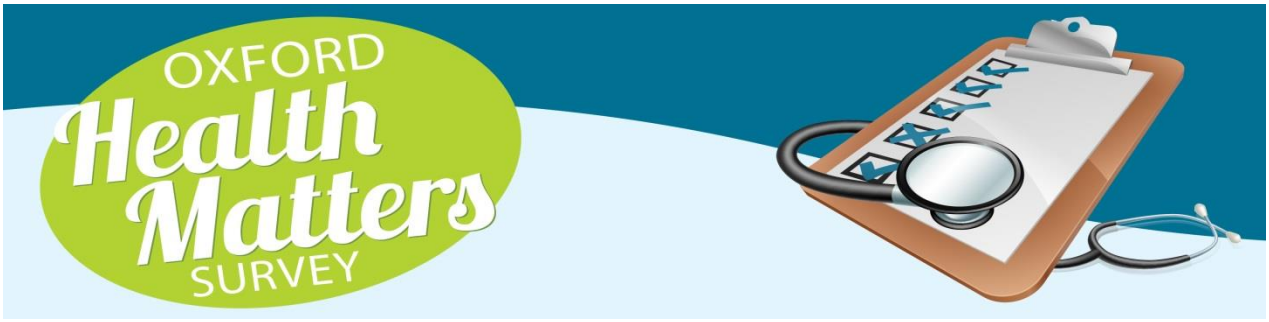


Report 3: Lyme Disease

May 2017

Summary

- The 2016 Oxford Health Matters Survey (OHMS) was conducted for Oxford County Public Health (Public Health) to inform public health program development in new and emerging areas based on the needs and concerns of the community.
- Lyme disease is a preventable infectious disease caused by the bacterium *Borrelia burgdorferi*. It can be transmitted to humans through infected blacklegged tick bites.[1] Residents can prevent tick bites by covering up, using insect repellent containing DEET and checking for ticks after spending time outdoors.[1]
- Most (89.2%) residents were aware of Lyme disease. Residents with high household income ($100,000 or more) were more likely to be aware of Lyme disease than residents with low household income (less than $40,000) (94.4% versus 76.5%).
- Less than two-thirds of residents (62.3%) were aware that Lyme disease is transmitted to people via ticks. Some sub-groups of residents were more aware of this than others. This included residents aged 35 to 64 years, residents with high household income and residents with post-secondary education.
- Over two-thirds (70.8%) of residents spent any time outdoors in grassy fields or wooded areas during the past spring or summer.
    - Of these residents, 65.5% took steps to protect themselves from tick bites such as wearing long pants, long sleeves and covering up (53.2%), using insect repellent (28.1%) and wearing closed footwear and socks (18.7%).
    - Of these residents, 58.0% checked themselves for ticks after leaving these areas. Residents aged 35 to 64 years (65.2%) versus those 65 years and older (42.1%) and residents with a high household income (69.2%) versus a low household income (36.0%) were more likely to check themselves for ticks.

Background

Lyme disease is an infectious disease caused by the bacterium *Borrelia burgdorferi.* It can be transmitted to people via infected blacklegged ticks (also known as deer ticks), which tend to live in grassy and wooded areas. These ticks become active in the spring and are commonly found around the north shores of Lake Erie (including Turkey Point and Long Point), Lake Ontario and the St. Lawrence River.[1] These areas are locations where there is an increased risk of Lyme disease (i.e., a blacklegged tick was found during three person-hours of drag sampling based on two sampling events from May to October).[2] Oxford County is not considered a risk area; however, it is possible to encounter blacklegged ticks almost anywhere in the province.[3] Climate change may be partially responsible for recent increases in Lyme disease as longer summer seasons increase the spread of ticks.[4]

Symptoms of Lyme disease include headache, fever, muscle and joint aches, fatigue and a skin rash which may look like a target or bull's-eye.[5] If left untreated, Lyme disease can spread to the joints, heart and nervous system. Lyme disease can be prevented by taking protective measures such as walking in the centre of trails, covering up, using insect repellent with DEET, checking for ticks on people and pets, showering after coming indoors and washing or drying clothes with high heat.[5]

One goal of Public Health is to reduce the burden of infectious diseases of public health importance, such as Lyme disease. In order to do this, Oxford County Public Health conducts passive tick surveillance by collecting ticks on behalf of the public and submitting them to the Public Health Ontario Laboratory for tick species identification and testing.[2] This allows Public Health to monitor the local situation. In addition, Oxford County has an information page on their website to raise awareness about ways that the public can protect themselves from Lyme disease.[6] When Lyme disease is diagnosed by a doctor or found during laboratory testing, it must be reported to Public Health. This allows for timely and effective prevention and control of the disease. This report supports efforts underway to reduce the burden of Lyme disease as it focuses on Oxford County's local needs in terms of resident's awareness of and measures taken to prevent Lyme disease.

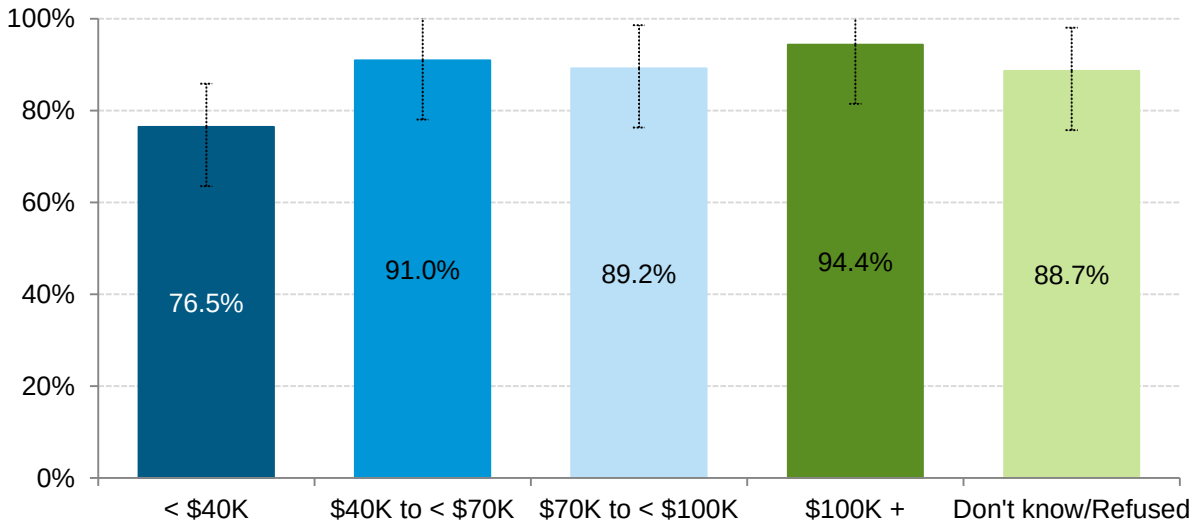
Please see methods in the Data Notes for more information about the survey, sample, and how the numbers are calculated and displayed.

