



# Healthy Sexuality, Sexually Transmitted Infections and Blood-Borne Infections

A Population Health Assessment Report

Population Health Assessment Report  
Oxford County Public Health  
September 2017

## About Oxford County

Located in the heart of southwestern Ontario at the crossroads of Highways 401 and 403, Oxford County has a population of approximately 114,000 people across eight municipalities that are “growing stronger together” through a partnership-oriented, two-tier municipal government incorporated as the County of Oxford. Oxford County is emerging as a leader in sustainable growth through the [Future Oxford Community Sustainability Plan](#) and County Council’s commitment to becoming a [zero waste](#) community and achieving [100% renewable energy](#) by 2050. Situated in one of Ontario’s richest areas for farmland, agriculture is a key industry that serves as a springboard for some of the sustainable industries that are steadily diversifying the local economy. Oxford County offers a thriving local arts, culture and culinary community, as well as conservation parks, natural areas and more than 100 kilometres of scenic trails. The Oxford County Public Health office is located in Woodstock, Ontario. Visit [www.oxfordcounty.ca/health](http://www.oxfordcounty.ca/health) or follow our social media sites at [www.oxfordcounty.ca/social](http://www.oxfordcounty.ca/social). Oxford County’s Strategic Plan is at [oxfordcounty.ca/strategicplan](http://oxfordcounty.ca/strategicplan).

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# Summary

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Healthy sexuality is important to health and involves many aspects of well-being. Oxford County Public Health is mandated to assess the health of the population, including sexual health, in order to tailor local services and supports that promote healthy sexual practices and prevent exposure and transmission of sexually transmitted infections (STIs) and blood-borne infections (BBIs). This report provides an overview of the sexual health status of Oxford County residents and identifies potential areas to focus future public health efforts. Key findings include:

- Oxford County residents report that they were more likely to have been sexually active before the age of 20 compared with residents of all of Ontario. However, most sexually active youth use some sort of birth control, such as condoms, the pill, diaphragms, spermicide or injections.
- Teens in Oxford County get pregnant at a similar rate to all teens in Ontario. However, teens in Woodstock and Tillsonburg have higher pregnancy rates than teens in Ontario.
- Oxford County residents have lower rates than residents of Ontario of chlamydia and gonorrhoea, two common sexually transmitted infections, even after differences in age structure are taken into consideration. However, Oxford County residents have higher rates of hepatitis C compared with residents of Ontario, after accounting for differences in age structure. The most common risk factors identified by those people diagnosed with hepatitis C include injection drug use, sharing needles and other drug equipment.
- In Oxford County, the per cent of grade 7 students up-to-date (i.e., covered) for hepatitis B vaccination has decreased over the last three school years. The per cent of grade 7 students up-to-date for human papilloma virus (HPV) has remained similar over the last three school years in Oxford County; however, the rates were consistently lower than Ontario.

Moving forward, four key areas of focus should be considered:

1. Promote healthy sexuality and prevent unintended consequences of being sexually active, particularly among youth and emerging adults.
2. Decrease hepatitis C transmission and increase diagnosis and treatment, particularly among people who inject drugs.
3. Increase the coverage of hepatitis B and HPV vaccine in grade 7 students.
4. Undertake routine monitoring of healthy sexuality in Oxford County to assess the progress on these areas of focus.

# Healthy Sexuality, Sexually Transmitted Infections and Blood-Borne Infections

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## Introduction

Sexual health is an important aspect of overall well-being and contributes to our quality of life.<sup>1</sup> Conceptualizing sexual health involves recognizing the intersections between physical, mental (i.e., emotional and intellectual) and social factors expressed within the context of personal, family and cultural values. For example, physical aspects may include preventing unintended pregnancies and sexually transmitted infections (STIs) as well as seeking care or treatment when needed.<sup>2</sup> Mental aspects may include being able to experience sexual satisfaction and intimacy when desired and being able to communicate about sexual health with partners and health care providers.<sup>2</sup> Social aspects might include recognizing and respecting sexual rights in order to have safe sexual experiences (i.e., free of coercion, discrimination and violence) as well as having access to sexual health information, education and care.<sup>2</sup> Public Health is mandated by the Ministry of Health and Long-Term Care (MOHLTC) to promote healthy sexuality among the residents of Oxford County and to prevent or reduce the burden of STIs and blood-borne infections (BBIs), which can be transmitted by exposure to blood and other body fluids through sexual contact.<sup>3</sup>

This report provides an overview of the sexual health status of Oxford County residents based on data available to Public Health. While we do not have a comprehensive picture of the sexual health of residents, we can start to piece together a picture through the data that is available to us. This report includes data on sexual behaviours, teen pregnancies, STIs and BBIs, cervical cancer screening (related to human papilloma virus (HPV)) and hepatitis B and HPV vaccination coverage. Where possible, these indicators were examined by smaller geographic areas (e.g., municipality) to determine if sexual health varies across Oxford County. Further information on the data sources, methods and limitations is available in Appendix A.

# Sexual behaviours

## Youth sexual activity

Youth that have sex at an early age may increase their risk of unplanned pregnancy and infections, particularly if they do not have access to protection or support and lack the knowledge and maturity to understand the consequences of their behaviour.<sup>4</sup> Youth sexual activity was defined as the proportion of 15 to 19 year olds who reported ever having sexual intercourse. In 2013-2014, about half of youth (52.6%) in Oxford County reported ever having had sexual intercourse (Appendix B, Table B1).

## Age of sexual debut

It was estimated that about three quarters of Oxford County residents aged 15 to 49 years first had sexual intercourse before age 20 (Table 1). Specifically, in 2013-2014, 75.8% of residents aged 15 to 49 years reported that they had sexual intercourse before age 20 which is higher than the Ontario rate (62.1%) for the same years.

**Table 1. Sexual debut before 20 years for residents aged 15 to 49 years by location, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
<b>Ontario</b>	64.5% (63.3%-65.6%)	64.6% (63.3%-65.9%)	62.1% (60.7%-63.5%)
<b>Oxford County</b>	78.9% (73.7%-84.0%)	73.9% (67.1%-80.7%)	75.8% (68.6%-83.1%)
Woodstock	83.7% (76.5%-90.9%)	79.5% (67.4%-91.6%)	81.0% (72.1%-89.9%)
North of 401*	73.9% (62.6%-85.3%)	58.6% (44.6%-72.6%)	76.2% (63.8%-88.6%)
South of 401†	77.2% (67.7%-86.7%)	79.5% (66.0%-93.0%)	70.6% (54.2%-87.0%)

\*North of 401 includes the municipalities of Blandford-Blenheim, East Zorra-Tavistock, Zorra and Ingersoll.

†South of 401 includes the municipalities of South-West Oxford, Norwich and Tillsonburg.

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.

Residents of Oxford County aged 15 to 49 years old reported, on average, in 2013-2014 that they were 17.5 years old when they first had sexual intercourse (Table 2). On average, residents of Oxford County first had sexual intercourse about one year earlier than Ontario overall (17.5 years versus 18.3 years). The median age (i.e., middle number) for Oxford County was slightly lower at 16.6 years, indicating that within Oxford County there were some people that reported having first had sexual intercourse when they were older, otherwise the two numbers would be much closer together (Appendix B, Table B2).



**Table 2. Average age of sexual debut (years) for residents aged 15 to 49 years by location, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
<b>Ontario</b>	18.2 (18.1-18.3)	18.1 (18.0-18.3)	18.3 (18.1-18.4)
<b>Oxford County</b>	17.1 (16.7-17.5)	17.3 (16.9-17.7)	17.5 (17.1-18.0)
Woodstock	17.1 (16.4-17.7)	16.9 (16.3-17.8)	17.4 (16.8-17.9)
North of 401*	17.1 (16.5-17.8)	18.1 (17.4-18.8)	17.7 (16.9-18.6)
South of 401†	17.1 (16.3-17.8)	17.2 (16.2-18.1)	17.6 (16.5-18.6)

\*North of 401 includes the municipalities of Blandford-Blenheim, East Zorra-Tavistock, Zorra and Ingersoll.

†South of 401 includes the municipalities of South-West Oxford, Norwich and Tillsonburg.

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.

## Number of sexual partners

Similar to having sex during adolescence, having more sexual partners can increase the risk of unplanned pregnancy and STIs/BBIs. It was estimated that about three quarters (75.9%) of Oxford County residents aged 15 to 49 years had one sexual partner in the past 12 months (Appendix B, Table B3). Other residents either did not have a sexual partner or had more than one sexual partner in the past 12 months; however, the data was not reportable for these two groups.

## Birth control use

Birth control use is important to prevent unplanned pregnancies and helps with family planning, which is related to better maternal health and empowerment of women and has been shown to increase women's economic and educational opportunities.<sup>5</sup> Participants aged 24 years or less who had sexual intercourse in the past 12 months were asked if they usually used birth control in the past 12 months. Birth control could include methods such as using condoms, the pill, diaphragms, spermicide or injections. In 2013-2014, it was estimated that 88.5% of sexually active Oxford County residents aged 24 years or less usually used some method of birth control (Table 3). Data was not reportable for smaller areas within Oxford County. In 2011-2012, estimates of usual birth control use were higher for Oxford County than Ontario (96.2% versus 80.9%).

