Understanding Patterns of Utilization for Seniors in Primary Care

Ross E.G. Upshur,
BA (Hons), MA, MD, MSc, CCFP, FRCPC
Canada Research Chair in Primary Care Research
Director, Joint Centre for Bioethics
Professor, Department of Family and Community Medicine
Staff Physician, DFCM Sunnybrook Health Sciences Centre
University of Toronto

Outline

- Philosophical Orientation
- Demographic Transition
- Patterns of Utilization
- Implications

Ballad of a (formerly) Thin Physician

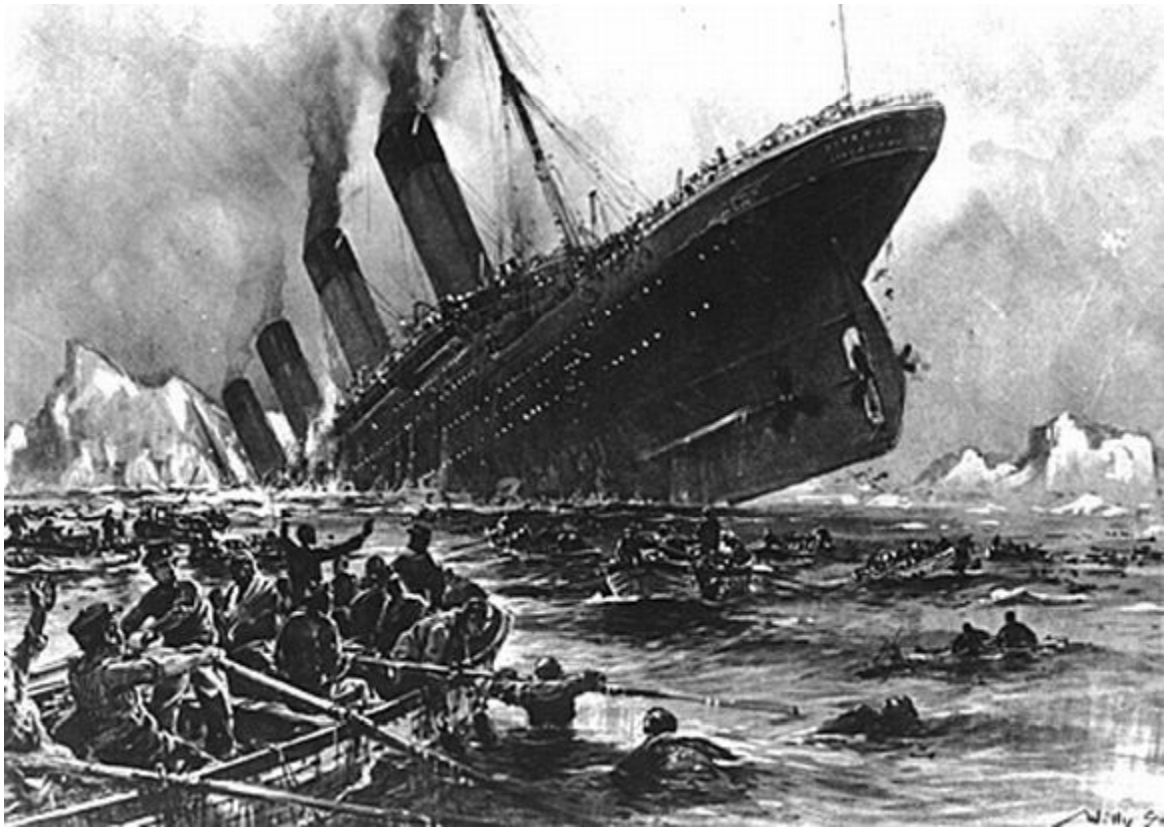
- Because something is happening here
  But you don't know what it is
  Do you, Dr. Upshur”

Voltaire

- What is optimism? said Cacambo.
  Alas, said Candide, it is a mania for saying things are well when one is in hell.

Schopenhauer

- But against the palpably sophistical proofs of Leibniz that this is the best of all possible worlds, we may even oppose seriously and honestly the proof that it is the *worst* of all possible worlds. For possible means not what we may picture in our imagination, but what can actually exist and last. Now this world is arranged as it had to be if it were to be capable of continuing with great difficulty to exist; if it were a little worse, it would be no longer capable of continuing to exist. Consequently, since a worse world could not continue to exist, it is absolutely impossible; and so this world itself is the worst of all possible worlds.



Grenzen und Grenzüberschreitungen, XIX. Deutscher Kongress für Philosophie, Bonn, 23.-27. September 2002, Vorträge und Kolloquien, Herausgegeben von Wolfram Hogrebe in Verbindung mit Joachim Bromand, Akademie V
2004, pp. 517-534

On the intelligibility of the universe and the notions of simplicity, complexity and irreducibility

Gregory Chaitin, *IBM Research Division*

Gregory Chaitin is at the IBM Watson Research Center in New York. His theory of algorithmic information develops an idea in Leibniz's *Discours de métaphysique*, **VI**, and fo
randomness and on the limits of formal axiomatic reasoning. It was while working on this theory that Chaitin discovered the remarkable Ω number. His two most recent books
Conversations with a Mathematician, published by Springer-Verlag, and *From Philosophy to Program Size*, published by the Institute of Cybernetics at Tallinn Technical U
Chaitin has an honorary doctorate from the University of Maine, and is an honorary professor at the University of Buenos Aires and a visiting professor at the University of

