Trends in Key Infectious Diseases

To:	Chair and Members of the Board of Health
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Recommendations

It is recommended that the Board of Health receive this report for information.

Key Points

Infectious disease patterns in Wellington Dufferin Guelph (WDG) have been shaped by the combined impacts of:

- COVID-19 pandemic disruptions
- Fluctuations in vaccine uptake
- Evolving testing practices
- Global travel
- Ecological and climate changes

These factors have altered transmission dynamics and population immunity, causing noticeable variability in disease incidence.

Five diseases were analyzed due to their public health significance and recent trends:

- Chickenpox
- Measles
- Invasive Group A Streptococcal (iGAS)
- Influenza
- Lyme disease

Background

Over the past decade, infectious disease epidemiology in WDG has been shaped by multiple converging influences, including the COVID-19 pandemic, fluctuations in vaccine uptake, evolving testing practices, global travel patterns, and shifts in ecological and climate conditions. These factors have had wide-ranging effects on transmission dynamics and population-level immunity, leading to noticeable variations in disease incidence across time. Routine review of these trends is essential both for early identification of emerging risks and for informing local planning, resource allocation, and public health response.

The analysis presented in this report focuses on five diseases of local and provincial significance: Chickenpox (Varicella), Measles, iGAS disease, Influenza (A & B), and Lyme Disease. These conditions were selected based on observed increases in incidence, public health importance, vaccine-related considerations, or the need to better understand the evolving epidemiological landscape following the COVID-19 pandemic. Data for the period 2015–2025 was extracted from internal surveillance systems, supplemented with expert epidemiological interpretation.

Discussion

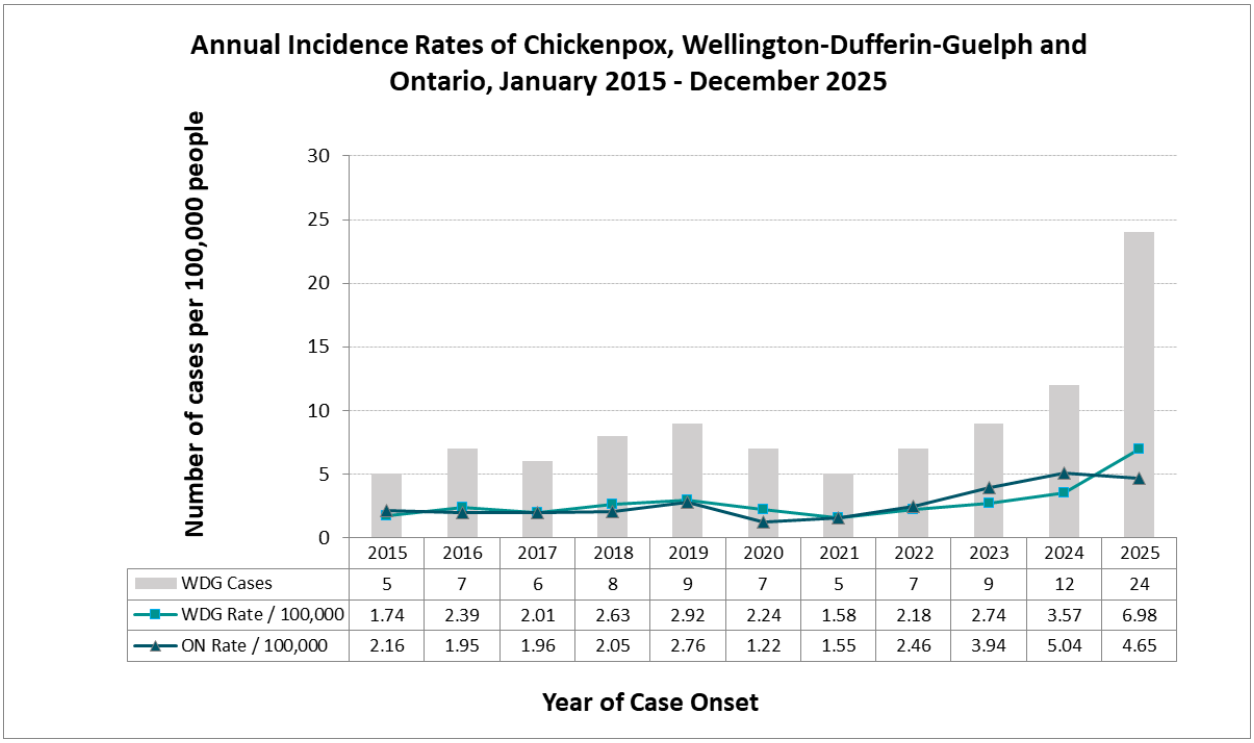
The five diseases that demonstrated marked increase are discussed below.

