


windsor and essex county



SEXUALLY TRANSMITTED AND BLOOD-BORNE INFECTIONS IN WINDSOR AND ESSEX COUNTY

Windsor-Essex County Health Unit
January 2016

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Sexually Transmitted and Blood-Borne Infections in Windsor and Essex County

Windsor-Essex County Health Unit

January 2016

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Executive Summary

The 2016 ***Sexually Transmitted and Blood-Borne Infections in Windsor and Essex County*** report, as prepared by the Windsor-Essex County Health Unit, provides insight into the burden of reportable sexually transmitted and blood-borne infections (STBBIs) in Windsor-Essex County during the previous ten year period of 2005 to 2014. The key findings of this report are described below:

- There is an average of 982 STBBIs reported annually in Windsor-Essex County and the annual number of STBBIs has increased by 27% since 2005.
- The top 3 most common STBBIs are chlamydia, hepatitis C, and gonorrhoea which account for 95% of all STBBI cases in Windsor-Essex County.
- Adolescents and young adults (those aged 15-29 years old) accounted for 72% of all STBBIs and were over 10-times more likely to have an STBBI than the rest of the Windsor-Essex County population.
- Chlamydial infections are the most common reportable disease (accounting for 73% of all STBBIs) in Windsor-Essex County; there is an average of 720 chlamydial infections annually in the region and the number of cases has increased by 48% since 2005.
- While the rate of gonorrhoea is steadily increasing in Ontario, it has decreased in Windsor-Essex County by 45%. However, gonorrhoea is still a leading cause of STBBIs and there is an average of 70 cases reported annually in the region.
- In Windsor-Essex County, the rate of hepatitis C infections is increased by 15% and it is greater than the Ontario rate. There are, on average, 140 cases per year in the region, mostly in individuals over 30 years old.
- Males and individuals who have sex with the same sex were disproportionately affected by HIV in Windsor-Essex County. However, the rate of HIV in the region has decreased slightly and is lower than the Ontario rate.
- Although syphilis is a relatively uncommon disease, the rate of infectious syphilis has greatly increased by 220% in Windsor-Essex County since 2005.
- There were a lower number (less than 5 cases per year) of acute hepatitis B infections, neonatal group B streptococcal infections, congenital cytomegalovirus infections, and neonatal herpes in Windsor-Essex County.
- There were no reported cases of chancroid, hepatitis D, or ophthalmia neonatorum in Windsor-Essex County from 2005 to 2014.
- In 2014, STIs cost Windsor-Essex County \$21.9 million in direct and indirect costs.

The overall findings of this report demonstrate that STBBIs are becoming an increasing burden on the population health of Windsor-Essex County. There is marked need for further public health programs and strategies to prevent and reduce the burden of STBBIs within the Windsor-Essex County population.

Introduction

Public Health and Reportable Diseases

Public health is responsible for improving the overall health and well-being of the population. The metropolitan area of Windsor and the surrounding Essex County are serviced by the Windsor-Essex County Health Unit which is one of the 36 public health units in Ontario. The Windsor-Essex County Health Unit provides public health services to 402,000 residents across 9 municipalities (Windsor, Tecumseh, Lakeshore, LaSalle, Amherstburg, Essex, Kingsville, Leamington, and Pelee). The region is the southernmost health unit district in Ontario.

Local boards of health govern each public health unit and are legislated by the Ontario *Health Protection and Promotion Act*. Part of this act mandates the prevention of the spread of infectious diseases and sets out the requirements for which diseases must be reported to health authorities. Mandatory reportable diseases in Ontario are prescribed by [Regulation 559/91](#) of the *Health Protection and Promotion Act*. Under this legislation the following sexually transmitted and blood-borne infections (STBBIs) must be reported:

- Acquired Immunodeficiency Syndrome (late stage of HIV infection)
- Chancroid
- Chlamydia trachomatis infections
- Gonorrhoea
- Group B Streptococcal disease, neonatal
- Hepatitis B
- Hepatitis C
- Ophthalmia neonatorum
- Syphilis

On December 4, 2013, three previously reportable STBBIs (congenital cytomegalovirus, hepatitis D, and neonatal herpes) were removed from the list of reportable disease in Ontario. These three STBBIs will be described in the present report since these STBBIs were reportable during the study period of this report.

The Ontario Public Health Standards (2008), which are public health guidelines published by the Ontario Ministry of Health and Long-Term Care, also provide specific public health requirements around infectious diseases, with a particularly prescribed focus on sexually transmitted infections and blood-borne infections. The present report addresses the assessment and surveillance requirements for STBBIs, including reporting data, conducting surveillance, and completing epidemiological analysis of STBBIs. The ultimate goal of these requirements is to prevent and reduce the burden of STBBIs in the population.

Sexually Transmitted and Blood-Borne Infections (STBBIs)

Infectious diseases transmitted through blood and/or sexual contact may collectively be referred to as sexually transmitted and blood-borne infections (STBBIs). Some infections, such as chlamydia and gonorrhoea, are almost exclusively transmitted through sexual contact. Other infections (usually viral) may be transmitted through both sexual contact and contact with contaminated blood. Some STBBIs may also be transmitted from mother to child¹.

STBBIs represent a considerable burden on public health and are one of the most common types of infectious diseases in Ontario. In Windsor-Essex County, every 2 in 3 reportable diseases are a STBBI and, across Ontario, 3 of the top 5 most commonly reported diseases are STBBIs (chlamydia, hepatitis C, and gonorrhoea). Hence, STBBIs are of significant importance to public health in Ontario.

The greatest risks for acquiring a STBBI are unprotected sex and injectable drug use¹. The 2013-2014 Canadian Community Health Survey provides insight into the sexual behaviours of Windsor-Essex County residents aged 15-49 years old. Below are some of the statistical findings related to local data on sexual health and sexual behaviours:

- Among Windsor-Essex County residents aged 15-19 years old, 40.6% of males and 25.0% of females reported ever having sexual intercourse (use estimates with caution).
- 12.6% of Windsor-Essex County residents aged 15-49 years old reported having two or more sex partners in the past 12 months (use estimate with caution).
- 36.6% of Windsor-Essex County residents aged 15-49 years old who are at risk for a sexually transmitted infection (STI) reported using a condom last time they had sexual intercourse.
- Among Windsor-Essex County residents aged 15-19 years old, 60.0% of males and 85.3% of females at risk for a STI used a condom the last time they had sexual intercourse.
- 3.8% of Windsor-Essex County residents aged 15-49 years old reported being diagnosed with a STI in their lifetime (use estimate with caution).

For the general population, the best ways to prevent STBBIs are abstinence or limiting the number of sexual partners, condom use during all forms of sex, vaccination, using sterile medical equipment (i.e., syringes), and practicing standard hygiene (i.e., handwashing)¹. Additionally, screening is an effective public health strategy to prevent the spread of infections through sexual contact¹. Ontarians can receive free screening for sexually transmitted infections at a doctor's office or through a sexual health clinic and adolescents do not require parental consent to be screened.

There are also social determinants of health that are associated with particular STBBIs. Some marginalized groups are more likely to acquire an STBBI because of risky health behaviours that are usually a result of social, economic, or cultural barriers. Some examples of high risk groups include adolescents, new immigrants, men who have sex with men, and institutionalized

individuals^{1,2}. Targeting public health programs towards these high risk groups can be an effective strategy for preventing incidence of STBBIs.

Objectives

The primary purpose of this report is to provide quantitative insight into the burden of STBBIs within the Windsor-Essex County population. The specific objectives of this report are:

- To describe the frequency and distribution of sexually transmitted and blood-borne infections in the Windsor-Essex County population.
- To determine demographically identifiable populations in Windsor-Essex County that are at risk for each specific sexually transmitted and blood-borne infection.
- To identify emerging trends in sexually transmitted and blood-borne infections in Windsor-Essex County.

Methods

The data analyzed and presented in this report is described in **Table 1**. Data for sexually transmitted and blood-borne infections were extracted from integrated Public Health Information System (iPHIS) for Windsor-Essex County and Ontario for the period of January 1, 2005 to December 31, 2014. Exact age, sex, annual trends, and geographical information are presented in this report except when there were less than five cases. Risk factors and co-morbidities were only reportable for HIV cases. Only confirmed STBBI cases were analyzed in this report.

Table 1. Sexually transmitted and blood-borne infection data analyzed in this report.

Dependent Variables	Independent Variables	Time Period	Regions	Data Source
Reportable, confirmed cases of STBBIs: <ul style="list-style-type: none"> Chancroid Chlamydia Cytomegalovirus (congenital)[†] Gonorrhoea (all types) Group B Streptococcal Disease (neonatal) Hepatitis (B, C, D[†]) Herpes (neonatal)[†] HIV Ophthalmia neonatorum Syphilis (early congenital, infectious, other) 	<ul style="list-style-type: none"> Age Sex Calendar Year Address & Postal Code Risk Factors* Co-Morbidities* 	Jan 1, 2005 – Dec 31, 2014	<ul style="list-style-type: none"> Windsor-Essex County Ontario 	iPHIS

*Where information is available.

[†]Mandatory reporting discontinued December 2013.

Integrated Public Health Information System (iPHIS)

Each public health unit in Ontario is responsible for collecting information and reporting on all communicable diseases that require mandatory surveillance. The integrated Public Health Information System (iPHIS) is the system used by public health units to report all case information related to reportable communicable diseases. Cases are classified in iPHIS according to the Ontario Ministry of Health and Long-Term Care (MOHLTC) case definitions.

Public health professionals can access data directly from iPHIS, but iPHIS data is also accessible to public health professionals through Public Health Ontario's Query tool which allows users to

dynamically explore aggregated regional iPHIS data (counts and rates) using various stratifiers, including age, sex, and calendar year.

Canadian Community Health Survey (CCHS)

The 2013-2014 CCHS was used to provide information about the sexual behaviours of the Windsor-Essex County population. Only individuals aged 15-49 years old can respond to the sexual behaviour module of the CCHS. Reliable estimates for health regions (e.g., Windsor-Essex County) can be produced by using a collated 2-year data set (e.g., 2013-2014). The estimates presented in this report adhere to the guidelines in the 2014 CCHS User Guide and were generated using bootstrapped weights. If the coefficient of variation (CV) was ≥ 16.6 and ≤ 33.3 the estimates was accompanied by a cautionary statement of high sampling variability. If the CV was > 33.3 the estimate was excluded from the reported due to very high sampling variability.

Limitations

Firstly, the primary route of transmission for different STBBIs in local populations is important for guiding public health planning. However, the available data does not allow one to determine the route of transmission for reported cases of STBBIs. Knowledge from the literature can accurately inform public health professionals about the primary route of transmission for STBBIs (for example, chlamydia and gonorrhoea are almost exclusively spread through sexual contact), but for other STBBIs the primary route of transmission may remain unclear for local populations.

Secondly, one must take caution when interpreting the findings for STBBIs. Differences in advocacy, public perception, and screening recommendations for males and females can influence the reported rate of STBBIs for each sex. It is speculated that STBBIs rates are more accurate among young female adults due to routine screening, but may be underreported for males due to certain barriers or due to the fact that males are often asymptomatic for particular STBBIs¹.

Thirdly, it is also important to note that the risk or rate of STBBIs in adolescents may be understated due to the fact that the denominator of any measure will be the total adolescent population. The total adolescent population contains a mixture of sexually active individuals (those at risk) and individuals with no prior sexual engagement (minimal to no risk)¹. Hence, this must be considered when comparing populations by age groups.

Sexually Transmitted and Blood-Borne Infections (STBBIs) in Windsor-Essex County

Overview

In Ontario, there is an average of 42,000 confirmed STBBIs reported annually and during the previous ten year period (2005-2014) over 460,000 confirmed STBBIs were reported. In Windsor-Essex County there is an average of 982 confirmed cases of STBBIs reported each year and from 2005 to 2014 there were a total of 9,815 confirmed STBBI cases reported in the region (see **Table 2**). The most burdensome STBBI, by a wide margin, is chlamydial infections which account for 73% of all STBBI cases in Windsor-Essex County. Together, the top three STBBIs (chlamydia, hepatitis C, and gonorrhoea) account for 95% of all STBBI cases in Windsor-Essex County. During this 10-year period (2005-2014), there were no reported cases of chancroid, hepatitis D, ophthalmia neonatorum, or early congenital syphilis.

Sexually transmitted and blood-borne infections have become an increasing burden on the population health of Windsor-Essex County; over the past ten years (2005-2014), the total number of confirmed STBBI cases has risen by 27% despite minimal change in the regional population (<2% population growth and no significant shift in vulnerable populations). The increasing burden of STBBIs in the Windsor-Essex County population warrants further assessment and surveillance, and additional preventative measures.

