

COVID-19 and Stroke

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COVID-19 Timeline



- ▶ Dec 8, 2019: First reported patient develops symptoms in Wuhan, China
- ▶ Jan 7, 2020: New COVID-19 virus identified
- ▶ Jan 13, 2020: First case reported outside China
- ▶ Jan 21, 2020: First reported COVID-19 case in the United States
- ▶ February 2020: Peak of COVID-19 hospitalizations in Wuhan, China
- ▶ March 11, 2020: WHO declares COVID-19 as pandemic
- ▶ July 2020: 10 Million Global Confirmed cases
- ▶ Nov 2020: 50 Million Global Confirmed cases
- ▶ Dec 18, 2020: FDA Approves Moderna vaccine



COVID-19 and Relation to Stroke Care

- ▶ Qureshi et al. (Apr 2020) review data from 54 facilities and found that 1.3% of patients infected with COVID-19 developed acute ischemic stroke (AIS), and that AIS patients had significantly higher rates of HTN, DM, HLD, atrial fibrillation and CHF.
 - ▶ Compared to 1.0% of patients without COVID-19 infection that developed AIS.
 - ▶ Noticed low rates of thrombolysis and mechanical thrombectomy in patients with and without COVID-19 infection.
- ▶ Kerleroux et al. (May 2020): Data collected from 32 French MT-capable centers from 2/15/2020-3/30/2020, found 21% decrease in MT volumes and increase in time from imaging to groin puncture of ~18 minutes.
- ▶ Teo et al. (May 2020): Increased onset of symptoms to door time and reduction in number of patients presenting within 4.5 hours (Hong Kong, 1/23-3/24/2020).



COVID-19 and Relation to Stroke Care

- ▶ Nogueira et al. (July 2021): Reviewed data from 187 comprehensive stroke centers spanning 40 countries, 6 continents. Compared data from “height” of pandemic period 3/1-5/31/2020 to the 3 month period immediately prior to pandemic period.
 - ▶ 1.5% stroke rate across >54,000 COVID-19 hospitalizations
 - ▶ Stroke admissions and mechanical thrombectomy volumes declined by 19.2% and 12.7% respectively. Volumes declined more at high volume centers than medium and low volume centers.

