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The Inequitable Burden of COVID-19 Exposure at Work:

The Occupational Exposure to COVID-19 Risk Tool

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Public Health Ontario Grand Rounds

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The Occupational Risk of COVID-19 Tool research team includes:

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Presentation Objectives

- Describe work characteristics in relation to risk of exposure to COVID-19 at work
- Explain how differences in occupational risk of exposure to COVID-19 can intersect with equity stratifiers to create inequitable risk
- Identify key components of the Occupational Exposure to COVID-19 Risk Tool data visualizations
- Discuss how the Occupational Exposure to COVID-19 Risk Tool could be used help to inform policy development at local, provincial and national levels in Canada

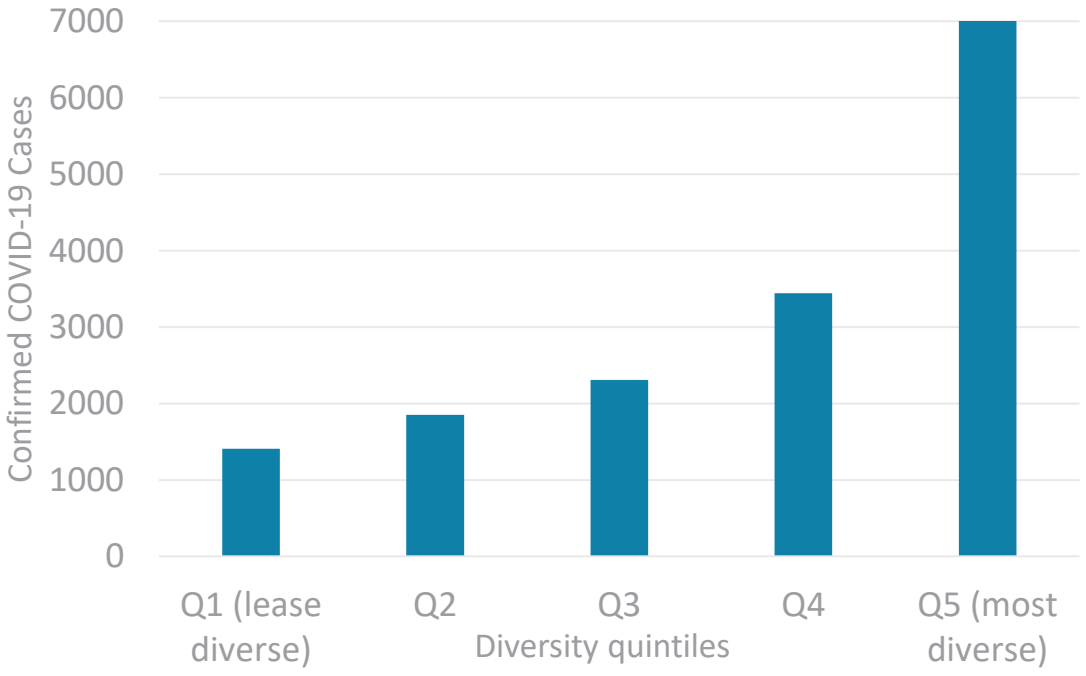
Source: Devlin H, 2020;[1] Evelyn K, 2020;[2] Reyes C, Husain N, Gutowski C, St. Claire S, Pratt G, 2020;[3] Shah K, 2020;[4] Thebault R, Tran AB, Williams V, 2020[5]

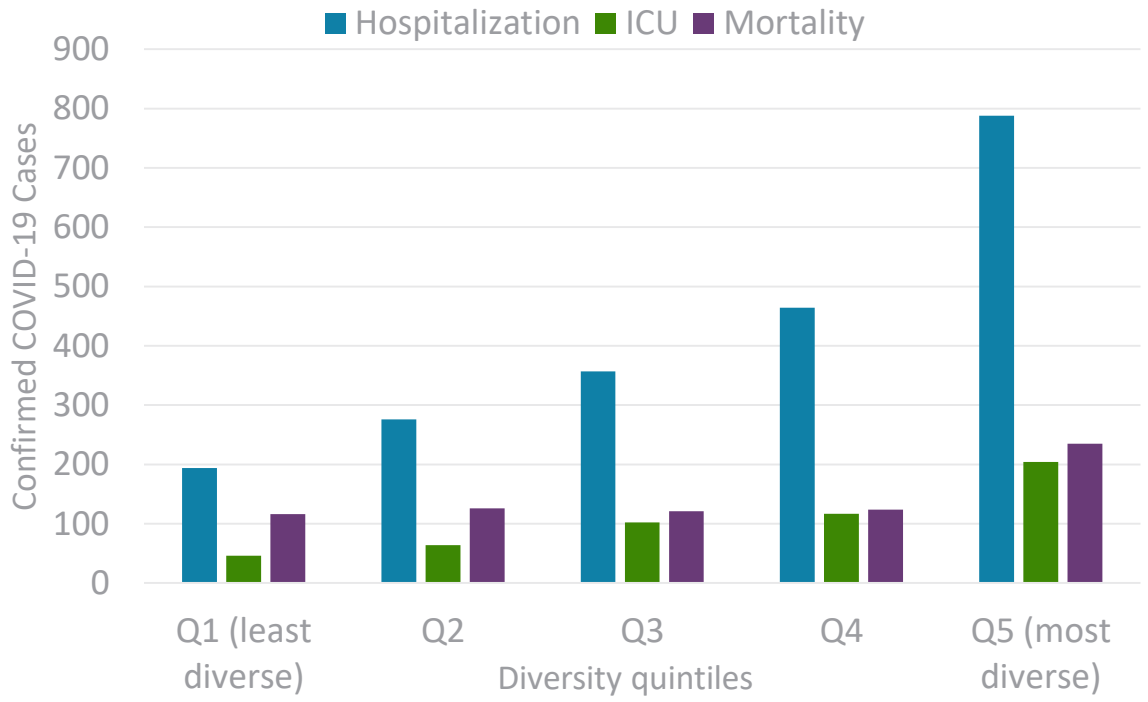
Estimating Social Inequities in COVID-19 Outcomes

- Early in the pandemic, challenges to assessing the impact of COVID-19 across social determinants of health:
  1. COVID-19 risk factors focused on clinical conditions with no SDOH data
  2. Limitations to COVID-19 surveillance data
     - Important equity stratifiers for measuring inequities not routinely collected
     - Limited data on potential mechanisms driving inequities (e.g., occupations)
- June 15, the Ontario Government expanded data collection on race, income, language and household size for each positive COVID-19 test[6]
  - In response to requests by community leaders and public health experts

Neighbourhood-level Diversity and COVID-19 in Ontario

COVID-19 cases and outcomes for each Diversity Quintile: January 15 to May 14, 2020[7]

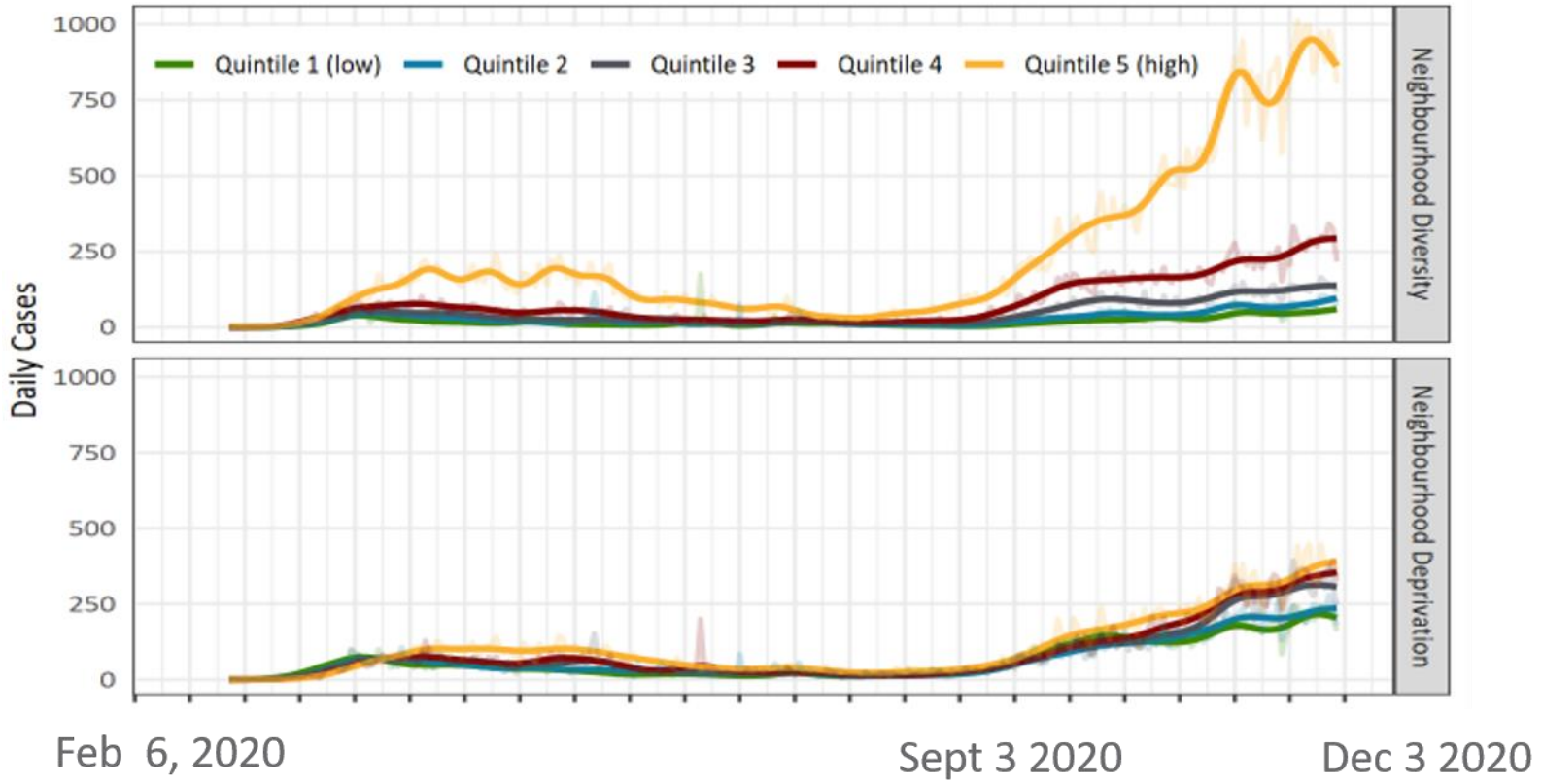




Source: CCM plus; Matheson FI, van Ingen T. 2016 Ontario marginalization index. Toronto, ON: St. Michael's Hospital; 2018. Joint publication with Public Health Ontario. Excludes COVID-19 cases reported in Ontario who reside in long term care.

Neighbourhood Diversity and Deprivation and COVID-19 in Ontario

Epidemic curve of COVID-19 cases: February 6 to December 3, 2020[8]

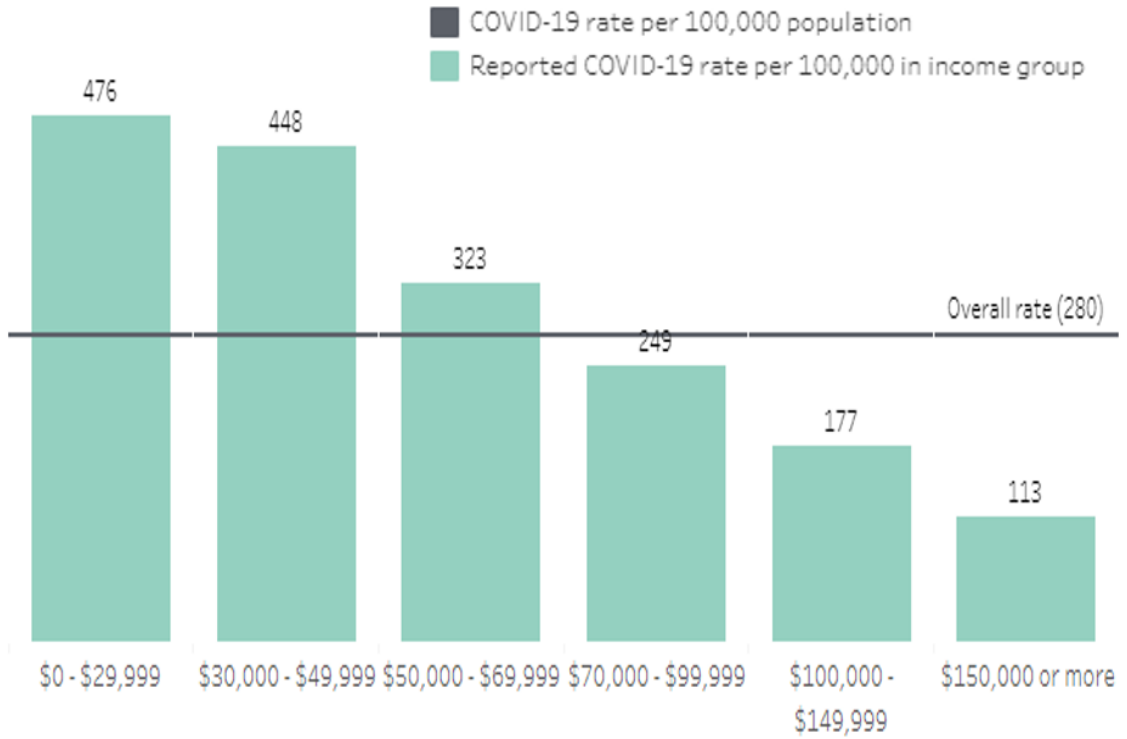


Source: CCM plus; Matheson FI, van Ingen T. 2016 Ontario marginalization index. Toronto, ON: St. Michael's Hospital; 2018. Joint publication with Public Health Ontario. Excludes COVID-19 cases reported in Ontario who reside in long term care.

