State-of-the-Art Management of COVID-19

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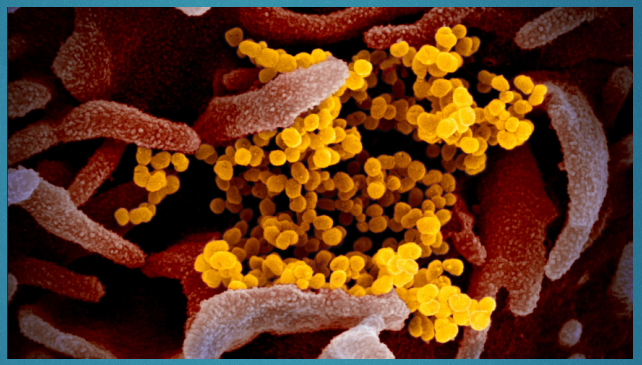
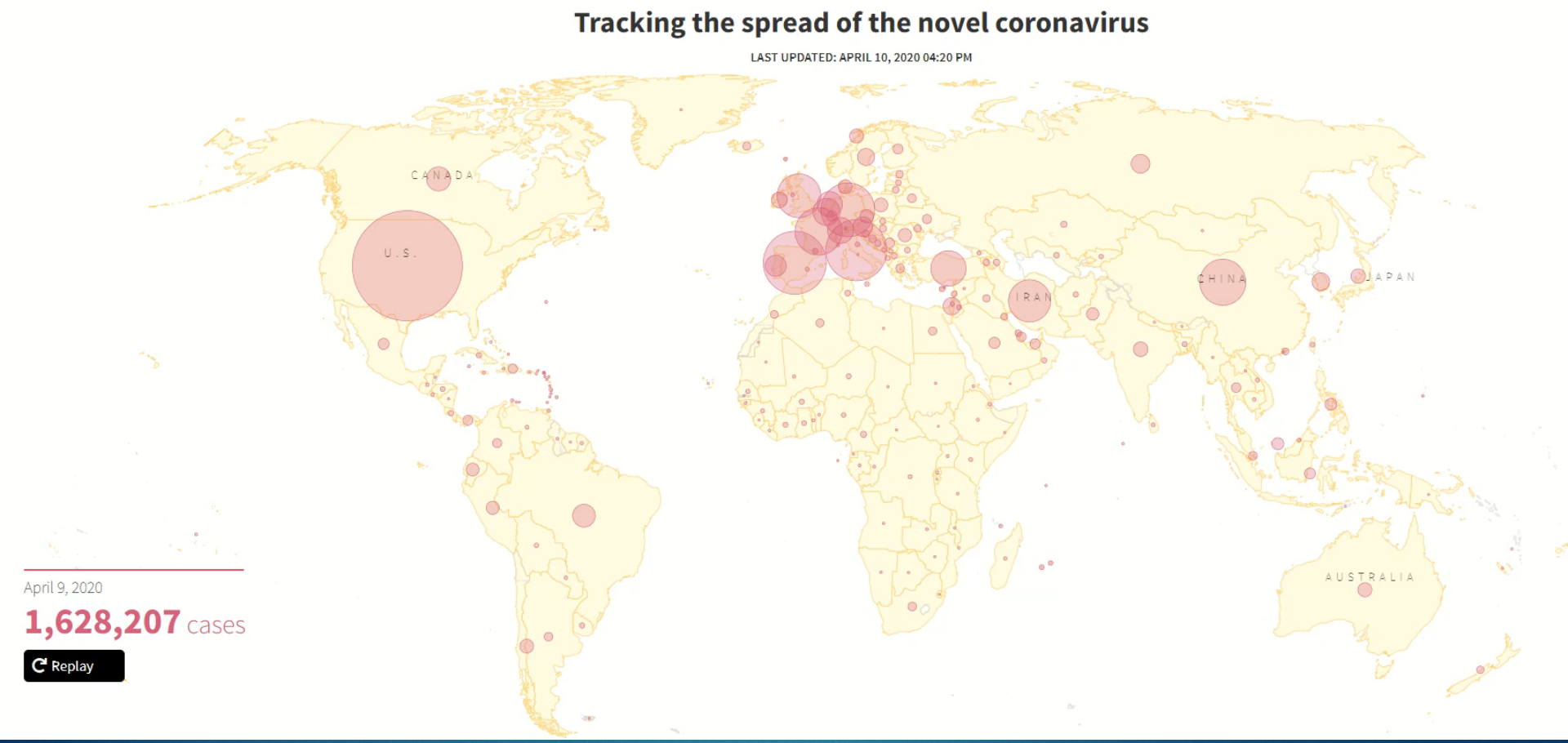
COVID-19: Pathogenesis, Transmission and PPE



Dr. Ramya Gopinath
Infectious Diseases Consultant
Columbia MD, USA

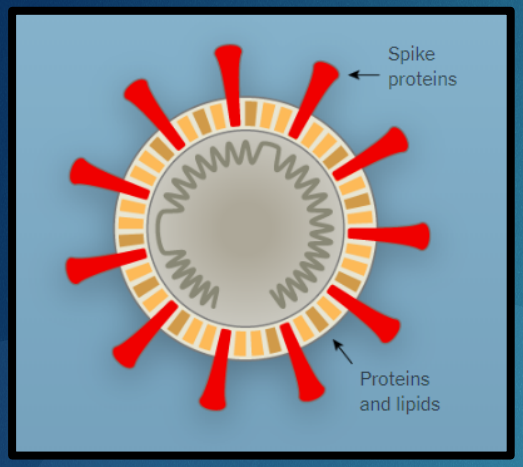
- **Coronavirus – "crown"-like spikes**
- Bats, birds, rodents, cattle, dogs → humans
- Family of viruses that cause:
  - The common cold
  - SARS (Severe Acute Respiratory Syndrome) - 2003
  - MERS (Middle East Respiratory Syndrome) - 2012
  - **COVID-19** (Coronavirus Disease 2019) - 2019

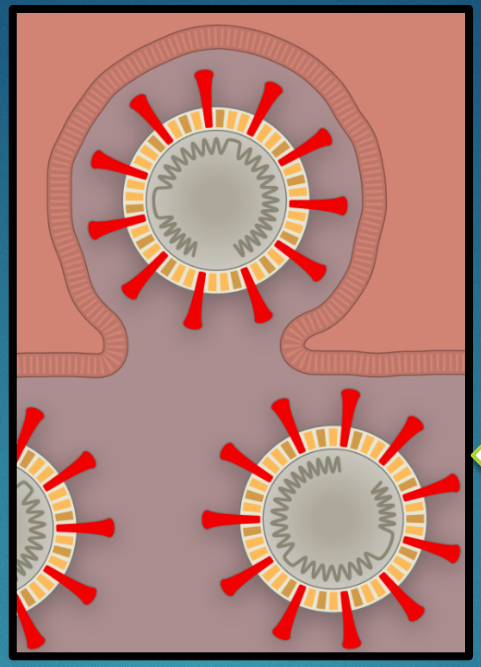
Development of the Pandemic

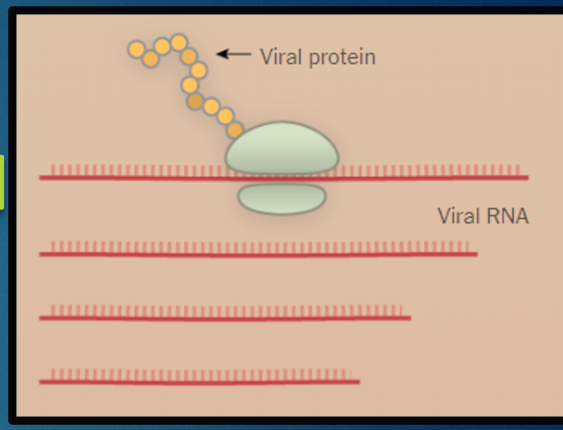


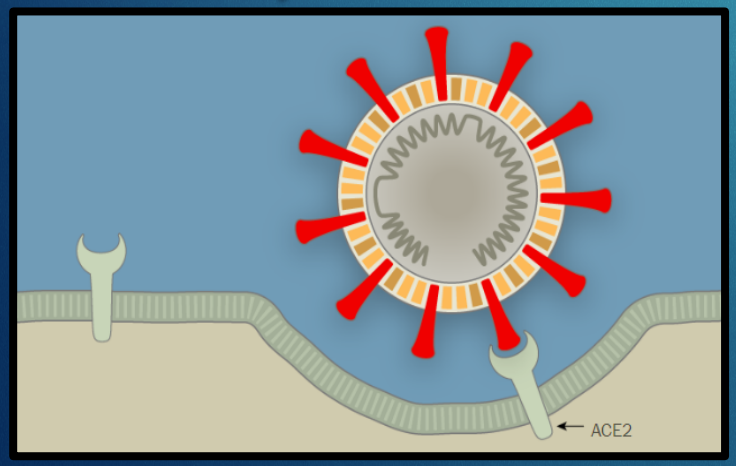
https://graphics.reuters.com/CHINA-HEALTH-MAP/0100B59S39E/index.html

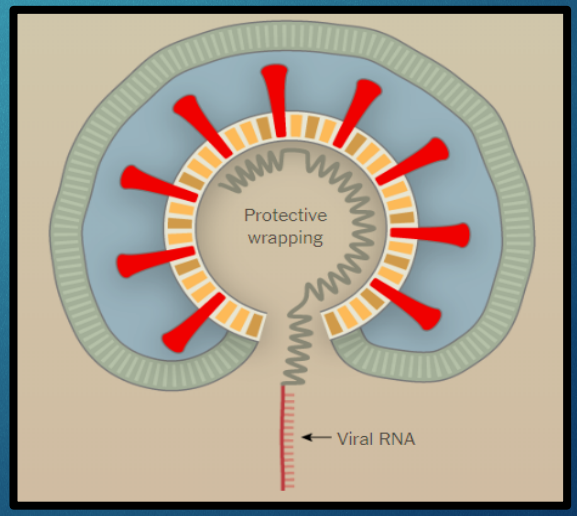
How the Virus Hijacks Our Cells





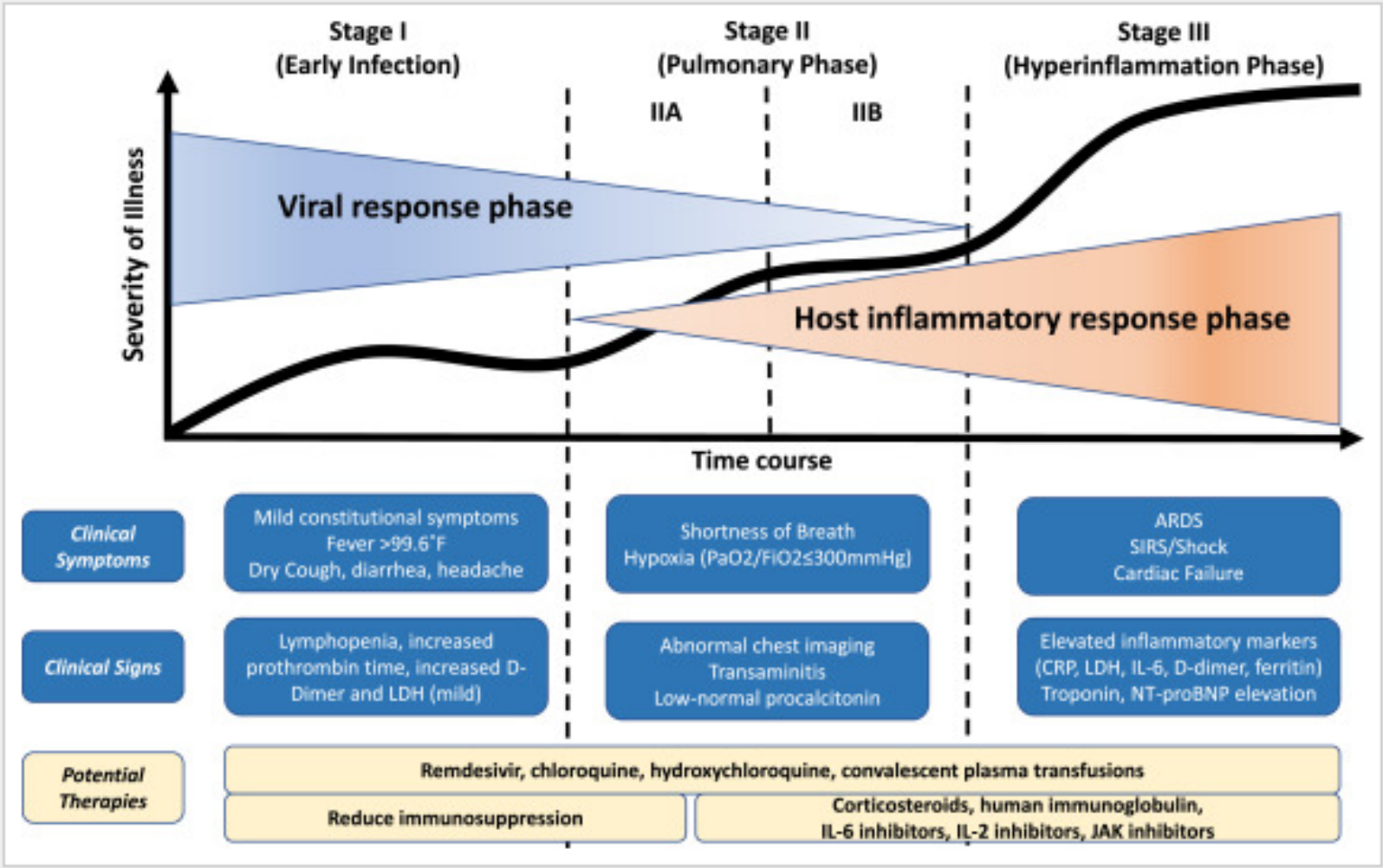






https://www.nytimes.com/interactive/2020/03/11/science/how-coronavirus-hijacks-your-cells.html

COVID-19 Disease Stages



Siddiqui, H et al J Heart Lung Trans 2020. DOI: https://doi.org/10.1016/j.healun.2020.03.012

Transmission

- Human-to-Human
- Sneezing/coughing/talking
- Droplets/airborne?
  - Aerosol – 3 hrs
- On surfaces*
  - Stainless steel: 5-6 hrs (→72h)
  - Plastic: 6-7 hrs (→72h)
  - Copper: max 4 hours
  - Cardboard: max 24 hrs
- Fecal-oral?
- **Asymptomatic carriers**

