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Mamow Ahyamowen  
PARTNERSHIP

# Learning from Our Ancestors - Mortality Experience of Communities Served by Weeneebayko Area Health Authority

May 2019



Parts of this material are based on data and information provided by Cancer Care Ontario (CCO). The opinions, results, view, and conclusions reported in this paper are those of the authors and do not necessarily reflect those of CCO. No endorsement by CCO is intended or should be inferred.

As well, parts of this material are based on data and/or information compiled and provided by CIHI. However, the analyses, conclusions, opinions and statements expressed in the material are those of the author(s), and not necessarily those of CIHI.

Finally, we would like to acknowledge Service Ontario for the use of the Ontario Registrar General's Death file (ORG-D).



*We don't see death as something to be avoided because we do not see death as the end of life. Sure, it is the end of our material life, but our spirit lives on with the creator. Our time in the material world is temporary and then we join our ancestors in the happy hunting grounds.*

*Growing up I was taught that when we see the Northern Lights it is our ancestors dancing in the spirit world.*







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# A Message from the Steering Committee

*When I look at this information it reminds me of the wisdom and knowledge that our elders and ancestors have passed down to us. I see this information as one more way that our ancestors are able to provide us with important lessons about how we can live a good and healthy life.*

Caroline Lidstone-Jones,  
Batchewana First Nation & Founding Member of the  
Mamow Ahyamowen Steering Committee

In 2016, our organizations came together to form the epidemiology partnership we call Mamow Ahyamowen (everyone's voices). Our goal is to be a trusted Northern voice providing the health information our communities need to achieve health equity. Communities told us this is a priority because communities want to be able to access and use their health data. Most of our Chiefs, Councilors, Health Directors and other community leaders manage community health programs without even basic health data for their communities.

With this report, we have started to share health information with communities. We hope and expect that this report will encourage community members to challenge the data and ask questions. These questions will help guide our partnership towards the next round of data analysis. By helping to answer the questions our communities are asking we will continue to support our communities to achieve health equity.

In the true spirit of partnership this work is the result of many people's efforts. We appreciate the funding that Indigenous Services Canada and the Province of Ontario provided to support this work. Our analysis was enabled by the foundational work that Carmen Jones and her team at Chiefs of Ontario did to bring a copy of the Indian Registry System dataset under First Nations governance. Finally, we could not have completed this work without the analytical expertise provided by our friends at the Institute for Clinical Evaluative Sciences and the knowledge translation support provided by friends at Laurentian University. Thank you Tristan, Christina, Kathy, Sue, Laura, and Jen.

Finally, we want to acknowledge the elders, ancestors, friends, and family members who have passed away. Their voices are represented in the graphs and numbers in this report. We have always valued the teachings of our elders and we see this report as one more teaching on how we can live good and healthy lives.

Miigwetch,

The Mamow Ahyamowen Steering Committee



# Introduction

The goal of this report is to help describe the mortality experience of First Nations in Northern Ontario. Mortality is internationally recognized as one of the most basic and widely used indicators of health status. During the analysis planning communities identified a number of priorities including mental health, addictions, suicides, diabetes, cancer, and other chronic conditions. This report on mortality and the chronic conditions present at the time of death touches on many of the themes that communities identified.

Some communities in Northwestern Ontario received mortality data over 30 years ago. For many communities this is the first time that mortality data has ever been available at the community level. Three levels of reports have been produced.

- Community level reports provide a local perspective on health for 58 communities who chose to participate in this analysis.
- Each partner level report provides a comparison for communities and helps to identify trends that may not be clear at community level.
- The overall partnership level report summarizes all the data—everyone's voices—and allows communities to understand important trends and make comparisons.

Mamow Ahyamowen (everyone's voices) strives to work with communities and community data in a respectful way. That includes making sure that the communities who chose to participate in this analysis have control over who has access to their community level reports. This means that communities decide who they share their community reports with. Partners decide who they share their partner reports with. The overall partnership level report is the only report that is available publicly.

The information shared in this report comes from Provincial and Federal databases. Community members were defined as registered members of the First Nations served by Weeneebayko Area Health Authority (WAHA) regardless of where the community members currently live.

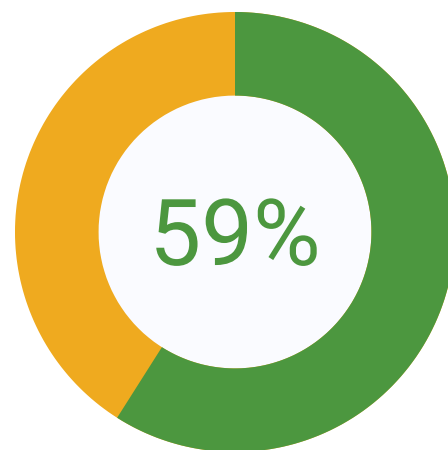
This report contains data on all-cause mortality, premature mortality, amenable mortality, and cause specific mortality. The cause of death provides a very limited understanding of people's health when they die. To better understand health status the report also presents data about the chronic conditions present at the time of death. Methods, limitations, and a glossary are provided in the report appendices.

**The information used to create this report comes from data collected between 1992 and 2014.**

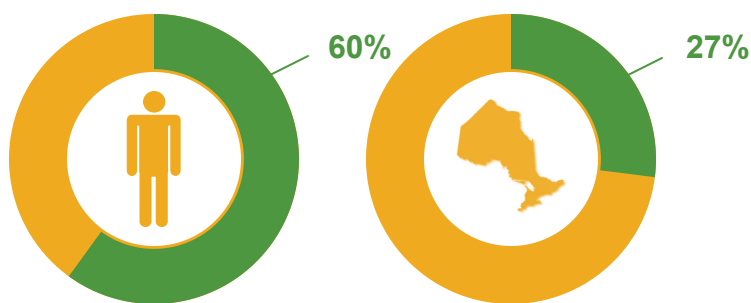
This study was supported by ICES, which is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC). The opinions, results and conclusions reported in this report are those of the authors and are independent from the funding sources. No endorsement by ICES or the Ontario MOHLTC is intended or should be inferred.

## We will start by looking at **deaths before retirement age**:

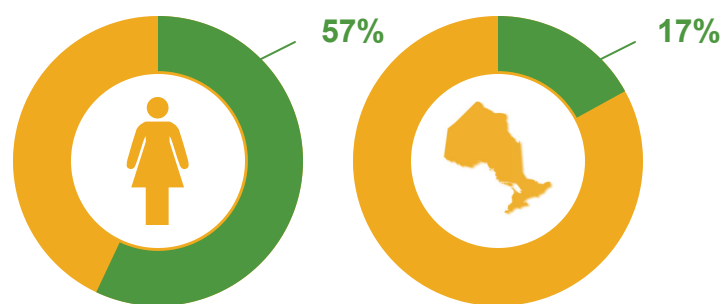
**59%** of all **deaths** among band members occurred **before retirement age** (65 years old) compared to **22% for Ontario overall**.



Deaths among men were more likely to occur **before retirement age** (65 years old) with 60% of deaths among men occurring before age 65 compared to 57% of deaths among women. However rates in our communities for **both** men and women were still higher than Ontario overall.



**60%** of deaths among men in our communities occurred before the age of 65 compared to **27%** of deaths among men in Ontario overall.



**57%** of deaths among women in our communities occurred before the age of 65 compared to **17%** of deaths among women in Ontario overall.



**2.8 out of every 10 deaths** in our communities could potentially have been **avoided with effective and timely health care or public health intervention**.

**This means that there are ways we can help our people to live longer.**

Amenable mortality in this context means avoidable. Amenable mortality includes all deaths before the age of 75 that were due to causes that are avoidable with timely and appropriate medical care or public health intervention. Amenable causes of death include things like diabetes, motor vehicle accidents, chronic obstructive pulmonary diseases, among others.



## Looking at overall rates of death:

### Between 1992 - 2014

There were **891 deaths** among WAHA community members. This means there were **87 deaths for every 1,000** community members.

This rate is **1.3x higher** than Ontario overall.

Men and women among WAHA communities have different rates of death:



VS



**75 deaths**  
for every 1,000 women  
(crude mortality rate)

**98 deaths**  
for every 1,000 men  
(crude mortality rate)



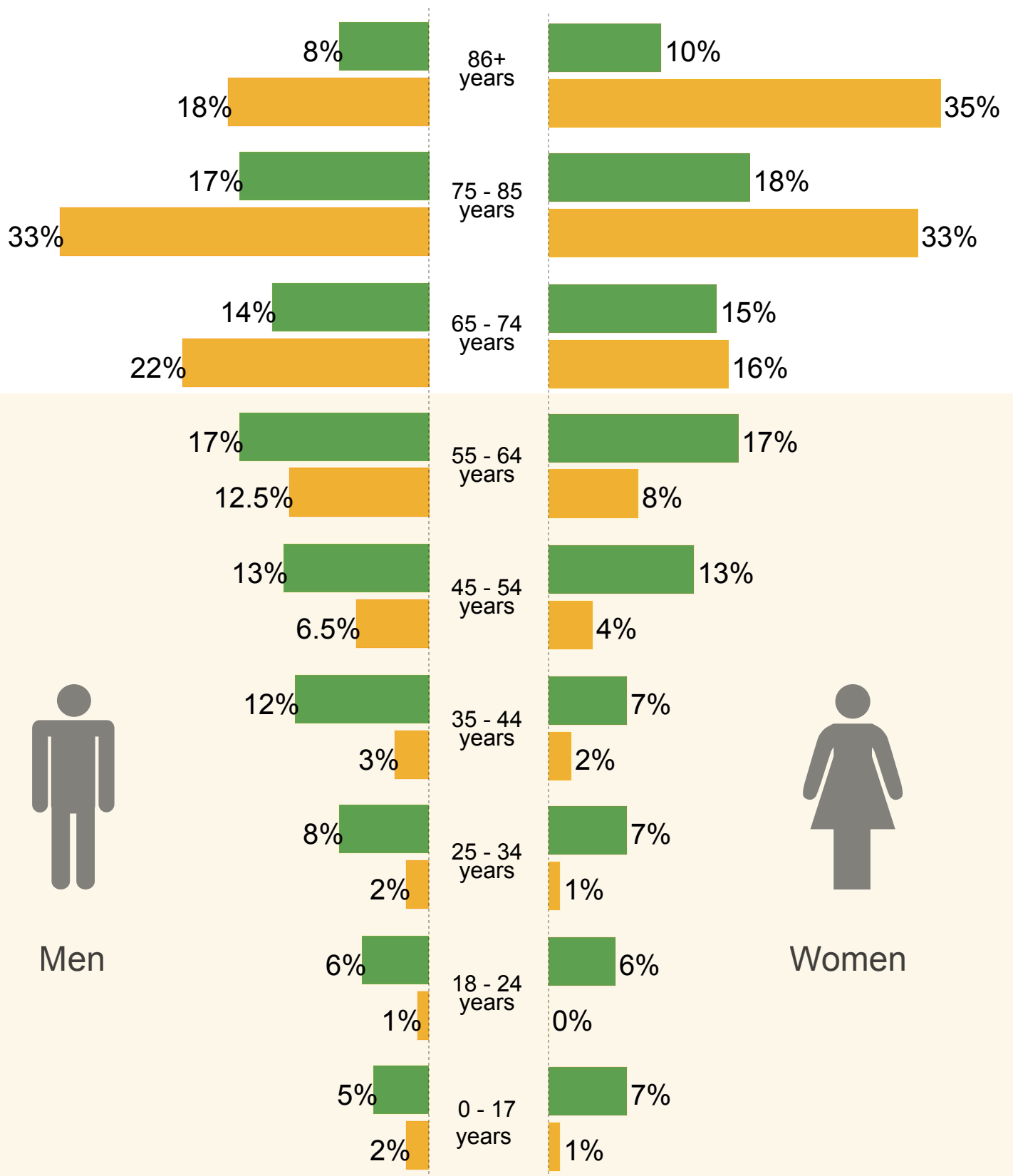
This is **1.2x higher for women** and **1.3x higher for men** than Ontario overall (comparison of age standardized mortality rates)

Crude mortality is the number of deaths out of total population in a given period of time.

The age standardized mortality rate takes into account that the First Nations population is younger than the rest of Ontario and helps us to make comparisons.

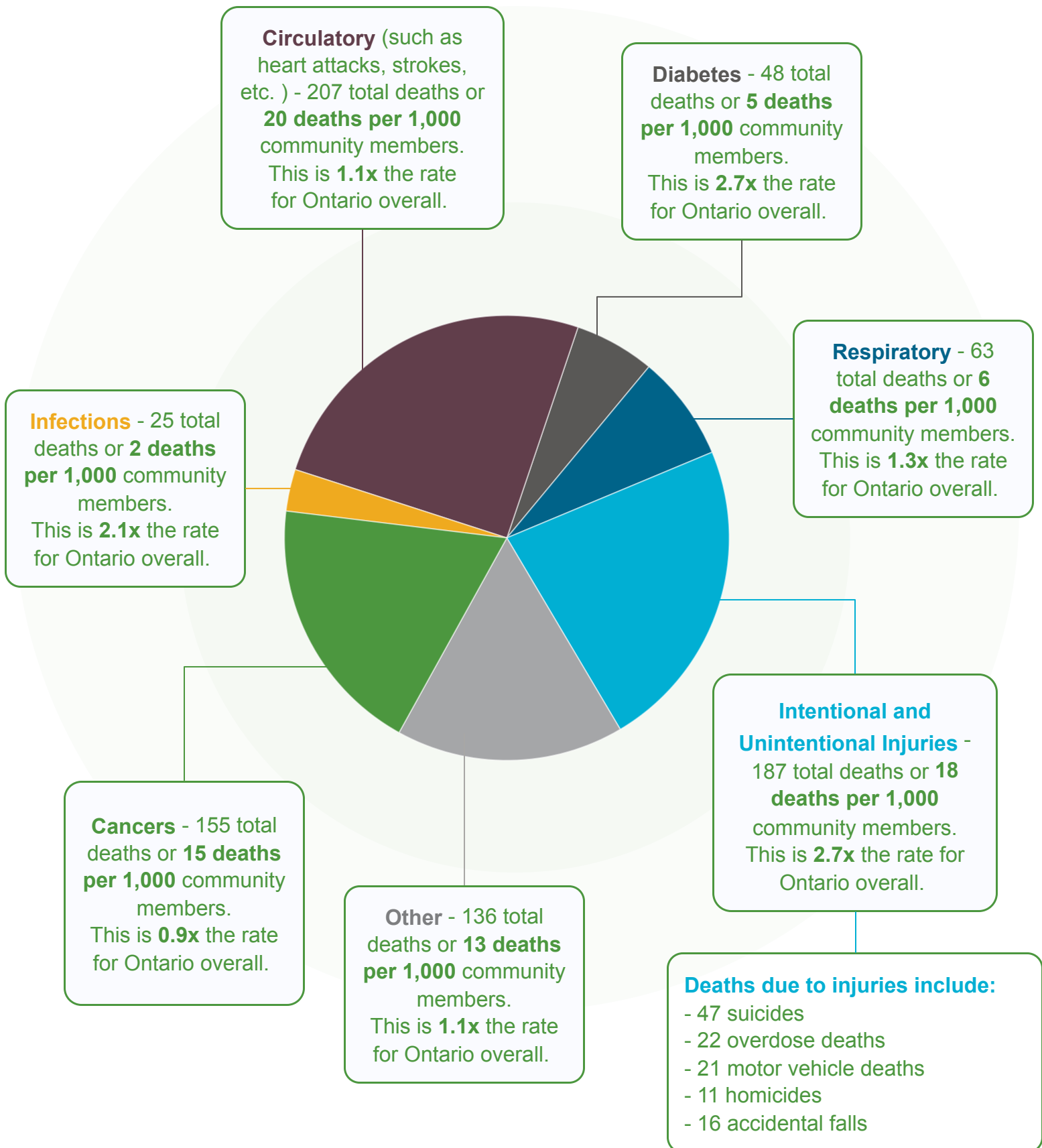
Members of our communities tend to **die at younger ages** than Ontario overall.

