COVID-19 and the Health Care/Essential Workers
COVID-19 and the Health Care/Essential Worker
Dr. Maureen Cividino April 17, 2020
No conflict of interest to declare

• No financial gain
• Opinion reflects that of Dr. Maureen Cividino only; not representative of any group or organization or employer
Objectives

By the end of the presentation the participant will be able to describe basic:
• Epidemiology of COVID-19
• Pathophysiology of SARS-coV2 virus
• HCW risk
• Screening
• Testing
• Prevention/Treatment
• Self-monitoring
• Self-isolation
• Work-self-isolation
April 17, 2020 Sit. Report 0900

• Global 2.2 million cases
• Increased 60,000 cases from yesterday
• 147,000 death increase by 8000 from yesterday
• 1,000,000 EU cases
• 680,000 US cases 34,500 deaths
• Canada over 30,000 cases and 1200 deaths
• Quebec has half Canadian cases and 630 deaths
# April 17, 2020 snapshot of cases in Canada

<table>
<thead>
<tr>
<th>Province/Medical Region</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>2,158</td>
<td>50</td>
</tr>
<tr>
<td>British Columbia</td>
<td>1,575</td>
<td>77</td>
</tr>
<tr>
<td>Manitoba</td>
<td>250</td>
<td>5</td>
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<tr>
<td>New Brunswick</td>
<td>117</td>
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<tr>
<td>Newfoundland and Labrador</td>
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<td>Ontario</td>
<td>8,961</td>
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<td>Prince Edward Island</td>
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<td>Quebec</td>
<td>15,857</td>
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<td>Saskatchewan</td>
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<td>Northwest Territories</td>
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<td>Nunavut</td>
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<td>0</td>
</tr>
<tr>
<td>Yukon</td>
<td>8</td>
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</tr>
</tbody>
</table>
Daily number of new cases in Canada

https://newsinteractives.cbc.ca/coronavirustracker/
Sweden: a cautionary tale?

The Public Health Agency announced a death toll of 1,203 people from Covid-19 on Wednesday, a rate of 118 per million inhabitants, compared with 55 in Denmark and just 13 in Finland, both of which imposed strict early lockdowns to curb the virus’s spread.

Sweden has passed the grim milestone of 1,200 coronavirus deaths, far exceeding the tolls of its nearest neighbours, but suggested it may be nearing the outbreak’s peak as scientists continue to question the government’s light-touch approach.
Canadian Predictions from early April

• Two most likely scenarios between 11,000 and 22,000 people would die by end of pandemic.
• Total number of cases of COVID-19 between 934,000 to 1.9 million.
• Between 500 and 700 people in Canada to die from the coronavirus by April 16 (Actual death count April 15, 1,056)
• There have been nearly 30,000 positive diagnoses so far
What is COVID-19?

• SARS-CoV-2 virus is an enveloped RNA virus
  • A betacoronavirus, like MERS-CoV and SARS-CoV (79% genetically same)

• All three have their origins in bats
  • Pangolin may be intermediary for SARS-2
  • Camel for MERS-coV
  • Civet cat for SARS-1

• Sequences from U.S. patients similar to China suggesting a likely single, recent emergence of this virus from an animal reservoir
COVID-19 routes of transmission

- Transmitted via droplets during close, unprotected contact
- Airborne spread has not been documented for COVID-19
  - Aerosols may be generated during aerosol generating procedures which could theoretically lead to transmission
  - WHO China Joint Mission on COVID-19 summarizing 75,465 cases indicates that airborne spread has not been reported
- No evidence documenting transmission by indirect contact (fomites)
  - Virus has been detected on surfaces in the patient environment
- Detected in stool and blood but role of fecal-oral and bloodborne transmission uncertain
- Rare reports infection through conjunctiva
- There is no conclusive evidence of vertical transmission to date, but further studies are needed
Incubation, communicability of COVID-19

• Incubation period ranges from 1.2 to 14 days
  • Median period is 5.1 days
  • Serial interval—period of time from onset of symptoms in one case to the time of symptom onset in the case(s) they infect (3.9-4.6d)

