



UPSTATE

COMPREHENSIVE STROKE CENTER

UPSTATE
MEDICAL UNIVERSITY
DEPARTMENT OF NEUROLOGY
*Cerebrovascular and
Neurocritical Care Division*

STROKE

and

COVID-19

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Disclosures

- No financial relationships with any device or drug companies
- Research funds from NONIN Inc, NIH

Learning Objectives

- Discuss the effect of COVID-19 pandemic on Stroke hospital admissions
- Discuss the challenges in acute stroke care during the COVID-19 pandemic
- Discuss impact of COVID-19 pandemic on stroke care delivery

How do you feel today?



COVID-19 Fact or Fiction

SARS-CoV-2 is the virus and COVID-19 is the disease

You can get COVID-19 by direct contact or via droplet from infected person

Infected persons can transmit SARS-CoV-2 virus even if they are not having symptoms (yet)

Incubation period after exposure can be as long as 14 days but viral shedding starts up to 5 days before symptom develops

All of the above are true

COVID-19: Which one is Fake News

Social Distancing > 6 feet and ear loop mask use are effective in reducing community transmission

Convalescent plasma, Remdesivir and Dexamethasone are promising therapies for COVID-19 patients

History of stroke or development of stroke during COVID-19 illness is associated with more severe disease and higher mortality

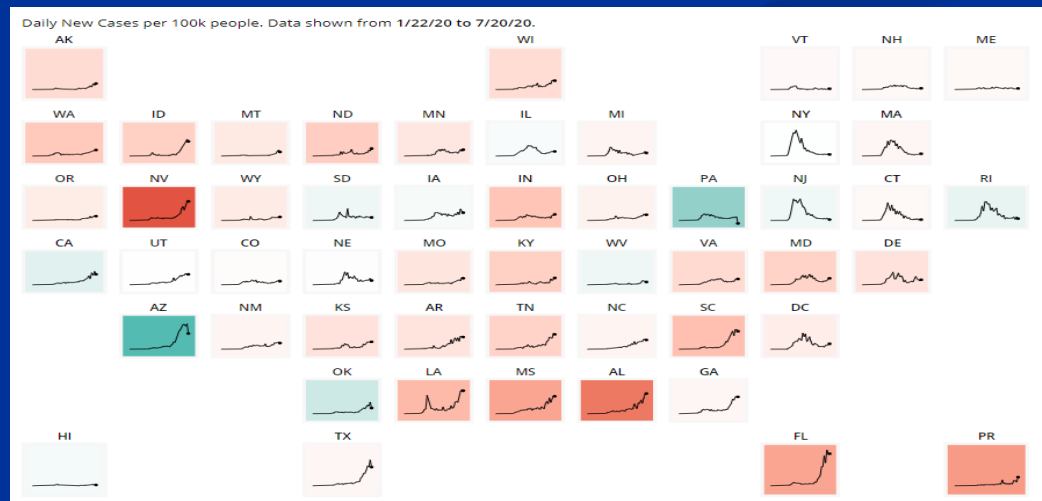
Going to a bar, eating inside a restaurant, or working out at a gym are all moderate to high risk activities for getting COVID-19

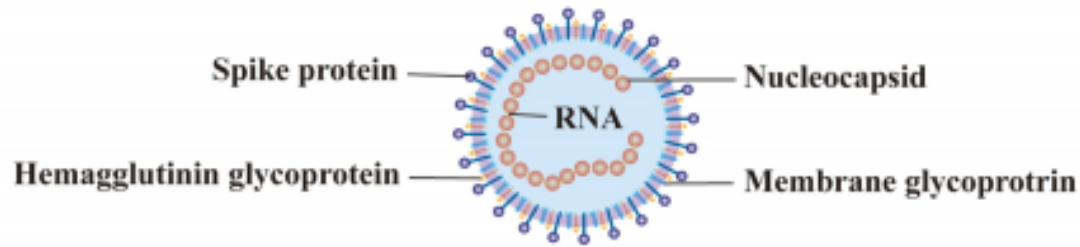
None of the above

COVID-19 Data

July 21, 2020 1935 EST

	Total	New Cases Last 24H	Total Death	New Death Last 24H
Global	14,894,973	239,093	615,386	5,678
US	3,897,465	67,140	141,972	1,119
NYS	408,181	882	32,520	18
Onondaga	3,312	22	195	0