Results

Awareness

The majority of residents (89.2%) were aware of Lyme disease (i.e., they had read, seen or heard about Lyme disease) (Appendix, Table 1). Residents with a household income less than $40,000 were less likely to be aware of Lyme disease (76.5%) than residents with a household income of $100,000 or more (94.4%) (Figure 1; Appendix, Table 3).

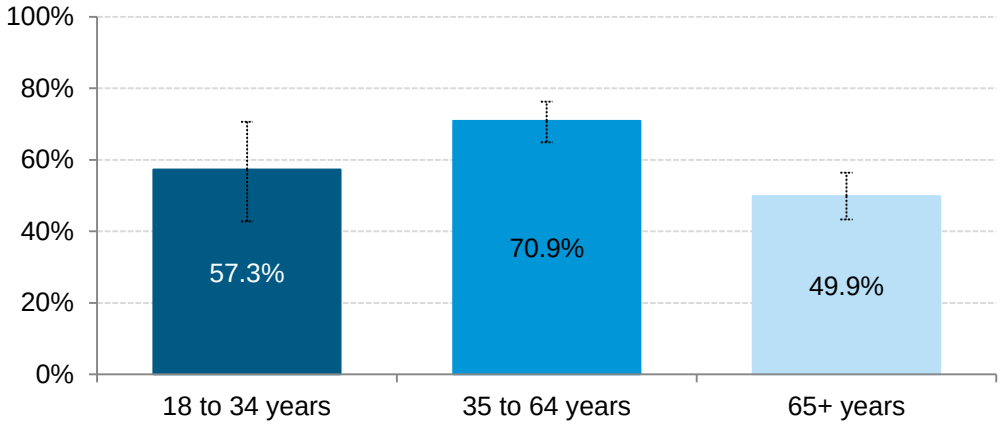
Figure 1. Aware of Lyme disease by household income, Oxford County, 2016



Less than two-thirds of residents (62.3%) were aware that Lyme disease is transmitted to people via ticks. Some residents (10.7%) thought that Lyme disease was transmitted by mosquitoes, insects, bugs or bug bites. Fewer residents (3.2%) mentioned other ways that they thought Lyme disease was transmitted such as from walking, hiking or hunting in tall grass, bush or wooded areas and from deer.

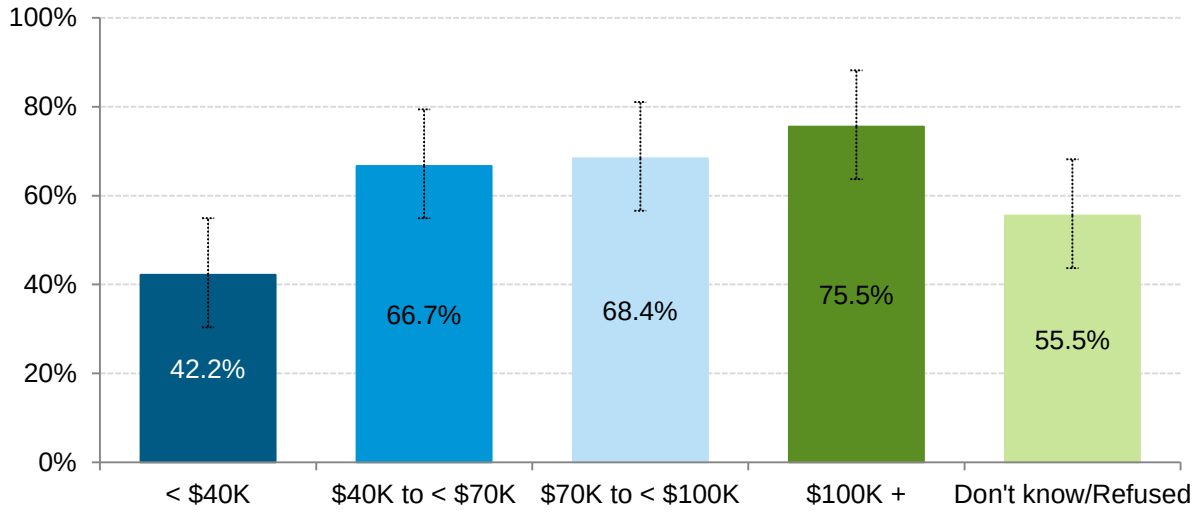
Residents aged 35 to 64 years were more likely than residents aged 65 years and older to be aware that Lyme disease is transmitted via ticks (70.9% versus 49.9%) (Figure 2; Appendix, Table 2).