**Table 3. Birth control use for sexually active youth aged 24 years or less, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
Ontario	80.5% (78.0%-83.0%)	80.9% (78.2%-83.7%)	79.0% (76.1%-81.9%)
Oxford County	89.4% (80.0%-98.7%)	96.2% (90.7%-100%)	88.5% (77.8%-99.1%)

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.

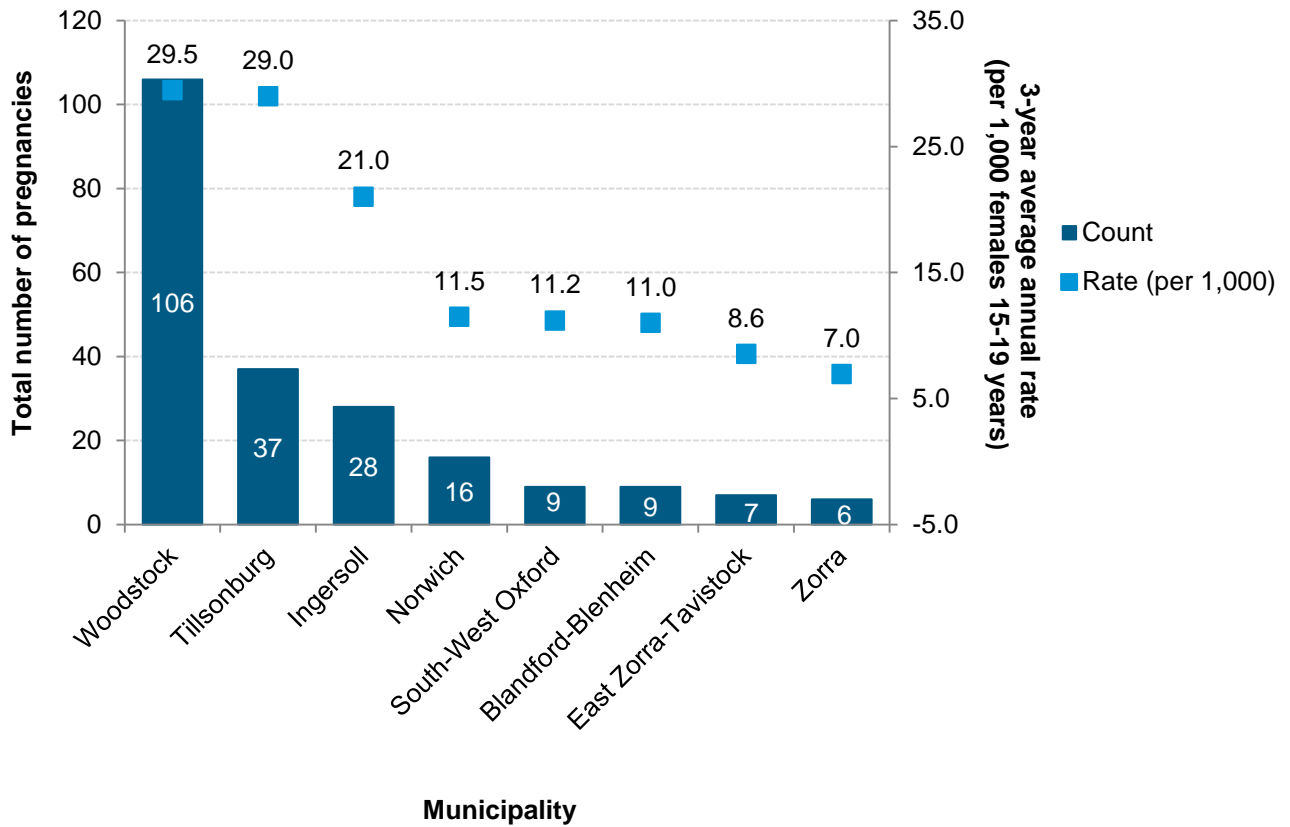
# Teen pregnancy

Some youth may plan their pregnancies, however, many are unplanned. Whether planned or unplanned, teen pregnancy is a major contributor of child and maternal health. For example, babies born to teenage mothers are more likely to have a low birth weight which can lead to health problems such as higher risk of sudden infant death syndrome (SIDS), diabetes, hypertension, heart disease, asthma, hearing problems and blindness.<sup>6,7</sup> Teenage pregnancy can also limit women's educational and economic advancement if mothers drop out of school. Lower education levels and income of the mother are often associated with worse health outcomes for the mother and baby. As a result, teen pregnancy can lead to a multi-generational cycle of poor health and poverty.<sup>6</sup>

Teen pregnancies include both pregnancies (i.e., live births and stillbirths combined) and therapeutic abortions among 15 to 19 year olds. The age of the mother is recorded at time of event, therefore, a female who becomes pregnant when 19 but who delivers at age 20 will not count as a teenage pregnancy. Additionally, medically or pharmacologically-induced abortions such as those induced by the emergency contraceptive pill, RU 486 or methotrexate (usually reserved for ectopic pregnancies) are not captured in the hospital or clinic data (see Appendix A for more information).<sup>8</sup> While it is unknown how many therapeutic abortions this may include, it is estimated that about 5% of all therapeutic abortions in Canadian hospitals (excluding Quebec) are medical procedures only, including pharmacologically-induced abortions.<sup>9</sup>

In 2014, there were 64 pregnancies among females aged 15 to 19 in Oxford County. For the combined years from 2012 to 2014, the total number of teen pregnancies was 218, or an average of 73 teen pregnancies per year. The average annual rate of teen pregnancies in Oxford County was 20.0 per 1,000 females aged 15 to 19 years. This is similar to a rate of 19.4 (per 1,000 females aged 15 to 19 years) in Ontario over the same time period.<sup>10</sup> Within Oxford County, teen pregnancy rates were highest in Woodstock and Tillsonburg (significantly higher than Ontario rates) followed by Ingersoll (Figure 1).

**Figure 1. Teen pregnancy by municipality, Oxford County, 2012-2014 (combined)**



Source: BORN Information System (2012-2014), Date Extracted: February 14, 2017 & Therapeutic Abortion Summary (2012-2014), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: February 16, 2017 & Population Estimates (2012-2014), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

# Sexually transmitted infections

## Chlamydia

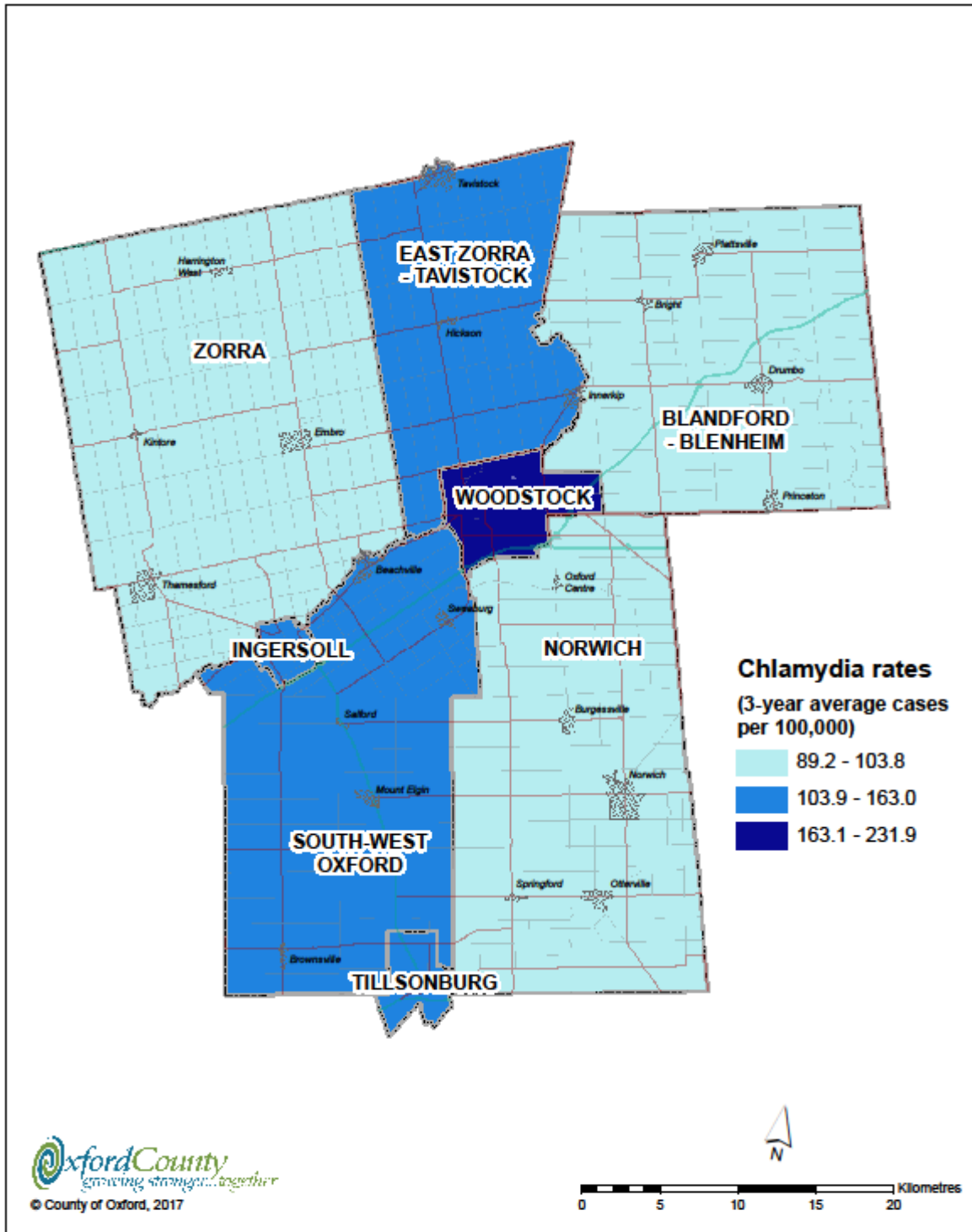
**Chlamydia is a preventable and curable STI caused by the bacteria *Chlamydia trachomatis*. It is spread through unprotected vaginal, anal and oral sex with an infected person and can be passed from an infected mother to her baby during delivery. Symptoms in women can include increased vaginal discharge and/or irritation, bleeding during or after sex, pain during sex and painful or burning urination.<sup>11</sup> Symptoms in men can include discharge and/or itching from the penis, pain or swelling in the testicles and painful or burning urination. However, some individuals may not experience any symptoms. Among women, if left untreated, chlamydia can cause pelvic inflammatory disease which can permanently damage the reproductive system, causing ectopic pregnancy (pregnancy outside of the uterus) and infertility. It can also increase the risk of acquiring and transmitting human immunodeficiency virus (HIV) during sexual intercourse.**