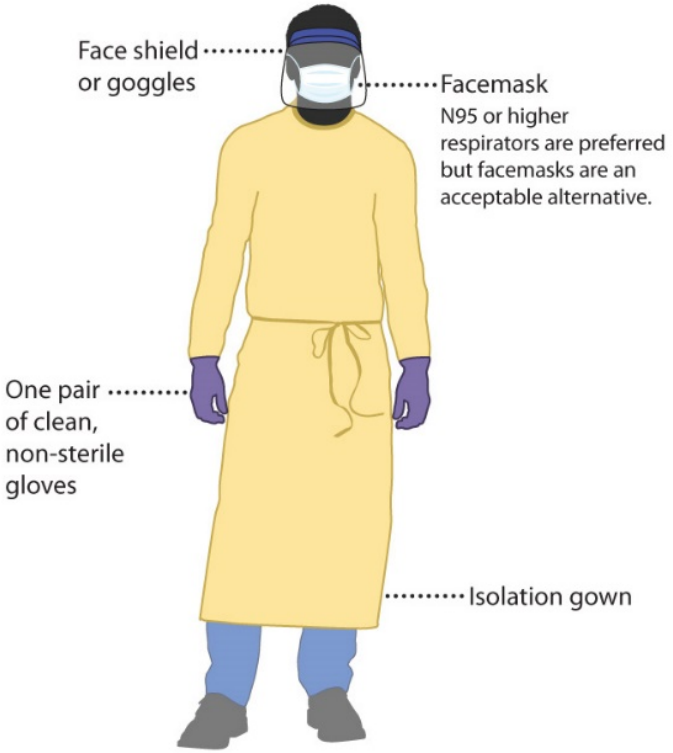
* van Doremalen et al. N Engl J Med 2020; 382:1564-1567

Personal Protective Equipment

COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator

Acceptable Alternative PPE – Use Facemask



CDC

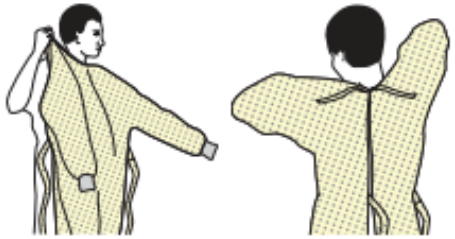
cdc.gov/COVID19

CS 315838-C 03/23/2020

SEQUENCE FOR DONNING PPE

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

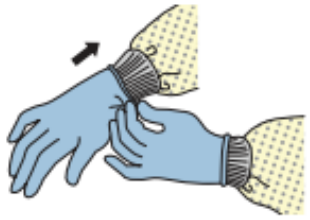
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown

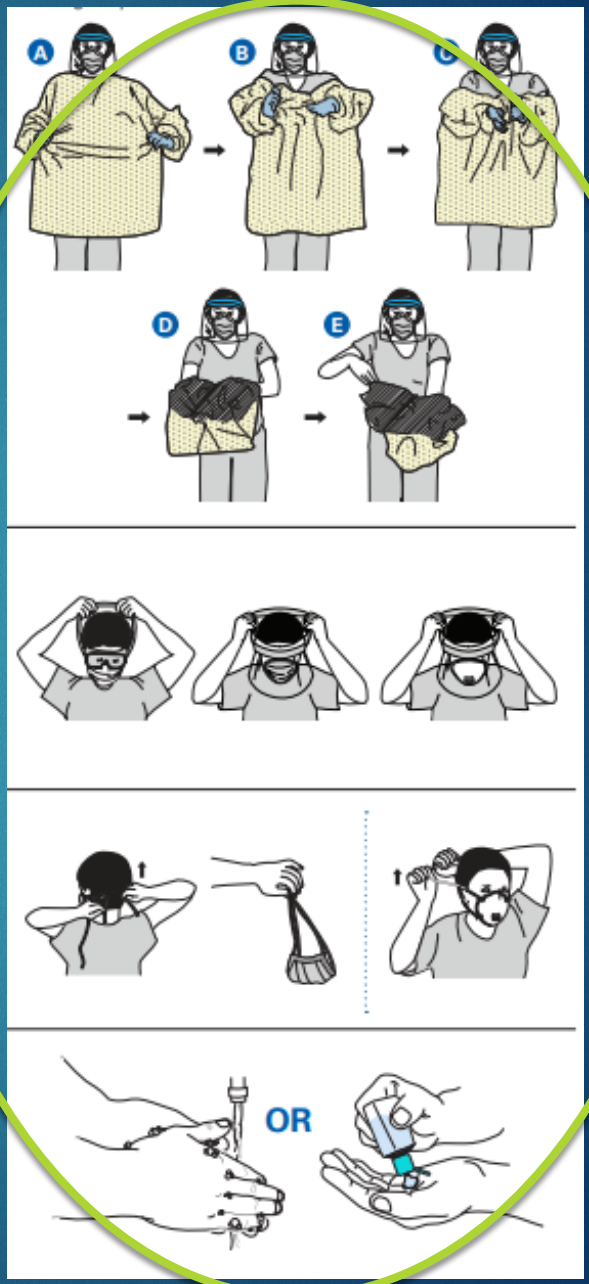


https://www.cdc.gov/hai/pdfs/ppe/PPE-Sequence.pdf

SEQUENCE FOR DOFFING PPE

Example 1

Example 2



https://www.cdc.gov/hai/pdfs/ppe/PPE-Sequence.pdf

Innovation is Key!

Thank you!

COVID-19:
Emergency Room and Hospital Care

Bangaru Raju, MD

Associate Program Director

Internal Medicine

Montefiore Mount Vernon, New York

ER Presentation

Clinical Presentation:

Incubation Period: 14 days, with median time of 4-5 days

Symptoms

- Fever: 83-99%
- Cough: 59-82%
- Fatigue: 44-70%
- Anorexia: 40-84%
- Shortness of Breath: 31-40%
- Sputum Production: 28-33%
- Myalgia: 11-35%

Risk Factors for Severe Illness

- Diabetes
- Chronic Respiratory Disease
- Hypertension
- Cancer
- Case fatality rate X>80 years

Person Under Investigation (PUI) in the ER

Travel history, direct contact with COVID positive patient

Follow appropriate isolation measures

Assess clinical status: for fever, respiratory symptoms (cough, SOB etc.)

Investigations: CBC, renal panel, ABG, LDH, Ferritin, r/o Flu, chest X-ray, chest CT scan if needed

Further management based on clinical status and investigations

ER Course of COVID-19 Patient

- Patients with mild symptoms, no significant comorbidities, no concern for deterioration may be discharged with following instructions:
  - Self-quarantine for two weeks and home monitoring
  - Hand hygiene, mask, respiratory hygiene and environmental cleaning
  - Limitations on movement around or from the house
  - Social distancing,
  - follow up by Department of Health is essential

Other patients need hospital admission - caution: follow local guidelines

Hospitalized Patients

- Place in a airborne droplet contact isolation room (negative pressure isolation room) with HEPA filter.

- In hospital care:
  - Supportive care is mainstay of treatment,
  - Fever - with Acetaminophen
  - Patients with pneumonia or critically ill-- antibiotics such as Ceftriaxone, Azithromycin may be started
  - Hypoxia- give supplementary oxygen to maintain oxygen saturation above 90%

Hospital Admission

- ICU/Telemetry: for patients with clinical deterioration

  Further care as per ICU team

- Discharge: 1) Home

  2) Short-Term Rehabilitation

  3) Nursing home

  4) Hospice/Palliative care.

Ear, Nose and Throat

Otolaryngology – Head and Neck Surgery

Covid 19 Considerations

Axay Shanti Kalathia MD

Overview

- **High Risk**! Viral density greatest in nose, nasopharynx, oropharynx
- Wuhan:
  - endoscopic pituitary surgery
  - fourteen people involved in that case became infected
    - https://www.entnet.org/sites/default/files/uploads/covid-19_endosb_lettertoeditor_neurosurgery_update3.23.20.pdf
- China, Italy, Iran, UK, Greece anecdotal reports:
  - Highest rate of COVID-19 transmissions to otolaryngologists including deaths

Topics

PRESENTATION

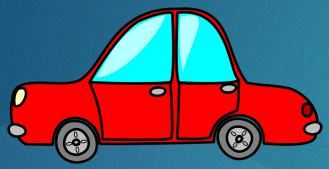
SYMPTOMS

EXAM

PROCEDURES

SURGERY

Presentation



Outpatient

Cold symptoms

Inpatient

Airway issues

Tracheostomy consultation

Universal Precautions!!!

Presenting Symptoms

- Huang et al: Lancet Published:January 24, 2020DOI:https://doi.org/10.1016/S0140-6736(20)30183-5
  - Fever - 98%
  - Dry Cough -76%
  - Malaise – 44%
- Mild Cases: (clinic)
  - Sore Throat
  - Facial Pain/Headache
  - Nasal congestion and drainage
  - (GI symptoms)
- **Loss or diminished taste/smell**
  - In many, the presenting symptom!
  - Germany series reports up to 60 %
  - South Korea series reports up to 30%

Examination

- Clinician at risk
- *Universal Precautions
- Avoid routine use of tongue depressor or mirror exam unless clinically indicated
- Keep 6-foot distance except when examining
- Have patient wear mask until nose/mouth exam
- Clean all surfaces patient comes into contact
- Additional cleaning procedures: e.g. wipe down otoscope handles, keyboards, pens, etc.

Personal Protective Equipment

- **Homemade Masks**: SSIO-USA Seva
  - prevent wearer from spreading
  - prevent touching face
  - Use on top of surgical mask or N95 mask to protect from gross spillage
- **Surgical Masks**
  - fluid Restriction; large droplets
- **N95 respirator mask**
  - 95% of small and large particle aerosol
  - tight fitting
  - US standards:
    - N95, N99, N100
  - European standards:
    - FFP 3 (99%) > FFP 2 (94%)> FFP 1 (84%)

Procedures

- Endoscopy: Aerosol Generating Procedure (AGP)
  - Any intervention involving nose, mouth, throat:
    - oral/dental
    - nasal and laryngeal endoscopy
    - bronchoscopy and esophagoscopy
    - high flow oxygen??; ?inhalation therapy??
  - At minimum N95 mask, shield, gloves and gown
  - Isolate room for 3 hours

Innovations

- CDC and FDA lifted restrictions, allowing use of personal and industrial devices in healthcare
- Reusable Industrial Elastomeric Respirator
  - Honeywell example shown
- Reusable Homemade Elastomeric Mask
  - Boston Children's Hospital Video
    - Anesthesia Mask ~ $1
    - Inline Filter < $1
    - Elastic Strap > $1

Surgery

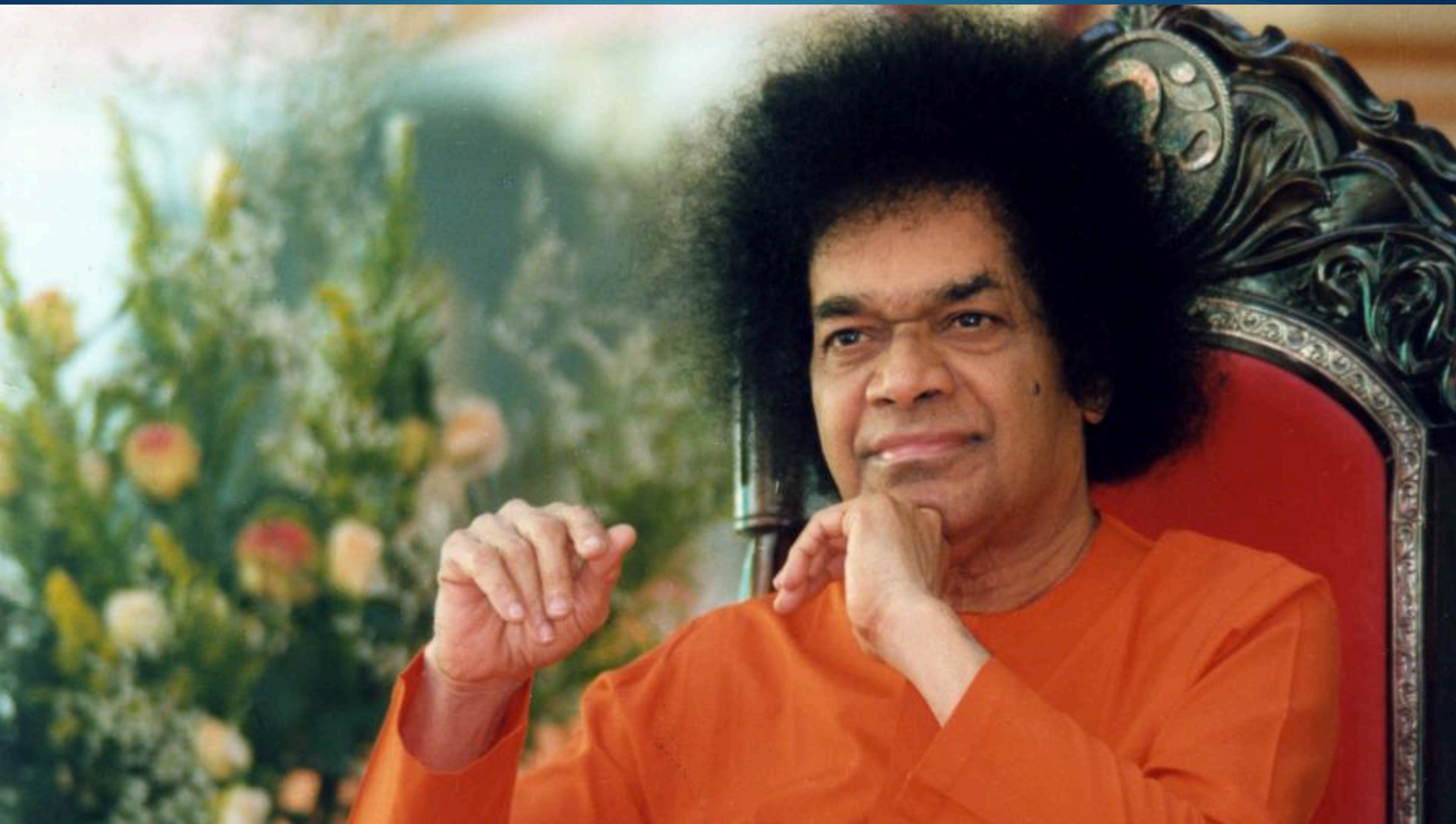
- Higher risk when powered surgical instrumentation (drill, cautery, laser) used in nose, mouth, throat: virus containing plume
- Postpone elective operations
- Test patient for Covid first
  - If Negative, use N95 mask by entire team
- If Positive:
  - PAPR (Powered Air Purifying Respirators) by OR team

Tracheostomy

- American Academy of Otolaryngology Head and Neck Surgery Recommendations
  - https://www.entnet.org/content/tracheotomy-recommendations-during-covid-19-pandemic
  - Wait minimum 2-3 weeks from time of intubation
  - 2 negative tests prior to operation
  - Limit people in room (students, residents video)
  - Complete paralysis
  - Closed circuit
  - Avoid cautery

Doctors by themselves cannot cure diseases. Divine Grace is essential.

