Physician Scope of Practice

A statistical approach to profiling practice patterns

Canadian Institute for Health Information

mcomeau@cihi.ca cihi.ca @cihi_icis

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Motivation

- **Raised at advisory group meeting last year**
- **Physicians practising differently than expected**
- **How much does physician specialty inform Scope of Practice**

What is Scope of Practice?

Daily clinical activities that describe the health care being delivered

- Consultations
- Assessments
- Surgical Procedures
- Therapeutic Procedures
- Diagnostic Procedures
- Etc.…

Describing Physician Activities

- **Physician Specialty**
- **Precise description of skills and credentials**
- **Complete listing of clinical activities i.e. fee codes**
- **National Grouping System Categories**

NGS Categories

Comparing Physician Services

- **Physician services are described differently in different jurisdictions**
- **Provincial Fee Schedules**
- **National Grouping System categories give a framework for organizing fee codes into a comparable groupings**

NGS Categories Examples

CONSULTATIONS

major consultation

MAJOR SURGERY

rhinoplasty

DIAGNOSTIC & THERAPEUTIC PROCEDURES

colonoscopy

MAJOR ASSESSMENT

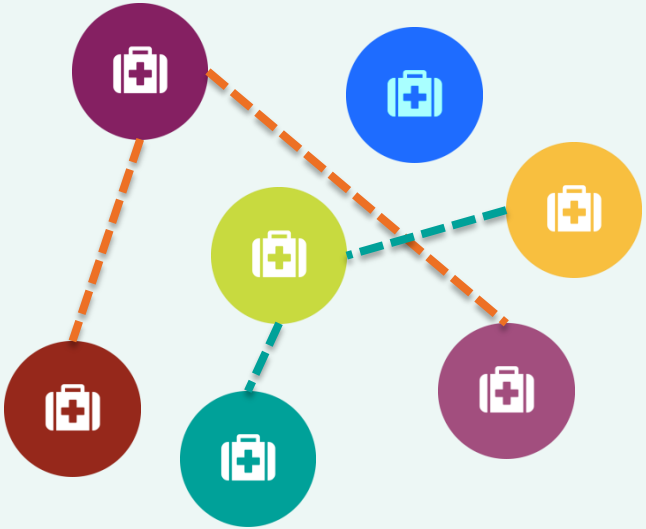
office assessment

OBSTETRICAL SERVICES

caesarean section

Practice Areas

The Idea



Reorganize NGS categories into homogenous groupings called *practice areas*

Measure *participation* within each practice area

Participation patterns define unique practice patterns for each physician

The Practice Areas

consultations

- MAJOR CONSULTATIONS
- OTHER CONSULTATIONS

obstetrical services

- SERVICES AT TIME OF DELIVERY
- VAGINAL DELIVERY
- CAESAREAN SECTION
- THERAPEUTIC ABORTIONS
- OTHER OBSTETRICS

psychotherapy

- INDIVIDUAL PSYCHOTHERAPY
- GROUP PYSCHOTHERAPY
- COUNSELING

assessments

- OFFICE
- HOSPITAL INPATIENT NEWBORN
- HOSPITAL INPATIENT OTHER
- HOSPITAL OUTPATIENT
- HOSPITAL UNSPSECIFIED
- UNSPECIFIED

musculoskeletal surgery

- FRACTURES
- ARTHROPLASTY – HIP
- ARTHROPLASTY – KNEE
- OTHER MUSCULOSKELETAL

etc...