In 2015, there were 201 residents with new cases of chlamydia in Oxford County.<sup>10</sup> Combining cases from 2013 to 2015, the three-year average crude incidence rate for Oxford County was lower at 167.5 (per 100,000) compared to 267.4 (per 100,000) in Ontario (Appendix B, Table B4).<sup>12,13</sup> Chlamydia is typically more commonly diagnosed in younger age groups. To assess if there is an underlying difference in rates independent of age structure, it is important to compare age-standardized incidence rates which take into consideration differences in age structures between two populations or geographic areas. From 2013 to 2015, the age-standardized rate in Oxford County was lower at 180.0 (per 100,000) compared to Ontario's rate of 267.3 (per 100,000) (Appendix B, Table B4).<sup>12,14</sup> Figure 2 shows the crude incidence rates of chlamydia by municipality in Oxford County. All municipalities had lower rates than Ontario (Appendix B, Table B4).<sup>a</sup> Within Oxford County, residents of Woodstock had the highest rate.

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<sup>a</sup> A limitation of this analysis is that crude rates (the true rate in the population) were used for comparisons due to small numbers of STI and BBI cases in some municipalities, particularly for gonorrhoea and hepatitis C. Age-standardized rates using direct standardization are recommended when comparing rates over places or time as this method adjusts for the effects of different age structures in different populations, however this method requires 20 or more cases.<sup>35</sup> Therefore, these rates do not take into consideration differences that may be due to different age structures between places.

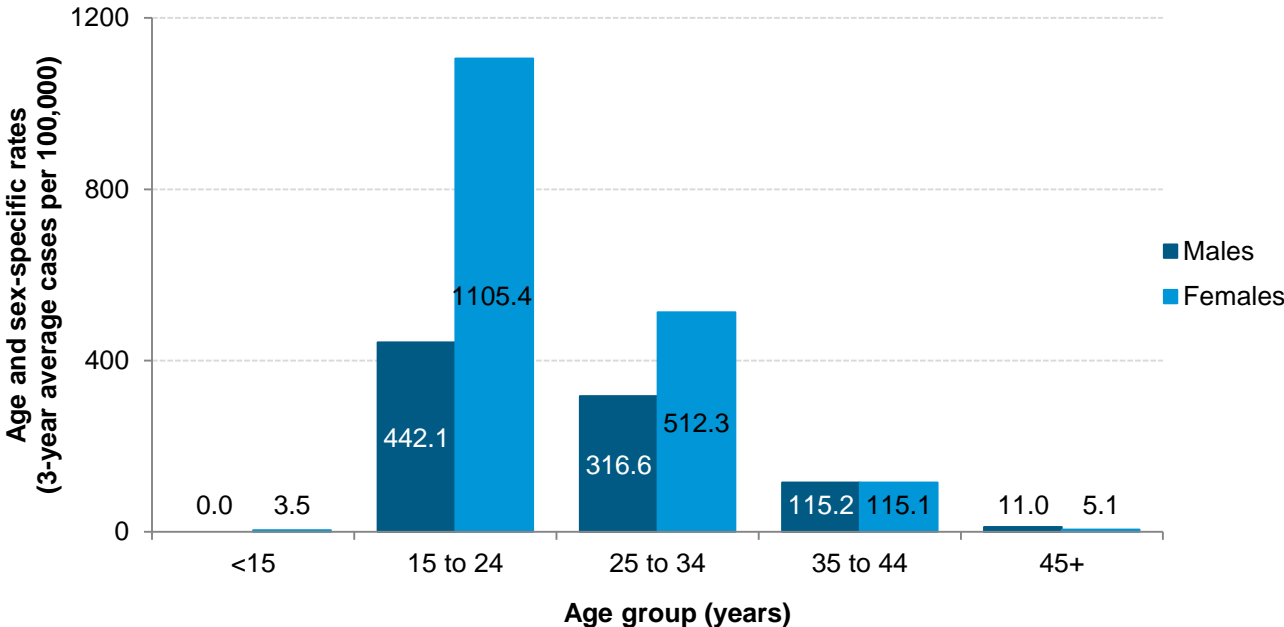
Figure 2. Chlamydia incidence rates (3-year average cases per 100,000) by municipality, Oxford County, 2013-2015 (combined)



Source: iPHIS (2013-2015), Date Extracted: March 6, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

Combining data from 2013-2015 in Oxford County, the age-specific incidence rate was highest among 15 to 24 year olds (768.3 per 100,000).<sup>12</sup> Within 15 to 24 year olds, the rate was higher among females (1,105.4 per 100,000) than males (442.1 per 100,000) (Figure 3).<sup>12</sup> Overall, females are diagnosed with chlamydia at a rate that is nearly twice that of males (217.9 per 100,000 compared to 116.5 per 100,000).<sup>12</sup> This may indicate that females, especially those 15 to 24 years old, are the group most often tested in Oxford County, or it may indicate that there is a higher level of underlying infection in this group.

**Figure 3. Chlamydia incidence rates (3-year average cases per 100,000) by age group and sex, Oxford County, 2013-2015 (combined)**

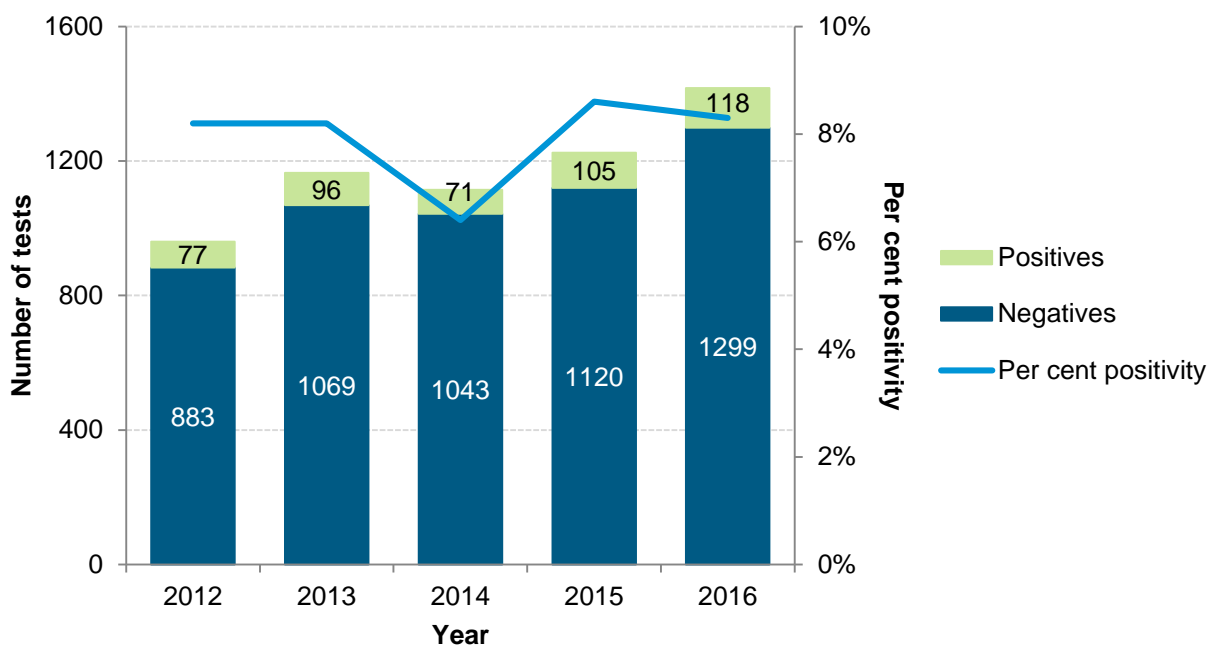


Source: iPHIS (2013-2015), Date Extracted: March 6, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

The most common self-reported risks identified among people newly diagnosed with chlamydia in Oxford County from 2013 to 2015 were sex with the opposite sex and not using a condom (cases may have more than one risk factor listed).<sup>15</sup> These self-reported risk factors do not include all possible ways that chlamydia may have been transmitted, but were those identified by residents with new cases of chlamydia.

