

Business Thinking & Organizational Structure

Data Sciences Institute
Topics in Deep Learning
Instructor: Erik Drysdale
TA: Jenny Du

Outline

- Healthcare initiatives
- Triple Win & Aim framework
- Example institution (DIHI)
- Disruptive technologies in (Canadian) healthcare

Healthcare Initiatives

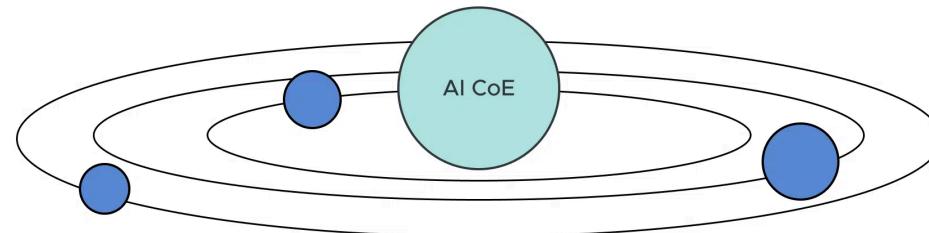
Healthcare Initiatives

- Successful healthcare initiatives will take into account:
 - Key stakeholders (patients & families, healthcare providers, and other hospital staff)
 - Organization structure
 - Current incentives
- **Transformation** is much harder than **change**, and most healthcare transformations will be underwhelming
 - Adoption of data science initiatives requires a solid understanding of both the *institutional* and *technical* challenges with DS
- We'll discuss one of the most common initiatives which is creating a center of excellence

AI Center of Excellence (Healthcare Initiatives)

AI Center of Excellence

- A healthcare organization wishing to adopt data science at scale will often face a key strategic question:
 - *To what extent should a central AI team coordinate and drive data science transformation?*
- A common approach is to develop an AI Center of Excellence
 - *A dedicated team or department that focuses on the strategic implementation of artificial intelligence technologies across the organization*



Source: [AtScale](#)

AI Center of Excellence (benefits)

- Concentration of expertise
 - Recruiting and maintaining AI talent is very difficult!
- Economies of scale
 - By having larger pool of skilled data scientists, you can more smoothly distribute work
- Fostering a community of practice
 - Lessons learned, educational materials, seminars, hackathons, etc
- Strategic vision and priority setting
 - By understanding the core technical challenges of AI and its trends, the AICoE is well placed to provide strategic direction as well as vet external vendor systems

AI Center of Excellence (benefits)



Source: Zinnov

AI Center of Excellence (challenges)

- Competing resources and priorities
 - Other groups will do some amount of DS; should the AICoE be treated as a new group in addition to IT, HR, finance, etc
- Misaligned interests
 - While an AICoE will have the same interests on many fronts with other departments, it will have to spend time persuading and coordinating other groups to ensure DS projects align with its vision
- Isolation of expertise
 - Concentrating the "cool" sounding work in one department may cause resentment or a sense of detachment from others (e.g. "we're not smart enough to do AI" or "they think they're the only ones that can do AI")

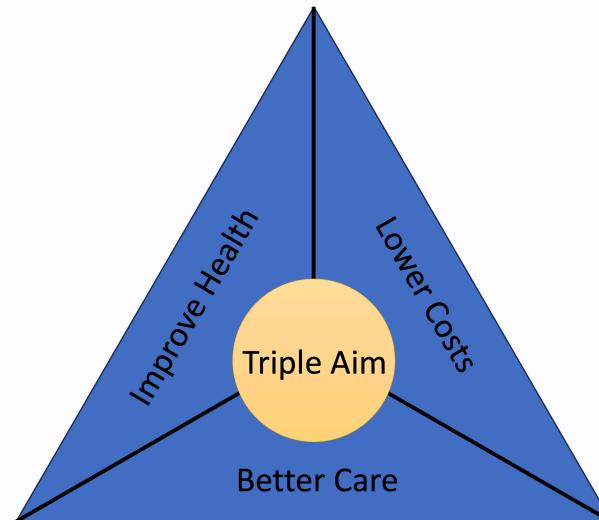
Triple Aim Framework

Triple Aim Framework

- Developed by Dr. Donald Berwick and colleagues at the Institute for Healthcare Improvement (IHI) in 2007.
- Three interconnected goals focus on enhancing healthcare systems and the overall health and well-being of populations.