Race/Ethnicity and Household Income and COVID-19 in Toronto

COVID 19 Rates per 100,000 by Household Income and Ethno-Racial Groups: May 20 to October 31, 2020[9]

Ethno-racial group (n=13,291)

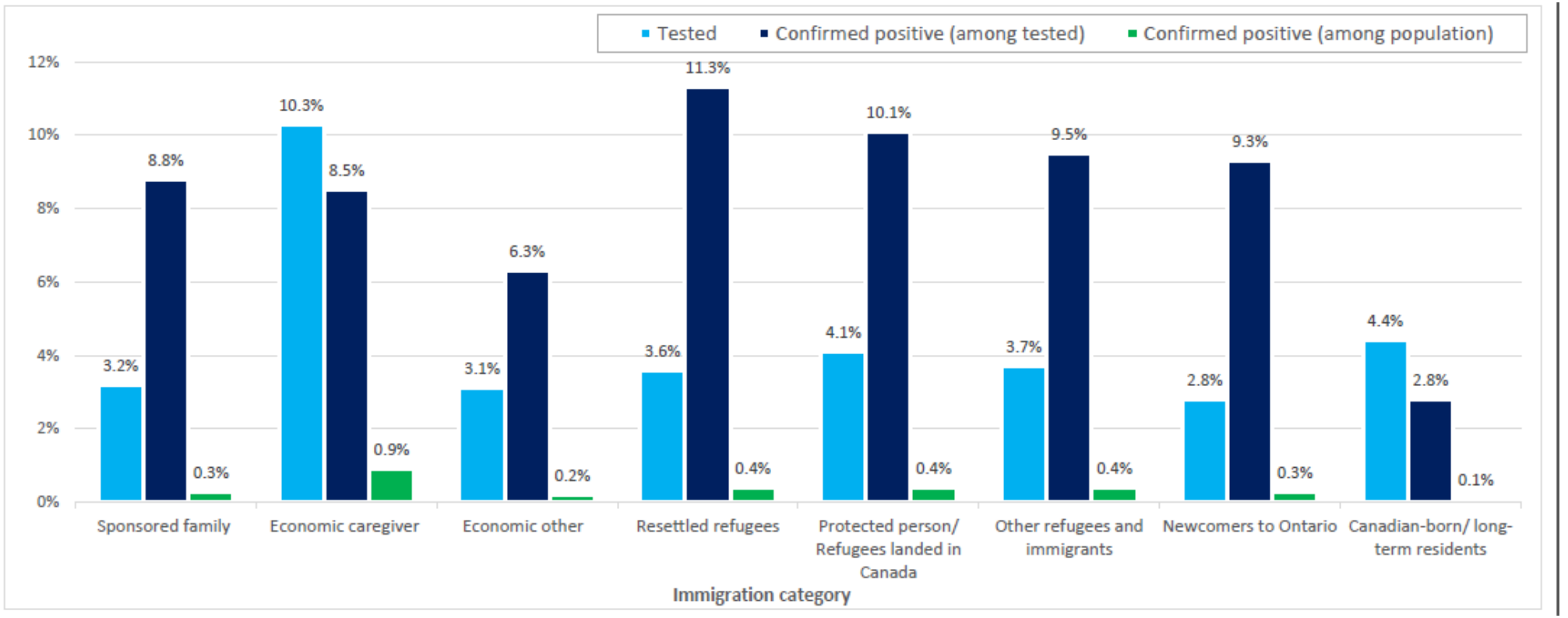


Household Income (n= 7,540)

Source: Toronto Public Health, 2020[9]

Immigrants and Refugees and COVID-19 in Ontario

Proportion of residents tested, percent positivity in Ontario by immigration category, as of June 13, 2020[10]



Percent positivity in those tested were higher in all immigrant categories compared with Canadian-born and pronounced in all refugee subgroups

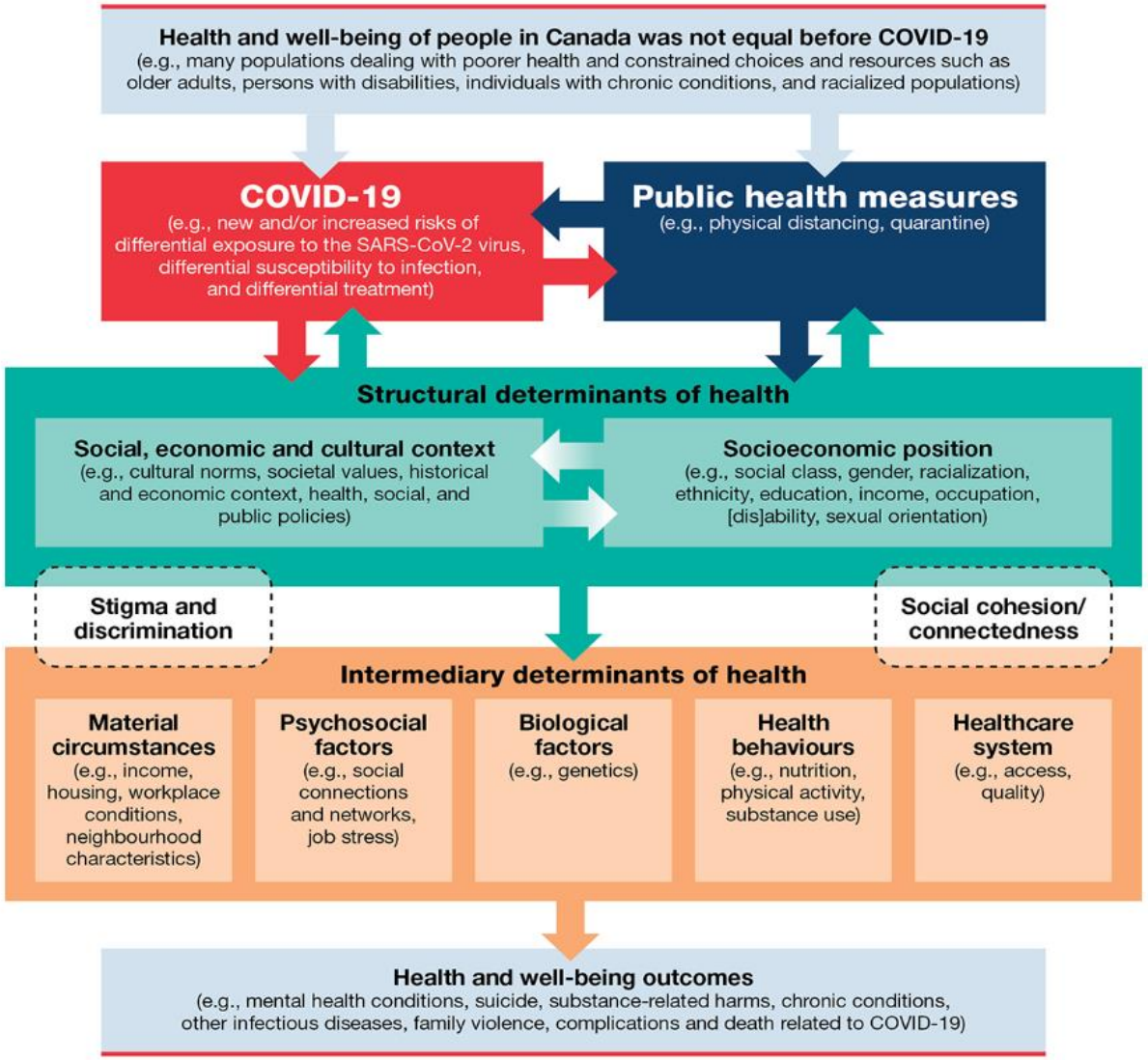
Source: Guttmann A, Gandhi S, Wanigaratne S, Lu H, Ferreira-Legere LE, Paul J, et al, 2020[10]

Framework

- Existing inequities before COVID-19
- Differential impacts of COVID-19

  Direct:
  - differential exposure
  - differential susceptibility
  - differential treatment

  Indirect
  - arising from the public health measures
- Many summaries now available[11,12]



Source: Public Health Agency of Canada, 2020[11]

Occupation and COVID-19: Early Evidence

- There is public health importance in characterizing the role of workplace in COVID-19 exposure and transmission
- Workplace transmission was observed early in the COVID-19 pandemic[13]
  - Health care workers in Wuhan, China
  - Occupational exposure in Singapore

Source: Koh D, 2020[13]

Workplace Outbreaks by Industry Type – Ontario (January-June, 2020)[14]

Public health unit declared outbreaks in non-hospital, non-congregate living, and non-childcare settings

Industry	Outbreak, n	Median size (range)	Duration, days (range)	Total # of cases
Manufacturing	89	3 (1-140)	9 (0-119)	702
Agriculture, forestry, fishing and hunting	24	3.5 (1-34)	13.5 (0-119)	197
Transportation and Warehousing	22	2 (1-36)	5.5 (0-75)	103
Other	13	3 (1-16)	7 (0-52)	67
Construction	12	2.5 (1-8)	4.5 (0-12)	44
Health care and social assistance	13	3 (1-13)	5 (0-50)	43
Retail	13	1 (1-14)	0 (0-56)	39
Public Administration	3	9 (2-10)	10 (3-18)	21
Accommodation and food services	5	2 (2-5)	6 (2-16)	15
Finance and Insurance	5	2 (1-5)	6 (0-31)	14

Source: Murti M, Achonu C, Smith BT, Brown KA, Kim JH, Johnson J, et al., 2020[14]

Distribution of Occupational Risk of Exposure

- Early in March, an article was published exploring ‘The Workers Who Face the Greatest Coronavirus Risk’[15]

Source: Gamio L, 2020[15]

Occupational Exposure to Disease and Infection

- Occupations with high exposure to disease or infection in the US:[16]
  - 18% of 144.7 million workers exposed at least once a month
  - 10% of 144.7 million workers exposed at least once a week
- Health care workers represent >90% of workers exposed once a month and >75% of workers exposed once a week
- Other notable major occupations exposed once a month include:
  - 52% of protective services (e.g., police officers, firefighters)
  - 52% of personal care and services (e.g., childcare workers, personal care aids)
  - 32% of community and social services (e.g., probation officers, social and human health assistances)

Data Source: Bureau of Labor Statistics Occupational Employment Statistics database linked to the Occupational Information Network (O*NET)

Physical Proximity to Others at Work

- Working in close proximity to others can increase risk of COVID-19 exposure at work[17]
  - In particular, when working indoors, for prolonged period of time and sharing work facilities
  - Impacts ability to socially distance
  - Requires adequate personal protective equipment
- Occupational COVID-19 outbreaks have been observed in industries where people work in close proximity to other workers and the public[18]
  - E.g., food processing plants, chefs, hairdressers and barbers

Occupational Exposure to COVID-19 Risk Data Tools

- Existing data visualization tools of occupational exposure to COVID-19 risk:
  - **Office of National Statistics** (UK)[18] and **Brookfield Institute (Canada)**[19] at Ryerson University tools examine physical proximity and exposure to disease and infection (O*NET)
  - **Vancouver School of Economics (VSE) COVID-19 Risk/Reward Assessment Tool**[20] examines viral transmission risk (VSE Risk Index) in Canada, combines:
    - Occupation characteristics (from O*NET): physical proximity, exposed to disease or infections, outdoors, contact with others, working directly with the public
    - Worker characteristics (from Census data): works from home, public transit, lives with health care worker, lives in crowded dwelling

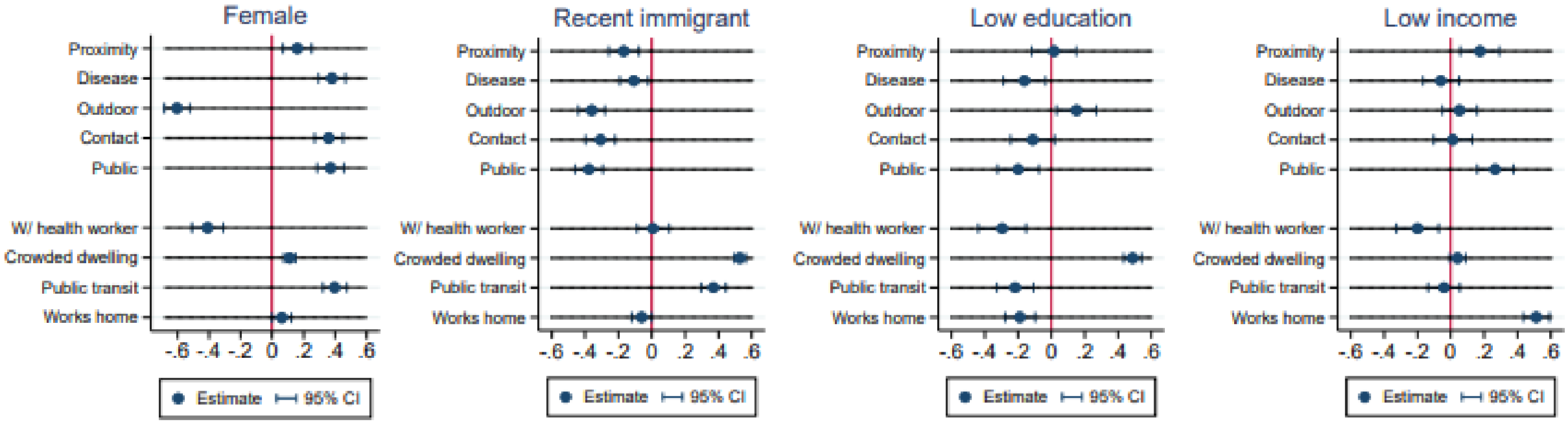
Research and Data Limitations

Gaps in existing Canadian occupational exposure to COVID-19 risk tools:

- Inclusion of **equity stratifiers**

Distribution of Occupational Exposure to COVID-19 Risk in Canada

- Distribution of work and home characteristics used in the VSE Risk Index by equity stratifiers[21]



Data Source: Labour Force Survey, 2019 linked to O*NET

Source: Baylis P, Beauregard P-L, Connolly M, Fortin NM, Green DA, Gutiérrez-Cubillos P, et al., 2020[21]