Figure 2. Awareness of how Lyme disease is transmitted by age group, Oxford County, 2016



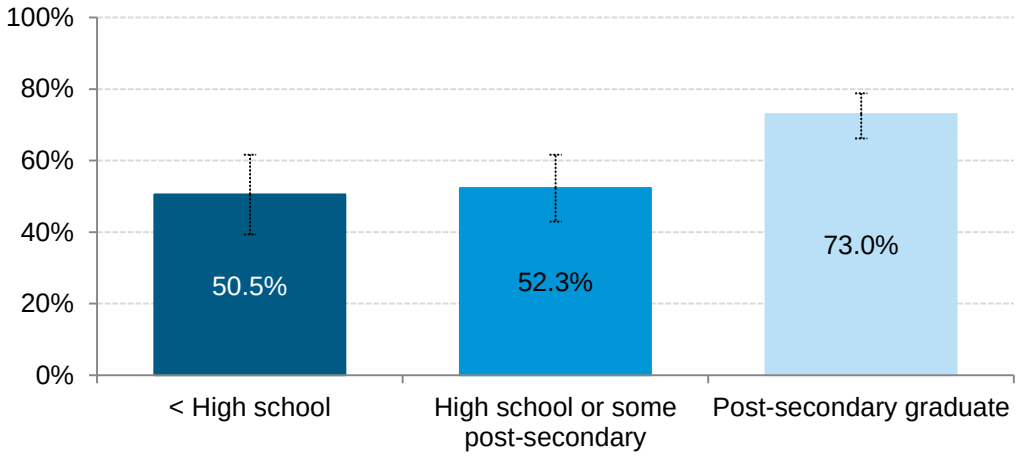
Residents with a household income less than $40,000 were less likely to be aware that Lyme disease is transmitted via ticks (42.2%) than residents with a household income of $40,000 to less than $70,000 (66.7%) and residents with a household income of $100,000 or more (75.5%) (Figure 3; Appendix, Table 3).

Figure 3. Awareness of how Lyme disease is transmitted by household income, Oxford County, 2016



Residents with post-secondary education were more likely to be aware that Lyme disease is transmitted via ticks than residents with high school or some post-secondary education (73.0% versus 52.3%) and residents with less than high school education (50.5%) (Figure 4; Appendix, Table 4).

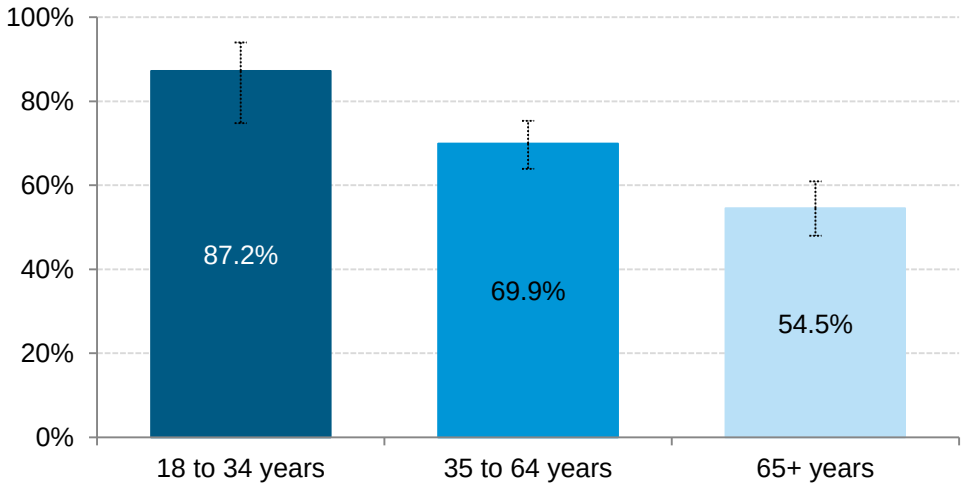
Figure 4. Awareness of how Lyme disease is transmitted by education level, Oxford County, 2016



Personal Protection

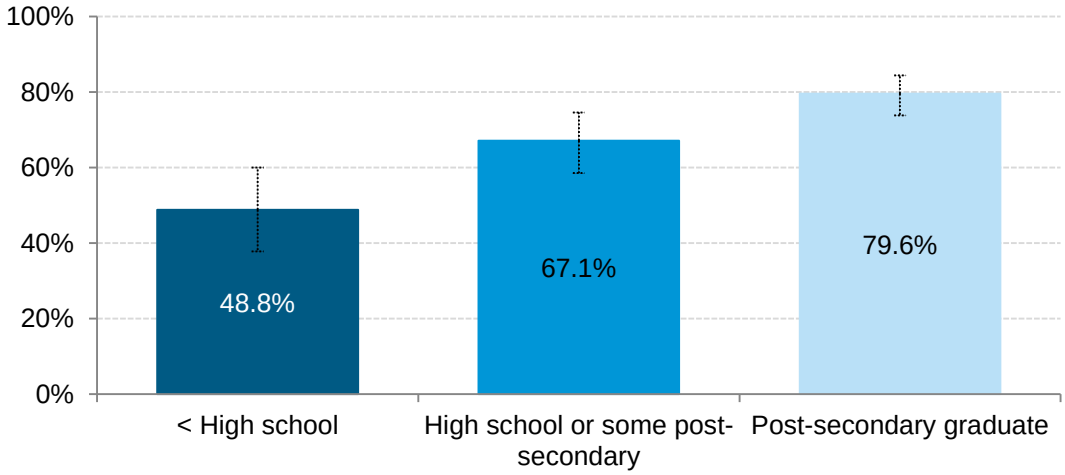
Over two-thirds of residents (70.8%) spent any time outdoors in grassy fields or wooded areas during the past spring or summer (Appendix, Table 1). Some sub-groups of residents were more likely to spend time outdoors in grassy fields or wooded areas. Residents aged 18 to 34 years (87.2%) and residents aged 35 to 64 years (69.9%) were more likely to spend time outdoors in grassy fields or wooded areas than residents aged 65 years and older (54.5%) (Figure 5; Appendix, Table 2).

