

Health Profile Groups - A Mutually Exclusive Classification

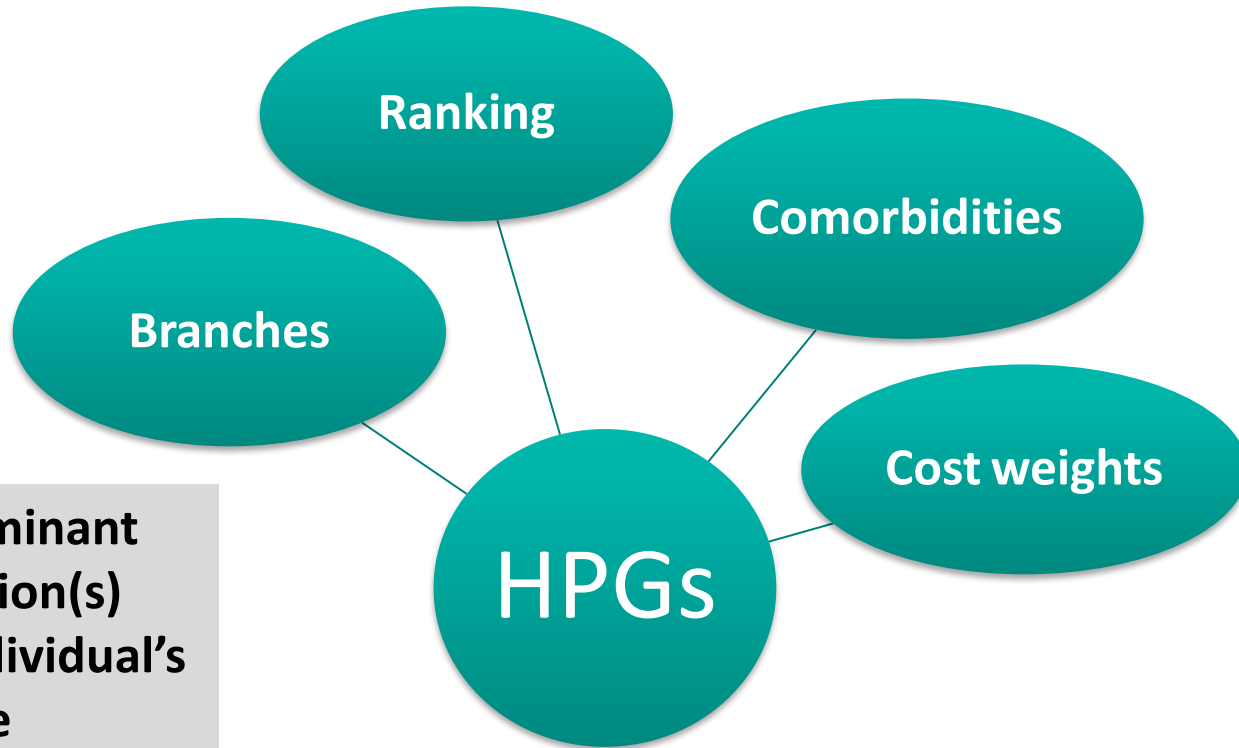
PCSI, Sydney

October, 2017

Yiwen Chen

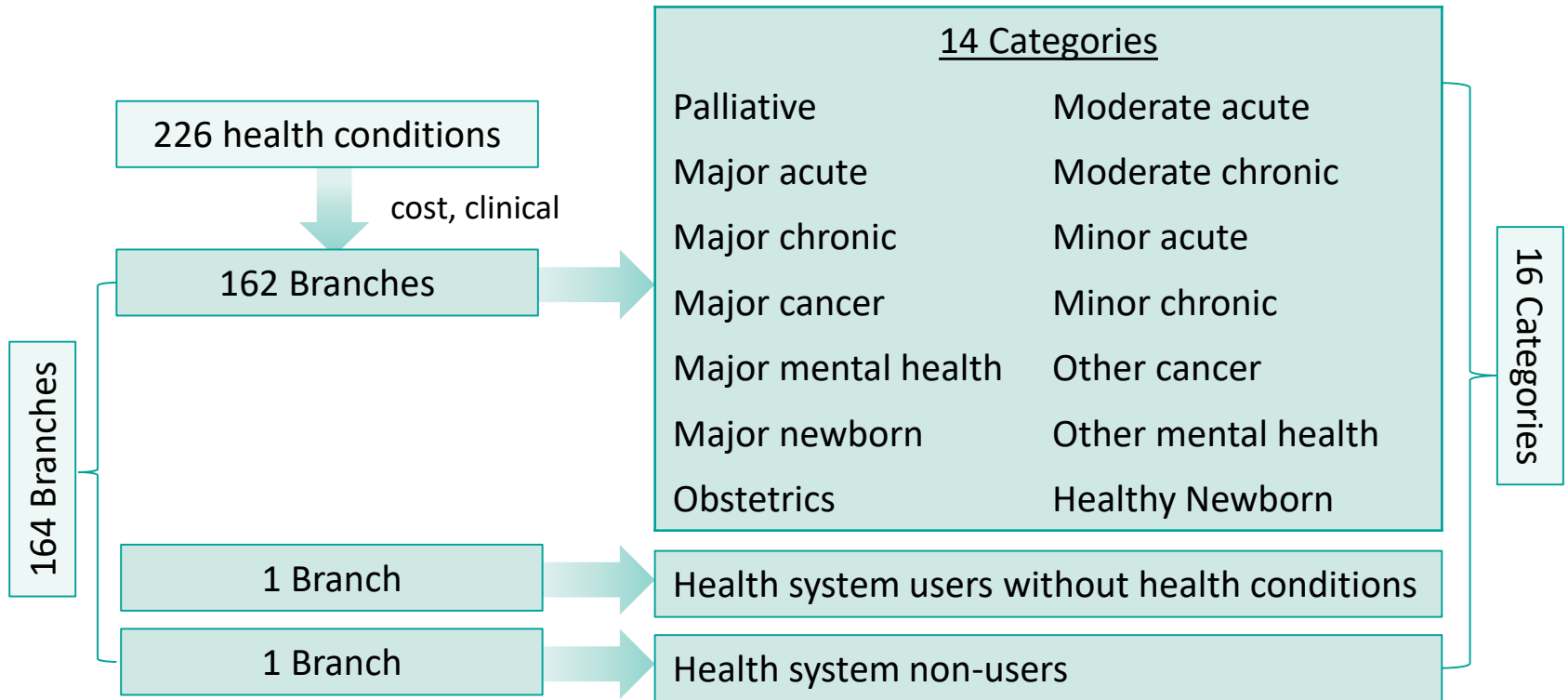
Canadian Institute for Health Information

Health Profile Groups (HPG)

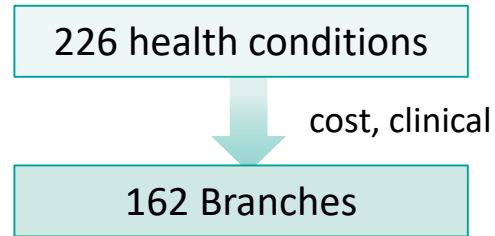


Identifies dominant health condition(s) driving an individual's clinical profile

Health Profile Groups – Branches



Health Profile Groups – Branches



Health Profile Groups – Assigning Branches

Health conditions



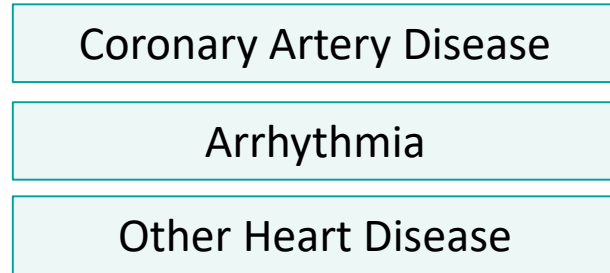
Branches



122 conditions map to 122 branches (75%)

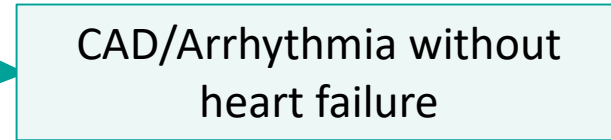
Health Profile Groups – Assigning Branches

