**Evidence-Based Practice Group**
**Answers to Clinical Questions**

# The Risk of Severe Acute Respiratory Syndrome (SARS) Infection Among Workers

## A Rapid Review

By

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**for**

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WorkSafeBC **Clinical Services – Worker and Employer Services**

# About this report

## The Risk of Severe Acute Respiratory Syndrome (SARS) Infection Among Workers

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### About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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## Objective:

To determine whether or not workers in any occupation are at greater risk of SARS infection.

## Methods:

### Search Strategy

A search was conducted on Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) 1946 to May 13, 2020.

The following terms and search strategy were used to identify analytic epidemiologic studies on SARS:

1. ((severe adj acute adj respiratory adj syndrome) or (severe adj acute adj respiratory adj syndrome coronavirus) or SARS or SARS-CoV or SARS-CoV-1) {Including Related Terms}
2. Coronavirus, SARS/
3. Severe Acute Respiratory Syndrome/
4. or/1-3
5. ((occupation or occupational or work or working) and (cause or causation or (risk adj factor) or association or etiology)) {Including Related Terms}
6. ((occupation or occupational or work or working) and risk) {Including Related Terms}
7. ((occupation or occupational or work or working) and epidemiology) {Including Related Terms}
8. (occupation or occupational or work or working) and (incidence OR prevalence OR attack rate) {Including Related Terms}
9. Occupational Exposure/
10. ((worker* OR employee*) AND exposure*) {Including Related Terms}
11. or/5-10
12. 4 and 11
13. Case-Control Studies/ or Control Groups/ or Matched-Pair Analysis/ or retrospective studies/ or ((case* adj5 control*) or (case adj3 comparison*) or control group*).ti,ab,kw.
14. cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ or cohort.ti,ab. or longitudinal.ti,ab. or prospective.ti,ab. or retrospective.ti,ab.
15. 13 or 14
16. 12 and 15

From the search strategy, 17 citations were identified. Upon screening of titles and abstracts, 10 were considered relevant and were subsequently retrieved for full-text screening.[1–10] After full-text screening, 4 papers were confirmed as relevant and included in this review.[4,6,7,10]

Additionally, on May 12, 2020, the Evidence Based Practice Group received a pre-publication email announcement from the ACP Journal Club regarding a systematic review on the risk factors for coronavirus infection in health care workers.[11] From that review, we identified two additional analytic studies that were of relevance to our review.[12,13] In total, six articles were included in this review.

## Study Characteristics and Results:

Appendix 1 summarizes the characteristics and results of the studies included in this review.

We found six articles that had the potential to estimate either the relative risk (RR = the risk of disease among one group divided by the risk of disease in a control group) or the odds ratio (OR = the odds of disease among one group divided by the odds of disease in a control group) of SARS-CoV infection among workers in comparison to another group of workers or some other appropriate control population.[4,6,7,10,12,13]

### Case Control Studies

#### 1. Nishiuri 2005

In a small study of health care workers (HCWs) at a single hospital in Hanoi, 29 cases with lab-confirmed SARS were compared to 98 control subjects who were employed at the same hospital and had also had contact with confirmed SARS cases.[13] Participants were surveyed in detail about their use of personal protection equipment (PPE) and hygiene habits during work. In unadjusted bivariate analyses, medical doctors were not at increased risk of infection compared to other hospital workers (OR = 0.8 [95% CI: 0.2 to 2.9]) but nurses had a three-fold greater risk of infection (OR = 3.2 [95% CI: 1.3 to 7.7]). These results were not adjusted for the likely effects of other underlying confounders.

#### 2. Reynolds 2006

From an initial cohort study of 193 hospital staff in Vietnam, Reynolds et al. conducted a nested case control study in an attempt to identify specific work activities that were associated with contracting SARS-CoV infection.[6] Cases consisted of 22 hospital employees who had likely contracted SARS from an index patient. They were compared to 45 control employees from the same hospital who did not develop an infection and had been seronegative for at least 18 days after exposure to the same patient. Information about work activities and potential exposure to the index patient was collected through self-administered questionnaires. All participants were also asked specifically about degree of proximity (but not frequency or duration) of contact.

