (FES) cycling after acute SCI – pilot study (Craig H Neilsen Foundation, Praxis Spinal Cord Institute)**
 - **FES cycling toolkit development (<https://www.fescyclingtoolkit.com/>)***
 - **International clinical practice guidelines development for FES cycling after SCI (UofA SCI Research Chair funds)***
 - **Patient experience of FES cycling in acute care study***

*Led by Hope Jervis-Rademeyer, MPT, PhD, BA (Kin), BA (Psych), former postdoctoral fellow; Assistant Professor, School of Rehabilitation Science, University of Saskatchewan



My research

- **Healthcare delivery for SCI**
 - **Models of Care Delivery from Rehabilitation to Community for Spinal Cord Injury: A Scoping Review***
 - **Canadian SCI rehabilitation model of care consensus development (Praxis Spinal Cord Institute, UofA SCI Research Chair funds)**
 - **CONnecting and Coordinating an Enhanced Network for TRansitions In Care (“CONCENTRIC” project) (CIHR)**



*Ho C, Atchison K, Noonan VK, McKenzie N, Cadel L, Ganshorn H, Rivera JMB, Yousefi C, Guilcher SJT. Models of Care Delivery from Rehabilitation to Community for Spinal Cord Injury: A Scoping Review. J Neurotrauma. 2021 Mar 15;38(6):677-697. doi: 10.1089/neu.2020.7396. Epub 2021 Jan 8. PMID: 33191849.

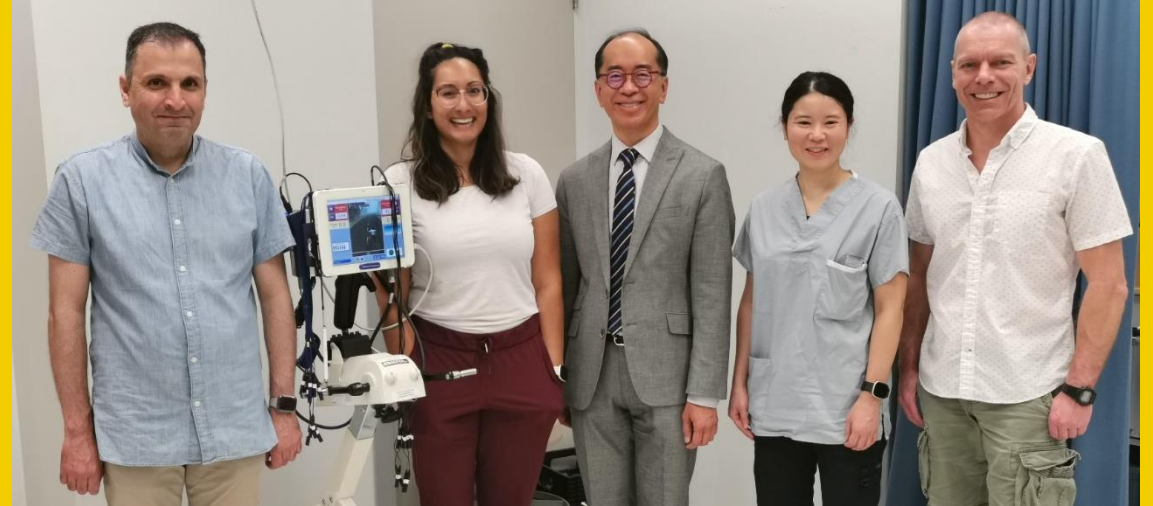
My research

- **Management of complications after SCI**
 - **Canadian white paper on pressure injury prevention and management (in conjunction with the Canadian Pressure Injury Advisory Panel)**
 - **NanoSALV human factors study (CAN Health Network, Alberta Health Services)**
 - **Use of transcutaneous abdominal stimulation to improve neurogenic bowel management in persons with chronic SCI in collaboration with the Swiss Paraplegic Centre (Praxis Spinal Cord Institute)**

EARLY FUNCTIONAL ELECTRICAL STIMULATION (FES) CYCLING AFTER ACUTE SCI



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Dirk Everaert, Yoshi Okuma, Vahid Abdollah,
Monica Gorassini, Chester Ho

[Clinicaltrials.gov NCT05255679](https://clinicaltrials.gov/ct2/show/study/NCT05255679)