Figure 5. Spent any time outdoors in grassy fields or wooded areas by age group, Oxford County, 2016



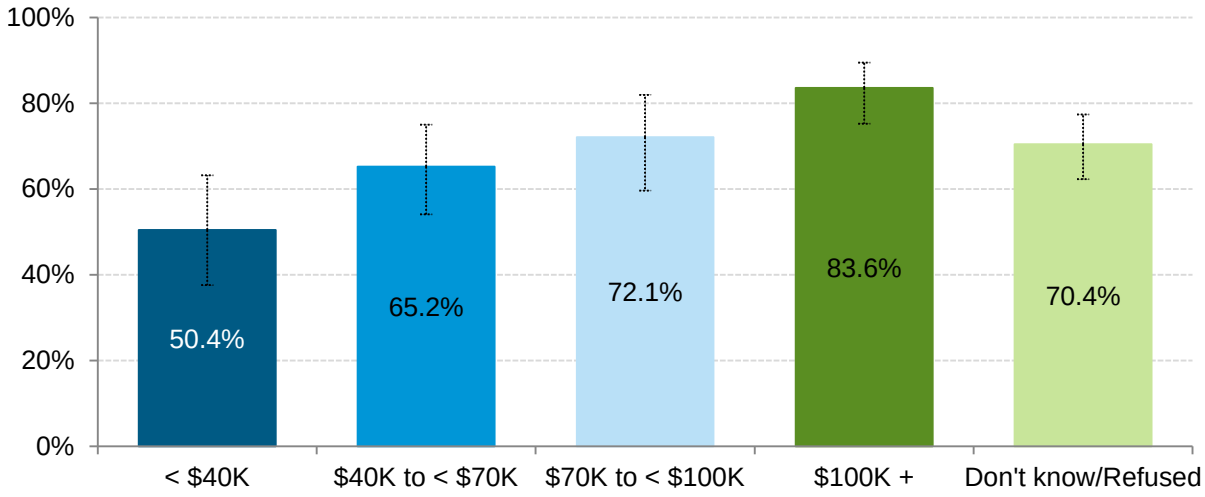
Residents with a post-secondary degree were more likely to spend time outdoors in grassy fields or wooded areas than residents with less than high school education (79.6% versus 48.8%) (Figure 6; Appendix, Table 4).

Figure 6. Spent any time outdoors in grassy fields or wooded areas by education level, Oxford County, 2016



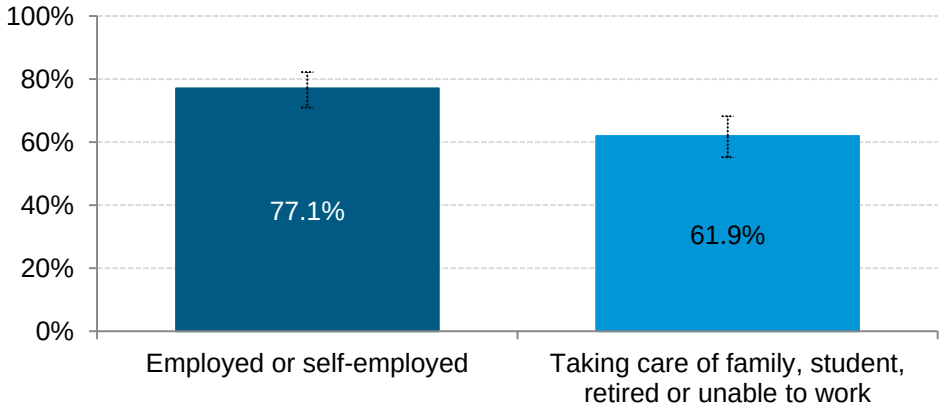
Residents with a household income of $100,000 or more were more likely to spend time outdoors in grassy fields or wooded areas than residents with a household income of less than $40,000 (83.6% versus 50.4%) (Figure 7; Appendix, Table 3).

Figure 7. Spent any time outdoors in grassy fields or wooded areas by household income, Oxford County, 2016



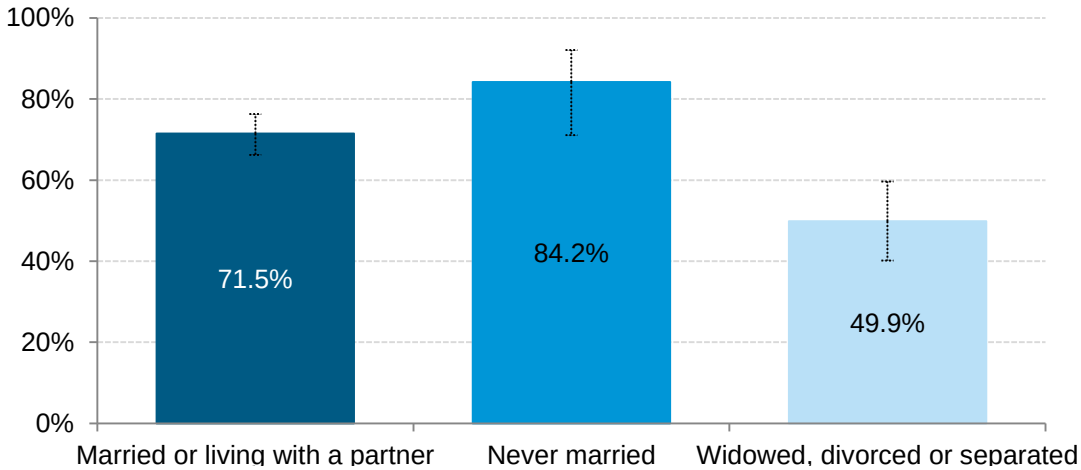
Residents who were employed or self-employed were more likely to spend time outdoors in grassy fields or wooded areas than residents who were taking care of family, students, retired or unable to work (77.1% versus 61.9%) (Figure 8; Appendix, Table 5).

Figure 8. Spent any time outdoors in grassy fields or wooded areas by employment status, Oxford County, 2016



Residents who were married or living with a partner (71.5%) and residents who were never married (84.2%) were more likely to spend time outdoors in grassy fields or wooded areas than residents who were widowed, divorced or separated (49.9%) (Figure 9; Appendix, Table 7).

