Population grouper decision support for health care and policy decisions

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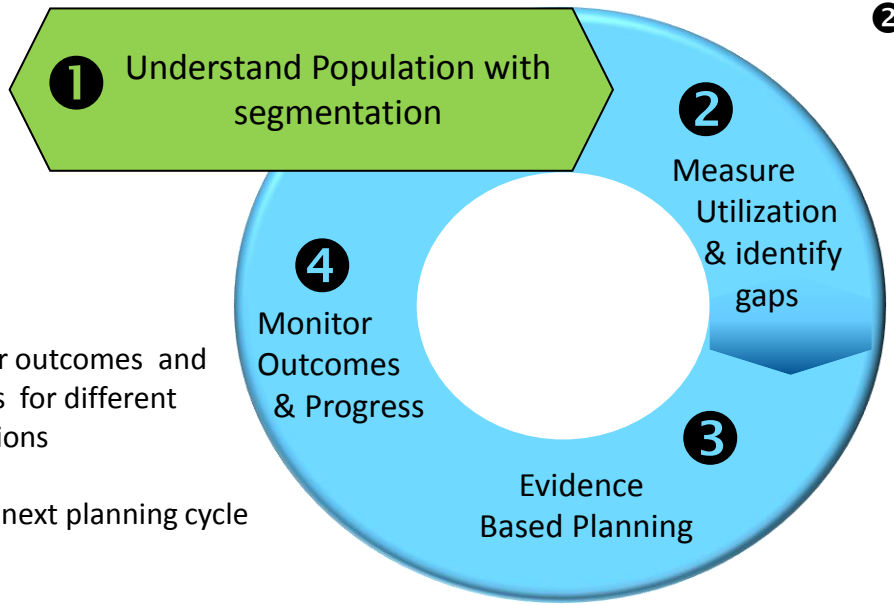
Understanding the health of a population allows the planning of the health care system to be strategic

❶ Grouping helps to understand the health and different health care needs of different parts of the population



❷ Measure health care used by the different groups.

Grouping helps to define the main combinations of care that people might need and identify gaps.

❸ Strategic Planning
Evidence based planning focussed on the needs of key target populations

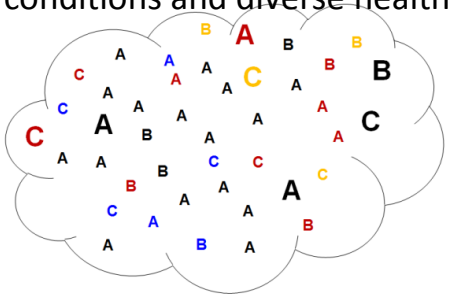
❹ Monitor outcomes and progress for different populations

Informs next planning cycle

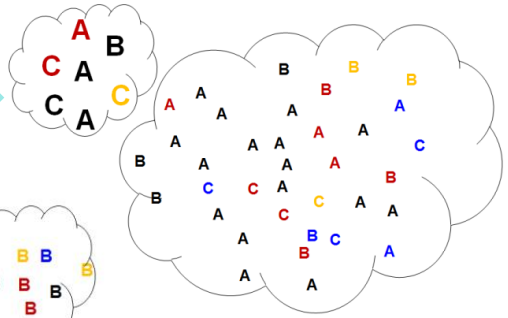
Diagram based on Population Segmentation in the National Health System UK
https://www.england.nhs.uk/wp-content/uploads/2014/09/1-seg-strat.pdf

Not everyone has the same health….
How can we divide the population to gain the insight we need ?

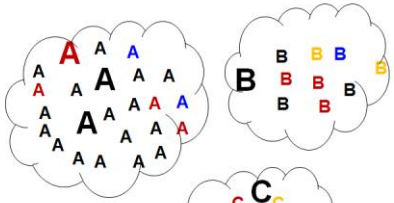
BC residents have many different health conditions and diverse health care needs



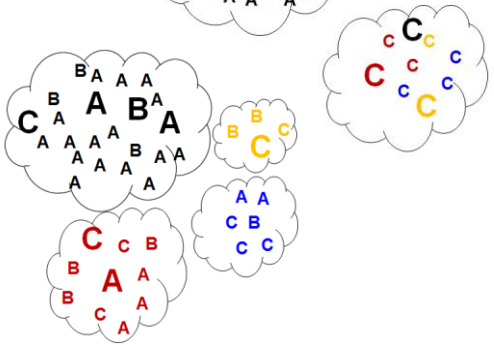
We could focus on the high users



We could focus on seniors



We could divide by chronic conditions



Key Concept: Health Status Groups

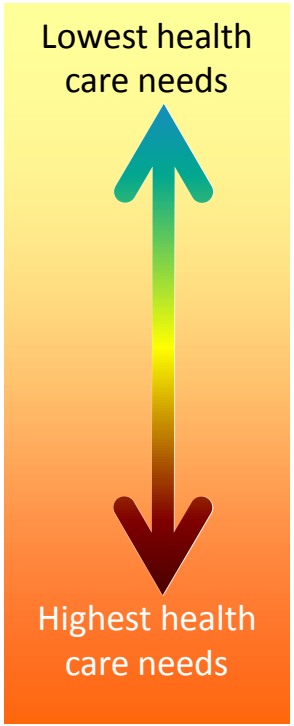
BC divides population into 14 Health Status Groups based on the health condition which determines their greatest need for health care that year.

