



UNIVERSITY OF ALBERTA  
SCHOOL OF PUBLIC HEALTH

# **The North is not all the same:**

*Comparing health system performance in  
18 regions in Canada*

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# Rationale

- Understand and address health disparities between North and South, and between Indigenous and non-Indigenous populations
- Much research focused on 3 northern territories, yet northern regions of provinces share some characteristics

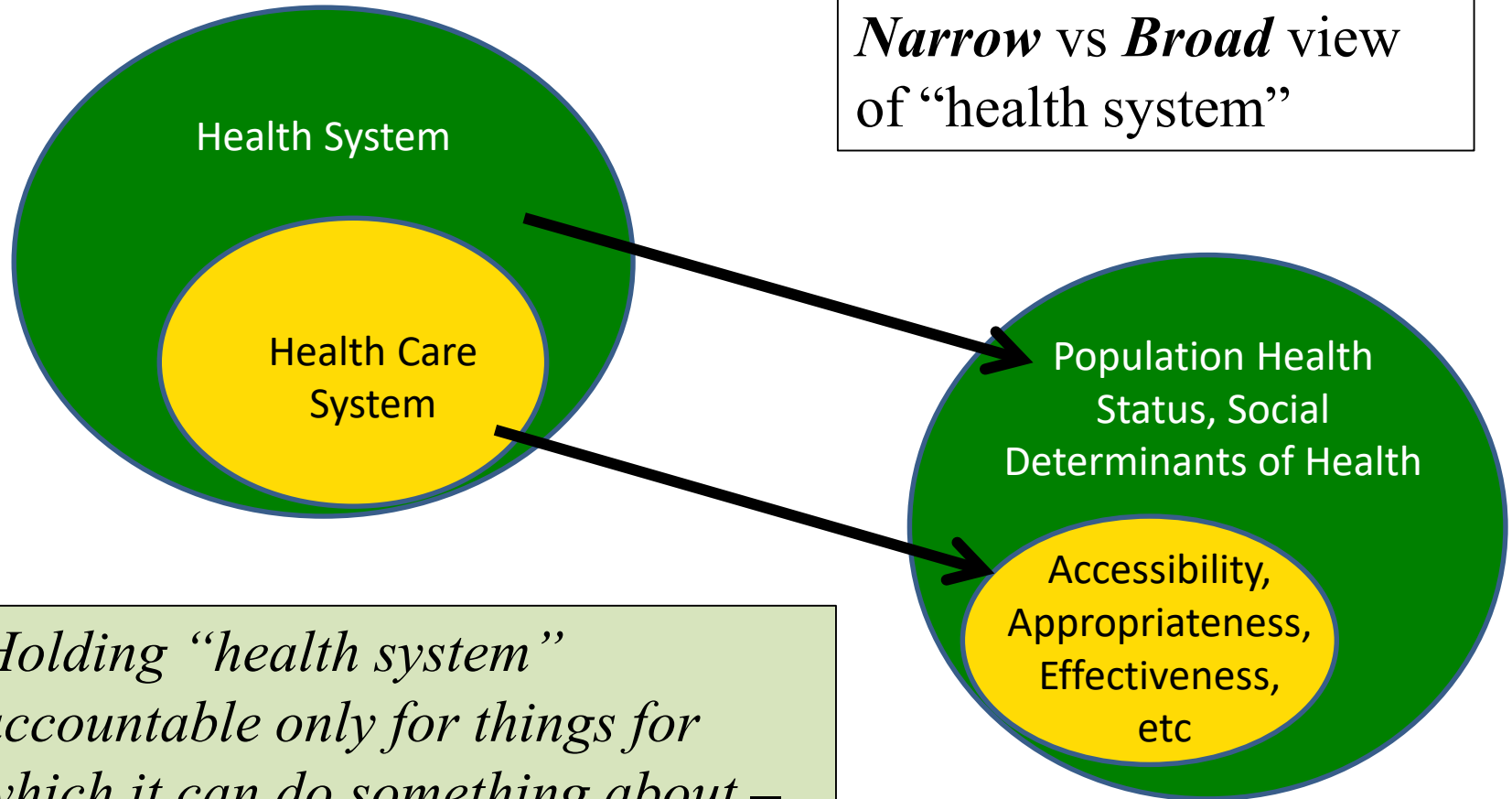
## Objectives

- Identify “northern” regions in Canada
- Compare health system performance among these regions



