



*Centre for Studies
in Family Medicine*



Patterns of Specialty Medical Referral

Analysis of a Primary Health Care Electronic Medical Record Database

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The views expressed in this presentation are those of the authors and do not necessarily reflect those of the Ministry of Health.

Outline

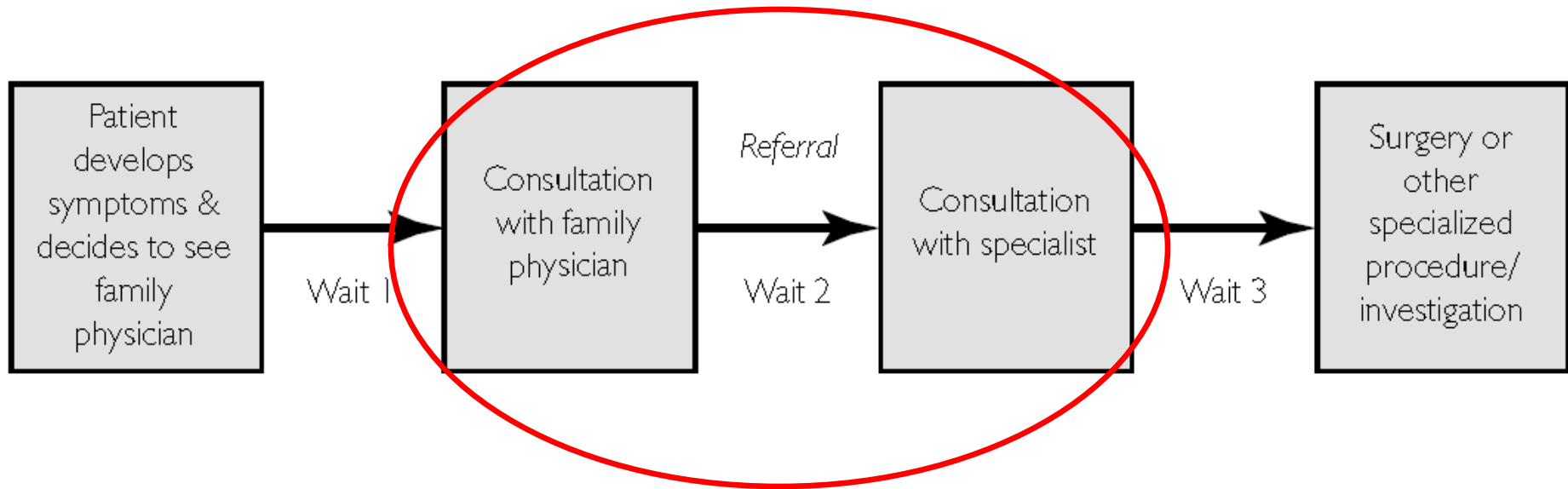
- **Background**
- **Research Questions**
- **Methods & Results**
- **Implications**

Referrals Matter

A referral is a major health care event!

- Request for help
- Marker of not-yet-met health need
- Initiates period of uncertainty for patients
- Inflection point in care cost trajectory

Referral Wait Times Matter



- **patients with specialist needs being managed by the primary care system**

Why a PHC EMR Database?

- **Contains patient-level clinical data not available elsewhere**
- **Wait 2 documented routinely for all referrals**

The DELPHI Database

- **Deliver Primary Healthcare Information**
- **Electronic Medical Records**
- **10 Practice Sites**
- **25 Family Physicians**
- **30,000 + patients**
- **Inception October 2005**