Information summarized for each BC resident each year from administrative data

- Definitions based on multiple years of data:
  - Chronic conditions grouped into high / *medium / low 'complexity*
  - Hospitalized for mental health or substance use issues (MCC17) anytime in 5 year period
  - Cancer diagnosis anytime in 2 year period

- Diagnoses from physician or hospital, or health status assessments (residential care, home care) or eligibility (Prescription drug program) in current year

Staying Healthy	**Healthy Non-User**
	Healthy / Minor Episodic Health Needs
	Maternity and Healthy Newborns
Getting Healthy	**Major or Significant Time-limited Health Needs: Children and Youth <18 yrs**
	Major or Significant Time-limited Health Needs: Adults
Living with Illness and Chronic Conditions	**Mental Health & Substance Use Needs**
	Population with Cancer
	Low Complex Chronic Conditions
	Medium Complex Chronic Conditions
	High Complex Chronic Conditions without Frail ADL supports
Towards the End of Life	**Frail Population, Living in the Community**
	Frail in Community with High Complex Chronic Conditions
	Living in the Community with Palliative Needs
	Frail Population, Living in Residential Care



Population Segmentation requires many decisions

Chronic Condition example:

Ministry uses chronic condition registries from the Public Health Agency of Canada

Chronic conditions are grouped high / medium / low based on the relative complexity of care

High Complex Chronic Conditions	Medium Complex Chronic Conditions	Low Complex Chronic Conditions
Alzheimer's	Angina	Asthma
Dementia	Chronic Obstructive Pulmonary Disease (COPD)	Mood / Anxiety Disorder* (includes Depression)
Cystic Fibrosis (PharmaCare Plan D)	Multiple Sclerosis	Diabetes
Heart Failure	Parkinson's	Epilepsy
Kidney Transplant	Pre-Dialysis Chronic Kidney Disease	Hypertension
	Rheumatoid Arthritis	Osteoarthritis
		Osteoporosis
In Chronic Condition Registry for this Event or Intervention		
Stroke	Coronary Artery Bypass Graft (CABG)	
Chronic Kidney Disease on Dialysis	Acute Myocardial Infarction (Heart Attack)	
	Intervention Cardiac Procedure (PTCA)	
In this Combination of Chronic Condition Registries		
AMI & Pre-Dialysis Chronic Kidney Disease	Diabetes and Mood / Anxiety Disorder*	
Angina & COPD	Osteoarthritis & Hypertension	
Diabetes, Hypertension, Osteoarthritis	Osteoporosis & Hypertension	
	Osteoporosis & Osteoarthritis	

Health Status Groups: Assignment to highest level of need

People are assigned to 'mutually exclusive' health status groups based on 'priority' order

- Step 1: People with co-morbidities can 'qualify' for multiple Health Status Groups (Orange cells)
- Step 2: Assign people to health status group that represents their 'highest' need in FY (Yellow cells)

UNIQUE ASSIGMENT / OVERLAPPING ASSIGNMENT	The FINAL Health Status group that represents their HIGHEST need for care in 2014/15 counts of people with multiple health conditions who fit definition for Health Status Group, but are assigned to 'higher' group														
People with co-morbidities will 'qualify' for multiple health status groups, and then be assigned to their 'highest'	PS14 EOL	PS13 RC	PS12 Cancer	PS11 Frail High CC	PS10 High CC	PS09 Frail	PS08 Mat & Healthy NB	PS07 MH & SU	PS06 Medium CC	PS05 Low CC	PS04 Child & Youth Other Major	PS03 Adult Other Major	PS02 Healthy	PS01 Non User	Total # fitting Heath Status Definition before assignment to Highest
PS14 End Of Life	20,080	-	-	-	-	-	-	-	-	-	-	-	-	-	20,080
PS13 Frail In Care (In Residential Care)	2,700	37,820	-	-	-	-	-	-	-	-	-	-	-	-	40,520
PS12 Cancer	5,710	1,040	61,050	-	-	-	-	-	-	-	-	-	-	-	67,810
PS11 Frail High Chronic Conditions (with supports)	4,530	6,970	1,280	27,910	-	-	-	-	-	-	-	-	-	-	40,690
PS10 High Complex Chronic Conditions (without supports)	5,130	25,780	6,540	-	187,470	-	-	-	-	-	-	-	-	-	224,920
PS09 Frail In The Community	8,430	8,030	2,260	27,910	570	21,200	-	-	-	-	-	-	-	-	68,400
PS08 Maternity and Healthy Newborns	30	-	750	-	150	10	107,500	-	-	-	-	-	-	-	108,460
PS07 Mental Health and Substance Use	810	2,710	1,440	1,740	6,130	1,250	1,180	81,760	-	-	-	-	-	-	97,020
PS06 Medium Complex Chronic Conditions	4,980	3,060	13,080	-	-	11,120	1,020	13,380	394,340	-	-	-	-	-	440,980
PS05 Low Complex Chronic Conditions	3,490	1,500	20,870	-	-	6,660	19,050	51,770	-	1,214,800	-	-	-	-	1,318,130
PS04 Child and Youth Major <18 years	-	-	-	-	-	-	-	-	-	-	29,990	-	-	-	29,990
PS03 Adult Major Age 18+	-	-	-	-	-	-	-	-	-	-	-	150,700	-	-	150,700
PS02 Healthy	480	420	19,010	-	43,010	1,710	19,770	23,950	170,840	815,980	-	-	1,785,720	-	2,880,880
PS01 Non User	-	-	440	-	4,840	240	-	2,050	10,720	81,940	-	-	-	699,740	799,970
COUNT OF PEOPLE IN FINAL HEALTH STATUS GROUP	20,080	37,820	61,050	27,910	187,470	21,200	107,500	81,760	394,340	1,214,800	29,990	150,700	1,785,720	699,740	4,820,080

