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Special Grand Rounds: June 11, 2020

COVID-19 Among Older Persons in Health Care Systems: Pragmatic Responses to the Crisis

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The Massachusetts Initiative to Improve Infection Control in NHs

Lewis A. Lipsitz, MD

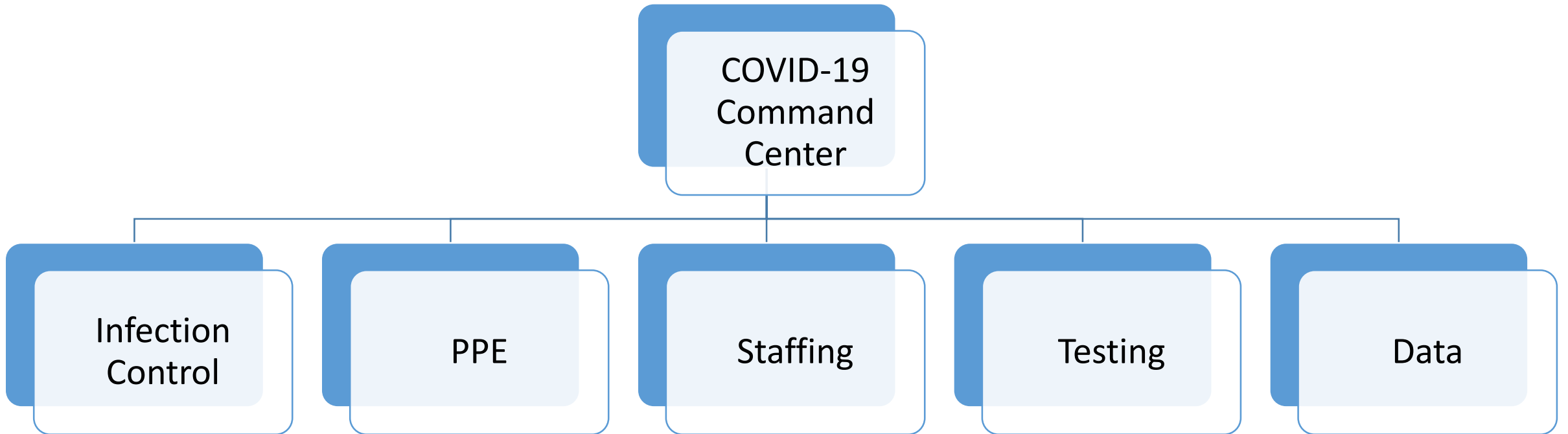
Hinda and Arthur Marcus Institute for Aging Research, Hebrew SeniorLife

In collaboration with the MA Senior Care Association and MA Executive Office of Health and Human Services.

Background – The Crisis of COVID-19 in MA NHs.

- In early April, 2020, Massachusetts' 383 nursing homes became a national hotspot for COVID-19 infections with over 10,000 confirmed cases.
- More than half of the state's deaths from the disease occurred among NH residents.
- On April 15th Governor Baker made \$130 million in additional funding available to NHs to improve their infection control processes by supporting staff, personal protective equipment, and testing.
- All NHs audited; supplemental funding contingent upon compliance with mandatory testing of all residents and staff, and adherence to 28-point infection control check-list and competencies.
- The Massachusetts Senior Care Association (MSCA) and Hebrew SeniorLife were asked to lead this effort, and developed an infrastructure and processes to address the crisis.

Organizational Structure



Audit Criteria

28 Point Checklist

Infection

PPE

Staffing

Clinical Care

Communication

6 (Core) Competencies

Cohorting

Congregate spaces

Wearing PPE

Doning & doffing

IC Policies

Symptom training

Criteria for 50% payment increase

Score > 24 +
adherent with all 6
competencies.

If score < 24 and/or
non-adherent -->
reinspection in 2 wks

Interventions

- Hired Pathway Health to provide on-site assessments, consultation & action plans for ~120 troubled facilities identified by the state or by poor audit scores.
- Conducted weekly virtual visits to review and assist with the action plans.
- Trained a Massachusetts “Swat Team” to provide additional on-site visits with Pathway virtual visits for targeted problematic facilities.
- Held weekly webinars on PPE, staffing, checklist items for all facilities.
- Disseminated a weekly Q&A with EOHHS and DPH input.
- Provided access to PPE, an MIT student-developed PPE predictor, and staff recruitment resources (State website, Monster.com). █
- Tested all residents and staff by National Guard and private labs.

Pragmatic Challenges

- Ambiguities: Close *congregate* spaces; full PPE if *community spread*, *terminal cleaning*, what PPE and where (Gowns? Hallways?)
- Residents with dementia who wander have difficulty wearing masks, staying in rooms, and maintaining social distance.
- Inability to adhere to guidance when PPE is in short supply.
- Constantly changing resident categories complicate cohorting and PPE use:
 - *Initially*: Symptomatic vs. asymptomatic
 - *Exposed*: Symptomatic vs. asymptomatic vs. exposed (PUI)
 - *Testing*: COVID negative, COVID positive, Asymptomatic positive, PUI.
 - *Recovering*: COVID neg, COVID pos, Asymptomatic pos, PUI, recovering.
- Temporary staff: National Guard (5 days), Resident Care Assistants (90 days, then need certification as CNAs), Monster.com ads for CNA positions not used.

Proposed Study Outcomes.

- Checklist score (up to 28)
 - Percent adherent with core competencies:
 - Rate of new resident infections (symptomatic or test +)*
 - Rate of new staff infections (symptomatic or test +)*
 - Mortality rate.
-
- Relationships between changes in processes and outcomes.

* Adjusted for NH staff size and local prevalence of COVID-19.

