

COVID-19 Applying the Hierarchy of Control to a Point of Care Risk Assessment for the protection of Health Care Workers

Hierarchy of prevention (control banding) for COVID19

Kevin Hedges, Ph.D., CIH, COH
khedges@ohcow.on.ca
Occupational Hygienist
OHCOW Eastern Clinic



Occupational
Health Clinics
for Ontario
Workers Inc.

Centres de
santé des
travailleurs (ses)
de l'Ontario Inc.

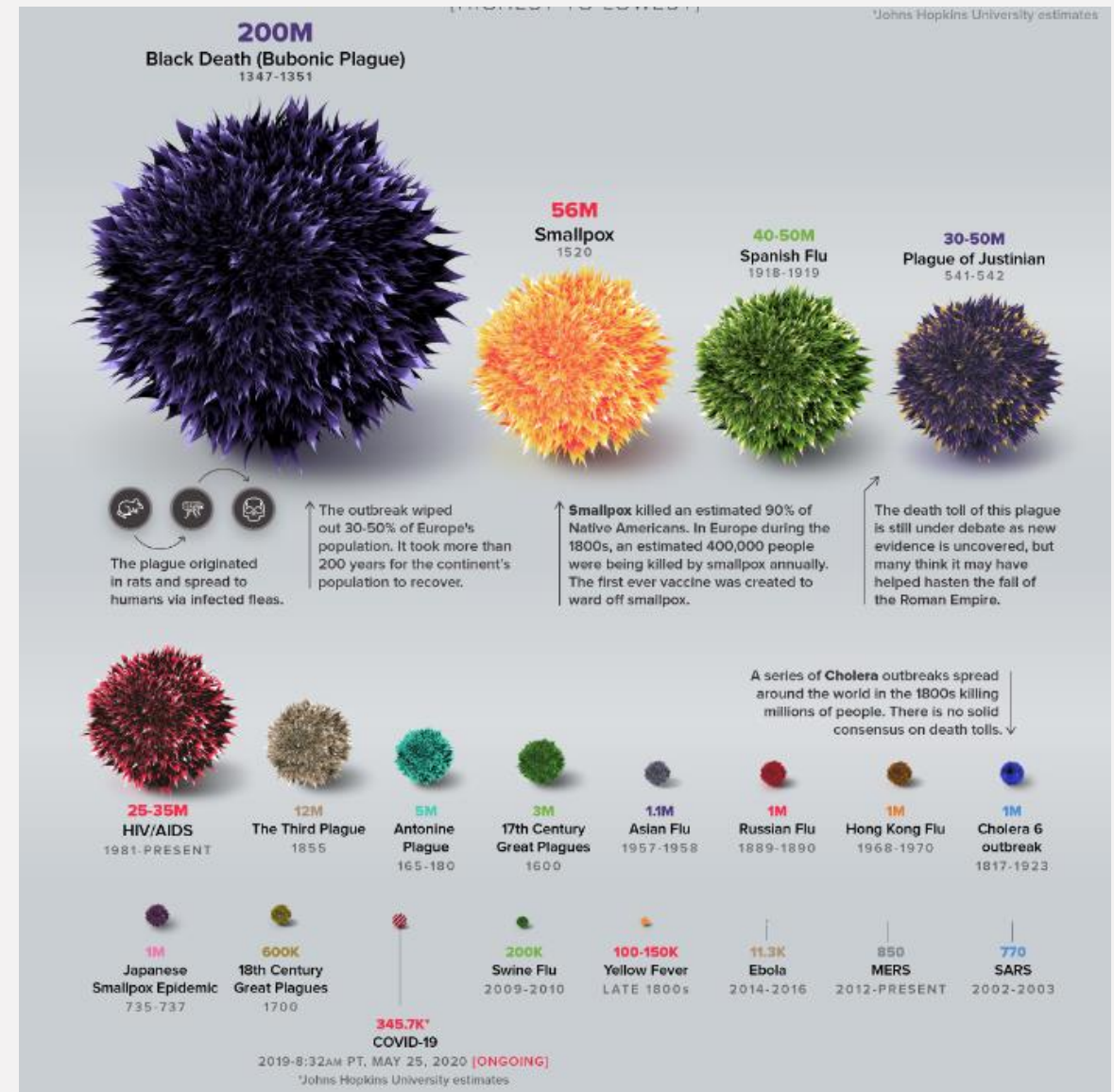
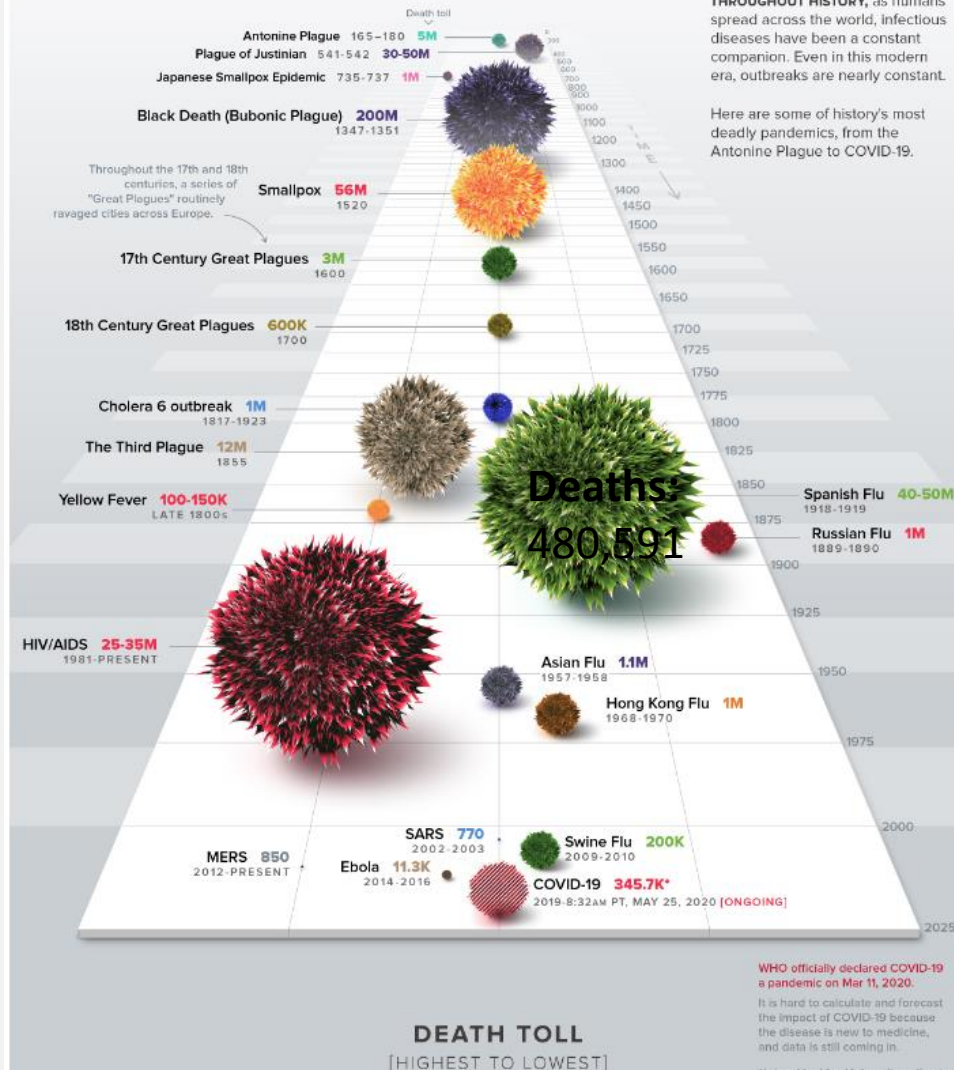
Prevention Through Intervention

HISTORY OF PANDEMICS

PAN-DEM-IC (of a disease) prevalent over a whole country or the world.

THROUGHOUT HISTORY, as humans spread across the world, infectious diseases have been a constant companion. Even in this modern era, outbreaks are nearly constant.

Here are some of history's most deadly pandemics, from the Antonine Plague to COVID-19.



[Visualizing the History of Pandemics](#) (Visual Capitalist March 14, 2020)

Coronavirus exposure

Airborne vs droplet



World Health Organization (WHO)
@WHO



FACT: #COVID19 is NOT airborne. The #coronavirus is mainly transmitted through droplets generated when an infected person coughs, sneezes or speaks. To protect yourself: -keep 1m distance from others -disinfect surfaces frequently -wash/rub your -avoid touching your pic.twitter.com/fpkcpHAJx7

11:44 AM - 28 Mar 2020

FACT CHECK: COVID-19 is NOT airborne

The virus that causes COVID-19 is mainly transmitted through droplets generated when an infected person coughs, sneezes, or speaks. These droplets are too heavy to hang in the air. They quickly fall on floors or surfaces.

You can protect yourself by staying at least 1 meter away from others. If you are sick, stay home and avoid close contact with others. To protect others, wear a mask and avoid touching your eyes, mouth, and nose. Disinfect surfaces that are touched frequently. Regularly clean your hands thoroughly and avoid touching your eyes, mouth, and nose.

World Health Organization March 28 2020 #Coronavirus #COVID19

Confused



medRxiv preprint doi: <https://doi.org/10.1101/2020.05.21.20108894>; this version posted June 5, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a CC-BY-NC-ND 4.0 International license.

