DCCM COVID-19 Town Hall

April 1st, 2020

Welcome/Ground Rules

- Welcome
- Webinar Format
  - Host and panelists
  - Audience participation/Chat

Agenda

- COVID-19 Dashboard
- Departmental Response
- “Just in Time” Emerging COVID literature
- Emerging Themes and Resources

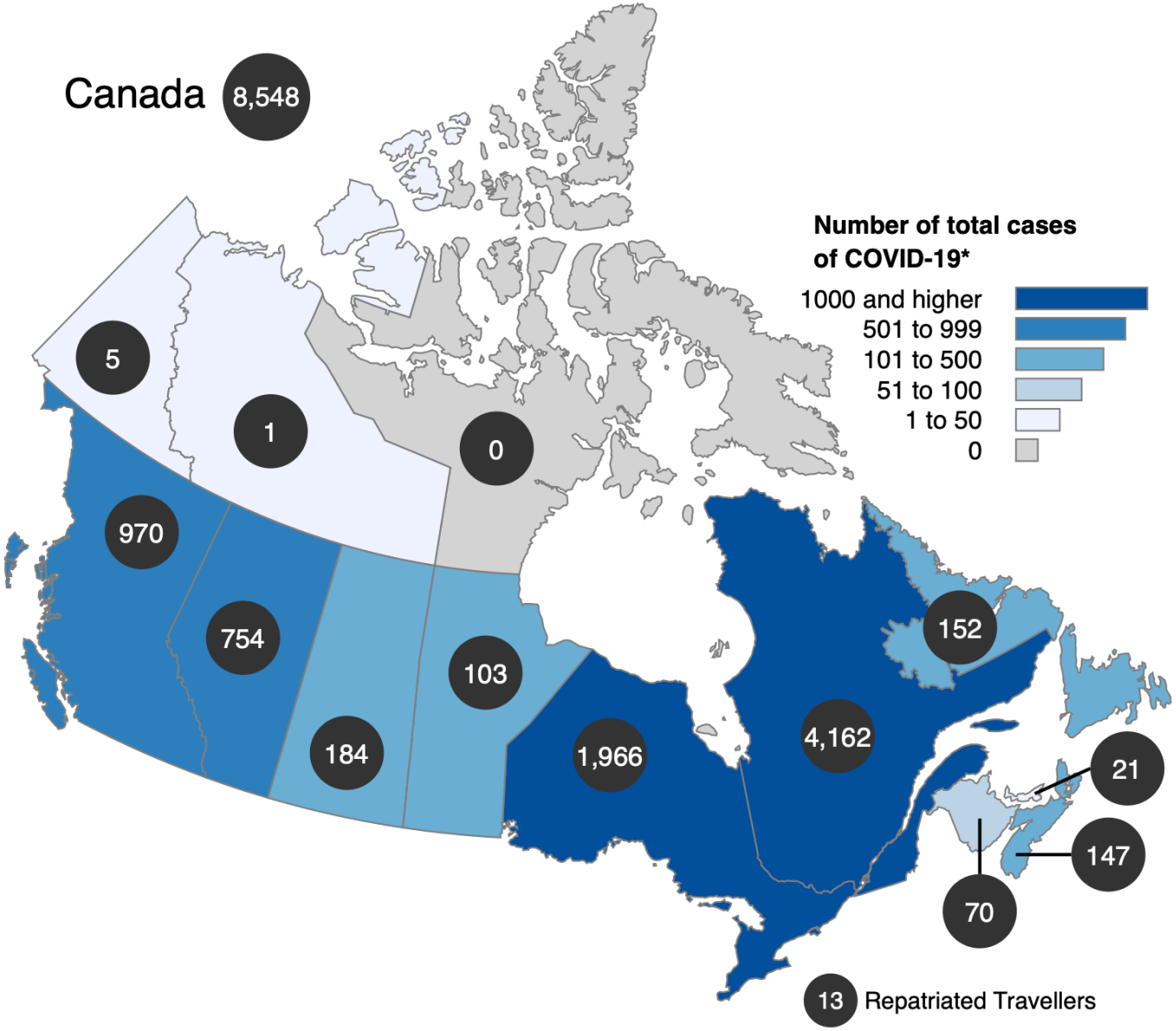
COVID-19 Dashboard

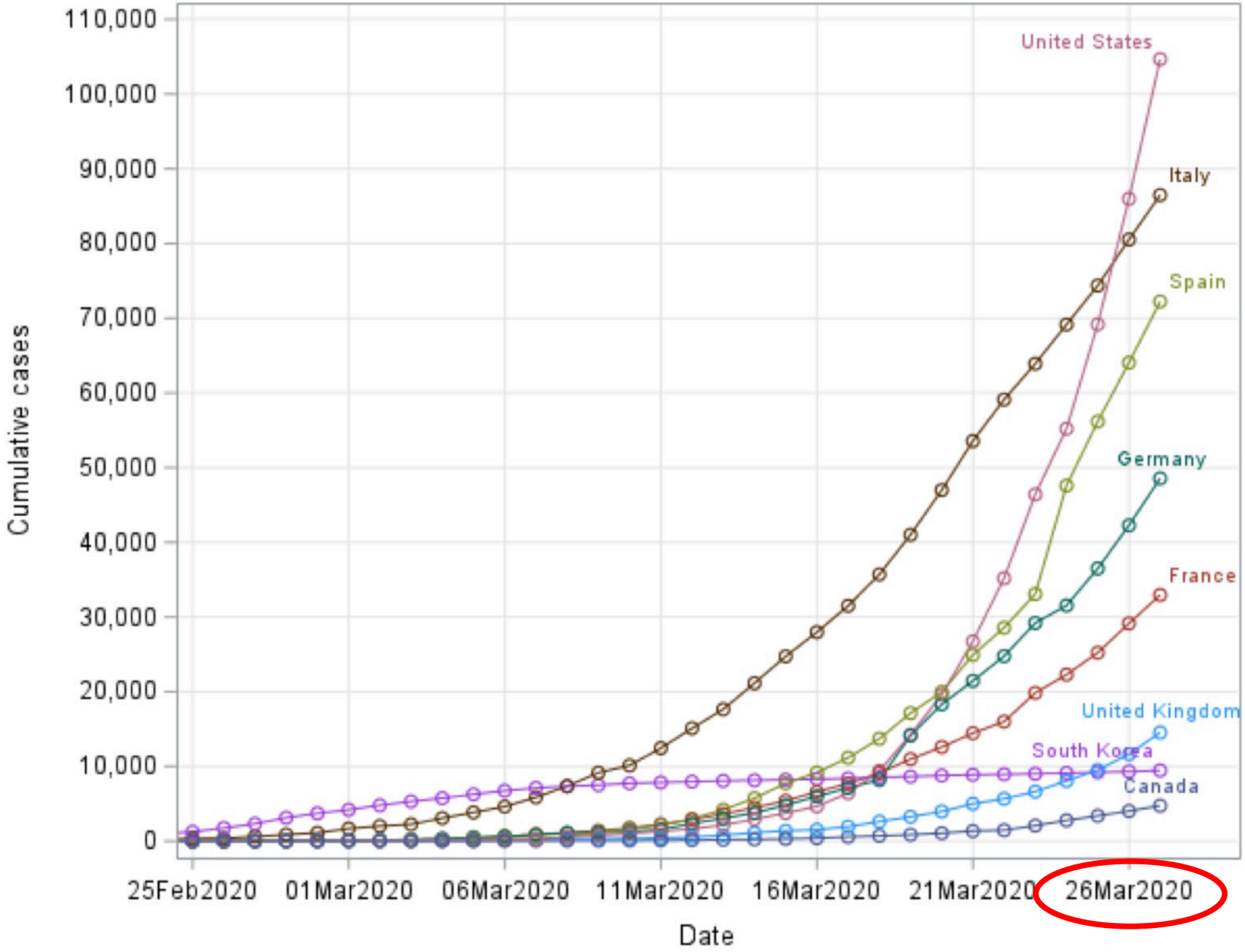
Dan Niven

Sources of Information up to March 31:

https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html#a1

https://www.alberta.ca/covid-19-alberta-data.aspx


Canada 8,548
Number of total cases of COVID-19*
1000 and higher
501 to 999
101 to 500
51 to 100
1 to 50
0
5
1
0
970
754
184
103
1,966
4,162
152
21
147
70
13 Repatriated Travellers


110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
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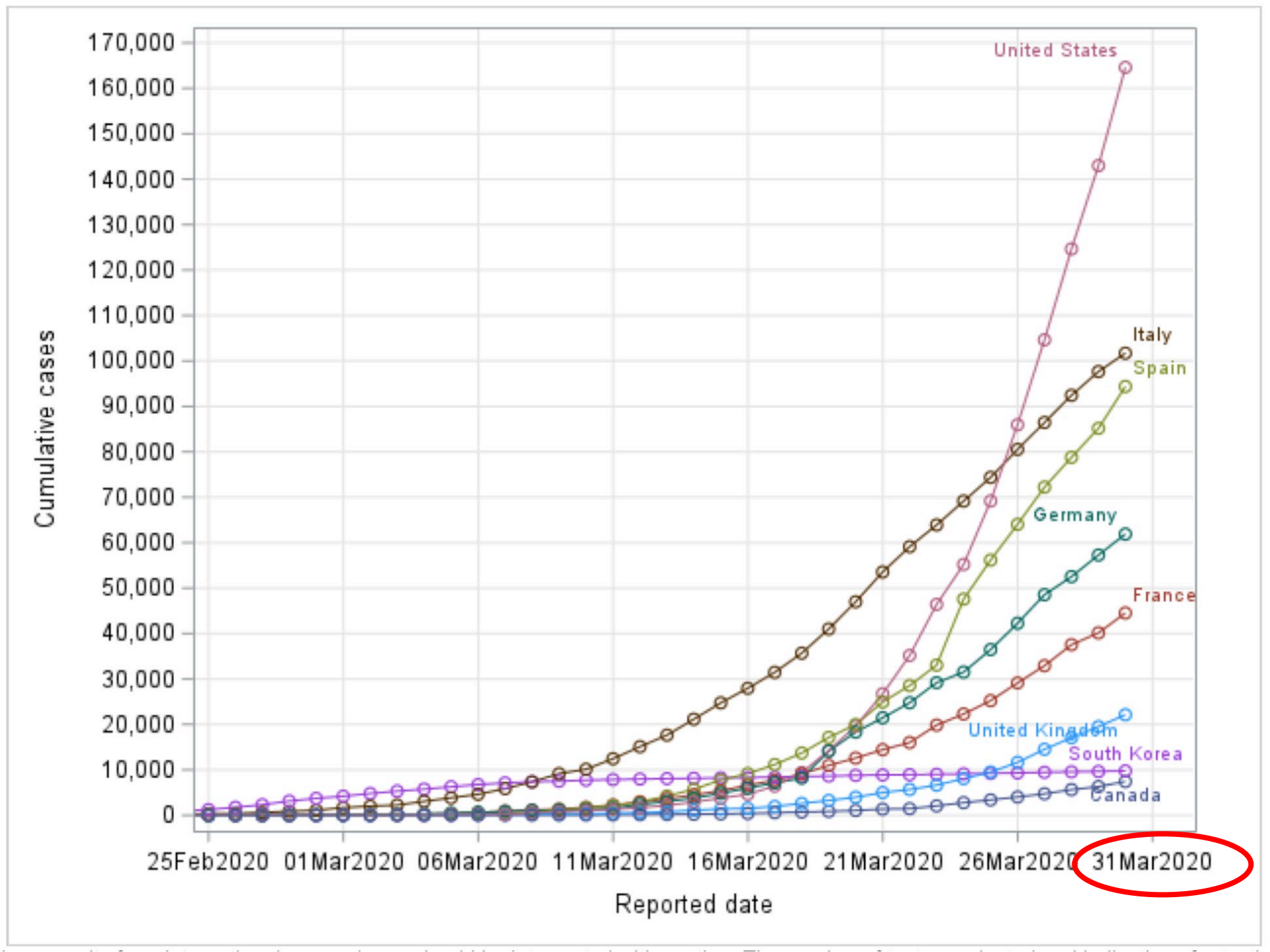
Cumulative cases
United States