The per cent positivity describes the proportion of positive results out of all unique specimens tested. Figure 4 shows that although more unique specimens of *Chlamydia trachomatis* were tested in 2016 than 2012,<sup>b</sup> about the same proportion of tests were positive (8%), except for 2014 which was around 6%.

**Figure 4. Unique specimens tested for *Chlamydia trachomatis*, Oxford County, 2012-2016**



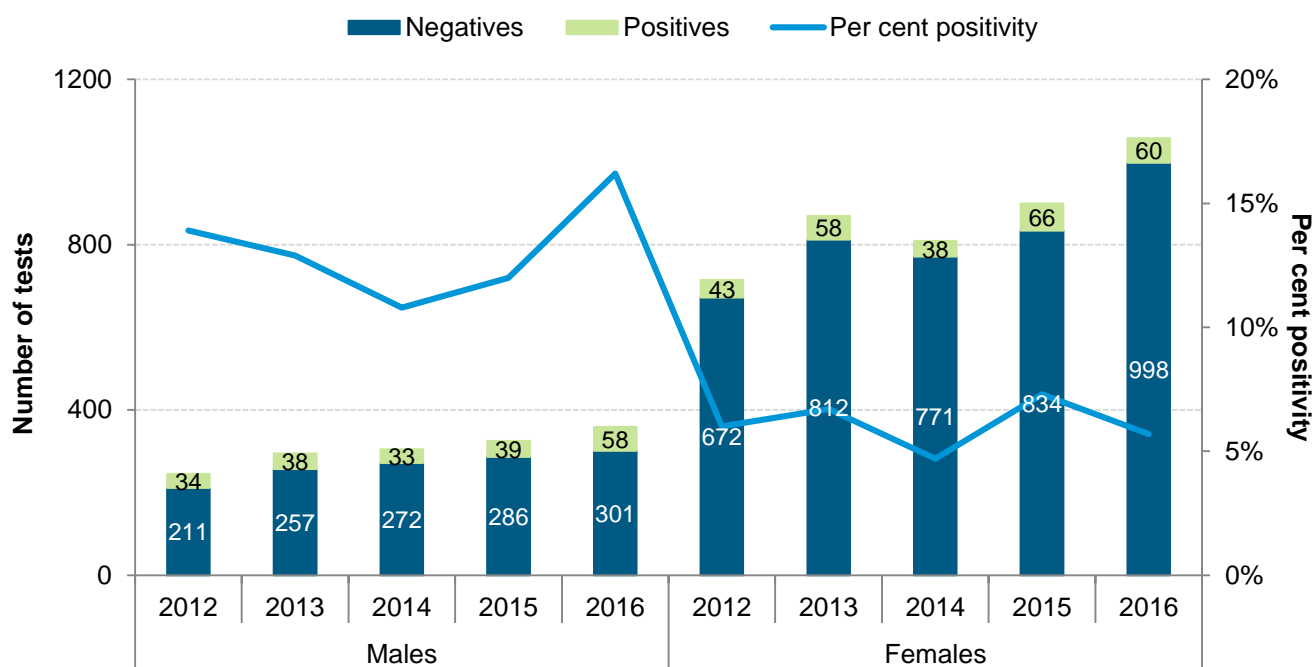
Source: STI Laboratory Data (2012-2016), Laboratory Information Management System, Public Health Ontario, Date Extracted: February 23, 2017.

<sup>b</sup> Laboratory test data from Public Health Ontario Laboratories for the bacteria that cause chlamydia (*Chlamydia trachomatis*) are based on the nucleic acid amplification test (NAAT) and cultures from cervical and urine specimens, as recommended by Public Health Ontario (Appendix A).



For each year, per cent positivity was higher among males than females. In 2016, 16% of unique specimens tested were positive for males compared to 6% for females (Figure 5). This is because males had fewer unique specimens tested and more of those tests were positive. On the other hand, females had more unique specimens tested and in proportion to the number of tests, fewer of those tests were positive. Chlamydia testing is often included in regular cervical cancer screening (Pap tests) for females, which may account for the higher testing rates in females.<sup>16</sup>

**Figure 5. Unique specimens tested for *Chlamydia trachomatis* by sex, Oxford County, 2012-2016**



Source: STI Laboratory Data (2012-2016), Laboratory Information Management System, Public Health Ontario, Date Extracted: July 27, 2017.

## Gonorrhea

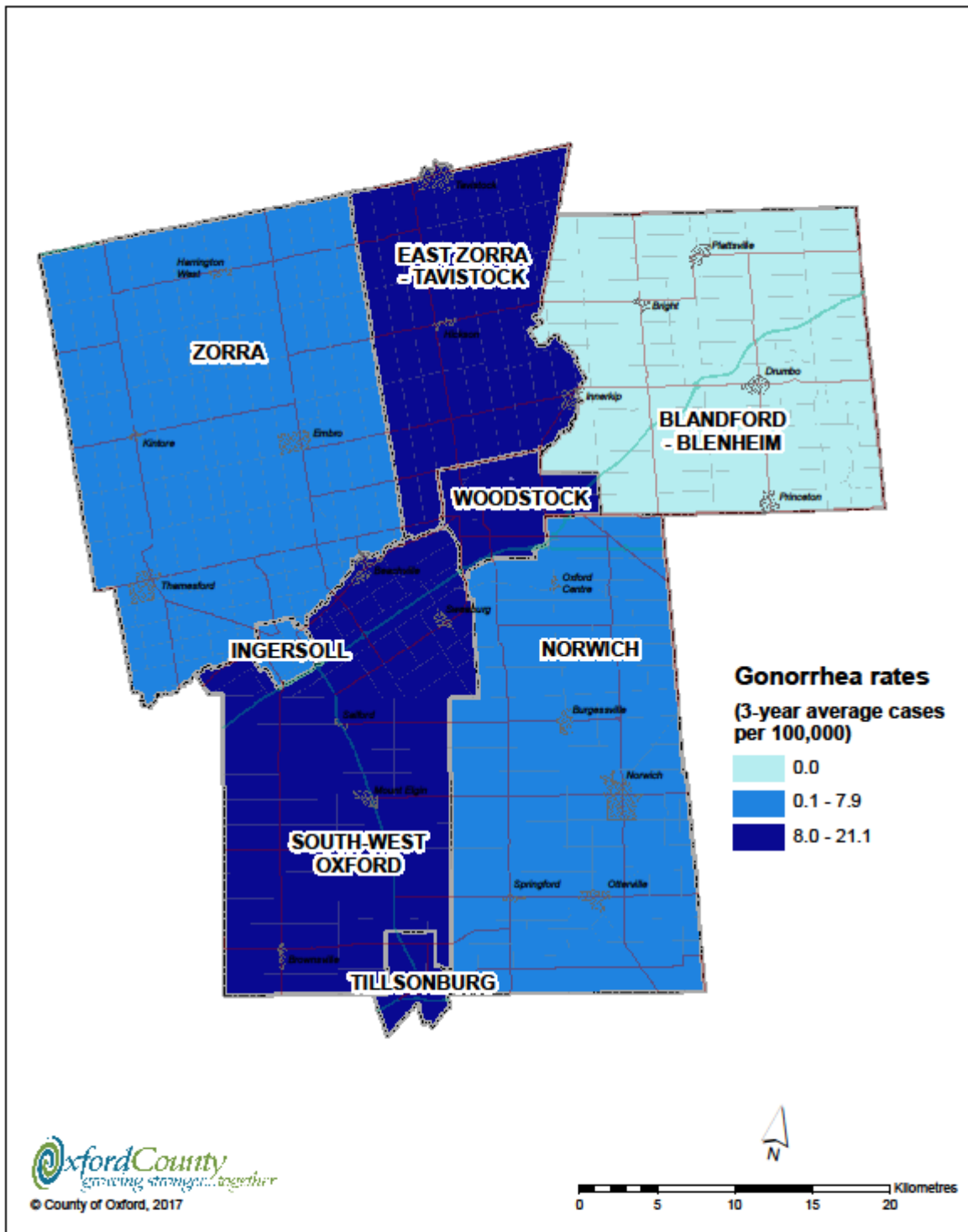
**Gonorrhea is a preventable and curable STI caused by the bacteria *Neisseria gonorrhoeae*. It is spread through unprotected vaginal, anal and oral sex with an infected person and can be passed from an infected mother to her baby during delivery. Symptoms in women can include white or yellow vaginal discharge, bleeding during or after sex and pain during urination. Symptoms in men can include discharge from the penis, itching around the penis, pain and/or swelling in the testicles and frequent or painful urination. However, some individuals may not experience any symptoms. If left untreated, gonorrhea can cause pelvic inflammatory disease in women and epididymitis (inflammation of the tubes of the testicles) in men. It can also spread to the blood and joints and increase the risk of acquiring or transmitting HIV.<sup>17</sup>**

In 2015, there were 18 residents with new cases of gonorrhea in Oxford County.<sup>10</sup> Combining cases from 2013 to 2015, the three-year average crude incidence rate for Oxford County was lower at 12.0 (per 100,000) compared to 39.8 (per 100,000) in Ontario (Appendix B, Table B5).<sup>12,13</sup> To assess if there is an underlying difference in rates independent of age structure, it is important to compare age-standardized incidence rates which take into consideration differences in age structures between two populations or geographic areas. From 2013 to 2015, the age-standardized rate in Oxford County was lower at 13.0 (per 100,000) compared to Ontario's rate of 40.0 (per 100,000) (Appendix B, Table B5).<sup>12,14</sup> Figure 6 shows the

crude incidence rates of gonorrhea by municipality in Oxford County. All municipalities had lower rates than Ontario except for South-West Oxford and East Zorra-Tavistock which did not differ from Ontario (Appendix B, Table B5). Within Oxford County, East Zorra-Tavistock, Woodstock, South-West Oxford and Tillsonburg had the highest rates.