Coronavirus invasion

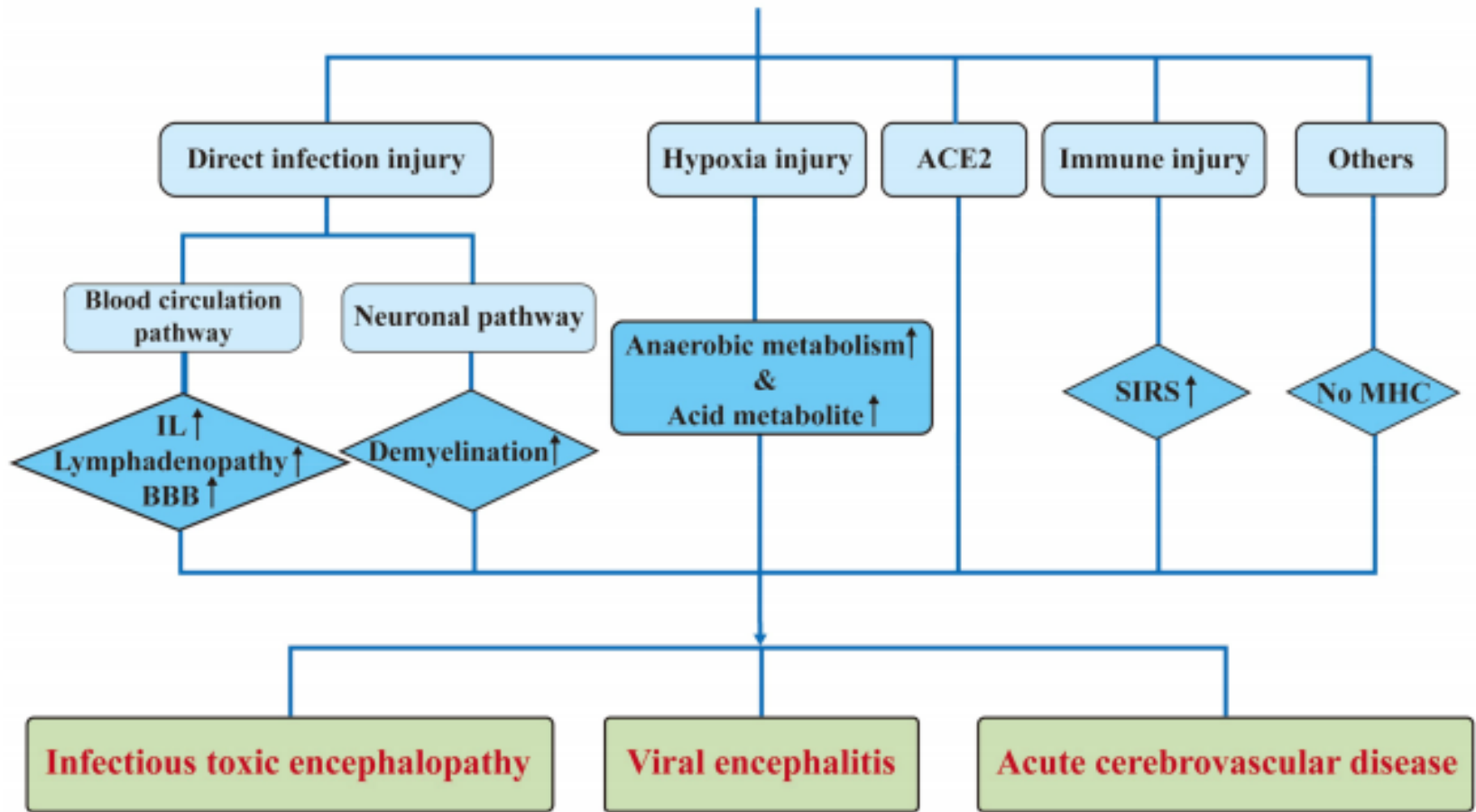


Fig. 2. Pathogenesis of nervous system injury caused by coronaviruses. ACE2: angiotensin-converting enzyme 2; BBB: blood brain barrier; IL: interleukin; MHC: major histocompatibility complexes; SIRS: systemic inflammatory response syndrome.

Stroke mechanism in COVID-19

- Hypercoagulability
 - Laboratory derangement
 - Increased Fibrinogen, D-dimer, CRP, Factor VIII, vWf, lupus anticoagulant
 - Clinical Thromboembolic complications
- Endotheliitis (vasculitis)
- Cytokine Storm
 - Hyperinflammatory response with secondary thrombosis

Incidence of Stroke in Hospitalized COVID-19 patients

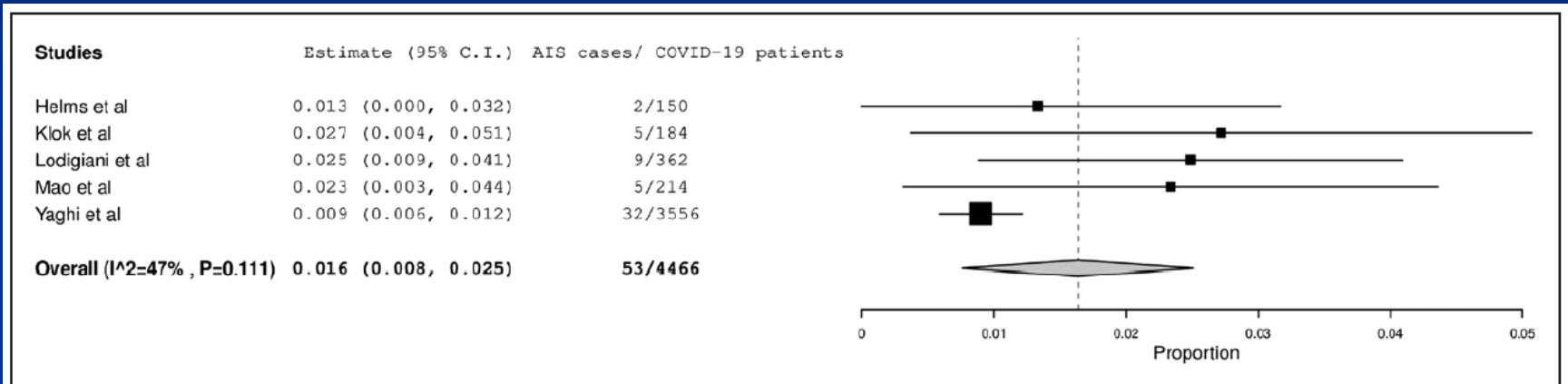


Figure. Rates of ischemic stroke reported in available to date cohort studies of patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