Preliminary Results

- Improved adherence with core competencies (State Audits):

Audit	# Facilities	% Adherence	% Non-Adherent
1	230	43% (98 passed)	57%
2	230	79% (181 passed)	21%
% Declined		7% (17)	
% Improved			44% (100)

- COVID-19 Infection Rates (CMS data) - Overall 47% Positive rate.
 - Total Number confirmed positive for the week/Avg Daily Census
 - Week 1 - 5/4/20 to 5/10/20 - 12%
 - Week 2 - 5/11/20 to 5/17/20 - 10%
 - Week 3 - 5/18/20 to 5/24/20 - 7%
 - Week 4 - 5/25/20 to 5/31/20 - 4%

Process Improvements

Competency	Audit 1 Missed	Audit 2 Missed	Audit 1 % Missed	Audit 2 % Missed	% Change
HCP is wearing recommended PPE for care of all residents	79	36	21.94%	15.65%	6.29%
Facility screens every individual entering the facility (including staff).	47	25	13.06%	10.87%	2.19%
All facility personnel are wearing a facemask while in the facility.	38	25	10.56%	10.87%	-0.31%
Designated Infection Control Lead maintains a line list of all patients with confirmed COVID-19	30	19	8.33%	8.26%	0.07%
All residents are screened for symptoms of COVID-19 (v.s., O2 Sat, and Temp) at least BID and documented.	48	13	13.33%	5.65%	7.68%
Staff have been trained and demonstrate competency on selecting, donning and doffing PPE.	45	18	12.50%	7.83%	4.67%

Conclusions

- By providing monetary incentives, guidance, and resources to nursing facilities, States may be able to improve infection control practices.
- Hopefully, this will reduce the rates of COVID-19 and other infections among NH residents and staff.
- It is still unknown whether improvements are due to the state-wide intervention nor if they can be sustained without payment incentives.
- Pragmatic trials of novel methods to implement and sustain infection control practices in NHs, beyond the COVID-19 pandemic, are critically needed.



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Temperature Monitoring in VA Community Living Centers VA LTSS-COIN

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Providence VAMC



Older and Colder?

Background

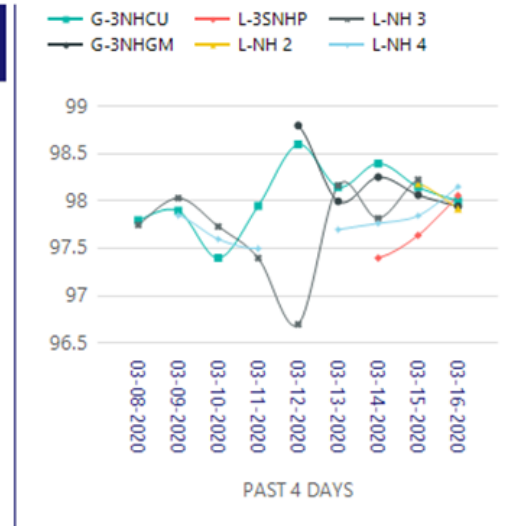
- Rosenberg 1987 – Older NH residents with pneumonia – less fever
- Castle 1991 – NH lower baseline temp – fever in only 50%
- High 2008 – ID Society of America – consider change from baseline
- Chester 2010 – Heterogeneity in older requires baseline for all vitals
- Sloane 2014 – NH antibiotic rx – 10% met ‘fever’ criteria

COVID-19 Pandemic

- Wang 2020 – Fever in 98.6%; less on admission
- Kimball 2020 - >50% COVID+ asymptomatic NH residents