AVOIDING COVID-19: AEROSOL GUIDELINES

Matthew J. Evans
Department of Physics
Massachusetts Institute of Technology
Cambridge, MA 02139
m3v4n5@mit.edu

June 4, 2020

ABSTRACT

The COVID-19 pandemic has brought into sharp focus the need to understand respiratory virus transmission mechanisms. In preparation for an anticipated influenza pandemic, a substantial body of literature has developed over the last few decades showing that the short-range aerosol route is an important, though often neglected transmission path. We develop a simple mathematical model for COVID-19 transmission via aerosols, apply it to known outbreaks, and present quantitative guidelines for ventilation and occupancy in the workplace.

Keywords SARS-CoV-2 · COVID-19 · coronavirus · aerosol · airborne

Evans, 2020
Pre-print June, 4 2020.

<https://www.medrxiv.org/content/10.1101/2020.05.21.20108894v3>

“Collectively, these preliminary data suggest that SARS-CoV-2 is resilient in aerosol form”

Persistence of Severe Acute Respiratory Syndrome Coronavirus 2 in Aerosol Suspensions

Alyssa C. Fears, William B. Klimstra, Paul Duprex, Amy Hartman, Scott C. Weaver, Kenneth S. Plante, Dhya Mirchandani, Jessica Ann Plante, Patricia V. Aguilar, Diana Fernández, Apneel Nalika, Apneel Totura, David Dyer, Brian Kearney, Matthew Lackemeyer, J. Kyle Bohannon, Reed Johnson, Robert F. Garry, Doug S. Reed, and Chad J. Royce

Author affiliations: Tulane University School of Medicine, New Orleans, Louisiana, USA (A.C. Fears, R.F. Garry, C.J. Royce); University of Pittsburgh, Pittsburgh, Pennsylvania, USA (W.B. Klimstra, P. Duprex, A. Hartman, D.S. Reed); University of Texas Medical Branch, Galveston, Texas, USA (S.C. Weaver, K.S. Plante, D. Mirchandani, J.A. Plante, P.V. Aguilar, D. Fernández); U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Maryland, USA (A. Nalika, A. Totura, D. Dyer, B. Kearney); National Institute of Allergy and Infectious Diseases, National Institutes of Health, Fort Detrick, Maryland, USA (M. Lackemeyer, J.K. Bohannon, R. Johnson)

On this Page

The Study

Conclusions

Suggested Citation

Figures

Fears et al, 2020
Now **Published** (June 22, 2020) in Emerging Infectious Diseases.

Important paper

March 28, 2020

Precautionary principle approach

“Further studies are needed WHO, March, 29 2020”.

Important for interventions

Occupational Health Clinics for Ontario Workers Inc.
Prevention Through Intervention

“SARS-CoV-2–infected persons may produce viral bioaerosols that remain infectious for long periods after production through human shedding and airborne transport”.



Featured Article

COVID-19 and Advanced Practice Registered Nurses (APRNs): Frontline update #1

Ana Diez Sampedro PhD, APRN, FNP-BC^a, Arturo Gonzalez DNP, APRN, ANP-BC^a, Victor Delgado DNP, APRN, ANP-BC^a, Monica Flowers DNP, APRN, FNP-BC^a, Tatayana Maltseva PhD, APRN, PMHNP-BC^a, Maria Olenick PhD, FNP, RN, FAAN.^a

Show more

<https://doi.org/10.1016/j.nurpra.2020.06.014>

[Get rights and content](#)

Highlights

- APRNs are on the front line of treatment of COVID-19
- APRNs can help with physical and psychological issues caused by COVID-19
- APRNs must regularly review updates on COVID-19 due to rapidly changing guidelines
- Vulnerable populations will face unique challenges from the pandemic
- COVID-19 affects the mental health of the general population and providers

Abstract

COVID-19 emerged in 2019 and rapidly became a global pandemic infecting millions, killing hundreds of thousands. The disease altered the practices of hospitals, clinics, and patients. These changes have implications for Advanced Practice Registered Nurses (APRNs). APRNs must remain current on best practices for treatment and diagnosis of COVID-19 while being cognizant of changes to their scope of practice. As the pandemic continues, APRNs will remain on the front lines treating COVID-19 patients while also caring for vulnerable populations within the community. To provide high-quality care, APRNs must utilize a multi-faceted approach that heeds ongoing updates to evidence-based practice.

Sampedro et al. 2020, [COVID-19 and Advanced Practice Registered Nurses \(APRNs\): Frontline update #1](#) The Journal for Nurse Practitioners, In-press Journal Pre-proof.

Risk to Canadians

COVID-19 is a serious health threat, and the situation is evolving daily. The risk will vary between and within communities, but given the increasing number of cases in Canada, the risk to Canadians is considered **high**.

This does not mean that all Canadians will get the disease. It means that there is already a significant impact on our health care system. If we do not flatten the epidemic curve now, the increase of COVID-19 cases could impact health care resources available to Canadians.

We continue to reassess the public health risk based on the best available evidence as the situation evolves.

Who is most at risk

While COVID-19 can make anyone sick, some Canadians with specific health circumstances are at an increased risk of more severe outcomes, including individuals:

- aged 65 and over
- with compromised immune systems
- with underlying medical conditions

In addition, social and economic circumstances may also be a factor in identifying someone who is vulnerable to COVID-19. This includes anyone who has:

- economic barriers
- difficulty accessing transportation
- difficulty accessing medical care or health advice
- unstable employment or inflexible working conditions
- insecure, inadequate, or nonexistent housing conditions
- ongoing specialized medical care or needs specific medical supplies
- social or geographic isolation, like in remote and isolated communities
- difficulty reading, speaking, understanding or communicating
- ongoing supervision needs or support for maintaining independence
- difficulty doing preventive activities, like frequent hand washing and covering coughs and sneezes

Think you might have COVID-19?

Take a self-assessment

- There's growing consensus as the literature emerges about how people can become infected. Fleeting encounters with people outdoors are unlikely to spread the coronavirus. **It seems now that the major culprit is close-up, person-to-person interactions for extended periods. Crowded events, poorly ventilated areas and places where people are talking loudly—or singing in a group indoors has a much higher risk.** There is also a concern about asymptomatic and pre symptomatic individuals being contagious.
- Health agencies have so far identified respiratory-droplet contact as the major mode of Covid-19 transmission. These large fluid droplets can transfer virus from one person to another if they land on the eyes, nose or mouth. But they tend to fall to the ground or on other surfaces pretty quickly.
- Since the outset (or even prior) to the pandemic, **evidence that the coronavirus can also be transmitted through aerosols, or minuscule droplets that float in the air longer than large droplets, has gotten much stronger. These aerosols can be directly inhaled.** It is assumed by Evans et al. 2020, p.1, (pre-print)- where hand hygiene protocols are in place and face coverings are worn to catch large droplets, aerosols are the dominant transmission mechanism. **The mounting evidence for this mode of transmission reinforces the precautionary principle approach for all workers and their families.**

Coronavirus – transmission (how can it spread)?

Three routes of exposure: Aerosol, droplet and fomite (hand to mouth) ← ? **Therefore should follow precautionary approach**

There is emerging evidence that coronavirus can be airborne – see

[“Is COVID-19 airborne?”](#),

Drs. Chad Roy & Ed Zuroweste (Migrant Clinicians Network)

[Commentary: COVID-19 Transmission Messages Should Hinge on Science.](#)

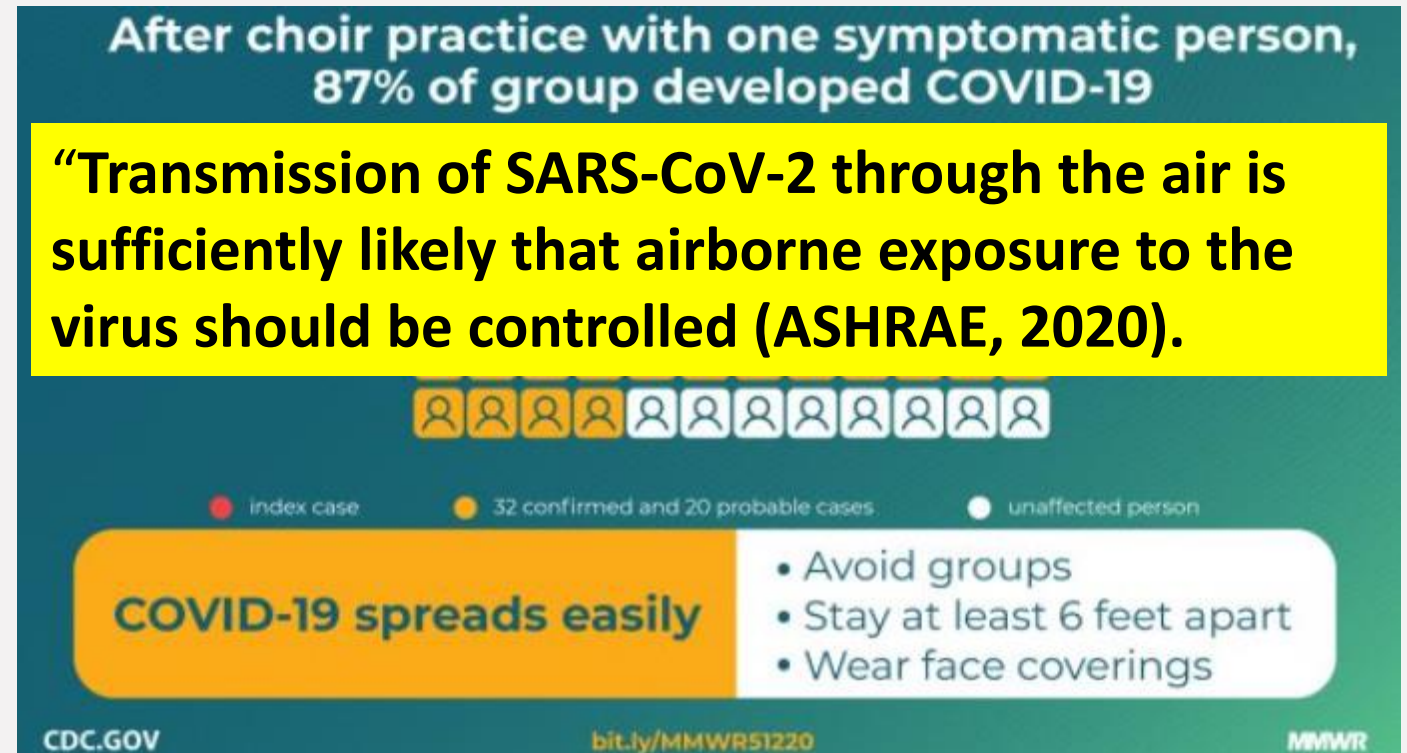
Dr. Brosseau is a national expert on respiratory protection and infectious diseases professor (retired), University of Illinois at Chicago Aerosol transmission and respiratory protection .