Chickenpox (Varicella)

Chickenpox is a highly contagious viral infection caused by varicella-zoster virus. It typically presents with fever and a generalized vesicular rash, and incidence has dramatically decreased since the introduction of routine immunization.[1]

Chickenpox incidence in WDG remained low and stable from 2015 to 2023, consistent with the protective impact of routine varicella immunization programs and reduced natural circulation of the virus within the community. In 2024, however, the region experienced an increase in chickenpox activity, which escalated further in 2025 (Figure 1.)

Figure 1.



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WDG Cases	5	7	6	8	9	7	5	7	9	12	24
WDG Rate / 100,000	1.74	2.39	2.01	2.63	2.92	2.24	1.58	2.18	2.74	3.57	6.98
ON Rate / 100,000	2.16	1.95	1.96	2.05	2.76	1.22	1.55	2.46	3.94	5.04	4.65

- Data Source: iPHIS, via PHO ID Query, extracted Dec 10, 2025, refreshed Jan 7, 2026
  * Data entry of 2025 cases, including those recently reported to Public Health, may be incomplete, therefore numbers are subject to change after the end of the year.

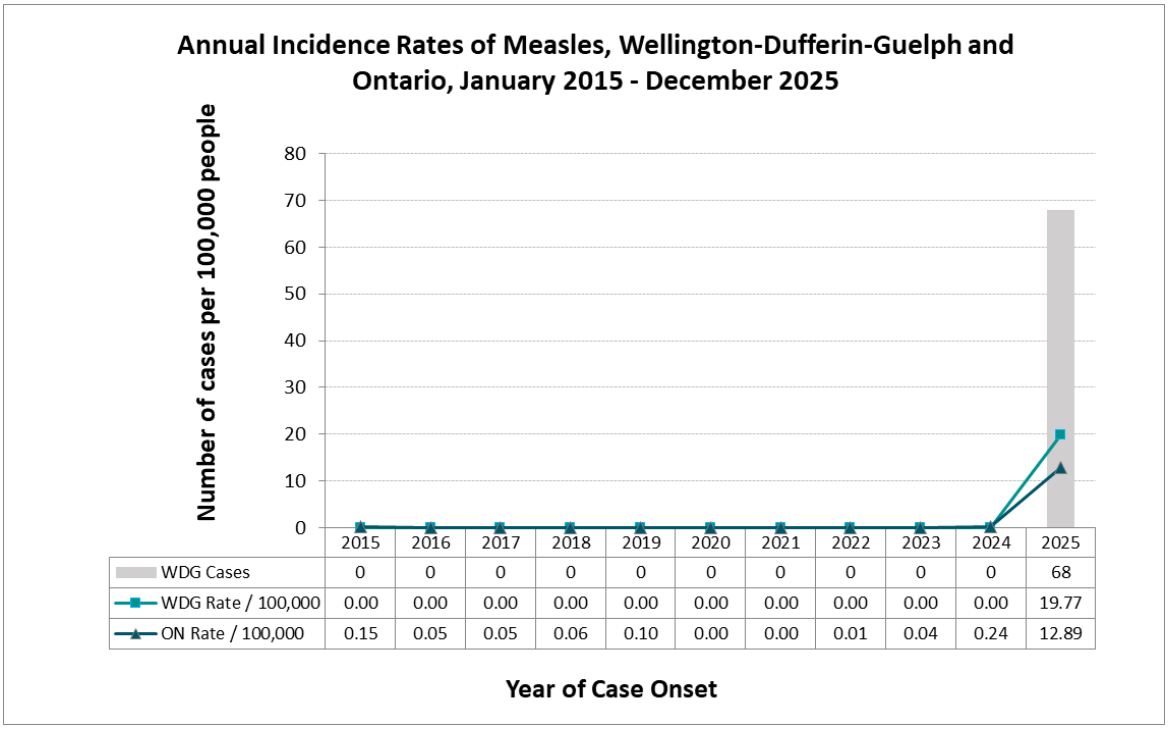
One likely contributing factor is the presence of post-pandemic immunity gaps. Additionally, the data suggest the possibility of waning vaccine-derived immunity, particularly as cohorts vaccinated many years ago grow older. Lower incidence of chickenpox among school-aged children in recent years may also have led to increased susceptibility among adults, adolescents, and under-vaccinated subgroups, due to decreased boosting of existing immunity by exposure to cases.[2] Of note, Integrated Public Health Information System (iPHIS) data indicate that 12.0% of cases in 2025 reported receiving prior vaccination, supporting the hypothesis that waning immunity may be playing a role in these trends.

