The background of the slide shows two healthcare workers in full personal protective equipment (PPE). The worker on the left is wearing a blue hooded gown, a face shield, and a teal surgical mask. The worker on the right is wearing a blue bouffant cap, glasses, a white surgical mask, and teal scrubs. They are standing in front of a plain, light-colored wall.

COVID 19

Protected Code Blue

Northern Ontario RNs

January 28, 2021

Laurie Mazurik MD FRCPC Toronto, Canada

My Background

- Emergency Medicine and Critical Care Transport Physician for 25 years
- **Run ~30-40 Mass Casualty Exercises since 2005 with 100-700 participants include deadly outbreak**
- Member of Canadian Standards Association (CSA) Team to develop national standards for PPE 2007-10
- Worked with Public Health Agency of Canada and Global Affairs Canada to develop CBRNE training 2011-14
- CAEP Representative to Public Health Agency of Canada for Ebola 2014
- Chair of Committee to Develop National Emergency Preparedness Standards for Health Care (HSO)-2018-Now
- Co-Developed “**Protected Code Blue**” with Dr. Randy Wax, et al in 2003

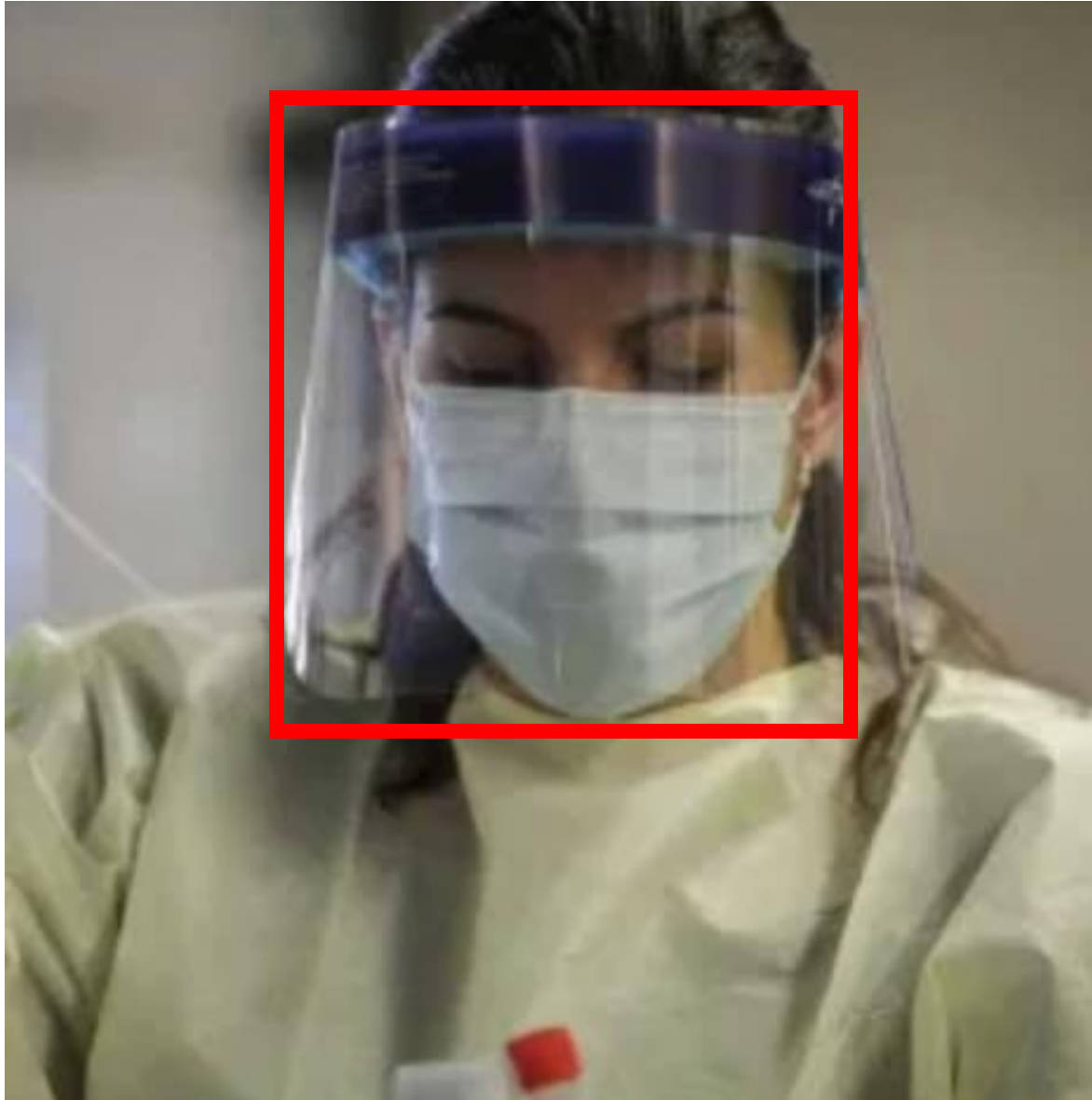


Discussion Points

- Quick Review : PPE and What is an AGP
- **2 -3-4-5 + Persons Protected Code Blue**
- Questions



