

# The impact of Covid-19 on the health of physicians, nurses and other healthcare workers: an interprovincial cohort study

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## Introduction

During the early months of the Covid-19 pandemic, studies demonstrated that healthcare workers (HCWs) were at increased risk of infection. Few modifiable risks were identified. It is largely unknown how these evolved over time.

## Objective

An interprovincial cohort of HCWs was established to assess the impact of working through the Covid-19 pandemic on their health, identify roles/tasks associated with infection, and lapses in control leading to greater risk.

## Methods

### Prospective cohort

**Participants** – Physicians (MDs) from AB, BC, ON, QC; Registered nurse (RNs), Licensed practical nurses (LPNs) & Health care aides (HCAs) from AB; Personal support workers (PSWs) from ON.

**Online questionnaires** – Early 2020, fall 2020, spring/summer 2021, spring/summer 2022: details of work tasks & conditions, Covid-19 infection, vaccination and mental health.

**Serology blood samples** – Pre-vaccine in late 2020 & post-vaccine samples 4, 7, 10 and 13 months after first vaccination.

### Within cohort nested case-referent study

**Participants** – Cases of Covid-19, confirmed by polymerase chain reaction, self-reported between Oct. 2020-March 2022, matched with up to 4 non-infected referents on job, province, gender, and date of first vaccination.

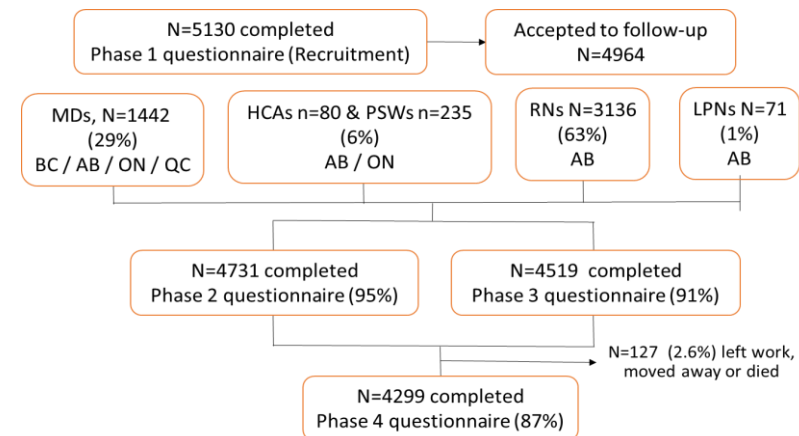
**Online questionnaire** – Exposures & experiences in the 21 days prior to case date.

**Statistical analysis** – Mixed effects logistic regression allowing for competing exposures.

AB: Alberta; BC: British Columbia; ON: Ontario; QC: Quebec

## Results – Prospective cohort

**Figure 1.** Questionnaire completion by phase.



**Table 1.** Factors associated with completion of final questionnaire.

Factor (vs. no or stated category)	Value	Total eligible N	Completed final questionnaire		Multivariable logistic regression	
			n	%	OR	95% CI
Sex (vs. other)	Female	4012	3558	88.7	1.29	0.94-1.77
<b>Age</b> (vs. < 40 y.o.)	40 < 55 y	1818	1608	88.4	1.21	0.96-1.53
	<b>55+</b>	1191	1113	93.5	<b>2.73</b>	<b>1.97-3.78</b>
<b>Married/de-facto</b>	<b>Yes</b>	3533	3199	90.5	<b>1.64</b>	<b>1.29-2.07</b>
Child at home < 18 y	Yes	2087	1867	89.5	1.14	0.90-1.44
Smoked tobacco, last 12 mo.	Yes	266	224	84.2	0.81	0.55-1.19
Chronic lung disease	Yes	76	71	93.4	1.70	0.60-4.83
Asthma medications, last 12 mo.	Yes	610	555	91.0	1.17	0.85-1.59
Treated anxiety/depression, last 12 mo.	Yes	1027	913	88.9	0.95	0.75-1.20
Direct contact with patients	Yes	4101	3650	89.0	1.01	0.71-1.42
<b>Completed final questionnaire</b>		<b>4837</b>	<b>4299</b>	<b>88.9</b>		<b>4209</b>

### Serology blood samples

- 60% of cohort gave a pre-vaccine sample (n=2940); 60% of these gave at least one post-vaccine sample (n=2752).
- Being 40 y.o. and older and living with a partner were also associated with giving blood samples.

## Results – Nested case-referent study

533 cases matched with 1697 referents.  
MDs: 20%; RNs: 74%; HCAs & PSWs: 3.6%; LPNs: 2.4%

Among **unvaccinated HCWs**, ↑ risk of infection with:

- direct contact with COVID-19 patients (OR 2.6, 95%CI 1.5-4.7);
- working on designated COVID-19 ward (OR 4.7, 95%CI 1.9-11.9);
- handling objects used by COVID-19 patients (OR 2.0, 95%CI 1.2-3.5);
- work in residential institutions (OR 2.4, 95%CI 1.0-5.8)/geriatric wards (OR 4.0, 95%CI 1.2-12.6).

Later, with **near universal HCW vaccination**, ↑ risk of infection if:

- being unable to access a N95 mask (OR 2.9, 95%CI 1.3-6.3);
- using decontaminated N95 masks (OR 2.8, 95%CI 1.4-5.8).

## Conclusions

### Prospective cohort study

- Successful recruitment of diverse cohort of HCWs across Canada with excellent retention rates (→ lower probability of important bias).
- This large prospective cohort provides valuable data on modifiable workplace factors, adverse outcomes of Covid-19 and mental ill-health

### Case-referent study

- Risks of Covid-19 infection from work in health care are now largely contained in Canada but with need for continued vigilance.

## References

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