



CIHI's Physician Scope of Practice Methodology



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Table of contents

CIHI's physician scope of practice methodology	4
Overview of the methodology	4
The methodology	4
Using the methodology	6
Future of the methodology	6
Reference	6

CIHI's physician scope of practice methodology

Optimization of Canada's health workforce is a process that is informed by several factors, including physicians' scope of practice. Establishing a mathematical foundation for this workforce measure could lead to an improved understanding of physicians' interactions with the health system and facilitate optimization.

Overview of the methodology

A physician's specialization indicates their formal training and credentials. However, the health care delivered by a provider can vary, both between specializations and within. For example, where a family physician in one setting may provide mainly consultations, others may have expertise and provide services traditionally offered by other specialties, such as anesthetic services.

The purpose of this methodology is to describe a physician's typical scope of practice, thus allowing for the measurement of and contrast between physicians and their practice scopes over time. In this document, a physician's scope of practice is defined by the clinical activities that are being delivered. These can include consultations, assessments and surgical procedures, among others. To address variations in service descriptions across jurisdictions, the National Grouping System (NGS) is used for organizing fee codes into comparable groupings.¹

This methodology uses the NGS categories, organized into practice areas, to analyze physicians' scope of practice and derive a specialty group's typical scope of practice by actual activities performed. This methodology assumes that a given specialist group will have mostly similar skill mixes and ways of practising, which permits the homogenous grouping of individuals into scope of practice categories.

The methodology

To assign a scope of practice value to a specialty group (s), the relative participation (R_i) in each practice area for each physician in that specialty is first calculated, then combined using *geometric clustering*.

The payment signature is defined by the mix of participation rates in each practice area, and the resulting value is the most typical participation rate sequence for the specialty group (i.e., a typical scope of practice).

To assign a scope of practice category to a physician, their participation rate is compared with the most typical participation rate for each specialty group and the most similar group is assigned to that physician.

s = specialty group	p = fee-for-service payments
\mathbb{P} = scope of practice category	n = number of practice areas
R = participation rate sequence for an individual physician	N = number of physicians in a specialty group
t_s = most typical participation rate sequence for specialty group s	l = number of specialties
	d = distance

Participation rate sequence for each physician:

$$R = (R_1, \dots, R_n) \text{ where } R_i = \frac{p_i}{P} \text{ and } P = \sum_i p_i$$

The participation rate sequence is equal to the physician's fee-for-service payments in each designated practice area divided by their total fee-for-service payments. The total fee-for-service payments are a sum of the fee-for-service payments from each practice area.

Most typical participation rate sequence for each specialty group:

$$t_s = (t_{1,s}, \dots, t_{n,s}) \text{ where } t_{i,s} = m_{i,s} + \frac{(1 - \sum_i m_{i,s})}{n} \text{ where } m_{i,s} = \text{median}\{R_{i,1}, \dots, R_{i,N}\}$$

The most typical participation rate sequence for a specialty group is equal to the median participation rate for all physicians within the specialty group, for each practice area, plus an adjustment factor. The adjustment factor is 1 minus the sum of the median participation rate for each practice area in a given specialty divided by the total number of practice areas.

Scope of practice category for each specialty group:

$$\mathbb{P}_s = t_s$$

The scope of practice category for a specialty group is equal to the typical participation rate for that specialty group.

Assigning a scope of practice category to each physician:

$$\mathbb{P} = \min_l \{d(R, t_l)\} \text{ where } d(R, t_l) = \sqrt{\sum_i (R_i - t_{i,l})^2}$$

The assigned scope of practice category for an individual physician is equal to the specialty scope of practice category that is most similar, determined by the minimum distance between the individual physician's participation rate sequence and each specialty group's most typical participation rate sequence. The distance between participation rate sequences is equal to the square root of the sum of the squared difference between the participation rate for each practice area of the individual physician and each specialty.

Using the methodology

To use a scope of practice measure, an individual physician's practice activity is compared with their peers' typical scope of practice. This results in a value (between 0 and 100 when scaled) that describes the distance between the individual's expected scope of practice and their actual scope of practice. The lower the scaled scope of practice value, the closer the physician's practice is to the average scope of practice of their peers, and vice versa. This value can facilitate observations in physician practices by quantifying physician services to aid researchers and stakeholders in understanding physician practices across jurisdictions at a more granular level.

Future of the methodology

This methodology enables a high-level understanding of each physician's practice and how it relates to that of their peers, and subsequently enables higher-quality decision-making and planning with better data. A current limitation of the methodology can be observed by comparing the pediatrician and geriatrician scopes of practice; though the populations served by each are vastly different, the methodology implies near identical scopes of practice. Further refinement of the methodology should incorporate more patient-level characteristics to better enhance scope of practice identification for physicians.

Reference

1. Canadian Institute for Health Information. [National Grouping System \(NGS\)](#) [infographic]. 2016.



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