COVID-19 for Vulnerable Populations: Evolving Impacts among Affordable Housing and Nursing Home Residents

TEXAS A&M UNIVERSITY College of Architecture
TEXAS A&M UNIVERSITY School of Public Health
Xuemei Zhu, Marcia Ory, Chanam Lee, Texas A&M University

innovationX

BACKGROUND

- The COVID-19 pandemic has brought unprecedented challenges to our society, and disproportionately affected vulnerable populations.
- **Affordable housing residents** represent a high-risk group as they are more likely to live in compact housing, work in high-risk professions, and have pre-existing health conditions and limited access to quality healthcare (Benfer et al., 2020).
- **Nursing home facilities** have become hotspots for COVID-19 infections and mortality due to the vulnerability of their residents. As of January 17, 2021, there were 570,626 resident cases of COVID-19 and 112,383 related deaths in nursing homes in the US (CMS, 2021).

METHODS

1. **Part 1 is a cross-sectional study of affordable housing residents** in Austin, TX, that explores the impacts of living environments on residents' physical activity and health, before and during the pandemic.
2. **Part 2 is a cross-sectional study of nursing homes** using national datasets to examine the extent of COVID-19 infections and mortality, and how facility attributes associated with these outcomes.

CONCLUSIONS

- **Affordable housing study:** Housing and neighborhood environments play significant roles in residents' physical activity and health. The pandemic has made housing stability and neighborhood amenities even more critical for low-income, affordable housing residents.
- **Nursing home study:** The COVID-19 pandemic is a sobering reminder about the importance of addressing infecting control in the design, planning, and management of nursing home facilities.
- **Looking ahead**, as the nation continues to navigate and cope with the pandemic, it is crucial to provide environmental and policy support for vulnerable populations living in affordable housing and nursing homes. Long-term efforts are needed to ensure the resilience of these residents and their housing facilities.

FINDINGS

Affordable Housing

IMPACTS OF LIVING ENVIRONMENTS ON RESIDENTS' PHYSICAL ACTIVITY & HEALTH

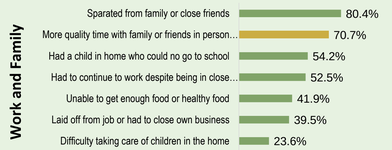
- Higher WalkScore is associated with increased recreational walking.
- Higher crime rate is associated with reduced total physical activity, reduced recreational walking, and poorer overall health.
- Social support is important for both physical activity and health.

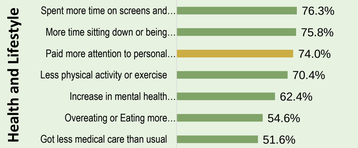
Table 1. Coefficient from three regression models

Variables (Type of variable)		MVPA	Recreational walking	General health
Personal factors	Age (Continuous)	-1.856	-1.607	-0.002
	Sex (Female = 1) (Binary)	-47.308	-41.165	0.074
	Non-Hispanic White (Ref.: Hispanic)	5.095	-5.834	-0.072
	Non-Hispanic Others (Ref.: Hispanic)	-45.479	-48.879	0.141
	Poverty (Binary)	166.423**	59.845	-0.164
	Car ownership (Binary)	-54.915	-36.027	0.198
	Obese (BMI>=30) (Binary)	-50.679	-50.803	-0.469**
	Family size (Continuous)	-21.439	-4.001	0.010
Housing type (Ref.: apt.)	Single family or duplex	56.120	-21.273	-0.042
	Studio	162.614*	181.728*	0.010
Neighborhood physical environment	Street connectivity (Factor)	-44.232*	-23.583	-0.207*
	Place for walking and bicycle (Factor)	-	-	-0.099
	Access to services (Factor)	-	-42.292†	0.330**
	Perceived high crime rate (Ordinal, 1-4)	-76.965**	-44.977*	-0.172*
	Too much traffic (Ordinal, 1-4)	-	26.029	-
	Free from litters (Ordinal, 1-4)	17.407	29.095	0.154
	WalkScore (Continuous)	2.679†	4.054**	-
Social Environment	Physically active neighbors (Ordinal, 1-4)	-	61.843**	-
	Friends/family encourages PA (Factor)	69.194**	50.380**	0.238**
	Social activity (Factor)	58.524**	60.565**	0.153*
Adjusted R-Square (Cox & Snell R-Square)		*0.264*	*0.372*	*0.303*

EXTENT OF COVID-19 IMPACTS

- The pandemic had significant impacts on affordable housing residents' work, family, and personal health, (see below). Their limited socioeconomic resources tend to exaggerate COVID-19 related challenges.





