



# Chronic Disease Surveillance in Canada

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On behalf of Chronic Disease Surveillance Division, PHAC

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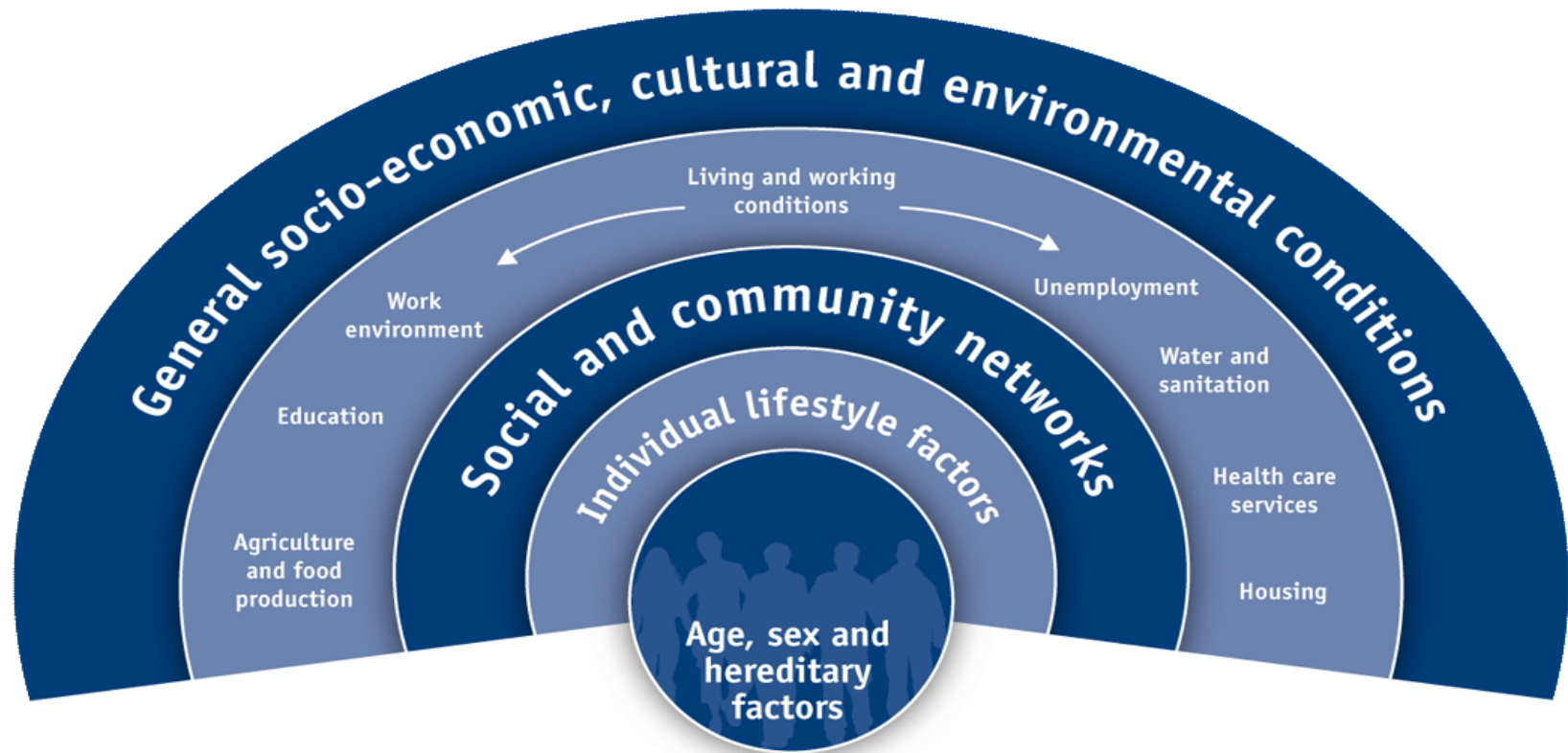
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# The Main Determinants of Health

Source: Dahlgren, G. & Whitehead, M. (2006). *European strategies for tackling social inequities in health: Levelling up Part 2*. World Health Organization



# Chronic Disease Vs Infectious Disease Surveillance

Source: Health Canada (2003). *Chronic Disease Surveillance in Canada: A Background Paper*

Issue	Chronic	Infectious
Temporality	Latency (decades)	Immediate (days)
Disease course	Long	Short
Cause of disease	Complex	An infectious agent
Public health intervention	Population level	Individual/population
Data sources	Routine databases	Clinical data
Data collection	Event-oriented	Person-oriented
Legislation and regulations	Only cancer is notifiable	List of notifiable diseases
Co-morbidity	Common (heart & diab.)	Not common



# Development of national chronic disease surveillance in Canada

1867	British North America Act: Census and statistics are the responsibility of the federal government
1871	The first national census in Canada
1918	Dominion Bureau of Statistics (now Statistics Canada)
1919	Department of Health (now Health Canada)
1969	National Cancer Incidence Reporting System (NCIRS) – event oriented
1972	Health Canada's Laboratory Centre for Disease Control
1992	Canadian Cancer Registry (CCR) – patient oriented
1999	National Diabetes Surveillance System (NDSS)
2004	Public Health Agency of Canada
2009	Canadian Chronic Diseases Surveillance System (CCDSS)