Early FES cycling after acute SCI

- **Background**

- **FES can make muscles contract, even in persons with sensory or motor complete SCI, to perform movements such as cycling**
- **FES cycling in chronic SCI can reverse muscle atrophy and improve spasticity, cardiovascular health, etc.**
- **Few studies done early after SCI (Baldi, Demchak, Galea, Eser, Lai)**
- **But could earlier FES cycling after acute SCI lead to more benefits in neurorecovery and muscle health?**

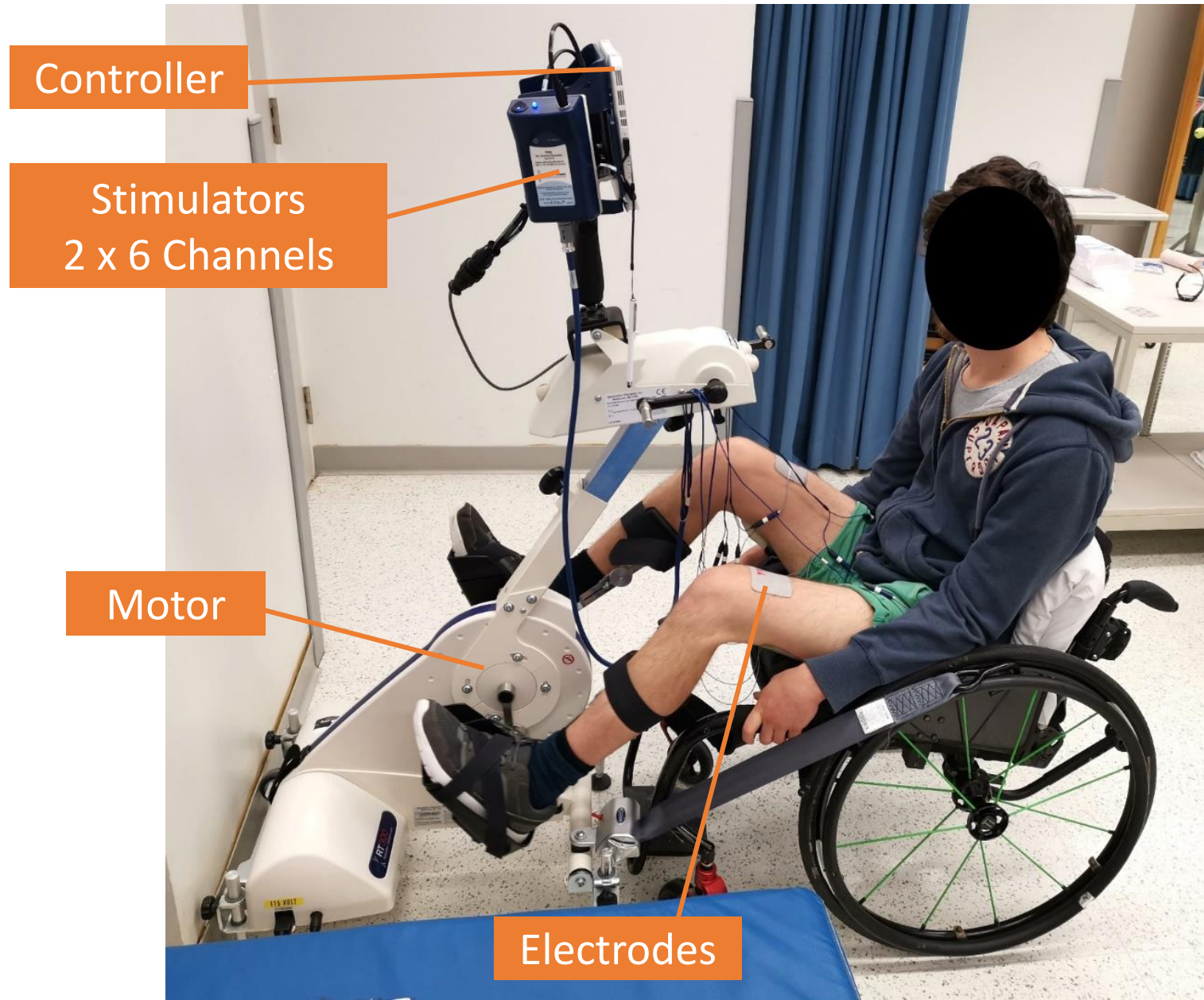
Early FES cycling after acute SCI

- **Pilot study (n=36)**
- **Single site clinical trial**
- **Research questions:**
 - **Can FES cycling starting early in acute**
 - **Prevent muscle atrophy?**
 - **Promote neurorecovery?**