- 5 px with LVO <50yo, 2 w/o COVID sx Oxley NEJM 2020
- 22 px in PA, USA (3 ICH) 10 w/o COVID sx Sweid IJS 2020
- 10 px in Paris, 2 <50 years old, 2 w/o COVID sx Escalard Stroke 2020
- 20/683 px in New Jersey , 6 without COVID sx Bach

COVID-related Strokes

	COVID-19 Positive N=32	COVID-19 Negative N=46	Historical Control N=80	P value
Age	63	70	69	0.001
% Men	72%	52%	45%	0.01
NIHSS	19	8	3	0.007
Cryptogenic	66%	30%	25%	0.011
Mortality	64%	9%	6%	0.001

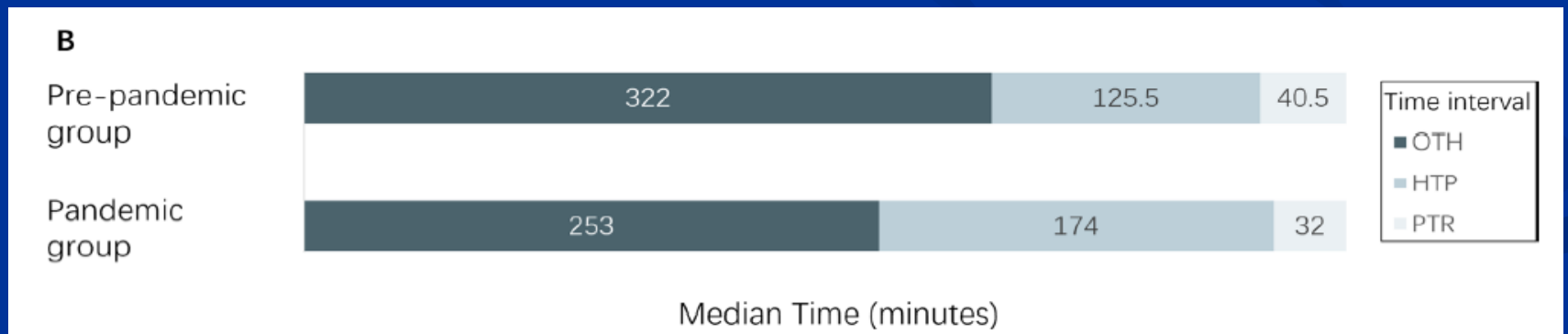
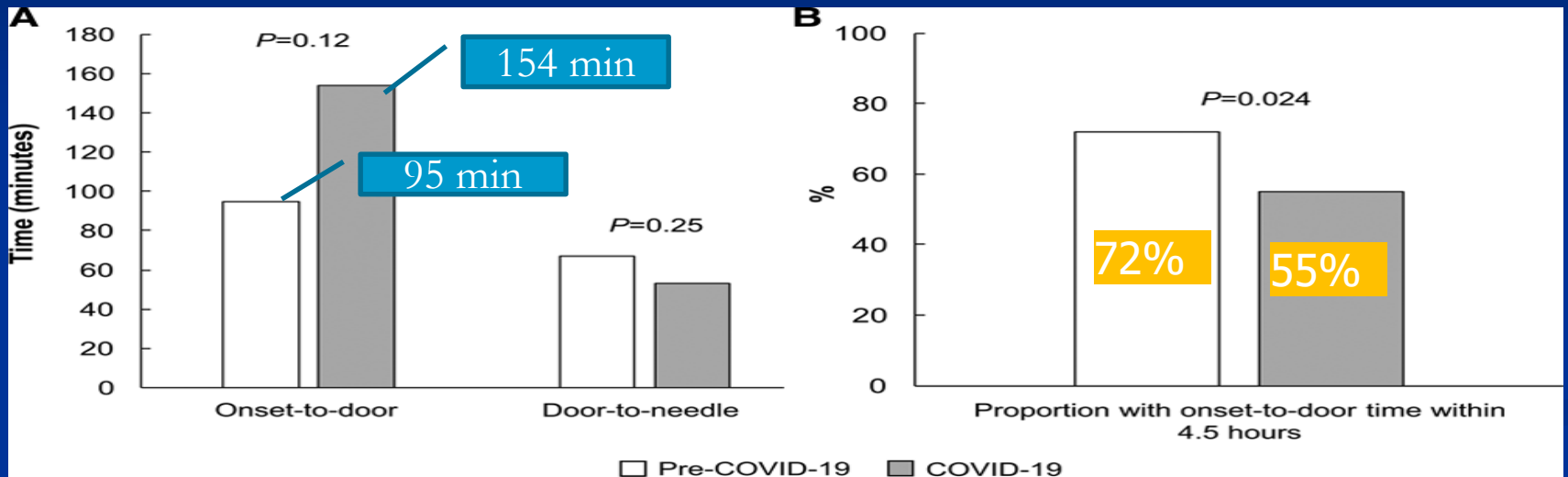
Stroke Numbers during COVID-19 Pandemic