Infants and Children

Those aged 0-9 years old are a particularly vulnerable population as many of these reported STBBIs can result in life-altering outcomes in children and youth who acquire an infection, such as an impaired immune system, developmental retardation, cognitive impairment, and loss of motor-sensory capabilities^{1,2}. From 2005 to 2014, there were 19 cases of STBBIs among Windsor-Essex County residents aged 0-9 years old. Of these 19 cases, there were 13 group B streptococcal infections among infants (<1 year old) and six other STBBIs (including gonorrhoea, hepatitis C, and HIV) among children (1-9 years old).

Adolescents and Young Adults

Those aged 15-29 years old are traditionally recognized as the group with the highest risk for acquiring STBBIs¹. Despite making up only 19% of the total population, this age group (15-29 years old) accounts for 72% of all STBBI cases in Windsor-Essex County (see **Figure 2**). In fact, the rate of STBBIs among adolescents and young adults aged 15-29 years old (rate: 951.3 STBBIs per 100,000 population) is 10.7-times greater than the rate of STBBIs among the rest of the Windsor-Essex County population (rate: 88.5 STBBIs per 100,000 population).

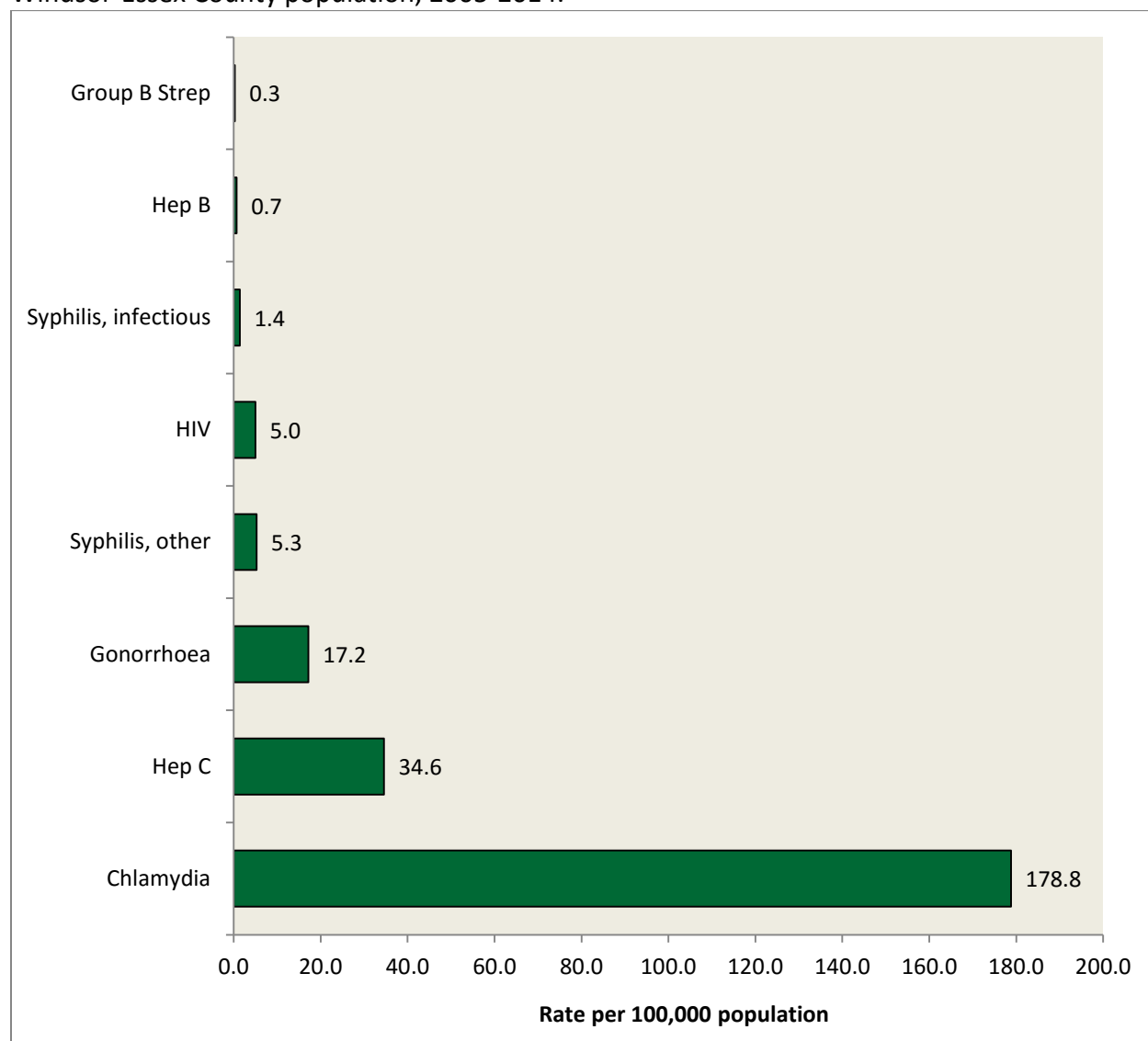
Table 2. The number of confirmed cases of sexually transmitted and blood-borne infections (STBBIs) in Windsor-Essex County, 2005-2014.

Infection	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Chancroid	0	0	0	0	0	0	0	0	0	0	0
Chlamydia	585	551	525	641	567	771	877	960	878	854	7209
Cytomegalo-virus (cong.)	0	0	0	0	0	<5	0	0	0	-	<5
Gonorrhoea (all types)	104	99	67	44	54	62	50	91	67	56	694
Group B Streptococcal	<5	<5	<5	<5	<5	<5	<5	0	0	0	13
Hepatitis B (Acute)	<5	<5	<5	<5	<5	<5	5	<5	6	<5	28
Hepatitis C	130	111	124	173	153	132	148	135	143	145	1394
Hepatitis D	0	0	0	0	0	0	0	0	0	-	0
Herpes (neonatal)	0	0	0	<5	0	0	0	<5	0	-	<5
HIV	18	24	25	17	19	24	16	21	26	13	203
Ophthalmia neonatorum	0	0	0	0	0	0	0	0	0	0	0
Syphilis (early cong.)	0	0	0	0	0	0	0	0	0	0	0
Syphilis (infectious)	<5	<5	0	<5	<5	9	<5	<5	17	13	55
Syphilis (other)	12	22	36	20	26	23	17	23	26	10	215
Total STBBIs	860	813	781	901	825	1025	1118	1235	1163	1094	9815

Sources: (1) – Integrated Public Health Information System (iPHIS), Ministry of Health and Long-Term Care [extracted 2015 Dec 22]. (2) – Public Health Ontario. Query: Windsor-Essex County Health Unit: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Note: When case counts fall between one and four, they are reported as <5 to prevent the release of potentially identifiable information related to those cases. The number of cases of congenital cytomegalovirus, hepatitis D, and neonatal herpes were not reported in 2014 due to the removal of these diseases from the reportable disease list in December 2013.

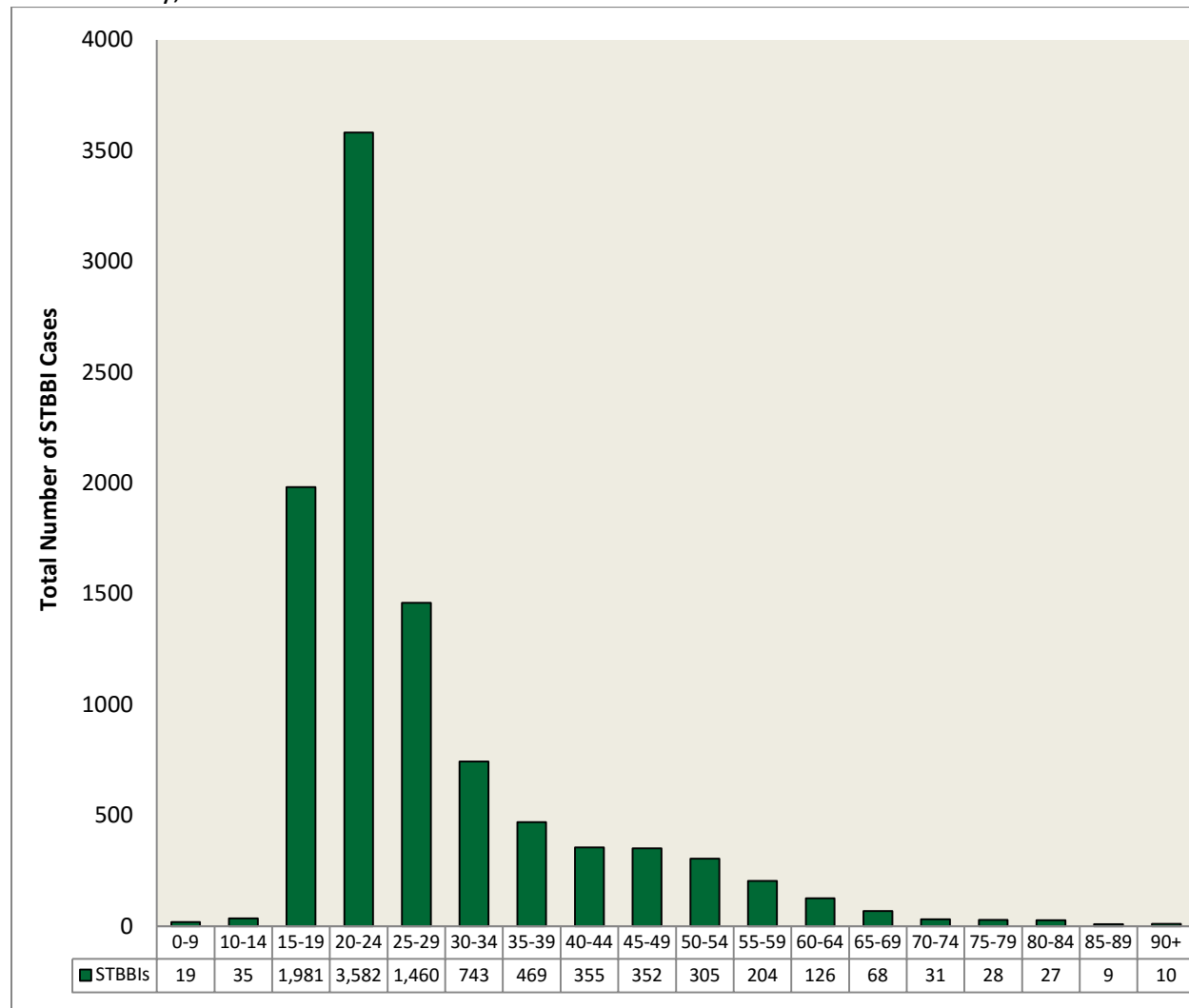
Figure 1. The average annual rate of sexually transmitted and blood-borne infections in the Windsor-Essex County population, 2005-2014.



Sources: (1) – Integrated Public Health Information System (iPHIS), Ministry of Health and Long-Term Care [extracted 2015 Dec 22]. (2) – Public Health Ontario. Query: Windsor-Essex County Health Unit: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Note: There were no cases of chancroid, hepatitis D, ophthalmia neonatorum, or early congenital syphilis in Windsor-Essex County from 2005-2014. Rates for cytomegalovirus and neonatal herpes could not be determined due to very low case counts.

Figure 2. The age distribution of all sexually transmitted and blood-borne infections in Windsor-Essex County, 2005-2014.



Sources: (1) – Integrated Public Health Information System (iPHIS), Ministry of Health and Long-Term Care [extracted 2015 Dec 22]. (2) – Public Health Ontario. Query: Windsor-Essex County Health Unit: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Cost of Sexually Transmitted Infections (STIs) in Windsor-Essex County

The direct and indirect costs of STIs in Windsor-Essex County were estimated using previously reported extrapolations developed by Chesson et al. (2004) and Chesson et al. (2008). Direct costs provide an estimation of the cost of medical resources (diagnosis, medication) used to treat these infections and associated sequelae (conditions arising due to the initial infection)⁵. Indirect costs provide an estimation of the societal cost due to lost productivity⁶. The direct and indirect costs of reportable STIs in Windsor-Essex County are reported in **Table 3**. In 2014, STIs cost Windsor-Essex County \$21.9 million in direct and indirect costs. The majority (98%) of the total costs of reportable STIs in Windsor-Essex County were due to HIV infections because HIV has no cure and requires life-long treatment^{1,2}. These costs are likely a conservative estimate of the true cost and do not include non-reportable STIs such as human papilloma virus (which can cause cancer) and herpes simplex virus; both of which are very prevalent in North America^{1,2}. It is also important to note that the values used to estimate the costs are based on estimates from the Centres for Disease Control and Prevention in the United States. Overall, STIs are a significant economic burden in Windsor-Essex County and without prevention strategies the economic cost of STIs will continue to grow.