Triple Aim Framework

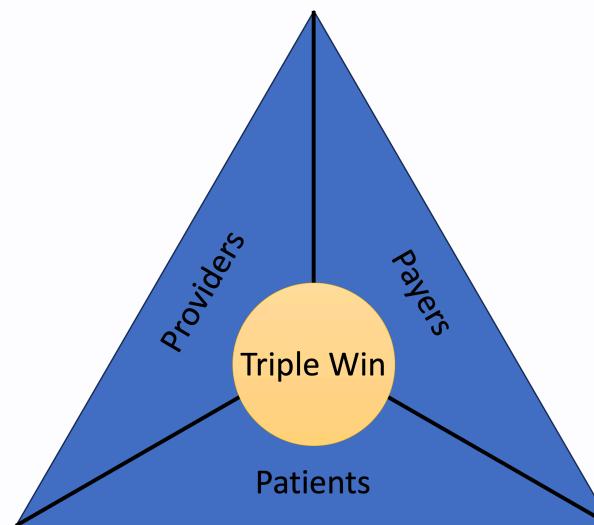
- 1. Improving Population Health:** Enhance the health of a defined population.
- 2. Enhancing Patient Experience of Care:** Improve the experience of care for individual patients.
- 3. Reducing the Per Capita Cost of Healthcare:** Reduce the overall cost of healthcare while maintaining or improving quality.



Triple Win Framework

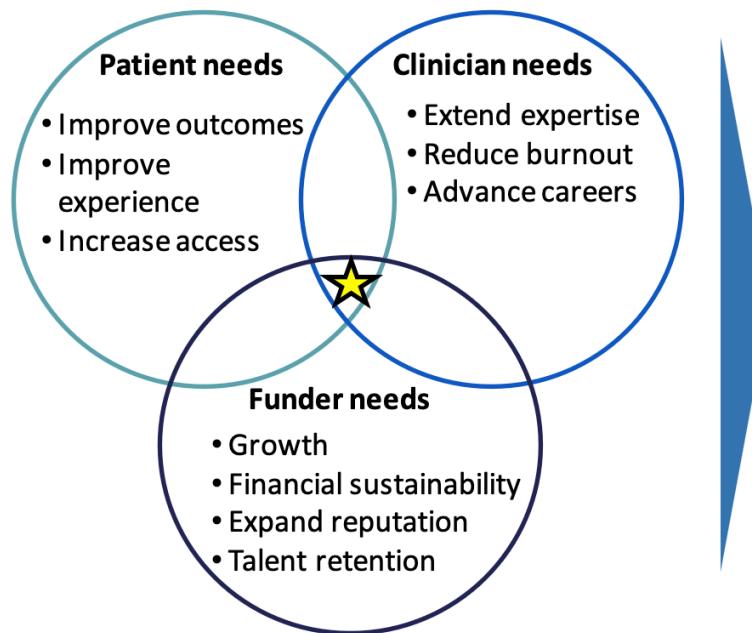
Triple Win Framework

- When thinking about new ideas, try expanding "Triple Aim" to "Triple Win".
- You need to consider how your idea creates value for all three stakeholders: patients, providers, and funders.



Translating the framework into practical value

Triple win



How does the idea create value for all three stakeholders?

Patient needs

- What is the unmet need?
- How many patients does this idea reach?
- How does it change their lives (is the improvement in outcomes or experience a breakthrough or an incremental improvement)?
- What are current / future alternatives?

