Healthy Environments

Health Status by Program Area

Population Health Assessment
Southwestern Public Health
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Contents

Summary

This report is intended to complement the 2019 health status report titled Understanding our Communities' Health, which aimed to provide a high-level overview of the current health status of people residing in the Southwestern Public Health (SWPH) region, which includes Oxford County, Elgin County and the City of St. Thomas.[1] This report includes some of the same indicators with additional data for nearby areas (based on pre-existing locations of air quality monitoring stations) as well as new indicators. These indicators were chosen based on consultations with the SWPH's Environmental Health team. The information included in this report may assist in program planning and be used to increase community awareness of health issues. The overarching trends are summarized below.

Air quality

Air quality in the SWPH region is typically low risk based on the Air Quality Health Index (AQHI) and the average annual concentrations of common pollutants (fine particulate matter and nitrogen dioxide) are below Canadian Ambient Air Quality Standards (CAAQS).

Climate change

Based on four common scenarios (representative concentration pathways) used by climate scientists, it is predicted that the average temperature in the SWPH region will increase by at least 1.5°C to upwards of almost 5°C by the year 2100 depending on the scenario. It is also expected that the number of heat waves, duration of the longest heat wave and the strength of heat waves will increase under all scenarios. The total annual amount of precipitation is expected to increase under all scenarios while the number of extreme cold events is expected to stay the same or decrease slightly.

Health effects from heat and cold

From 2013 to 2017, the rates of emergency department visits for heat and cold-related illnesses was variable from year to year. The rates of hospitalizations from heat and cold-related illnesses each year were small, but the rates of hospitalizations were consistently higher for cold-related illnesses compared to heat-related illnesses. Illnesses that may be exacerbated by heat or cold were not included in this report.

Healthy Environments

Air Quality

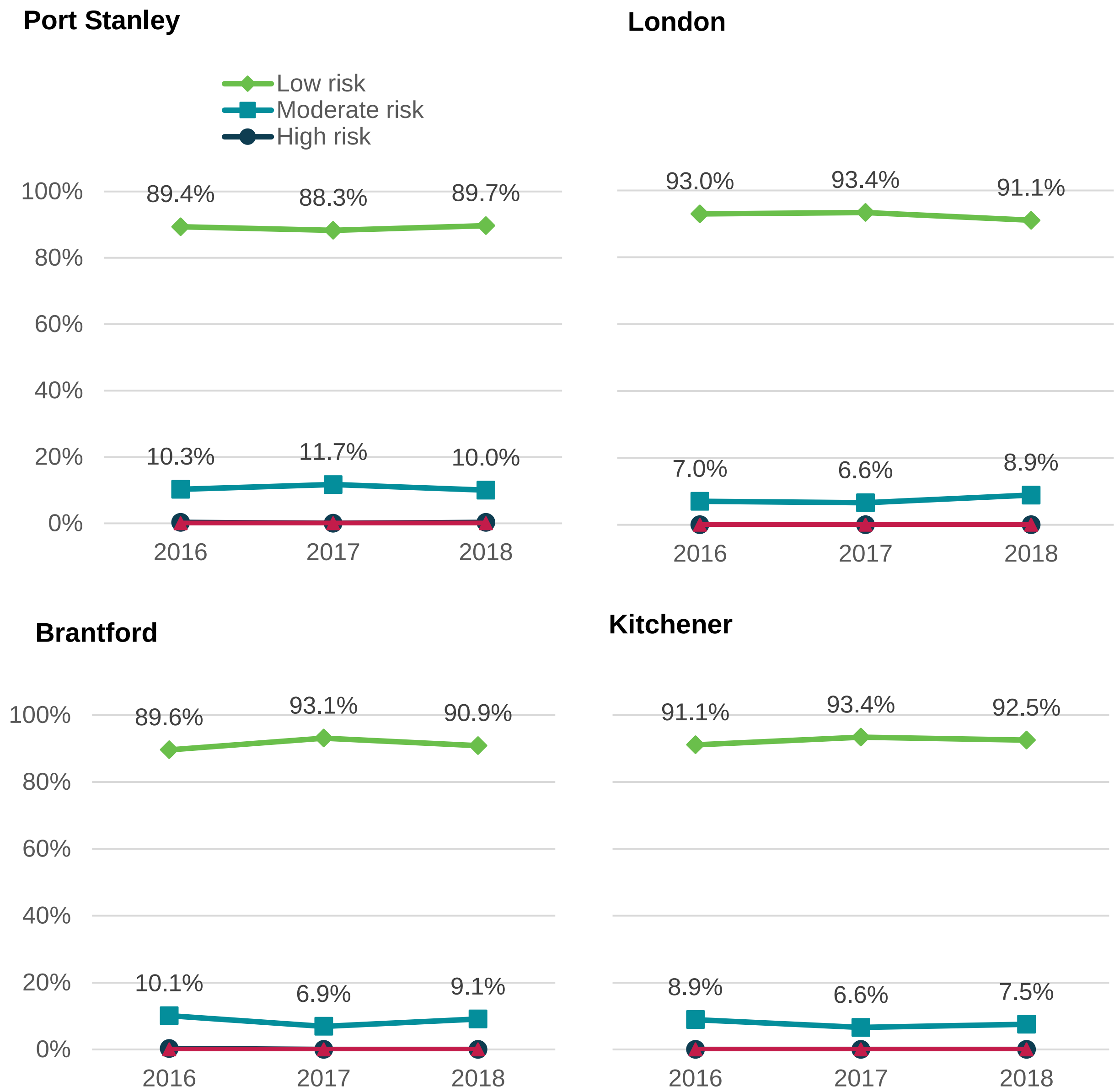
Air Quality Health Index (AQHI)

The Air Quality Health Index (AQHI) is a 10-point scale that provides a measure of risk to health based on a mixture of three common air pollutants known to affect human health: ozone (O_3), fine particulate matter ($PM_{2.5}$) and nitrogen dioxide (NO_2).

- **Low risk (1-3)** - Ideal air quality for general population. People at higher risk of being affected by poor air quality (e.g., people with heart or respiratory problems) can enjoy usual outdoor activities.
- **Moderate risk (4-6)** - No need to modify usual outdoor activities unless experiencing symptoms such as coughing or throat irritation. People at higher risk should consider reducing or rescheduling strenuous activities if they are experiencing respiratory symptoms.
- **High risk (7-10)** - Consider reducing or rescheduling strenuous activities if experiencing symptoms. Those at higher risk should reduce or reschedule strenuous activities outdoors.
- **Very high risk (10+)** -The general population should reduce or reschedule strenuous activities outdoors. Those at higher risk should avoid strenuous activities.