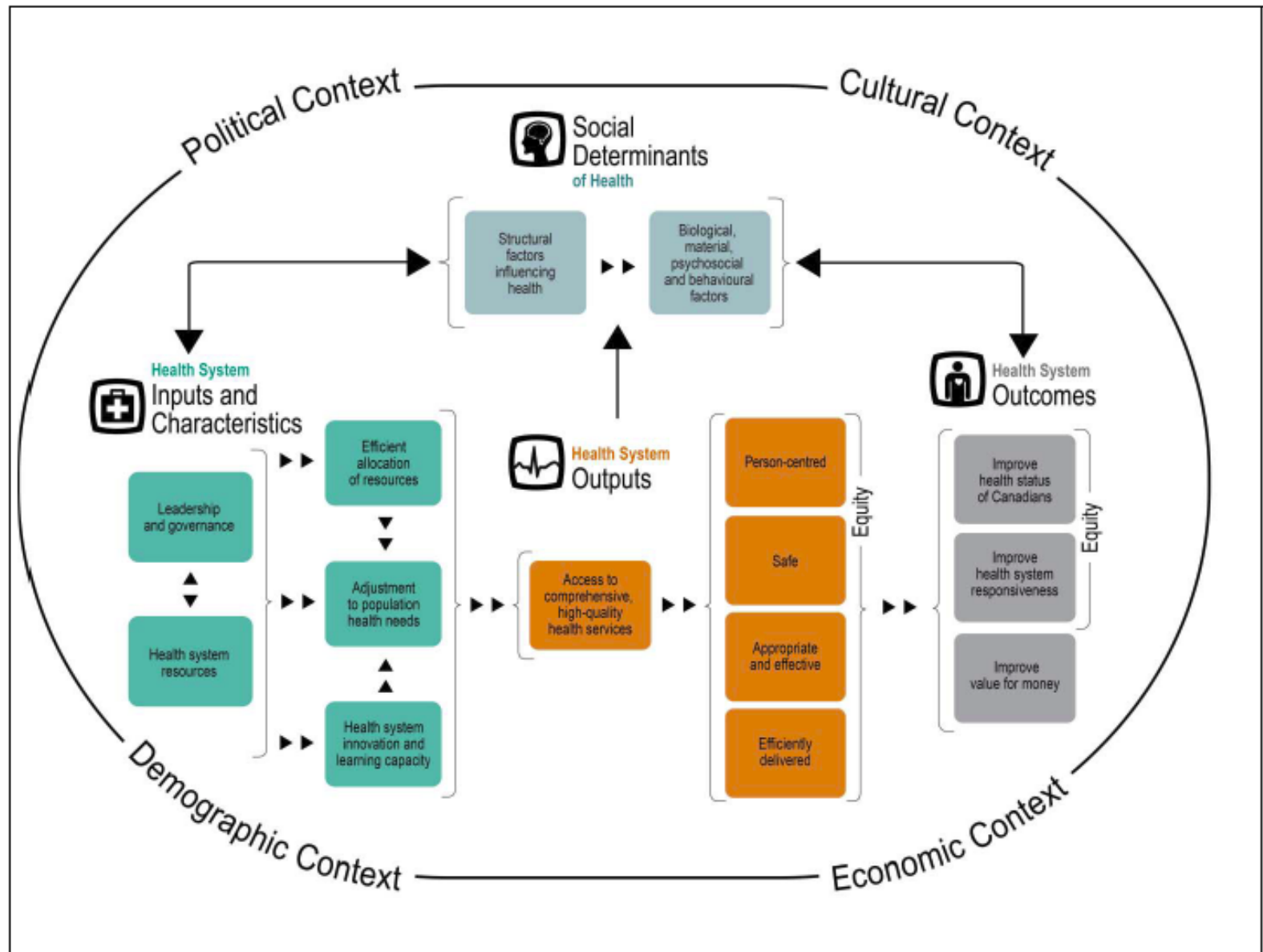
A health system “consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health (WHO 2007)

*Narrow vs Broad* view  
of “health system”