Italy
Spain
Germany
France
United Kingdom
South Korea
Canada
25Feb2020
01Mar2020
06Mar2020
11Mar2020
16Mar2020
21Mar2020
26Mar2020
Date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Cumulative cases
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Spain
Germany
France
United Kingdom
South Korea
Canada
25Feb2020
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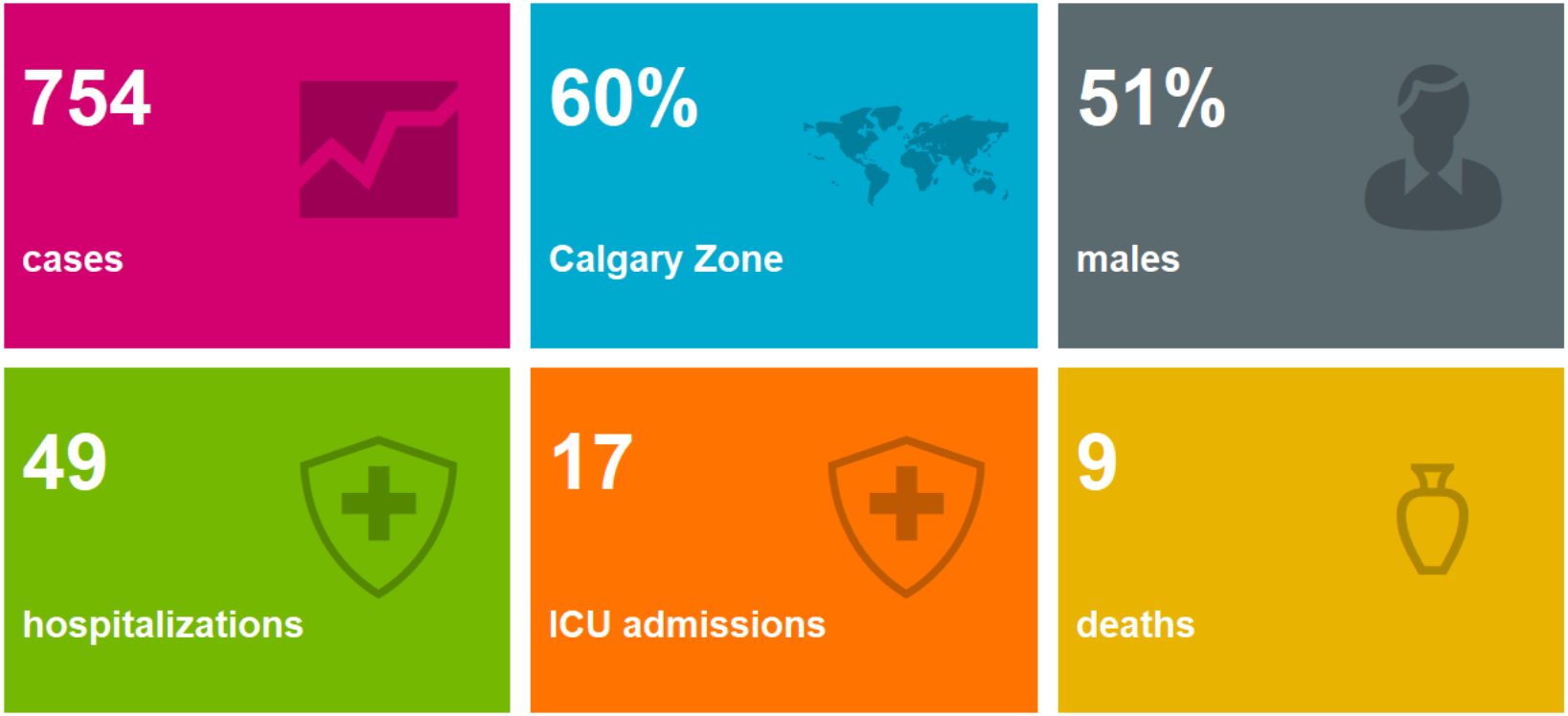
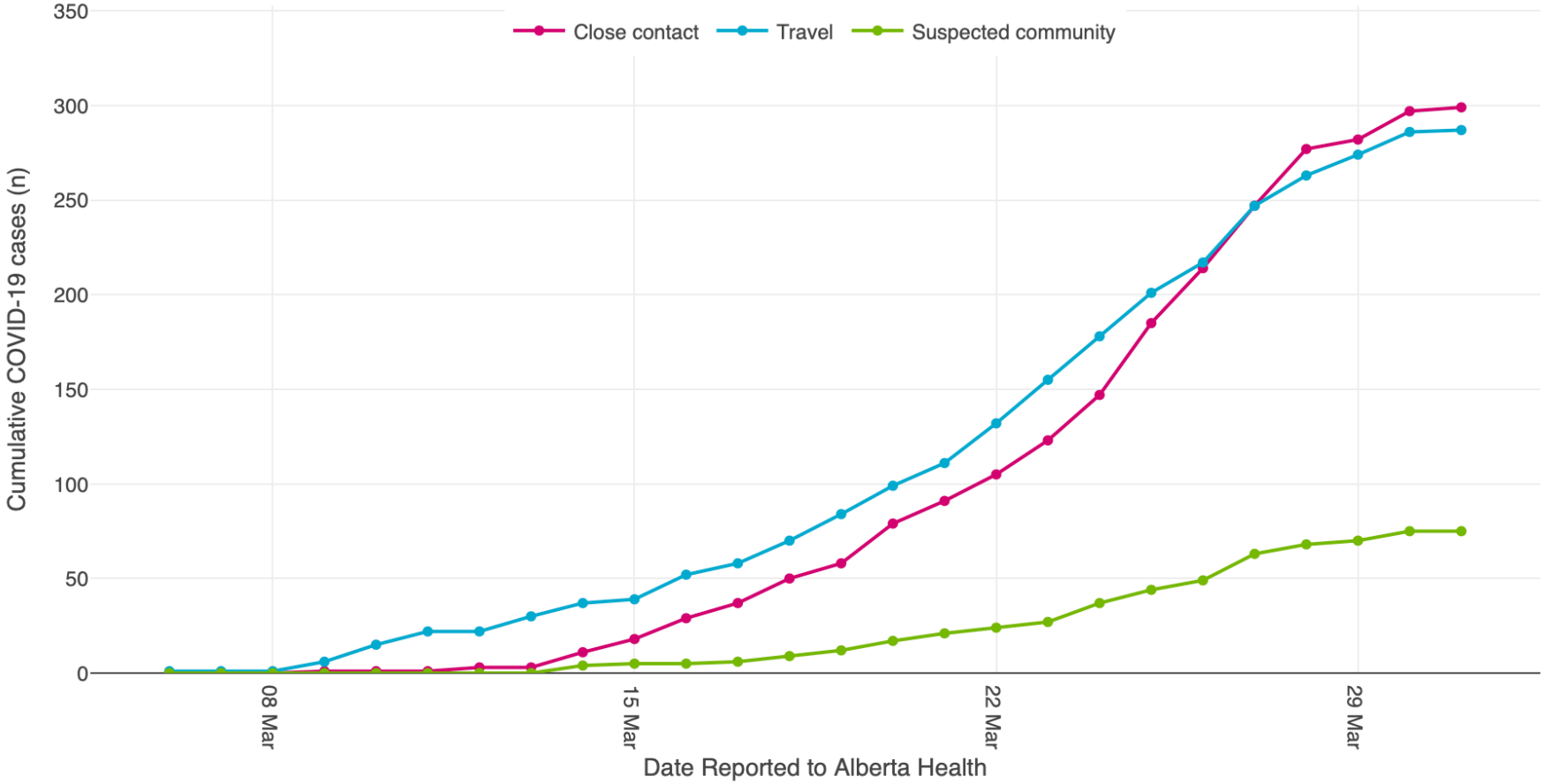
31Mar2020
Reported date