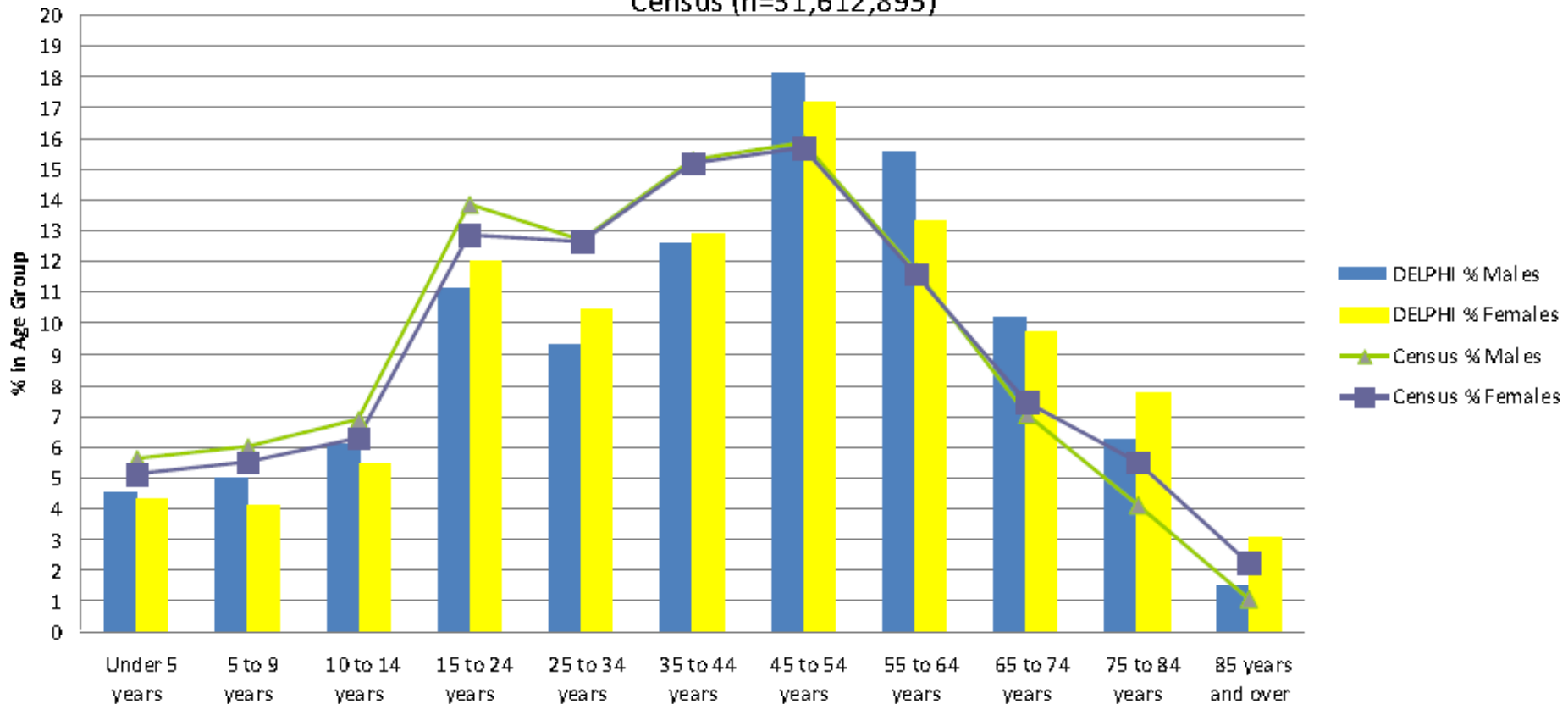


DELPHI and the General Population

DELPHI - 2006 Canadian Census

DELPHI (n=28,279)

Census (n=31,612,895)



Research Questions

- **What are the rates of referral by patient?**
- **What were the actual wait times experienced by patients?**
- **How do patterns of referrals and wait-times in southwestern Ontario compare to the published literature?**

Implications

- 1. Growth in referrals will vary by specialty, due in part to changing demographics.**
- 2. Time from referral to specialist visit is an underexplored contributor to wait times.**
- 3. Patient-level factors matter. PHC EMR databases are critical tools in this research.**

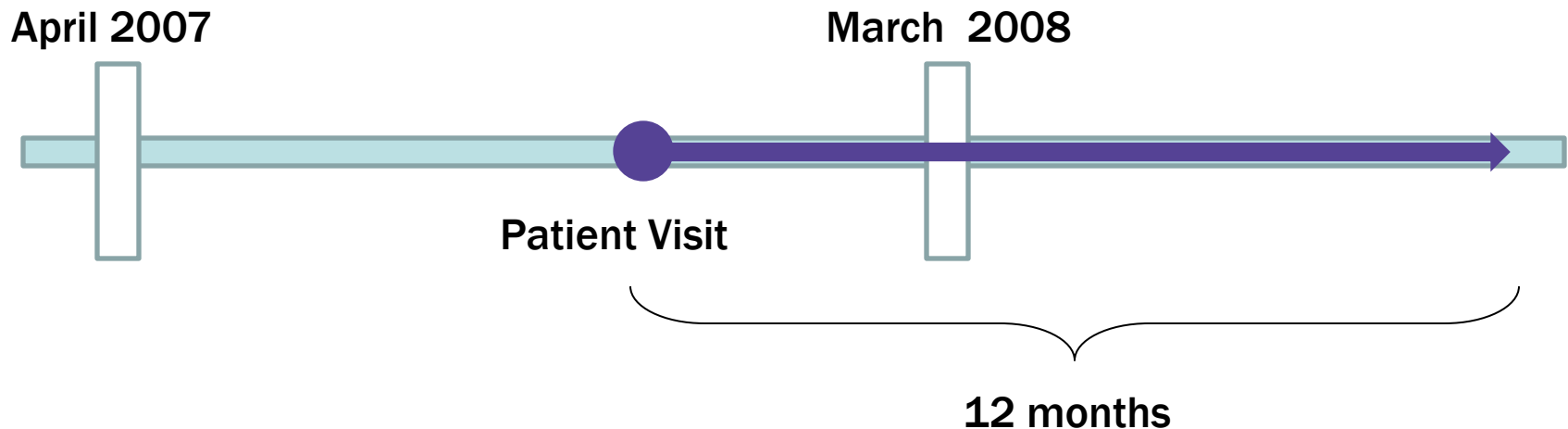
Referrals

In the DELPHI database, what are the rates of referrals from family physicians to other specialist physicians?

Do referral rates vary by patient or practice characteristics?