Of the days with available air quality data in 2018, the Port Stanley air quality monitoring site – the only air quality monitoring site in the Southwestern Public Health (SWPH) region – reported low risk air quality 89.7% of the time and moderate risk 10.0% of the time (Figure 1). There was only one high risk day in May 2018 (accounting for 0.3% of the time) in Port Stanley and there were no high-risk days in London, Brantford or Kitchener. Over this time, the AQHI was similar in the surrounding areas of London, Brantford and Kitchener (Figure 1).

Figure 1. Proportion of days of the year by Air Quality Health Index (AQHI), Port Stanley, London, Brantford and Kitchener air quality monitoring sites, 2016-2018



Note: on June 24, 2015, the Air Quality Index (AQI) was replaced with the Air Quality Health Index (AQHI); therefore, yearly comparable data is not available before 2016.

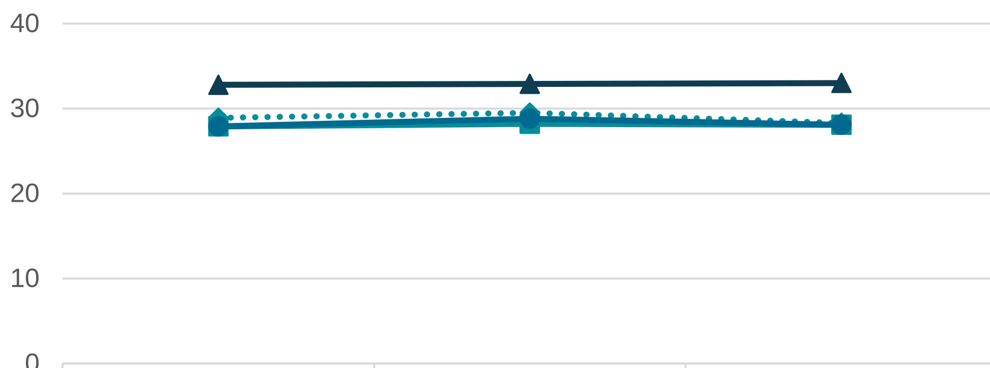
Source: Ontario Ministry of the Environment, Conservations and Parks. Air Quality Information System. Toronto, ON. Date Extracted: March 15 & April 22, 2019.

Pollutant Concentrations

Ozone (O_3)

In 2017, the annual average concentration of ozone was 33.0 ppb in Port Stanley (Figure 2). The average annual concentration of ozone in Port Stanley was consistent between 2015 to 2017 and was slightly higher than the surrounding areas of London, Brantford and Kitchener. Typically, ozone levels are lower in urban areas because the ozone (O_3) reacts with nitric oxide (NO) emitted by vehicles and combustion to create nitrogen dioxide (NO_2) and oxygen (O_2).[2] Higher levels of ozone along Lake Erie have also been attributed to the long-range flow of pollutants from the United States.[2]

Figure 2. Average annual concentration of O_3 (ppb), Port Stanley, London, Brantford and Kitchener air quality monitoring sites, 2015-2017



	2015	2016	2017
Port Stanley	32.8	32.9	33.0
London	27.9	28.2	28.1
Brantford	28.9	29.5	28.3
Kitchener	27.9	28.8	28.1

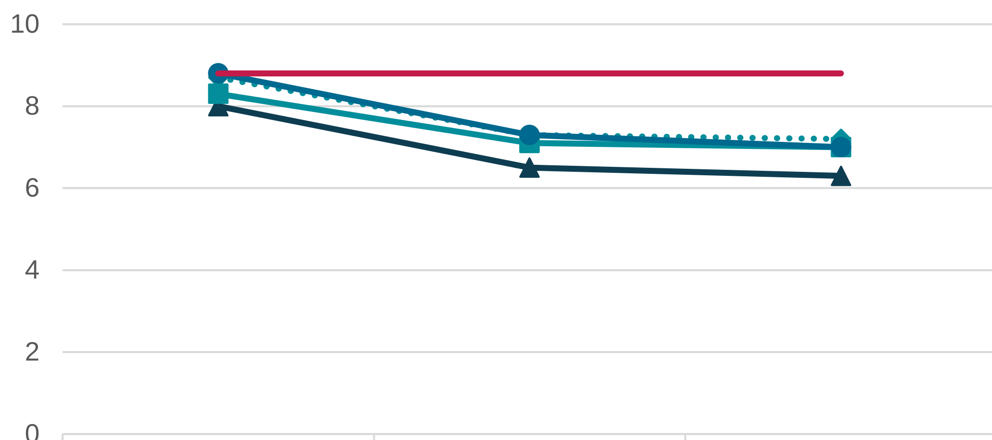
Source: Ontario Ministry of the Environment, Conservations and Parks. Air Quality Information System. Toronto, ON. Date Extracted: March 22, 2019.

There is no Canadian Ambient Air Quality Standard (CAAQS) for annual concentrations of ozone. However, there is an Ontario one-hour Ambient Air Quality Criteria (AAQC) for ozone, which is based on a concentration of 80 ppb for one hour (averaging time). In 2016, there were a total of seven hours (not necessarily consecutive) with ozone levels exceeding the one-hour AAQC in Port Stanley compared to eight hours in Brantford, two hours in London and two hours in Kitchener.[2]

Fine particulate matter ($PM_{2.5}$)

In 2017, the annual average concentration of $PM_{2.5}$ was 6.3 micrograms (µg)/m^3 in Port Stanley (Figure 3). The average annual concentration of $PM_{2.5}$ in Port Stanley has consistently remained below the 2020 Canadian Ambient Air Quality Standard (CAAQS) for annual average $PM_{2.5}$ concentrations (8.8 µg/m^3). In 2015, the average annual concentration of $PM_{2.5}$ in Kitchener met the CAAQS. Otherwise, the average annual concentration of $PM_{2.5}$ has remained below the CAAQS in surrounding areas between 2015 to 2017.

Figure 3. Average annual concentration of $PM_{2.5}$ (µg/m^3), Port Stanley, London, Brantford and Kitchener air quality monitoring sites, 2015-2017



	2015	2016	2017
Port Stanley	8.0	6.5	6.3
London	8.3	7.1	7.0
Brantford	8.7	7.3	7.2
Kitchener	8.8	7.3	7.0
CAAQS	8.8	8.8	8.8

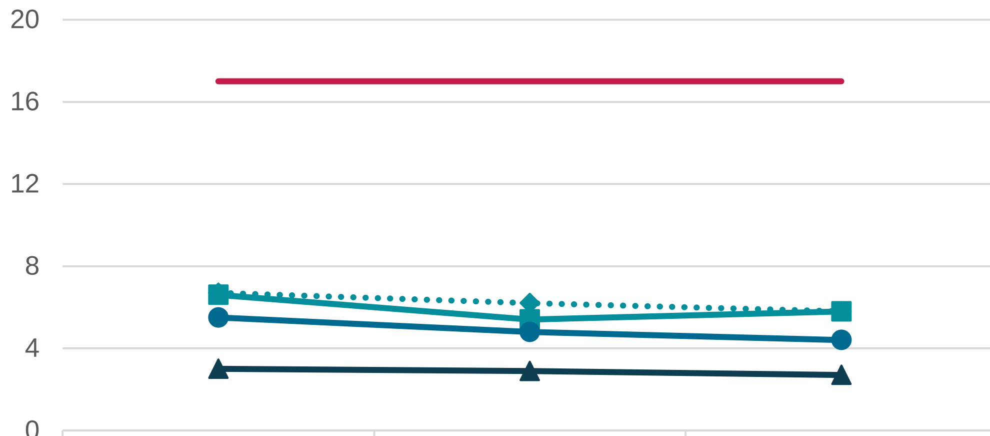
Source: Ontario Ministry of the Environment, Conservations and Parks. Air Quality Information System. Toronto, ON. Date Extracted: March 22, 2019.

