Nursing Cost Allocation Survey Analysis

PCSI 2022, Reykjavik

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Canadian Institute for Health Information

Outline

- **Background**
- **Methods**
- **Results: Per diem cost analysis**
- **Results: Total cost analysis**
- **Thoughts**

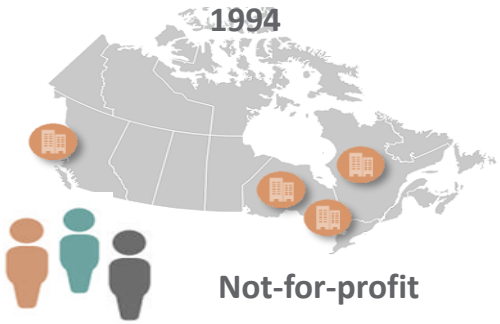
Canada

- 2nd largest in the world in surface area
- Population – 38 m people
- Diverse in people, climates and geography
- A federal government, 10 provinces and 3 territories

- Canada Health Act, 1984
  - ✓**Universality** – every resident is entitled to healthcare services
  - ✓**Public administration** - funded by federal and provincial governments
- 600+ hospitals and
- 2,000+ other health organizations

Canadian Institute for Health Information (CIHI)

Who we are



Not-for-profit

Pan-Canadian

Our Vision

Better data

Better decisions

Healthier Canadians

Standards

Working with our stakeholders, we continue to lead the development and implementation of pan-Canadian standards

Databases

Spending

Clinical

Workforce

We build and maintain pan-Canadian databases that enable jurisdictions to compare data

Indicators & Analysis

Spending

Quality

Access

Specialized Services

Population health

…and more

Building Capacity

Health System Performance schools

Conferences & Events

Workshops

Self-study

Web conferences

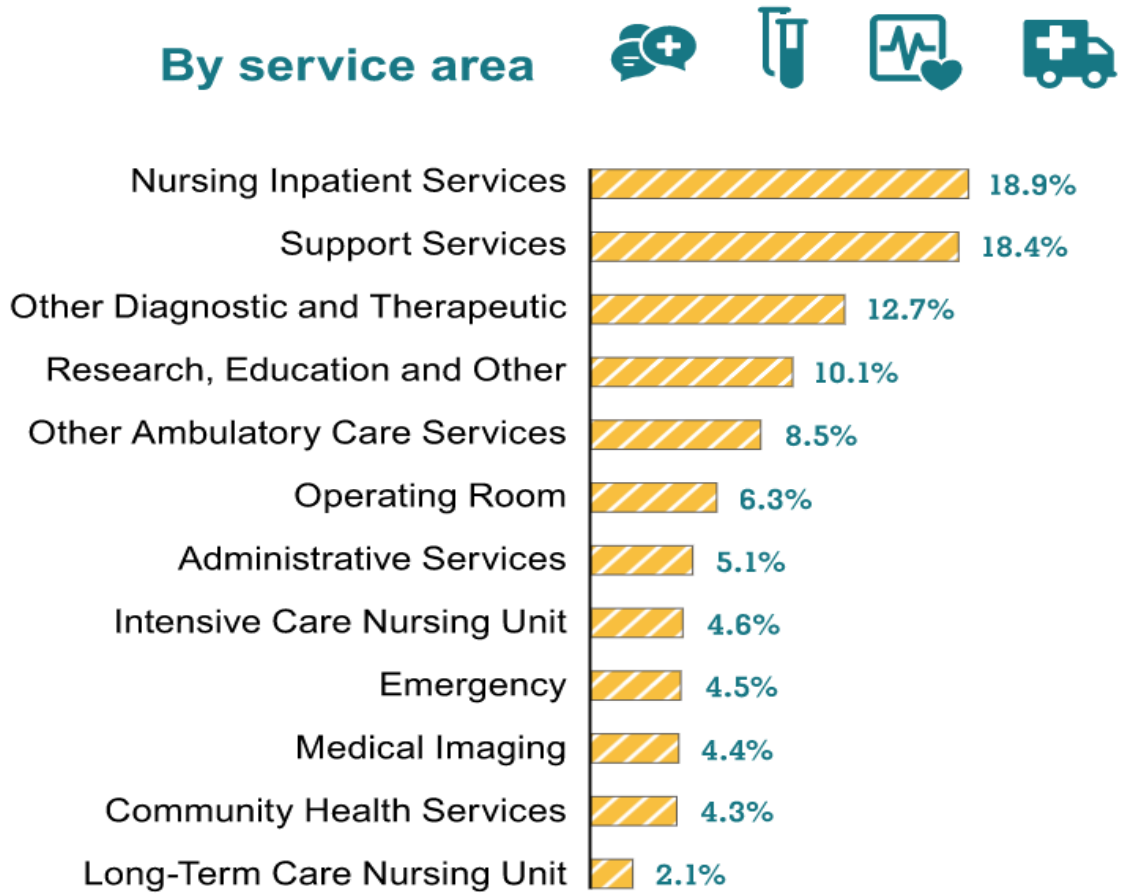
Privacy and Security

We are committed to protecting the privacy of Canadians by ensuring the confidentiality, integrity and availability of health care data