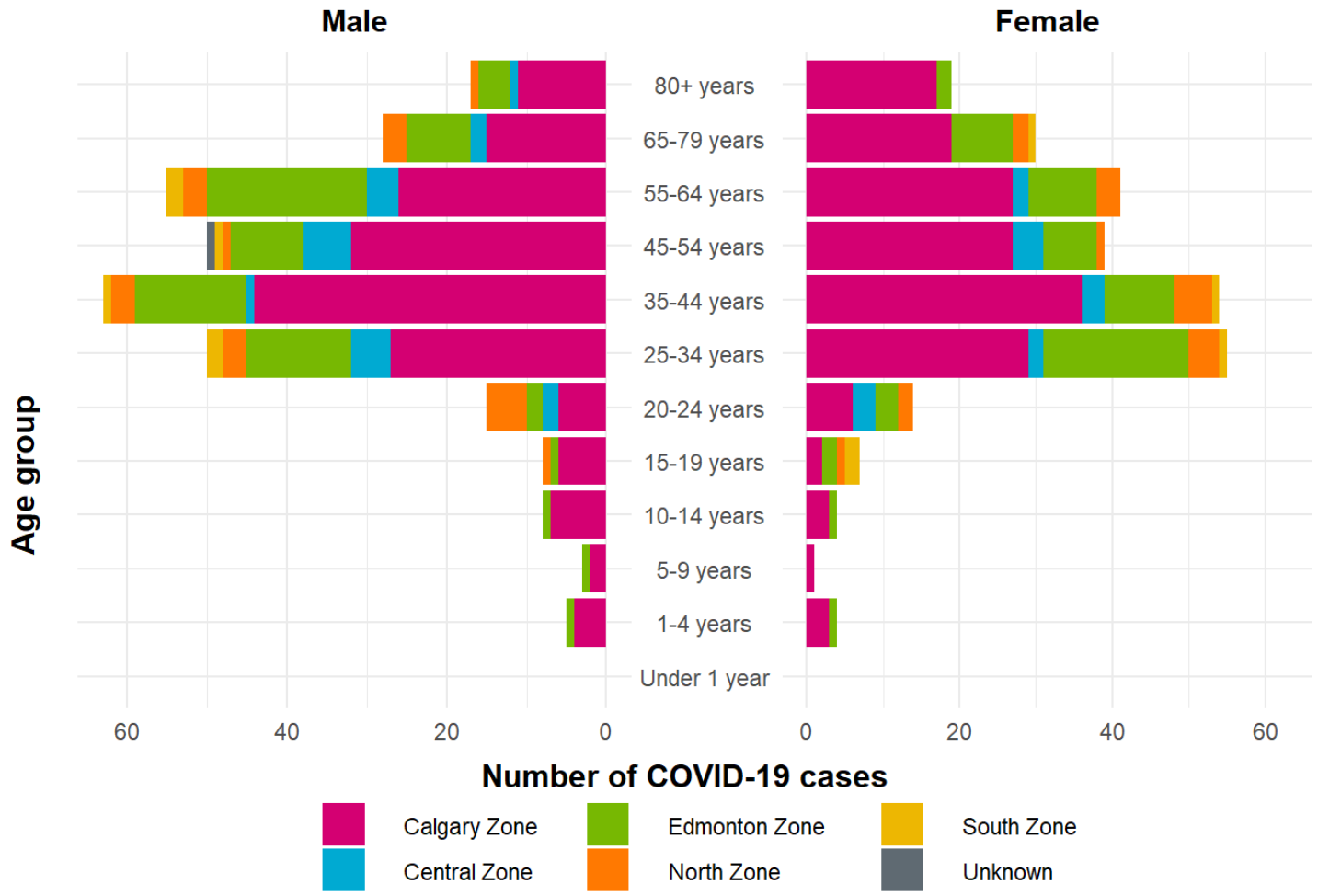
Alberta COVID Cases – March 31



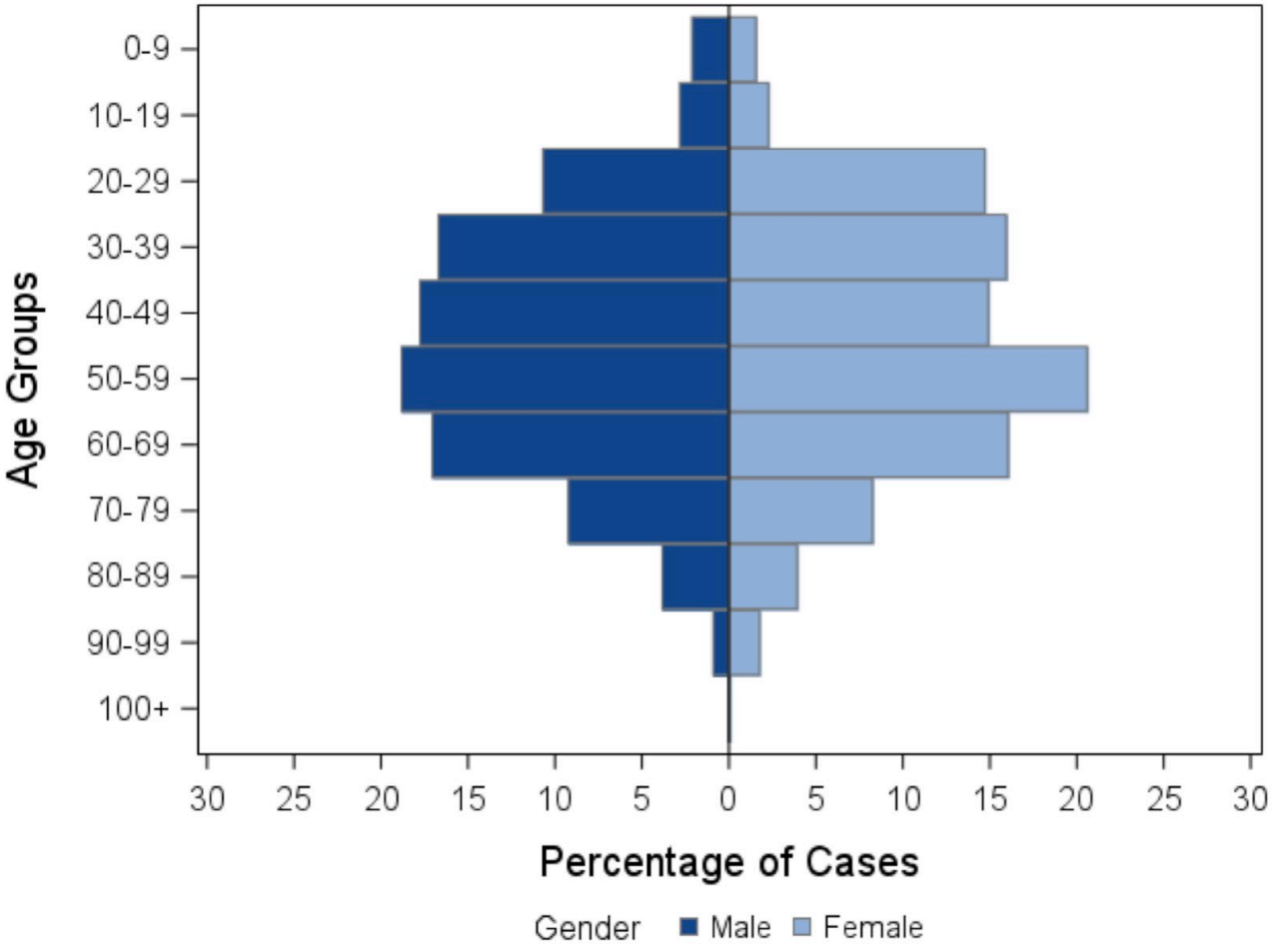
Alberta Cases: Route of Acquisition



Alberta Case Demographics



Canada Cases: Demographics



Severe COVID-19 Cases in Canada

Severe Cases				
Overall Summary Hospitalizations				
Hospitalizations*			353	
Hospitalizations in ICU			108/353	(31%)
Hospitalizations requiring mechanical ventilation¥			46/353	(13%)
Breakdown by:	**Hospitalizations**		**Admitted to ICU**	
Age groups	n=327		n=99	
≤ 19	5	(2%)	1	(1%)
20-39	27	(8%)	7	(7%)
40-59	94	(29%)	30	(30%)
60-79	139	(43%)	52	(52%)
80+	61	(19%)	9	(9%)
Gender	n=351		n=108	
Female	149	(42%)	45	(42%)
Male	202	(58%)	63	(58%)