Health conditions



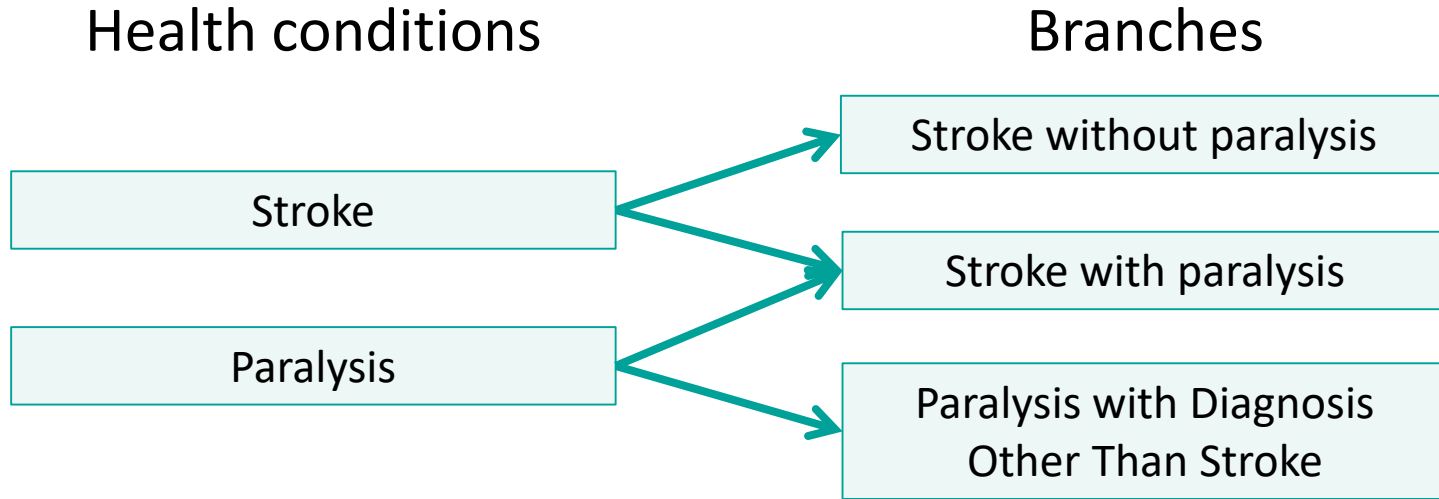
Branches

clinically similar,
require similar cost resources



87 conditions rolled up
to 22 branches (14%)

Health Profile Groups – Assigning Branches



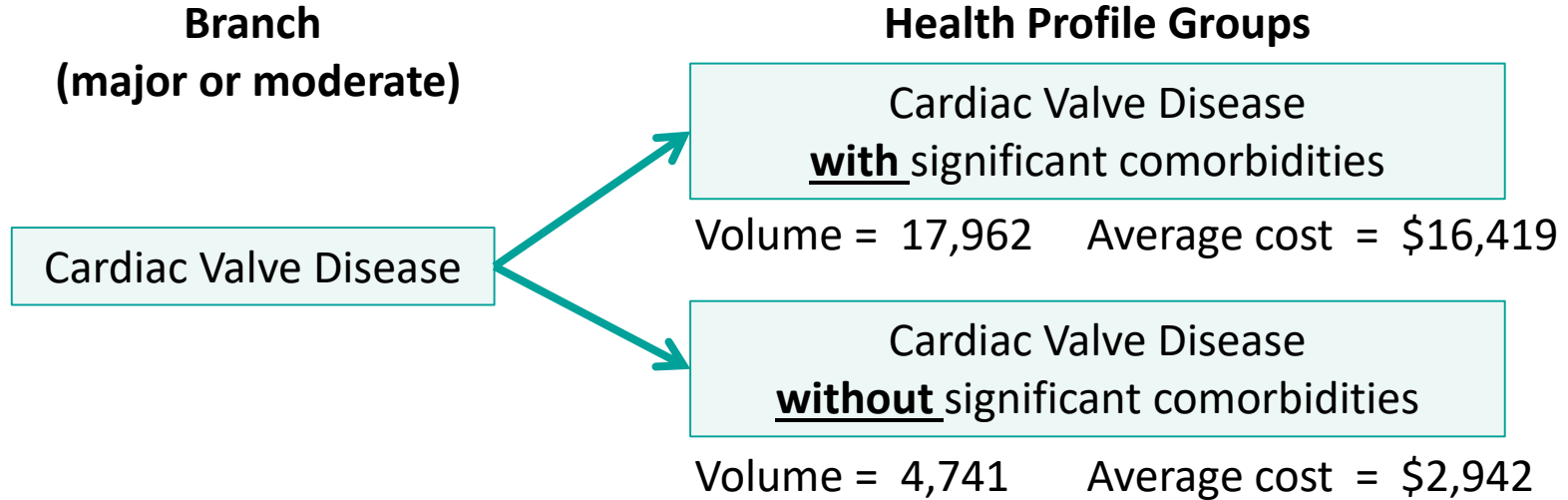
17 conditions derived
into 18 branches (11%)

