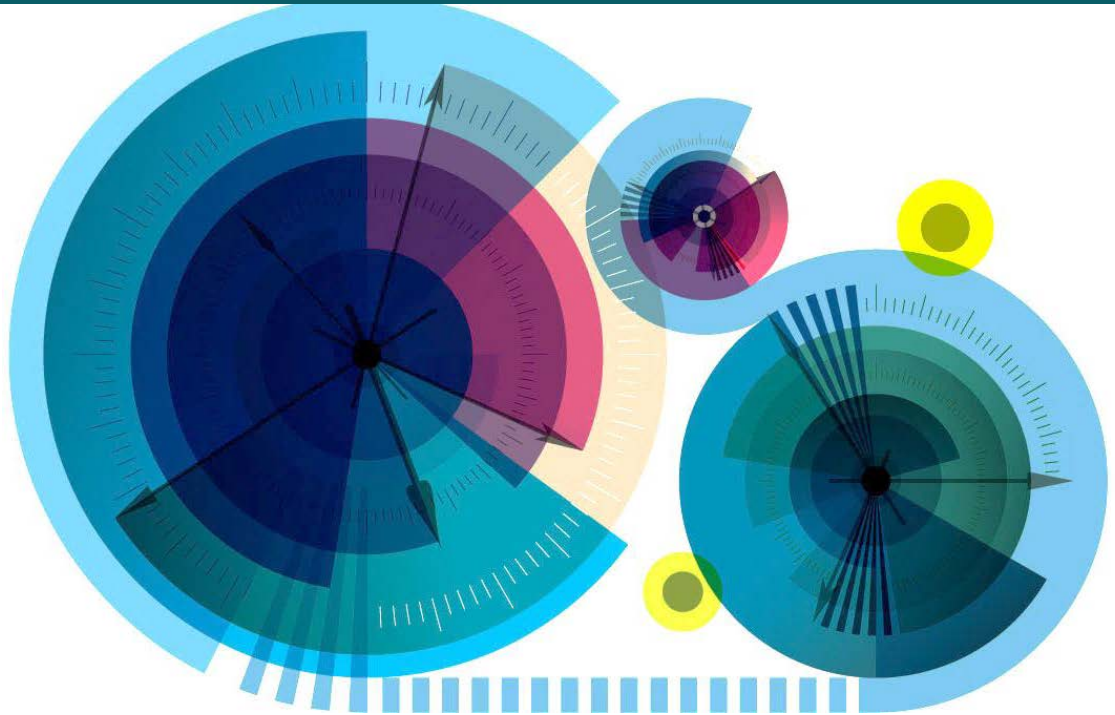
Driving Quality and Innovation:
Clinical Trials Showcase



island health

Island Health Research | Five Days in May 2019 | @VIHealthRes | #5DIM

Improving Treatment Outcomes and Value for Chronic Gastrointestinal Disorders and Antibiotic Resistant Organisms using Fecal Microbiota Transplant

Hannah Roy, Christine Lee, and the **CaLM** Team

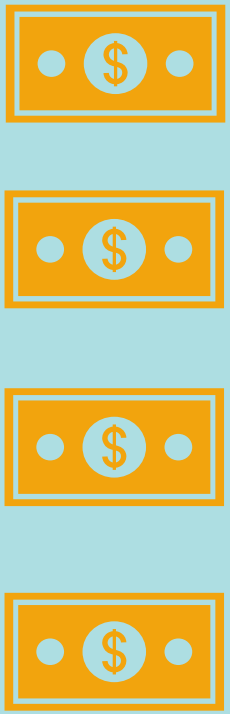
Dr. Christine Lee

Hannah's Story

Experienced symptoms age 13 – 26

- Crohn's, Irritable Bowel Syndrome:
  - ER 2x/month
  - Multiple hospitalizations, clinic visits
  - Daily intramuscular injections
  - School and work days lost
- *Recurrent Clostridium difficile* infection
  - Discussion of surgery to remove large bowel

	C. difficile Infection	Inflammatory Bowel Diseases (ulcerative colitis/Crohn's)	Irritable Bowel Syndrome	Carbapenem-Resistant Organisms
Disrupted gut flora	+++	+++	+++	+
Incidence	↑190% Ann Int Med. 2017	Canada, highest worldwide	15 – 25% Canadians	↑Incidence (High mortality rate)
Current Treatment				
Efficacy	40%	25%	Low	None
Cost	High	High	High	Indirectly - High
Additional Issues	**Ongoing disruption of microbiota**	**Opportunistic infections Lymphoma**	**Unknown**	**N/A**
Solution?				



Direct Cost Canada

$9.6 Billion/Year

Hannah’s Story

“POST-FMT

- Restoration of QoL and Productivity
- No ER visits, no further pain/IM injections
- Gastroenterologist follow-up once per year”

Fecal Microbiota Transplant

Major Benefits

Superior Response Rate

Low Cost: $10/treatment

No Immediate or Long-term safety issues

Major Challenge

Limited access – remote, rural and out of province patients
Suitable donor availability

Innovative Intervention

Lyophilized FMT (LYO-FMT)

✓ Scalable Patient-Centered Care

Availability of donors with favorable microbial profile
Capacity to mass produce
Minimal storage requirement: shelf life = 2 years @ 5^{o}C

✓ Accessibility - Delivery to Rural and Remote Areas

Stable at room temperature for shipping
Able to train site personnel for reconstitution and administration remotely
Oral capsules – Obtained HC's permission

✓ Favourable Cost Benefit

Prevents hospital readmissions
Vancomycin (usual care) @ $1200 to > 30,000/pt Fidaxomicin @ $4600 for 30 days
LYO-FMT $ 10/treatment (donor screening, equipment depreciation)

Improving Treatment Outcomes & Value Using FMT

Goal of Team :

Obtain efficacy and safety data required by Health Canada to meet its requirements for inclusion of LYO-FMT for main stream treatment

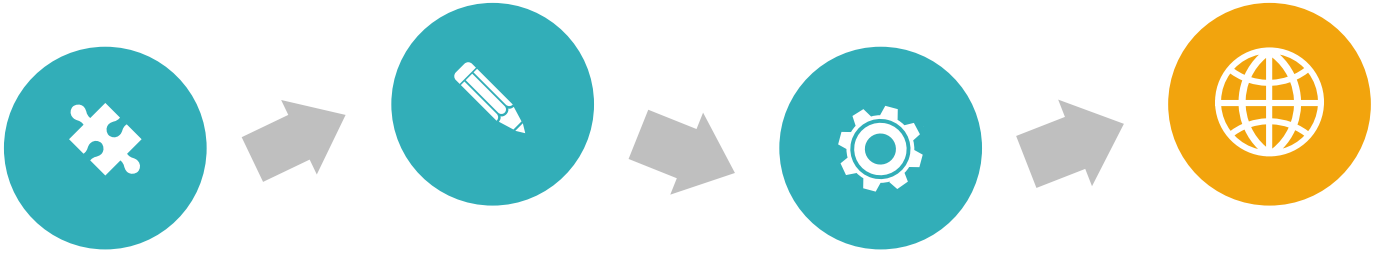
Outcomes to Achieve:

1. Routine clinical use of LYO-FMT for GID and ARO
2. Improve QoL for patients & caregivers; patient satisfaction
3. Save healthcare resources

FMT Clinical Applications

***Clostridium difficile* Infection (CDI)**	**Inflammatory Bowel Disease [Ulcerative Colitis & Crohn's]**	**Irritable Bowel Syndrome (IBS)**	**Antimicrobial Resistant Organisms**
✓ FMT efficacy of 85 - 90 % vs 40% usual care (vancomycin) ✓ Safe ✓ Cost effective than current Rx	✓ Comparable efficacy to current Rx, but no toxicity ✓ Cost effective than current Rx	✓ Preliminary data: Promising efficacy	✓ Decolonization of VRE and CRO

CaLM Access Program = Wide Scalability



- **Physical Space**
- **Logistics**
  - **Personnel**
    - Program coordinator
    - Laboratory technician
    - Quality, Regulatory Expert
    - Legal/Insurance
  - **Inventory tracking and distribution**
  - **Evaluation of program**
- **Foster current/future donors, research & development**

Thank You

to our stool donors
& FMT technicians!