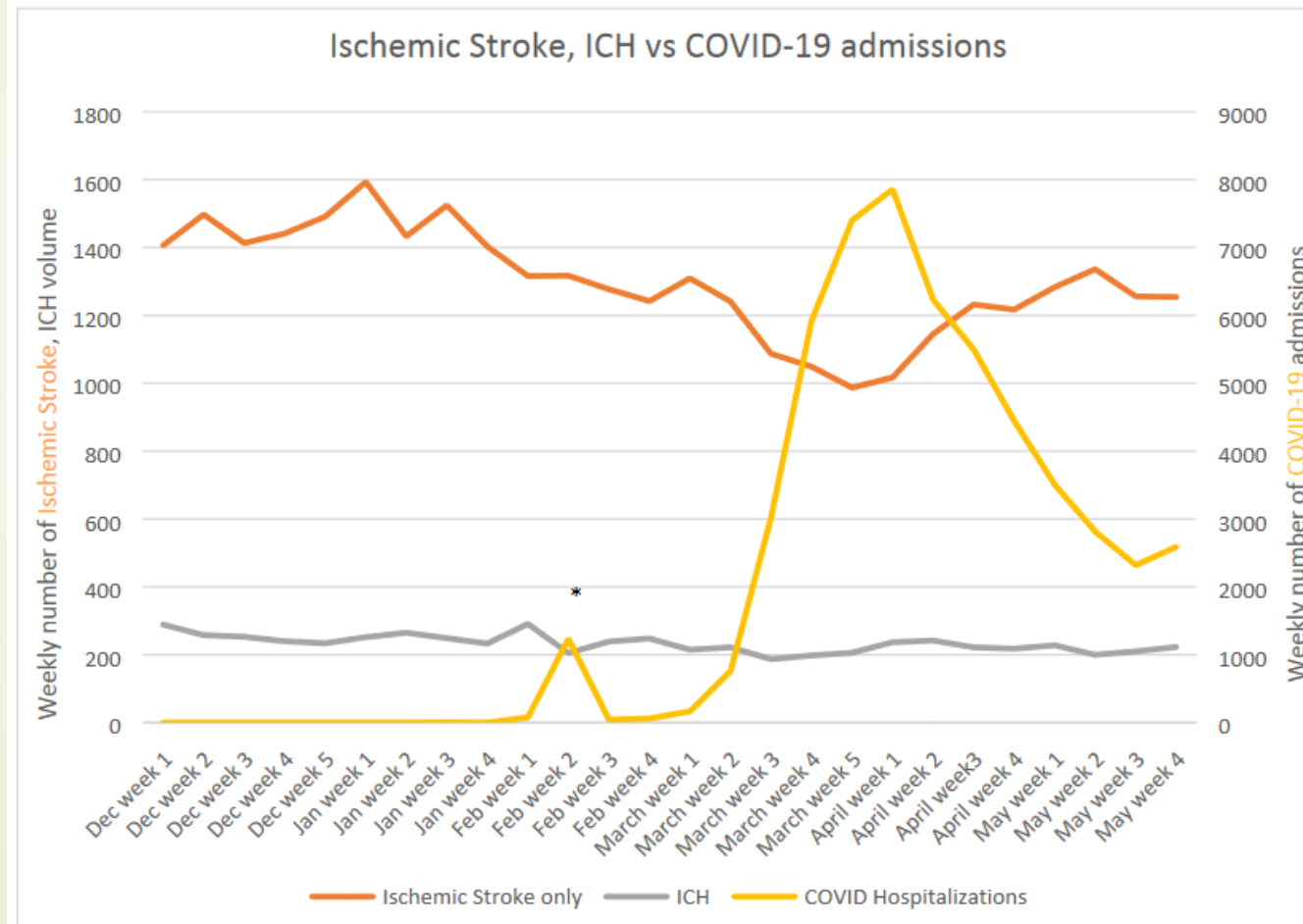


COVID-19 and Relation to Stroke Care

- ▶ Nogueira et al. (Jun 2021): Data from 457 stroke centers spanning 70 countries over the period 3/1-6/30/2020
 - ▶ 13.2% decline in use of IV thrombolytics compared to the 4 month period prior to pandemic
 - ▶ 11.9% decrease in interfacility transfers