	France	Spain	China	USA	Brazil	Germany	Upstate
Ischemic Stroke	- 7%	- 28%	- 38%	- 20%	- 38%	Same	- 13%
TIA	- 2%	NA	NA	NA	- 64%	- 45%	- 27%
Intracranial Hemorrhage	Same	NA	NA	-12%	Same	Same	- 18%
Subarachnoid Hemorrhage	Same	NA	NA	Same	Same	Same	Same
Thrombolysis	- 41%	- 7%	-26%	- 3%	NA	Same	- 43%
Thrombectomy	- 21%	Same	- 23%	- 16%	NA	Same	- 14%

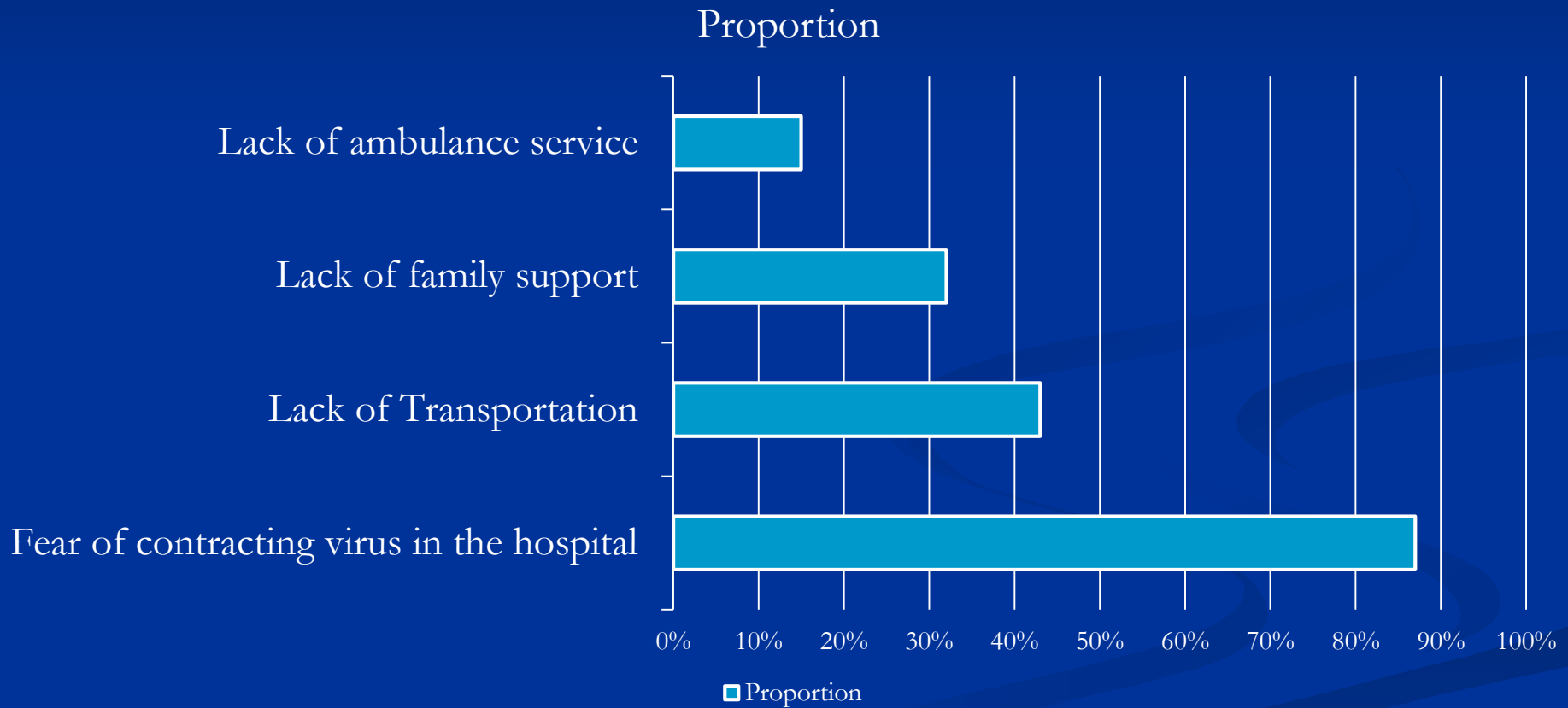
Pop et al. Eur J Neurol 2020;0:1-5.
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 Diegoli et al. Stroke 2020. In Press
 Bersano et al. Eur J Neurol 2020: In press.