Nov 18, 1999 (Second World Youth Conference)



Care of the Critically ill COVID –19 patient

KALPALATHA K. GUNTUPALLI MD

CHIEF OF PULMONARY/CRITICAL CARE MEDICINE

BEN TAUB HOSPITAL,

OSCAR FRIEDMAN ENDOWED PROFESSOR, BAYLOR COLLEGE OF MEDICINE

HOUSTON, TX

This is a first!

1. When did we see an infectious disease that affected ***some one you know*** and is seriously ill from it and some of them die from it?
2. When did we see (8-14%) our ***colleagues infected*** from patients?
3. When did we see the lockdown for the world and we are the "***new soldiers*** - boots on the ground" in the trenches with serious risk to ourselves and perhaps our families?
4. When did we see hospitals filled with patients with ***one*** disease?
5. When did we in the recent past see so many patients ***younger than 50 critically ill*** and die from one disease?
6. When did we see ophthalmologists and neurosurgeons take ***primary care*** of ICU patients?
7. When was there a health crisis that ***no one could volunteer*** because they were needed locally too?
8. When did we think construction workers can donate N 95s and oil industry CAPRs and engineer make us safe intubation boxes?
9. When did ***sports arenas become hospitals***?
10. When did the whole world ***stay home but were afraid to socialize. Home but not on vacation***?

COVID-19 SUGGESTED TREATMENT ALGORITHM

COVID-19 Symptoms with admission criteria

Isolation & Notify infection control

Laboratory Testing: CBC w/diff, CMP, CRP, PCT, LDH, ferritin, troponin, CPK, D-Dimer

Microbiologic Testing: NP swab for flu/RSV with reflex to Verigene (adenovirus, human metapneumovirus, parainfluenza, rhinovirus), COVID-19, urine strep and legionella antigen, sputum Gr stain and culture

Other testing: CXR, EKG, baseline echo, CT Chest if indicated

1. Alert state health dept
2. Notify all personnel involved
3. Take appropriate barrier precautions
4. Prepare necessary equipment

COVID positive

NO

Usual Care

Assess resp status & hemodynamics

Severe Disease: MICU
Impending respiratory failure
Shock

MIld Disease
Acute Care floor
RR < 30
SaO2 > 93% on RA
PaO2 > 70 on RA
No increased WOB
Hemodynamics stable

1. Monitor SaO_2, QT interval, electrolytes
2. Close observation for clinical deterioration: worsening oxygenation, increased WOB
3. Consider broad spectrum antibiotics if superinfection suspected
4. **Avoid nebulizers; use MDI with spacer if indicated**
5. Preferential use of acetaminophen for fever
6. Supportive care

SUPPORTIVE CARE: fluid resuscitation, oxygen supplementation, and antipyretics

Moderate Disease
Acute Care or Step down
Any of the following:
RR > 30
SaO2 < 93% on RA
PaO2 < 70 on RA
Increased WOB
Hemodynamics stable

1. Venturi mask/NRB to maintain SaO_2
2. If rapidly declining course, consider early intubation; ANESTHESIA to intubate
3. **Consider high flow O2 or NIV only if in negative pressure room, if not, place surgical mask over the HFO cannula**
4. **If NIV, place viral filter close mak**
5. **Consider self-proning**
6. Avoid nebulizers; use MDI with spacer if needed
7. Preferential use of acetaminophen for fever, avoid NSAIDs
8. Avoid systemic steroids

SUPPORTIVE CARE: fluid resuscitation, oxygen supplementation, and antipyretics

1. ANESTHESIA to intubate (pre-oxygenate, avoid bag-mask ventilation, RSI)
2. Early broad spectrum antibiotics
3. Fluid bolus then assess fluid responsiveness
4. Low Vt ventilation (4-6 cc/kg, Pplat < 30)
5. Post-intubation CXR, avoid daily CXray
6. Ensure ETT is secure
7. Encourage bedside U/S rather than routine CXR
8. Ensure adequate sedation
9. Early proning

1. Early goals of care discussion (DNR especially if with co-morbidities)
2. Consider early involvement of palliative care
3. service/ethics committee
4. Fluid conservative strategies
5. **Avoid corticosteroids** unless indicated for AI/shock
6. Avoid nebulizers; MDI to be administered thru vent circuit
7. Preferential use of acetaminophen for fever
8. TEG for diagnosis of hypercoagulable state, consider systemic anticoagulation
9. Consider 2 D-Echo – Cardiology consult

CONSIDERATIONS IN DNI/DNR PATIENTS
No high flow O_2/NIPPV
Maximize comfort using medications

CONSIDERATIONS IN CARDIAC ARREST
Consider futility early
Limit number of people and duration of resuscitation efforts

Severe ARDS = (P/F < 150): Consider the following rescue strategies:

- Paralytics
- Recruitment maneuvers/high PEEP
- Alternate ventilator modes: APRV, inverse-ratio ventilation
- Inhaled flolan (case-by-case decision by attending)
- ECMO in very rare (after multi-disciplinary discussion)

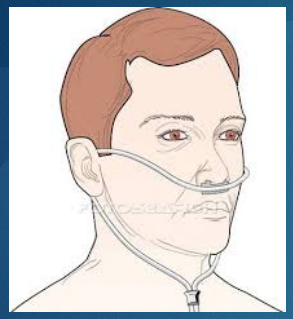
Higher PEEP/lower FiO2

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

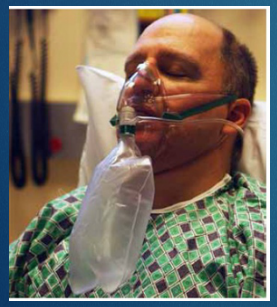
FiO_2	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

Non-Invasive Management: Oxygen Delivery Systems

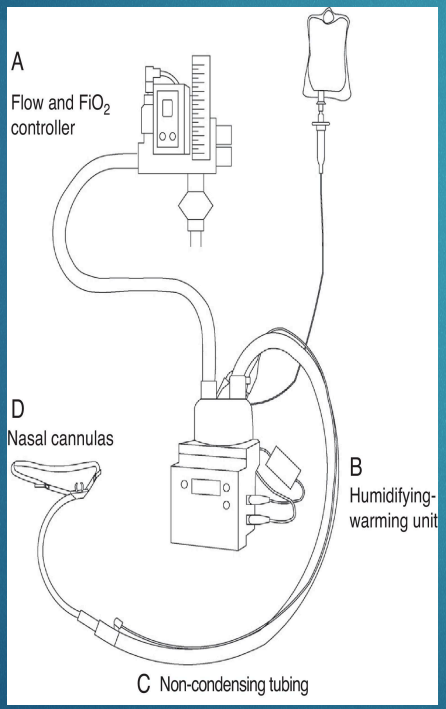
High Flow Oxygen Delivery system 20-60 L/min Humidified, heated

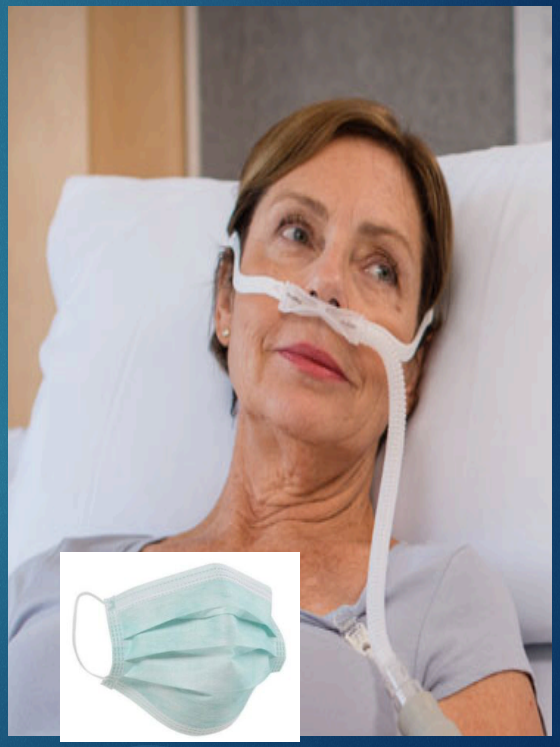


Nasal Cannula



Non rebreather Mask





Non-Invasive Ventilation CPAP/Bi PAP

Total Face mask
With Viral filter

Helmet CPAP
With Viral Filter

“Cooperative” or Self Proning

1. Alert state health dept
2. Notify all personnel involved
3. Take appropriate barrier precautions
4. Prepare necessary equipment

COVID positive

COVID-19 Symptoms with admission criteria

Isolation & Notify infection control

TRUTH · RIGHT CONDUCT · PEACE · LOVE · NON VIOLENCE

Assess resp status & hemodynamics

Severe Disease: MICU
Impending respiratory failure
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1. ANESTHESIA to intubate (pre-oxygenate, ***avoid bag-mask*** ventilation, RSI)
2. Early broad spectrum antibiotics
3. Fluid bolus then ***assess fluid*** responsiveness
4. Low Vt ventilation (4-6 cc/kg, Pplat < 30) ***Lung protective ventilation***
5. Post-intubation CXR, ***avoid daily CXray***
6. Ensure ETT is secure
7. Encourage ***bedside Ultrasound*** rather than routine CXR .
8. Ensure ***adequate sedation***
9. ***Early proning***
10. ***Sedate Paralyse with proning***

1. Early ***goals of care discussion*** (DNR especially if with co-morbidities)
2. Consider early involvement of palliative care service/ethics committee
3. ***Fluid conservative strategies***
4. **Avoid corticosteroids** unless indicated for AI/shock
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- Alternate ventilator modes: APRV
- Inhaled Epoprostenol
- ECMO - rare (after multi-disciplinary discussion)

Lower PEEP/higher FiO2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
PEEP	5	5	8	8	10	10	10	12

FiO_2	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

Higher PEEP/lower FiO2

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

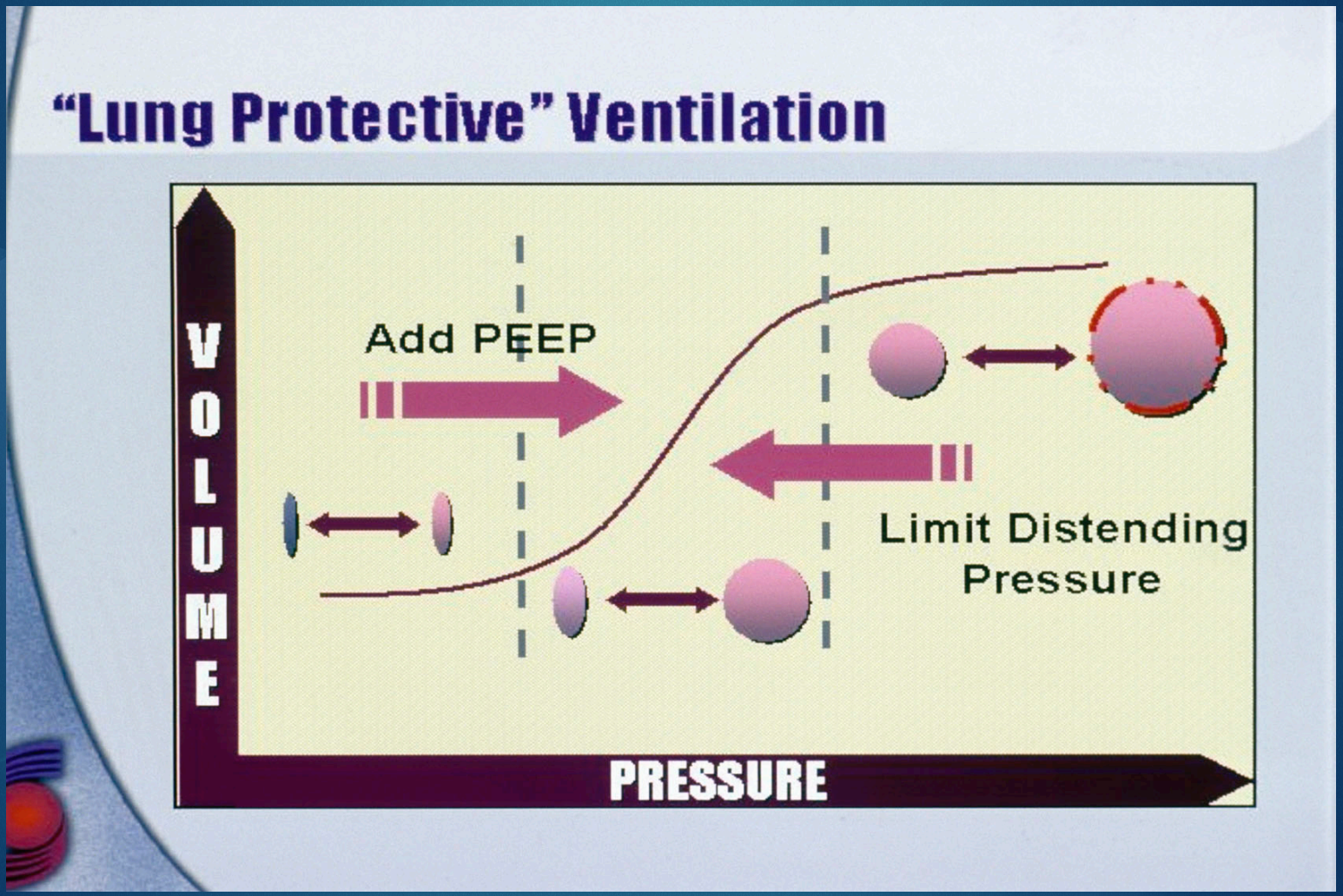
FiO_2	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

ARDS:
Concept of Lung Injury in an inflamed or diseased lung

- Large volume ventilation causes lung Injury even in normal lungs
- Repeated opening/closing of an atelectatic collapsed alveoli causes lung injury
- **R**epeated **A**lveolar **C**ollapse and **E**xpansion

- PSILI - Patient Self Induced Lung Injury
- Ventilator Induced Lung Injury

Avoid **RACE** Repetetive Airway Collapse Expansion = PEEP
Avoid Overdistension = Limit plateau pressure < 30
Low Tidal Vomume