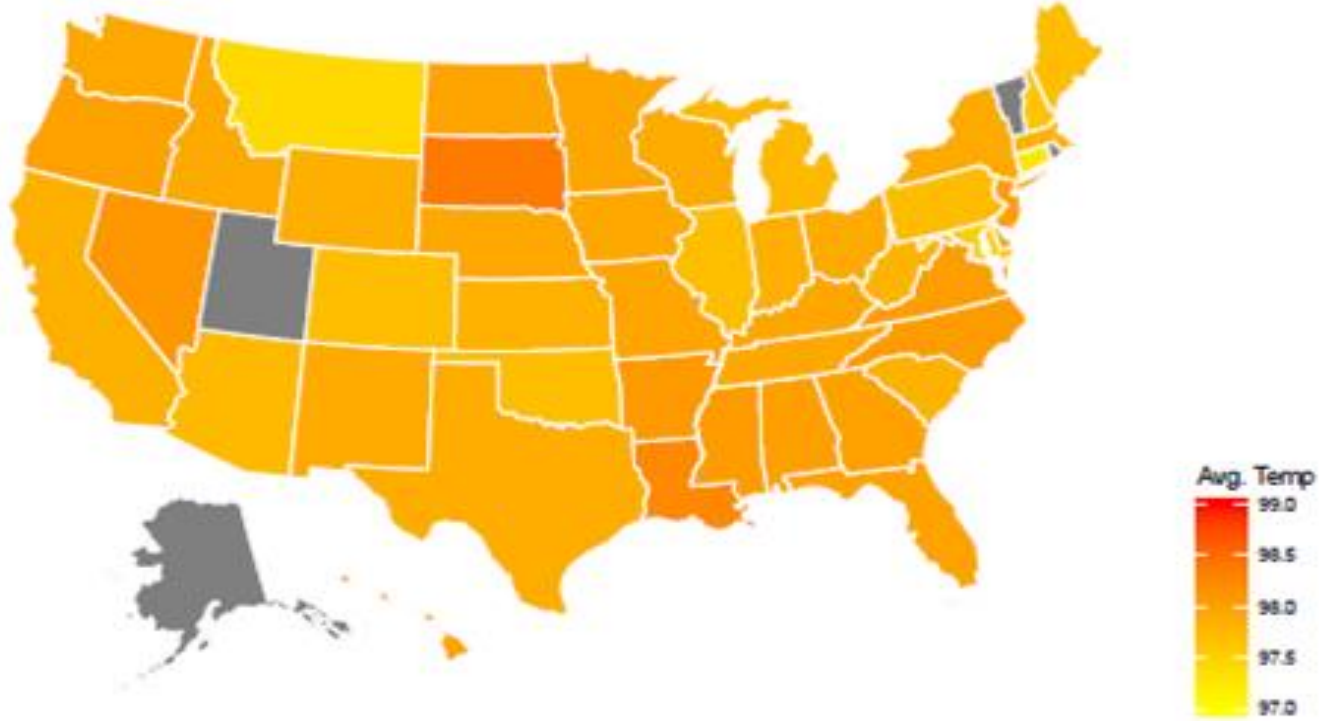
CLC Temperature Monitor System

Ward	Room/Bed	Patient Name (Patient ICN)	Checked last 24 hrs?	AVG Temp	MAX Temp	4-Day Trend
G-3NHGM	310-1	Names Blocked Out	✓	98.6	98.6	
	318-1		✓	98.3	98.4	
	320-1		✓	98.7	99.1	
	325-1		✓	98.4	98.8	
	333-2		✓	97.9	98.2	
	343-2		✓	97.8	98.2	
	348-1		✓	97.4	97.4	
	350-2		✓	98.2	98.6	
	357-1		✓	97.8	97.8	
			✓	98.0	98.2	
			✓	98.0	98.4	
			✓	97.6	97.6	
			✓	98.0	98.6	
			✓	97.8	98.0	
G-3NHCU	314-1	✓	97.8	98.0		
	324-1	✓	98.0	98.3		
	329-1	✓	98.1	98.1		
	329-2	✓	98.7	99.1		
	335-1	✓	97.6	97.8		
		✓	97.6	97.9		
	343-1	✓	97.9	98.2		
	348-2	✓	98.2	98.2		
350-2	✓	98.4	98.8			

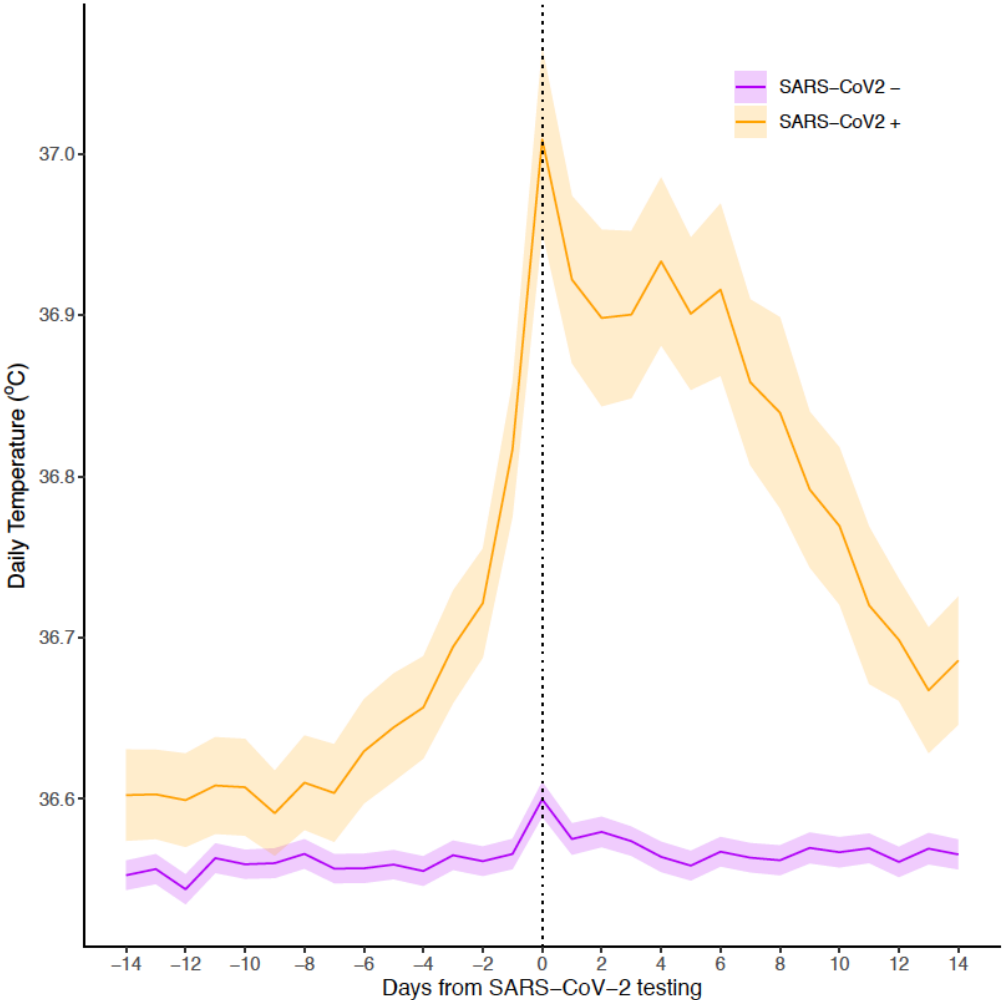


CLC Temperature Map

CLC Average Temperatures (2020-03-17)