Measles

Measles is a highly infectious airborne viral illness characterized by fever, cough, conjunctivitis, and rash. It can cause serious complications including pneumonia and encephalitis and is preventable with two-dose Measles, Mumps, Rubella (MMR) vaccination.

Given the absence of reported laboratory-confirmed cases, there is no evidence of measles activity between 2015 and 2024. This outcome underscores historically robust local immunization efforts and the effectiveness of both provincial and national elimination strategies. However, a significant change occurred in 2025, with sixty-eight measles cases reported (Figure 2.).

Figure 2.

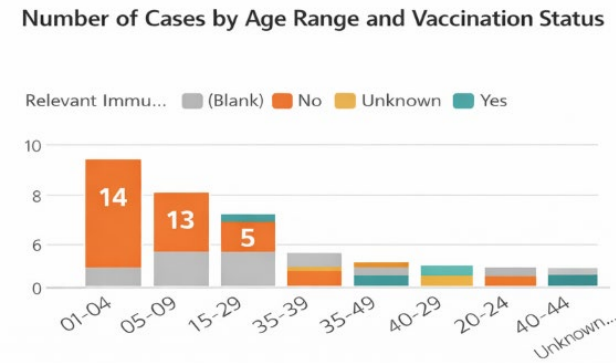


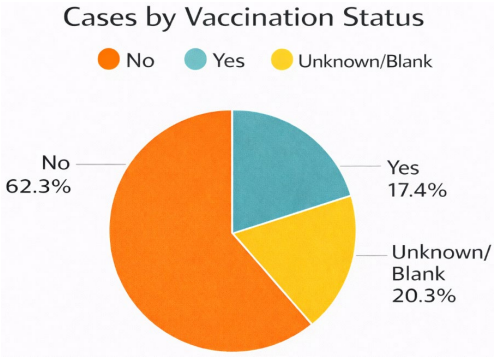
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WDG Cases	0	0	0	0	0	0	0	0	0	0	68
WDG Rate / 100,000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.77
ON Rate / 100,000	0.15	0.05	0.05	0.06	0.10	0.00	0.00	0.01	0.04	0.24	12.89

The resulting incidence rate of 19.77 per 100,000 surpasses the provincial rate and signals a major shift in the region's risk profile. This sharp increase represents one of the most important communicable disease developments of the past decade and was a result of a measles outbreak in 2025 that encompassed several public health units in Ontario.

The resurgence of measles in WDG is linked to several interrelated issues. Globally, measles cases have increased due to widespread disruptions in routine childhood vaccination programs during the COVID-19 pandemic, along with apparent waning immunity or failure to develop immunity in vaccinated individuals (which is reflected in the 17% of vaccinated individuals becoming infected-see figure 3 and 4) creating large populations of susceptible individuals and reducing herd immunity.[3]

Figure 3 and 4.





*Reported case counts may be an under-estimate due to possible under-reporting in adults, among those up-to-date on vaccinations and in traditionally under-vaccinated communities where contact with the medical community may be avoided/limited.