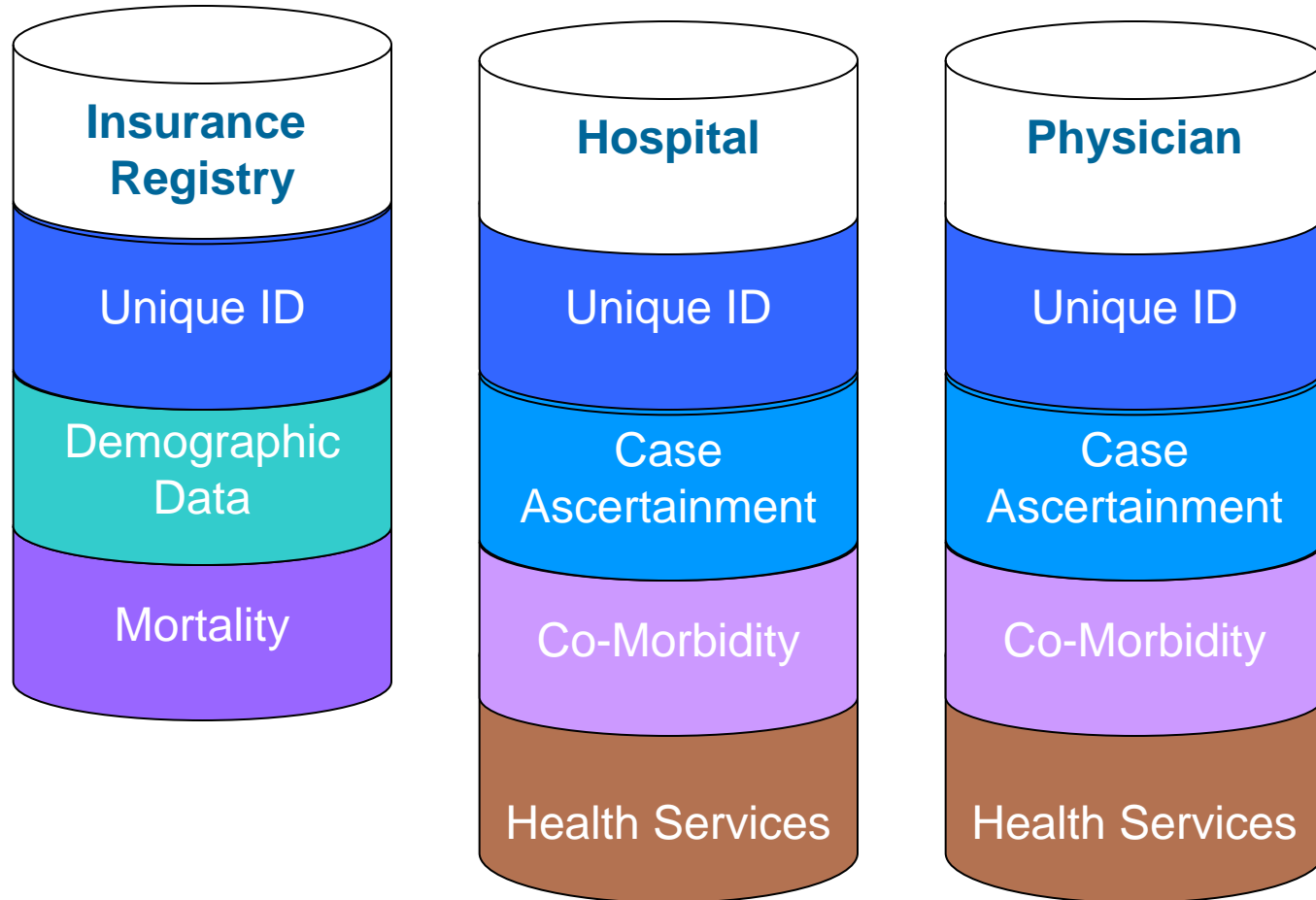
# What is Canadian Chronic Diseases Surveillance System (CCDSS)?

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- A collaborative network of provincial and territorial (P/T) surveillance systems supported by PHAC
- Priorities are set by a public health network “Task Group on Surveillance of Chronic Disease and Injury
- It uses P/T health admin databases and was initially used to track diabetes - National Diabetes Surveillance System (NDSS) established in 1999
- Creates nationally comparable data: prevalence, incidence, mortality, complications, co-morbid conditions, health services utilization



# CCDSS: Data sources



**Data sources linked using a unique lifetime identifier**

# CCDSS is a partnership

## Key Roles:

### » PHAC

- Coordination and technical support
- Compile and report national data
- Funding (MOUs with P/Ts, Grants and Contributions, operating budget)

### » P/Ts

- Identify and assign technical resources
- Implement and maintain system
- Create data for national reports
- Create regional reports