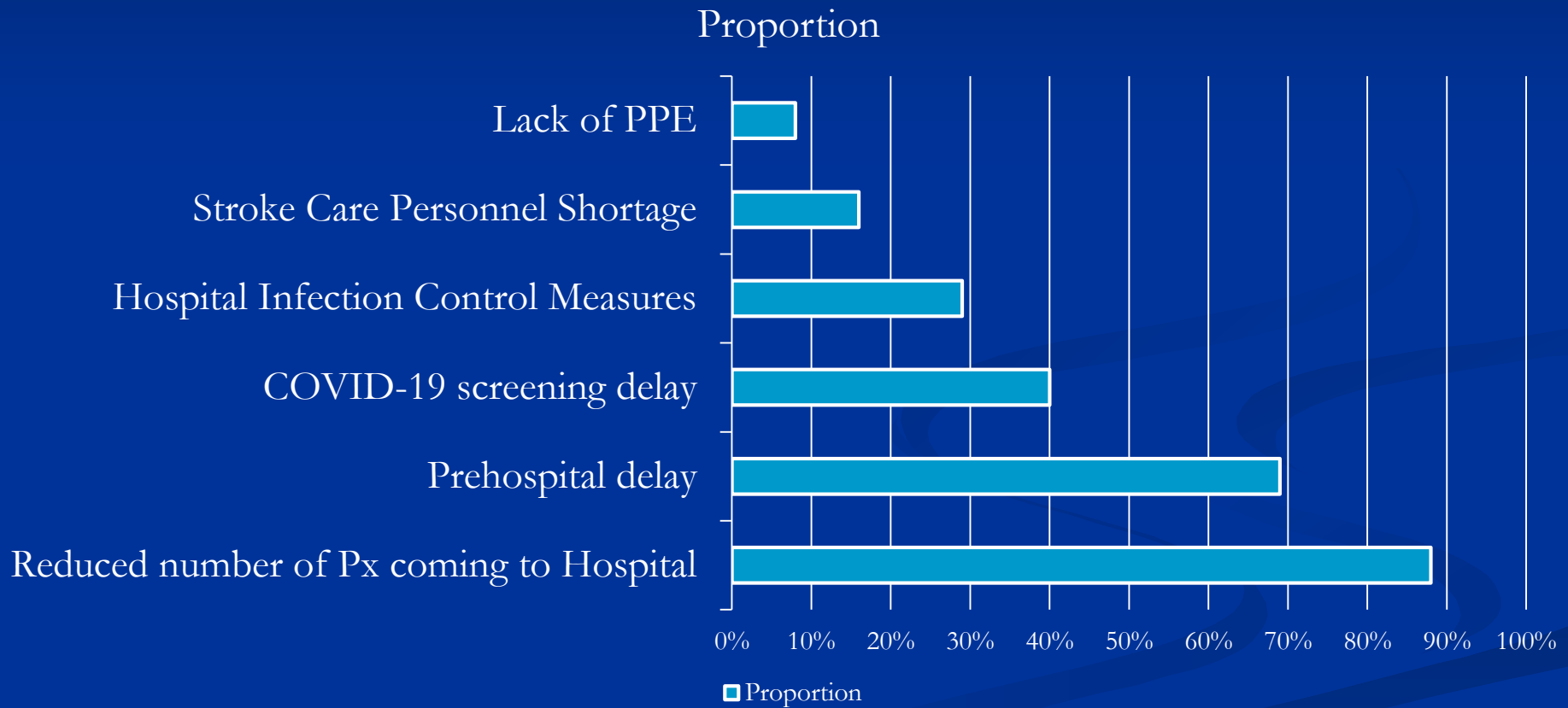
Stroke Numbers during COVID19 Pandemic



Reasons for Hospital Delay and reduced stroke admissions



Reasons for Decreased Thrombolysis/Thrombectomy



Protection of Health Care worker

- Chinese CDC: 44,672 cases, 3.8% HCW
 - 14.8% classified as severe with 5 deaths
- Wuhan Hospital: 138 cases, 29% HCW
 - HCW infected (78% acute inpatient ward, 18% ED, 5% ICU)
- Contact tracing: Patient 1 in China hospital
 - 8 HCW exposed, 6 developed COVID-19
- Netherland study: 6% of HCW tested positive

Asymptomatic COVID-19

	China	Japan	Diamond Princess	Korea	Washington SNF	Wuhan Children	Pregnant Women
Total Number Screened	72,314	565	3,711	28	76	1391	214
Positive Cases	56,128	13	634	28	23	171	33
Asymptomatic Case	889	4	328	3	13	27	29
Incidence Rate	1.6%	30.8%	51.7%	10.7%	56.5%	15.8%	88%

Protecting Provider and Px

- Assume all patients as COVID positive
- Maximum level PPE if supply allows
- Minimize number of staff in room with patient
- PPE
 - Protects provider
 - Protects px
 - Protects OTHER patients
 - Protects other Health care provider
 - Protects provider's family