WAHA  
Ontario





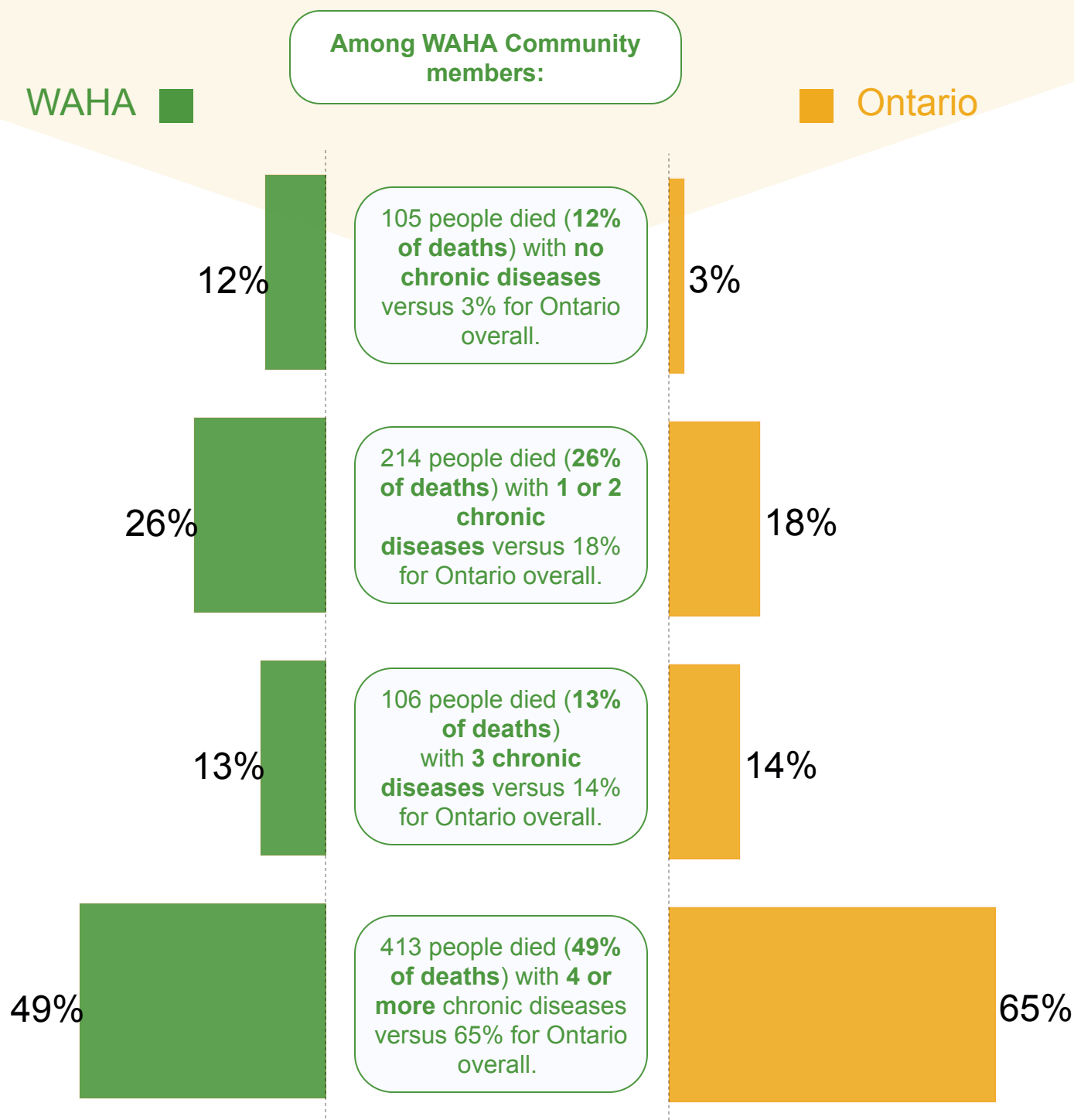
## Common causes of death:



Please note that there are 70 deaths or 7 deaths per 1000 community members where the cause was not recorded or is missing. This is 3.9x the rate for Ontario overall. Please see page 24 of the report.

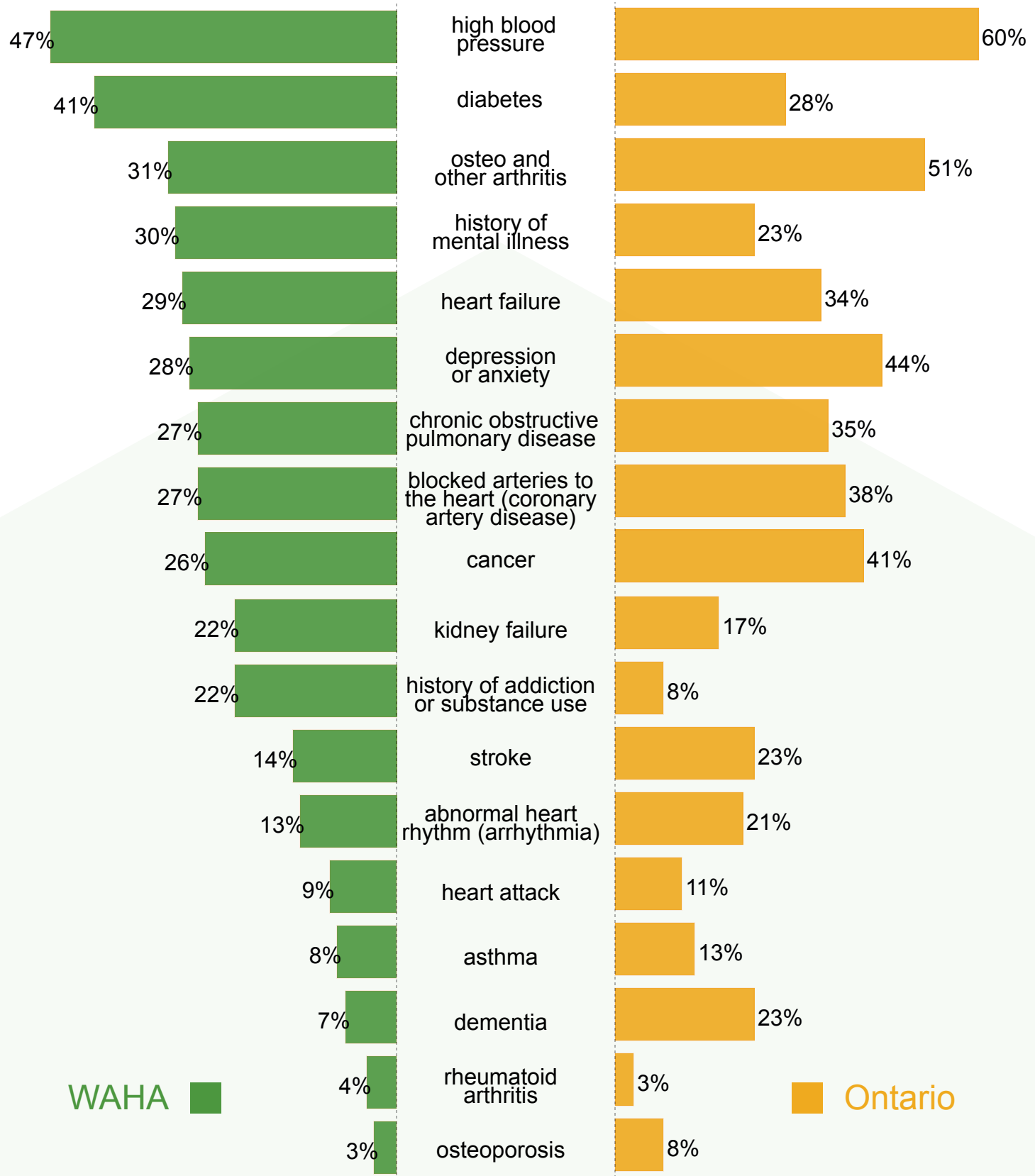
## Looking only at the cause of death does not give the complete picture. We also need to **look at chronic conditions present when someone dies**:

Looking at the the cause of death alone does not provide a lot of information about how healthy our people are when they die. This is why it is also important to look at the **number and types of chronic diseases** that are present at the time of death. This information can **help us understand** what is making people sick when they die.





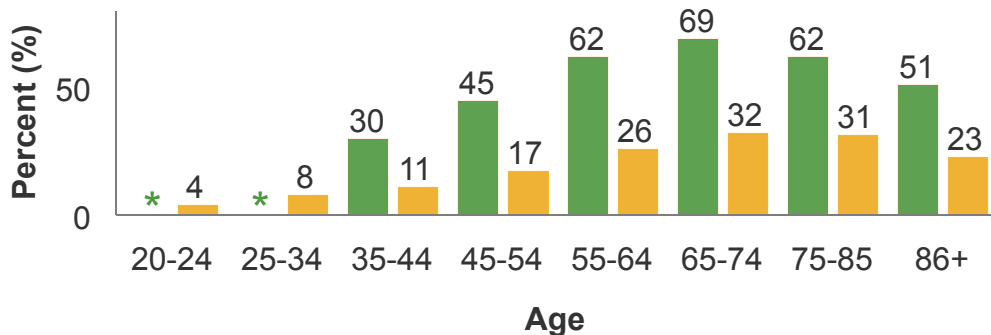
Here are some of the specific chronic conditions and the proportions of people who died with these conditions between 1992 and 2014.



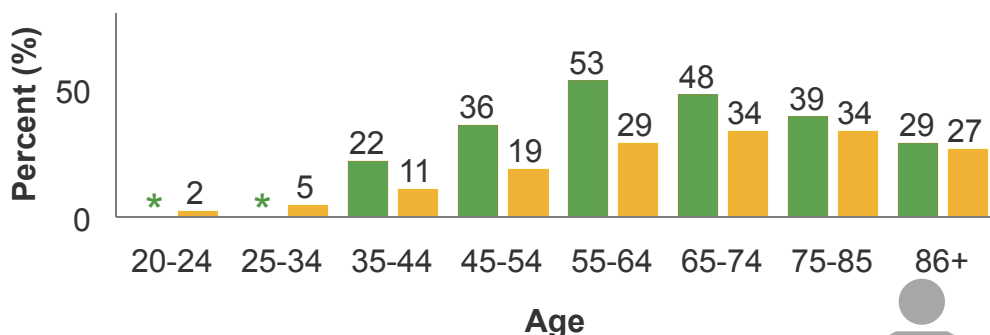
It is important to note that the chronic condition may be present at the time of death and/or the main cause of death (for example cancer). However, the chronic condition may have happened in the past and/or may not be the main cause of death (for example, history of mental illness).

When we look at the ages of the people who die with different chronic conditions and compare it to Ontario overall we start to see **important patterns in our data that can help us prioritize our health programming**

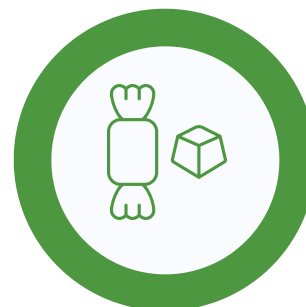
Women with a history of diabetes at death



Men with a history of diabetes at death



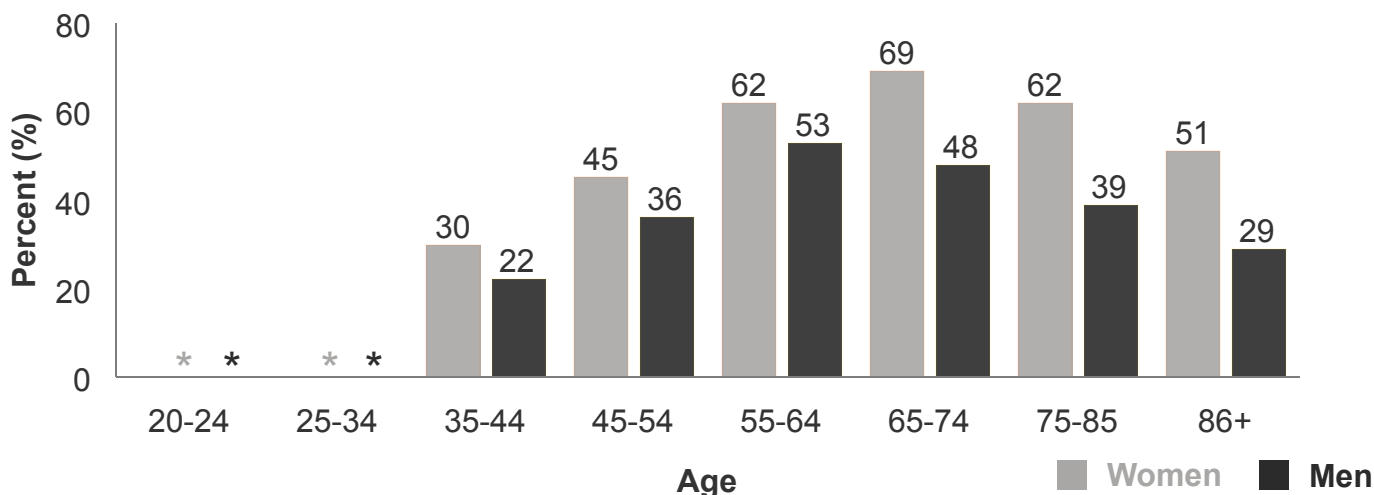
■ WAHA ■ Ontario



**More people** in our communities tend to **have diabetes** when they die compared to Ontario overall.

As well, **women** in our communities are **more likely** to have a history of **diabetes** when they die compared to men.

Women and men from WAHA communities who had diabetes when they died



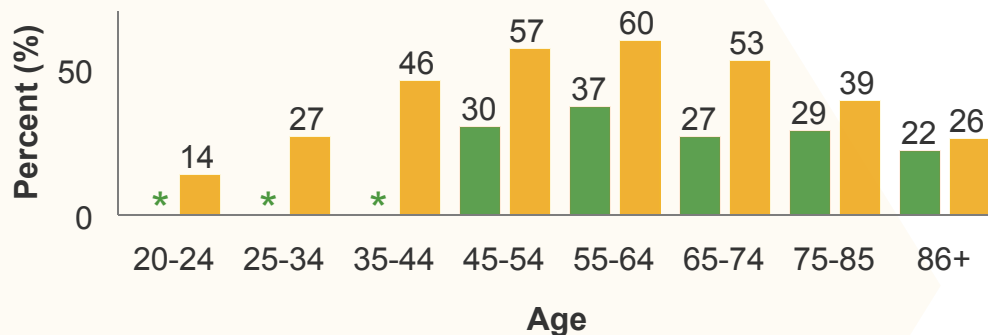
■ Women ■ Men

\* = This data has been excluded for privacy reasons

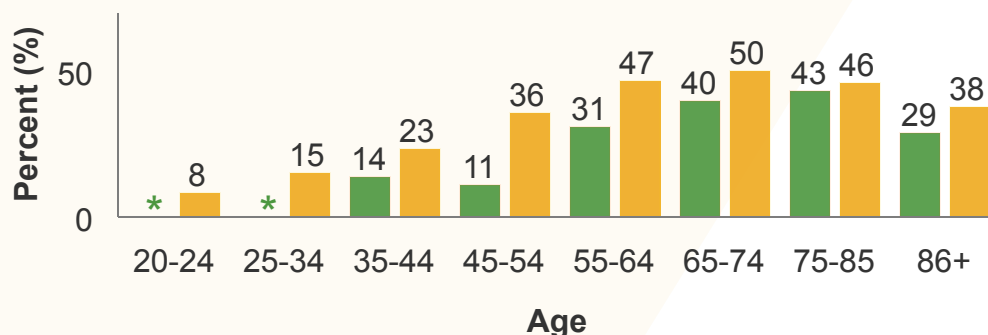
Our community members are **less likely** to have a history of **cancer** when they die compared to Ontario overall. This may be partly due to lower screening rates for some cancers.

As well, **men 65+** in our communities are **more likely** to have a history of **cancer** when they die compared to women.

### Women with a history of cancer at death

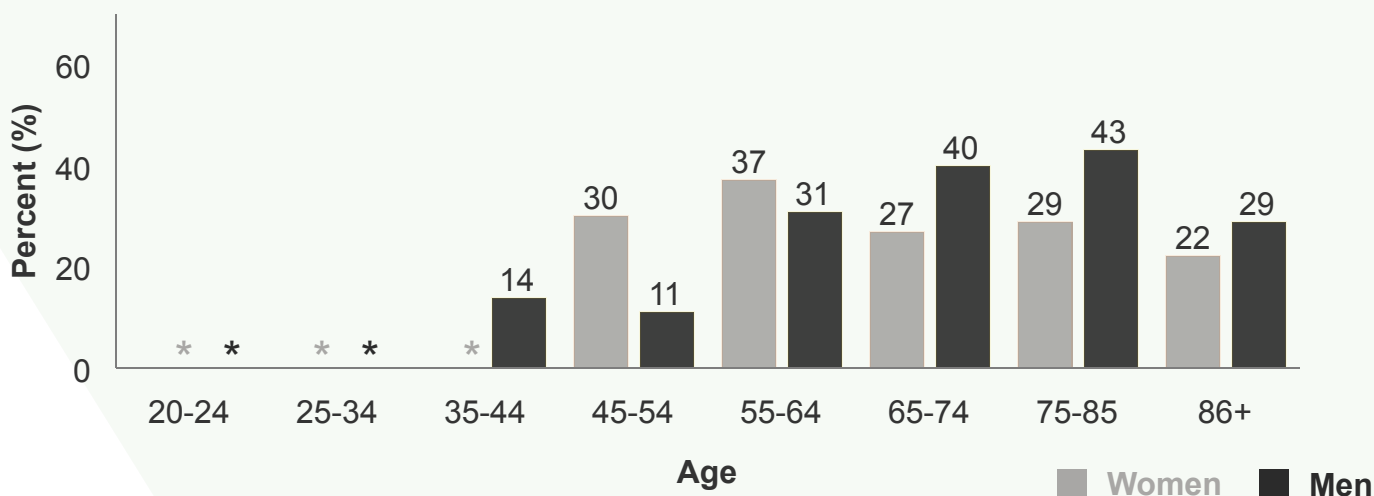


### Men with a history of cancer at death



■ WAHA ■ Ontario

### Women and men from WAHA communities who had cancer when they died



\* = This data has been excluded for privacy reasons

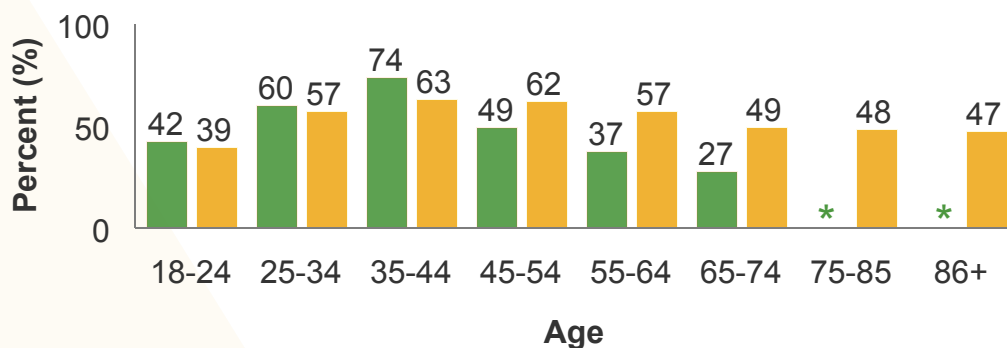


**Women between 18-44** in our communities are **more likely** to have a history of **depression and anxiety** when they die compared to Ontario overall.