Overall, participants in non-clinical positions were 80% less likely than those in clinical positions to test positive for SARS-CoV after exposure to the index case (OR = 0.2 [95% CI not reported, but P value = 0.011 is significant). (By inverting this odds ratio, this effect can also be expressed as a 5-fold increase in risk for participants in clinical positions compared to non-clinical positions.)

Nearly all activities involving physical proximity to the index patient were significantly associated with an increased risk of SARS-CoV infection. Such activities included having: come within 1 meter of index patient (OR = 9.3 [95% CI: 2.8 to 30.9]); come within 1 meter of index patient, without ever wearing a mask (OR = 5.4 [95% CI: 1.8 to 16.3]); spoke with index patient (OR = 3.5 [95% CI: 1.2 to 10.4]); entered patient's room (OR = 20.0 [95% CI: 4.1 to 97.1]); spoke with index patient in his room (OR = 3.7 [1.1 to 12.6]); saw (viewed) index patient (OR = 14.0 [95% CI: 3.6 to 55.3]); visited patient room when patient was not there (OR = 3.7 [95% CI: 1.3 to 10.9]); touched visibly contaminated surface (OR = 7.8 [2.3 to 25.9]); or entered general ward (OR = 8.0 [95% CI: 1.7 to 38.4]).

This study has important limitations. A multivariable analysis was not performed therefore none of the reported associations have been adjusted for the underlying effects of other important risk factors or confounding variables. Furthermore, many of the described work activities are correlated with, and therefore not independent from, each other. This may explain the unintuitive pattern of some of the odds ratios. For example, the unadjusted odds ratio for the risk of merely entering the index patient's room (OR = 20) is inconceivably higher than the odds ratio for the more acute risk of coming within 1 meter of the index patient without ever using a mask (OR only 1.9).

The likelihood of selection bias also has to be considered in this study as only 64% of hospital staff volunteered to submit a serological specimen for testing. Furthermore, the serological status of 63% of otherwise eligible control subjects was "undetermined" and therefore these subjects were excluded from the analysis.

### 3. Yu 2003

One other relevant case control study was by reported by Yu and colleagues.[10] Many important methodological details of this study were not reported. However this study compared the seroprevalence of SARS among live animal traders in Guangdong Province to that of three local control groups: 1) health-care workers involved with SARS control in two city hospitals; 2) public health workers in the Guangdong Centre for Disease Control (CDC) facility; and 3) healthy adults visiting a clinic for routine physical examinations. Cases were identified based on detection of serum IgG antibody to SARS-CoV by enzyme-linked immunosorbent assay (ELISA). We used the raw data from this article to re-calculate odds ratios that compare the risk of infection among hospital workers to each of the other worker groups. In this regard the risk of infection among hospital workers was 80% lower compared to live animal traders (OR = 0.20 [95% CI: 0.05 to 0.56]).

Comparisons against other control groups were not statistically significant as the number of cases was small and the precision of the estimates were unstable.

The authors reported that at the time that this study was conducted, validation of the ELISA kit that was used had not yet been completed, and the IgG antibody test could not distinguish recent from remote infection.

It is not clear how individual subjects in the control groups were selected or matched, if at all, to case subjects in terms of age, sex, timing of study entry or other potentially important confounding variables. No bivariate or multivariable analyses were provided and therefore the reported (as well as our recalculated) odds ratios for the effects of occupation are not adjusted for underlying imbalances in important risk factors or potential confounders between comparison groups.