Care for all patients

We aim to provide all patients with the care they need

Safety for all staff

We aim to protect all team members from SARS-CoV-2

Key Processes

- Surge beds
- Supplies
- Clinical care team
- Care processes

Departmental Priorities

- Complete stage 1 & 2 surge planning
- Develop strategy for ACH PICU
- Build common care pathways

COVID-19 Critical Care Literature Update

Literature published up to March 27, 2020

Dan Niven and Chip Doig

Surviving Sepsis Campaign: guidelines on the management of critically ill adults with coronavirus disease 2019 (COVID 2019). Intensive Care Medicine 2020 (unedited accepted proof).

- Panel of 36 experts representing 12 countries
- Addressed 53 questions (we won't review all!):
  - Infection control, laboratory diagnosis, hemodynamic and ventilatory support, specific therapy for COVID
- GRADE approach, followed by recommendations based on risk-benefit, resource & cost, feasibility
- Recommendations characterized into:
  - Weak
  - Strong
  - Best Practice recommendation

Surviving Sepsis Campaign: guidelines on the management of critically ill adults with coronavirus disease 2019 (COVID 2019). Intensive Care Medicine 2020 (unedited accepted proof).

- Given the absence of direct evidence for COVID-19, predefined algorithm:
  - MERS
  - SARS
  - ILI and other viral respiratory infections
  - ARDS and Sepsis

Risk of infection in HCP's

- Amongst laboratory confirmed* infection in China, 1716/44672* (3.8%) were HCP's
- 14.8% of HCP's had severe or critical illness
- Italy: "considerable burden of infection in HCW's"

<u>Recommendation 1:</u>

HCP's performing AGMP's** wear N-95's, gown, face shield or safety goggles (Best Practice Statement)

**intubation, bronchoscopy, open suctioning, nebulized treatment, BVM, proning, disconnects, NIPPV, Tracheostomy, CPR

Risk of infection in HCP's

Recommendation 3:

HCP's caring for non-ventilated patients use surgical masks with other PPE (evidence weak recommendation).

Recommendation 4:

HCP's performing non-AGMP's on mechanically ventilated patients may follow recommendation #3 (weak recommendation).

Risk of infection in HCP's

Recommendations 3&4: what's the evidence?

(1) 4 RCT's (n=5,549) individuals with seasonal ILI:

- OR (95% CI) for risk laboratory confirmed respiratory infection 1.06 (0.9,1.25) for use of surgical masks vs N-95
- OR (95%CI) for ILI: 1.31 (0.94, 1.85) surgical mask vs N-95

(2) One non-cluster RCT (n=212) in seasonal coronavirus:

- Infection incidence: 4.3% surgical mask vs 5.7% N-95

(3) SARS CO-2 may be more easily transmissible than Influenza

Risk of infection in HCP's
Recommendations 3&4:

Current recommendations from the Critical Care SCN:

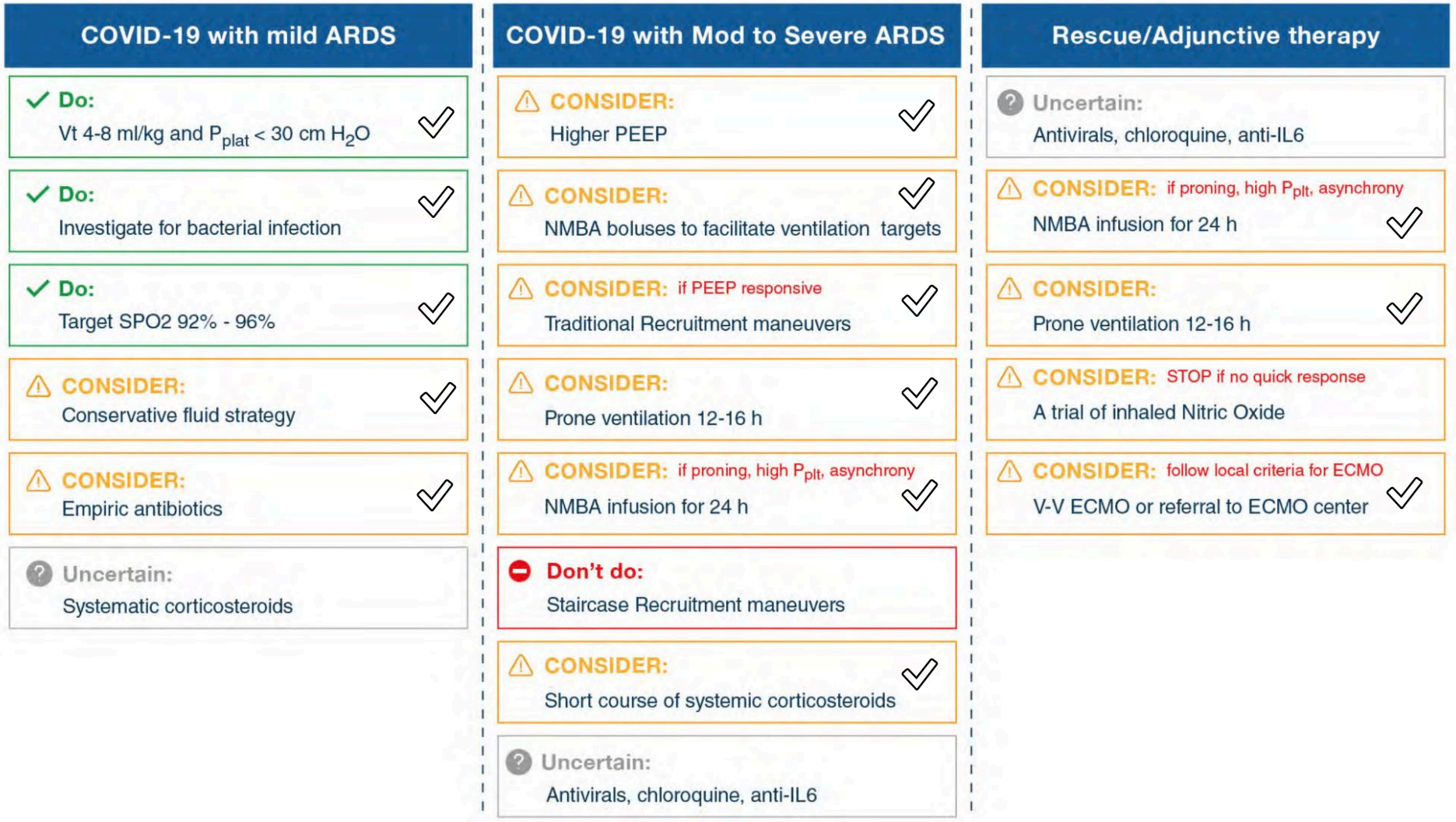
- Use of N-95 for all mechanically ventilated patients!

