

# ***Alberta Health Industries Innovation System***

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**THECIS**

RESEARCH . APPLICATION . ADVOCACY

...This study is about Alberta's health industries, an exciting and volatile sector. The sector opens the opportunity for Alberta to participate actively in a growing industry that is projected by knowledgeable observers to generate revenues of more than \$10 billion in Canada alone.

...The health industries are global, especially in their science base, but there is evidence that we in Alberta find places in the global system where resources of both codified ("know what") and tacit ("know how") knowledge are brought together to build a successful niche that integrates well into the global system. Two striking Alberta examples are found in the "personalized medicine" initiatives of **Chenomx** in Edmonton and the advanced imaging systems from **IDC** in Calgary.

# Scope

- Focuses on firms (mainly) and infrastructural organizations that support industry development (e.g. associations, government agencies, research organizations).
- In the main excludes practitioners who deliver services directly to patients.
- Constructed database of >300 firms and organizations classified as firms, associations, government, university, or research group.

# Scope - 2

- Definitions:
  - Follow Statistics Canada NAICS codes in large measure.
  - Generally consistent with Michael Rachlis' recommendations ("Prescription for Excellence" , Harper Perrenial, Toronto, 2004) as to the best role for the private sector

# *Methodology*

- Statistical analysis based on Statistics Canada files and our database. Reviewed earlier studies.
- Orientational interviews with the advisory committee and a number of well informed individuals to structure the project.
- Semi-structured interviews with actors focusing on innovative activity, networks and industry “geography”, Alberta advantages and disadvantages, and opportunities barriers to growth.
- **WARM THANKS TO THOSE WHO GAVE US SO MUCH TIME!**

# *Classification*

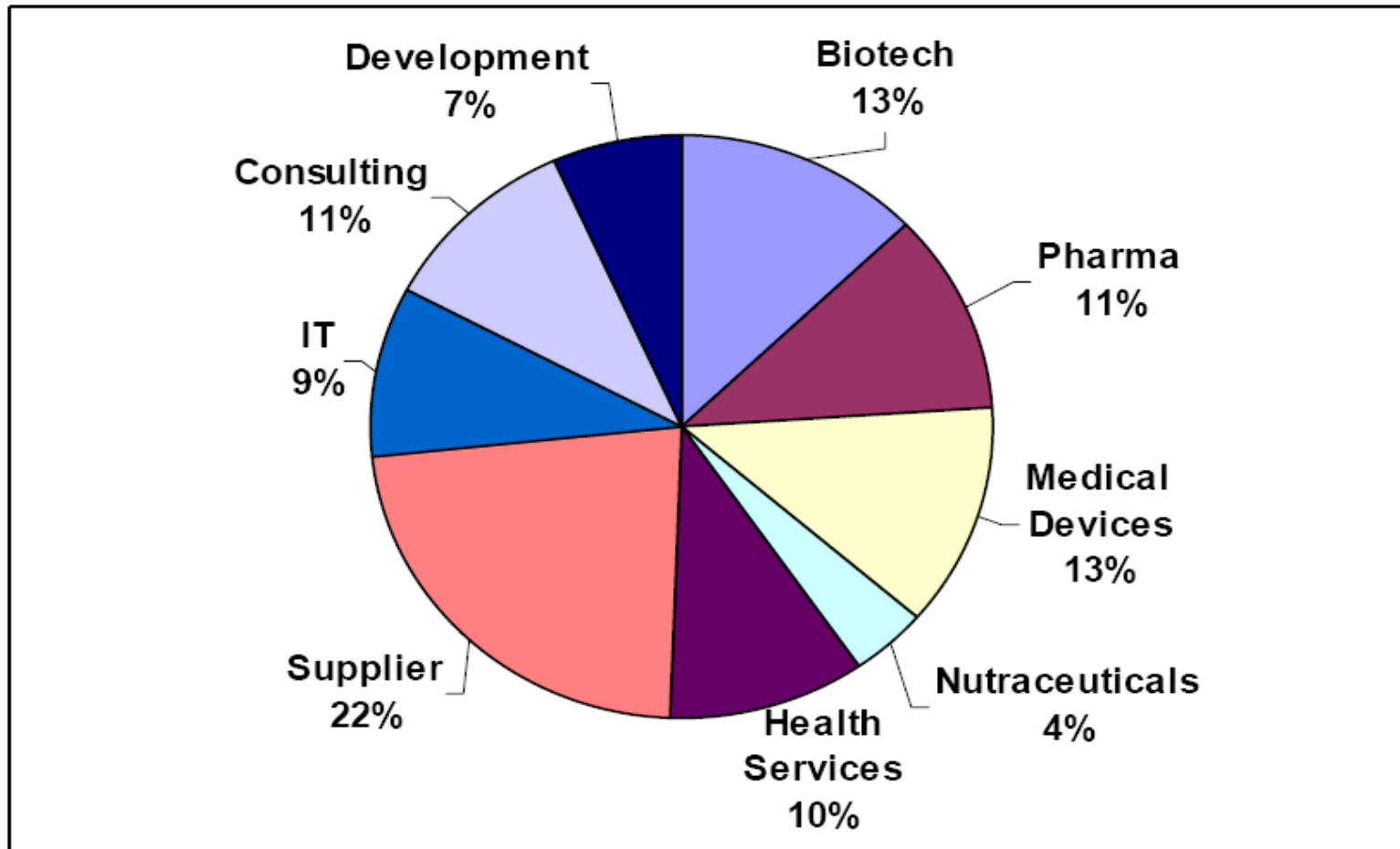
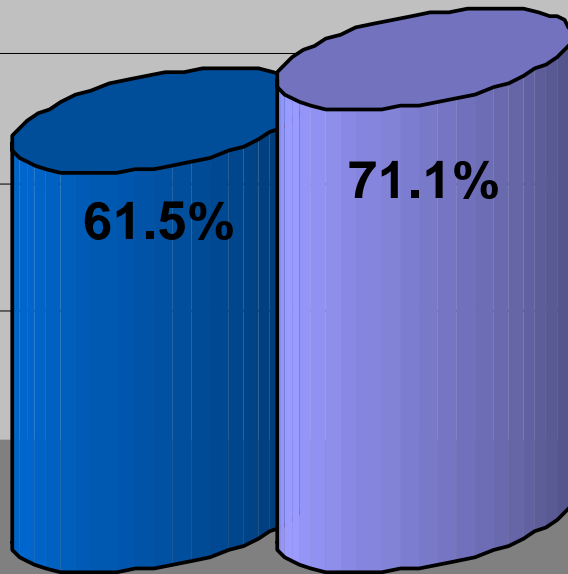


FIGURE 2.1 DISTRIBUTION OF COMPANIES IN THE DATABASE BY THEIR FOCUS.