Health Profile Groups – Ranking

Clinical complex - resource intensive ↓

Rank	Branch
1	Palliative state (acute)
2	Respiratory failure with heart failure
5	Extremely low birth weight or immaturity
7	Acute Myocardial Infarction with Heart Failure
19	Brain Cancer
24	Eating Disorder
74	Seizure
81	Epilepsy
82	Retinopathy
135	Asthma
161	Acute ENT, Upper Respiratory Condition (incl. colds, croup)
162	Other Viral Infection
163	Users without health conditions
164	Non-users

Health Profile Groups – Comorbidity Split



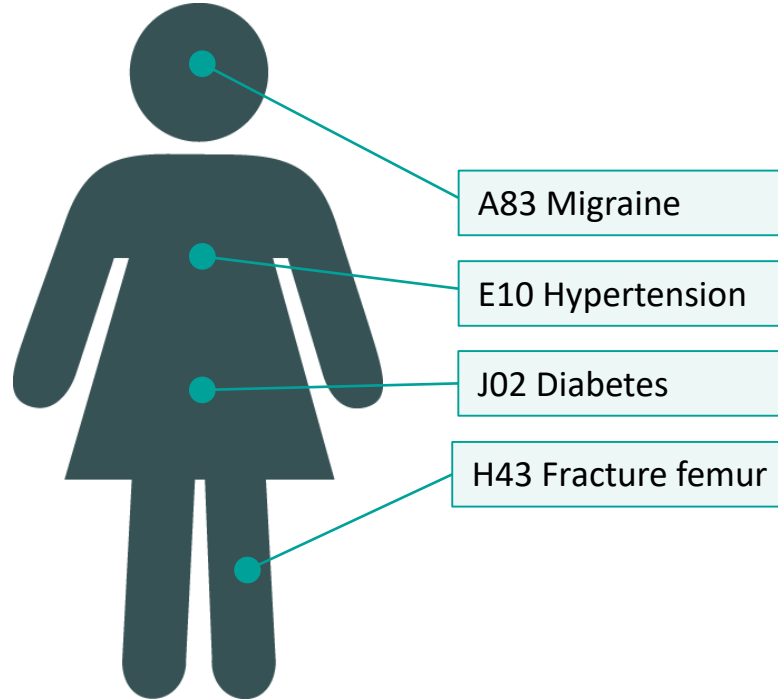
164 branches split into 239 groups, based on presence/absence of significant (major/moderate) comorbidities

HPG Example

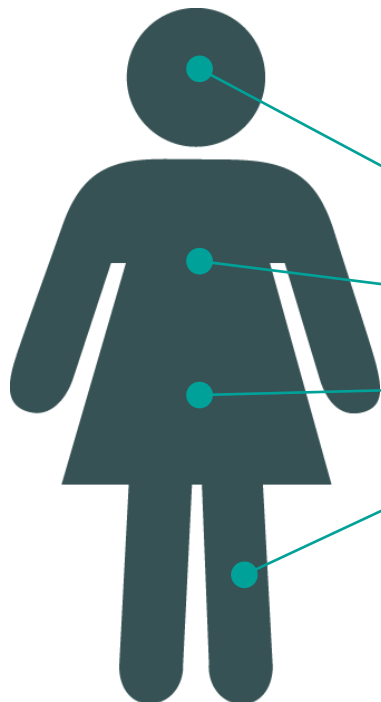
Mary

Female

60 years old



HPGs Example



A83 Migraine

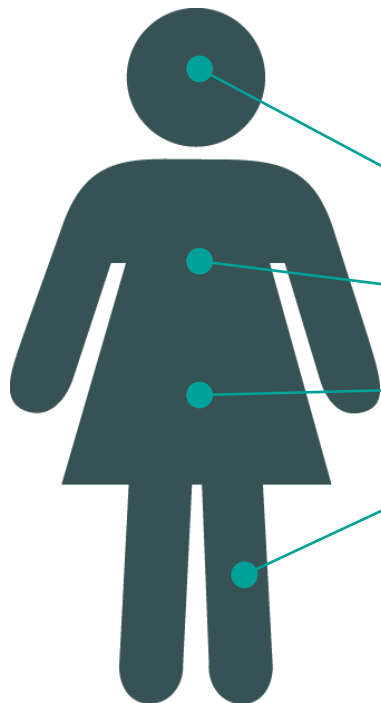
E10 Hypertension

J02 Diabetes

H43 Fracture femur

Branch	Rank	Category
Migraine	131	Minor Acute
Hypertension	113	Minor Chronic
Diabetes w/o Chronic Kidney or Chronic Vasc Dx	95	Moderate Chronic
Major Acute MSK	51	Major Acute