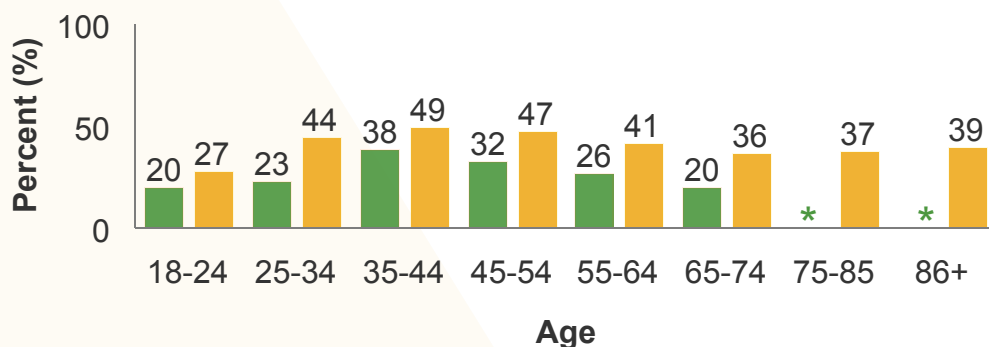
**Men** in our communities are **less likely** to have a history of **depression and anxiety** when they die compared to Ontario overall.

**Women** in our communities are **more likely** to have a history of **depression and anxiety** when they die compared to men.

**Women with a history of depression/anxiety at death**

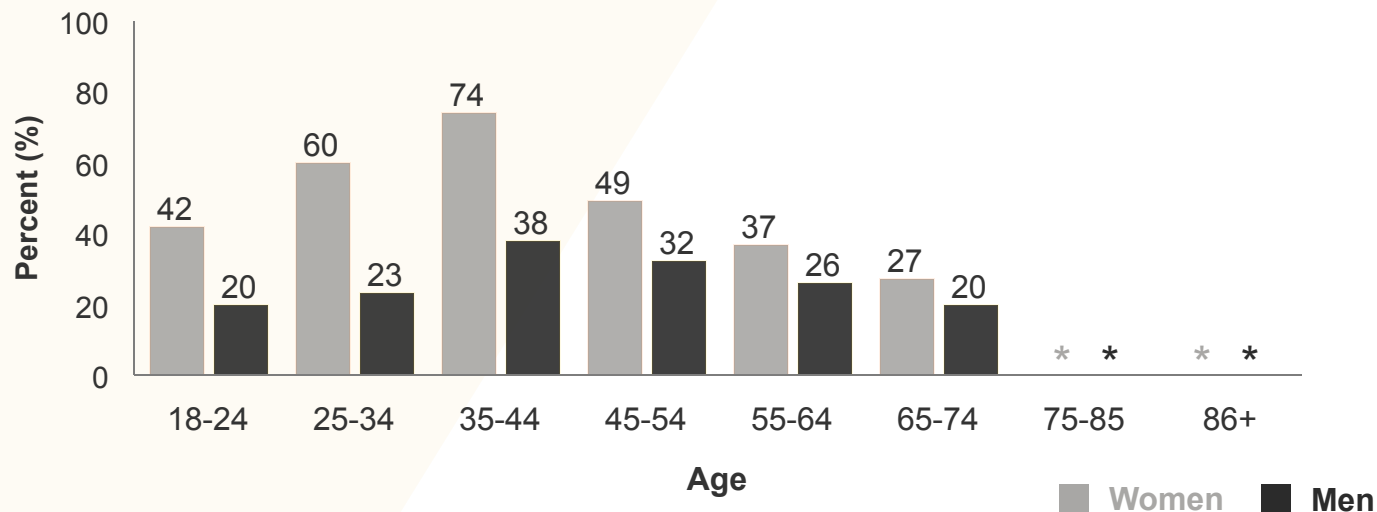


**Men with a history of depression/anxiety at death**



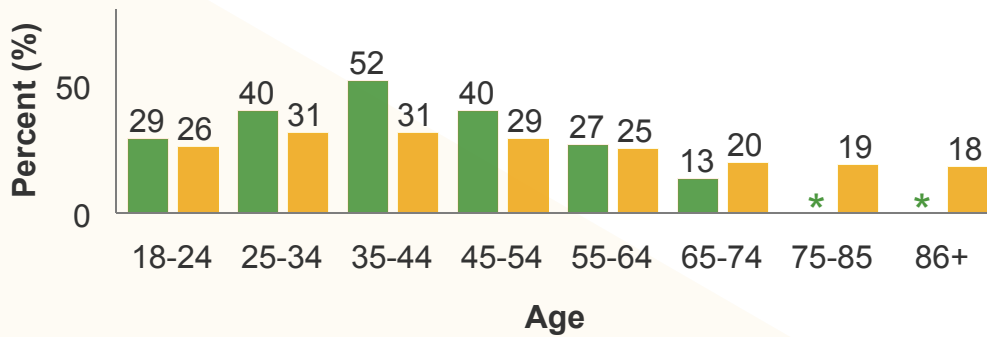
■ WAHA ■ Ontario

**Women and men from WAHA communities who had depression/anxiety when they died**



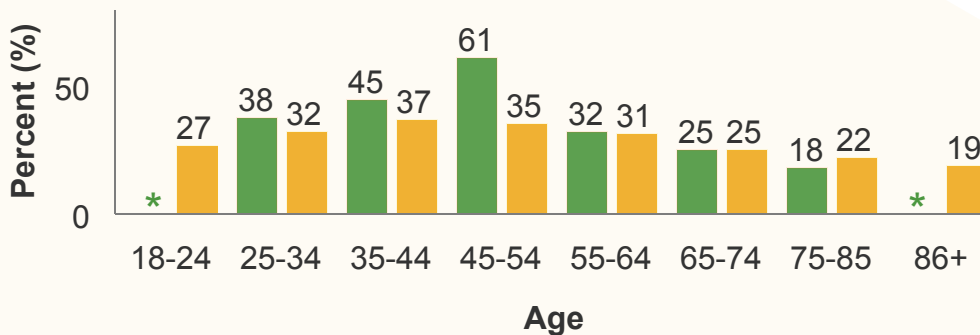
\* = This data has been excluded for privacy reasons

## Women with a history of mental illness at death



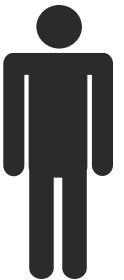
**More people** in our communities **between 18-64**, tend to have a history of **mental illness** when they die compared to Ontario overall.

## Men with a history of mental illness at death

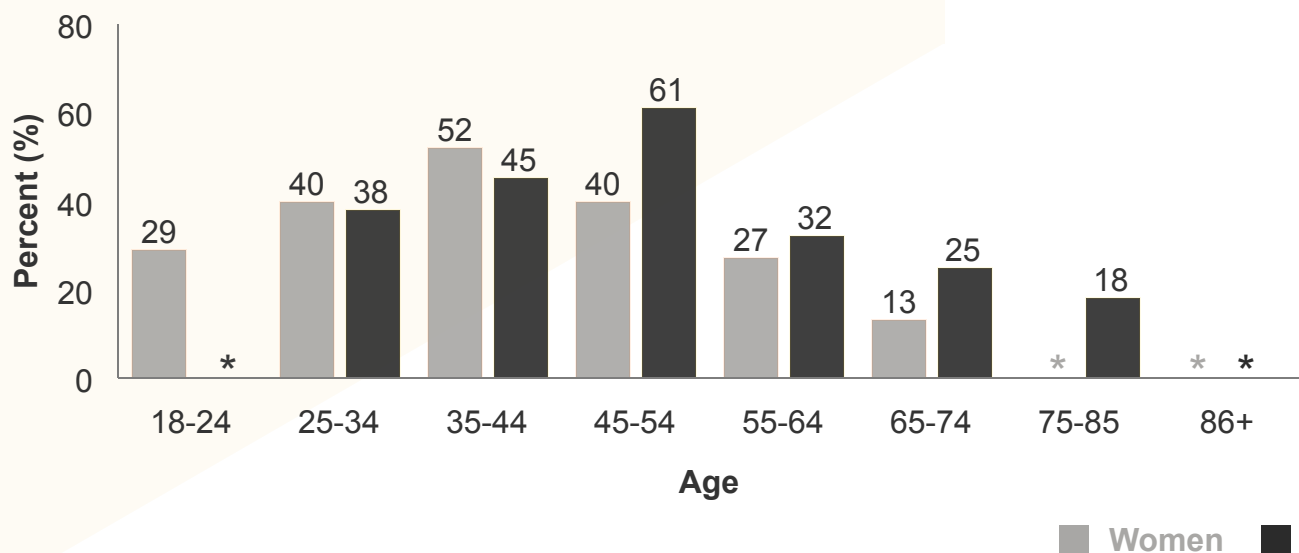


**Men between 45-74** in our communities are **more likely** to have a history of **mental illness** when they die compared to women.

■ WAHA ■ Ontario



## Women and men from WAHA communities who had a history of mental illness when they died



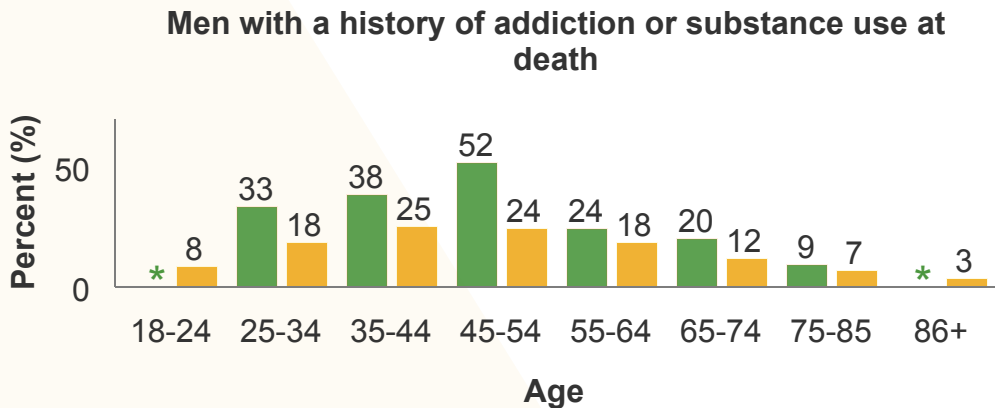
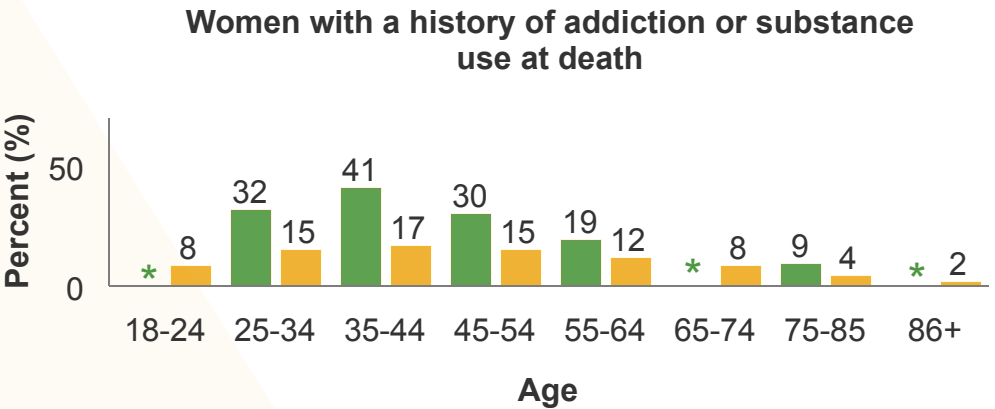
■ Women ■ Men

\* = This data has been excluded for privacy reasons

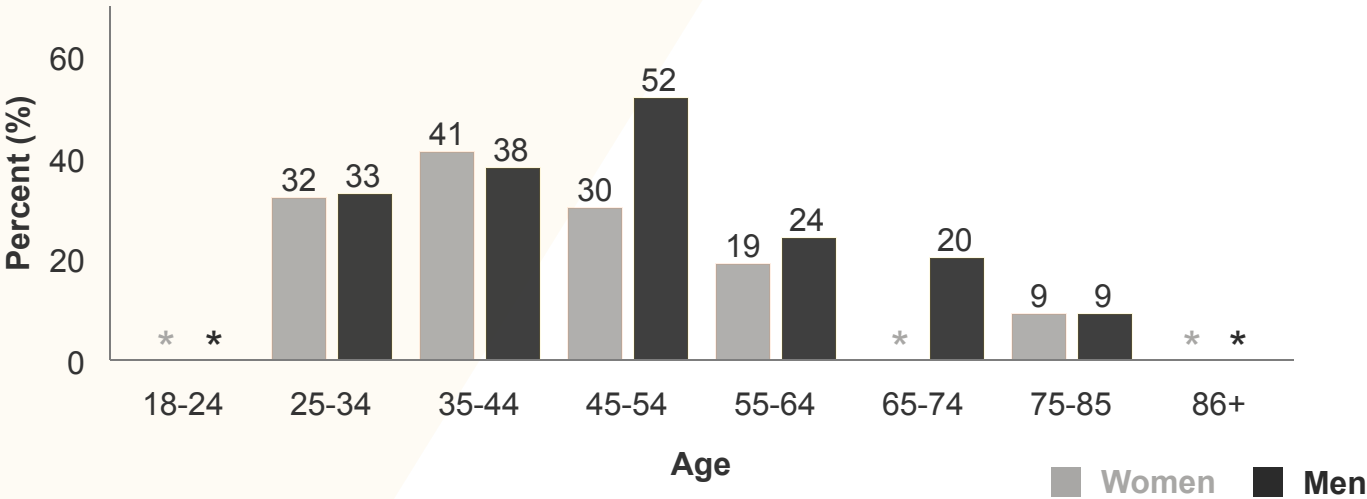
# Taking a closer look into the mental illness category:

Our community members are **more likely** to have a history of **addiction or substance use** when they die compared to Ontario overall.

**Men between 45-64** in our communities are **more likely** to have a history of **addiction or substance use** when they die compared to women.