Severe Hypoxemic Respiratory Failure
Narendra et al CHEST 2017

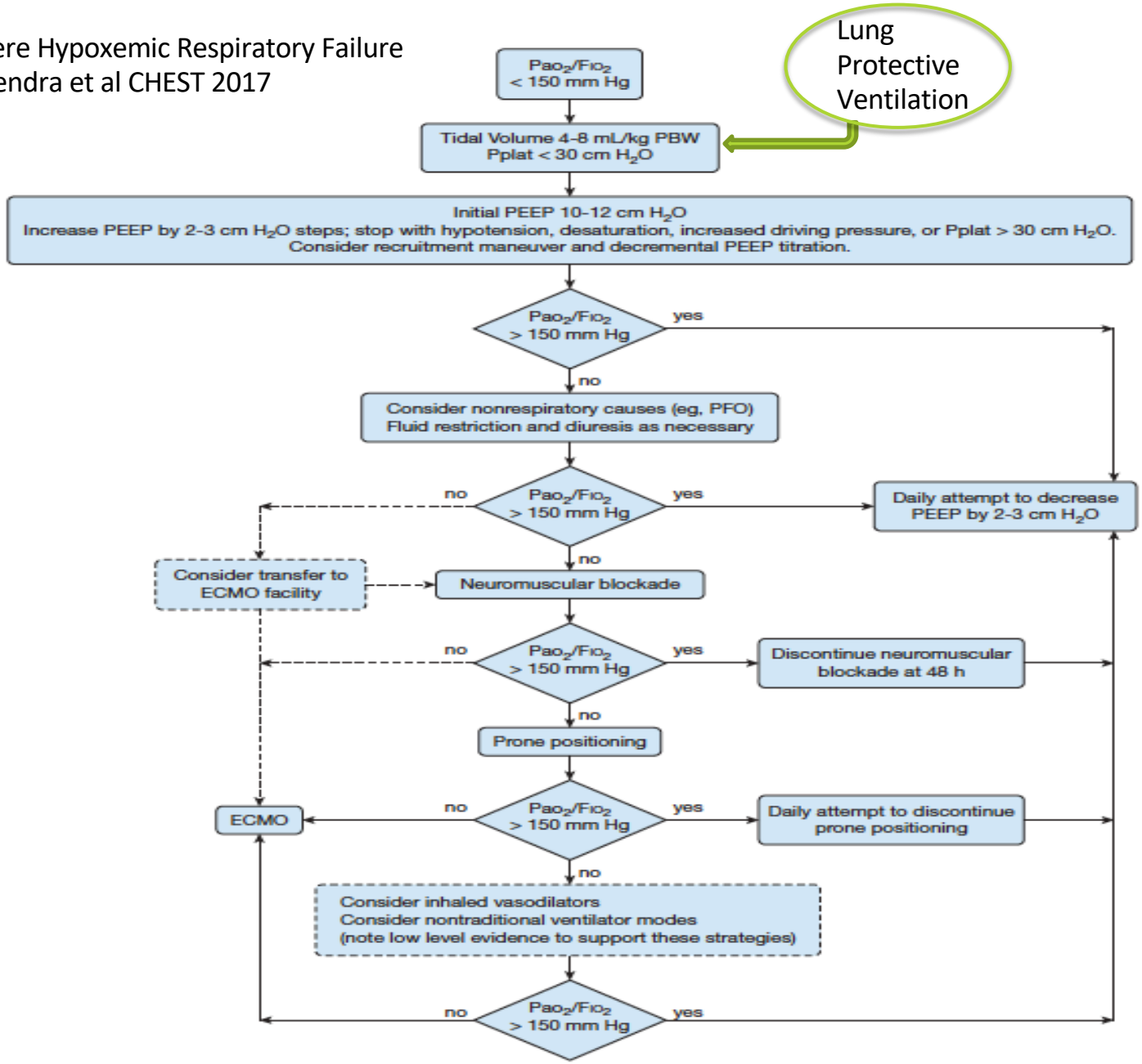


Figure 2 – *A suggested approach to severe hypoxemic respiratory failure based on our view of the available evidence. The dashed lines represent less-favored alternative approaches. This approach is intended to be reasonable, not rigid. Experienced clinicians might select different priorities, and this approach might be superseded as new evidence becomes available. ECMO = extracorporeal membrane oxygenation; PBW = predicted body weight; PFO = patent foramen ovale. See Figure 1 legend for expansion of other abbreviations.*

Proning for ARDS

NEJM 2013

Parameter	Prone	Supine
Number 466	237	229
28 day mortality %	16	32.8 P < .001
90 day mortality	23.6	41 P < .001
# sessions 16 hrs	4+_4 73% of time on ventilator	

PROSEVA TRIAL
50% reduction in mortality
NEJM 2013

Top Ten Clinical Take Away Points

- 1. COVID -19 has ***protean* manifestations**
- 2. Up to half of the patients can be managed by ***non invasive methods***
- 3. Remember large volume ventilation can cause/exacerbate lung injury in spontaneous or ventilated patients. ***Avoid large volume ventilation. Use lung protective ventilation***
- 4***. Intubation by the most experienced***, preferably by video laryngoscopy with rapid sequence intubation.
- 5. ***"Cooperative Proning"*** in unintubated – When on vent ***Prone early*** in severe hypoxemic patients, develop multidisciplinary "proning teams"
- 6. Keep **the L and H phenotypes** in mind but ***ARDS treatment principles are similar.***
- 7. ***Paralysing patient*** and comes with enhanced responsibility! Need ***multiple safety steps/ checks***
- 8. Patients are ***hypercoagulable***!
- 9. Think ***out of the box*** for bedside interventions! That can save you, your colleagues and your patient!
- 10. ***Post ICU Syndrome*** – Neuromuscular Weakness, Cognitive defects, Psychiatric problems. Just getting patient out of the ICU is not the only criterion for victory celebration!

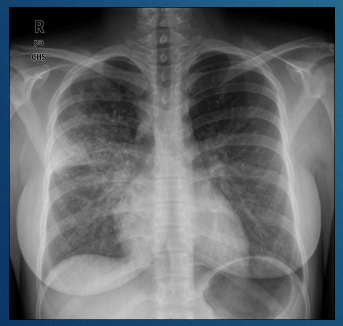
Top 10 Administrative Take Away Points

- 1. This is ***not a Sprint but a Marathon!*** (Wuhan – Dec → April)
- 2. Your ***poor planning can cost lives***! Protecting health care workers should be your top most priority!
- 3. Going from ***"resource rich" to "resource poor"*** may be only a week away!
- 4. ***"Command and Control center"*** should be the coordinating apex body
- 5. Plan/Rehearse and ***prepare to change*** again in 24 hrs - Multidisciplinary engagement is the key in the Surge planning
- 6. Prepare to ***train personnel not normally deployed*** for those tasks – All are COVID doctors in a pandemic.
- 7. ARDS has relatively longer ICU course – patients accumulate and you reach ***capacity very quickly***
- 8. Build in ***20% workforce for outag***es from COVID illness, exhaustion, emergencies
- 9. ***Keep up the morale of your team***! Be cognizant of burnout/anxiety/depression/PTSD
- 10. ***Lead from the front!*** "*Yatha Raajaa Thatha prajaa*" – People around you take cues from your body language, behavior, coping, etc.

Innovations can save you and your colleagues

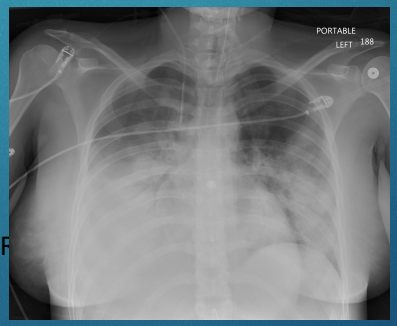
ARDS – The Two Phenotypes

Feature	Common	L - type	H - type – Typical ARDS
Compliance	Keep tidal volume low 6-8 ml/kg	Very Good	Low
Reason for hypoxia		V/Q abnormality Subpleural Patchy infiltrates,Low lung weight	Shunt = water logged lungs, basal atelectasis, heavy
PEEP	Keep driving pressure < 15	8-10	Higher
Proning for PO2/FIO2 < 150	Both may respond	May respond Low recruitability	More likely to respond High recruitability



L

The" L" Phenotype



H

The "H" Phenotype

CAPRs

Sairam

and

Thank You!

Cardiovascular Implications of COVID-19

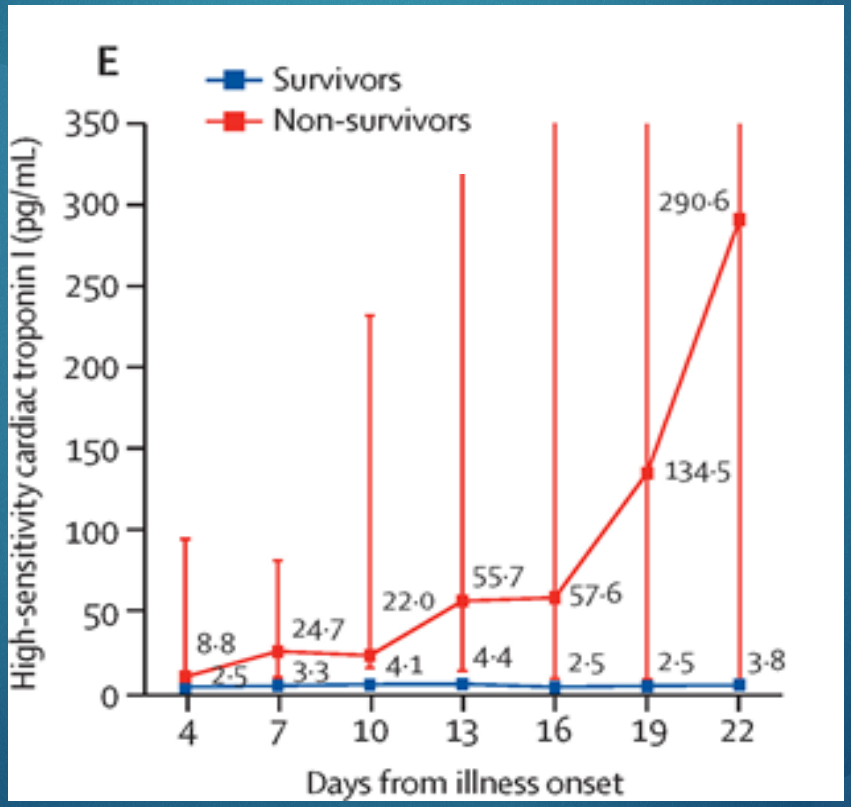
Aniket S. Rali, MD
Baylor College of Medicine

Outline

- Cardiac biomarkers
- Mimicker of ACS
- Clinical Considerations
- QTc Monitoring

Cardiovascular Biomarkers

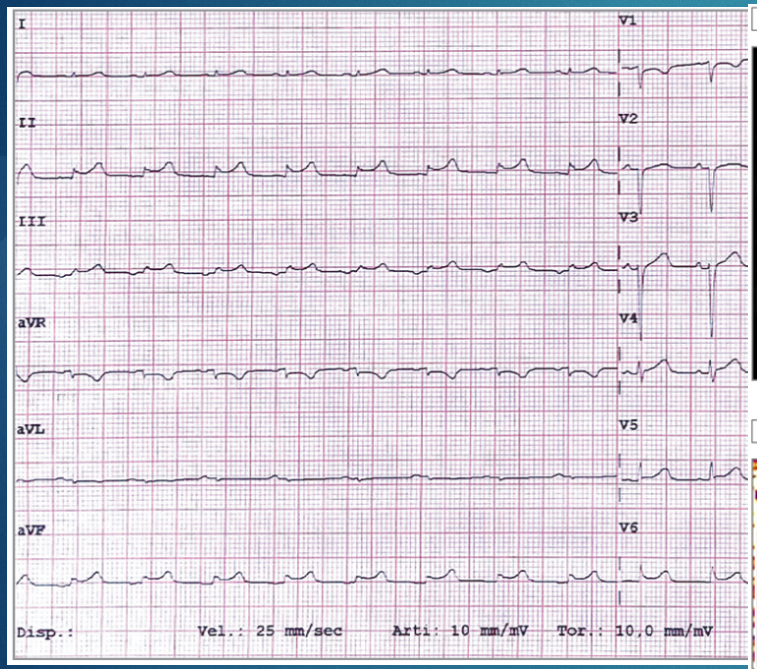
- High-sensitivity cardiac troponin I has been shown to be a predictor of worse in-hospital outcomes.

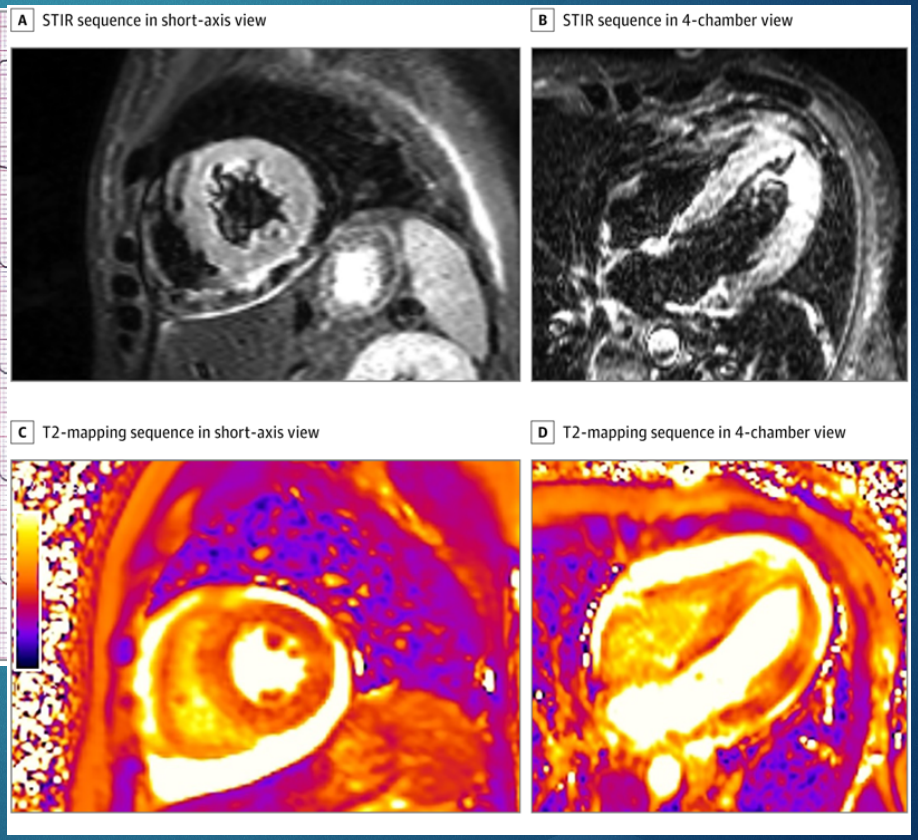


Zhou, F., et al., *Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study*. Lancet, 2020.