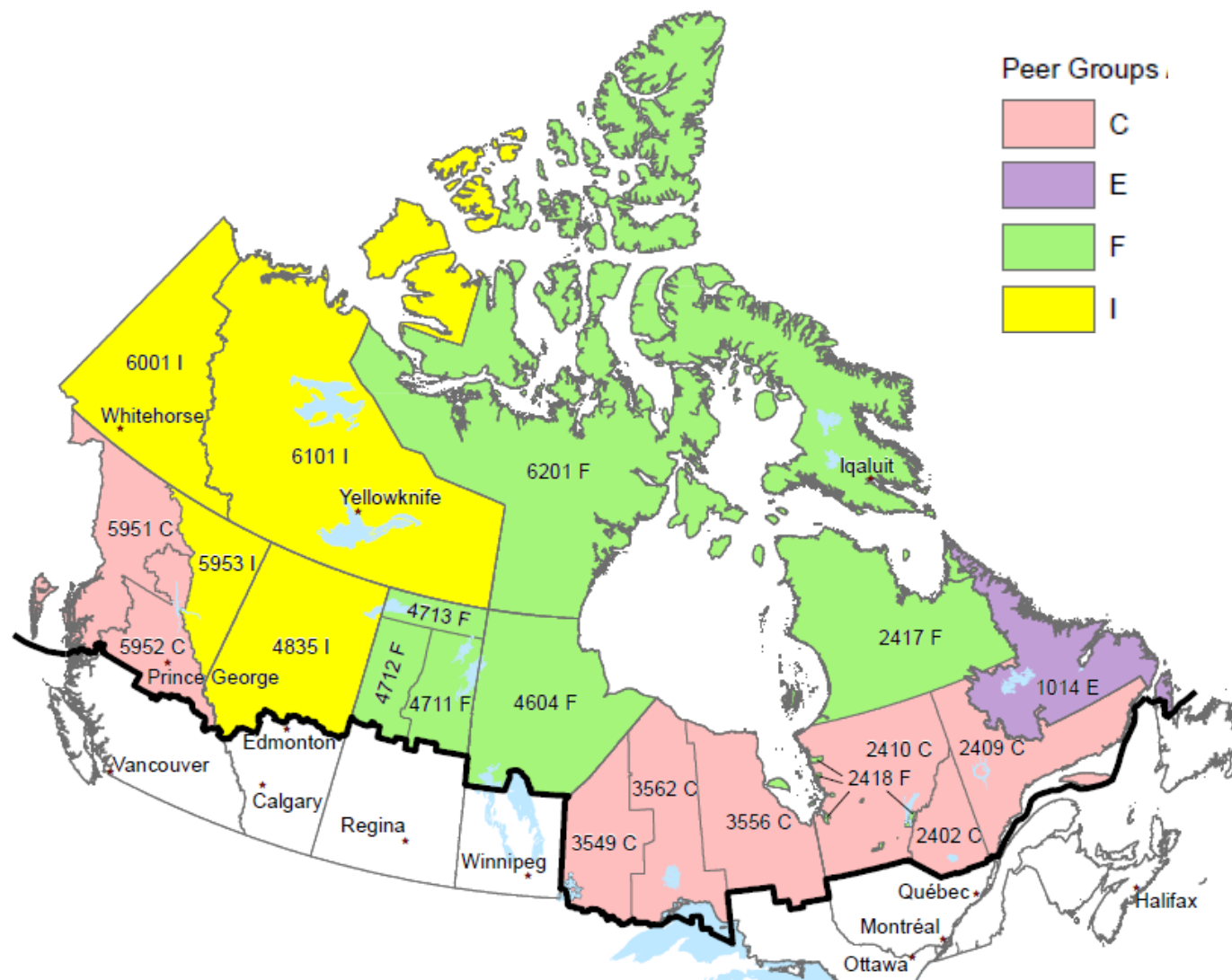
*Holding “health system”  
accountable only for things for  
which it can do something about –  
but it can also do more than what it  
is doing now*

# Health system performance framework



# Canada's Northern Regions

Labrador [NL]
Saguenay [QC]
Côte-Nord [QC]
Nord [QC]
Nunavik [QC]
Baie-James [QC]
Northwestern [ON]
Porcupine [ON]
Thunder Bay [ON]
Northern [MB]
Ma-Ke-At [SK]
Mamawetan
Keewatin
Athabasca
North Zone [AB]
Northwest [BC]
N-Interior [BC]
Northeast [BC]
Yukon
NWT
Nunavut



Statistics Canada's health regions and peer groups

# Selected indicators based on the CIHI framework

## *Contextual factors*

- Population size
- % in urban population centres (>30,000)
- % Indigenous people
- % immigrants

## *Social determinants*

- % postsecondary education
- Mean annual income
- % employed
- % smokers, drinkers, physically inactive