## Pharma & Biotech Overlap



■ Biotechnology  
Firms involved in  
Pharmaceuticals

■ Pharmaceutical  
Firms involved in  
Biotechnology

# *Alberta Health Industries*

## Statistical Profiles

- Statistics Canada (CBP)
- HABIT Survey
- Our Database

## Qualitative analysis

# *Statistics Canada data (2007)*

- Statistics Canada collects data across the spectrum of activities related to health industries.
- Advantages: Database of firms and institutions is essentially complete. Statutory authority ensures response rate.
- Disadvantages: The ambiguities with many NAICS codes even at 5 digit\* level.

\*For the NAICS code, the first two digits designates the sector, the third digit designates the subsector, the fourth digit designates the industry group and the fifth digit designates industries.

# Statistics Canada

## Data on Geographic Distribution (2007)

(Information on all firms in NAICS codes that pertain to companies in the database.)

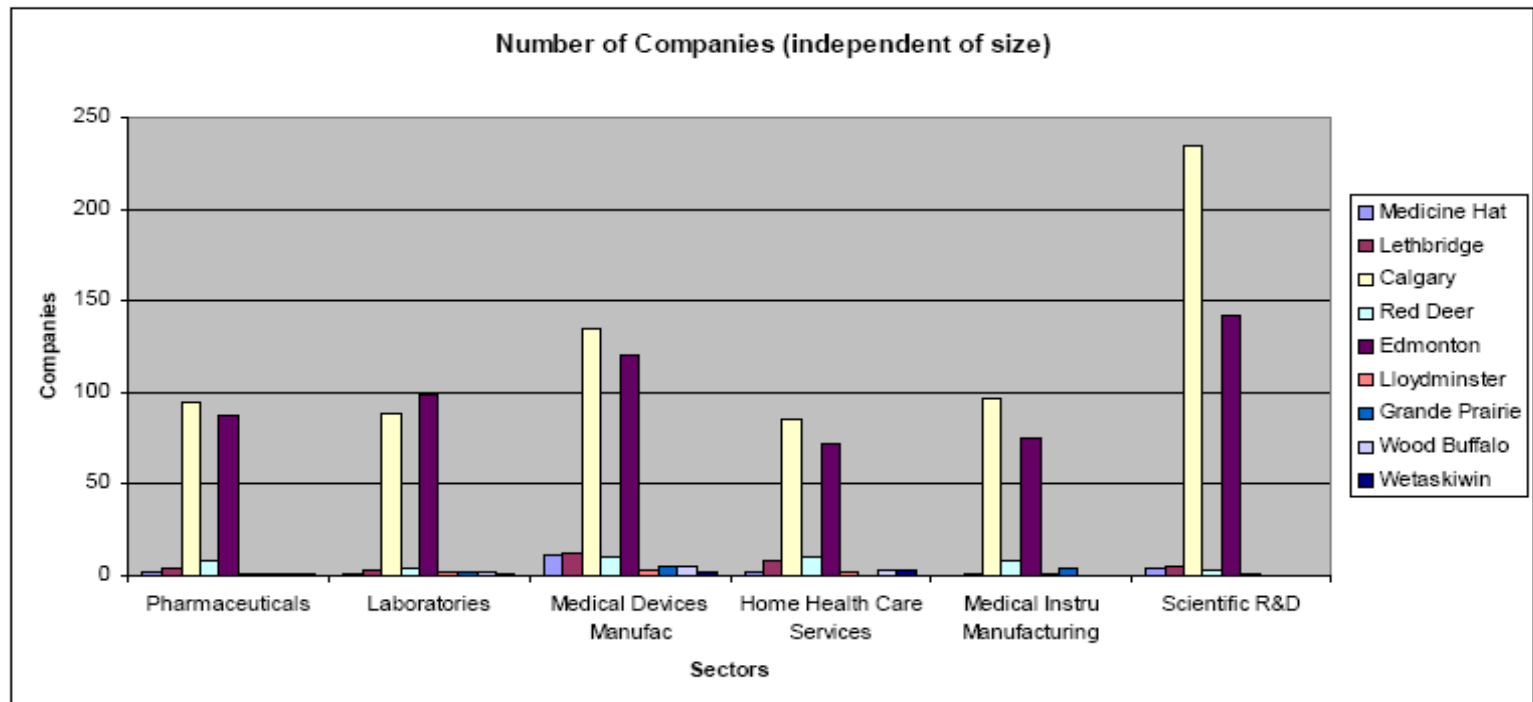
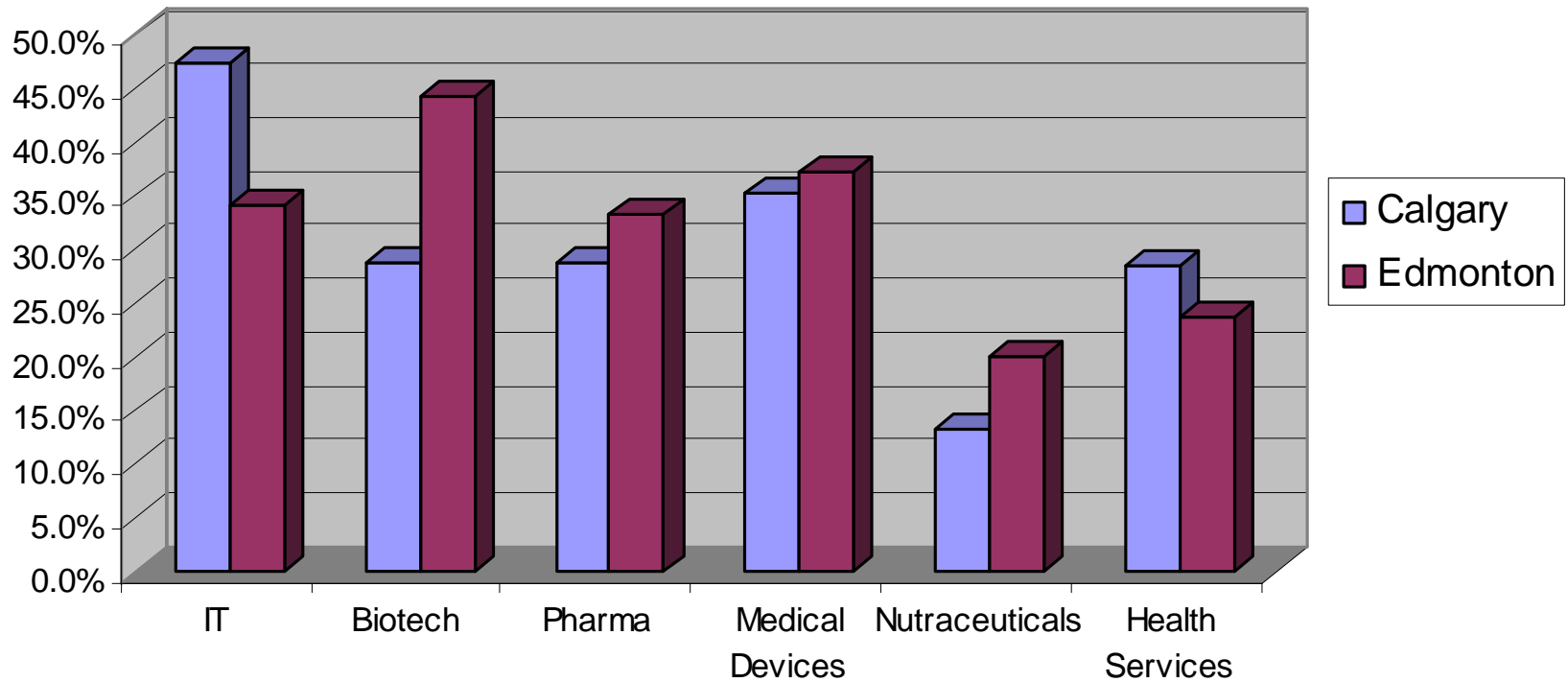


