Urban/Rural Inequalities in the COVID-19 Pandemic

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Unique Issues in COVID-19

• Caused by infection of the novel beta-coronavirus, SARS-CoV 2, started in December 2019, Wuhan, China

• Every one is susceptible to the virus infection

• Higher risks of hospitalizations and deaths among elderly (people aged 65 or above), or people with underlying chronic conditions
  • More than 50% hospitalizations and 80% deaths were elderly
  • Outbreaks in nursing homes, senior living residencies and congregations

• More cases in men than women

• Majority of cases were in urban areas, but rising number of cases in rural areas
Methods

• Data sources:
  • Line list file of individual COVID-19 cases from Florida Department of Health
  • Metropolitan status, population structure by age and gender for each county from US Census Bureau

• Statistical analysis:
  • Epidemic curve fitted with a negative binomial model
  • Adjusted incidence of COVID-19 with Poisson regression
  • Adjusted rates and odds ratios of emergency department (ED) visits, hospitalizations, and deaths with logistic regressions

• Data and codes are available at
  • https://www.github.com/xinhuayu/
Overview

• Population in FL: 21.5 million people, 20.5% are elderly people (people aged 65 or above)

• As of May 27, 2020, 53,176 total COVID-19 cases
  • 25.7% were elderly

• Total 10,056 hospitalizations
  • 54.3% were elderly

• Total 2,446 deaths
  • 83.4% were elderly
Epidemic Curves by Age Groups, FL
Epidemic Curves among Elderly People by Metropolitan Status, FL
Distributions of Elderly COVID-19 Cases by Metropolitan Status

Metro Status
- Large: 69.5%
- Medium: 22.7%
- Small: 4.5%
- Rural: 3.3%
Adjusted Incidence (per 1,000) of COVID-19 among Elderly People across Metropolitan Status

*: p<0.01 compared with large metropolitan area
Adjusted Rates (per 100) of Emergency Department Visits among Elderly Patients

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*: p<0.01 compared with large metropolitan area
p for trend <0.01, for all groups
Adjusted Rates (per 100) of Hospitalizations among Elderly Patients

*: p<0.01 compared with large metropolitan area
p for trend <0.01 among women aged 75+
Adjusted Rates (per 100) of Deaths among Elderly Patients
Adjusted Hospitalization Rates by Counties, FL

Predicted hospitalization rate:
- <10%
- 10-20%
- 20-40%
- 40-60%
- >60%
Conclusions

• Most COVID-19 cases in US Florida were in large or medium size metropolitan areas
• Elderly people in small metropolitan areas had lower incidence of COVID-19, while those in rural areas had higher incidence than those living in large metropolitan areas
• Elderly patients in small metropolitan and rural areas had lower rates of ED visits and hospitalizations than those in large metropolitan areas
• Elderly men had higher rates of ED visits and hospitalizations than elderly women
• Elderly women aged 75 or above in rural areas had higher incidence of COVID-19 but significantly lower rates of ED visits and hospitalizations than those in large metropolitan areas
Limitations and Future Research

• Florida data only
• Testing capacity limits case diagnosis
• Limited health care resources in small metropolitan and rural areas
• Unknown timing from symptom onset to ED visits/hospitalizations/deaths
• Comorbidities
• Other socio-demographic characteristics
• Change of inequalities over time
• Inequalities across different regions
Full Report

• Yu X. Urban and rural inequalities among elderly patients during the COVID-19 epidemic in Florida, US

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• Any comments? Please email: xyu2@memphis.edu

Thank You!