## *Health system inputs*

- **Inflow/outflow ratio**
- Density of GPs/Specialists
- % with regular doctor

## *Health system outputs*

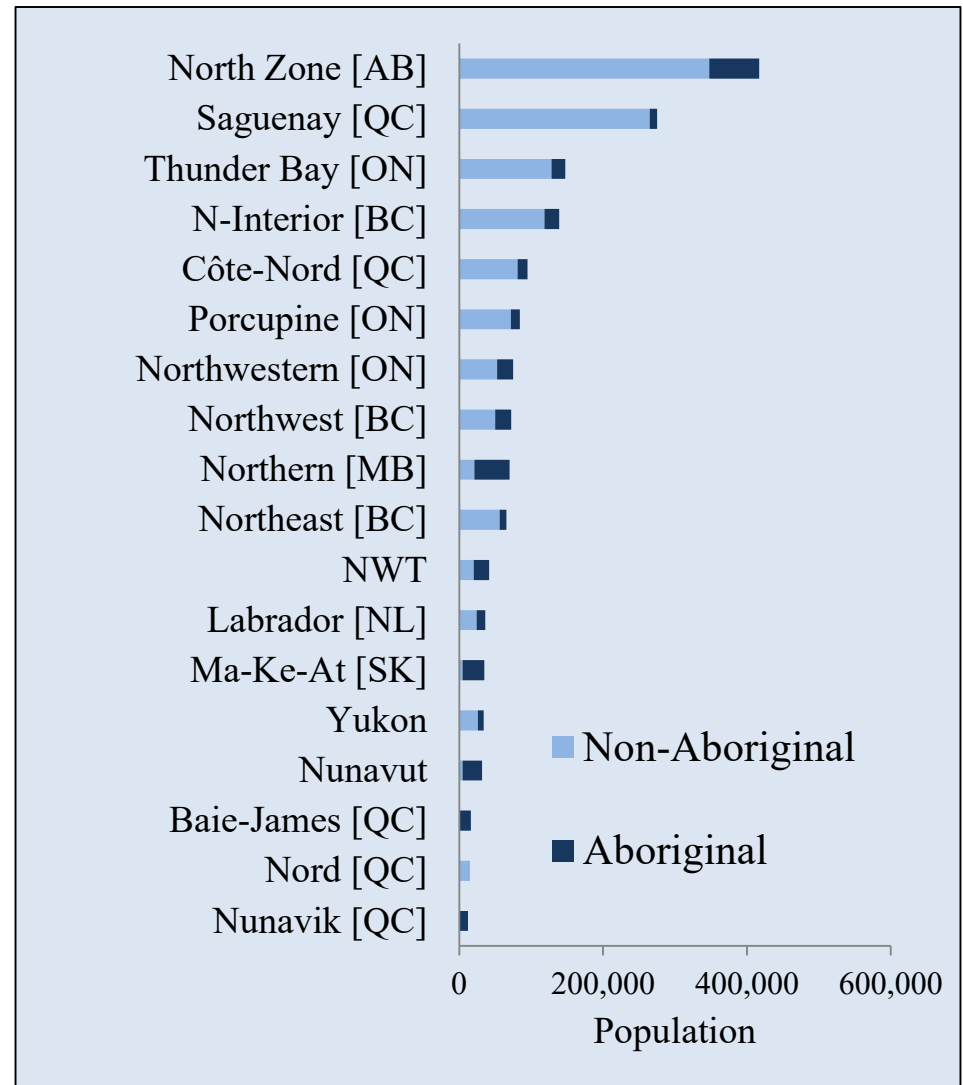
- **Hospitalization rate for ambulatory care sensitive conditions (ACSC)**
- Hospital readmission rate

## *Health system outcomes*

- **Potentially avoidable mortality (PAM)**
- Hospitalization rates for selected conditions
- Self perceived health

# Context: Political, Demographic, Cultural, Economic

- Territories vs regions within provinces
- Land claims status
- Population varies in size (430K -> 13K)
- Large cities in some regions
- Indigenous people 25% of population overall, varies from <5% to >85%
- Low ethnic diversity (except Indigenous): < national average  
20% immigrants



# Social/behavioural determinants of health

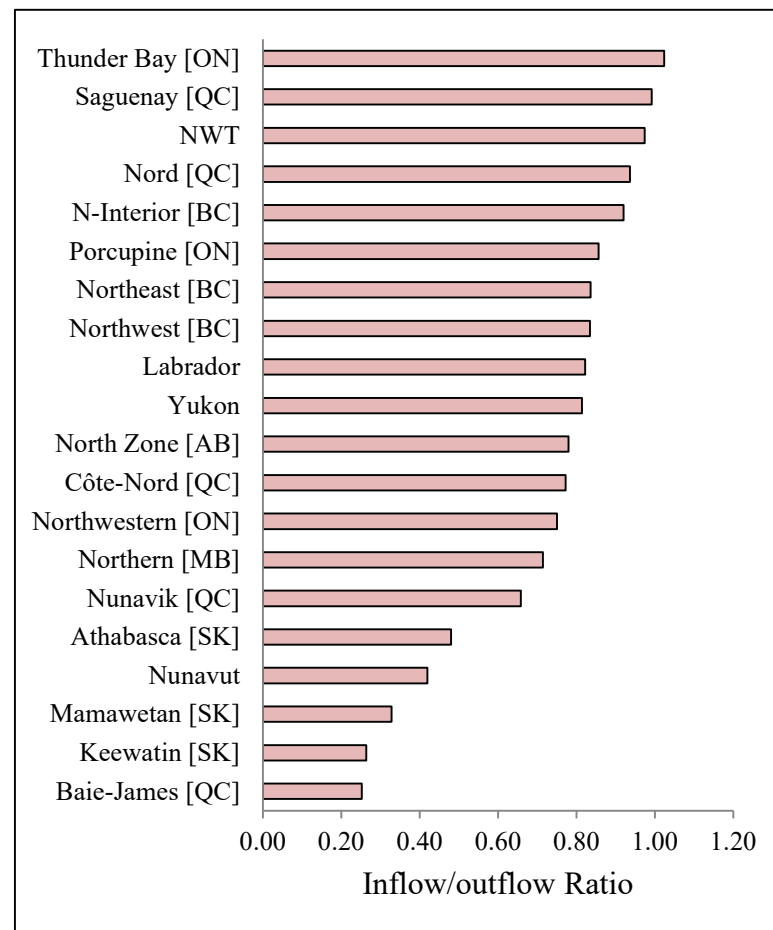
Health Region	Social/behavioural determinants of health					