• Period of communicability unknown
  • High viral loads early in disease with minimal symptoms
  • Viral particle shedding longer from stool specimens
  • Lower respiratory tract symptoms may have negative NPS swabs
  • Clearance swabs for return-to-work can still be positive 3 weeks out

• Immunity unknown
  • Assumptions that once infected and cleared will be immune
  • Antibody testing in its infancy
  • Some evidence in South Korea of possible reactivation of infection (uncertain)
Risk Factors/Work restrictions

• Pregnancy
  • No evidence of increased risk for pregnant HCW
  • No evidence of vertical transmission
  • No recovery of virus in breast milk or cord bloods

• Immune compromise
• Hypertension
• Cardiac disease
• Diabetes
Numbers of HCWs infected

- As of 8 April 2020, 22 073 cases of COVID-19 among HCWs from 52 countries had been reported to WHO
  - No systematic reporting
- China CDC on 44 672 confirmed cases as of 17 February 2020 indicated 1688 (3.8%) infections were among HCWs, including five deaths
- Italy, a situation report from 10 April 2020 reported 15 314 infections among HCW, representing 11% of all infections at that time
- HCWs are being infected both in the workplace and in the community, most often through infected family members.
Risk Factors for HCW infection

- Late recognition or suspicion of COVID-19 in patients
- Working in a higher-risk department, COVID units
- Longer duty hours
- Sub-optimal adherence to IPC measures
- Lack of or improper use of PPE
- Inadequate or insufficient IPC training


Transmission of COVID-19 to Health Care Personnel During Exposures to a Hospitalized Patient — Solano County, California, February 2020 (MMWR) April 14, 2020

• Of 9,282 U.S. COVID-19 cases reported among HCP, median age was 42 years, and 73% were female, reflecting these distributions among the HCP workforce

• Among the 1,423 HCP with exposure data:
  • 780 (55%) health care exposure
  • 384 (27%) household exposure
  • 187 (13%) community exposure
  • 72 (5%) multiple exposure

• 723 (8%-10%) hospitalized; 184 (2%-5%) admitted to ICU
• 27 (0.3%-0.6%) died

• 6% of HCP patients were aged ≥65 years, 10 (37%) deaths occurred among persons in this age group
Active Screening Signs and Symptoms

- Fever 37.8 C or new onset cough or difficulty breathing
- Nasal (anosmia, sneezing, nasal congestion, runny nose)
- Throat (sore, hoarse voice, difficulty swallowing)
- GI (nausea, vomiting, diarrhea, abdominal pain)
- Headache
- Unexplained fatigue, general malaise
Testing

- PCR testing gold standard for diagnosis and clearance
  - Single test satisfactory
  - NPS preferred
- Negative NPS test and sick patient—repeat NPS and attempt lower tract specimen
- NML very similar testing to reference labs
- Many reference labs now in academic health centres increasing capacity
- Varying sensitivity PCR; 50-90% first test; specificity >90%
  - Pre-symptomatic transmission; follow-up testing often becomes positive
- Spartan cube: Rapid DNA test; not as yet tested using human samples; may be of value in rural and remote communities
Exposure: Case and Contact Management

- Close contact: talking together, eating together, charting together, sharing patient care and not wearing PPE
- Casual contact: saying hello in a doorway, dropping off a tray, borrowing a pen, sharing an elevator

Suspect case (symptomatic HCW) should be removed from work while awaiting testing results and self-isolate at home
- HCW tests positive needs to be off work until symptoms resolve and has 2 negative PCR tests at least 24 hours apart before return to work OR 14 days after onset of symptoms
- Determine all contacts up to 48 hours prior to symptom onset
- Remember to report to public health and WSIB or MOL as appropriate if deemed work-related
Vaccination and Treatments

- 70 Coronavirus Vaccines Are Under Development, With 3 in Human Trials, WHO

RCTs for drugs (approved):
  - Actemra®/RoActemra® (tocilizumab)
  - Hydroxy-chloroquine (+/-) azithromycin
  - Colchicine
  - Lopinavir/ ritonavir
  - Kevzara (Sarilumab)
  - Ruxolitinib