Figure 9. Spent any time outdoors in grassy fields or wooded areas by marital status, Oxford County, 2016

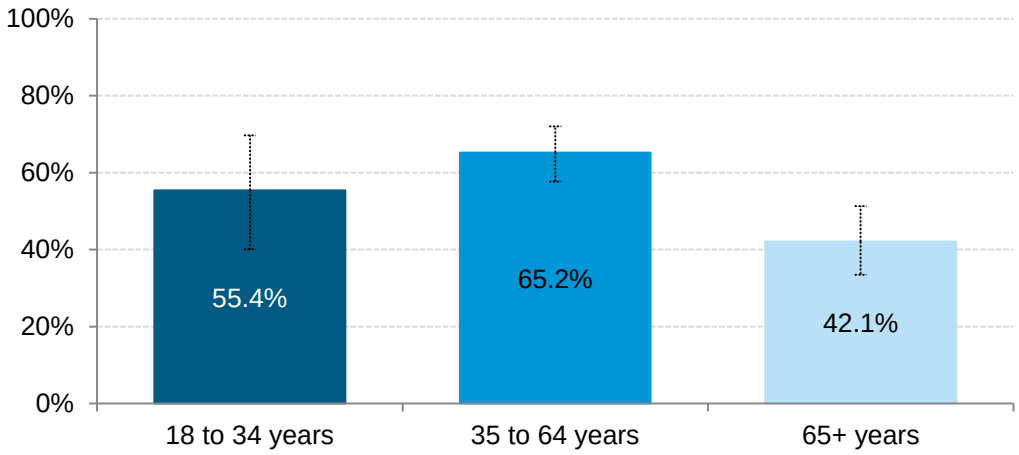


Of residents who spent any time outdoors in grassy fields or wooded areas during the past spring or summer, 65.5% took steps to protect themselves from tick bites. Specifically, 16.3% did every time, 22.0% did most of the time, 14.6% did some of the time and 12.7% rarely did (Appendix, Table 8). These steps included wearing long pants, long sleeves and covering up (53.2%), using insect repellent (DEET not mentioned; 28.1%), wearing closed footwear and socks (18.7%), tucking in or taping pants (9.2%) and using insect repellent containing DEET (6.9%) (Appendix, Table 8). About one-fifth (19.7%) of residents reported that they took other measures to protect themselves, such as checking for ticks after spending time outside, avoiding grassy and wooded areas and staying on paths.

Residents were also specifically asked if they checked themselves for ticks after leaving grassy fields or wooded areas. Over half of residents (58.0%) checked themselves for ticks. In particular, 15.3% checked every time, 16.8% checked most of the time, 13.4% checked some of the time and 12.6% rarely checked (Appendix, Table 8).

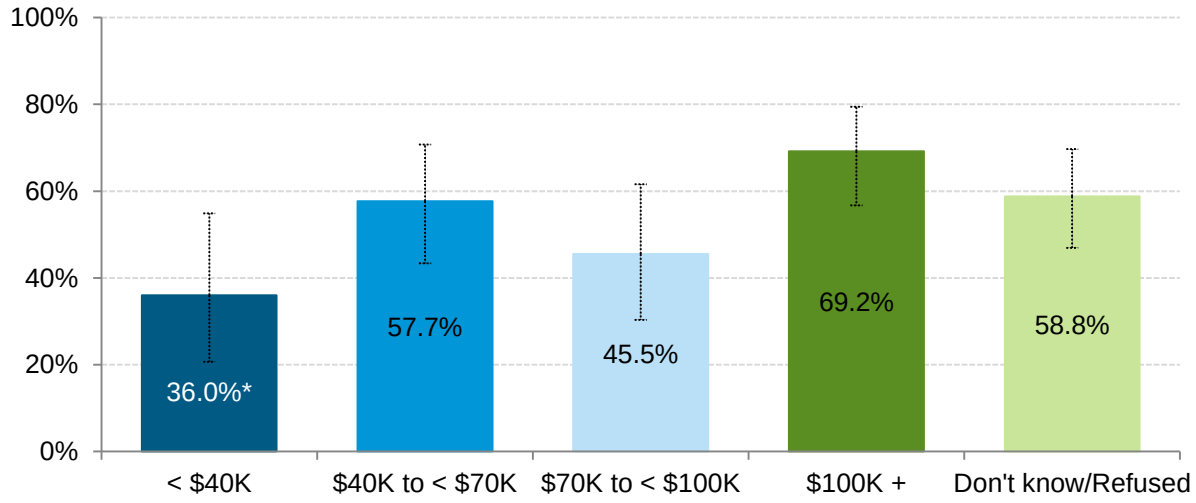
Residents aged 35 to 64 years were more likely to check for ticks than residents aged 65 years and older (65.2% versus 42.1%) (Figure 10; Appendix, Table 2).

Figure 10. Checked for ticks after leaving grassy fields or wooded areas by age, Oxford County, 2016



Residents with a household income of $100,000 or more were more likely to check for ticks than residents with a household income of less than $40,000 (69.2% versus 36.0%) (Figure 11; Appendix, Table 3).

Figure 11. Checked for ticks after leaving grassy fields or wooded areas by household income, Oxford County, 2016



* High variability results, interpret with caution.

Considerations

Although the majority of Oxford County residents (89.2%) had read, seen or heard about Lyme disease, under two-thirds (62.3%) of these residents were aware that Lyme disease is transmitted to people via ticks and some sub-groups had even lower levels of awareness. Oxford County residents in general may benefit from additional public education about Lyme disease and there were some sub-groups of residents may be particularly important to reach. This includes older adults, residents with lower household income and residents with lower education levels. Oxford County residents may also benefit from initiatives that promote using protective measures when spending time outdoors in grassy fields or wooded areas. Some protective measures such as using insect repellent containing DEET and wearing closed footwear and socks were reportably used by less than one-third of residents spending time outdoors in these settings.

Appendix: Tables

Table 1. Lyme disease awareness and personal protection, by sex, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)		
		Overall	Male	Female
Aware of Lyme disease	Yes	89.2% (85.8%-91.9%)	88.4% (82.8%-92.4%)	89.9% (85.4%-93.2%)
	No	10.8% (8.1%-14.2%)	11.6%* (7.6%-17.2%)	10.1%* (6.8%-14.6%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.3% (57.2%-67.3%)	59.0% (50.6%-66.9%)	65.6% (59.6%-71.1%)
	No	29.2% (24.8%-34.0%)	29.1% (22.3%-37.1%)	29.3% (24.1%-35.1%)
	Don't know/Refused	8.5%* (5.6%-12.5%)	11.9%* (6.9%-19.7%)	5.1%* (3.1%-8.3%)
Spent any time outdoors in grassy fields or wooded areas	Yes	70.8% (66.4%-74.9%)	77.1% (70.2%-82.8%)	64.7% (58.9%-70.2%)
	No	29.2% (25.1%-33.6%)	22.9% (17.2%-29.8%)	35.3% (29.8%-41.1%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.5% (59.0%-71.5%)	62.2% (52.3%-71.2%)	69.5% (61.4%-76.5%)
	No	34.5% (28.5%-41.0%)	37.8% (28.8%-47.7%)	30.5% (23.5%-38.6%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.0% (51.5%-64.3%)	53.5% (43.8%-62.9%)	63.4% (55.2%-70.8%)
	No	42.0% (35.7%-48.5%)	46.5% (37.1%-56.2%)	36.6% (29.2%-44.8%)

* High variability results, interpret with caution.