FIGURE 2.3 DISTRIBUTION OF FIRMS (BY NUMBER) ACROSS ALBERTA (2007).

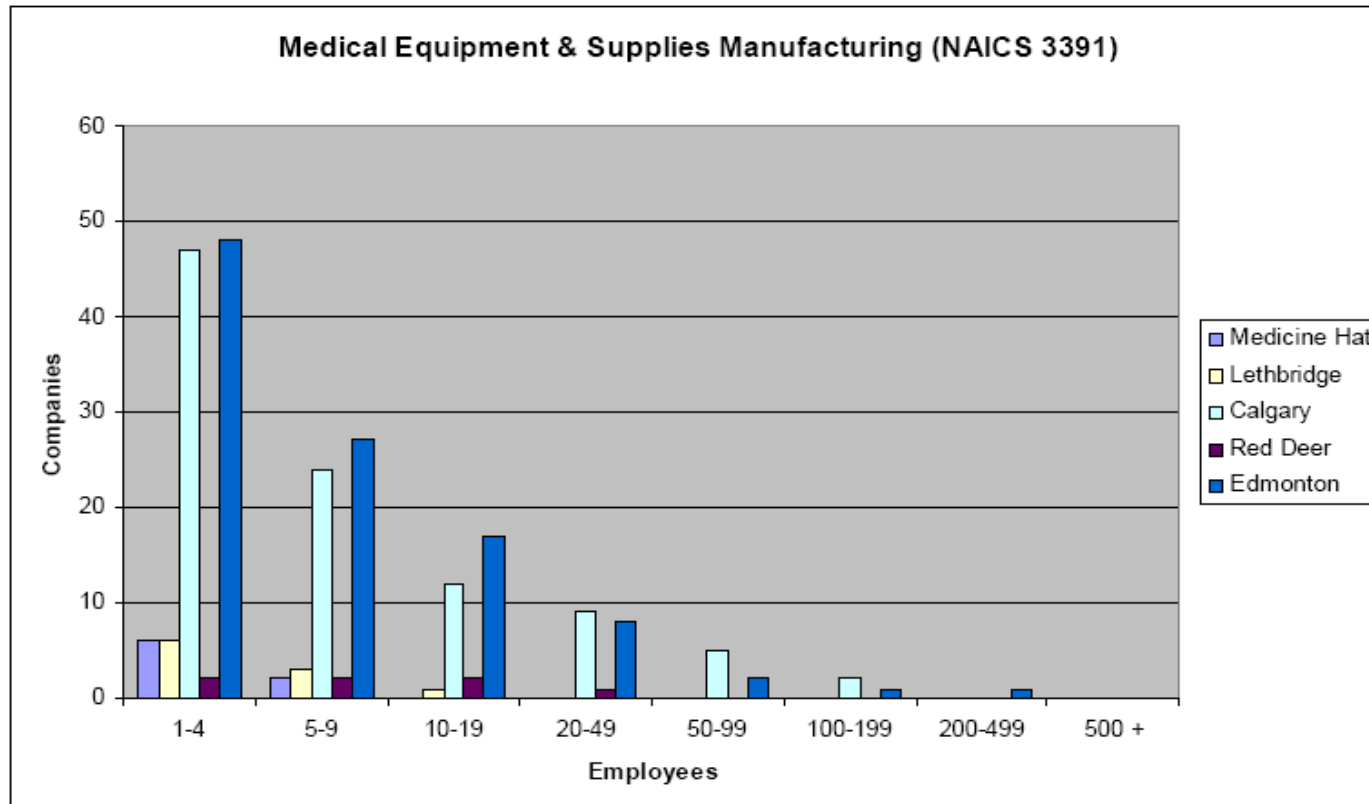
Provides perspective on opportunities for knowledge flows.