Count of people assigned to the FINAL Health Status Group that prepresents their Highest Need for Care in 2014/15. (Unique Health Status Group assignment)
Count of ALL people who have the health condition that would 'qualify' them for the Health Status Group. (Overlapping Health Status Group assignment)
Count of people within each 'Final' Health Status Group who had co-morbidities which would have qualified them for other Health Status Groups. These cannot be summed.

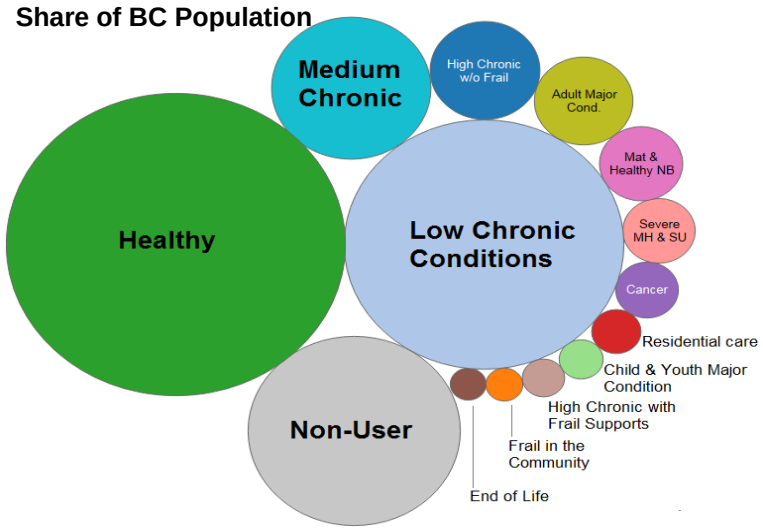
Example: 40,520 total count for residential care

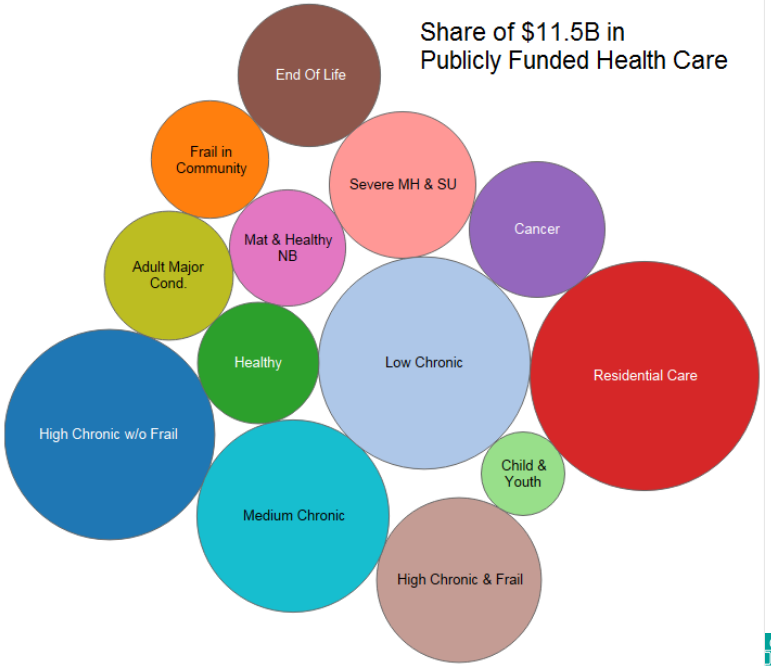
2,700 are assigned to their higher need (End of Life)

Of the 37,820 in the 'mutually exclusive' RC group, 1,040 have cancer.