University of Minnesota, [Center for Infectious Disease Research and Policy](#) (CIDRAP).

“Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures” (ASHRAE, 2020).

“Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air. transmission of the virus” (ASHRAE, 2020).

Why air conditioning / ventilation is so important



High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice — Skagit County, Washington, March 2020

<https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6919e6-H.pdf>

AEROSOL GENERATION

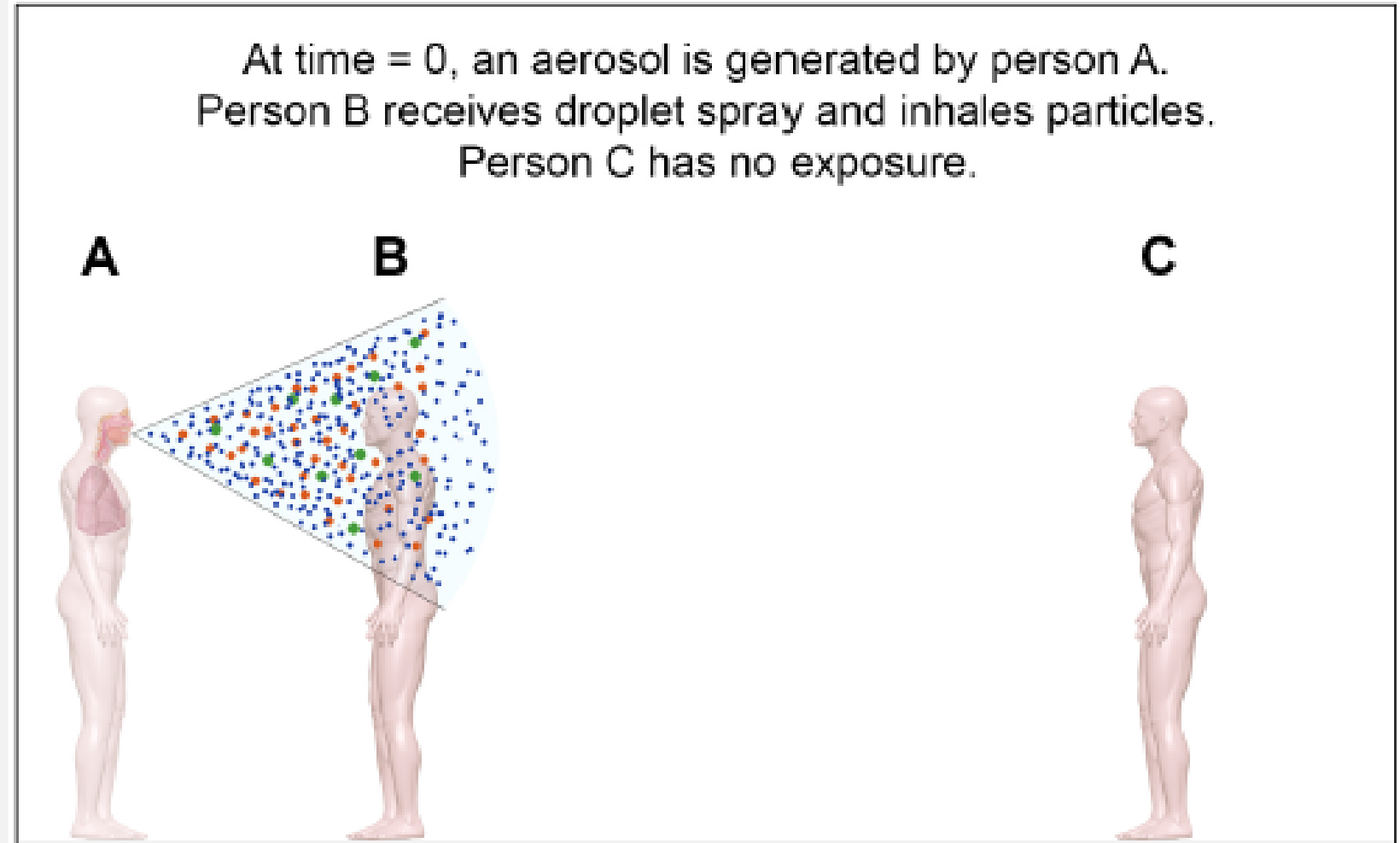
Inhalation can occur at the time and near the point of generation

Aerosols can be generated by natural processes:

- Vomit
- Hemorrhage
- Diarrhea (toilet flushing)
- Coughing
- Sneezing
- Talking

Aerosols can be generated by medical procedures:

- Intubation
- Bronchoscopy
- Drug delivery
- Respiratory support



Courtesy of, and thank you, to Dr. Lisa Brosseau & Dr. Rachael Jones

University of Minnesota Center for Infectious Disease Research and Policy (CIDRAP) and

Absolute Science Illustration

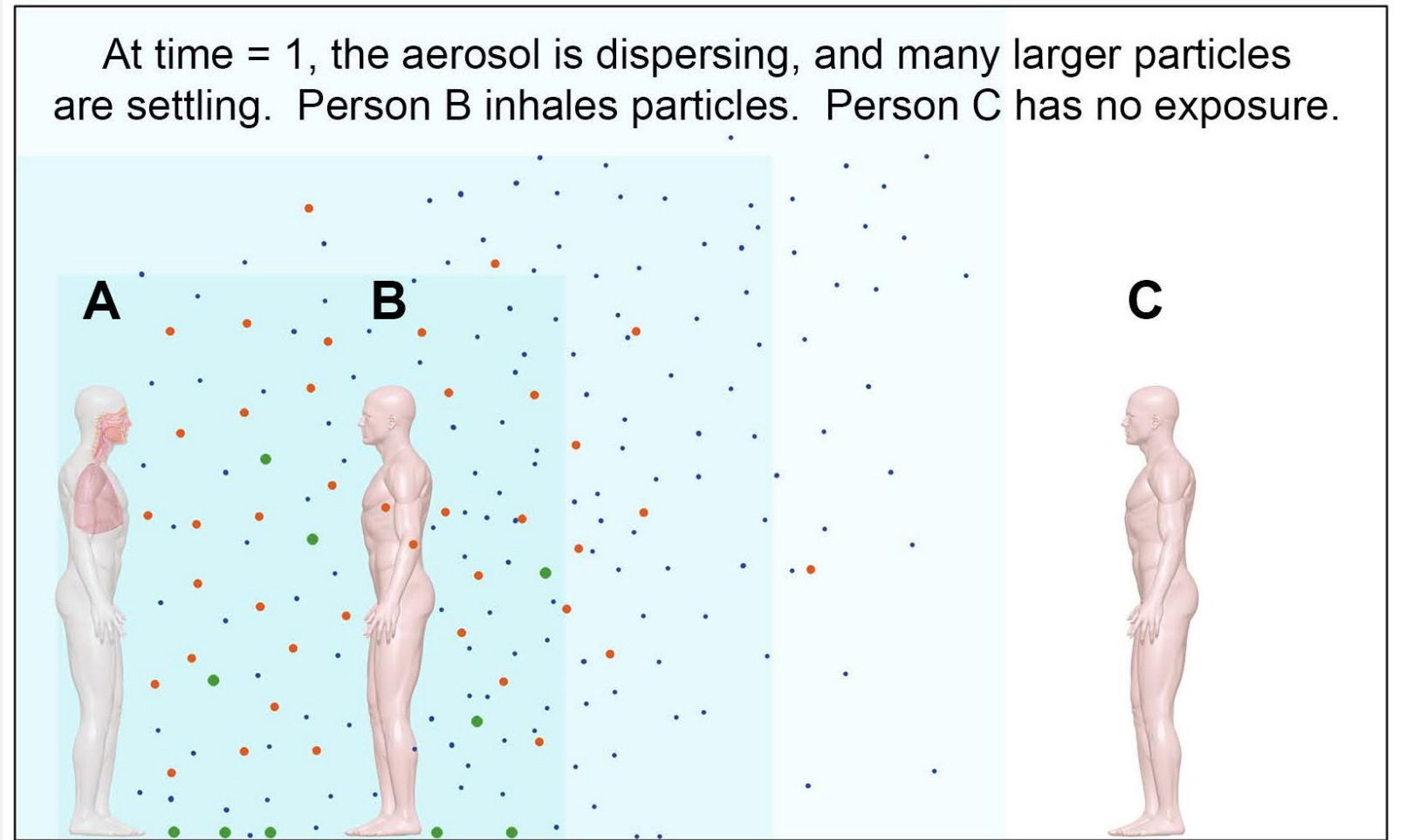
AEROSOL SETTLING AND DIFFUSION

Inhalation is possible near and further from the point of generation

Inhalation continues to be possible near the source as settling and diffusion take place.