Global Stroke Admissions

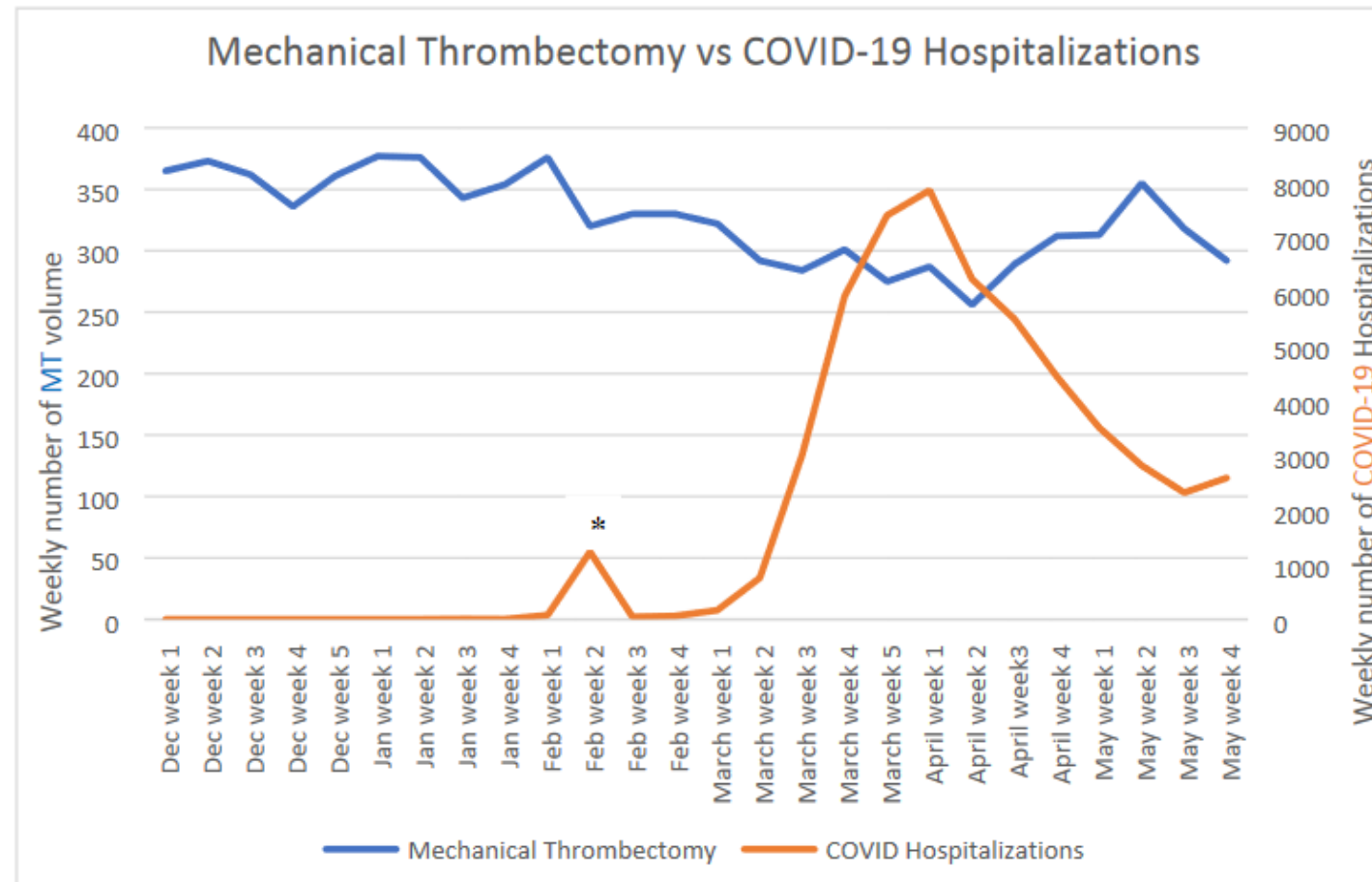
Figure 1. Weekly volume of stroke admissions (ischemic and hemorrhagic) and COVID-19 hospitalizations volumes.



* Peak of 1235 COVID hospitalizations in the second week of February, predominantly from one hospital in Wuhan, China.