---

Abstract: We discuss views about whether the universe can be rationally comprehended, starting with Plato, then Leibniz, and then the views of some dis
scientists of the previous century. Based on this, we defend the thesis that comprehension is compression, i.e., explaining many facts using few theoretical
assumptions, and that a theory may be viewed as a computer program for calculating observations. This provides motivation for defining the complexity of
something to be the size of the simplest theory for it, in other words, the size of the smallest program for calculating it. This is the central idea of algorithmic
information theory (AIT), a field of theoretical computer science. Using the mathematical concept of program-size complexity, we exhibit irreducible mathe
facts, mathematical facts that cannot be demonstrated using any mathematical theory simpler than they are. It follows that the world of mathematical ideas

Chronicity and complexity

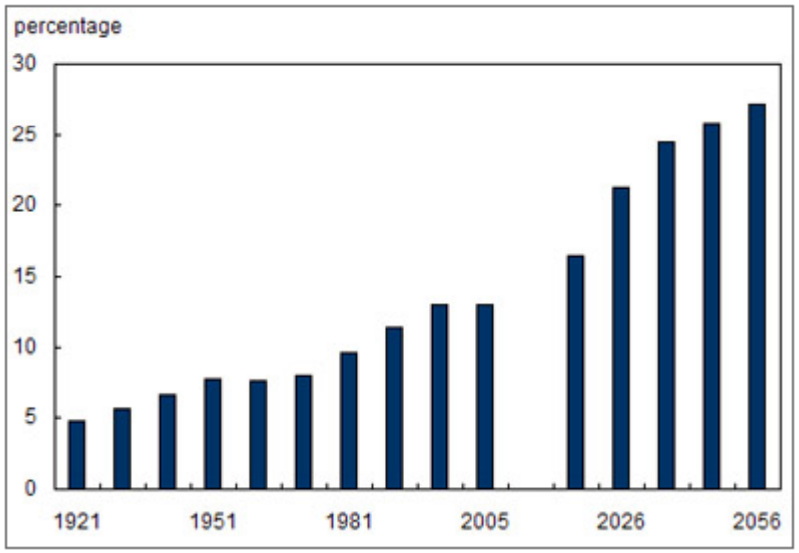
Is what's good for the diseases always good for the patients?

Ross E.G. Upshur MD MSc CCFP FRCPC **Shawn Tracy**

Mrs Smith is an 83-year-old woman living independently in the community. She has the following active medical problems: congestive heart failure secondary to ischemic heart disease, atrial fibrillation, osteoarthritis, osteoporosis, urinary incontinence, and depression. She is taking 11 prescribed medications on a regular basis. She is seen regularly in the clinic for management of her anticoagulation and multiple chronic conditions.

is useful for epidemiologic purpose
regarded as discrete clinical entiti
ment strategies can be tailored. In fa
disease is reflected in most clinical
The language here is of multimorbid
comorbidity.

Viewed from the perspective of t
vider or the patient, however, this ap
sense as the number of conditions ir
and symptoms associated with mult



Percentage of Canadian population comprised of persons aged 65 or older, 1921 to 2005 and projections to 2056 (Sources: Statistics Canada, Censuses of Canada; Population projections for Canada, provinces and territories.)

Chronic Health Conditions
Denton and Spencer 2010
Canadian Journal on Aging

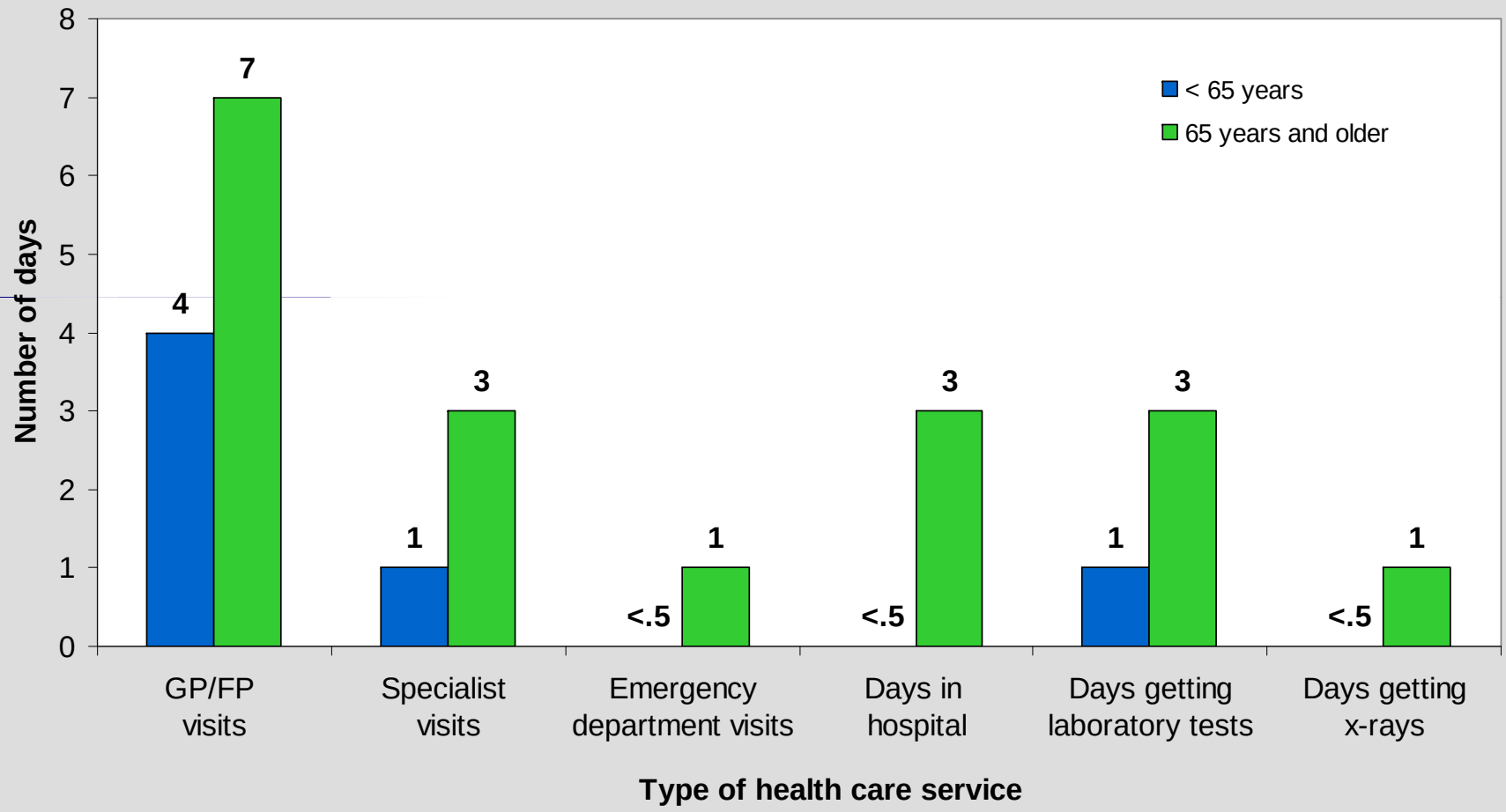
Table 4:
Percentage of distribution of the population by number of chronic conditions and age group, 2005