In 2016, only three air quality monitoring stations in Ontario measured concentrations above the 24-hour Ambient Air Quality Criteria (AAQC) for $PM_{2.5}$ (28 µg/m^3). These three stations were in Hamilton, Cornwall and Ottawa.[2]

Nitrogen dioxide (NO_2)

In 2017, the annual average concentration of NO_2 was 2.7 parts per billion (ppb) in Port Stanley (Figure 4). Similar annual average concentrations have been observed in surrounding areas between 2015 to 2017. In all surrounding areas, the average annual NO_2 concentration readings were well below the 2020 Canadian Ambient Air Quality Standard (CAAQS) for annual NO_2 concentrations (17.0 ppb).

Figure 4. Average annual concentration of NO_2 (ppb), Port Stanley, London, Brantford and Kitchener air quality monitoring sites, 2015-2017



	2015	2016	2017
Port Stanley	3.0	2.9	2.7
London	6.6	5.4	5.8
Brantford	6.7	6.2	5.8
Kitchener	5.5	4.8	4.4
CAAQS	17.0	17.0	17.0

Source: Ontario Ministry of the Environment, Conservations and Parks. Air Quality Information System. Toronto, ON. Date Extracted: March 22, 2019.

In 2016, no air quality monitoring sites in Ontario detected exceedances of provincial one-hour (200 ppb) and 24-hour (100 ppb) Ambient Air Quality Criteria (AAQC) for NO_2.[2]

Climate Change Projections

Scientists typically project changes to the climate using four standard models, or scenarios, called representative concentration pathways (RCPs): RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5. These scenarios ensure that climate modelling efforts across organizations are comparable. Each RCP projects climate changes until the year 2100, but the higher number RCPs predict more severe changes. The RCPs are mainly informed by population growth, income per capita, energy per unit of income (energy intensity), emissions per unit of primary energy (carbon factor) and land use (Table 1).[3] The scientific literature does not state which scenario is most likely to occur because there is too much uncertainty; however, RCPs 2.6 to 6.0 are intended to reflect scenarios in which climate policies are in place.[4]

Table 1. Descriptions of representative concentration pathways (RCPs)[3]

Scenario	RCP 2.6	RCP 4.5	RCP 6.0	RCP 8.5
Description	**Mitigation**	**Stabilization**	**Stabilization**	**Worst case**
Greenhouse gas emissions	Very low– global carbon dioxide (CO_2) emissions peak by 2020 and decline to around zero by 2080	Very low baseline with medium to low mitigation – CO_2 continues to increase but more slowly	Medium baseline with high mitigation – CO_2 continues to increase slightly faster than in RCP 4.5	High baseline – emissions increase rapidly
Land use	Crops increase and grassland remains constant, livestock farming increases, forests continue to decline	Crops and grassland areas decline, and reforestation occurs	Crops continue on trend and grasslands are rapidly reduced, reforestation occurs	Crops and grasslands increase, and forests decrease
Energy use	Oil use declines but other fossil fuel use increases and is offset by capture of carbon dioxide, biofuels use is high and solar and wind power increases but remains low	Oil consumption constant, but nuclear power and renewable energy use increases	Energy consumption peaks in 2060 then declines to levels similar to RCP 2.6, oil consumption remains high with a smaller role for biofuel and nuclear energy	Oil use grows rapidly until 2070, coal use is the largest increase in energy consumption
Population growth/size	Global population peaks around 9 billion	Global population peaks around 9 billion	Global population peaks around 10 billion	Global population peaks around 12 billion
Economic growth	High	Moderate	Lowest	Low

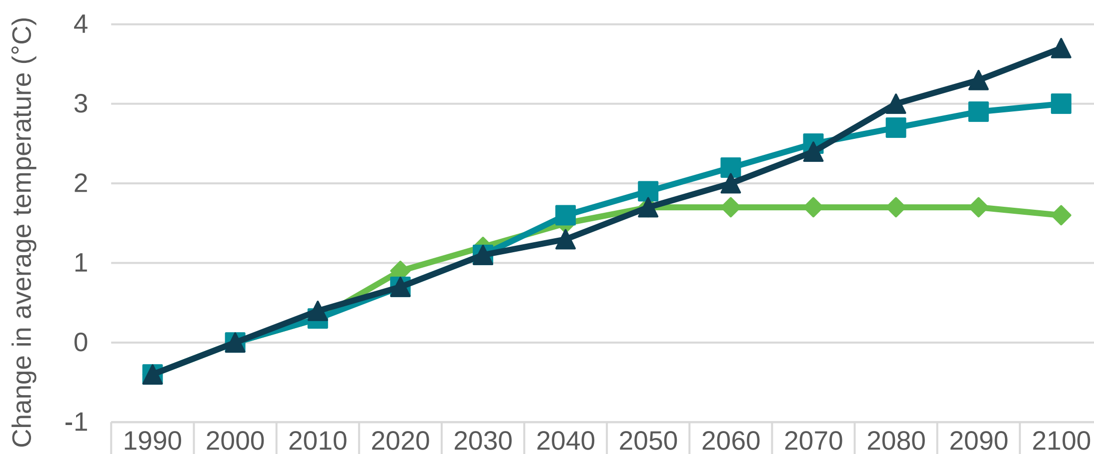
The Laboratory of Mathematical Parallel Systems (LAMPS) at York University uses a reference period from 1981 to 2005 in their climate projections and publicly share the results for regional areas, including Oxford County and Elgin St. Thomas.[a]

Temperature

Average temperature

Using the mitigation scenario (RCP 2.6), the average temperature is projected to increase by 1.6°C in Oxford County and 1.5°C in Elgin St. Thomas by the year 2100 (Figure 5, Figure 6). In the stabilization scenarios, it is projected that the average temperature will increase by 3.0°C to 3.7°C in Oxford County and 2.9°C to 3.6°C in Elgin St. Thomas by the year 2100 (Figure 5, Figure 6). Local climate change projections by decade are not available for the worst-case (RCP 8.5) scenario.