Data Quality

Our Internationally recognized data and information quality program helps to ensure evidence based decision-making

Hospital Spending by Service Area



Source: Hospital Spending (2022), CIHI: https://www.cihi.ca/en/hospital-spending

Canadian Patient Cost Database (CPCD)

Patient record level costing data

- Which **days** of the patient's stay were the most expensive? The least expensive?
- What **types of costs** contribute the most to the patient cost?
- Which **business areas** of the hospital contributed the most to the **patient cost?**

60+
Facilities

Clinical
data sources

400 million records

4 of 13
Provinces and Territories (voluntary database)

Case Mix

- **Canadian grouping method – CMG +**
- **Clinical system**
  - Major Clinical Categories
  - Intervention and diagnosis partitions

Relative weights 

  - clinical group, + five factors (age, comorbidities, flagged interventions, intervention events and out of hospital interventions)

- **Patient level cost used to calibrate the Resource Intensity Weight (RIW)**

Nursing Cost Allocation Methods

Time Based Allocation (Workload)

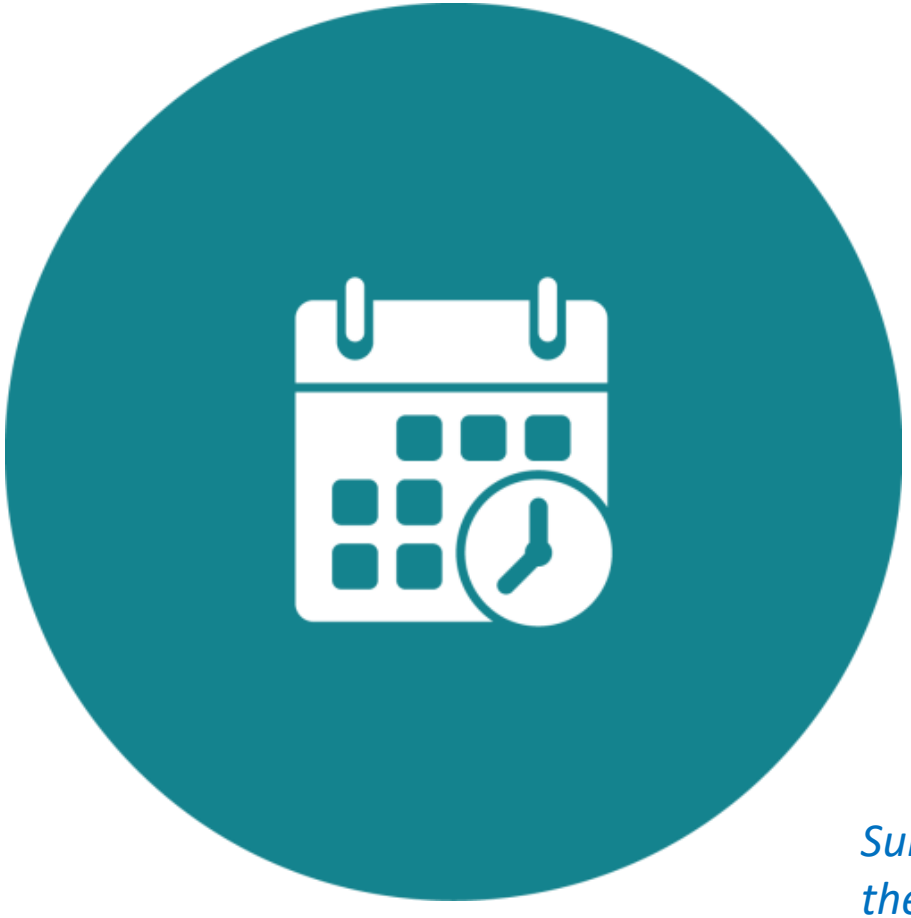
Patient Time

Focused on these two methods because they were the most common

Percentage Staff Time

Acuity Driven