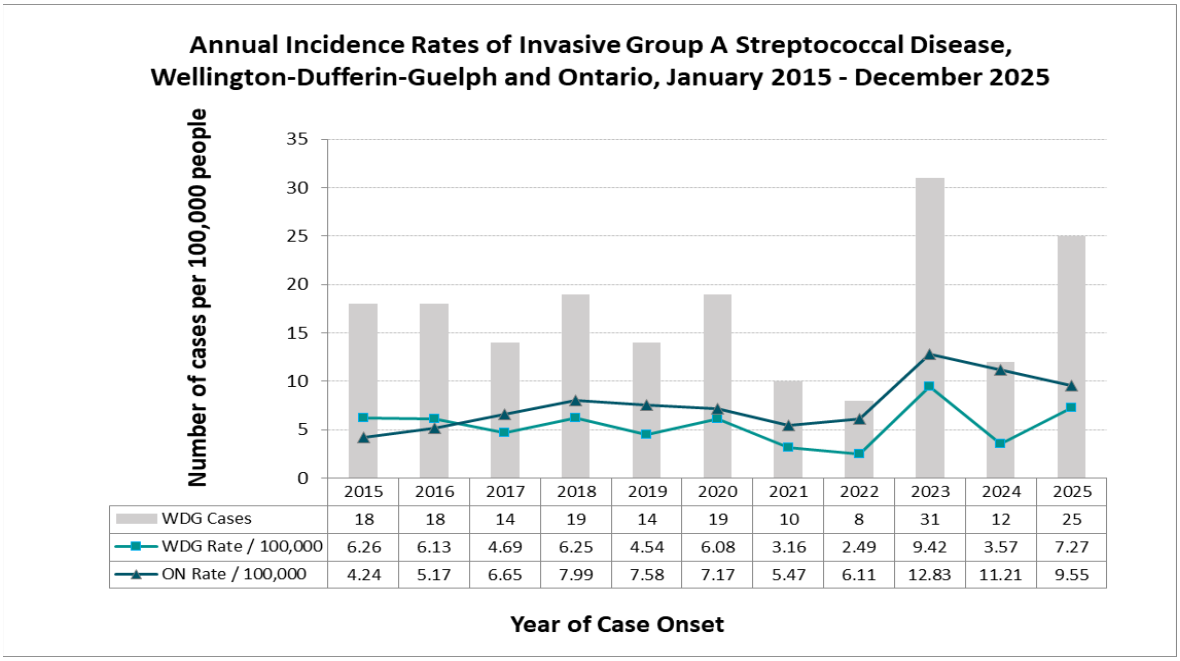
These international immunity gaps elevate the likelihood of importation events, which have been documented as key drivers of local transmission.[4] Once measles is introduced into a community, even small declines in immunization coverage can allow rapid spread, particularly in settings with close person-to-person contact. The 2025 increase therefore reflects both global epidemiological pressures and vulnerabilities within local immunization systems. In November of 2025, Canada no longer holds its measles elimination status.[5]

Invasive Group A Streptococcal (iGAS) Disease

iGAS disease is a serious bacterial infection caused by *Streptococcus pyogenes*. While this bacterium often causes mild illnesses like strep throat, in rare cases it can enter the bloodstream or deep tissues and lead to very severe, life-threatening conditions. These include necrotizing fasciitis (sometimes called “flesh-eating disease”), streptococcal toxic shock syndrome (a rapid, overwhelming infection that can cause organ failure), and sepsis (a dangerous whole-body reaction to infection).[6] Because these illnesses can progress quickly, early recognition and treatment are critical.

Between 2015 and 2022, the incidence of iGAS infections in WDG remained relatively moderate, with only minor year-to-year variation. In 2023, however, the region experienced a significant increase, reporting 31 cases, a noticeable deviation from prior patterns. Elevated activity continued through 2025, mirroring provincial trends and suggesting systemic shifts in pathogen behaviour or host susceptibility (Figure 5).[6]

Figure 5.



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WDG Cases	18	18	14	19	14	19	10	8	31	12	25
WDG Rate / 100,000	6.26	6.13	4.69	6.25	4.54	6.08	3.16	2.49	9.42	3.57	7.27
ON Rate / 100,000	4.24	5.17	6.65	7.99	7.58	7.17	5.47	6.11	12.83	11.21	9.55