Restorative Therapies
Baltimore, USA

INTERVENTION: FES Cycling with RT300



- 15 → 45 min/session
- 3 days/week
- Stimulation
 - Quads, Hamstrings
 - Gastrocs, Tibialis Ant.
 - Gluteals

Restorative Therapies
Baltimore, USA

Early FES cycling after acute SCI

• Inclusion criteria:

- Traumatic or non-traumatic SCI with acute onset
- Level C1 – L5, AIS* A-B-C-D
- Able to start FES cycling 14-21 days after injury
- 18 - 80 years old
- Medically stable

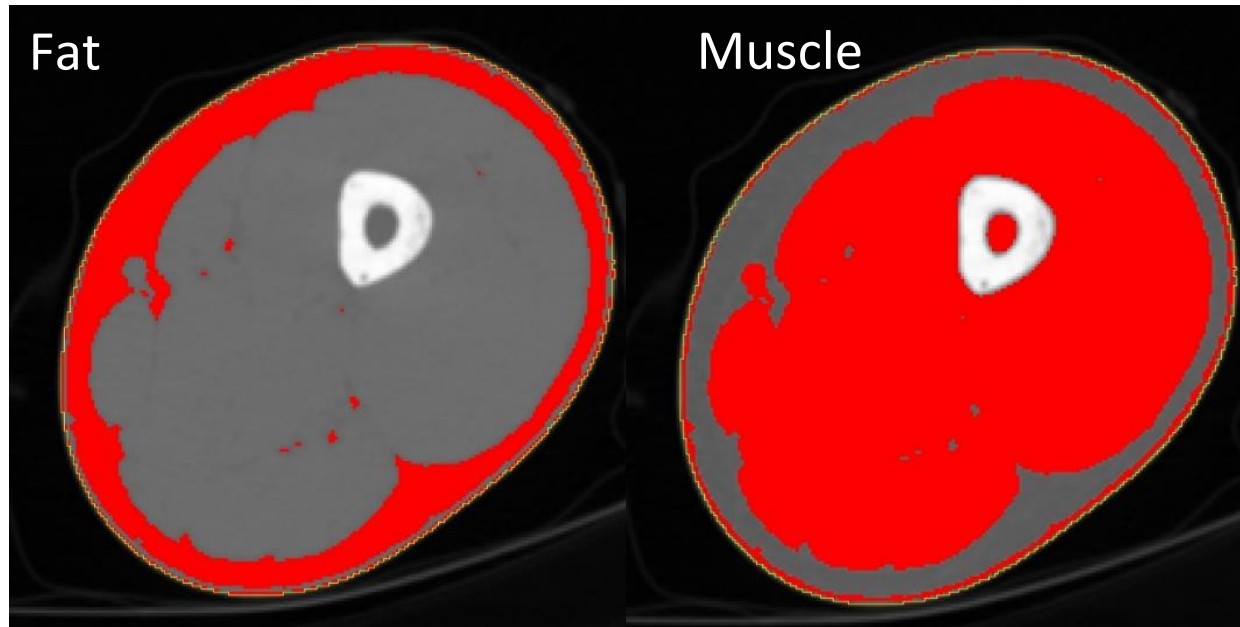
Exclusion criteria:

- AIS D able to walk without assistive device
- Unstable fractures (spine, lower extremities, pelvis)
- Pregnancy

OUTCOME MEASURES

1. CT scans

- **Muscle - Fat cross sectional area of calf, thigh**
- **Helical scans both legs**
- **Measured 1 slice at 50% femur, 35% tibia**
- **Hounsfield Units: Fat (-190 | -30), Muscle (-29 | 199)**