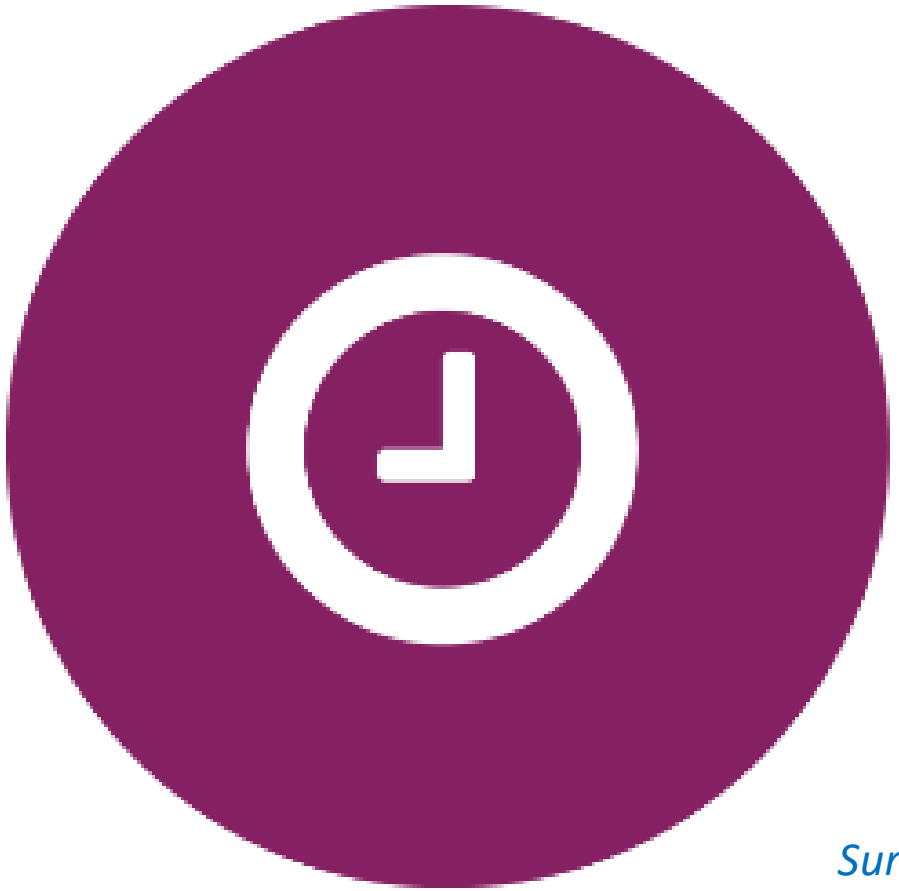
Patient Time



- **Patient time =**
  - Date/time of discharge - date/time of admission
- **Cost/patient time =**
  - Cost for period ÷ total patient time for all patients
- **Patient cost =**
  - Cost/patient time x individual patient time

Summary: allocate $ based on the proportion of time the patient is on the nursing unit

Workload



- **Workload =**
  - Average time (minutes)/activity on the unit
- **Workload/patient =**
  - # Activities x workload/activity
- **Cost/workload =**
  - Cost for period ÷ total workload in the period
- **Patient cost =**
  - Cost/workload x total workload for the individual patient

Summary: allocate $ based on the proportion of time the staff spend providing services to the patient

Analysis: Selection criteria

Focused on nursing inpatient because a) it is the costliest and b) most completely reported

Nursing Inpatient

- Mostly Patient Time
- Very few Workload

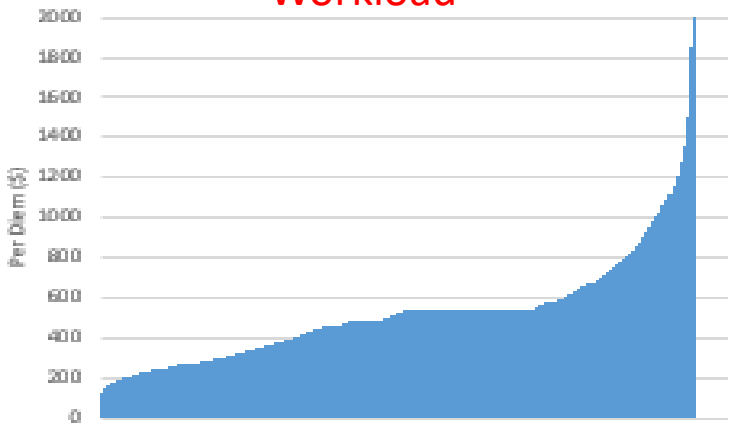
Ambulatory Care

- Mostly Workload
- Some Patient Time
- Patient time = time of discharge – time of arrival

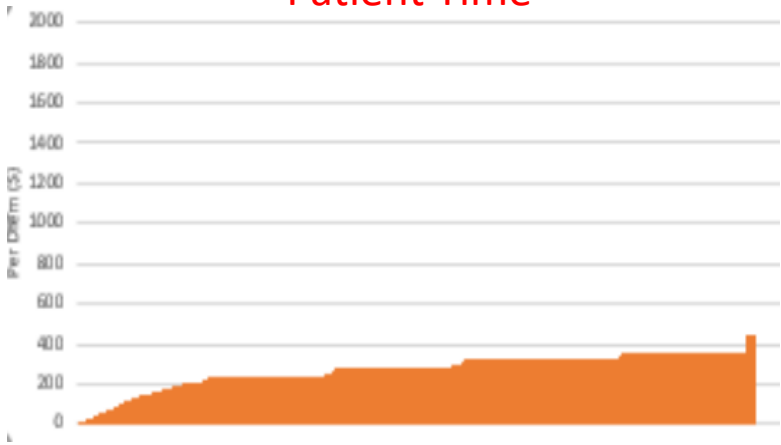
Medical Nursing Units

Workload has a much greater variability in the patient cost per day in these nursing units

Workload



Patient Time



Intensive Care Units (ICU)