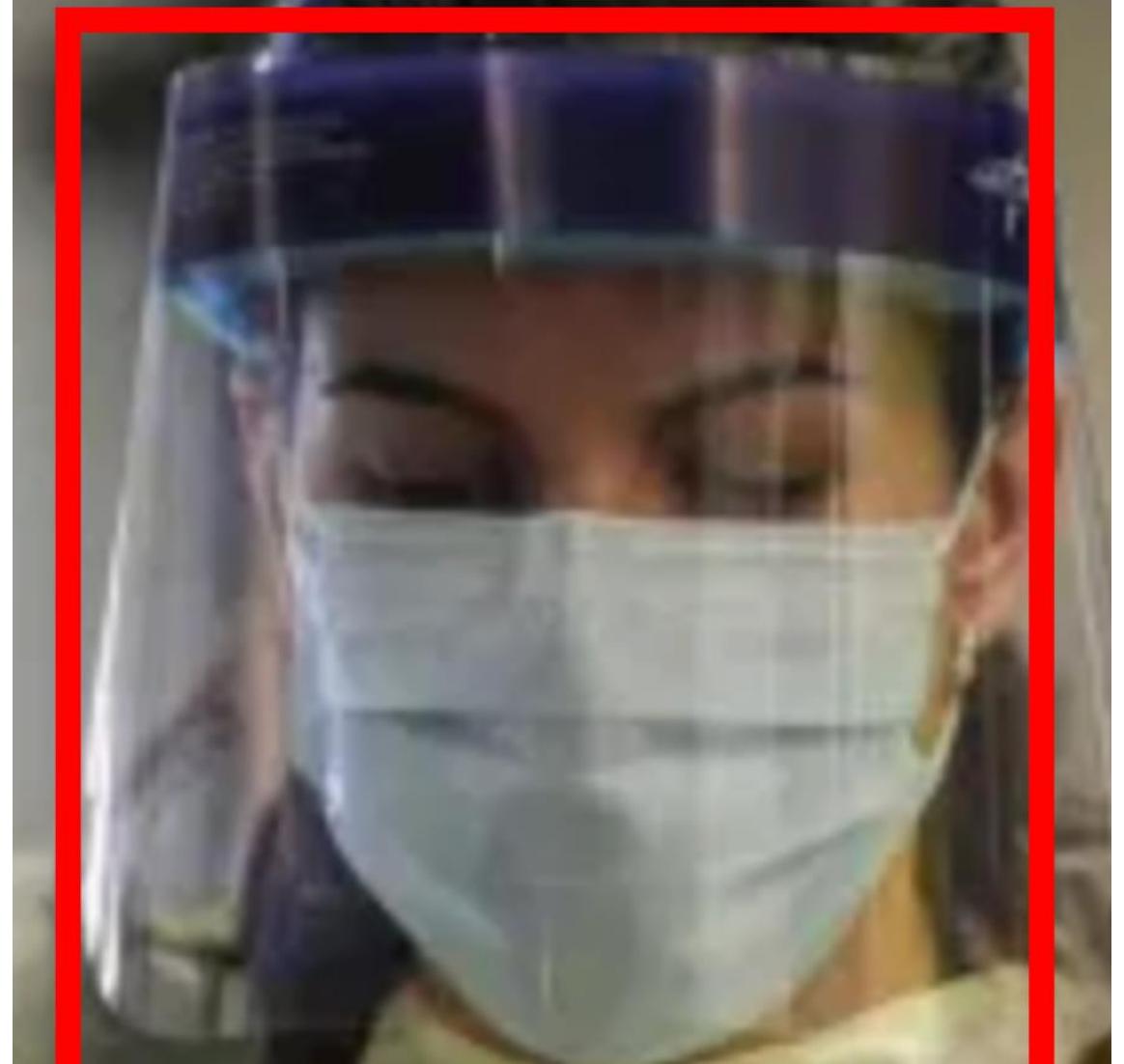
Quick Review HCW Protection



THINK of your
**Respiratory
BOX** as most
important

Surgical Mask/Face Shield

- If COVID 19 is in your community, safest to wear all shift
- Follow IPAC guidance for cleaning shield (if possible)
- Face shield is superior to protective glasses or goggles
- The combination of the 2 can fog.
- **UPGRADE to N95 for AGP**





A Bouffant **does** provide coverage of ears, and hair. Easy to doff safely. **Use it.**

Something to ADD post doffing

- In countries where they intubate MERS, **washing or sanitizing your face and neck post DOFFING** is part of the routine.
- Probably a good idea.
- If you are still unsure, shower and put on clean scrubs.



What is an Aerosol Generating Procedure?

Aerosol Generating Procedures and Risk of Transmission of Acute Respiratory Infections to Healthcare Workers: A Systematic Review

Khai Tran , Karen Cimon, Melissa Severn, Carmem L. Pessoa-Silva, John Conly

Published: April 26, 2012 • <https://doi.org/10.1371/journal.pone.0035797>

Article	Authors	Metrics	Comments	Media Coverage
				

Abstract

Introduction

Methods

Results

Discussion

Supporting Information

Acknowledgments

Author Contributions

References

Reader Comments (0)

Media Coverage (0)

Figures

Abstract

Aerosol generating procedures (AGPs) may expose health care workers (HCWs) to pathogens causing acute respiratory infections (ARIs), but the risk of transmission of ARIs from AGPs is not fully known. We sought to determine the clinical evidence for the risk of transmission of ARIs to HCWs caring for patients undergoing AGPs compared with the risk of transmission to HCWs caring for patients not undergoing AGPs. We searched PubMed, EMBASE, MEDLINE, CINAHL, the Cochrane Library, University of York CRD databases, EuroScan, LILACS, Indian Medlars, Index Medicus for SE Asia, international health technology agencies and the Internet in all languages for articles from 01/01/1990 to 22/10/2010. Independent reviewers screened abstracts using pre-defined criteria, obtained full-text articles, selected relevant studies, and abstracted data. Disagreements were resolved by consensus. The outcome of interest was risk of ARI transmission. The quality of evidence was rated using the GRADE system. We identified 5 case-control and 5 retrospective cohort studies which evaluated transmission of SARS to HCWs. Procedures reported to present an increased risk of transmission included [n; pooled OR(95%CI)] tracheal intubation [n=4 cohort; 6.6 (2.3, 18.9), and n=4 case-control; 6.6 (4.1, 10.6)], non-invasive ventilation [n=2 cohort; OR 3.1(1.4, 6.8)], tracheotomy [n=1 case-control; 4.2 (1.5, 11.5)] and manual ventilation before intubation [n=1 cohort; OR 2.8 (1.3, 6.4)]. Other intubation associated procedures, endotracheal aspiration, suction of body fluids, bronchoscopy, nebulizer treatment, administration of O₂, high flow O₂, manipulation of O₂ mask or BiPAP mask, defibrillation, chest compressions, insertion of nasogastric tube, and collection of sputum were not significant. Our findings suggest that some procedures potentially capable of generating aerosols have been associated with increased risk of SARS transmission to HCWs or were a risk factor for transmission, with the most consistent association across multiple studies identified with tracheal intubation.