Aerosol transmission (inhalation) is possible further from the source over time.

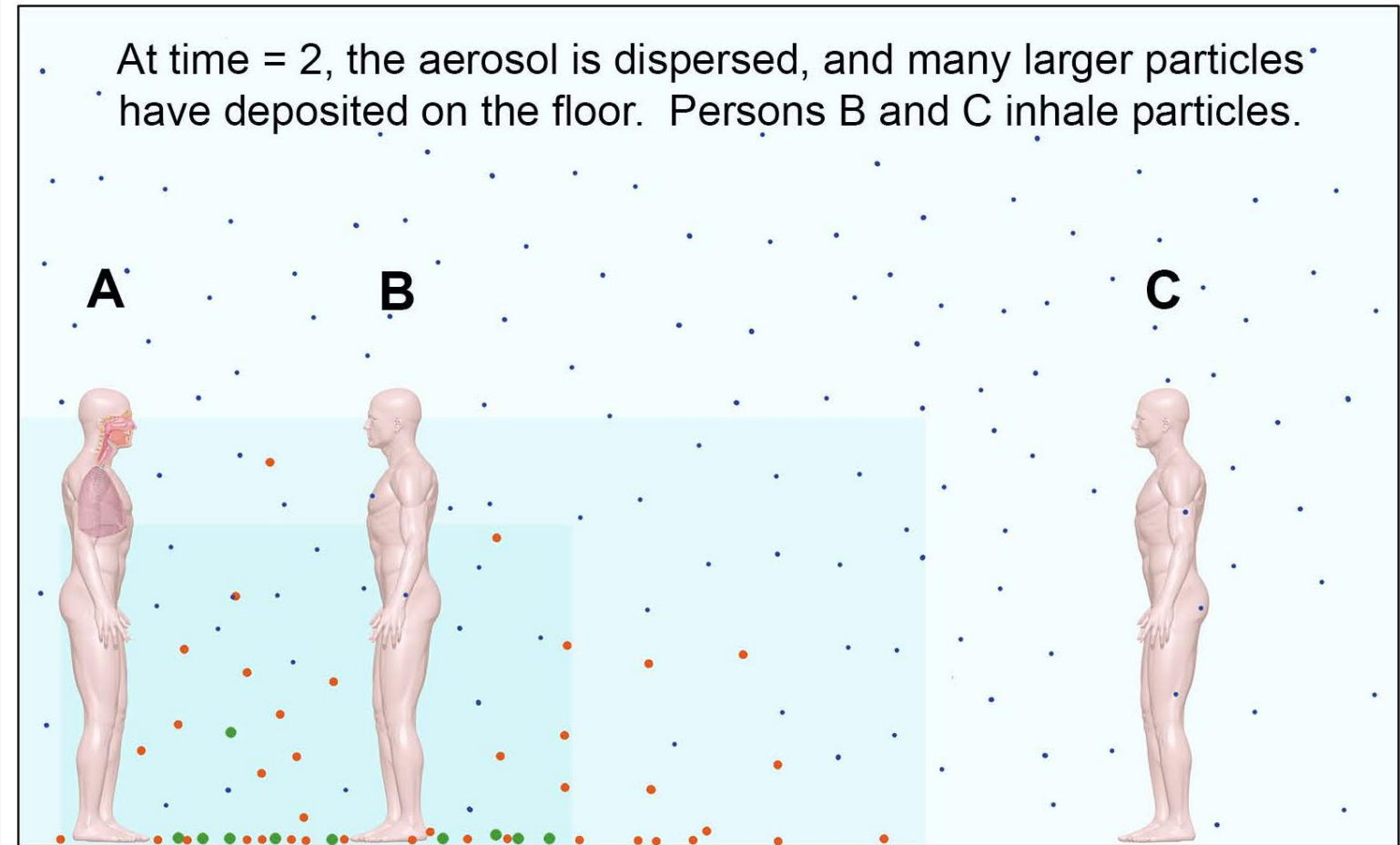
Infection depends on organism viability and dose (concentration of organisms in aerosol).



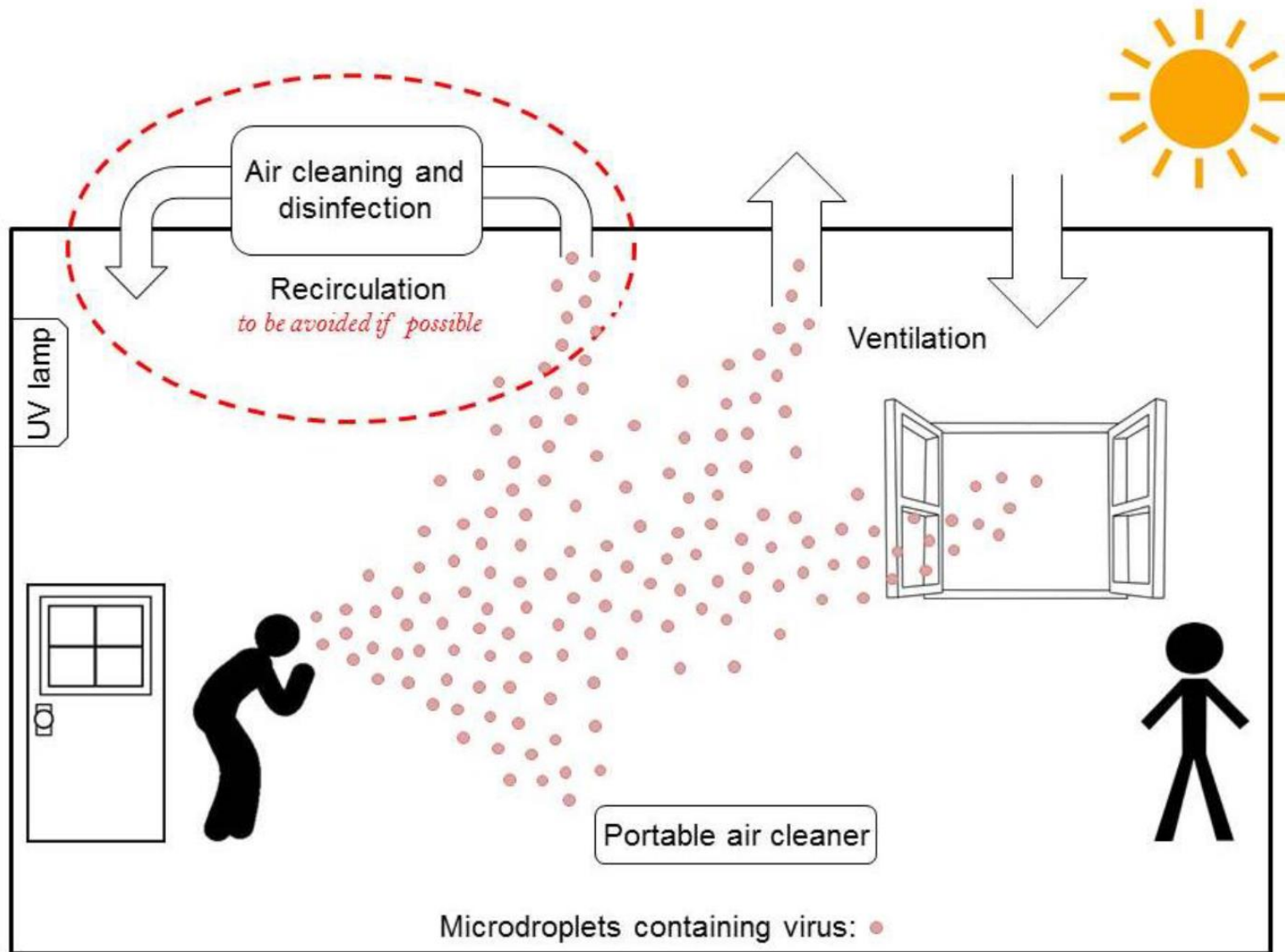
AEROSOL DIFFUSION AND SETTLING

Aerosol transmission (inhalation) is possible throughout the space

Infection depends on organism viability and dose (concentration of organisms in aerosol).



Courtesy of, and thank you, to Dr. Lisa Brosseau & Dr. Rachael Jones
University of Minnesota Center for Infectious Disease Research and Policy (CIDRAP) and
Absolute Science Illustration



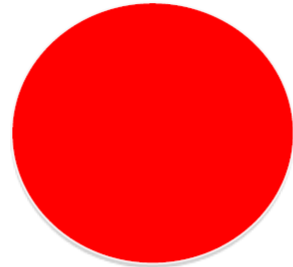
Can control banding help us to more clearly communicate the risk and therefore apply protective measures where they are more badly needed?

“Control banding may be used to assign job tasks into risk categories and prioritize the application of controls” (Sietsema et al. 2020, p.124).

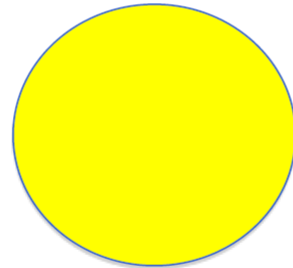
Control banding models, first developed for pharmaceutical and chemical hazards, use toxicity and exposure information to qualitatively categorize risk into several levels or “bands,” which are then used to guide the selection of appropriate “controls,” or methods for eliminating or minimizing risk (Sietsema et al. 2020, p.125).