# CCDSS expansion: Status

- **National Surveillance Ongoing**
  - » Diabetes (since 1999)
  - » Hypertension (since 2010)
  - » Mental Illnesses (Mood & Anxiety, Omnibus) (since 2010)
  - » Chronic Respiratory (COPD, Asthma) (since 2011)
- **National Pilot**
  - » Heart Diseases (IHD, MI)
  - » Musculoskeletal (Arthritis, Osteoporosis)
- **Feasibility**
  - » Neurological Conditions
  - » Heart Failure
  - » Stroke
  - » Mental Illnesses (psychoses, substance use disorders)
  - » Injury (Unintentional injuries, falls)
- **Future Plans**
  - » Renal Disease
  - » Bowel Disease

# Data Processing

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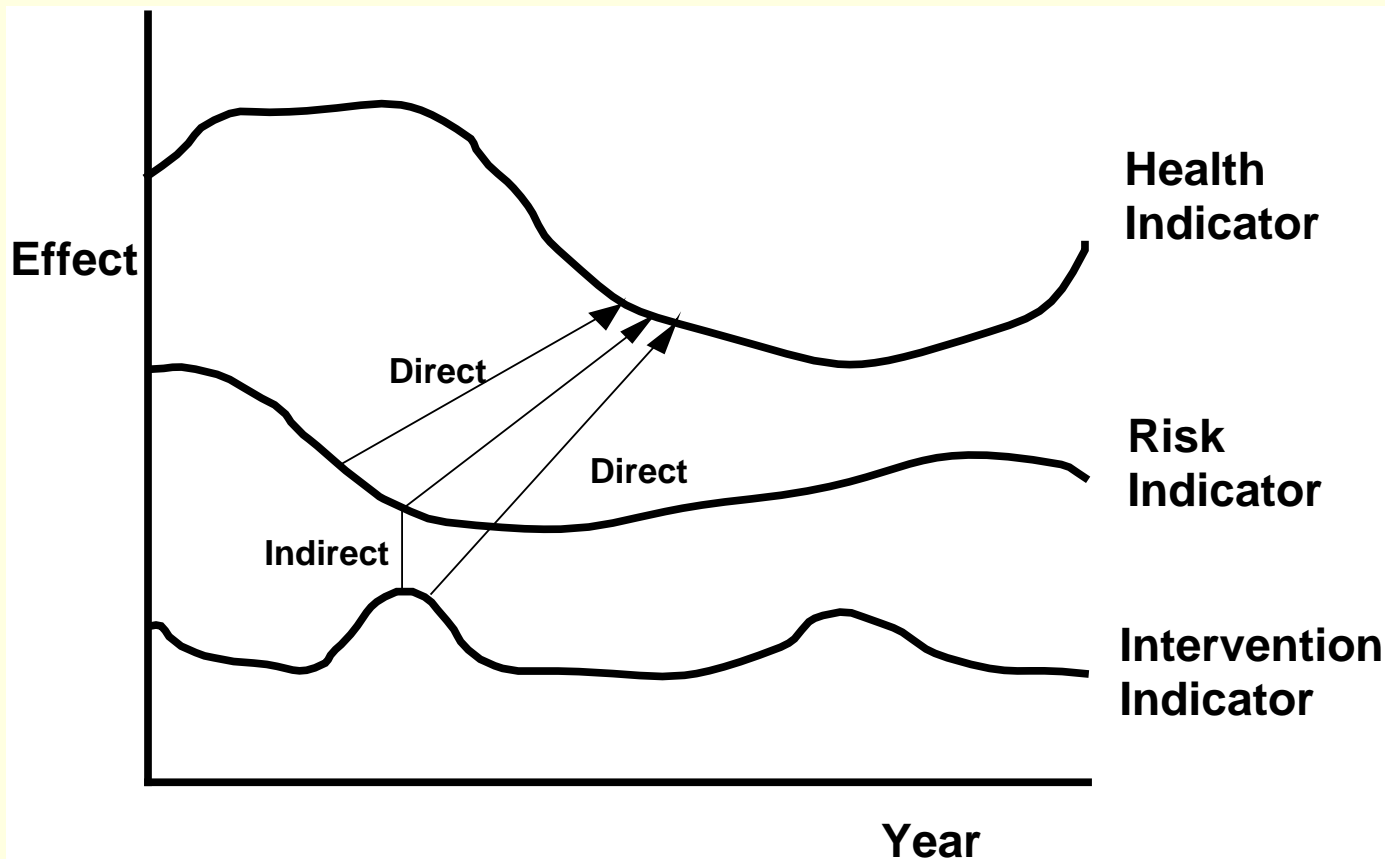
Source: Choi BCK (2012). The past, present, and future of public health surveillance. (Invited Spotlight Article). *Scientifica*, Article ID 875253

- Data analysis is conducted to serve the 6 uses of public health surveillance: (1) Early warning, (2) Impact assessment, (3) Policy development, (4) Policy evaluation, (5) Risk assessment, (6) Generation of hypothesis for research
- Surveillance information should be able to recognize trends
- Surveillance information should be used to inform programs and policy



# Direct and indirect effects of risk and intervention indicators on health indicators

Source: Choi BCK, 1998. Perspectives on epidemiologic surveillance in the 21st century. *Chronic Diseases in Canada* 19:145-151

