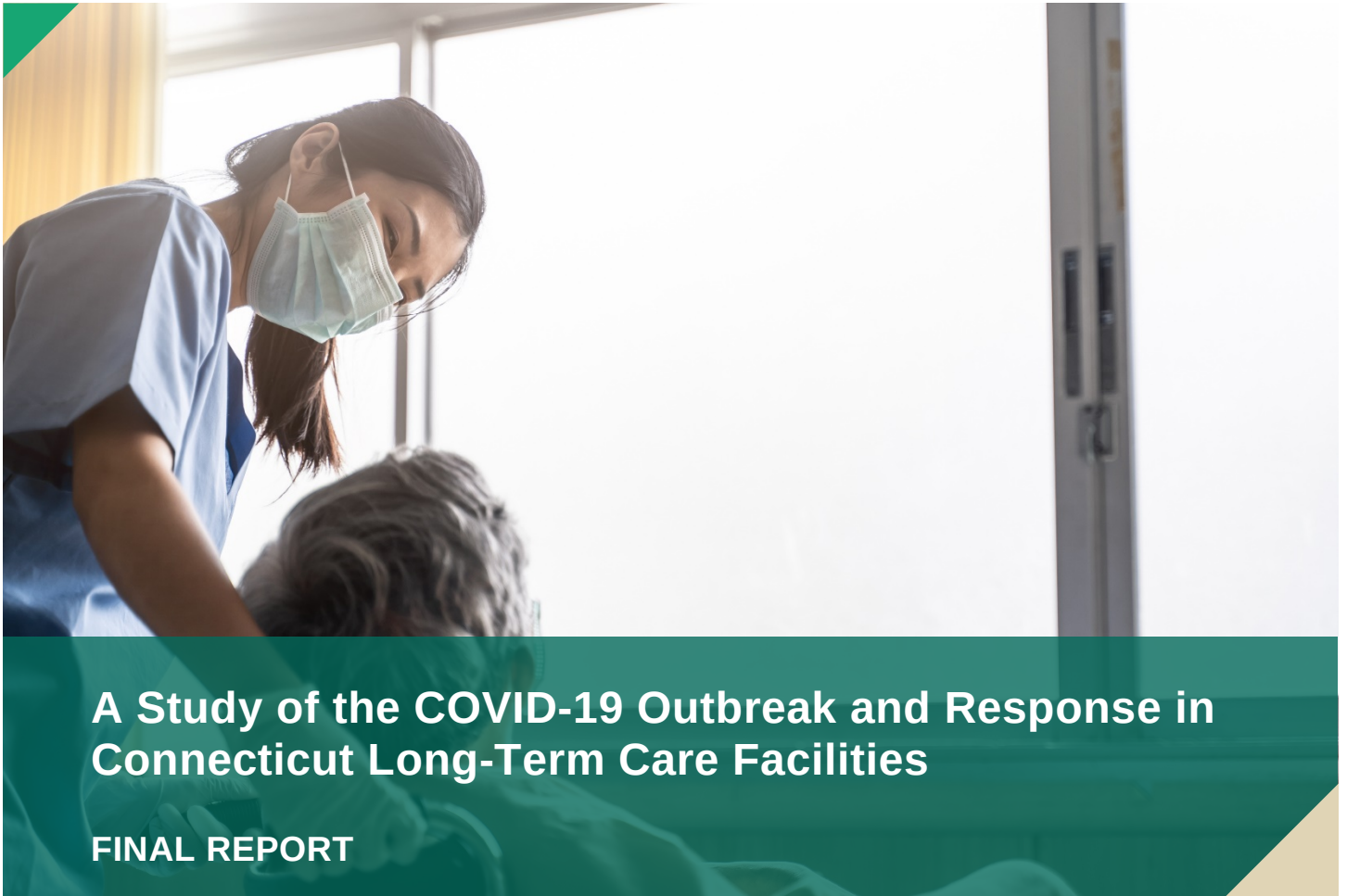




A Study of the COVID-19 Outbreak and Response in Connecticut Long-Term Care Facilities

FINAL REPORT

September 30, 2020
DPH #2021-0041

Submitted to:

Connecticut Department of Public Health
Donna C. Maselli, R.N., M.P.H., Project Lead
410 Capital Ave., MS #13, GCT
Hartford, CT 06134

Submitted by:

Mathematica, Inc.
600 Alexander Park, Suite 100
Princeton, NJ 08540

Acknowledgements

Mathematica developed this report under contract to the Connecticut Department of Public Health (Contract Log #2021-0041). The work to complete this project was a team effort and we acknowledge the contributions of the entire team.

Report authors

Patricia Rowan, M.P.P., PMP (project director)

Reena Gupta, M.Sc.

Rebecca Lester, B.A.

Michael Levere, Ph.D.

Kristie Liao, M.P.P.

Jenna Libersky, M.P.H

Debra Lipson, M.H.S.A.

Andrea Wysocki, Ph.D.

Julie Robison, Ph.D. (UConn Health, Center on Aging)

Patricia A. Bowen, J.D., L.M.S.W., L.N.H.A (UConn Health MPH Student)

Research analytics support

Dayna Gallagher, Burke Hays, Addison Larson, Ash Levine, Huihua Lu, Cherise Mangal, Télyse Masaoay, Joseph Mastrianni, Margaret Raskob, Grace Reinders, Shauna Robinson, Britta Seifert, Christina Sintek, and Annu van Bodegom

Communications support

Amy Berridge, Sheryl Friedlander, Donovan Griffin, Margaret Hallisey, John Kennedy, Gwyneth Olson, Anuja Pandit, Allison Pinckney, Jennifer de Vallance, and Sarah Westbrook

Mathematica would also like to express our gratitude to everyone who supported this work by participating in interviews—particularly residents of long-term care facilities and their family members—and sharing their experiences.