COVID 19 Mimics ACS

- MyoPericarditis vs Coronary Spasms vs Coronary Micro-emboli





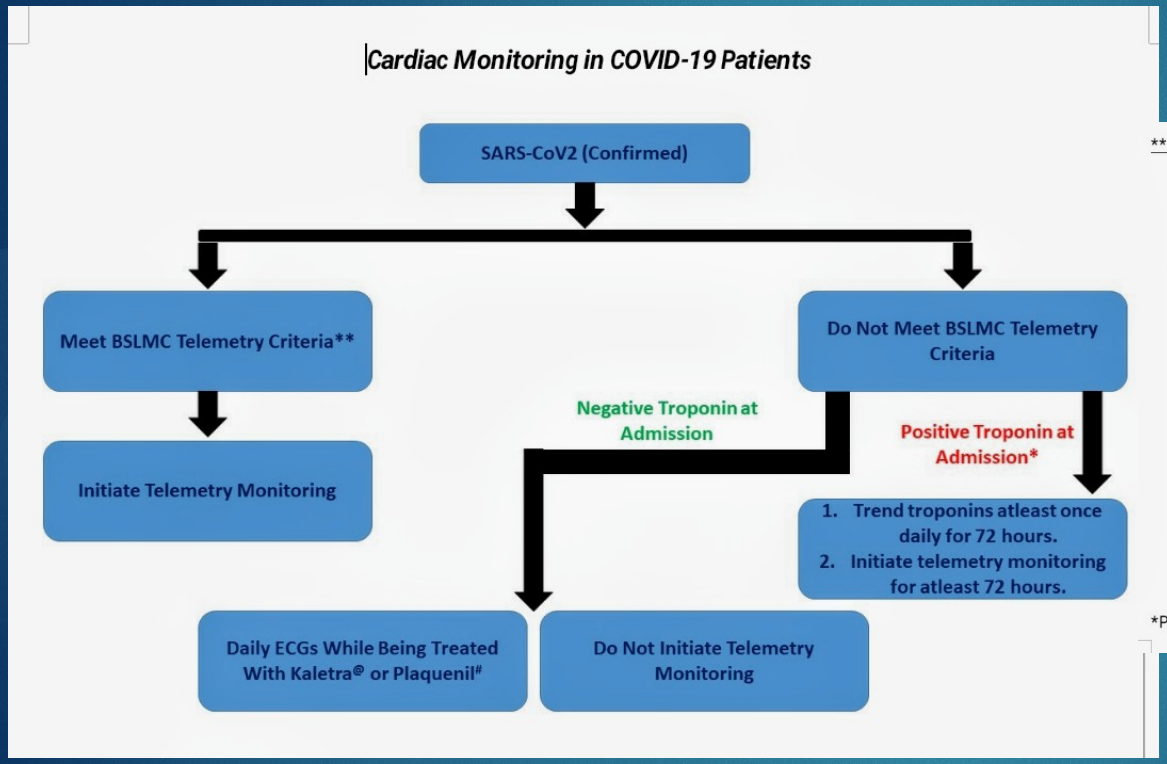
Inciardi RM, Lupi L, Zaccone G, et al. Cardiac Involvement in a Patient With Coronavirus Disease 2019 (COVID-19). *JAMA Cardiol.* Published online March 27, 2020. doi:10.1001/jamacardio.2020.1096

COVID 19 Mimics ACS - Considerations

- Benefits of diagnostic/therapeutic cardiac catheterization vs exposure to HCW and potential contamination of lab equipment.
- Role for POC echocardiography in identifying wall motion abnormalities, pericardial effusions etc.
- Role of thrombolytics in treatment of ACS.

COVID 19 – Telemetry Monitoring

- Who needs telemetry monitoring?



** BSLMC Telemetry Criteria

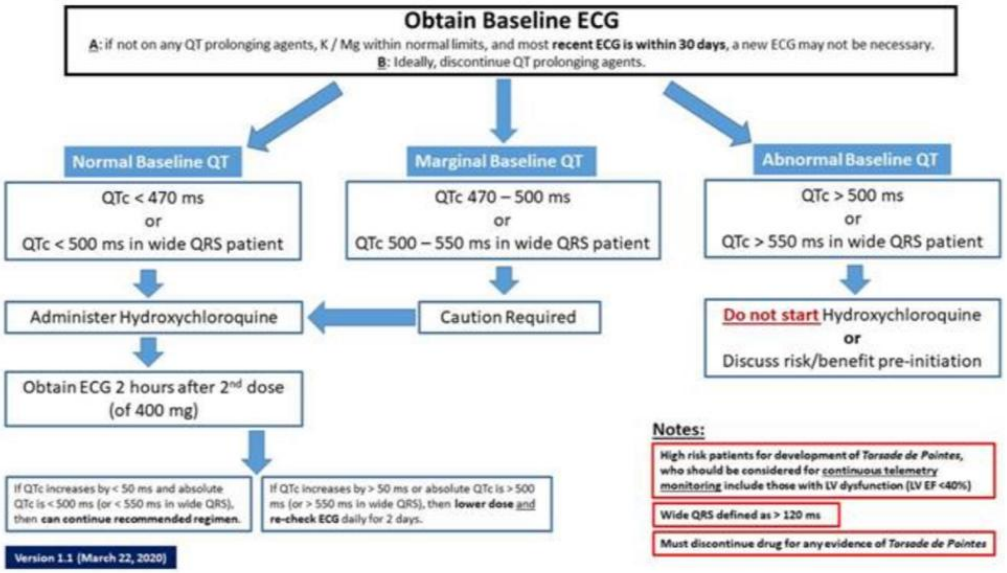
- Chest pain
- Syncope
- S/p PCI/Ablation/AICD
- K > 5.5, K < 2.5, or Mag < 1.0
- PE with intervention/thrombolysis
- History of VAD or Heart Transplant
- ACS or Rule out MI
- Decompensated HF
- Acute stroke/TIA
- Post op CABG or history of CABG, valve replacement
- Symptomatic arrhythmia
- Cardiac contusion
- Myocarditis or Pericarditis
- Step down from ICU with recent cardiac or respiratory arrest
- 2nd or 3rd degree heart block
- Uncontrolled atrial arrhythmia or sustained VT
- Post op patients with angina, new ECG changes, positive pre-op stress test SBP < 90 or HR > 130
- Initiation/monitoring/drug toxicity of antiarrhythmic medications
- Suspected rejection of heart transplantation

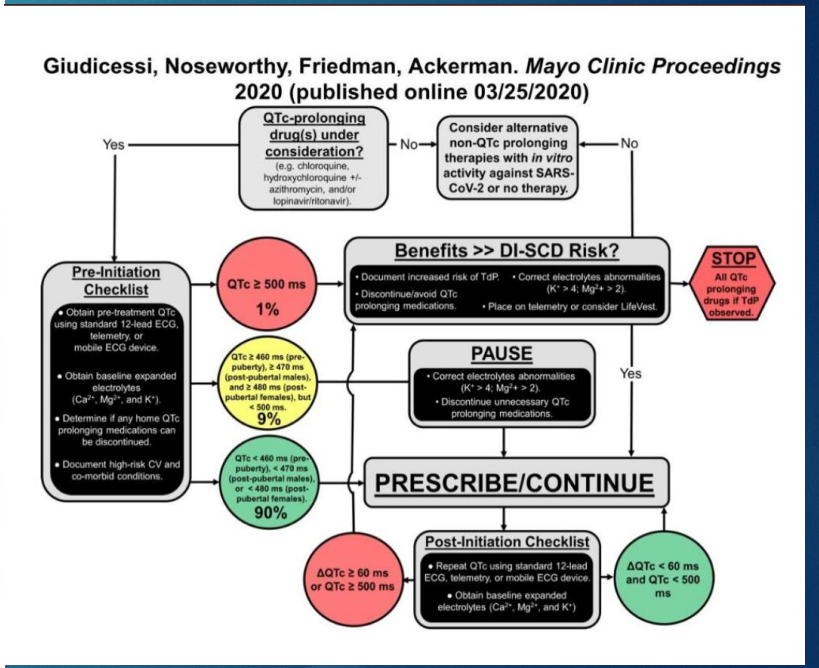
*Positive for this cohort of patients considered > 2 x upper limit of normal in the BSLMC lab.

Thank You!

COVID 19 Treatments – QTc Monitoring

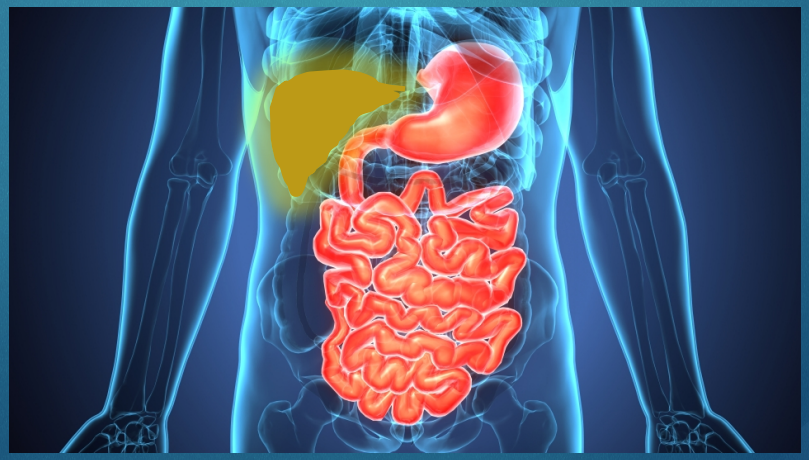
- Two medications proposed in treatment of COVID-19, i.e. Azithromycin and Hydroxychloroquine, both prolong QTc and can cause lethal arrhythmias.





Gastrointestinal and Liver Involvement with COVID-19

Dr. Hari Conjeevaram, MD, MSc, FACP, FACG
Professor of Medicine
University of Michigan
Ann Arbor, MI, USA



What we know:

- Incidence of GI (Digestive) symptoms including nausea and/or diarrhea in up to 50% (range 5-50%).
- There have been reports of isolated diarrhea preceding cough and fever.
- The virus may be present in GI secretions and viral RNA is detectable in stool.
  - Gastrointestinal infection and potential fecal-oral transmission must be considered.
- Abnormal liver enzymes are observed in 20-30% of persons with COVID-19 infection.

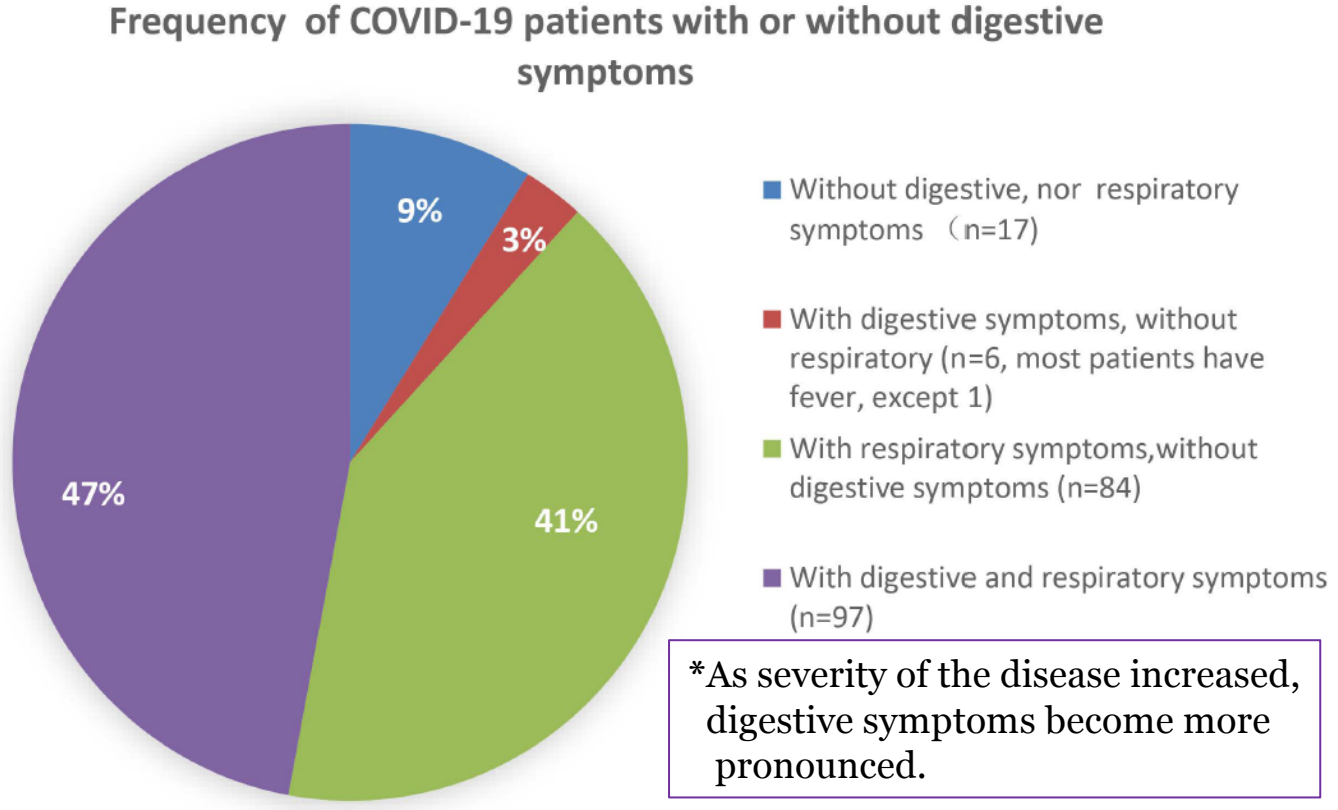
Joint GI Society COVID-19 Clinical Insights March 2020
AASLD COVID-19 Clinical Insights April 2020

Digestive Symptoms

- Anorexia (Lack of appetite) – most common
- Diarrhea
  - *Recently cases of 'hemorrhagic colitis' reported*
- Vomiting
- Abdominal Pain

Joint GI Society COVID-19 Clinical Insights March 2020

Digestive Symptoms



*As severity of the disease increased, digestive symptoms become more pronounced.

Pan L et al. Amer J GE 2020 (*In Press*)

Endoscopic Procedures – Potential High Risk for Transmission

- There is potential for fecal-oral transmission.
  - Virus is detected in saliva and in stool (virus shedding).
- The joint GI societies recommend to “strongly consider rescheduling non-urgent endoscopic procedures”.
- Endoscopic procedures should be considered aerosol-generating (droplet exposure).
- When performing procedures, in addition to standard PPE (gloves, gown, eyewear), also should use headwear (face shield) and masks.

Joint GI Society COVID-19 Clinical Insights March 2020

Liver Tests/Liver Function Abnormalities

- Mainly ALT (SGPT), AST (SGOT) elevations [1-2 times the upper limit of normal (ULN)]*
- Elevated Bilirubin – usually mild to modest
- Elevated Prothrombin Time (PT)/INR*

AASLD COVID-19 Clinical Insights April 2020

Liver Tests/Liver Function Abnormalities

- **Incidence** of elevated liver biochemistries **in hospitalized patients** → ranges from **14% to 53%.**
- Elevated liver biochemistries **may reflect a direct virus-induced cytopathic effect and/or immune damage from the provoked inflammatory response**.
- **Liver injury occurs more commonly in more severe COVID-19 cases** than in mild cases.
  - *Higher mean liver enzyme levels and PT/INR in patients with digestive symptoms*.
- **Low serum albumin** on hospital admission is a **marker of COVID-19 severity**.