# *Activity in the two major centres*

Location vs. Industry Type



# *Size distribution is typically "Power Law"*



**FIGURE 2.4 APPROXIMATE "POWER LAW" DISTRIBUTION OF SIZE OF FIRMS IN MEDICAL EQUIPMENT AND SUPPLIES MANUFACTURING (2007)**

Figures for most other NAICS codes are quite similar

# *Size of Companies*

There are not yet firms of a scale to achieve global recognition except perhaps in a very highly specialized area. For example, there is one firm in each of Calgary and Edmonton in the medical devices (Edmonton) and medical instrument manufacturing (Calgary) sectors with employment over 200 and two firms in each city in these sectors with employment above 100.



# ***The Alberta Health and Bio-industry Survey***

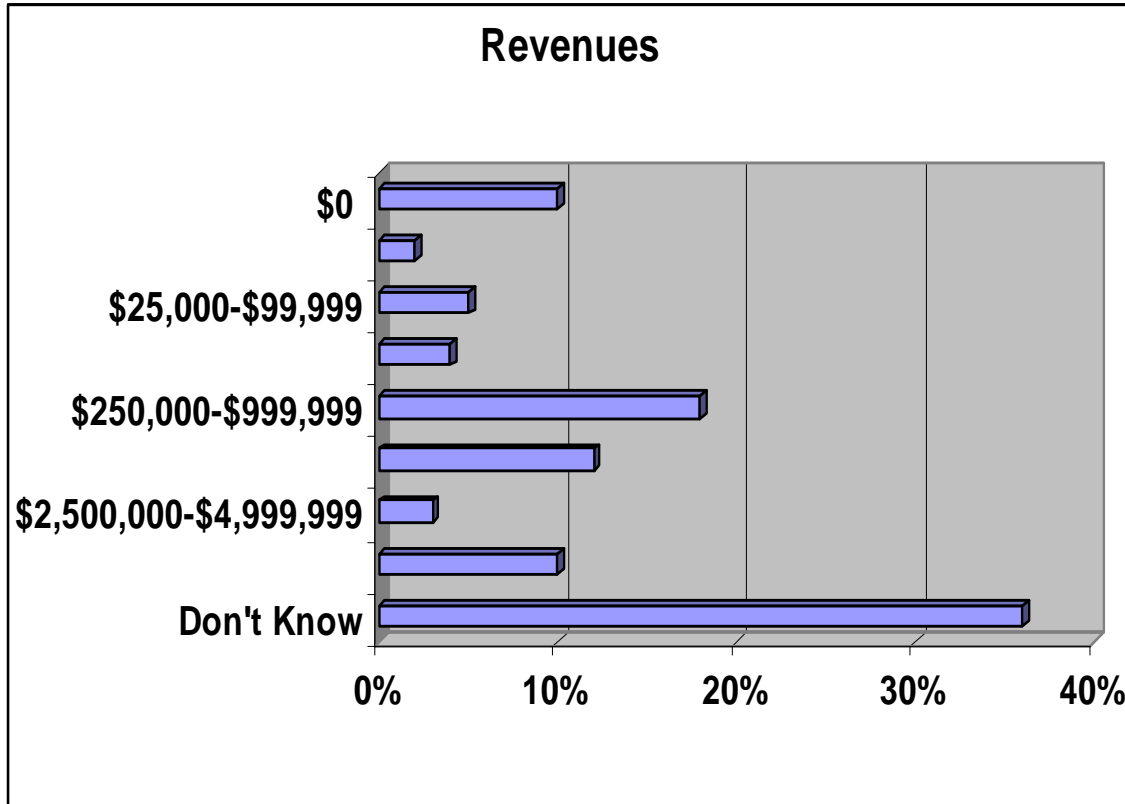
## **The Survey (December 2004)**

- Health and Bio Industry Sector Team (HABIT), Alberta Economic Development, Alberta Innovation and Science, with assistance of BioAlberta, in the summer and fall of 2003.
- database of approximately 250 Alberta health and bio companies.
- Eighty-six companies responded to the survey although, all respondents did not respond to all questions.
- The response rate on individual questions ranged from ~6% to ~42% with a median near 23% so that an answer to a typical question represents ~10% of firms.

# ***The Alberta Health and Bio-industry Survey***

- Advantage: many questions provide detailed insight on company attitudes complementary to our interview methodology.
- Disadvantage: Presence of non-health related companies, limits of response rates.

# Revenues



52% reported that less than half of the revenues generated in Canada

Royalties, license fees, and contracts were a significant source.