Table 3. The estimated direct medical costs of treating sexually transmitted infections in Windsor-Essex County (2014).

Sexually Transmitted Infection	Infections in WEC in 2014	Direct cost per infection* (2014 CND)	Total direct costs (2014 CND)	Indirect cost per infection* (2014 CND)	Total indirect costs (2014 CND)
Chlamydia (Female)	535	\$392	\$209,939	\$76	\$40,439
Chlamydia (Male)	319	\$32	\$10,260	\$16	\$5,130
Gonorrhea (Female)	19	\$427	\$8,128	\$76	\$1,436
Gonorrhea (Male)	37	\$85	\$3,153	\$16	\$595
HIV (Male & Female)	13	\$321,326	\$4,177,243	\$1,337,435	\$17,386,658
Syphilis (Male & Female)	23	\$714	\$16,423	\$180	\$4,143
Total	–	–	\$4,425,149	–	\$17,438,402

WEC – Windsor-Essex County

*These estimated costs are based on the values reported by Chesson et al. (2004) and Chesson et al. (2008), and include the direct medical costs of acute infections and sequelae^{5,6}. Costs were adjusted to 2014 Canadian Dollar values using the average annual Consumer Price Index.

Note: The cost values presented here have been rounded to the nearest dollar (\$).

Chancroid

Background

Chancroid is a sexually transmitted infection caused by the bacteria *Haemophilus ducreyi* and is characterized by painful ulcers in the genital area^{1,2}. Infections are common in tropical areas, including Asia and Africa, but are relatively rare in North America². Direct sexual contact is the most common mode of transmission and the use of a condom during sexual encounters is an effective way at preventing transmission².

Windsor-Essex County

Chancroid is very rare in Ontario. There were no reported cases of chancroid in Windsor-Essex County during the study period (2005-2014) of this report. The last reported case of chancroid in Ontario was in 1997 (only 1 case reported that year)⁴.

Chlamydia

Background

Chlamydial infections are caused by the bacteria *Chlamydia trachomatis* and are the most commonly reported STI in Canada and the United States¹. Since most chlamydial infections do not cause any clinical signs, people often become unwitting carriers that contribute to the ongoing spread of this infection^{1,2}. In females, up to 70% do not show any symptoms of chlamydial infections⁷. In circumstances when symptoms are present, males may present with urethral discharge, pain with urination, and/or frequency with urination⁷. Females may present with endocervical discharge, pain with urination, and/or pain with sexual intercourse⁷. Chlamydia in females can also cause pelvic inflammatory disease or risk of infertility⁷. The infection is transmitted through sexual contact with the penis, vagina, mouth, or anus of an infected individual². It may take 7-14 days or longer for clinical signs to appear after becoming infected². Chlamydial infections are treated with antibiotics, but re-infection is common, and without treatment the infection can last for months². Sexually-active youth are at the greatest risk for infection². Health education, with an emphasis on condom use, and screening of high risk groups have been shown to be effective prevention strategies for chlamydial infections².

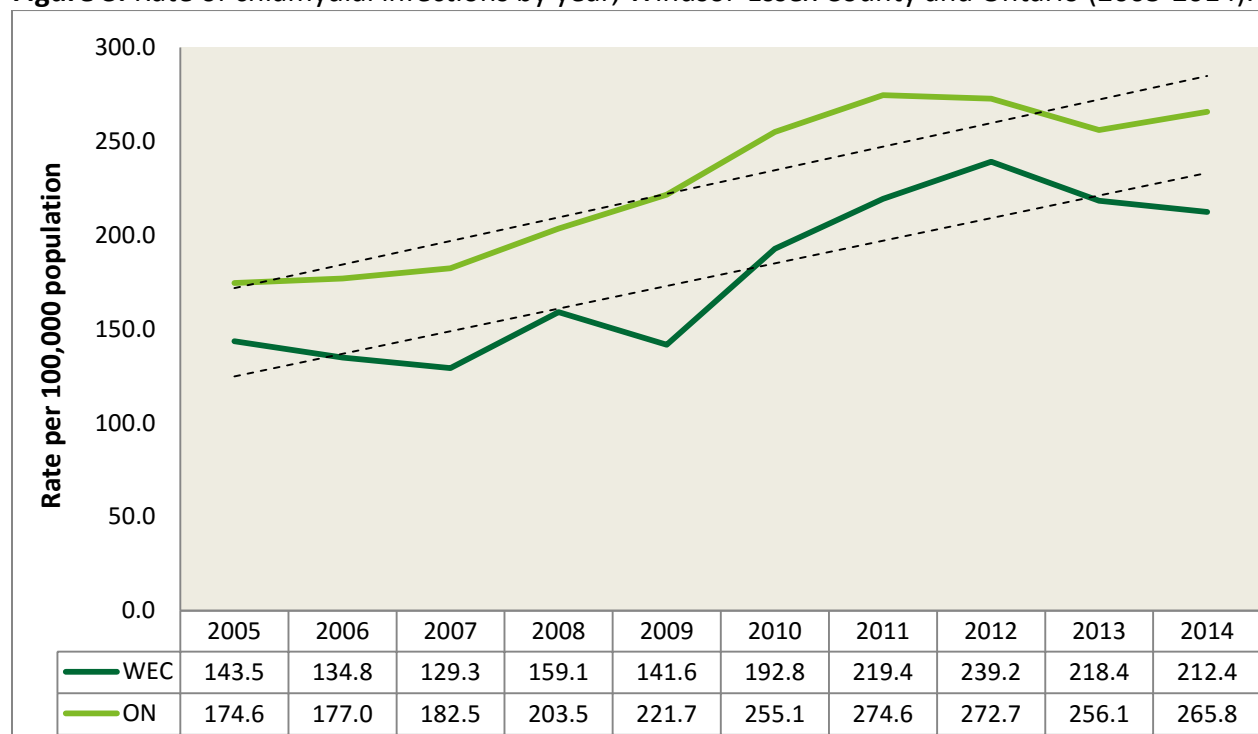
Windsor-Essex County

Chlamydial infections are the most common STBBI in Windsor-Essex County by a wide margin with an annual average rate of 178.8 cases per 100,000 population. The annual rates of chlamydial infections in Windsor-Essex County were significantly lower than the Ontario rates from 2005-2014 (see **Figure 3**). However, from 2005-2014, the rate of infections has been increasing both regionally and provincially. Over the past ten years (2005-2014), the rate of chlamydial infections has increased by 48% in Windsor-Essex County; this represents an estimated increase of 275 cases annually in the region.

The rates of chlamydial infections were examined by age and sex, and are reported in **Figure 4**. In general, Windsor-Essex County residents aged 15-24 years old had the greatest rate of chlamydial infections and accounted for 70% of all cases in the region. The rate of chlamydial infections was four-times and two-times greater among females aged 15-19 years old and 20-24 years old than males, respectively. Females accounted for 65% of all cases and males accounts for 35% of all cases. Overall, Windsor-Essex females aged 15-24 years old have the greatest rate of chlamydial infections and account for 49% of all cases in the region.

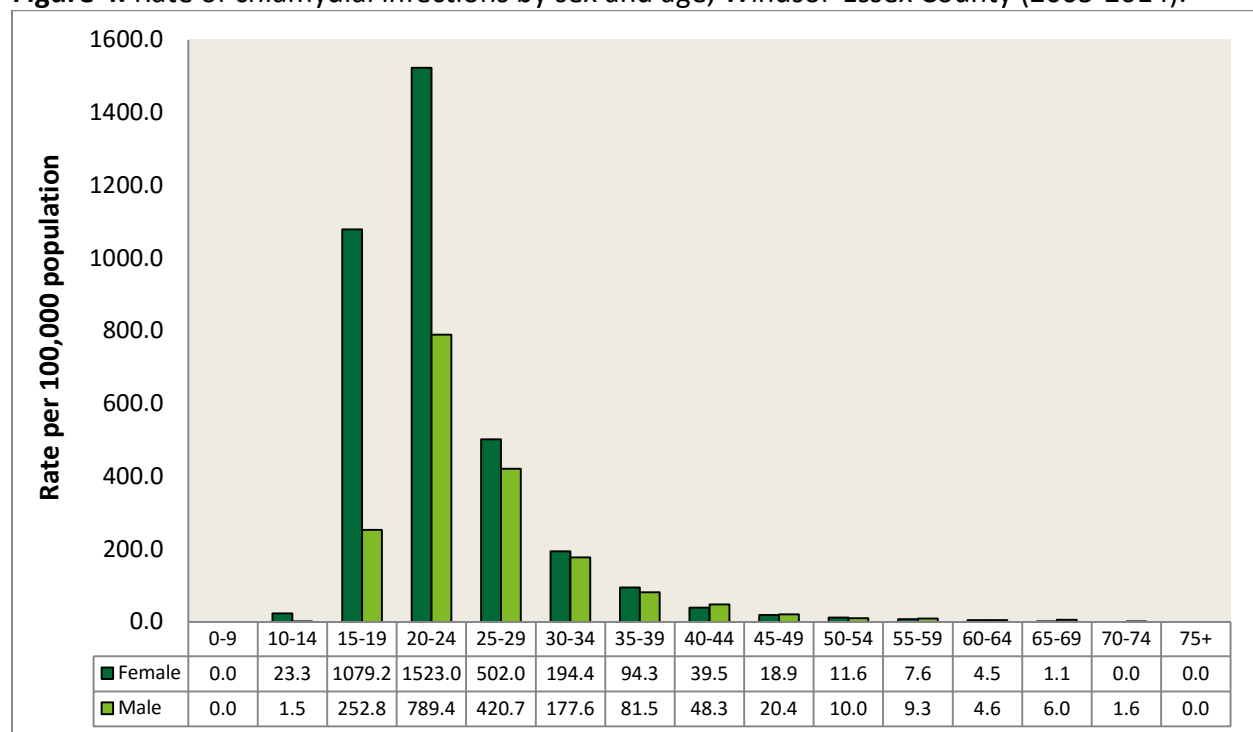
The large number of chlamydial infections, relative to other STBBIs, allowed for the mapping of cases within Windsor-Essex County (see **Figure 5**) and the Windsor metropolitan area (see **Figure 6**). These maps show that there were a high density of chlamydia infections in 2014 in the regions of west Windsor and Leamington. Statistical analysis revealed that the city of Windsor contains areas with a greater density of cases (hotspot) and areas with a lower density of cases (coldspot) as demonstrated in **Supplementary Figure 1**.

Figure 3. Rate of chlamydial infections by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 4. Rate of chlamydial infections by sex and age, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 5. Distribution of chlamydial infections in Windsor-Essex County (2014).