Contents

Acknowledgements	ii
List of Acronyms	vii
Executive Summary	viii
I. Introduction	1
A. About this report.....	1
B. Similar assessments done by other states	3
C. Organization of this report.....	3
II. Recommendations to Help Connecticut Prevent and Prepare for Future Infectious Disease Outbreaks in LTC Facilities	4
A. Person-centered care.....	4
B. Surveillance and outbreak response	5
C. Emergency response	6
D. Screening and testing	7
E. Infection control.....	8
F. LTC staffing and workforce availability	9
G. State agency roles, expertise, and skills.....	10
H. Communication and coordination across state agencies, facilities, and support organizations.....	10
I. Care transitions.....	11
J. Reimbursement mechanisms to support increased LTC system costs	12
III. Assessment of the COVID-19 Outbreak in Connecticut on Residents in the State's LTC Facilities	13
A. Connecticut as a whole	13
B. Residents of Connecticut nursing homes	16
C. Connecticut assisted living facilities.....	33

IV. Assessment of the State's Preparedness and Response to COVID-19 in LTC Facilities	35
A. Surveillance and outbreak response	35
B. Infection control, including PPE.....	39
C. Emergency response structure and communications	47
D. State agency roles, expertise, and skills.....	51
E. Screening and testing of residents and staff.....	52
F. Reimbursement mechanisms to support increasing LTC system costs	54
G. Communications with LTC industry stakeholders and other key stakeholders.....	55
V. Assessment of the LTC Industry's Preparedness and Response to COVID-19	58
A. Surveillance and outbreak response	58
B. Infection control within and outside of facilities, including PPE	59
C. LTC facility staffing and workforce availability	62
D. Screening and testing of residents and staff.....	66
E. Care transitions	67
F. Communication between LTC facilities and the state, and between facilities and residents and family members.....	69
VI. Conclusion	73
References	74
Appendix A. Methods.....	A.1
Appendix B. Supplemental Tables and Figures.....	B.1
Appendix C. Timelines	C.1

Exhibits

ES.1. Count of recommendations by topic	viii
1. New COVID-19 cases and deaths in Connecticut, neighboring states, and the United States	14
2. Total COVID-19 deaths per 100,000 residents, by age group, in Connecticut, neighboring states, and the United States	15
3. Ratio of the share of total COVID-19 cases and deaths, by race and ethnicity, to share of population in Connecticut and neighboring states	16
4. Total COVID-19 cases and deaths per licensed bed in Connecticut nursing homes.....	17
5. New COVID-19 cases and deaths in Connecticut nursing homes	18
6. Summary of findings from analyses of relationship between nursing home characteristics and COVID-19 outcome	21
7. COVID-19 cases and deaths in an example nursing home, by room location.....	24
8. Summary of findings from analyses of relationship between resident characteristics and COVID-19 outcome	26
9. Data availability for individual nursing home COVID-19 outcomes by state	28
10. Total nursing home COVID-19 cases and deaths per licensed bed in Connecticut and nearby states, adjusted for nursing home characteristics.....	29
11. Changes in any depressive symptoms among Connecticut nursing home residents, March through July	31
12. Changes in unplanned substantial weight loss among Connecticut nursing home residents, March through July.....	32
13. Total COVID-19 cases and deaths per bed in Connecticut assisted living facilities	34
14. Calls to DPH infection control staff related to COVID-19, March through June 2020	42
15. DPH count of PPE distribution by setting, as of July 16, 2020	44
16. Daily CRF admissions, April 15 through June 30, 2020.....	50
17. Pre-COVID staffing levels reported by nursing homes in Connecticut, the United States, and nearby states	63
A.1. Interview topics, by stakeholder	A.2
B.1. Characteristics of Connecticut nursing homes	B.2
B.2. Characteristics of Connecticut assisted living facilities	B.4

B.3. Rates of COVID-19 transmission in Connecticut and neighboring states	B.4
B.4. Rates of COVID-19 transmission in Connecticut by county	B.5
B.5. Characteristics of Connecticut nursing home residents.....	B.6
B.6. Characteristics included in feature selection model.....	B.7
B.7. COVID-19 cases and deaths in Connecticut nursing homes compared to cases in the surrounding town	B.9
B.8. Facility-level multivariate regression model.....	B.10
B.9. Bivariate analyses of the relationship between nursing home characteristics and COVID-19 cases and deaths per licensed bed in Connecticut.....	B.11
B.10. Bivariate regression coefficients from analyses of the relationship between nursing home characteristics and COVID-19 cases and deaths per licensed bed in Connecticut	B.13
B.11. Concentration of COVID-19 cases in wings within nursing homes	B.14
B.12. Individual-level multivariate regression model.....	B.15
B.13. Wing-level multivariate regression model.....	B.16
B.14. Total COVID-19 cases and deaths in long-term care facilities per 100,000 total population in Northeast states	B.17
B.15. Total nursing home COVID-19 cases and deaths per licensed bed in Connecticut and nearby states and nearby nursing homes	B.18
B.16. Unplanned substantial weight loss, by COVID-19 status.....	B.19
B.17. Changes in severe pressure ulcers among Connecticut nursing home residents, March through July	B.20
B.18. Changes in cognitive functioning scale among Connecticut nursing home residents, March through July.....	B.21
B.19. Changes in activities of daily living score among Connecticut nursing home residents, March through July.....	B.22
B.20. Changes in episodes of incontinence among Connecticut nursing home residents, March through July	B.23
B.21. Total COVID-19 cases and deaths in Connecticut assisted living facilities compared to cases in the surrounding town	B.24
B.22. Total COVID-19 cases and deaths in Connecticut assisted living facilities by size of facility	B.24