Age Group	Number of Chronic Conditions							
	0	1	2	3	4	5	6	7+
	– percentage distribution –							
12–29	45.5	27.7	15.0	6.4	3.0	1.3	0.5	0.6
30–49	35.2	28.4	16.6	8.9	5.0	2.7	1.2	1.9
50–64	20.7	24.7	20.3	13.5	8.6	5.0	2.9	4.4
65–79	10.0	18.6	20.3	17.4	13.0	8.8	4.6	7.3
80+	6.7	14.9	18.1	18.2	14.9	10.4	6.9	9.9
All ages	31.3	25.9	17.4	10.4	6.4	3.7	2.0	2.9

Table 1. Age and gender distribution of the elderly population, Ontario, 2005

Age group	Female	Male	Total
65-69	237,673	218,295	455,968
70-74	212,267	187,524	399,791
75-79	187,206	146,614	333,820
80-84	147,749	94,118	241,867
85+	121,766	55,486	177,252
Total	906,661	702,037	1,608,698

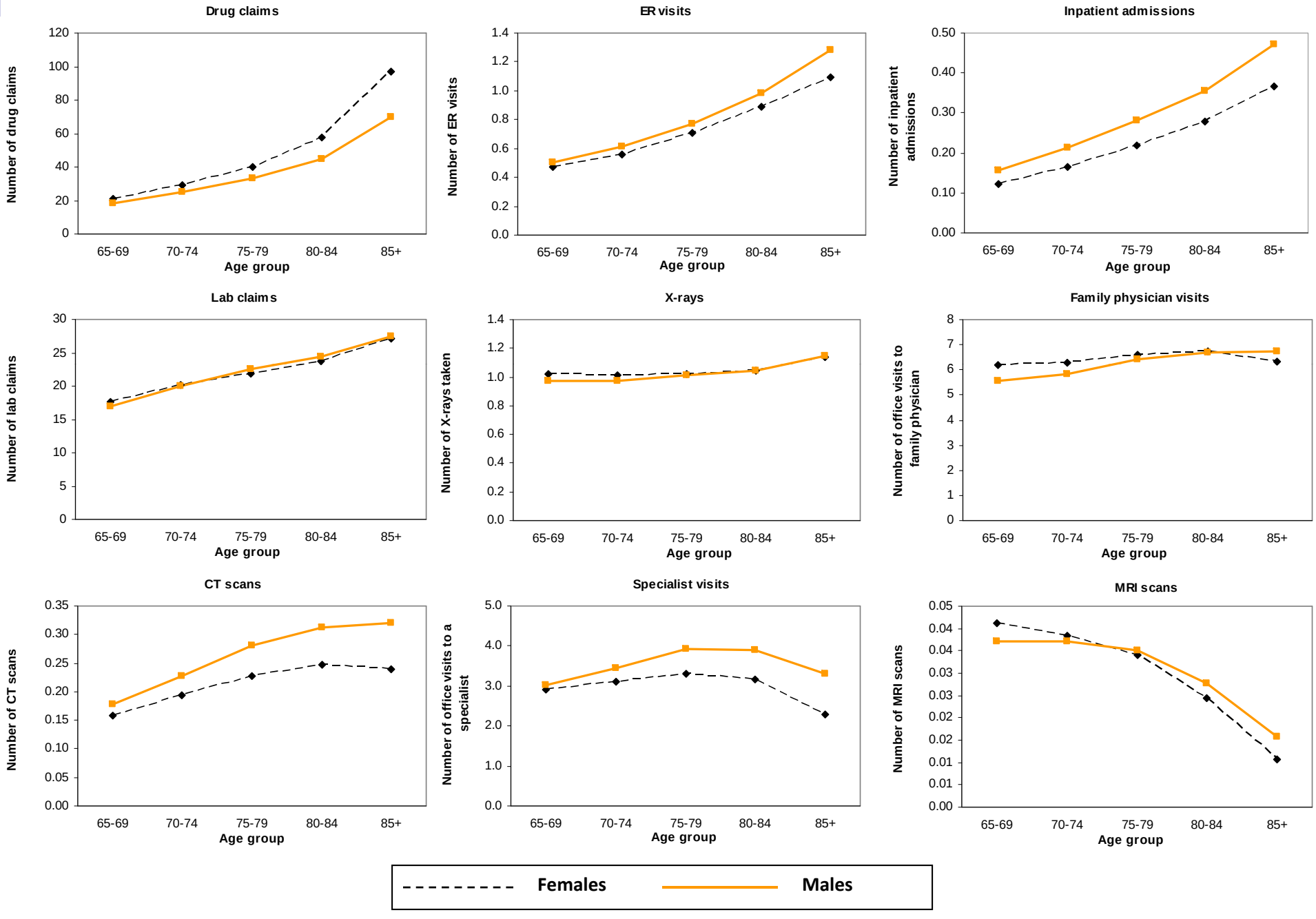
1.2 Average number of days per year in which a visit was made to the health care system, per person, by type of service, in Ontario, in 2002/03