Referrals: Methods

Timeline



- **Unit of analysis: individual patient**

Referrals: Methods

**All DELPHI Database
Patients**

```
graph TD; A[All DELPHI Database Patients] --> B[24,856 Visited  
April 1, 2007-March 31, 2008]; B --> C[17,085  
No Referrals]; B --> D[7,771 (31.3%)  
One or more referrals];
```

**24,856 Visited
April 1, 2007-March 31, 2008**

**17,085
No Referrals**

**7,771 (31.3%)
One or more referrals**

Overall Referral Rate

**455 Referrals
per 1000 patients per year**

Referral Rates

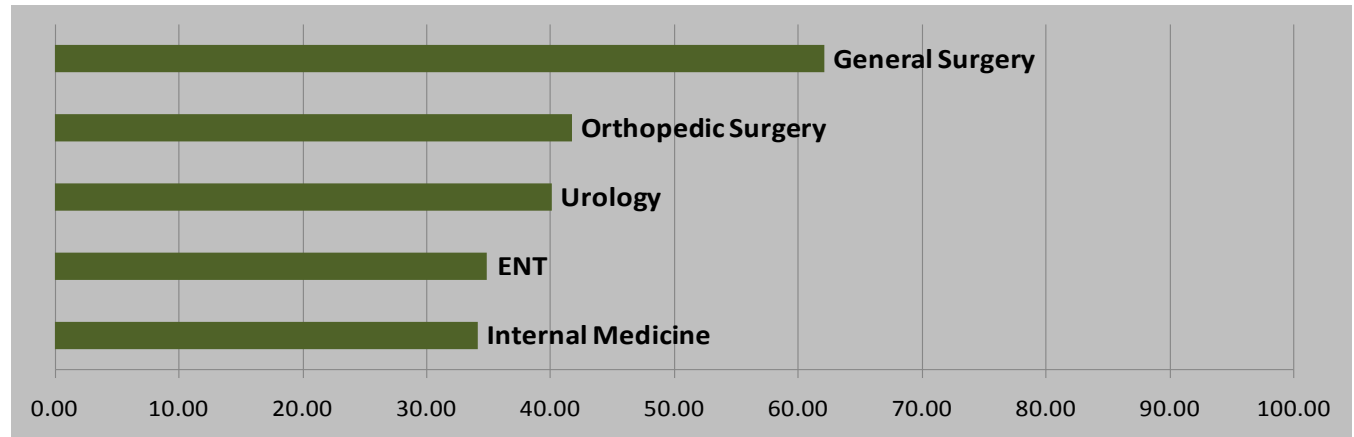
BY -		RATE / 1000 PATIENTS
Sex*	Male	435.5
	Female	470.7
Age*	0 - 19 yrs	220.9
	20 - 44 yrs	438.8
	25 - 64 yrs	523.5
	65+ yrs	569.9
Location*	Rural	475.7
	Urban	424.4