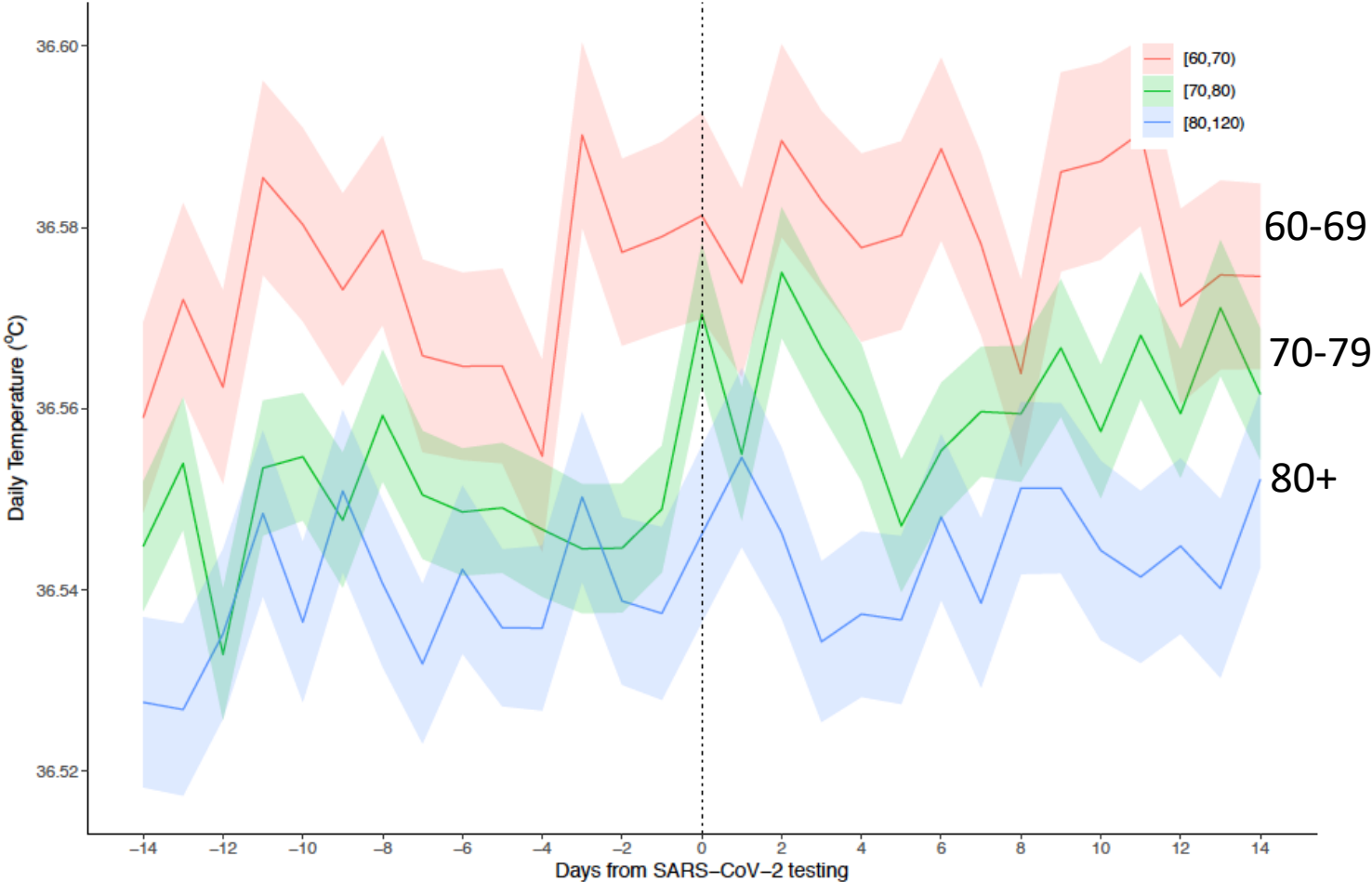


Temperature before/after Universal Testing



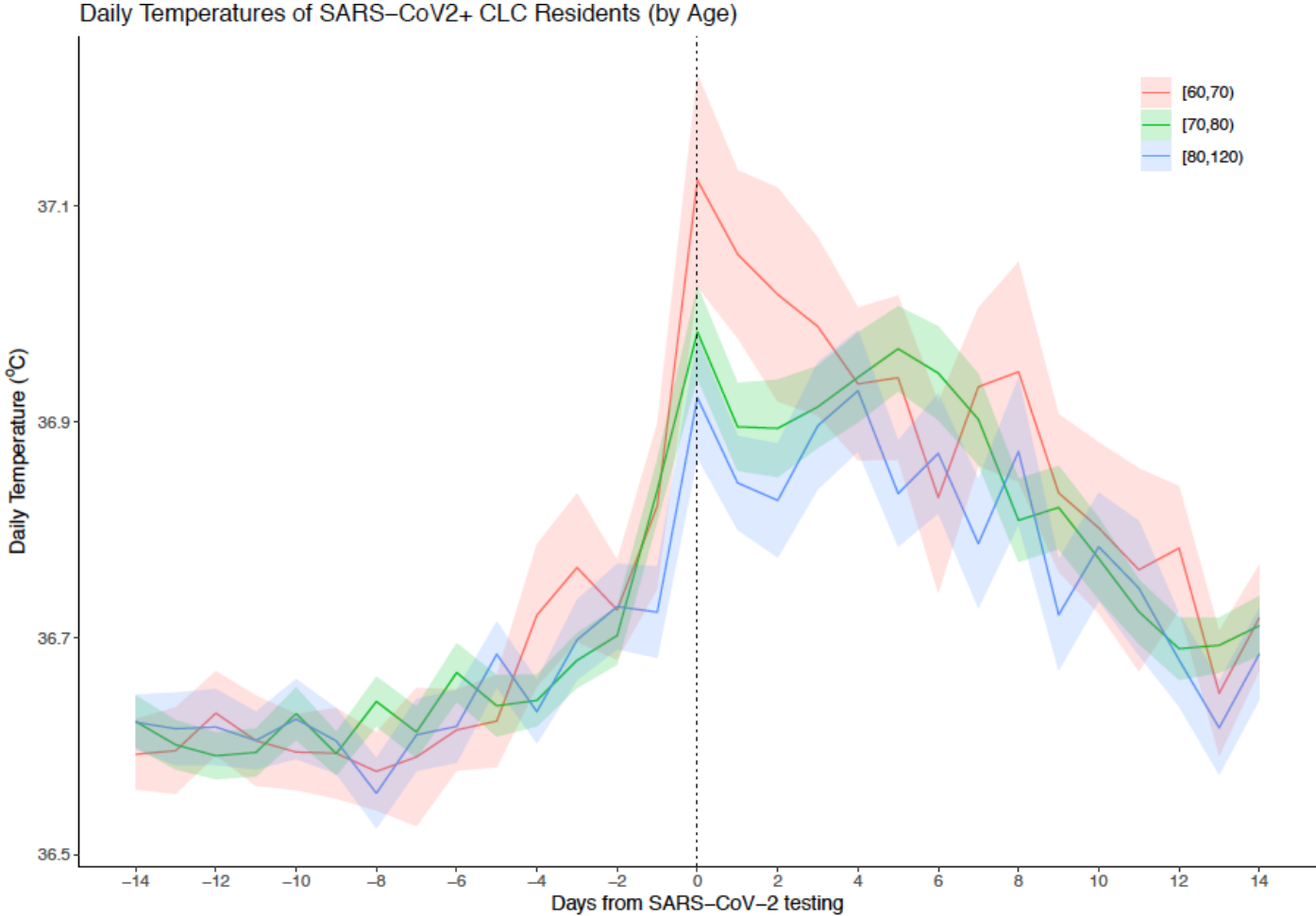
Accepted JAMDA 2020

Temperature by Decade (SARS-CoV-2 Negative)