✓ Intubation

✓ NIV

✓ BVM

✓ Tracheostomy

✓ None of the others were considered significant including: **CPR**, bronchoscopy, nebulizers, high flow O₂, defib, endotracheal aspiration, NG, collection of sputum

ALWAYS
Read the fine print

Study; Country	Design/Setting	Period of evaluation	Population	Assessment of training and protective equipment?	Laboratory tests	Study quality (GRADE)
	Hospitals	2003 SARS outbreak in Toronto	624 HCWs (physicians, residents, nurses, therapists, technologists, housekeepers, others)	Yes	Culture and PCR for SARS-CoV	VERY LOW
		2003 SARS outbreak in Guangzhou	758 HCWs (doctors, nurses, health attendants, technicians, others)	Yes	ELISA for antibody against SARS-CoV	VERY LOW
Liu et al, 2009 [24] China	Case-control; Hospital	2003 SARS outbreak in Beijing	477 HCWs (medical staff, nursing staff, others)	Yes	ELISA for antibody against SARS-CoV	VERY LOW
Pei et al, 2006 [21] China	Case-control study; Three hospitals	2002–2003 SARS outbreak in Beijing and Tianjin	443 HCWs (doctors, nurses, technicians, administrators, others)	Yes	Not mentioned of methods to detect antibodies against SARS-CoV	VERY LOW
Fowler et al, 2004 [26] Canada	Retrospective cohort study; Intensive care unit	2003 SARS outbreak in Toronto	122 critical care staff (physicians, nurses, nursing assistants, respiratory therapists, others)	No, on training All HCWs wore gloves, gowns, N-95/PCM 2,000 masks, and hairnets. Eye and face shields were variably employed	PCR or serology for SARS-CoV	VERY LOW
Loeb et al, 2004 [27] Canada	Retrospective cohort study; Intensive care unit; Coronary care unit	2003 SARS outbreak in Toronto	43 nurses	Yes	Serology, immunofluorescence	VERY LOW
Ma et al, 2004 [22] China	Case-control study; Five hospitals	2003 SARS outbreak in Beijing	HCWs (nurse assistants, janitors and others) (N = 473)	Yes	Diagnostic criteria for SARS from Chinese Ministry of Health	VERY LOW
Teleman et al, 2004 [23] Singapore	Case-control study; Hospital	2003 SARS outbreak in Singapore	86 HCWs (doctors, nurses, others)	Not mentioned	Symptoms, chest X-ray and serology	VERY LOW
Wong et al, 2004 [28] China	Retrospective cohort study; Hospital	2003 SARS outbreak in Hong Kong	66 medical students	Yes, on personal protection equipment No, on training	Indirect immunofluorescent to detect antibodies against SARS-CoV	VERY LOW
Scales et al, 2003 [29] Canada	Retrospective cohort study; Intensive care unit	2003 SARS outbreak in Toronto	69 intensive care staff	Unclear	Radiographic lung infiltrates	VERY LOW

CoV: coronavirus; HCWs: health care workers; PCR: polymerase chain reaction; SARS: severe acute respiratory syndrome.
doi:10.1371/journal.pone.0035797.t001



- ORNGE Recently did inflight Tests using a Manikin and an AGP simulator to look at the spread of particles
- They compared 02 4 l/min with a MASK vs HFNC vs BIPAP
- They found **almost NO DIFFERENCE** in spread
- Based on this **they resumed BiPAP in Transfers**
- **NOT PUBLISHED**

The Implications for
you:

**Airvo safer than
initially thought.**

With no negative
pressure consider
covering with an O2
Mask though.



Protected Code Blue Northern Ontario Nursing Stations



This Code is run the same as all Code Blues *except* PPE is added.



This can slow the response and impede communication.



Practice is essential.



An N95 is required for Aerosol Generating Procedures.



Consider the airway management of CPR to be aerosol generating. Do 2 person BVM

There is only
One Goal
behind the Term
PROTECTED...
Protecting you and
your Team



If an Arrest
Occurs **IN** a
NSTN Station
This is almost
the same as same
as a Bystander
making
a 911 Call.





PROTECTED CODE BLUE: Nursing Station Response



<div> <input checked="" type="checkbox"/> TASKS </div>	
	ACTIVATE CODE
	Initiate recording device or baby monitor
	Notify MD
	Set up Video/Phone System
	Don PPE (N95+)
	Divide Tasks
	Prepare Resuscitation Equipment (see below)
	Set up CPR Device/Board
BLS	
	Cover patient airway - surgical mask/towel over mouth & nose
	Start compressions (if not already in progress)
	Apply defibrillator pads and turn on monitor
	Identify rhythm: Shock/No Shock
	<div> <div><u>SHOCK:</u></div> <div>Defibrillate</div> </div> <div> <div><u>NO SHOCK:</u></div> <div>ACLS vs Termination of Resuscitation</div> </div>
ACLS	
	Resume compressions
	Ask First Responders to leave room unless wearing N95
	Insert airway (LMA, iGel, ETT). Cover with airway with towel
	Attach BVM preassembled BVM (with filter) & begin ventilations

How long would this take?
This applies to WHAT situation?

TIME MATTERS!

- Early initiation of cardiopulmonary resuscitation and defibrillation are critical for improving survival, *given that every minute of delayed treatment decreases survival by 10%.*



Team Configuration

In general, top-performing hospitals had ***dedicated or designated resuscitation teams*** versus ad hoc resuscitation teams at non-top-performing hospitals.