List of Acronyms

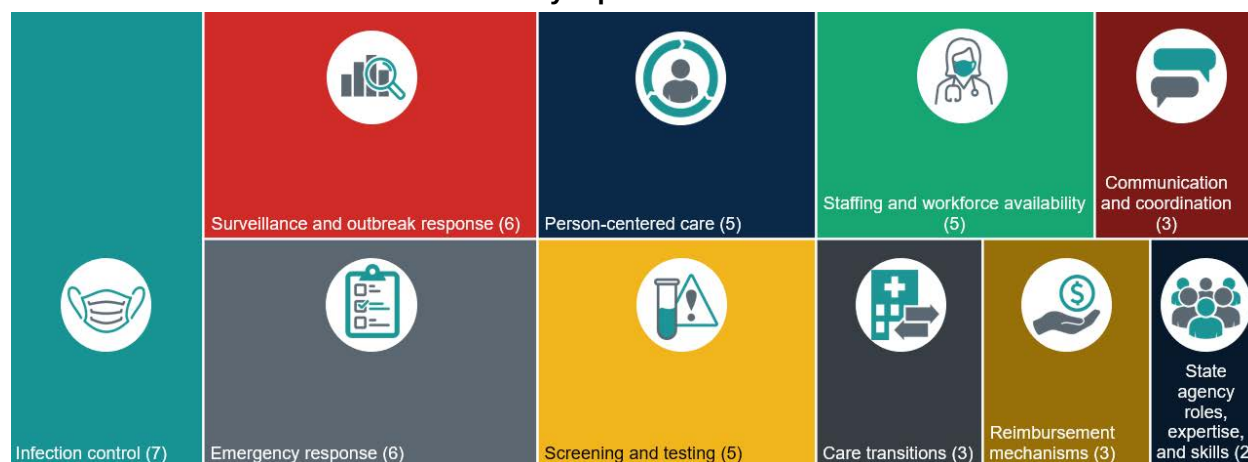
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
COVID-19	SARS-Co-V-2
CRF	COVID-19 recovery facility
CT DSS	Connecticut Department of Social Services
DHHS	U.S. Department of Health and Human Services
DPH	Connecticut Department of Public Health
FEMA	Federal Emergency Management Agency
FLIS	Facility Licensing and Inspection Section
HAI	health care-acquired infection
HCBS	home and community-based services
ICAR	Infection Control Assessment and Response
LPN	licensed practical nurse
LTC	long-term care
LTSS	long-term services and supports
LR	long-term recommendation
MAP	Mutual Aid Plan
MDS	Minimum Data Set
NF	nursing facility
NHSN	National Healthcare Safety Network
OPM	Connecticut Office of Policy and Management
PPE	personal protective equipment
PPS	point prevalence survey
POD	point of distribution
RN	registered nurse
SEIU	Service Employees International Union
SR	short-term recommendation
WHO	World Health Organization

Executive Summary

In Connecticut, SARS-CoV-2 (COVID-19) has had a disproportionate impact on long-term care (LTC) facilities, with cumulative deaths among long-term care residents representing nearly three-quarters of all COVID-19-related deaths in the state (72 percent of 4,432 deaths as of July 30, 2020). In response, Connecticut hired Mathematica and its partner at the UConn Center on Aging to conduct an independent assessment of the impact of COVID-19 on the state’s nursing homes and assisted living facilities. Mathematica has released its findings in two parts: an interim and a final report. The interim report, which the Connecticut Department of Public Health (DPH) released on August 18, 2020, contained a preliminary analysis of the impact of COVID-19 in the state and in LTC facilities, and a preliminary assessment of the state and LTC industry’s preparedness and response to the COVID-19 outbreak.

This document comprises the final report, which presents Mathematica’s updated assessment of the state and industry’s preparedness and response to the COVID-19 outbreak, along with its analysis of both facility- and resident-level data in the state to determine predictive factors of greater incidence of COVID-19 cases in LTC facilities. The final report relies on data collected and analyzed from July 13 to September 15, 2020, which includes publicly reported information, data and documentation provided by the state, and interviews with key stakeholders. Specifically, Mathematica received and reviewed 190 documents from the state’s agencies and extracted relevant information. Mathematica conducted 52 interviews with more than 130 stakeholders and analyzed them for themes and congruence with other documentation. Mathematica also analyzed facility- and resident-level data using descriptive statistics and multivariate regression models.

Exhibit ES.1. Count of recommendations by topic



The final report presents 23 short-term immediate and achievable steps the state and LTC industry can take to prepare for a second wave of COVID-19 and 22 long-term recommendations to prepare for future disease outbreaks in LTC facilities (Section II). The report organizes the recommendations into 10 themes as presented in Exhibit ES1: (1) person-centered care; (2) surveillance and outbreak response; (3) emergency response; (4) screening and testing; (5) infection control; (6) long-term care staffing and workforce availability; (7) state agency roles, expertise, and skills; (8) communication and coordination across state agencies, facilities, and support organizations; (9) care transitions; and (10) reimbursement mechanisms. Section II provides a full list of recommendations. The report also presents an assessment of the preparedness for and response to COVID-19 at state agencies, including DPH (Section IV) and for the LTC industry (Section V). The findings and recommendations rely on data on the extent of the outbreak in Connecticut compared to neighboring states and its impact on LTC residents (Section III).

I. Introduction

Older adults living in long-term care (LTC) facilities are at greater risk of complications and death from SARS-CoV-2 (COVID-19) than older adults living in the community. The increased risk comes from the higher prevalence of underlying clinical conditions among older adults in these facilities, the highly transmissible nature of the virus, and the frequent interactions common in congregate care settings (Centers for Disease Control and Prevention [CDC] 2020a). Although individuals living in LTC facilities represent about 1 percent of the total U.S. population, this group accounts for more than 40 percent of all U.S. COVID-19 deaths through the middle of September 2020 (COVID Tracking Project 2020). The percentage is even higher in Connecticut; deaths in LTC facilities represented 72 percent of the state's 4,432 total deaths from COVID-19 as of July 30.

At the time of this report, the COVID-19 pandemic in Connecticut has subsided and community spread remains relatively low, with the test positivity rate below 2 percent as of September 17, 2020. The window of opportunity to change the state's public policies and approach to response to the outbreak might be limited as the season changes and more activities move indoors, increasing the risk of an increase in cases and deaths. The recommendations contained in this report aim to ensure Connecticut is well positioned to respond to both a potential second wave of COVID-19 and outbreaks of any future infectious diseases.

A. About this report

On June 8, 2020, Connecticut Governor Ned Lamont ordered an independent assessment of the impact of COVID-19 on the state's nursing homes and assisted living facilities (Office of Governor Ned Lamont 2020a). The goals of the assessment are to (1) describe the impact of COVID-19 in Connecticut as a whole and in LTC facilities compared to other states in the region and the country, (2) assess the state and LTC industry's preparedness and response to the COVID-19 outbreak, and (3) identify immediate and achievable steps the state and LTC industry can take to prepare for a potential second wave of COVID-19 and long-term recommendations (LRs) to prevent future infectious disease outbreaks in LTC facilities.

The Connecticut Department of Public Health (DPH) selected Mathematica—a nonpartisan, independent public policy research firm—along with consultants at the UConn Center on Aging to conduct this assessment after a competitive procurement process. On August 18, DPH released Mathematica's interim report, which contained an analysis of the impact of COVID-19 in the state and in LTC facilities, along with a preliminary assessment of the state and LTC industry's preparedness and response to the COVID-19 outbreak (Rowan et al. 2020). The interim report also identified immediate and achievable steps the state and LTC industry could take to prepare for a potential second wave of COVID-19.