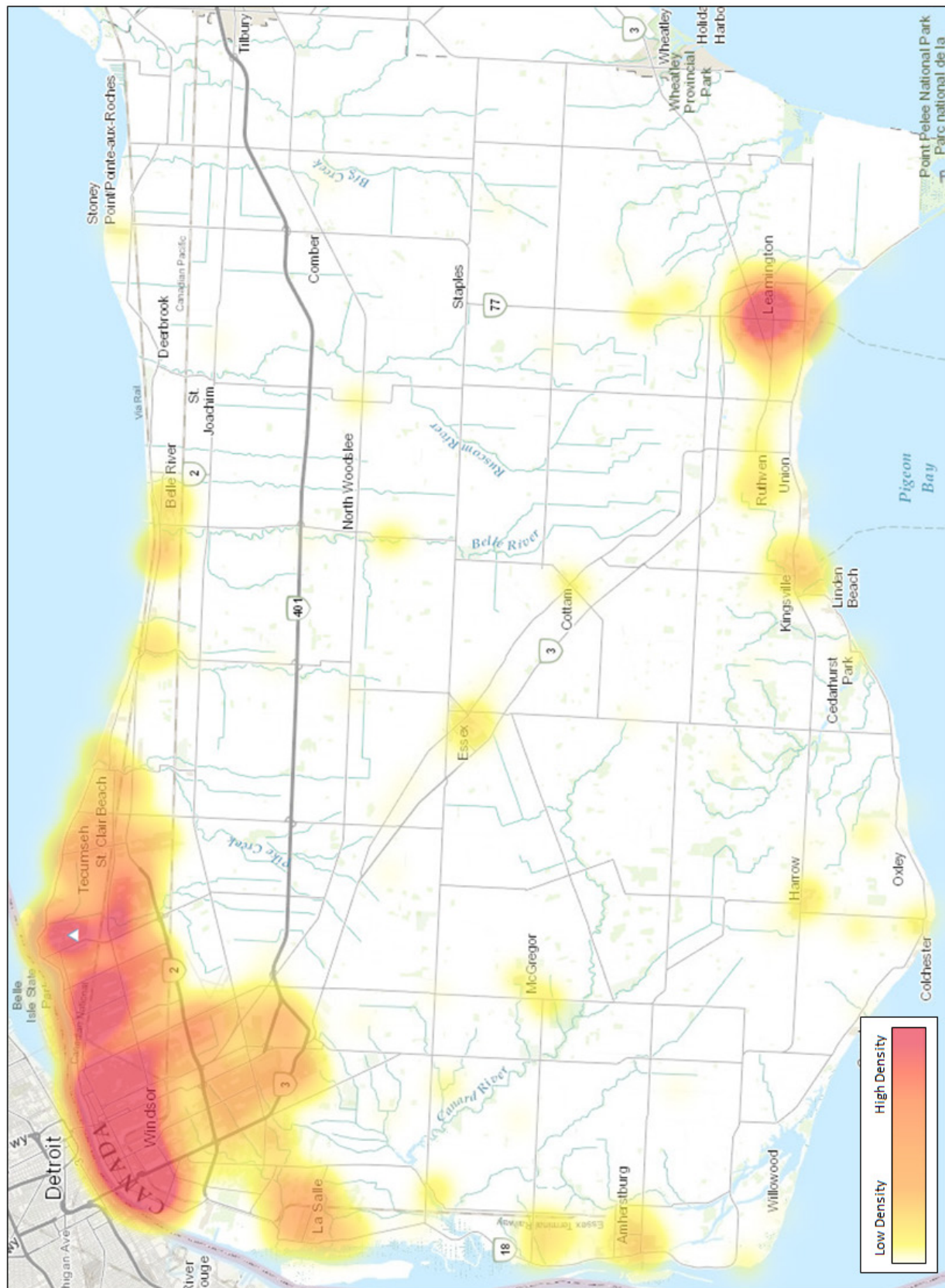
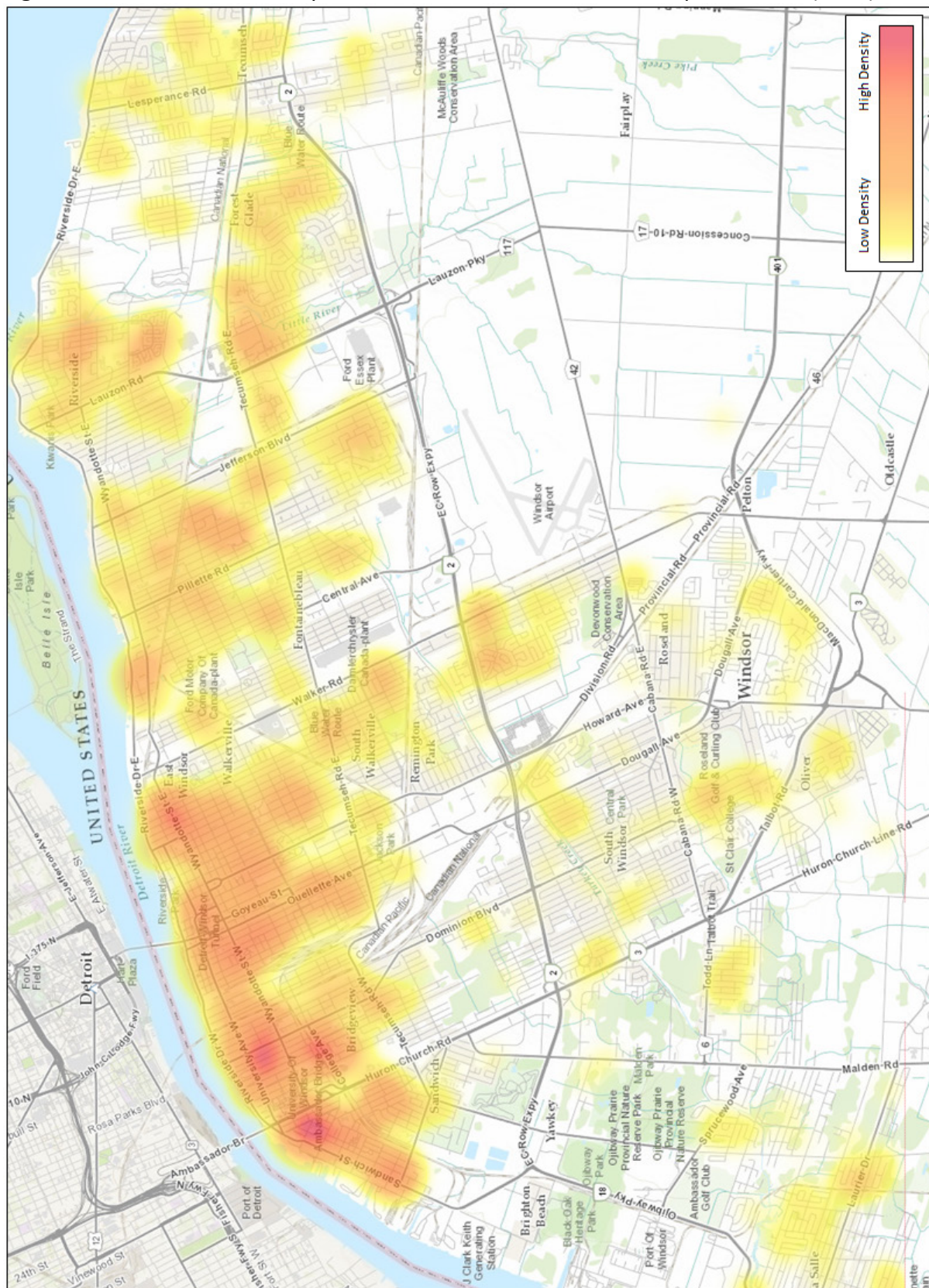


Figure 6. Distribution of chlamydial infections in the Windsor metropolitan area (2014).



Cytomegalovirus Infection (Congenital)

Background

Human cytomegalovirus (CMV), also known as herpesvirus 5, can cause congenital infections in newborn infants and, although most cases do not show clinical signs, it can result in developmental delays and hearing loss¹. It is estimated that 20-25% of all hearing loss in infants is caused by this virus¹. In adults, CMV rarely causes clinical signs except when the immune system is weakened, such those who may be immunocompromised due to an HIV infection or from taking medicine after an organ transplant^{1,2}. CMV can be transferred from person-to-person through bodily fluids; this includes mother-to-baby transmission (in utero and breastfeeding), sexual contact, and via contaminated blood products (i.e., blood transfusion)^{1,2}. Those at risk include prematurely-born or low birth-weight infants and individuals with a weakened immune system². Practicing good hygiene (i.e., handwashing) when working with infants and children can prevent the spread of this virus².

Windsor-Essex County

There were less than 5 cases of congenital cytomegalovirus infections in Windsor-Essex County during the 10-year study period of this report (2005-2014). In Ontario, there were 63 cases reported between 2004 and 2013, which represents an average of 6.3 cases per year (range of 3-11 cases per year)⁴.

Congenital cytomegalovirus was removed from the Ontario reportable disease list in 2013.

Gonorrhoea

Background

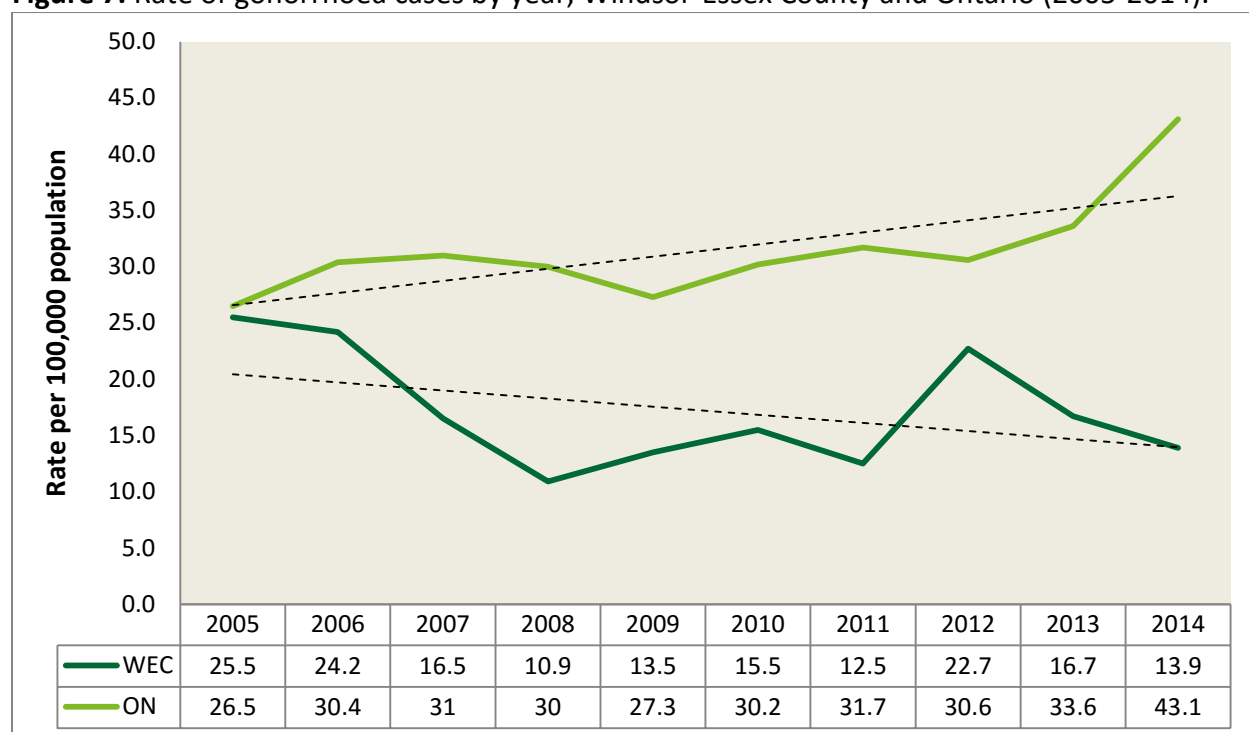
Gonococcal infections are caused by the bacteria *Neisseria gonorrhoeae* and occur only in humans¹. Infections of the reproductive tract usually do not cause clinical signs in females, but when clinical signs do occur they may include painful swelling of the cervix, urethra, and fallopian tubes¹. Contrarily, gonococcal infections in males are usually symptomatic and primarily result in painful swelling of the urethra¹. Clinical signs may take 1 – 14 days to appear after becoming infected, but can take longer². Infections are typically treated with antibiotics, but the causative bacteria can easily develop resistance which complicates antibiotic therapy². Those traditionally at high risk for infection are sexually-active youth, marginalized groups (i.e., low socio-economic status), sex trade workers, and men who have sex with men². Effective prevention strategies include sexual health education (especially condom usage), regular screening of high risk populations, and limiting the number of sexual partners².

Windsor-Essex County

Gonorrhoea is the third most common STBBI in Windsor-Essex County and accounts for 7% of all STBBI cases in the region; there is an average annual rate of 17.2 cases per 100,000 population. The annual rates of gonococcal infections in Windsor-Essex County were significantly lower than the provincial rates from 2005-2014(see **Figure 7**). While the rate of gonorrhoea is increasing across the province, the rate in Windsor-Essex County has been decreasing; from 2005 to 2014, the regional rate of gonococcal infections has decreased by 45%, representing 47 fewer cases each year. Conversely, the Ontario rate has increased by 63% in the past ten years (2005-2014).