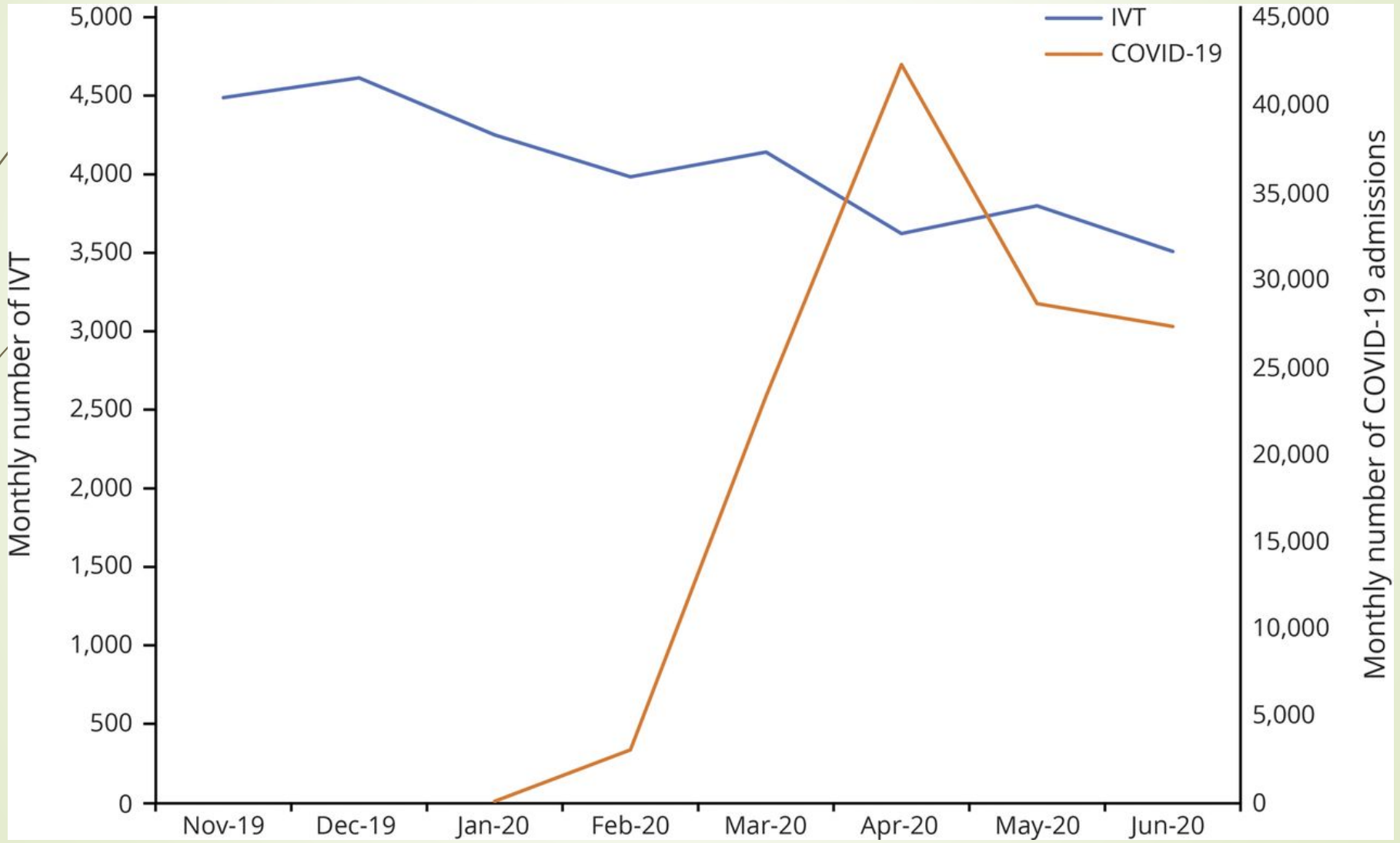
Global Mechanical Thrombectomy Volumes

Figure 2. Weekly volume of mechanical thrombectomy and COVID-19 hospitalizations.



* Peak of 1235 COVID hospitalizations in the second week of February, predominantly from one hospital in Wuhan, China.

