

Enhancing Collaboration for Better Research, Commercialization and Technology Adoption

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Presentation Themes

1. Improving research collaboration within (and between) HealthCareCAN/AFMC partner institutions
2. Improving technology adoption channels

But first ... it's axiomatic that collaboration drives science



- Bibliographic studies show that Canadians are good scientific collaborators

Collaboration Theme 1

Improving research collaboration within (and between) partner institutions

AHSNs and Faculties of Medicine are hotbeds of innovation

- **Inputs:** Canada's Top 40 Research Hospitals[©] performed \$2.38b of research in 2014
 - Up 5% from 2013
 - More if Faculties of Medicine \$\$ included
 - ≈36% of Canada's Top 50 Research Universities[©] total (\$6.7b)
- **Outputs:** CAHO (2013, 2014): 139 research commercializations (better mousetraps)
 - HCC/AFMC (2013, 2014): ~250 commercializations (our estimate)
 - Canada (10-year): ~1,250 commercializations (our estimate)
 - ~3-4% of world total
 - World (10-year): our estimate ~41,250 commercializations (our estimate)

So What?

- **Impacts?**

- How many of 1,250 Canadian innovations are in use in Canada?
- How many of 41,250 World innovations are in use in Canada?

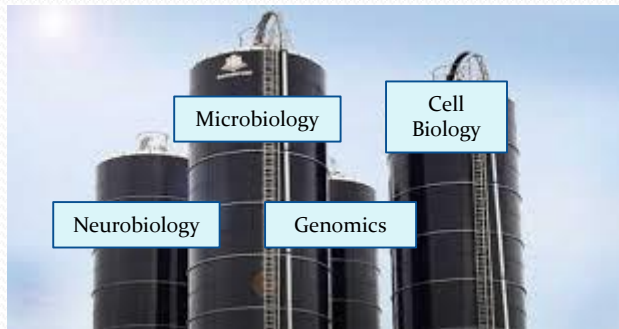
- **Conclusions**

- Innovation and commercialization is a necessary condition, but not sufficient for progress in healthcare
- Canada doesn't have an apparent health research **input** or **output** deficit
- We may well have an **adoption** deficit
- Need to examine barriers to implementing healthcare innovations

First Barrier to Collaboration: Science lives in silos



Second barrier: Academic research silos often don't align with clinical silos



Research Silos



Clinical Silos

Third Barrier: Funding Silos

Granting Council Funding of “Diabetes” Research (2007-2014)*

Council	# Projects Canada	Number of Departments
CIHR	5,551	≤325
NSERC	393	≤106
SSHRC	2	2
CFI	74	n/a
Total	6,020	≤433

* Number of research projects funded.