KEY POINTS:

- Designate your Team Roles on a White Board in the Resuscitation Room
- Do this every morning and shift change
- CHECK your equipment

CTAS 1-call 1807 624 1253

If No response in 10mins

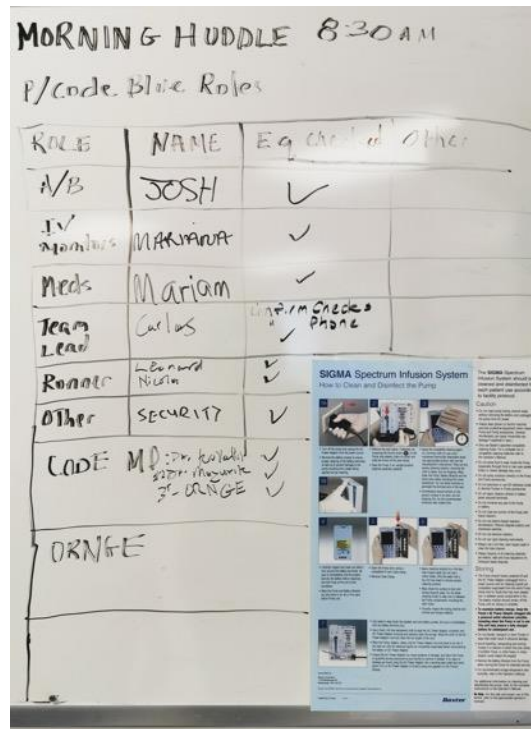
Call ORNGE OCC: 1833 401 5577

Code OB: 1807 737 3030

Press "0" for admitting

A: 1(807) 212-2482

WRITE IT ON THE BOARD




PCB Team	Name	Eq Checked	Other
Leader		X	
Chest Compressions		X Board	
AED		X	
Airway		X	
IV/Monitor		X	
Contact INFO	OTN		



Practice

Is Essential



A medical training manikin is lying on a white sheet, connected to a ventilator. A handwritten note is placed on the sheet next to the manikin. The note contains the following text:

②
ON Artrial
E- verbal / M- Incomprehensible.
M- does Not obey commands
P 140 R 40 O₂ Sat 80% aNRA
BP 100/60 T 40.0
Diffuse crackles / wheezes
throughout chest



Let's go through the steps

PCB Team	Name	Eq Checked	
Leader		X	
Chest Compressions		X Board	
AED		X	
Airway		X	
IV/Monitor		X	
Contact INFO	OTN		

15

Morning
Huddle/Shift
Change
Assign roles
& Check
Equipment

QUICK REVIEW the STEPS

2021-01-28

Patient found VSA
ACTIVATE PROTECTED CODE BLUE

DON PROPER PPE (N95+)

ABCs instead of CAB to protect providers

Cover or Secure Airway,
then Begin Compressions

Provide ventilations when you can
Do 2-person BVM, SGA or
intubation

AED:

AED pads to be placed on patient as early as possible. Administer shock(s) as required.

IV/IO

IV fluids, Drugs, Other interventions
as per ACLS

TOR or ROSC

Doff PPE under supervision

Debrief





Let's Try some cases

An unexpected Arrest occurs in the Nursing Station

STEPS

Patient found VSA ACTIVATE PROTECTED CODE BLUE
DON PROPER PPE (N95+)
ABCs instead of CAB to protect providers Cover or Secure Airway, then Begin Compressions Provide ventilations when you can Do 2-person BVM, SGA or intubation
AED: AED pads to be placed on patient as early as possible. Administer shock(s) as required.
IV/IO IV fluids, Drugs, Other interventions as per ACLS
TOR or ROSC
Doff PPE under supervision
Debrief

A TWO Person Response is the SAME AS EMS

Patient found VSA ACTIVATE PROTECTED CODE BLUE	HCP 1
DON PROPER PPE (N95+)	
ABCs instead of CAB to protect providers Cover or Secure Airway, then Begin Compressions Provide ventilations when you can Do 2-person BVM, SGA or intubation	

AED: AED pads to be placed on patient as early as possible. Administer shock(s) as required.	HCP 2
IV/IO IV fluids, Drugs, Other interventions as per ACLS	
TOR or ROSC	
Doff PPE under supervision	
Debrief	

A TWO PERSON Response is the SAME AS EMS

Patient found VSA ACTIVATE PROTECTED CODE BLUE	
DON PROPER PPE (N95+)	
ABCs instead of CAB to protect providers Cover or Secure Airway, then Begin Compressions Provide ventilations when you can Do 2-person BVM, SGA or intubation	HCP 1

AED: AED pads to be placed on patient as early as possible. Administer shock(s) as required.	HCP 2
IV/IO IV fluids, Drugs, Other interventions as per ACLS	
TOR or ROSC	
Doff PPE under supervision	
Debrief	

IF ASYSTOLIC WHAT MAY
BE THE NEXT STEP?