### Cohort studies

#### 1. Fowler 2004

In a retrospective cohort study of 122 physicians and nurses from a Toronto hospital intensive care unit (ICU), the risk of SARS infection was compared between nurse and physician groups who had performed intubation and/or two different ventilation procedures on SARS patients.[12] In unadjusted bivariate analyses only, nurses who assisted in endotracheal intubation were 21-times more likely to develop SARS than nurses who cared for patients in the ICU at other times (RR = 21.38 [95% CI: 4.89 to 93.37]). Interestingly, physicians who performed the intubations were not at significantly greater risk of infection (RR = 3.82 [95% CI: 0.23 to 62.24]). No multivariable analysis or other method of controlling for underlying confounders was performed.

#### 2. Loeb 2004

Loeb et al. retrospectively studied a small cohort of 43 nurses who had worked one or more shifts in a hospital intensive care unit (ICU) or coronary care unit (CCU) during a time when a SARS patient resided there.[4] Multiple variables relating to exposure were ascertained through self-reported questionnaires and subsequent interviews. Self-reported data was corroborated whenever possible by data from patients' chart notes. Information was also collected about type and duration of patient care activities that were performed, types of PPE used, and the duration and frequency of PPE equipment use when caring for SARS patients.

Overall, eight nurses were infected with SARS. None of these infections occurred among nurses who had not entered a SARS patient's room.
For nurses who always wore an N95 mask, the risk of infection was 78% lower (RR = 0.22 (95%CI: 0.05 to 0.93]) compared to nurses who did not wear any (N95 or surgical) mask consistently. For nurses who always wore a surgical (but

not N95) mask the risk of infection was 55% lower (RR = 0.45 [95%CI: 0.07 to 2.71]) in comparison to nurses who did not wear any mask consistently.

When comparing users of N95 masks to those using surgical masks, the difference in the risk of infection was not significant (RR = 0.5 [95% CI 0.06 to 4.23]).

Three specific patient care activities were associated with SARS infection: 1) intubating (RR = 4.20 [95% CI: 1.58 to 11.14]); 2) suctioning before intubation (RR = 4.20 [95% CI: 1.58 to 11.14, p = 0.04); and 3) manipulating an oxygen mask (9.0 RR, 95% CI 1.25 to 64. 9]).

Again, a multivariable analysis was not conducted and, therefore, these results are not adjusted for the effects of other risk factors and potential confounding variables.

**3. Wang 2009**

In a large retrospective cohort study by Wang and colleagues, structured questionnaires were sent to 2,512 workers at two university teaching hospitals in Taiwan.[7] A response rate of 87.5% was achieved. Of 2,197 respondents, 882 reported having had contact with SARS patients, but only 9 of the 2,197 subjects (0.4%) displayed positive findings for SARS-CoV IgG antibody. Among HCWs overall, the risk of contracting SARS for HCWs in the emergency room (ER) – regardless of whether close contact had occurred – was estimated to be 26 times higher than the corresponding risk for HCWs who had worked only in the ordinary ward (RR = 25.94 [95% CI: 7.0 to 95.14]).

Among HCWs who specifically had close contact with SARS patients, the risk of infection was not as high, but still significantly greater for HCWs in the ER compared to HCWs in the ordinary ward (RR = 9.45 [95% CI: 2.58 to 34.64]).

No multivariable analysis was performed and therefore these effects are likely confounded by the underlying effects of other important risk factors for infection.

## **Discussion**:

In this rapid review, we identified six analytic studies, all of which had significant reporting or methodological limitations and were therefore at considerable risk of bias. None of the studies utilized methodological or statistical methods to estimate the independent adjusted effect of occupation or type of work on the risk of infection after controlling for confounding variables. For both of the above reasons, the results from the reviewed studies must be interpreted cautiously.

We did not find any studies that compared the risk of infection among workers to that of the general population.