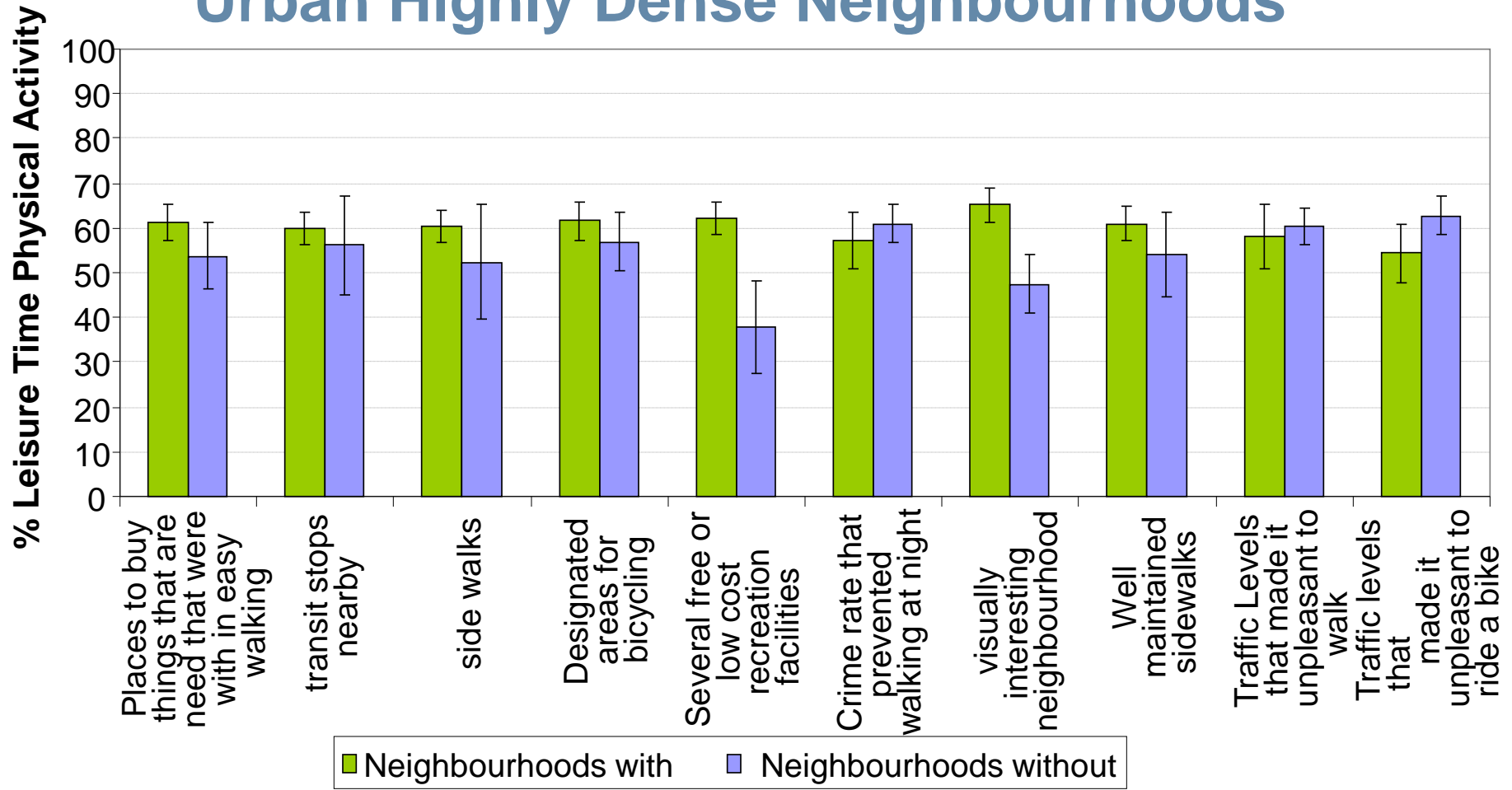


# Our Work in Environmental Health Surveillance

- **Built environment:** In 2011, PHAC funded one-time BE content on the Canadian Community Health Survey (N=8316). Canadians in neighbourhoods with parks, walking trails, bike paths, playgrounds and public swimming pools engaged in significantly more physical activity than those who don't
- **Enhanced Cancer Surveillance System:** A set of case-control studies carried out with cancer registries in the mid 1990s. In general researchers had to have their own environmental data and link indirectly with subjects
- **CCDSS:** conducts surveillance on asthma and COPD. However, does not monitor airborne pollution levels. Has potential for record linkage with other environmental databases
- **Cancer in Young People in Canada (CYP-C) program:** has potential for environmental health studies using linkage to environmental data



# Built Environment: Characteristics that Influence Leisure Time Physical Activity in Urban Highly Dense Neighbourhoods



# Information Dissemination

- **WHO:** Target audience are F/P/T governments, decision-makers, NGOs, public health professionals, researchers and general public
- **WHAT:** Information products include (1) Routine reports (Diabetes, CVD, Arthritis etc) (2) Special Reports (Health Adjusted Life Expectancy) (3) Fact Sheets (Sleep Apnea, Osteoporosis, Chronic Obstructive Pulmonary Disease, etc) (4) Highlight Reports (Diabetes, Hypertension, Asthma, COPE, Mental Illness) based on data gathered from the Canadian Chronic Disease Surveillance System (CCDSS), (5) Web Tools (Infobase, DataCubes) (6) Web Pages
- **HOW:** Disseminated via traditional publishing methods (print), electronically (PDF) and on the web (HTML). Promotion of our products is done through corporate Facebook and Twitter accounts, Rich Site Summary (RSS) Feeds, listservs, and internal departmental tools.
- **CHALLENGE:** There is a significant amount of chronic disease surveillance information but how can we organize and disseminate so that it can be utilized for maximum effectiveness?