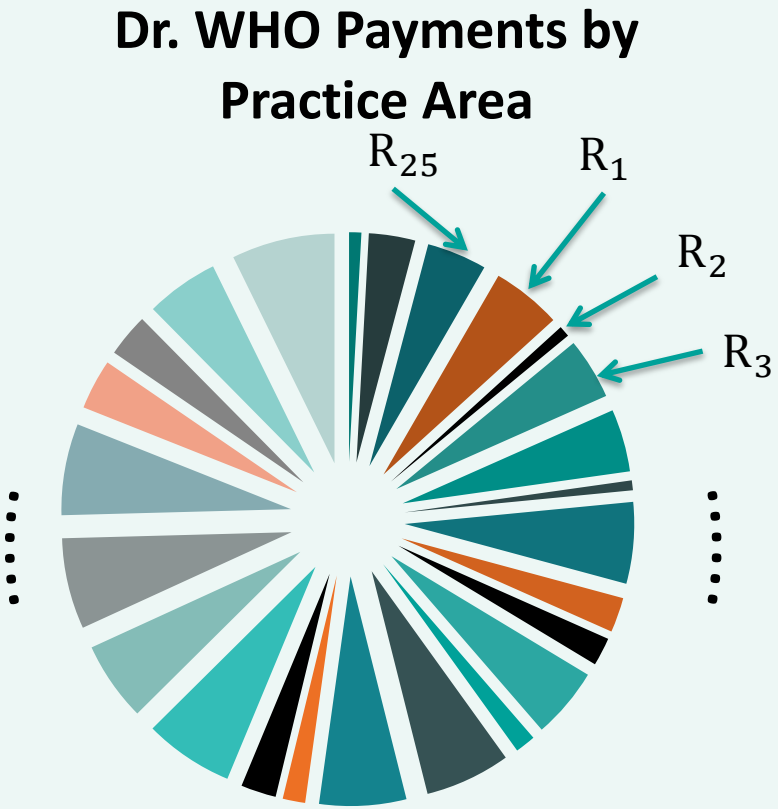
Scope of Practice Categories

Assigning a Scope of Practice – the Setup

Basic assumption: physicians within a given specialty represent a group of like-behaving individuals the majority of who practise in similar ways.

- Choose a specialty, **s**
- Let PA_i denote the i^{th} practice area
- For each physician let p_i represent their total payments for PA_i
- We`ll associate a scope of practice category Π_s to each specialty

Assigning a Scope of Practice – the Math I



- For each physician we define their ***participation rate sequence*** as follows: $R = (R_1, \cdots, R_{25})$ where

$$R_i = \frac{p_i}{P}$$

and $P = \sum_i p_i$.

- Each R_i is a ***relative measure of participation*** within the practice area PA_i.

Think Pie

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Assigning a Scope of Practice – the Math II

- **Does Dr. WHO have a typical practice pattern for his specialty?**
- **Need to define what is the *most typical participation rate sequence* for the specialty**
- **In other words we want to most representative pie chart**

For each specialty group **s**, we define the ***payment signature of s***, denoted $t_s = (t_{1,s}, \cdots, t_{25,s})$ as follows:

$$t_{i,s} = \frac{m_{i,s}}{\sum_j m_{j,s}}$$

where $m_{i,s} = median\{R_{i,1}, \cdots, R_{i,N}\}$ and where $R_{i,j}$ denotes the participation rate value in the ith practice area for the jth physician in specialty group **s**.

Assigning a Scope of Practice – the Assignment

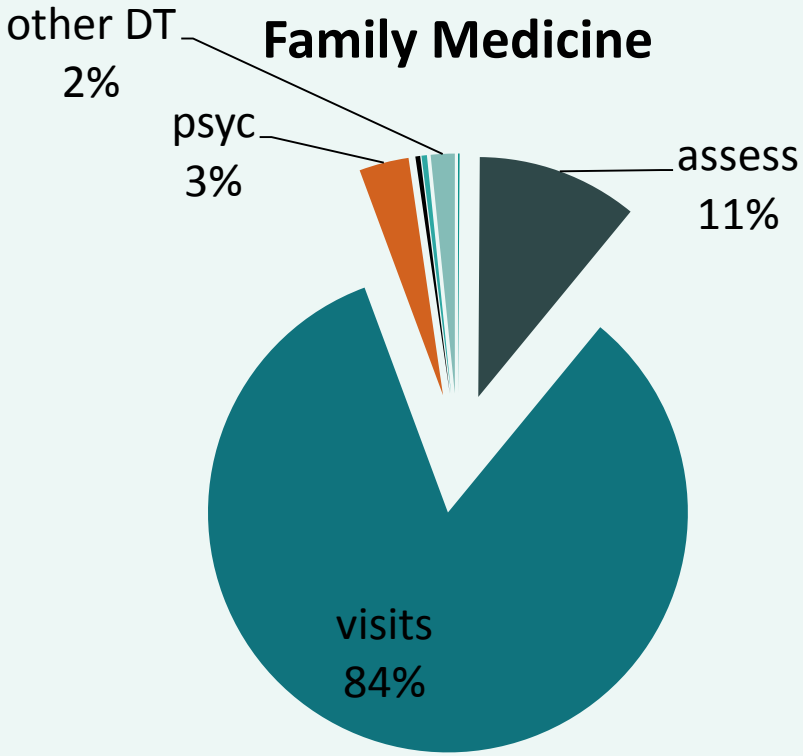
- **Let $R = (R_1, \cdots, R_{25})$ denote the participation rate sequence for Dr. WHO**
- **We say that their *scope of practice* is most similar to the specialty group *s* when**