Women and men from WAHA communities who had a history of addiction or substance use when they died

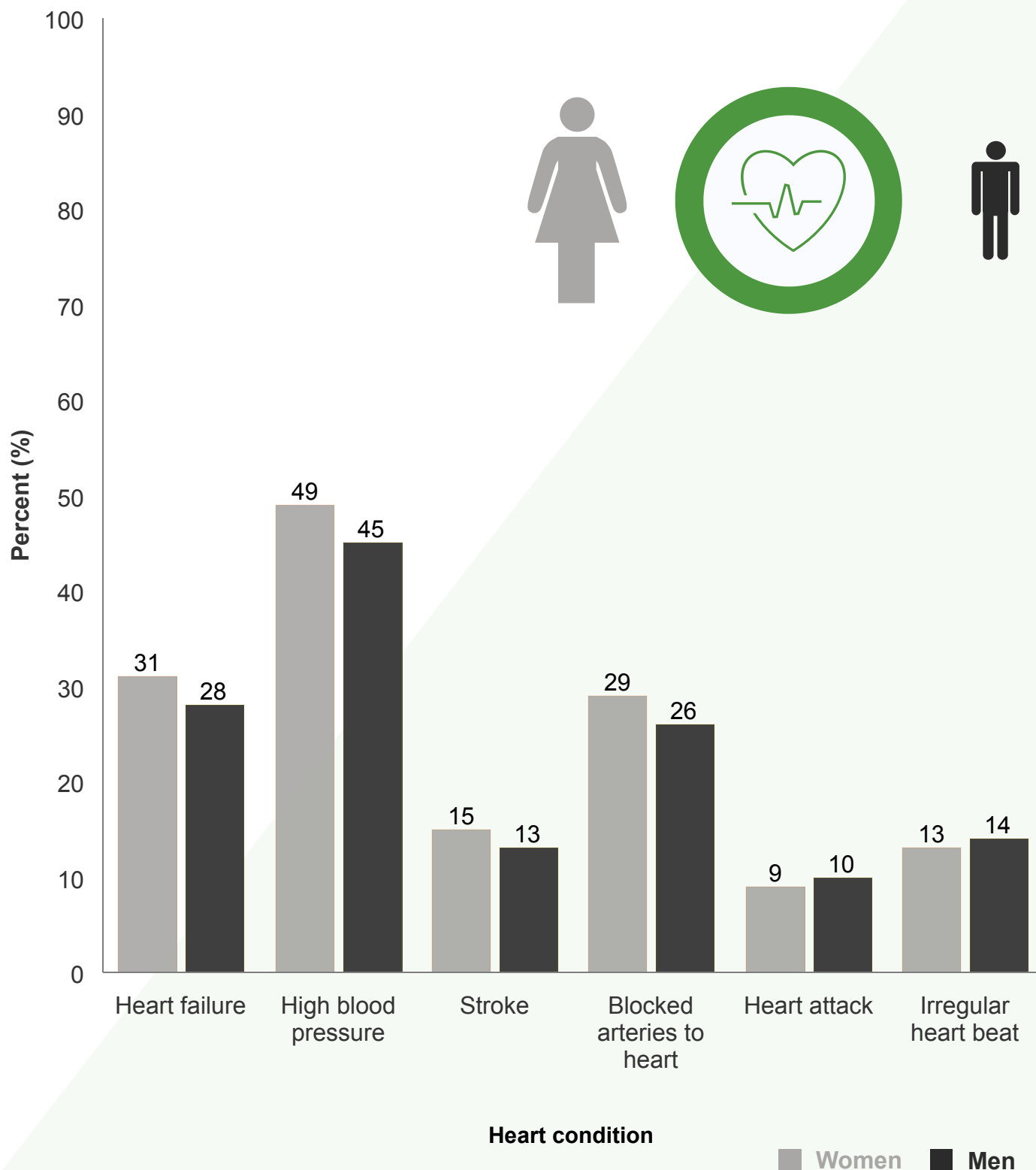


\* = This data has been excluded for privacy reasons

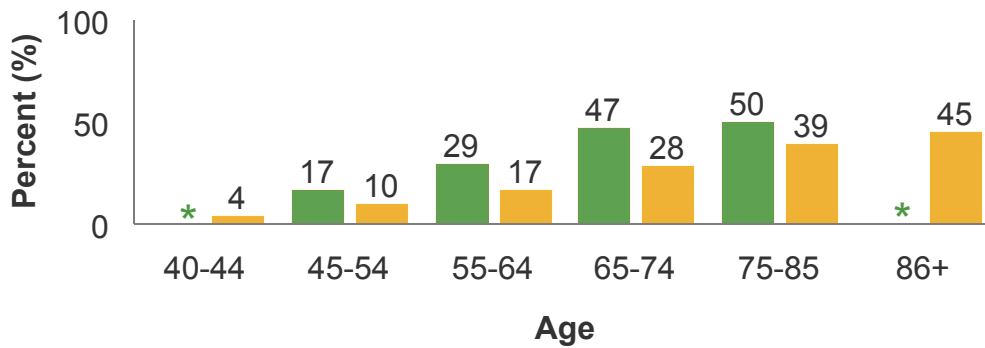


**Women** in our communities are **slightly more likely** to have a history of a **heart condition** when they die compared to men.

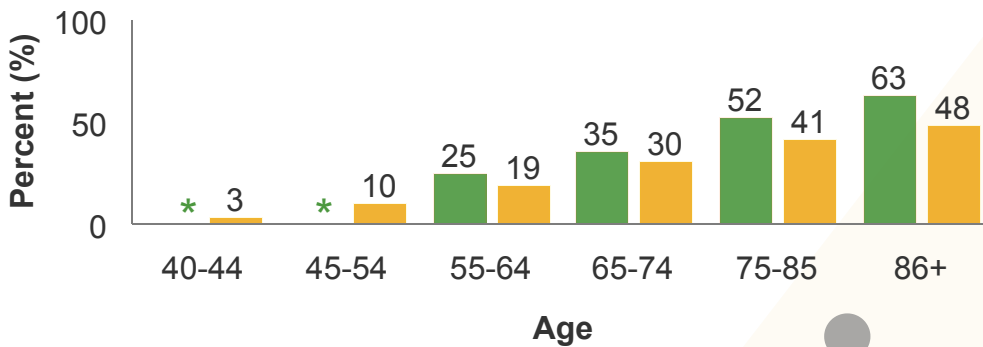
**Women and men from WAHA communities with a history of a heart condition when they died**



### Women with a history of heart failure at death



### Men with a history of heart failure at death



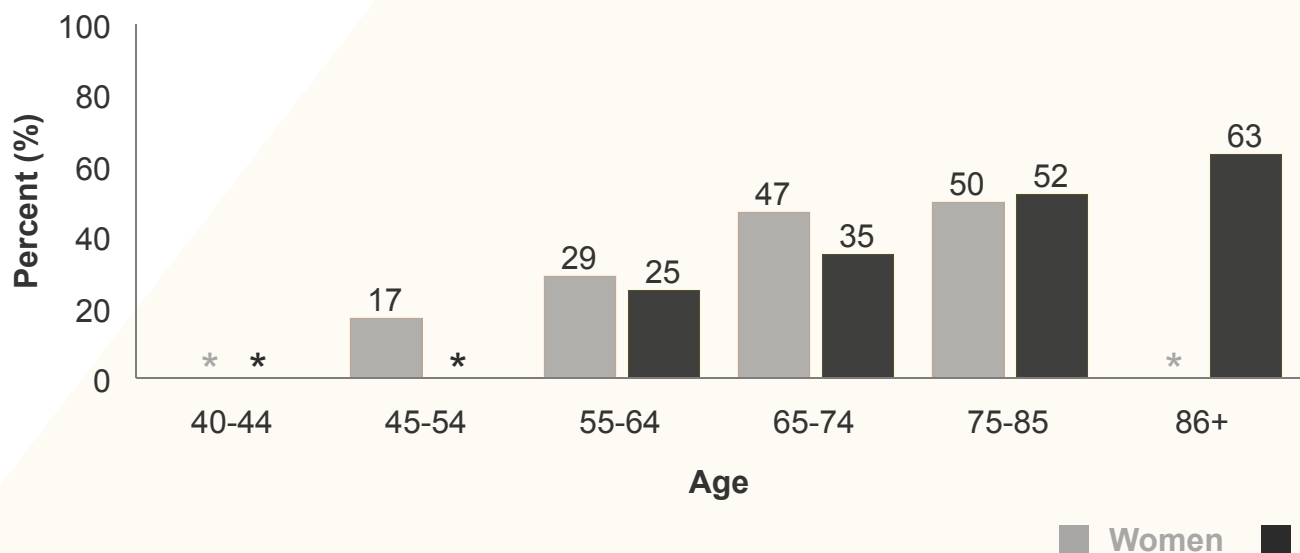
■ WAHA ■ Ontario



In most age groups, our community members are **more likely** to have a history of **heart failure** when they die compared to Ontario overall.

**Women between 55-74** in our community are **more likely** to have a history of **heart failure** when they die compared to men.

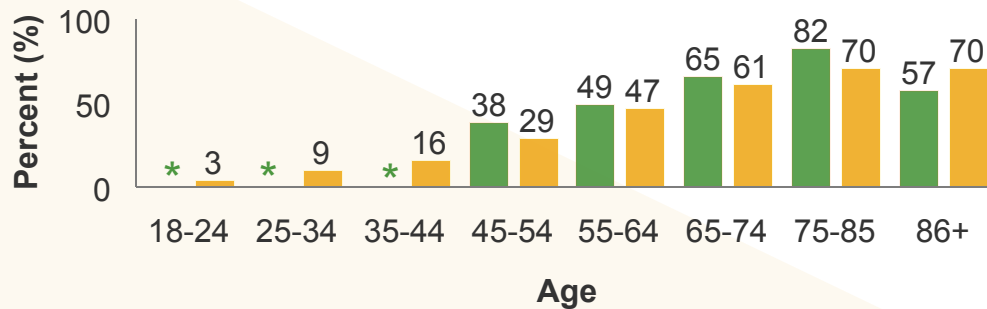
### Women and men from WAHA communities who had a history of heart failure when they died



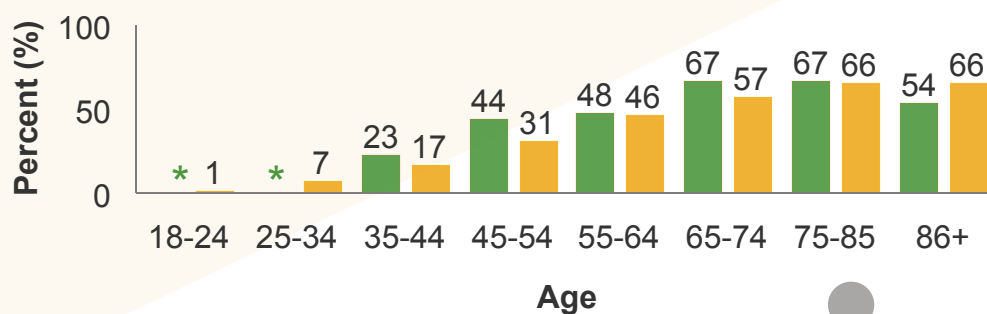
■ Women ■ Men

\* = This data has been excluded for privacy reasons

### Women with a history of high blood pressure (hypertension) at death



### Men with a history of high blood pressure (hypertension) at death



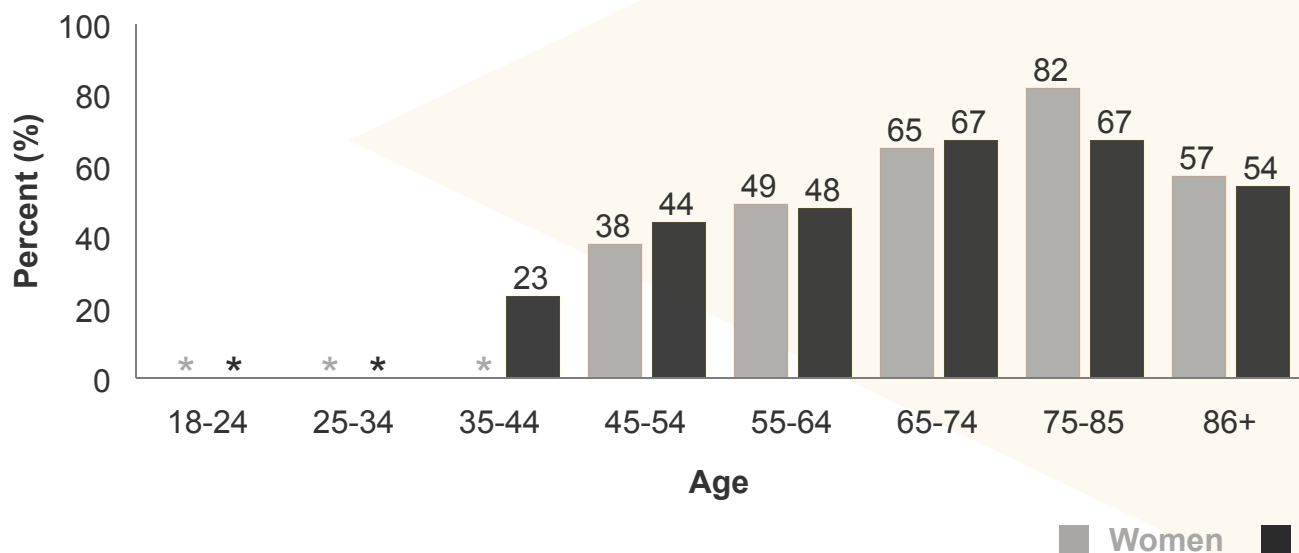
■ WAHA ■ Ontario



In most age groups, our community members are **more likely** to have a history of **high blood pressure** (hypertension) when they die compared to Ontario overall.

**Women 75+** in our community are **more likely** to have a history of **high blood pressure** when they die compared to men.

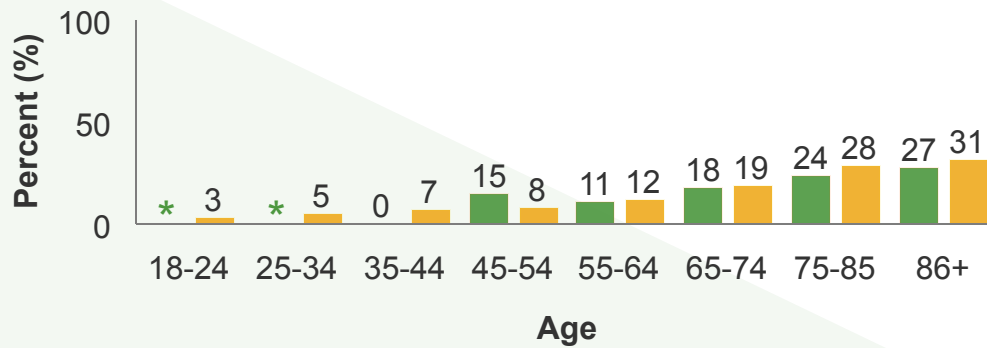
### Women and men from WAHA communities who had a history of high blood pressure (hypertension) when they died



■ Women ■ Men



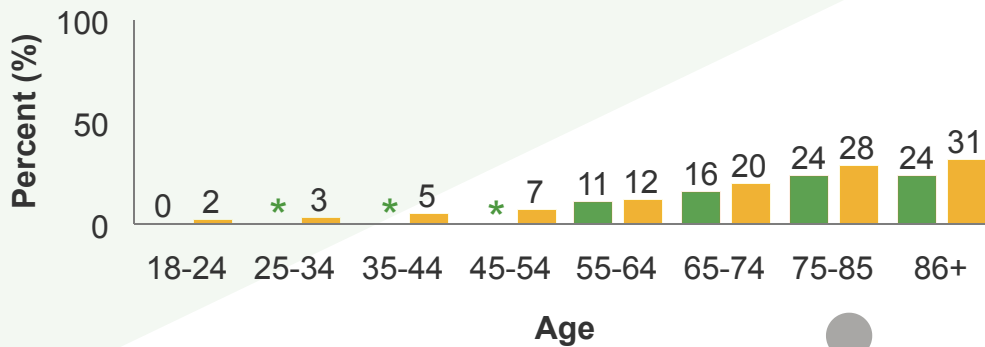
### Women with a history of stroke at death



Our community members are **less likely** to have a history of **stroke** when they die compared to Ontario overall.

**Women between 65-74 and 86+** in our community are **more likely** to have a history of **stroke** when they die compared to men.