Within one case control study, nurses had a 3-fold greater unadjusted risk of infection whereas other hospital workers groups, including physicians, showed no significantly greater risk of acquiring an infection. Yet in another study, a 5-fold increase in the unadjusted risk of infection was reported for clinical versus non-clinical hospital workers. Specific activities requiring close proximity to infected patients were also associated with increases in the unadjusted risk of infection. Nurses assisting with intubation appeared to be at greater risk of infection than nurses not assisting with intubation.

Within the cohort studies, nurses were found to be at greater risk of infection if having entered the room of a SARS patient, however the effect was greatly attenuated by the use of PPE. In this regard, nurses who always wore a surgical (but not N95) mask had 55% lower risk of infection, and nurses who always wore an N95 mask had 78% lower risk of infection compared to nurses who did not wear any mask consistently. As was evident in the case control studies, patient care interventions such as intubating, suctioning before intubation and manipulating an oxygen mask were associated with increased unadjusted risks of infection.

HCWs in emergency rooms were more at risk of infection than HCWs in “ordinary” wards. However, HCWs in the ER who engaged in known contact with SARS patients had weaker increases in infection risk than HCWs in the ER in general. This possibly reflects more diligent use (and effectiveness) of PPE and other precautions by workers when knowingly in close contact with infected patients.

As with studies of other serious infectious diseases, we caution that the rates of SARS infection and diagnosis specifically among HCWs may be inflated by higher rates of testing in comparison to other populations. This is understandable given the need to quarantine, and test symptomatic HCWs in order to prevent transmission to patients and co-workers within hospitals and other health care facilities.

## Summary:

- In this rapid review, we identified only 6 analytic epidemiologic studies, all of low reporting and/or methodological quality
- Estimates of the relative risk of infection between different workers and/or types of work activities was possible at only a very crude level that did not account for the potential distortional effects of important confounding variables.
- Currently, there is some consistency of findings between studies to suggest a higher risk of SARS-CoV infection among *some* HCWs, particularly nurses performing activities in close proximity to infected patients; however, the studies themselves were of low reporting and/or methodological quality.
- Based on the limited analytic epidemiologic research currently available, the general conclusion of this rapid review is that there is weak evidence of a consistent association between nurses who work closely with SARS patients and a greater risk of SARS-Cov infection.

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## Appendix 1: Characteristics and Findings of Included Studies

| Author | Study design/features | Primary sample size (analysed) | Country | Study population & setting | Exposure &/or case definition/history | Outcome (COVID-19) ascertainment | Intended objective or analysis | Data sources | Worker-related results | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Nishiura et al 2005** | Case control | 29 cases, 98 controls | Vietnam | HCWs from single hospital in Hanoi. | Controls were employed at the hospital and had contact with confirmed cases. | Cases had lab-confirmed SARS. | To examine relationship between SARS and precautionary behaviours undertaken by exposed workers at hospital. | Survey about PPE and hygiene habits. | Unadjusted odds ratios (95% CI) by occupation:<br><br>Medical doctors, 0.8 (0.2–2.9); Nurses, 3.2 (1.3–7.7); Other co-medicals, 2.2 (0.9–5.2); Relatives of patients, < 0.1 (0.0–0.4). | No multivariable analysis. |
| **Reynolds et al 2006** | Nested case-control study | 193 in cohort (67 in nested case control) | Vietnam | Cohort of hospital staff at Hospital A, a small (<60 bed) private facility in Hanoi, Vietnam. | Worked at least one shift during index patient's stay. | Laboratory confirmation of SARS-CoV infection was performed at the Centers for Disease Control and Prevention (Atlanta, Georgia, USA) and was based either on detection of RNA from SARS-CoV in clinical specimens (via reverse transcriptase polymerase chain reaction assays, RT-PCR), or by serology. | To ascertain the extent of SARS-CoV transmission among the clinical and non-clinical staff at the hospital and to determine the nature of the initial exposures to the index patient that resulted in a substantial transmission event. | Information was collected regarding contact with index patient during stay in the hospital, as well as symptoms from the time index patient was admitted to the hospital until 10 days after patient was transferred.<br><br>Self-reported symptoms were checked against case investigation forms for 42 staff members.<br><br>Participants were asked about whether they had ever engaged in a series of work activities relating to exposure to the index patient. | 79% of Hospital A staff completed the exposure and symptom questionnaire.<br><br>29 of the 36 SARS cases (81%) at Hospital A occurred among clinical personnel with direct patient care or ancillary clinical roles.<br><br>The highest SARS attack rates occurred among nurses who worked in the outpatient and inpatient general wards (57.1, 47.4%, respectively).<br><br>Nurses assigned to the operating room/intensive care unit, experienced the lowest attack rates (7.1%) among all clinical staff.<br><br>Non-clinical personnel were affected as well, with 19% of cases (n = 7) occurring among housekeepers and other cleaning staff (n = 5), kitchen staff (n = 1), and receptionists (n = 1).<br><br>Of the 124 Hospital A staff who participated in the serosurvey, 36 (29%) had at least one serum specimen that tested positive for the presence of antibody to SARS-CoV antigen including 4 individuals, including 2 non-clinical workers, who had not previously been identified as SARS cases. Having a non-clinical staff position was protective (O.R. = 0.2, p = 0.011). | No proper risk-set sampling for controls.<br><br>Survivor sampling used instead (all workers who didn't get SARS were automatically part of the control group), which doesn't ensure representativeness of controls to the source population in terms of other risk factors and potential confounders. |