GP/FP = General practitioner/family physician

Mean utilization per person by age group and sex, Ontario, 2005/06

Age group	Female	Male	Total	P-value
65-69	50.7	47.0	48.9	<0.01
70-74	60.6	56.3	58.6	<0.01
75-79	73.7	68.2	71.3	<0.01
80-84	93.3	82.0	88.9	<0.01
85+	132.6	107.8	124.8	<0.01
Total	75.7	63.4	70.3	<0.01


Drug claims
Number of drug claims
120
100
80
60
40
20
0
65-69
70-74
75-79
80-84
85+
Age group
ER visits
Number of ER visits
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
65-69
70-74
75-79
80-84
85+
Age group
Inpatient admissions
Number of inpatient admissions
0.50
0.40
0.30
0.20
0.10
0.00
65-69
70-74
75-79
80-84
85+
Age group
Lab claims
Number of lab claims
30
25
20
15
10
5
0
65-69
70-74
75-79
80-84
85+
Age group
X-rays
Number of X-rays taken
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
65-69
70-74
75-79
80-84
85+
Age group
Family physician visits
Number of office visits to family physician
8
7
6
5
4
3
2
1
0
65-69
70-74
75-79
80-84
85+
Age group
CT scans
Number of CT scans
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
65-69
70-74
75-79
80-84
85+
Age group
Specialist visits
Number of office visits to a specialist
5.0
4.0
3.0
2.0
1.0
0.0
65-69
70-74
75-79
80-84
85+
Age group
MRI scans
Number of MRI scans
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
65-69
70-74
75-79
80-84
85+
Age group
Females
Males

BMC Health Services Research

IMPACT FACTOR 1.66

Research article

Open Access

Measuring change in health status of the elderly at the population level: the transition probability model

Rahim Moineddin, **Jason X Nie**, **Li Wang**, **C Shawn Tracy** and **Ross EG Upshur**

BMC Health Services Research 2010, **10**:306 doi:10.1186/1472-6963-10-306

Published: 9 November 2010

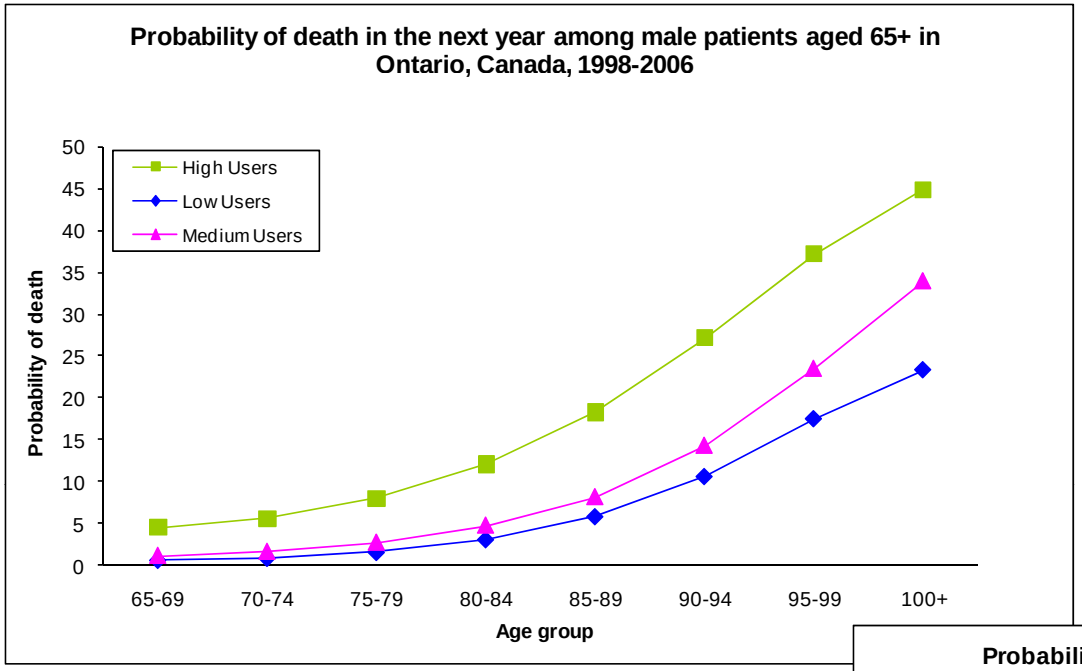
Abstract (provisional)