Source: The Innovation Atlas of Canada

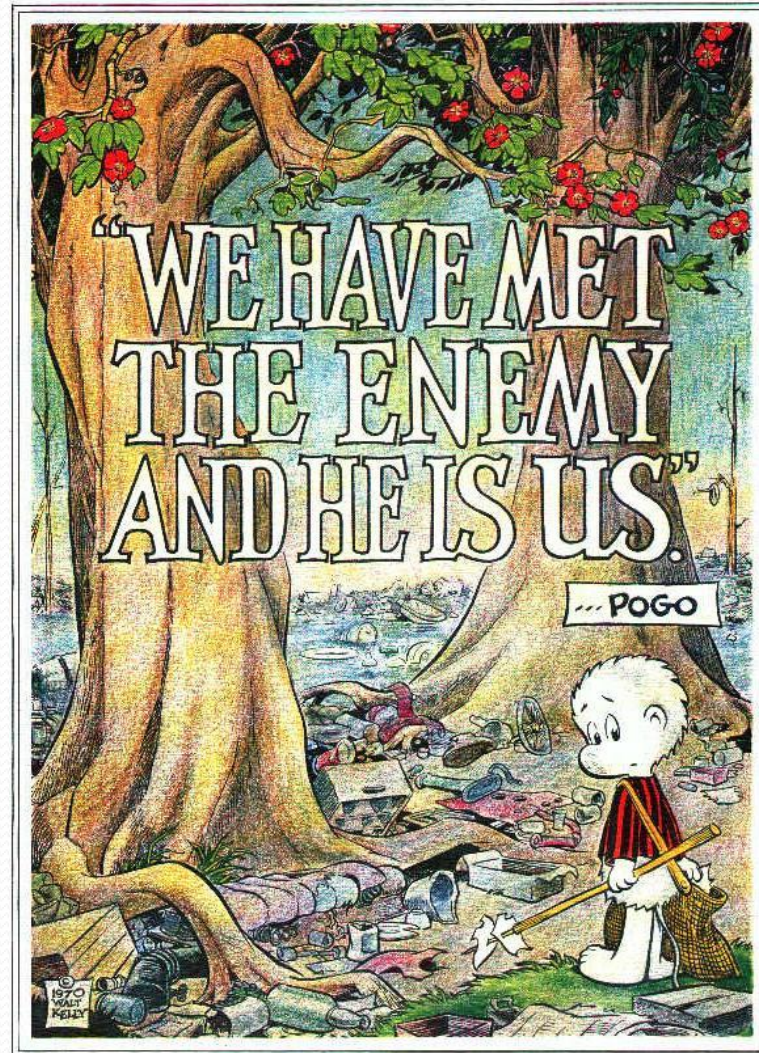


Collaboration links within AHSNs, Universities are also under-developed

Neuroscience Disciplinary Overlap (CFI - McGill Example)

Evans, Alan	Montreal Consortium for Brain Imaging Research (MCBIR)	Innovation Fund
Baum, Shari	Montreal Network for the Study of Language, Mind and Brain	Innovation Fund
Kennedy, Timothy	The Molecular Basis of Neuronal Excitability	New Opportunities Fund
Nader, Karim	The Memory and Neuroplasticity Lab	On-going New Opportunities Fund
Wiseman, Paul	Integrated two-photon/ confocal microscope and image correlation spectroscopy system for studies of the assembly and disassembly of macromolecular adhesion complexes in living cells	On-going New Opportunities Fund
Robson, John	Integration of Neuroimaging and Electrophysiological Tools in Cognitive Neuroscience	New Opportunities Fund
Colman, David	Equipment for a new laboratory that studies myelin and synapse formation in living cells	Canada Research Chairs Infrastructure Fund
Ruthazer, Edward	Two-Photon Microscope for In Vivo Imaging of Neural Circuit Development	Canada Research Chairs Infrastructure Fund
Palmer, Caroline	Sequence Production Laboratory	Canada Research Chairs Infrastructure Fund
Arbel, Tal	Computer Vision, Medical Imaging and Perceptual Modeling Lab	On-going New Opportunities Fund
Collins, D Louis	Research facility for image-guided neurosurgery	On-going New Opportunities Fund
Cook, Erik	The role of the visual cortex in visual perception	Canada Research Chairs Infrastructure Fund
Steinhauer, Karsten	Research Laboratory for Electrophysiological Studies in the Neurocognition of Language	Canada Research Chairs Infrastructure Fund
Flores, Cecilia	Establishment of a multidisciplinary unit for the study of neurobiological mechanisms implicated in drug abuse and schizophrenia	On-going New Opportunities Fund
Fournier, Alyson	The Cellular Biology of Neurite Outgrowth Inhibition	Canada Research Chairs Infrastructure Fund
Cornish, Kim	A multidisciplinary technical platform for neuroscience studies of neurodevelopmental disorders	Canada Research Chairs Infrastructure Fund
McAdams, Stephen	Music Perception and Cognition Laboratory	Canada Research Chairs Infrastructure Fund
Titone, Debra	Establishment of a Cognitive Neuroscience Laboratory for the Study of Language and Memory	Canada Research Chairs Infrastructure Fund
Armony, Jorge	Neural and autonomic measures of cognitive-emotional interactions in healthy humans and in individuals with anxiety disorders	Canada Research Chairs Infrastructure Fund

So ...