ROLES OF LIVING ENVIRONMENTS IN COPING PROCESS

- **Losing access to neighborhood amenities (e.g., playgrounds, parks)** and **crowded living space** are significant environmental barriers, confounded by the **challenges of taking care of children** during the pandemic.

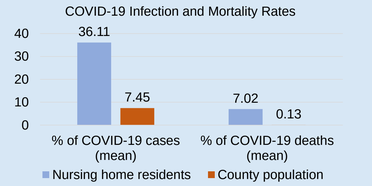
Barriers
- No regular **maintenance**
- Partial or complete **park closure**
- **Apartment crowding**
- **Fear of infection** in public spaces
- People **not wearing masks**

Facilitators
- Outdoor **exercise** equipment
- **Rental assistance** from apartments
- Easily accessible **food pantry**
- Information on **healthy practices** to deal with COVID-19 from management

Nursing Homes

EXTENT OF COVID-19 IMPACTS

- Nursing home residents have extremely higher infection and mortality rates, compared to the whole population in their county.



Note: The percentage is calculated as the number of COVID-19 cases/deaths out of total bed capacity in the facility.

ROLES OF FACILITY FACTORS

Factors associated with LESS cases (C) / deaths (D):
- Overall quality measure rating (C/D)
- Adjusted RN staffing hours/resident/day (C/D)
- Ventilator dependent unit (C/D)
- Resides in hospital (D)
- COVID-19 point-of-care test on residents (C)
- Able to receive test results within a day (C/D)

Factors associated with MORE cases (C) / deaths (D):
- For-profit owner (C)
- More certified beds (C/D)
- More infection control citations (C/D)
- More frequent and wider testing (C/D)
- More substantiated complaints (D)
- Nursing staff shortage (C/D)
- Long/short stay quality measure rating (C/D)

Table 2. Models predicting number of COVID-19 cases and deaths

Variable		MODEL 1: # of cases (N = 14,264) Coef.	MODEL 2: # of deaths (N = 14,289) Coef.
(Constant)		-13.546**	-6.492**
Facility Attributes	Owner type – government (Base: For profit)	-5.780**	-0.238
	Owner type – non-Profit (Base: For profit)	-6.196**	0.082
	Resides in hospital	-1.315	-0.977*
	# of certified beds	0.238**	0.056**
	Overall rating	-0.377†	-0.029
	Quality measure (QM) rating	-1.996**	-0.378**
	Long stay QM rating	1.697**	0.259**
	Short stay QM rating	1.429**	0.394**
	Adjusted RN staffing hours/resident/day	-4.717**	-0.336*
	# of substantiated complaints	0.016	0.023*
	# of citations from infection control inspections	1.153**	0.273**
Facility Resource and Policies for COVID-19 (# of Weeks)	Able to test all current residents in next 7 days	0.596**	0.125**
	Average time to receive resident test result (0-1 day)	-0.169*	-0.047*
	Tested residents with new signs or symptoms	0.908**	0.182**
	Tested asymptomatic residents in a unit or section after a new case	0.866**	0.145**
	Tested asymptomatic residents facility-wide after a new case	0.918**	0.082**
	Tested asymptomatic residents without known exposure as surveillance	0.420**	0.064**
	Tested another subgroup of residents	0.489**	0.198**
	COVID-19 point-of-care tests on residents	-0.747**	-0.081
	Shortage of nursing staff	0.047*	0.016*
	Supply of eye protection	0.003	0.028*
	Ventilator dependent Unit	-0.407**	-0.098**
Community Attributes	Total population of county	<0.001	<0.001
	% of COVID-19 confirmed cases in county	0.888**	-0.015
	% of COVID-19 deaths in county	13.652**	20.407**
Adjusted R-Square		*0.334*	*0.212*

** $P < 0.01$; * $0.01 \leq P < 0.05$; † $0.05 \leq P < 0.1$