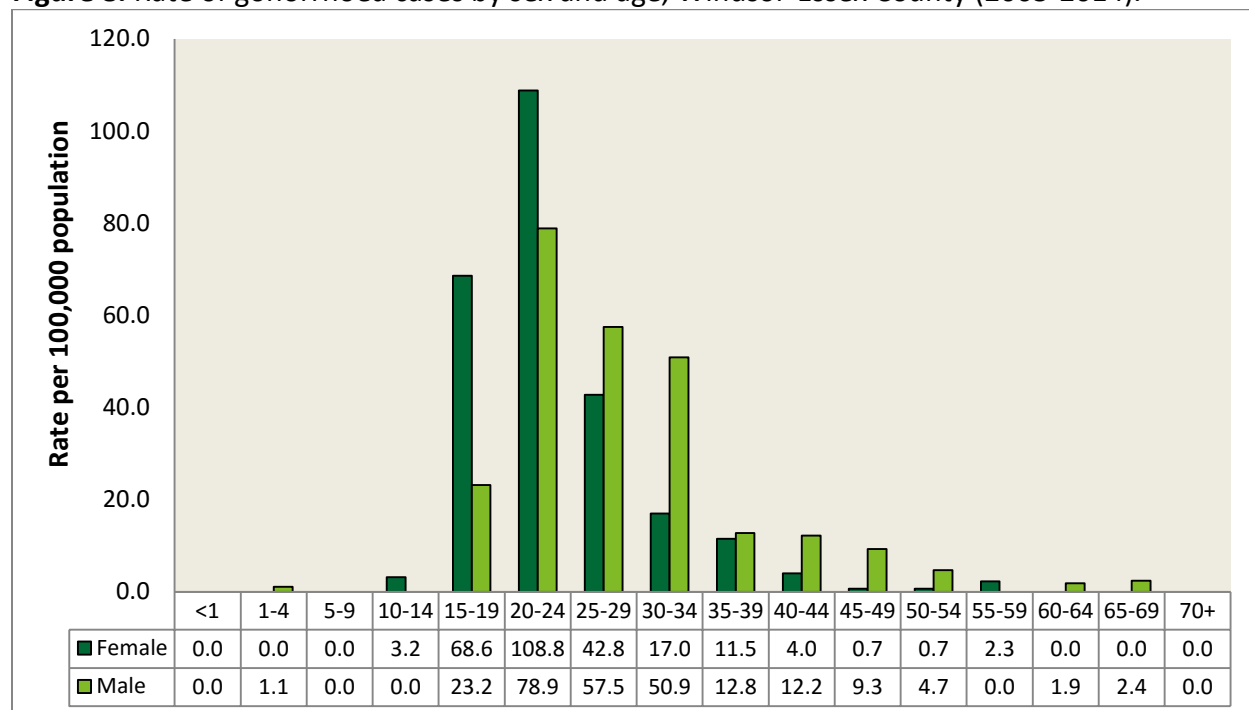
The rates of gonococcal infections were examined by age and sex, and are reported in **Figure 8**. The Windsor-Essex County population aged 15-24 years old had the greatest rates of gonorrhoea and accounted for 56% of all cases. When examining the local distribution of cases by sex, there was no overall difference: 50% were female and 50% were male. However, the rate for females was greater during adolescence (15-24 years old) and the rate for males was greater during early adulthood (20-34 years old). Overall, all adolescents and young adults (males and females) have the greatest rate of gonococcal infections in Windsor-Essex County.

Figure 7. Rate of gonorrhoea cases by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 8. Rate of gonorrhoea cases by sex and age, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Group B Streptococcal Disease (Neonatal)

Background

Group B streptococcal disease in newborns is characterized by severe clinical signs such as sepsis, pneumonia, osteomyelitis (infected bone), and meningitis (inflamed brain lining)². Fatalities are common and those who do survive may have permanent sensory retardation or seizures². Infants born prematurely (<37 weeks) are at the highest risk for infection and they may be given treatment during delivery to prevent infection². Screening women for group B streptococci and instituting hospital infection control practices can be effective prevention methods².

Windsor-Essex County

Cases of group B streptococcal disease are uncommon in Windsor-Essex County; from 2005 to 2014, there were a total of 13 cases in the region (all occurring in infants less than 1 year old). Typically there are fewer than 5 cases per year and in the previous three years (2012-2014) there were no reported cases. The rate of group B streptococcal disease in Windsor-Essex County is 31.6 cases per 100,000 live births and the Ontario rate averages 39.1 cases per 100,000 live births⁴.

Hepatitis B (Acute)

Background

The Hepatitis B virus causes an infection of the liver which results in clinical signs such as nausea, tiredness, and jaundice (yellow colouring of the skin and eyes); however, many cases are asymptomatic¹. The virus is transmitted through bodily fluids including blood, semen, and vaginal secretions, but the virus can also live on surfaces for up to 7 days^{1,2}. Hepatitis B infections can result in cirrhosis (liver scarring) and liver cancer². Those who become infected will have antibodies in their blood indefinitely and in some circumstances an individual may become a chronic carrier of the virus for life⁴. The most common ways of transmission are through sexual or close contact (co-habiting), injectable drug use, and mother-to-baby transmission². Those at risk for hepatitis B include men who have sex with men, injectable drug users, inmates, healthcare workers, travelers, and those with diabetes². Effective hepatitis B vaccines are available and are one of the best prevention methods, particularly when implemented as a universal vaccination program or targeted to those at risk of acquiring an infection².

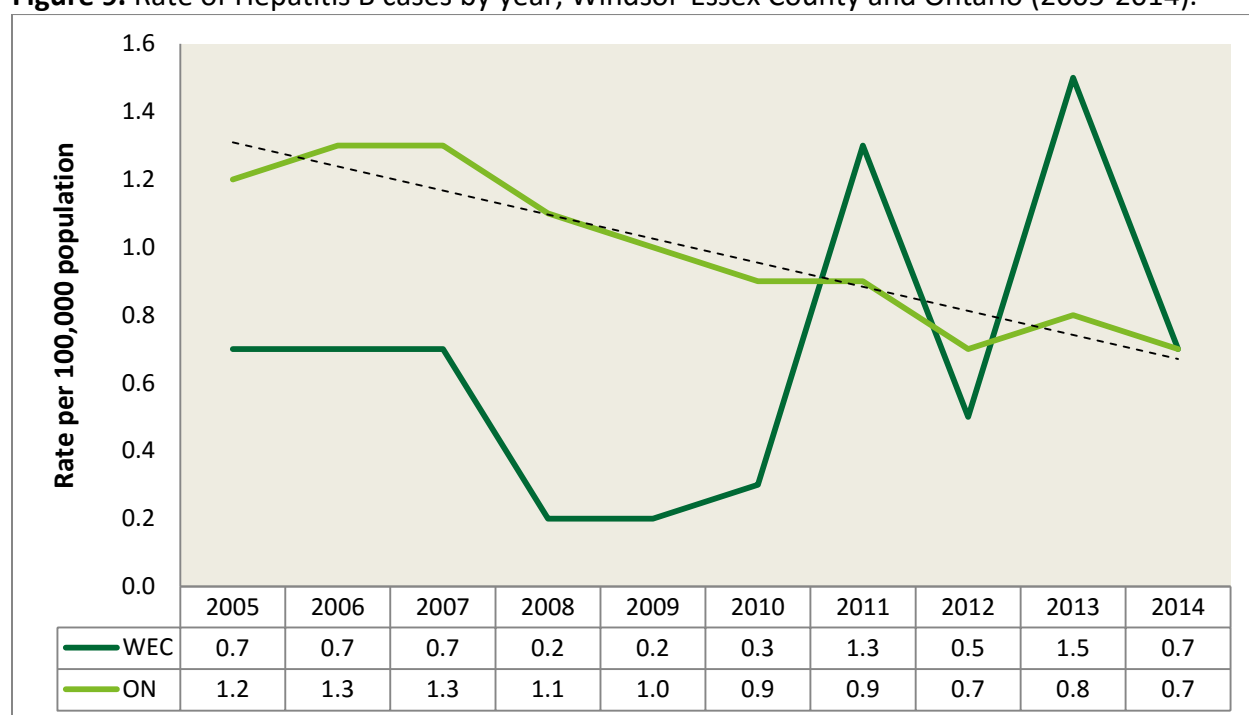
Windsor-Essex County

Acute hepatitis B infections are one of the least prevalent STBBIs in Windsor-Essex County with only 3 cases on average reported each year in the region and a total of 28 cases report between 2005 and 2014. In Ontario, the rate of acute hepatitis B infections has decreased steadily by 42% during the past ten year period (2005-2014). However, due to the sporadic nature of infections and small number of cases, it is difficult to assess any trends locally (see **Figure 9**). Recent above-average rates in 2011 and 2013 are concerning and further monitoring of acute hepatitis B cases is warranted.

The rates of acute hepatitis B infections were examined by age and sex, and are reported in **Figure 10**. Females accounted for 39% of cases and males accounted for 61% of cases. A large proportion (68%) of cases occurred in adults aged 35-54 years old.

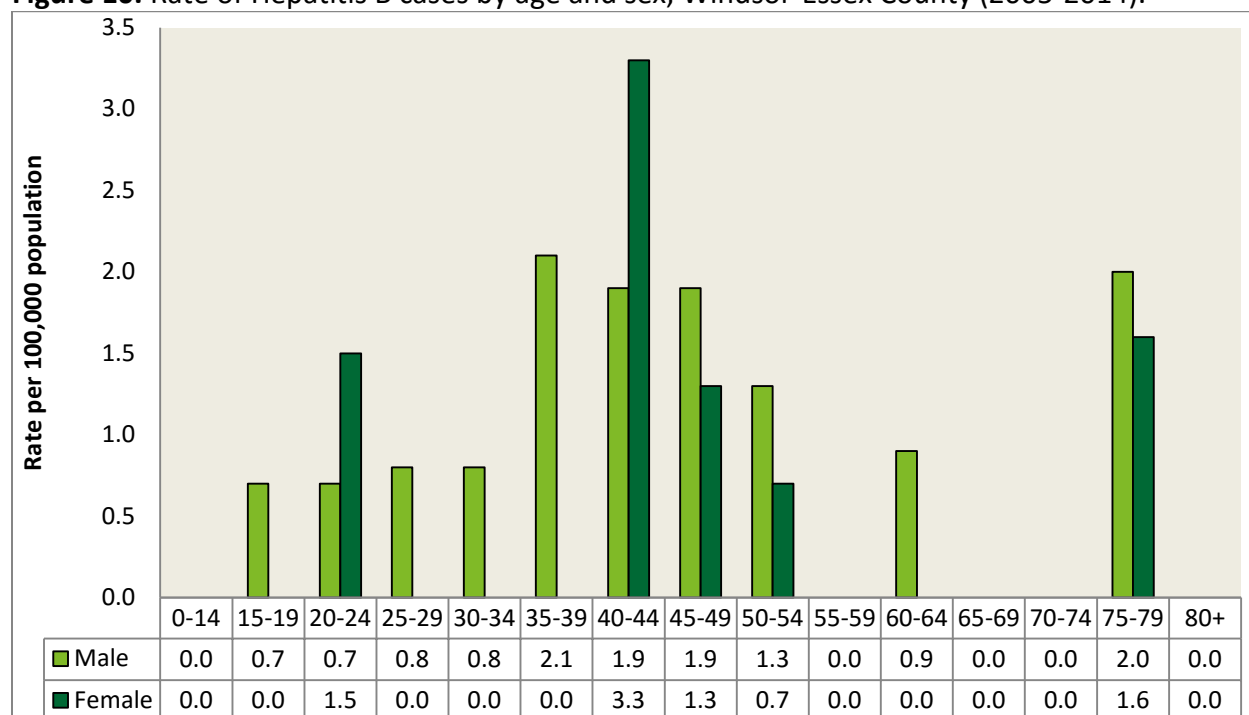
Since September 1994, the province of Ontario has implemented a hepatitis B vaccine program offering free vaccinations for all students in grade 7. The low number of acute hepatitis B infections that are presently observed is likely a consequence of this vaccination program.

Figure 9. Rate of Hepatitis B cases by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 10. Rate of Hepatitis B cases by age and sex, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Hepatitis C

Background

The hepatitis C virus causes an infection of the liver, but it usually does not cause any clinical signs^{1,2}. An infected individual may experience nausea or discomfort in the abdomen and, uncommonly, jaundice (yellowing of eyes and skin) will occur^{1,2}. It can take 2 weeks to 6 months for an infected person to show any clinical signs². Chronic infections — which can last for decades — may result in cirrhosis (liver scarring) and liver cancer². Several new effective treatments are available for hepatitis C infections, but the therapy is expensive with reported side effects¹. Injectable drug use is the primary way of becoming infected². Sexual transmission of hepatitis C is uncommon², and the way that the virus is transmitted through sexual activity is still being investigated, but it is thought that most sexually transmitted hepatitis C infections result from trauma to the body's membrane lining (e.g., sex toys, rough sex, anal penetration, genital ulcers)³. Individuals with a high risk of infection include injectable drug users, healthcare workers, men who have sex with men, and individuals with an HIV infection^{1,2}. There is no effective vaccine for hepatitis C, but reducing risky health behaviours (such as injectable drug use, multiple sex partners, or unprotected sex) are effective prevention methods^{1,2}.

Windsor-Essex County

Hepatitis C infections are the second most common STBBI in Windsor-Essex County (the average annual rate is 34.6 cases per 100,000 population), although it is likely that only a small proportion of these cases result from sexual transmission. From 2005 to 2014, the rate of hepatitis C infections has decreased by 15% in Ontario, but increased by 14% in Windsor-Essex County. From 2005 to 2014, the annual rates of hepatitis C infections in Windsor-Essex County were no different from the provincial rates, except in 2007 when it was lower and 2008 when it was higher (see **Figure 11**).