Other thoughts about research collaboration

1. **Institutions** don't do research ... **people** do research
 - Science progresses primarily through personal interactions, not institutional interactions
 - But institutions can facilitate (or hinder) personal interactions
2. **Academic and Clinical science are both highly siloed**
 - Clinical discipline silos
 - Practitioner-Practitioner silos
 - Practitioner-Researcher silos
 - Personal acquaintance silos
 - Institutional silos within healthcare continuum
 - Hospitals
 - Faculties of Medicine
 - Other University Departments
 - Non-profit research organizations
 - Funders
 - Etc.
3. **Scientific progress often happens at disciplinary boundaries**
 - Suggests need to mash together different fields, disciplines
 - ... Actually, to mash together people from different fields, disciplines

Collaboration in the Real World

(Importance of disciplinary connections)

A building block of innovation science is connecting seemingly unrelated ideas. We are flooded with discoveries in isolated domains. Making quick connections between, for instance, biology and technology, could lead to bigger ideas and redirect research and development.

Andrew Kusiak
Professor of mechanical and industrial engineering
University of Iowa
Nature. 18 February 2016

Collaboration in the Real World

(Importance of personal connections)



St. Michael's Hospital, Ryerson unveil joint venture to improve health care

ELIZABETH CHURCH

The Globe and Mail

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1 Comment



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READ NOW

Ori Rotstein, surgeon-in-chief at Toronto's St. Michael's Hospital, didn't know Ryerson University's dean of engineering when he took the seat beside him at an award announcement five years ago. Before the event ended, the pair had struck an alliance, figuring there must be ways the school and hospital, located on each other's doorsteps, could work together.

The results of that chance meeting are on display this week with the opening Tuesday of shared research facilities and a new business incubator, both designed to help translate science into improvements in care and hasten their use at the bedside.

"I said, 'We are neighbours and we have not done much together,'" remembers Ryerson's Mohamed Lachemi, now the school's interim president. "When you bring people with different perspectives together, that's when you get innovation."

How to stimulate personal interactions in partner institutions

- Follow the CFI OMS approach
- Organize thematic presentations
 - e.g. “Current developments in research” - (internal medicine, musculoskeletal research, oncology, testing, etc.)
- Invite researchers from allied fields/disciplines and partner institutions within and across networks to share activities, findings, etc.
- Help them cultivate new research relationships