AASLD COVID-19 Clinical Insights April 2020
Pan L et al. Amer J GE 2020 (*In Press*)

Liver Tests/Liver Function Abnormalities

- **Rare cases of severe acute liver injury** have been described.
- **Some of the therapeutic agents used to manage symptomatic COVID-19 may be hepatotoxic** (e.g. statins, remdesivir, and tocilizumab) (less common with chloroquine, hydroxychloroquine, and azithromycin).

AASLD COVID-19 Clinical Insights April 2020

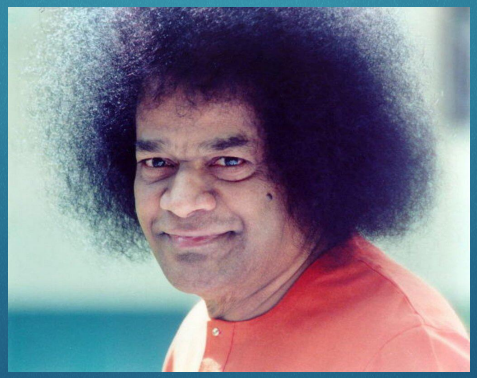
Take Home Messages:

- Up to half of all COVID-19 patients present with digestive symptoms.
- A small percent present with digestive symptoms but no respiratory symptoms.
- COVID-19 patients with digestive symptoms have a longer time from onset to admission.
- As the severity of the disease increased, digestive symptoms became more pronounced.
- Laboratory data: mild to significant increase in ALT (SGPT), AST (SGOT), and prothrombin time (PT/INR).
- Endoscopic Procedures – potential high risk for transmission.
- DO not stop immunosuppressant medications for patients.

Joint GI Society COVID-19 Clinical Insights March 2020
https://www.gastro.org/press-release/joint-gi-society-message-covid-19-clinical-insights-for-our-community-of-gastroenterologists-and-gastroenterology-care-providers

AASLD COVID-19 Clinical Insights April 2020
https://www.aasld.org/sites/default/files/2020-04/AASLD-COVID19-ClinicalInsights-4.07.2020-Final.pdf

Jai Sai Ram!



Radiology of COVID-19

VIJAY CHUNDI, MD, RADIOLOGIST

Common Patterns and Distribution on Initial CT Images of 919 Patients With COVID-19

Imaging Finding	No. of Studies	No. of Reported Cases/ Total No. of Patients (%)
Bilateral involvement	12	435/497 (87.5)
Peripheral distribution	12	92/121 (76.0)
Posterior involvement	1	41/51 (80.4)
Multilobar involvement	5	108/137 (78.8)
Ground-glass Opacification	22	346/393 (88.0)
Consolidation	10	65/204 (31.8)

- Salehi, Abhedi, et al; AJR:215, July 2020

Covid-19 Pneumonia Imaging modalities

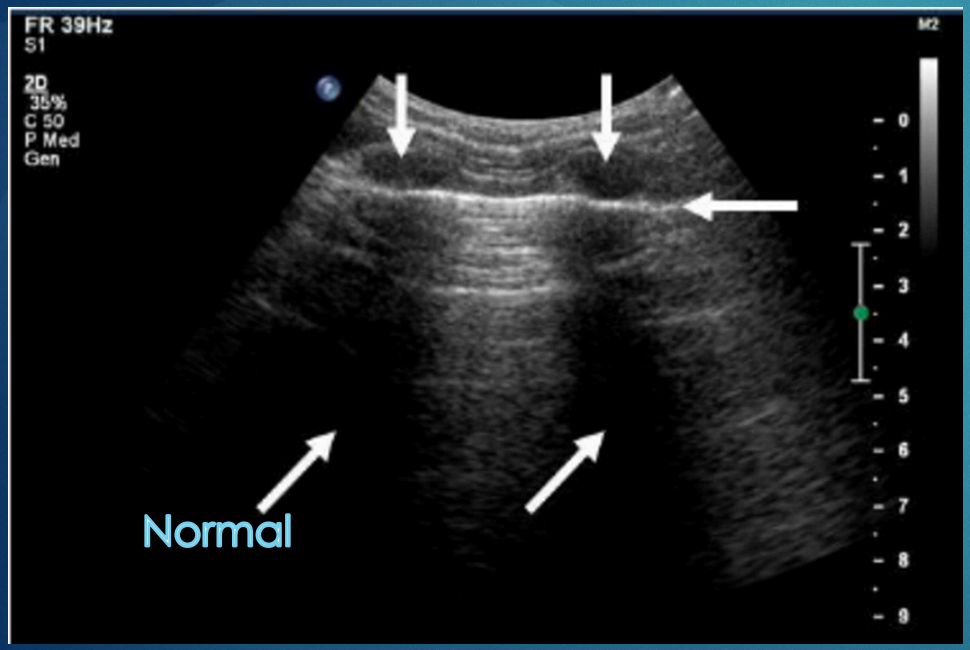
- **Radiographs (X-ray)**: widely available and portable
  - Portable supine CXR is limited in differentiating peripheral fluid from air space disease (Consolidation)

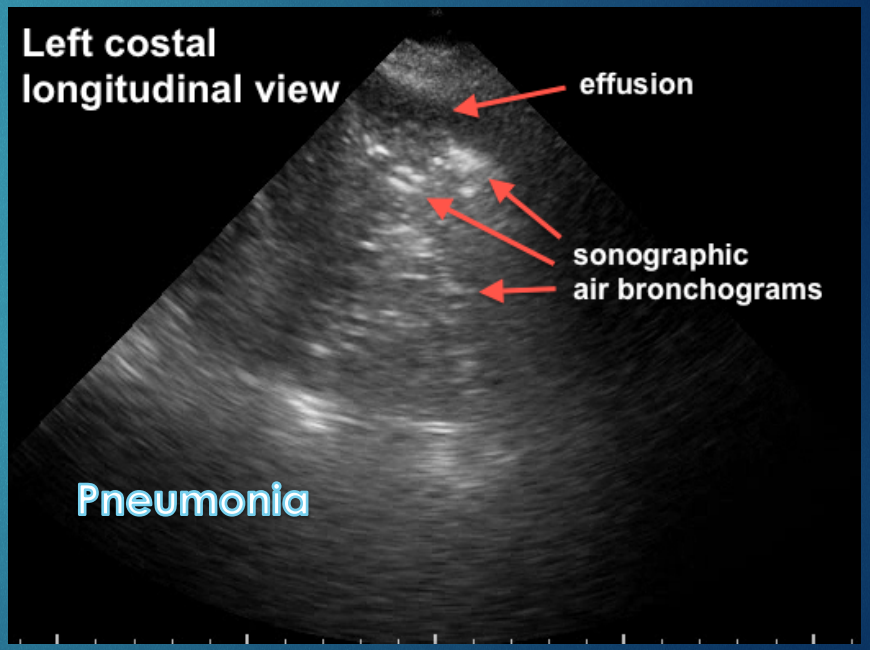
- **CT:** Gold standard - Available in most of developed world but issue with cost and availability exists. NOT portable

- **Ultrasound (US)**: widely available, portable including handheld units
  - Proven for ER and bedside use and routinely used worldwide; excellent in neonates, pediatrics, and ICU
  - Excellent for finding fluid; pleural effusions, guiding drainage, etc.
  - Limitations in chest-Operator dependent, Sternum and ribs obscure lungs, deeper areas not seen

US of COVID-19 Pneumonia

- Need more studies but some preliminary reports are promising in this crisis.
- If pretest probability (prevalence and clinical suspicion) is high and CT or CXR not practical or available, US can help confirm if positive





Thinkingcriticalcare.com

Chest CT COVID-19 Pneumonia

- **Asymptomatic** (1-2 wks) - few peripheral Ground Glass Opacities (GGOs)
- **Early** Symptomatic - Peripheral GGOs, mild consolidation
- **Severe** Symptomatic - Greater degree of consolidation and ARDS
- **Older** patients and immunocompromised pts may have atypical features
- If testing is negative with **High** clinical suspicion and suggestive CT, presume they have COVID-19 and re-test

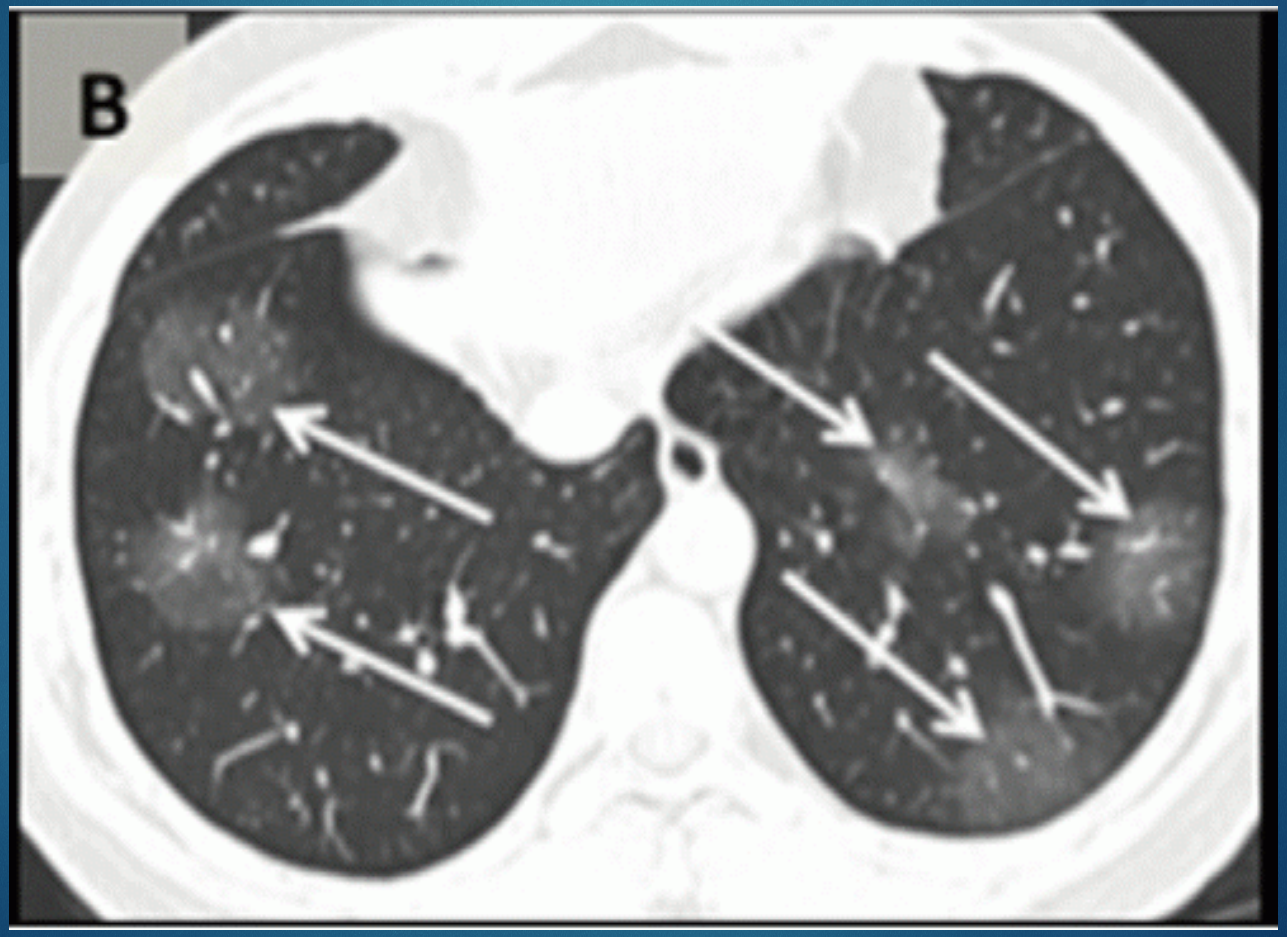
COVID-19 Pneumonia Key Points

- CXR at early phase-normal or minimally abnormal
- CT may show classic bilateral, multilobar GGOs (often round) **before** symptoms
- Lymphadenopathy and pleural effusions are **rare**
- With clinical progression, progressive consolidation develops
- End Stage is ARDS-Bilateral extensive air space opacification

CT COVID-19 Peripheral GGOs

https://pubs.rsna.org/doi/10.1148/radiol.2020200236

COVID-19 Classic Rounded Peripheral GGOs



Source: Itnonline.com and Radiology Online

NOT LIKELY to be COVID-19 Pneumonia

- Discrete nodules
- Cavitation
- Central GGOs (Non COVID-19 Pneumonia)
- Smooth septal thickening with pleural effs (CHF)
- Subpleural reticulation or honey combing (Interstitial lung dz)
- If you see the above, you should look for OTHER etiologies

CONCLUSIONS

- Radiology plays an important role in evaluation of COVID-19 pneumonia
- Bilateral peripheral GGOs are highly suggestive of COVID-19 pneumonia
- If testing is negative with **High** clinical suspicion and suggestive CT, presume they have COVID-19 and re-test

LABORATORY MEDICINE COVID-19

PRAVEENA YETUR, MD FCAP FASCCP
SENIOR PATHOLOGIST
MEDICAL SCIENCE LIAISON
LABCORP – WEST DIVISION

About COVID-19 Tests

1) COVID-19 Test
   - Real Time PCR
   - Nucleic Acid Amplification (NAA)
   - Sensitivity and Specificity
   - Turnaround Time (TAT)
2) ID NOW™ COVID-19 (Abbott Rapid Test)
   - Isothermal NAA
3) Antibody Blood Test

COVID-19 tests are offered without copay or out-of-pocket cost.

In which settings are COVID-19 tests available to the public?

1) Outpatient
   - Physicians Offices and Clinics
   - Surgery Centers
   - Point of Care Testing Facilities (Drive-Thru)
2) Inpatient
   - Hospitals
   - Nursing Care Facilities
3) Other settings (Correctional Facilities, etc.)

What are sample types?

1) Nasopharyngeal (NP) Swabs
2) Oropharyngeal (OP) Swabs
3) NP Wash/Aspirate
4) Sputum
5) Lower Respiratory Tract Aspirates
6) Bronchoalveolar Lavage (BAL)

What is the stability of the sample?

1) Room Temperature – 24 hours
2) Refrigerated – 72 hours
3) Frozen – longer

What are the current CDC testing criteria?