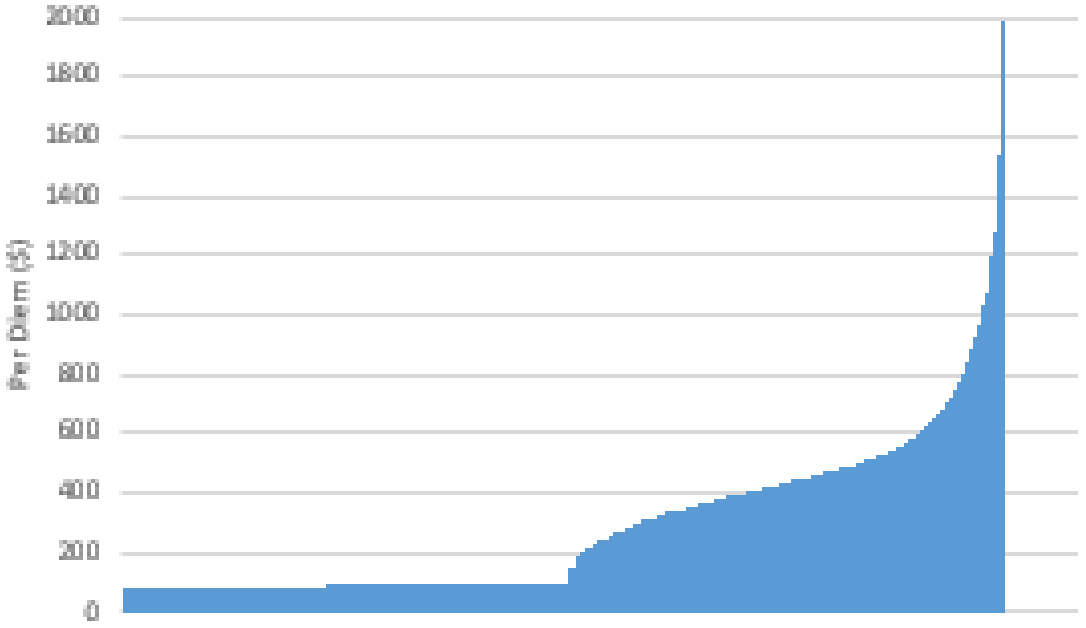
Workload

Patient Time

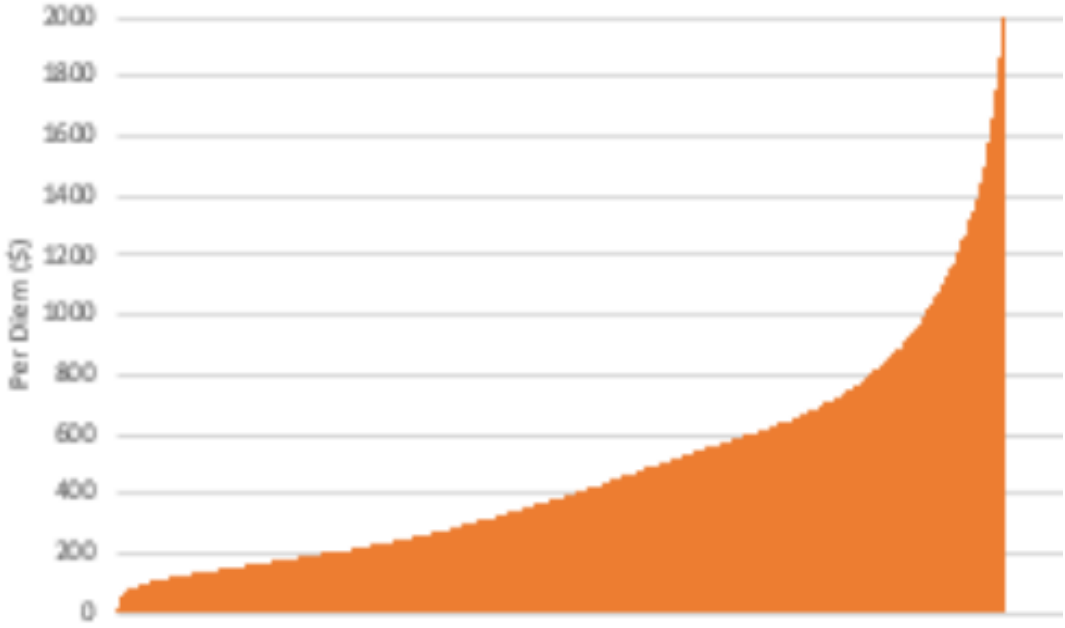
Operating and Post Anesthetic Recovery Room

Workload and patient time approaches look similar in the OR and recovery room
Workload = time spent by personnel providing services (personnel are usually dedicated to a single patient while in the OR/Recovery)
Patient time = time of patient arrival in OR to the time of departure