This final report contains an updated assessment of the state and industry's preparedness and response to the COVID-19 outbreak. This report also contains a detailed analysis of both facility- and resident-level data for nursing home residents in Connecticut to determine factors that predicted greater incidence of COVID-19 cases in LTC facilities. The information contained within this final report includes the information contained in the interim report, some of which has been supplemented with more complete data and makes recommendations for both short and long-term actions to prevent and respond to future infectious disease outbreaks.

1. Sources

Mathematica's review of information provided by DPH and other relevant state agencies informs this report. These data included information reported to the state by LTC facilities directly to DPH, as well as resident-level data from Minimum Data Set (MDS) assessments of nursing home residents' health and functional status conducted in the state from 2012 to August 2020. Mathematica also requested written documentation from state agencies for review related to emergency preparedness and planning, regulations governing LTC facilities in the state, all relevant guidance and communication from DPH to LTC facilities, organizational charts and other information related to state agency staffing, and documentation related to facility reporting requirements.

In addition, Mathematica conducted 52 interviews with 132 people from July 27 to September 10, 2020. We interviewed a sample of state agency staff, facility administrators, trade association representatives, labor representatives, legislators, direct care staff working in nursing homes, LTC advocacy groups, nursing home residents, and family members of residents living in LTC facilities.

For a full explanation of the sources and methods used in this report, including a list of the organizational affiliations of the individuals interviewed, please see Appendix A.

2. Limitations of this report

Mathematica completed the data collection and analysis for this report over a 13-week period from July to September 2020. Although Mathematica has done everything in its power to ensure all information contained in this report is up to date and accurate as of September 15, 2020, Mathematica recognizes the policy response at both the state and federal levels continues to evolve rapidly. As a result, it is possible some information related to the state's response could be outdated or inaccurate by the time this report is released to the public.

Because of the accelerated timeline for this project, Mathematica relied on in-depth interviews with key stakeholders in the state and LTC industry to provide information related to the state's preparedness and response. In most cases, Mathematica could verify the information stakeholders provided by reviewing written documentation from the state. But in some cases, verification was not possible either because the documentation was not available or there was insufficient time to locate the source. In those cases, Mathematica relied on the views and experiences of the stakeholders interviewed, and the report includes such perspectives if two or more stakeholders reported them during interviews.¹

Mathematica worked with DPH to ensure we interviewed a wide variety of stakeholders with a range of perspectives to inform the assessment contained in this report. However, a few individuals that Mathematica contacted for an interview—including at DPH and the Governor's office—did not respond to our requests after repeated attempts.

This report does not analyze COVID-19 cases and deaths among staff working in LTC facilities due to a lack of sufficient data available. Section V.C.2.d discusses the data that are available and presents the available information on the toll of COVID-19 on direct care staff.

¹ Throughout this report, we use the terms *some* or *several* to refer to perspectives shared by two or three stakeholders, whereas the term *many* refers to information shared by four or more individuals. In some instances, we have included information not reported by two or more stakeholders to ensure we captured the range of experiences and perspectives.

Finally, due to travel restrictions and visitation lock downs at LTC facilities that were in place during the period of performance, Mathematica did not conduct any in-person visits to LTC facilities in the state. Instead, Mathematica conducted all stakeholder interviews by telephone and video conferences.

B. Similar assessments done by other states

Since the beginning of the pandemic, states across the country have monitored and assessed the impact of COVID-19, taking a variety of actions to mitigate the spread of COVID-19 in LTC facilities and protect the health and well-being of LTC facility residents and staff. These actions include issuing executive orders, releasing regulatory guidance and policies, and enacting state legislation that address many issues, including LTC facility visitation, testing of residents and staff, availability of and funding for personal protective equipment (PPE) and other resources, staff compensation and workforce capacity, hospital discharges, facility oversight and monitoring, emergency preparedness, health disparities and residents' quality of life.

Like Connecticut, many other states also have undertaken an assessment of the COVID-19 outbreak in LTC. Reports similar to this one have been undertaken in Arizona, Colorado, Michigan, New York, New Jersey, and Virginia (Arizona Department of Health Services 2020; Colorado Department of Public Health & Environment 2020; Michigan Nursing Home COVID-19 Task Force 2020; New York State Department of Health 2020a; Manatt Health 2020; Virginia Department of Health 2020). In addition, the federal Centers for Medicare & Medicaid Services (CMS) released a report on September 17, 2020, from its independent Coronavirus Commission on Safety and Quality in Nursing Homes (MITRE 2020). Where relevant, this report highlights findings and recommendations from these other assessments that are relevant to Connecticut.

C. Organization of this report

Section II of this report presents short- and long-term recommendations for Connecticut and the LTC industry. Section III assesses facility- and resident-level data to quantify the impact of COVID-19 on residents in LTC facilities. Section IV assesses the state's preparedness and response to the COVID-19 outbreak in LTC facilities. Section V assesses the industry's preparedness and response to the COVID-19 outbreak. Section VI presents conclusions.

Appendix A describes in detail the methods used in this study and Appendix B contains supplementary tables and figures from the data analysis. Appendix C contains timelines of select federal and state policy and guidance in response to the COVID-19 outbreak from March through September 15, 2020.

II. Recommendations to Help Connecticut Prevent and Prepare for Future Infectious Disease Outbreaks in LTC Facilities

This report presents 45 recommendations: 23 short-term recommendations (SRs) for immediate and achievable steps the state and LTC industry can take to prepare for a potential second wave of COVID-19 and 22 LRs to prepare for future disease outbreaks in LTC facilities. The report organizes the recommendations into 10 themes: person-centered care; surveillance and outbreak response; emergency response; screening and testing; infection control; LTC staffing and workforce availability; state agency roles, expertise, and skills; communication and coordination across state agencies, facilities, and support organizations; care transitions; and reimbursement mechanisms.

The report numbers the recommendations for easy reference to them; the numbering approach does not indicate any rank ordering of recommendations. Many of these recommendations are complementary and would have to be implemented concurrently to have the greatest impact.

Mathematica acknowledges that the state has already begun implementing some of these recommendations. In those instances, we recommend that the work continue.