HPGs Example



A83 Migraine

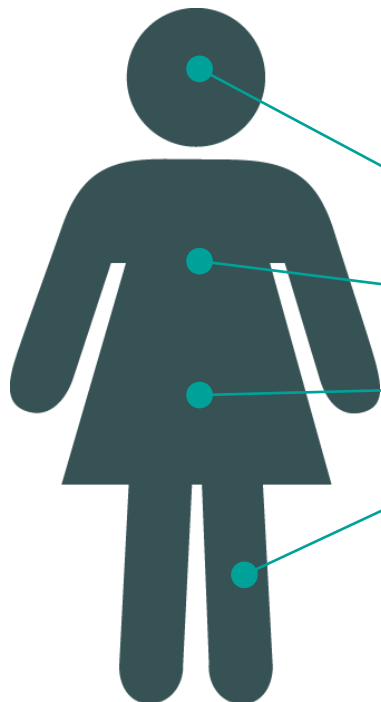
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HPGs Example



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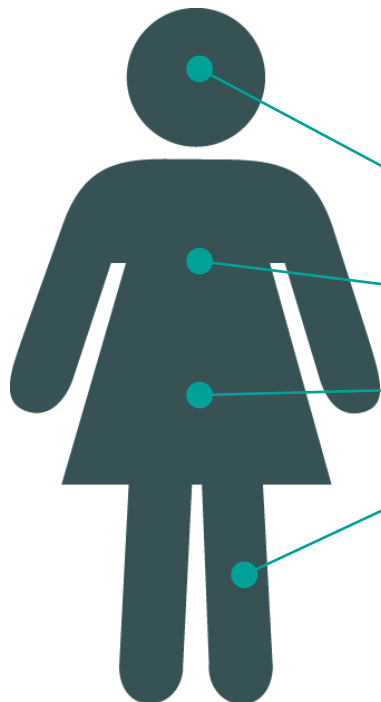
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HPGs Example



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- E10 Hypertension
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Rank	HPG
51	Major Acute MSK with significant comorbidity

Health Profile Groups - Cost Weights

- Simple relative average cost

$$HPG\ RIW = \frac{\text{Average cost for HPG}}{\text{Average cost for total pop}}$$

- Compare to “average person”

HPG	Concurrent RIW	Prospective RIW
Major Acute MSK with significant comorbidity	4.7	3.7

- Reflect the population's concurrent and future burden of morbidity

HPGs Cost Model Goodness of Fit (GOF)

- System-wide GOF statistics a bit better

Model	Volume	Average Cost	Bias	Prediction Error	R ²
Branch	19,268,544	\$3,382	\$2	2,598	29.1%
HPG	19,268,544	\$3,382	\$2	2,491	31.0%

HPGs Cost Model Goodness of Fit (GOF) - Concurrent

- System-wide GOF statistics a bit better
- Comorbidity split improve the overall GOF for split branches

Model	Volume	Average Cost	Bias	Prediction Error	R ²
Branch	19,268,544	\$3,382	\$2	2,598	29%
Branch not split (HPG = Branch)	13,841,949	\$1,817	-\$7	1,328	35%
Branch split (Before split)	5,426,595	\$7,375	\$24	5,838	23%
Branch split (After split to HPGs)	5,426,595	\$7,375	-\$3	5,468	27%

Concurrent GOF - Sample Comorbidity Splits

Branch	Volume	Average Costs	Bias	Prediction Error	R ²
Major Acute MSK	72,965	\$8,561	\$163	7,928	15%
Without Significant Comorbidity	37,651	\$3,936	\$52	6,737	28% ←
With Significant Comorbidity	35,314	\$13,493			
COPD w/o pneumonia	127,198	\$4,021	\$26	3,058	1%
Without Significant Comorbidity	60,001	\$2,209	-\$39	2,750	12% ←
With Significant Comorbidity	67,197	\$5,638			

Health Region Profiling

Category	
Major Chronic	3%
Major Acute	2%
Major Mental Health	2%
Major Cancer	1%
Moderate Chronic	8%
Moderate Acute	6%
Minor Chronic	10%
Minor Acute	41%
Other Mental Health	5%
Other Cancer	1%
Palliative	0%
Obstetrics	3%
Major Newborn	1%
Healthy Newborn	2%
Users without conditions	4%
Non-users	12%