1) Clinical Criteria
   - Signs and symptoms associated with COVID-19
2) Epidemiological Criteria*
   - History of residence in or travel to affected geographic regions
   - Any exposure
   - Other

*CDC criteria is changing with regular updates

Detailed guidance about the testing process, including specimen handling for COVID-19 specimens, is available at: https://www.labcorp.com/COVID-19

COVID-19: Opportunities for Service

GANESH YADLAPALLI, MD

PROFESSOR OF MEDICINE
UNIVERSITY OF CINCINNATI MEDICAL SCHOOL, USA

ASSOCIATE CHIEF, SECTION OF NEPHROLOGY,
VA MEDICAL CENTER, CINCINNATI, USA

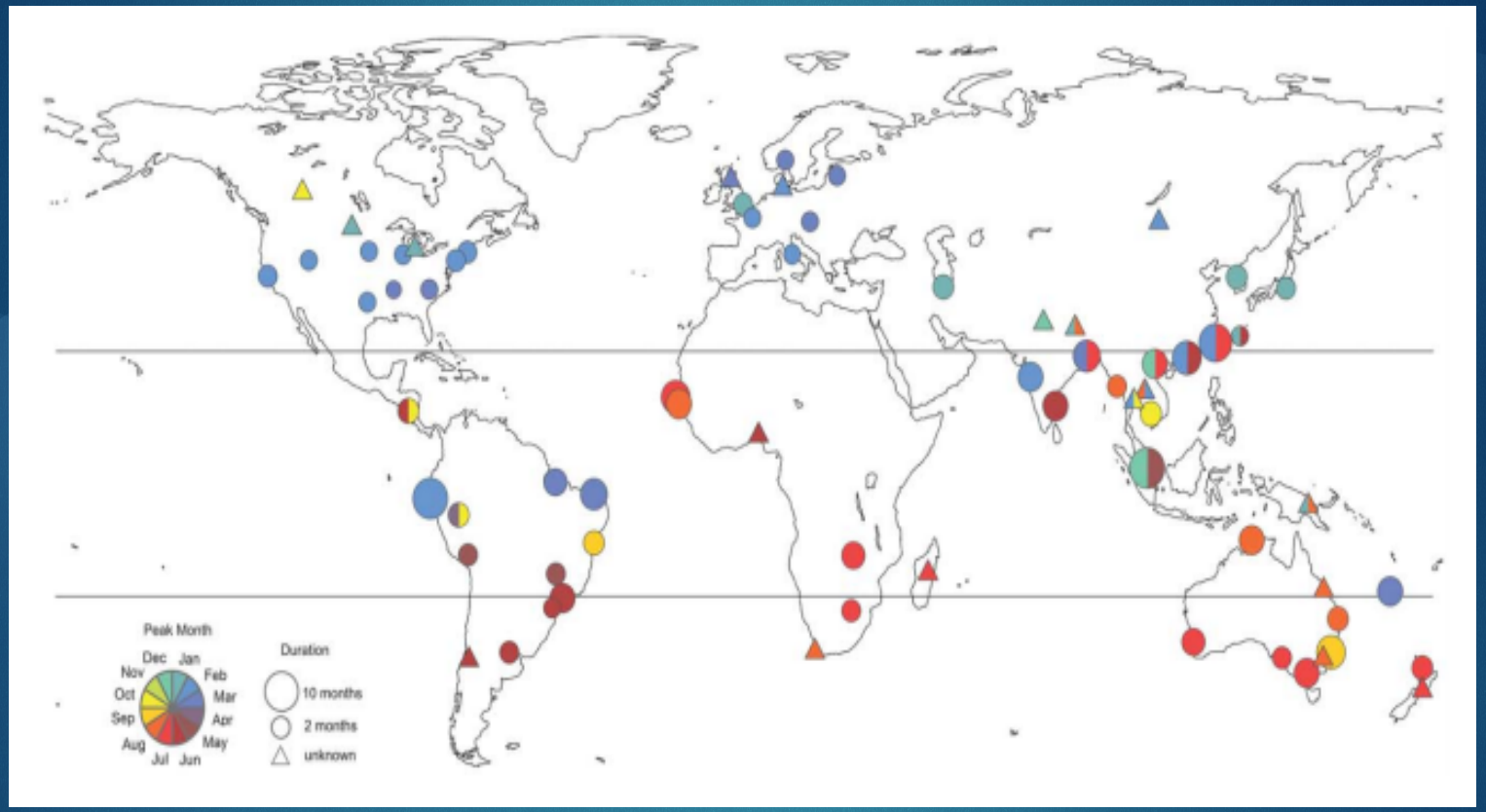
ASSOCIATE DIRECTOR OF DIALYSIS UNIT,
CINCINNATI VA MEDICAL CENTER

Goal- Slow Down the Pandemic
What Can We Do?

COVID-19 Pandemic: Current Status

https://coronavirus.jhu.edu/map.html

? Future
Lessons From Seasonal Influenza



Prepare for the Worst, Pray for the Best

K Bloom-Feshbach1, WJ. Alonso, C V, Tamerius J, Simonsen L, et al. (2013) Latitudinal Variations in Seasonal Activity of Influenza and Respiratory Syncytial Virus (RSV): A Global Comparative Review. PLoS ONE 8(2): e54445. doi:10.1371/journal.pone.0054445

Steps to Slow Down the Pandemic

Effective measures are

- Social Distancing
- Personal Protection Equipment (PPEs)
  - Masks
  - Face shields
  - Gowns
- COVID-19 Testing

Opportunities to Help

- **General public**
- **People who are at high risk of exposure**
  - Healthcare workers
  - Staff working in death care industry
    - Funeral home staff
    - Religious organization (priests)
  - Staff working for solid waste and wastewater management

What can we do:

We can supply PPE – mask, face shields and gowns

PPE: Masks

Sathya Sai International Organization - USA

Sathya Sai | About Us | Events and Activities | In the Community | For Members | C

HOME / FOR MEMBERS / SER

Homemade Mask and PPE Service Project

https://sathyasai.us/service/homemade-mask-service-2020

PPE: Face shields

https://sathyasai.us/service/homemade-mask-service-2020

PPE: Gowns

SSIO COVID-19 Initiative

Goal:

Is to supply at least 95,000 Masks, shields and gowns

SSIO of Mauritius will be distributing 5000 masks next week

SSIO of Botswana will be distributing face shields to local hospital

PPEs: Other Avenues for Innovation

- N95 masks (Respirators)
- HEPA filters for masks
- HEPA filters for ventilators

Necessity is Mother of Invention

COVID-19 Testing

- We are exploring
  - Collaborations to develop testing kits
  - To buy point-of-care testing kits

Explore Universe of Brain for the Universe

Thank you

Mental Health and Well Being

During and After the COVID-19 Pandemic

Meera Narasimhan, MD, DFAPA

Professor and Chair, Department of Neuropsychiatry and Behavioral Science, University of South Carolina
& Service Line Director, Behavioral Health
Prisma Health Columbia, South Carolina
&
Special Advisor to the President, University of South Carolina
Health Innovations and Economic Development

Stress of COVID-19 Pandemic
Healthcare Systems, Professionals & People

Healthcare Systems

- Mismatch between demand and resources
- Testing capabilities
- Triaging
- Protecting personnel while taking care of patients
- PPE rationing
- Policy changes
- Agonizing clinical and financial decisions

Healthcare Workers

Professional Level

- Unknown nuances of disease pathology
- Overwhelming barrage of patients(sick and scared)
- Overwhelming flow of information
- Shifting guidelines
- PPE
- ICU beds
- Negative pressure rooms
- Ventilators

Healthcare Workers

Personal Level

- Potentially bring this virus back home to our loved ones
- Worries about family children, elderly
- Anxious, afraid and threatened
- Painful awareness of our own mortality

People

- Disrupts normalcy
- Social Isolation
- Fear ,worry, irritability due to binge viewing of media outlets, social media, misinformation
- Worries about family children, elderly
- Not being able to be say goodbye to family during their final moments
- Economic implications

Symptoms of Stress during COVID-19

- Fear and worry about your own health and the health of your loved ones
- Changes in sleep or eating patterns
- Difficulty sleeping or concentrating
- Feeling anxious and sad
- Worsening of chronic health problems
- Worsening of mental health conditions
- Increased use of alcohol, tobacco and drugs

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html

Mind Body Connectivity

Psychoneuroimmunology

Stress

Depression

Anxiety Ds

+ve

LIMBIC SYSTEM (Hippocampus)

HYPOTHALAMUS

CRH

PITUITARY GLAND

(Anterior Pituitary)

ACTH

ADRENAL GLAND

(Adrenal Cortex)

Glucocorticoid

Endocrine

Thyroid

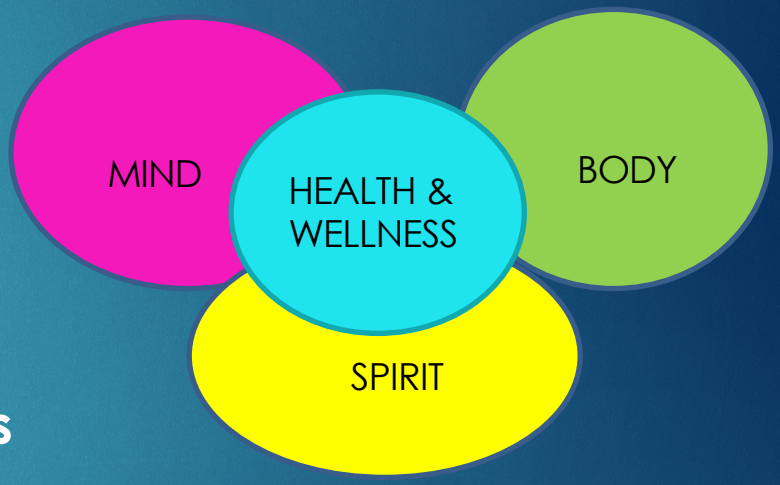
Adrenals

Cytokines

- Infection
- Pain
- Allergies

Therapies and Tools
Coping with the Stress of COVID-19

- **Mindfulness**
- Psychological First Aid
- Trauma Focused CBT
- Grief Counseling
- Online therapy companies
- AI powered mental health chatbots
- Crisis Text lines
- Suicide hotlines



(URL links on SSSIO website)

Coping with COVID-19 the SAI way

Rx

Mental Wellness Prescription

For Healthcare Providers

Stop worrying about things you cannot control

Add a sense of normalcy to help yourselves, coworkers, family and friends

Internet, I-phones (Information Technology) in moderation to connect with the world, stay informed, but avoid getting overwhelmed with the surge of information flow

Be healthy by exercising regularly and maintaining a healthy diet

A must is sleep and rest

Be mindful of your emotions, do self checks of your feelings: anxiety, depression & practice mindfulness meditation

A prayer of gratitude to SAI for the opportunity bestowed on us to serve our fellow human beings

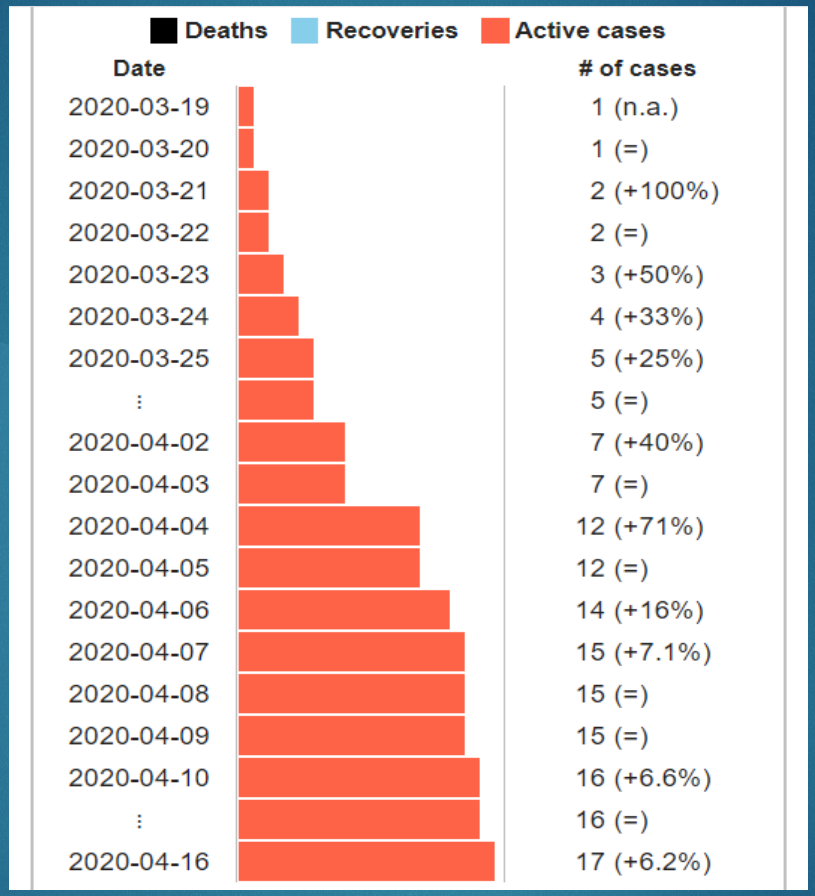
Lokah Samastah Sukhino Bhavantu

SSIO ZONE 3 COVID-19 SUMMARY

FIJI, AUSTRALIA, NZ

Fiji COVID-19 Summary

Updated cases diagnosed in Fiji



Source:Ministry of Health and Medical Services ,Fiji Broadcasting Corporation (FBC)