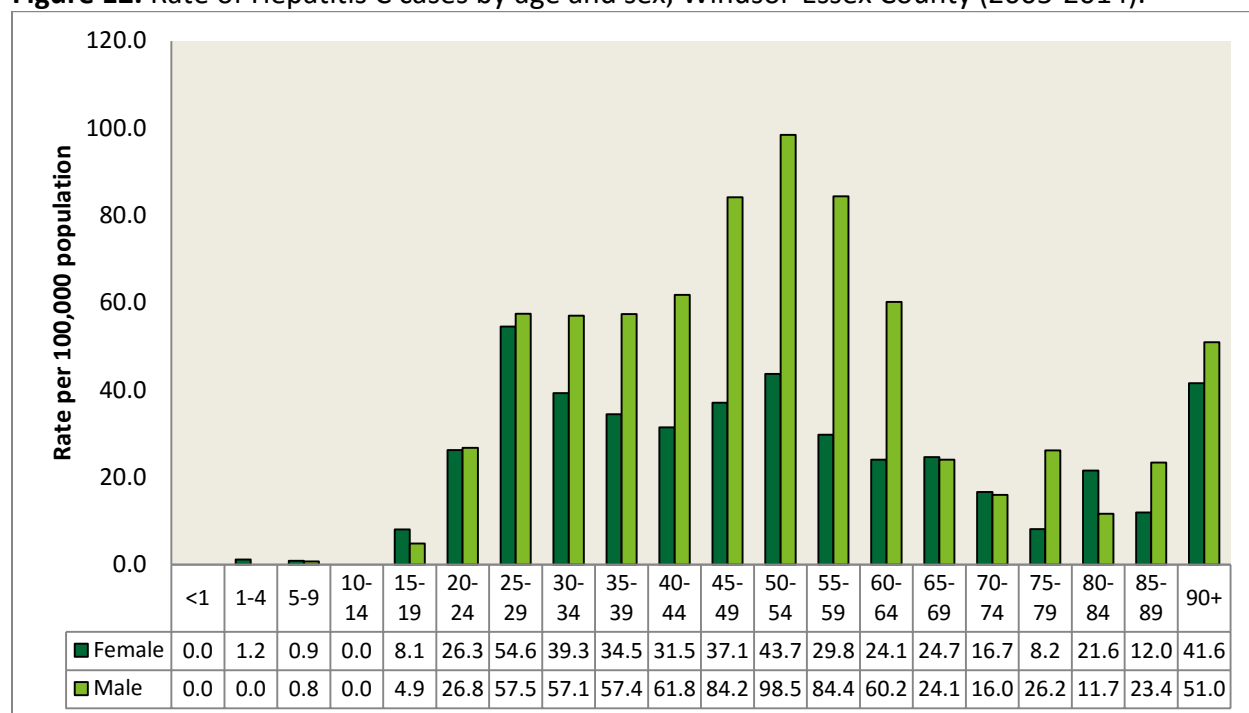
The rates of hepatitis C infections were examined by age and sex, and are reported in **Figure 12**. Those aged 30-64 years old had the greatest rates of hepatitis C infection and accounted for 75% of all cases in Windsor-Essex County. Females accounted for 37% of cases and males accounted for 63% of cases. Overall, male adults aged 30-64 years old accounted for 51% of all hepatitis C infections in the region.

Figure 11. Rate of Hepatitis C cases by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 12. Rate of Hepatitis C cases by age and sex, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Hepatitis D

Background

The hepatitis D virus can only cause infection in individuals already infected with the hepatitis B virus; on its own the hepatitis D virus cannot infect cells^{1,2}. When it does infect the liver it usually causes clinical signs similar to hepatitis B infections¹. The hepatitis D virus is transmissible from person-to-person through contaminated needles or blood products, and sexual contact^{1,2}. Those at risk include any person with a hepatitis B infection that engages in injectable drug use, and practices risky sexual behaviours^{1,2}. Since the hepatitis D virus can only cause co-infection with the hepatitis B virus, receiving the hepatitis B vaccine is one of the best preventative measures for this disease².

Windsor-Essex County

There were no cases of hepatitis D infections reported in Windsor-Essex County during the study period (2005-2014). On average, there are 3.6 cases reported per year in Ontario (range of 1-8 cases per year). From 2004 to 2013, there were a total of 36 cases reported in Ontario⁴.

Hepatitis D was removed from the Ontario reportable disease list in 2013.

Herpes (Neonatal)

Background

Neonatal herpes infections are caused by the herpes simplex virus (HSV) and can present clinically as either a disseminated disease (affects multiple organ systems such as liver and lungs), a localized neurological disease (affects the central nervous system), or a localized skin disease (affects skin, eyes, or mouth)¹. Mortality is high for infants with disseminated infections, and infants with localized neurological infections will often have permanent neurological damage¹. HSV is usually transmitted from an infected mother to her newborn during delivery and is transmissible between adults via sexual activity^{1,2}. To prevent transmission to newborn infants, expecting mothers with genital herpes can take antiviral therapy before delivery and may deliver by Caesarian section^{1,2}. Sexual health education, condom usage, self-abstaining during active infection, and proper hygiene practices are effective ways to prevent HSV transmission among the adult population².

Windsor-Essex County

There were less than 5 cases of neonatal herpes in Windsor-Essex County during the 10-year study period of this report (2005-2014). In Ontario, there were 63 cases reported between 2004 and 2013, which represents an average of 6.3 cases per year (range of 2-11 cases per year)⁴.

Neonatal herpes was removed from the Ontario reportable disease list in 2013.

Human Immunodeficiency Virus

Background

Infection with human immunodeficiency virus (HIV) can cause many clinical outcomes but the advanced or late stage of infection is acquired immunodeficiency syndrome (AIDS)^{1,2}. Those with AIDS have weaker immune systems and are more susceptible to opportunistic infections and cancer². The time from infection with HIV to diagnosis with AIDS can vary from 1 year to 15 years or more, but individuals infected with HIV can test positive within a month after infection^{1,2}. The primary modes of transmission are through unprotected sex, injectable drug use, from mother-to-baby (in utero and breastfeeding), and via contaminated blood products^{1,2}. However, newborns testing positive for HIV may not actually have the virus as they may just be carrying maternal HIV-antibodies passed on from their mothers. Those at the highest risk for HIV infections are individuals engaged in injectable drug use, unprotected sex, mixing of sexual and drug-using networks, and sex with multiple partners². Prevention of HIV infections and AIDS is very important as there is no cure. Sexual education, condom use, preventing injectable drug use, screening at risk groups, sanitation of medical and piercing equipment, and antiretroviral prophylaxis are some effective prevention strategies for HIV/AIDS².

Windsor-Essex County

The rate of HIV infections in Windsor-Essex County is considerable lower than the rate of other STIs in the region; however, due to the severe clinical outcomes of this disease and the lack of a cure, it still remains a significant priority in public health. In Windsor-Essex County, the rate of HIV infections was lower than the Ontario rate (see **Figure 13**). From 2005 to 2014, the rate of HIV infections has decreased steadily in Ontario by 26%. The rate of infections has also been decreasing in Windsor-Essex County, although the decrease is less substantial than Ontario and if current trends continue Windsor-Essex County may be no better off than the rest of the province.

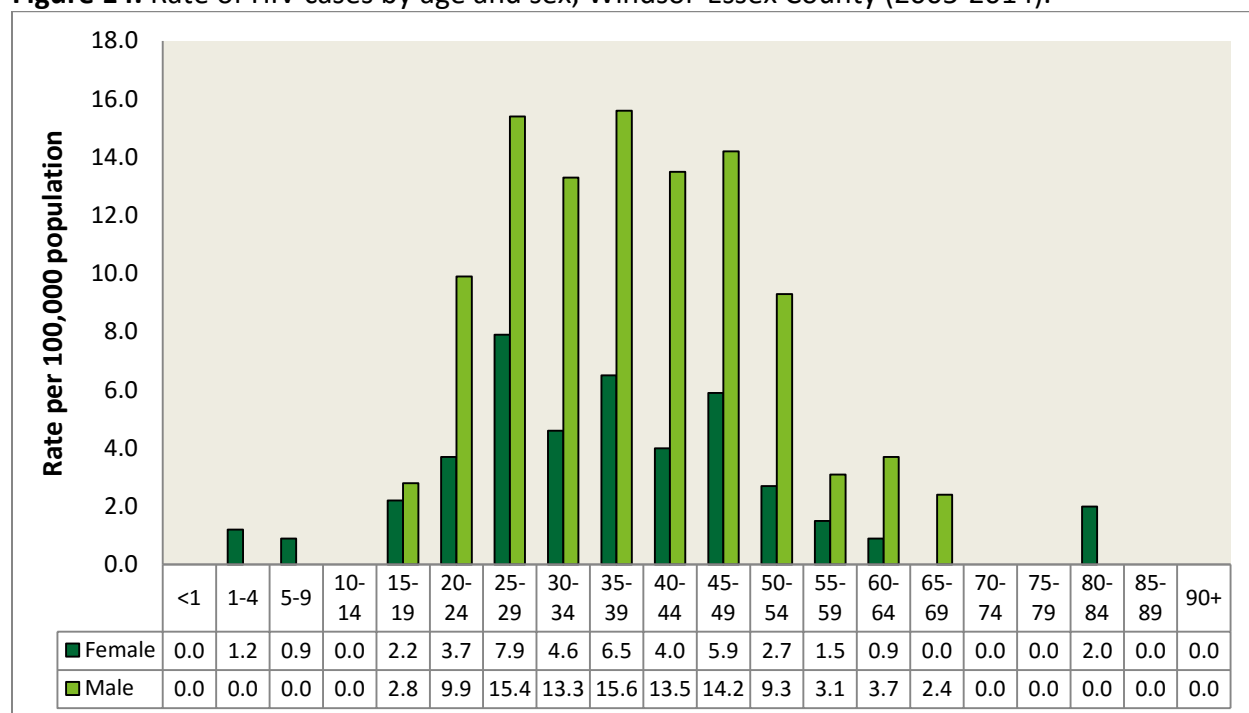
The rates of HIV infections were examined by age and sex, and are reported in **Figure 14**. The rate was much greater among Windsor-Essex males; 71% of all HIV cases in the region were in males. Windsor-Essex County residents aged 25-49 years old had the greatest rates of HIV infections and this age group accounted for 70% of all HIV cases in the region. Overall, males aged 25-49 years old accounted for 50% of all the HIV cases in Windsor-Essex County from 2005 to 2014.

Figure 13. Rate of HIV cases by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 14. Rate of HIV cases by age and sex, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by health unit and year. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Immigrant Population

Of the 120 HIV cases reported in the integrated Public Health Information System (iPHIS) between January 1, 2010 and October 31, 2015 in Windsor-Essex County, there were 11 cases that reported being born outside of Canada. These 11 cases arrived in Canada between January 2003 and May 2015. Five (45%) of these 11 cases were diagnosed with HIV within 60 days of immigrating to Canada, and 4 cases (36%) were diagnosed with HIV more than 1 year after immigration to Canada. Eight (73%) of the 11 cases originated from Africa. These statistics are summarized in **Table 4**. The country of origin and date of arrival were unknown for 1 case.

Table 4. HIV among immigrants in Windsor-Essex County (2010-2015), n=11.

Demographics	Number of Cases	% of Cases
Total known individuals born outside Canada with HIV	11	100%
Sex	No.	%
Female	5	45%
Male	6	55%
Age at diagnosis	No.	%
18-34	5	45%
35-54	6	55%
Continent of origin	No.	%
Africa	8	73%
Other	2	18%
Unknown	1	9%
Time of diagnoses after immigrating to Canada	No.	%
Diagnosed within 60 days post-immigration	5	45%
Diagnosed between 60-365 days post-immigration	1	9%
Diagnosed >1 year post-immigration	4	36%
Unknown	1	9%

Source: MOHLTC, integrated Public Health Information System (iPHIS) database, extracted [2015/10/31].

Note: Includes HIV cases up to Oct 31, 2015

Risk Factors

Risk factors indicate which characteristics or behaviours of an individual increase the risk acquiring an infection such as HIV. For HIV cases occurring between January 1, 2010 and October 31, 2015 in Windsor-Essex County, risk factors were recorded for 98 cases. The top risk factors for these HIV cases are reported in **Table 5**. Individuals who engage in sex with another individual of the same sex represented 56% of reported HIV cases and, hence, represent a high risk group in the region. The lack of condom usage was also a major risk factor with 50% of reported HIV cases indicating no condom usage. These risk factors highlight high risk groups and potential opportunities for targeted prevention strategies.