Clinician needs

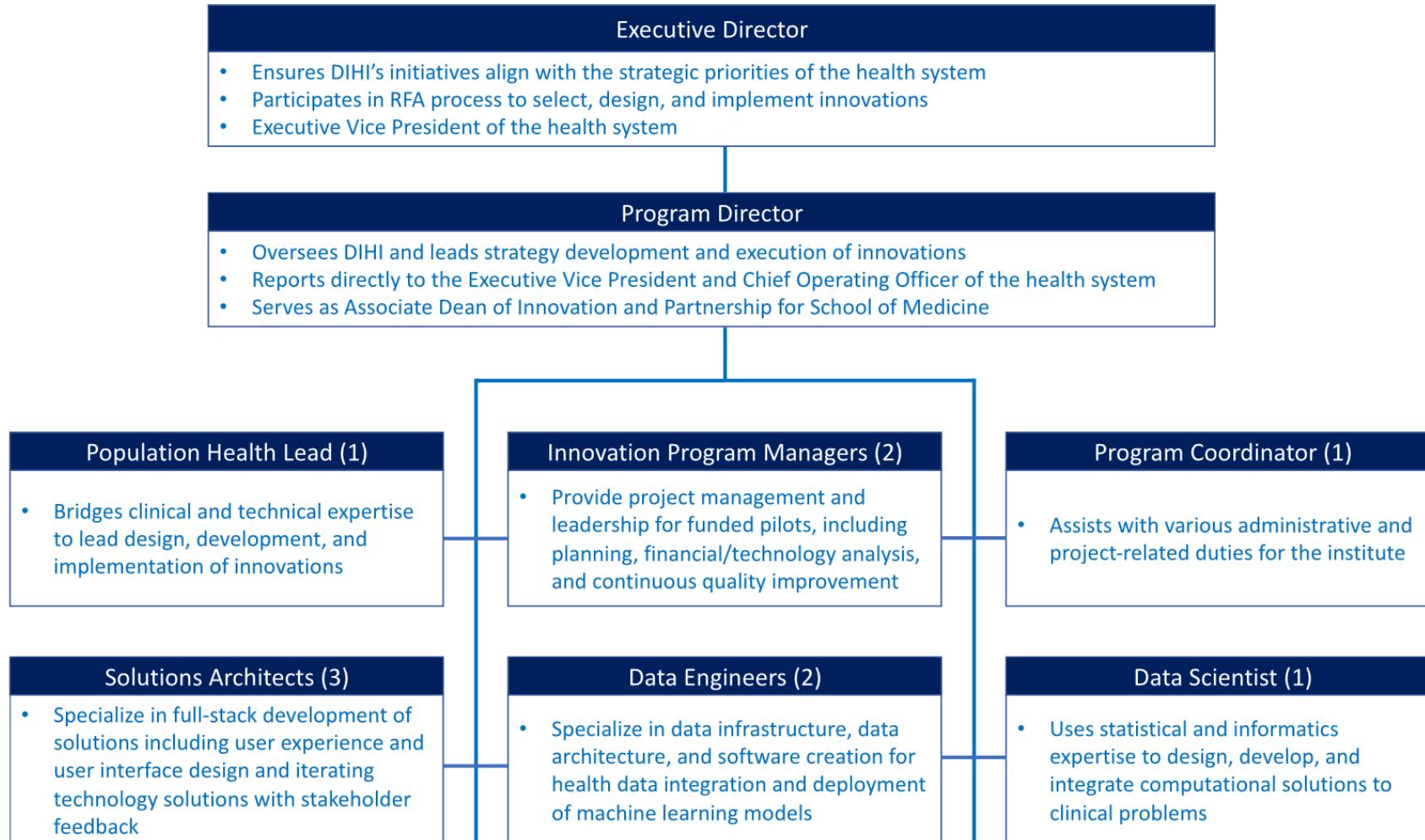
- What team members will this idea impact?
- How will their daily work change?
- Will the idea increase efficiency and wellbeing?
- What opportunities does it create (e.g., publications, education, connection to colleagues)?

Funder needs

- How is financial value created (direct reimbursement, contractual fees, licensing revenue)?
- Who is the payor (patient, insurance, hospital, pharma, government)?
- How does this impact the brand?
- Will this create career opportunities?