Figure 5. Projected changes in average temperature (°C) from reference period (1981-2005) by decade, by representative concentration pathways (RCPs), Oxford County

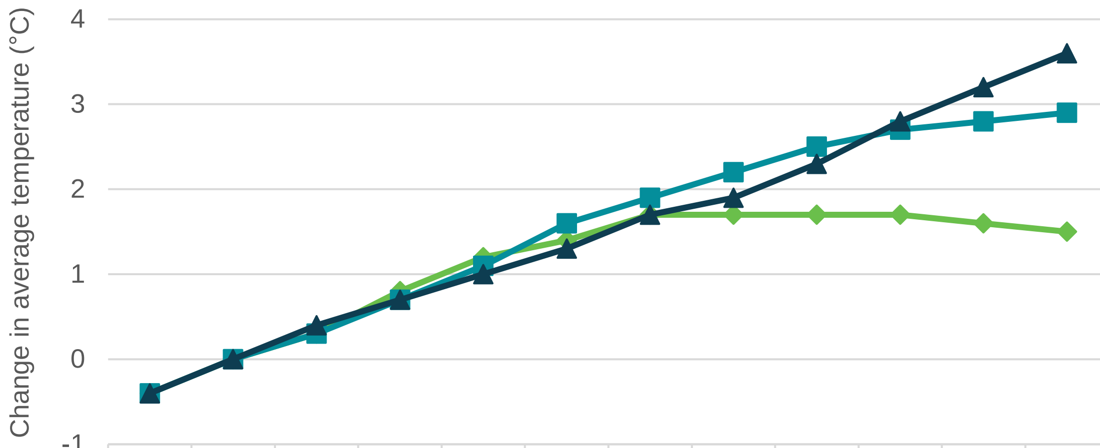


	1990	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
RCP 2.6	-0.4	0.0	0.3	0.9	1.2	1.5	1.7	1.7	1.7	1.7	1.7	1.6
RCP 4.5	-0.4	0.0	0.3	0.7	1.1	1.6	1.9	2.2	2.5	2.7	2.9	3.0
RCP 6.0	-0.4	0.0	0.4	0.7	1.1	1.3	1.7	2.0	2.4	3.0	3.3	3.7

Note: the RCP 8.5 projection is described in Figure 7 as it is not available by decade
Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_timeseries.htm#/SubregionTmAnnualTime

[a] http://lamps.math.yorku.ca/OntarioClimate/

Figure 6. Projected changes in average temperature (°C) from reference period (1981-2005) by decade, by representative concentration pathways (RCPs), Elgin St. Thomas

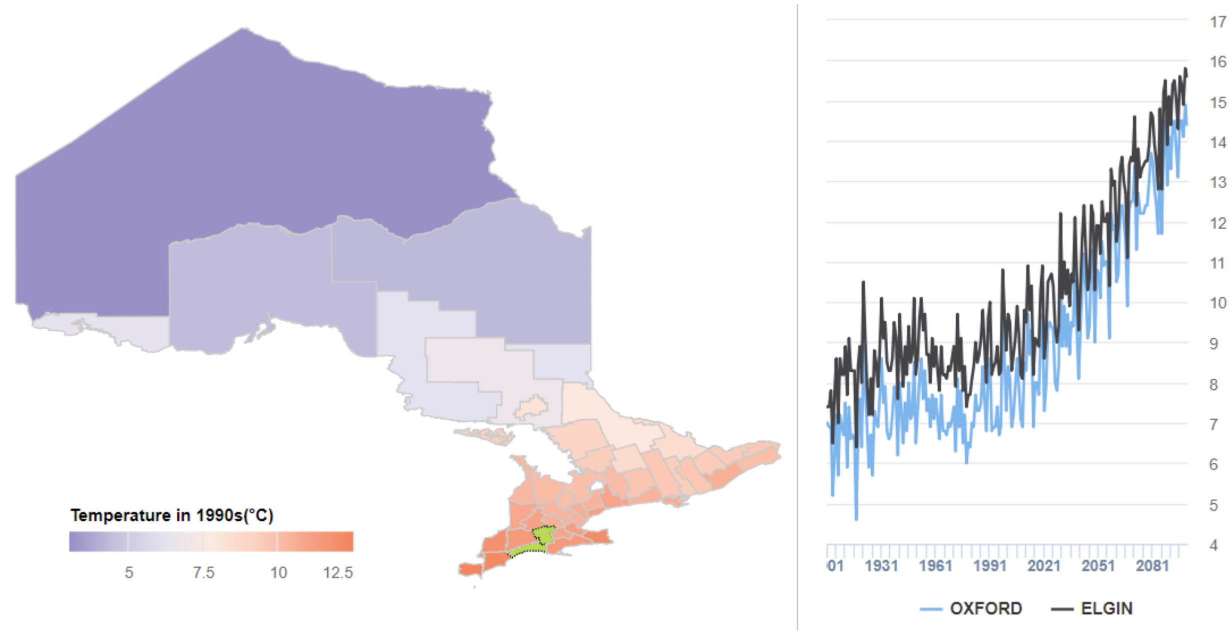


	1990	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
RCP 2.6	-0.4	0.0	0.3	0.8	1.2	1.4	1.7	1.7	1.7	1.7	1.6	1.5
RCP 4.5	-0.4	0.0	0.3	0.7	1.1	1.6	1.9	2.2	2.5	2.7	2.8	2.9
RCP 6.0	-0.4	0.0	0.4	0.7	1.0	1.3	1.7	1.9	2.3	2.8	3.2	3.6

Note: the RCP 8.5 projection is described in Figure 7 as it is not available by decade
Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_timeseries.htm#/SubregionTmAnnualTime

Using the worst-case scenario for projections (RCP 8.5), the projected average temperature in 2019 was 9.1°C in Oxford County and 10.3°C in Elgin St. Thomas. The average temperature is projected to increase to 14.4°C in Oxford County and 15.6°C in Elgin St. Thomas by the year 2100 (Figure 7). By the 2080s (between 2070 to 2099), there is a projected increase in the average temperature by 4.9°C in Oxford County and 4.8°C in Elgin St. Thomas.

Figure 7. Projected average temperature (°C) under RCP 8.5, Oxford County and Elgin St. Thomas



Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/WorldClimate/

Minimum temperature

Using the mitigation scenario (RCP 2.6), it is projected that the average daily low temperature will increase by 1.8°C in Oxford County and 1.7°C in Elgin St. Thomas by the 2050s and remain similar by the 2080s (Table 2). Using the worst-case scenario (RCP 8.5), it is projected that the average daily low temperature will increase by 3.0°C in Oxford County and 2.9°C in Elgin St. Thomas by the 2050s and it is projected to increase by 5.1°C in Oxford County and 5.0°C in Elgin St. Thomas by the 2080s (Table 2).