	Postsec education	Annual income	Employment	Current smoking	Heavy drinking	Physical activity
<b>CANADA</b>	66.5	40650	80.5	19.7	18.4	53.7
<b>Peer Group C</b>						
Saguenay [QC]	72.7	34011	80.5	20.8	26.1	51.6
Côte-Nord [QC]	61.4	38639	78.3	26.0	27.9	51.0
Nord [QC]	63.3	38768	81.2	25.5	22.3	58.6
Northwestern [ON]	54.4	37943	77.0	19.9	21.2	59.8
Porcupine [ON]	58.0	39297	76.7	25.9	21.6	58.4
Thunder Bay [ON]	62.5	38725	77.1	23.8	25.2	58.6
Northwest [BC]	53.7	36814	74.1	21.2	14.1	59.7
N-Interior [BC]	54.2	38236	77.4	23.8	17.7	59.0
<b>Peer Group E and I</b>						
Labrador [NL]	59.4	40150	70.7	29.1	23.5	48.5
North Zone [AB]	55.1	52872	79.8	27.2	21.4	54.2
Northeast [BC]	52.5	46642	78.7	24.7	21.4	58.1
NWT	59.4	54717	78.6	35.8	32.9	54.6
Yukon	67.3	47222	83.1	27.7	30.1	64.1
<b>Peer Group F</b>						
Nunavik [QC]	34.5	35643	68.9			
Baie-James [QC]	45.6	32051	68.6			
Northern [MB]	38.3	30135	62.5	32.3	27.5	51.0
Ma-Ke-At [SK]	34.5	26635	51.0	41.6	22.9	56.5
Nunavut	40.7	43305	62.6	57.9	15.6	44.0