Risk Communication and Control Banding (CB)

The Stoplight Effect – What do *you* do at a yellow?

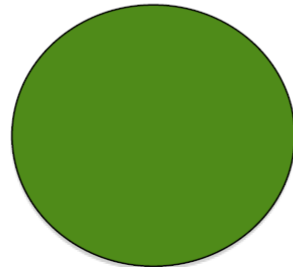


STOP!



- Stop every time?
- Go every time?
- Assess traffic, then decide?
- Speed limit vs. your speed?

... or **CHECK FOR
POLICE?**



GO!



Lawrence Livermore National Laboratory

LLNL-PRES-749659 WHWB_CB + COVID19_Risk Communication_dmz



4

Toxicity and exposure levels are relatively easy to predict or measure for chemical exposures, but ascribing them to biological exposures is more difficult. For biological organisms, several factors contribute to the hazard, including virulence, infectivity, and pathogenicity.

- **Virulence** is a measure of the severity of the consequences of infection;
- **infectivity** is measured by the number of organisms required to induce infection; and
- **pathogenicity** is the ability of an organism to cause disease.

For many human pathogens, we do not fully understand and cannot easily measure the virulence, infectious dose, pathogenicity, and/ or route(s) of transmission (Sietsema et al. 2020, p.125). The US Department of Labor, Occupational Safety and Health Administration (OSHA) **has simplified the process** by assigning risk levels to different jobs and assigning controls based on the risk level which is described in more detail in:

- [Guidance on Preparing Workplaces for an Influenza Pandemic \(OSHA, 2009\).](#)
- [OSHA Guidance on Hazard Recognition and Classifying Risk of Worker Exposure to SARS-CoV-2 \(OSHA, 2020\).](#)
- [OSHA Guidance on Control and Prevention \(OSHA, 2020\).](#)
- [OSHA Guidance on Returning to Work \(OSHA, 2020\).](#)

Coronavirus – what is the risk of getting COVID 19 (workplace).

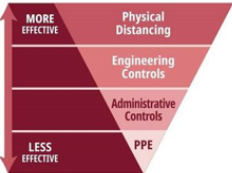
Many risk factors to consider including:

- Proximity (e.g. Ophthalmologist).
- Time.
- Number of contacts.
- Space < 2 metres etc.

Think of infectious people as point sources (Brosseau, L).

Each situation will require an assessment that “should” also consider “community transmission”.

Risk management (control banding) matrix for COVID19 - Workplaces.

		Low Risk (Caution)* Examples: Workers who are not in frequent or close contact with other workers or the general public ¹ . Where routine physical distancing (< 2 metres) is not possible / and or people are working in close proximity with sub optimal ventilation?	Medium Risk* Examples: Frequent contact with the possibly asymptomatic persons , eg. schools, high volume retail such as grocery stores or with other workers ¹ . Risk assessment should consider areas of ongoing community transmission (travellers, residences and other high population density and possibly high volume retail).	High Risk* Examples: Health care delivery and support staff who may be exposed to known or suspected COVID 19 patients. Medical transport workers (moving known or suspected COVID-19 patients in enclosed vehicles). Mortuary workers ¹ . Personal care and other close range work.	Very High Risk Examples: Health care workers (HCW) performing aerosol generating procedures; HCW or laboratory workers collecting or handling specimens from known or suspected COVID-19 patients; Morgue workers performing autopsies ¹ . Dentists and dental technicians.
Elimination/Physical Distancing (MOST EFFECTIVE)		Maximize distance apart; Maintain physical distance > 2 metres at minimum. Where possible work from home. Keep direct social contact to a minimum, especially indoors.	Support & enable telework and/or curbside service delivery. Restructure layout, flow & points of interaction to Maintain physical distance > 2 metres as much as possible.	Telemedicine. External tent for triage. Physical barriers in triage. Physical distance not possible so much stronger lower order controls starting off with engineering control.	May not be possible. Physical distance not possible so much stronger lower order controls starting off with engineering control – general and localized ventilation.
Engineering Controls		Ventilation Maximize air changes, including opening windows & doors as/where feasible; Technical resources Good practices around ventilation Optimize Workplace for cleaning and personal hygiene .	Ventilation Maximize air changes, including opening windows & doors as/where feasible; Technical Resources Good practices around ventilation. Prevention by design eg. Physical barriers (Plexiglas) , uni-directional flow ; alternate direction of service provision Optimize Workplace for cleaning & personal hygiene . Stand alone air purifying devices, fans behind static staff.	Ventilation: Increased ventilation air changes per hour. (Minimum ASHRAE) Barriers, doors, cleanable curtains Temporary Negative Pressure Isolation Technical Resources Workplace cleaning .	Ventilation: Temporary Negative Pressure Isolation Technical Resources Increased ventilation and localised ventilation. Such as headboard ventilator for patient bed, Chair-Side Air Extraction For Dental Offices. Workplace cleaning .. Exhalation particle capture device , Patient encapsulation w. frame & plastic sheeting , & possibly exhaust ventilation .
Administrative Controls		Hazard awareness training Work schedule, location & flow to minimize convergence. Basic education to raise awareness. Personal hygiene. Best Practice - Hand Hygiene (frequent hand washing etc.). Sanitation/disinfection/cleaning. Safe work practices, including limited use of common facilities. Screening worker risk & health. Facilitate & support hazard & risk communication	Risk assessment & Risk Management plan Hazard awareness training. Work schedule with less worker convergence. Document occupantsto ease contact tracing. Comprehensive education to raise awareness & understanding of risks & controls. Facilitate regular time & access for Personal hygiene (frequent hand washing etc.) Organize & document Sanitation/disinfection/cleaning. Safe work practices. Screening worker risk & health. Facilitate & support hazard & risk communication	Risk assessment & risk management plan Competency based training. Training of correct use of personal protective equipment (PPE) see: Proper Use of Respirators Infographic . PPE program including CSA Z94; Clean/Dirty areas; batch tasks to minimize in and out; limit staff cross-over Screening worker risk & health, modify location & tasks to minimize risk. Create mechanisms to facilitate & support hazard & risk communication Acknowledge and plan for Psychosocial health / fatigue management.	Competency based training. Training & monitoring of correct use of personal protective equipment (PPE) see: Proper Use of Respirators Infographic . (Buddy system?) PPE program including CSA Z94 Screening workers daily. Other full body and eye PPE. Enforce practices to facilitate & support hazard & risk communication RACE re: Psychosocial health / fatigue management.
Personal protective equipment (PPE) (LEAST EFFECTIVE) (preserve critical PPE supplies for HCW). Refer to CDC strategies for optimizing supplies of PPE		Where physical distancing is not possible. Consider face masks (source control) for all present to minimize transmission.	Face masks for all present (as source control) to minimize transmission. Gloves (w. appropriate training & disposal) for frequent common touching; If/when congestion is unavoidable, and/or poor ventilation and/or increased community transmission conduct risk assessment to inform additional controls whether an N95 is required (eg. bus driver) for worker protection.	RPE CSA Standard Z94.4 should be followed (as a minimum) and preferably Tool for choosing respiratory protection against bioaerosols is recommended and review case studies . Respirator program required: Fit tested N95 as a minimum. P100 or elastomeric are other options. Proper donning, doffing, storage, disposal and hygiene. Other full body coveralls and eye PPE. Including goggles, face shield. Fluid resistant isolation gown. (disposable) contaminated waste.	RPE CSA Standard Z94.4 should be followed (as a minimum) and preferably Tools for choosing respiratory protection against bioaerosols is recommended and case studies . Preferred Powered air purifying respirators (PAPR). Other full body and eye PPE. Other full body including eye PPE.including goggles, face shield. Fluid resistant isolation gown (disposable) conted waste.

Where PPE does not meet minimum requirements (eg. No fit or short-supply) then it is very important that more effective stringent exposure control and other prevention strategies are put in place, such as providing increased room or local exhaust ventilation based on individual, operational & environmental risk.

For an additional description of the risk levels* and classifying workers at risk refer to: US [Occupational Health and Safety Administration \(OSHA\)](#), [COVID-19](#), [Hazard Recognition](#).

Occupational Health Clinics for Ontario Workers Inc.

Prevention Through Intervention

Coronavirus – what is the risk of getting COVID 19 (workplace).

Risk management (control banding) matrix for COVID19 - Workplaces.