However, in the event of severe shortage…we should have some relief that risk of infection with a regular mask vs N-95 is uncertain, and as a collective we might have to consider what is the approach borne of necessity.

Remaining Recommendations:

COVID-19 with mild ARDS	COVID-19 with Mod to Severe ARDS	Rescue/Adjunctive therapy
✓ **Do:** Vt 4-8 ml/kg and P_{plat} < 30 cm H_2O	⚠ **CONSIDER:** Higher PEEP	? **Uncertain:** Antivirals, chloroquine, anti-IL6
✓ **Do:** Investigate for bacterial infection	⚠ **CONSIDER:** NMBA boluses to facilitate ventilation targets	⚠ **CONSIDER:** if proning, high P_{plt}, asynchrony NMBA infusion for 24 h
✓ **Do:** Target SPO2 92% - 96%	⚠ **CONSIDER:** if PEEP responsive Traditional Recruitment maneuvers	⚠ **CONSIDER:** Prone ventilation 12-16 h
⚠ **CONSIDER:** Conservative fluid strategy	⚠ **CONSIDER:** Prone ventilation 12-16 h	⚠ **CONSIDER:** STOP if no quick response A trial of inhaled Nitric Oxide
⚠ **CONSIDER:** Empiric antibiotics	⚠ **CONSIDER:** if proning, high P_{plt}, asynchrony NMBA infusion for 24 h	⚠ **CONSIDER:** follow local criteria for ECMO V-V ECMO or referral to ECMO center
? **Uncertain:** Systematic corticosteroids	⛔ **Don't do:** Staircase Recruitment maneuvers	
	⚠ **CONSIDER:** Short course of systemic corticosteroids	
	? **Uncertain:** Antivirals, chloroquine, anti-IL6	

Remaining Recommendations: ✓ CCSCN guidelines



Annals of Internal Medicine: Brief Research Report
COVID-19 and the risk to health care workers.
Ng K, et al. Ann Int Med 2020: doi:10.7326/L20-0175

- Nosocomial infection in 41 HCW's caring for a patient with COVID-19 pneumonia requiring MV (status of COVID-19 not known at time of exposure)
- All had exposure to AGMP for >=10 minutes within 2 metres of the patient (intubation, extubation, NIV, open circuits). 85% surgical mask only.
- COVID sampling from HCW's on day of home isolation (1, 2, 4, 5 post exposure) and day 14 post exposure.

Annals of Internal Medicine: Brief Research Report
COVID-19 and the risk to health care workers. Ng K, et al. Ann Int Med.

Table. Number of Nasopharyngeal Swabs in Exposed Health Care Workers, by Type of Procedure, Day After Last Exposure, and Type of Mask*

Type of AGP (n = 41 HCWs)	PPE	Timing of First Swab From Date of Last Exposure				Timing of Second Swab From Date of Last Exposure
		HCWs With Swab Done on Day 1, n	HCWs With Swab Done on Day 2, n	HCWs With Swab Done on Day 4, n	HCWs With Swab Done on Day 5, n	HCWs With Swab Done on Day 14, n
Endotracheal intubation (n = 10)	Surgical mask	1	0	1	2	4
	N95 mask	1	1	0	4	6
Extubation (n = 2)	Surgical mask	1	1	0	0	2
	N95 mask	0	0	0	0	0
NIV (ICU/HDU) (n = 25)	Surgical mask	20	4	0	0	25
	N95 mask	0	0	0	0	0
Other† (n = 4)	Surgical mask	3	0	0	1	4
	N95 mask	0	0	0	0	0

AGP = aerosol-generating procedure; PPE = personal protective equipment; NIV = noninvasive ventilation; ICU = intensive care unit; HCW = health care worker; HDU = high-dependency unit.
* All swabs were negative for SARS-CoV-2 on polymerase chain reaction assay.
† Oral suctioning in an open circuit or exposure to aerosols in an open circuit.

Risk factors associated with ARDS and death in patients with coronavirus disease 2019 pneumonia in Wuhan China.
Wu et al. JAMA Int Med 2020; doi:10.1001/jamainternmed.2020.0994

Methods:

- Retrospective cohort of 201 patients HOSPITALIZED with confirmed COVID-19 at Jinyintan Hospital, Wuhan
- Admitted Dec 25→Jan 26.
- All confirmed + by RT-PCR
- Broadly tested for other ILI and bacterial pathogens
- Outcome: development ARDS, mortality

Risk factors associated with ARDS and death in patients with coronavirus disease 2019 pneumonia in Wuhan China.
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Study population	No. (%)
No. of patients	201
Age, median (IQR), y	51 (43-60)
≥65	40 (19.9)
<65	161 (80.1)
Gender	
Male	128 (63.7)
Female	73 (36.3)

Risk factors associated with ARDS and death in patients with coronavirus disease 2019 pneumonia in Wuhan China.

Wu et al. JAMA Int Med 2020; doi:10.1001/jamainternmed.2020.0994

Initial common symptoms	
Fever	188 (93.5)
Cough	163 (81.1)
Productive cough	83 (41.3)
Dyspnea	80 (39.8)
Fatigue or myalgia	65 (32.3)
Chest imaging, infiltrate[a]	
Unilateral	10 (5.0)
Bilateral	191 (95.0)

Comorbidities	
Hypertension	39 (19.4)
Diabetes	22 (10.9)
Cardiovascular disease	8 (4.0)
Liver disease	7 (3.5)
Nervous system disease	7 (3.5)
Chronic lung disease	5 (2.5)
Chronic kidney disease	2 (1.0)
Endocrine system disease[b]	2 (1.0)
Tumor	1 (0.5)

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Table 1. Demographic Characteristics of Patients With Coronavirus Disease 2019 Pneumonia (continued)

Study population	No. (%)
Clinical outcomes	
ARDS	84 (41.8)
ICU admission	53 (26.4)
Death	44 (21.9)

Median time from admission to ARDS: 2 days (IQR 1, 4)
67 patients ventilated: all deaths from this cohort (65.7%)
Median LOS hospital all patients: 13 days

Wu et al. JAMA Int Med 2020; doi:10.1001/jamainternmed.2020.0994

Risk factors developing ARDS:

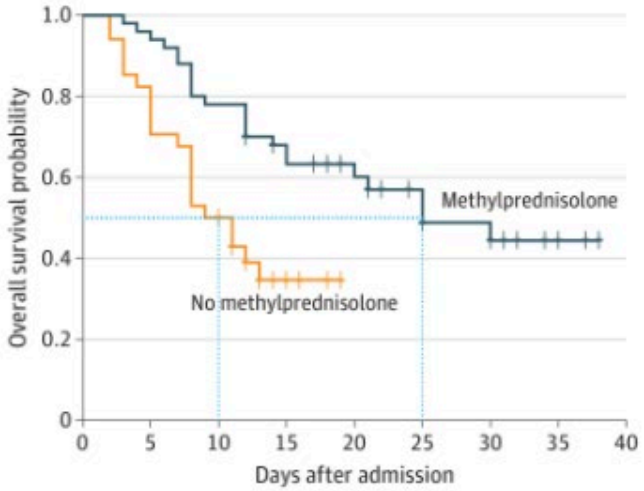
- >=65 years of age, male (?...borderline p-value)
- Febrile >=39C
- Hypertension, diabetes
- Neutrophilia, lymphopenia
- Elevated AST, urea, LDH, CRP, ferritin, PT, d-dimer

Risk of death with ARDS:

- Increased age (HR 6.2 age >=65)* (no other rf above 1.7)
- Hypertension (HR 1.7, borderline p-value)
- Increased SOFA (extrapolation: increased end organ dysfunction)
- Increased LDH, IL-6

Wu et al. JAMA Int Med 2020; doi:10.1001/jamainternmed.2020.0994
Controversial: corticosteroids not currently recommended.

Figure. Survival Curve in Patients With Acute Respiratory Distress Syndrome Who Did and Did Not Receive Methylprednisolone Treatment



No. at risk

No methylprednisolone	34	28	17	4	0	0	0	0	0
Methylprednisolone	50	48	39	29	20	14	11	4	0

Administration of methylprednisolone reduced the risk of death (hazard ratio, 0.38; 95% CI, 0.20-0.72; P = .003).

Emerging Themes and Important Resources

Jonathan Gaudet

Important Resources

- **Critical Care SCN Website**
  - https://www.criticalcareresearchscn.com/detail/posts/covid-19

- AHS **PPE Donning and Doffing** Information
  - https://www.albertahealthservices.ca/info/Page10531.aspx

- **Spectrum ID** app
  - Case tracking, who to test, how to test, antimicrobial management, etc.

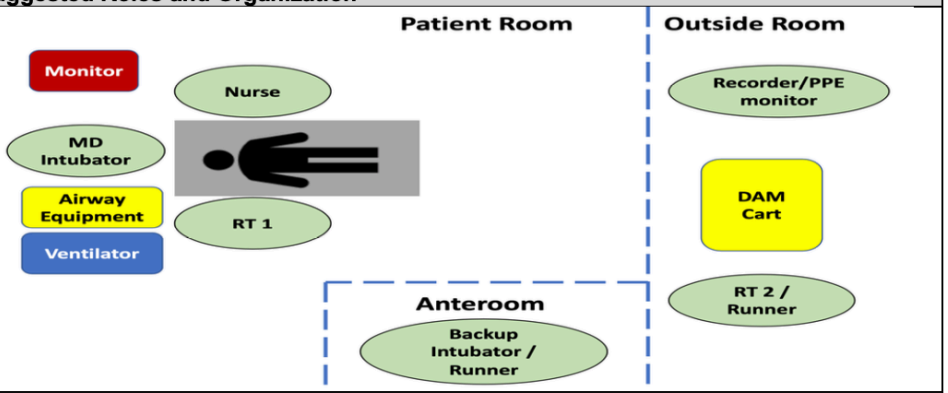
ILI / COVID-19 Airway Management Best Practice Considerations

V5. March 31, 2020

Preparation

1. PPE: Don full PPE including N95 respirator, goggles, face shield, gown and gloves. Proper application of PPE should be verified by an observer prior to patient contact
2. Early airway assessment for predictors of difficulty and consultation as necessary
3. Consider early, controlled intubation and avoid NIV, HHHFO and other AGMP as able
4. Minimize staff exposure:
   a. Minimize personnel in the room as able
   b. **Negative pressure room with anteroom if available (or neutral pressure room with door closed)**
   c. Ensure HMEF is between the mask and BVM at all times
5. **Intubation should be performed by most experienced practitioner to optimize first pass success**
6. Prepare necessary equipment and drugs **OUTSIDE** of room

Suggested Roles and Organization



Intubation Plan

- ✓ Optimize patient and intubator positioning; consider need for Troop pillow
- ✓ **Optimize pre-oxygenation using nasal prongs with 5L/min O_2 (up to 15L/min as necessary) AND tight seal BVM with 15L/min O_2 and PEEP valve = 5 cm H_2O**
- ✓ Reserve 2 person 2 handed BVM manual ventilation for situations when non-invasive O_2 delivery is failing
- ✓ **Video laryngoscopy recommended as Plan A.**
- ✓ **Best pharmacotherapy determined by MRHP on case-by-case basis to minimize chance of cough and aerosol generation**
- ✓ If no contraindications, Modified RSI (avoid coughing and facilitate first pass success) and leave nasal prongs with O_2 in place for apneic oxygenation:
  - Use higher mg/kg dose of muscle relaxants to ensure rapid onset of optimal intubating conditions (allow 1 minute for onset of adequate muscle relaxation):
    - Rocuronium 1.2-1.6 mg/kg (IBW)
    - Succinylcholine 1.5-2 mg/kg (TBW)
- ✓ If SpO2 < 70% begin 2 person 2 handed BVM manual ventilation with an OPA
- ✓ Wait until cuff inflated post-intubation before ventilating

Post-Intubation

- ☐ Confirm ETT position with $ETCO_2$ and CXR
- ☐ Closed suction system; avoid circuit disconnections and clamp ETT for planned disconnections
- ☐ Lung protective ventilation strategy (6-8 mL/kg Vt IBW; Pplat < 30 cm H_20; Optimal PEEP)
- ☐ Strategies for failing gas exchange: deep sedation and paralysis; permissive hypercapnia; prone positioning
- ☐ Maintain droplet and contact isolation and PPE as per IP&C

AGMP = aerosol generating medical procedures; BVM = bag valve mask; HHHFO = heated humidified high flow oxygen (AIRVO, Optiflow); HMEF = heat moisture exchange filter; IBW = ideal body weight; MRHP = most responsible healthcare provider; NIV = non-invasive ventilation; OPA = oropharyngeal airway; RSI = rapid sequence intubation; TBW = total body weight. This is a living document. Watch for new versions. The materials can be viewed as Level C evidence (expert consensus).