Shaded cells = lowest quartile [least desirable]



# Health system inputs and characteristics

Health Region	Health system inputs and characteristics			
	Inflow/ outflow	GP/FP	Specialists	Regular doctor
<b>CANADA</b>	1.00	109	105	85
<b>Peer Group C</b>				
Saguenay [QC]	0.99	124	88	85
Côte-Nord [QC]	0.77	151	67	78
Nord [QC]	0.94	254	25	81
Northwestern [ON]	0.75	133	16	83
Porcupine [ON]	0.86	112	36	84
Thunder Bay [ON]	1.02	116	101	85
Northwest [BC]	0.83	135	31	88
N-Interior [BC]	0.92	136	63	85
<b>Peer Group E and I</b>				
Labrador [NL]	0.82	116	45	66
North Zone [AB]	0.78	84	23	74
Northeast [BC]	0.84	92	15	80
NWT	0.97	68	23	40
Yukon	0.81	169	29	75
<b>Peer Group F</b>				
Nunavik [QC]	0.66	213	16	x
Baie-James [QC]	0.25	225	12	x
Northern [MB]	0.71	90	22	62
Ma-Ke-At [SK]	0.32	91	3	57
Nunavut	0.42	30	3	16



Inflow/outflow ratio is an important characteristic of northern health regions

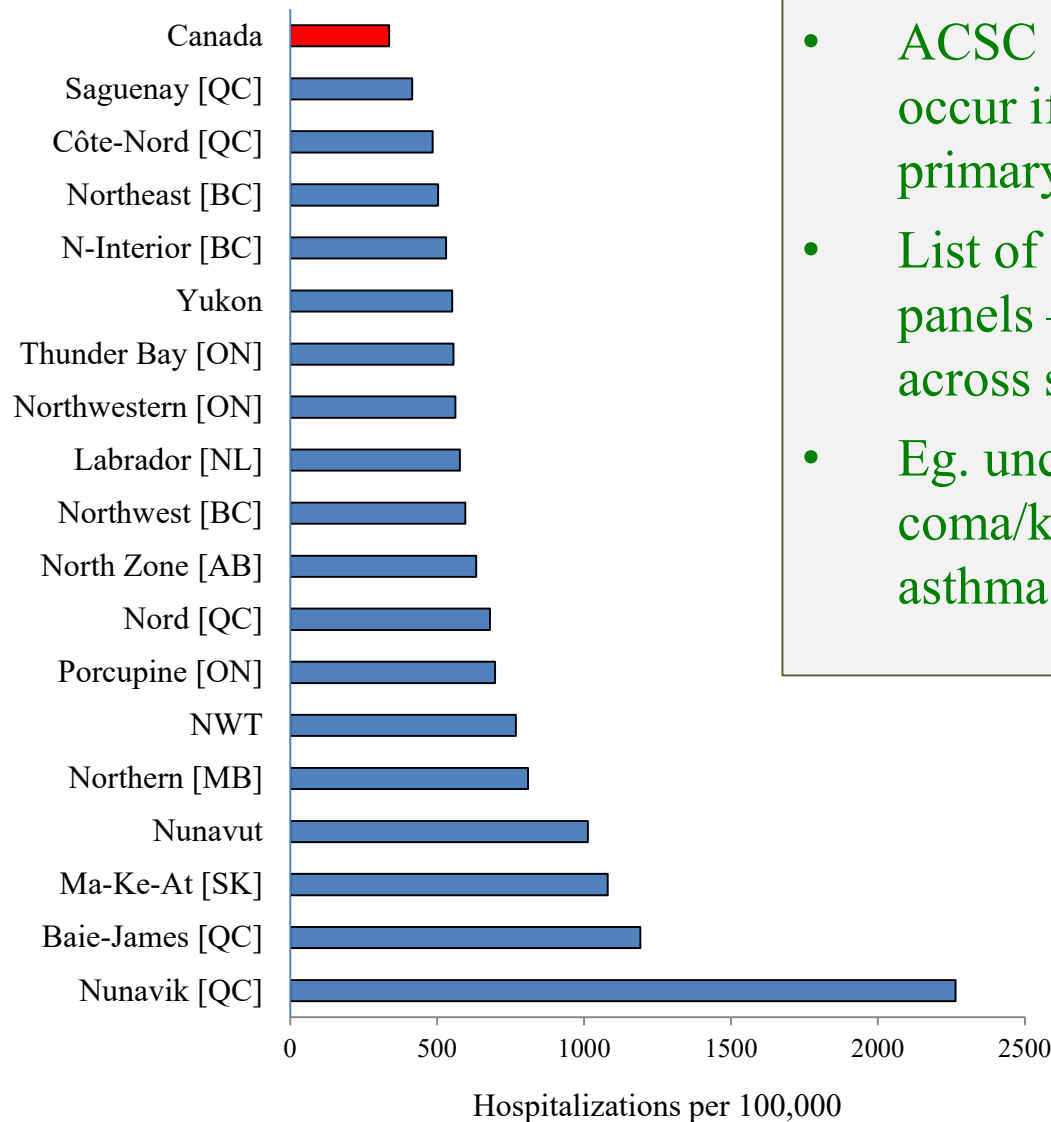
- the smaller the ratio, the larger the outflow, ie. more patients obtain care outside their region of residence