	<p>Medium Risk Health care workers or hospital ancillary staff.</p> <p>See: Point of Care Risk Assessment** Areas of building without public or patients If there is a likelihood of treating patients with COVID 19 then the risk becomes high.</p>	<p>High Risk Areas of Healthcare facilities where public or patients present?.</p> <p>If there is treatment required that requires AGPs then the risk becomes very high.</p>	<p>Very High Risk Health care workers (HCW) performing aerosol generating procedures; HCW or laboratory workers collecting or handling specimens from known or suspected COVID-19 patients; Morgue workers performing autopsies¹. Dentists and dental technicians.</p>
<p>Elimination/Physical Distancing</p> <p>(MOST EFFECTIVE)</p>	<p>Support & enable telework and/or curbside service where able; Maintain physical distance > 2 metres as much as possible. Clear room/area occupancy signage (eg. red/green) ID & manage protocol for points of contact & constriction</p>	<p>Maximize use of Telemedicine. External tent for triage. Physical barriers and load management procedures in triage. Physical distance not possible so much stronger lower order controls starting off with engineering control.</p>	<p>May not be possible. Physical distance not possible so much stronger lower order controls starting off with engineering control – general and localized ventilation.</p>
<p>Engineering Controls</p>	<p>Ventilation Maximize air changes, including opening windows & doors as/where feasible; Technical Resources</p> <p>Good practices around ventilation. Physical barriers (Plexiglas) Workplace surfaces to optimize cleaning. Stand alone air purifying devices. Reduce furniture, mark floors, organize flow,</p>	<p>Ventilation: Temporary Negative Pressure Isolation Technical Resources Increased ventilation air changes per hour. Optimize surfaces for cleaning. Patient isolation capacity w. enhanced, filtered exhaust ventilation.</p>	<p>Ventilation: Temporary Negative Pressure Isolation Technical Resources Increased ventilation and localised ventilation. Such as headboard ventilator for patient bed, Chair-Side Air Extraction For Dental Offices. Workplace cleaning. Exhalation particle capture device. Patient encapsulation w. frame & plastic sheeting, & possibly exhaust ventilation.</p>
<p>Administrative Controls</p>	<p>Hazard awareness training. Work schedule location & flow to minimize convergence.. Comprehensive education to raise awareness & understanding. Personal hygiene (frequent hand washing etc.) Sanitation/disinfection/cleaning. Safe work practices. Facilitate & support hazard & risk communication Screening workers.</p>	<p>Regular & refreshed Competency based training. Training of correct use of personal protective equipment (PPE) see: Proper Use of Respirators Infographic. PPE program including CSA Z94; Clean/Dirty areas; batch tasks to minimize in and out; limit staff cross-over agg execution & communication protocol Frequent, thorough environmental cleaning Planned breaks to reduce fatigue and maximize don/doff safety Facilitate & support hazard & risk communication Screening workers.</p>	<p>Competency based training. Training & monitoring of correct use of personal protective equipment (PPE) see: Proper Use of Respirators Infographic. (Buddy system?) PPE program including CSA Z94 Screening workers daily. Other full body and eye PPE.</p> <p>Enforce practices to facilitate & support hazard & risk communication. RACE re: Psychosocial health / fatigue management.</p>
<p>Personal protective equipment (PPE)</p> <p>LEAST EFFECTIVE</p>	<p>Where physical distancing is not possible. Consider face masks for all present (as source control) to minimize transmission. There may be some situations where cogenesis is unavoidable, and / or poor ventilation and / or increased community transmission. A risk assessment will inform whether an N95 is required. A risk assessment will inform whether an N95 or better is required.</p>	<p>RPE CSA Standard Z94.4 should be followed (as a minimum) and preferably Tool for choosing respiratory protection against bioaerosols is recommended and case studies. Fit tested N95 as a minimum. P100 or elastomeric are other options. Other full body and eye PPE. Other full body coveralls and eye PPE. Including goggles, face shield. Fluid resistant isolation gown. (disposable) contaminated waste.</p>	<p>RPE CSA Standard Z94.4 should be followed (as a minimum) and preferably Tools for choosing respiratory protection against bioaerosols is recommended and case studies. Preferred Powered air purifying respirators (PAPR). Other full body and eye PPE. Other full body including eye PPE.including goggles, face shield. Fluid resistant isolation gown (disposable) contd waste.</p>

Specific for Health Care Workers

References: OSHA 2020¹ Guidance on preparing workplaces for COVID – 19*, CSA Standard Z94.4-11, The [International Society for Respiratory Protection](#) (ISRP), [Neesham-Grenon, E 2013, Journal of the International Society for Respiratory Protection, Vol. 30, No. 1, 2013, IRSST \(2015\) support tool for choosing respiratory protection for bioaerosols \(Health Care Sector\)](#); See also [IRSST case studies that provide worked examples for health care and other sectors](#). Resource Environmental Associates (2008), Protecting Personnel from Pandemic Influenza, [ASHRAE \(2020\) Position Document on Infectious Aerosols](#). [CDC 2012, In-depth report: expedient methods for surge airborne isolation within healthcare settings during response to a natural or manmade epidemic](#). [ASHRAE 2020, Guidance for Building Operations During the COVID-19 Pandemic](#)

Where PPE does not meet minimum requirements (eg. No fit or short-supply) then it is very important that more effective stringent exposure control and other prevention strategies are put in place, such as providing increased room or local exhaust ventilation based on individual, operational & environmental risk.

- ✓ Containment / limit occupancy.
- ✓ Increased ventilation is very important.
- ✓ Training in proper use of PPE is very important.
- ✓ Selection of PPE is very important (including fit testing of Respirators).

For an additional description of the risk levels* and classifying workers at risk refer to: US [Occupational Health and Safety Administration \(OSHA\)](#), [COVID-19](#), [Hazard Recognition](#).

Occupational Health Clinics for Ontario Workers Inc.

Prevention Through Intervention

COVID-19; LLNL CB for Respirators

Lawrence Livermore National Laboratory (LLNL) Control Banding (CB) for Respirators which includes Health Care Workers (HCW).

Risk Level	1 (Low)	2 (Medium)	3 (High)	4 (Very High)
Examples	Jobs that do not require contact with known or suspected SARS-CoV-2 infected people nor frequent contact with the general public. Minimal occupational contact with public and other coworkers. Working at home during shelter-in-place or working in the office where social distancing (>6 feet) can be maintained with other co-workers.	Jobs (including healthcare workers) that include frequent and/or close contact with (within 6 feet) of people who may be infected with SARS-CoV-2 but who are not known or suspected COVID-19 patients. In areas with ongoing community transmission, workers who have contact with the general public (schools, crowded work or retail environments).	Healthcare delivery and support staff exposed to known or suspected COVID-19 patients, medical transport workers moving known or suspected COVID-19 patients in enclosed vehicles, morgue workers preparing the bodies of deceased COVID-19 patients.	Healthcare workers performing aerosol-generating procedures on known or suspected COVID-19 patients or collecting or handling specimens from known or suspected COVID-19 patients, morgue workers performing autopsies on deceased COVID-19 patients.
Respirator Controls - Equipment	None required. Surgical mask or N95 respirator can be worn voluntarily.	Wear N95 filtering facepiece respirator when social distancing (>6 feet) is not possible in the work area. Replace respirator when it becomes damaged, soiled, or if breathing becomes difficult.	Wear N100 filtering facepiece respirator (if successful quantitative fit-test has been documented) or higher-level respirator, such as HF APR, FF APR, or PAPR (if successful fit-test has been documented). Replace respirator when it becomes damaged, soiled, or if breathing becomes difficult. Replace HEPA cartridges when breathing becomes difficult.	Wear HF APR, FF APR, or PAPR (if successful fit-test has been documented). Replace HEPA cartridges when breathing becomes difficult.
Respirator Controls – Training	Read and understand the N95 permit that is included with the respirator.	Read and understand the PPE controls in the work control document. Read and understand the N95 permit that is included with the respirator. Ensure facial hair is not present between the face and sealing surfaces of the respirator.	Respirator Approval Form signed by supervisor and HSD. Annual completion of HS4610-W (web course) and HS4610-P (fit-test/practical training)	Respirator Approval Form signed by supervisor and HSD. Annual completion of HS4610-W (web course) and HS4610-P (fit-test/practical training)

Courtesy of Dr. Dave Zalk author of Control Banding “A Simplified, Qualitative Strategy for the Assessment of Occupational Risks and Selection of Solutions”.

Presentation delivered through Workplace Health Without Borders (International) by Dr. Dave Zalk who is also a BoD member with WHWB (International).

Workplace Health Without Borders WHWB

Subscribe 70

Home Videos Playlists Channels Discussion About



Workplace Health Without Borders

231 views 3 years ago

Workplace Health Without Borders (whwb) promotional video

Uploads



WHWB AFRICA INFECTION CONTROL Dr. Ajibike Oyewumi
22 views • 2 weeks ago



WHWB Infection Control for OSH Professionals Thomas Fuller Ma...
30 views • 3 weeks ago



WHWB TONY HAVICS RESPIRATOR PROTECTION
31 views • 1 month ago



WHWB WIEGO COVID
13 views • 1 month ago



WHWB COVID CONTROL BANDING
88 views • 1 month ago




Thomas P. Fuller Industrial Hygiene in Hospitals COVID19 - ...
63 views • 2 months ago

<https://www.youtube.com/channel/UCj5PLvW65Lr0feLYGVLBnmQ>

Control Banding & COVID-19: Simplifying Risk Communication

Workplace Health Without Borders
WHWB Teleconference on COVID-19
Monday 27 April 2020

David M. Zalk, PhD, CIH
EHS Manager, LLNL
Email; zalk1@llnl.gov
Director of Occupational Hygiene
UIC School of Public Health/GPOHP
Email; dzalk2@uic.edu



LLNL-PRES-749652
This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore
National Laboratory under contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

Lawrence Livermore
National Laboratory


0:01 / 17:13

WHWB COVID CONTROL BANDING

Workplace Health Without Borders WHWB

Subscribe 70

88 views



davidzalk

Dr. Zalk's presentation is available on YouTube:
<https://www.youtube.com/watch?v=hZJ81otqMfg>

Each situation will require an assessment that should also consider community transmission.