A. Person-centered care

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR1:** LTC facilities and their state regulators must balance strict measures designed to limit the spread of the virus with the need to support the physical, emotional, and psychosocial needs of LTC residents.
 - The state and LTC industry must continue to prioritize person-centered care, which is care that meets residents' physical, emotional, and psychosocial needs and gives them choices and control over their daily lives.
- **SR2:** Facilities should ensure resident care plans reflect COVID-19-specific impacts on individual residents.
 - Resident care plans should address social supports, a plan to prevent isolation and loneliness, any risk factors for depression, and how nursing homes meet residents' needs when family members are not allowed in the building.
- **SR3:** Facilities should continuously assess the appropriateness of any policy that restricts the movement of residents within their facility.
 - The state should support facilities with appropriate guidance on resident restrictions based on the prevalence of COVID-19 in each facility and with input from representatives of the LTC industry, residents and resident councils, family members, the LTC ombudsman, and state regulators.
- **SR4:** Recognizing that visitation is an important resident right, the state should develop a framework to guide policies on the reopening of LTC facilities to visitors based on a set of criteria. The framework could be modeled on those developed by other states and would allow facilities to reopen based on meeting specified criteria at the facility and community levels, rather than a one-size-fits-all statewide policy that does not consider facility and local indicators (Minnesota Department of Health 2020a; Arizona Department of Health Services 2020).

- Criteria included in the visitor reopening framework should include availability and frequency of testing, community prevalence of COVID-19, and the facility-level PPE stockpile, among others.
- **SR5:** The state should work with facilities that meet certain criteria to designate essential caregivers (family members and private duty aides hired by the family) who would have increased access to LTC facilities to fill a defined role for specific residents.
 - This would be similar to an approach taken in Michigan that allows these individuals to be in the facility for two to three hours per day to provide care and assistance to residents, and one in Minnesota, which recommends allowing essential caregivers access to the facility for up to three hours per day (Robert 2020; Minnesota Department of Health 2020b).
 - DPH should issue guidance to facilities for designating these caregivers. For example, the Department should require essential caregivers to comply with facility policies for screening, regular COVID-19 testing, and training in appropriate donning and doffing of PPE. DPH should also specify criteria that facilities need to meet in order to implement this policy.
 - The state should consider granting limited immunity to facilities for any adverse events that arise as a result of allowing essential caregivers access to the facility if all other requirements for screening, training, and testing are met.

B. Surveillance and outbreak response

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR6:** DPH should continue infection control focused surveys, targeting more frequent surveys in nursing homes with ongoing or increasing infections.
 - Surveyors should continue to provide technical assistance and real-time remedial instruction to facilities during these surveys to ensure compliance with state regulations.
- **SR7:** DPH should ensure all temporary survey staff, including National Guard personnel, complete basic and ongoing training to conduct surveys consistently and thoroughly, including training on infection control and prevention.
 - Industry stakeholders reported survey teams can be an important source of communication and guidance. To this end, it is critical that all personnel conducting infection control focused surveys receive basic and ongoing training on how to conduct surveys and issue citations consistent with CMS guidelines.
 - Opportunities for ongoing communication and guidance to surveyors are also important. DPH should continue to assess the frequency of meetings with surveyors and provide written summaries for those who cannot attend.
- **SR8:** All Facility Licensing and Investigations Section (FLIS) staff or other personnel conducting in-person surveys in nursing homes should be regularly tested for COVID-19 to ensure that surveyors do not become a source of possible infection among residents or staff.

2. Longer-term recommendations to prevent future outbreaks

- **LR1:** The state should explore ways to reduce duplicate case reporting to minimize burden on facilities and the state and reduce the risk of data errors.

- For example, the state could map which data elements and metrics related to census, cases, PPE, and so on are reported by facilities to multiple reporting streams and eliminate overlap. The state should explore integrating reporting systems or automating uploads from one system to another.
- Streamlining reporting requirements might help free LTC facility, DPH, and contractor personnel from ensuring data accuracy and timeliness toward efforts to strengthen infection control procedures.
- **LR2:** The state should make participation in the Mutual Aid Plan (MAP) mandatory for assisted living communities.
 - The requirement that assisted living facilities report to MAP under Executive Order Number 7EE (Lamont 2020a) should be made permanent to ensure the state has immediate access to data from these facilities anytime there is a future activation of the state’s Mutual Aid Plan (Lamont 2020a).
 - The state should ensure membership fees in the MAP are equal for all participants to eliminate potential barriers to entry for MAP participation or consider a sliding fee scale based on facility revenue.
- **LR3:** The state should make infection control training mandatory for the designated on-call nurses at assisted living service agencies that provide services to adults living in assisted living facilities.²
 - Before the pandemic, Connecticut was one of only nine states (as of 2019) without any specific regulations that addressed infection control policies in assisted living communities (Bucy et al. 2020).

C. Emergency response

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR9:** The state should develop plans for a potential second wave in consultation with representatives from the state legislature, LTC industry and home and community-based services (HCBS) providers, residents, and family members.
 - Early planning and response efforts focused on hospital capacity, with nursing homes viewed primarily as a backstop to alleviate high demand for acute care beds. Ongoing emergency planning and response efforts should include representatives of the LTC industry, including HCBS providers, and LTC residents and family members to address their unique needs.
- **SR10:** The state should continue its planning efforts to scale up COVID-19 recovery facility (CRF) capacity as needed and deploy it quickly in response to the scope and severity of a second wave.
 - LTC facilities should continue to have the option to transfer COVID-19-positive residents directly to a CRF without first transferring them to the hospital.
 - DPH has developed three CRF models; Mathematica recommends DPH use Models 2 and 3 for ongoing CRF capacity to avoid the trauma of moving residents out of the facilities where they live. Section IV.C.2.B provides more information.

² According to state regulations “Connecticut does not license assisted living facilities; instead it licenses and regulates the ‘assisted living service agencies’ that provide assisted living services” within the facilities considered managed residential communities in the state’s regulations. See <https://www.cga.ct.gov/2012/rpt/2012-R-0244.htm#:~:text=Connecticut%20does%20not%20license%20assisted,that%20provide%20assisted%20living%20services.&text=An%20MRC%20can%20become%20a,existing%20ALSA%20to%20provide%20services>.

- **SR11:** The state should explore executing per diem contracts for staff extenders now to ensure resources are available for a timely response to a potential second wave.
 - State agency staff reported using outside contractors for subject matter expertise and general staff extension in the first wave of the COVID-19 response. Contracts for similar resources could be put in place now (for example, with testing lab Care Partners, housing contractors to house staff that need to quarantine, and per diem staff) to quickly scale up the state's response to future waves.