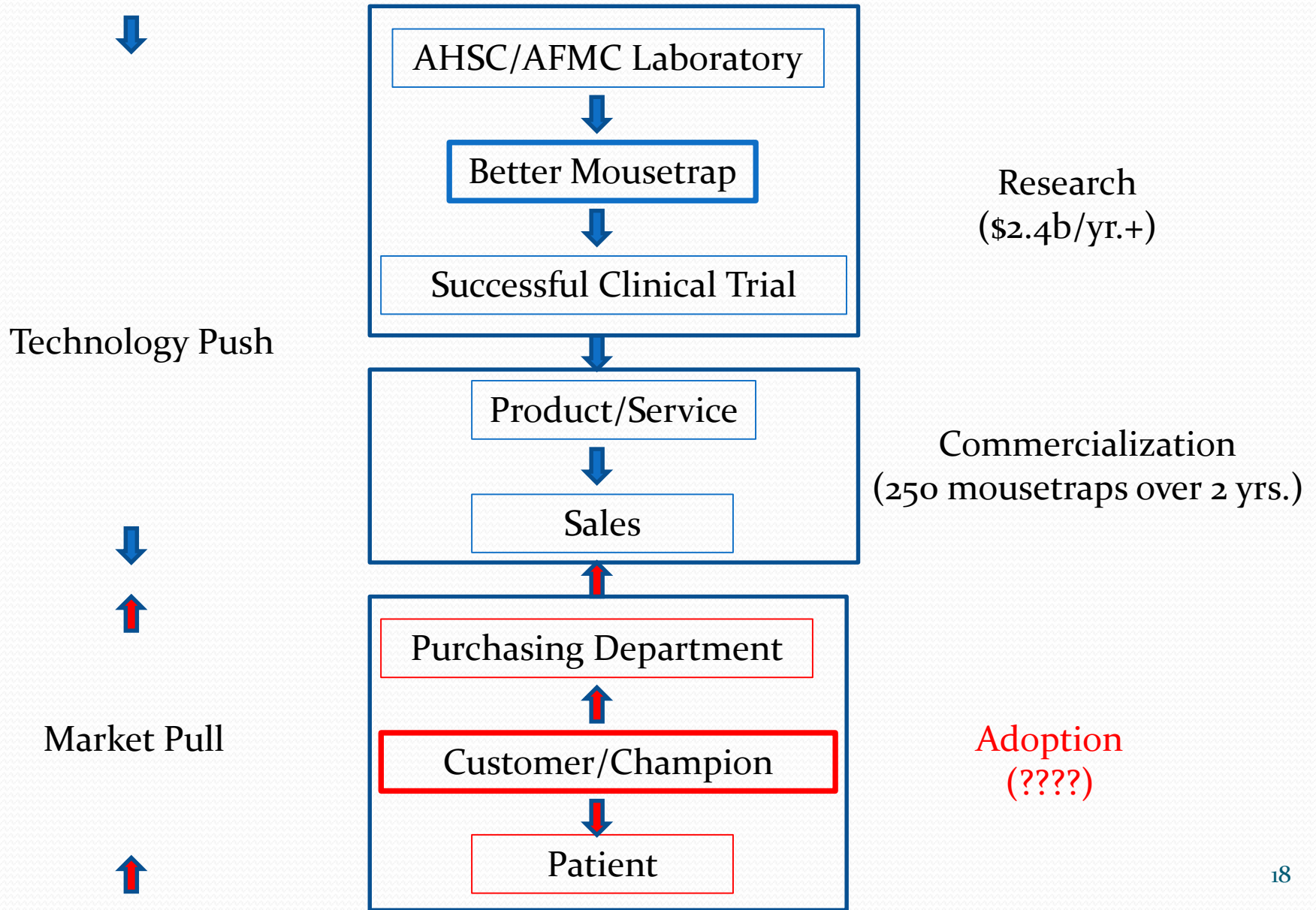
Take-Aways

- We need new levels of personal interaction to break down silos, facilitate researcher interactions and technology adoption
- AHSNs and Faculties of Medicine can facilitate this

Collaboration Theme 2

Improving technology adoption channels

Standard model of tech transfer



Successful technology/knowledge transfer requires Early Adopters



Proposed Goal: Become early adopters of (at least) made-in-Canada innovations
(If we don't do it, who else will?)

How Does Early-Stage Adoption Work (or not)?



Better Mousetrap



Customer-Champion
(and skeptics)

Barriers to Adoption

- Un-familiarity, lack of awareness
- Inertia, resistance to change
- Risk vs. reward perception
- Exposure of current limitations
- Under-cutting of authority
- NIH (not invented here)
- \$\$\$
- Lack of practitioner-champions !!!!
- **Result: ADOPTION DEFICIT**

Proposition – A core challenge for healthcare collaboration is overcoming barriers to the adoption of novel research outputs

- Yes, Canada has **commercialization** challenges
 - (So does everyone else)
 - Focus of much policy attention
 - Focus of many technology push program \$\$ to fill pipeline
- But we also have **adoption** challenges
 - Unique to us? Probably not
 - Focus of little policy attention
 - Even less program \$\$
 - Paradox: Public health asset ownership should reduce adoption barriers, but doesn't appear to