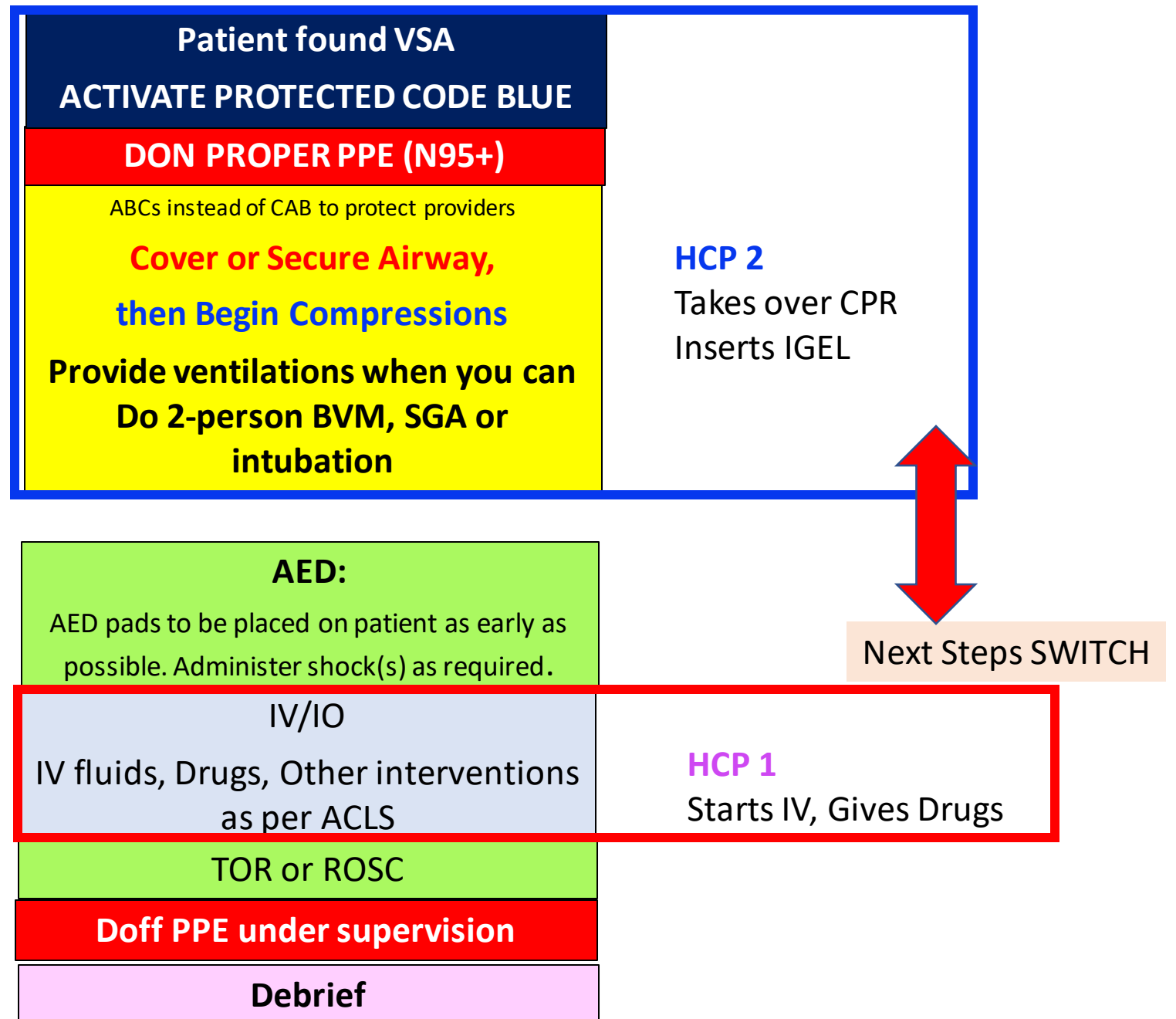
A TWO PERSON Response is the SAME AS EMS

Patient found VSA ACTIVATE PROTECTED CODE BLUE	
DON PROPER PPE (N95+)	
ABCs instead of CAB to protect providers Cover or Secure Airway, then Begin Compressions Provide ventilations when you can Do 2-person BVM, SGA or intubation	HCP 1

AED: AED pads to be placed on patient as early as possible. Administer shock(s) as required.	HCP 2
IV/IO IV fluids, Drugs, Other interventions as per ACLS	
TOR or ROSC	
Doff PPE under supervision	
Debrief	

IF PEA WHAT MAY
BE THE NEXT STEP?
Or Persistent VF

A TWO PERSON Response is the SAME AS EMS



IF a **THIRD
PERSON ARRIVES**
WHAT WILL YOU
HAVE THEM DO?

Patient found VSA ACTIVATE PROTECTED CODE BLUE	
DON PROPER PPE (N95+)	
ABCs instead of CAB to protect providers Cover or Secure Airway, then Begin Compressions Provide ventilations when you can Do 2-person BVM, SGA or intubation	HCP 2 Takes over CPR Inserts IGEL

AED: AED pads to be placed on patient as early as possible. Administer shock(s) as required.	
IV/IO IV fluids, Drugs, Other interventions as per ACLS	HCP 1 Starts IV, Gives Drugs
TOR or ROSC	
Doff PPE under supervision	
Debrief	

What to do with the **Third Person** Arriving?

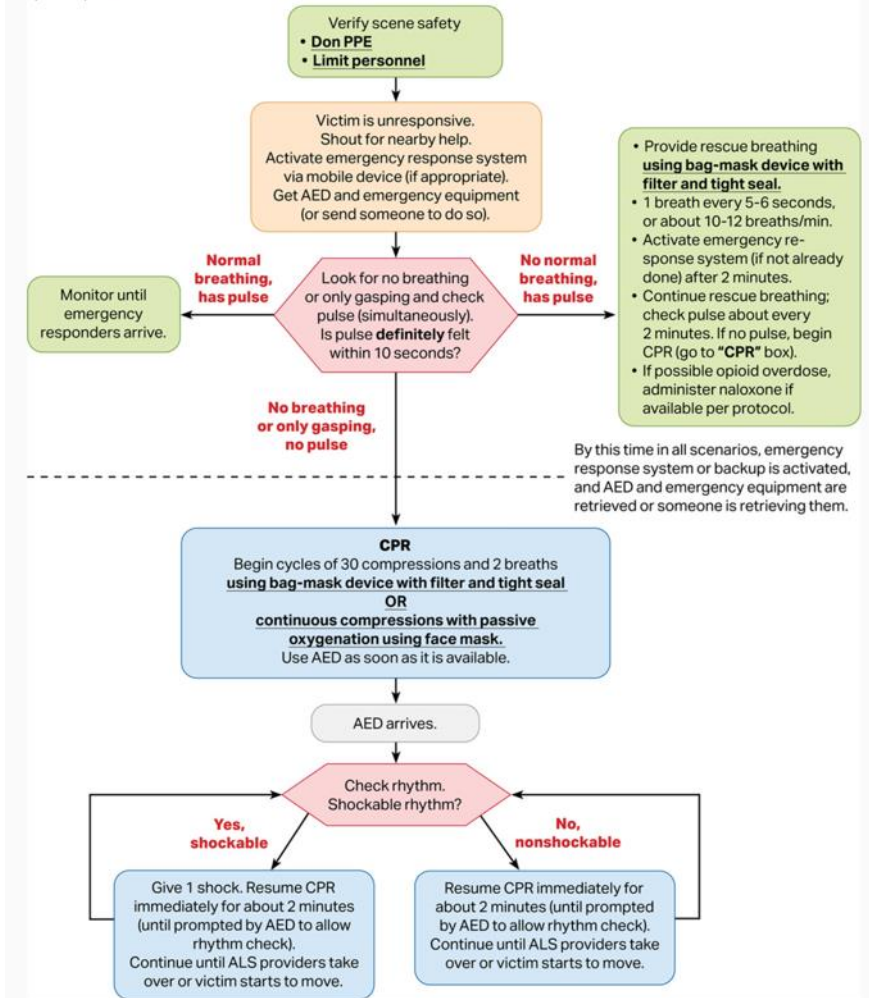
Depends on their skills

ALWAYS LIMIT PERSONNEL to those can help

- No Medical Skills > Phone for help
- CPR Provider > CPR
- Skilled Resuscitation > Team Lead?
- Intubator > Manage airway and intubate
- **They must FIRST do WHAT before they join ?**

BLS Healthcare Provider Adult Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



What to do with the **FOURTH** Person Arriving?