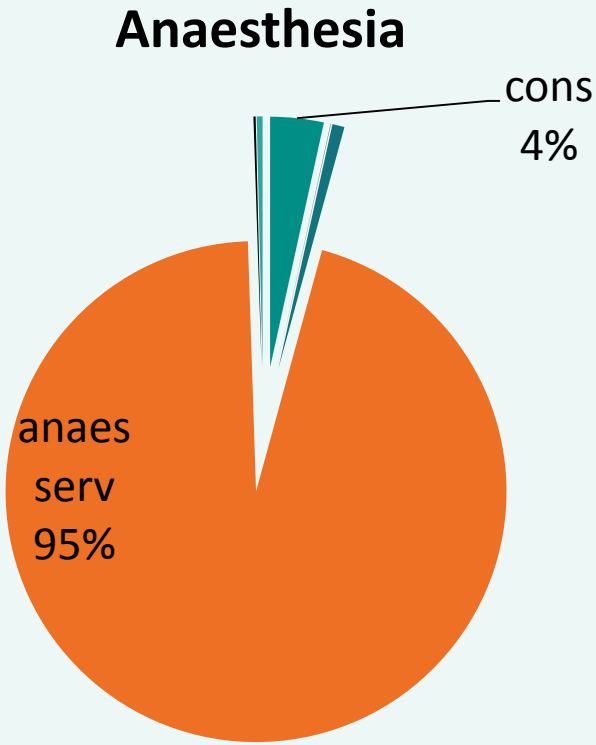
$$\min_{l \in spec} \{d(R, t_l)\} = d(R, t_s)$$

where $d(R, t_l) = \sqrt{\sum_i (R_i - t_{i,l})^2}$ is the Euclidean distance between the tuples.

Examples

Scope of Practice as a Pie Chart – the Payment Signature





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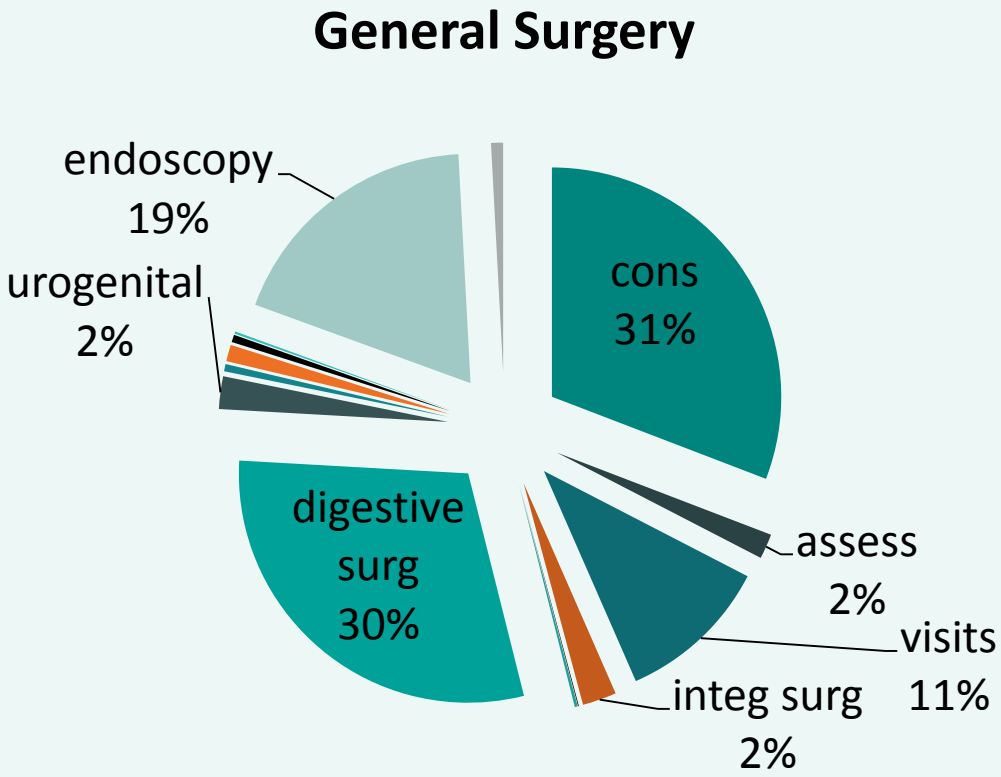