RCTs applied for:
  - Hydroxychloroquine prophylaxis for HCWs
  - Ribavirin (Virazole)
COVID-19 and the Essential Worker

Date: April 17/20
By Dr. Alain Sotto, Hon BSc, MD, CCFP(EM), FCBOM, Coroner
Pandemic Severity Index: CDC

- Similar to the system for the severity of Hurricanes
- Uses a case fatality ratio as the critical driver for forecasting a pandemic’s severity
- Allows for better forecasting of the impact of a pandemic
- Enables recommendations to be made regarding mitigation strategies and intervention
- Provides communities and businesses a tool for scenario-based contingency planning to guide their pandemic preparedness plans

1918: H1N1
1957: H2N2
1968: H3N2
2009: H1N1p
Seattle Police Enforcing Social Distancing: December 1918

- Policemen in Seattle wearing masks during the Pandemic of 1918: Spanish Influenza
- Officials feared mass hysteria in major cities.
- Citizens were urged to stay indoors and avoid congested areas.
- Here, policemen patrol the streets to ensure public safety.

Record held at: National Archives at College Park, MD. Record number 165-WW-269B-25.
Social Distancing Failure: 1918

- In 1918, Philadelphia held a war parade that killed thousands, despite warnings of influenza in soldiers during WW1
- 200,000 people attended the crammed parade event
- Three days later, every bed in Philadelphia’s 31 hospitals was filled with sick and dying patients, infected by the Spanish flu
- By the end of the week, more than 4,500 were dead
Essential Workers in Toronto: Lessons from SARS-2003

- GDP decreased by $1 Billion in Toronto
- Some corporations were shutdown for 10 days +
- SARS task forces were set up for critical infrastructure/essential companies
- Essential companies need to liaise with Provincial Public Health and EOCs (Emergency Operations Centres)
- Communication to employees with updated medical information to keep essential staff at work
- Contingency planning guidelines for essential staff; travel restrictions etc.
- Enhanced hygiene and cleaning of essential workplaces - PPE, sanitizers, etc.
- Limit public gatherings, social distancing, self screening, self-quarantine guidelines
Lessons Learned H1N1 Pandemic: 2009

• **Communications were key to managing residual risks associated with:**
  • Work Place Absenteeism; and education on the H1N1 risks to workers
  • Continuity of critical business functions

• **Limiting Spread and Severity**
  • Screening at entry points, enhanced cleaning and hygiene protocols etc.

• **Plan/Decision Triggers:**
  • Severity of the virus in the community
  • Reported and confirmed cases in companies were tracked
  • Number of hospitalizations and ICU admissions
  • Health officials’ decisions regarding social distancing and non-medical interventions:
    • Hospital restrictions
    • Establishment of H1N1 assessment centres
    • Closure of schools
    • Restrictions on public gatherings
    • Travel restrictions
  • Declaration of Provincial Emergency
Mitigation options available for Pandemics

**Non-Pharmaceutical Interventions (NPI)**

- Social distancing
- No public gatherings
- Physical distancing (2 meters)
- Barrier precautions e.g. masks, hand hygiene

**Pharmaceutical Interventions (PI)**

- Vaccines
- Antivirals

Current national guidelines (NACI & AMMI) recommend ALL of these strategies be used in combination to prevent the spread of pandemic influenza, including antivirals *for prevention* as well as treatment.
Pandemic Planning Assumptions

Should be similar and aligned with Ontario Pandemic Plan

- Two waves, each lasting up to 8 weeks
  - Peaking at 3-4 weeks
  - Waves 1 and 2 are 3 – 9 months apart, with the second wave stronger than the first
- Attack rate of 35%
- Absenteeism – 3 scenarios:
  - Mild, Medium, and Severe impacts
  - Absenteeism rate of up to 40% for peak of wave
    - sick, socially distanced, absent due to school closures, ‘worried well’ (vulnerable populations)
- Little lead time between WHO declaration of Phase 6 pandemic and outbreak in Ontario (< 1-2 months)
- No effective vaccine prophylaxis or limited anti-virals from MOH – except Tamiflu only for Influenza; now readily available for prophylaxis and treatment
- Regulatory (MOL, OSHA, etc...) requirements status quo - Sec. 25 (2)(h)
Why is Pandemic Planning important to TTC?