## Products produced in Alberta

0%	13.2%
1%-49%	5.7%
50%-99%	15.1%
100%	30.2%
N/A	35.8%

# ***Product stages***

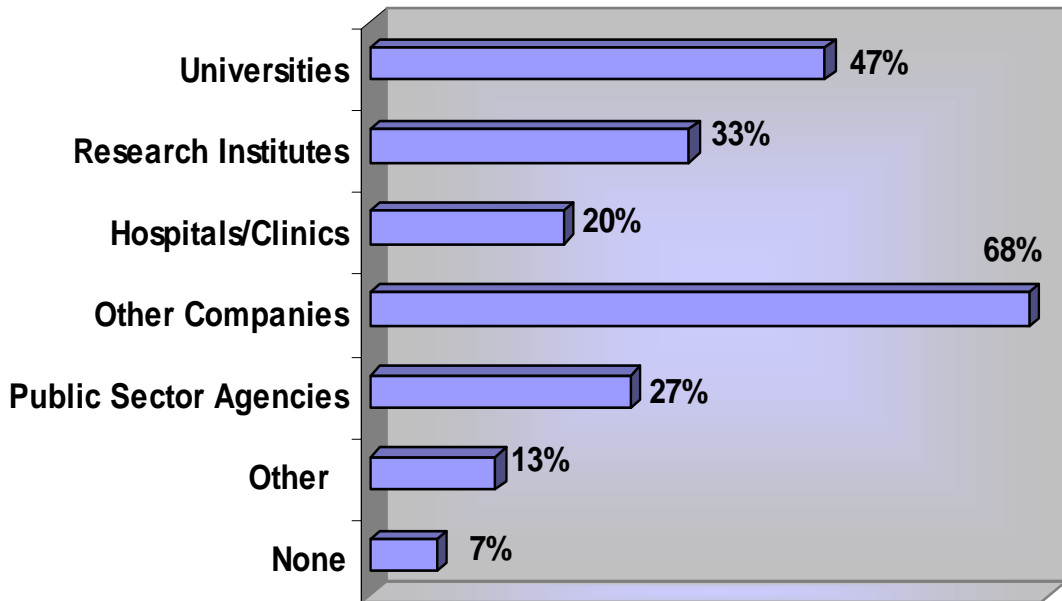
Research and development	61.4%
Approved for marketing	22.9%
New product in the market	22.9%
Established product	18.1%
Awaiting regulatory approval	15.7%
Pre-clinical trials	14.5%
Clinical trials	14.5%
N/A	15.7%

# *Clients*

Companies	55%
Hospitals/clinics	30%
Retailers/consumers	28%
Health authorities	26%
Other professionals	26%
Government	19%
Physicians	19%
Universities	19%
Other	9%

# Alliances

Alliances



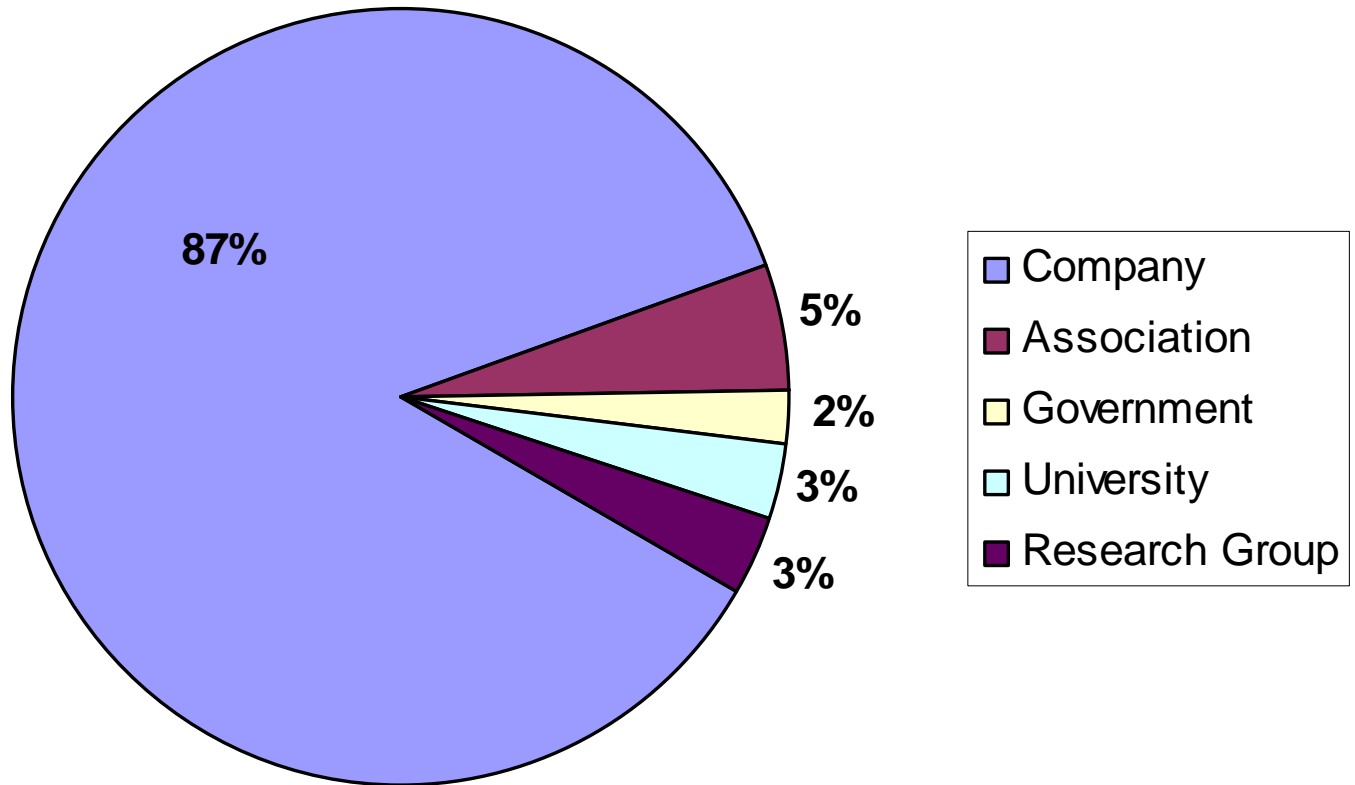
Function of alliance

R&D	34.2%
Marketing	19.7%
Invest./finan.	15.8%
Mfg.	15.8%
Other	11.8%
Clinical trials	7.9%

# *Categories*

- Pharmaceuticals
- Medical devices
  - assistive, diagnostic, hospital equipment, medical/surgical supplies, imaging
- Biotechnology
- Health services
  - Telehealth, networks, laboratories, distributing, consulting, hospital support services
- IT in support of health
- Neutraeuticals
- Government and associations
- Research institutions
- 280 actors classified

## Type of Organization



# ***What we learned in the interviews.***

Themes and impressions from in depth conversation with a 10% sample of the database.