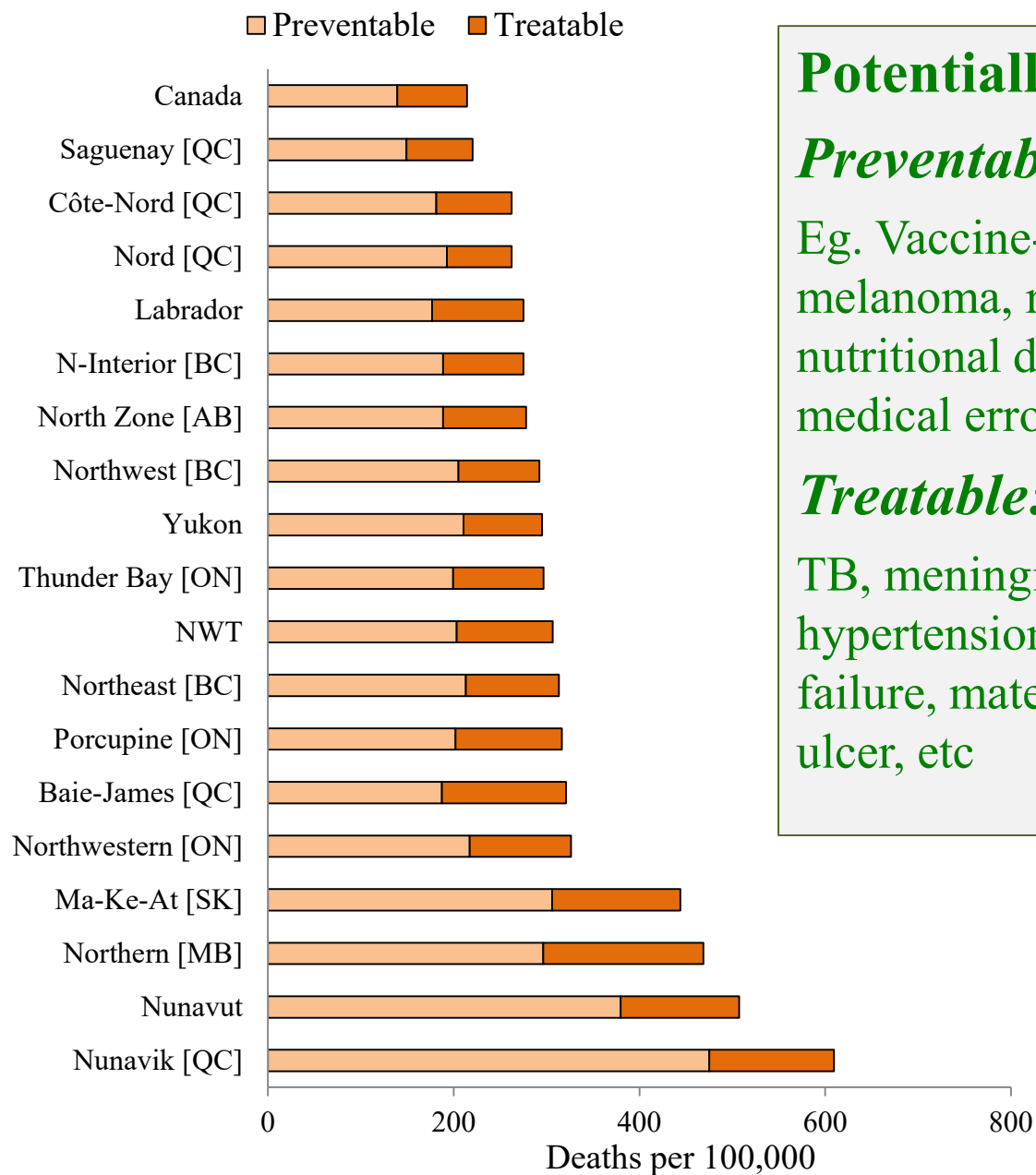
			Health Region			Health system outputs				
Health Region	Health system outcomes					ACSC	Med readm	Obstet readm	Surg readm	Young pt readm
	PAM	AMI hosp	Injury hosp	Suicide	Perceiv ed health	336	13.5	2.0	6.7	6.6
CANADA	205	258	618	11.2	60	414	12.6	2.4	6.3	6.7
Peer Group C						485	14.9	2.3	7.7	5.5
Saguenay [QC]	209	289	790	14.7	58	679	14.9	2.9	6.8	5.2
Côte-Nord [QC]	250	325	678	17.6	54	562	15.1	2.0	7.4	6.9
Nord [QC]	242	388	1152	19.8	60	697	15.3	1.9	7.4	6.9
Northwestern [ON]	325	385	965	25.9	56	556	14.7	2.1	7.7	6.7
Porcupine [ON]	313	476	832	16.9	56	596	14.9	1.9	7.6	6.3
Thunder Bay [ON]	298	354	782	17.5	56	530	14.3	2.3	7.2	6.7
Northwest [BC]	280	284	1175	18.4	56	577	14.4	2.7	7.0	6.7
N-Interior [BC]	268	273	865	13.7	55	633	14.9	1.8	7.8	6.8
Peer Group E and I						503	14.8	2.9	6.0	5.7
Labrador [NL]	263	396	951	21.5	61	768	14.7	2.1	8.2	7.4
North Zone [AB]	272	327	1198	14.6	56	551	14.9	2.7	7.0	4.8
Northeast [BC]	318	338	743	17.7	56	2264	22.9	5.0	8.7	9.3
NWT	307	324	1320	14.0	51	1191	18.8	1.8	11.2	6.6
Yukon	280	291	1199	14.6	57	809	14.7	2.5	7.4	6.7
Peer Group F						1080	15.5	1.7	9.4	8.0
Nunavik [QC]	583	324	2832	70.4	x	1013	13.3	1.5	8.0	7.9
Baie-James [QC]	313	548	1114	25.9	x					
Northern [MB]	455	409	1502	33.3	50					
Ma-Ke-At [SK]	439	391	1663	29.4	48					
Nunavut	509	183	952	57.9	41					

## Health system outputs and outcomes

## Hospitalization for Ambulatory Care Sensitive Conditions

- ACSC are diagnoses that should not occur if there is access to appropriate primary care services in a region
- List of diagnoses determined by expert panels – may change over time or vary across studies
- Eg. uncontrolled seizures, diabetic coma/ketoacidosis, unstable angina, asthma, etc