Table 2. Lyme disease awareness and personal protection, by age group, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)			
		Overall	18 to 34 years	35 to 64 years	65 years and older
Aware of Lyme disease	Yes	89.2% (85.8%-91.9%)	91.3% (80.2%-96.5%)	89.6% (85.0%-92.9%)	85.8% (80.5%-89.8%)
	No	10.8% (8.1%-14.2%)	**	10.4%* (7.1%-15.0%)	14.2%* (10.2%-19.5%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.5% (57.3%-67.4%)	57.3% (42.8%-70.6%)	70.9%‡ (64.9%-76.3%)	49.9%‡ (43.3%-56.4%)
	No	29.2% (24.8%-34.0%)	27.9%* (17.0%-42.4%)	24.2%‡ (19.2%-30.0%)	41.7%‡ (35.4%-48.3%)
	Don't know/Refused	8.3%* (5.5%-12.5%)	**	4.9%* (2.8%-8.5%)	8.4%* (5.4%-12.9%)
Spent any time outdoors in grassy fields or wooded areas	Yes	71.0% (66.5%-75.1%)	87.2%‡ (74.8%-94.0%)	69.9%† (63.9%-75.3%)	54.5%‡† (48.0%-60.9%)
	No	29.0% (24.9%-33.5%)	**	30.1%‡ (24.7%-36.1%)	45.5%‡ (39.1%-52.0%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.4% (58.8%-71.4%)	59.4% (43.8%-73.4%)	71.0% (63.6%-77.4%)	60.5% (51.4%-68.9%)
	No	34.6% (28.6%-41.2%)	40.6%* (26.6%-56.2%)	29.0% (22.6%-36.4%)	39.5% (31.1%-48.6%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.0% (51.4%-64.2%)	55.4% (40.1%-69.7%)	65.2%‡ (57.6%-72.0%)	42.1%‡ (33.4%-51.3%)
	No	42.0% (35.8%-48.6%)	44.6% (30.3%-59.9%)	34.8%‡ (28.0%-42.4%)	57.9%‡ (48.7%-66.6%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.
‡, † Statistically significant difference between groups based on a 95% confidence interval.

Table 3. Lyme disease awareness and personal protection, by household income, Oxford County, 2016 (continued on next page)

Indicator	Responses	Per cent of residents (95% CI)					
		Overall	**<$40K**	**$40K to < $70K**	**$70K to < $100K**	**$100K +**	**Don't know/ Refused**
Aware of Lyme disease	Yes	89.2% (85.8%-91.9%)	76.5%‡ (63.6%-85.9%)	91.0% (81.7%-95.9%)	89.2% (76.1%-95.6%)	94.4%‡ (88.3%-97.4%)	88.7% (82.2%-93.1%)
	No	10.8% (8.1%-14.2%)	23.5%* (14.1%-36.4%)	**	**	**	11.3%* (6.9%-17.8%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.3% (57.2%-67.3%)	42.2%‡† (30.4%-54.9%)	66.7%† (55.8%-76.0%)	68.4% (54.8%-79.4%)	75.5%‡ (63.1%-84.8%)	55.5% (46.3%-64.3%)
	No	29.2% (24.8%-34.0%)	48.0%‡ (35.2%-61.1%)	27.4%* (18.8%-38.1%)	27.3%* (17.0%-40.9%)	17.6%*‡ (10.2%-28.6%)	32.8% (25.1%-41.6%)
	Don't know/ Refused	8.5%* (5.6%-12.5%)	**	**	**	**	11.7%* (6.4%-20.6%)
Spent any time outdoors in grassy fields or wooded areas	Yes	70.8% (66.4%-74.9%)	50.4%‡ (37.6%-63.2%)	65.2% (54.1%-75.0%)	72.1% (59.6%-81.9%)	83.6%‡ (75.2%-89.5%)	70.4% (62.3%-77.4%)
	No	29.2% (25.1%-33.6%)	49.6%‡ (36.8%-62.4%)	34.8% (25.0%-45.9%)	27.9%* (18.1%-40.4%)	16.4%*‡ (10.5%-24.8%)	29.6% (22.6%-37.7%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.5% (59.0%-71.5%)	63.2% (44.2%-78.8%)	66.4% (51.7%-78.5%)	59.6% (42.2%-74.9%)	68.3% (54.6%-79.5%)	65.7% (54.0%-75.7%)
	No	34.5% (28.5%-41.0%)	36.8%* (21.2%-55.8%)	33.6%* (21.5%-48.3%)	40.4%* (25.1%-57.8%)	31.7%* (20.5%-45.4%)	34.3% (24.3%-46.0%)

Indicator	Responses	Per cent of residents (95% CI)					
		Overall	**<$40K**	**$40K to < $70K**	**$70K to < $100K**	**$100K +**	**Don't know/ Refused**
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.0% (51.5%-64.3%)	36.0%*‡ (20.7%-54.9%)	57.7% (43.4%-70.7%)	45.5%* (30.3%-61.6%)	69.2%‡ (56.7%-79.4%)	58.8% (46.9%-69.7%)
	No	42.0% (35.7%-48.5%)	64.0%‡ (45.1%-79.3%)	42.3%* (29.3%-56.6%)	54.5% (38.4%-69.7%)	30.8%*‡ (20.6%-43.3%)	41.2% (30.3%-53.1%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.
‡, † Statistically significant difference between groups based on a 95% confidence interval.