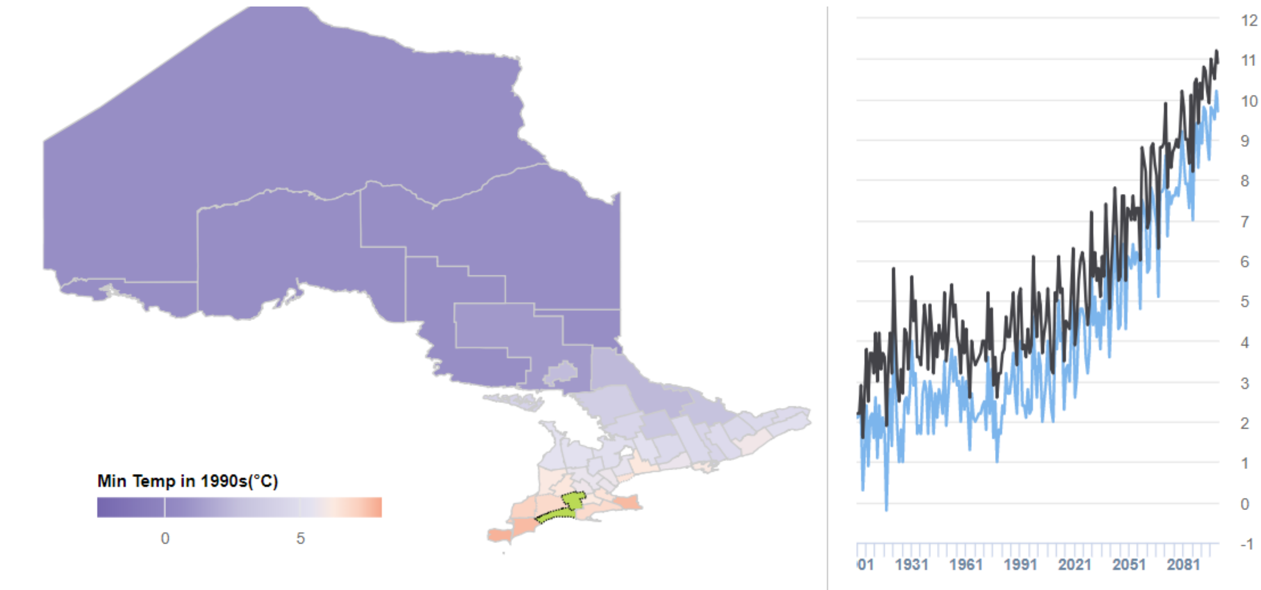
Table 2. Projected changes in minimum temperature (°C) from reference period (1981-2005) by representative concentration pathways (RCPs), Oxford County and Elgin St. Thomas

	2050s (between 2040 to 2069)		2080s (between 2070 to 2099)	
Scenario	Oxford County	Elgin St. Thomas	Oxford County	Elgin St. Thomas
RCP 2.6	1.8°C	1.7°C	1.7°C	1.7°C
RCP 4.5	2.3°C	2.3°C	2.9°C	2.9°C
RCP 6.0	2.0°C	1.9°C	3.3°C	3.2°C
RCP 8.5	3.0°C	2.9°C	5.1°C	5.0°C

Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofOXFORD and http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofELGIN

Using the worst-case scenario for projections (RCP 8.5), the projected average daily low temperature in 2019 was 4.2°C in Oxford County and 5.3°C in Elgin St. Thomas. The average daily low temperature is projected to increase to 9.7°C in Oxford County and 10.9°C in Elgin St. Thomas by the year 2100 (Figure 8).

Figure 8. Projected average daily low temperature (°C) under RCP 8.5, Oxford County and Elgin St. Thomas



Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/WorldClimate/

Maximum temperature

Using the mitigation scenario (RCP 2.6), the average daily high temperature is projected to increase by 1.8°C in Oxford County and in Elgin St. Thomas by the 2050s and remain similar by the 2080s (Table 3). Using the worst-case scenario (RCP 8.5), the average daily high temperature is projected to increase by 3.0°C in Oxford County and 2.9°C in Elgin St. Thomas by the 2050s and by 5.1°C in Oxford County and 4.9°C in Elgin St. Thomas by the 2080s (Table 3).

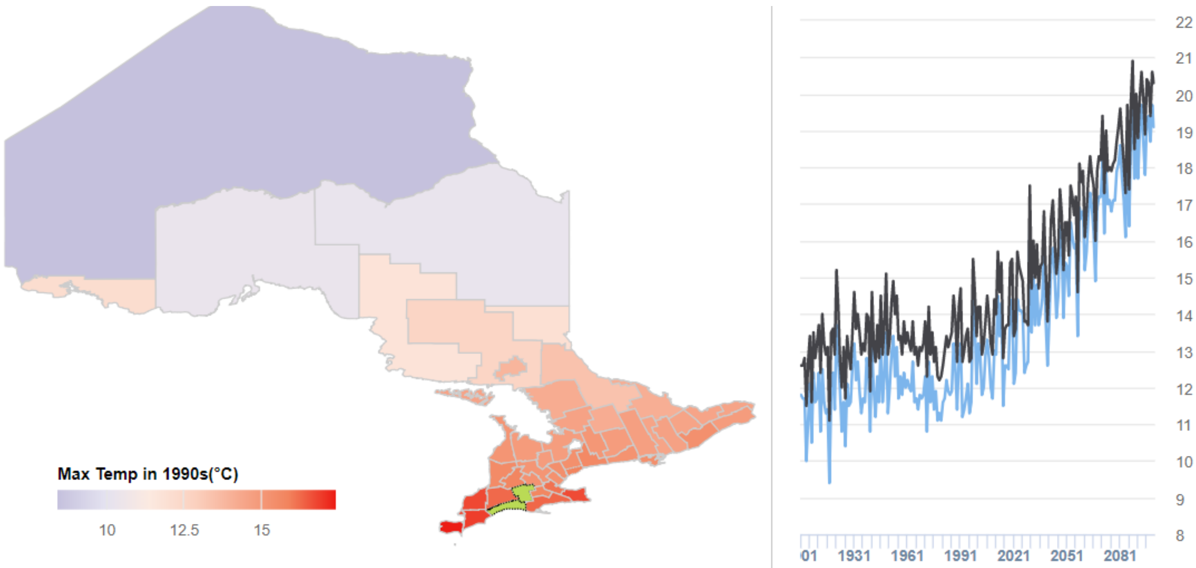
Table 3. Projected changes in maximum temperature (°C) from reference period (1981-2005) by representative concentration pathways (RCPs), Oxford County and Elgin St. Thomas

	2050s (between 2040 to 2069)		2080s (between 2070 to 2099)	
Scenario	Oxford County	Elgin St. Thomas	Oxford County	Elgin St. Thomas
RCP 2.6	1.8°C	1.8°C	1.7°C	1.7°C
RCP 4.5	2.4°C	2.3°C	3.0°C	2.9°C
RCP 6.0	2.1°C	2.0°C	3.4°C	3.3°C
RCP 8.5	3.0°C	2.9°C	5.1°C	4.9°C

Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofOXFORD and http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofELGIN

Using the worst-case scenario for projections (RCP 8.5), the projected average daily high temperature in 2019 was 14.2°C in Oxford County and 15.4°C in Elgin St. Thomas. The average daily high temperature is projected to increase to 19.1°C in Oxford County and 20.3°C in Elgin St. Thomas by the year 2100 (Figure 9).