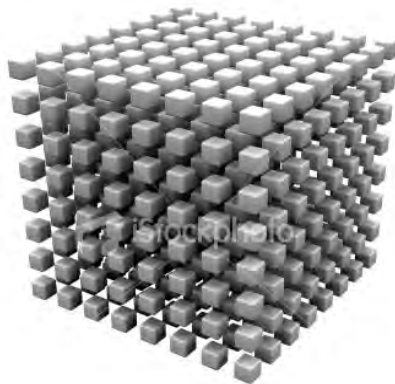




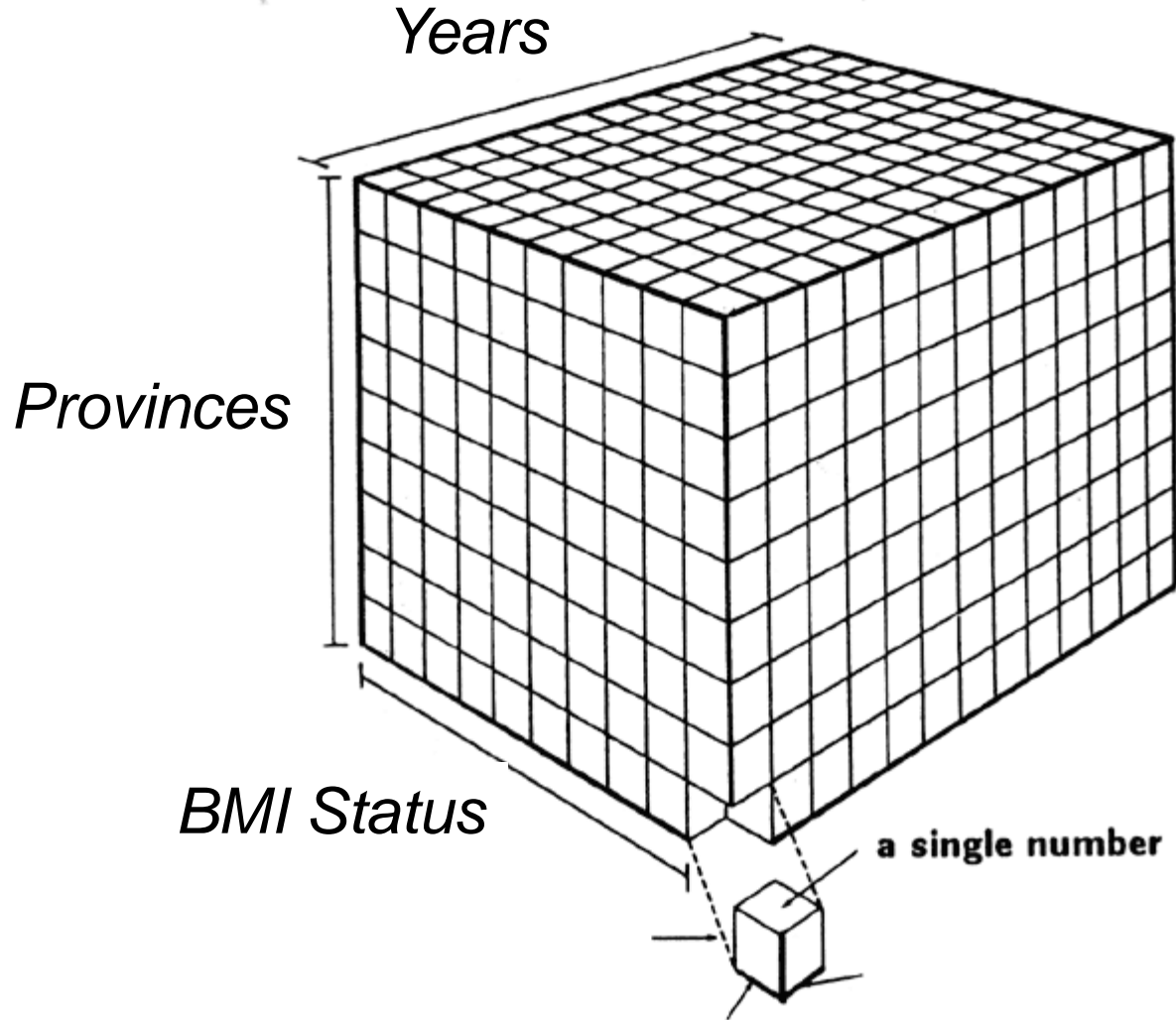
# Chronic Disease Surveillance Infobase Data Cubes