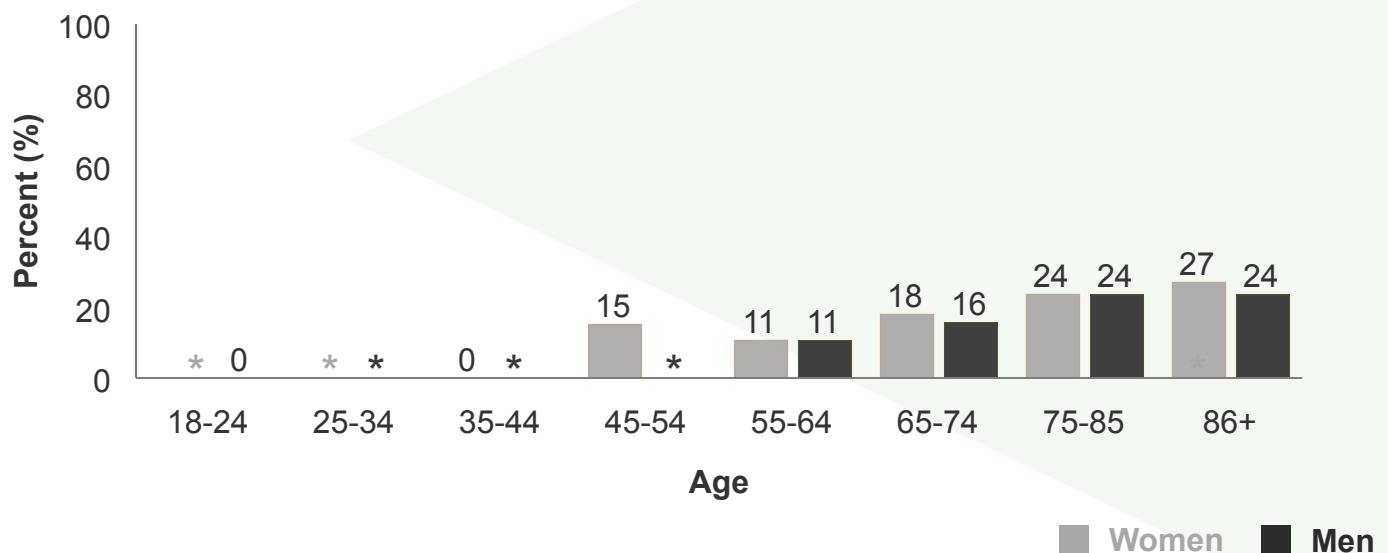
### Men with a history of stroke at death



■ WAHA ■ Ontario



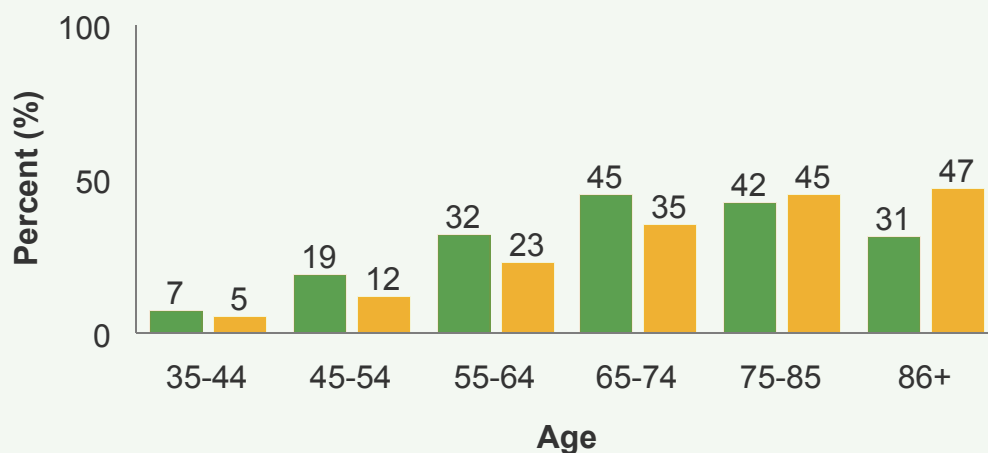
### Women and men from WAHA communities who had a history of stroke when they died



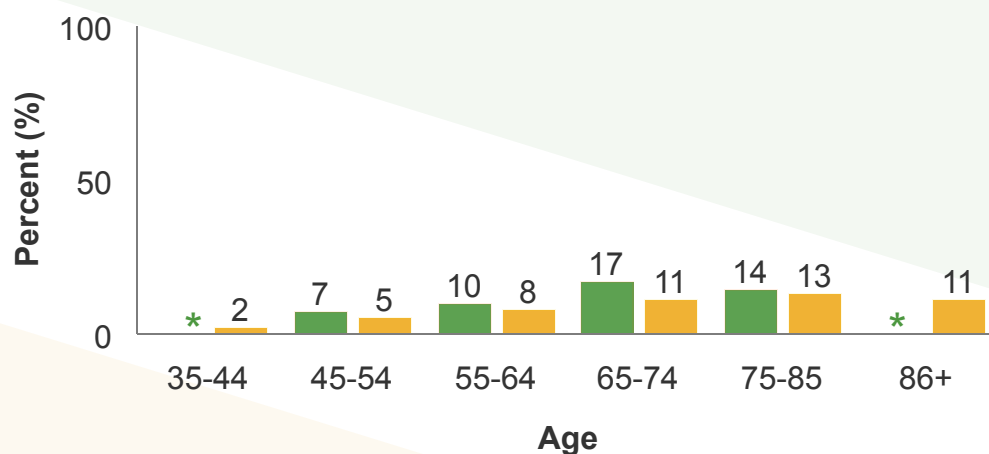
■ Women ■ Men

\* = This data has been excluded for privacy reasons

### People with a history of blocked arteries to heart (coronary artery disease) at death

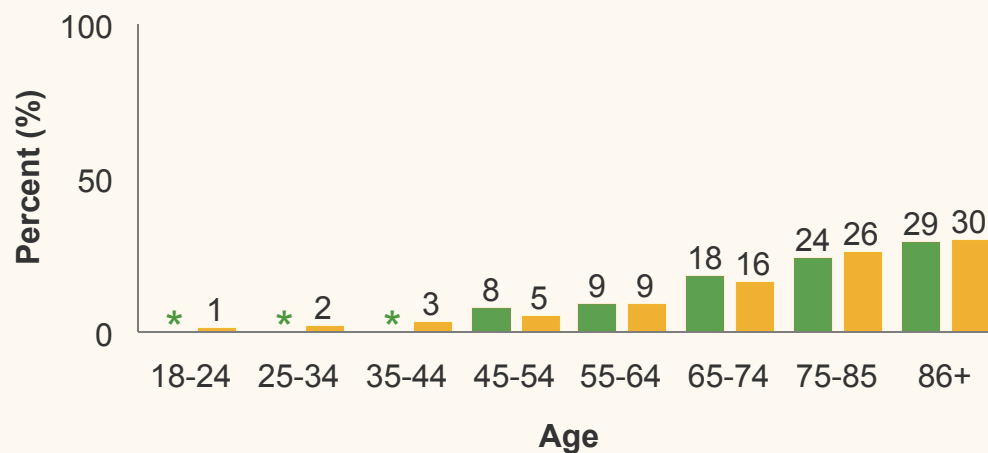


### People with a history of heart attack (acute myocardial infarction) at death



■ WAHA ■ Ontario

### People with a history of irregular heart beat (arrhythmia) at death

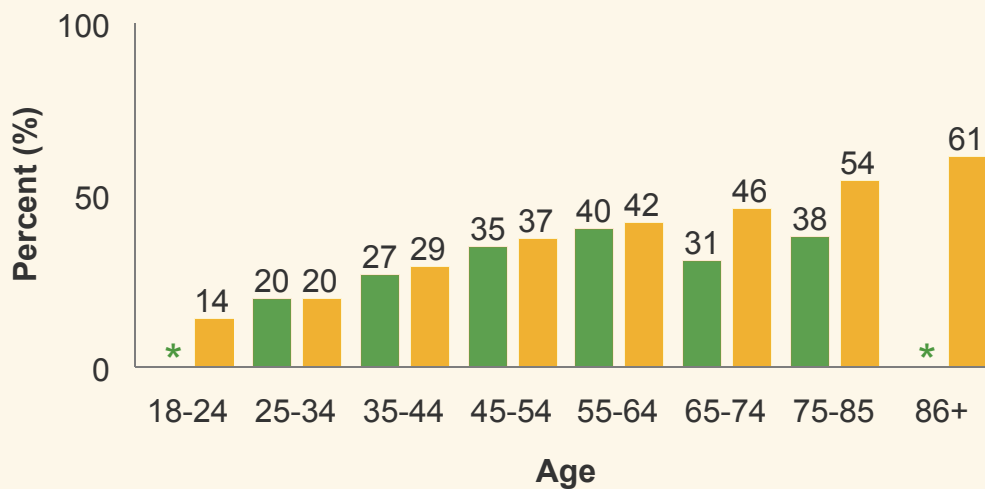


In most age groups, our community members are **more likely** to have a history of **blocked arteries to the heart** and history of a **heart attack** when they die compared to Ontario overall. Our community members are **equally as likely** to have a history of **irregular heart beat** when they die compared to Ontario overall.

\* = This data has been excluded for privacy reasons



People with a history of osteoarthritis at death



■ WAHA ■ Ontario



Our community members are **less likely** to have a history of **osteoarthritis** when they die compared to Ontario overall.

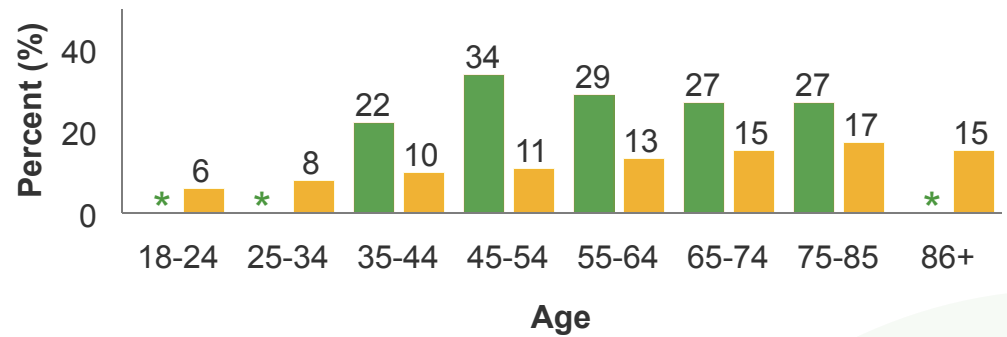
\* = This data has been excluded for privacy reasons



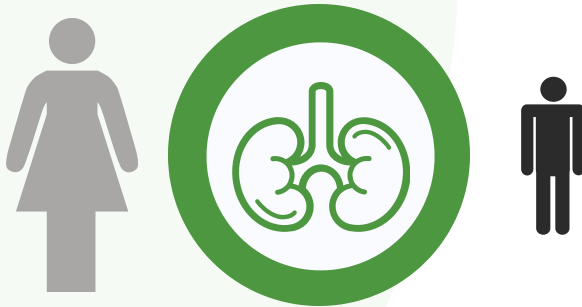
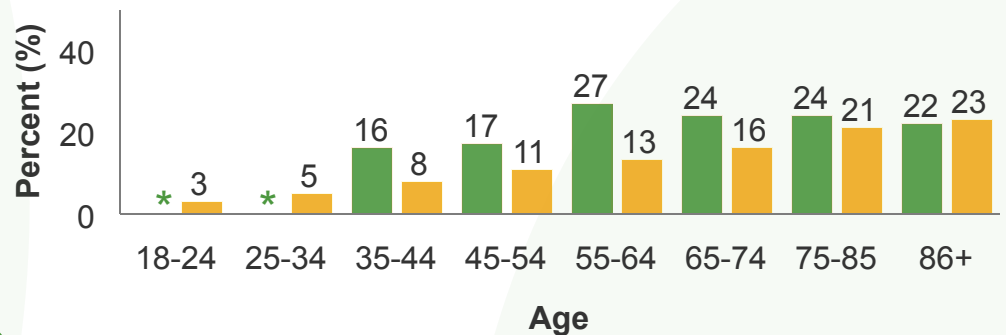
## Women with a history of kidney failure at death

Our community members are **more likely** to have a history of **kidney failure** when they die compared to Ontario overall.

**Women** in our communities are **more likely** to have a history of **kidney failure** when they die compared to men.

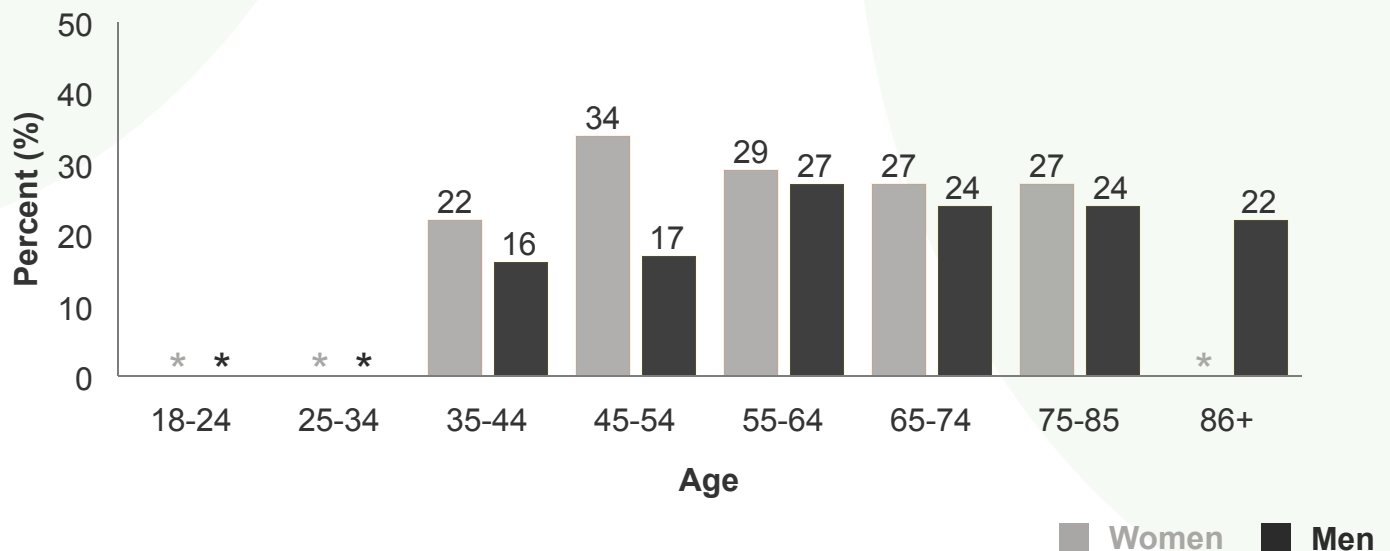


## Men with a history of kidney failure at death



■ WAHA ■ Ontario

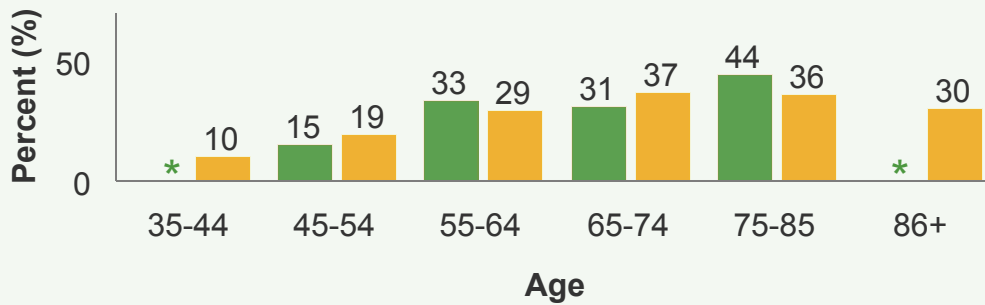
## Women and men from WAHA communities who had a history of kidney failure when they died



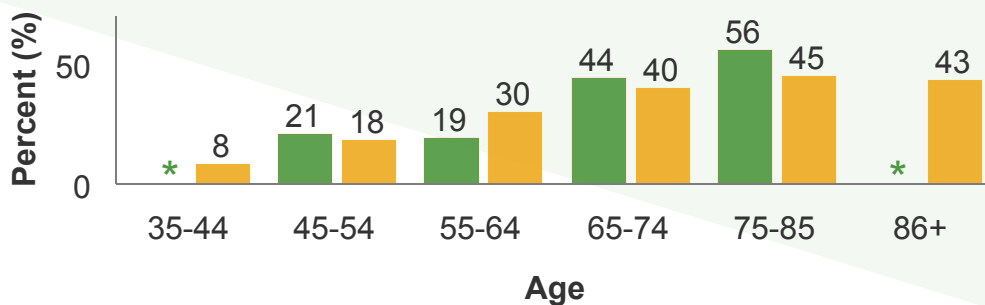
■ Women ■ Men

\* = This data has been excluded for privacy reasons

### Women with a history of chronic obstructive pulmonary disease (COPD) at death



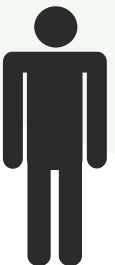
### Men with a history of chronic obstructive pulmonary disease (COPD) at death



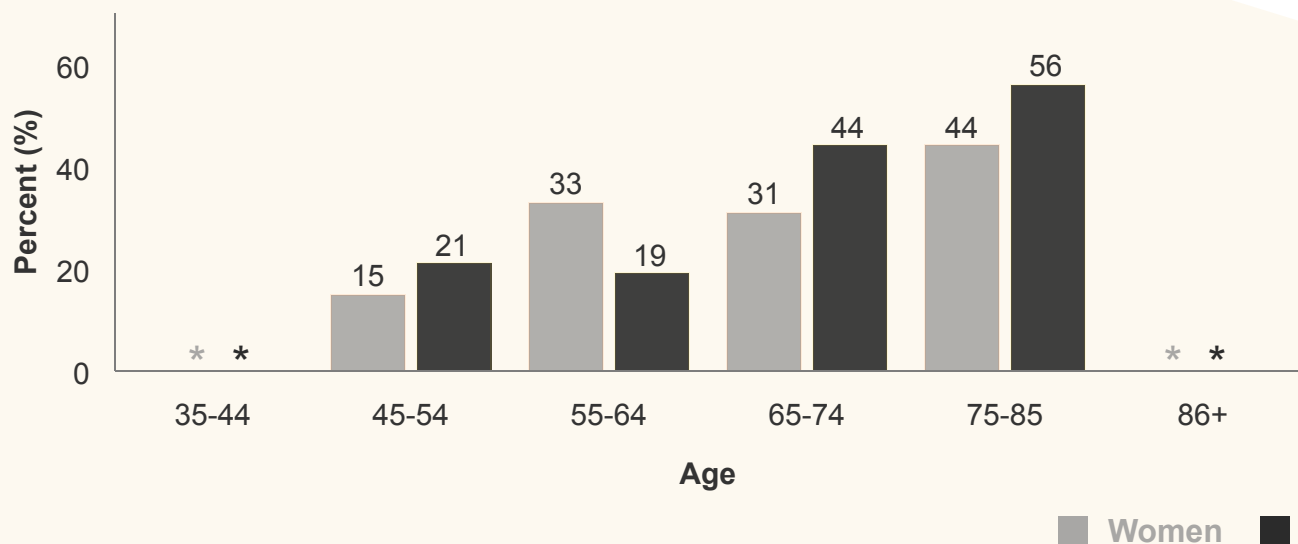
Our community members are **equally as or slightly more likely** to have a history of **chronic obstructive pulmonary disease (COPD)** when they die compared to Ontario overall.