BC's Population Segmentation - Health Status Groups

- 54% of BC residents are healthy or low users of health care, and use about 23% of $11.5 Billion health care provided by the BC Ministry of Health in 2014/15
- 33% who have 'low' or medium complex chronic conditions use 25% of health care
- 2% who are frail, using supports for activities of daily living either in the community or in residential care, or are receiving palliative care use 37% of health care





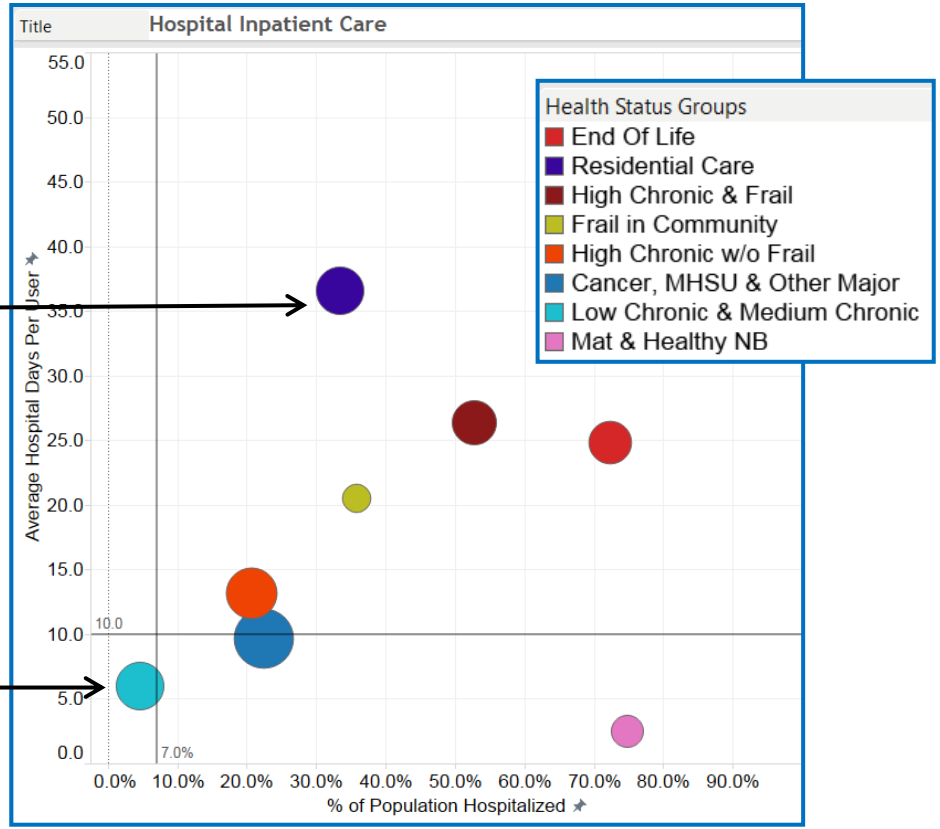
Insight from using Population Segmentation

Who used hospital inpatient care in 2014/15?

- At BC level, 7% of BC residents were hospitalized for an average stay of 10 days.
- But that average is not representative of anyone !

1/3 of people in residential care in the year were hospitalized for an average of 37 days

5% of people with low or medium chronic conditions were hospitalized for ALOS 6 days



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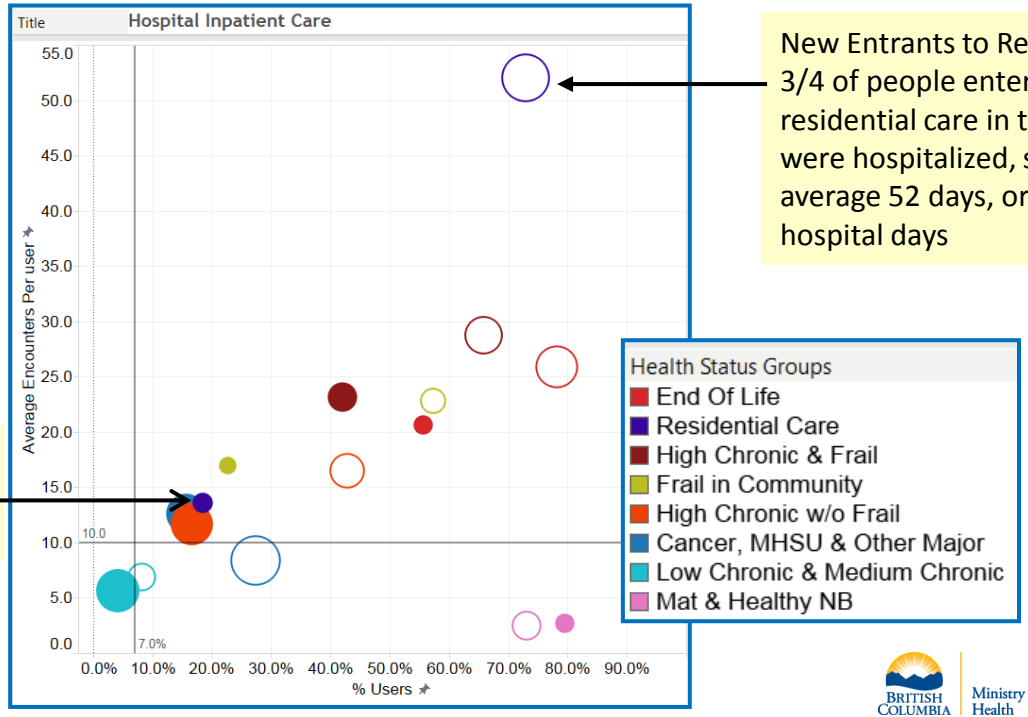
Need to look closer at people with changing health conditions

In the year that people have changes in their health, they will use more health care

Pattern of hospitalization changes for 'new entrants' to health status group are different from the population who stayed in their same health status group from previous year.