There was no self-reported risk factor information for gonorrhea cases from 2013 to 2015 in Oxford County (see limitations of risk factor information in Appendix A), but it can be assumed that transmission occurred because of unprotected sex.

Figure 6. Gonorrhoea incidence rates (3-year average cases per 100,000) by municipality, Oxford County, 2013-2015 (combined)

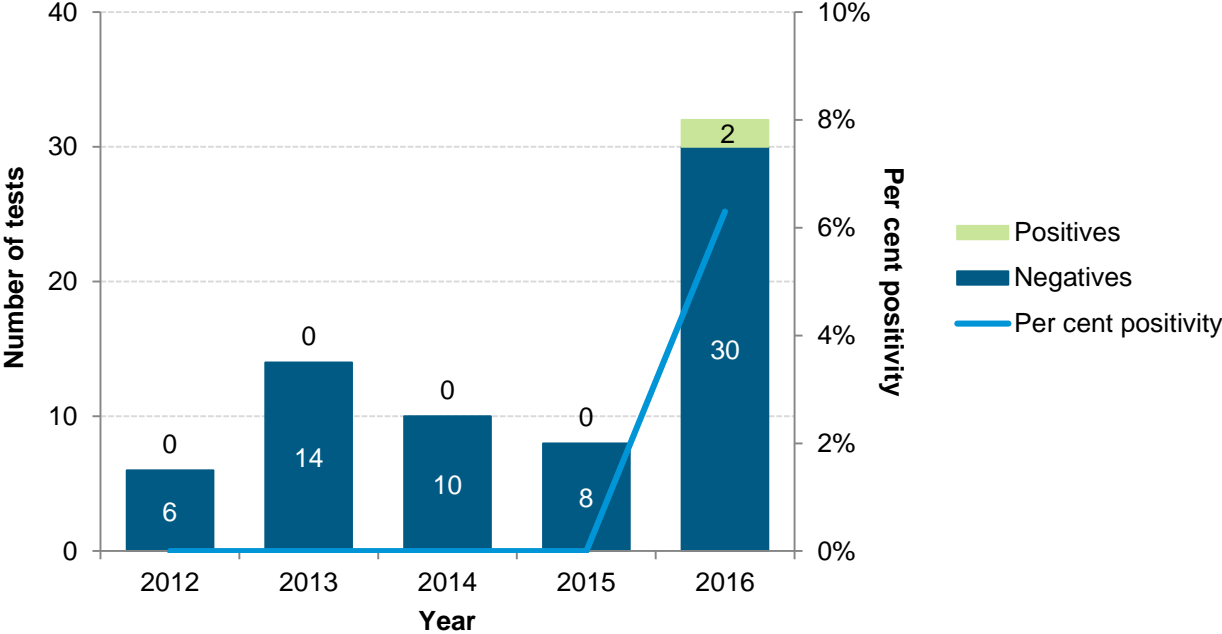


Source: iPHIS (2013-2015), Date Extracted: March 8, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

Map Creation Date: April 11, 2017

Figure 7 shows that the number of tests for *Neisseria gonorrhoeae* increased in 2016.<sup>c</sup> However, this does not include cultures submitted for confirmation from front-line labs such as hospitals. The corresponding per cent positivity in 2016 was 6% compared to 0% in previous years. This may be in part be due to an overall three-fold increase in testing in 2016 following a reminder sent out from Oxford County Public Health in July 2015 updating health care professionals that all sexually active people who have signs and symptoms of gonorrhoea should be tested as per the Public Health Ontario (PHO) Guidelines for Testing and Treatment of Gonorrhoea in Ontario<sup>18</sup> as well as a “Top Ten Reasons” campaign that occurred in Oxford County from November to December 2015 that encouraged people to get tested for STIs.<sup>19</sup> Typically, it would be expected that increased routine testing would lead to a lower per cent positivity; however, in 2016 there was a small increase in positive cases (from zero to two), likely because there was limited testing conducted before 2016.

**Figure 7. Unique specimens tested for *Neisseria gonorrhoeae*, Oxford County, 2012-2016**



Source: STI Laboratory Data (2012-2016), Laboratory Information Management System, Public Health Ontario, Date Extracted: February 23, 2017.

<sup>c</sup> Laboratory test data from Public Health Ontario Laboratories for the bacteria that cause gonorrhoea (*Neisseria gonorrhoeae*) are based on cultures from cervical, pharyngeal, rectal, urethral, vaginal and other specimen sites as recommended by Public Health Ontario (Appendix A).

## Syphilis

Syphilis is a sexually transmitted bacterial infection caused by *Treponema pallidum*. Syphilis can be spread through contact with syphilis sores during vaginal, anal or oral sex and it can be spread from a mother to her unborn baby, which may cause fetal deformity (e.g., cataracts, deafness and seizures) or stillbirth. There are different stages of infection: primary, secondary, latent and tertiary. Syphilis is generally considered to be infectious in the primary, secondary or early latent stages.<sup>20</sup> Primary stage symptoms typically include a painless sore(s) or ulcer in the mouth, anus, penis, cervix or vagina. Secondary symptoms can include rash, fever, sore throat, swollen lymph nodes, patchy hair loss, fatigue, muscle aches and weight loss. There are no symptoms in the latent stage. The tertiary stage may occur 10 to 30 years after initial infection and can include irreversible damage to the brain and spinal cord, heart, eyes and bones. Syphilis can be treated with antibiotics.

In 2015, there were four residents with new cases of syphilis (infectious and other) in Oxford County.<sup>10</sup> Combining cases from 2013 to 2015, the three-year average crude incidence rate was 1.8 (per 100,000) in Oxford County compared to 11.0 (per 100,000) in Ontario.<sup>12,13</sup>

# Blood-borne infections

## Hepatitis B

Hepatitis B is a vaccine preventable liver infection that is caused by the hepatitis B virus (HBV). This virus can be spread through contact with infected blood and through semen and vaginal fluid, for example, through sexual transmission, transmission at birth and shared injection and inhalation equipment contaminated with blood. Roughly half of infected individuals develop symptoms, which can take two to six months to appear.<sup>21</sup> Symptoms can include fatigue, loss of appetite, fever, nausea, vomiting, dark urine, pale stools, stomach pain, joint pain and jaundice. Hepatitis B is more infectious than HIV and if left untreated it can cause cirrhosis of the liver, liver failure, liver cancer and premature death. The hepatitis B vaccine is publicly funded for grade 7 students and for other populations at high risk. Public Health administers the vaccine through school-based programs to students in grade 7 with the goal of preventing new hepatitis B infections. Populations meeting the high risk eligibility criteria may receive the publicly funded vaccine from their primary health care provider or from Public Health.

In 2015, there were no residents with new cases of hepatitis B in Oxford County. Combining data from 2013 to 2015, the three-year average crude incidence rate was 0.3 (per 100,000) in Oxford County compared to 0.7 (per 100,000) in Ontario.