**Example institution: Duke
Institute for Health
Innovation (DIHI)**

Example Org Chart



Source: Sandhu et. al (2023)

How to create a sense of urgency



Guiding Principles

Build to show value

Build to integrate

Build to scale

- Work on the right problem
- Align front-line staff and organizational leaders
- Start building minimal viable products
- Create interfaces for trans-disciplinary innovation
- Staff projects to move quickly
- Adapt workflows, roles, and organization
- Targeted and sustained innovator engagement
- Build modular infrastructure to support many projects
- **Build organizational capabilities and capacity**

Build Responsibly

Aligning top to bottom



Source: DIHI: AI in biomedical data analytics and population health

You need leadership and management



Align Front-Line Staff and Organizational Leaders *Create Synergies Between Leaders and Managers*

Management

- *Planning and Budgeting*: establishing detailed steps and timetables for achieving needed results, then allocating the resources necessary to make it happen
- *Organizing and staffing*: establishing structure for accomplishing plan requirements, staffing structure with individuals, delegating responsibility and authority for carrying out the plan
- *Controlling and problem solving*: monitor results, identify deviations from plan, solving problems

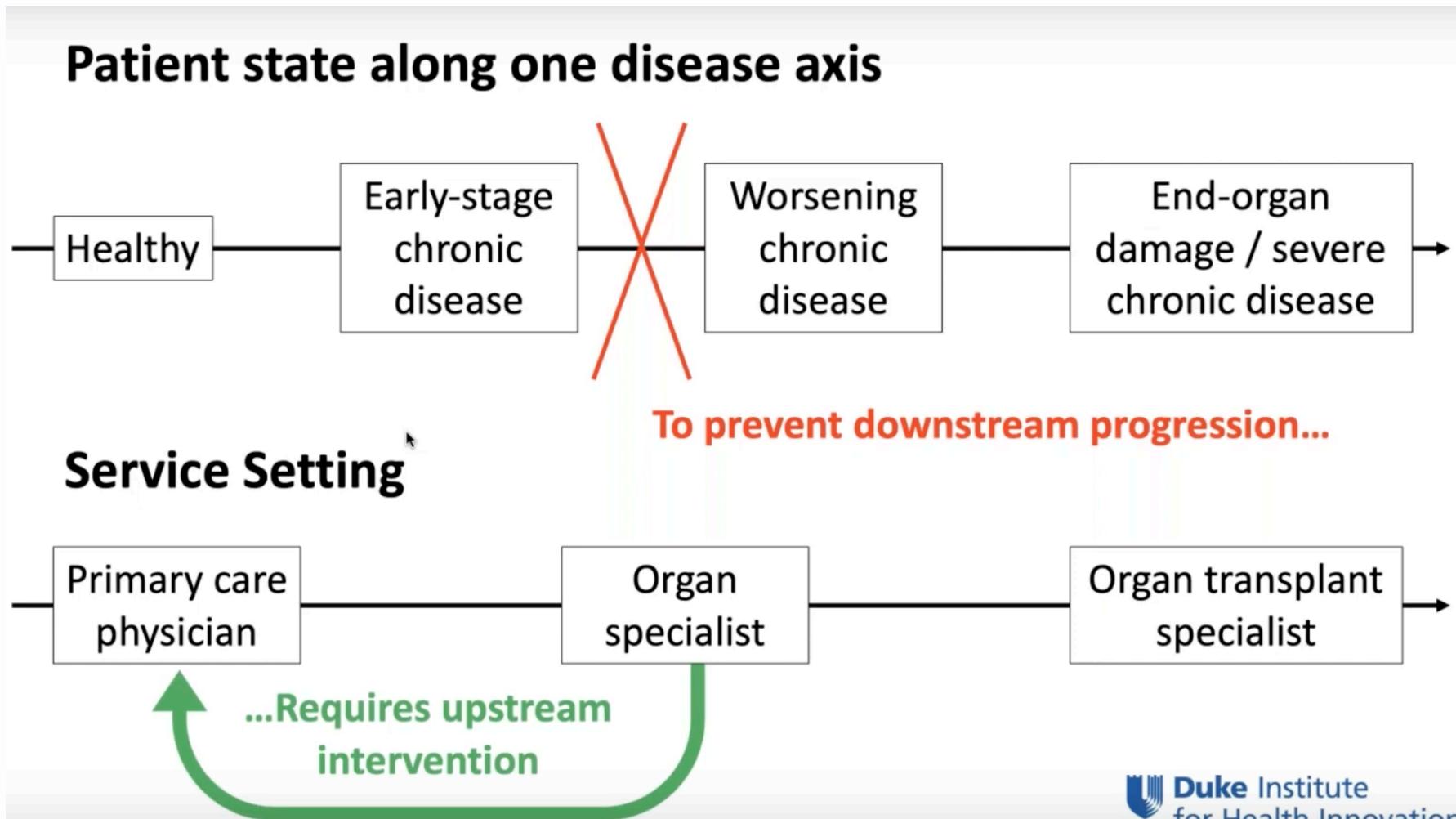
Leadership

- *Establishing direction*: developing a vision of the future – often the distant future – and strategies for producing the changes needed to achieve that vision
- *Aligning people*: communicating direction to all those whose cooperation is needed to influence the creation of teams and coalitions that understand and embrace the vision