**Men between 65-85** in our communities are **more likely** to have a history of **COPD** when they die compared to women.

■ WAHA ■ Ontario



### Women and men from WAHA communities who had a history of chronic obstructive pulmonary disease (COPD) when they died



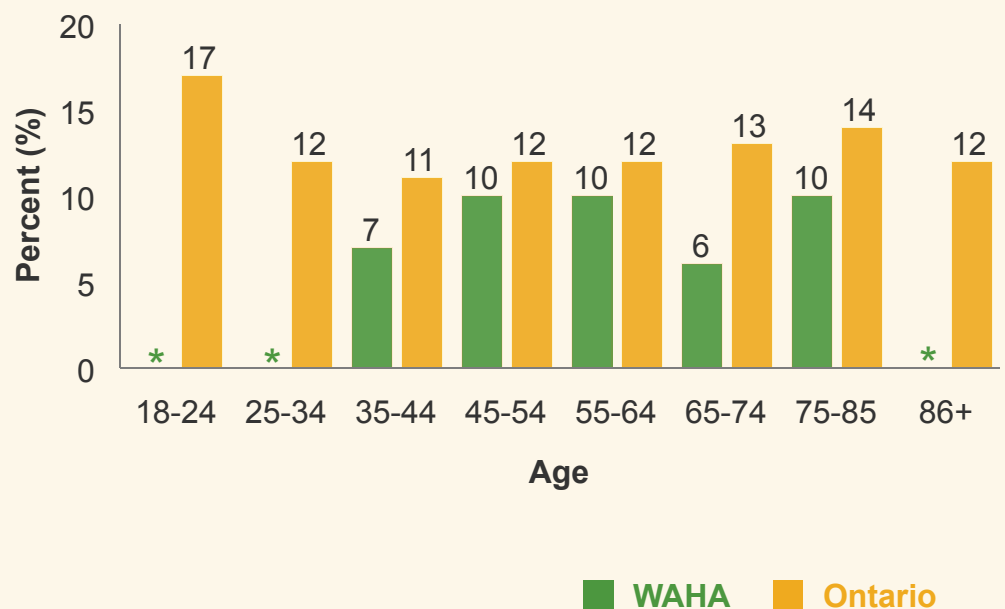
■ Women ■ Men

\* = This data has been excluded for privacy reasons



Our community members are **less likely** to have a history of **asthma** when they die compared to Ontario overall.

People with a history of asthma at death



\* = This data has been excluded for privacy reasons

## Key Messages

- Our community members are much **more likely to die before retirement age** (65 years old) than the overall Ontario population.
- Many of our people **could live longer** with better public health and/or medical care.
- The most **common causes of death** among our community members are **injuries, circulatory, and cancer** related deaths. We have **more deaths in our communities due to injuries, infections and diabetes than Ontario overall**. Circulatory and cancer deaths in our communities are occurring at about the same rate as Ontario overall
- People in our communities are **dying from cancer at about the same rate as Ontario overall**. However, the proportion of people who have experienced cancer when they die is lower among our community members than Ontario overall.
- Almost half of the people who die in our community **have at least four chronic diseases** by the time they die.
- Our community members tend to have **fewer chronic diseases** when they die than the overall Ontario population. This is likely **because our community members are dying so much younger**. This means they do not get old enough to have some of the chronic diseases that are more common among elders.
- When we look at the ages of the people who die with different chronic conditions and compare it to Ontario overall **we start to see important patterns** in our data that can help us prioritize our health programming. For example:
  - The proportion of **men 45+ dying with a history of mental illness and addiction/substance use** is higher than the proportion of women 45+ dying with those chronic conditions.
  - The proportion of **young women dying with depression & anxiety, and kidney failure** is higher than the proportion of young men dying with those chronic conditions.
- The proportion of **women dying with diabetes, and several of the cardiovascular health issues** is **higher** than the proportion of men dying with those chronic conditions.



# Appendix 1: Data Sources

## What data were used?

The Indian Registry System (IRS) was used to identify all registered band members of the communities that chose to participate in this analysis.

## What years are included?

Data for deaths occurring between 1992 to 2014 were included.

## Who is included?

All registered band members of the 59 communities who chose to participate were included in the analysis regardless of where they live in Ontario. This means that registered band members were included if they lived on reserve or off reserve. The Ontario overall results include all residents of Ontario who are OHIP eligible including registered band members of the 59 communities participating in this analysis. At the Ontario level the results did not differ significantly if registered band members were included or excluded from the Ontario overall rates. Only the rates for Northwestern Health Unit and the Northwest Local Health Integration Network differed significantly when registered band members were included or excluded from the rates. This reflects the relatively large registered First Nations population in these two geographical areas. Results presented in the appendices are based on comparison populations (e.g. Ontario, Health Units, and LHINs) that represent the non-registered population in each of those geographies.

## Who is not included?

People who are not registered in the IRS are not included in this analysis even if they live on reserve and even if they self-identify as being part of a participating First Nation. Band members from communities who did not choose to participate in this analysis are not included in the analysis even if they reside in a community that chose to participate in the analysis.

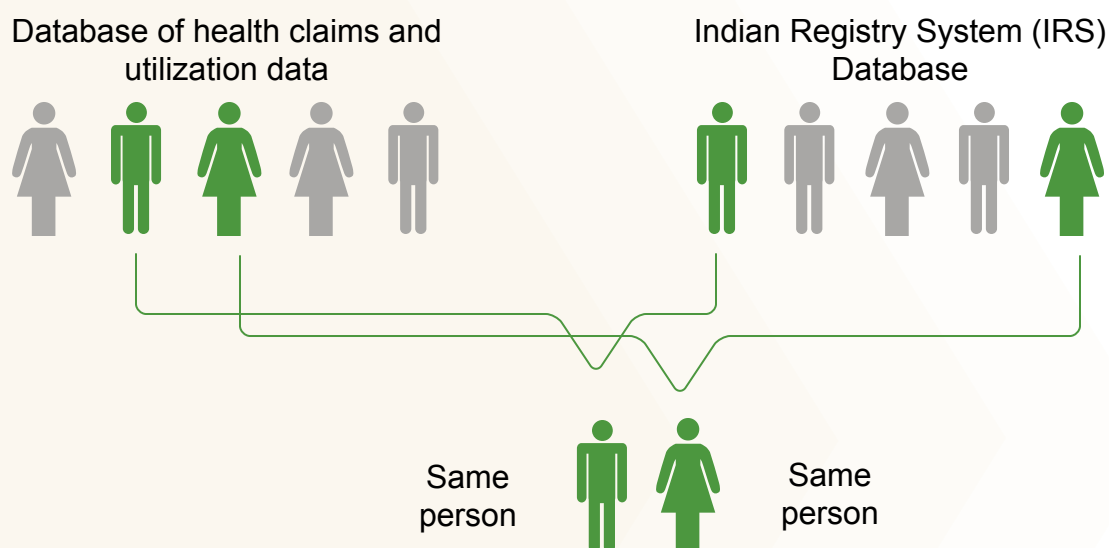
## Where did the data come from?

Data for this analysis came from several linked databases. These databases fall into three different groupings:

- **Population based databases** were used to identify who to include in the analysis and to link these individuals records with their records in other databases. Specifically, the IRS was used to identify all registered band members from the communities that chose to participate in this analysis. The Ontario Registered Persons Data Base (RPDB) was used to link individuals in the IRS with their records in other databases. The RPDB was also used to create the overall Ontario comparison statistics provided in this report.
- **Vital Statistics** data captures births and deaths in Ontario. The Ontario Registrar General's Death file (ORG-D) was used to identify most of the deaths summarized in this report. Some additional deaths were captured only in the RPDB or only in the IRS. Only the ORG-D has comprehensive cause of death data. Deaths that only appeared in the RPDB or IRS were therefore classified as missing cause of death in the section of the report that analyses the causes of death.
- **Health Administration Data** were used to determine the chronic diseases present at the time of death. Health administrative data captures information such as reasons for physician visits and hospital admissions. This data is used to determine which chronic diseases are present at the time of death.

## Appendix 1: Data Sources

Population Files	Vital Statistics	Health Administration Data
Indian Registry System (IRS) Ontario Registered Persons Database (RPDB)	Ontario Registrar General's Death file (ORG-D) (includes comprehensive cause of death)	Health claims and utilization data (physician visits, hospital admissions, etc.)



By connecting the above databases, we now know more about the mortality experience in our communities.

### How did we identify death date and the cause of death?

Vital statistics data and population files were used to identify the date of death for each person that died and was included in this analysis.

- Primary source was the ORG-D
- If missing in ORG-D then the RPDB was used
- If missing in the ORG-D and RPDB then the IRS was used

Among the 59 communities who participated in this analysis there were 5,837 deaths between 1992 and 2014.

\* Image Reference: Cancer Care Ontario, Aboriginal Cancer Control Unit: How we measure cancer in First Nations, Inuit and Métis populations, 2017.

## Appendix 2: Indicators Used in Report

### What were the indicators used in this report?

#### **Mortality:**

Numerators include all individuals who meet the criteria of the indicators listed below. Denominators for indicators that report on the entire cohort period from 1992 to 2014 use the living population at the mid-point of the cohort period. Denominators for the annual mortality time trend data count people who were alive and had OHIP eligibility at any point in the year.

**All-cause mortality:** Includes all deaths, regardless of age or the cause of death.

**Premature mortality:** Includes all deaths before age 65, regardless of the cause of death.

**Cause specific mortality:** Includes all deaths grouped according to the underlying cause of death. The categories of underlying causes of death used in this analysis are circulatory and cardiovascular diseases, cancers, external causes of injury and poisoning, respiratory diseases, diabetes, other causes of death, and missing causes of death.

**Amenable mortality:** Includes all deaths before age 75 that were due to causes that are avoidable in the presence of timely and appropriate medical care or public health intervention. Amenable causes of death include diabetes, motor vehicle accidents, chronic obstructive pulmonary disease, among others.

#### **Chronic conditions present at the time of death:**

Chronic conditions present at the time of death are presented as percentages where the numerator is the number of people who met the chronic condition eligibility criteria at the time they died. The denominator represents all the people who died. When age categories are presented it is based on the age at which the individual died rather than the age at which they met the criteria for having a particular chronic condition. Time trends for chronic conditions are based on the individuals who died in each year.

#### **Individual chronic conditions (e.g. diabetes, asthma, stroke, etc):**

Each chronic condition has a specific set of eligibility criteria based on health service utilization prior to death. Each chronic condition at the time of death includes all deaths for which the individual met the eligibility criteria for the specific chronic condition. One of the eligibility criteria is age. Unless otherwise stated the minimum age to be eligible to have a chronic condition in this analysis was 18 years old. The following chronic conditions have older age cutoffs:

- Diabetes: 20 years or older
- Chronic Obstructive Pulmonary Disease (COPD): 35 years or older
- Heart Failure: 40 years or older
- Blocked Arteries to the Heart (Coronary Artery Disease): 35 years or older
- Heart Attack (Acute Myocardial Infarction): 35 years or older

## Appendix 2: Indicators Used in Report

### Multimorbidity at time of death:

Multimorbidity is the presence of two or more chronic conditions in one individual.

In this report multi-morbidity is calculated at the time of death and is presented in four categories including:

- the proportion of people with no (0) chronic conditions when they died,
- the proportion of people with one (1) chronic condition when they died,
- the proportion of people with two or three (2-3) chronic conditions when they died, and
- the proportion of people with four or more chronic conditions when they died.

The following 18 chronic conditions were analyzed for this report:

- asthma
- cancer
- heart failure (congestive heart failure)
- chronic obstructive pulmonary disorder (COPD)
- diabetes
- heart attack (acute myocardial infarction)
- rheumatoid arthritis
- osteo- and other arthritis
- Crohn's or colitis disease
- abnormal heart rhythm (cardiac arrhythmia)
- high blood pressure (hypertension)
- blocked arteries to the heart (chronic coronary syndrome)
- stroke
- osteoporosis
- mood disorder (depression/anxiety)
- mental illness
- dementia
- kidney/renal failure

The addiction and substance use indicator is a subset of mental illness so is not considered a separate chronic condition for the calculation of multimorbidity.

### How were comparisons made?

Comparisons are made between Weeneebayko Area Health Authority results and Ontario overall results. The WAHA population tends to be younger than the overall Ontario population.

To account for this, rates were age standardized to the age structure of the Ontario population in 2000. All the rates listed in the report are based on crude rates (e.g. not age standardized). All comparisons of rates (e.g. 4.1x the rate for Ontario overall) are calculated using age standardized rates to control for the known differences in the ages of the WAHA and Ontario populations. The age group used during age standardization were 0-17, 18-44, 45-64, and 65+. These age groups were selected to balance the need to have relatively large age bands due to the small populations of WAHA communities while still having age bands that reflect the underlying differences in the age structures of the WAHA and Ontario populations.

### Privacy through this report:

Where counts are small (e.g. less than 6 events) the data is excluded and replaced with an asterix (\*).

If the remaining data could allow a small count to be recalculated then an additional piece of data is excluded to prevent the small count from being derived from other data. This is done to be respectful of the privacy of the people whose data is being represented in this report.

## Appendix 3: Limitations

Although this report has a lot of information, it is important to recognize a number of limitations of the data. These limitations include:

The Indian Registry System (IRS) is an imperfect registry rooted in a colonial system. There are several limitations of the IRS including:

- There are many people who identify as First Nations but are not registered in the IRS.
- There is often a lag in the time between a child's birth and when they are registered in the IRS. This means that if a child was born in 2013 but was not registered until 2015 then they will not be counted in the numerators or denominators of this report. Similarly, if a child passed away in 2013 but was not registered in the IRS until 2015 then they would not be counted in denominator of this report.

The results presented here are based on band membership. This means that the results are interpreted as the total band population regardless of where band members live. This does not allow for differentiation of the health experiences of band members who live on reserve, off reserve, or on a different reserve. Total band population was used for a couple of reasons:

- Community members often have to move off reserve for reasons other than their own preferences. Such reasons include access to medical care for chronic conditions, access to school for children, access to adequate housing, etc. By presenting results for the total band population communities are able to get a sense of the kinds of services communities need to be able to provide in order for community members to live their lives in the locations they choose rather than the location where services are available.
- Community population sizes are already very small and create limitations in the data that can be shared at the community level. If the data was broken down into on-reserve and off-reserve groupings then populations would be even smaller and less data would be able to be shared with communities.
- Assigning individuals to categories such as "on-reserve" or "off-reserve" is challenging. People may have lived in multiple locations between 1992 and 2014. People may spend part of their time on reserve (summers) and part of their time off reserve. Individuals may be registered with one band but live on the reserve of a different band. Band members may live very close to the reserve, participate in activities on reserve, and receive services on reserve but may not be geographically on-reserve.



## Appendix 3: Limitations

Service utilization can be very different between Mamow Ahyamowen communities and other Ontario communities. Some of the key differences in service utilization include:

- Many of the communities participating in this analysis are remote and isolated communities where the only access is by air with some winter road access for a few weeks each winter. This makes access to hospital services very different than most Ontario communities where hospitals can be accessed by driving, walking, or even public transportation.
- Most communities have nursing stations or health centres. Nursing stations often provide an expanded scope of care particularly in remote and isolated communities. This means that nurses provide some care that might typically be provided by physicians.
- Several communities receive at least some of their health services from Manitoba due to their proximity to the Manitoba border. This may affect the health service utilization data available for these community members.