Table 5. Risk factors for HIV in Windsor-Essex County (2010-2015), n=98.

Risk Factors	Number of HIV cases	% of HIV cases
Sex with same sex	55	56%
No condom used	49	50%
Sex with opposite sex	31	32%
Tattoo and piercing	25	26%
Anonymous sex	24	24%
Travel to or live in a country where HIV is endemic	20	20%
Sex contact is HIV positive	17	17%
More than one sex contact in last 6 months	14	14%
Sex contact lived in or visited a country where HIV is endemic	12	12%
Travel outside province	10	10%
Serosorting	8	8%
Injection drug use	7	7%
Co-infected with another STI	6	6%
New sex contact in past 2 months	6	6%
Other*	54	55%

Source: MOHLTC, integrated Public Health Information System (iPHIS) database, extracted [2015/10/31].

Note: Individuals with HIV can report multiple risk factors. This data includes HIV cases up to Oct 31, 2015.

*Includes: bathhouse, met contact via internet, received blood or blood products, condom breakage, shared sex toys, alcohol/drug impairment, occupational exposure, correctional facilities, pregnant, invasive medical procedure, shared needle/drugs, sex trade worker, and fighting, biting, torture, or blood brother.

Co-Morbidities

Co-morbidities occur when an individual is infected with both HIV and another disease. Between January 1, 2010 and October 31, 2015, there were seven reported cases of HIV that had co-morbidities in Windsor-Essex County. The co-morbidities are summarized in **Table 6**.

Table 6. Co-morbidities of HIV cases in Windsor-Essex County (2010-2015), n=7.

Co-Morbidity	Number of Cases
Syphilis	2
Chlamydia	2
Hepatitis C	2
Gonorrhea	1
Total	7

Source: MOHLTC, integrated Public Health Information System (iPHIS) database, extracted [2015/10/31].

Note: Includes HIV cases up to Oct 31, 2015.

Ophthalmia Neonatorum

Background

Ophthalmia neonatorum is an inflammation of the eyes of newborn infants which may result in complete or partial blindness¹. It is caused when the newborn's eyes become exposed to infectious bacteria during birth¹. The bacteria that can cause ophthalmia neonatorum include *Chlamydia trachomatis* (chlamydia), *Neisseria gonorrhoeae* (gonorrhoea), and other bacterial species (e.g., *Staphylococcus aureus*)¹. The best way to prevent this disease is by giving newborn infants prophylactic (preventative antibiotics) eye drops and to provide further treatment to infants born to mothers with known gonococcal or chlamydial infections^{1,2}.

Windsor-Essex County

There were no cases of ophthalmia neonatorum reported in Windsor-Essex County during the study period (2005-2014) of this report. Cases are relatively uncommon in Ontario with only 32 cases being reported in the province between 2005 and 2014.

Syphilis

Background

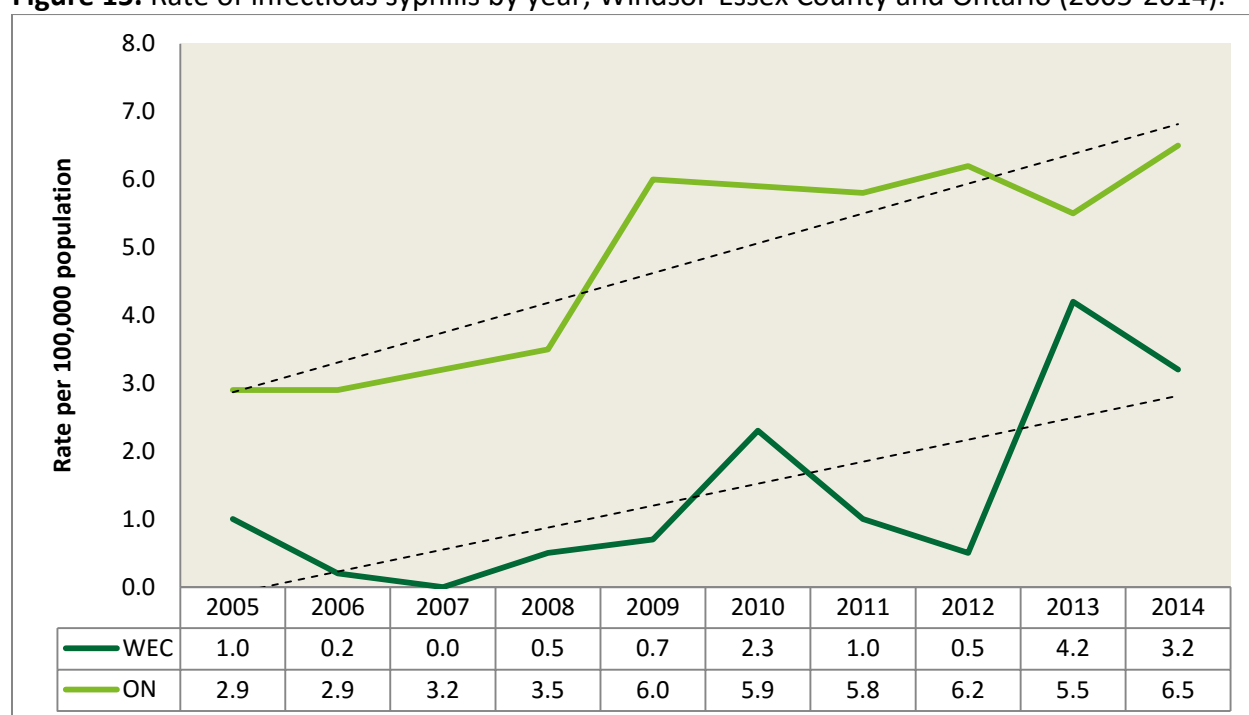
Syphilis infections are caused by the bacteria *Treponema pallidum* and are relatively uncommon in developed nations such as Canada¹. Congenital syphilis in infants is caused by transmission of the bacteria from the mother through the placenta and can result in stillbirth¹. In adults, acquired syphilis is transmitted through sexual contact with infected individuals and usually develops into syphilis 10-90 days after transmission¹. The first stage of syphilis appears as ulcers on the skin and develops into the second stage of syphilis (rash and lesions) after 1-2 months¹. The infection will then become dormant (no clinical signs) for an extended period of time and in 15-30 years the third stage of syphilis will appear as growths on different body tissues and may cause neurosyphilis (infection of the brain and spinal cord)¹. Those who engage in risky or unprotected sex, sex trade workers, and men who have sex with men are at high risk for syphilis infections². Effective ways to prevent syphilis infections include community education programs on sexual health, routine screening of high risk groups, and interventions to decrease risky sexual behaviours².

Windsor-Essex County

Of the three types of syphilis (early congenital, infectious, and other) classified in this report, there were no cases of early congenital syphilis reported in Windsor-Essex County in the past ten years (2005-2014). The rates of infectious and other syphilis cases are low compared to other STBBI cases in the region. For infectious syphilis, the Windsor-Essex County rate is lower than the provincial rate (see **Figure 15**); however, from 2005-2014, the rate has increased by 220% in the region (that is, the rate has tripled over the past ten years). This represents an increase of nearly 9 additional cases of infectious syphilis each year in Windsor-Essex County. Conversely, the rate of other syphilis cases has been decreasing in Ontario, but the rate has remained relatively stable in Windsor-Essex County, and presently there is no difference between the provincial and local rates of infection (see **Figure 17**).

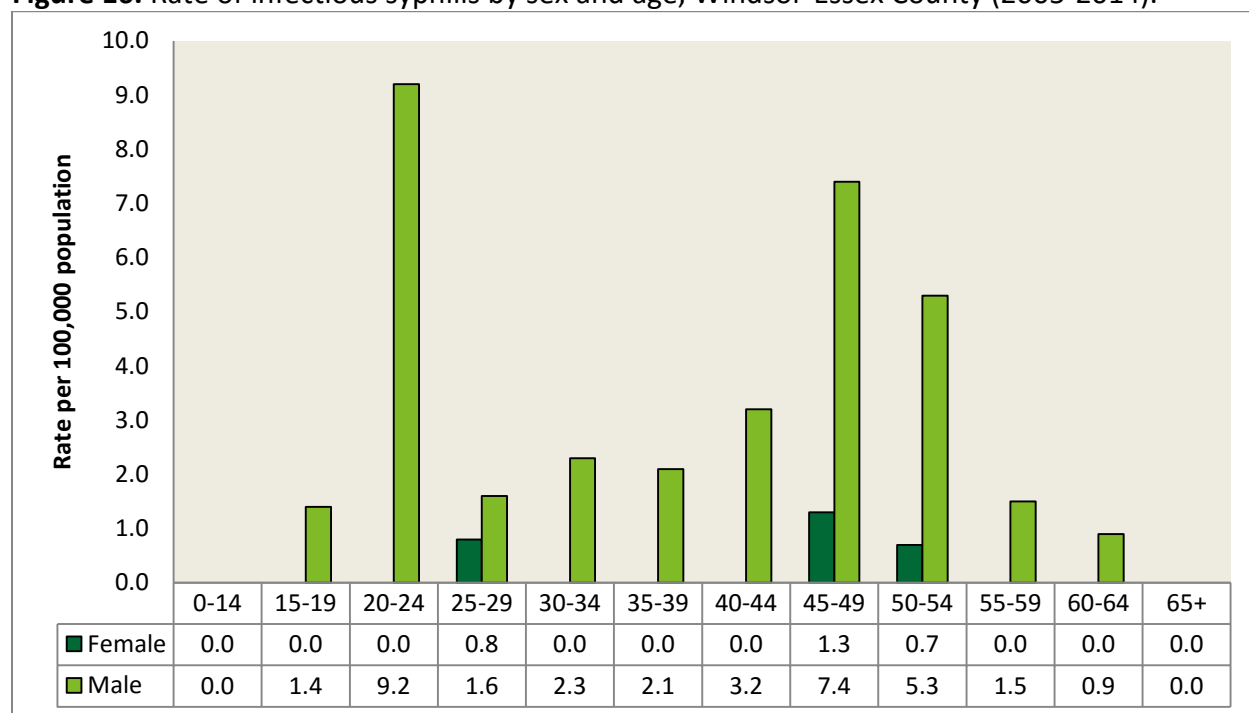
The rates of infectious syphilis were examined by age and sex, and are reported in **Figure 16**. The rates of infectious syphilis were greatest among those aged 20-24 years old and those aged 45-54 years old. These trends in age groups coincide with the clinical phases of syphilis. Males were almost exclusively affected; 93% of infectious syphilis cases were in males in Windsor-Essex County. The rates of other syphilis cases were examined by age and sex, and are reported in **Figure 18**. Females accounted for 39% of cases and males accounted for 61% of cases. The rate was relatively consistent among males aged 30-84 years old. The rate in females peaked at 30-39 years old and again at 75-84 years old.

Figure 15. Rate of infectious syphilis by year, Windsor-Essex County and Ontario (2005-2014).



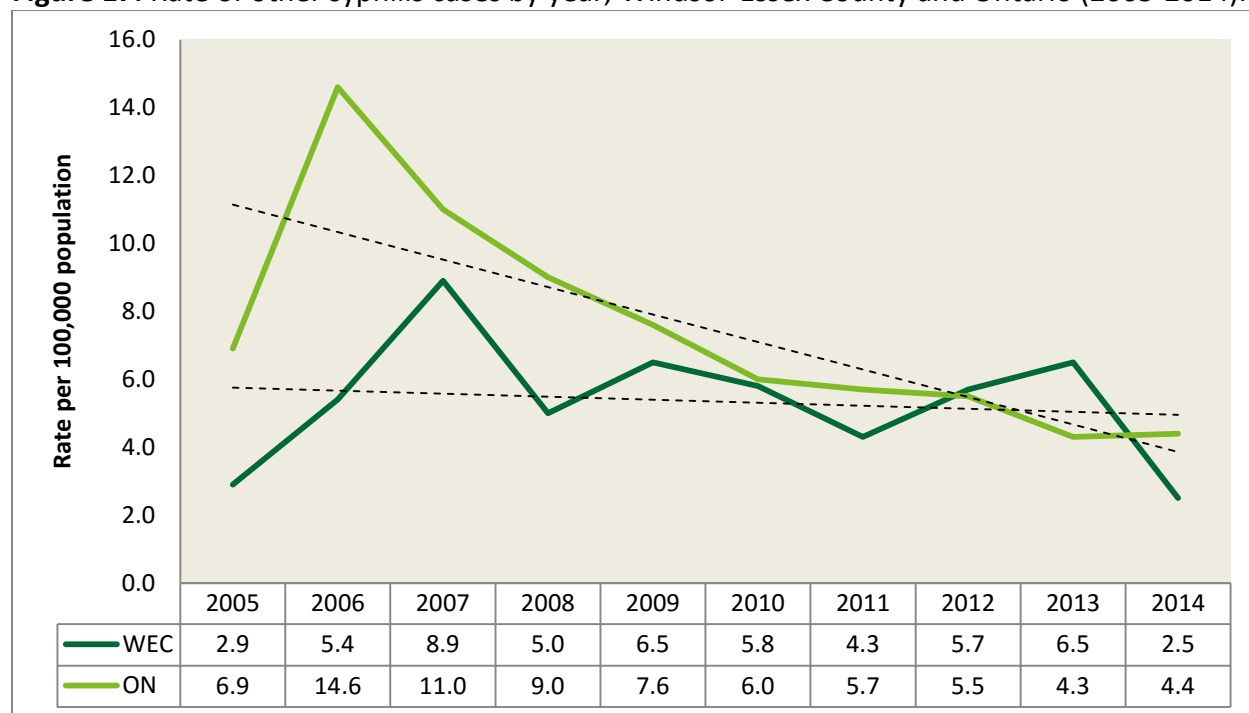
Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 16. Rate of infectious syphilis by sex and age, Windsor-Essex County (2005-2014).