Distribution of Occupational Exposure to COVID-19 Risk in Canada

- Association between physical proximity and exposure to disease by equity stratifiers using data from 2016 Census linked to O*NET[22]
  - Women were employed in occupations associated with significantly higher average risks of exposure to COVID-19 than men
  - Workers in low-income occupations are experience greater risk of exposure to COVID-19 at work compared to other those in medium and high occupations
    - ➢ This is especially the case for women, immigrants, and visible minority groups in low-income occupations

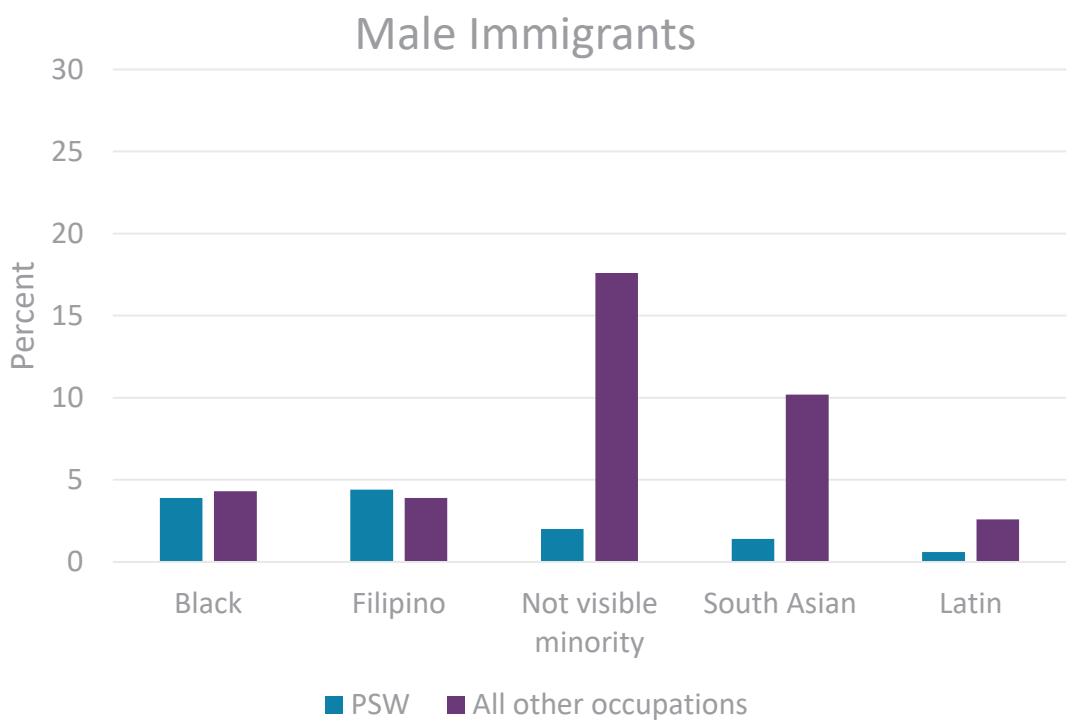
Data Source: 2016 Canadian Census linked to O*NET

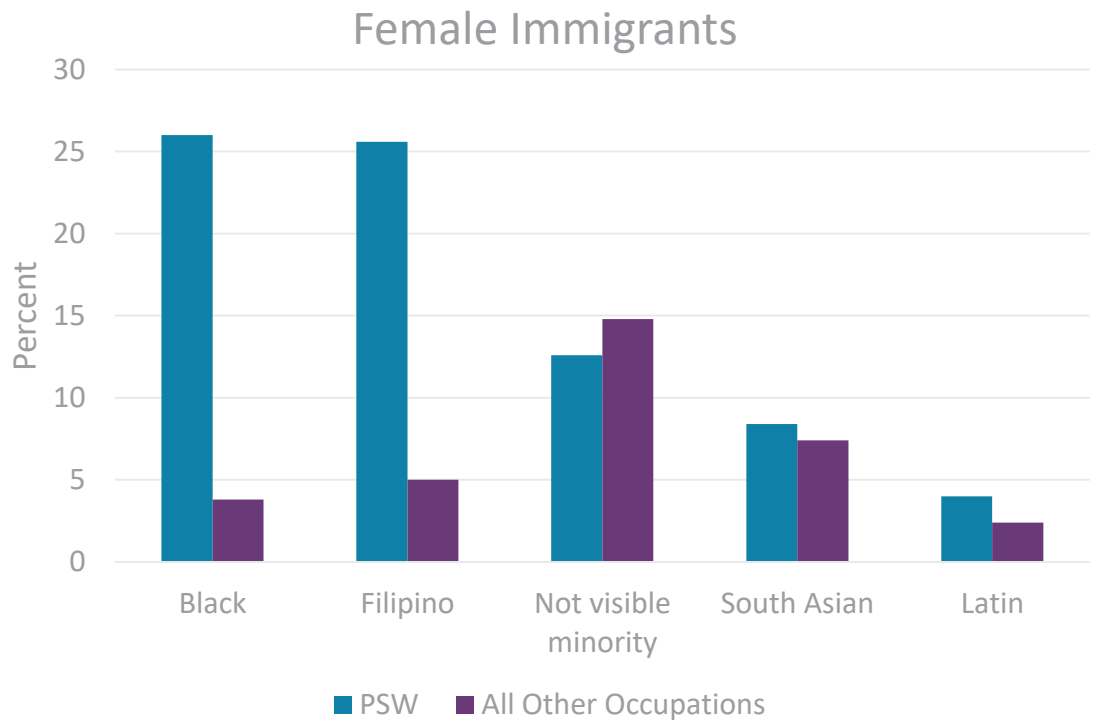
Research and Data Limitations

Gaps in existing Canadian occupational exposure to COVID-19 risk tools:

- Inclusion of **equity stratifiers**
- **Intersectionality** of risk across multiple equity stratifiers

Intersectionality of Risk: Personal Support Workers in Canada





Data: Statistics Canada, 2016 Census of Population

Personal Support Workers (nurse aides, orderlies and patient service associates) is an example of an occupation with higher risk of contracting COVID-19 where woman, immigrants and racialized populations account for the majority of the workforce[23]

Source: Turcotte M, Savage K, 2020[23]

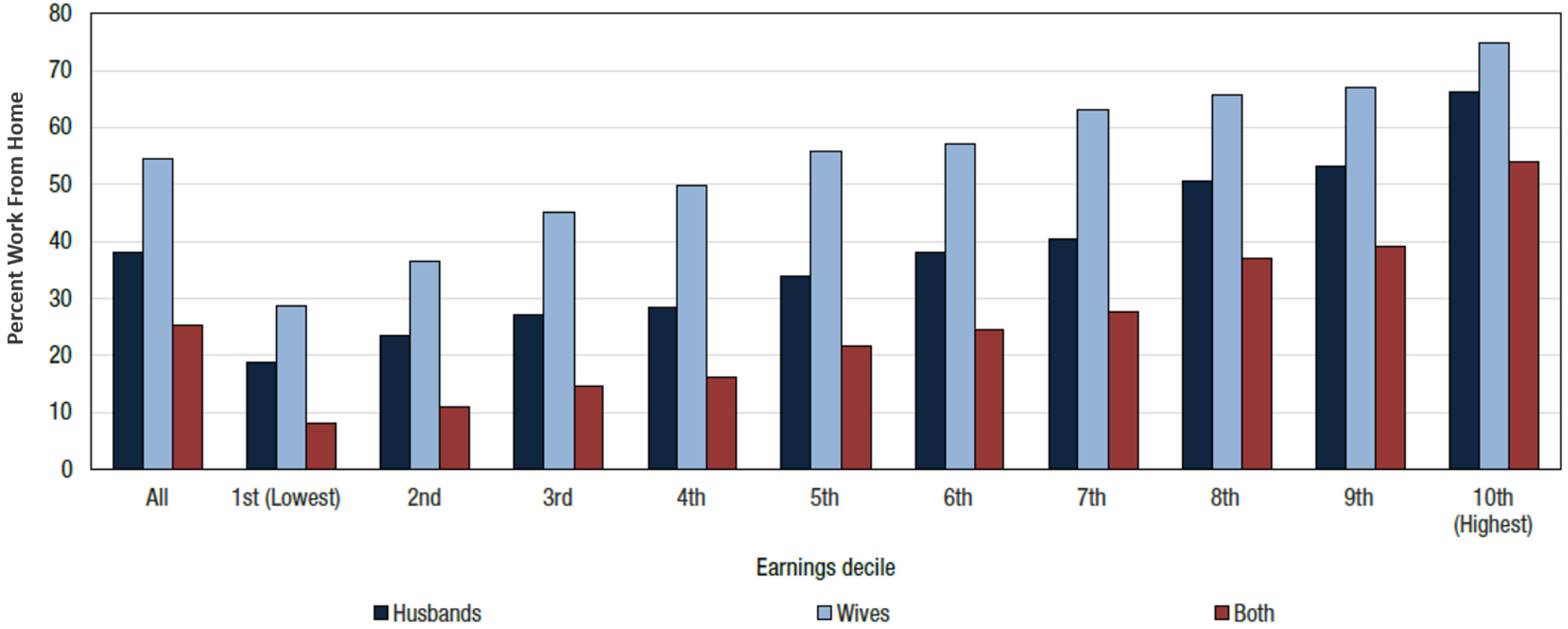
Research and Data Limitations, cont.

Gaps in existing Canadian occupational exposure to COVID-19 risk tools:

- Inclusion of **equity stratifiers**
- **Intersectionality** of risk across multiple equity stratifiers
- Differentiate ability to "**work from home**"

Inequality Working From Home During COVID-19 Pandemic

Ability to work from home by Earning Decile in Canada[24]



Data Source: Labour Force Survey, April 2020 and the Occupational Information Network (O*NET)

Research and Data Limitations, cont.

Gaps in existing Canadian occupational exposure to COVID-19 risk tools:

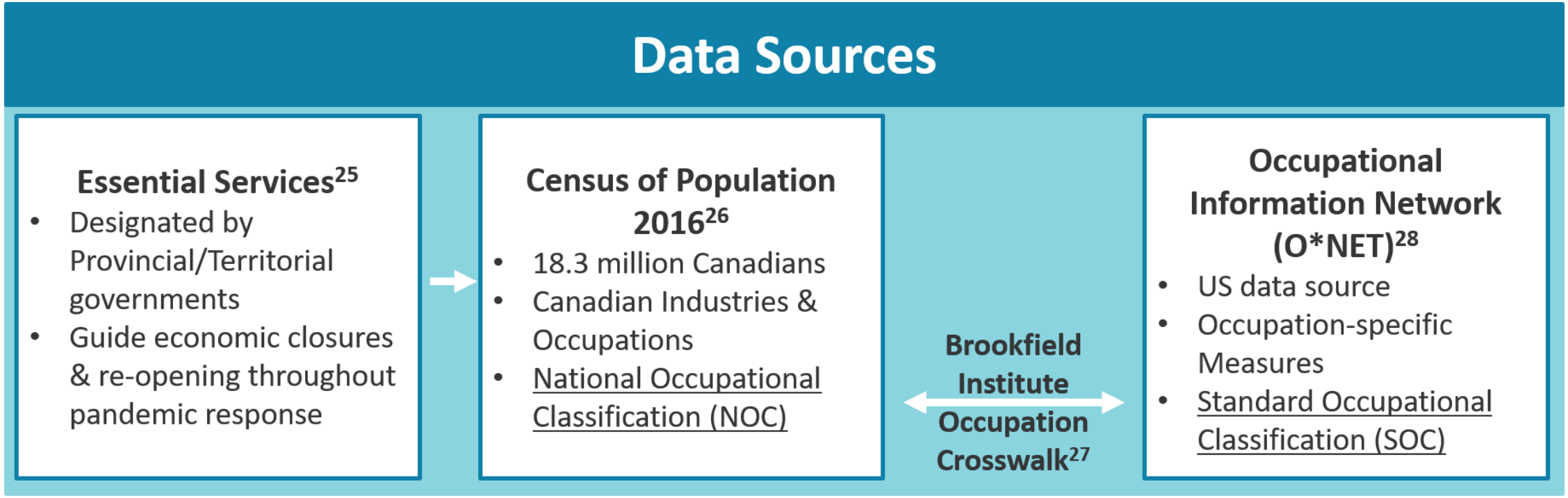
- Inclusion of **equity stratifiers**
- **Intersectionality** of risk across multiple equity stratifiers
- Differential ability to from "**work from home**"
- Examination of in **essential service workers**
- **Lack of regional data** to assist with local decision-making and planning
- Occupational exposure **not disaggregated by race/ethnicity**

Study Objectives

Build an open source data visualization tool to:

1. Describe the differential burden of occupational exposure to COVID-19 risk in Canadian workers across age, sex, race/ethnicity, immigrant status and household income; and,
2. Inform the design of equitable policies and interventions to mitigate inequities in occupational exposure to COVID-19 risk

Methods



The Occupational Exposure to COVID-19 Risk Tool

Methods – Census of Population

- **Industry: North American Industry Classification System (NAICS) 2012**[29]
  - 20 Sectors, 323 Industry Groups
  - Used to classify essential/non-essential services
- **Occupation: National Occupational Classification (NOC) 2016**[30]
  - 10 Broad Occupation Groups, 500 unit occupation groups
  - Mapped to occupational indicators from O*NET
- **Geography:** Province/Territory, Health Region
- **Median Income in Occupation** (CAD 2015)
- **Counts:**
  - **Sex:** Female; Male; Total
  - **Age (years):** 15-24; 25-34; 35-44; 45-54; 55-64; 65+; Total
  - **Race/Ethnicity**
  - **Immigrant Status**
  - **Household Income Quintiles**

Source: Statistics Canada, 2020[29,30]

Methods – Census of Population

Province Territory	Industry	Occupation	Sex	Age (years)	Total (N)	Non-Immigrant (N)	Immigrant (N)	Non-permanent Resident (N)	Median Income (CAD 2015)
Ontario	X	Y	Female	15-24	55	15	30	10	$
Ontario	X	Y	Female	25-34	…	…	…	…	$
Ontario	X	Y	Female	35-44	…	…	…	…	$
Ontario	X	Y	Female	45-54	…	…	…	…	$
Ontario	X	Y	Female	55-64	…	…	…	…	$
Ontario	X	Y	Female	65+	…	…	…	…	$
Ontario	X	Y	Female	Total	400	200	150	50	$

Methods – Essential Services

Ontario Orders the Mandatory Closure of All Non-Essential Workplaces to Fight Spread of COVID-19[31]

Provincial government compiling list of essential services during COVID-19 pandemic[32]

Quebec's COVID-19 shutdown is on: Here are the essential businesses and services staying open[33]

- **Essential Services:**
  - "Services and functions considered **essential** to preserving life, health and basic societal functioning"[25]
  - Provinces & Territories outlined services deemed essential
  - Each service was mapped to the **North American Industry Classification System (NAICS) 2012**[29]

Source: Public Safety Canada, 2020[25]; Statistics Canada, 2020[29]

Example: Essential Services in Ontario

Ontario Essential Services list (April 3rd 2020)[34]	North American Industry Classification System (NAICS) 2012 Corresponding Industry Group Codes[29]
Gas stations and other fuel suppliers.	4471 Gasoline stations
Laundromats and drycleaners.	8123 Dry cleaning and laundry services
Organizations that provide health care including: • retirement homes • hospitals • clinics • long-term care facilities • independent health facilities • mental health and addictions counselling supports.	6214 Out-patient care centres 6215 Medical and diagnostic laboratories 6216 Home health care services 6219 Other ambulatory health care services 6221 General medical and surgical hospitals 6222 Psychiatric and substance abuse hospitals 6223 Specialty (except psychiatric and substance abuse) hospitals 6231 Nursing care facilities 6232 Residential developmental handicap, mental health and substance abuse facilities 6233 Community care facilities for the elderly 6239 Other residential care facilities

Methods – Census of Population, cont.