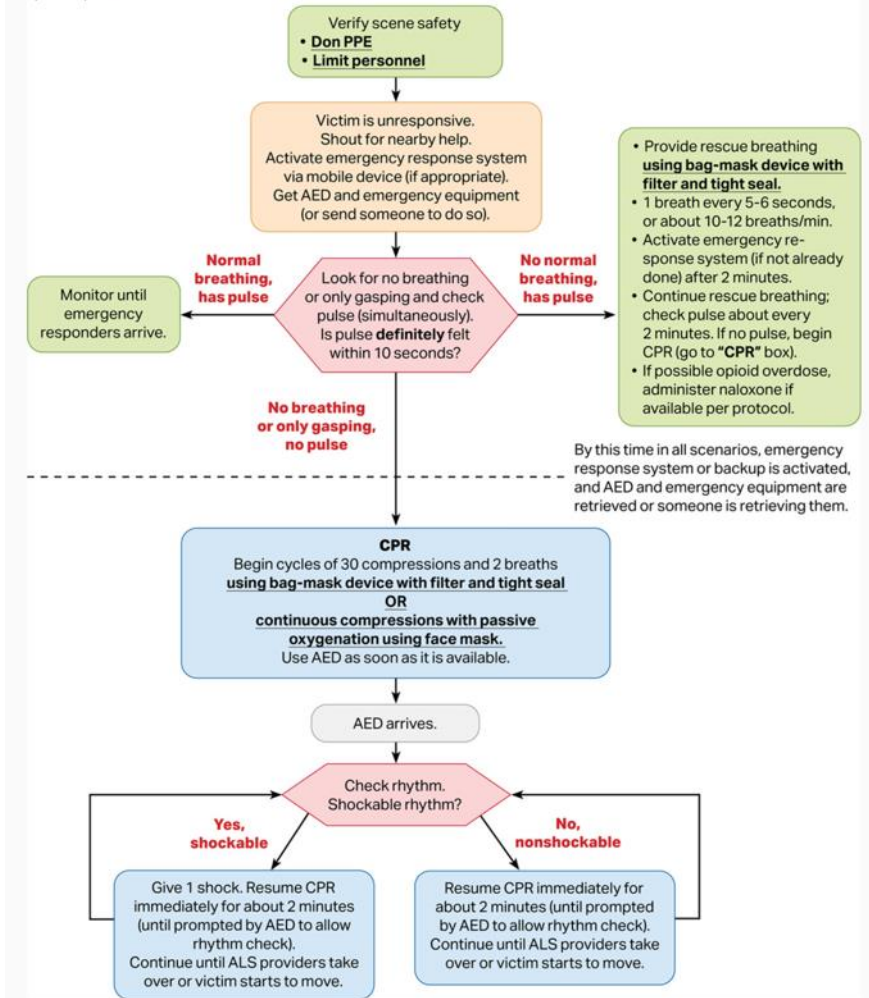
Depends on their skills

ALWAYS LIMIT PERSONNEL to those can help

- No Medical Skills > Phone for help
- CPR Provider > CPR
- Skilled Resuscitation > Team Lead?
- Intubator > Manage airway and intubate
- **They must FIRST do WHAT before they join ?**

BLS Healthcare Provider Adult Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



Fifth Person ?