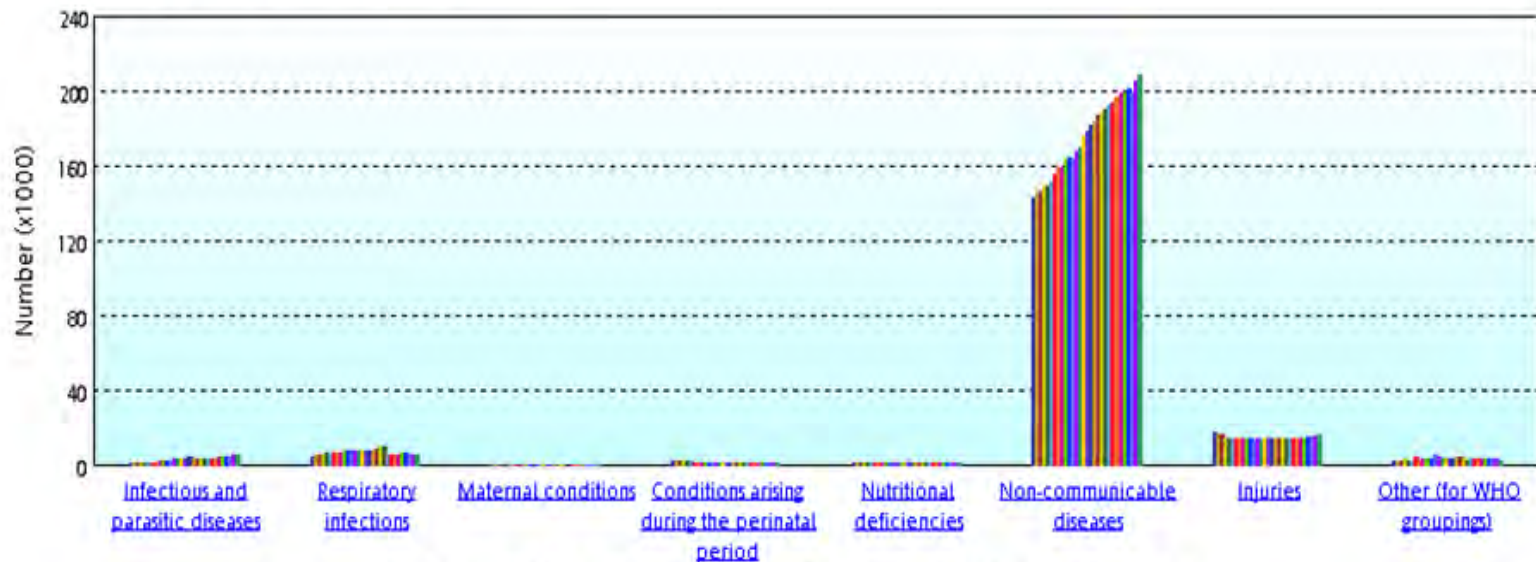
Source: Chronic Disease Infobase Data Cubes [www.infobase.phac-aspc.gc.ca](http://www.infobase.phac-aspc.gc.ca)

- Data Cubes are web tools that quickly allow users to create tables and graphs using their web browser. These online interactive databases produce output displayed in a table format with a corresponding graph.