2. Longer-term recommendations to prevent future outbreaks

- **LR4:** The state should revise its emergency response plans to explicitly include LTC facilities and HCBS providers.
 - The revised plans should recognize these settings and providers as critical health care assets and detail a specific response that addresses the unique risks and needs of residents and staff in those settings, drawing on the lessons learned from the COVID-19 response.
- **LR5:** Planning for and responding to future infectious disease outbreaks should include representatives of the LTC industry and HCBS providers.
 - The earliest response to COVID-19 in Connecticut did not include these perspectives and, as a result, those settings were somewhat neglected due to the focus on hospitals.
- **LR6:** The state should explore creating a mechanism to redeploy furloughed licensed health care personnel from other settings to LTC facilities and HCBS providers during future outbreaks.
 - For example, if outpatient clinics are closed or health care staff are furloughed as a result of decreased demand, those staff could be redeployed to LTC facilities or HCBS providers to make up for staffing shortages in those settings.
 - One approach could be similar to the Massachusetts COVID-19 LTC Facility Staffing Portal, which matches demand for staffing needs with potential staff. As of May 2020, 1,900 individuals had applied to meet the demand for jobs posted on the portal (MassHealth 2020).

D. Screening and testing

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR12:** DPH should continuously revisit its guidance on testing LTC facility residents and staff as new information becomes available or testing guidance from the CDC evolves.
 - For example, the state recently changed its resident and staff testing guidance to align with the CDC recommendations to base testing on community prevalence.
- **SR13:** DPH should continue to assess the Care Partners testing program to ensure it meets its intended goals.
 - The Care Partners program aims to provide a dedicated testing partner to each nursing home in the state to process tests of residents and staff. DPH should examine how well these matches work, ensure assignments consider geographical distance between facilities and Care Partner contractors, and ensure that they allow for some flexibility for facilities to continue using their existing lab relationships as appropriate.

2. Longer-term recommendations to prevent future outbreaks

- **LR7:** As new testing technology receives Food and Drug Administration approval the state should continue to review its Medicaid reimbursement to ensure they incentivize efficient use of resources.
 - For example, if a combined COVID-19 and influenza test becomes available, Medicaid reimbursement policy should ensure facilities are not incentivized to test separately, which could create undue pressure on laboratory capacity.
- **LR8:** Facilities should consider increasing the testing frequency of some residents at higher risk, beyond current requirements.
 - Our analysis found increased risk of contracting COVID-19 among residents who frequently leave the facility for dialysis or other outpatient treatment.
- **LR9:** The state should issue guidance on recommended screening and testing strategies for visitors to LTC facilities as visitation policies expand and the change in seasons limits the ability to conduct outdoor visits (see also SR4).
 - For example, the guidance could require that visitors get tested and self-isolate while waiting for the results before visiting a facility. The state could look to policies instituted by health systems for elective surgeries that require testing 48 hours in advance as an example of a potential best practice.

E. Infection control

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR14:** Due to the role of community prevalence in driving COVID-19 outbreaks in facilities, everyone living in or visiting Connecticut should continue to heed guidance from the state and national authorities to ensure community spread remains low.
 - This includes continuing to maintain social distancing, wearing a mask while in public, practicing good hygiene, staying home when feeling sick, and getting a flu shot to protect yourself and others from infection.
- **SR15:** Facilities should consider the rooming assignments of high-risk residents on units in such a way that reduces exposure of others on the unit.
 - For example, facilities could assign residents who frequently leave the facility for dialysis or other outpatient treatment a room at the end of a hallway near an exit to allow for easier transfers.
- **SR16:** Facilities should ensure they have an adequate stockpile of PPE that is available and accessible to staff on every shift.
 - Facility management should ensure someone on every shift has access to the PPE supply if the supplies are stored in locked containers.

2. Longer-term recommendations to prevent future outbreaks

- **LR10:** Connecticut should broaden qualifications for an infection preventionist and expand the role to full-time in all nursing homes. Medicaid payment rates should be adjusted to cover the extra cost of full-time positions.

- The state could broaden the training for infection preventionists to align with the federal rules of participation for nursing homes, which state this position can have training in nursing, medical technology, microbiology, epidemiology, or other related fields (§42 CFR 483.80.b.1).
- The state and LTC industry should work with community colleges and other training programs to meet the increased demand for infection control and prevention training and certifications.
- **LR11:** The state should continue to maintain a stockpile of PPE that is available to LTC facilities in case of future increases in COVID-19 or other infectious diseases that are accompanied by breakdowns in the supply chain and lack of availability from the Strategic National Stockpile.
- **LR12:** As evidence emerges regarding the role of building design and ventilation, LTC facilities should consider changing their physical environments to better limit the spread of an airborne virus similar to COVID-19. The state could support these building renovations by guaranteeing loans for facilities.
- **LR13:** When vaccines to provide protection from COVID-19 become available and are proven safe and effective for vulnerable populations, state distribution plans should designate LTC residents and staff as having priority to receive them.
 - On September 21, Governor Ned Lamont announced the creation of a special commission that would establish priorities for distribution of an eventual vaccine. This group should consider the unique risks of LTC facility residents and staff in prioritizing receipt of a vaccine.

F. LTC staffing and workforce availability

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR17:** Facilities should adopt staffing policies that can help limit potential exposure for staff and residents, such as the following:
 - Facilities can use two 12-hour shifts instead of three 8-hour shifts to limit entry and exit of staff to the building while maintaining staffing levels.
 - Facilities should also explore strategies, such as increasing full-time staff positions, to limit the number of staff working in multiple facilities (for example, fewer moonlighting staff).
 - Facilities should consistently assign staff to work on the same unit and with the same residents.
- **SR18:** The state should extend the temporary suspension of in-state licensure requirements for as long as the public health emergency is in effect.
 - Before the pandemic, Connecticut was 1 of only 10 states without a nurse licensing compact in place to allow licensed staff from out of state to work in its health care facilities (National Council of State Boards of Nursing 2020). The temporary lifting of licensing requirements has given the LTC industry needed flexibility to bring in staff from out of state.