Supporting Health Care Workers

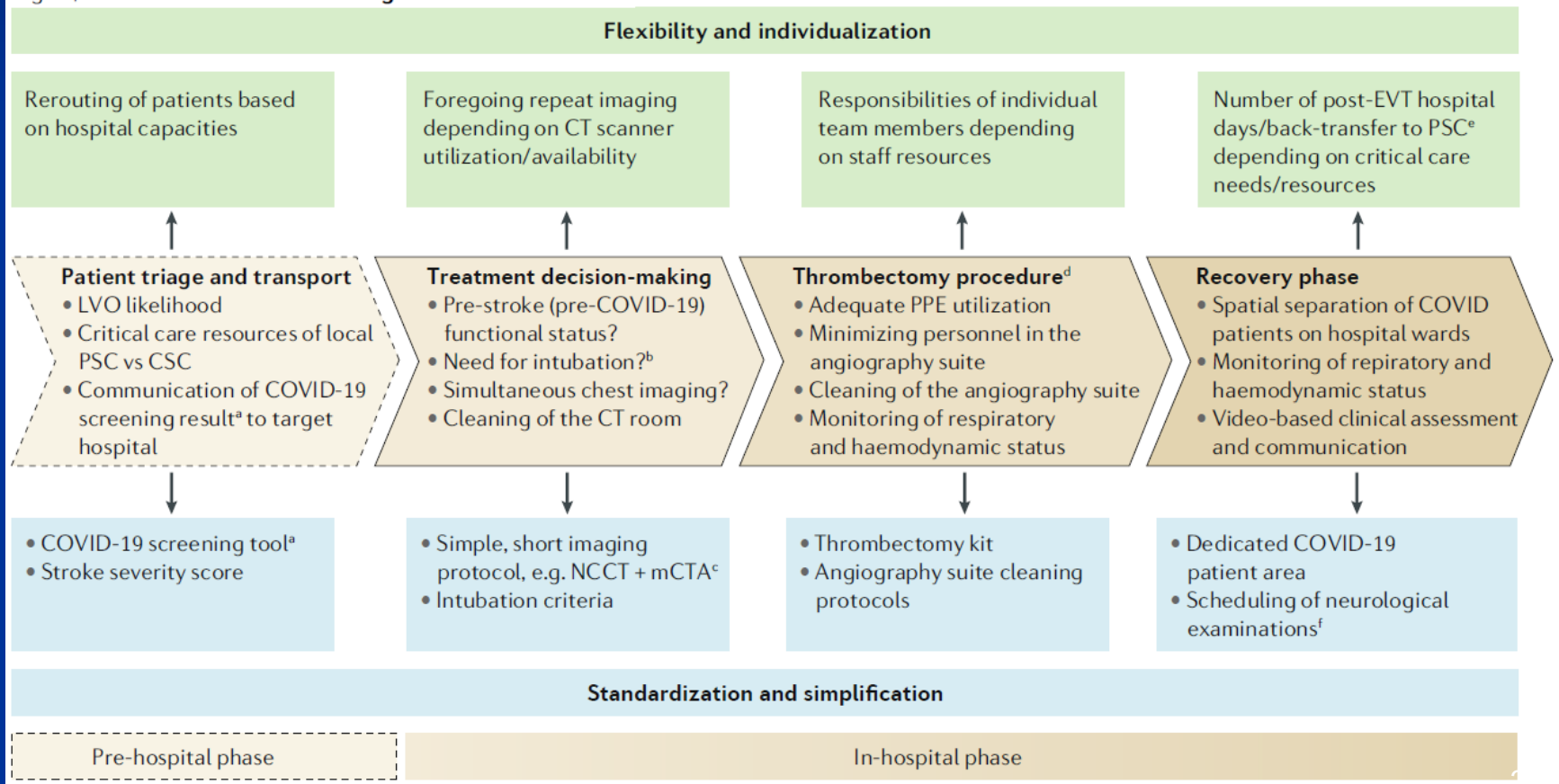
- Health care worker support for relaxation and coping strategies
- Encourage buddy or peer support system
- Providing accommodation/resources in case of the need to self-isolate/quarantine
- Simulation training, coaching for new skills, donning/doffing, protocol training

AHA/ASA Temporary Guidance

- Guideline adherence: Goal vs expectation
- PPE: conservation strategy, limit staff to minimum
- Telemedicine: optimize use
- Health and safety: Handwashing, PPE use, testing/quarantine as necessary
- Teamwork: work collaboratively with others

Process Change: Acute Stroke Treatment Workflow

Fig. 1 | COVID-19-related challenges in EVT workflows.