Research Partners

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

Crohn's and Colitis Canada
Crohn et Colite Canada

MICHAEL SMITH FOUNDATION FOR HEALTH RESEARCH
Discover. Connect. Engage.

island health

Vancouver CoastalHealth

CHÉOS
Centre for Health Evaluation & Outcome Sciences

Victoria Division of Family Practice
AGPSC initiative

BC SUPPORT Unit
Advancing Patient-Oriented Research

UBC

University of Victoria

PICNet
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

Health Canada | Santé Canada

UNIVERSITY OF ALBERTA

McMaster University

Thank you!

A Learning Health System in the ICU: Changing Practice through Clinical Research

Dr. Gordon Wood

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Comparison of Sucralfate and Ranitidine for the Prevention of Upper Gastrointestinal Bleeding in Patients Requiring Mechanical Ventilation

Deborah Cook, M.D., Gordon Guyatt, M.D., John Marshall, M.D., David Leasa, M.D., Hugh Fuller, M.B., Richard Hall, M.D., Sharon Peters, M.D., Frank Rutledge, M.D., Lauren Griffith, M.Sc., Allan McLellan, M.D., Gordon Wood, M.D., Ann Kirby, M.D., et al., for the Canadian Critical Care Trials Group*

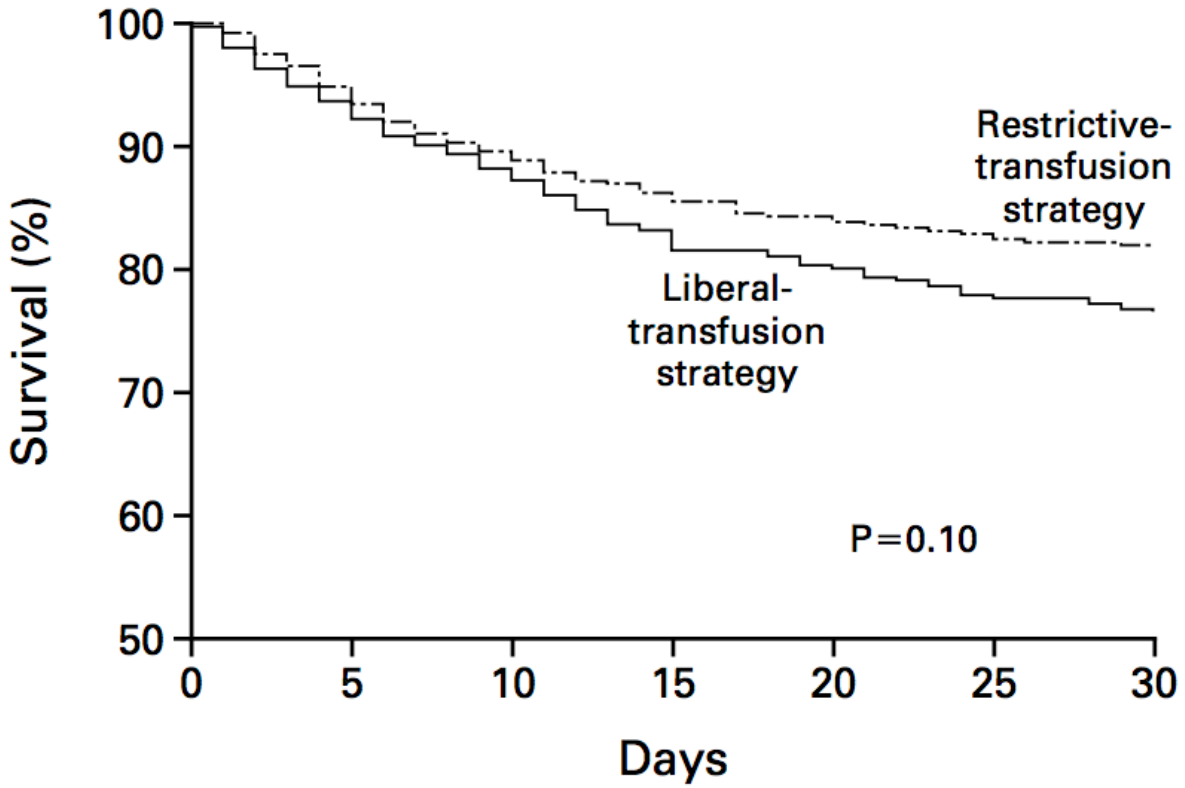
The New England Journal of Medicine

VOLUME 340 FEBRUARY 11, 1999 NUMBER 6

A MULTICENTER, RANDOMIZED, CONTROLLED CLINICAL TRIAL OF TRANSFUSION REQUIREMENTS IN CRITICAL CARE

PAUL C. HÉBERT, M.D., GEORGE WELLS, PH.D., MORRIS A. BLAJCHMAN, M.D., JOHN MARSHALL, M.D., CLAUDIO MARTIN, M.D., GIUSEPPE PAGLIARELLO, M.D., MARTIN TWEEDDALE, M.D., PH.D., IRWIN SCHWEITZER, M.SC., ELIZABETH YETISIR, M.SC., AND THE TRANSFUSION REQUIREMENTS IN CRITICAL CARE INVESTIGATORS FOR THE CANADIAN CRITICAL CARE TRIALS GROUP*

M. Douglas, K. Mulcahy, A. Drummond; *Kingston General Hospital, Kingston* — G. Wood, D. Heyland, A. Taite; *Hôpital Maisonneuve–Rosemont,*


A
All Patients
100
90
80
70
60
50
Survival (%)
0
5
10
15
20
25
30
Days
Restrictive-transfusion strategy
Liberal-transfusion strategy
P=0.10

- The CCCTG was formed in 1989 to improve the care of critically ill patients through **investigator led research.**
- At the time **Industry run trials** dominated the landscape of multi-center clinical research. This research is undertaken with the objective of brining a new technology to market then expanding its clinical niche and ultimately maximizing the financial return.
- The questions posed by investigator-led studies arise from curiosity or confusion and controversy. The major emphasis is on the methods used to study the problem and the rigor with which these methods are applied.

- Research programs are brought to the group by individual members.
- Studies usually address the comparative efficacy of two available clinical strategies.
- The investigator with help from experts in the Trials Group, develops a strategy to study the problem.

CCCTG
Canadian Critical Care Trials Group

- Sites are usually paid based on per patient enrollment. The payment is modest ($500 - $1500 per patient). Most centers will also conduct Industry sponsored trials which are well paid.
- The Lead Investigator will oversee the publication of the study and sub-studies.
- There is usually a Knowledge Translation component after publication

CCCTG
Canadian Critical Care Trials Group

- We have chosen to study questions that reflect the daily concerns of practicing Intensivists.
- There is a collaborative structure that combines scientific rigor with intense collegiality.
- Canada is a world leader in ICU Research and the CCCTG structure and function has been copied by many.

ICU Research in Island Health

- 10 Industry Sponsored Trials
  - Mainly looking for molecules to turn off the inflammatory mediators of sepsis
  - All have been negative trials
- 20 Academic Trials (CCCTG)
  - Every study has provided some useful information for the care of critically ill patients
  - Currently involved in 6 of these trials