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| | | | | | | | | | Odds ratios (95% CI) for risky work activities:<br>Touched index patient, 2.8 (0.9–8.5);<br>Talked to or touched index patient without mask (ever), 1.9 (0.6–5.9);<br>Came within 1 meter of index patient, 9.3 (2.8–30.9);<br>Came within 1 meter of index patient, without mask (ever), 5.4 (1.8–16.3);<br>Spoke with index patient, 3.5 (1.2–10.4);<br>Entered patient room, 20.0 (4.1–97.1);<br>Spoke with index patient in his room, 3.7 (1.1–12.6);<br>Saw (viewed) index patient,14.0 (3.6–55.3);<br>Visited patient room when patient was not there, 3.7 (1.3–10.9);<br>Touched visibly contaminated surface, 7.8 (2.3–25.9);<br>Entered general ward, 8.0 (1.7–38.4). | |
| **Yu (Centers for Disease Control and Prevention (CDC)) et al 2003** | Seroprevalence & case-control | 792 | China | Asymptomatic animal traders in three animal markets in Guangzhou, Guangdong Province, and persons in three control groups:<br>1) HCWs involved with SARS control in two city hospitals,<br>2) public health workers in the Guangdong CDC facility, and<br>3) healthy adults visiting a clinic for routine physical examinations. | Animal traders in three animal markets compared to 3 other worker control groups. | A sample of blood (5 mL) was drawn from each subject, and IgG antibody to SARS-CoV was tested by enzyme-linked immunosorbent assay (ELISA) by using the test kit (batch no. 20030501) manufactured by Beijing Huada GBI Biotechnology Co. Ltd., Beijing. | To compare the seroprevalence of SARS-CoV IgG antibody in animal traders (i.e., workers in live animal markets) with that of persons in control groups. | Seroprevalence study conducted by the Guangdong Center for Disease Control and Prevention (CDC) in conjunction with the Guangzhou CDC, Baiyun District CDC, and Shijing Township Hospital | Of 792 persons tested, IgG antibody to SARS-CoV was detected in 72 (9.1%).<br><br>Positive rates were highest in the trader group (13.0%), compared with the three control groups (Hospital workers (2.9%), Guangdong CDC workers (1.6%), Healthy adults at clinic (1.2%).<br><br>Among animal traders, the highest prevalence of antibody was found among those who traded primarily masked palm civets (72.7%), wild boars (57.1%), muntjac deer (56.3%), hares (46.2%), and pheasant (33.3%).<br><br>Calculated odds ratios (& 95% confidence limits) for hospital workers vs: animal traders, 0.20 (0.05 - 0.56); Guangdong CDC workers, 1.86 (0.18 - 93.28); healthy adults at clinic, 2.50 (0.24 - 124.37). Only the comparison between hospital workers and animal traders is statistically significant. | Seroprevalence study.<br><br>Estimation of prevalence of asymptomatic infection with SARS-CoV or an antigenically related virus occurred in Guangdong Province, but not of workers who actually fall ill. Control groups could easily differ systematically from cases in terms of other risk factors and confounders for SARS infection.<br><br>No table of demographic or clinical characteristics of participants to verify comparability between groups in terms of important risk factors and confounders.<br><br>No multivariable analysis. |