Global IV Thrombolysis Volumes



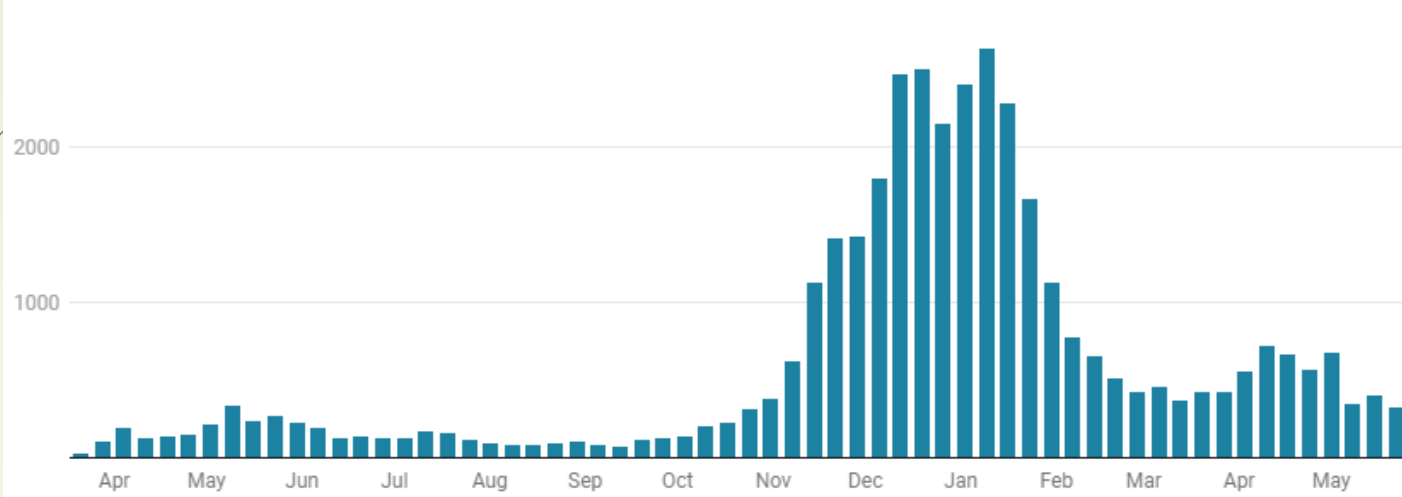


COVID-19 Pandemic: Upstate Experience

- ▶ Caused large changes in service census as well as overall hospital census as the months progressed
- ▶ Unclear what effect widespread social distancing and isolation protocols had on utilization of stroke codes, or subsequent accuracy of those codes