# The Data Cube



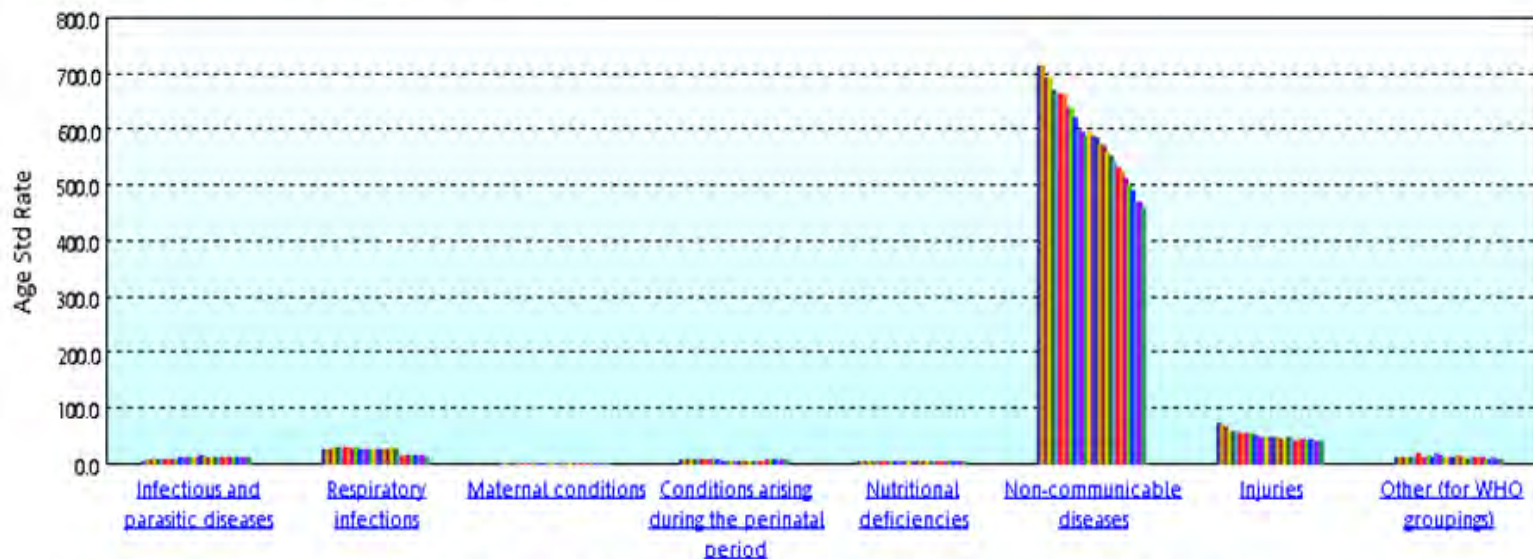


Source: Public Health Agency of Canada using Statistics Canada, Vital Statistics

■ 1979 ■ 1980 ■ 1981 ■ 1982 ■ 1983 ■ 1984 ■ 1985 ■ 1986 ■ 1987 ■ 1988 ■ 1989 ■ 1990 ■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

Number as values	<u>Infectious and parasitic diseases</u>	<u>Respiratory infections</u>	<u>Maternal conditions</u>	<u>Conditions arising during the perinatal period</u>	<u>Nutritional deficiencies</u>	<u>Non-communicable diseases</u>	<u>Injuries</u>	<u>Other (for WHO groupings)</u>	<u>Cause</u>
1979	861	4,366	27	1,785	292	142,316	16,557	1,979	<b>168,183</b>
1980	955	4,982	28	1,642	301	145,921	15,740	1,904	<b>171,473</b>
1981	992	4,698	23	1,483	331	145,919	15,532	2,051	<b>171,029</b>
1982	1,053	5,495	7	1,513	393	149,322	14,165	2,465	<b>174,413</b>
1983	1,117	6,047	20	1,333	421	149,225	14,088	2,233	<b>174,484</b>
1984	1,102	5,589	12	1,303	399	151,300	14,001	2,021	<b>175,727</b>
1985	1,124	5,969	15	1,214	437	155,332	13,417	3,815	<b>181,323</b>
1986	1,186	6,499	11	1,219	429	158,851	13,741	2,288	<b>184,224</b>
1987	1,714	6,039	15	1,125	463	158,677	14,209	2,711	<b>184,953</b>
1988	1,900	6,800	18	1,063	431	163,049	13,628	3,122	<b>190,011</b>
1989	2,193	6,746	16	1,186	481	163,776	13,814	2,753	<b>190,965</b>
1990	2,353	6,776	10	1,165	441	163,254	13,060	4,914	<b>191,973</b>
1991	2,727	6,876	12	1,013	466	167,293	13,237	3,944	<b>195,568</b>
1992	2,834	6,728	19	981	428	169,263	13,116	3,166	<b>196,535</b>





Source: Public Health Agency of Canada using Statistics Canada, Vital Statistics

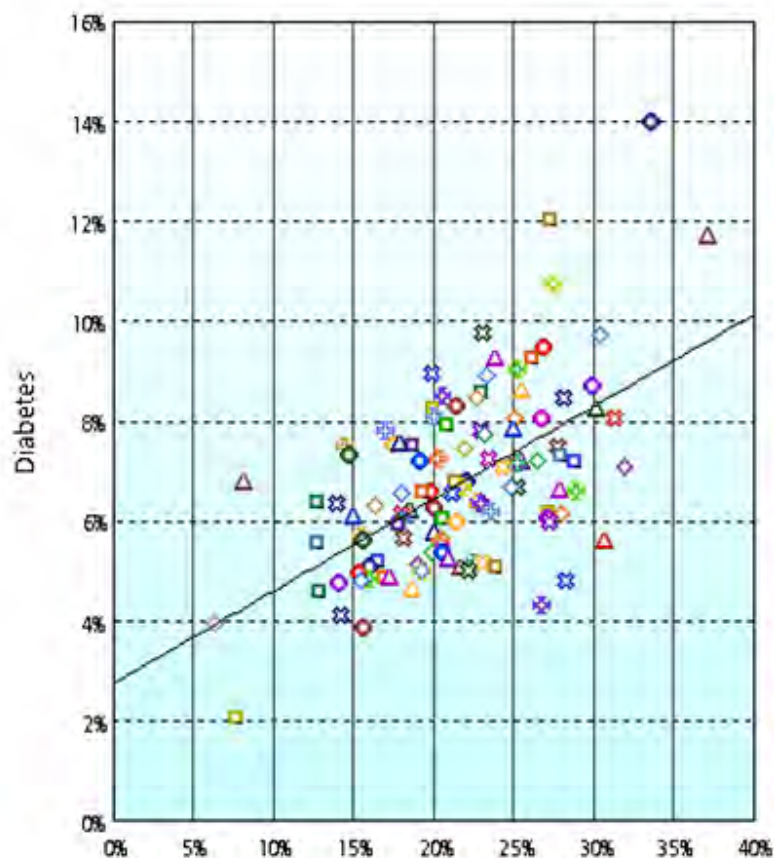
■ 1979 ■ 1980 ■ 1981 ■ 1982 ■ 1983 ■ 1984 ■ 1985 ■ 1986 ■ 1987 ■ 1988 ■ 1989 ■ 1990 ■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