Clinical Research Nurses
Gayle Carney (left)
with Fiona Auld

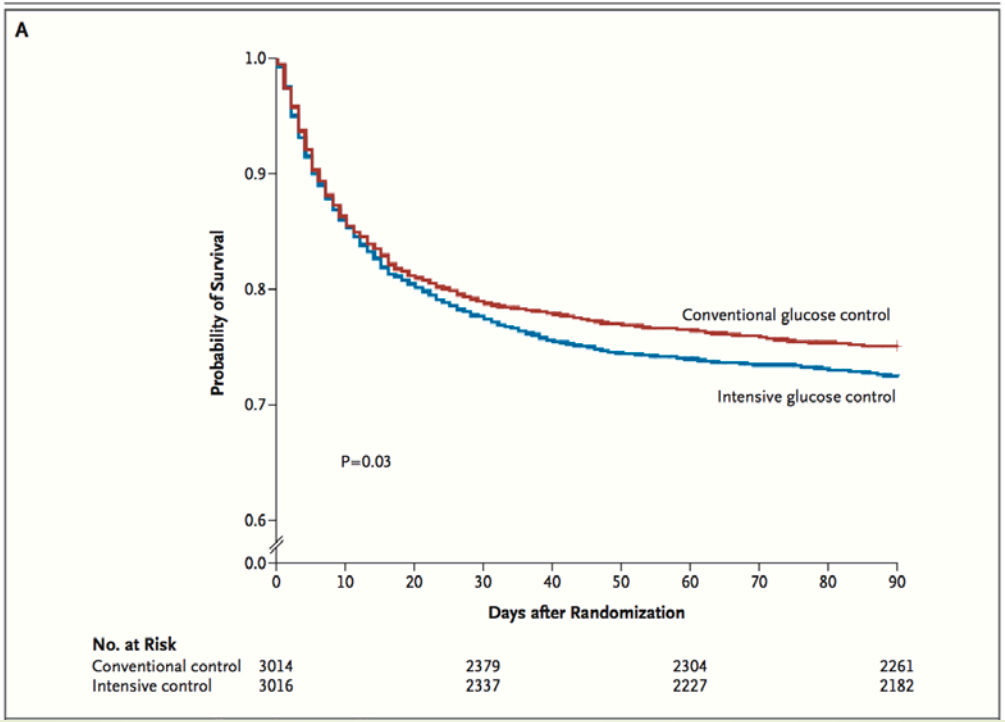
Dr. Daniel Ovakim
Sub-Investigator

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 26, 2009 VOL. 360 NO. 13

Intensive versus Conventional Glucose Control in Critically Ill Patients

The NICE-SUGAR Study Investigators*



VANCOUVER ISLAND health authority

Clinical Order Set

ADDRESSOGRAPH

Critical Care Insulin Infusion

Qualified to Use
INTENSIVISTS, INTERNAL MEDICINE

Key: **Req** – Requisition **MAR** – Medication Administration Record **K** – Kardex **Dis** – Discontinued **P** – Drug Profile

KEY

Patient Population

- Do not start Insulin IV infusion if patient has a blood glucose less than or equal to 10 mmol/L
- Do not use in patients with diabetic ketoacidosis or hyperglycemic hyperosmolar nonketotic coma

Diabetes Management

- Discontinue all previous Insulin orders and anti-diabetic medication orders
- For any inconsistent or abnormally high/low bedside blood glucose values, collect blood sample for glucose measurement by laboratory prior to changes/action
- Mix 50 units of Insulin Regular (Toronto) in 100 mL 0.9% Sodium Chloride (final concentration of 0.5 units/mL)

Start Insulin IV infusion based on current blood glucose as follows:

Blood Glucose (mmol/L)	Less than or equal to 10	10.1 – 13	13.1 – 16	16.1 – 20	Greater than 20
Rate	Do NOT start	1 unit/h	2 units/h	3 units/h	Call MD for orders

Frequency of glucose check when/after Insulin IV infusion initiated, based on current glucose value, as follows:

Blood Glucose (mmol/L)	Less than 4	4 – 5.9	6 – 10	10.1 – 15	Greater than 15
Frequency	q1h and PRN	q2h	q4h	q2h	q1h

Maintenance Insulin IV infusion adjustment based on blood glucose as follows:

INCREASE or SMALL DECREASE in glucose ***ie Current glucose higher than previous or current glucose falling by less than 3 mmol/L***	**Current Glucose (mmol/L)**	**MODERATE to LARGE DECREASE in glucose** ***ie Current glucose lower than previous by greater than or equal to 3 mmol/L***
Stop infusion, give D50W 25 mL IV bolus. Repeat blood glucose monitoring in 1 hour. Resume infusion at 50% of previous rate once blood glucose greater than 10 mmol/L	Less than 4	Stop infusion, give D50W 25 mL IV bolus. Repeat blood glucose monitoring in 1 hour. Resume infusion at 50% of previous rate once blood glucose greater than 10 mmol/L
Reduce rate by 1 unit/h	4 – 5.9	Reduce rate by 50%
No change in rate	**6 – 10 (TARGET)**	Reduce rate by 50%
Increase rate by 0.5 unit/h	10.1 – 12	Reduce rate by 1 unit/h
Increase rate by 1 unit/h	12.1 – 15	No change in rate
Give 4 units IV bolus and increase rate by 1 unit/h	15.1 – 18	No change in rate
Give 8 units IV bolus and increase rate by 1 unit/h	Greater than 18	No change in rate

- If tube feeds or TPN are held for greater than 1 hour, discontinue Insulin IV infusion. Continue bedside blood glucose monitoring q4h. When tube feeds or TPN resume at previous rate, restart Insulin at previous rate
- Discontinue orders prior to transfer to floor. Consult MD for appropriate orders

Signature, Designation | College License # | Date | Time | Page 1/1

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island health

Clinical Order Set

ADDRESSOGRAPH

IV insulin – Adult Inpatient Acute

These orders are for use on All Acute Adult Inpatients unless there exist VIHA approved insulin management order sets that are more appropriate (eg High Intensity Care, Obstetrics)

Key: **Req** – Requisition **MAR** – Medication Administration Record **K** – Kardex **Dis** – Discontinued **P** – Drug Profile

KEY

- Discontinue all previous insulin, oral hypoglycemic and Bedside Blood Glucose Monitoring orders
- Hold insulin if IV dextrose/glucose, TPN or tube feed stopped for greater than 1 hour. Notify MD ordering insulin for further orders

Patient population

- Patients who are NPO or unpredictable PO intake and receiving IV dextrose/glucose, TPN or continuous tube feeds
- NOT for pregnancy or for Diabetic Ketoacidosis or hyperglycaemic emergencies

Investigations

Bedside Blood Glucose (mmol/L)	Less than 4	4 to 5.9	6 to 10	10.1 to 15	Greater than 15
Frequency	q20 minutes	q2h	q4h	q2h	q1h

insulin

Starting insulin dose:

- Mix 100 units regular human insulin in 100 mL 0.9% sodium chloride for 1 unit/mL
- If previously on insulin: total daily insulin dose _____ units/24 hours = _____ unit/h
- If insulin-naïve: weight _____ kg x 0.02 = _____ unit/h

Other: _____ unit/h

Maintenance insulin IV infusion

- Adjustment based on current and previous glucose values as follows:

Current value Bedside Blood Glucose (mmol/L)	INCREASE in glucose Current value higher than previous	SMALL DECREASE in glucose Current value lower than previous by less than 3 mmol/L	MODERATE to LARGE DECREASE in glucose Current value lower than previous by greater than or equal to 3 mmol/L
Less than 4	Stop infusion, treat per VIHA hypoglycaemia protocol. Repeat blood glucose monitoring in 20 minutes. Resume infusion at 50% of previous rate once blood glucose greater than 5 mmol/L		
4 to 5.9	Reduce rate by 1 unit/h	Reduce rate by 1 unit/h	Reduce rate by 50 %
6 to 10 (TARGET)	No change in rate	No change in rate	Reduce rate by 50 %
10.1 to 12	Increase rate by 0.5 unit/h	Increase rate by 0.5 unit/h	Reduce rate by 1 unit/h
12.1 to 15	Increase rate by 1 unit/h	Increase rate by 1 unit/h	No change in rate
15.1 to 18	Increase rate by 2 unit/h	Increase rate by 2 unit/h	No change in rate
Greater than 18	Increase rate by 3 unit/h	Increase rate by 3 unit/h	No change in rate
	Notify MD ordering insulin		

- If rate needs to be decreased to less than 0.5 unit/h, stop infusion. Recheck bedside blood glucose (BBG) q2h Once BBG is 6 mmol/L or greater resume insulin infusion at previous rate or at 1 unit/h whichever is lower