Table 4. Lyme disease awareness and personal protection, by education level, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)			
		Overall	< High school	High school or some post-secondary	Post-secondary graduate
Aware of Lyme disease	Yes	89.7% (86.3%-92.3%)	82.7% (72.9%-89.5%)	89.0% (82.3%-93.4%)	91.9% (87.2%-95.0%)
	No	10.3% (7.7%-13.7%)	17.3%* (10.5%-27.1%)	11.0%* (6.6%-17.7%)	8.1%* (5.0%-12.8%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.6% (57.4%-67.5%)	50.5%‡ (39.4%-61.6%)	52.3%† (42.9%-61.6%)	73.0%‡† (66.2%-78.8%)
	No	28.9% (24.5%-33.7%)	40.2%‡ (30.0%-51.4%)	36.6%† (28.0%-46.1%)	20.5%‡† (15.6%-26.5%)
	Don't know/Refused	8.5%* (5.7%-12.6%)	**	11.1%* (5.8%-20.3%)	6.5%* (3.4%-12.3%)
Spent any time outdoors in grassy fields or wooded areas	Yes	71.1% (66.6%-75.2%)	48.8%‡ (37.8%-60.0%)	67.1% (58.6%-74.6%)	79.6%‡ (73.8%-84.4%)
	No	28.9% (24.8%-33.4%)	51.2%‡ (40.0%-62.2%)	32.9% (25.4%-41.4%)	20.4%‡ (15.6%-26.2%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.9% (59.3%-71.9%)	58.5% (41.3%-73.7%)	64.2% (51.6%-75.0%)	68.0% (59.5%-75.4%)
	No	34.1% (28.1%-40.7%)	41.5%* (26.3%-58.7%)	35.8%* (25.0%-48.4%)	32.0% (24.6%-40.5%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.4% (51.8%-64.6%)	49.9%* (33.3%-66.5%)	59.4% (46.9%-70.8%)	59.1% (50.7%-66.9%)
	No	41.6% (35.4%-48.2%)	50.1%* (33.5%-66.7%)	40.6% (29.2%-53.1%)	40.9% (33.1%-49.3%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.
‡, † Statistically significant difference between groups based on a 95% confidence interval.

Table 5. Lyme disease awareness and personal protection, by employment status, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)		
		Overall	Employed or self-employed	Taking care of family, student, retired or unable to work
Aware of Lyme disease	Yes	89.1% (85.7%-91.8%)	92.5% (87.9%-95.5%)	83.7% (77.8%-88.4%)
	No	10.9% (8.2%-14.3%)	7.5%* (4.5%-12.1%)	16.3% (11.6%-22.2%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.3% (57.1%-67.3%)	64.5% (56.8%-71.4%)	59.3% (52.4%-65.9%)
	No	29.1% (24.7%-34.0%)	25.1% (19.2%-32.1%)	34.2% (28.1%-40.9%)
	Don't know/Refused	8.5%* (5.6%-12.6%)	10.5%* (6.0%-17.5%)	6.4%* (4.1%-9.9%)
Spent any time outdoors in grassy fields or wooded areas	Yes	70.8% (66.3%-74.9%)	77.1%‡ (71.0%-82.2%)	61.9%‡ (55.2%-68.2%)
	No	29.2% (25.1%-33.7%)	22.9%‡ (17.8%-29.0%)	38.1%‡ (31.8%-44.8%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.5% (58.9%-71.5%)	65.2% (56.2%-73.2%)	69.2% (60.1%-77.0%)
	No	34.5% (28.5%-41.1%)	34.8% (26.8%-43.8%)	30.8% (23.0%-39.9%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.0% (51.5%-64.3%)	60.0% (51.1%-68.2%)	57.1% (47.3%-66.4%)
	No	42.0% (35.7%-48.5%)	40.0% (31.8%-48.9%)	42.9% (33.6%-52.7%)

* High variability results, interpret with caution.
‡ Statistically significant difference between groups based on a 95% confidence interval.

Table 6. Lyme disease awareness and personal protection, by rural or urban residence, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)		
		Overall	Rural	Urban
Aware of Lyme disease	Yes	89.2% (85.8%-91.9%)	89.7% (83.6%-93.7%)	88.9% (84.5%-92.2%)
	No	10.8% (8.1%-14.2%)	10.3%* (6.3%-16.4%)	11.1%* (7.8%-15.5%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.3% (57.2%-67.3%)	69.4% (59.9%-77.5%)	58.7% (52.5%-64.6%)
	No	29.2% (24.8%-34.0%)	23.0% (16.5%-31.1%)	32.4% (26.9%-38.5%)
	Don't know/Refused	8.5%* (5.6%-12.5%)	**	8.9%* (5.8%-13.5%)
Spent any time outdoors in grassy fields or wooded areas	Yes	70.8% (66.4%-74.9%)	78.1% (70.7%-84.0%)	67.0% (61.4%-72.2%)
	No	29.2% (25.1%-33.6%)	21.9% (16.0%-29.3%)	33.0% (27.8%-38.6%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.5% (59.0%-71.5%)	64.1% (52.6%-74.2%)	66.4% (58.5%-73.5%)
	No	34.5% (28.5%-41.0%)	35.9% (25.8%-47.4%)	33.6% (26.5%-41.5%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.0% (51.5%-64.3%)	59.8% (48.4%-70.3%)	57.0% (49.1%-64.5%)
	No	42.0% (35.7%-48.5%)	40.2% (29.7%-51.6%)	43.0% (35.5%-50.9%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.