- *Motivating and inspiring*: energizing people to overcome major political, bureaucratic, and resource barriers to change by satisfying basic, unmet needs



**“Successful transformation is 70 to 90 percent leadership
and only 10 to 30 percent management.”**

Making organizational alignment



Breakout #1

Imagine a group of young physicians starting a new clinic wanted to build a practice that would be "data driven". If you were hired to provide strategic advice, what would be your main recommendation(s) be?

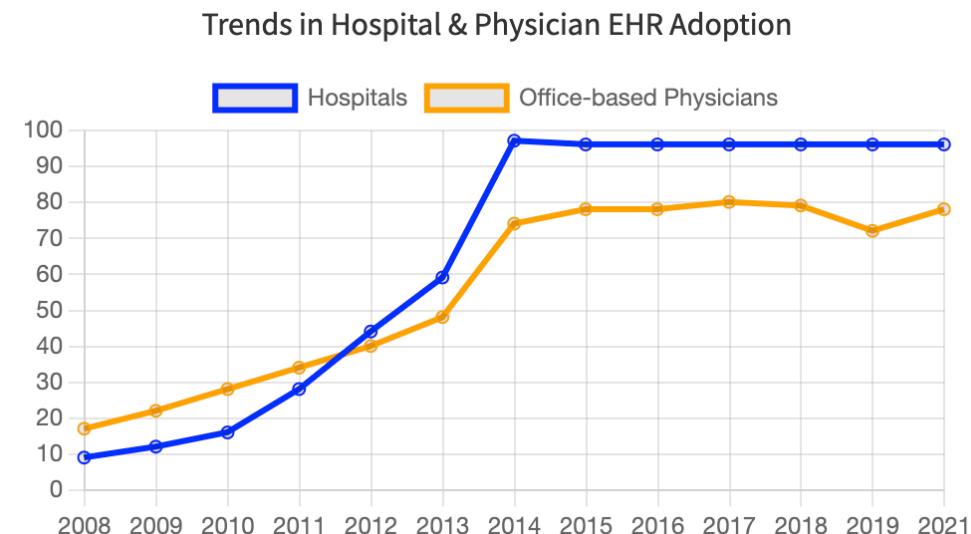
Disruptive technologies in healthcare

Disruptive technologies (overview)

- A disruptive technology refers to an innovation that significantly alters the way consumers, industries, or businesses operate
 - Classic examples include smartphones, streaming services, ride sharing, short-term rentals, and much more
- Disruptive technologies come about when a sufficient number of complementary technologies allow for an innovation to "break through" (think cell phones and ride sharing)
 - But many also capitalize on **regulatory arbitrage**
 - This will be important to understand many of the (currently early-stage) "disruptions" we are seeing in Canadian healthcare

Disruptive technologies (healthcare)

- Healthcare as an industry is a study of contrasts:
 - Foundational aspects of medical education and clinical practice have shown remarkable resilience to change
 - Whereas, the tools of medicine are constantly changing
- Besides pharma and medical devices, the main disruptive innovations have been: **EHRs, telemedicine, and new service models**