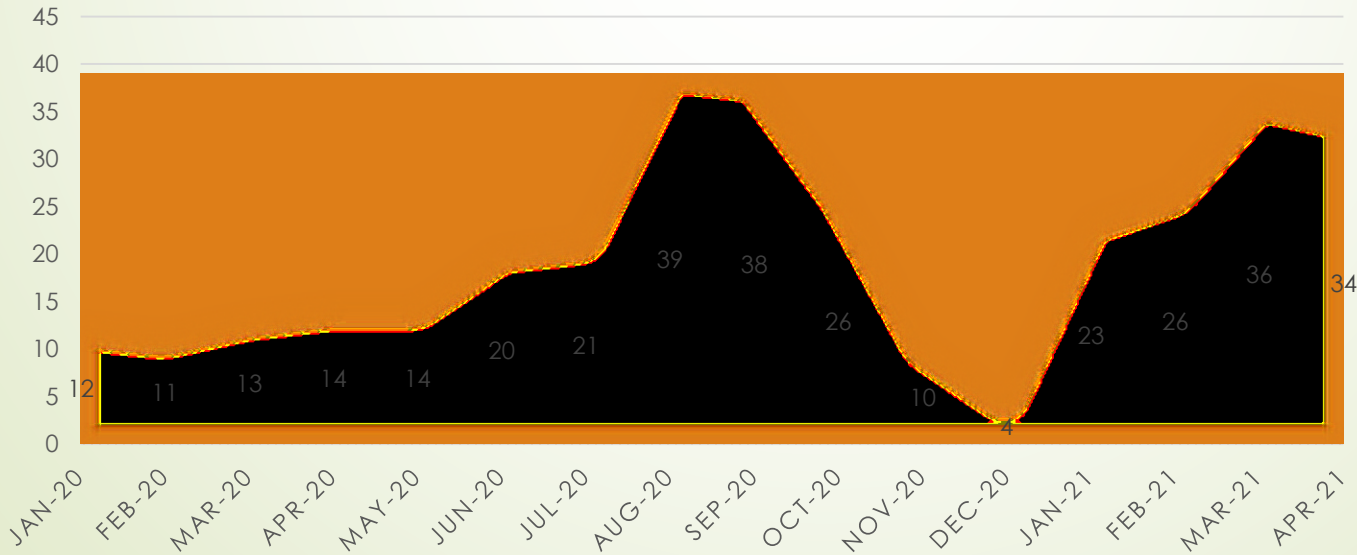
Total Inpatient Stroke Codes 2020-2021

New COVID-19 Cases By Report Week



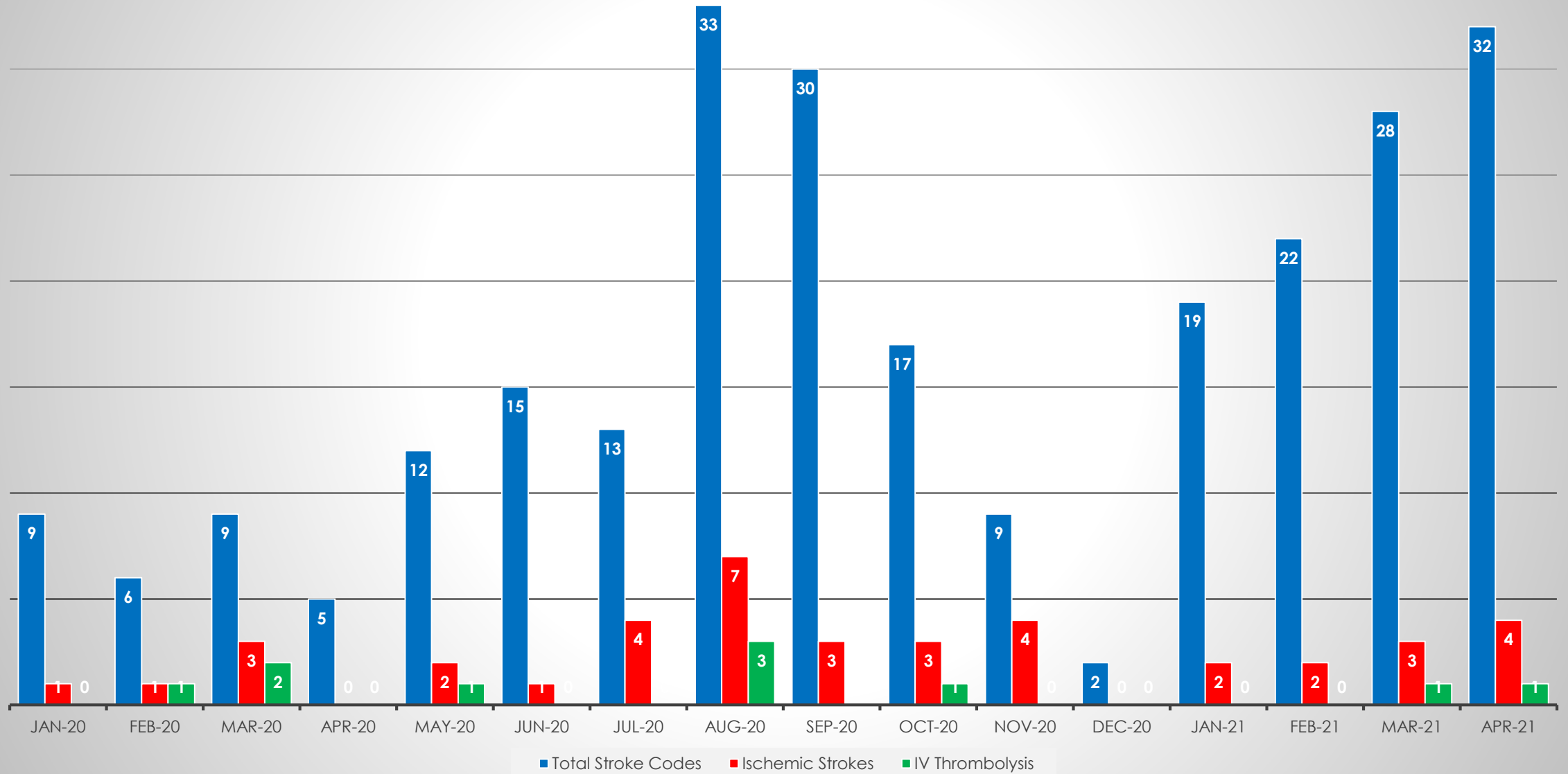
Report week is the week new cases were reported by the Onondaga County Health Department. Data are presented in the graph by the last date of each report week. Updated weekly, last update: 5/25/2021