Pacific Island Country summary

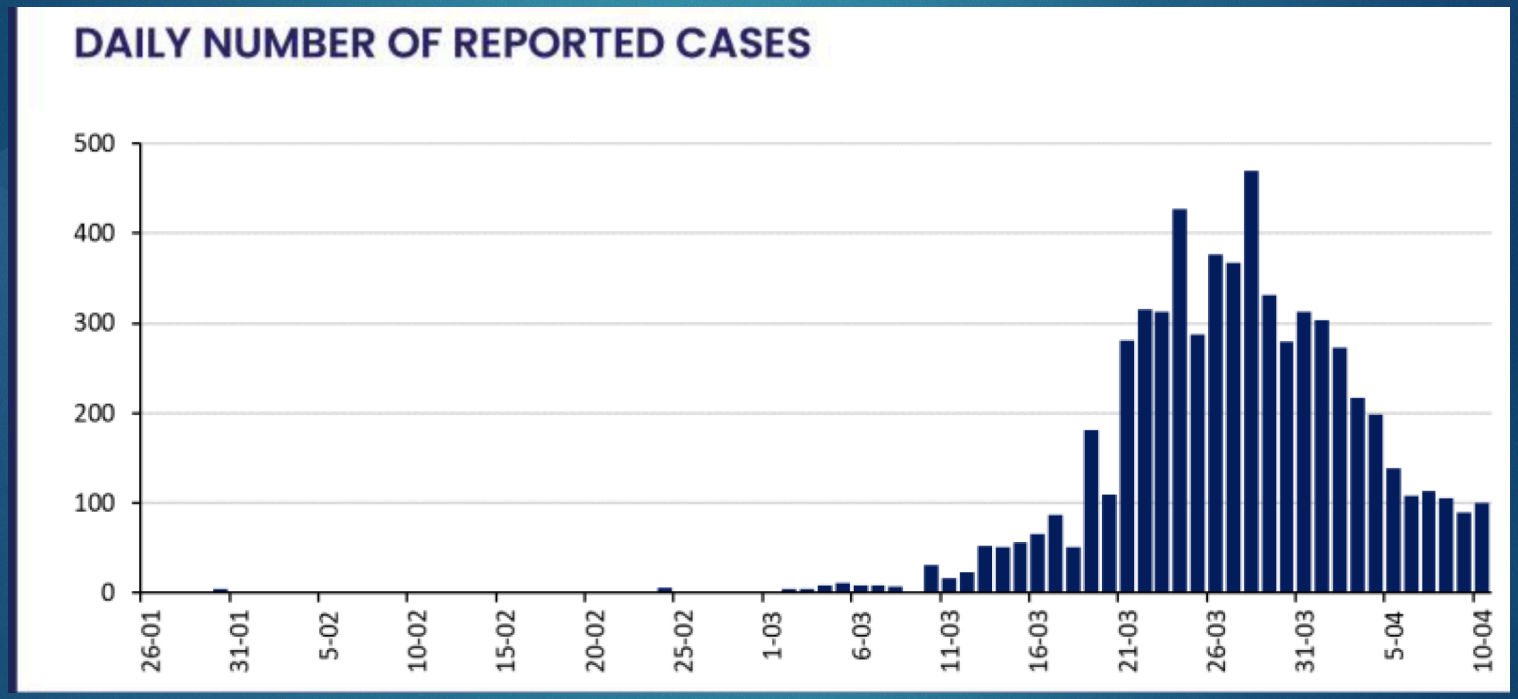
- As of 10 April 2020, 6 countries (**Commonwealth of the Northern Marianas (CNMI), Papua New Guinea, Fiji, French Polynesia, Guam** and **New Caledonia**) in the PICTs have reported **225 cases** including 6 deaths, excluding the number of cases from USS Theodore Roosevelt currently docked in Guam.
- ***Restrictions in place*** :**Samoa, Solomon Islands, Tonga, Vanuatu and Tuvalu** have declared states of emergency.
- The **Marshall Islands** and **Federated States of Micronesia** have completely sealed their borders.
- **CMNI** is under nationwide curfew from 7pm to 6am daily.
- **Cook Islands** are in Code Yellow recommending people work from home.
- Fiji is under a nationwide curfew from 8pm to 5am daily. Lautoka and Suva are under full lockdown.
- **French Polynesia** is under nationwide curfew from 8pm to 5am till 29 April.
- **Kiribati** is at Level 4 alert with a stay at home policy.
- **New Caledonia** self-quarantine measures continue.
- **Niue** is at Level 4 alert with a stay at home policy.
- **Papua New Guinea** ended its lockdown on 06 April. The state of emergency has been extended by 2 months.
- **Tonga** is under nationwide curfew from 8pm to 6am.

Source: https://www.spc.int/updates/blog/2020/04/covid-19-pacific-community-updates

Australia Covid Summary

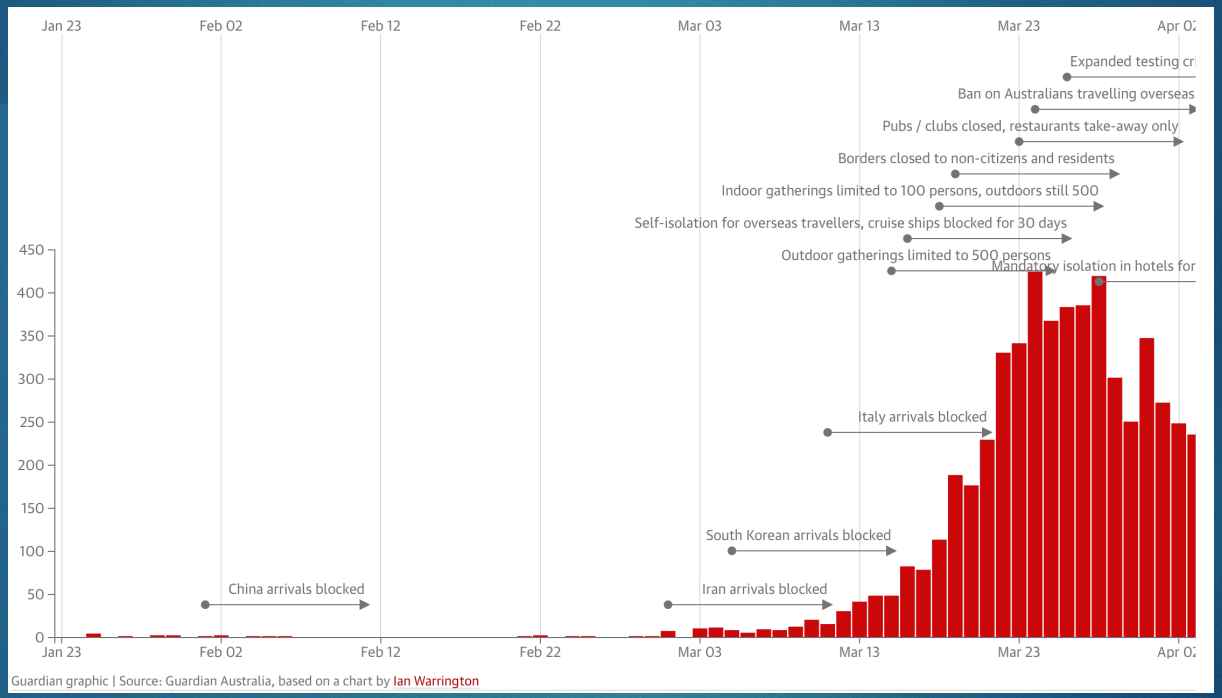
Source:https://www.health.gov.au/resources/publications/coronavirus-covid-19-at-a-glance

Australia



Source:https://www.health.gov.au/resources/publications/coronavirus-covid-19-at-a-glance

Australia- timelines for Govt response Covid-19

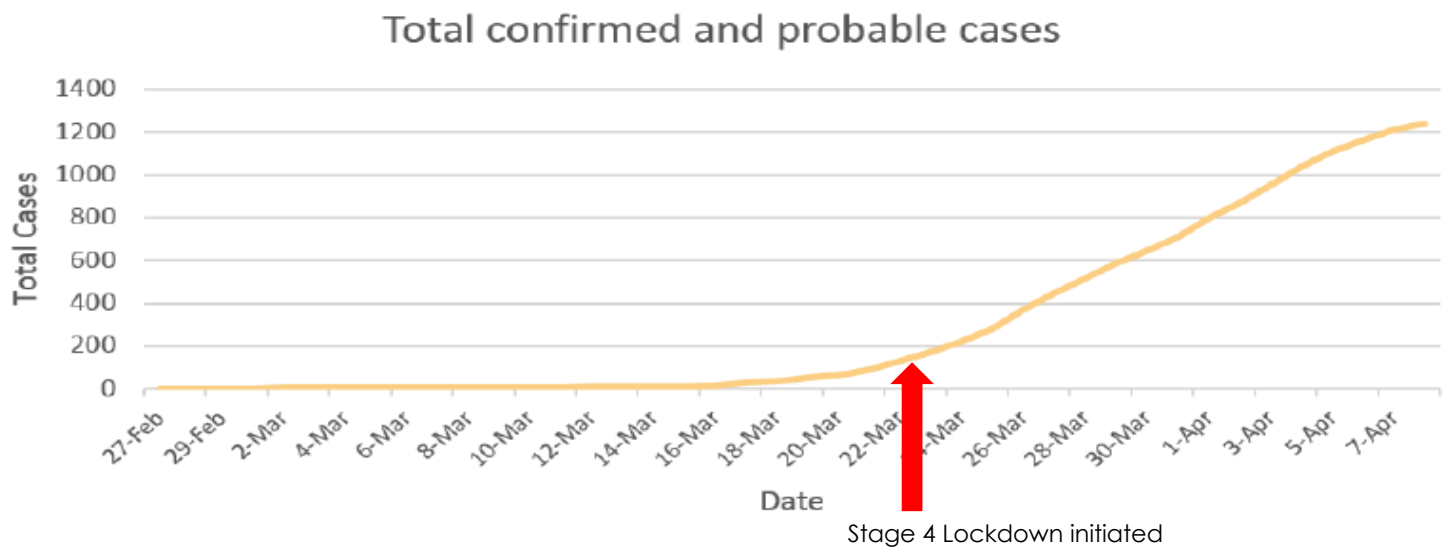


New Zealand


CURRENT STATUS OF CONFIRMED CASES
1035
4
422
Total cases
Total deaths
Cases recovered

New Zealand

Epidemic curve



Total confirmed and probable cases over time, as at 9.00 am, 9 April 2020

Modified from: Epidemic Curve
www.health.govt.nz/our-work/diseases-and condition/covid-19-novelcoronavirus/covid-19-current situation/covid-19-current -cases#curve

LEVEL	RISK ASSESSMENT	RANGE OF MEASURES (can be applied locally or nationally)
Level 4 - Eliminate Likely that disease is not contained	• Sustained and intensive transmission • Widespread outbreaks	• People instructed to stay at home • Educational facilities closed • Businesses closed except for essential services (e.g. supermarkets, pharmacies, clinics) and lifeline utilities • Rationing of supplies and requisitioning of facilities • Travel severely limited • Major reprioritisation of healthcare services
Level 3 - Restrict Heightened risk that disease is not contained	• Community transmission occurring OR • Multiple clusters break out	• Travel in areas with clusters or community transmission limited • Affected educational facilities closed • Mass gatherings cancelled • Public venues closed (e.g. libraries, museums, cinemas, food courts, gyms, pools, amusement parks) • Alternative ways of working required and some non-essential businesses should close • Non face-to-face primary care consultations • Non acute (elective) services and procedures in hospitals deferred and healthcare staff reprioritised
Level 2 - Reduce Disease is contained, but risks of community transmission growing	• High risk of importing COVID-19 OR • Uptick in imported cases OR • Uptick in household transmission OR • Single or isolated cluster outbreak	• Entry border measures maximised • Further restrictions on mass gatherings • Physical distancing on public transport (e.g. leave the seat next to you empty if you can) • Limit non-essential travel around New Zealand • Employers start alternative ways of working if possible (e.g. remote working, shift-based working, physical distancing within the workplace, staggering meal breaks, flexible leave arrangements) • Business continuity plans activated • High-risk people advised to remain at home (e.g. those over 70 or those with other existing medical conditions)
Level 1 - Prepare Disease is contained	• Heightened risk of importing COVID-19 OR • Sporadic imported cases OR • Isolated household transmission associated with imported cases	• Border entry measures to minimise risk of importing COVID-19 cases applied • Contact tracing • Stringent self-isolation and quarantine • Intensive testing for COVID-19 • Physical distancing encouraged • Mass gatherings over 500 cancelled • Stay home if you're sick, report flu-like symptoms • Wash and dry hands, cough into elbow, don't touch your face

Source: https://covid19.govt.nz/;

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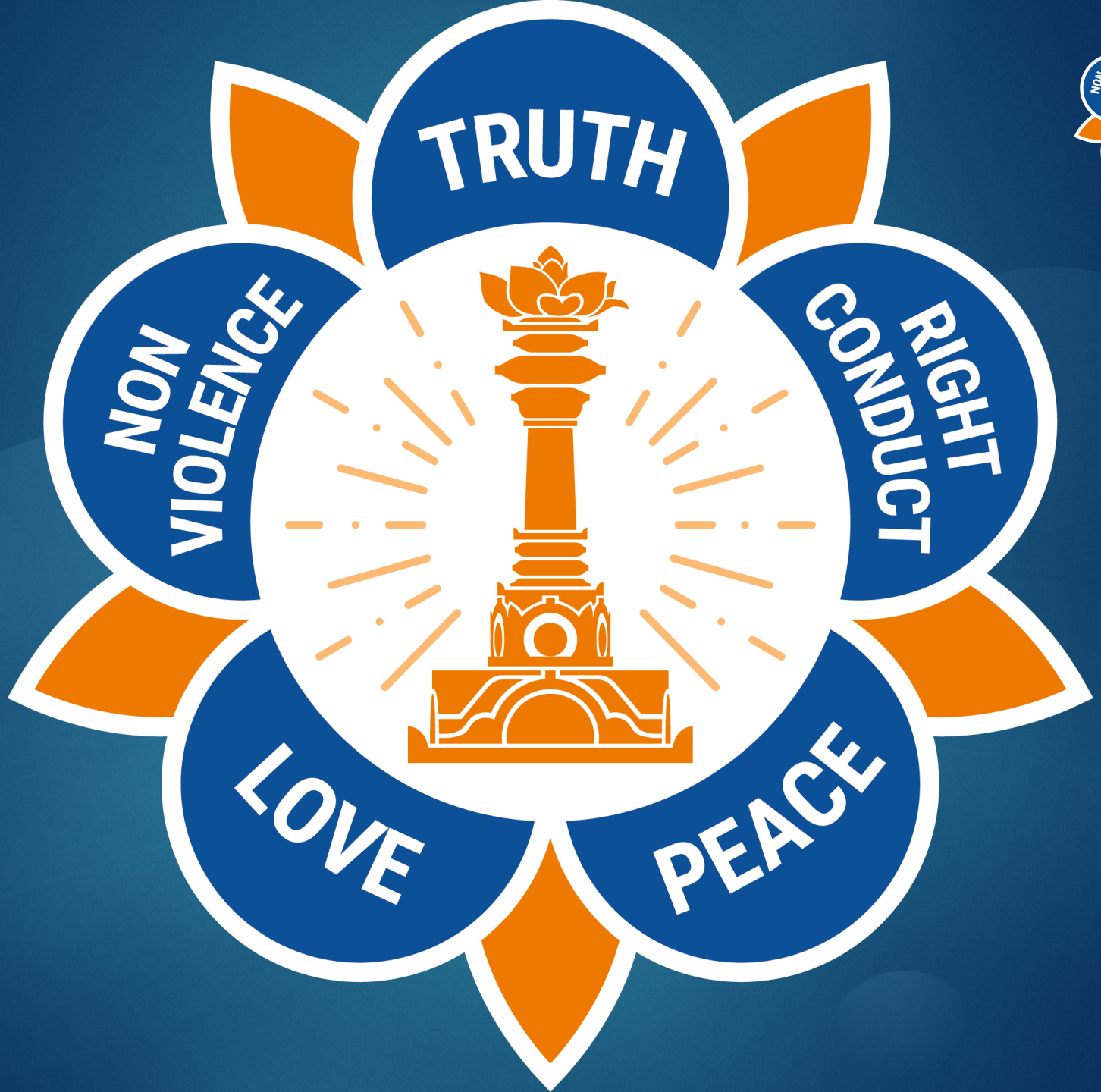
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