Signature, Designation | College License # | Date | Time | Page 1/1

1

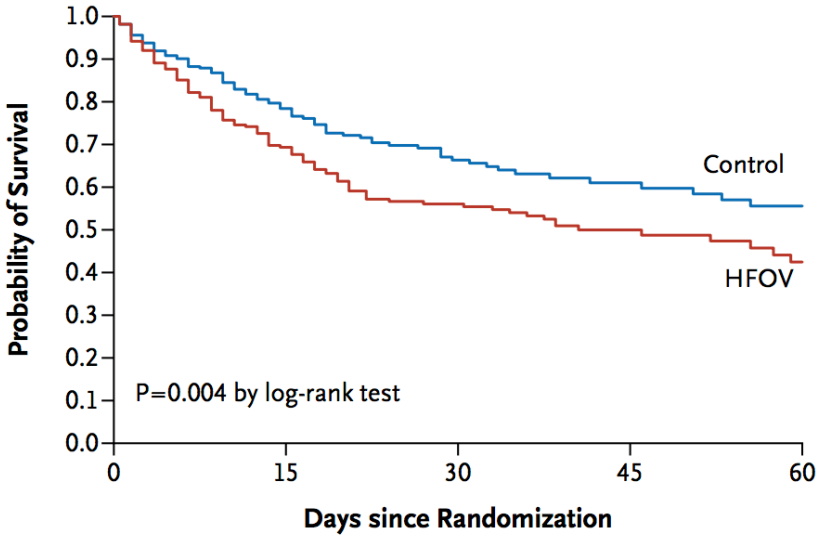
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

High-Frequency Oscillation in Early Acute Respiratory Distress Syndrome

Niall D. Ferguson, M.D., Deborah J. Cook, M.D., Gordon H. Guyatt, M.D., Sangeeta Mehta, M.D., Lori Hand, R.R.T., Peggy Austin, C.C.R.A., Qi Zhou, Ph.D., Andrea Matte, R.R.T., Stephen D. Walter, Ph.D., Francois Lamontagne, M.D., John T. Granton, M.D., Yaseen M. Arabi, M.D., Alejandro C. Arroliga, M.D., Thomas E. Stewart, M.D., Arthur S. Slutsky, M.D., and Maureen O. Meade, M.D., for the OSCILLATE Trial Investigators and the Canadian Critical Care Trials Group*

ABSTRACT



No. at Risk					
HFOV	275	169	98	54	26
Control	273	181	92	54	39

Figure 2. Probability of Survival from the Day of Randomization to Day 60 in the HFOV and Control Groups.

ORIGINAL RESEARCH

Management of Acute Respiratory Distress Syndrome and Refractory Hypoxemia

A Multicenter Observational Study

Erick H. Duan[1,2,3], Neill K. J. Adhikari[4,5], Frederick D'Aragon[2,6,7], Deborah J. Cook[1,2,3], Sangeeta Mehta[5,8], Waleed Alhazzani[1,2,3], Ewan Goligher[5,9], Emmanuel Charbonney[10], Yaseen M. Arabi[11], Tim Karachi[1,12], Alexis F. Turgeon[13,14], Lori Hand[2,15], Qi Zhou[2], Peggy Austin[2], Jan Friedrich[5,16], Francois Lamontagne[6,7], François Lauzier[14], Rakesh Patel[17], John Muscedere[18], Richard Hall[19], Pierre Aslanian[20], Thomas Piraino[3,21], Martin Albert[22], Sean M. Bagshaw[23], Mike Jacka[23], Gordon Wood[24], William Henderson[25], Delbert Dorscheid[26], Niall D. Ferguson[5,9], and Maureen O. Meade[1,2,15]; on behalf of the Canadian Critical Care Trials Group

[1]Department of Medicine, McMaster University, Hamilton, Ontario, Canada; [2]Department of Health Research Methods, Evidence and Impact. McMaster University, Hamilton, Ontario, Canada; [3]St. Joseph's Healthcare Hamilton, Hamilton, Ontario, Canada; [4]Department of Critical Care Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; [5]Interdepartmental Division of Critical Care Medicine, University of Toronto, Toronto, Ontario, Canada; [6]Centre de Recherche du Centre Hospitalier Universitaire de Sherbrooke, Université de Sherbrooke, Sherbrooke, Quebec, Canada; [7]Department of Anesthesia, Université de Sherbrooke, Sherbrooke, Quebec, Canada; [8]Sinai Health Center, Toronto, Ontario, Canada; [9]Division of Respirology, University Health Network and Mount Sinai Hospital, Toronto, Ontario, Canada; [10]Department of Critical Care, Hôpital du Sacré-Coeur de Montréal, Montreal, Quebec, Canada; [11]King Saud bin Abdulaziz University for Health Sciences, King Abdullah International Medical Research Center, Riyadh, Saudi Arabia; [12]Juravinski Hospital, Hamilton, Ontario, Canada; [13]Centre de Recherche du Centre Hospitalier Universitaire de Québec, Université Laval, Quebec, Quebec, Canada; [14]Department of Anesthesiology and Critical Care Medicine, Division of Critical Care, Université Laval, Quebec, Quebec, Canada; [15]Hamilton General Hospital, Hamilton, Ontario, Canada; [16]Critical Care and Medicine Departments, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada; [17]Department of Medicine, University of Ottawa, Ottawa, Ontario, Canada; [18]Department of Critical Care Medicine, Queens University, Kingston, Ontario, Canada; [19]Departments of Critical Care Medicine and Anesthesiology, Dalhousie University, Halifax, Nova Scotia, Canada; [20]Division of Critical Care, Department of Medicine and Centre de Recherche, Centre Hospitalier de l'Université de Montréal, Montréal, Quebec, Canada; [21]Departments of Anesthesia, Division of Critical Care, McMaster University, Hamilton, Ontario, Canada; [22]Departments of Medicine and Critical Care, Centre de recherche Hôpital de Sacré-Cœur de Montréal, Université de Montréal, Montreal, Quebec, Canada; [23]Department of Critical Care Medicine, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada; [24]Island Health Authority, Victoria, British Columbia, Canada; [25]Critical Care Medicine, Vancouver General Hospital University of British Columbia, Vancouver, British Columbia, Canada; and [26]Center for Heart Lung Innovation, Division of Critical Care Medicine, St. Paul's Hospital, University of British Columbia, Vancouver, British Columbia, Canada

Conclusions: Patients with moderate-to-severe ARDS receive treatment adjuncts frequently, especially with refractory hypoxemia. Paradoxically, therapies with less evidence supporting their use (e.g., pulmonary vasodilators) were over-used, whereas those with more evidence (e.g., prone positioning, neuromuscular blockade) were under-used. Patients received higher VTs and lower PEEP than would be suggested by the evidence.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Dalteparin versus Unfractionated Heparin in Critically Ill Patients

The PROTECT Investigators for the Canadian Critical Care Trials Group and the Australian and New Zealand Intensive Care Society Clinical Trials Group

RESULTS

There was no significant between-group difference in the rate of proximal leg deep-vein thrombosis, which occurred in 96 of 1873 patients (5.1%) receiving dalteparin versus 109 of 1873 patients (5.8%) receiving unfractionated heparin (hazard ratio in the dalteparin group, 0.92; 95% confidence interval [CI], 0.68 to 1.23; P=0.57). The proportion of patients with pulmonary emboli was significantly lower with dalteparin (24 patients, 1.3%) than with unfractionated heparin (43 patients, 2.3%) (hazard ratio, 0.51; 95% CI, 0.30 to 0.88; P=0.01). There was no significant between-group difference in the rates of major bleeding (hazard ratio, 1.00; 95% CI, 0.75 to 1.34; P=0.98) or death in the hospital (hazard ratio, 0.92; 95% CI, 0.80 to 1.05; P=0.21). In prespecified per-protocol analyses, the results were similar to those of the main analyses, but fewer patients receiving dalteparin had heparin-induced thrombocytopenia (hazard ratio, 0.27; 95% CI, 0.08 to 0.98; P=0.046).