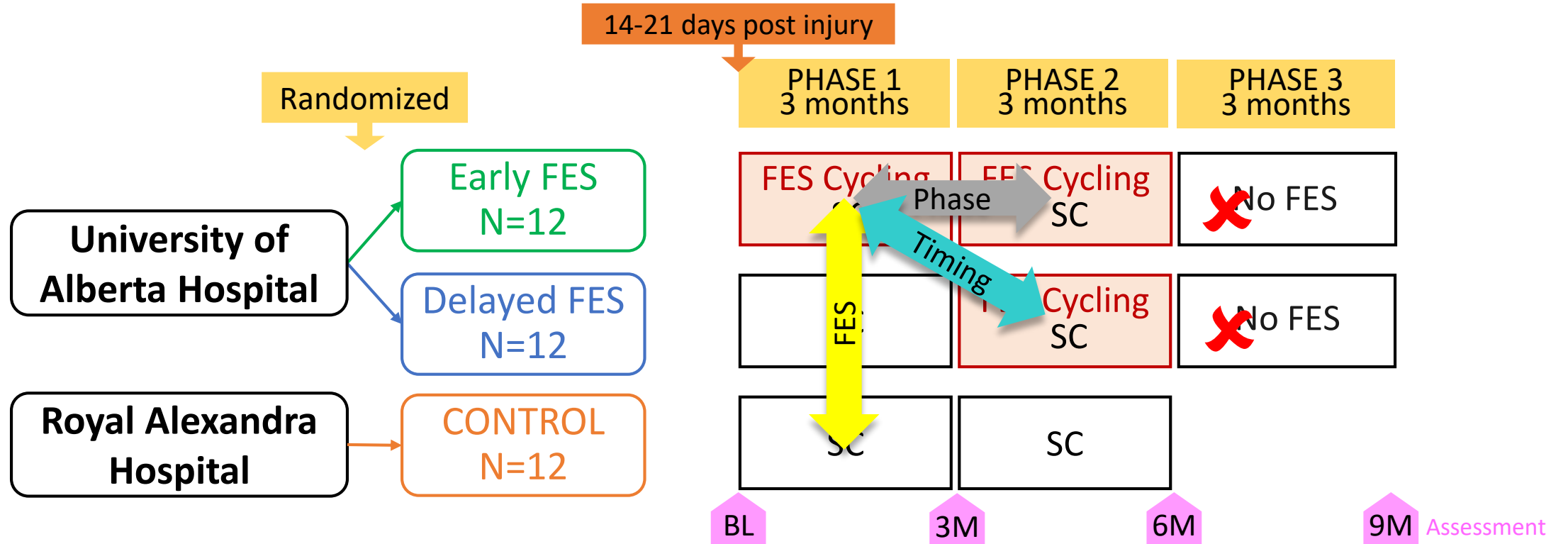
2. Electrophysiology

- **Corticospinal connections (Transcranial Magnetic Stimulation)**
- **Spinal excitability (H/M wave ratio)**
- **Spasticity (Cutaneomuscular reflex)**

3. Clinical

- **ISNCSCI examination**
- **Leg circumferences & skinfolds**
- **Spasticity, Reflexes**
- **Walking test**
- **Pain, Depression, Quality-of-Life**

STUDY DESIGN



FACTORS

FES: Can FES prevent muscle atrophy?

TIMING: Is an early start better than delayed?

PHASE: Is the effect in Phase 2 different from Phase 1?

SC = Standard Care (physical & occupational therapies)