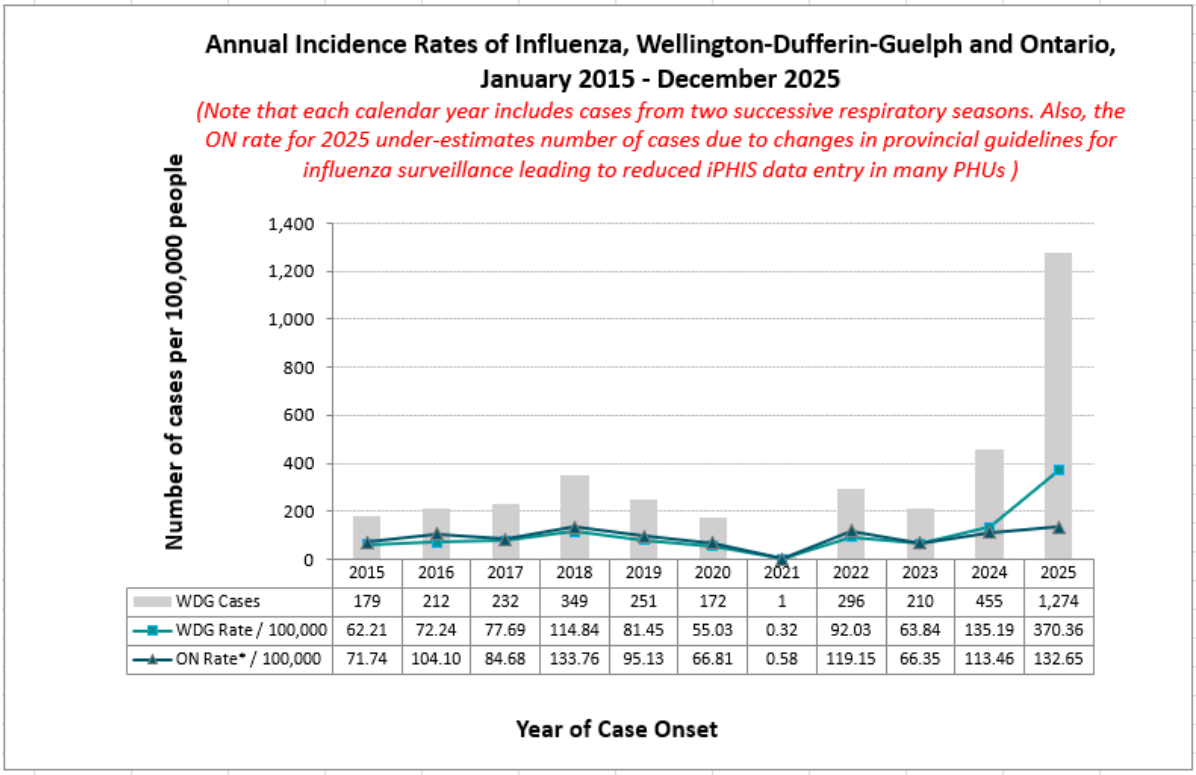
Following the COVID-19 pandemic, respiratory pathogen circulation patterns changed dramatically, with increased viral co-infections and altered immunity potentially heightening susceptibility to severe bacterial infections such as iGAS.[7] Differences in health-seeking behaviour and access to care may also influence detection and reporting. Notably, only a few cases in 2025 have occurred in children, suggesting that adults represent the primary drivers of current local activity. This aligns with observations elsewhere in Ontario and Canada.[8]

Influenza (A & B)

Influenza is a seasonal respiratory viral infection caused by influenza A and B viruses. It can lead to severe disease, especially in high-risk groups, and vaccine effectiveness varies annually based on circulating strains.

Figure 6 shows that Influenza activity in WDG from 2015 to 2019 followed predictable seasonal cycles, characterized by winter peaks of varying intensity. In 2020 and 2021, influenza incidence declined sharply as COVID-19 mitigation measures, including masking, school closures, reduced travel, and physical distancing, suppressed the circulation of many respiratory viruses. Beginning in 2022, influenza activity rebounded significantly, with strong peaks during subsequent seasons.

Figure 6.



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WDG Cases	179	212	232	349	251	172	1	296	210	455	1,274
WDG Rate / 100,000	62.21	72.24	77.69	114.84	81.45	55.03	0.32	92.03	63.84	135.19	370.36
ON Rate* / 100,000	71.74	104.10	84.68	133.76	95.13	66.81	0.58	119.15	66.35	113.46	132.65