*significant at p-values = 0.0001

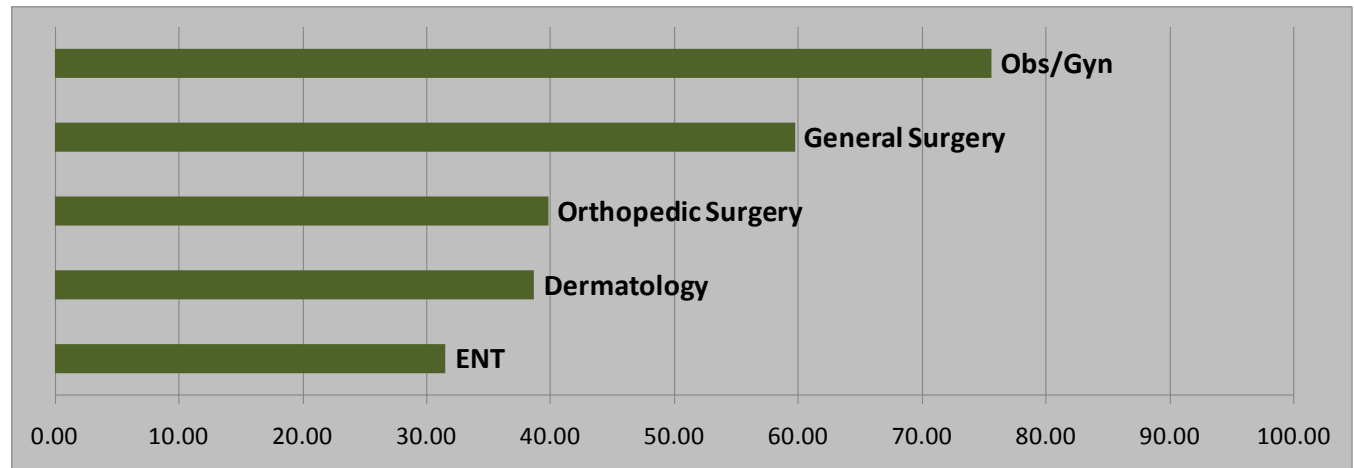
Referral Rate by Consultant Specialty

Top Five: Overall

Males



Females

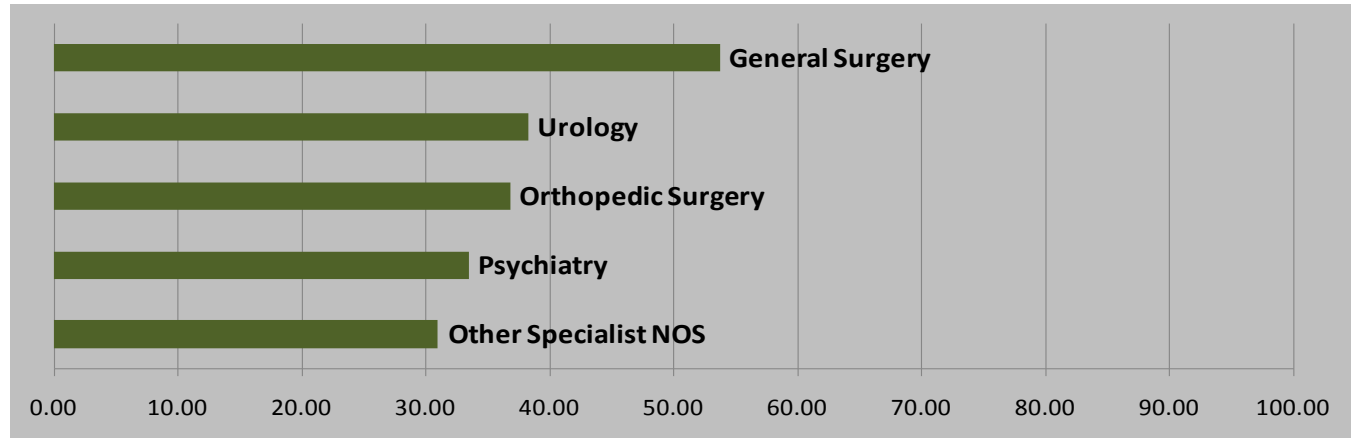


Rate / 1000 pts

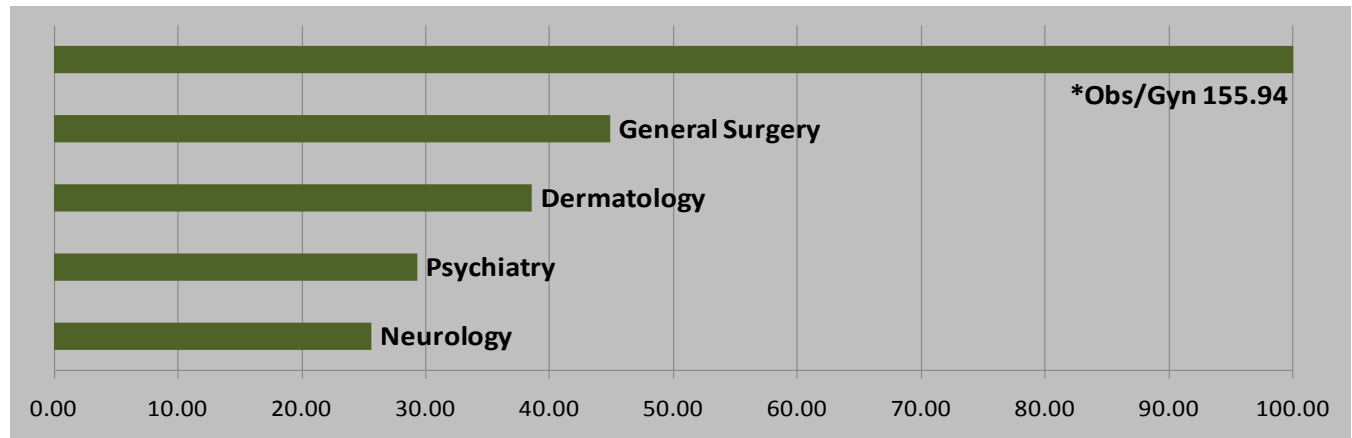
Referral Rate by Consultant Specialty

Top Five: Age 20-44

Males



Females



Rate / 1000 pts

What does the literature say?

- **Referrals per encounter vs. referrals per patient**
- **Most comparable study: Chan & Austin 2003**
 - OHIP claims data 1997/1998
 - 560 referrals / 1000 patients / year
 - Patient characteristics important
- **In other studies, factors associated with referrals:**
 - Patient age, sex, SES, health status
 - Physician sex, training, tolerance of uncertainty
 - Practice location, size, remuneration
 - Health system private vs. public, prevalence of diagnoses, patient pressure perception

Implications

Population growth leads to more referrals.

Growth in referrals will vary by specialty, due in part to the changing demographics of the Ontario population.