INPATIENT STROKE CODE VOLUME




Results

Inpatient Stroke Code Analysis

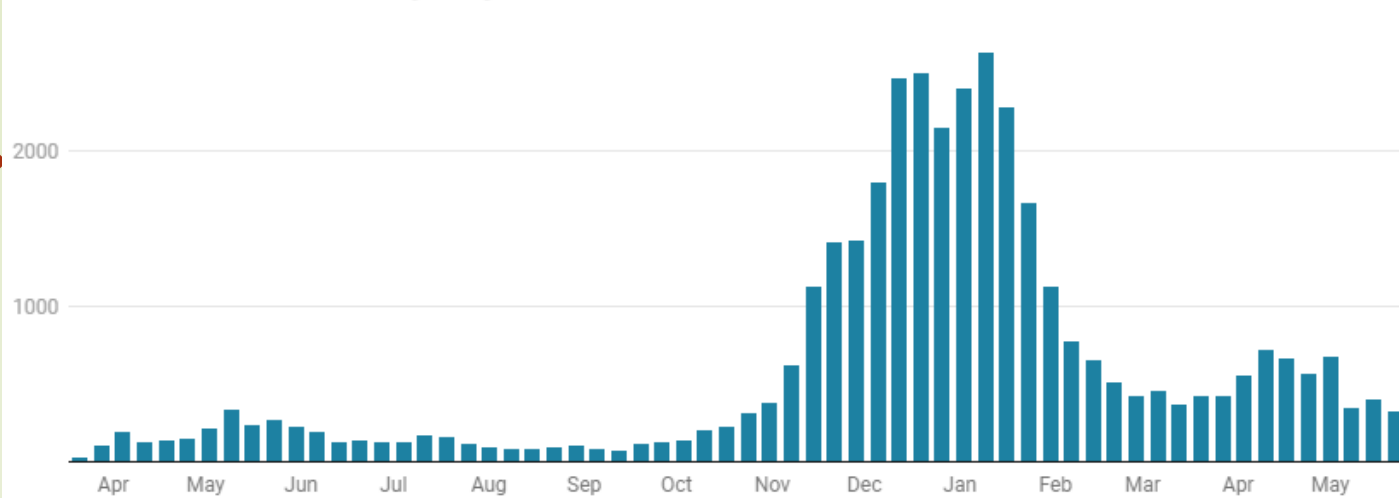




Upstate Inpatient Stroke Code Results

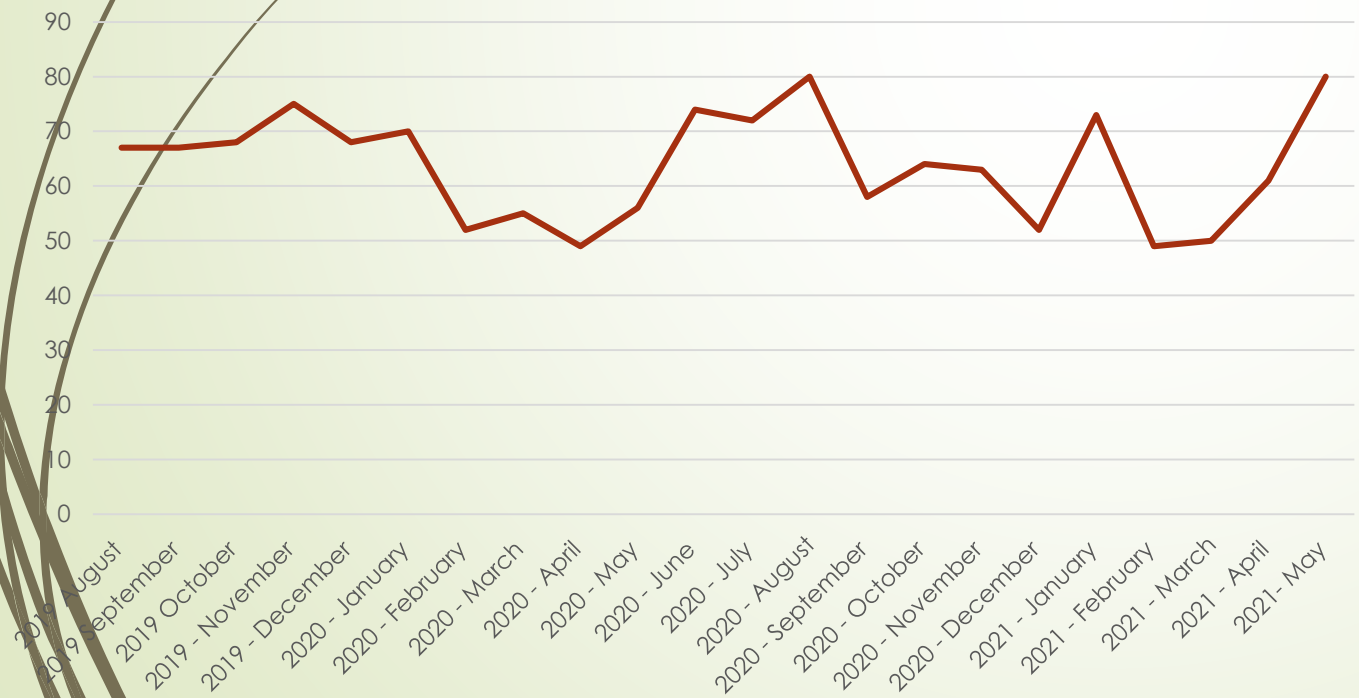
- ▶ 261 total stroke codes, 40 ischemic strokes (15.3%), 10 received IV alteplase (3.8%)
 - ▶ Overall, accuracy of initiated stroke codes for ischemic stroke was similar to that in 2019 (14.5%).
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New COVID-19 Cases By Report Week



Report week is the week new cases were reported by the Onondaga County Health Department. Data are presented in the graph by the last date of each report week. Updated weekly, last update: 5/25/2021

Upstate Stroke Admissions



- 15.8% decline 3-6/2020, compared to prior to 3 months (160 vs. 190)
- 13.9% decline 10/20-2/21, compared to prior 4 months (236 vs. 274)



Conclusions



- ▶ COVID-19 Pandemic period associated with:
 - ▶ Decrease in overall stroke admissions
 - ▶ Decrease in mechanical thrombectomy volumes
 - ▶ Decrease in IV thrombolytic usage
 - ▶ Decrease in interfacility transfers
- ▶ Reason for the decrease in volume are unclear, but possible explanations can include:
 - ▶ Reduced disease burden/increased medication compliance?
 - ▶ Reduced peri-operative stroke volumes?
 - ▶ Social distancing leading to more unwitnessed strokes?
 - ▶ Less overall assessments on hospitalized patients?



Future Directions



- ▶ Long-term effects of COVID-19 infection remain to be seen
- ▶ Follow-up studies to assess long-term stroke risk for COVID-19 patients
- ▶ Follow-up studies to assess for development of cerebrovascular risk factors (e.g. atrial fibrillation)
- ▶ Improvements to care system:
 - ▶ Facilitate more rapid screening for infections and improving interfacility transfer process to reduce times so patients can receive timely therapies/interventions
 - ▶ More stroke outreach and community education programs to increase awareness of stroke to try to reduce number of unwitnessed strokes and reduce number of patients presenting out of treatment window



References



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- ▶ Teo KC, Leung W, Wong YK, et al. Delays in Stroke Onset to Hospital Arrival Time During COVID-19. *Stroke*. 2020 May 20. 51(7).
- ▶ Our World in Data via Johns Hopkins University
- ▶ Onondaga County Health Department: COVID-19 Data and Reports: <https://www.covid19.ongov.net/data>. Accessed 5/29/2021.
- ▶ Special thanks to Josh Onyan and Michelle Vallelunga for providing the data for our Upstate review.