- Mapping Industries to Occupations

Industry Group Code[29]	Occupation Unit Code[30]
1110 Farms	9213 Supervisors, food and beverage processing
1110 Farms	7611 Construction trades helpers and labourers
1110 Farms	6552 Other customer and information services representatives

Essential service designation (Yes/No)

Occupational Information Network (O*NET)[28]

Methods – Occupational Information Network (O*NET)

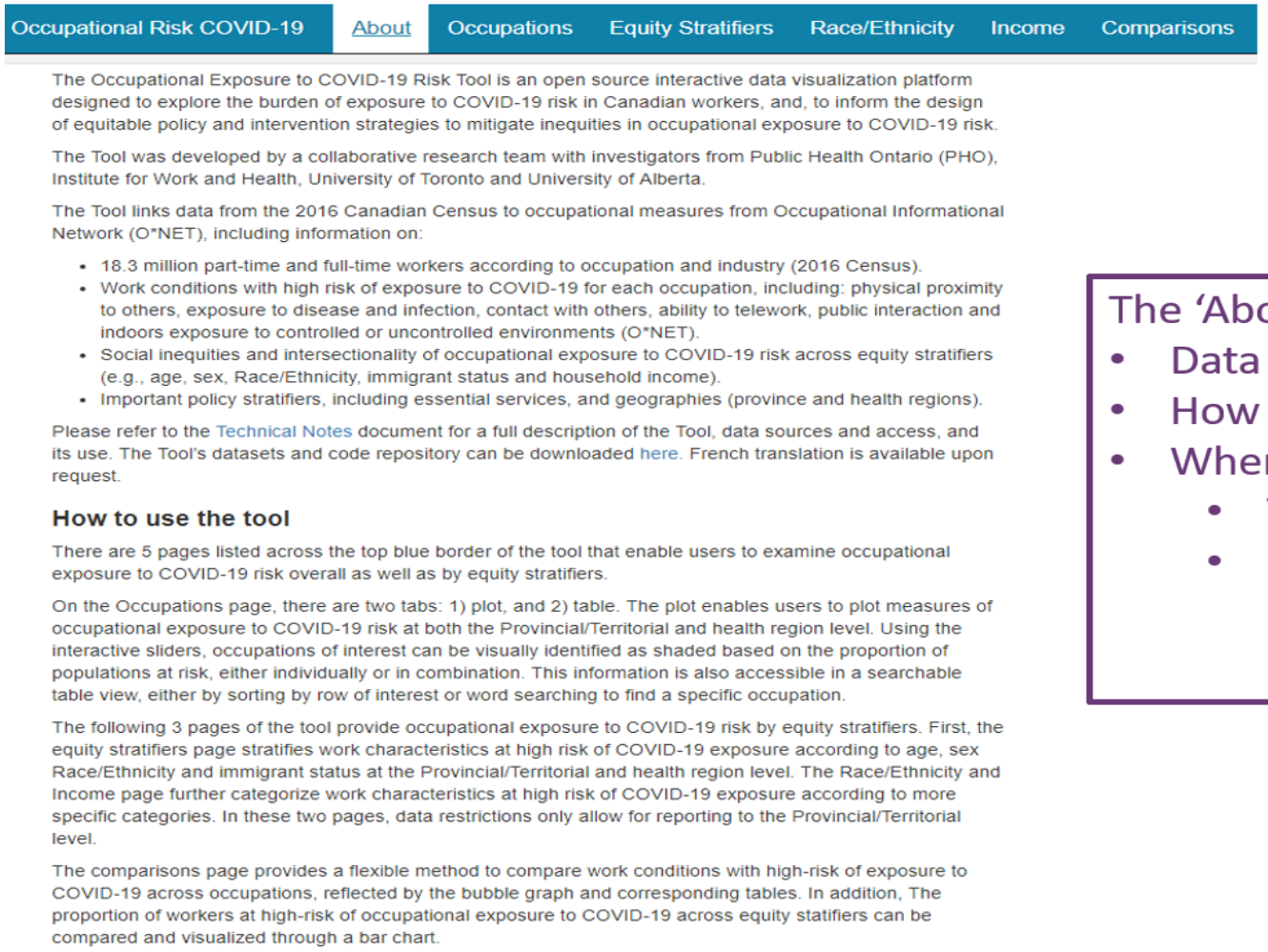
- US-based open data source that provides ecological measures for a number of occupational factors[28]
  - Respondents answer questions using a 5-point Likert scale
  - Scores are averaged for each occupation (range 0 to 100)

Physical Proximity	Exposure to Disease/Infection	Contact with Others	Able to Work from Home[35]
"To what extent does this job require the worker to perform job tasks in close physical proximity to other people?" 0 (not near people) 100 (very close/near touching)	**"How often does this job require exposure to disease/infections?"** 0 (never) 100 (every day)	**"How much does this job require the worker to be in contact with others in order to perform it?"** 0 (no contact) 100 (constant contact)	**Dichotomized using 17 questions related to "physical and social factors that influence the nature of work" & "general types of job behaviors occurring on multiple jobs"** Binary: Yes/No

Methods – Putting it all together

- **The Occupational Exposure to COVID-19 Risk Tool**
- Open-source & Interactive data visualization tool software[36]
- Interactive data visualizations:
  - graphical illustrations & data tables
- Features:
  - Visualize occupational exposure to COVID-19 risk across occupations, industry sectors & geography
  - Examine occupational exposure to COVID-19 risk related to essential services workers, age, sex, race/ethnicity, immigrant status, and household income
  - Explore occupational characteristics available to reduce occupational exposure to COVID-19 risk (i.e., work from home)
- Users:
  - Policy Makers and Researchers at both the provincial/territorial & regional level

Results - The Occupational Exposure to COVID-19 Risk Tool



Occupational Risk COVID-19 | About | Occupations | Equity Stratifiers | Race/Ethnicity | Income | Comparisons

The Occupational Exposure to COVID-19 Risk Tool is an open source interactive data visualization platform designed to explore the burden of exposure to COVID-19 risk in Canadian workers, and, to inform the design of equitable policy and intervention strategies to mitigate inequities in occupational exposure to COVID-19 risk.

The Tool was developed by a collaborative research team with investigators from Public Health Ontario (PHO), Institute for Work and Health, University of Toronto and University of Alberta.

The Tool links data from the 2016 Canadian Census to occupational measures from Occupational Informational Network (O*NET), including information on:

- 18.3 million part-time and full-time workers according to occupation and industry (2016 Census).
- Work conditions with high risk of exposure to COVID-19 for each occupation, including: physical proximity to others, exposure to disease and infection, contact with others, ability to telework, public interaction and indoors exposure to controlled or uncontrolled environments (O*NET).
- Social inequities and intersectionality of occupational exposure to COVID-19 risk across equity stratifiers (e.g., age, sex, Race/Ethnicity, immigrant status and household income).
- Important policy stratifiers, including essential services, and geographies (province and health regions).

Please refer to the Technical Notes document for a full description of the Tool, data sources and access, and its use. The Tool's datasets and code repository can be downloaded here. French translation is available upon request.

How to use the tool

There are 5 pages listed across the top blue border of the tool that enable users to examine occupational exposure to COVID-19 risk overall as well as by equity stratifiers.

On the Occupations page, there are two tabs: 1) plot, and 2) table. The plot enables users to plot measures of occupational exposure to COVID-19 risk at both the Provincial/Territorial and health region level. Using the interactive sliders, occupations of interest can be visually identified as shaded based on the proportion of populations at risk, either individually or in combination. This information is also accessible in a searchable table view, either by sorting by row of interest or word searching to find a specific occupation.

The following 3 pages of the tool provide occupational exposure to COVID-19 risk by equity stratifiers. First, the equity stratifiers page stratifies work characteristics at high risk of COVID-19 exposure according to age, sex Race/Ethnicity and immigrant status at the Provincial/Territorial and health region level. The Race/Ethnicity and Income page further categorize work characteristics at high risk of COVID-19 exposure according to more specific categories. In these two pages, data restrictions only allow for reporting to the Provincial/Territorial level.

The comparisons page provides a flexible method to compare work conditions with high-risk of exposure to COVID-19 across occupations, reflected by the bubble graph and corresponding tables. In addition, The proportion of workers at high-risk of occupational exposure to COVID-19 across equity statifiers can be compared and visualized through a bar chart.

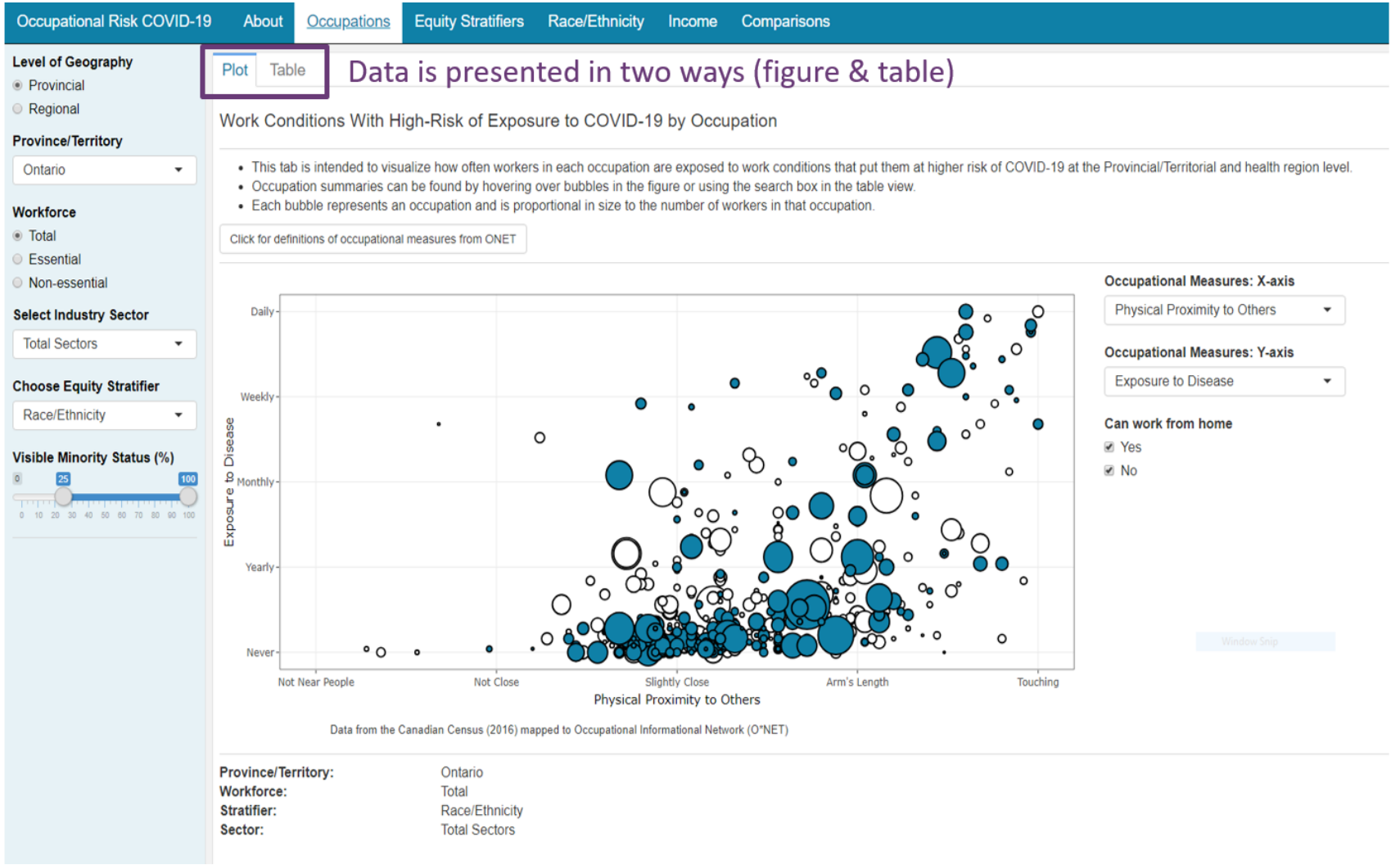
Multiple tabs allow users to explore questions of interest