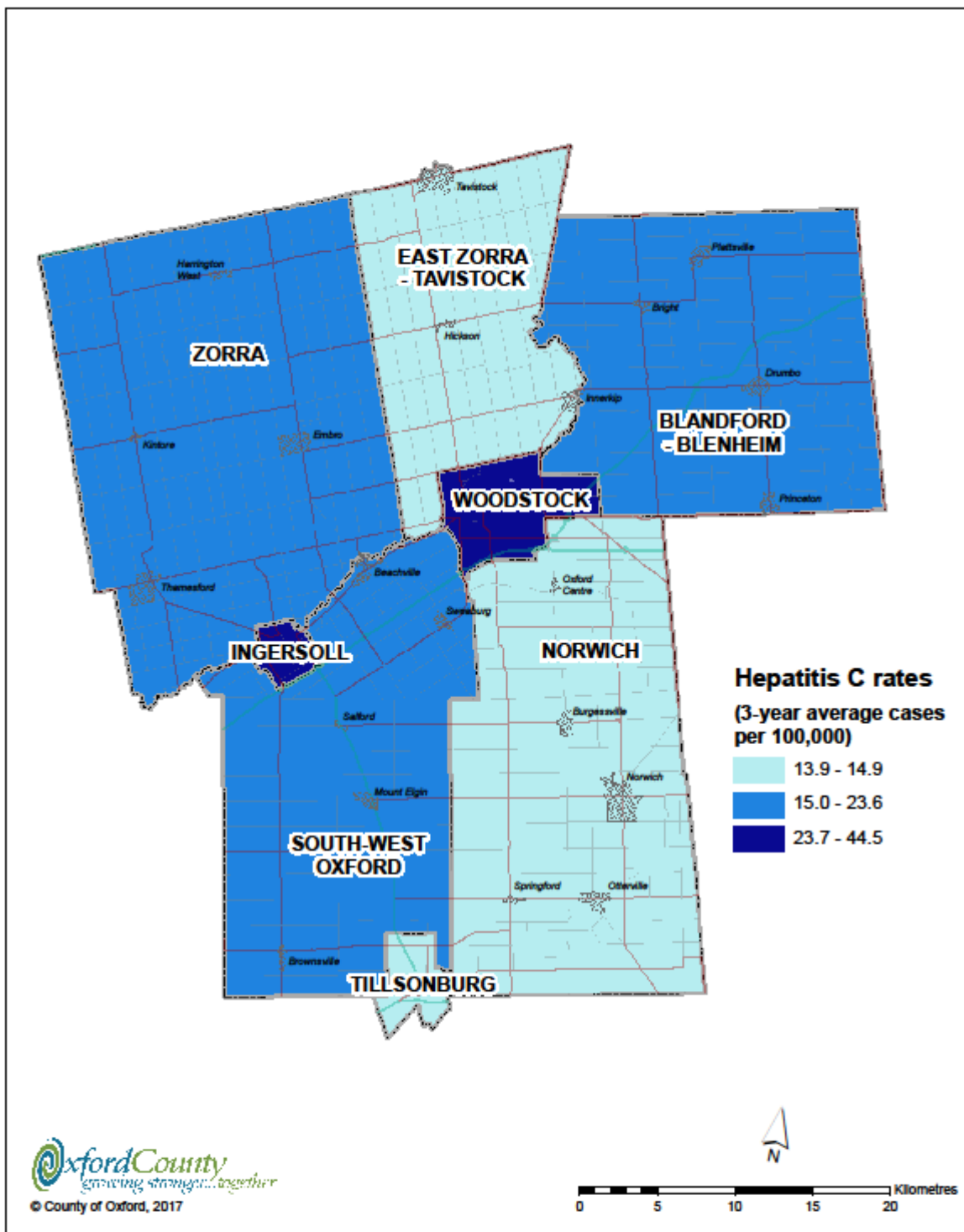
## Hepatitis C

**Hepatitis C is a liver infection that is caused by the hepatitis C virus (HCV). This virus is blood-borne and can be spread through infected blood. This can happen in many ways, including through unprotected sex if it involves contact with blood, such as menstrual blood, open sores and semen or vaginal fluid if blood is present.<sup>22</sup> However, it is most commonly transmitted through shared injection and inhalation equipment contaminated with blood. Additional risk factors include receiving a blood transfusion before 1992 and exposure to inadequate infection control practices when receiving medical care or invasive personal services.<sup>23</sup> Many infected people do not have symptoms. Symptoms can include fatigue, loss of appetite, fever, nausea, vomiting, dark urine, pale stools, stomach pain, joint pain and jaundice. If left untreated, hepatitis C can cause cirrhosis of the liver, liver cancer and premature death. There is currently no vaccine to prevent hepatitis C; however, hepatitis C can be cured with treatment.**

In 2015, there were 53 residents with new cases of hepatitis C in Oxford County. Combining data from 2013 to 2015, the three-year average crude incidence rate was higher in Oxford County at 41.7 (per 100,000) compared to 31.0 (per 100,000) in Ontario (Appendix B, Table B6).<sup>12,13</sup> To assess if there is an underlying difference in rates independent of age structure, it is important to compare age-standardized incidence rates which take into consideration differences in age structures between two populations or geographic areas. From 2013 to 2015, the three-year average age-standardized incidence rate was higher at 44.7 (per 100,000) in Oxford County compared to 31.1 (per 100,000) in Ontario (Appendix B, Table B6).<sup>12,14</sup> Figure 8 shows the three-year crude incidence rates of hepatitis C by municipality in Oxford County. All municipalities had similar rates to Ontario, except for Tillsonburg which had lower rates (Appendix B, Table B6). Within Oxford County, Woodstock and Ingersoll had the highest rates.

The higher three-year average hepatitis C rates in Oxford County compared to Ontario could indicate that more people are getting tested in Oxford County, or it may indicate that there is a higher level of underlying infection. Regardless, hepatitis C infection can lead to serious, long-term chronic disease and can be passed on to others. It is important for individuals at risk to seek testing and treatment to stop the spread of this disease.<sup>23</sup> The most common risk factors identified among residents with new hepatitis C infections in Oxford County, listed in the order of frequency of occurrence were: drug use-related risk factors (i.e., injection drug use, illicit drug use, shared needles, shared other drug equipment and inhalation drug use), tattoos and piercings, incarceration at a correctional facility, shared personal items (e.g., toothbrush, razor blades), sexual contact is hepatitis C positive and received blood or blood products.<sup>15</sup>

Figure 8. Hepatitis C incidence rates (3-year average cases per 100,000) by municipality, Oxford County, 2013-2015 (combined)



Source: iPHIS (2013-2015), Date Extracted: March 8, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.



## HIV/AIDS

HIV is a viral infection that attacks the immune system and can lead to acquired immunodeficiency syndrome (AIDS), a disease that increases the risk of acquiring other infections and diseases. HIV is spread through contact with infected blood and body fluids, including semen, vaginal and rectal fluids, such as through sexual transmission, transmission at birth and shared injection and inhalation equipment contaminated with blood. Infected individuals may be asymptomatic for years or may experience fever, fatigue, night sweats, headaches, diarrhea, sore throat and/or rashes.<sup>24</sup> As the immune system weakens over time, individuals become more susceptible to other infections. There is no cure for HIV but antiretroviral therapy (ART) can help control the symptoms and prolong life.

In 2015, there were no residents with new cases of HIV/AIDS in Oxford County. Combining data from 2013 to 2015, the three-year average crude incidence rate was 0.9 (per 100,000) in Oxford County compared to 6.0 (per 100,000) in Ontario.

## HPV and cervical cancer screening

Most cervical cancer is caused by human papilloma virus (HPV). Screening is used to detect cervical cancer early in people with no symptoms and was one of the few ways prior to HPV vaccination to prevent cancer from developing. Early detection through regular Pap tests allows for early treatment. Receiving the HPV vaccination is another effective way to prevent cervical cancer as two types of HPV (16 and 18) cause 70% of cervical cancers.<sup>25</sup> Most women infected with HPV do not develop cervical cancer. In 2013-2015, 61.4% of Oxford County women aged 21 to 69 had a Pap test, controlling for age (Table 4). This is slightly lower than in previous years and similar to Ontario's rate of 61.3%. These rates are well below the provincial target of 85% in both Oxford County and Ontario.<sup>26</sup>

**Table 4. Age-standardized cervical cancer screening participation of eligible women 21-69 years old, Ontario and Oxford County, 2007-2015**

Location	2007-2009	2010-2012	2013-2015
Ontario	66.7%	66.1%	61.3%
Oxford County	66.1%	64.9%	61.4%

Source: Cancer System Quality Index, (2007-2015), Cancer Quality Council of Ontario, Date Extracted: May 24, 2017.

The per cent of women routinely receiving Pap tests (within 42 months of a normal Pap test result) was 64.6% in Oxford County and 65.6% in Ontario, controlling for age (Table 5). This is lower than in previous years. Cervical cancer screening retention is decreasing over time for both Oxford County and Ontario. This trend has also been observed in British Columbia and is thought to be a result of barriers such as misconceptions about the test, confusion about when and how often women should get tested, lack of access to a family physician, lack of time and embarrassment.<sup>27</sup>

**Table 5. Age-standardized cervical cancer screening retention of eligible women 21-66 years old, Ontario and Oxford County, 2010-2012**

Location	2010	2011	2012
Ontario	80.4%	71.5%	65.6%
Oxford County	76.7%	69.2%	64.6%

Source: Cancer System Quality Index (2010-2012), Cancer Quality Council of Ontario, Date Extracted: May 17, 2017.

# Hepatitis B and HPV vaccination coverage

Hepatitis B and HPV vaccines are publicly funded for specific populations and are provided by Public Health through school-based programs to grade 7 students.<sup>d</sup> However they are not required for school attendance under Ontario's *Immunization of School Pupils Act* (ISPA) and therefore uptake is generally lower than other required vaccinations. Increasing up-to-date vaccination coverage (i.e., those who have received the recommended number of doses for a vaccine by a certain age) among school-aged children is one way effective way to prevent hepatitis B and HPV in individuals and also reduce spread in the population.<sup>28</sup> In the school-based program, two doses of vaccine are required for coverage of grade 7 students. These vaccines may also be administered by Public Health to other age groups and in other settings, such as Sexual Health Clinics. However, this data is not captured in this report as it is not consistently recorded in the immunization reporting system used in Public Health (Panorama).

