Association of Age-Specific 2020 Florida COVID-19 Rates With Population Age Distribution and Presidential Preference

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ABSTRACT

Objective: To assess whether county age distribution is associated with age-specific COVID-19 infection, emergency department, hospitalization, and mortality rates.

Design: Florida's 2020 COVID-19 cases are summarized into age-specific county rates and supplemented with socioeconomic and demographic characteristics and 2020 presidential voting results to assess the association of population age structure and political choices with age-specific COVID-19 infection, emergency, hospitalization, and mortality rates.

Results: Younger counties experienced higher under-25 infection rates, as well as higher over-64 infection, emergency, and hospitalization rates. Older counties experienced reduced infection rates for all ages and decreased over-64 emergency and hospitalization rates. Trump's vote share was associated with higher infection rates for all and higher over-64 emergency, hospitalization, and mortality rates.

Conclusions: Younger counties experience higher COVID-19 infection rates for all residents, with elevated morbidity risks among seniors. Older counties had lower COVID-19 infection, emergency, and hospitalization rates. Age-specific messaging may help slow pandemic spread.

KEY WORDS: COVID-19, political affiliation, population age structure

Florida has recorded 1.3 million COVID-19 infections and 21 000 associated deaths through December 2020.[1] The elevated hospitalization and mortality age-associated risks pose an amplified threat in a state with one of the highest proportions of older residents.[2] Furthermore, the 4.3% infection rate among Floridians younger than 25 years is 33% higher than national averages.[3] This volatile combination makes the state home to one of the most infected younger population cohorts, with one of the larger concentrations of older, more vulnerable populations.

As one of the most popular retirement destination states, Florida has the second highest level of age segregation, with many older residents living in generationally isolated retirement communities.[4] Although the reduced COVID-19 replication rates in such enclaves[2] might be a sign of the kind of insulation most helpful to those at a highest risk of bad outcomes once infected, such protections appear ineffective. A study of COVID-19 infection dynamics through June 2020 in Florida's largest counties found strong evidence that "estimated cross-infection effects of young persons on older persons dominated the [protective] within-older group transmission effects," though found no evidence of reciprocal downward transfers.[5]

Having affirmed the Republican presidential candidate in both 2016 and 2020, politically associated health behaviors hold continued relevance in Florida, where a disproportionate share of that support came from older voters[6] and where that Republican vote share is positively associated with infections and deaths.[2] Even during quarantine periods, phone location patterns show mobility was not reduced in counties with higher pro-Republican vote shares.[7]

This study explores COVID-19 infection, emergency department (ED), hospitalization, and mortality rates by age cohort, assessing the potential influence of intergenerational effects and political preferences.

Design

Individual cases of COVID-19 infection, ED, hospitalization, and mortality reported through December

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15, 2020, are copied from "Florida's COVID-19 Data and Surveillance Dashboard," the state's official data source reported to the Centers for Disease Control and Prevention.[1,3] Outcome rates per 100 000 are computed in total and by age cohort (0-24, 25-64, 65+ years) for each county. Taking advantage of natural variations in cohort proportions, voting results, and other core determinants such as poverty, vaccination, and race, this ecological study leverages these independent variables to identify county-level relationships.

To test intergenerational transmission hypotheses, regressions measure the strength of relationship between population proportions under-25 with infection and outcome rates among those older than 64 years and between population shares over-64 with outcomes under-25. 2020 presidential election results are included in models to measure the possible moderating influence of political preferences. Employing similar variables and techniques used in other pandemic studies set at the same county-level unit of analysis, OLS regression models the county-level data, with standard errors allowing for heteroskedasticity.[2,5,7,8] Analysis was conducted using Stata v16.1. Institutional review board review was waived as all data were obtained from publicly available data sets.

Results

Based on the 1 140 643 COVID-19 cases reported through December 15, 2020, higher under-25 population proportions and higher levels of Republican voter preference were associated with higher COVID-19 rates while higher over-64 proportions were associated with lower rates. With variable scaled to make regression coefficients read as the effect of a 1% change in the independent variable on outcome rates per 100 000, the Table, Panel A, summarizes key results. Principally, each 1% increase in the under-25 population proportion is associated with 119 more infections per 100 000 overall and 70 more infections within their own age cohort. (Not shown, the proportion under-25 had no association with intracohorts ED, hospitalization, or mortality rates.) Intergenerationally, that same 1% increase in the under-25 population is associated with 102 more infections, 30 more ED visits, and 28 more hospitalizations per 100 000 among those older than 64 years.