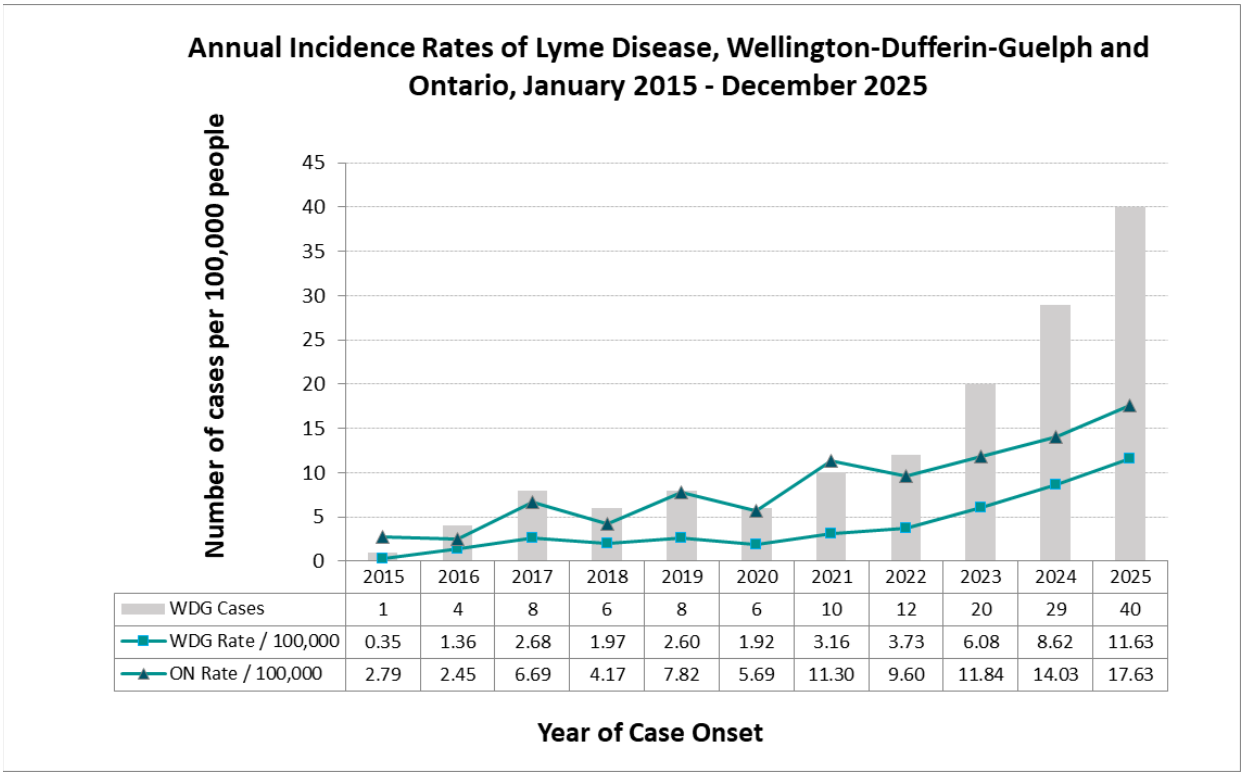
In 2025, the influenza incidence rate in WDG reached 241.58 per 100,000, the highest level recorded in the ten-year surveillance period. This resurgence highlights the continued impacts of the pandemic on immunity and viral epidemiology. One contributing factor appears to be the presence of a new circulating influenza strain (since August 2025, there has been a rapid increase of A (H3N2) J.2.4.1 alias K subclade viruses detected from several countries based on available genetic sequence data) combined with a mismatched seasonal influenza vaccine, which, while still offering protection against severe outcomes, has been less effective in preventing infection.[9] Additionally, following the pandemic, influenza virus circulation appears to have rebounded more strongly than anticipated, reflecting complex interactions between population immunity, viral evolution and interaction, and seasonal transmission dynamics.

Lyme Disease

Lyme disease is a tick-borne bacterial infection caused by *Borrelia burgdorferi*, transmitted via blacklegged ticks. Symptoms can progress from erythema migrans rash and fever to neurologic and cardiac complications if untreated.[10]

Lyme disease has shown a steady and sustained increase in WDG over the 2015–2025 period, rising from a single reported case in 2015 to 29 cases in 2024 and 40 cases reported so far in 2025 (Figure 7).

Figure 7.