The 'About' page provides information:

- Data sources
- How to use the tool
- Where to locate:
  - Technical Notes for further details
  - Open-source data repository

Source: Public Health Ontario, Occupational exposure to COVID-19 risk tool, 2020[37]

Results - The Occupational Exposure to COVID-19 Risk Tool



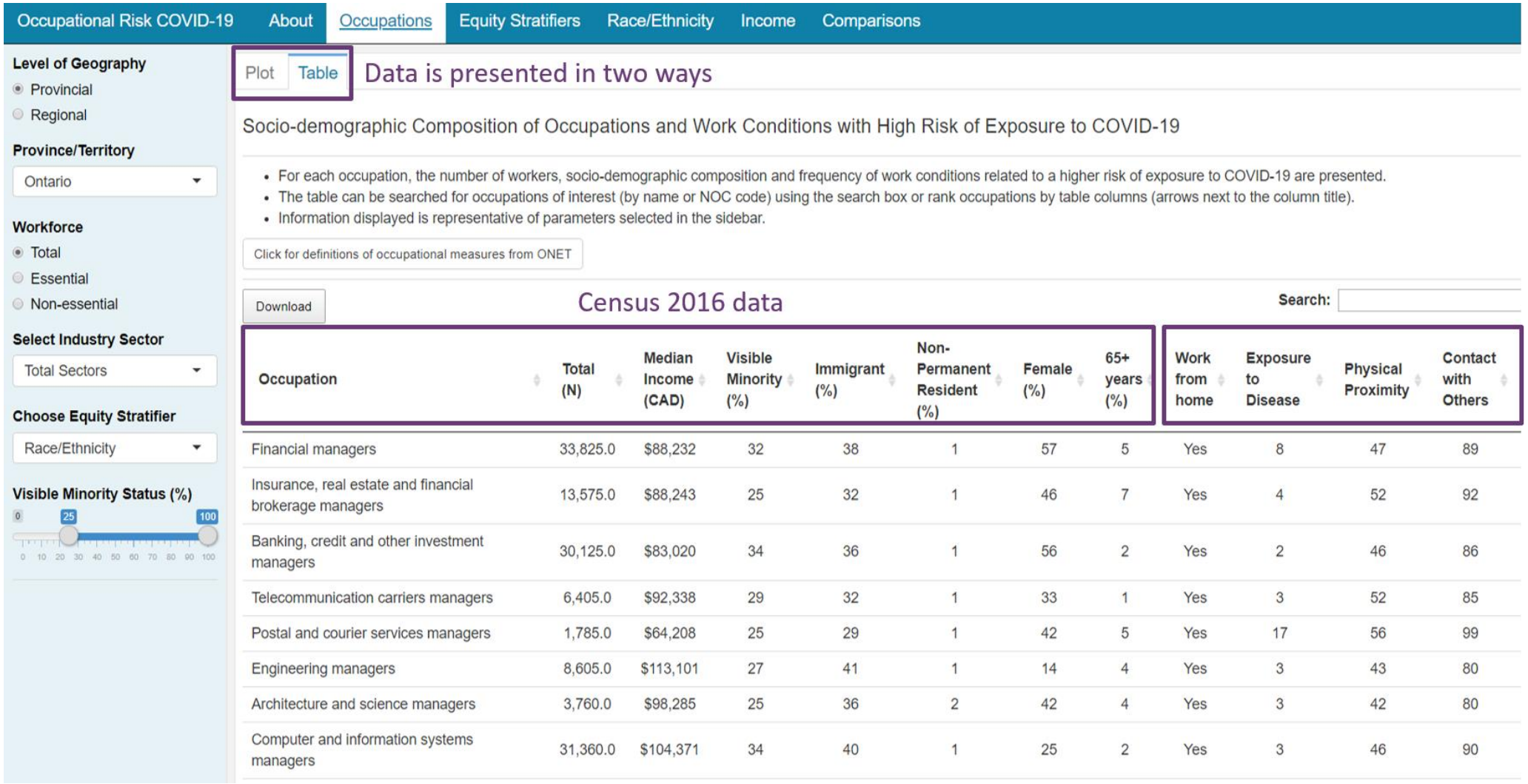
Essential service & Census 2016 data

Title and helpful information

Occupational Information Network (O*NET) data

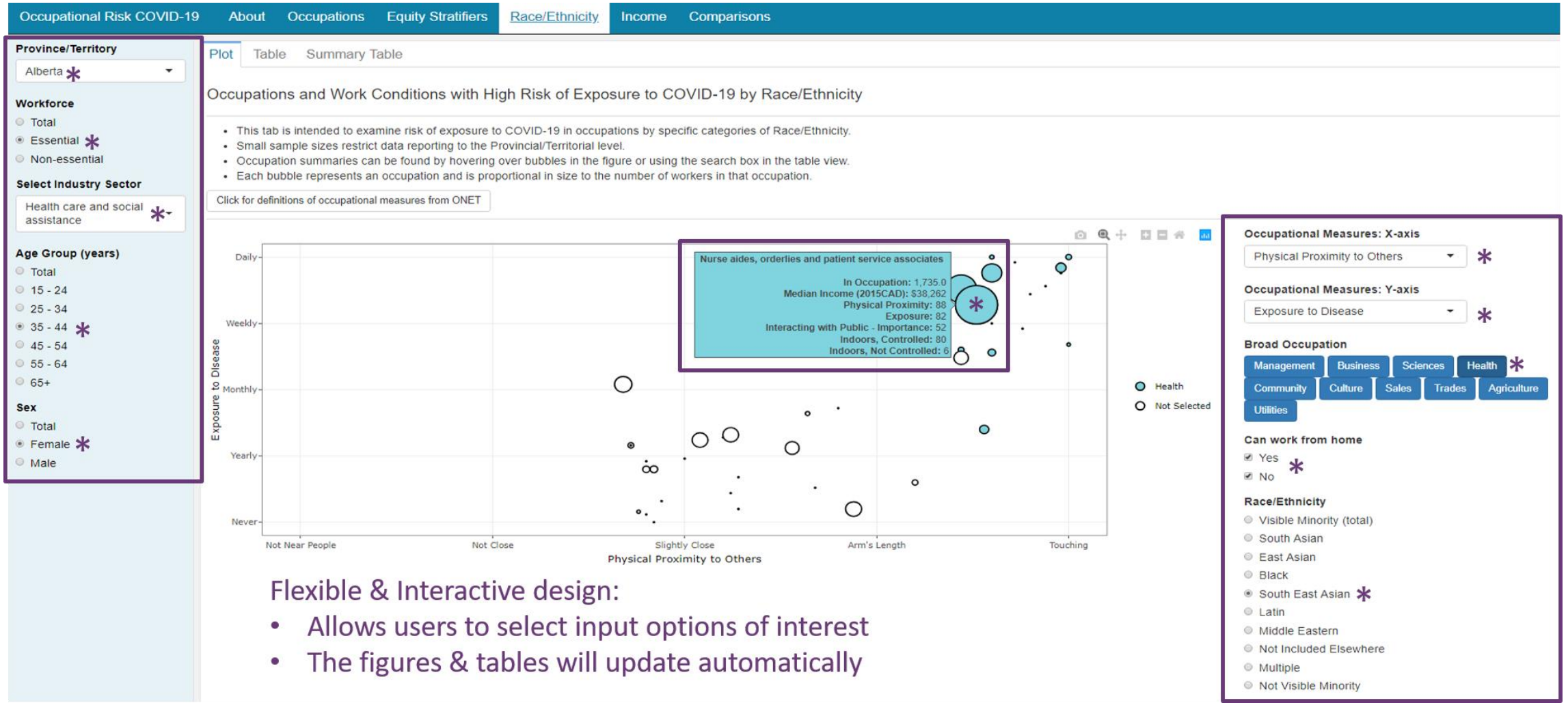
Source: Public Health Ontario, Occupational exposure to COVID-19 risk tool, 2020[37]

Results - The Occupational Exposure to COVID-19 Risk Tool



Source: Public Health Ontario, Occupational exposure to COVID-19 risk tool, 2020[37]

Results - The Occupational Exposure to COVID-19 Risk Tool

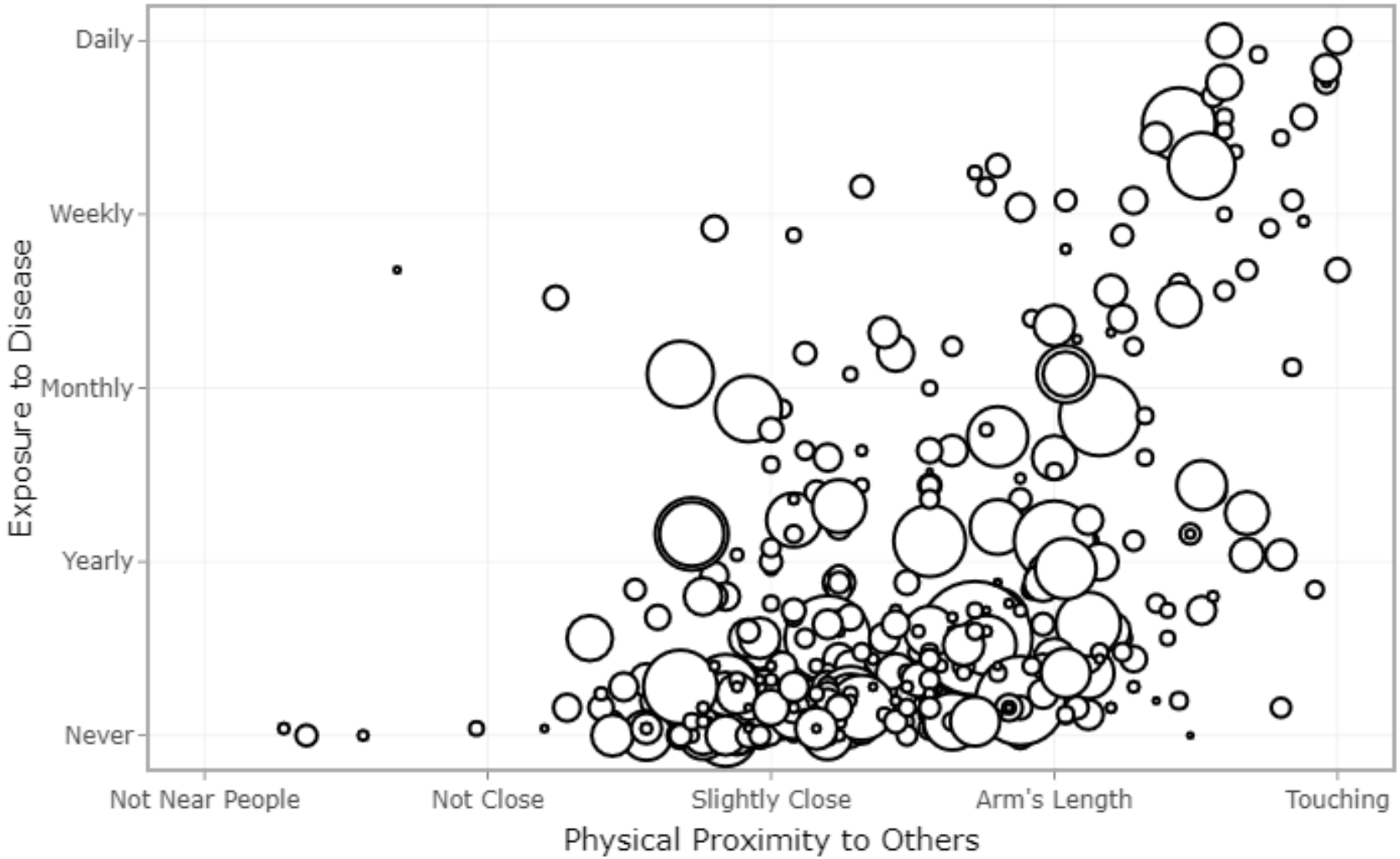


Flexible & Interactive design:

- Allows users to select input options of interest
- The figures & tables will update automatically

Source: Public Health Ontario, Occupational exposure to COVID-19 risk tool, 2020[37]