PROTECT STUDY PROJECT

- Literature Review of VTE Prophylaxis in ICU
- Survey of the VTE practice of Canadian Intensivists – to determine what is the standard of care
- DIRECT Study – to determine the safety of Daltoperin in renal failure
- Pilot Trial
- Full RCT
- KT studies

ELSEVIER

Journal of Critical Care
Volume 26, Issue 2, April 2011, Pages 223.e1-223.e9

PROphylaxis for ThromboEmbolism in Critical Care Trial protocol and analysis plan

Deborah Cook [a, b, 1] ✉, Maureen Meade [a, b, 1], Gordon Guyatt [a, b, 1], Stephen D. Walter [b, 1], Diane Heels-Ansdell [b, 1], William Geerts [c, 1], Theodore E. Warkentin [a, d, 1], D. Jamie Cooper [e, f, 1], Nicole Zytaruk [b, 1], Shirley Vallance [e, 1], Otavio Berwanger [g, 1], Marcelo Rocha [h, 1], Ismael Qushmaq [i, 1], Mark Crowther [a, d, 1]

Show more

https://doi.org/10.1016/j.jcrc.2011.02.010

ELSEVIER

Journal of Critical Care
Volume 20, Issue 4, December 2005, Pages 364-372

Original Article

Prophylaxis of Thromboembolism in Critical Care (PROTECT) Trial: a pilot study

Deborah J. Cook MD [a, b] ✉, Graeme Rocker MD [c], Maureen Meade MD [a, b], Gordon Guyatt MD [a, b], William Geerts MD [d], David Anderson MD [c], Yoanna Skrobik MD [e], Paul Hebert MD [f], Martin Albert MD [e], Jamie Cooper MD [g], Shannon Bates MD [a], Christopher Caco MD [a], Simon Finfer MD [h], Robert Fowler MD [d], Andreas Freitag MD [a], John Granton MD [d], Graham Jones MD [a], Stephan Langevin MD [i] ... Mark Crowther MD [a]

CONECCKT-T

- The objectives of this quality improvement program in medical-surgical critically ill patients are:
  - **Phase 1)** to generate evidence-based practice guidelines for thromboprophylaxis;
  - **Phase 2a)** to identify rates of appropriate thromboprophylaxis in Canadian ICUs;
  - **Phase 2b)** to analyze determinants of appropriate use;
  - **Phase 3a)** to understand barriers and facilitators to appropriate thromboprophylaxis;
  - **Phase 3b)** to conduct *pilot* work toward a future cluster randomized trial of customized knowledge translation for thromboprophylaxis

Lauzier et al. Critical Care 2014, 18:R82
http://ccforum.com/content/18/2/R82

CRITICAL CARE

RESEARCH Open Access

Thromboprophylaxis patterns and determinants in critically ill patients: a multicenter audit

François Lauzier[1], John Muscedere[2], Éric Deland[3], Demetrios Jim Kutsogiannis[4], Michael Jacka[4], Diane Heels-Ansdell[5], Mark Crowther[6], Rodrigo Cartin-Ceba[7], Michael J Cox[8], Nicole Zytaruk[5], Denise Foster[9], Tasnim Sinuff[10,11], France Clarke[5], Patrica Thompson[4], Steven Hanna[5], Deborah Cook[5,6*] and for the Co-operative Network of Critical Care Knowledge Translation for Thromboprophylaxis (CONECCKT-T) Investigators and the Canadian Critical Care Trials Group

Lauzier et al. Critical Care 2014, 18:R82
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ELSEVIER

Journal of Critical Care
Volume 29, Issue 3, June 2014, Pages 471.e1-471.e9

Electronic Article

Barriers and facilitators of thromboprophylaxis for medical-surgical intensive care unit patients: A multicenter survey

Deborah Cook MD [a, b], Mark Duffett MSc [b, c], Francois Lauzier MD [d], Chenglin Ye PhD [b], Peter Dodek MD [e], Bojan Paunovic MD [f], Rob Fowler MD [g], Michelle E. Kho PhD [b, h], Denise Foster RN [i], Tom Stelfox MD [j], Taz Sinuff MD [g], Nicole Zytaruk RN [b], France Clarke RRT [b], Gordon Wood MD [k, l], Michael Cox MD [m], Jim Kutsiogiannis MD [n], Michael Jacka MD [n], Marios Roussos MD [o, p] ... Gordon Guyatt MD [a, b]

Lauzier et al. Critical Care 2014, 18:R82
http://ccforum.com/content/18/2/R82

CRITICAL CARE

RESEARCH Open Access

Thromboprophylaxis patterns and determinants in critically ill patients: a multicenter audit

François Lauzier[1], John Muscedere[2], Éric Deland[3], Demetrios Jim Kutsogiannis[4], Michael Jacka[4], Diane Heels-Ansdell[5], Mark Crowther[6], Rodrigo Cartin-Ceba[7], Michael J Cox[8], Nicole Zytaruk[5], Denise Foster[9], Tasnim Sinuff[10,11], France Clarke[5], Patrica Thompson[4], Steven Hanna[5], Deborah Cook[5,6*] and for the Co-operative Network of Critical Care Knowledge Translation for Thromboprophylaxis (CONECCKT-T) Investigators and the Canadian Critical Care Trials Group

Intensive Care Med (2013) 39:2115–2125
DOI 10.1007/s00134-013-3074-x

ORIGINAL ARTICLE

Physicians declining patient enrollment in a critical care trial: a case study in thromboprophylaxis

D. Cook
Y. Arabi
N. D. Ferguson
D. Heels-Ansdell
A. Freitag
E. McDonald
F. Clarke
S. Keenan
G. Pagliarello
W. Plaxton
M. Herridge
T. Karachi
S. Vallance
J. Cade
T. Crozier
S. Alves da Silva
R. Costa Filho
N. Brandao
I. Watpool
T. McArdle
G. Hollinger
Y. Mandourah
M. Al-Hazmi
N. Zytaruk
N. K. J. Adhikari
The PROTECT Research Coordinators
PROTECT Investigators
Canadian Critical Care Trials Group and the
Australian and New Zealand Intensive Care Society Clinical Trials Group

ELSEVIER

Journal of Critical Care
Volume 29, Issue 3, June 2014, Pages 471.e1-471.e9

Electronic Article

Barriers and facilitators of thromboprophylaxis for medical-surgical intensive care unit patients: A multicenter survey

Deborah Cook MD [a, b], Mark Duffett MSc [b, c], Francois Lauzier MD [d], Chenglin Ye PhD [b], Peter Dodek MD [e], Bojan Paunovic MD [f], Rob Fowler MD [g], Michelle E. Kho PhD [b, h], Denise Foster RN [i], Tom Stelfox MD [j], Taz Sinuff MD [g], Nicole Zytaruk RN [b], France Clarke RRT [b], Gordon Wood MD [k, l], Michael Cox MD [m], Jim Kutsiogiannis MD [n], Michael Jacka MD [n], Marios Roussos MD [o, p] ... Gordon Guyatt MD [a, b]

Lauzier et al. Critical Care 2014, 18:R82
http://ccforum.com/content/18/2/R82

CRITICAL CARE

RESEARCH Open Access

Thromboprophylaxis patterns and determinants in critically ill patients: a multicenter audit

François Lauzier[1], John Muscedere[2], Éric Deland[3], Demetrios Jim Kutsogiannis[4], Michael Jacka[4], Diane Heels-Ansdell[5], Mark Crowther[6], Rodrigo Cartin-Ceba[7], Michael J Cox[8], Nicole Zytaruk[5], Denise Foster[9], Tasnim Sinuff[10,11], France Clarke[5], Patrica Thompson[4], Steven Hanna[5], Deborah Cook[5,6*] and for the Co-operative Network of Critical Care Knowledge Translation for Thromboprophylaxis (CONECCKT-T) Investigators and the Canadian Critical Care Trials Group

Intensive Care Med (2013) 39:2115–2125
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ORIGINAL ARTICLE

Physicians declining patient enrollment in a critical care trial: a case study in thromboprophylaxis

D. Cook
Y. Arabi
N. D. Ferguson
D. Heels-Ansdell
A. Freitag
E. McDonald
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M. Herridge
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S. Vallance
J. Cade
T. Crozier
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R. Costa Filho
N. Brandao
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The PROTECT Research Coordinators
PROTECT Investigators
Canadian Critical Care Trials Group and the
Australian and New Zealand Intensive Care Society Clinical Trials Group

ELSEVIER

Journal of Critical Care
Volume 29, Issue 3, June 2014, Pages 471.e1-471.e9

Electronic Article

Barriers and facilitators of thromboprophylaxis for medical-surgical intensive care unit patients: A multicenter survey

Deborah Cook MD [a, b], Mark Duffett MSc [b, c], Francois Lauzier MD [d], Chenglin Ye PhD [b], Peter Dodek MD [e], Bojan Paunovic MD [f], Rob Fowler MD [g], Michelle E. Kho PhD [b, h], Denise Foster RN [i], Tom Stelfox MD [j], Taz Sinuff MD [g], Nicole Zytaruk RN [b], France Clarke RRT [b], Gordon Wood MD [k, l], Michael Cox MD [m], Jim Kutsiogiannis MD [n], Michael Jacka MD [n], Marios Roussos MD [o, p] ... Gordon Guyatt MD [a, b]

JAMA. 2014 Nov 26;312(20):2135-45. doi: 10.1001/jama.2014.15101.