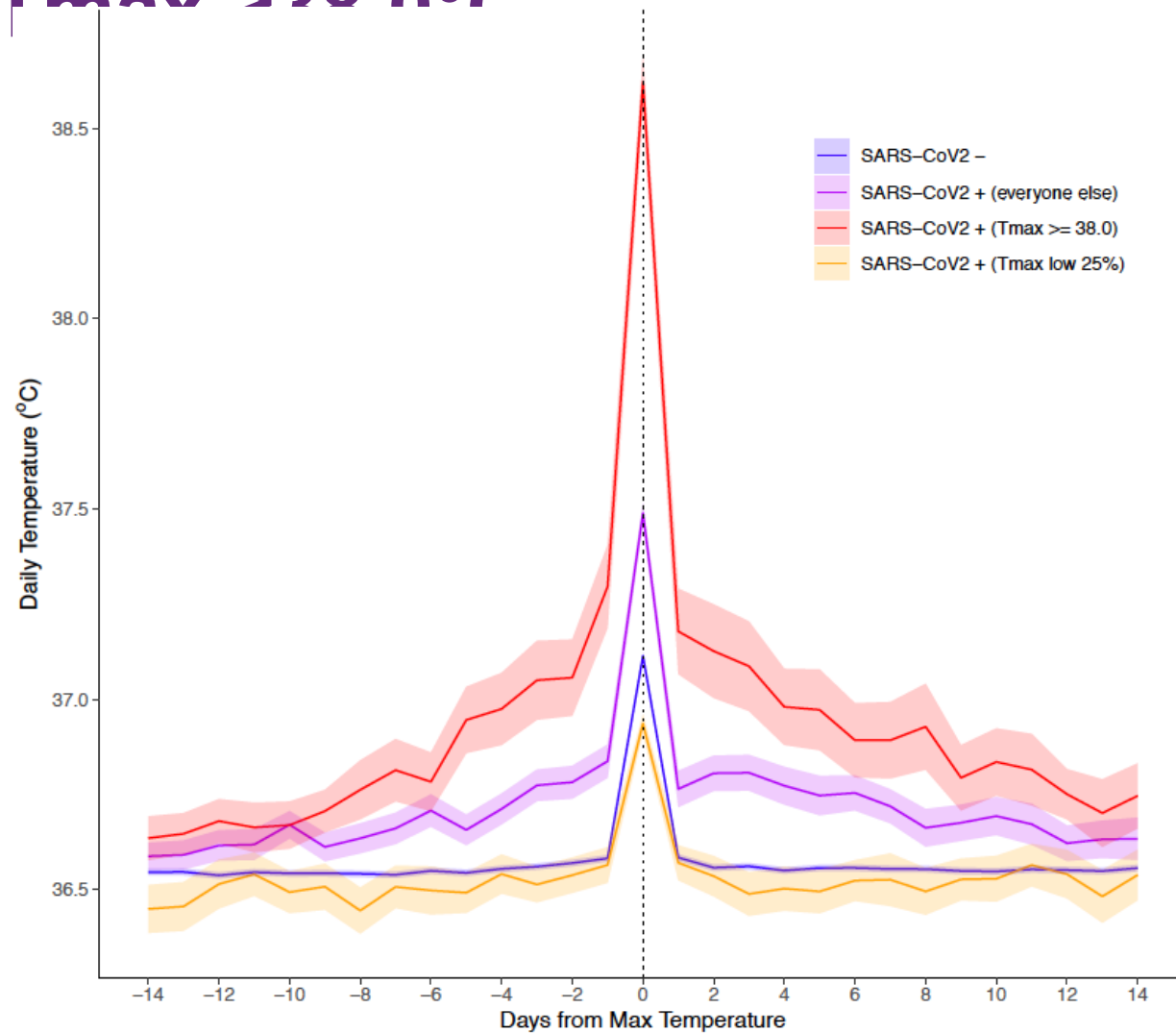


Temperature by Decade

SARS-CoV-2 Positive

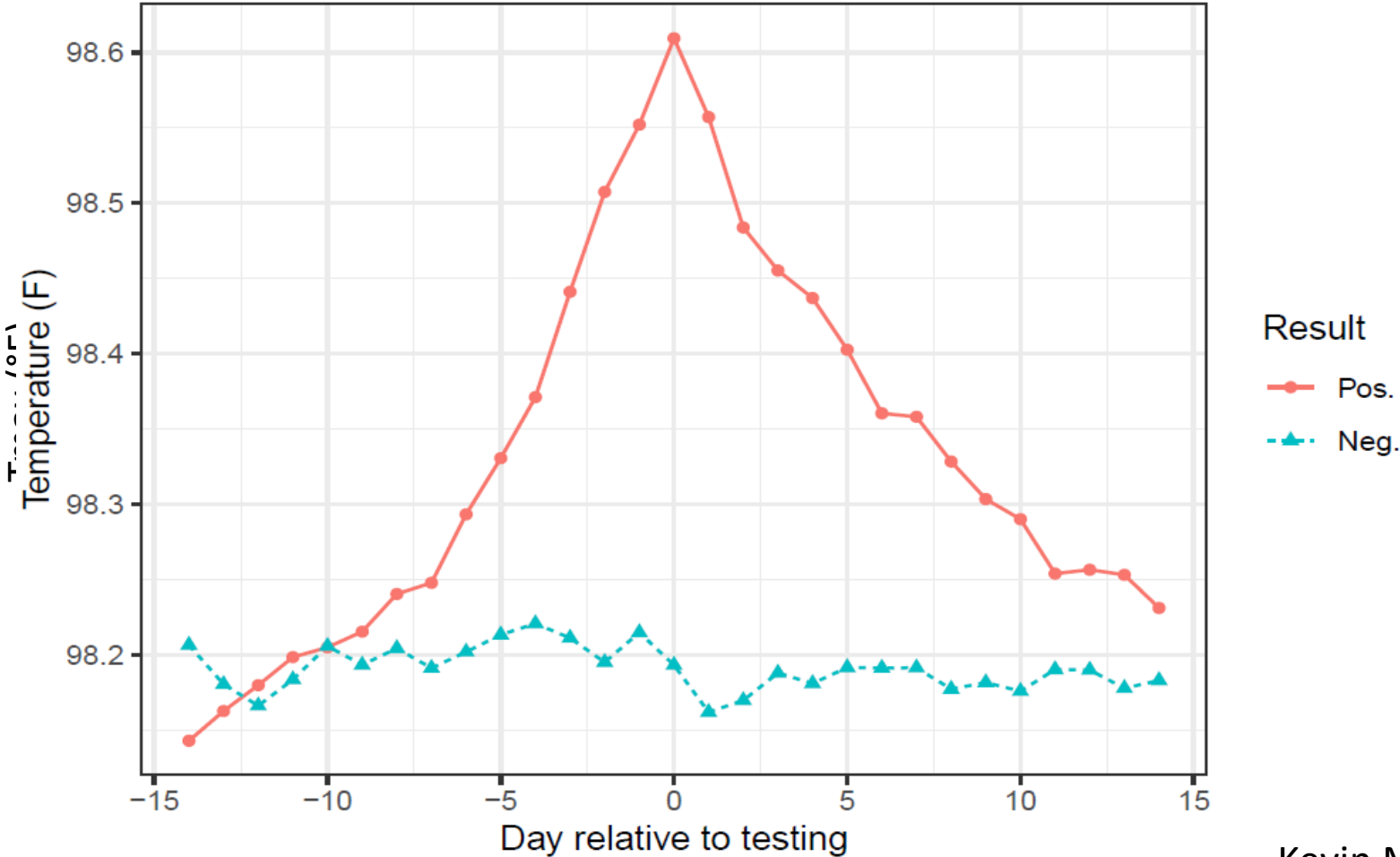


Most CLC Residents with SARS-CoV-2 Do Not Meet $T_{max} \geq 38.0^{\circ}\text{C}$



Accepted JAMDA 2020

Private Sector Nursing Facilities



Kevin McConeghy, Pharm D

Key Points

- Most residents with SARS-CoV-2 do not meet CDC 38.0°C ‘fever’ threshold
 - Does not mean they are ‘asymptomatic’
- Value of single time temperature measurement?
- Deciding on a ‘cutoff’ poses challenges:
 - Case identification
 - ‘Cooler’ residents
 - Increases from baseline
 - Outbreak identification
 - Ward/Facility temperature

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Symptomatic & Asymptomatic SARS-CoV-2 Presentation in Nursing Home Residents

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On behalf of the COVID-19 Research Team

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The Project

- A unique clinical-academic partnership between:
 - Genesis HealthCare, a large post-acute & long-term care provider with roughly 350 SNFs in 25 states
 - Brown University Center for Gerontology & Healthcare Research
- Genesis hosts its own EMR & keeps detailed COVID-19 tracking data, shared with Brown nightly
- Brown investigators collaborate with Genesis leadership to identify & answer clinical, operational, & epidemiological questions related to COVID-19 using close to real time data.

Data

- Genesis PointClickCare EMR data:
 - Vital signs every shift
 - Change in condition documentation when new symptoms present
 - Daily census
 - Other EMR elements: eMAR, orders, labs, diagnoses, etc.
- Genesis resident line listing
 - Each SNF uses to track resident symptoms, testing status, disposition
 - Counts of presumed & confirmed cases, deaths aggregated at the facility level
 - For SNFs that have been universally tested: testing dates & results
- County prevalence data from Johns Hopkins Coronavirus Resource Center
- CASPER data

Sample

- 16,000 residents of 341 SNFs across 25 states
 - Excludes COVID-only SNFs
- Sub-analysis of 64 SNFs in 10 states that underwent universal testing (point prevalence survey) as of May 4, 2020
 - AL, CO, MA, MD, NH, NJ, NM, PA, RI, WV

Share of SARS-CoV-2 cases who were asymptomatic vs. symptomatic at time of testing in SNFs with & without universal testing