For strategic planning – puts focus on changing the trajectory to residential care

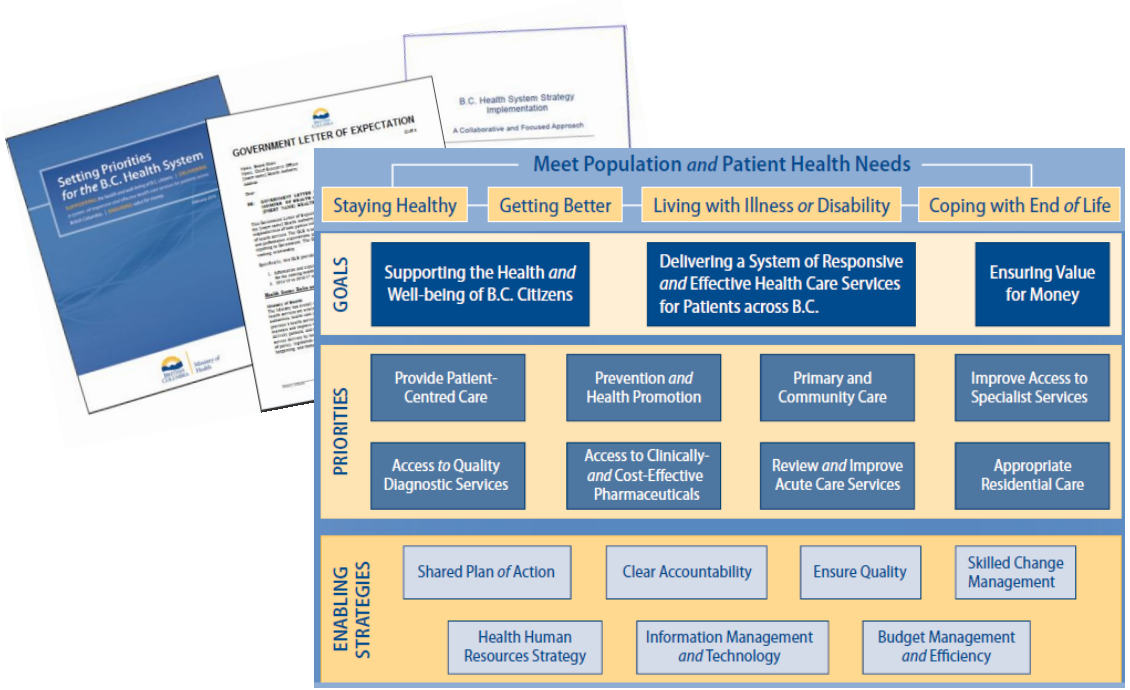
Graph shows % of health status group who were hospitalized in year and their Average days in hospital (Size of dot = Total Days)



New Entrants to Res Care: 3/4 of people entering residential care in the year were hospitalized, staying average 52 days, or 12% of BC's hospital days

19% of people who were already in residential care at the start of the year were hospitalized in 14/15 for ALOS 14 days

From Analysis to Planning to Better Care



Grouping BC residents by their need for health care is central to our strategic planning

http://www.health.gov.bc.ca/library/publications/year/2014/Setting-priorities-BC-Health-Feb14.pdf

Identify Target Populations → Identify Gaps in Care → Develop Policies, Care Pathways & Incentives → Monitor → **Better Care**

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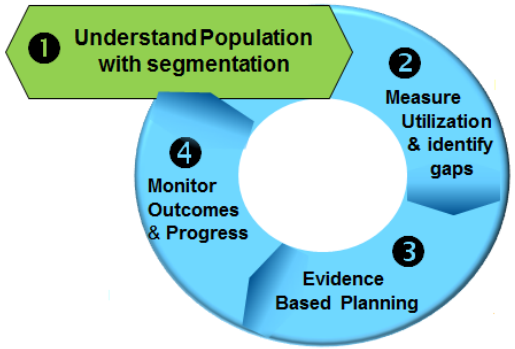
Population Segmentation – different levels for different uses

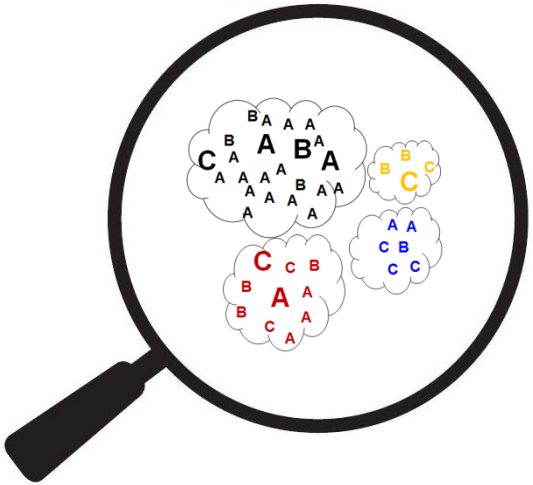
Broad health status groups provide valuable insight for many things…

strategic planning,

comparing communities

understanding utilization patterns….