Figure 9. Projected average daily high temperature (°C) under RCP 8.5, Oxford County and Elgin St. Thomas



Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/WorldClimate/

Heat Waves

Heat waves are prolonged periods of extremely hot weather, which may be accompanied by high humidity. Heat waves are measured relative to the usual weather in the area and relative to normal temperatures for the season, so what is considered a heat wave in one geographic area may be normal temperature in another area. For example, local heat waves occur when there are three consecutive days with a daily maximum temperature of 32°C or higher.

Using the mitigation scenario (RCP 2.6), the projected duration of the longest heat waves each year is projected to increase by five days in Oxford County and six days in Elgin St. Thomas by the 2050s compared to the reference time period of 1981 to 2005 (Table 4). Using the worst-case scenario (RCP 8.5), the duration of the longest heat waves each year is projected to increase by 9 days in Oxford County and 10 days in Elgin St. Thomas by the 2050s, compared to a projected increase of 23 days in Oxford County and 25 days in Elgin St. Thomas by the 2080s (Table 4).

The total number of days with heat waves per year and the strength of the heat waves are also projected to increase compared to the reference period by the 2050s and 2080s under each scenario for both Oxford County and Elgin St. Thomas (Table 4).

Table 4. Projected changes in heat wave characteristics from reference period (1981-2005) by representative concentration pathways (RCPs), Oxford County and Elgin St. Thomas

	2050s (between 2040 to 2069)		2080s (between 2070 to 2099)	
Scenario	Oxford County	Elgin St. Thomas	Oxford County	Elgin St. Thomas
Duration (days) of longest heat wave per year				
Reference	6	5	6	5
RCP 2.6	5	6	6	7
RCP 4.5	6	7	9	11
RCP 6.0	5	5	9	9
RCP 8.5	9	10	23	25
Total number of heat wave days per year (not necessarily consecutive days)				
Reference	14	12	14	12
RCP 2.6	32	33	33	34
RCP 4.5	43	44	62	63
RCP 6.0	36	34	73	69
RCP 8.5	61	62	126	129
Heat wave strength (total temperature differences from the normal of the reference climate time period of 1981 to 2005 of all heat wave days in a year)				
Reference	114°C	98°C	114°C	98°C
RCP 2.6	302°C	307°C	314°C	325°C
RCP 4.5	405°C	406°C	596°C	605°C
RCP 6.0	335°C	309°C	680°C	630°C
RCP 8.5	577°C	584°C	1,297°C	1,302°C

Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofOXFORD and http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofELGIN

Extreme Cold Events

Extreme cold events in the climate change projections are called “cold spells,” which are defined as at least five consecutive days when the daily minimum temperature is below that of the 10% coldest days in the reference climate (1981 to 2005).

The total number of days per year considered to be cold spells is projected to remain the same under the mitigation scenario (RCP 2.6) and decrease slightly under all other scenarios for Oxford County and Elgin St. Thomas (Table 5).

Table 5. Projected changes to the total number of cold spell days per year from reference period (1981-2005) by representative concentration pathways (RCPs), Oxford County and Elgin St. Thomas

	2050s (between 2040 to 2069)		2080s (between 2070 to 2099)	
Scenario	Oxford County	Elgin St. Thomas	Oxford County	Elgin St. Thomas
Reference	1	1	1	1
RCP 2.6	0	0	0	0
RCP 4.5	-1	-1	-1	-1
RCP 6.0	-1	-1	-2	-2
RCP 8.5	-1	-1	-1	-1

Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofOXFORD and http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofELGIN

Precipitation

Compared to the reference period of 1981 to 2005, under all scenarios, the total annual precipitation is expected to increase slightly in Oxford County and Elgin. St Thomas by the 2050s and 2080s (Table 6).

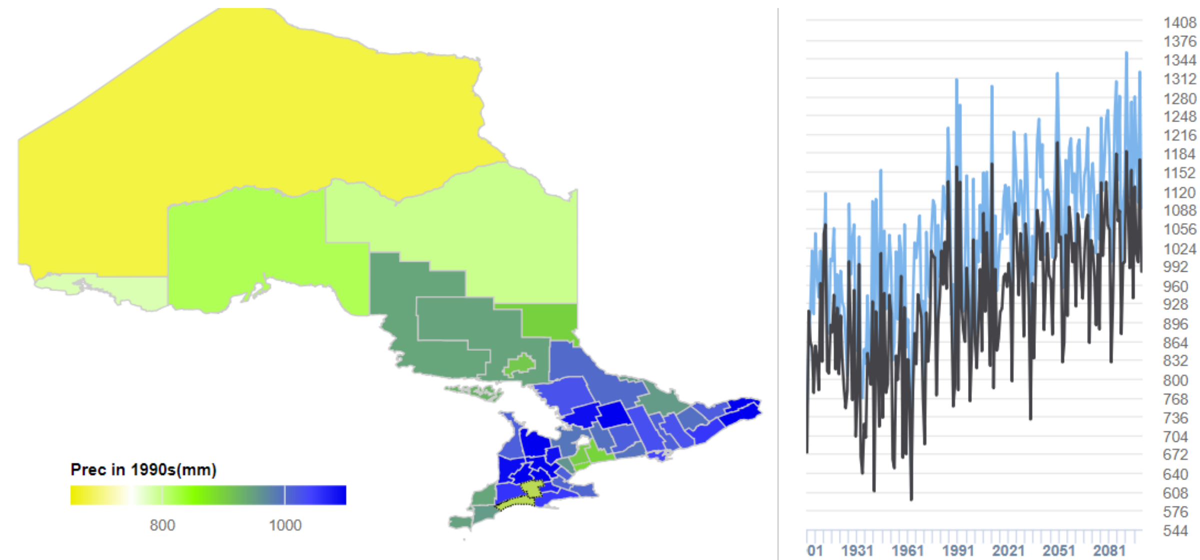
Table 6. Projected changes to the total annual precipitation (mm) from reference period (1981-2005) by representative concentration pathways (RCPs), Oxford County and Elgin St. Thomas

	2050s (between 2040 to 2069)		2080s (between 2070 to 2099)	
Scenario	Oxford County	Elgin St. Thomas	Oxford County	Elgin St. Thomas
Reference	999	941	999	941
RCP 2.6	52	51	58	54
RCP 4.5	64	63	57	56
RCP 6.0	51	49	82	81
RCP 8.5	70	70	100	99

Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofOXFORD and http://lamps.math.yorku.ca/OntarioClimate/index_app_documents.htm#/summaryofELGIN

Using the worst-case scenario for projections (RCP 8.5), the projected total annual precipitation in 2019 was 1,129 mm in Oxford County and 978 mm in Elgin St. Thomas. The total annual precipitation is projected to vary substantially from year to year with an overall trend of increasing precipitation by 2100 (Figure 10).