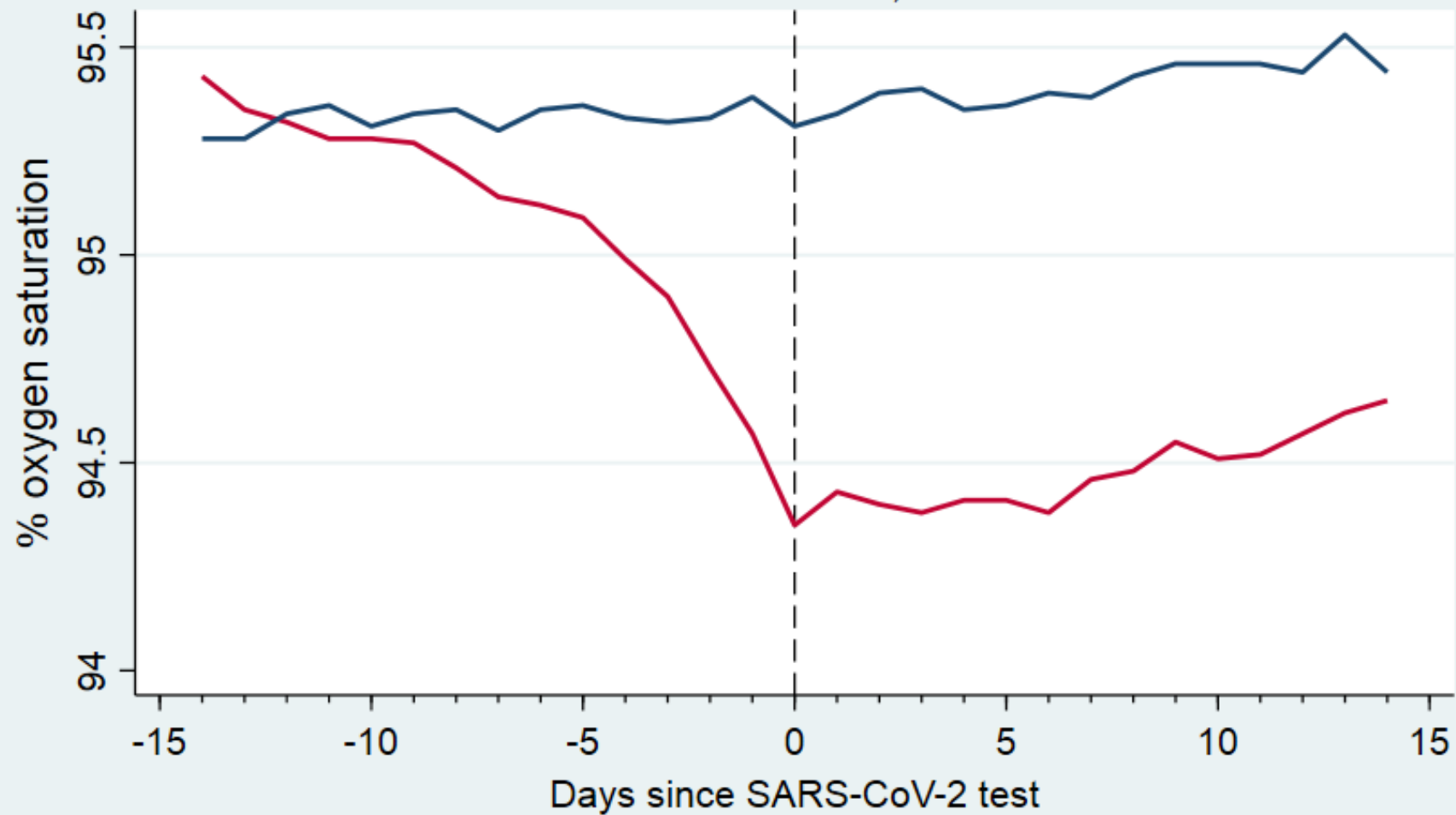
*data as of May 22

	SNFs without universal testing		SNFs with universal testing		TOTAL	
	PCR Positive	PCR Negative	PCR Positive	PCR Negative	PCR Positive	PCR Negative
Asymptomatic	903 (24%)	3423 (65%)	1008 (45%)	3214 (67%)	1911 (32%)	6637 (66%)
Symptomatic	2831 (76%)	1818 (35%)	1235 (55%)	1568 (33%)	4066 (68%)	3386 (34%)
TOTAL	3734 (100%)	5241 (100%)	2243 (100%)	4782 (100%)	5977 (100%)	10,023 (100%)

	SARS-CoV-2 PCR Positive	SARS-CoV-2 PCR Negative	<i>P</i>
All Tested Residents	n=5,977	n=10,023	
Mean age (max=89)	74.5 (10.8)	73.0 (11.9)	<0.001
% Over age 90	20.9%	18.1%	<0.001
% Female	63.0%	62.8%	0.79
% Black	16.7%	10.7%	<0.001
% Hispanic	4.1%	3.8%	0.36
Residents with Symptoms (14d lookback)	n=4,066	n=3,386	
Runny nose	2.4%	3.3%	0.013
Sore throat	3.1%	5.1%	<0.001
Nasal congestion	2.9%	3.1%	0.52
Chest congestion	3.9%	4.7%	0.09
Cough	37.4%	22.9%	<0.001
Shortness of breath	3.4%	4.3%	0.06
Tachycardia	5.6%	7.4%	0.003
Temp 100.4+	35.1%	25.1%	<0.001
Temp 99.0+	56.3%	31.5%	<0.001
O2 saturation \geq 3% decline	12.0%	10.8%	0.11
Confusion	2.7%	2.5%	0.69
Malaise	16.4%	3.9%	<0.001
Nausea/vomiting/diarrhea	16.4%	9.2%	<0.001