Referral Volume Extrapolations

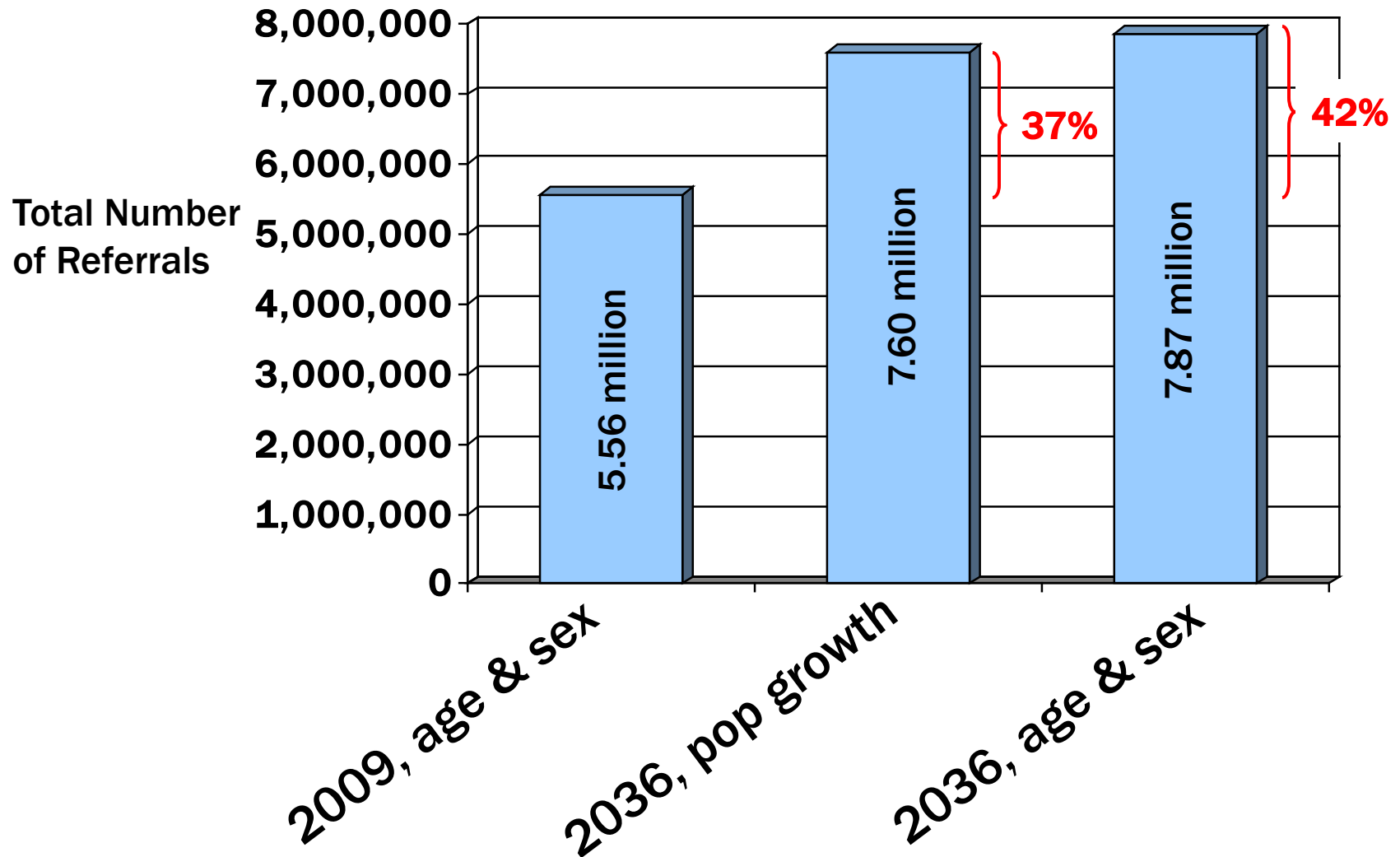
- **Two extrapolations**
 - Apply DELPHI rates to Ontario population 2009
 - Apply DELPHI rates to Ontario population 2036
 - Rates adjusted for population age and sex composition
- **Assumptions**
 - DELPHI referral rates apply to Ontario as a whole
 - Age/sex category referral rates stable over time
- ***For illustrative purposes only***