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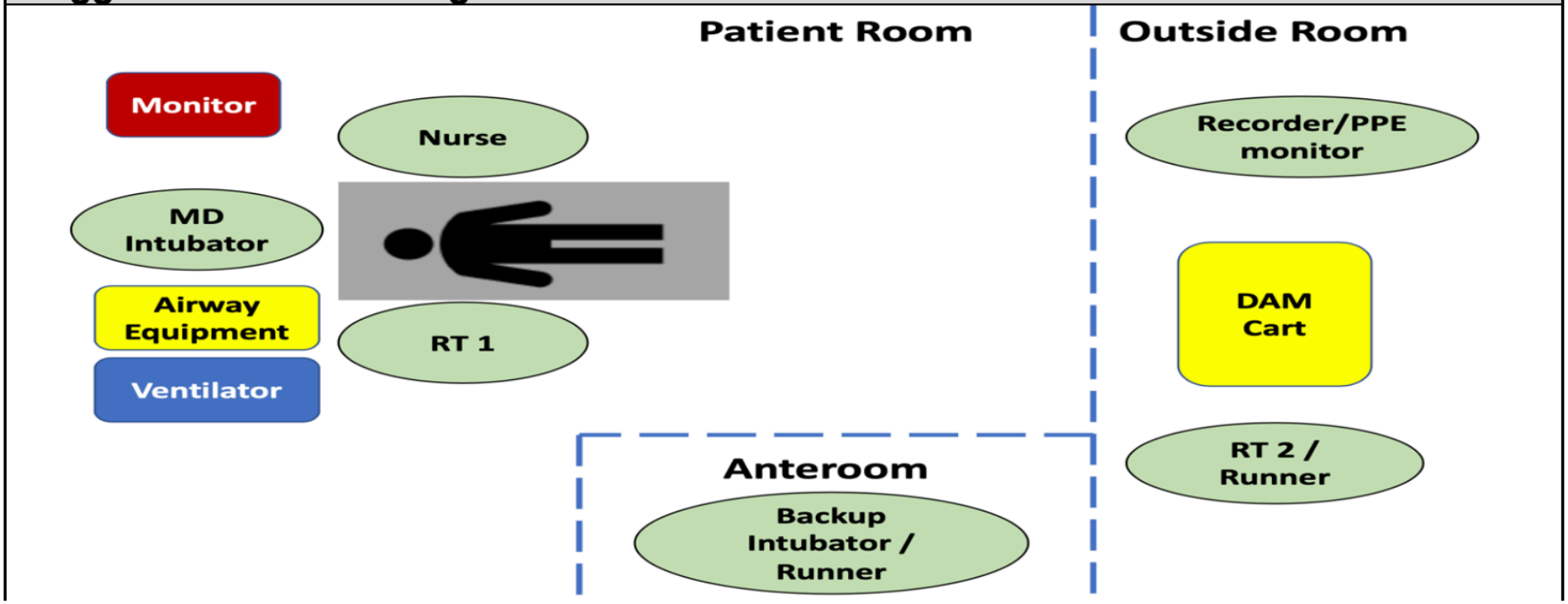

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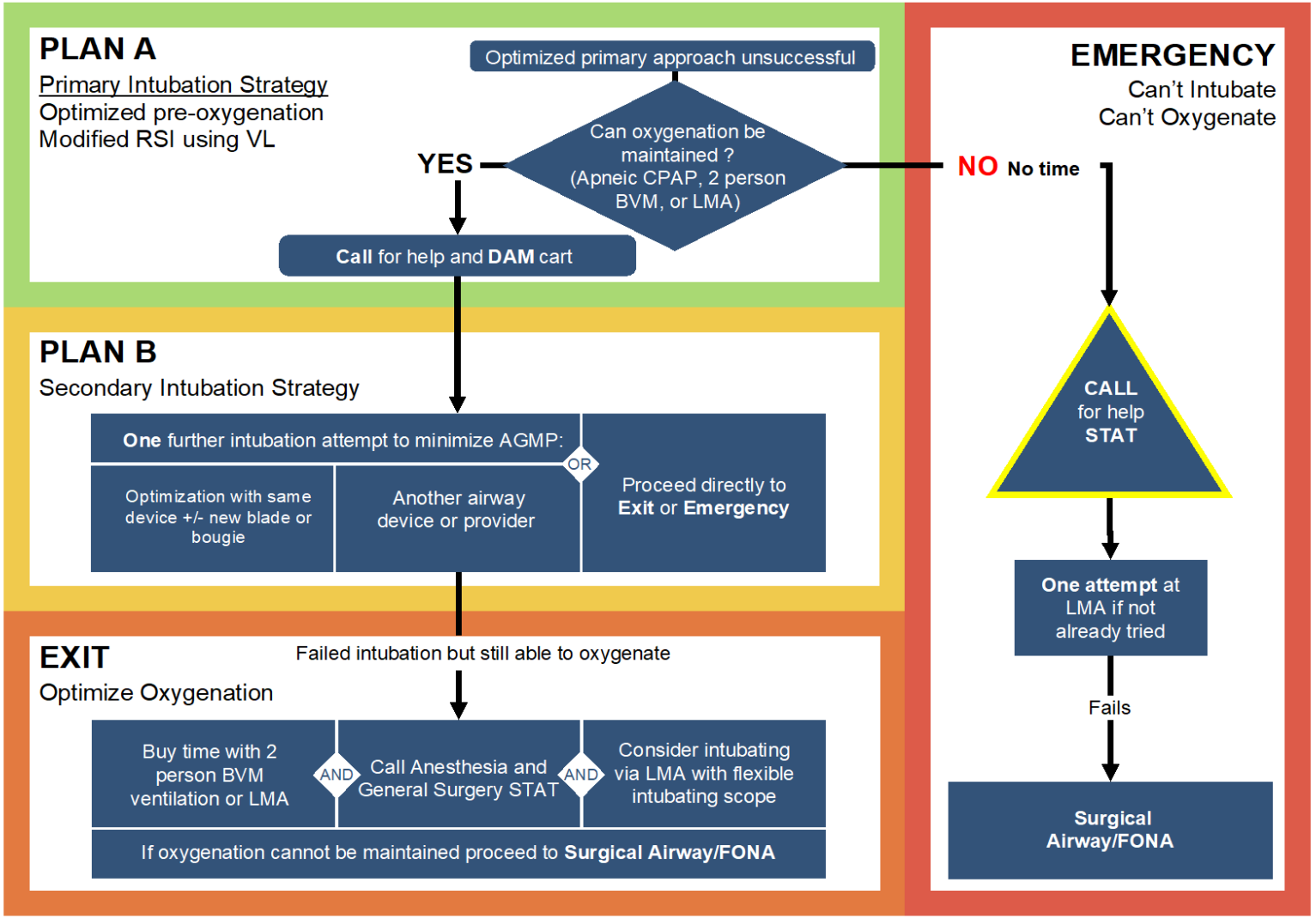
COVID-19 Adult Airway Management Algorithm

V5. March 28, 2020



AGMP = Aerosol Generating Medical Procedure*; BVM = Bag Valve Mask ventilation*; DAM = Difficult Airway Management; FONA = Front of Neck Access; LMA = Laryngeal Mask Airway*; VL = Video Laryngoscopy. Algorithm adapted from Law et al. Can J Anesth. 2013 & AIME Covid-19 Emergency Rapid Sequence Intubation Approach V1.4. This is a living document . These materials can be viewed as Level C evidence (consensus expert opinion).

Upcoming Town Halls…

- What do you want to learn next?
- What are the emerging issues we need to address as a Department?
- Send ideas and thoughts to:
  - Jon Gaudet
  - Chip Doig
  - Dan Niven
  - Tom Stelfox

Care for all patients

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with the care they need

Safety for all staff

We aim to protect all team members

from SARS-CoV-2