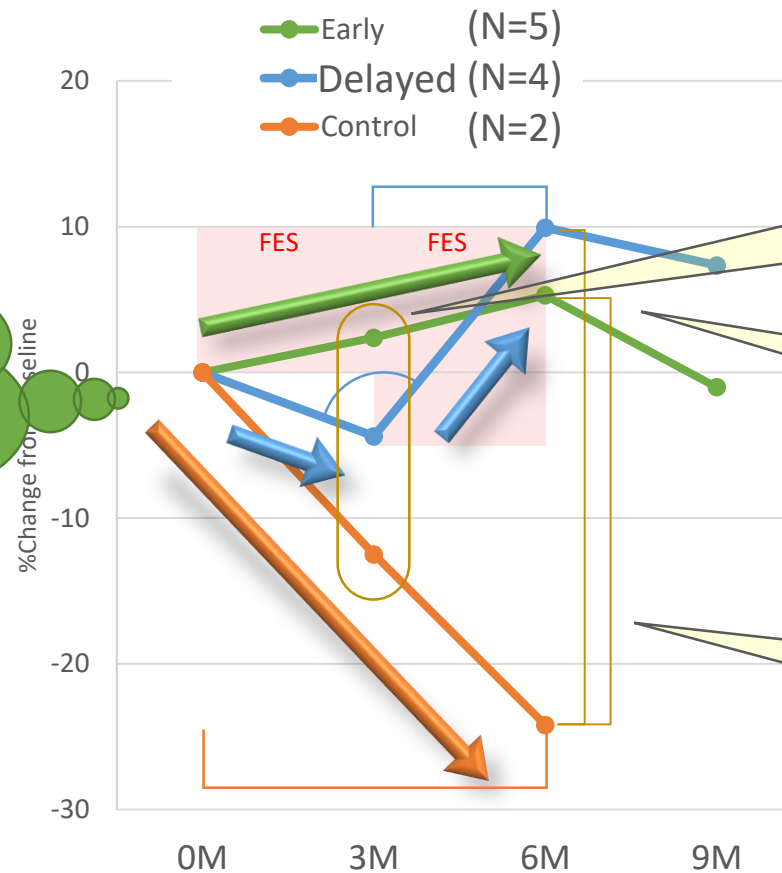
MUSCLE CROSS-SECTIONAL AREA | Thigh

- Mean Left-Right Leg
- %Change from baseline
- %Change per phase

- 2-way ANOVAs
- 9M excluded

AIS A-B

FESGroup Effects



At 3M, loss without FES vs. gain with FES, but NOT significant

No significant difference between Early and Delayed group at 6M

At 6M, Early and Delayed group had significantly more muscle than Control

Expected Delayed worse:
1.Recover from atrophy
2.Only 3 months FES vs. 6

Early FES cycling after acute SCI

- **Neurorecovery outcomes**
 - **Electrophysiology findings – surprisingly not as sensitive as clinical measures**
 - **Participants with AIS C and D classification will improve anyway**
 - **Participants with AIS A and B classification appear to have high rate of conversion from motor complete to incomplete injuries**

Summary of FES cycling study

- In those with AIS A-B classification, substantial atrophy occurred without FES cycling.
- With early FES cycling, no atrophy occurred.
- Delayed group had atrophy at first which was completely reversed at 6 months.
- In AIS C-D, no atrophy occurred, regardless of FES Cycling.
- There appears to be a trend for higher conversion rate in those with AIS A-B classification.

CONCENTRIC PROJECT



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Funded by the Canadian Institutes for Health Research, the CONCENTRIC project has brought together a provincial team with the passion to improve the transitions in care from hospital to community for persons with SCI in Alberta.

Goal: to design, implement and evaluate an evidence-based, standardized provincial model of care with clear transition strategies for persons with SCI

CONCENTRIC project

- **Why study transitions in care gaps from rehab to community?**
 - **Community rehabilitation gaps with less access to specialized SCI rehabilitation services and lack of co-management between specialists and community providers.**
 - **Unstandardized processes transitioning from inpatient rehabilitation to community settings.**
 - **High costs of SCI – lifetime economic burden per Canadian with SCI is \$1.5 – 3.5 million dollars; with annual economic burden from traumatic SCI as high as \$2.67 billions.**
 - **Assumption: the high costs are partially attributable to suboptimal transitions from inpatient rehabilitation to community.**

“I feel like I fell off a cliff when I left inpatient rehabilitation to return to my community with my new spinal cord injury”



CONCENTRIC project

- **Goals:**

- **To improve care for persons with SCI.**
- **To engage, empower and leverage multiple partners within the healthcare system and in the community.**
- **To facilitate connections between partners, systems or processes in the community and within healthcare facilities, building connections that facilitate smooth transitions.**



Community-based Participatory Research Approach

A collaborative research approach that actively involves persons with lived experience, community partners, and other concerned individuals/groups as equal partners throughout the research process rather than as research subjects.



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CONCENTRIC project

Research approach

Community-based participatory research

- General meetings/ Breakout sessions/ Case clinic
- Working groups
- Orientation sessions/ Mentor support
- SCI Education Days/ Lunch & Learn/ Webinars
- Evaluation survey/ Feedback
- One-pagers/ Reports/ Project Website

Frameworks adopted/considered

- Theory U/U-Process model
- Consolidated Framework for Implementation Research [CFIR]
- WHO Community-based Rehabilitation Matrix

