Use of CEDR Big Data for Elucidating COVID-19's Impact on Emergency Care

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What is CEDR?

- The American College of Emergency Physicians' (ACEP) Clinical Emergency Data Registry (CEDR) is the **first Emergency Medicine specialty-wide registry**.
- Captured multiple data streams to calculate quality measure scores for reporting to CMS.
- Accumulated **75+ million visits** from **30+ million patients** since 2015.
- Leveraging big data to bridge knowledge gaps & democratize analytics relevant to emergency medicine

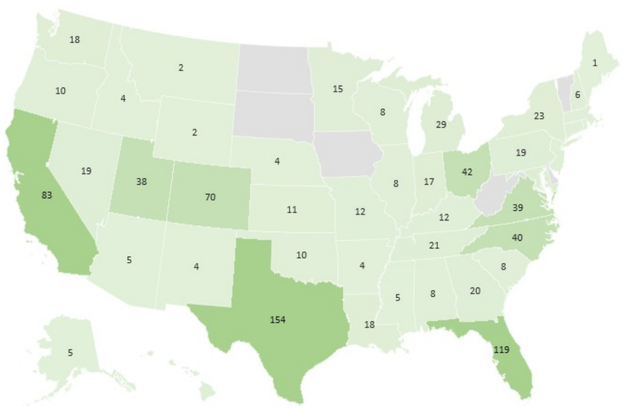

Figure 1. Map of CEDR Participants in 2020. n=990.

* Janke, AT, Jain, S, Hwang, U, et al. Emergency department visits for emergent conditions among older adults during the COVID-19 pandemic. *J Am Geriatr Soc*. 2021; 1–9. https://doi.org/10.1111/jgs.17227

† Venkatesh, AK, Janke, At, Li, S, et al. Emergency Department Utilization for Emergency Conditions During COVID-19, *Ann Emerg Med.* 2021;1–8. https://doi.org/10.1016/j.annemergmed.2021.01.011

Collecting CEDR Data

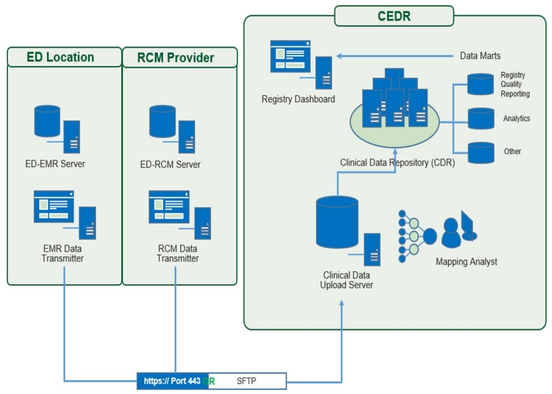

Figure 2. CEDR Data Collection and Warehousing.

- Data are collected on a site-by-site basis with site-specific timelines. This can result in a short data lag.
- All data are normalized before being pushed into the Clinical Data Repository to be queried.

Querying Database for COVID-19 and Emergency Conditions

Queries performed against **164 emergency departments (EDs) in CEDR, across 2019 and 2020**. All data are a combinations of revenue cycle management and electronic health record data feeds.

- Site Location
- All Visits
- Diagnoses (ICD-10-CM)
  - AMI, CVA, DVT, stroke, sepsis, fall, hip fracture
- Patient Disposition
- Patient Demographics
- Patient Insurance
- COVID-19-like Orders

Use Case: ED Visit Surveillance During the COVID-19 Pandemic

Cleaning Query-level:
- Excluded all inactive data streams.
- Excluded sites where EHR feeds were not normalized or complete.

Additional cleaning at the Yale analytics-level
- Nonparametric Smoothing (LOWESS)
- Poisson Regression Modelling
- Incident Rate Ratios (IRRs)

Retrospective Findings

Nationwide

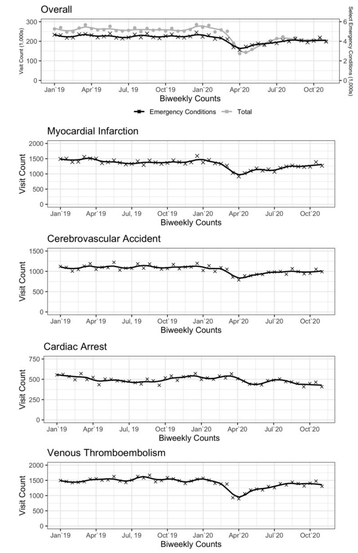

Figure 3. Total and select emergency condition biweekly ED visit counts.†

The decline in ED visits for these time-sensitive conditions suggests COVID-19 may continue to impede patients from seeking essential care.†

In Older Adults (40+)

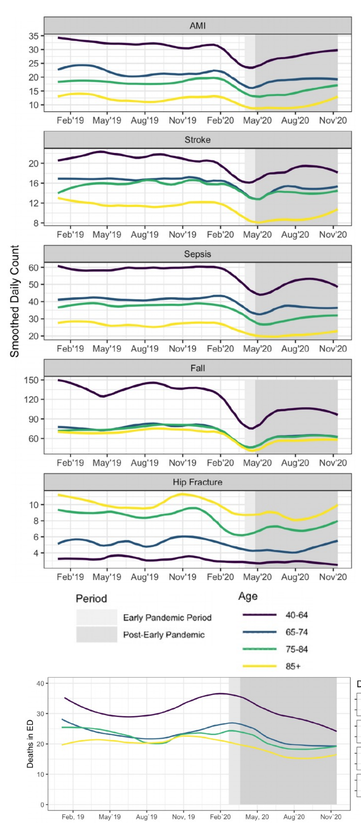

Figure 4. ED visit counts for select conditions by age category.*

The decline in ED visits for emergent conditions in older adults might explain excess mortality seen nationwide during the COVID-19 pandemic.*

Figure 5. Emergency department (ED) deaths in ED, counts, and incident rate ratios by age. Smoothed daily counts for deaths in ED are reported by age category.*