## Potentially avoidable mortality

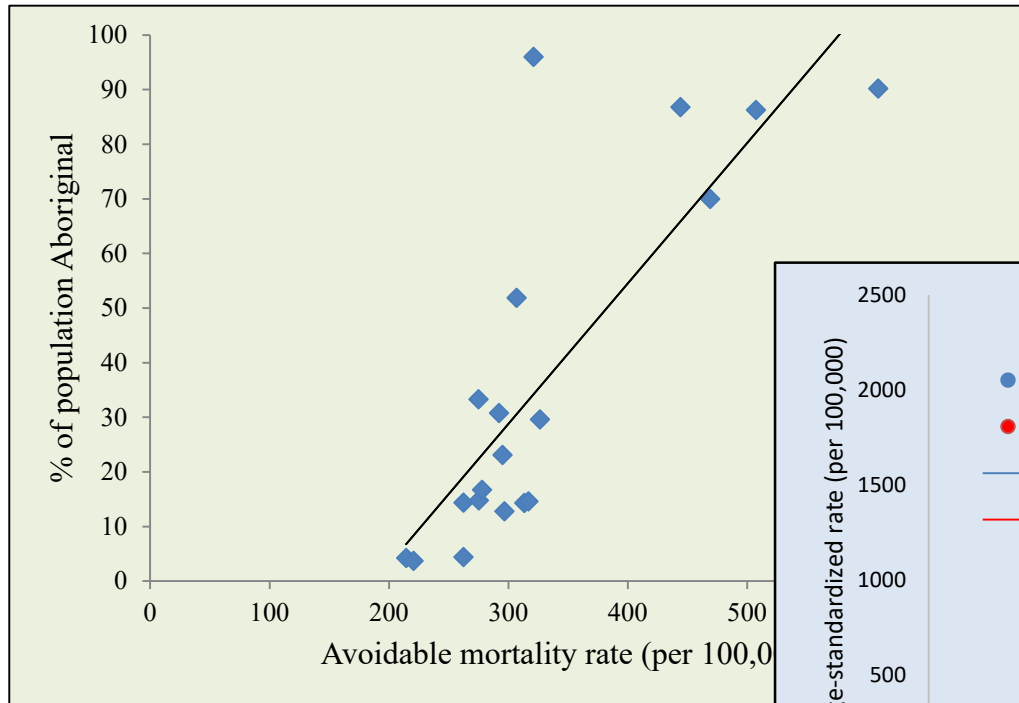
### *Preventable:*

Eg. Vaccine-preventable diseases, STDs, melanoma, rheumatic heart disease, nutritional deficiencies, transport accidents, medical errors

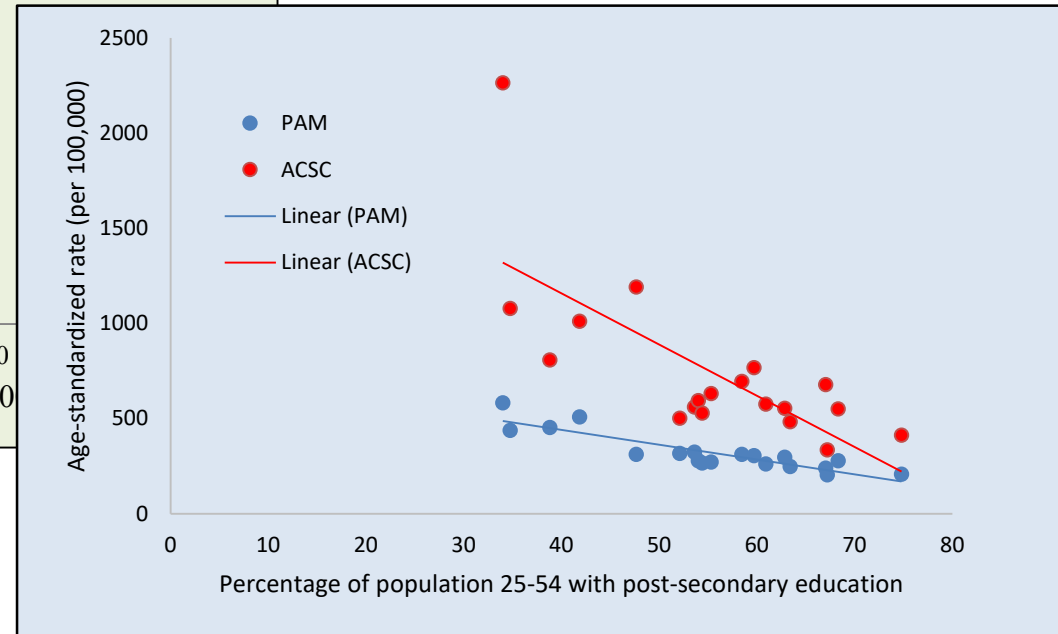
### *Treatable:*

TB, meningitis, some cancers, hypertension, respiratory infections, renal failure, maternal death, poisoning, peptic ulcer, etc

# Correlations



Avoidable mortality and ACSC are themselves highly correlated ( $R=0.84$ )



## Some observations

- Larger regions, especially highly urbanized ones, have better outcomes
- Regions with high proportion of Indigenous population have poorer outcomes
- Regions with lower average income have poorer outcomes

# Conclusions

- We identified 18 northern health regions consisting of the 3 territories and northernmost regions of 8 provinces – these differ in terms of a variety of demographic, social, political and cultural characteristics
- We used the CIHI health system performance framework to compare these health regions, focusing on one “output” (ACSC hospitalizations) and one “outcome” (avoidable mortality) indicator
- All northern regions perform worse than Canada nationally in terms of these two indicators



- Certain regions [Peer Group F] tend to cluster together, reporting the worst performance – Nunavut, Nunavik, James Bay, northern Manitoba and northern Saskatchewan
- Size of population, socioeconomic status, degree of urbanization and proportion of Indigenous people in the population are all associated with performance.
- CIHI framework cannot be fully used as many domains lack valid indicators and the data to derive them – what's available may not be the most appropriate
- Need for mixed methods approach
- There are substantial variation within some large regions – masking disparities.