The per cent of school-aged children who were up-to-date (i.e., have received a specific number of valid vaccine doses for their age at the time of assessment), which is an indication of protection against the disease, for hepatitis B during the school year is presented in Table 6. In the 2015-2016 school year, 62.8% of 12 year old students in Oxford County were up-to-date for hepatitis B compared to 69.9% in Ontario. This is a slight decrease from previous school years and may indicate a downward trend that requires intervention. Doses that were administered to students prior to grade 7 for pre-travel, risk factors, parental preference or according to a schedule for a different jurisdiction may not have been reported to Public Health and result in an underestimation of coverage.

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<sup>d</sup> The hepatitis B vaccine was introduced in schools to grade 7 students in September 1994 as a three-dose series. In September 2000, it became a two-dose series. The HPV vaccine, specifically HPV-4, was introduced in schools to grade 8 females in September 2007 as a three-dose series. In September 2015, it became a two-dose series. In September 2016, the HPV vaccine schedule changed to offer the vaccine to grade 7 females and males and during this transition period, grade 8 females were also offered the vaccine. These vaccines are offered in all schools in Oxford County except for one school in Norwich and in Amish schools. Health care providers can special order these vaccines if the student chooses not to receive the vaccine at school and/or has barriers to receiving the vaccine at Public Health.

**Table 6. Hepatitis B up-to-date coverage for children 12 years old attending school in Ontario and Oxford County, 2013-2016 school years**

Location	2013-2014	2014-2015	2015-2016
Ontario	71.7%	70.7%	69.9%
Oxford County	69.9%	67.3%	62.8%

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage report for school pupils: 2013–14, 2014–15 and 2015–16 school years. Toronto, ON: Queen's Printer for Ontario; 2017.

The per cent of school-aged children who were up-to-date for HPV during the school year is presented in Table 7. In the 2015-2016 school year, 54.4% of 13 year old, female students in Oxford County were up-to-date for HPV compared to 61.0% in Ontario, representing a 6.6% gap between Oxford County and Ontario rates.

**Table 7. HPV up-to-date coverage for female children 13 years old attending school in Ontario and Oxford County, 2013-2016 school years**

Location	2013-2014	2014-2015	2015-2016
Ontario	61.5%	60.4%	61.0%
Oxford County	54.6%	52.5%	54.4%

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage report for school pupils: 2013–14, 2014–15 and 2015–16 school years. Toronto, ON: Queen's Printer for Ontario; 2017.

# Considerations and Future Actions

This population health assessment report considered a broad range of indicators that are related to healthy sexuality, STIs and BBIs. The results suggest that Oxford County is similar to Ontario for most indicators. However, a higher proportion of residents of reproductive age (15 to 49 years) first had sexual intercourse before age 20 years in Oxford County than Ontario (75.8% versus 62.1%). This suggests that it is important to continue efforts that target school-age children, youth and emerging adults to promote healthy sexual practices, particularly in the urban areas of Woodstock, Tillsonburg and Ingersoll where the rates of teen pregnancy were highest. However, it is important to note that Oxford County has a diverse population and some sub-groups have different norms and expectations around age of sexual debut and family planning. For example, Low German-Speaking Mennonite women may have many planned pregnancies and they are typically after marriage.<sup>29</sup>

Although Oxford County was generally similar to Ontario with regards to infection rates, there were some areas of note within Oxford County. For example, within Oxford County chlamydia rates differed by area; Woodstock had the highest incidence rates of chlamydia although these were lower than Ontario's rate. Oxford County had higher incidence rates of hepatitis C than Ontario and within Oxford County, rates were highest in Woodstock and Ingersoll. The most common risk factors for hepatitis C were injection drug use and shared needles or other drug equipment.

Building on the success of its interventions to date, Oxford County would benefit from a focused action in the following four areas to improve the sexual health of residents in Oxford County:

1. **Promote healthy sexuality and prevent unintended consequences of being sexually active particularly among youth and emerging adults.** This might include:
  - a. Implementing evidence-based strategies to increase access to contraceptives and the use of condoms among youth and emerging adults to decrease the transmission of STIs and prevent unintended pregnancy.
2. **Decrease hepatitis C transmission and increase diagnosis and treatment, particularly among people who inject drugs.** This might include:
  - a. Increasing access to hepatitis C treatment for people who inject drugs and efforts to increase the use of clean needles among people who inject drugs.

3. **Increase the coverage of hepatitis B and HPV vaccine in grade 7 students.** This might include:
  - a. Implementing evidence-based strategies to increase uptake and further narrow the gap in immunization rates by promoting innovative outreach activities for high-risk communities and sub-populations in Oxford County.
4. **Undertake ongoing monitoring of healthy sexuality in Oxford County.** This might include:
  - a. Ongoing monitoring of a few core indicators of interest that support the review of progress on the identified focused interventions.

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# Appendix A: Data Sources and Methodology

## Better Outcomes Registry and Network (BORN) Information System

The BORN Information System is a comprehensive data source for reproductive core indicators. All hospitals and midwifery practice groups in Ontario enter information about pregnancy, labour, birth and early postpartum care. Data has been found to be complete after 15 months but there are large variations in the timeliness between health units.<sup>30</sup> BORN was available from April 2012 onwards; therefore, 2012 rates may be slightly underestimated as there was not a full year of data collection. Historical data for January 1, 2012 to March 31, 2012 is extracted from NIDAY Perinatal Database which includes only hospital births.

The number of pregnancies (i.e., live births and stillbirths) among women aged 15 to 19 years by dissemination was extracted through the Public Health cube for Oxford County residents. Municipality was calculated by converting dissemination areas available in BORN into Census subdivisions (i.e., municipalities) using Statistics Canada's dissemination area reference maps based on the 2011 Census.<sup>31</sup> Dissemination areas in BORN were originally assigned to individuals based on postal codes. It is possible that a postal code crossed two or more dissemination areas. In those cases, individuals were assigned to the area where most people with that postal code likely reside. This overlap may occur more frequently in rural areas.<sup>32</sup> Due to small counts in some municipalities, data was combined over three years to present a three-year average rate (per 1,000 population). Comparable data for Ontario was requested through a BORN custom data request. The Ontario data available through the standard reports presents maternal age groupings for those aged <14 years, 14 to 17 years and 18 to 19 years who had a live birth or stillbirth. A custom data request was needed because the information from the standard report is not comparable to the data extracted from the Public Health cube (i.e., it does not provide data for 15 to 19 year olds).

## Canadian Community Health Survey (CCHS)

The Canadian Community Health Survey (CCHS) is a national telephone survey that collects information about health status, health care utilization and determinants of health from the population aged 12 years and older. However, questions about sexual health and sexual activity are only asked of individuals aged 15 to 49 years and excludes individuals who were responding to the survey via proxy. The CCHS also excludes people living on reserves and other Indigenous settlements, full-time members of the Canadian Forces and people living in institutions. Data is self-reported and may be subject to recall bias and social desirability bias, particularly for sensitive topics such as sexual activity. Estimates at the municipal level may not be representative of the population as the sampling frame was not designed for analysis below the health region level. 'Don't know', refused and not stated responses were removed from analysis when they represented less than 5% of the unweighted sample. This assumes that data are missing at random, which is not always the case. Data from 2017 and onwards will not be comparable to previous years due to a change in sampling methodology and content.

## Cancer System Quality Index (CSQI)

The CSQI is an administrative database maintained by Cancer Quality Council of Ontario (CQCO), an organization that advises Cancer Care Ontario and the Ministry of Health and Long-Term Care (MOHLT) with the goal of improving the quality of cancer care in the province. The CSQI in particular tracks Ontario's progress against cancer, shows where quality and performance improvement are needed and reports on 39 quality measures related to cancer control. Measures that are currently available at the health unit level include breast cancer screening, cervical cancer screening and the population that is overdue for colorectal cancer screening.

## Integrated Public Health Information System (iPHIS)

In Ontario, iPHIS is the system that contains case information for reportable diseases based on the *Health Protection and Promotion Act* (HPPA). Data is collected by Oxford County Public Health staff as part of their routine activities and is entered into iPHIS, which is maintained by Public Health Ontario (PHO) and the Public Health Protection and Prevention Branch of the MOHLTC. Confirmed and probable cases of reportable diseases are classified according to the MOHLTC case definitions. Provincial and local counts were extracted through Public Health Ontario's Infectious Disease Query. Individuals that have not been tested for STIs/BBIs will not be included in this data. Therefore, the rates presented may be an underestimate of the true burden in the population. Risk factors extracted from iPHIS are self-reported and may not represent true exposures or all potential risk factors. Risk factors are not a required field to be entered into iPHIS for STIs, therefore they may not be recorded for each case.

Data was extracted from iPHIS by accurate episode date with the responsible health unit as Oxford County. Cases were extracted with full addresses, including postal codes, to map rates by municipality. Due to small case counts in some municipalities, data was combined over three years to present a three-year average rate. Statistically significant differences in rates between municipalities and Ontario were based on non-overlapping 95% Poisson confidence intervals. Rates were presented as choropleth maps and categorized as low, medium or high by using natural breaks (Jenks method).<sup>33</sup> Some records were not included in the map due to insufficient location information or locations that placed those cases substantially outside of Oxford County. This included 3% of chlamydia cases, 9% of gonorrhoea cases and 32% of hepatitis C cases.