Cost-effectiveness of dalteparin vs unfractionated heparin for the prevention of venous thromboembolism in critically ill patients.

Fowler RA[1], Mittmann N[2], Geerts W[3], Heels-Ansdell D[4], Gould MK[5], Guyatt G[4], Krahn M[3], Finfer S[6], Pinto R[1], Chan B[7], Ormanidhi O[8], Arabi Y[9], Qushmaq I[10], Rocha MG[11], Dodek P[12], McIntyre L[13], Hall R[14], Ferguson ND[15], Mehta S[16], Marshall JC[17], Doig CJ[18], Muscedere J[19], Jacka MJ[20], Klinger JR[21], Vlahakis N[22], Orford N[23], Seppelt I[24], Skrobik YK[25], Sud S[26], Cade JF[27], Cooper J[28], Cook D[29]; Canadian Critical Care Trials Group; Australia and New Zealand Intensive Care Society Clinical Trials Group.

PROSPECT

PRObiotics to prevent Severe Pneumonia and Endotracheal Colonization Trial

STUDIES

PROSPECT

PRObiotics to prevent Severe Pneumonia and Endotracheal Colonization Trial

STUDIES

Canada-DONATE
National Observational Study of the ICU Management of Deceased Organ Donors

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PRObiotics to prevent Severe Pneumonia and Endotracheal Colonization Trial

Canada-DONATE
National Observational Study of the ICU Management of Deceased Organ Donors

SAHaRA

Aneurysmal Subarachnoid Hemorrhage - Red Blood Cell Transfusion and Outcome (SAHaRA): A Randomized Controlled Trial

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National Observational Study of the ICU Management of Deceased Organ Donors

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Aneurysmal Subarachnoid Hemorrhage - Red Blood Cell Transfusion and Outcome (SAHaRA): A Randomized Controlled Trial

HEMOTION TRIAL

HEMOglobin transfusion threshold in Traumatic brain Injury OptimizatioN: The HEMOTION TRIAL PROTOCOL

Lessening **O**rgan Dysfunction with **VIT**amin C

Lessening Organ Dysfunction with VITamin C

Heparin AnticoaguLation to improve Outcomes in septic shock: The HALO International Phase II RCT

Lessening Organ Dysfunction with VITamin C

Heparin AnticoaguLation to improve Outcomes in septic shock: The HALO International Phase II RCT

Bacteremia **A**ntibiotic **L**ength **A**ctually **N**eeded for **C**linical **E**ffectiveness: Randomized Controlled Trial

BALANCE

STandard versus Accelerated initiation of Renal Replacement Therapy in Acute Kidney Injury (STARRT-AKI): A Multi-Centre, Randomized, Controlled Trial