- ~1.7 million riders daily on TTC – essential service!
- Day to day work will be disrupted up to 60-70%
- High absenteeism – up to 35% of the population may get Pandemic illness over 12 months
- Qualified staff must be available to operate and service vehicles
- Part of critical infrastructure groups
- Pandemic planning now regarded as corporate ‘best practices’
What are the TTC’s Main Goals?

• Protect the **health and safety** of our employees: New paradigm shift
  “You can’t be truly SAFE at work without **first** being HEALTHY!!”
• Want workers to feel **safe** coming in to work: OHSA, Sec. 25(2)(h)
  “Take every **reasonable** step for providing a safe workplace...”
• Protect our assets
• Comply with legislative requirements
• Provide transportation services to Toronto
1. **Emergency Response Organization / Pandemic Task Force**
   a) Protocols for the activation of appropriate emergency response organizations during a pandemic, including the company EOC (Emergency Operations Centre) with drills every 6-12 months

2. **Monitor and Surveillance of Emerging Pandemic Threats**
   a) Monitoring of sites on pandemic risks by WHO, CDC and review of emerging threats on Public Health
   b) Internal pandemic disease screening protocols and internal monitoring of pandemic related absences

3. **Communication Strategy: the most important!**
   a) Internal communications to all employees and contractors by lead executives on pandemic task force
   b) Communication with external stakeholders – the unions, public sector, government, media, etc.
   c) E-mails, townhalls with Occ-Health, EFAP, company pandemic internet site, health and safety meeting packages; managing the fears
   d) Policies on masks/antivirals/vaccine/work from home and ‘just-in-time’ information as it evolves
4. Health Protocols to Reduce Spread in the Workplace
   a) Infection control guidelines adopted from Public Health; identifying vulnerable workers (chronic lung/heart/kidney/immune/age > 65) who may have serious disease if they become ill
   b) Self-screening forms for critical sites, review of close-contact cases and reducing spread in the workplace

5. Human Resources and Business Continuity Protocols
   a) Protocols for managing and coding higher absenteeism, travel restrictions, compensation, work at home, 14-day self-isolation and no medical certificates available; Work refusals process and MOL
   b) Apply business continuity plans and identify essential staff in mission critical jobs in each company

6. Facilities
   a) Identification of enhanced cleaning protocols for facilities staff to follow i.e. enhanced cleaning 2x /day
   b) Includes disinfection of common touch areas; supplies of detergents, hand sanitizers/gloves/masks/N95

7. Supply Chain (just-in-time)
   a) Protocols to help maintain the adequate flow and availability of supplies at sites for 6-8 weeks+
8. Information Technology
   a) Strategy for maintaining IT services operational and allowing for social distancing and work from home
   b) Includes e-mail communications, IT security and increasing remote work and video-IT strategies

9. Security
   a) Includes strategy to ensure adequate security staff at sites and screening at critical entry points like call centers, control rooms, security of supplies: detergents/hand sanitizers/masks/gloves/vaccine etc..

10. Vaccines and Antivirals (TBD)
    a) Explore the stockpiling of anti-viral prophylaxis and ensure vaccines for mission critical staff
    b) Administration of antivirals/vaccines as per occupational physician medical directive and delegation
A risk-based framework has been developed to describe the stages of Company X’s response to the WHO Pandemic phases:

- ensures appropriate effort is expended when required according to the appropriate risk in Ontario
- ensures consistency of preparations and for response to the pandemic within Company X

The framework identifies:

1. A description of the Pandemic stage
2. The risk to Company X
3. The trigger which initiates the Pandemic stage (internal and external)
4. A high level description of the strategy or response that Company X will adopt at that stage
Company X Response Stages vs. WHO Phases
Integrating Pandemic with Emergency Management

1) BIAs (Business Impact Analysis)
   Hazard Identification and Risk Assessment

2) Protocols: Mitigation and Prevention
   - Antivirals and health-related stockpiles
   - Social distancing in stages
   - Enhanced hygiene
   - Education (Pandemic 101)
   - Seasonal influenza campaigns
   - Employee communications

3) Preparedness
   Company X Pandemic Plan:
   - Planning assumptions
   - The 10 Protocols
   - Staged Response Strategy
   - Drills and exercises

4) Response
   - COOPs (Continuity Of Operations Plan)

5) Recovery
   - Strategies for critical processes
From BIA to COOPs...

Corporate Plan
- Planning Assumptions
- Stage and Response
- Corporate Protocols

BIAs

COOPs

Operational Capability Assessments

Top 10 Concerns

Business Unit Planning Assumptions and Staged Response

BIA
- Business continuity risks
- Recovery priorities (key processes, systems, staff)
- Strategies

COOPs
- Draft COOPs
- Plans
- Procedures
- Instructions

Tabletop exercises

Assessment of Operational Capability

Management reviews for alignment

Stakeholder reviews for dependencies, gaps

Annual Review, update & practice

Declare readiness
# Typical Response Actions for Essential Workers

<table>
<thead>
<tr>
<th>Typical Response Actions</th>
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<tbody>
<tr>
<td><strong>Monitor Situation for Pandemic</strong></td>
</tr>
<tr>
<td>Monitor the global situation, and impacts on the local community and employees. Monitor employee absentee rates. Decide response actions. Train additional staff in preparation to maintain essential operations</td>
</tr>
<tr>
<td><strong>Communicate</strong></td>
</tr>
<tr>
<td>Communicate with employees, suppliers and customers, stakeholders, other interdependent critical infrastructure sectors, state, provincial, and local health authorities. Consider the impact on employee families.</td>
</tr>
<tr>
<td><strong>Control Infection</strong></td>
</tr>
<tr>
<td>Limit the spread through personal hygiene, workplace screening and cleaning, personal protective equipment, work from home capability, social distancing (e.g. workplace screening, visitor and travel restrictions, return to work policies), anti-virals and vaccine.</td>
</tr>
<tr>
<td><strong>Support Employees</strong></td>
</tr>
<tr>
<td>Provide guidance to managers and staff, provide medical and psychological support. Consider the impact on employee families and measures to support them.</td>
</tr>
<tr>
<td><strong>Maintain Essential Operations</strong></td>
</tr>
<tr>
<td>Defer or cease non-essential work, re-deploy staff. Monitor and adjust response actions as required. Plan for subsequent waves.</td>
</tr>
</tbody>
</table>
## Respond According to Severity

<table>
<thead>
<tr>
<th></th>
<th>Monitor Situation</th>
<th>Communicate</th>
<th>Control Infection</th>
<th>Support Employees</th>
<th>Maintain Essential Operations</th>
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<tr>
<td><strong>Routine</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Enhanced</strong></td>
<td>Periodic updates from health authorities</td>
<td>Periodic updates to all staff Limited sector-wide notifications</td>
<td>Consider enhanced procedures</td>
<td>Consider enhanced support for managers to make decisions</td>
<td></td>
</tr>
<tr>
<td><strong>Advanced</strong></td>
<td>Frequent updates from health authorities Monitor employee absentee rates</td>
<td>Frequent updates to all staff Periodic sector-wide notifications</td>
<td>Confirm anti-viral priorities and consider distribution in consultation with health authorities Confirm vaccine priorities to support essential business</td>
<td>Enhanced support for managers to make decisions re: staff and their families, close contact situations</td>
<td>Essential business plus regulatory requirements only</td>
</tr>
<tr>
<td><strong>Full Activation</strong></td>
<td>Daily updates from health authorities Monitor employee absentee rates</td>
<td>Daily updates to all staff Frequent sector-wide notifications</td>
<td>Decide anti-viral distribution in consultation with health authorities Prepare to support requirements by state, provincial and local agencies/governments to identify critical workers for prioritized distribution of vaccine when available</td>
<td>Enhanced support for managers to make decisions re: staff prioritization</td>
<td>Essential business only</td>
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## Severity Response Matrix for Pandemics