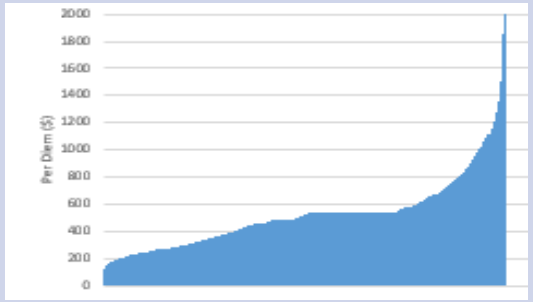
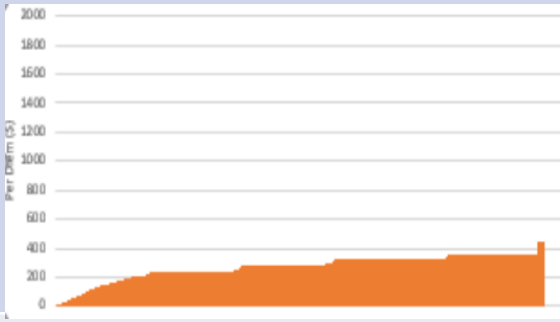
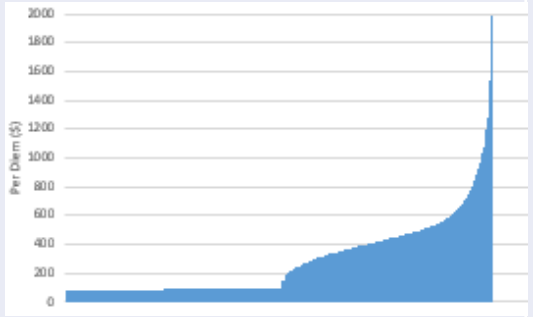
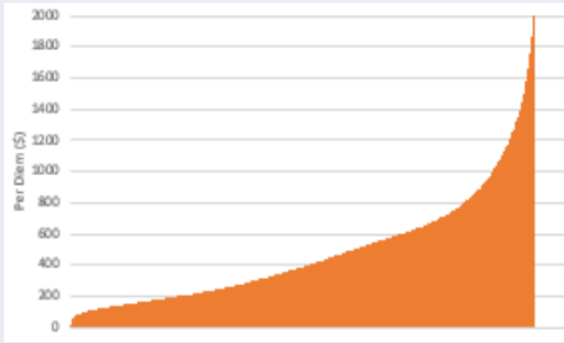
Workload