STARRT-AKI

STARRT-AKI ENROLLMENT REPORT: April 22, 2019

Site Name	Site Activation Date	Length of Site Activation (months)	Number of Patients Enrolled	Recruitment Rate (patients enrolled/month)	Number of patients enrolled last week
AUSTRALIA					
Austin Hospital, Melbourne	14-Oct-15	42.87	51	1.19	0
Princess Alexandra Hospital	17-Mar-16	37.70	30	0.80	0
The Alfred	11-Apr-16	36.87	63	1.71	1
Western Health	12-Apr-16	36.83	21	0.57	0
Sunshine Coast University Hospital (formerly Nambour)	12-Apr-16	36.83	12	0.33	0
Royal Prince Alfred Hospital	8-Jun-16	34.93	40	1.15	0
Nepean Hospital	1-Jul-16	34.17	17	0.50	0
Geelong Hospital	19-May-17	23.43	11	0.47	0
Bendigo Hospital	1-Jun-17	23.00	22	0.96	2
Ballarat Hospital	14-Jun-17	22.57	7	0.31	0
Eastern Health	25-Jul-17	21.20	34	1.60	0
The Royal North Shore Hospital	1-Sep-17	19.93	32	1.61	0
Flinders Medical Centre	5-Oct-17	18.80	6	0.32	0
St. Vincent's Hospital	13-Oct-17	18.53	6	0.32	0
The Northern Hospital	13-Apr-18	12.47	2	0.16	0
Concord Hospital	12-Nov-18	5.37	0	0.00	0
AUSTRIA					
Medical University Innsbruck	2-Aug-17	20.93	36	1.72	0
Medical University Graz	11-Oct-17	18.60	3	0.16	0
Medical University Innsbruck, General and Surgical ICU	5-Apr-18	12.73	2	0.16	0
Medical University of Vienna	19-Feb-19	2.07	1	0.48	0
BELGIUM					
Ghent University Hospital	3-Jan-18	15.80	44	2.78	0
CANADA					
University of Alberta Hospital	1-Jan-16	40.73	36	0.89	0
Centre Hospitalier Universitaire de Sherbrooke (CHUS)	14-Mar-16	37.80	72	1.90	1
Lakeridge Health	18-Mar-16	37.67	9	0.24	0
Mount Sinai Hospital	18-Mar-16	37.67	2	0.05	0
Juravinski Hospital	22-Mar-16	37.53	96	2.56	1
St. Paul's Hospital	30-Mar-16	37.27	7	0.19	0
Hamilton General	15-Apr-16	36.73	48	1.31	0
St. Michael's Hospital	18-Apr-16	36.63	47	1.28	0
St. Joseph's Healthcare	19-Apr-16	36.60	26	0.71	0
Kingston General Hospital	25-Apr-16	36.40	37	1.02	0
The Ottawa Hospital - Civic Campus	26-Apr-16	36.37	26	0.71	0
The Ottawa Hospital - General Campus	26-Apr-16	36.37	58	1.59	0
Health Sciences North	5-May-16	36.07	44	1.22	0
Sunnybrook Health Sciences Centre	8-Jun-16	34.93	29	0.83	0
Hopital Maisonneuve-Rosemont	22-Jun-16	34.47	4	0.12	0
Regina Qu'Appelle Health Authority	22-Jun-16	34.47	25	0.73	0
CHUM	6-Jul-16	34.00	47	1.38	0
Royal Alexandra Hospital	20-Jul-16	33.53	1	0.03	0
Toronto Western Hospital - UHN (on hold)	28-Sep-16	31.20	2	0.06	0
Toronto General Hospital - UHN (on hold)	28-Sep-16	31.20	5	0.16	0
Fraser Health - Surrey Memorial Hospital	28-Oct-16	30.20	0	0.00	0
Victoria General Hospital	2-Nov-16	30.03	2	0.07	0
Royal Jubilee Hospital	2-Nov-16	30.03	9	0.30	0
Peter Lougheed Centre	18-Nov-16	29.50	19	0.64	0
Foothills Hospital	18-Nov-16	29.50	21	0.71	0
McGill University Health Centre	12-Dec-16	28.70	10	0.35	1
IUCPQ	30-Dec-16	28.10	7	0.25	0
CHU de Québec (CHUQ) - Université Laval	12-Jan-17	27.67	21	0.76	0
CIUSSS MCQ	13-Mar-17	25.67	16	0.62	0
Red Deer Regional Hospital	15-Mar-17	25.60	34	1.33	0
London Health Sciences Centre – Victoria Hospital	24-Mar-17	25.30	7	0.28	0
Mazankowski Alberta Heart Institute	5-Apr-17	24.90	2	0.08	0
London Health Sciences Centre – University Hospital	21-Apr-17	24.37	9	0.37	0
Misericordia Community Hospital	26-Apr-17	24.20	4	0.17	0
Sturgeon Community Hospital	9-May-17	23.77	5	0.21	0
Grey Nuns Community Hospital	9-May-17	23.77	10	0.42	0
Trillium Health Partners - Credit Valley Hospital	13-Sep-17	19.53	12	0.61	0
Trillium Health Partners - Mississauga Hospital	22-Sep-17	19.23	4	0.21	0
Health Sciences Centre	24-Jan-18	15.10	9	0.60	1
St. Joseph's Health Centre Toronto	30-Jan-19	2.73	0	0.00	0
CHINA					
Beijing Friendship Hospital, Capital Medical University	29-Jan-18	14.93	40	2.68	1
Guizhou Provincial People's Hospital	29-Jan-18	14.93	16	1.07	0
Henan Provincial People's Hospital	29-Jan-18	14.93	11	0.74	0
Renmin Hospital of Wuhan University	29-Jan-18	14.93	12	0.80	0
The First Affiliated Hospital of Xi'An Jiaotong University	29-Jan-18	14.93	8	0.54	1
Xiangya Hospital Central South University	29-Jan-18	14.93	21	1.41	0
Zhongda Hospital Southeast University	29-Jan-18	14.93	62	4.15	1
Shandong Provincial Hospital	26-Mar-18	13.07	9	0.69	0
The First Hospital of Jilin University	3-Apr-18	12.80	4	0.31	2
The First Affiliated Hospital of Bengbu Medical College	25-Apr-18	12.07	6	0.50	1
Wuxi People's Hospital	19-Jul-18	9.23	4	0.43	1
Peking Union Medical College Hospital	31-Aug-18	7.80	10	1.28	0
Peking University First Hospital	7-Dec-18	4.53	0	0.00	0
The First Affiliated Hospital of Xiamen University	28-Feb-19	1.77	1	0.57	1
FINLAND					
Helsinki University Central Hospital	19-Feb-16	38.60	28	0.73	0
Turku University Hospital	9-Feb-17	26.73	13	0.49	0
Tampere University Hospital	18-Apr-17	24.47	7	0.29	0
FRANCE					
Hôpital Louis Mourier	23-Feb-17	26.27	23	0.88	0
Centre Hospitalier Départemental La Roche-Sur-Yon	27-Feb-17	26.13	33	1.26	0
CHU D'Amiens	27-Feb-17	26.13	33	1.26	0
Hopital Pitie-Salpetriere - Pneumologie et réanimation médicale (Pr Similowski)	27-Feb-17	26.13	30	1.15	0
Hôpital Avicenne	27-Feb-17	26.13	33	1.26	0
Hôpital Edouard Herriot	27-Feb-17	26.13	40	1.53	0
CH De Bourg-en-Bresse – Fleyriat	27-Feb-17	26.13	56	2.14	0
CHRU de Nîmes - Service de Réanimation	1-Mar-17	26.07	19	0.73	0
CHU De Rouen	2-Mar-17	26.03	12	0.46	0
CH Sud Francilien	8-Mar-17	25.83	14	0.54	0
CHU Dijon Bourgogne	8-Mar-17	25.83	73	2.83	0
CH Le Mans	9-Mar-17	25.80	11	0.43	0
Hotel Dieu - Service d'Anesthesie	9-Mar-17	25.80	17	0.66	0
CH de Béthune Beuvry – Germont et Gauthier	15-Mar-17	25.60	29	1.13	0
Hopital G. Montpied	17-Mar-17	25.53	26	1.02	0
CH de Dieppe	17-Mar-17	25.53	16	0.63	0
Hôpital Henri Mondor	20-Mar-17	25.43	37	1.45	0
Hôpital Civil	20-Mar-17	25.43	2	0.08	0
CHU de Pointe à Pitre	22-Mar-17	25.37	66	2.60	0
André Mignot	23-Mar-17	25.33	11	0.43	0
Centre Hospitalier Dr. Schaffner (Lens)	23-Mar-17	25.33	13	0.51	0
Hôpital Nord Laennec	27-Mar-17	25.20	40	1.59	0
Groupe Hospitalier Carnelle Portes de l'Oise	27-Mar-17	25.20	7	0.28	0
Hotel Dieu – Service de Médicale	27-Mar-17	25.20	34	1.35	0
Hôpital de la Source - CHR d'Orléans	29-Mar-17	25.13	7	0.28	0
CH René DUBOS – Pontoise	12-Apr-17	24.67	22	0.89	0
CH Lyon Sud – Pierre Benite	19-May-17	23.43	19	0.81	0
HEGP : Hôpital Européen Georges-Pompidou	13-Jun-17	22.60	32	1.42	0
Hopital Pitie Salpetriere - reanimation medicale (Pr Combes)	18-Aug-17	20.40	7	0.34	0
GERMANY					
University Hospital Münster	15-Mar-17	25.60	19	0.74	0
Klinikum Coburg	30-Jan-18	14.90	5	0.34	0
IRELAND					
St. Vincent's University Hospital	7-Nov-16	29.87	3	0.10	0
ITALY					
San Raffaele Hospital	3-Jul-18	9.77	2	0.20	0
Ospedale San Carlo	23-Nov-18	5.00	1	0.20	0
NEW ZEALAND					
Wellington Hospital	21-Apr-16	36.53	68	1.86	1
Auckland City Hospital	29-May-16	35.27	42	1.19	0
Christchurch Hospital	29-Jun-17	22.07	17	0.77	0
Hawke's Bay Hospital	24-Oct-17	18.17	3	0.17	1
Rotorua Hospital	17-Jan-18	15.33	2	0.13	0
Auckland Hospital DCCM	2-Apr-18	12.83	10	0.78	0
Taranaki Hospital	28-Sep-18	6.87	0	0.00	0
Whangarei Hospital	17-Dec-18	4.20	3	0.71	0
Tauranga Hospital	23-Jan-19	2.97	2	0.67	0
SWITZERLAND					
Center Hospitalier Universitaire Vaudois (CHUV)	9-Jul-18	9.57	25	2.61	0
Geneva University Hospital	27-Feb-19	1.80	1	0.56	0
UK					
Guy's and St. Thomas' NHS Foundation Trust	18-Jul-17	21.43	60	2.80	0
Queen's Medical Centre, Nottingham University Hospitals NHS Trust	5-Apr-18	12.73	3	0.24	0
Buckinghamshire Healthcare NHS Trust, Wycombe Hospital	10-Apr-18	12.57	1	0.08	0
Buckinghamshire Healthcare NHS Trust, Stoke Mandeville Hospital	10-Apr-18	12.57	7	0.56	1
St. James University Hospital, Leeds Teaching Hospitals NHS Trust	26-Apr-18	12.03	14	1.16	0
Milton Keynes University Hospital NHS Foundation Trust	30-Apr-18	11.90	3	0.25	0
East Kent University Hospitals NHS Trust	11-May-18	11.53	1	0.09	0
Lewisham and Greenwich NHS Trust – University Hospital Lewisham	8-Jun-18	10.60	7	0.66	0
Royal Liverpool and Broadgreen University Hospitals NHS Trust	11-Jul-18	9.50	8	0.84	0
King's College Hospital NHS Foundation Trust	30-Aug-18	7.83	2	0.26	0
Queen Elizabeth University Hospital	6-Sep-18	7.60	3	0.39	0
Aberdeen Royal Infirmary – NHS Grampian	25-Sep-18	6.97	9	1.29	0
Warwick Hospital	1-Nov-18	5.73	0	0.00	0
Golden Jubilee National Hospital	1-Nov-18	5.73	3	0.52	0
Western Sussex Hospitals NHS Trust – St. Richards Hospital	22-Nov-18	5.03	0	0.00	0
Western Sussex Hospitals NHS Trust – Worthing Hospital	22-Nov-18	5.03	2	0.40	1
St Helens & Knowsley Teaching Hospitals NHS Trust	26-Nov-18	4.90	3	0.61	0
York Teaching Hospital NHS Foundation Trust	3-Dec-18	4.67	1	0.21	0
Royal Bornemouth & Christchurch Hospitals NHS Trust	5-Dec-18	4.60	2	0.43	1
University Hospital Ayr (NHS Ayrshire and Arran)	22-Feb-19	1.97	0	0.00	0
Lewisham and Greenwich NHS Trust – Queen Elizabeth Hospital	12-Mar-19	1.37	0	0.00	0
St. George's University Hospitals NHS Trust	13-Mar-19	1.33	0	0.00	0
University Hospital of North Tees	20-Mar-19	1.10	1	0.91	0
University Hospitals Coventry & Warwickshire	5-Apr-19	0.57	0	0.00	0
USA					
Mayo Clinic	23-Nov-16	29.33	11	0.38	0
University of Alabama at Birmingham	24-May-17	23.27	22	0.95	0
University of Kentucky	26-Jan-18	15.03	57	3.79	4
University of Florida	16-Mar-18	13.40	17	1.27	0
Rhode Island Hospital	4-Apr-18	12.77	2	0.16	0
The Miriam Hospital	4-Apr-18	12.77	2	0.16	0
BRAZIL					
Hospital de Clinicas de Porto Alegre	7-Feb-19	2.47	4	1.62	1
TOTAL STUDY			2724	0.78	