## Population Estimates

Population estimates were used as the denominator to calculate rates. Population estimates by municipality were only available up to 2015 at the time of analysis; therefore, this was the most recent year of data included in this report. This is because the focus was on examining sexual health status in smaller areas of Oxford County, where possible. Population estimates are based on the 2011 Census counts adjusted for net under-coverage and changes in the population between Census day and July 1<sup>st</sup> (i.e., births, deaths and migration). Estimates are produced for July 1<sup>st</sup> by the Demography Division at Statistics Canada and were obtained through IntelliHEALTH ONTARIO. Age-standardized rates are based on the 2011 Canadian Standard Population and are used to account for differences in the age structure of different populations (e.g., Oxford County compared to Ontario).

## STI Laboratory Data

Data from laboratory tests performed by the Public Health Ontario Laboratories for the bacteria that cause chlamydia (*Chlamydia trachomatis*) and gonorrhoea (*Neisseria gonorrhoeae*) are available through Public Health Ontario at the health unit level. The presented data includes both males and females and all age groups. Since data is based on unique specimens, some cases may be overrepresented if multiple samples were submitted per individual.

Recommendations for the type of test (NAAT or culture) and location of specimen sample to include varied between tests for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Selections were based on recommendations from Public Health Ontario and Oxford County's Primary Health Care Nurse Practitioner, Mary VandenNeucker.

## Therapeutic Abortion Summary

This summary uses several data sources to identify therapeutic abortions in Ontario hospitals, clinics and private physician's offices. The hospital data sources include inpatient hospitalizations from the Discharge Abstract Database (DAD) and ambulatory visits from the National Ambulatory Care Reporting System (NACRS). The O04 International Statistical Classification of Diseases and Related Health Problems, 10<sup>th</sup> Revision, Canada (ICD-10-CA) codes, the diagnostic type codes of M, 1, 2, W, X or Y and the Canadian Classification of Health Interventions (CCI) codes of 5CA88, 5CA89 and 5CA90 were used. Medical services data includes Ontario Health Insurance Plan (OHIP) approved claims files from the Claims History Database (CHDB) to measure abortions in clinics and private physician's offices. The fee schedule codes included S752A and S785A. This data was obtained through IntelliHEALTH ONTARIO using the therapeutic abortion summary standard report and was combined with the number of teen pregnancies from BORN to provide an overall picture of teen pregnancies.

## Confidence Intervals

The per cents in brackets that follow each per cent estimate in the tables are the confidence intervals (CIs). Each estimate is based on the survey sample, and a CI is a range of values that describes the uncertainty surrounding an estimate.<sup>34</sup> The 95% CI shows a range of values that have a 95% chance of including the true estimate in the population if the survey was repeated. The larger a 95% CI, the more caution should be used when using the estimate. CIs that don't overlap show statistically significant differences between groups. Statistically significant results indicate the finding is unlikely to be due to chance alone.

## Appendix B: Data Tables

**Table B1. Youth sexual activity for residents aged 15 to 19 years, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
<b>Ontario</b>	38.0% (35.4%-40.6%)	32.8% (29.8%-35.8%)	32.1% (29.4%-34.8%)
<b>Oxford County</b>	50.2% <sup>E</sup> (31.7%-68.6%)	36.3% <sup>E</sup> (19.0%-53.5%)	52.6% <sup>E</sup> (31.8%-73.4%)

The superscript 'E' denotes high sampling variability and estimates should be interpreted with caution.

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.

**Table B2. Median age of sexual debut (years) for residents aged 15 to 49 years by location, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
<b>Ontario</b>	16.9 (16.9-17.0)	16.9 (16.8-17.0)	17.0 (16.9-17.1)
<b>Oxford County</b>	16.2 (15.8-16.6)	16.4 (15.9-16.9)	16.6 (16.0-17.3)
Woodstock	16.2 (15.6-16.9)	16.1 (15.6-16.7)	16.6 (16.1-17.1)
North of 401*	16.2 (15.6-17.3)	17.3 (16.5-17.9)	17.0 (15.8-17.6)
South of 401†	16.2 (15.7-16.7)	15.8 (14.7-17.5)	16.4 (15.4-18.5)

\*North of 401 includes the municipalities of Blandford-Blenheim, East Zorra-Tavistock, Zorra and Ingersoll.

†South of 401 includes the municipalities of South-West Oxford, Norwich and Tillsonburg.

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.

**Table B3. One sexual partner in past 12 months for residents aged 15 to 49 years by location, Ontario and Oxford County, 2009-2014**

Location	2009-2010	2011-2012	2013-2014
<b>Ontario</b>	73.9% (73.0%-74.9%)	72.4% (71.3%-73.5%)	70.5% (69.4%-71.7%)
<b>Oxford County</b>	79.9% (74.9%-84.9%)	74.9% (66.7%-83.0%)	75.9% (68.8%-83.0%)
Woodstock	81.2% (72.6%-89.8%)	79.4% (67.5%-91.3%)	77.8% (66.5%-89.0%)
North of 401*	83.4% (74.3%-92.5%)	67.0% (53.6%-80.4%)	78.5% (64.9%-92.2%)
South of 401†	75.7% (65.4%-86.0%)	75.4% (52.1%-98.7%)	72.7% (57.0%-88.4%)

\*North of 401 includes the municipalities of Blandford-Blenheim, East Zorra-Tavistock, Zorra and Ingersoll.

†South of 401 includes the municipalities of South-West Oxford, Norwich and Tillsonburg.

Source: Canadian Community Health Survey (2009-2010, 2011-2012, 2013-2014), Statistics Canada, Share File, Ontario MOHLTC.



**Table B4. Chlamydia incidence rates (3-year average cases per 100,000) by location, Ontario and Oxford County, 2013-2015 (combined)**

Location	Number of cases	Crude rate	Age-standardized rate
<b>Ontario</b>	109,697	267.4 (265.8-269.0)	267.3 (265.7-268.9)
<b>Oxford County</b>	558	167.5 (153.9-182.0)	180.0 (165.0-195.0)
Woodstock	276	231.9 (205.3-260.9)	
Tillsonburg	79	163.0 (129.0-203.1)	
East Zorra-Tavistock	29	134.6 (90.1-193.3)	
South-West Oxford	31	130.9 (89.0-185.9)	
Ingersoll	48	125.8 (92.7-166.8)	
Blandford-Blenheim	24	103.8 (66.5-154.4)	
Zorra	26	102.1 (66.7-149.6)	
Norwich	30	89.2 (60.2-127.3)	

Note: Not all cases in Oxford County could be mapped to a municipality due to insufficient address information. Therefore, the total number of cases from each municipality may not equal the total for Oxford County.

Source: iPHIS (2013-2015), Date Extracted: March 6, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

**Table B5. Gonorrhoea incidence rates (3-year average cases per 100,000) by location, Ontario and Oxford County, 2013-2015 (combined)**

Location	Number of cases	Crude rate	Age-standardized rate
<b>Ontario</b>	16,318	39.8 (39.2-40.4)	40.0 (39.4-40.6)
<b>Oxford County</b>	40	12.0 (8.6-16.4)	13.0 (9.0-17.0)
South-West Oxford	5	21.1 (6.9-49.3)	
Woodstock	18	15.1 (9.0-23.9)	
Tillsonburg	7	14.4 (5.8-29.8)	
East Zorra-Tavistock	3	13.9 (2.9-40.7)	
Ingersoll	3	7.9 (1.6-23.0)	
Norwich	2	5.9 (0.7-21.5)	
Zorra	1	3.9 (0.1-21.9)	
Blandford-Blenheim	0	N/A	

Note: Not all cases in Oxford County could be mapped to a municipality due to insufficient address information. Therefore, the total number of cases from each municipality may not equal the total for Oxford County.

Source: iPHIS (2013-2015), Date Extracted: March 6, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.

**Table B6. Hepatitis C incidence rates (3-year average cases per 100,000) by location, Ontario and Oxford County, 2013-2015 (combined)**

Location	Number of cases	Crude rate	Age-standardized rate
<b>Ontario</b>	12,721	31.0 (30.5-31.6)	31.1 (30.6-31.6)
<b>Oxford County</b>	139	41.7 (35.1-49.3)	44.7 (37.2-52.1)
Woodstock	53	44.5 (33.4-58.2)	
Ingersoll	13	34.1 (18.1-58.3)	
Zorra	6	23.6 (8.6-51.3)	
Blandford-Blenheim	5	21.6 (7.0-50.5)	
South-West Oxford	5	21.1 (6.9-49.3)	
Norwich	5	14.9 (4.8-34.7)	
Tillsonburg	7	14.4 (5.8-29.8)	
East Zorra-Tavistock	3	13.9 (2.9-40.7)	

Note: Not all cases in Oxford County could be mapped to a municipality due to insufficient address information. Therefore, the total number of cases from each municipality may not equal the total for Oxford County.

Source: iPHIS (2013-2015), Date Extracted: March 6, 2017 & Population Estimates (2013-2015), Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: February 15, 2017.



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