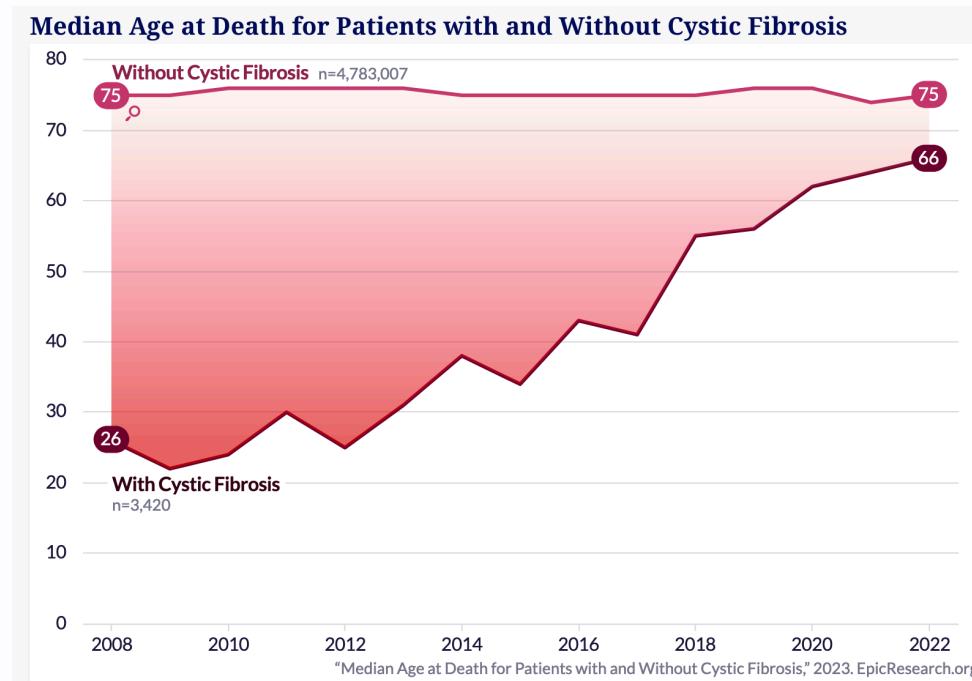


Source

25

Disruptive technologies (rare-disease orgs & pharma)

- Breakthrough therapies can disrupt how entire patient groups are treated, & rare-disease non-profits have helped drive this
- The case of Cystic Fibrosis (CF) is illustrative
 - Advances in nutrition, antibiotics, lung clearance, and modulator therapies have revolutionized care
 - Technological breakthroughs have made it a "new" disease



Source: Epic

Disruptive technologies (Medical devices)

- Countless imaging modalities, surgical instruments, and monitoring devices
- Laparoscopy (key-hole) surgery has enabled countless surgeries to be carried out at lower risk, lower cost, and faster recovery



First telesurgical laparoscopic surgery performed in 2001 ([source](#))

EHRs: Disruptive or interruptive technologies?

- Electronic health records (EHRs) have changed the way medicine is practiced. But has this disruption been good?
- A [survey](#) of physician views about EHRs found:
 - 40% believe there are more challenges than benefits
 - 71% agree that EHRs greatly contribute to burnout

“ Average time spent on EHR interaction by physicians was nearly 37% of their workday... Family medicine physicians spent approximately half... Nurse clinicians spent... 22%.

Source: [Pinevich et. al \(2021\)](#)

Detour: Canada's healthcare system

- Canada has a universal healthcare model (like most rich countries)
- But the Canada Health Act (1985) has created a unique legal landscape for healthcare in the country
 - In exchange for \$\$\$ provinces agree to the five principals of the CHA: Universality, Portability, Comprehensiveness, Public Administration, Accessible
 - But healthcare is provincially managed
 - The federal government can fine provinces for being out of step with the CHA, but it is rare/difficult
- In theory, a physician cannot charge for any medical service that is covered by the provincial plan... (70% of HC is paid by government)
 - Question: Has anyone seen exceptions to this?