# ***Why locate in Alberta?***

- *“There is an energy level and a mentality in Alberta that is extremely constructive.”*
- *“Alberta offers a great environment for business development.”*
- *“There’s an entrepreneurial spirit in Calgary which you just cannot beat.”*

~but~

- *“The only benefit is on a personal level... From a business point of view, I strongly think that this was not a good choice, because of the lack of industry in this area...”*

# Networks

- One driver of this project is the “cluster hypothesis” that firms benefit from co-location
- Interviews indicate relatively little local networking:
  - *“We feel very lonely... I’m desperately trying to hire someone now for regulatory affairs, someone who knows medical devices... There’s just no pool of people in medical devices in this area.”*
  - *“I’ve had a number of people approach me from the university with great ideas, or some great results, and another product could be developed, but we don’t have enough receptors in the community to develop these.”*

# Networks

- Associations play a role, but health is still a nascent industry in the Province:
  - *“BioAlberta. I think they’re important, I think they’re key, especially for smaller companies...”*
  - *“BioAlberta is a good network organization, but you have to have something to network into, and for bio/pharma in Alberta there’s not [too] much to network into....”*
- Sub-sectors form discrete groups that can relate to other areas – IT and biotechnology.

# Networks

- Nearly 72% of firms interviewed reported influences of universities (and affiliated hospitals) – in and beyond Alberta..
- Spin-off of firms based on ideas generated in university research was significant – formal and informal.
- UTI and TecEdmonton helpful, but sometimes limiting.
  - *“I think UTI serves a very useful function. I think the problems we ran into with IP come from the fact they wear 3 different hats.”*
  - *“...no investor is going to come in...if a university maintains it has at least 50% of the IP.”*

# *Finance and capital*

Competing with oil & gas for investors:

- *“...oil and mining are very much like biotech in the risk/reward calculation... So you get an investment community that has similar mindsets: we just have to ask the stakeholders for more patience because we’re not digging at 10 feet per day, and know that the well is 100 feet down.”*

# *Finance and capital*

- Lack of Venture Capital a common complaint:
  - *“Alberta has some advantages from the point of view of low personal and corporate taxes. Alberta has some disadvantages in that there is not as much good venture capital as there should be in a Province as rich as this.”*
  - *“There’s no venture fund here, they abolished the one venture fund they had, Vencap.”*

# *Infrastructure organizations*

- NRC – IRAP is a very influential program. More than 30% of firms reported financial support for their technology.
- AHFMR and its technology commercialization initiatives have been significant
- There is some concern over lack of sector expertise in accounting and law in the province.

# ***Moving up the value chain***

- Innovative distribution & service delivery organizations:
  - *" The interesting thing about any business, and again whether it's the oil & gas business or any other like this one, is that once you get into the business, you start to see complementary businesses develop. The exciting thing is that there are all sorts of opportunities out there..."*

# ***Moving up the value chain***

- Small companies have asked for help in business management & navigating IP:
  - *“...there’s always stuff that can be or possibly could be intellectual property. I’ve done R&D through the U of C, and I’m involved with a company that does research for one of the big companies... it gets really complex as far as the intellectual property goes, if [you’re trying] to come out with a marketable product.”*

# *Procurement*

Do local institutions and market stimulate firms?

- Relatively few firms report local customers.
  - Only exceptions are Health Services companies, and some Health IT companies
  - IT companies often depend upon contracts with health regions
  - Pharma & biotech, in particular, focus on foreign (esp. US) markets
  - Start-up medical device companies would benefit from greater support from local markets

# ***Wish lists***

## ● Economics:

- *"Make stock options affordable for small companies again."*
- *"Programs where you can get tax credits for investing..."*
- *"Reduce capital gains taxes."*
- *Create a venture capital pool*

## ● Government:

- *"I wish the Provincial governments would get their act together as far as common standards for the medical industry throughout the country."*
- *"I don't see enough vision or planning on the part of government and where they're going."*

## ● Management Pool:

- *"we've got to do a better job of creating skilled, experienced managers for these areas"*