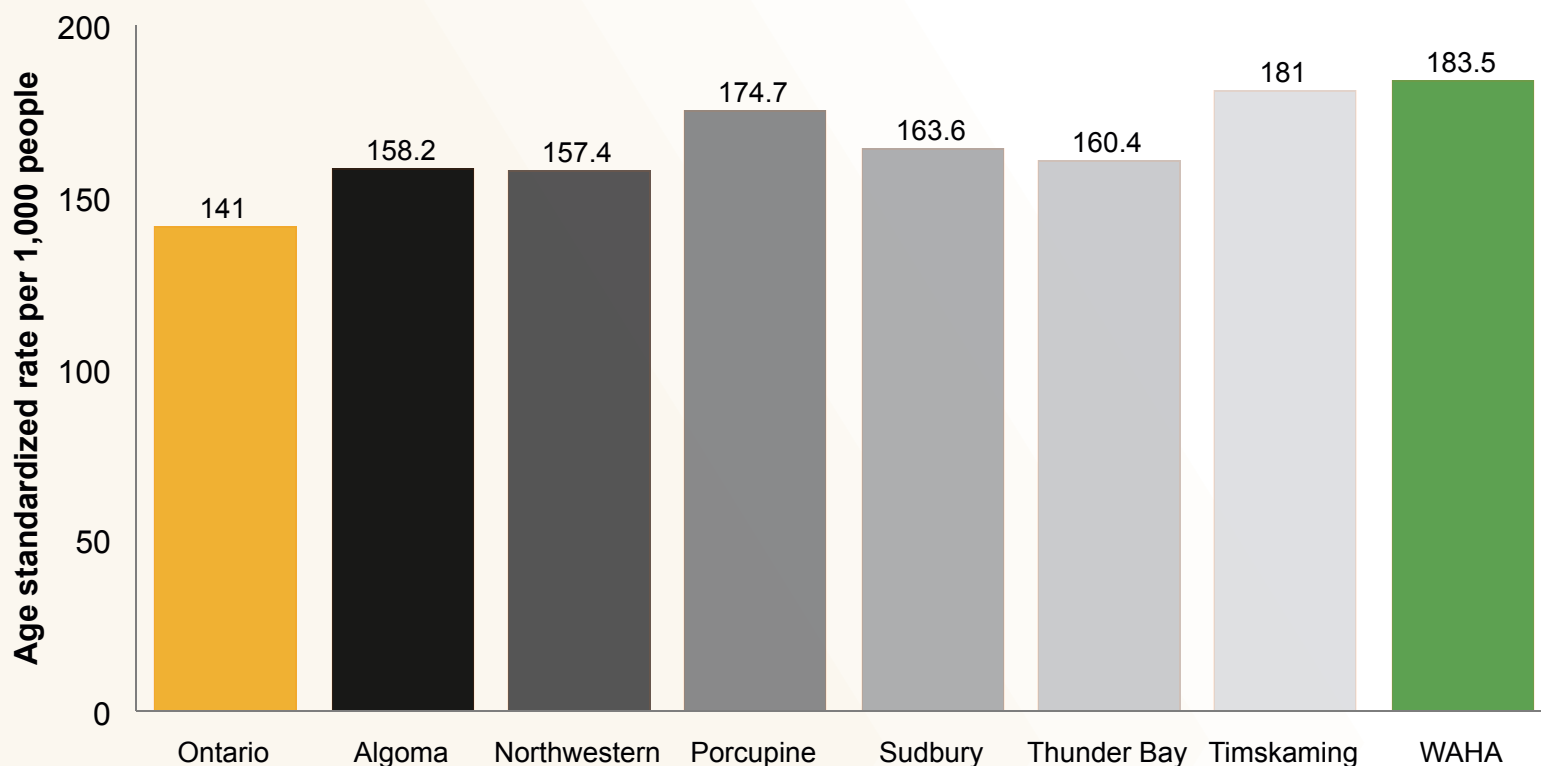
The population size is relatively small particularly at the community level.

- This leads to unstable data.
- This means that small changes in the data can lead to big differences in the results.
- It is important to interpret results with caution when dealing with small population sizes.
- Ideally the results are interpreted together with other data such as the qualitative experiences and knowledge of community members.

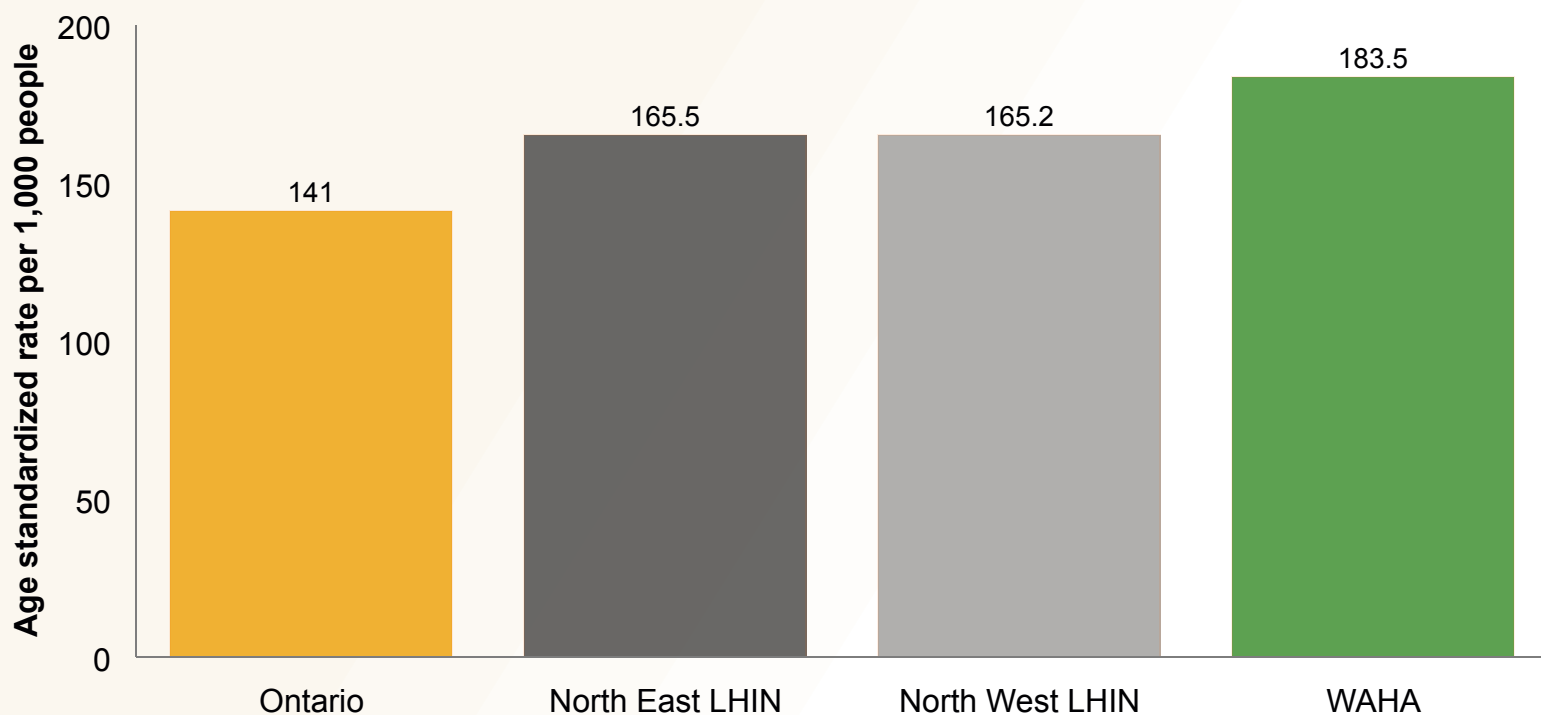


## Appendix 4: Additional comparisons with non-registered population - All cause mortality

**All causes of mortality (age standardized rates per 1,000) for both men and women in Ontario, Public Health Units and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**

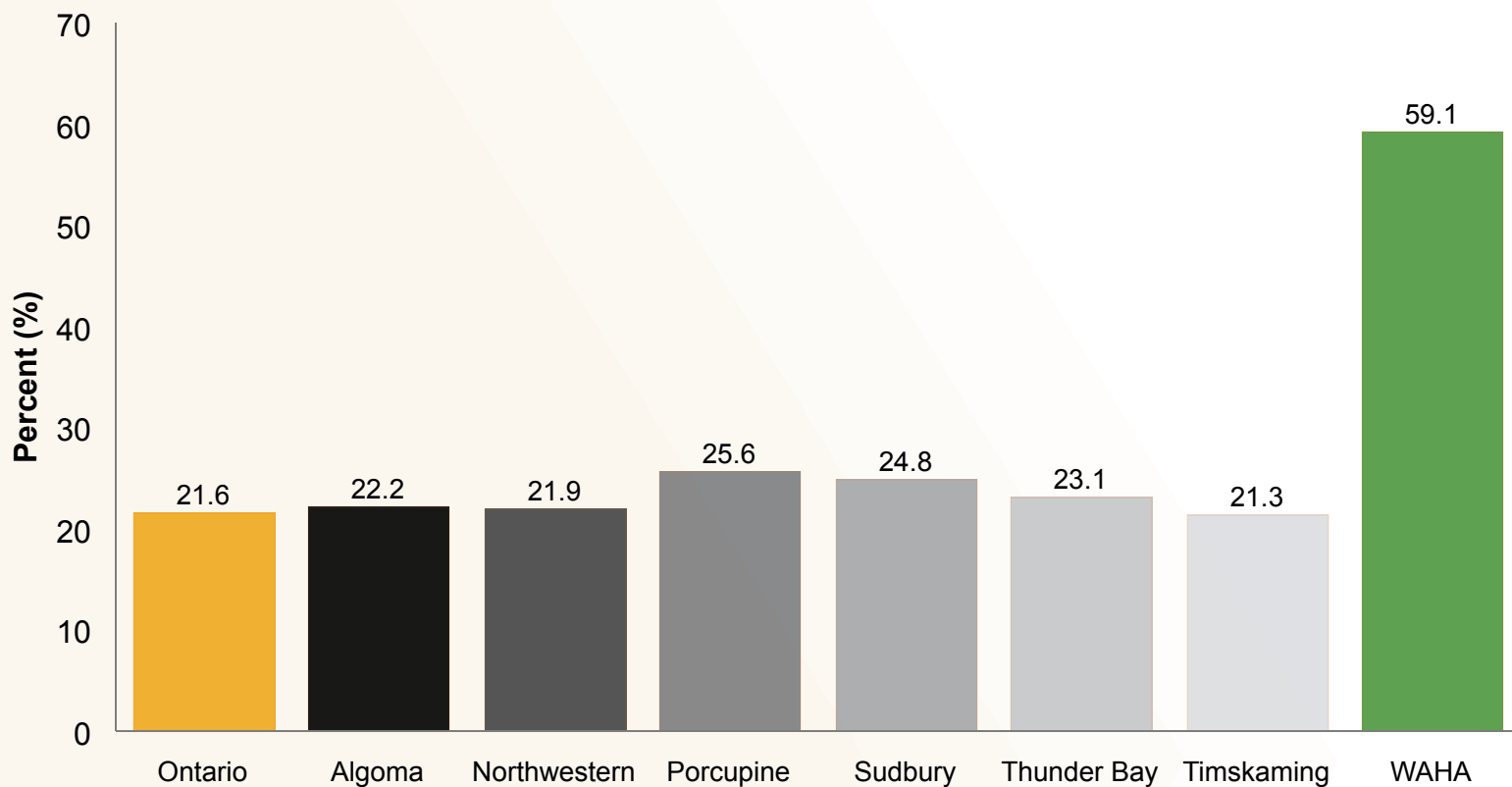


**All causes of mortality (age standardized rates per 1,000) for both men and women in Ontario, Local Health Integration Networks and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**

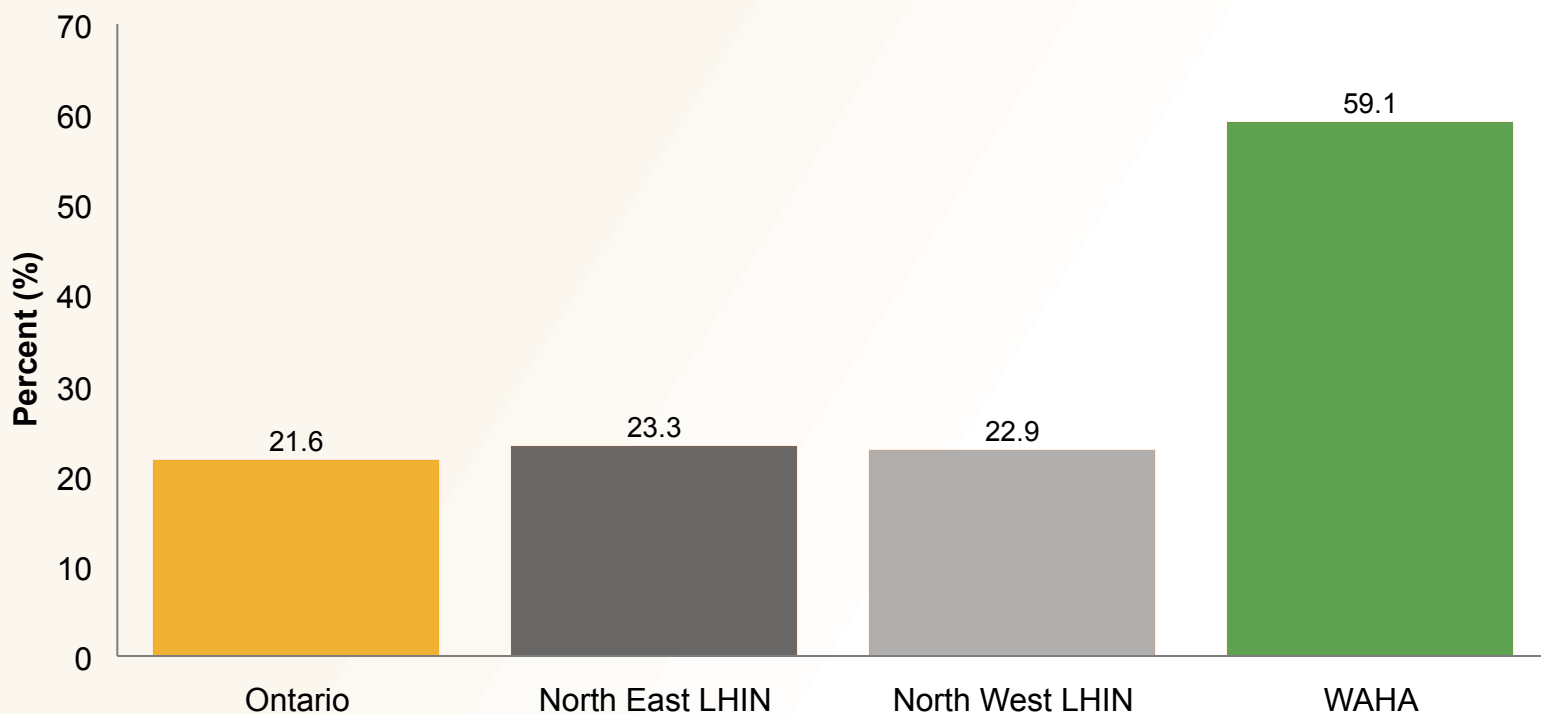


## Appendix 5: Additional comparisons with non-registered population - Premature mortality

**Percent premature deaths (age<65) for both men and women in Ontario, Public Health Units and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**

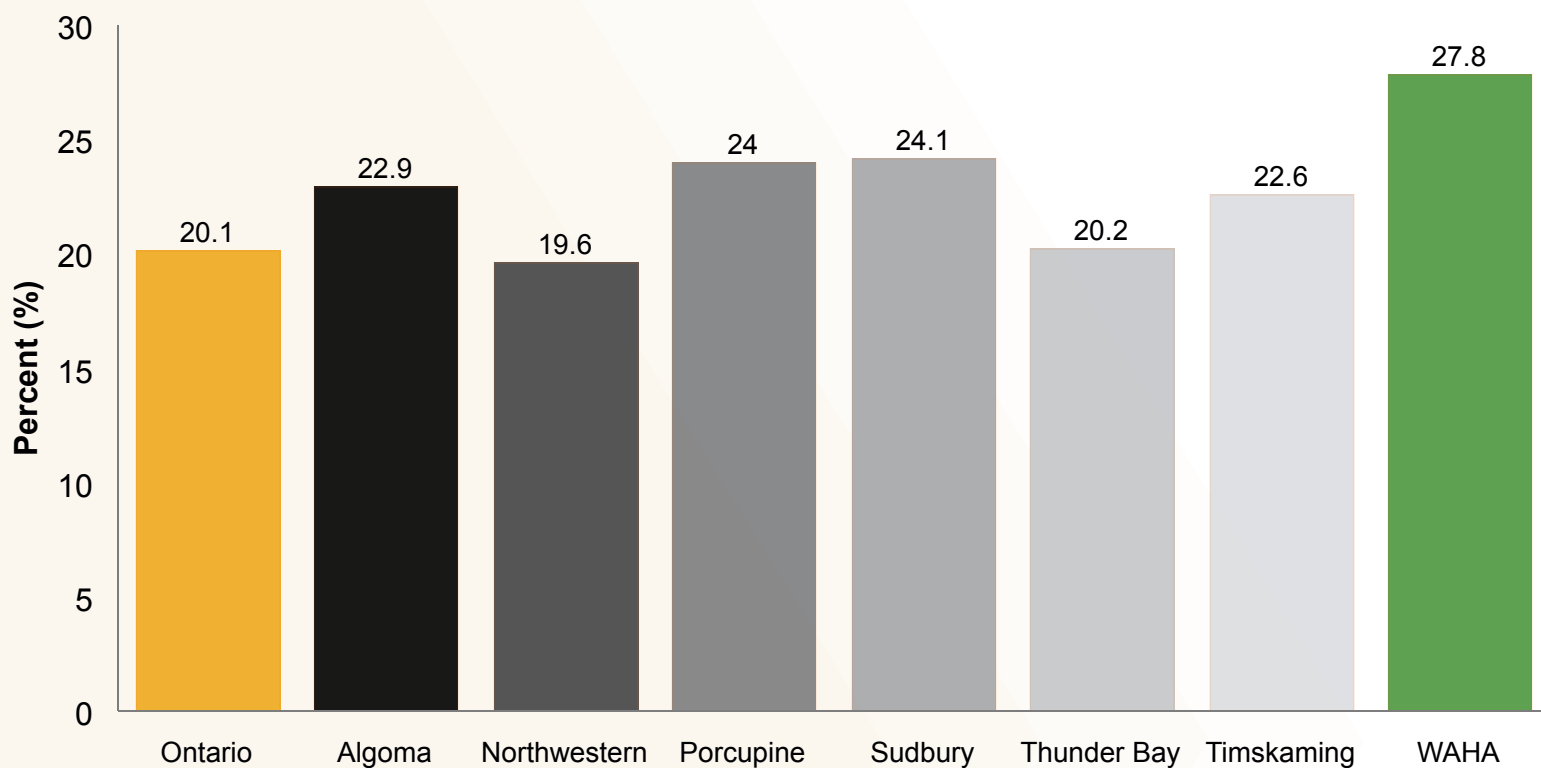


**Percent premature deaths (age<65) for both men and women in Ontario, Local Health Integration Networks (LHINs) and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**