COVID-19; LLNL CB for Respirators

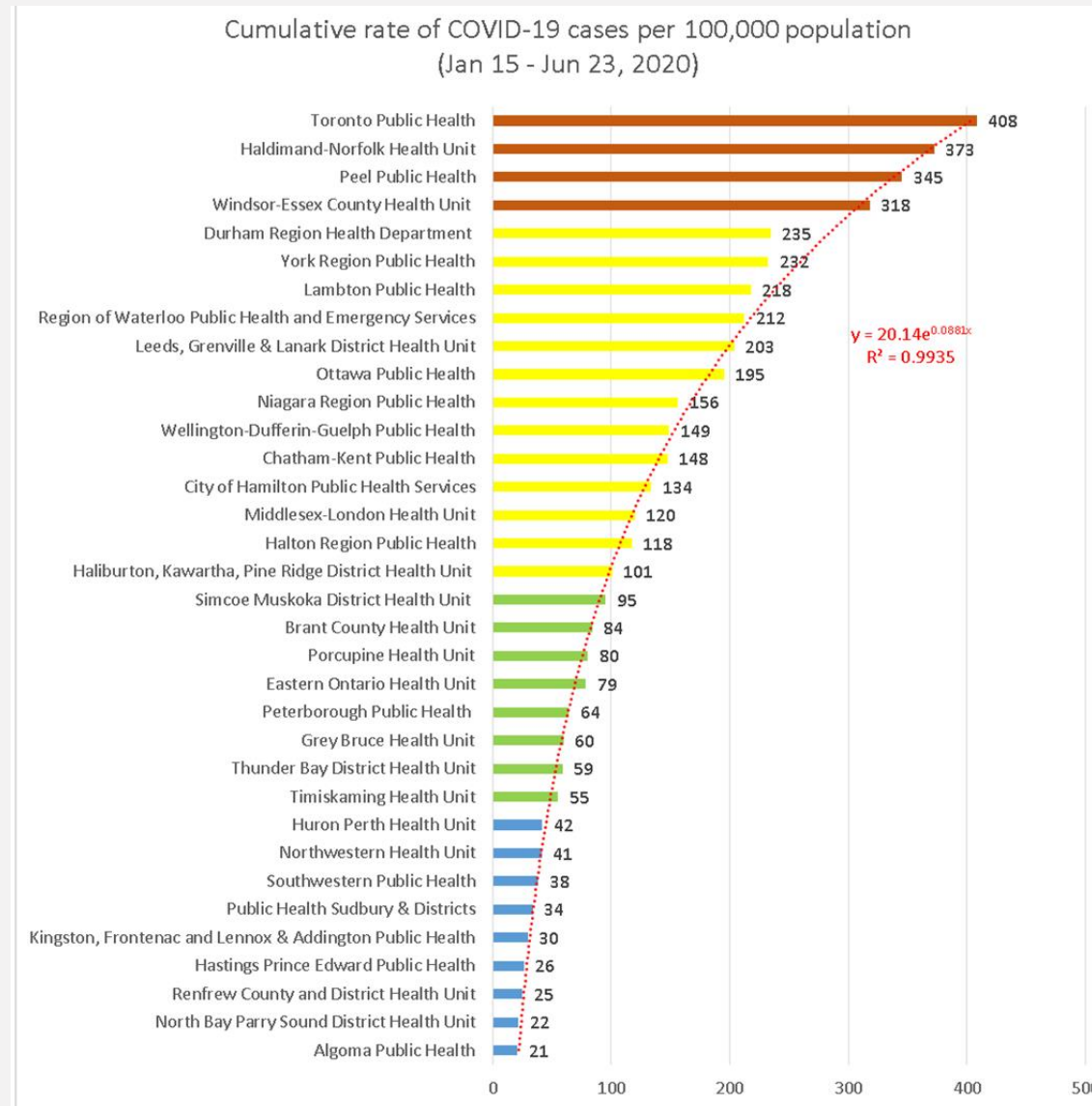
Risk Level	1 (Low)	2 (Medium)	3 (High)	4 (Very High)
Examples	Jobs that do not require contact with known or suspected SARS-CoV-2 infected people nor frequent contact with the general public. Minimal occupational contact with public and other coworkers. Working at home during shelter-in-place or working in the office where social distancing (>6 feet) can be maintained with other co-workers.	Jobs (including healthcare workers) that include frequent and/or close contact with (within 6 feet) of people who may be infected with SARS-CoV-2 but who are not known or suspected COVID-19 patients. In areas with ongoing community transmission, workers who have contact with the general public (schools, crowded work or retail environments).	Healthcare delivery and support staff exposed to known or suspected COVID-19 patients, medical transport workers moving known or suspected COVID-19 patients in enclosed vehicles, morgue workers preparing the bodies of deceased COVID-19 patients.	Healthcare workers performing aerosol-generating procedures on known or suspected COVID-19 patients or collecting or handling specimens from known or suspected COVID-19 patients, morgue workers performing autopsies on deceased COVID-19 patients.
Respirator Controls - Equipment	None required. Surgical mask or N95 respirator can be worn voluntarily.	Wear N95 filtering facepiece respirator when social distancing (>6 feet) is not possible in the work area. Replace respirator when it becomes damaged, soiled, or if breathing becomes difficult.	Wear N100 filtering facepiece respirator (if successful quantitative fit-test has been documented) or higher-level respirator, such as HF APR, FF APR, or PAPR (if successful fit-test has been documented). Replace respirator when it becomes damaged, soiled, or if breathing becomes difficult. Replace HEPA cartridges when breathing becomes difficult.	Wear HF APR, FF APR, or PAPR (if successful fit-test has been documented). Replace HEPA cartridges when breathing becomes difficult.
Respirator Controls – Training	Read and understand the N95 permit that is included with the respirator.	Read and understand the PPE controls in the work control document. Read and understand the N95 permit that is included with the respirator. Ensure facial hair is not present between the face and sealing surfaces of the respirator.	Respirator Approval Form signed by supervisor and HSD. Annual completion of HS4610-W (web course) and HS4610-P (fit-test/practical training)	Respirator Approval Form signed by supervisor and HSD. Annual completion of HS4610-W (web course) and HS4610-P (fit-test/practical training)

Lawrence Livermore National Laboratory (LLNL) Control Banding (CB) for Respirators which includes Health Care Workers (HCW).

Courtesy of Dr. Dave Zalk author of Control Banding “A Simplified, Qualitative Strategy for the Assessment of Occupational Risks and Selection of Solutions”.

Presentation delivered through Workplace Health Without Borders (International) by Dr. Dave Zalk who is also a BoD member with WHWB (International).

Control banding is about risk management!



For a more detailed risk assessment methodology in “non health care settings” Sietsema et al. 2020 has proposed a method based using the National Institutes of Health (NIH) risk groups as a surrogate for toxicity and combining the exposure duration with the exposure likelihood, we can generate the risk of a job task to the worker.

For health care settings in general, healthcare workers are in the highest risk category and are addressed elsewhere and Sietsema et al. 2020 refers to Guidance on Preparing Workplaces for an Influenza Pandemic. 2009.

<https://www.osha.gov/Publications/OSHA3327pandemic.pdf>

More recently OSHA Guidance on Control and Prevention (OSHA, 2020):

<https://www.osha.gov/SLTC/covid-19/controlprevention.html> Under health care the following is provided:

Identify and Isolate Suspected Cases

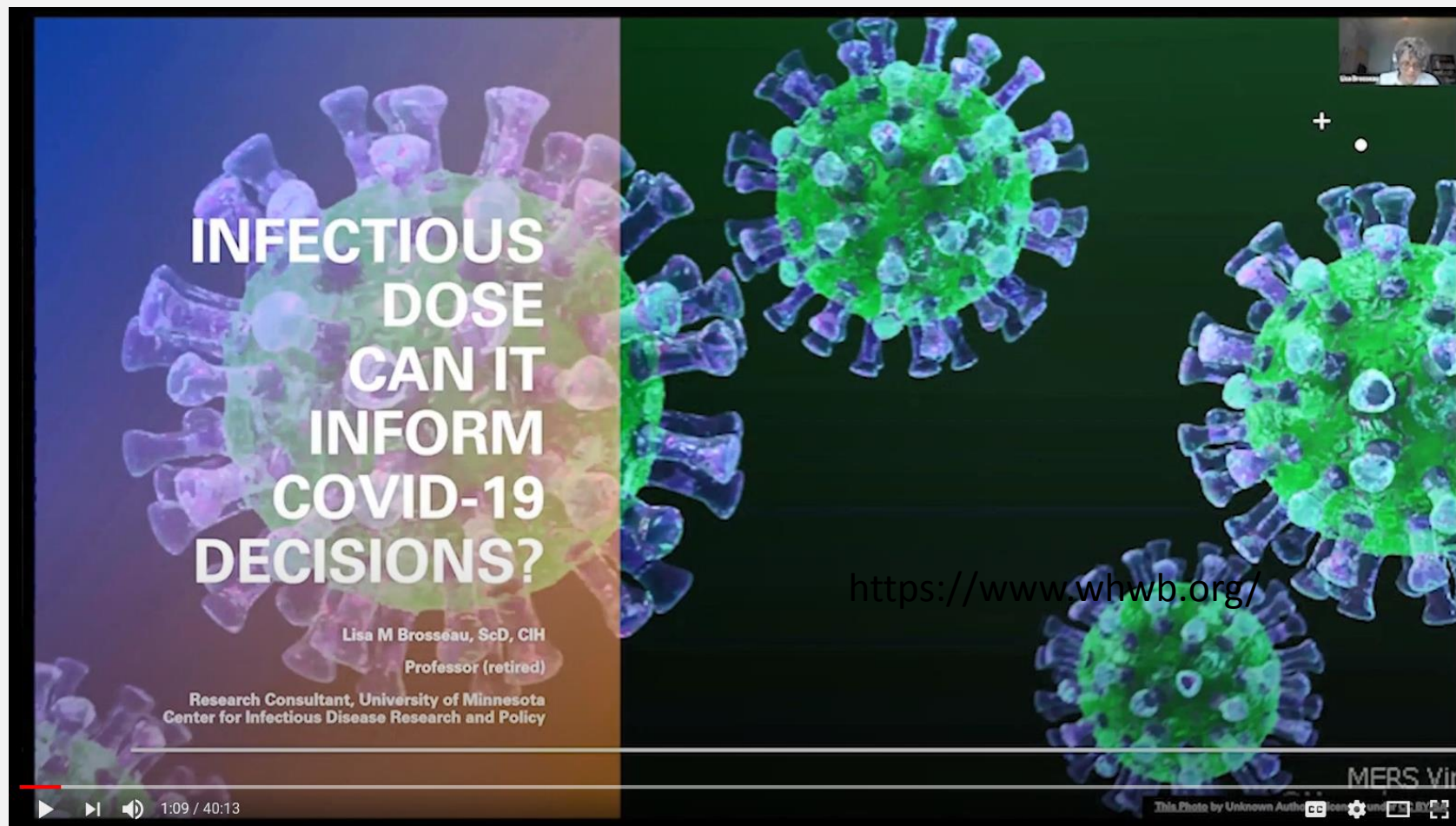
- In workplaces where exposure to COVID-19 may occur, prompt identification and isolation of potentially infectious individuals is a critical first step in protecting workers, visitors, and others at the work site.
- Wherever feasible, immediately isolate individuals suspected of having COVID-19. For example, move potentially infectious individuals to isolation rooms. On an aircraft, if possible and without compromising aviation safety, move potentially infectious individuals to seats away from passengers and crew. In other work sites, move potentially infectious individuals to a location away from workers, customers, and other visitors and with a closed door, if possible.
- Take steps to limit the spread of the individual's infectious respiratory secretions, including by providing them a facemask and asking them to wear it, if they can tolerate doing so. Note: A surgical mask on a patient or other sick person should not be confused with PPE for a worker; the surgical mask acts to contain potentially infectious respiratory secretions at the source (i.e., the person's nose and mouth).
- After isolation, the next steps depend on the type of workplace. For example:
 - **In most types of workplaces (i.e., those outside of healthcare):**
 - Isolated individuals should leave the work site as soon as possible. Depending on the severity of the isolated individual's illness, he or she might be able to return home or seek medical care on his or her own, but some individuals may need emergency medical services.
 - **In healthcare workplaces:**
 - If possible, isolate patients suspected of having COVID-19 separately from those with confirmed cases of the virus to prevent further transmission, including in screening, triage, or healthcare facilities.
 - Restrict the number of personnel entering isolation areas, including the room of a patient with suspected or confirmed COVID-19.
 - Protect workers in close contact* with the sick person by using additional engineering and administrative controls, safe work practices, and PPE.
 - Sick workers should leave the work site as soon as possible. Depending on the severity of the isolated worker's illness, he or she might be able to return home or seek medical care on his or her own, but some individuals may need emergency medical services.

*CDC defines *close contact* as being within about 6 feet of an infected person while not wearing recommended PPE. Close contact also includes instances where there is direct contact with infectious secretions while not wearing recommended PPE. Close contact generally does not include brief interactions, such as walking past a person.

Engineering controls (ie. ventilation).

<https://www.osha.gov/SLTC/covid-19/controlprevention.html>

- Three routes of exposure: **aerosol**, droplet and fomite (hand to mouth) should be considered in the PCRA.
- To help guide the health care worker (HCW) “determine” whether they are “adequately protected” against infection: prior to treating the suspected COVID 19 patient, a point of care risk assessment will inform whether the controls are suitably protective. **(This will be discussed further).**
- A risk assessment will provide the impetus to ensure that the hierarchy of control approach has been followed (for example, ventilation at ≥ 12 Air Changes per Hour (ACH) & negative pressure to prevent airborne microorganisms in the room from entering hallways and corridors in a COVID19 isolation ward – [refer to CDC Infection Control “Air”](#)) and precautionary principle be applied.
- It is important to engage a “Certified” Occupational / Industrial Hygienist for guidance and support, to help set up programs and verify that the controls are in fact effective.



WHWB Lisa Brosseau COVID TRANSMISSION JUNE 22 2020



Workplace Health Without Borders WHWB

Subscribe 72

Dr. Brosseau's presentation is now available on YouTube (PLEASE SHARE)

<https://www.youtube.com/watch?v=dGK2R3O0fWc&feature=youtu.be>

Occupational Health Clinics for Ontario Workers Inc.

Prevention Through Intervention

Workplace Health Without Borders

[ABOUT WHWB](#) | [WHWB BRANCHES](#) | [FORUM](#) | [RESOURCES](#) | [TRAINING](#) | [MENTORING](#) | [JOIN WHWB](#) | [SUPPORT WHWB](#) | [WWOSH](#) | [WHWB NEWS](#)

[Login to Post](#)

Translate:
Please support WHWB financially
 Canadian supporters can make a tax deductible donation through [CanadaHelps.org](#) using the button below

Educational Resources
 International Agency for Research on Cancer
 Occupational Hygiene Learning

Links
 International Labour Organization
 OpenWHO.org
 WHWB Newsletter
 World Health Organization

Like us on Facebook
 Workplace Health Without Borders

Using Zoom
 This Link will take you to a page with a few suggestions for using Zoom.

June 2020						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

ILO issues guidance for safe, healthy, return to work during COVID-19
 The International Labour Organization (ILO) has recently issued two guidance documents for creating safe and effective return-to-work conditions during the COVID-19 pandemic. The first of these, the Guidance Note says that return to work policies need to be informed by a human-centred approach that puts peoples' rights at the heart of economic, social and environmental policies. Social dialogue – bringing together governments, workers' and employers' organizations – will be critical in creating the effective policies and trust needed for a safe return to work.
 The Guidance Note, A safe and healthy return to work during the COVID-19 pandemic, is accompanied by a 10-point, Practical Guidance Action Checklist for employers, workers and their representatives. This tool is intended to complement and not replace national occupational safety and health regulations and guidance, to help establish the practical details of a safe return to work.
 These can both be downloaded as PDF documents at the following link: https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_745368/lang-en/index.htm.
 June 10th, 2020 | Category: General | Leave a comment

WWOSH Multilingual COVID-19 Q&A Graphic Document
 The WWOSH group has published a Q&A document in graphic format, designed to acquaint waste workers with accurate information on appropriate control measures to protect themselves and their families from COVID-19. It also tries to dispel a number of common misconceptions about COVID-19. Links to the Q&A in 5 languages can be found here.
 If you have any questions about this document, you can contact WWOSH directly here.
 May 17th, 2020 | Category: Educational, General, WHWB News | Leave a comment

COVID-19 Resources
 The following link will take you to a collection of resources for reducing the risk of COVID-19 infection. This list will be updated regularly, so please check back periodically.
<https://app.box.com/s/3yp7blg4u3qpwag3i17lbf1a52ytl>
 These are in addition to links found on this website itself. For references to COVID-19 on the site, simply put the keyword COVID-19 in the search box in the upper right of this page and hit enter.
 The members of Waste Workers Occupational Health (WWOSH) have contributed to the above list and also have produced a graphic Q&A document that is available in 5 languages. A link to this Q&A can be found on this site under the WWOSH entry in the navigation bar above.
 April 29th, 2020 | Category: Educational, General, WHWB News | Leave a comment

Rapid Expert Consultation on the Effectiveness of Fabric Masks for the COVID-19 Pandemic (April 8, 2020)
 This document was prepared by the *National Academies' Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats*. The aim of this rapid expert consultation is to respond to questions concerning the effectiveness of homemade fabric masks worn by the general public to protect others, as distinct from protecting the wearer. The request stems from an interest in reducing transmission within the community by individuals who are infected, potentially contagious, but asymptomatic.
 This document is a useful reference for all OHS professionals who may be asked about the effectiveness of these homemade masks for limiting the spread of COVID-19. The document is available in pdf format at this link: <http://nap.edu/25776>.
 April 22nd, 2020 | Category: General | Leave a comment

Responding to COVID-19: A Science-Based Approach
The Fifth Webinar in APHA/NAM COVID-19 Conversations Webinar Series
 The fifth COVID-19 Conversations webinar will provide an update on testing for COVID-19, the data different tests will provide, how we can use that data to help plan easing physical distancing, and the equity issues to consider regarding what populations can access testing and how to ensure equal access for all.
Webinar #5: COVID-19 Testing: Possibilities, Challenges, and Ensuring Equity
 Wednesday, April 22, 5-6:30 p.m. ET
 Register to attend the webinar

<https://www.whwb.org/>

- Under the Occupational Health and Safety Act (OHSA), your employer must take every precaution in the circumstances for the protection of a worker. **This includes the whole hierarchy of controls**, but especially at minimum an N95 respirator to a healthcare worker who is working in situations with a significant risk of being exposed to COVID. **This is your legal right.**
- Your right to a higher level of Personal Protective Equipment (PPE) is strongly supported by research that there is airborne transmission of the virus as well as droplet/contact. This is especially significant for workers at close quarters with potentially infectious patients, even when not performing aerosol-generating procedures.
- All healthcare workers should do a point of care risk assessment (PCRA) before heading into hazardous working conditions.

(Alec Farquhar)