# ***The Health Industries***

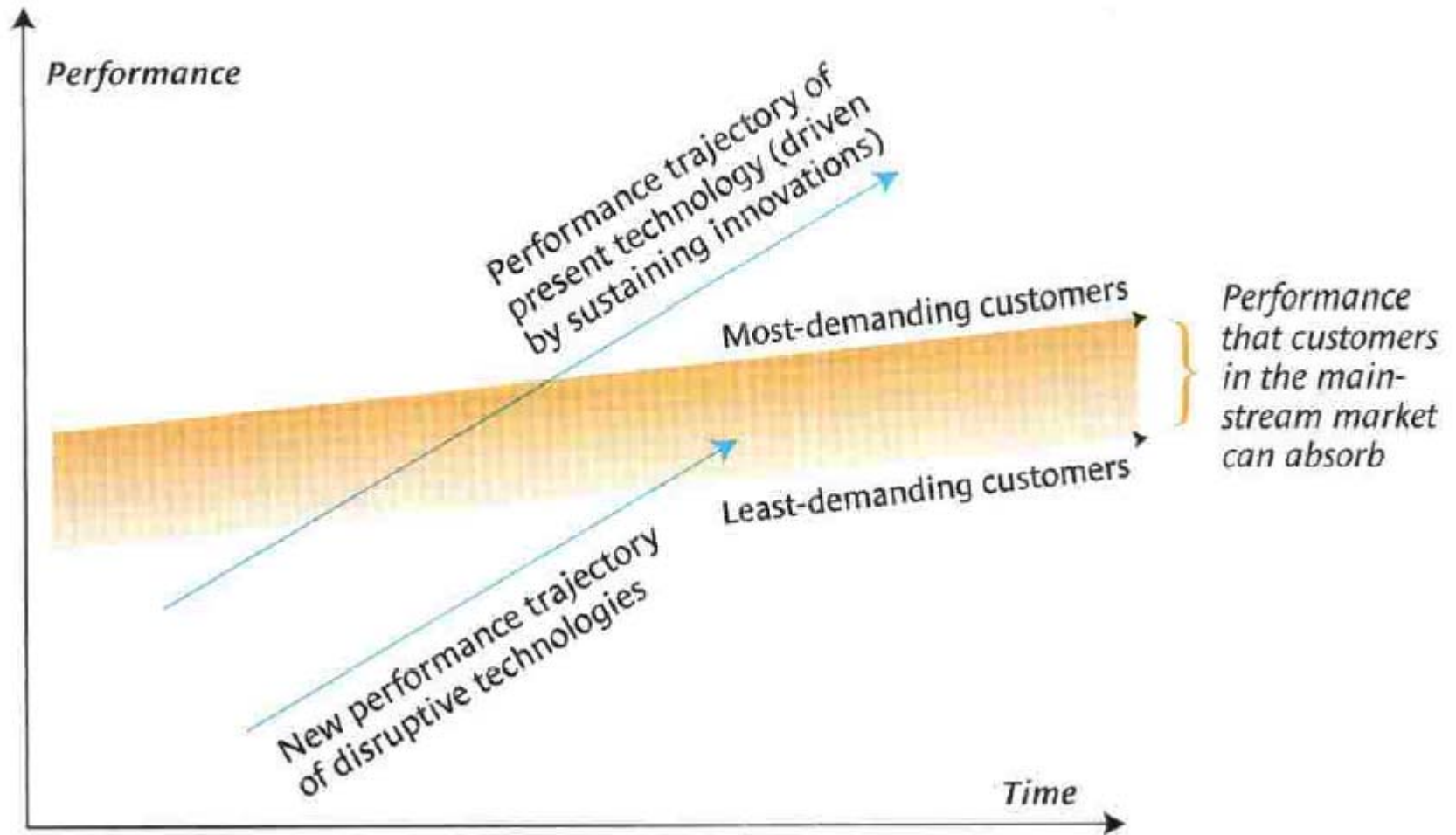
## ***A role for disruptive innovation?***

Christensen, Bohmer, and Kenagy,  
Harvard Business Review, Sept. -  
Oct. 2000 p. 102.

# ***Characteristics of disruptive innovation***

- Commonly require change in technical competences or market competences or both. (Destroy established competences.)
- Commonly introduced by newcomers to an industry. – Ultimately displace previous generation technology leaders.
- Arise in niche markets.
- Do not initially meet needs of major customers to whom market leaders listen carefully.
- Example: “microcomputer” to personal computer.

# The Progress of Disruptive Innovation



Christensen, Bohmer. Kenagy (2000)

# ***Disruption in health industries***

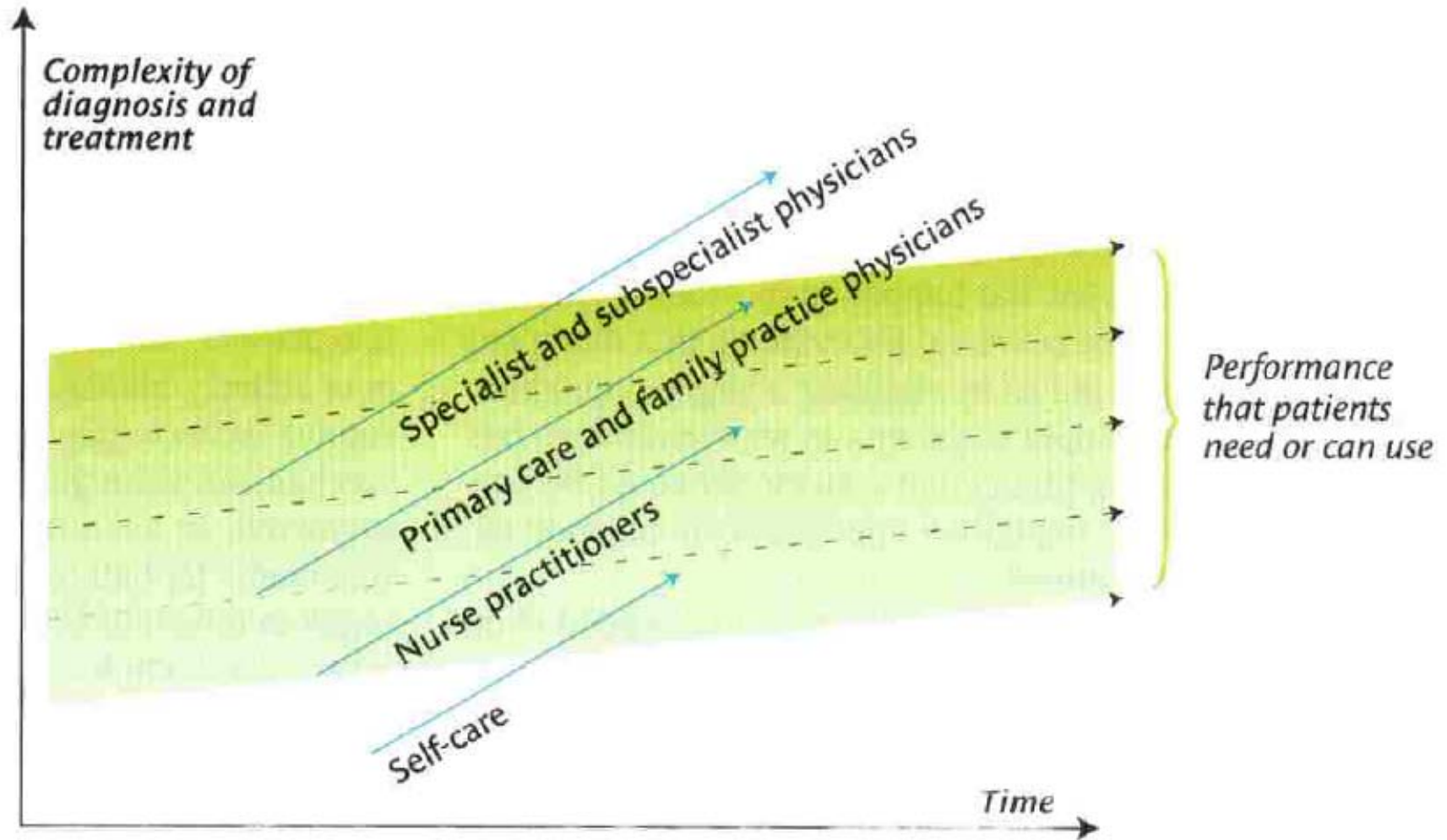
- In many industries disruptive innovations have allowed larger numbers of less skilled people to do things in a less expensive way in a less expensive setting.
- Has this happened in health industries?
- Pregnancy tests - blood glucose meters.