But sometimes you need to take a closer look

with the CIHI Population Grouper….

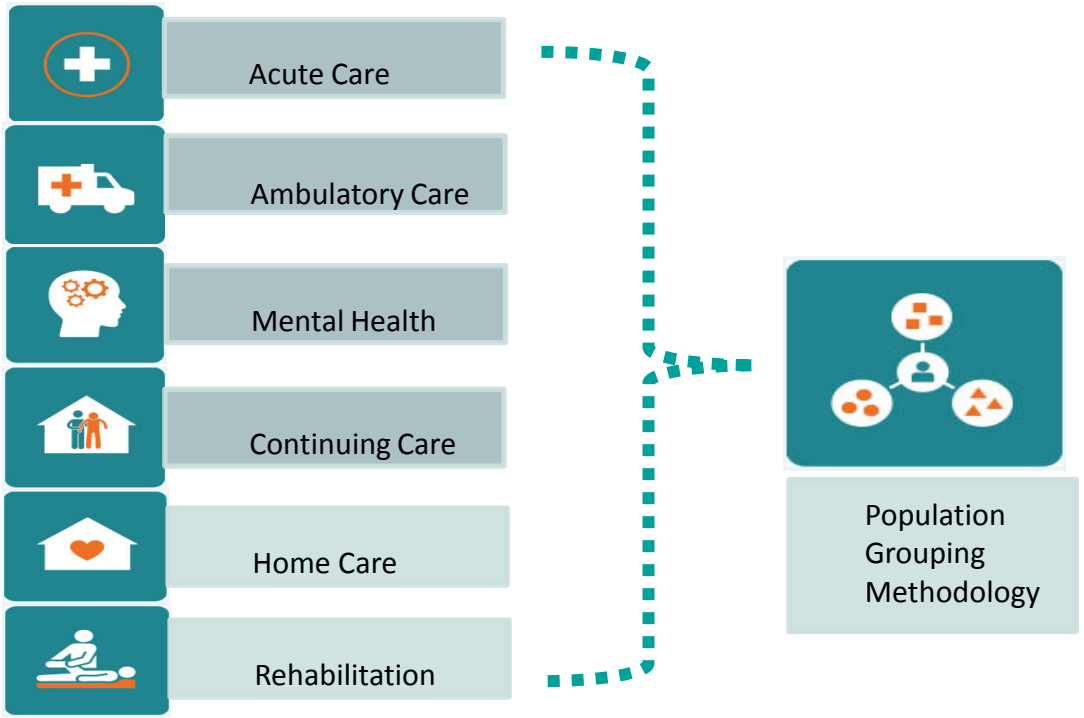
The Need

- **You would like to understand "the 10%"**
  - E.g. in BC there are about 4.6 million residents
  - 460,000 are quite ill and consume 60% (or more) of all health care resources
- **You'd like to understand how and why care varies across your province**
  - In terms of volume of patients cared for, weighted volume, cost per weighted case—and even efficiency (actual vs. expected cpwc)
- **You'd like to fund the health care system more fairly**
  - Not an average cost per patient
  - Not a flat fee per service

CIHI Population Grouping Methodology

- **Provides a clinical profile of each individual in the population**
  - Each person eligible for publicly funded health care
  - Based on historical person-level clinical information from across the continuum of care
  - Over extensive time period (e.g. two years)
- **Indicators**
  - Cost weights - current and future burden of morbidity

Case Mix at CIHI



Population Grouping Methodology vs. Other CIHI Case Mix Product

Similarity

- Clinical classification
- Predictive indicators

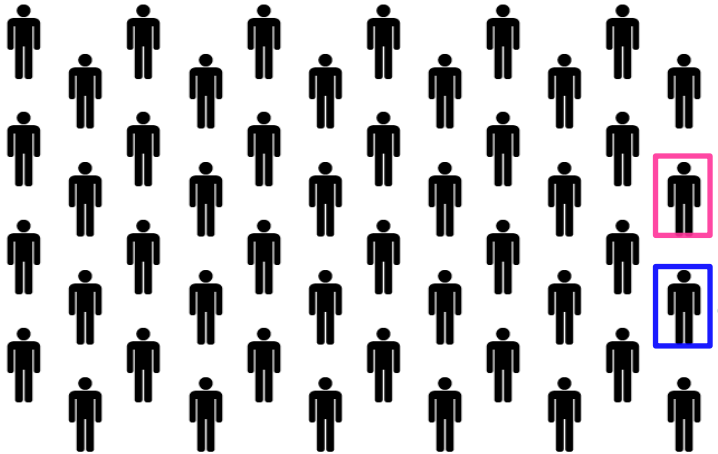
Differences

- Does not focus on any one sector
- Target population includes all persons registered for publicly-funded health care
- Looks at person over a 2-year time period

Population Grouping Methodology - Methodology Illustration

Health Region A

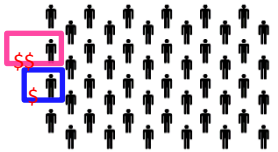
(Population: 190,000)



Clinical data
- Hospital
- Long-term care
- Physician billing

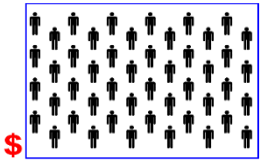
Demographic data
- Date of Birth
- Gender
- Postal Code

How much will **someone** with this profile cost the health system next year?