Remember

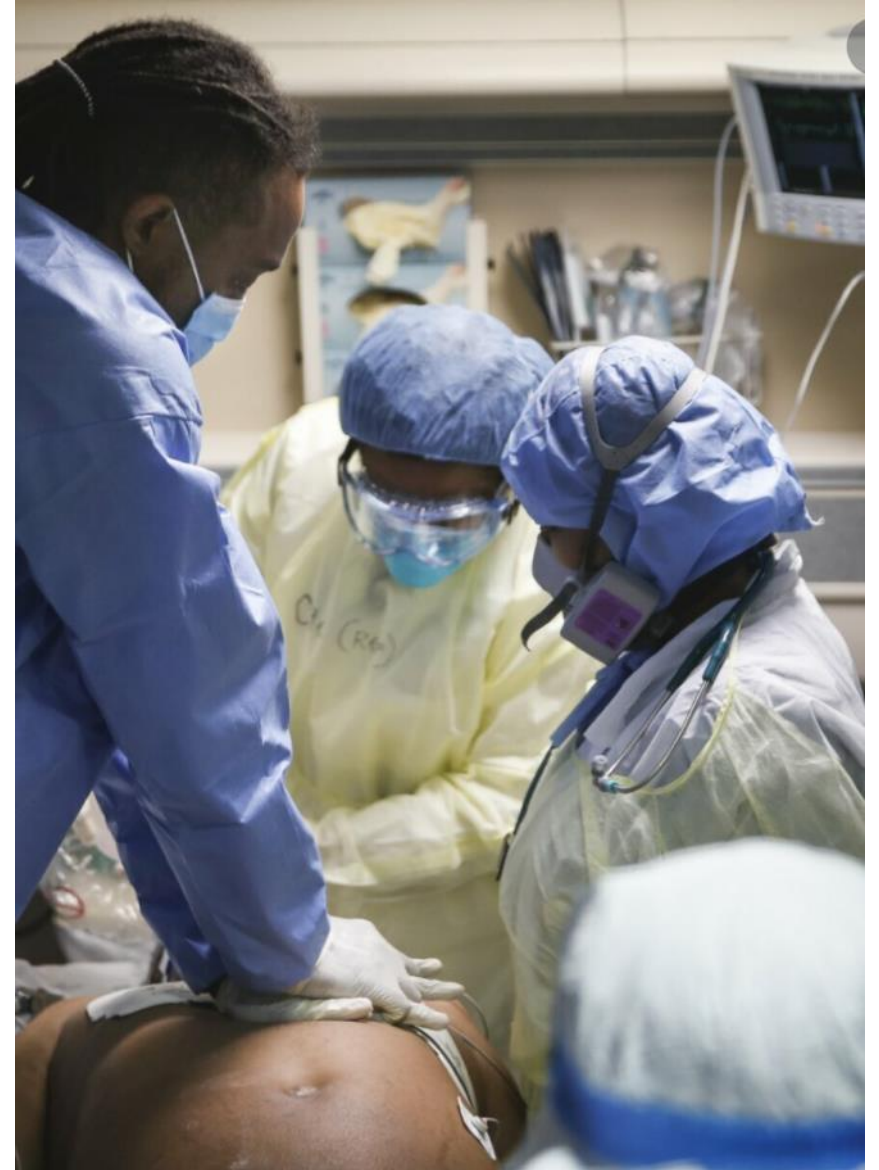
- Everyone in proper PPE

Minimize

- **Minimize the number of People in the room**

Focus on

- Focus on what is needed to save the life of the patient



FIVE + People: Form an **INSIDE** & **OUTSIDE** Team

INSIDE: Patient Care MINIMUM #



OUTSIDE Team: Support

- Chart
- Runner
- Relief for INSIDE Team
- How do you **communicate**?



Communication?

- Check it during your am Huddle



Small Stations 2-3 Nurses/Medics

- **Never going to have an OUTSIDE TEAM**
- **Charting-** difficult and in the room
- **Runner?** Keep things close so running isn't needed
- **Communication?** With who?



Small Stations 2-3 Nurses/Medics

- Biggest problem?
- **CPR Fatigue**
- Waiting for a Pronouncement if person cannot be saved
- **Solutions?**

A medical training mannequin is shown from the back, lying on a yellow surface. A CPR device, consisting of a yellow base and a clear plastic reservoir with a blue valve, is attached to its back. Two hands are visible, adjusting the device. The device has a black strap and a yellow handle. A white tube is connected to the reservoir.

2-3 Person Nursing Stations
Will be getting or have a CPR Device:
Check it as part of your AM Review

When you are done a Protected CODE Blue:

**BUDDY OR
SUPERVISED
DOFFING**

DEBRIEF

Solutions that help all size teams



GET MD ON IMMEDIATELY WITH
YOU



CONTACT ORNGE



ADD TALKING TIMER TO PROMPT
YOU TO CHECK PULSE, RHYTHM
AND CHANGE CPR PROVIDER



ADVANCED DISCUSSION ABOUT
GOALS OF CARE

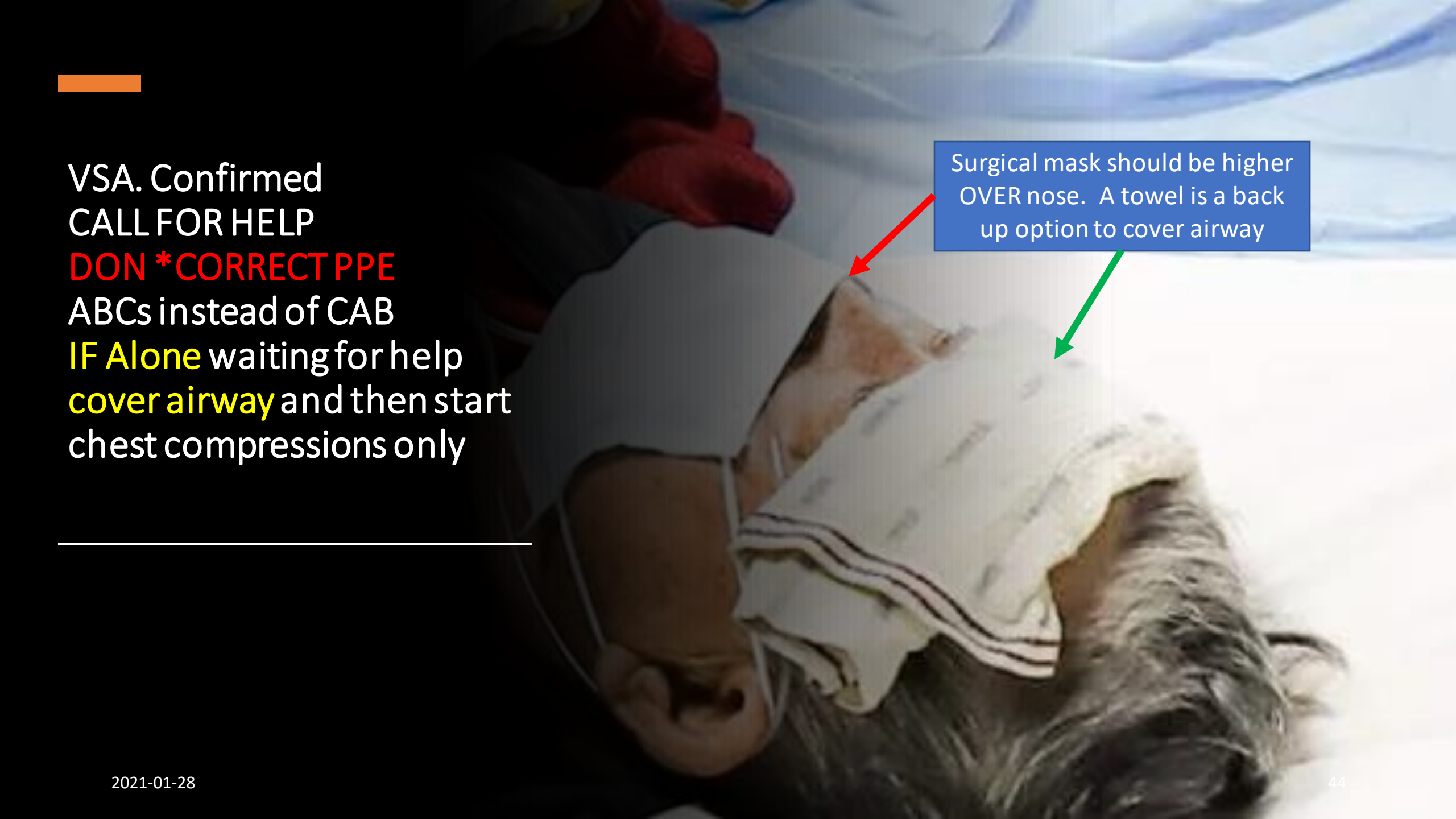


Let's recap

VSA First Contact

- Regardless of whether it is in a residence, public or health care setting there is always a first contact and call for help
- **WHAT should the person who identifies the person is VSA do next IF:**
- **They do not have PPE**
- **They have a surgical mask**
- **They have an N95**