Stages

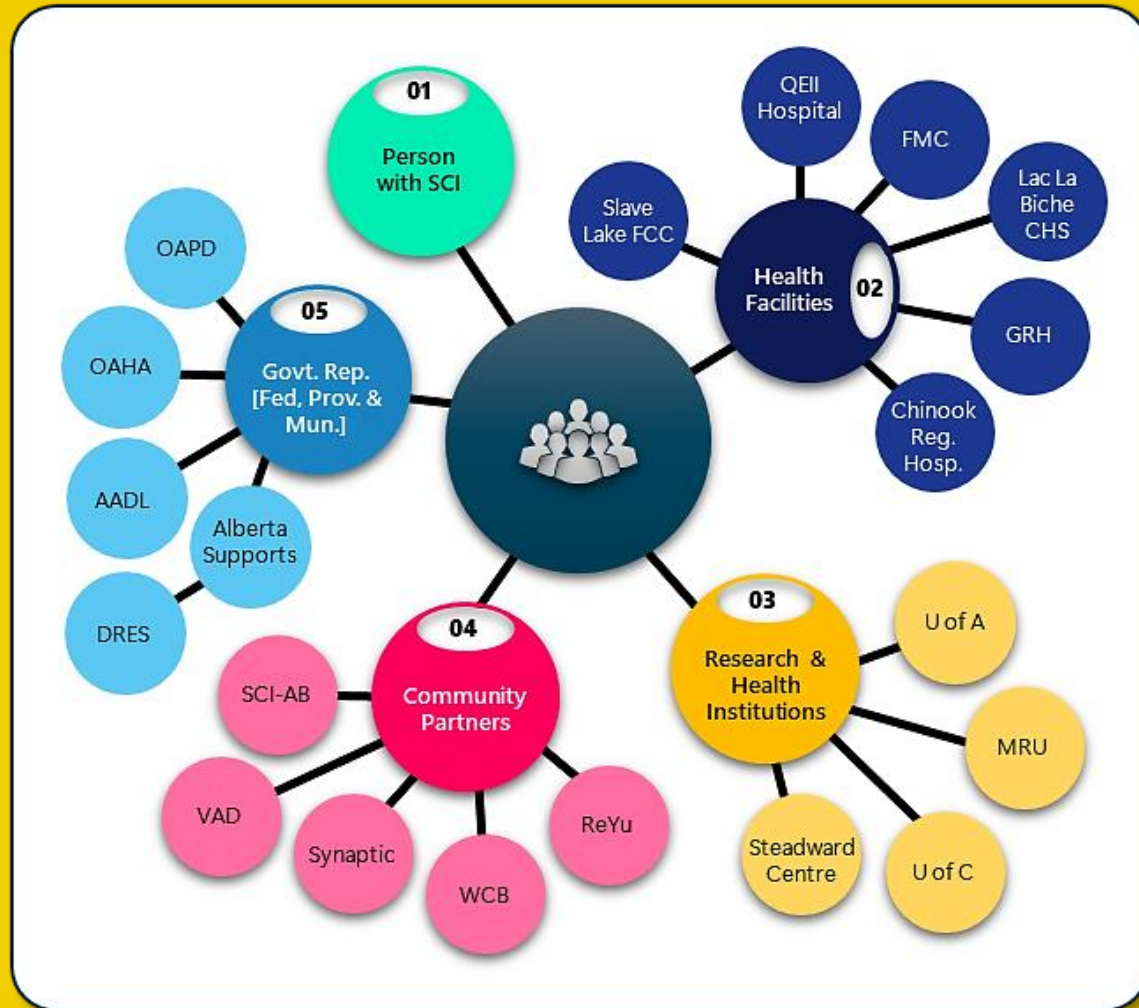
3 Stages

- Situation analysis
- Model development
- Model implementation and evaluation

Research methods

- Semi-structured interview
- Focus group discussion
- Think-aloud method
- Modified Delphi
- Questionnaire survey [closed and open-ended]