<table>
<thead>
<tr>
<th>CDC Case Fatalities</th>
<th>SEVERE ≥ 2.0%</th>
<th>MODERATE 0.5% - 2.0%</th>
<th>MILD &lt; 0.5%</th>
<th>SCENARIOS</th>
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<tr>
<td>5</td>
<td>Pandemic Peak Wave</td>
<td>Pandemic Peak Wave</td>
<td>Pandemic Peak Wave</td>
<td>Pandemic Peak Wave</td>
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<tr>
<td>4</td>
<td>Alert Pandemic</td>
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<td>3</td>
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<tr>
<td>2</td>
<td>Enhanced Monitoring</td>
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<td>Alert Pandemic</td>
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<tr>
<td>1</td>
<td>Routine Monitoring</td>
<td>Routine Monitoring</td>
<td>Enhanced Monitoring</td>
<td>Alert Pandemic</td>
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**Illness Attack Rate**

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<tr>
<th>MILD 15%</th>
<th>MODERATE 25%</th>
<th>SEVERE 35%</th>
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</thead>
</table>

**Scenarios**

- Staff Absenteeism
  - 20% for 1 week, 10% for remainder of wave (20% / 10%)  
  - 30% / 15%  
  - 40% / 20% or greater
Social Distancing? Don’t Kiss Your Loved Ones!
COVID-19 and the Health Care/Essential Workers
COVID-19 and the Health Care/Essential Workers Personal Protective Equipment (PPE)

Presented by Dr. Sidney Siu MD, FRCPC April 17th, 2020

• Disclaimers
  • No conflict of interest
  • No financial gains
  • Opinions and Recommendations are based on the “current knowledge” and they will change when more scientific evidence or information become available
  • Opinions and Recommendations are strictly of those of the speaker and NOT those from OEMAC, CBOM, OMSOC, Western University, or the Office of the Chief Coroner
Learning Objectives

• Hierarchy of protection
• PPE Selection and Care
  • Appropriate for the circumstance
  • Different types of Mask/Respirator
  • Certification and Approval of Mask/Respirator
  • Extended use
  • Reuse
Hierarchy of Protection

• Elimination (Not feasible)
• Substitution (Not feasible)
• Engineering Control (Physical barrier, local ventilation, general ventilation)
• Administrative Control (Patient and Staff screening, Cohorting patients and staff, limiting number of potential exposure)
• Work practice, Personal hygiene and Education
• Personal Protective Equipment
Personal Protective Equipment

• Selection
  • Appropriate for the situation

• Care
  • Donning and doffing
  • Extended use
  • Reuse
Current Recommendations

TECHNICAL BRIEF

IPAC Recommendations for Use of Personal Protective Equipment for Care of Individuals with Suspect or Confirmed COVID-19

April 6, 2020
Mode of transmission

• After two and a half months of global clinical experience and updated scientific and epidemiological evidence, routes of transmission for COVID-19 reveal the following:
  • COVID-19 cases and clusters demonstrate that Droplet/Contact transmission are the routes of transmission.
  • The majority of cases are linked to person-to-person transmission through close direct contact with someone who is positive for COVID-19.
  • There is no evidence that COVID-19 is transmitted through the airborne route.
Optimizing the Supply of Personal Protective Equipment During the COVID-19 Pandemic

Recommendations from Ontario Health

Release date: April 11, 2020
Droplet and Contact transmission

• Droplet transmission
  • Prevent the droplet from reaching the mucous membrane
    • Control the source (mask the patient)
    • Face shield
    • Masks and goggles
    • N95s
    • Elastomeric Respirators

• Contact transmission
  • Prevent the agent from reaching the mucous membrane
  • Hands are the most likely vehicle for transmission
  • Work clothes and street clothes
Face shields

• Likely very effective for droplet exposure but cannot locate any study to verify this
• More comfortable than goggles
• When to use them?
• Two types:
  • Single use (integral part of a surgical/procedure mask)
  • Reusable (disinfection, scratches, storage)
“Requirement” for face shields

• Standards recommended by Health Canada
  Conformance with standards is voluntary for manufacturers of medical devices. A manufacturer may choose to demonstrate conformance with a listed standard or may elect to address the safety and effectiveness in another manner.