21%

16%



Based on 2010-2011 and 2011-2012 AB Registry, DAD, NACRS, CCRS and PLPB data used in POP methodology development

Health region profiling

Health profile category

	Alberta	South	Calgary	Central	Edmonton	North
Major chronic	2.6%	3.3%	2.4%	3.0%	2.6%	2.6%
Major acute	2.4%	2.4%	2.2%	2.8%	2.3%	2.6%
Major mental health	1.8%	2.5%	1.5%	1.8%	2.2%	1.4%
Major cancer	0.7%	1.0%	0.8%	0.9%	0.6%	0.6%
Total	7.5%	9.2%	6.9%	8.5%	7.7%	7.2%

Alberta



South



Calgary



Central



Edmonton

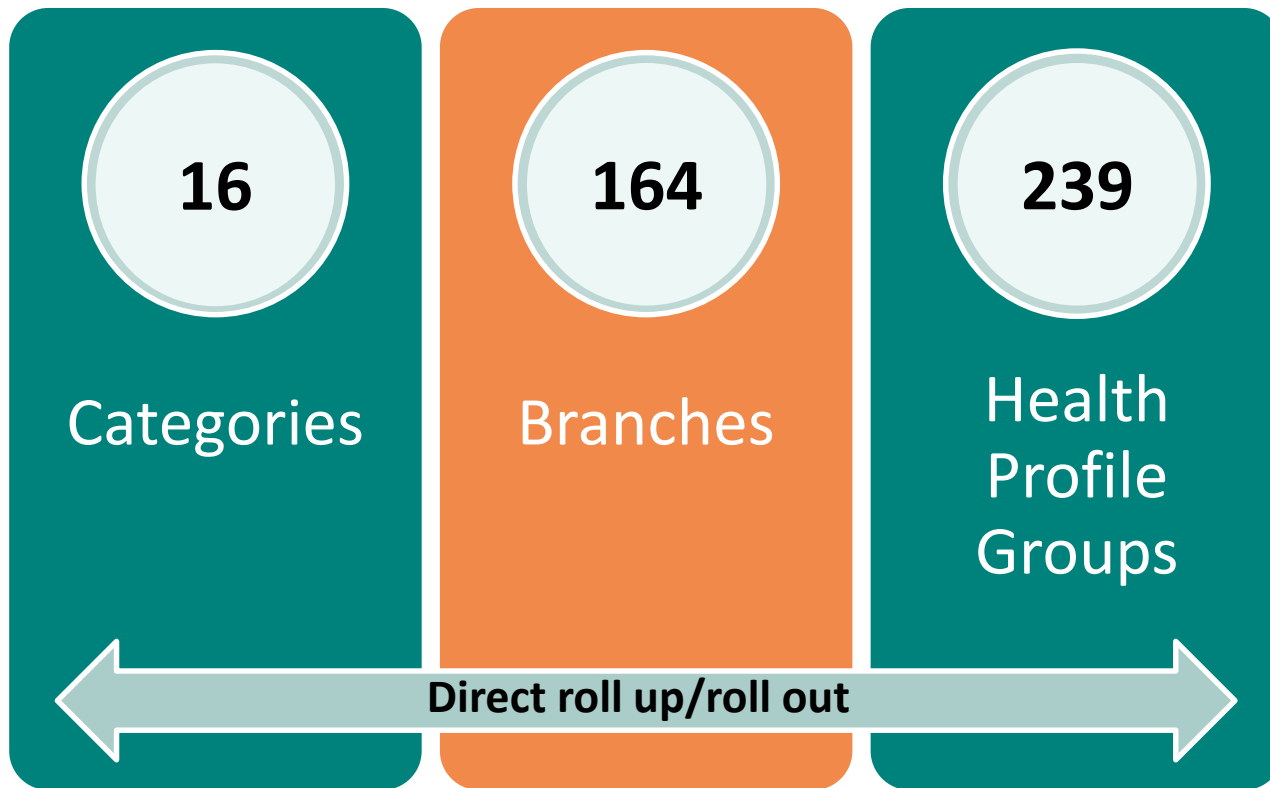


North



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Health Profile Groups Layers



Future Work in Plan

- Methodology can be rolled out further
- Continue care and mental health data
- Functional status and socio-economic status







Canadian Institute for Health Information

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