Patient Time



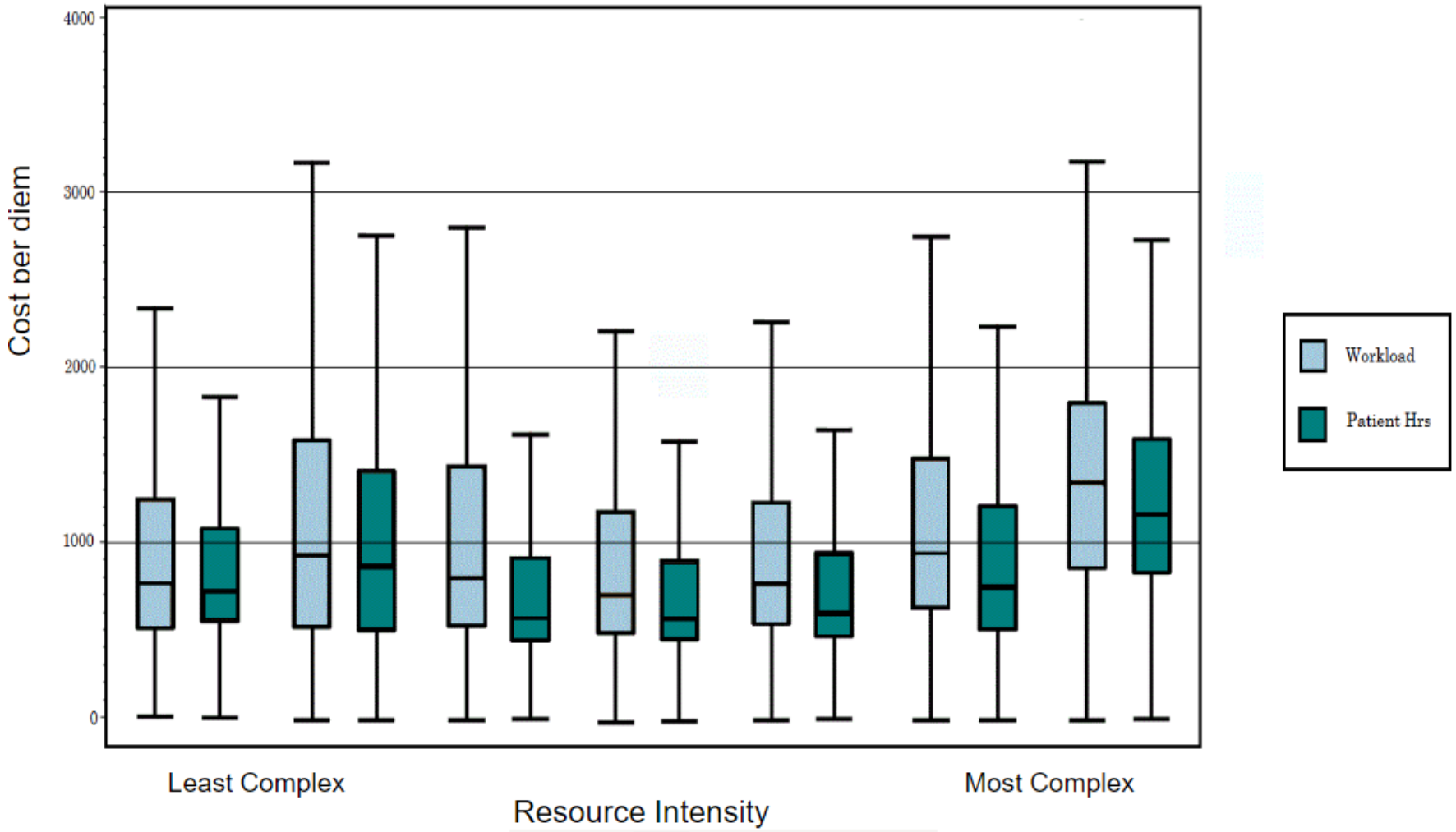
Results: Per Diem Analysis

	Workload	Patient Time
Medical Unit Surgical Unit Medical/Surgical Unit Intensive Care Unit		> 
Operating Room Post-Anesthetic Recovery Room		= 

Summary: Workload allocation should be used to examine cost per day, or daily cost curves except in OR/Recovery.

Time in the OR/Recovery room drives the daily cost in OR/Recovery room.

Cost per diem Box Plot by Resource Intensity, Ontario 2008-2009 and 2009-2010



Summary: current results re per diem cost based on two allocation methods are consistent with previous work

Analysis Part 2: Does the allocation method have an impact on total cost?

- **Approach:**

Mostly Workload

- 3 Ontario hospitals

Mostly Patient Time

- 9 Ontario hospitals

Differences in:

Average Length of Stay within CMG's

Size of hospital (total cases, total RIW)

Summary: difficult to compare allocation methods between different cohorts

Another Approach

- **Charles K. Botz, Ph.D., Jason Sutherland, Ph.D., and Jolyn Lawrenson, Cost Weight Compression: Impact of Cost Data Precision and Completeness, Health Care Financ Rev. 2006 Spring; 27(3): 111–122.**
- **Replaced workload cost with per diem (patient time) and found:**
  - For the nursing per diem model versus the nursing workload model the average compression was 19.6 percent (for the 25.9 percent of cases that changed cost weight by at least 5 percent).

Summary: previous work compared two allocation methods within the same patient cohort

Another Approach

- **Cost/day =**
  - Total cost in nursing unit ÷ total patient days in unit (nursing inpatient except OR/Recovery Room
- **Replace workload nursing cost by cost /day**
  - Cost/day x total patient days = cost per episode (nursing)
- **Total Episode cost =**
  - Nursing + D&T + OR + indirect
- **Compare workload and cost/day approach using the paired t-test**

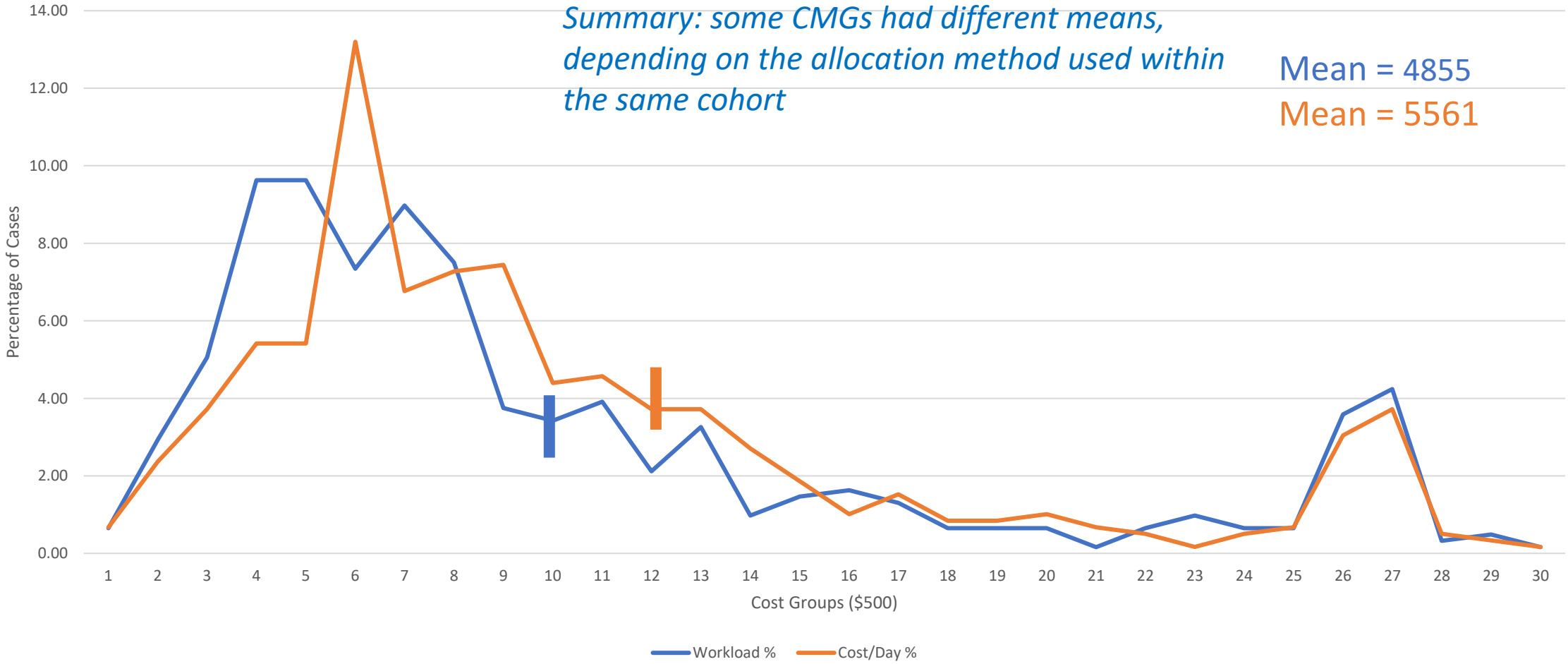
Repeated the previous approach: compared the two allocation methods within the same cohort of patients.