Patient from the field
(EMS/direct to ED)
Infection Control Screen
POSITIVE and/or
Travel History POSITIVE

Patient transferred from
another facility WITHOUT:
Infection Control Screen
and/or Travel History
Screening

Unclear/Unable to provide
History, ANY
Historical/Exam features
suggestive of alternate
diagnosis

Physician Discretion and Clinical Judgement

Protected Code Stroke

Protected Code Stroke

+ Positive Screen for COVID-19



Pre-notification screening: communication with paramedics or sending facility prior to arrival - Positive infection screen:
patient is exhibiting or has close contacts with infectious symptoms and/or travel history



Unclear or unable to obtain history: patient is obtunded or not able to communicate. History or exam features suggestive of an alternate diagnosis

INSIDE Room		OUTSIDE Room	
MD1	RN1	MD2	Safety Lead
Mask On Patient	RN2/RT (Optional)		
DO NOT use stethoscope (contamination)		<ul style="list-style-type: none"> Safety Lead to monitor PPE All charting OUTSIDE ROOM 	
EXPERIENCED STAFF — MD1 (ATTENDING OR SR. TRAINEE)			
Required PPE (use donning/doffing checklist):			
1. Full-sleeve gown 2. Surgical Mask 3. +/- Head covering (optional) 4. Face Shield 5. Gloves			



Intubate EARLY for increasing O₂ requirements
Airway management for deteriorating patients OR increasing oxygen requirements FiO₂ > 0.5 - Preoxygenate with facemask, with filter, BVM WITHOUT MANUAL VENTILATIONS. AVOID BiPAP, CPAP, Nasal High Flow Therapy



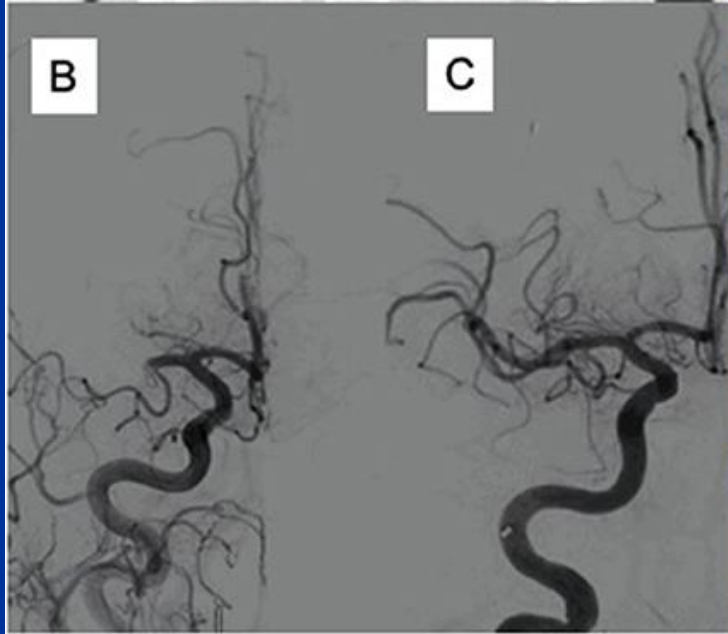
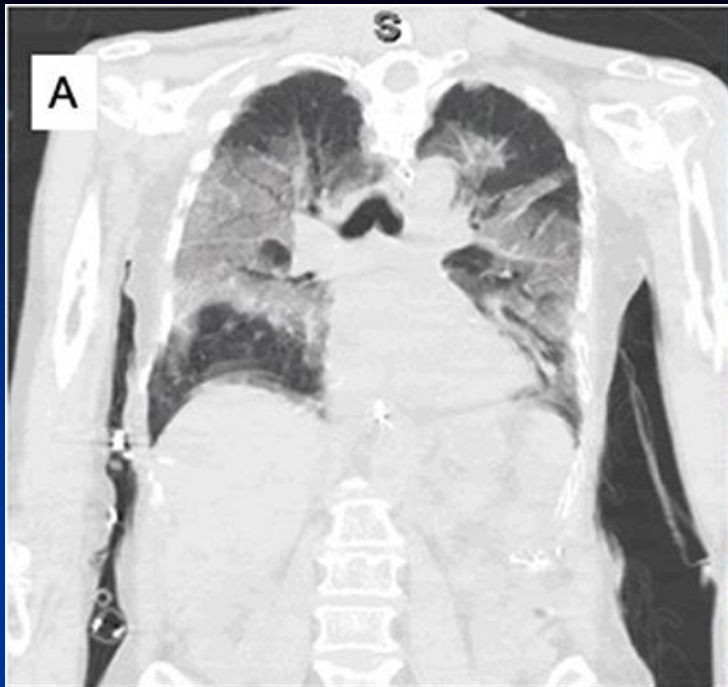
Crisis Resource Management: Role designation and clarity, closed loop communication, optimized team size, avoid cross-contamination