Ontario Age Pyramid: 2009 and 2036

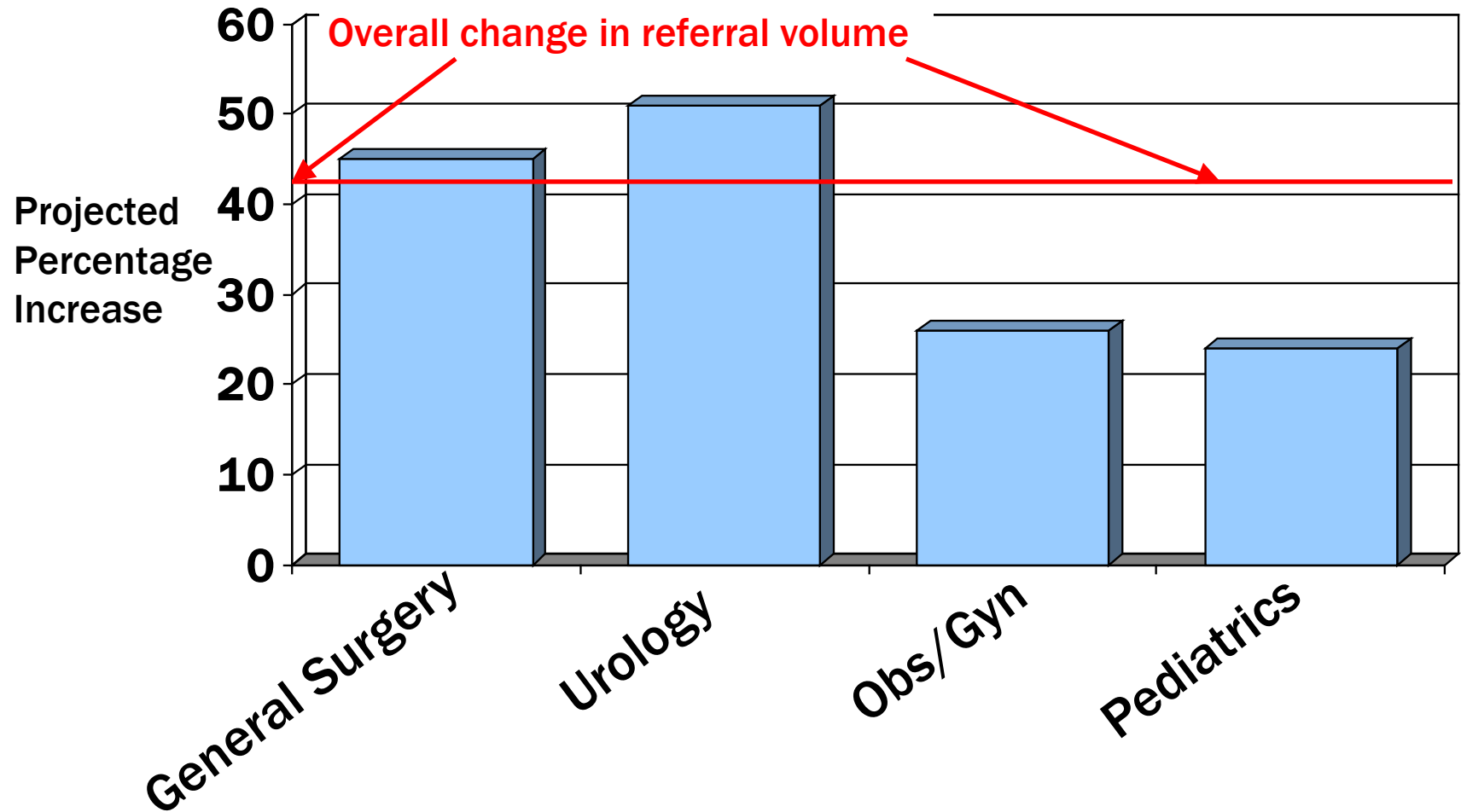
Total population growth: 37%



Referral Volume Extrapolations



Change in Referral Volume 2009-2036

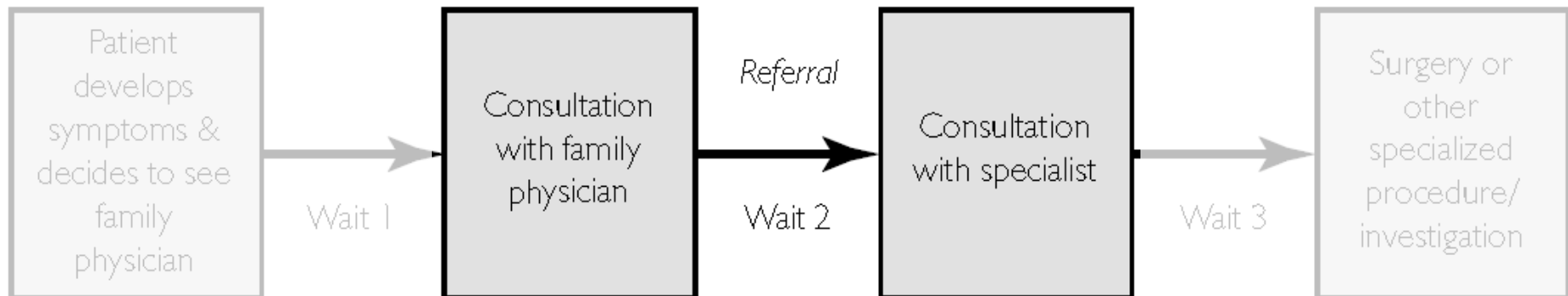


Implications

- 1. Growth in referrals will vary by specialty, due in part to changing demographics.**
- 2. Time from referral to specialist visit is an underexplored contributor to wait times.**
- 3. Patient-level factors matter. PHC EMR databases are critical tools in this research.**

Referral Wait Times

- **What were the actual wait times experienced by patients referred to specialty medical care?**
- **How did the wait times vary by consultant specialty?**



Referral Wait Times: Methods

- **Unit of analysis: individual referral**
- **Included referrals: Oct 2005 - March 2008**
- **Excluded referrals:**
 - **Missing information**
 - **Duplicates**
 - **Specialties with <100 total referrals**