TABLE
Association of Age-Specific 2020 Florida COVID-19 County Rates With Population Age Distribution and Presidential Preference[a]

	Dependent Variable					
Model, Dependent Variable	**Infection Total**	**Infections/100k: Age Under-25**	**Infections/100k: Age 65 y + Over**	**Emergency /100k: Age 65 y + Over**	**Hospitalization /100k: Age 65 y + Over**	**Deaths /100k: Age 65 y + Over**
Panel A. Outcome ~ core determinants and						
% Population under-25	119[b] (56)	70[c] (25)	102[b] (40)	30[b] (12)	28[c] (9)	11 (6)
% Republican presidential vote	− 88[c] (31)	− 51[d] (14)	− 75[c] (23)	− 22[d] (6)	− 16[c] (5)	− 7 (4)
Panel B. Outcome ~ core determinants and						
% Population 65 y + over	101[d] (26)	6 (16)	144[d] (27)	26[c] (9)	17[b] (7)	18[d] (5)
% Republican presidential vote	98[d] (26)	4 (16)	140[d] (26)	25[c] (9)	15[b] (7)	18[d] (5)

[a] *The table contains results of OLS regression with standard errors using models that also adjust for demographic and socioeconomic characteristics: poverty, proportion foreign born, high school graduation percent, flu vaccination rates among Medicare enrollees, proportion of population by age cohort (0-24, 25-64, 65+ years), the proportion under the age of 65 years without health insurance, adult smoking rates, and presidential election vote totals for 2016 and 2020 presidential elections. Data are drawn from the American Community Survey, County Health Rankings, the Behavioral Risk Factor Surveillance System, the Florida Department of State, the Florida Department of Health, and the Centers for Disease Control and Prevention. Standard errors in parentheses.*

[b] $P < .05$.

[c] $P < .01$.

[d] $P < .001$.

The story is flipped for the over-64 population proportion (Table, Panel B), with each 1% increase in population proportion associated with 88 fewer infections per 10 000 overall, and within their own age cohort, 75 fewer infections, 22 fewer ED visits, and 16 fewer hospitalizations. Intergenerationally, that same 1% increment in the over-64 population is associated with 51 fewer under-25 infections.

In addition to overall higher infection rates, the level of 2020 Republican support is associated with elevated infection, ED, hospitalization, and mortality rates among those older than 64 years. These effects are drawn from models that incorporate age cohort populations and other explanatory variables, so do not simply reflect the fact that Republican voters are generally older.

Discussion

Study findings demonstrate strong intra- and intergenerational effects. While it has been known that under-25 populations have the highest infection rates nationwide and within Florida,[1] findings indicate those rates are higher still in younger counties with higher cohort population shares. As the age group with most social connections, this generation might be most prone to such within-cohort amplification. The elevated over-64 infection, ED, and hospitalization rates in counties with proportionately more under-25 proportions, although not direct evidence of intergenerational transfer, do show that older people are at a higher risk in younger counties.

In areas with larger over-64 proportions, that cohort's lower infection, ED, and hospitalization rates might reflect smaller social circles or the increased precautions of an older population more mindful of their own morbidity and mortality risks. Indeed, without infection from other age cohorts, the reproduction rates among older populations might not even sustain the pandemic.[5] The reduced infection rates in under-25 populations in such counties might be interpreted as intergenerational beneficence or the result of higher proportions of older cohorts mathematically crowding out other cohorts.

In addition to its association with higher infection, ED, and hospitalization rates for over-64 cohorts, 2020 voter preference is the only county characteristic strongly related to COVID-19 mortality rates. The pandemic might serve as an alternate expression of the deaths of despair already found in these counties,[2] with risks amplified by the lax precautions encouraged in political messaging.[7]

This analysis has some limitations. Although it cannot be determined whether intergenerational effects were due to direct transmission between age groups, or intracohort reproduction rate changes, the evidence indicates that the age distribution of county populations is associated with outcome levels. As a community-level analysis, findings hold relevance to the county as a group and should not be inferred as relevant to individuals. For example, it cannot be determined whether individual infection was more likely due to personal age or voting preference, only that county-level COVID-19 outcomes were associated with county vote tallies and age compositions. Although limited to a single state's experience, all counties are using the same counting standards, ensuring the comparability required for statistical analysis. Finally, intercounty comparisons ignore differences in age segregation, voting patterns, and other subtleties among population groups within counties.

Implications for Policy & Practice

- Infection prevention is the most effective way to reduce elderly COVID-19 mortality.[8] Florida's exceptionally high infection rates in under-25 populations[1] work through intergenerational effects demonstrated in this study, placing senior lives at elevated risk.
- The politicization of fundamental preventive practices compounds those threats, seemingly ignoring the ageist implications of state government policies that disproportionately impact seniors.
- By identifying the elevated risk to seniors living in counties with higher under-25 population proportions and voting preferences, this study informs public health resource allocation and vaccine distribution decisions. It gives direction to local health departments regarding when and where information campaigns, vaccination drives, and policy enforcement will have the greatest effect. Employing audience- and age-specific messaging[9] focused on groups with elevated infection propagation rates could reduce COVID-19 infections and deaths for all, minimizing the economic and human costs of the pandemic.

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