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WDG Cases	1	4	8	6	8	6	10	12	20	29	40
WDG Rate / 100,000	0.35	1.36	2.68	1.97	2.60	1.92	3.16	3.73	6.08	8.62	11.63
ON Rate / 100,000	2.79	2.45	6.69	4.17	7.82	5.69	11.30	9.60	11.84	14.03	17.63

This upward trajectory reflects the expanding distribution of blacklegged ticks in southern Ontario, influenced by ecological and climate variables that support tick survival and reproduction.[11] Warmer temperatures, changing precipitation patterns, and shifts in wildlife habitats all contribute to the gradual establishment of Lyme-endemic areas.

Importantly, several 2025 cases reported likely exposure within the WDG region, reflecting an increasing local environmental risk and the advancing geographic spread of infected tick populations. This trend aligns with provincial and national observations and underscores the importance of ongoing environmental surveillance and public education on tick bite prevention.

Trends Among Diseases

Across the diseases examined, several common themes emerge that help contextualize the observed patterns. Post-pandemic immunity gaps appear to continue to be a factor, however not as impactful as the first two years following the pandemic.

Changes in testing availability, laboratory practices, and diagnostic awareness have also influenced case detection, contributing to apparent increases for certain diseases.

Climate change is becoming an increasingly relevant driver of infectious disease risk, particularly for vector-borne diseases such as Lyme disease. Meanwhile, several of the increases observed, notably in measles and iGAS, reflect broader national and global epidemiological shifts, including international outbreaks and pathogen evolution. These trends point to important considerations for local immunization programs, which must adapt to changing levels of susceptibility, vaccine coverage, and provider and public awareness.

Health Equity Implications

The trends outlined in this report have significant implications for public health planning and service delivery. Rising disease incidence, particularly for measles, influenza, and Lyme disease, underscores the importance of robust surveillance systems capable of detecting outbreaks and emerging threats in near real time. Strengthening routine immunization coverage is critical to prevent future outbreaks, particularly considering ongoing global disruptions to vaccination programs. Additionally, increased local risk of vector-borne disease necessitates enhanced environmental monitoring, community education, and collaboration with municipal and provincial partners.

Social factors—such as income, housing, access to health care, transportation, and language or cultural barriers—can make it harder for some community members to get vaccinated, seek early medical care, or protect themselves from infection.[12] These barriers can increase the risk of getting sick and experiencing more serious illness from vaccine-preventable diseases like chickenpox and measles, as well as infections such as influenza and iGAS. People living in crowded or unstable housing, those with chronic health conditions, and individuals who face discrimination or limited access to primary care are often at higher risk of severe outcomes.[13] For Lyme disease, people who work outdoors or who live in rural areas may face greater exposure and have less access to timely assessment.[14] Children also carry a higher risk of exposure as they often play outdoors in grassy and wooded areas, where they may not notice a tick attached to their skin or they may find a tick and not tell an adult.

The patterns observed also highlight the need for ongoing clinician education, particularly regarding early identification of measles and iGAS, appropriate use of testing, and awareness of evolving disease dynamics. Public health preparedness, including outbreak response capacity, communication strategies, and partnerships with community organizations, will remain vital as WDG navigates a changing infectious disease landscape.

Conclusion

Infectious disease trends in the Wellington-Dufferin-Guelph region from 2015 to 2025, reveal significant and evolving patterns that reflect a combination of global epidemiological pressures, post-pandemic immunity shifts, ecological factors, and changing testing practices. Understanding these trends supports evidence-informed decision-making and enables the public health unit to respond proactively to emerging risks. Continued surveillance, strong partnerships, and adaptive programming will be essential to safeguard community health as disease patterns continue to evolve.

Ontario Public Health Standards

Foundational Standards

- ☒ Population Health Assessment
- ☒ Health Equity
- ☐ Effective Public Health Practice
- ☐ Emergency Management

Program Standards

- ☐ Chronic Disease Prevention and Well-Being
- ☐ Food Safety
- ☒ Healthy Environments
- ☐ Healthy Growth and Development
- ☐ Immunization
- ☒ Infectious and Communicable Diseases Prevention and Control
- ☐ Safe Water
- ☐ School Health
- ☐ Substance Use and Injury Prevention

2024-2028 WDGPH Strategic Goals

More details about these strategic goals can be found in WDGPH's 2024-2028 Strategic Plan.

- ☒ Improve health outcomes
- ☐ Focus on children's health
- ☐ Build strong partnerships
- ☐ Innovate our programs and services
- ☒ Lead the way toward a sustainable Public Health system

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