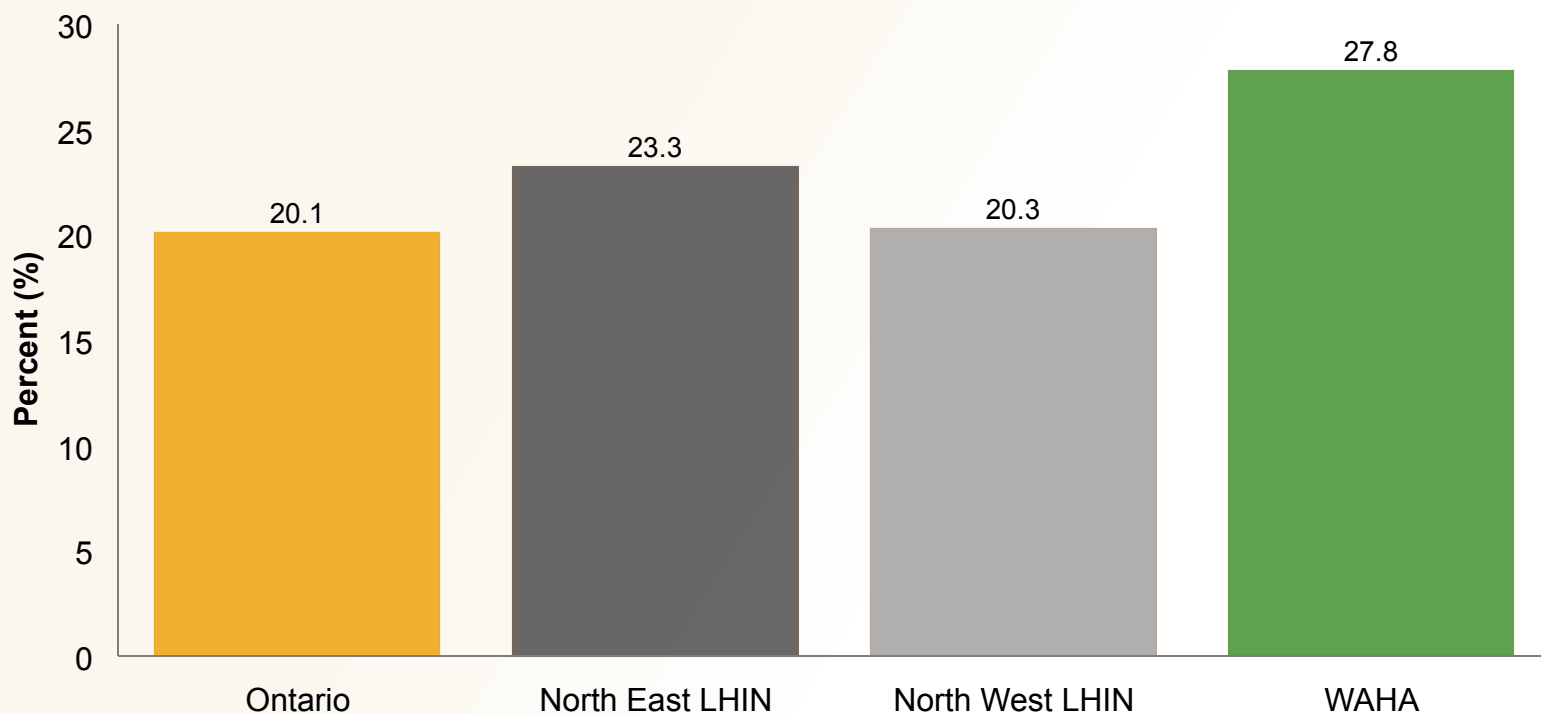


## Appendix 6: Additional comparisons with non-registered population - Amenable mortality

**Percent of deaths amenable to medical, public health interventions, or both (age<75) for both men and women in Ontario, Public Health Units and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**



**Percent of deaths amenable to medical, public health interventions, or both (age<75) for both men and women in Ontario, Local Health Integration Networks (LHINs) and Weeneebayko Area Health Authority (WAHA) between 1992 to 2014.**



## Appendix 7: Glossary

**Abnormal heart rhythm** is formally known as **cardiac arrhythmia**. They occur when the heart beats with an unusual timing or force.

**All-cause mortality** includes all deaths, regardless of age or the cause of death.

**Amenable mortality** includes all deaths before age 75 that were due to causes that are avoidable in the presence of timely and appropriate medical care or public health intervention. Amenable causes of death include diabetes, motor vehicle accidents, chronic obstructive pulmonary disease, among others.

**Arthritis** is an inflammation or swelling of the joints. It can occur as **rheumatoid arthritis** where the body's immune system attacks itself resulting in joints that are painful, swollen, stiff and are sometimes destroyed. **Osteo and other arthritis** occurs when the bone or cartilage of one or more joints begins to degrade and leads to pain and stiffness.

**Asthma** occurs when airways become blocked and breathing becomes difficult. It can result in coughing, wheezing, and a sense of pressure on the chest. It is the result of the body's reaction to a variety of potential causes such as allergens or rapid changes in air temperature.

**Blocked arteries to the heart** is formally known as **chronic coronary syndrome** or **coronary artery disease**. It occurs when the blood vessels to the heart become blocked. This means less blood reaches the heart and this can cause chest pain and damage to the muscles that make the heart work properly.

**Cancer** is also known as a **neoplasm**. Cancers occur when cells in the body are unable to control their growth properly. This leads to ongoing growth that can disrupt normal body functions and it sometimes spreads to other parts of the body.

**Cause specific mortality** includes all deaths grouped according to the underlying cause of death: circulatory & cardiovascular diseases, cancers, external causes of injury and poisoning, respiratory diseases, and diabetes.

**Chronic Obstructive Pulmonary Disease (COPD)** is emphysema or chronic bronchitis where the airway is partly blocked making it difficult to breath out.

**Data** are a set of facts. One source of information

**Dementia** affects older people and causes their mind to gradually lose some of its ability. People with dementia often have trouble remembering things, understanding words, and planning or carrying out complex activities.

**Depression and anxiety** are often grouped together in a category called **mood disorders**. Depression can cause sadness, inactivity, difficulty thinking and concentrating, changes in appetite or time spent sleeping, feelings of hopelessness, and sometimes suicidal thoughts or an attempt to commit suicide. Anxiety is an abnormal or overwhelming sense of apprehension or fear about an upcoming event/threat. It can include doubt over whether the threat is real, about one's ability to cope with the threat and can even cause sweating, tension and an increased pulse.



## Appendix 7: Glossary

**Diabetes** can be type 1 or type 2 diabetes. In this work we looked at type 2 diabetes which occurs when the body cannot properly process sugar so there is too much sugar in the blood. Type 2 diabetes can develop in adults and occurs most often in people who are overweight. It is sometimes also referred to as adult onset diabetes or non-insulin dependent diabetes.

**Epidemiology** is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

**Heart attacks** are formerly known as **acute myocardial infarction (AMI)**. They occur when the blood supply to the heart muscle is not enough to provide the oxygen the heart needs. It results in damage to the heart muscle.

**Heart failure** is formerly known as **congestive heart failure (CHF)**. It occurs when the heart is unable to pump enough blood through the body.

**High Blood Pressure** is formerly known as **hypertension** and it can be caused by several factors including problems with kidneys or hormones. High blood pressure can lead to other problems like heart attacks or strokes.

**Information** is any stimulus that reduces uncertainty in a decision-making process.

**Kidney failure** is formally called **renal failure**. Kidney failure often occurs gradually and can be caused by diabetes or high blood pressure. When kidneys fail the body is no longer able to properly clean the blood. This can mean that people with kidney failure need dialysis to do the job that the kidneys usually do.

A **mental illness** is a condition of the mind or body that disrupts the personality, mind, and emotions of an individual to the point where they can no longer maintain normal psychological functions. Mental illness in the context of this report refers to conditions such as psychoses, personality disorders, schizophrenia, addictions, and substance use disorders. In this report depression and anxiety are captured under the separate variable called Mood Disorders.

**Multimorbidity** is the presence of two or more chronic conditions in one individual.

**Osteoporosis** usually affects older women and causes their bones to become weaker and more fragile.

**Premature mortality** includes all deaths before age 65, regardless of the cause of death.

**Stroke** occurs when a blood vessel in the brain breaks or is blocked. It can lead to sudden changes that can include decrease or loss of consciousness, ability to move part or all of one's body, and the ability to feel things when touched.

### Definitions adapted from:

Forsetlund L, Bjørndal A. *The potential for research-based information in public health: identifying unrecognised information needs*. BMC Public Health. 2001;1:1.

Last, J. (2014) *A Dictionary of Epidemiology, 6th edition*. New York, NY: Oxford University Press

Pease, R., ed. *Merriam-Webster's Medical Dictionary, 2nd* Springfield: Merriam-Webster, 2006.

Public Health Agency of Canada website: <https://www.canada.ca/en/public-health/services/public-health-practice/skills-online/glossary-terms.html>

## Appendix 8: List of partners



Fort Frances Tribal Area  
Health Services (FFTAHS)



Keewaytinook Okimakinak



Kenora Chiefs Advisory  
(KCA)



Maamwesying North Shore  
Community Health Service



Matawa First Nations  
Management



Shibogama First Nations  
Council



Sioux Lookout First Nations  
Health Authority (SLFNHA)



Wabun Tribal Council



Weeneebayko Area Health  
Authority (WAHA)



Windigo First Nations  
Council

## Appendix 9: List of the 59 communities that participated in this analysis

Anishinaabeg of Naongashiing  
Aroland  
Asubpeeschoseewagong  
Atikameksheng Anishnawbek  
Attawapiskat  
Batchewana  
Bearskin Lake  
Constance Lake  
Couchiching  
Eabametoong  
Eagle Lake  
Fort Albany  
Fort Severn  
Garden River  
Ginoogaming  
Kashechewan  
Kitchenuhmaykoosib Inninuwug  
Lac La Croix  
Lac Seul  
Long Lake #58

Marten Falls  
Matachewan  
Mattagami  
McDowell Lake  
Mishkeegogamang  
Mishkosiminiziibiing  
Mississauga  
Mitaanjigamiing  
MoCreebec  
Moose Cree  
Muskrat Dam  
Naicatchewenin  
Naotkamegwanning  
Neskantaga  
Nibinamik  
Nigigoonsiminikaaning  
North Spirit Lake  
Northwest Angle #33  
Northwest Angle #37  
Obashkaandagaang

Ochiichagwe'Babigo'Ining  
Ojibways of Onigaming  
Peawanuk  
Pikangikum  
Rainy River  
Sagamok  
Sandy Lake  
Seine River  
Serpent River  
Shoal Lake #40  
Thessalon  
Wabaseemoong  
Wabigoon Lake  
Wauzhushk Onigum  
Wawakapewin  
Weagamow  
Webequie  
Whitesand  
Wunnumin Lake



## Appendix 10: ICD-9 codes used in the Cause Specific Mortality Analysis

The International Classification of Diseases, Injuries, and Causes of Death 9th Revision (ICD-9) provides a numbered international medical classification standard. The individual ICD-9 codes that are used in this report are listed below to help interpret the results and allow for comparable analyses to be completed in the future.

- a. diseases of the cardiovascular and circulatory system (ICD9 390-459)
- b. cancer (ICD9 140-239)
- c. diseases of the respiratory system (ICD9 460-519)
- d. intentional and unintentional injuries (ICD9 800-999.9, E000-E999). This includes:
  - i) suicide (E950-E959.9);
  - ii) overdoses (E850-E862.9);
  - iii) violence/homicide (E960-E969.9);
  - iv) motor vehicle (E810-E819.9);
  - v) accidental falls (E880-E888)
- e. infectious and parasitic agents (ICD9 001-139)
- f. diabetes (ICD 250)
- g. other causes
- h. Missing (report number of missing with COD information)

## Appendix 11: Definitions and data sources used for defining chronic conditions at time of death

Definitions and data sources used for defining chronic conditions at time of death:

Chronic Condition	Definition
Asthma	ICES-derived cohort: Ontario Asthma Database (ASTHMA)
Cancer	Ontario Cancer Registry (OCR)
Heart Failure	ICES-derived cohort: Ontario Congestive Heart Failure Database (CHF)
Chronic Obstructive Pulmonary Disorder (COPD)	ICES-derived cohort: Ontario Chronic Obstructive Pulmonary Disease (COPD)
Diabetes	ICES-derived cohort: Ontario Diabetes Database (ODD)
Heart attack	ICES-derived cohort: Ontario Myocardial Infarction Database (OMID)
Rheumatoid Arthritis	ICES-derived cohort: Ontario Rheumatoid Arthritis Database (ORAD)

## Appendix 11: Definitions and data sources used for defining chronic conditions at time of death

Chronic Condition	Definition
Osteo and Other Arthritis	ICD9/OHIP: 715, 727, 729, 710, 720, 274, 716, 711, 718, 728, 739 ICD10: M00-M03, M07, M10, M11-M14, M20-M25, M30-M36, M65-M79, M15-M19
Crohn's or Colitis	ICES-derived cohort: Ontario Crohn's and Colitis Cohort Database (OCCC)
Abnormal Heart Rhythm (Arrhythmia)	ICD9 /OHIP: 427.3 (DAD) / 427 (OHIP) ICD 10: I48.0, I48.1
High Blood Pressure	ICES-derived cohort: Ontario Hypertension Database (HYPER)
Blocked Arteries to the Heart (Coronary Artery Disease)	ICD 9/OHIP: 411-414 ICD-10: I20, I22-I25 *remove if in OMID
Stroke	Any hospital admission with the following diagnostic codes: ICD-9: 430.x, 431.x, 433, 434, 435.x., 436, 362.3 OHIP: 436, 432, 435 ICD-10: 160 (excl 160.8), 161, 163 (excl 163.6), 164, G45 (excl G45.4), H34.0, H34.1
Osteoporosis	ICD9/OHIP: 733 ICD10: M81, M82
Depression or Anxiety	CD9/OHIP: 311, 309, 300, 296 ICD10: F30—F34 (excl. F340), F38—F42, F431, F432, F438, F44, F450, F451, F452, F48, F530, F680, F930, F99
History of Mental Illness	ICD9/OHIP: 291, 292, 295, 297, 298, 299, 301, 302, 303, 304, 305, 306, 307, 313, 314, 315, 319, ICD10: F04, F050, F058, F059, F060, F061, F062, F063, F064, F07, F08, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26 F27 F28, F29, F340, F35, F36, F37, F430, F439, F453, F454, F458, F46, F47, F49, F50, F51, F52, F531, F538, F539, F54, F55, F56, F57, F58, F59, F60, F61, F62, F63, F64, F65, F66, F67, F681, F688, F69, F70, F71, F72, F73, F74 F75 F76 F77 F78, F79, F80, F81, F82, F83, F84, F85 F86 F87 F88, F89, F90, F91, F92, F931, F932, F933, F938, F939, F94, F95, F96, F97, F98
Dementia	ICD9/OHIP: 290, 331 (OHIP) / (DAD: 046.1, 290, 294, 331.0, 331.1, 331.5, 331.82) ICD10: F00, F01, F02, F03, G30
Kidney Failure	ICD9/OHIP: 403,404,584,585,586,v451 ICD 10: N17, N18, N19, T82.4, Z49.2, Z99.2

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- The Ontario Ministry of Research, Innovation, and Science's Round 13, Early Researcher Award to Dr Jennifer Walker









[www.mamowahyamowen.ca](http://www.mamowahyamowen.ca)