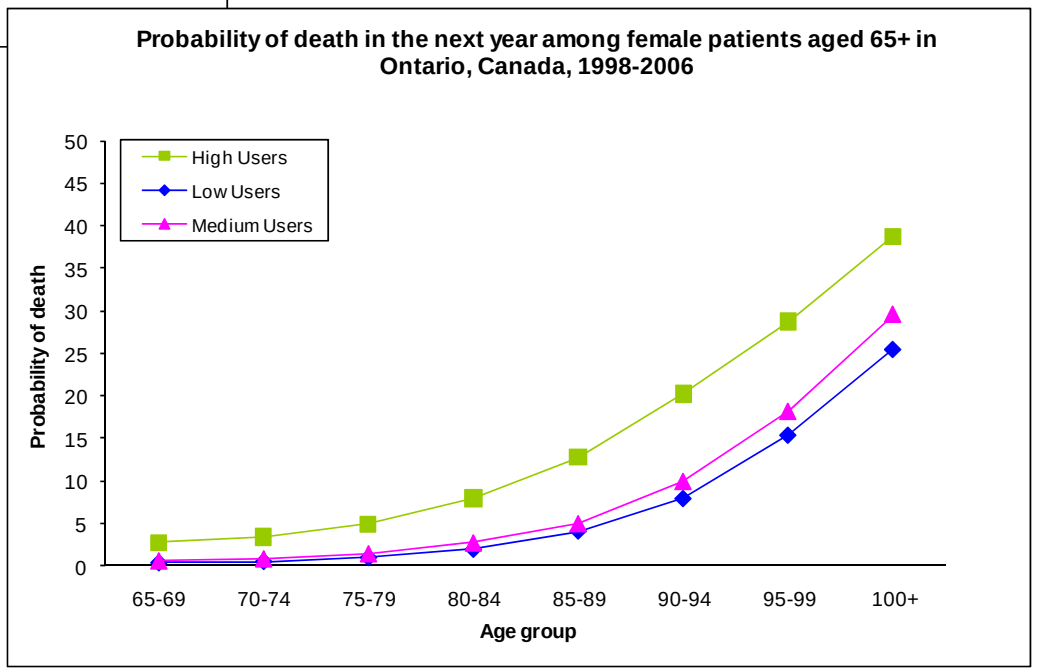
Background

The current demographic transition will lead to increasing demands on health services. However, debate exists as to the role age plays relative to co-morbidity in terms of health services utilization. While age

Classification of cut points for low-, medium- and high-users

Year	First quartile	Third quartile
1998	20	63
1999	20	63
2000	21	68
2001	22	70
2002	24	73
2003	24	76
2004	25	78
2005	26	80
2006	26	81


Probability of death in the next year among male patients aged 65+ in Ontario, Canada, 1998-2006
High Users
Low Users
Medium Users
Probability of death
0
5
10
15
20
25
30
35
40
45
50
65-69
70-74
75-79
80-84
85-89
90-94
95-99
100+
Age group


Probability of death in the next year among female patients aged 65+ in Ontario, Canada, 1998-2006
High Users
Low Users
Medium Users
Probability of death
0
5
10
15
20
25
30
35
40
45
50
65-69
70-74
75-79
80-84
85-89
90-94
95-99
100+
Age group

BMC Family Practice

IMPACT FACTOR 1.71

Top
Abstract
Background
Methods
Results
Discussion
Conclusions
Competing interests
Authors' contributions
Acknowledgements
References
Pre-publication history

Research article

Highly accessed Open Access

From pharmaco-therapy to pharmaco-prevention: trends in prescribing to older adults in Ontario, Canada, 1997-2006

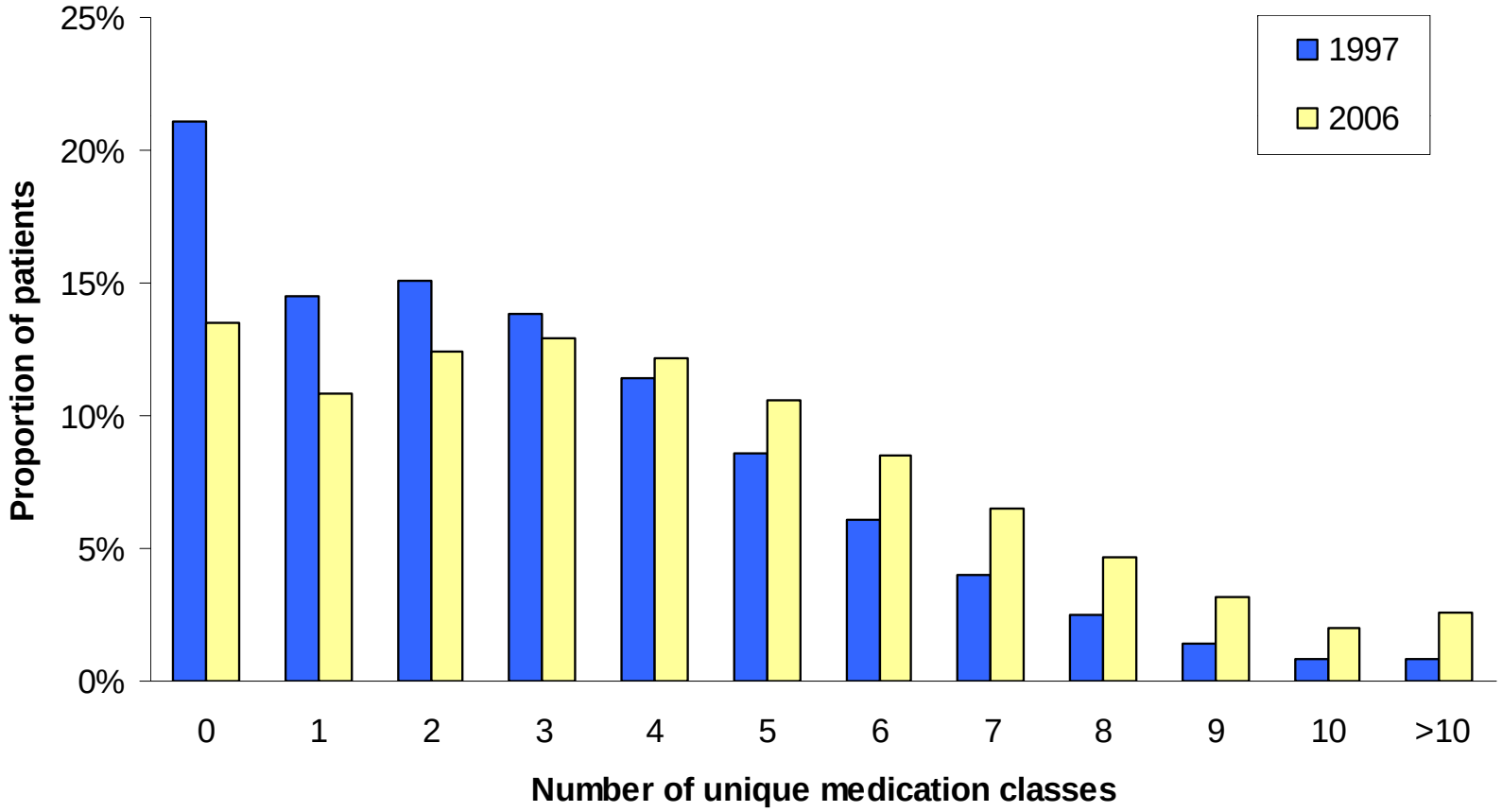
Jana M Bajcar[1,2,3,4,5], **Li Wang**[3], **Rahim Moineddin**[5,6], **Jason X Nie**[3,7], **C Shawn Tracy**[3,8] and **Ross EG Upshur**[3,5,6,8,9]