*data as of May 22

Mean SpO2 among all SNF residents
All Genesis facilities, 6/9/2020



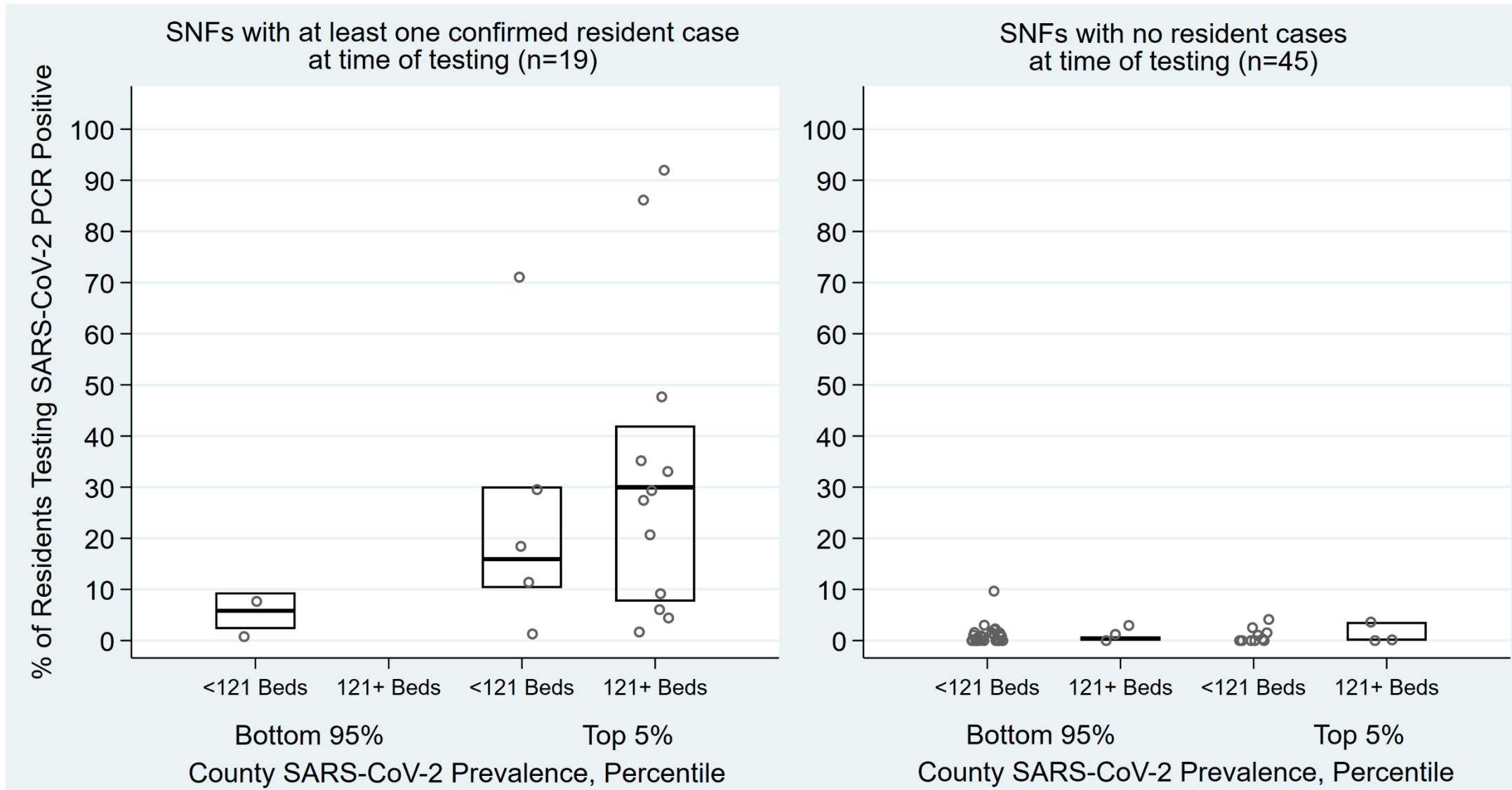
Sensitivity & Specificity of Tmax thresholds for SARS-CoV-2

Tmax, oral (F)	Lookback from Date of Testing		
	24 hours	48 hours	72 hours
98.0	0.84/0.23	0.9/0.16	0.94/0.1
98.4	0.65/0.51	0.75/0.42	0.8/0.33
98.8	0.41/0.81	0.49/0.75	0.54/0.7
99.2	0.26/0.96	0.31/0.94	0.35/0.93
99.6	0.20/0.98	0.23/0.98	0.27/0.97
100.0	0.13/0.99	0.16/0.99	0.19/0.98
100.4	0.11/0.99	0.13/0.99	0.15/0.99
100.8	0.07/ 1	0.09/0.99	0.11/0.99
101.2	0.05/ 1	0.06/ 1	0.07/0.99

Limited to residents who underwent diagnostic PCR testing due to the presence of symptoms

SARS-CoV-2 Prevalence Among Universally Tested SNFs (n=64)

*data as of May 4



Median 19.5% (range: 1.7%, 91.7%)

Median 0% (range: 0%, 10.7%)

New SARS-CoV-2 Cases Detected as a Result of Universal Testing (n=64)

*data as of May 4

	SNFs with <u>at least one</u> confirmed resident case at time of testing (n=19)	SNFs with <u>no</u> resident cases at time of testing (n=45)
Number (%) of SNFs that identified <u>new</u> cases as a result of testing	17 (89.5%)	7 (15.6%)
Number of new cases identified in those SNFs	Median: 16 cases Range: 1-74 cases	Median: 1 case Range: 1- 4 cases

Summary

- Cough, low grade fever, hypoxia, malaise, & GI symptoms are common presenting symptoms in nursing home residents with COVID-19.
 - Cold symptoms are not
- Universal testing is critical to identify asymptomatic & pre-symptomatic cases once SARS-CoV-2 is confirmed in a facility, especially in areas of high prevalence.
- In SNFs without known cases, universal testing is likely to have lower yield, particularly in areas of low prevalence, but may still prove to be an important early warning surveillance tool.
 - Adapting testing strategy to local conditions & facility need likely makes more sense than a “one size fits all” approach
 - Any testing strategy needs to take into consideration cost of tests (& who will pay), and implications for staff

Next Steps

- Differentiation of asymptomatic vs. pre-symptomatic cases
- Predictive value of different constellations of symptoms
 - Implications for pre-admission screening
- Mortality risk factors in the nursing home population
 - Clinical, treatment, & organizational factors
 - Disparities in outcomes for Black residents within SNFs
- Monitoring trends in recovery & reinfection



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Questions?

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