CMG 97 - Influenza/Acute Upper Respiratory Infection

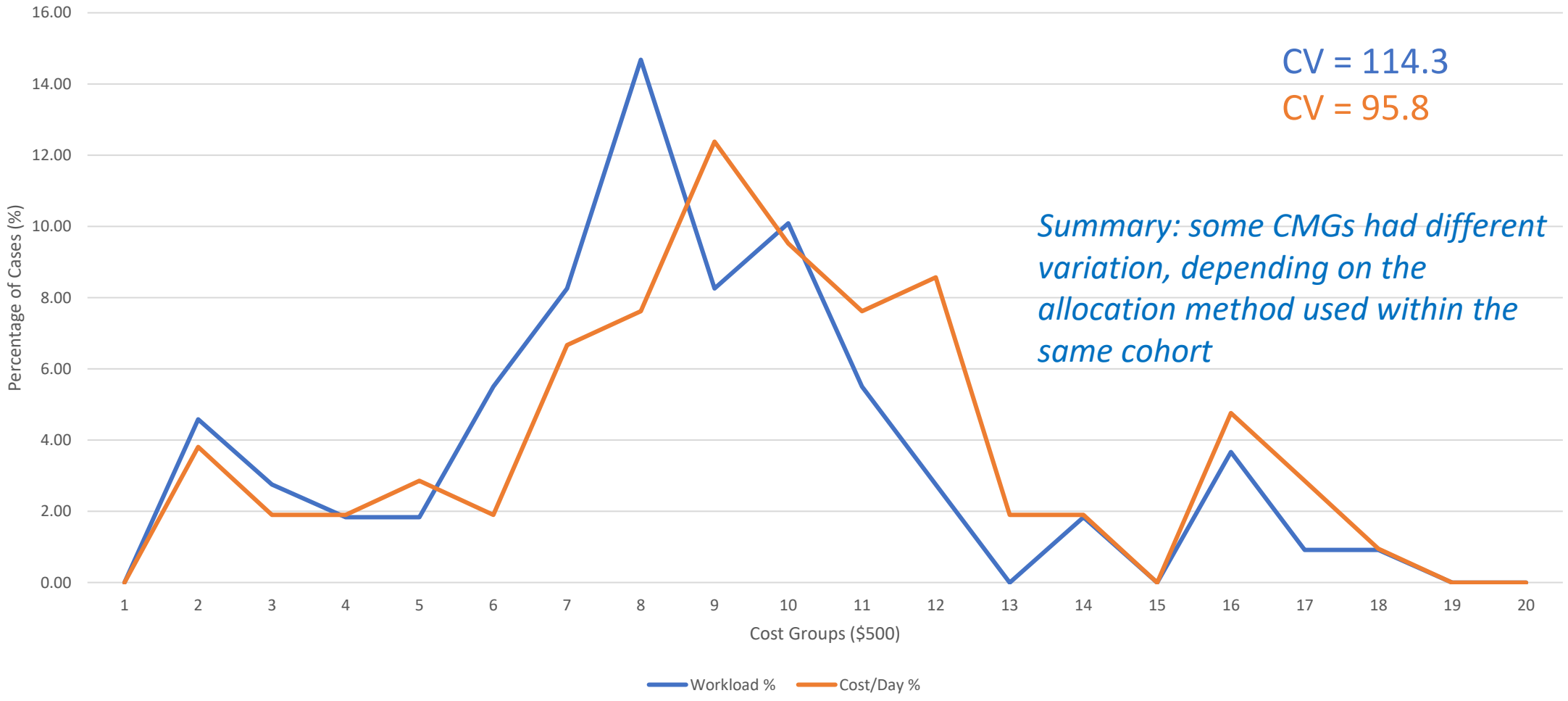
Summary: some CMGs had different means, depending on the allocation method used within the same cohort