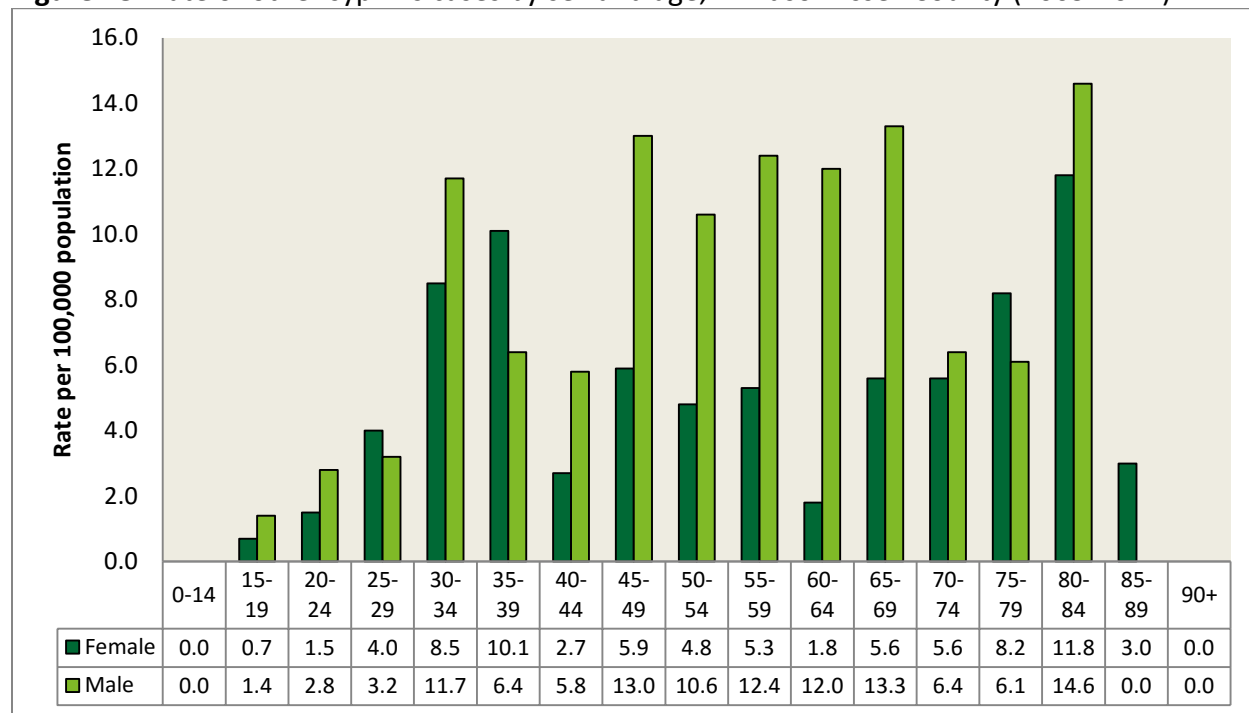
Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 17. Rate of other syphilis cases by year, Windsor-Essex County and Ontario (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Figure 18. Rate of other syphilis cases by sex and age, Windsor-Essex County (2005-2014).



Source: Public Health Ontario. Query: WECHU: case counts and crude rates of reportable diseases by age and gender. Toronto, ON: Ontario Agency for Health Protection and Promotion [cited 2015 Dec 7].

Conclusion and Recommendations

The overall findings of this report demonstrate that STBBIs are becoming an increasing burden on the population health of Windsor-Essex County. Since 2005, the total number of STBBIs has increased by 27% (despite a relatively stable population structure). The majority (72%) of STBBIs occur among adolescents and young adults (aged 15-29 years old) and this age group is over ten-times more likely to have an STBBI than the rest of the Windsor-Essex County population. It is estimated that STBBIs cost Windsor-Essex County \$21.9 million in 2014.

The results of more detailed analysis of each reportable STBBI are summarized in **Table 7**. The rate of some STBBIs (gonorrhoea, other syphilis infections, and HIV) decreased but the rate of the most common STBBIs (chlamydia, hepatitis C, and infectious syphilis) increased between 2005 and 2014. Most of the rates were lower or similar to the provincial rates. Males were equally or disproportionately affected by all STBBIs except for chlamydia.

Based on the evidential findings outlined in this report, the following recommendations were engineered to support and guide future public health strategies and programs related to the prevention and reduction of STBBIs in Windsor-Essex County:

Recommendation #1: Continue to inform decision making processes and policies with evidence generated from the assessment and surveillance of sexually transmitted and blood-borne infections.

- *Specific goal:* conduct an environmental assessment of sexual health services in Windsor-Essex County.

Recommendation #2: Plan, implement, and evaluate health promotion initiatives that aim to increase awareness and education around sexually transmitted and blood-borne infections.

- *Specific goal:* increase the practice of safe sexual behaviours by addressing and promoting access to free condoms among those aged 15-29 years old.

Recommendation #3: Target public health activities at groups that would benefit the most and aim to reduce the incidence of the most burdensome sexually transmitted and blood-borne infections in these groups.

- *Specific goal:* provide more school-based services in the community to increase testing and to increase the understanding of the importance of testing and communication with sexual partners.

Recommendation #4: Community outreach and collaboration with community partners on initiatives to reduce and prevent cases of sexually transmitted and blood-borne infections.

- *Specific goal:* provide clear and consistent messaging to community partners regarding information and priorities around sexually transmitted and blood-borne infections.

Overall, STBBIs are a significant burden on the health of the Windsor-Essex County population. This report highlights the key STBBI trends and the groups that are disproportionately affected by STBBIs in the region. It is anticipated that these results will assist with directing future programs and initiatives around prevention and mitigation of STBBIs.

Table 7. Summary of the local burden, trends, and high-risk groups in Windsor-Essex County for sexually transmitted and blood-borne infections (2005-2014).

STBBI	Burden of cases in WEC (Rank)	WEC rate compared to Ontario rate*	WEC ten year trend (rate of infection)	Sex group(s) at risk	Age group(s) at risk
Chlamydia	1	Lower	48% <u>increase</u> (275 more cases/year)	65% females, 35% males	15-24 years old
Hepatitis C	2	Same	14% <u>increase</u> (17 more cases/year)	37% females, 63% males	30-64 years old
Gonorrhoea	3	Lower	45% <u>decrease</u> (47 less cases/year)	50% females, 50% males	15-24 years old
Syphilis (other)	4	Same	14% <u>decrease</u> (2 less cases/year)	39% females, 61% males	30-84 years old
HIV	5	Lower	27% <u>decrease</u> (5 less cases/year)	29% females, 71% males	25-49 years old
Syphilis (infectious)	6	Lower	220% <u>increase</u> (9 more cases/year)	7% females, 93% males	20-24 years old
Hepatitis B	7	Same	Could not determine	39% females, 61% males	35-54 years old
Group B Streptococcal	8	Lower	Could not determine	Could not report	<1 year old

WEC – Windsor-Essex County

*The average annual rates for Windsor-Essex County were either statistically different (lower or higher) or not statistically different (same) than the Ontario rates.

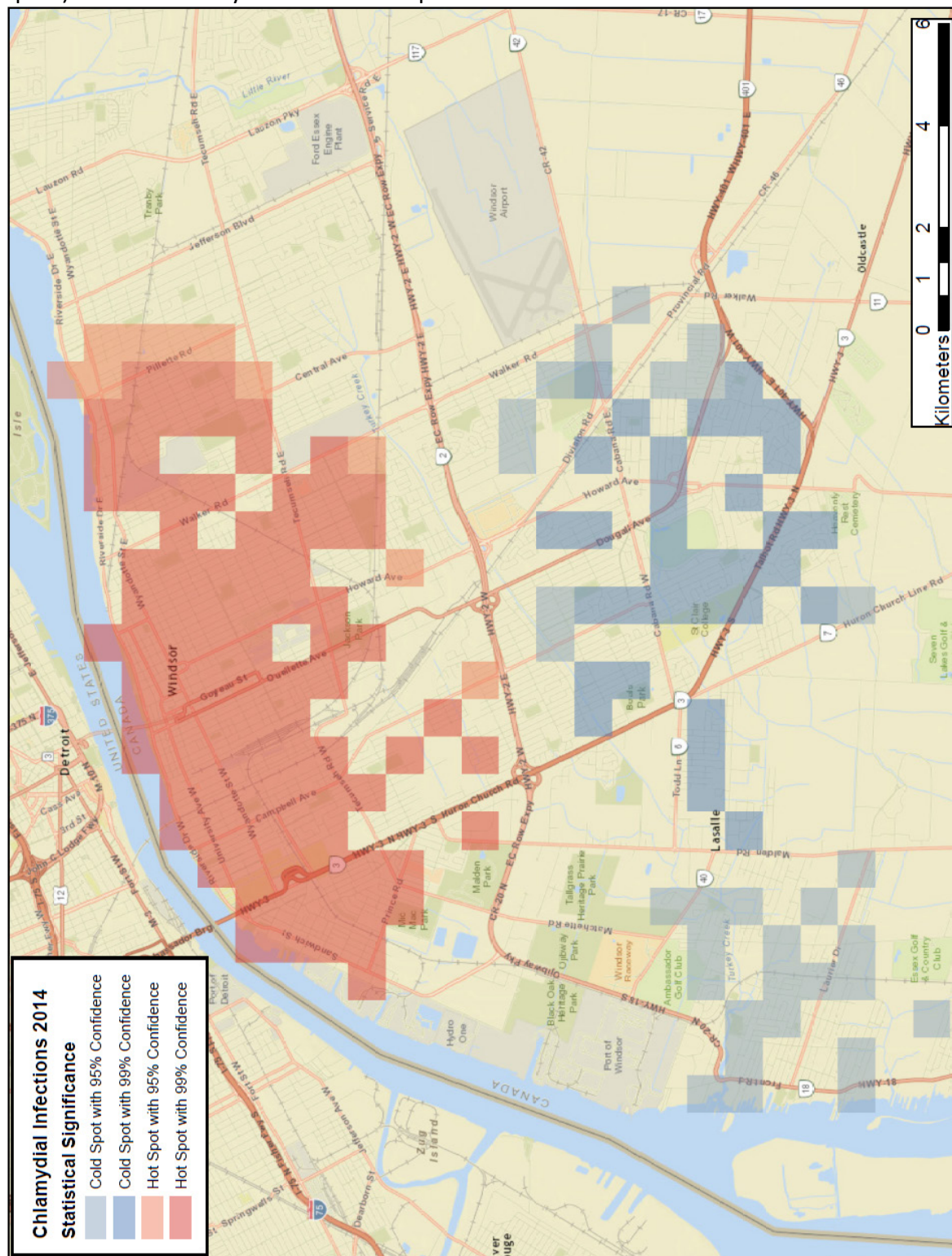
Note: There were no cases of chancroid, hepatitis D, ophthalmia neonatorum, or early congenital syphilis in Windsor-Essex County from 2005-2014. Due to low case counts for cytomegalovirus and neonatal herpes, no meaningful demographic data could be reported.

References

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Appendix A

Supplementary Figure 1. Statistical analysis of high density (hot spots) and low density (cold spots) areas of chlamydial infections reported in 2014.



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