CONCENTRIC: >100 interest holders reached

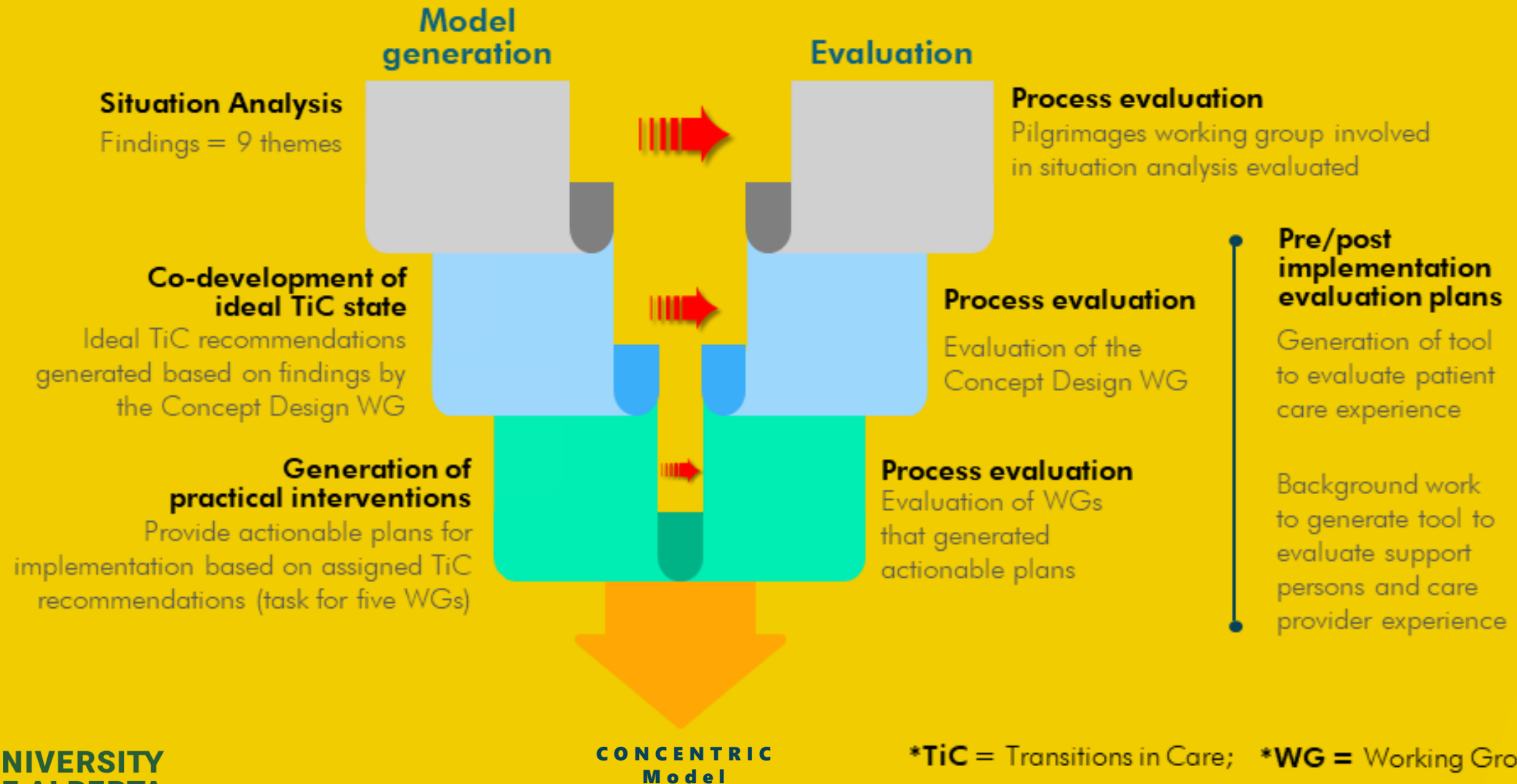


Abbreviations

Chinook Reg. Hosp.	Chinook Regional Hospital
DRES	Disability Related Employment Supports
Fed.	Federal
FMC	Foothills Medical Centre
Govt. Rep.	Government Representative
GRH	Glenrose Rehabilitation Hospital
Lac La Biche CHS	Lac La Biche Community Health Services
MRU	Mount Royal University
Mun.	Municipal
OAPD	Office of Advocate for Persons with Disabilities
OAHA	Office of the Alberta Health Advocates
Prov.	Provincial
QEII Hospital	Queen Elizabeth II Hospital
ReYu	ReYu Paralysis Recovery Centre
SCI-AB	Spinal Cord Injury Alberta
Slave Lake FCC	Slave Lake Family Care Clinic
Synaptic	Synaptic Spinal Cord Injury and Neurological Rehabilitation Centre
U of A	University of Alberta
U of C	University of Calgary
VAD	Voice of Albertans with Disabilities
WCB	Workers' Compensation Board



CONCENTRIC: Process Summary



CONCENTRIC project

- **Results from stages 1 and 2:**
 - **5 themes with 16 recommendations identified.**
 - **The 5 themes are:**
 - **Person-centred care planning**
 - **Communication and collaboration between specialists and community providers**
 - **Focus on healing and recovery as defined by persons with SCI**
 - **Peer support and education throughout the continuum of care**
 - **Resources to be centralized to improve accessibility**