Age Std Rate as values	Infectious and parasitic diseases	Respiratory infections	Maternal conditions	Conditions arising during the perinatal period	Nutritional deficiencies	Non-communicable diseases	Injuries	Other (for WHO groupings)	Cause
1979	4.0	22.9	0.1	7.1	1.5	715.2	70.6	9.4	830.9
1980	4.4	25.6	0.1	6.4	1.6	713.9	66.1	8.9	826.9
1981	4.5	23.2	0.1	5.8	1.7	693.3	64.0	9.4	802.0
1982	4.7	26.4	0.0	5.9	1.9	690.2	58.0	10.9	798.0
1983	4.9	28.4	0.1	5.1	2.0	672.0	56.9	9.7	779.1
1984	4.7	25.5	0.0	5.0	1.8	662.7	55.9	8.6	764.4
1985	4.7	26.4	0.1	4.7	1.9	661.9	52.9	15.7	768.2
1986	4.9	27.8	0.0	4.7	1.8	658.3	53.4	9.4	760.4
1987	6.8	24.9	0.1	4.3	1.9	636.9	54.3	10.8	739.9
1988	7.3	27.0	0.1	4.1	1.7	636.1	51.3	12.1	739.7
1989	8.2	25.8	0.1	4.4	1.8	618.8	50.9	10.4	720.5
1990	8.6	25.0	0.0	4.1	1.6	597.6	47.3	17.9	702.2
1991	9.7	24.5	0.0	3.6	1.7	595.1	47.2	14.0	695.8
1992	9.9	23.2	0.1	3.5	1.5	586.3	46.1	11.0	681.5
1993	11.0	23.9	0.1	3.8	1.6	595.4	47.0	10.7	693.4

Diabetes  
as values

Obese  
as values

Health Region



Obese  
Health Region

- ◆ [Zone 5, New Brunswick](#)
- [Zone 5, Nova Scotia](#)
- ▲ [Burntwood / Churchill, Manitoba](#)
- [Central Regional Integrated Health Authority, Newfoundland and Labrador](#)
- ✱ [District of Algoma Health Unit, Ontario](#)
- ◇ [Zone 1, Nova Scotia](#)
- [Five Hills Regional Health Authority, Saskatchewan](#)
- [Western Regional Integrated Health Authority, Newfoundland and Labrador](#)
- ▲ [Eastern Ontario Health Unit, Ontario](#)
- [Grey Bruce Health Unit, Ontario](#)
- ✱ [Région de la Gaspésie - Îles-de-la-Madeleine, Quebec](#)
- ◇ [Lambton Health Unit, Ontario](#)
- [Prairie North Regional Health Authority, Saskatchewan](#)
- [Parkland Regional Health Authority, Manitoba](#)
- ▲ [Chatham-Kent Health Unit, Ontario](#)
- ✱ [Peterborough County-City Health Unit, Ontario](#)
- ✱ [Zone 3, Nova Scotia](#)
- ◇ [Kelsey Trail Regional Health Authority, Saskatchewan](#)
- [Renfrew County and District Health Unit, Ontario](#)
- [Leeds, Grenville and Lanark District Health Unit, Ontario](#)
- ▲ [Zone 7, New Brunswick](#)
- ✱ [South Zone, Alberta](#)
- ✱ [Zone 1, New Brunswick](#)
- ◇ [Sudbury and District Health Unit, Ontario](#)
- [Zone 6, New Brunswick](#)
- [Niagara Regional Area Health Unit, Ontario](#)
- ▲ [Zone 4, Nova Scotia](#)
- ✱ [Région de la Chaudière-Appalaches, Quebec](#)
- ✱ [Hastings and Prince Edward Counties Health Unit, Ontario](#)
- ◇ [Kingston, Frontenac and Lennox and Addington Health Unit, Ontario](#)
- [Région de la Mauricie et du Centre-du-Québec, Quebec](#)
- [Queens County, Prince Edward Island](#)
- ▲ [Waterloo Health Unit, Ontario](#)
- ✱ [City of Toronto Health Unit, Ontario](#)
- ✱ [Northwestern Health Unit, Ontario](#)
- ◇ [Cypress Regional Health Authority, Saskatchewan](#)
- [Peel Regional Health Unit, Ontario](#)
- [Zone 3, New Brunswick](#)
- ▲ [Zone 2, Nova Scotia](#)
- ✱ [Durham Regional Health Unit, Ontario](#)

# Collaborative Surveillance Networks

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- World Alliance for Risk Factor Surveillance (WARFS) (1999) – Global
- Americas' Network for Chronic Disease Surveillance (AMNET) (2003) – WHO Region of Americas
- Canadian Alliance for Regional Risk Factor Surveillance (CARRFS) (2008) – Local health units across Canada





# Topics for Further Discussion

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- How national chronic disease surveillance activities can inform environmental health surveillance development
- How environmental health surveillance can support chronic disease surveillance and visa versa
- What ways can environmental health surveillance fit into chronic disease surveillance