Addressing the adoption deficit



Researcher

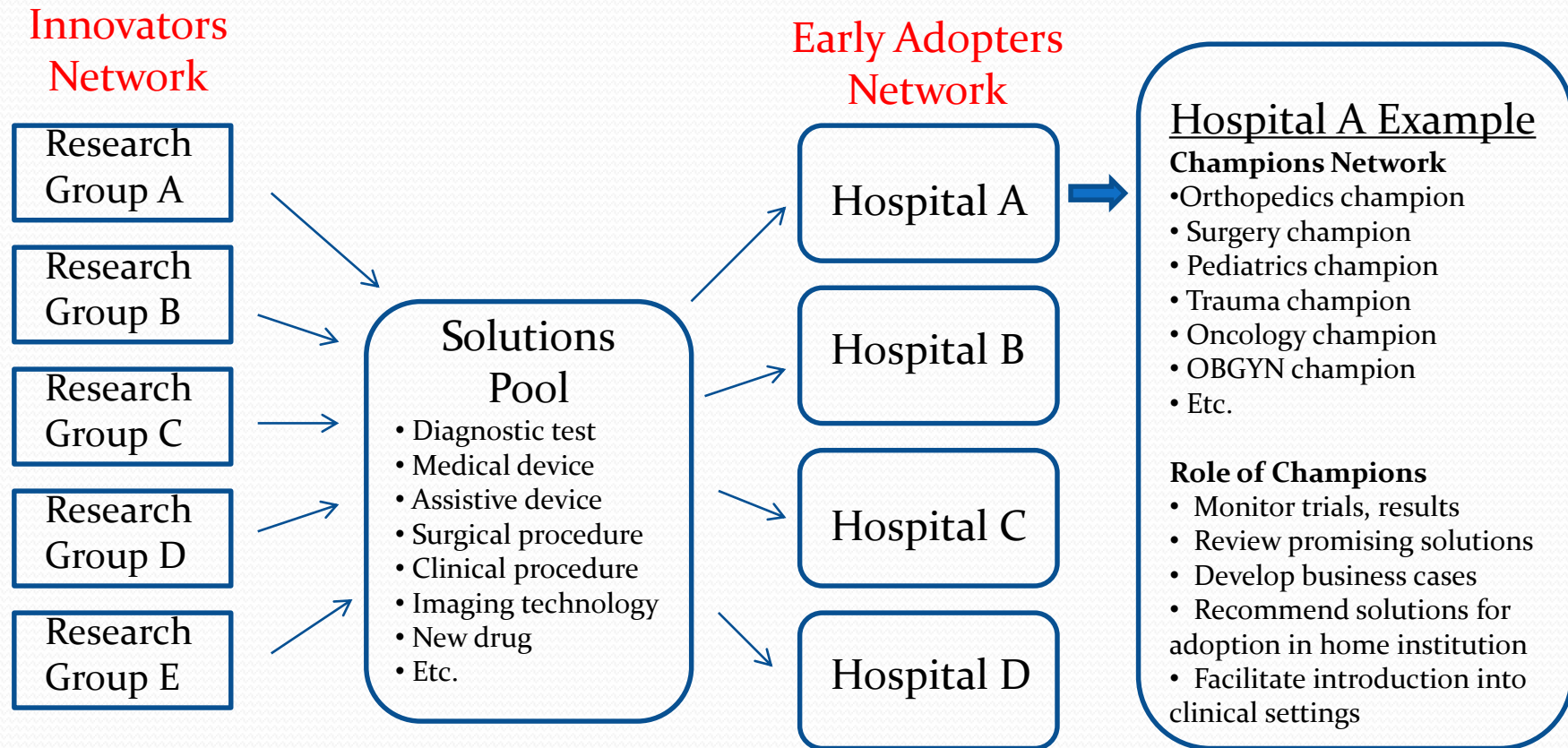


Clinician



Challenge: Link researchers to practitioner-champions
Develop an early-stage adopters network

A proposal: Canadian Health Innovation Testbed (CHIT)



Involving Industry in CHIT

Innovators Network

Research Group A

Research Group B

Research Group C

Research Group D

Research Group E

Solutions Pool

- Diagnostic test
- Medical device
- Assistive device
- Surgical procedure
- Clinical procedure
- Imaging technology
- New drug
- Etc.

Early Adopters Network

Hospital A

Hospital B

Hospital C

Hospital D

Hospital A Example Champions Network

- Orthopedics champion
- Surgery champion
- Pediatrics champion
- Trauma champion
- Oncology champion
- OBGYN champion
- Etc.

Role of Champions

- Monitor trials, results
- Review promising solutions
- Develop business cases
- Recommend solutions for adoption in home institution
- Facilitate introduction into clinical settings

Company A

Company B

Company C

Company D

Company E

CHIT Benefits

- Accelerate commercialization of Canadian inventions
 - Benefits to companies/economy
 - Benefits to inventors, institutions
- Accelerate adoption of proven health solutions
 - Benefits to patients
 - Benefits to healthcare system
- Make Canada an early-stage adoption leader
- Validate made-in-Canada solutions to outside world

Next step?

- HealthCareCAN/AFMC-led feasibility study for CHIT
- Granting Council financial support?

Conclusion: 2 Collaboration Goals

1. Break down the silos
2. Turbo-charge innovation adoption

Thank you!

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