Implementation

Pilot Site Implementation Champions



Nicole Owens
GRH [Edmonton Zone]



Brittney Makhotkina
FMC [Calgary Zone]



Dawn Miller
FMC [Calgary Zone]



Jibin Jacob
CRH [South Zone]



Joanne Hunter
SLFCC [North Zone]



Brenda Kinnie
SCI-AB [Community]



Wanda Seifried
SCI-AB [Community]



Zahra Bhatia
SCI-AB [Community]



Rob MacIsaac
SCI-AB [Community]

CRH - Chinook Regional Hospital, Lethbridge

FMC - Foothills Medical Centre, Calgary

GRH - Glenrose Rehabilitation Hospital, Edmonton

SCI-AB - Spinal Cord Injury Alberta

SLFCC - Slave Lake Family Care Clinic, Slave Lake



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CONCENTRIC output so far...



4th Annual Spinal Cord Injury Education Day 2025

Thursday, 24th April 2025
12:30pm – 4:00pm

Discussion Topics

- ✓ Bowel Management
- ✓ Spasticity Management
- ✓ Wheelchair Seating
- ✓ Nerve and Tendon Transfers



More Info  www.concentricproject.com  scistudy@ualberta.ca

Join us
 Via Zoom

- ✓ Learn
- ✓ Share
- ✓ Network

REGISTER NOW

Registration is free.



 Registration Link
www.tinyurl.com/4thsciday

SCI Education Days

2021 - 2025



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Transform your **Spinal Cord Injury care experience**



...be involved
...be empowered
...be heard

Try today

My Experience Survey

...for Persons with Spinal Cord Injury



Developed with and by persons with SCI



Easy to complete by you, or with the help of a family member, friend or care provider.



Helps you examine your care and identify areas of concern or things you need.



Guides your talks with your care providers.



To access the survey or for any question, please email

➔ Katharina.KovacBurns@albertahealthservices.ca

My Experience Survey

Survey co-created with
PwSCI and validated with
SCI patient population

◆ Srijan et al 2024 - Ernest W. Johnson Excellence in Research Writing In-Training Award

- Novel Application of the World Health Organization Community-Based Rehabilitation Matrix to Understand Services' Contributions to Community Participation for Persons With Traumatic Spinal Cord Injury - A Mixed-Methods Study

◆ Kovacs Burns et al 2024

- Measures for Persons with Spinal Cord Injury to Monitor Their Transitions in Care, Health, Function, and Quality of Life Experiences and Needs: A Protocol for Co-Developing a Self-Evaluation Tool

**Knowledge
Transfer
Efforts**



- ◆ Conference Workshop at the 63rd ISCOS Annual Scientific Meeting in Belgium, Antwerp (September 2024)
 - Workshop 10 - Building a Person-Centred Model of Spinal Cord Injury Healthcare in Canada
 - **Chester Ho** (On behalf of CONCENTRIC Team) - Development of a Canadian SCI Rehabilitation to Community Model of Care
- ◆ Kamran et al. 2024 - Presentation at the 63rd ISCOS Annual Scientific Meeting in Belgium, Antwerp (September 2024)
 - Co-designing a model of care for people with SCI in Alberta - A community-based participatory research.

Knowledge Transfer Efforts



CONCENTRIC project

- **Next steps:**
 - **Evaluation on impact to persons with SCI, families, caregivers, providers and healthcare system to be completed by 2026.**
 - **Further KT activities, e.g. publications and advocacy**
 - **Exploring future funding opportunities:**
 - **Spread and scale to other provinces?**
 - **Application of model to other conditions, e.g. stroke?**
 - **Development of CONCENTRIC toolkit for use by others?**

COLLABORATIVE OPPORTUNITIES



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Collaborative opportunities

FES cycling project:
co-development of
multi-site RCT?

CONCENTRIC
project:
adoption of model?
Spread and scale?

Other
opportunities?



Acknowledgment



Fondation
Brain Canada
Foundation



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Canadian Institutes of Health Research
Instituts de recherche en santé du Canada



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Spinal Cord Injury Research Chair Endowment



PRAXIS
Spinal Cord Institute



Spinal Cord Injury Alberta
Lésions Médullaires Alberta



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Merci!