• Face shields
  A face shield is a device that has a transparent window or visor supported in front of the face to shield the eyes and face. Health Canada advises organizations who are manufacturing face shields to consult some or all of the following standards throughout the design and testing stages:
  • ANSI/ISEA Z.87.1 (2015) - American National Standard For Occupational And Educational Personal Eye And Face Protection Devices
  • CSA Z94.3 (2020) - Eye and face protectors
  • CSA Z94.3.1 (2016) - Guideline For Selection, Use, And Care Of Eye And Face Protectors
Goggles

- Very uncomfortable
- May fog up
- Most used in the medical department are NOT goggles but safety glasses
Gloves:

• Not all gloves are created equal
• In general, sterile gloves have less leakage than procedure gloves
• Leakages increase after gloves manipulated
• Latex: 0.24 mm, Nitrile: 0.16mm
• Hand hygiene after gloves removal
Mask vs Respirator

• Strictly, a mask is NOT a respirator

• In general, masks are “approved” by FDA and classified by ASTM (American Society of Testing and Materials) and respirators are certified by NIOSH (National Institute of Occupational Safety and Health)

• Masks provide protection for the surgical field, the patient and the wearer

• Respirators provide protection for the wearer
Medical Mask

- ASTM: 3 Levels. Major difference: fluid resistance. 3>1
- Level 2 and 3 have BFE ( bacterial filtration efficiency ) >98%, Level 1 > 95%
- All have Class 1 flame spread ( Note not flame resistant )
Respirators:

- Full face
- Half face
  - Filtering Facepiece
  - Elastomeric Respirator
Filtering Facepiece (N95s)

- NIOSH approved
- Other Countries approval
  - Europe FFP2 (EN149-2001)
  - China KN95 (GB2626-2006)
  - Australia P2 (AS/NZ1716:2012)
  - Korea 1st Class (KMOEL-2017-64)
  - Japan DS (JMHLW-Notification 214, 2018)
- Medical N95s?
  - Splash resistance
N95 beyond shelf life

Ministry of Health

COVID-19 Guidance: Information on the Use of N95 Filtering Facepiece respirators beyond the manufacturer-designated shelf life

Version 1 - March 27, 2020

This fact sheet provides information for health care workers about the use of N95 respirators beyond the manufacturer-designated shelf life. It is not intended to provide legal or medical advice.

Highlights

- Do not destroy N95 respirators that are beyond the manufacturer-designated shelf life
- N95 respirators beyond the manufacturer-designated shelf life can serve important purposes: Fit Testing, Training, and Droplet/Contact Precautions

An expired N95 respirator can still be effective at protecting health care provider if:

- the straps are intact
- there are no visible signs of damage
- they can be fit-tested

Health care providers should inspect the respirator and perform a seal check.
Extended Use of N95s

- Industrial experience, up to 8 hours
- CDC recommendations for health care settings:
  - Discard N95 respirators following use during aerosol generating procedures.
  - Discard N95 respirators contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.
  - Discard N95 respirators following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions.
  - Consider use of a cleanable face shield (preferred\(^3\)) over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls) to reduce surface contamination.
  - Perform hand hygiene with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).
Reuse of N95s

SYNOPSIS
04/04/2020
COVID-19 – What We Know So Far About... Reuse of Personal Protective Equipment
Decontamination of N95s (FFPR)

• Hydrogen peroxide vapour
  • CDC released guidance and FDA authorized 3rd party
  • Up to 20 cycles
  • Not for cellulose material