# ***Disruption in health industries - 2***

We need diagnostic and therapeutic advances that allow nurse practitioners to treat diseases that used to require a physician's care, for example, or primary care physicians to treat conditions that used to require specialists. Similarly, we need innovations that enable procedures to be done in less expensive, more convenient settings – for doctors to provide services in their offices that used to be done during a hospital stay, for example. The graphs “Disruptions of Health Care Professions” and “Disruptions of Health Care Institutions” suggest the patterns by which these disruptive innovations might transform health care.

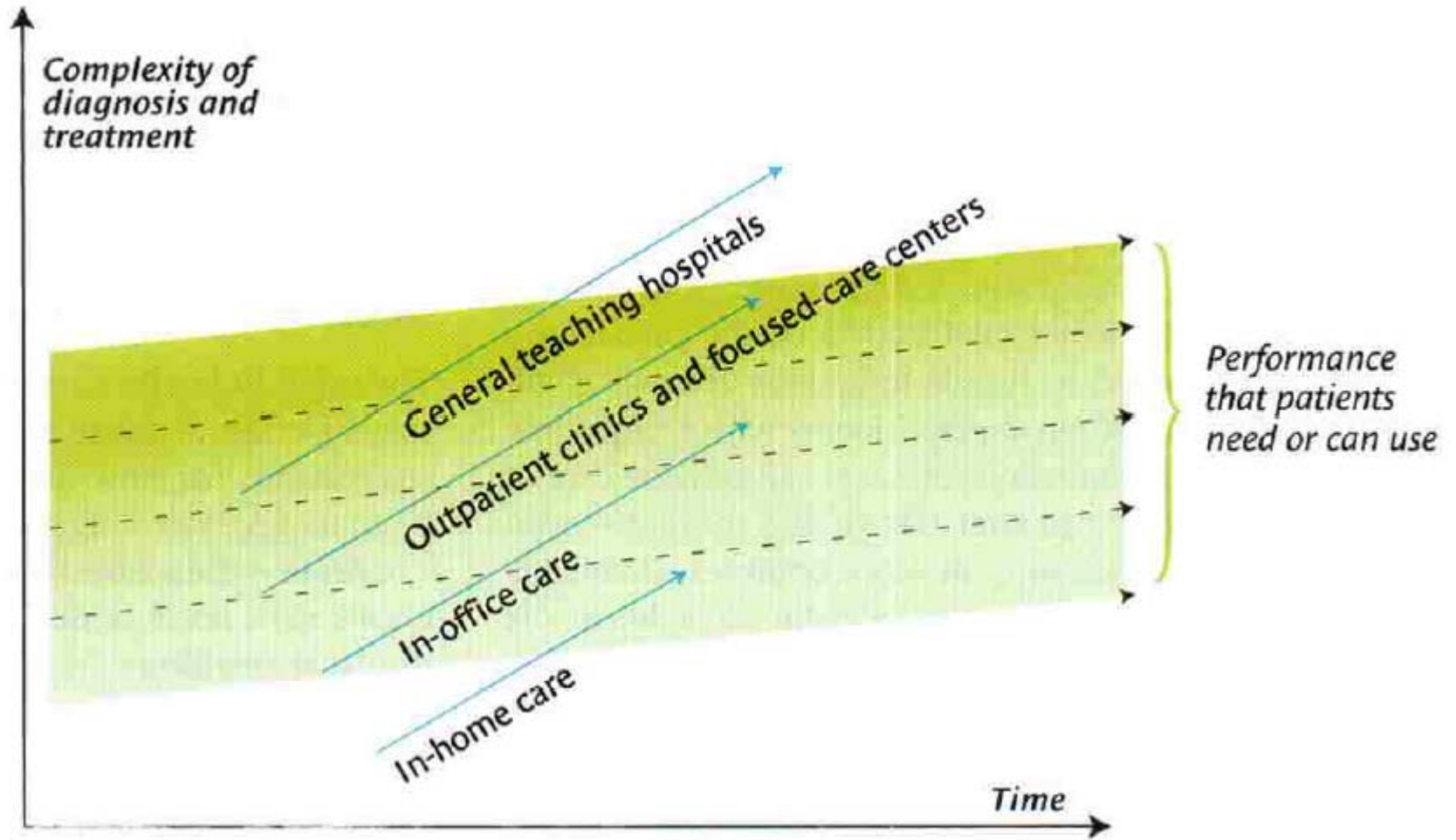
... Christensen, Bohmer, and Kenagy (2000)

# ***Disruptions of health care professions***



Christensen, Bohmer, and Kenagy(2000)

# ***Disruption of health care institutions***



Christensen, Bohmer, and Kenagy (2000)

# Alberta Opportunity?

● Unencumbered by large players in current technology.

● CV technologies



● Litebook  
-user driven



- Jet Lag
- Body Blues
- Dreading winter
- Low mood
- Restless sleep
- Teens sleeping-in
- Fatigue
- Shift work problems

● Remmers sleep recorder for apnea diagnosis