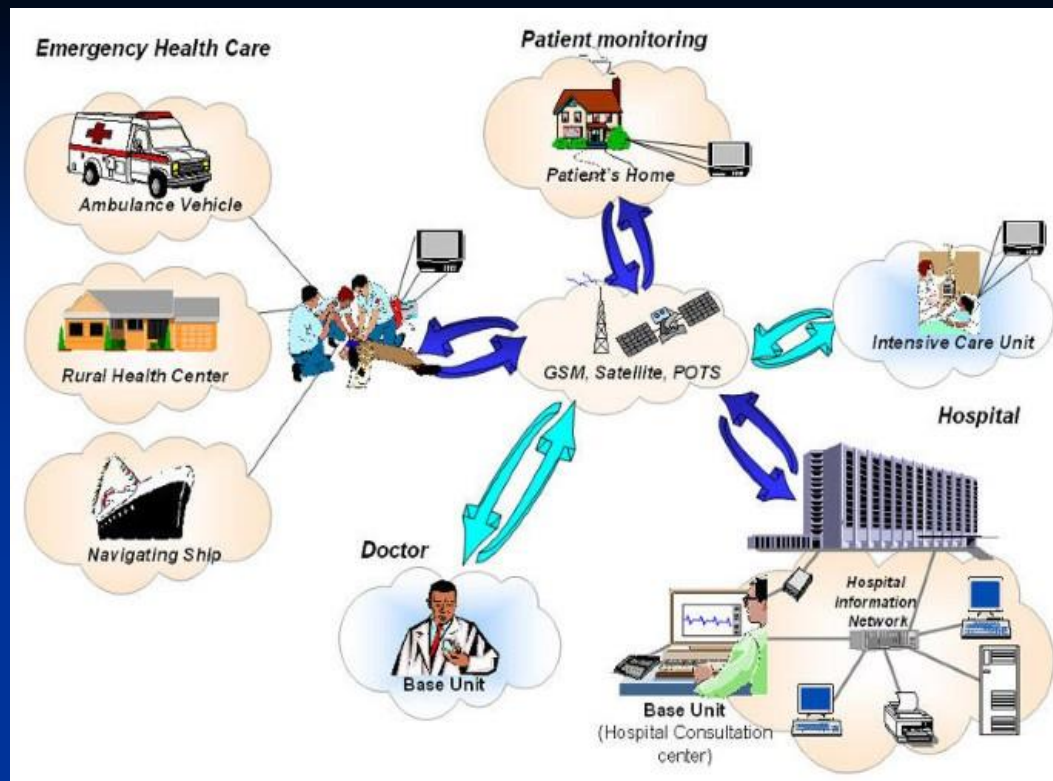
Process change: IV Thrombolysis (IV-TPA)

- Post TPA monitoring
 - Videomonitoring/assessment to minimize staff exposure
 - Abbreviated monitoring protocol in stable patients
 - Admit to non-ICU to preserve capacity

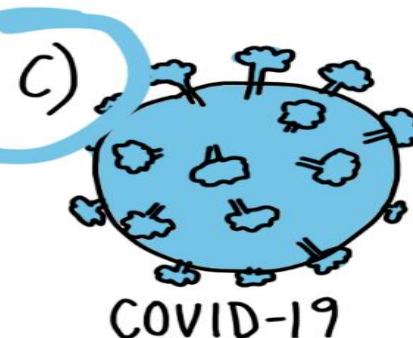
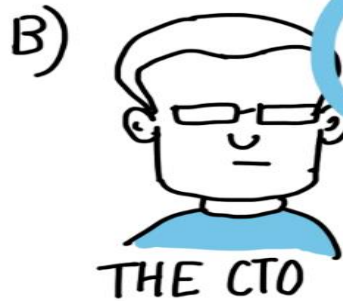
Process Change: Endovascular Therapy (EVT)

- SNACC Consensus Statement, endorsed by SVIN, SNIS, NCS, ESMINT
 - LVO patients should be considered suspected COVID-19 until proven otherwise
 - Enhanced airborne precaution should be maintained
 - Low threshold for intubation/GA for procedure
 - Monitored Anesthesia Care if available
 - Use HEPA filter, negative pressure room if possible





WHO LED THE DIGITAL TRANSFORMATION OF YOUR COMPANY ?





The NEW Normal...

The Vital Importance of Social Distancing

How a reduction in social contact can reduce the spread of the coronavirus



Source: Signer Laboratory/Gary Warshaw



The NEW Normal Part 2...

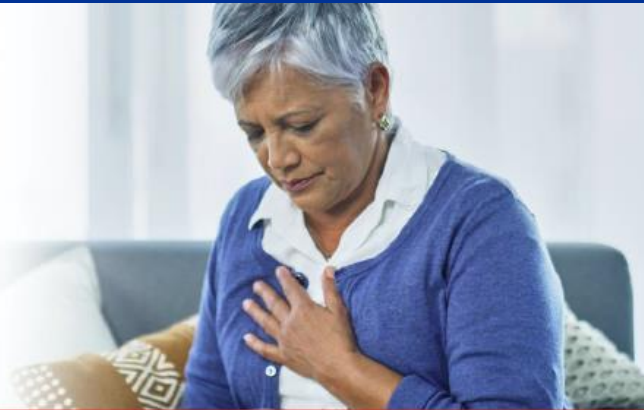




American Stroke Association.
A division of the American Heart Association.

Together to End Stroke®

OPPORTUNITIES FOR STROKE RECOVERY HAVE NEVER BEEN GREATER



Heart Attacks and Strokes Don't Stop During Pandemics.

Call 911 right away if you have symptoms. Even while fighting the coronavirus, emergency systems stand ready to help.

BE A **STROKE HERO**

F

FACE
DROOPING

A

ARM
WEAKNESS

S

SPEECH
DIFFICULTY

T

TIME TO
CALL 911

You don't need superpowers to be a **STROKE HERO**, just know how to spot a stroke



Thank
You