Figure 10. Projected total annual precipitation (mm) under RCP 8.5, Oxford County and Elgin St. Thomas

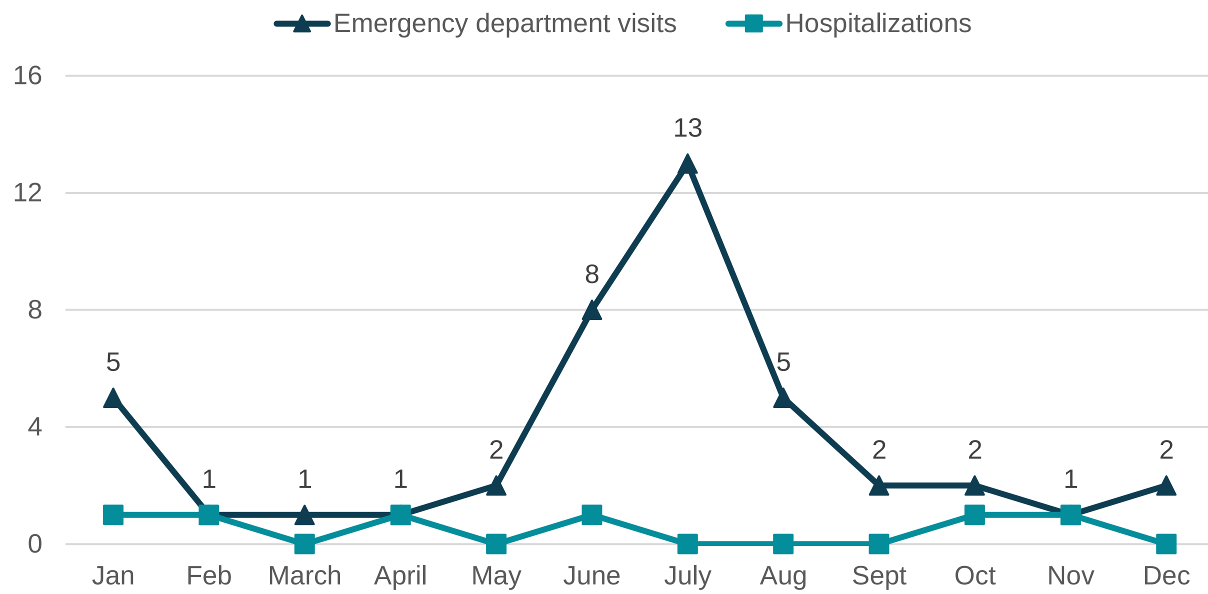


Source: Laboratory of Mathematical Parallel Systems (LAMPS), York University, Data available from: http://lamps.math.yorku.ca/WorldClimate/

Emergency Department Visits and Hospitalizations from Environmental Causes

In 2018, there were 43 emergency department (ED) visits and 6 hospitalizations for reasons such as sunburns, frostbite, hypothermia, exhaustion and bites (this includes non-specific bites, which may be from bugs, animals, etc.), with most visits occurring in the summer months (Figure 11). This information is based on real-time triage complaints and hospital admissions from local emergency departments, which may not reflect the final diagnosis in the hospital or upon discharge from the hospital. These data may include people who live within the SWPH region and people who live outside of the SWPH region.

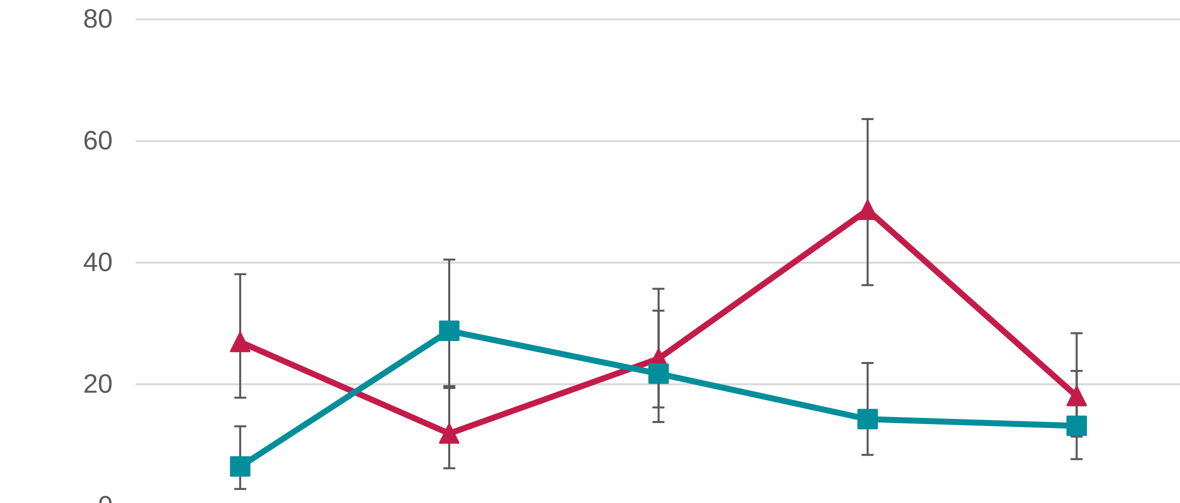
Figure 11. Number of emergency department visits and hospitalizations for environmental reasons by month, Southwestern Public Health hospitals*, 2018



***The hospitals include St. Thomas Elgin General Hospital, Woodstock General Hospital, Alexandra Hospital and Tillsonburg District Memorial Hospital.
Source: Acute Care Enhanced Surveillance System (ACES), KFL&A Public Health, Date Extracted: March 21, 2019.

Heat-related illnesses include heatstroke and sunstroke, fainting, heat cramps, heat exhaustion, heat fatigue and swelling from heat. Cold-related illnesses include frostbite, hypothermia and other effects of reduced temperature such as immersion of hands and feet and chilblains (inflammation of small blood vessels in the skin from repeated exposure to cold that causes itching, red patches, swelling and blistering). Based on diagnosis data, the rate of ED visits for heat- and cold-related illnesses varied from year to year. In 2016, the rate of ED visits for heat-related illnesses (48.7 per 100,000 population) was higher than in 2014, 2015 and 2017 (Figure 12). The rate of ED visits for cold-related illnesses was higher in 2014 and 2015 compared to 2013 (Figure 12). In the SWPH region, the highest number of heat alerts were issued in 2016 and the highest number of cold alerts were issues in 2014 and 2015.[1]

Figure 12. Crude rate (per 100,000 population) of emergency department visits for heat- and cold-related illnesses, Southwestern Public Health, 2013-2017



	2013	2014	2015	2016	2017
Heat	26.9	11.9	24.2	48.7	18.1
Cold	6.5	28.8	21.7	14.3	13.2

Source: Ambulatory Emergency External Cause (2013-2017), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 21, 2019 & Population Estimates (2013-2016), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: December 21, 2018 & Population Projections (2017), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: January 2, 2019.