• UV-C
  • May cause strap and facepiece damage ( may not disinfect straps )
  • 10-20 cycles

• Heat & Humidity
  • 5 cycles at 60C and 80% RH
  • High heat may damage respirator
Elastomeric half face

• Decontamination can be a challenge
• Should not be used by a symptomatic worker (exhalation valve will not stop the aerosol from escaping the respirator) or in areas where the wearer can contaminate the “field”.
• Medical N95s do not have exhalation valve.
Aerosol Generating Medical Procedures

### Procedures Generating Droplets/Aerosols

- Endotracheal intubation, including during cardio-pulmonary resuscitation
- Cardio-pulmonary resuscitation during airway management (e.g. manual ventilation)
- Open airway suctioning
- Bronchoscopy (Diagnostic or Therapeutic)
- Autopsy
- Sputum induction (Diagnostic or Therapeutic)
- Non-invasive positive pressure ventilation for acute respiratory failure (CPAP, BiPAP)
- High flow oxygen therapy
Aerosol Generation Procedures

- Dentistry
- Home care (suction, moisture oxygen)
- Funeral Home
# PPE for Health Care

## Healthcare Facilities - Inpatient facilities

<table>
<thead>
<tr>
<th>Setting</th>
<th>Individual</th>
<th>Activity</th>
<th>Type of PPE or procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare workers</td>
<td>Providing direct care to patients with suspect or confirmed COVID-19, including nasopharyngeal and oropharyngeal swab collection</td>
<td>Droplet and Contact precautions, including:</td>
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<td>Surgical/procedure mask</td>
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<td>Isolation gown</td>
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<td>Gloves</td>
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<td>Eye protection (goggles or face shield)</td>
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<tr>
<td>Patient room</td>
<td>Aerosol-generating medical procedures performed on suspect or confirmed COVID-19 patients</td>
<td>Airborne, Droplet and Contact precautions, including:</td>
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<td>N95 respirator (fit-tested, seal-checked)</td>
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<td>Isolation gown</td>
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<td>Eye protection (goggles or face shield)</td>
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<td>Negative pressure room, if available</td>
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<tr>
<td>Environmental service workers</td>
<td>Entering the room of patients with suspected or confirmed COVID-19</td>
<td>Droplet and Contact precautions, including:</td>
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<td>Surgical/procedure mask</td>
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<td>Eye protection (goggles or face shield)</td>
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<tr>
<td>Visitors</td>
<td>Entering the room of a patient with suspected or confirmed COVID-19 Visitors should be kept to a minimum</td>
<td>Droplet and Contact precautions, including:</td>
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<td>Surgical/procedure mask</td>
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<td>Eye protection (goggles or face shield)</td>
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</table>
Face Covering

- Not a respirator
- Not a medical mask
- No certification or approval needed
- Can stop aerosol from expelled from the wearer
- May stop some aerosols from getting to the wearer
- Deterrence of touching the face
- “Mask” for the patients?
Donning and Doffing of PPE

• https://www.youtube.com/watch?v=syh5UnC6G2k

My personal recommendation

- Face shield
- Risk Assessment for N95s (FFPR)
  - NIOSH approved medical N95s
  - NIOSH approved N95s
  - Any NIOSH approved N95s that are beyond shelf life
  - Other approved medical respirators
  - Other approved respirators
  - Extended use of N95s
  - Re-use of disinfected N95s
Useful References:

- **Extended use of N95s**: https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html
- **Elastomeric Respirators**: https://www.ncbi.nlm.nih.gov/books/NBK540078/
Useful References 2:

- N95s vs Surgical masks
- ASTM standards for surgical masks
  https://www.astm.org/Standards/F2100.htm
- Gloves leakages
  https://jamanetwork.com/journals/jamasurgery/fullarticle/390669
- Gloves comparison
- Health Canada COVID 19 PPE guides
  https://buyandsell.gc.ca/specifications-for-COVID-19-products#100
Questions?

srscons@on.aibn.com