1 Undergraduate Medical Education, Faculty of Medicine, University of Toronto, Trillium Health Centre, CA Building 3rd Floor, 100 Queensway West, Mississauga, ON L5B 1B8 Canada
2 Department of Pharmacy, Sunnybrook Health Sciences Centre, 2075 Bayview Ave., Room E3-05, Toronto, ON M4N 3M5 Canada
3 Primary Care Research Unit, Sunnybrook Health Sciences Centre, 2075 Bayview Ave., Room E3-49, Toronto, ON M4N 3M5 Canada
4 Leslie Dan Faculty of Pharmacy, University of Toronto, 144 College St., Toronto, ON M5S 3M2 Canada
5 Department of Family and Community Medicine, University of Toronto, 263 McCaul St., 5th Floor, Toronto, ON M5T 1W7 Canada
6 Institute for Clinical Evaluative Sciences, 2075 Bayview Ave., Room G1-06, Toronto, ON M4N 3M5 Canada
7 School of Kinesiology and Health Science, York University, 344 Bethune College, Toronto, ON M3J 1P3 Canada
8 University of Toronto Joint Centre for Bioethics, 155 College St., Suite 754, Toronto, ON M5T 1P8 Canada
9 Dalla Lana School of Public Health, University of Toronto, 155 College St., 6th Floor, Toronto, ON M5T 3M7 Canada