STARRT-AKI

STARRT-AKI ENROLLMENT REPORT: April 22, 2019

Site Name	Site Activation Date	Length of Site Activation (months)	Number of Patients Enrolled	Recruitment Rate (patients enrolled/month)	Number of patients enrolled last week
AUSTRALIA					
Austin Hospital, Melbourne	14-Oct-15	42.87	51	1.19	0
Princess Alexandra Hospital	17-Mar-16	37.70	30	0.80	0
The Alfred	11-Apr-16	36.87	63	1.71	1
Western Health	12-Apr-16	36.83	21	0.57	0
Sunshine Coast University Hospital *(formerly Nambour)*	12-Apr-16	36.83	12	0.33	0
Royal Prince Alfred Hospital	8-Jun-16	34.93	40	1.15	0
Nepean Hospital	1-Jul-16	34.17	17	0.50	0
Geelong Hospital	19-May-17	23.43	11	0.47	0
Bendigo Hospital	1-Jun-17	23.00	22	0.96	2
Ballarat Hospital	14-Jun-17	22.57	7	0.31	0
Eastern Health	25-Jul-17	21.20	34	1.60	0
The Royal North Shore Hospital	1-Sep-17	19.93	32	1.61	0
Flinders Medical Centre	5-Oct-17	18.80	6	0.32	0
St. Vincent's Hospital	13-Oct-17	18.53	6	0.32	0
The Northern Hospital	13-Apr-18	12.47	2	0.16	0
Concord Hospital	12-Nov-18	5.37	0	0.00	0
AUSTRIA					
Medical University Innsbruck	2-Aug-17	20.93	36	1.72	0
Medical University Graz	11-Oct-17	18.60	3	0.16	0
Medical University Innsbruck, General and Surgical ICU	5-Apr-18	12.73	2	0.16	0
Medical University of Vienna	19-Feb-19	2.07	1	0.48	0
BELGIUM					
Ghent University Hospital	3-Jan-18	15.80	44	2.78	0
CANADA					
University of Alberta Hospital	1-Jan-16	40.23	36	0.89	0
Centre Hospitalier Universitaire de Sherbrooke (CHUS)	14-Mar-16	37.80	72	1.90	1
Lakeridge Health	18-Mar-16	37.67	9	0.24	0
Mount Sinai Hospital	18-Mar-16	37.67	2	0.05	0
Toronto Western Hospital - UHN (on hold)	28-Sep-16	31.20	2		
Toronto General Hospital - UHN (on hold)	28-Sep-16	31.20	5		
Fraser Health - Surrey Memorial Hospital	28-Oct-16	30.20	0		
Victoria General Hospital	2-Nov-16	30.03	2		
Royal Jubilee Hospital	2-Nov-16	30.03	9		
Peter Lougheed Centre	18-Nov-16	29.50	19		
Foothills Hospital	18-Nov-16	29.50	21		
McGill University Health Centre	12-Dec-16	28.70	10		
IUCPQ	30-Dec-16	28.10	7		
CHU de Québec (CHUQ) - Université Laval	12-Jan-17	27.67	21		
CIUSSS MCQ	13-Mar-17	25.67	16		
Red Deer Regional Hospital	15-Mar-17	25.60	34		
London Health Sciences Centre – Victoria Hospital	24-Mar-17	25.30	7		
Mazankowski Alberta Heart Institute	5-Apr-17	24.90	2		
Tampere University Hospital	18-Apr-17	24.47	7	0.29	0
FRANCE					
Hôpital Louis Mourier	23-Feb-17	26.27	23	0.88	0
Centre Hospitalier Départemental La Roche-Sur-Yon	27-Feb-17	26.13	33	1.26	0
CHU D'Amiens	27-Feb-17	26.13	33	1.26	0
Hopital Pitie-Salpetriere - Pneumologie et réanimation médicale (Pr Similowski)	27-Feb-17	26.13	30	1.15	0
Hôpital Avicenne	27-Feb-17	26.13	33	1.26	0
Hôpital Edouard Herriot	27-Feb-17	26.13	40	1.53	0
CH De Bourg-en-Bresse – Fleyriat	27-Feb-17	26.13	56	2.14	0
CHRU de Nîmes - Service de Réanimation	1-Mar-17	26.07	19	0.73	0
CHU De Rouen	2-Mar-17	26.03	12	0.46	0
CH Sud Francilien	8-Mar-17	25.83	14	0.54	0
CHU Dijon Bourgogne	8-Mar-17	25.83	73	2.83	0
CH Le Mans	9-Mar-17	25.80	11	0.43	0
Hotel Dieu - Service d'Anesthesie	9-Mar-17	25.80	17	0.66	0
CH de Béthune Beuvry – Germont et Gauthier	15-Mar-17	25.60	29	1.13	0
Hopital G. Montpied	17-Mar-17	25.53	26	1.02	0
CH de Dieppe	17-Mar-17	25.53	16	0.63	0
Hôpital Henri Mondor	20-Mar-17	25.43	37	1.45	0
Hôpital Civil	20-Mar-17	25.43	2	0.08	0
CHU de Pointe à Pitre	22-Mar-17	25.37	66	2.60	0
André Mignot	23-Mar-17	25.33	11	0.43	0
Centre Hospitalier Dr. Schaffner (Lens)	23-Mar-17	25.33	13	0.51	0
Hôpital Nord Laennec	27-Mar-17	25.20	40	1.59	0
Groupe Hospitalier Carnelle Portes de l'Oise	27-Mar-17	25.20	7	0.28	0
Hotel Dieu – Service de Médicale	27-Mar-17	25.20	34	1.35	0
Hôpital de la Source - CHR d'Orléans	29-Mar-17	25.13	7	0.28	0
CH René DUBOS – Pontoise	12-Apr-17	24.67	22	0.89	0
CH Lyon Sud – Pierre Benite	19-May-17	23.43	19	0.81	0
HEGP : Hôpital Européen Georges-Pompidou	13-Jun-17	22.60	32	1.42	0
Hopital Pitie Salpetriere - reanimation medicale (Pr Combes)	18-Aug-17	20.40	7	0.34	0
GERMANY					
University Hospital Münster	15-Mar-17	25.60	19	0.74	0
Klinikum Coburg	30-Jan-18	14.90	5	0.34	0
IRELAND					
St. Vincent's University Hospital	7-Nov-16	29.87	3	0.10	0
ITALY					
San Raffaele Hospital	3-Jul-18	9.77	2	0.20	0
Ospedale San Carlo	23-Nov-18	5.00	1	0.20	0
NEW ZEALAND					
Wellington Hospital	21-Apr-16	36.53	68	1.86	1
Auckland City Hospital	29-May-16	35.27	42	1.19	0
Christchurch Hospital	29-Jun-17	22.07	17	0.77	0
Hawke's Bay Hospital	24-Oct-17	18.17	3	0.17	1
Rotorua Hospital	17-Jan-18	15.33	2	0.13	0
Auckland Hospital DCCM	2-Apr-18	12.83	10	0.78	0
Taranaki Hospital	28-Sep-18	6.87	0	0.00	0
Whangarei Hospital	17-Dec-18	4.20	3	0.71	0
Tauranga Hospital	23-Jan-19	2.97	2	0.67	0
SWITZERLAND					
Center Hospitalier Universitaire Vaudois (CHUV)	9-Jul-18	9.57	25	2.61	0
Geneva University Hospital	27-Feb-19	1.80	1	0.56	0
UK					
Guy's and St. Thomas' NHS Foundation Trust	18-Jul-17	21.43	60	2.80	0
Queen's Medical Centre, Nottingham University Hospitals NHS Trust	5-Apr-18	12.73	3	0.24	0
Buckinghamshire Healthcare NHS Trust, Wycombe Hospital	10-Apr-18	12.57	1	0.08	0
Buckinghamshire Healthcare NHS Trust, Stoke Mandeville Hospital	10-Apr-18	12.57	7	0.56	1