2. Longer-term recommendations to prevent future outbreaks

- **LR14:** Connecticut should increase the minimum required staffing ratios in nursing homes and may need to consider financing mechanisms to raise the Medicaid reimbursement rate to support greater increases in direct care workers' pay and benefits.
 - At a minimum, the state could increase staffing ratios in all nursing homes to match the ratios required in CRFs. The state could also consider increasing the minimum staffing ratios to match

the staffing levels required for a 4- or 5-star staffing rating. CMS identified these staffing thresholds in its staffing study, which set thresholds based on clinical evidence on the relationship between staffing and quality (CMS 2020a).

- **LR15:** The state should ensure all LTC facility staff and HCBS providers have access to guaranteed paid sick time under the state's existing paid sick leave regulations.
- **LR16:** If any nursing homes close due to declining occupancy rates as a result of COVID-19, the state should work with local colleges and universities to facilitate opportunities for staff retraining in HCBS jobs.

G. State agency roles, expertise, and skills

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR19:** The state should designate qualified staff or contractors that can provide technical assistance to LTC facilities regarding infection control guidelines.
 - DPH employees in the Infectious Disease section reported providing significant assistance to facilities during regular provider calls, which industry stakeholders described as helpful.
 - To the extent possible, the state should explore whether additional resources can provide further technical assistance given the demands on the time of infectious disease staff. Staff providing technical assistance should have education and experience in infection control and prevention, epidemiology, and knowledge of the regulatory requirements of LTC facilities.
 - The state should set up a single point of entry for facilities to access this expertise.

2. Longer-term recommendations to prevent future outbreaks

- **LR17:** The state should conduct a comprehensive assessment of DPH staffing needs, including number of staff, skills required for topics including infection control and emergency response, and interaction with other groups within and outside of DPH.
 - The state should look to the staffing approaches used in other similar states as a model. The assessment should consider lessons learned related to the state agency resources needed to respond to COVID-19.

H. Communication and coordination across state agencies, facilities, and support organizations

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR20:** DPH should supplement its weekly calls with LTC facilities by providing written summaries following each call and archiving guidance in a central place (for example, via Blast Faxes or the MAP website).
 - At the end of August, DPH began adding written summaries and recordings of weekly webinars to the MAP website to address this recommendation.
 - DPH should organize blast fax records by date, provide a brief summary of the content in each document, and list the newest documents first. DPH currently posts blast faxes on two websites

(the FLIS website and the LTC MAP); the state should ensure information is consistent across these sites.

- **SR21:** Facilities should ensure family members can obtain accurate and timely information on residents' health and well-being.
 - Family members reported challenges obtaining information about their loved ones from facilities. Facilities should provide weekly written updates on the situation in each facility and designate a single point of contact for family members to request updates on individual residents.
 - The Ombudsman program should facilitate communication between families and facilities when families do not receive timely information about residents.

2. Longer-term recommendations to prevent future outbreaks

- **LR18:** The state's LTC Planning Committee, comprising elected officials and state agency representatives, should increase the frequency of meetings and add agenda topics related to the COVID-19 response moving forward.
 - This committee currently meets quarterly but recent meeting agendas have not discussed the effects of COVID-19 (Connecticut Office of Policy and Management 2020a).
 - The committee should invite state associations for nursing homes, assisted living communities, and HCBS providers to participate on this committee to formalize a venue for communication with the industry.

I. Care transitions

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR22:** The Connecticut Department of Social Services (CT DSS) and contracted access agencies should work with hospitals to facilitate discharge of older adults and people with disabilities with COVID-19 to home and community-based settings, rather than nursing homes, with appropriate home health and other supports and care coordination.

2. Longer-term recommendations to prevent future outbreaks

- **LR19:** The state should ensure all LTC residents receive counseling on their options to receive services in the community and support those who want return to the community
 - The state should ensure continued support to state Medicaid programs (Money Follows the Person, My Community Options, and MyPlaceCT.org) that help people who need long-term services and supports (LTSS) return to or remain in the community, if that is their preference.
 - CT DSS should ensure sufficient resources to deliver adequate HCBS and PPE, including grocery and medical supplies, to beneficiaries' homes and prioritize COVID-19 cases.
- **LR20:** The state should support nursing homes that want to develop business plans to repurpose their facilities to provide community-based care.
 - For example, Connecticut's right-sizing plan provides grants to nursing facilities to develop new business plans that repurpose their physical space for community-based care such as adult day programs, with funds supporting architectural and site development plans, and potentially for construction costs.

J. Reimbursement mechanisms to support increased LTC system costs

1. Short-term recommendations to mitigate a second wave of COVID-19

- **SR23:** The state should continue to assess how it supports facilities with the cost of widespread resident and staff testing.
 - The state announced on August 5 that it would continue to cover the cost of testing LTC facility residents and staff through October 31.

2. Longer-term recommendations to prevent future outbreaks

- **LR21:** The state should ensure the ongoing cost of nursing facility resident and staff COVID-19 testing, as well as PPE, are adequately covered by the state's Medicaid reimbursement rates.
- **LR22:** The state should consider tying a component of Medicaid reimbursement for LTSS in nursing facilities and in home and community-based settings, to provider performance on quality metrics such as those used to calculate the CMS star ratings.

III. Assessment of the COVID-19 Outbreak in Connecticut on Residents in the State's LTC Facilities

Residents of Connecticut's LTC facilities were devastated by the pandemic. As of the end of July, nursing homes reported 2,849 residents had died because of COVID-19³ and assisted living facilities reported an additional 349 deaths for a total of 3,198 deaths in Connecticut LTC facilities. In total, deaths in LTC facilities represented 72 percent of the state's 4,432 total deaths from COVID-19.

Key factors explaining variation in the extent of the spread of the virus across nursing homes included community prevalence and staffing ratings. However, even within nursing homes, cases and deaths varied substantially across residents, often reflecting the demographic characteristics and health conditions associated with COVID-19 risk, as well as the frequency of interaction with staff and providers outside the facility. Moreover, COVID-19 cases and deaths alone do not capture the full impact of the pandemic on residents' well-being; nursing home residents also experienced substantial deterioration in health and functioning because of the indirect effects of the pandemic, such as reduced visitation and changes in the provision of care.

Connecticut has 216 licensed nursing homes; the 212 that report data on the number of COVID-19 cases and deaths in the state's regular reports were the focus of our analysis. Appendix Exhibit B.1 contains descriptive statistics of these 212 nursing homes. Connecticut also reports data on COVID-19 in 133 assisted living facilities in the state's regular reports. Appendix Exhibit B.2 contains descriptive statistics of these assisted living facilities.