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| **Fowler et al 2004** | Retrospective cohort study | 122 | Canada | HCWs in intensive care unit. | Physicians and nurses performing endotracheal intubation and ventilation procedures on nine patients treated for SARS. | | To determine whether specific ventilatory strategies (high-frequency oscillatory [HFO] ventilation and noninvasive positive-pressure ventilation [NIPPV]) were associated with an increased risk of SARS development in healthcare workers. | | Nurses who assisted in endotracheal intubation were much more likely to develop SARS than were nurses who cared for patients with SARS in the ICU at other times (RR, 21.38; 95% CI, 4.89 to 93.37; p 0.001). Physician's were not at significantly greater risk (RR, 3.82; 95% CI, 0.23 to 62.24).<br><br>Nurses caring for patients receiving NIPPV may have been more likely to develop SARS than nurses caring for patients with SARS treated with conventional ventilation (RR, 2.33; 95% CI, 0.25 to 21.76; p 0.5), but this was not statistically significant.<br><br>Nurses caring for patients with SARS receiving HFO did not appear to have an increased risk of developing SARS than did nurses who cared for patients with SARS who received conventional mechanical ventilation (RR, 0.74; 95% CI, 0.11 to 4.92; p 0.6) (Table 3). The association was similar when examined by nursing shift at risk (RR, 0.55; 95% CI, 0.1 to 3.12; p 0.8), and neither reached statistical significance. | No multivariable analysis.<br><br>Small study therefore precision of estimates is low. |
| **Loeb et al 2004** | Retrospective cohort study | 43 | Canada | Nurses who worked in two critical care units in a Toronto hospital. | Nurses who worked one or more shifts in hospital A's ICU from March 8 to 13 and from March 17 to 21 (i.e., when a SARS patient was in the unit) were included in the cohort.<br><br>Similarly, nurses who worked one or more shifts from March 14 to March 16 in hospital A's CCU were included. | Nurses who met the suspected or probable case definition and the three SARS source patients were tested for antibodies against SARS-associated coronavirus by immunofluorescence. | To determine factors that predispose or protect healthcare workers from severe acute respiratory syndrome (SARS). | Using a standardized data collection form, trained research nurses abstracted information regarding the patient care activities administered by the critical care nurses. | 43 nurses worked at least one shift in a critical care unit where there was a patient with SARS.<br><br>8 nurses were infected with SARS. None of the 11 nurses who did not enter a SARS patient's room became ill.<br><br>The most common symptoms included: fever (8 [100%] of 8), myalgia (7 [87.5%] of 8), cough (6 [75%] of 8) and chills (6 [75%] of 8).<br><br>5 nurses (62.5%) had headaches, and 4 (50%) had shortness of breath. Of the 8 nurses, 4 (probable SARS case-patients) had unilateral infiltrates on chest radiograph and 4 (suspected SARS case-patients) had normal chest radiographs. 3 (13%) of 23 nurses who consistently wore a mask (either surgical or N95) acquired SARS compared to 5 | No multivariable analysis. |