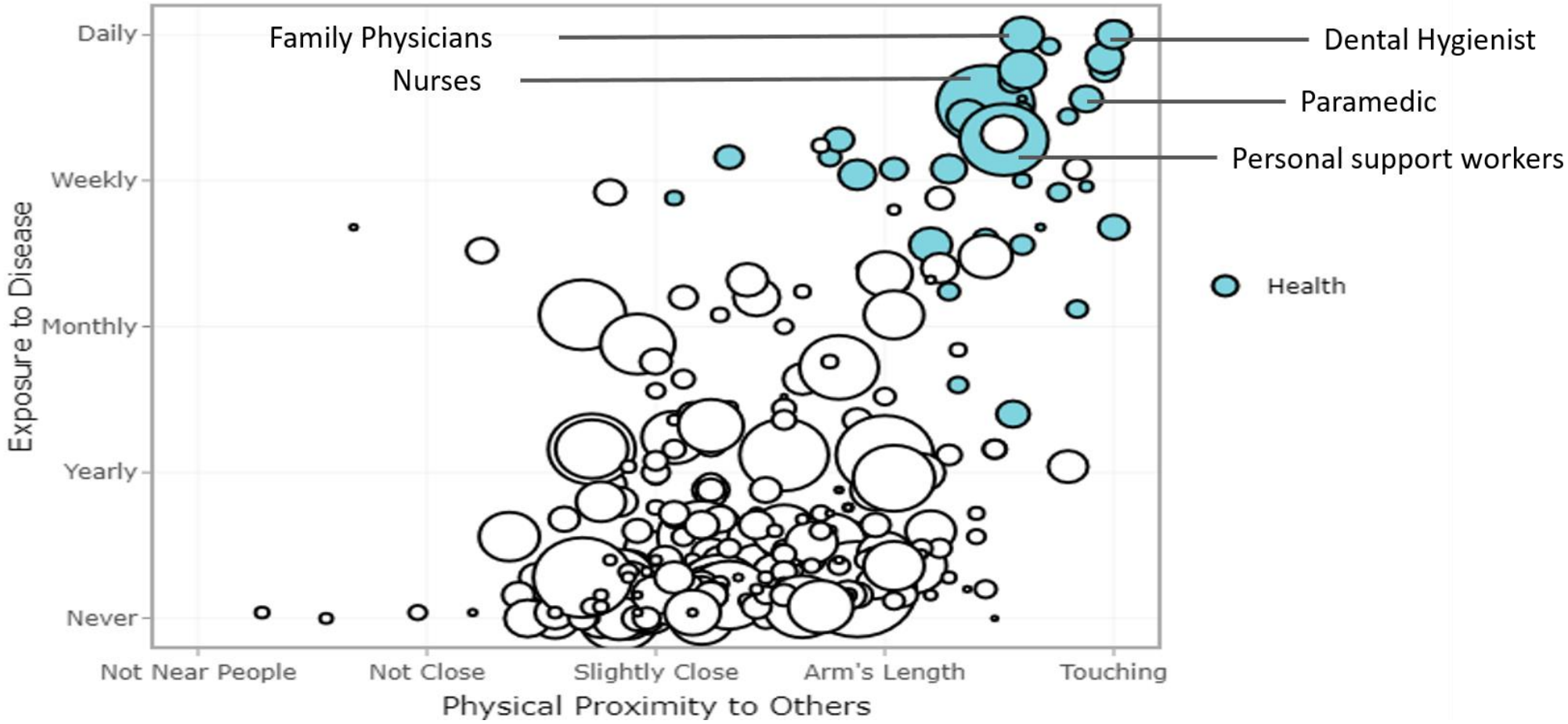
Occupation and Risk of COVID-19 Exposure at Work



Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: occupation and risk of COVID-19 exposure at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Occupation and Risk of COVID-19 Exposure at Work

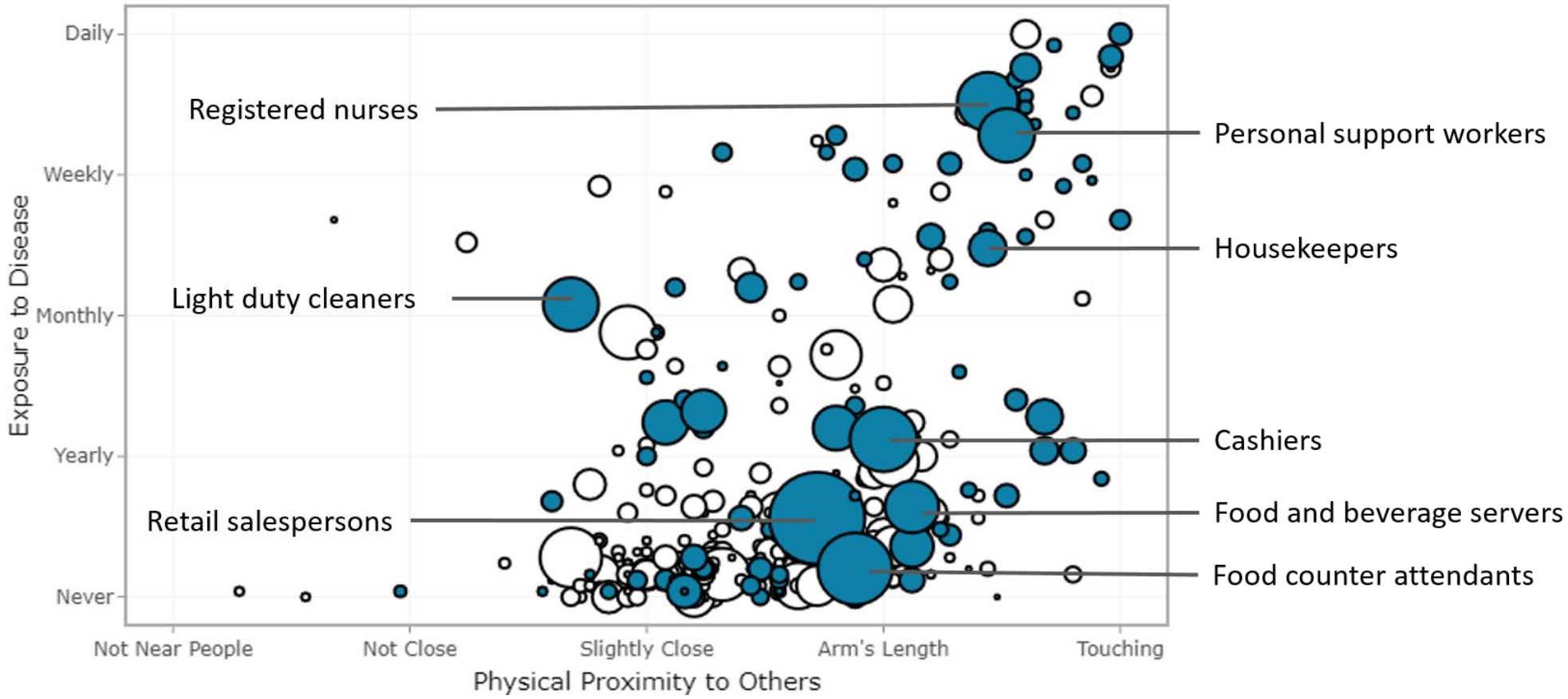
Essential workers in health occupations are at higher risk of COVID-19 exposure at work



Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: occupation and risk of COVID-19 exposure at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Occupation and Risk of COVID-19 Exposure at Work, cont.

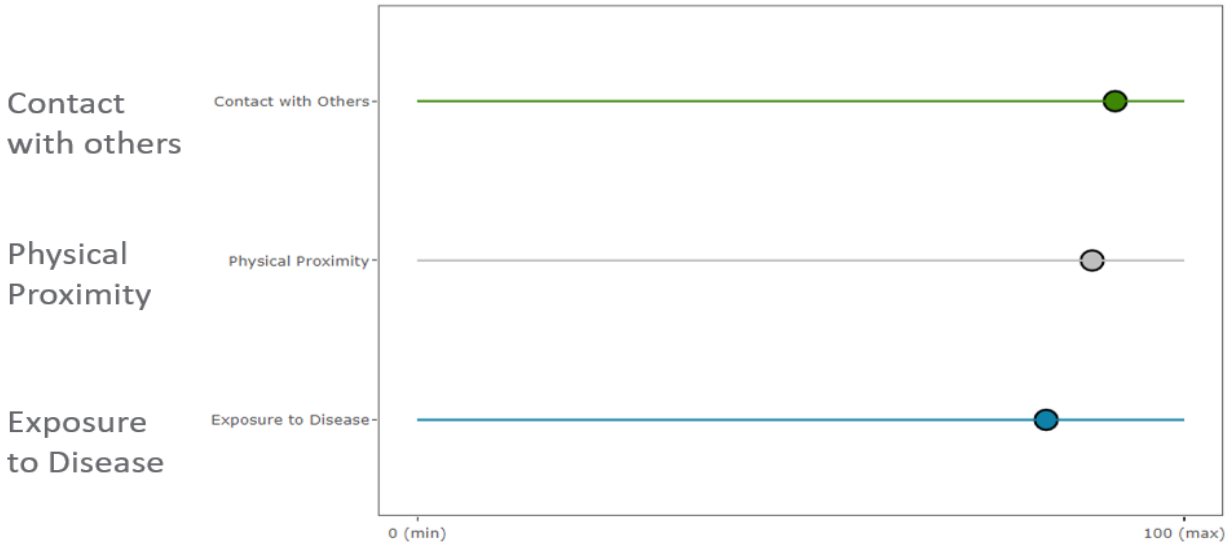
Occupations with workers >50% female, >12% racialized workers who are unable to work from home



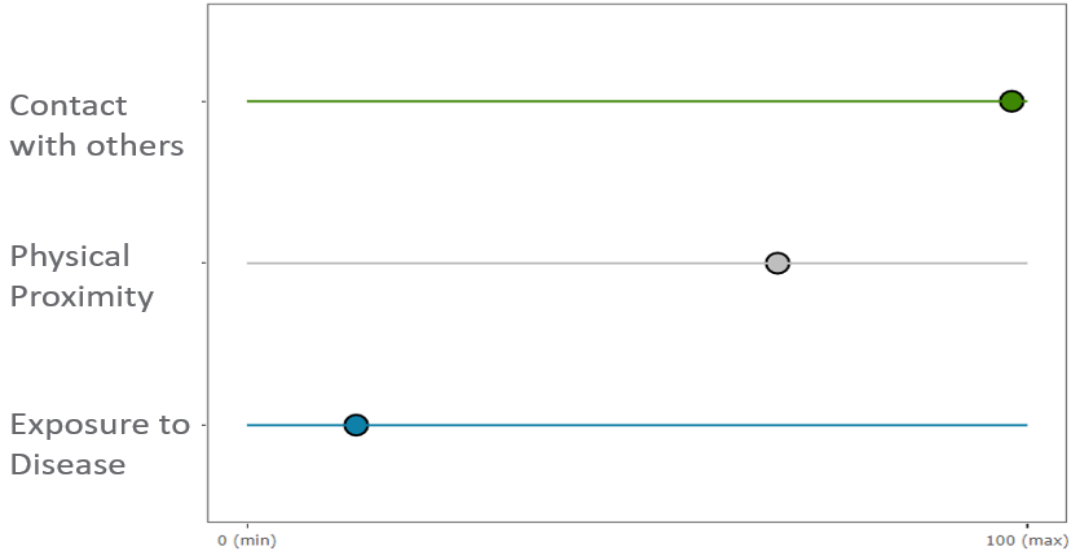
Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: occupation and risk of COVID-19 exposure at work, cont. [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Occupation-specific Risk of Exposure to COVID-19 at Work

Personal support worker



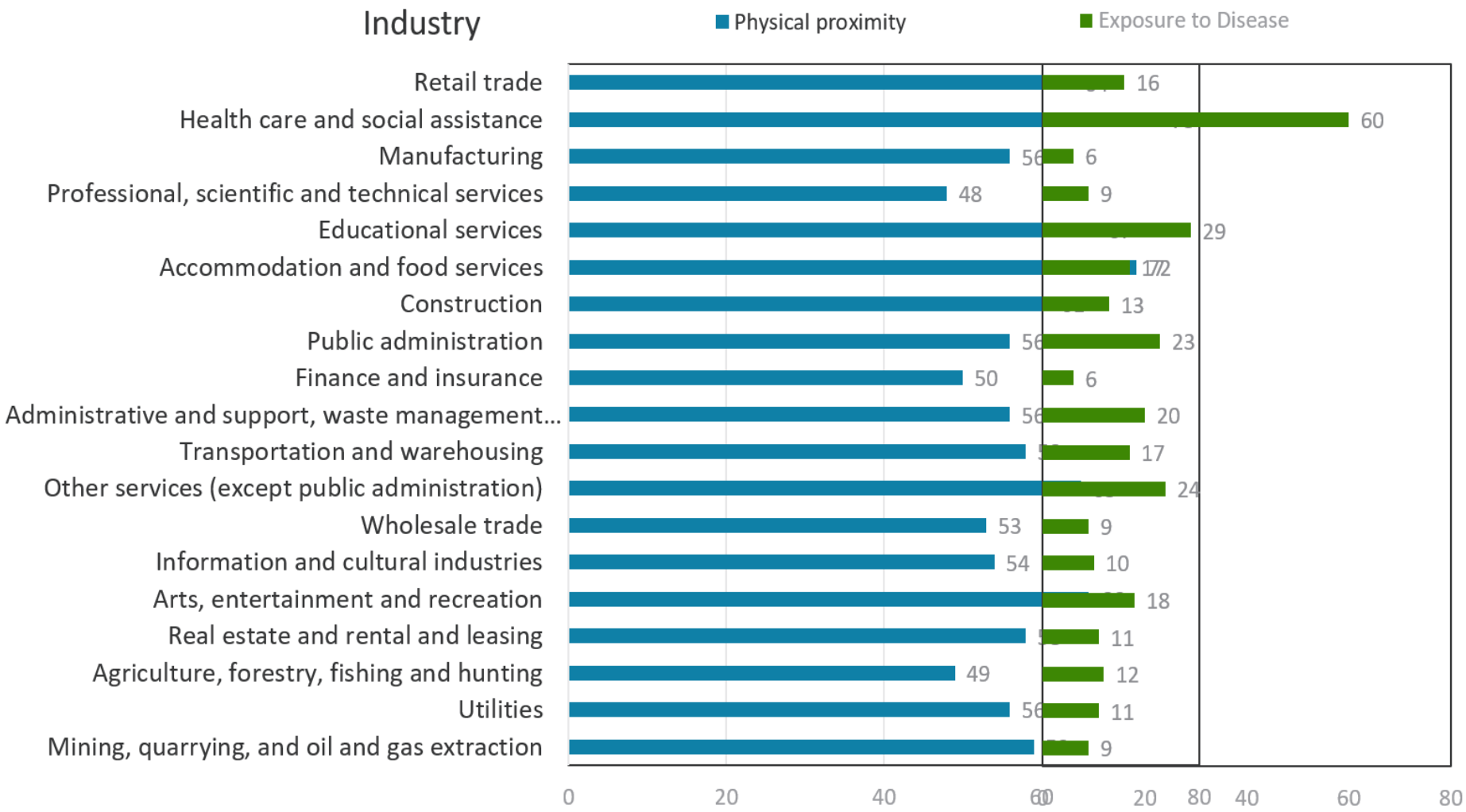
Retail sales



Occupation	No. of Workers	Female (%)	Immigrant (%)	Racialized (%)	Low Income Quintile (%)	Can Work from Home
Personal support worker	87,585	89	40	37	26	No
Retail salesperson	270,100	58	25	29	28	No

Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: occupation-specific risk of exposure to COVID-19 at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

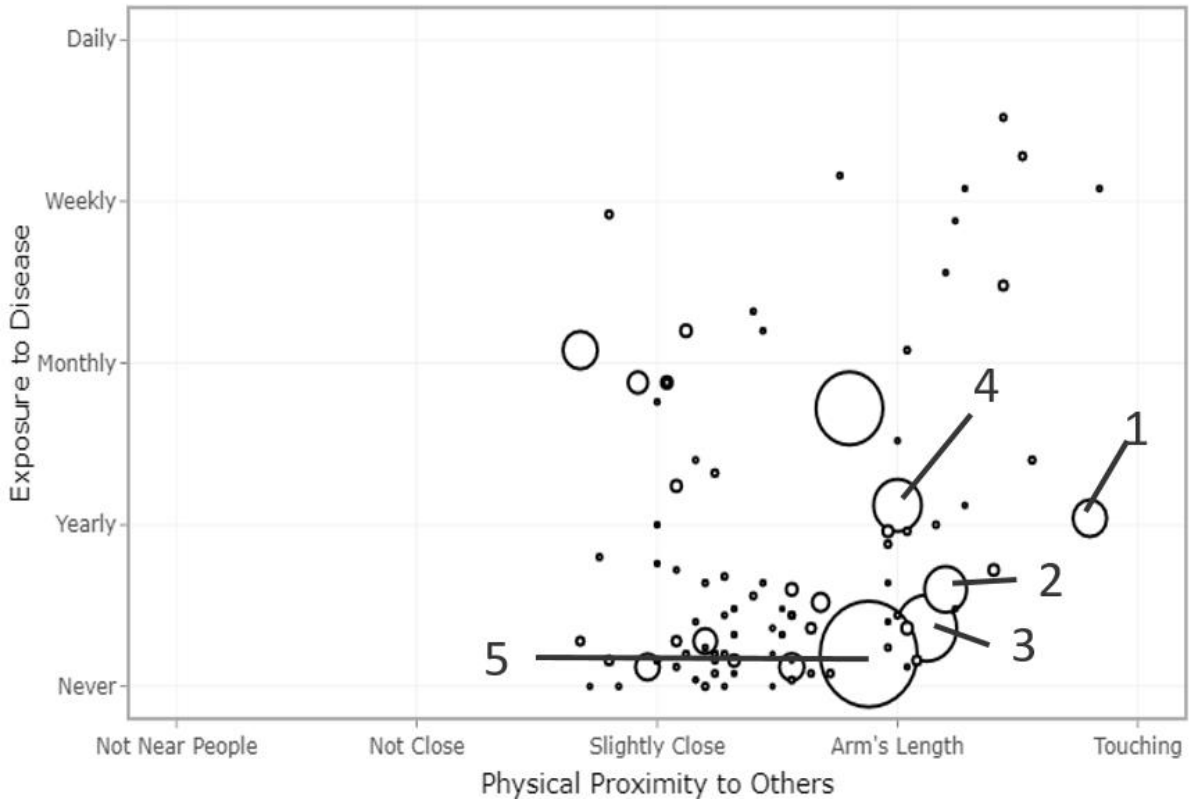
Industry Sector and Risk of Exposure to COVID-19 at Work



Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: occupation-specific risk of exposure to COVID-19 at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Industry, Occupation and Risk of COVID-19 Exposure at Work

Accommodation and Food Services: Occupations with essential workers, unable to work from home (Ontario)

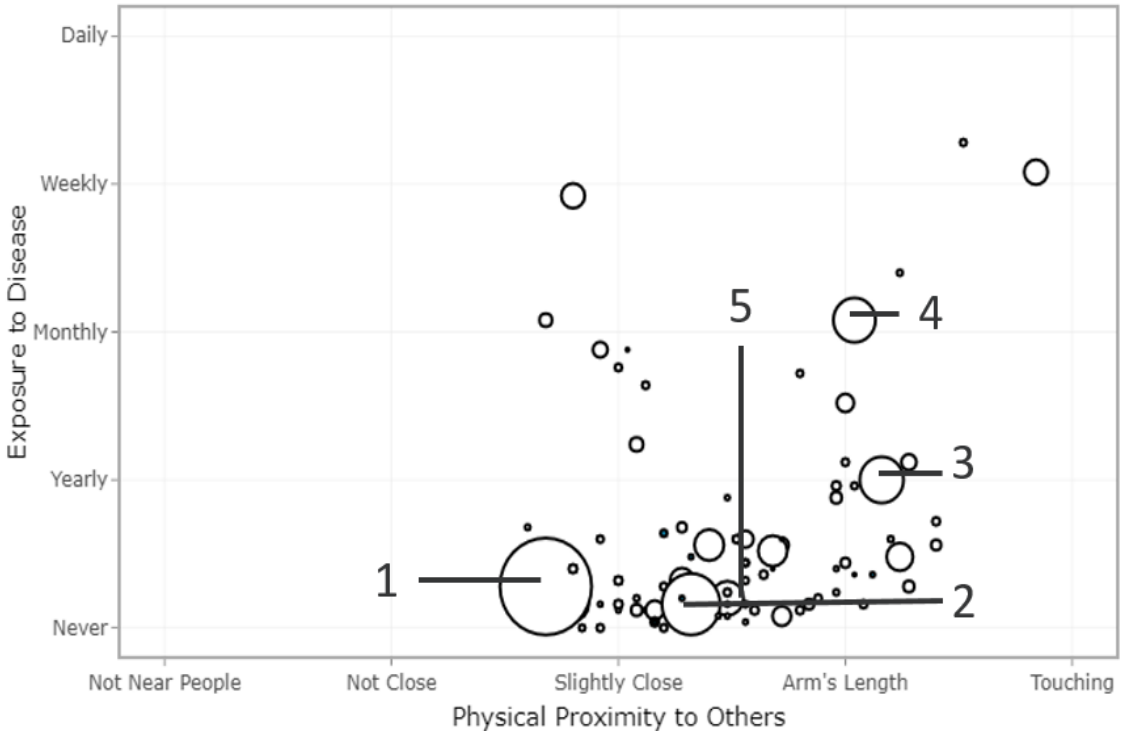


	Occupation	N	Median Income	Female (%)	Racialized (%)
1	Supervisors: food service	13,440	$22,922	70	32
2	Chefs	21,670	$25,738	21	57
3	Managers: Restaurant and food service	47,650	$30,053	50	36
4	Cashiers	28,715	$9,475	82	49
5	Food counter attendants, kitchen helpers	127,135	$9,923	61	34

Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: industry, occupation and risk of COVID-19 exposure at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Industry, Occupation and Risk of Exposure to COVID-19 at Work

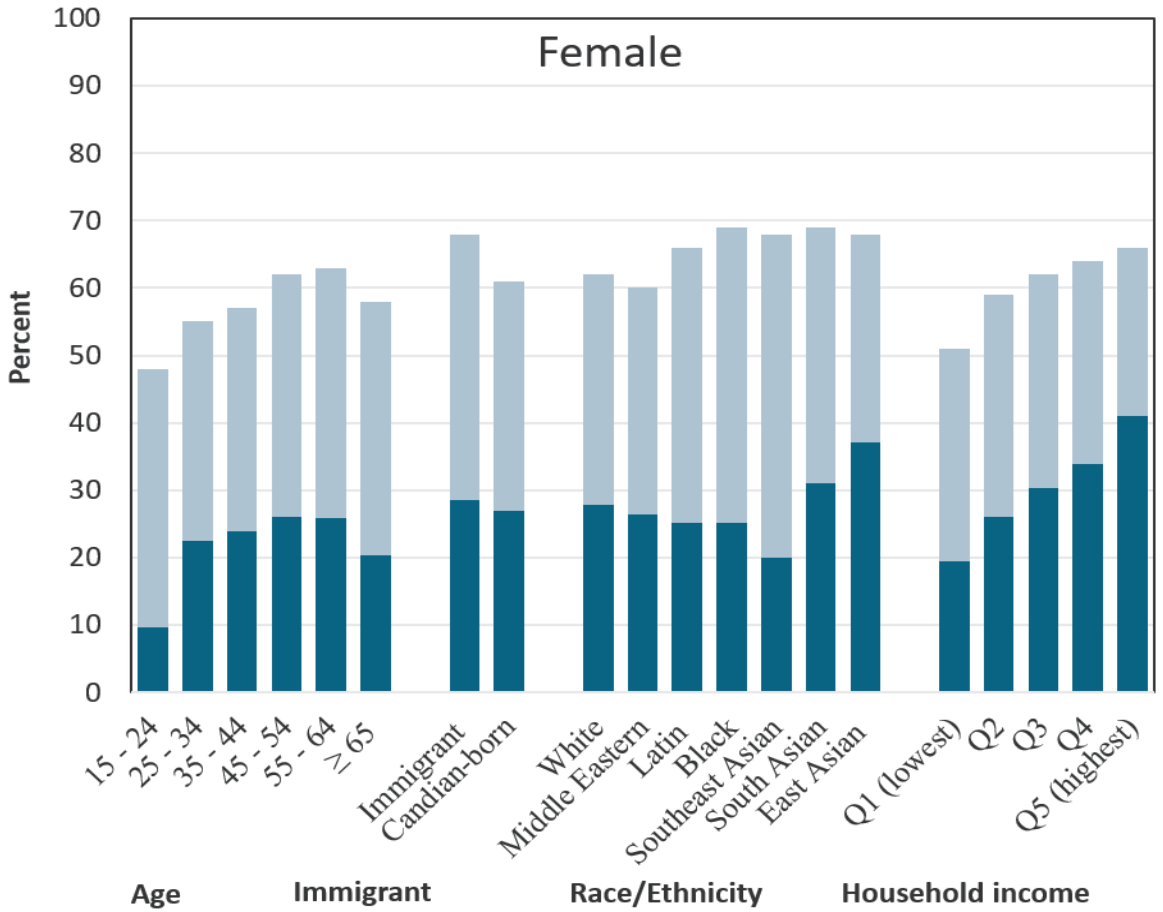
- Can estimate parameters specific to Public Health Units in Ontario (or across health regions)
- Transportation and Warehousing: Occupations with essential workers, unable to work from home

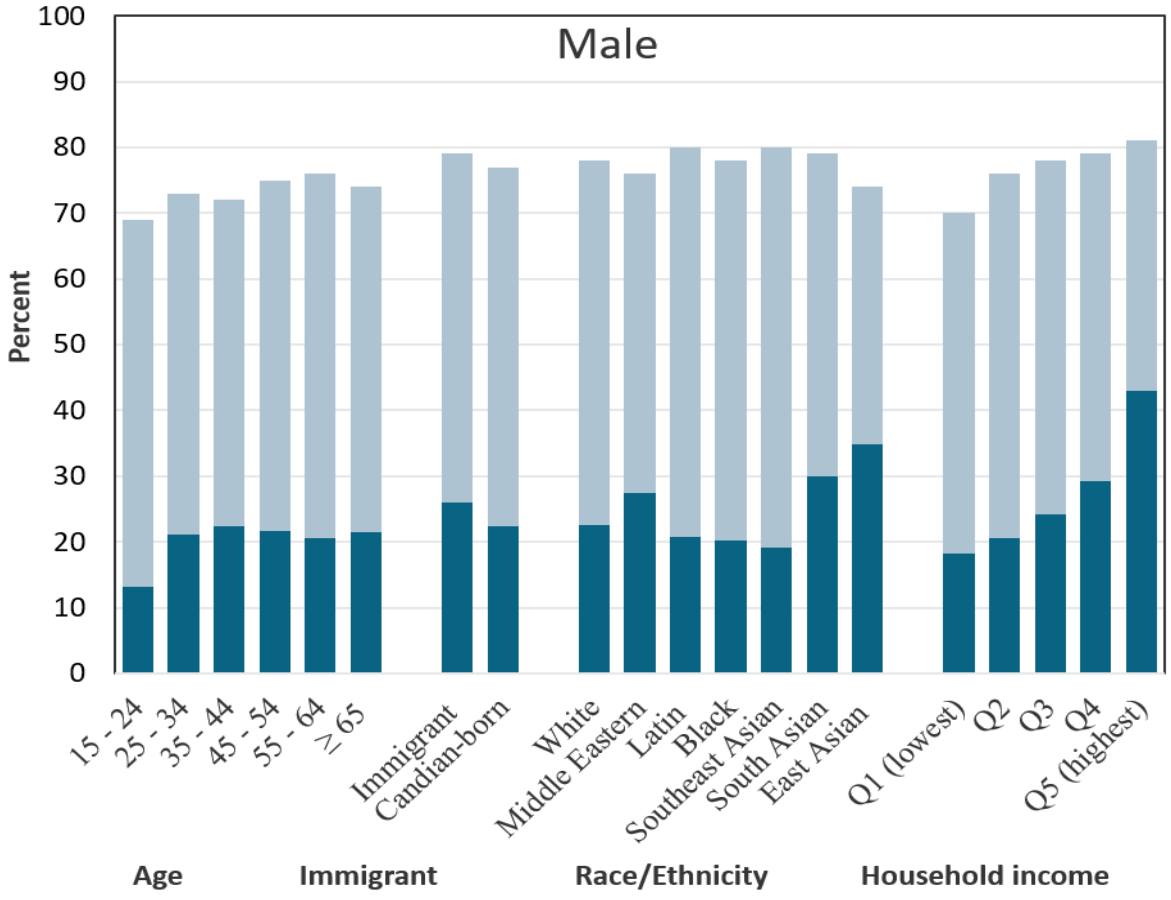


	Occupation	N	Median Income	Female (%)	Racialized (%)
1	Transport truck drivers	17,545	$24,253	2	82
2	Material handlers	6,800	$30,631	30	71
3	Taxi and limousine drivers and chauffeurs	3,700	$13,306	1	91
4	Bus drivers, subway and transit operators	3,395	$49,140	44	60
5	Mail, postal and related workers	1,940	$49,613	50	76

Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: industry, occupation and risk of COVID-19 exposure at work [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Is ‘Essential Work’ Equal across Equity Stratifiers

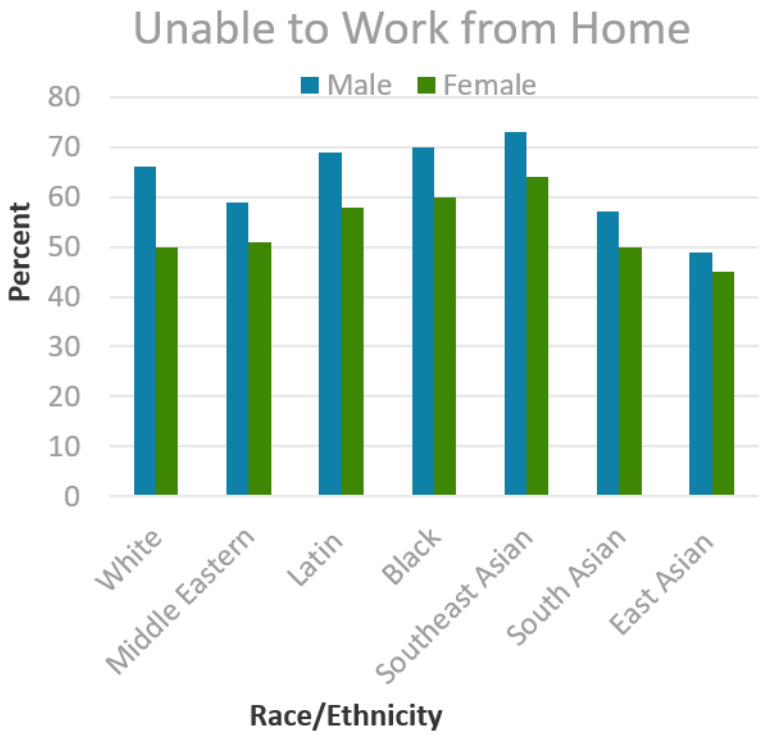


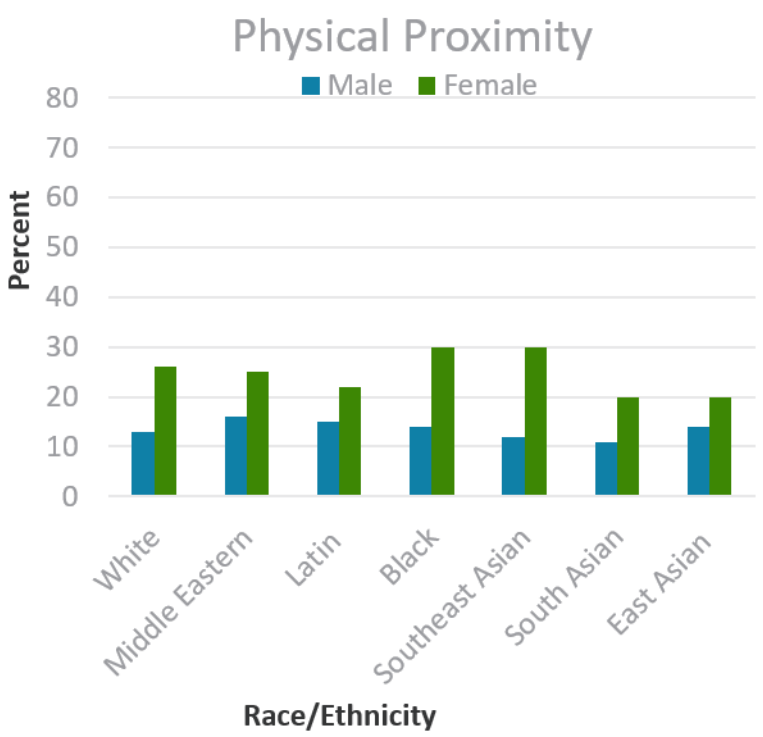


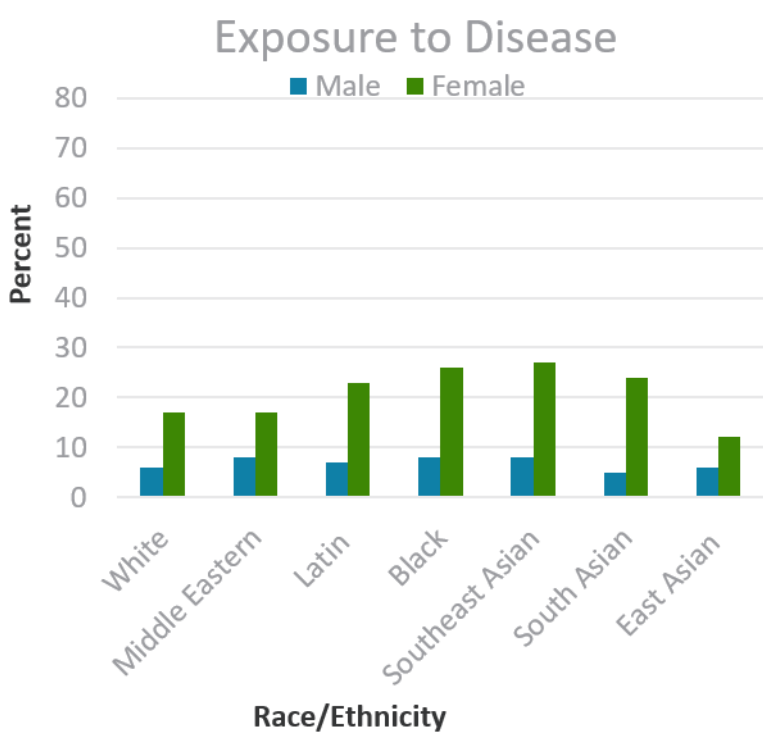
% of Essential That Can Work From Home % Essential Workers

Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: is ‘essential work’ equal across equity stratifiers [Internet]. Toronto, ON: Queen’s Printer for Ontario; 2020 [cited 2020 Dec 17].

High-Risk of Exposure to COVID-19 at Work by Race/Ethnicity

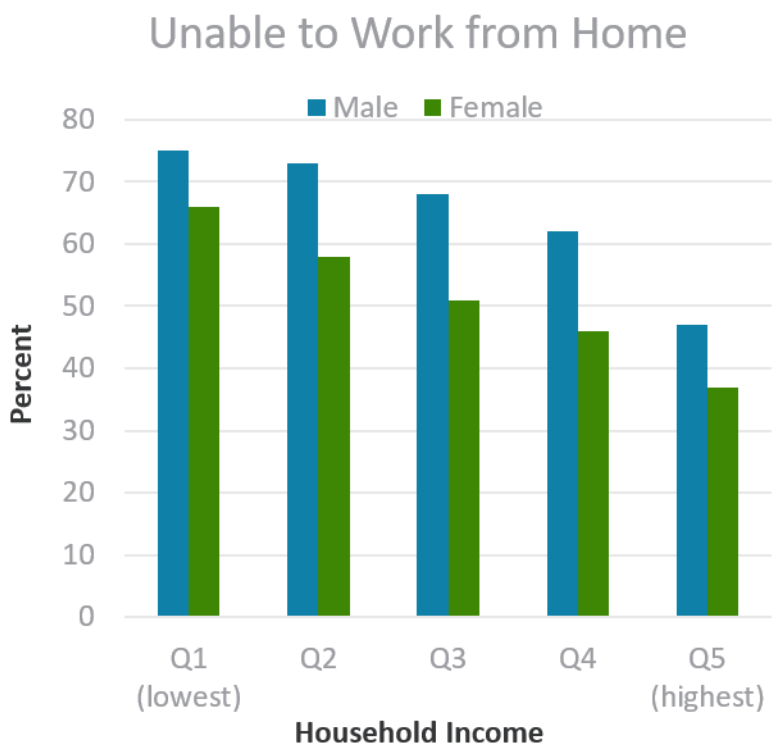


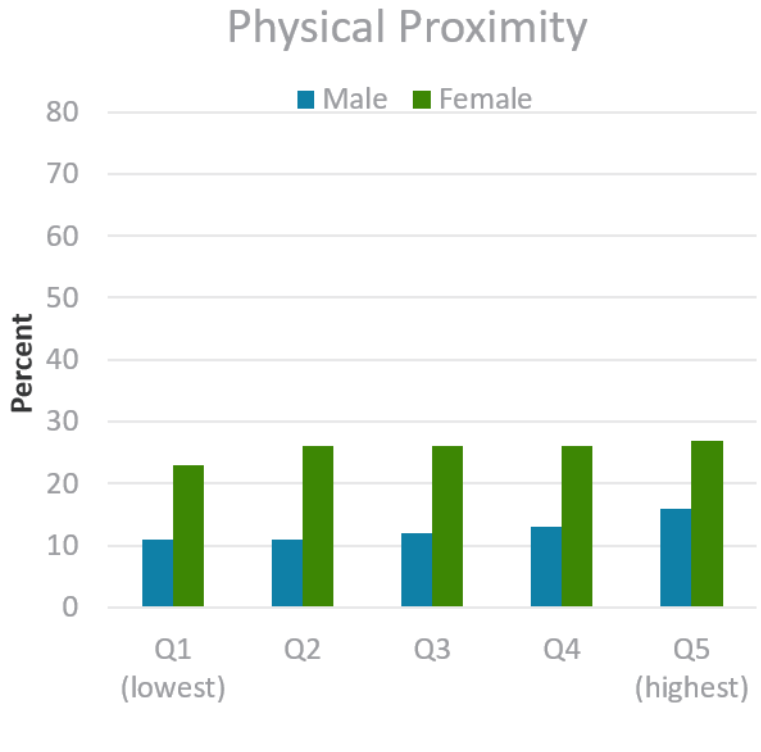


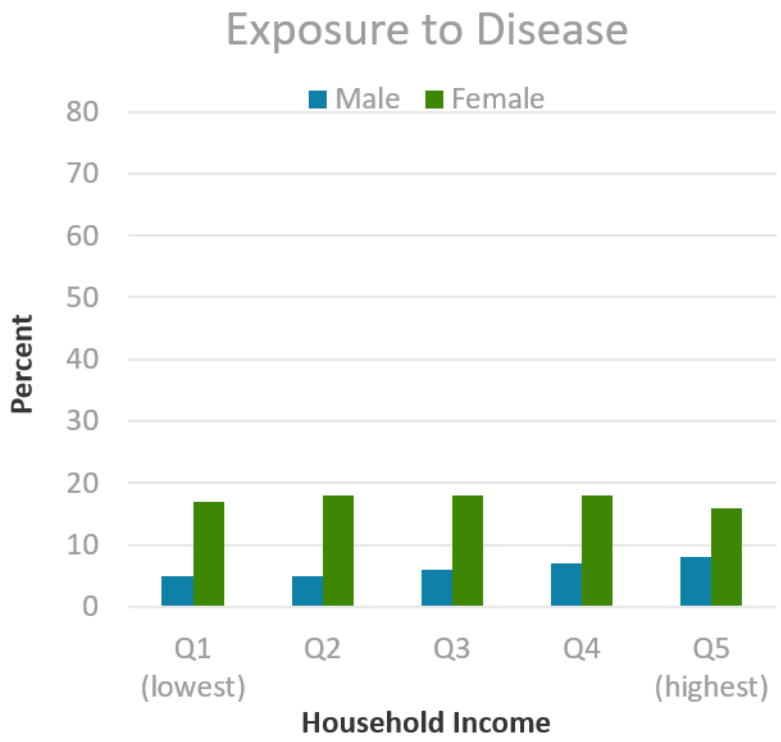


Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: high-risk of exposure to COVID-19 at work by race/ethnicity [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

High-Risk of Exposure to COVID-19 at Work by Household Income







Source: Data as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). Occupational exposure to COVID-19 risk tool: high-risk of exposure to COVID-19 at work by household income [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Dec 17].

Potential Applications

- Team has limited capacity to help provide data and analytical support related to:
  - Data to help inform decisions at regional and provincial levels
    - Lockdown and mitigation strategies for re-opening society using an equity lens
    - E.g., how many workers effected and sociodemographic breakdown, distribution of work characteristics
    - E.g., can inform workplace guidance, personal protective equipment
  - Estimate occupation denominators
    - E.g., vaccination priority planning - the number essential workers across industries
  - Help address research and policy data needs
    - Denominators to estimate COVID-19 rates in healthcare workers, oral health occupations
    - Data to calibrate mathematical models –essential workers working from home across industry
    - Classifying sales in non-essential services to compare to alcohol and cannabis sales

Limitations

- A number of assumptions are made using the available data:
  - Labour market is consistent from 2016 Census data to pre-COVID-19
  - Changes to work exposures are not reflected in any workplace risk measures
    - E.g., PPE use, working from home
  - Labour force estimates do not account for pandemic-related workforce changes
  - Ecological measures of workplace exposures are similar between US and Canada
  - Risk of exposure is related to work and not places (e.g., workers at a workplace but not risk of the public visiting workplace)
  - Missing information occupational factors (e.g., paid sick leave and precarious work)
- The Occupational Exposure to COVID-19 Risk Tool doesn't examine COVID-19 cases, only workplace characteristics related to risk of exposure to COVID-19

Strengths

- Open sourced data tool using existing, publically available data
- The large sample size of the 2016 Census allows occupational risk of exposure to be simultaneously across:
  - Intersectionality of risk across multiple equity stratifiers, essential service workers at multiple levels of geography (regional, provincial and federal) and ability to work from home
- Provides data to assist with regional decision-making and planning
- **Disaggregates** occupational exposure to COVID-19 risk **by race/ ethnicity**

Conclusions/Next Steps

- Early findings demonstrate differential occupational exposure to COVID-19 across a number of equity stratifiers
- A link to the Tool will now be provided in the chat box
- We hope to hear from you!!!
  - Can’t find what you are looking for?
  - Need help answering a question?
  - Suggested improvements or data/information you would like to see added?

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Thank you!

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