Predictive Indicators

How much will this **population** cost the health system next year?



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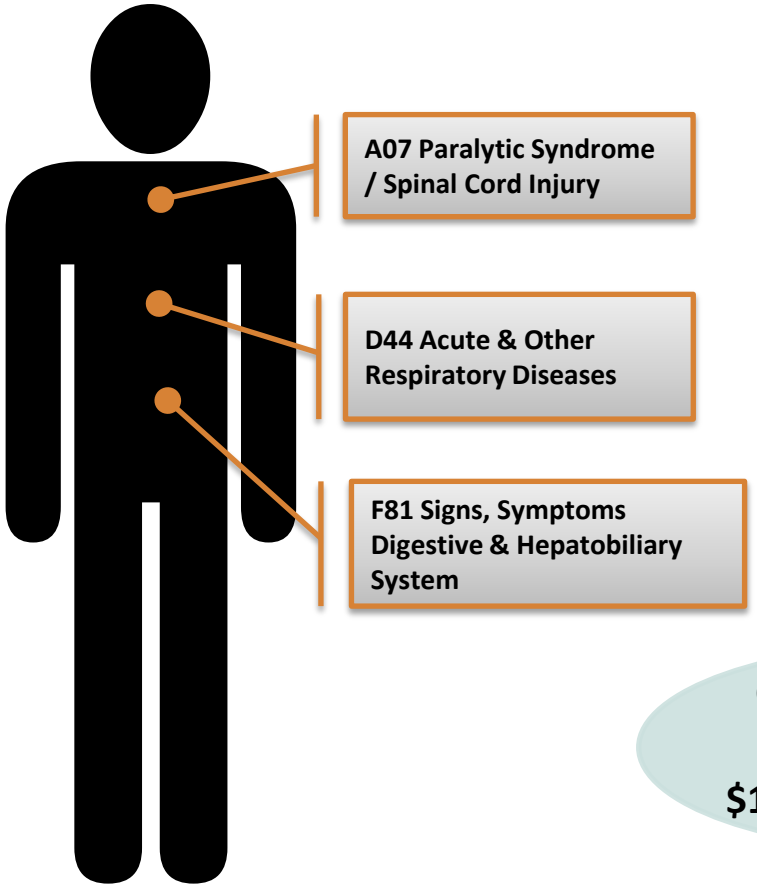
Estimated Cost for a Person (Illustration)



concurrent cost weight is 6.12

Population average concurrent cost is $2,861

expected concurrent cost:

$17,509 = $2,861 x 6.12

prospective cost weight is 2.17

Population average prospective cost is $1,483

expected prospective cost:

$3,218= $1,483 x 2.17

Mock data

Profiling of Population (Concurrent)

Decile	Volume	Average Cost	Average Predicted Cost	Proportion of Costs	Avg. # of Health Conditions	Average Age (in Years)	Min. Cost Weight	Max. Cost Weight
1	2.3M	56	-7	0.2%	0.2	39.0	-4.44	0.00
2	2.3M	200	39	0.7%	0.8	27.1	0.00	0.03
3	2.3M	317	145	1.1%	1.0	34.3	0.03	0.07
4	2.3M	488	260	1.7%	1.8	33.5	0.07	0.12
5	2.3M	725	474	2.5%	2.6	33.7	0.12	0.22
6	2.3M	1,046	830	3.7%	3.2	36.9	0.22	0.37
7	2.3M	1,507	1,359	5.3%	3.9	40.5	0.37	0.62
8	2.3M	2,356	2,380	8.3%	4.7	46.9	0.62	1.11
9	2.3M	4,252	4,608	14.9%	5.6	48.7	1.11	2.28
10	2.3M	17,612	18,470	61.7%	8.0	56.4	2.28	173
All	23M	2,856	2,860	100%	3.2	39.7	-4.44	173

* 2010-2011 and 2011-2012 Ontario, Alberta, and B.C. data used in methodology development

Risk Adjusted Average Cost (RAAC)

$$\text{RAAC} = \frac{\text{Average Cost (5)}}{\text{CMI (6)}}$$

Example:

(1) Region	(2) Cases (i.e. people)	(3) Total Cost	(4) Weighted Cases	(5) Average Cost	(6) CMI	(7) RAAC
A	1.45M	$2,455M	1.3M	$1,693	0.897	$1,888
B	0.3M	$556M	0.344M	$1,853	1.147	$1,616
C	0.45M	$889M	0.556M	$1,976	1.236	$1,599
Total	2.2M	$3.9B	2.2M	$1,773	1.000	$1,773