Table 7. Lyme disease awareness and personal protection, by marital status, Oxford County, 2016

Indicator	Responses	Per cent of residents (95% CI)			
		Overall	Married or living with a partner	Never married	Widowed, divorced or separated
Aware of Lyme disease	Yes	89.4% (86.0%-92.0%)	89.9% (85.7%-92.9%)	93.8% (81.6%-98.1%)	81.5% (72.4%-88.1%)
	No	10.6% (8.0%-14.0%)	10.1%* (7.1%-14.3%)	**	18.5%* (11.9%-27.6%)
Aware that Lyme disease is transmitted to people via ticks	Yes	62.4% (57.2%-67.3%)	70.3%‡ (64.6%-75.5%)	53.0% (37.9%-67.6%)	42.1%‡ (32.8%-52.1%)
	No	29.1% (24.7%-33.9%)	24.5%‡ (19.8%-29.9%)	29.4%* (17.5%-45.0%)	47.6%‡ (38.0%-57.5%)
	Don't know/Refused	8.5%* (5.6%-12.6%)	5.2%* (2.9%-9.0%)	**	10.2%* (5.8%-17.4%)
Spent any time outdoors in grassy fields or wooded areas	Yes	70.8% (66.3%-74.9%)	71.5%‡ (66.2%-76.3%)	84.2%† (71.1%-92.1%)	49.9%‡† (40.2%-59.7%)
	No	29.2% (25.1%-33.7%)	28.5%‡ (23.7%-33.8%)	15.8%*† (7.9%-28.9%)	50.1%‡† (40.3%-59.8%)
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Yes	65.9% (59.3%-71.9%)	66.0% (58.4%-72.9%)	69.0% (51.7%-82.2%)	58.3% (43.3%-71.9%)
	No	34.1% (28.1%-40.7%)	34.0% (27.1%-41.6%)	31.0%* (17.8%-48.3%)	41.7%* (28.1%-56.7%)
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Yes	58.4% (51.8%-64.6%)	58.3% (50.9%-65.5%)	63.7% (46.5%-78.0%)	46.4% (32.6%-60.8%)
	No	41.6% (35.4%-48.2%)	41.7% (34.5%-49.1%)	36.3%* (22.0%-53.5%)	53.6% (39.2%-67.4%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.
‡, † Statistically significant difference between groups based on a 95% confidence interval.

Table 8. Lyme disease personal protection, by frequency, Oxford County, 2016 (continued on next page)

Indicator	Responses	Per cent of residents (95% CI)
		Overall
Took steps to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Every time	16.3% (12.2%-21.4%)
	Most of the time	22.0% (17.2%-27.6%)
	Some of the time	14.6% (11.0%-19.2%)
	Rarely	12.7%* (8.6%-18.2%)
	Never	34.5% (28.5%-41.0%)
Measures taken to protect self from tick bites (only asked of those who spent any time outdoors, n=346)	Wearing long pants, long sleeves or covering up	53.2% (45.3%-60.9%)
	Insect repellent (DEET not mentioned)	28.1% (21.6%-35.6%)
	Wearing closed footwear or socks	18.7%* (13.3%-25.7%)
	Tucking in pants/taping pants	9.2%* (5.7%-14.7%)
	Insect repellent containing DEET	6.9%* (4.1%-11.3%)
	Other	19.7%* (13.9%-27.1%)

Indicator	Responses	Per cent of residents (95% CI)
		Overall
Checked self for ticks after leaving grassy fields or wooded areas (only asked of those who spent any time outdoors, n=346)	Every time	15.3% (11.4%-20.3%)
	Most of the time	16.8% (12.6%-22.0%)
	Some of the time	13.4% (9.7%-18.1%)
	Rarely	12.6%* (8.6%-18.1%)
	Never	42.0% (35.7%-48.5%)

* High variability results, interpret with caution. ** Extremely high variability results, data suppressed.

Data Notes

Definitions

Rural versus Urban Comparisons: Results are presented for Oxford County as a whole, and where possible, reported by whether the resident lives in a 'rural' or 'urban' area within the County. Although there are a mixture of rural and (sub)urban areas even within the municipalities, for the purposes of this report, they were subdivided as follows:

1. **Rural**: Zorra, East Zorra-Tavistock, Blandford-Blenheim, Norwich and South-West Oxford.
2. **Urban**: Woodstock, Ingersoll and Tillsonburg.

Methods

The 2016 Oxford Health Matters Survey (OHMS) was conducted for Oxford County Public Health by the Institute for Social Research (ISR) at York University. The purpose of the survey was to collect data to help shape public health programs in new and emerging areas based on the needs and concerns of the community. The survey interviewed by telephone a total of 550 randomly selected households from September to December 2016 with Oxford County residents aged 18 years or older. This resulted in an overall response rate of 44%, which is comparable to other recent Canadian health surveys. If the household included a person aged 18-30 years old, they were selected to answer the survey to increase the number of young people in the sample, as they are typically harder to reach with this type of survey. Otherwise, the person with the first birthday in the household was asked to complete the survey. The number of responses for various questions may not total 550 due to survey skip patterns and differing amounts of non-response to each question. Responses to questions relevant to individuals are weighted by age and sex to adjust for fewer males and younger individuals completing the survey. This weighting allows the sample to more closely represent the population of Oxford County.

The interviewer was instructed not to read a list of potential responses to the questions "Can you tell me how people get Lyme disease?" and "What did you do to protect yourself from tick bites?". Responses were grouped based on the most appropriate pre-existing categories (could select more than one). For example, in the second question, residents may have mentioned

wearing long pants, long sleeves or covering up as well as using insect repellent. It is possible that residents may have responded differently with a set of options to choose from (e.g., may have mentioned using insect repellent but not DEET specifically).

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.[7] 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. In graphs, the 95% CI is shown by an error bar. Error bars and CIs that don't overlap show statistically significant differences between groups (e.g., when comparing males and females). Statistically significant results indicate the finding is unlikely to be due to chance alone.

Variability

Throughout the report, some numbers may be suppressed because they are unstable due to high variability, as measured by the coefficient of variation (CV). The CV indicates how precise an estimate is. Higher CVs indicate more variability, which often occurs when there is a small sample size. When the CV is between 16.6 and 33.3, the estimate should be interpeted with caution because of high variability. In tables, this is shown with an asterisk (*). Estimates with a CV of 33.3 or more are not reportable and the estimates are replaced with double asterisks (**). Estimates may also not be reportable if they are based on an unweighted denominator of less than 30 or a numerator of less than 5.

Missing Responses

"Don't know" and "Refused" responses are usually removed from the analysis, unless they account for over 5% of the responses. Then they are included as a separate category. Responses are self-reported and may be subject to recall bias (trouble remembering) and social desirability bias (answering in the "expected" or socially acceptable way).

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