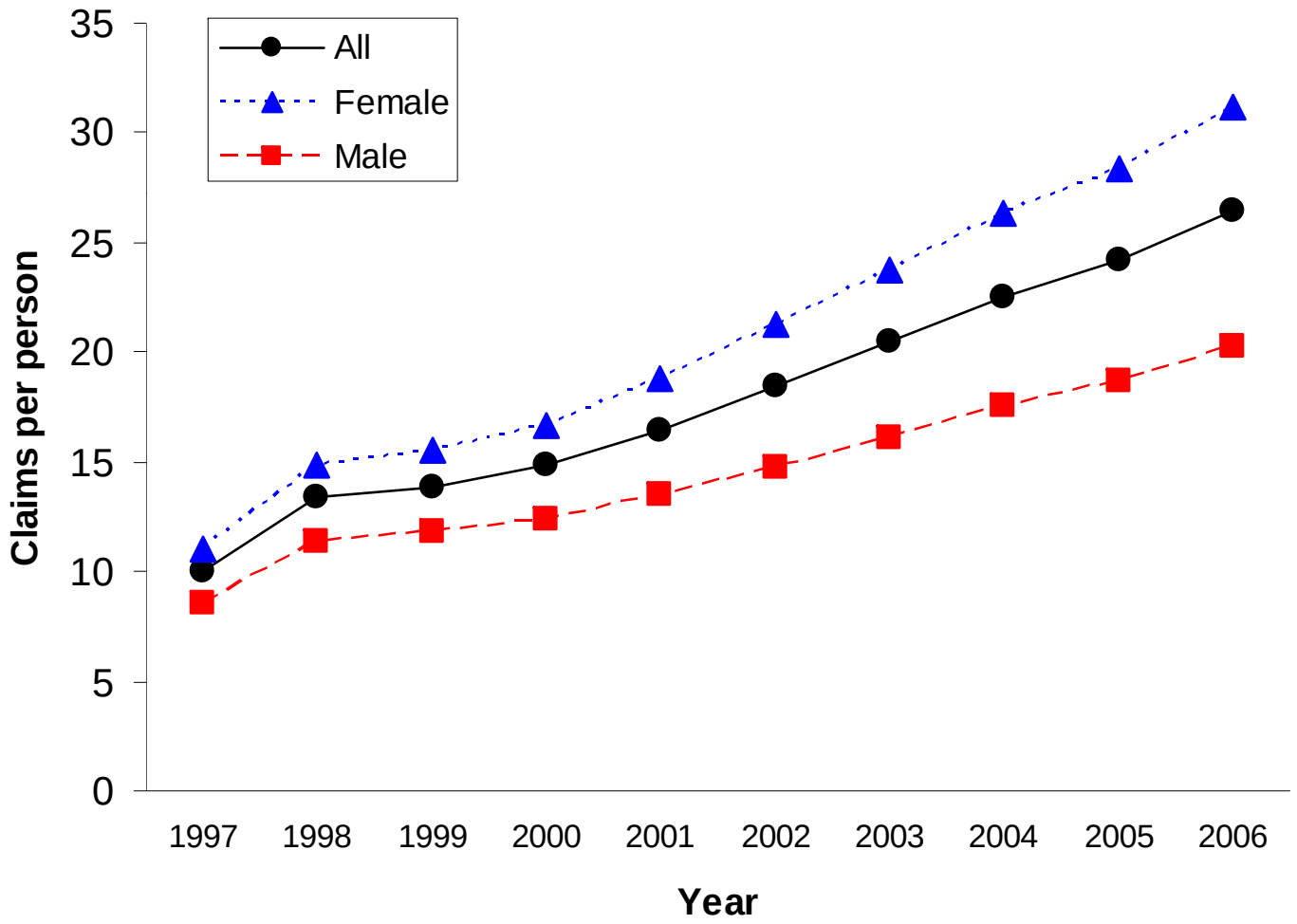
author email corresponding author email

BMC Family Practice 2010, **11**:75 doi:10.1186/1471-2296-11-75

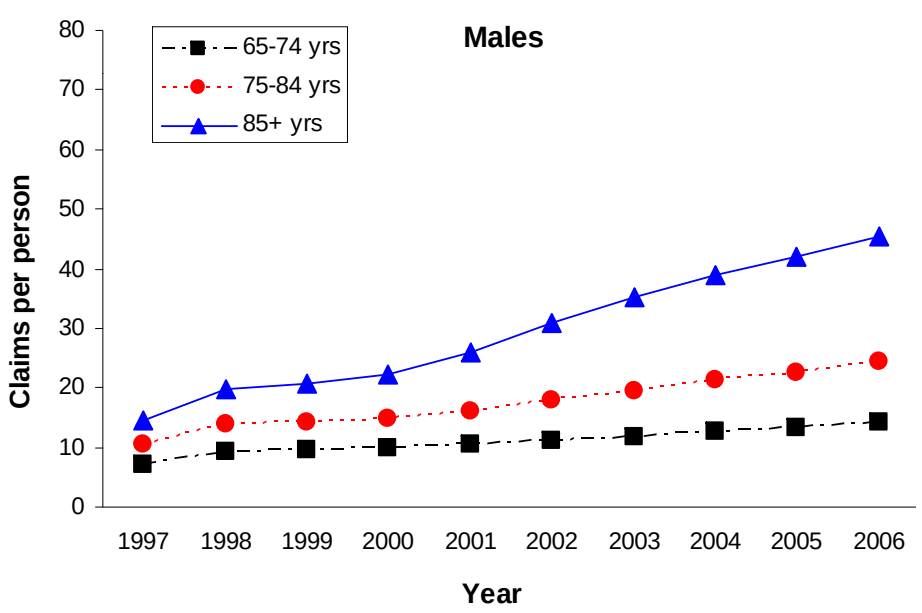
Frequency distribution of number of unique medication classes for older adults aged 65+ in Ontario, Canada, 1997-2006

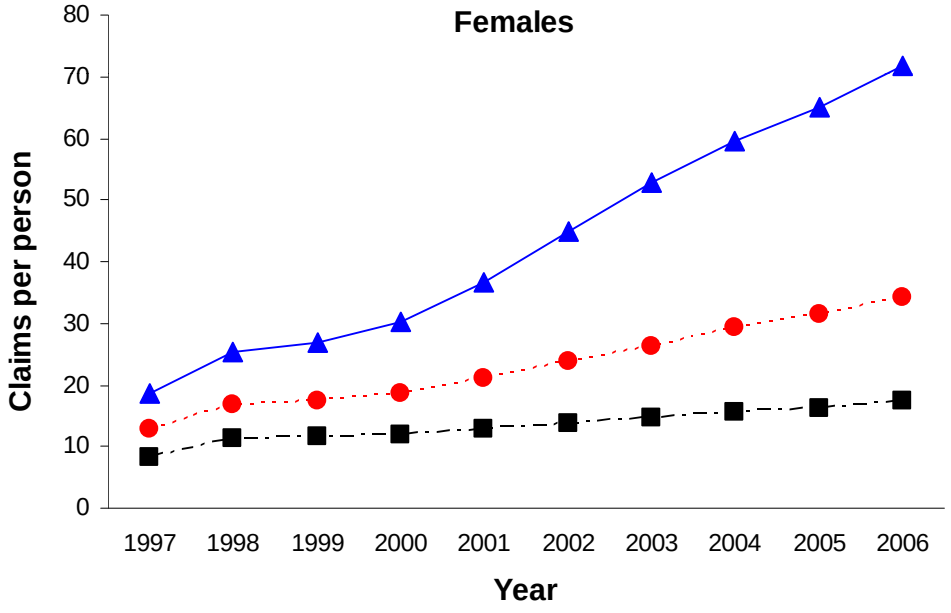


Gender differences in prescription claims per person for older adults aged 65+ in Ontario, Canada, 1997-2006



Age differences in prescription claims per person for older adults aged 65+ in Ontario, Canada, 1997-2006





Prescription claims by medication class for primary care patients aged 65+ in Ontario, Canada