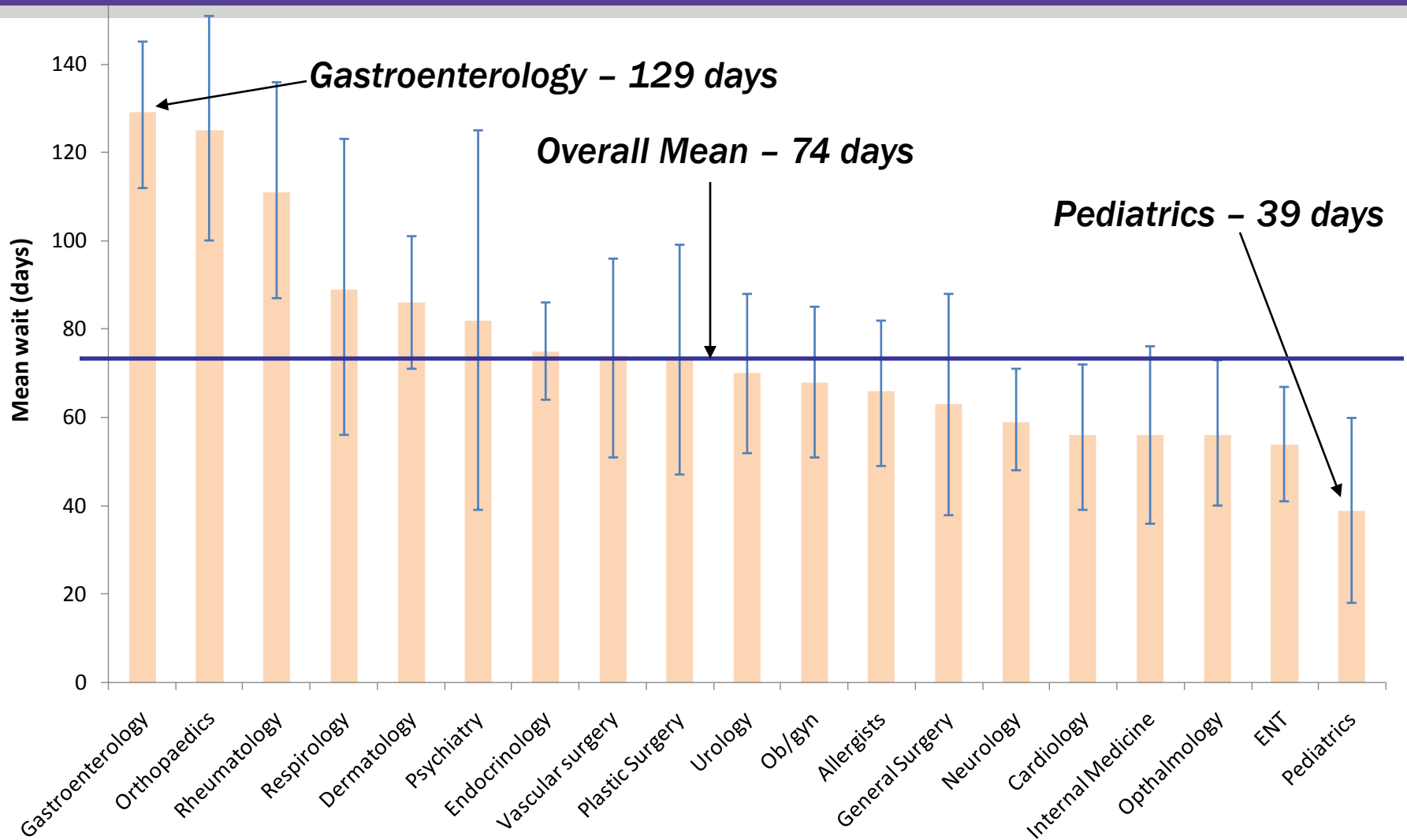
Days Waiting

- **16,115 referrals**
- **Mean wait: 74 days**
- **Median wait: 47 days, range 0-858 days**

By –		Mean (median)	95% CI
Sex	Male	73 (49)	64 – 82
	Female	76 (44)	68 – 84
Age			
Age	0 - 19 yrs	56 (38)	52 – 63
	20 - 44 yrs	77 (49)	67 – 87
	25 - 64 yrs	80 (49)	69 – 91
	65+ yrs	72 (43)	61 – 82

95% confidence intervals for the means, adjusted for clustering by practice

Mean Referral Wait Time by Specialty



- Vertical high-low bars represent 95% CI adjusted for clustering by practices.

What does the literature say?