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| | | | | | | | | | (56%) of 9 nurses who did not consistently wear a mask (RR 0.23, 95% CI 0.07 to 0.78, p = 0.02). The RR for infection was 0.22 (95%CI 0.05 to 0.93, p = 0.06) when nurses who always wore an N95 mask (2 SARS infected and 14 noninfected nurses) were compared with nurses who did not wear any mask (N95 or surgical mask) consistently (5 SARS-infected and 4 noninfected nurses).<br><br>The RR for infection was 0.45 (95%CI 0.07 to 2.71, p = 0.56) when nurses who always wore a surgical mask (1 SARS-infected and 3 noninfected nurses) were compared with nurses who did not wear any mask (N95 or surgical mask) consistently (5 SARS-infected and 4 for non-SARS nurses).<br><br>The difference for SARS infection for nurses who consistently wore N95 masks and those who consistently wore surgical masks was not significant (RR 0.5, 95% CI 0.06 to 4.23, p = 0.5).<br><br>3 patient care activities were associated with SARS infection: intubating (relative risk [RR] 4.20, 95% CI 1.58 to 11.14, p = 0.04); suctioning before intubation (4.20 RR, 95% CI 1.58 to 11.14, p = 0.04); and manipulating an oxygen mask (9.0 RR, 95% CI 1.25 to 64. 9, p ≤ 0.01).<br><br>It shows that if all nurses had worked eight shifts, 53% of them would become infected with SARS. The probability of SARS infection was 6% (8/143) per shift worked. | |
| **Wang et al 2009** | Retrospective cohort study | 2,197 | Taiwan | HCWs from 2 teaching hospitals and 2 non-teaching hospitals in Taiwan. | Subjects were from 2 teaching hospitals and 2 non-teaching hospitals in Taiwan which were reported to have SARS. | Confirmation of the results of polymerase chain reaction, enzyme-linked immunosorbent assay (ELISA), immunofluorescence assay (IFA) or neutralization antibody testing (NT). | To evaluate the positive rate for SARS-CoV IgG antibody among Taiwanese HCWs deriving from medical facilities for SARS patients. | The structured questionnaire was written to collect relevant information from study participants.<br><br>Content validity of the questionnaire was determined by a panel of experienced researchers who provided suggestions regarding accuracy, adequacy and relevance of questions. | A total of 2512 sets of questionnaires was distributed with a return rate of 87.5% (2197 sets). 882 of the respondents had contact with SARS patients.<br><br>Among 2197 subjects studied, a total of 9 subjects (0.4%) displayed positive findings for SARS-CoV IgG antibody.<br><br>Among workers overall, the RR of contracting SARS for HCWs in the emergency room (ER) was estimated to be | No multivariable analysis. |

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| | | | | 25.94 times greater than the corresponding risk for those HCWs who worked in the ordinary ward (95% CI 7.0-95.14, p<0.001).<br><br>But among HCWs who actually came into contact with SARS patients, the RR for positive serum IgG antibody titer among HCWs from the ER was not as high, although still significantly greater than it was for those working in the ordinary ward (RR 9.45, 95% CI 2.58- 34.64, p = 0.001). |

## Appendix 2: WorkSafeBC - Evidence-Based Practice Group Levels of Evidence

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| **1** | Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs. |
| **2** | Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies. |
| **3** | Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group. |
| **4** | Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be |
| **5** | Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees. |

## References:

1. Canadian Task Force on the Periodic Health Examination: The periodic health examination. CMAJ. 1979;121:1193-1254.
2. Houston TP, Elster AB, Davis RM et al. The US Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition. AMA Council on Scientific Affairs. American Journal of Preventive Medicine. May 1998;14(4):374-376.
3. Scottish Intercollegiate Guidelines Network (2001). SIGN 50: a guideline developers' handbook. SIGN. Edinburgh.
4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003;169(3):207-208.