MEDICATION CLASS	NUMBER OF CLAIMS			PROPORTION OF TOTAL CLAIMS			CLAIMS PER PERSON		
	1997	2006	Change	1997	2006	Change	1997	2006	Change
Osteoporosis	61,636	1,508,457	2,347%	0.38%	2.92%	668%	0.0445	0.919	1,965%
Lipid-lowering	445,390	3,549,066	697%	2.74%	6.88%	151%	0.3216	2.1621	572%
Thyroid replacements	484,499	1,724,859	256%	2.98%	3.34%	12%	0.3499	1.0508	200%
Psychotropics	1,899,995	6,716,502	254%	11.70%	13.02%	11%	1.3721	4.0918	198%
Cardiovascular	4,506,488	15,557,064	245%	27.75%	30.16%	9%	3.2544	9.4776	191%
Diabetes	686,009	2,341,826	241%	4.22%	4.54%	8%	0.4954	1.4267	188%
Gastrointestinal	1,764,359	5,326,708	202%	10.87%	10.33%	-5%	1.2741	3.2451	155%
Narcotics/ analgesics	638,156	1,350,001	112%	3.93%	2.62%	-33%	0.4608	0.8224	78%
Corticosteroids	640,422	1,089,796	70%	3.94%	2.11%	-46%	0.4625	0.6639	44%
NSAIDs	1,094,162	1,816,538	66%	6.74%	3.52%	-48%	0.7902	1.1067	40%
Asthma/COPD	708,109	1,106,389	56%	4.36%	2.15%	-51%	0.5114	0.674	32%
Antibiotics	865,051	1,261,464	46%	5.33%	2.45%	-54%	0.6247	0.7685	23%
All other classes	2,619,665	7,685,790	193%	15.06%	15.96%	6%	1.8918	4.6823	148%

Guilty as Charged!

Multiple chronic diseases: the care challenge

- Clinical Practice Guidelines (CPGs) have a single disease focus
- CPGs often conflict with each other and between diseases
- Reliance on single disease CPGs for care of patient with multiple co-morbidities = near total medicalization of patient's life

Clinical Practice Guidelines and Aging

- Few of the major CPG's used in Canada have specific recommendations for older adults
- Few of the major CPG's used in Canada have specific recommendations for co-morbid illness
- Few of the major CPG's used in Canada have specific recommendations on time to benefit

The Problem of Time

Is he the answer?

The Horton Solution

- Time is the variable we have given up on
- “The approach we are currently endorsing-accepting that we must inevitably lose the fight for time, revealed by providing ever narrower synoptic summaries or “bottom-lines” of increasingly complex evidence-does not address the more fundamental point –namely the need to provide a temporal space to interpret that information.”

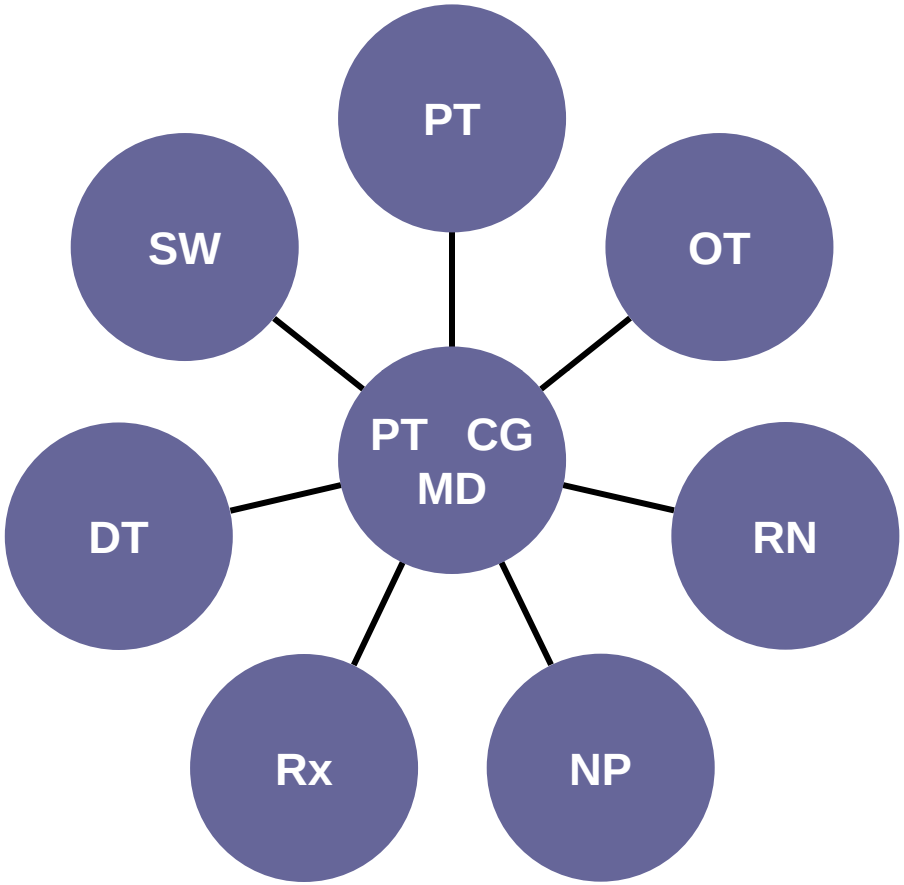
IMPACT Clinic: What it is

- **I**nterprofessional **M**odel of **P**ractice for **A**ging and **C**omplex **T**reatment
- A comprehensive model of:
  - Assessment
  - Care
  - Mentorship and training

→ Interprofessional problem solving

What it is

- An interdisciplinary team works with patient, caregiver(s), and referring practitioner
  - Typical appointment covers a diverse range of medical, functional and psycho-social issues
  - Goal: ‘unpack’ the patient’s condition
  - Takes 2-3 hours
  - Complements family practitioners’ care


PT
SW
OT
PT CG
MD
DT
RN
Rx
NP

Major reforms in approach are needed

- best evidence
- community-based, integrated, patient-focused vs disease-focused
- patient empowerment for self-directed care
- interprofessional health care teams
- adequate support systems
- information systems

New ways of thinking

- What are the outcomes?
- How do we measure and reduce informational and temporal complexity?
- How do we envision a system of integrated care across the life course and all transition points?

Acknowledgements

- Canada Research Chair
- PSI
- CIHR
- The IMPACT Clinic