The rate of ED visits due to heat-related illnesses was similar between people living in the urban and rural municipalities; however, the rate of ED visits for cold-related illnesses was higher among people living in the urban municipalities compared to the rural municipalities (Figure 13).

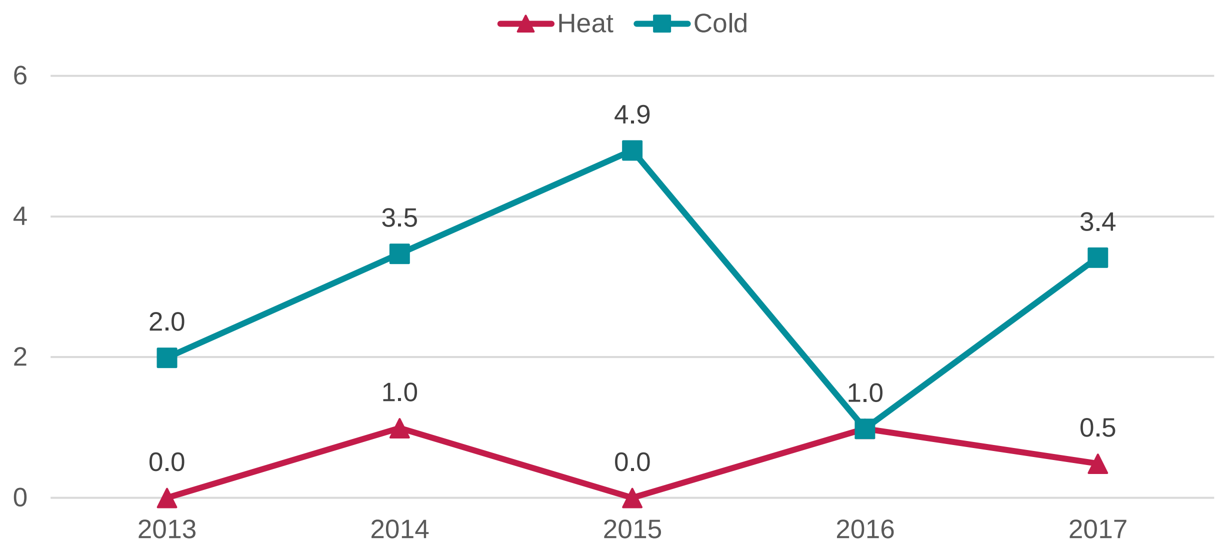
Figure 13. Crude rate (per 100,000 population) of ED visits for heat- and cold-related illnesses by urban or rural residence, Southwestern Public Health, 2016

In 2016, there were 55.8 (95% CI: 42.3-71.6) heat- and 22.3 (95% CI: 14.6-33.3) cold-related ED visits per 100,000 population living in the urban municipalities of St. Thomas, Aylmer, Ingersoll, Tillsonburg and Woodstock.

In 2016, there were 39.1 (95% CI: 28.6-53.3) heat- and 3.4 (95% CI: 1.1-8.8) cold-related ED visits per 100,000 population living in the rural municipalities of Bayham, Central Elgin, Southwold, Dutton/Dunwich, Malahide, West Elgin, Blandford-Blenheim, East Zorra-Tavistock, Zorra, Norwich and South-West Oxford.

The number of hospitalizations for heat-related illnesses was small each year, with only five hospitalizations total between 2013 and 2017, which means the rates of hospitalizations for heat-related illnesses were typically between 0 to 1 hospitalization per 100,000 population each year. The rate of hospitalizations for cold-related illnesses were higher compared to heat-related illnesses (Figure 14). The rates of hospitalizations for cold-related illnesses were not statistically significant different over time (error bars not shown).

Figure 14. Crude rate (per 100,000 population) of hospitalizations for heat- and cold-related illnesses, Southwestern Public Health, 2013-2017



Source: Ambulatory Emergency External Cause (2013-2017), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 21, 2019 & Population Estimates (2013-2016), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: December 21, 2018 & Population Projections (2017), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: January 2, 2019.

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Appendix A: Technical Notes

This report summarizes information from a variety of data sources available to Public Health. The methods used and geography presented depends on the data source. More detail about the data sources can be found below.

Acute Care Enhanced Surveillance System (ACES)

ACES is a surveillance system that monitors real-time triage (emergency department visits) and inpatient (hospital admissions) data from participating hospitals in Ontario. This system was developed (with partnerships) and is maintained by Kingston, Frontenac, Lennox & Addington (KFL&A) Public Health. Machine learning is used to classify chief complaint text entered in the hospital into specific syndromes (e.g., environmental). The environmental syndrome was found to have strong correlation to validated diagnosis data from the National Ambulatory Care Reporting System (NACRS).[5] However, real-time data is always more sensitive than specific; therefore, more visits will be classified as environmental in ACES and they will be categorized less precisely than in NACRS.

Air Quality Information System

The Ministry of the Environment, Conservation and Parks monitors air quality at 39 stations across Ontario. Some of the air quality stations monitor pollutant levels for ozone, fine particulate matter, nitrogen dioxide, sulphur dioxide, carbon monoxide and total reduced sulphur compounds. However, the Port Stanley, London, Kitchener and Brantford stations only monitor pollutant levels for ozone, fine particulate matter and nitrogen dioxide.

National Ambulatory Care Reporting System (NACRS)

NACRS contains information about unscheduled emergency department visits. The data submitted by emergency departments is validated by CIHI and released to public health units on a quarterly basis through IntelliHEALTH ONTARIO. NACRS can also be used to obtain information about inpatients that were admitted from the emergency room to critical care units/operating rooms, other units within a hospital or to another acute care facility. This information was used to capture emergency department visits and hospitalizations for heat- and cold-related illnesses (Table 7).

Table 7. Description of emergency department visits and hospitalizations for heat- and cold-related illnesses

Condition group	Condition	ICD-10-CA codes
Heat-related illnesses	Effects of heat and light	T67
Cold-related illnesses	Frostbite	T33-T35
	Hypothermia	T68
	Other effects of reduced temperature	T69

Population Estimates and Projections

Population estimates and projections were used as the denominator to calculate rates. Population estimates are produced by the Demography Division at Statistics Canada and were obtained through IntelliHEALTH ONTARIO.

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