Mock data

Population Based Funding

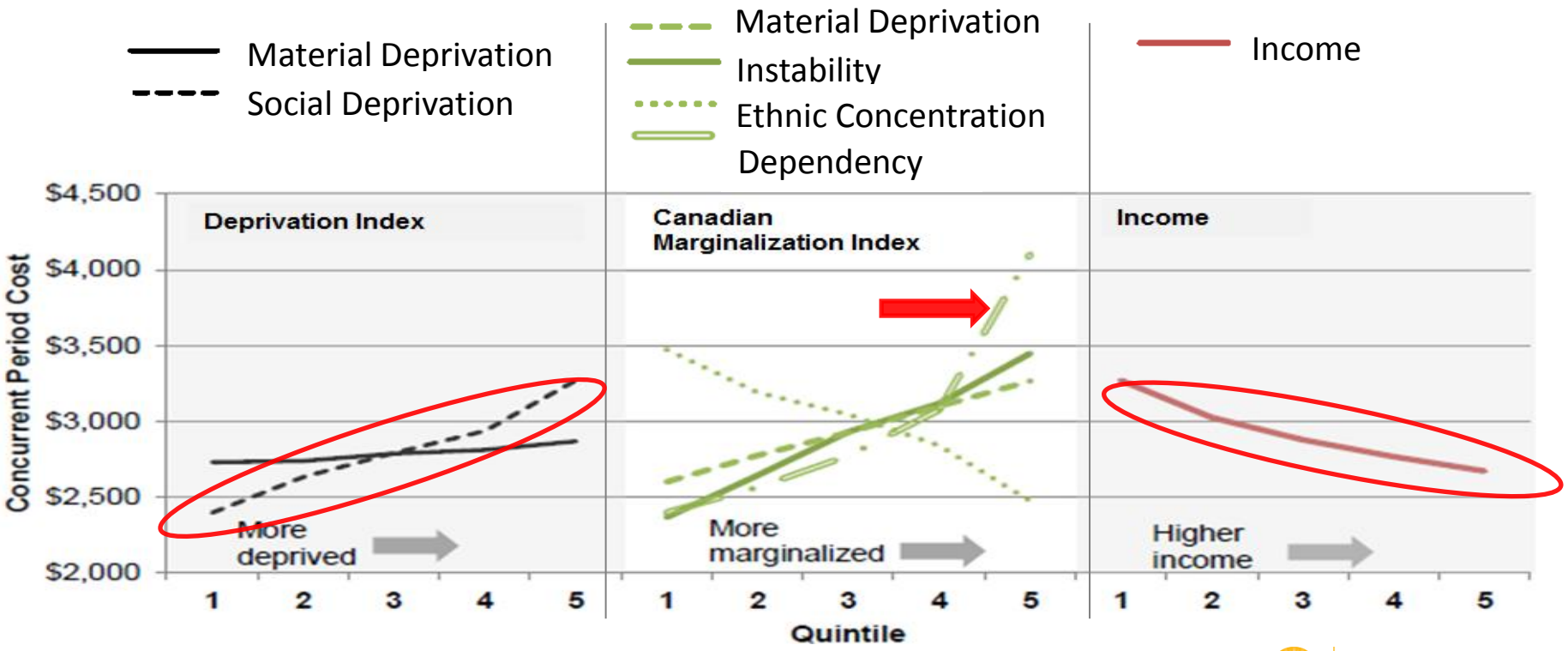
Funding for upcoming period

- Proportion of weighted cases (i.e. case mix and volumes) is used to divide overall budget

(1) Region	(2) Historical Funding	(3) Weighted Cases	(4) Proportion of Weighted Cases	(5) Population Based Funding
A	$2,455M	1.3M	$59.1\% = \frac{1.3M}{2.2M}$	**$2,304M** = .591 x $3.9B
B	$556M	0.344M	$15.6\% = \frac{.344M}{2.2M}$	**$610M** = .156 x $3.9B
C	$889M	0.556M	$25.3\% = \frac{.556M}{2.2M}$	**$986M** = .253 x $3.9B
Total	$3.9B	2.2M	100%	$3.9B

Mock data

Average Per-Person Cost During 2010/11 and 2011/12, by SES Quintiles



Note: The foundation data for the study is composed of 3 consecutive years of Ontario, Alberta, and British Columbia data, starting with 2010-2011.

Take Away

- Population grouping methodologies provide strategic information for policy level decision making at the regional and provincial levels.
- They also help make sense of linked health data for use in provincial/regional health planning, funding and risk adjustment.
- Understanding how to make effective use of this information requires a nationally standardized vocabulary. CIHI's POP methodology provides this.

- Case Mix videos: visit CIHI YouTube channel—POP video coming soon

The Future

- EMR data
  - →The gold standard…if done well—i.e. collected to a standard
- Drug data
- Home care, inpatient rehabilitation data, more cost data
- We built a better mousetrap…
  - Beta release being evaluated by jurisdictions
  - Coming soon…Version 1.0 late this year and will include a mutually exclusive classification.


Questions?

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