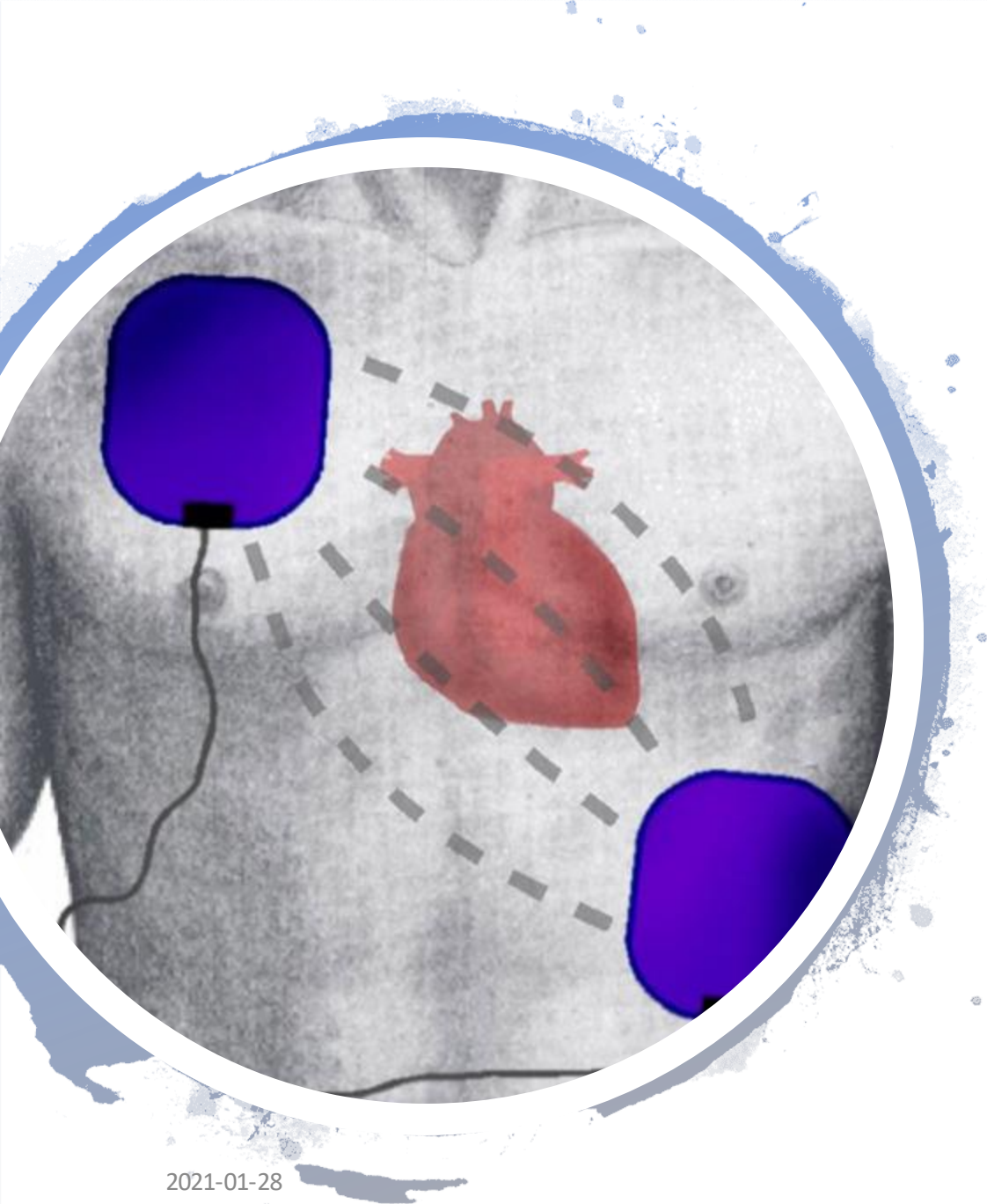
VSA. Confirmed
CALL FOR HELP
DON *CORRECT PPE
ABCs instead of CAB
IF Alone waiting for help
cover airway and then start
chest compressions only

Surgical mask should be higher
OVER nose. A towel is a back
up option to cover airway

Does CPR generate Aerosols? **YES**

- BUT
- Remember CPR consists of:
 - **Chest Compressions**
 - which is *unlikely* to generate aerosols but always cover mouth and nose
- PLUS
 - **Airway Management & Ventilation**
 - which *can* generate aerosols
 - **DO TWO PERSON BAGGING OR**
 - **Insert IGEL & Cover nose /Mouth with Towel OR**
 - **If an MD is there> Intubation**






Is defibrillation considered an aerosolizing generating procedure?

- **NO** . BUT always secure the airway when doing an arrest-cover it or 2 person BVM or intubate, etc.
- **A-B-Cs (instead of CAB) In Protected Code Blue**. Even just covering the airway to start.
- **Protect the Team first.**



Discuss Goals of Care: Early



A snowman constructed from numerous small Baby Yoda figurines stands in the foreground. The figurines are arranged to form the head, body, and limbs of the snowman. The background features a brick wall and a window with a wire mesh. The scene is set outdoors in a snowy environment.

Stay Safe.
Spread Kindness.

Laurie Mazurik MD FRCPC
lmazurik@gmail.com

2021-01-28

Snowman Baby Yoda
Moose Factory Jan 2021