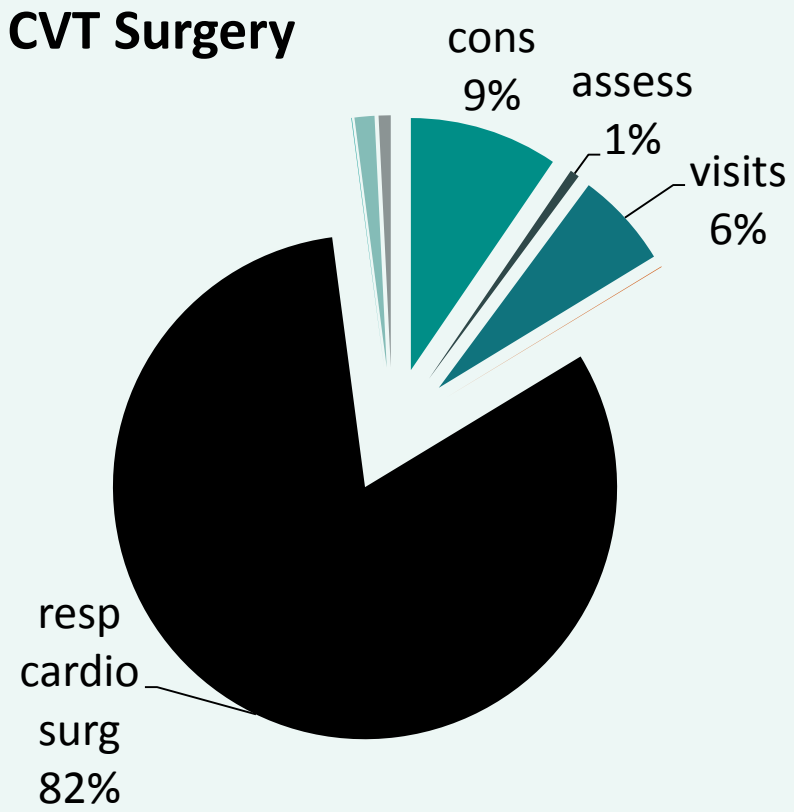

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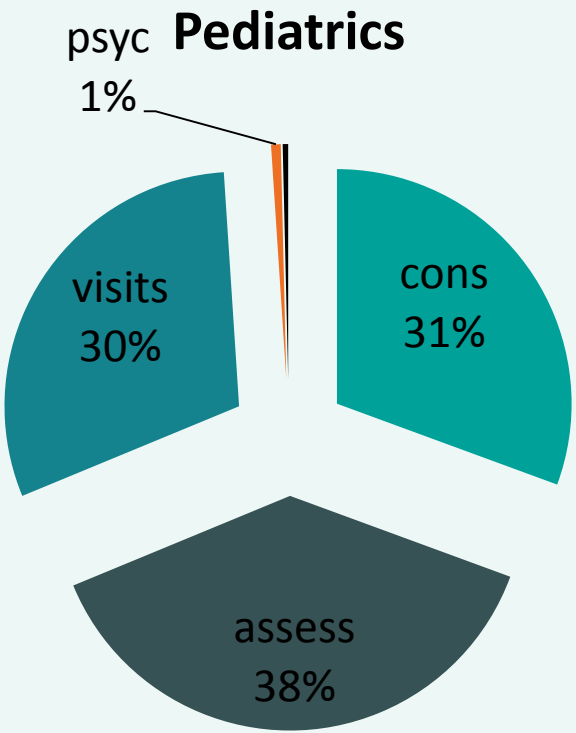
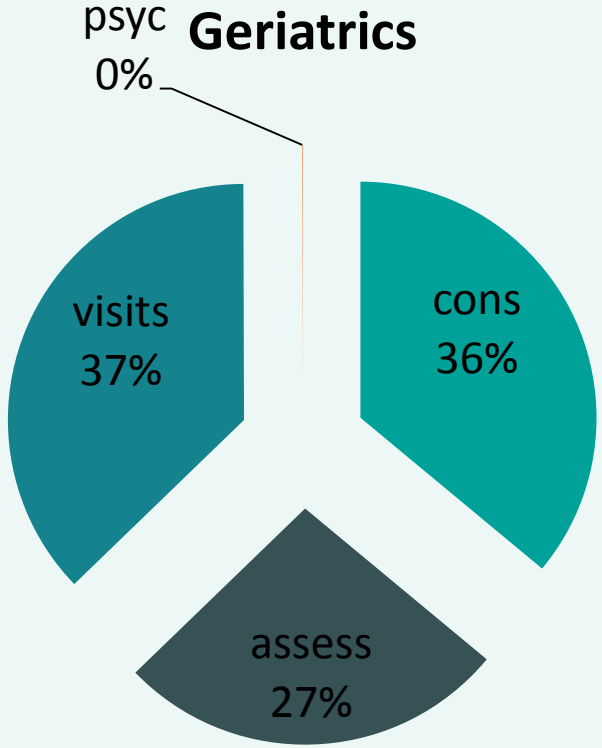
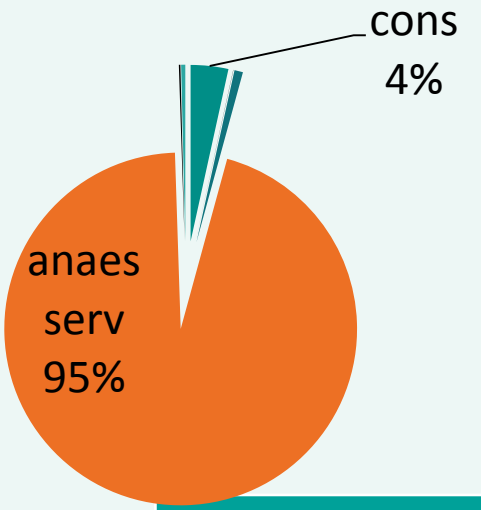
Scope of Practice as a Pie Chart – the Payment Signature





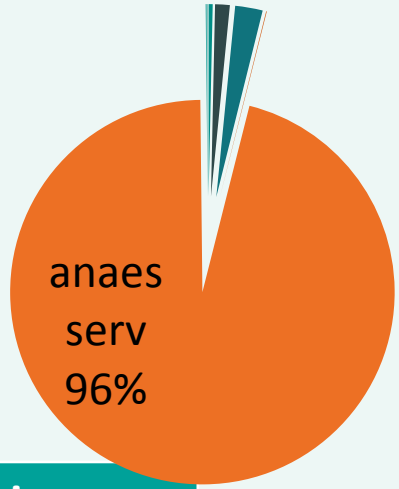
Identifying Scope of Practice

Anaesthesia



it's a match! … but

Dr. WHO



NPDB Specialty	Family Medicine
Total Payments	$405,000
Actual FTE	1.51
Functional Specialty	Anaesthesia
Expected FTE	1.19

Next Steps

- **Work at refining the practice areas**
- **Explore other options for defining the centroid of a scope of practice cluster**
- **Analyze the dissimilarity between clusters**
- **Develop a clinical description of the scope of practice categories**
- **Look at the evolution over time**
- **Incorporate Alternative Payments**

Questions?