Detour: Canada's healthcare system

EXHIBIT 1

Health Care System Performance Rankings

	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING	3	10	8	5	2	6	1	7	9	4	11
Access to Care	8	9	7	3	1	5	2	6	10	4	11
Care Process	6	4	10	9	3	1	8	11	7	5	2
Administrative Efficiency	2	7	6	9	8	3	1	5	10	4	11
Equity	1	10	7	2	5	9	8	6	3	4	11
Health Care Outcomes	1	10	6	7	4	8	2	5	3	9	11

EXHIBIT 4

Health Care System Performance Compared to Spending



Source: Commonwealth Fund (2021)

Disruptive technologies (new service models)

- There has been an explosion in new service models in Canadian healthcare that are taking advantage (regulatory arbitrary) of our "unique" system
 - Federal vs provincial
 - Medically necessary vs not
 - Publically funded in theory but not in practice



[CEO of Canadian virtual health-care company defends charging for services](#)

Health Minister Jean-Yves Duclos has raised the alarm about doctors charging for medically necessary services. Dr. Brett Belchetz, CEO of...

Mar 13, 2023



[Alberta clinic charging for access to doctors would break medicare laws, Health Canada says](#)

Health Canada says a Calgary medical clinic that soon plans to charge its patients a fee to gain faster access to a family doctor would be...

Jul 26, 2023



[Telus Health, Medical Services Commission reach settlement over fee program in B.C., says minister](#)

The injunction application alleged the LifePlus program included annual fees that could lead people to believe they would get preferential...

Apr 26, 2023



[Clinic under scrutiny for charging fee to see nurse practitioners](#)

Ontario's health ministry says it is reviewing an Ottawa walk-in clinic set to offer patients access to nurse practitioners for \$400 a year.

Oct 4, 2023



[Why more Quebec family doctors are leaving the public health system](#)

Because of a series of decades-old government decisions, Quebec has quietly developed a parallel, privately paid health care sector that...

Aug 8, 2023



Disruptive technologies (new service models: telehealth)

maple

“ Instead of connecting an Ontario patient with a doctor in Ontario — which would be covered under OHIP — Maple will set up an appointment with a nurse practitioner or a physician outside of the province. Those appointments aren't covered by OHIP. And before a patient speaks with a health worker, they go through a text-based chat, which is also uninsured by OHIP. Maple works the same way in other provinces.

Source

Disruptive technologies (new service models: telehealth)

Dialogue

“ Dialogue only works with organizations or insurance companies. It doesn't work with individuals... From a health care regulations point of view, that is the safest way to stay within the confines of the Canada Health Care Act... A patient never uses their credit card to pay for health care service.”

Source

Disruptive technologies (new service models: nursing)

- Temporary nurses hired through staffing agencies have been around for decades
 - Historically they filled roles due to sickness, mat leave, etc
- During Covid, health system demand for these nurses skyrocketed, and they have now become a fixture of a system
 - Up to 50% of nurses in an ED might be "temporary"

The Globe and Mail

Opinion: Nurses are fleeing the health system to work for private staffing agencies. Who can blame them?

As the nursing shortage grows worse in Canada's hospitals and long-term care homes, provinces and territories are paying hundreds of...

Oct 19, 2023



CBC

How nursing staffing agencies are costing Ontario hospitals untold millions

Hospitals across Ontario have dramatically ramped up their use of nurses from private staffing agencies to the tune of tens of millions of...

Dec 7, 2023



Disruptive technologies (new service models: nursing)

- Nurse staffing agencies sometimes use surge pricing, and their nurses usually have more control over their schedules
- In the US, we've seen companies begin to develop platforms based on a classic two-sided market (re: Uber)

CLIPBOARD
HEALTH

“ We connect professionals with open shifts at top facilities. Facilities get the help they need and caregivers get the flexibility, freedom, and great rates to live life to the fullest. ”

Breakout #2

How do you see the role of data science in Canada's healthcare system emerging with these disruptive trends?