Mean = 4855

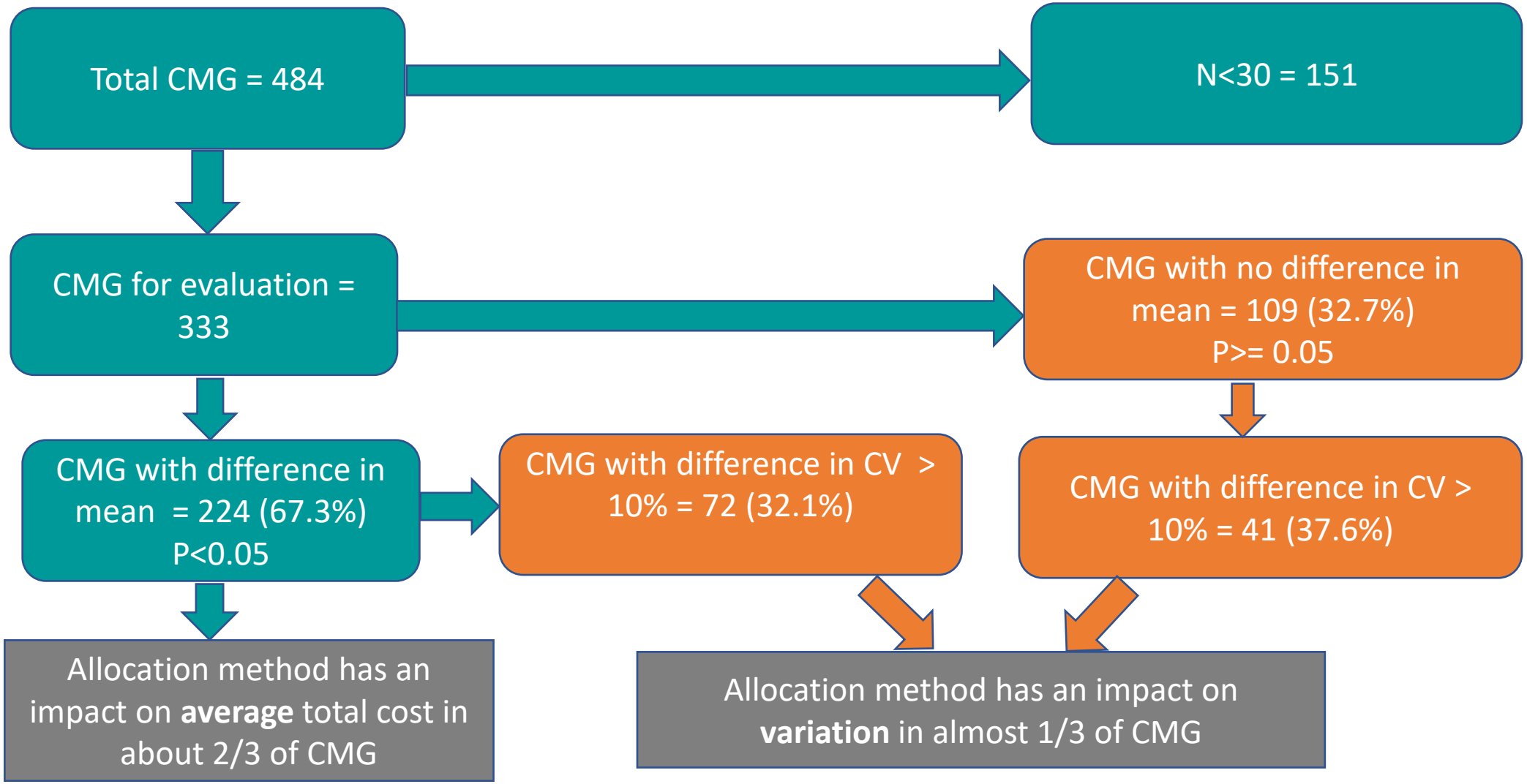
Mean = 5561



CMG 766 - Fracture of Femur



Overview of Total Cost Analysis



Next steps / Recommendations

- *Recommendations*
  - *Consider using a staff utilization method (workload measurement) to allocate costs in nursing units like medical/surgical/ICU/Obstetrics/Pediatrics etc.*
  - *Avoid examining cost per day when using allocation methods other than staff utilization (workload measurement) (except OR/Recovery Room)*
- *Next Steps*
  - *Present and discuss the findings with the Canadian "Patient Cost Data Advisory Group" and with internal CIHI experts*
  - *Consider adding the results to the CIHI MIS Patient Costing Methodology*
  - *Consider using information gathered to influence the revisions to the MIS Standards about nursing workload measurement.*

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