- **Most reports about wait 2 focus on particular specialty or clinical problem.**
- **Fraser Institute Waiting List Report 2009**
 - survey of specialists in 12 disciplines
 - median overall wait time in Ontario was 6.7 weeks (~47 days)
- **Statistics Canada 2010**
 - Analysis of 2007 Canadian Community Health Survey
 - 45% <1 month, 41% 1-3 months, 15% > 3 months

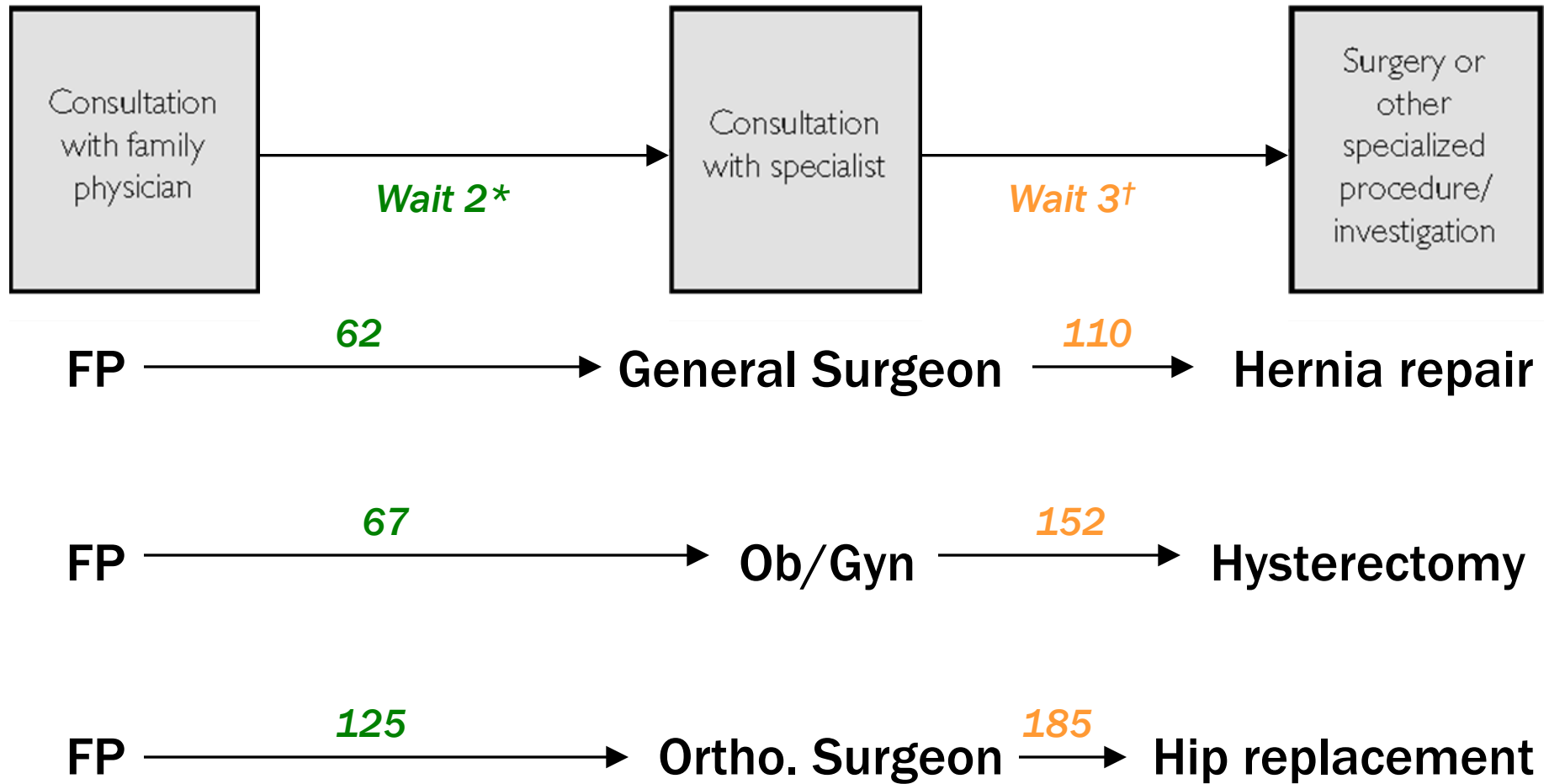
The Primary Care Perspective

Referral = request for help

Wait time = duration of burden of unmet health need

Wait 2 = patients with specialist needs being managed by the primary care system

Referral Waits in Context



* Mean number of days. Data from current study.

† 90th percentile of days Q1 2011. Data from Ontario Ministry of Health and Long Term Care, www.waittimes.net

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Because the total referral volume is so large, small changes in referral rate may have big implications.

But what causes referral rate variation?

Sources of Referral Rate Variation

- **Health system**
- **Geography**
- **Practice**
- **Physician**
- **Patient**

How Much Patient Level Variance?

- **What proportion of variation in referral rates is attributable to the patient level vs. the practice level?**

Patient: 92%

Practice: 8%

- **Multi-level Poisson regression**

Potential of EMR Research

- **Need to understand the specific patient factors that influence referrals**
- **EMRs provide a rich source of data about the patient**
- **EMR data will only grow and improve over time**
- **Provide information that can be used to influence policy at the patient level**

To summarize...

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- 3. Patient-level factors matter. PHC EMR databases are critical tools in this research.**

Using patients' records to improve patients' experiences.

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