In this section, we first summarize the extent of the outbreak in Connecticut as a whole. This summary provides important context to understand what was happening outside the walls of LTC facilities, but where staff returned to each day. We next discuss the impact of the pandemic on residents of Connecticut's nursing homes relying on a broad range of data sources. We examine the characteristics associated with the spread of COVID-19 across nursing homes and the characteristics associated with the spread within individual residents of nursing homes. We also compare the extent of the outbreak among nursing home residents in Connecticut to those in nearby states. In addition, we examine how the pandemic affected residents' well-being. Finally, we examine the impact of the pandemic on residents in assisted living facilities.

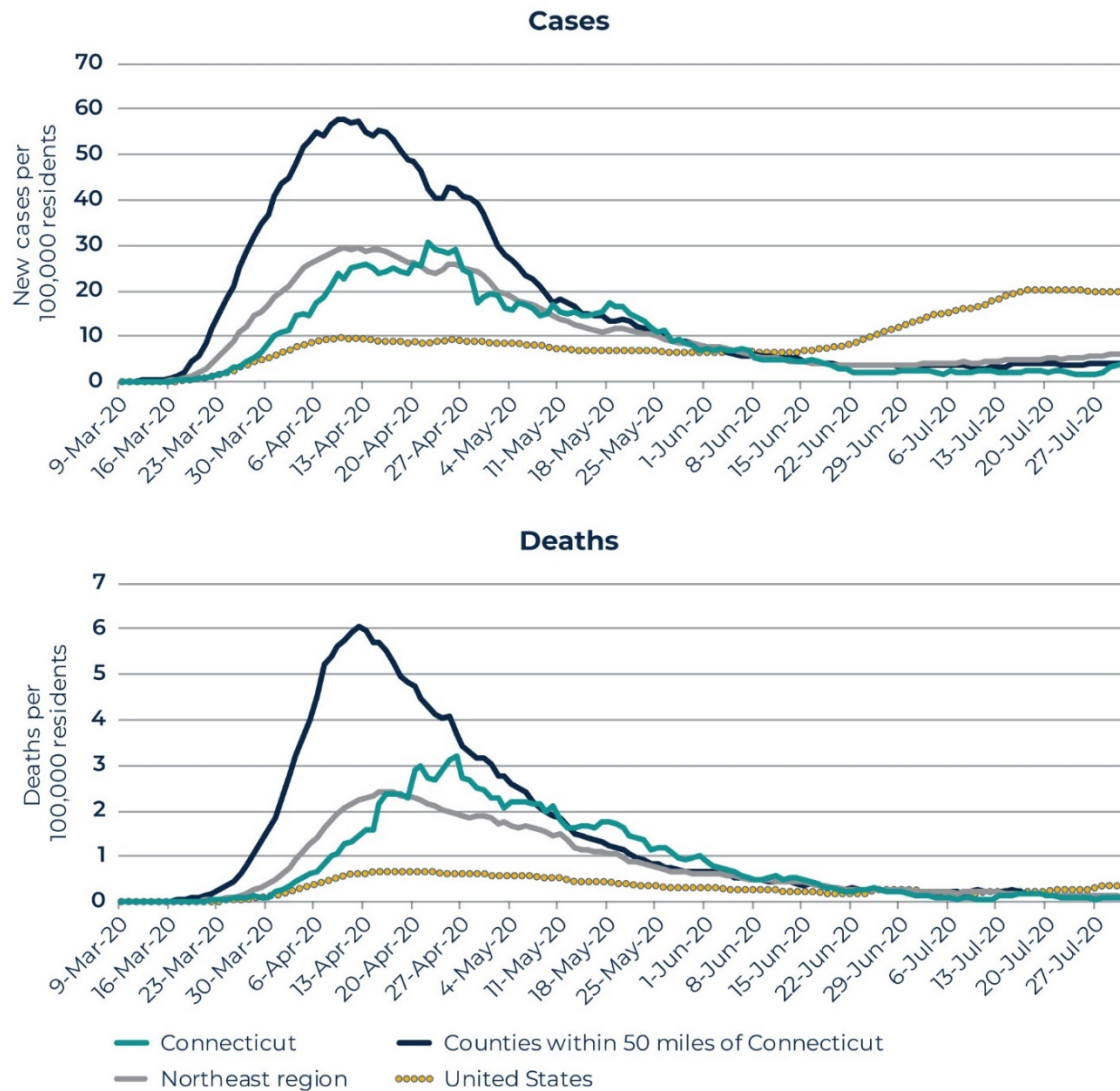
A. Connecticut as a whole

Connecticut was among the states most adversely affected by the pandemic. In total, by the end of July 2020, nearly 50,000 residents had contracted COVID-19 and more than 4,400 had died. The number of new cases and deaths peaked in Connecticut in late April 2020, with new cases reaching 30.9 per 100,000 residents on April 22 and deaths reaching 3.2 per 100,000 residents on April 26 (Exhibit 1). The COVID-

³ We focus our analysis through the end of July because of concerns about a change in reporting. However, as of September 10, the state reported only 58 new cases and 28 new deaths since July 22, so all findings would be essentially unchanged if we considered a broader time horizon. As described in the DPH weekly reports on COVID-19 cases in nursing homes, DPH and CMS require Connecticut nursing homes to report on the impact of COVID-19 on their residents and staff through the CDC National Healthcare Safety Network (NHSN). Connecticut DPH began reporting NHSN data from June 17, 2020. Cumulative data for residents was rebaselined on July 15 and on July 21 to account for false positives detected that week. Due to the different data collection and processing methods for NHSN and data sources used before this source to report on COVID-19 cases and deaths, DPH does not sum the data before and after the rebaselining on July 21, 2020, due to possible duplication of cases and deaths between prior and current data reported.

19 outbreak was more severe in Connecticut than the United States as a whole early in the pandemic, but new cases and deaths nationally have remained higher than new cases and deaths in Connecticut since mid-to-late June (Exhibit 1). Connecticut also had more new cases and deaths than the Northeast region, but fewer cases and deaths than counties within 50 miles of Connecticut in neighboring states.⁴

Exhibit 1. New COVID-19 cases and deaths in Connecticut, neighboring states, and the United States



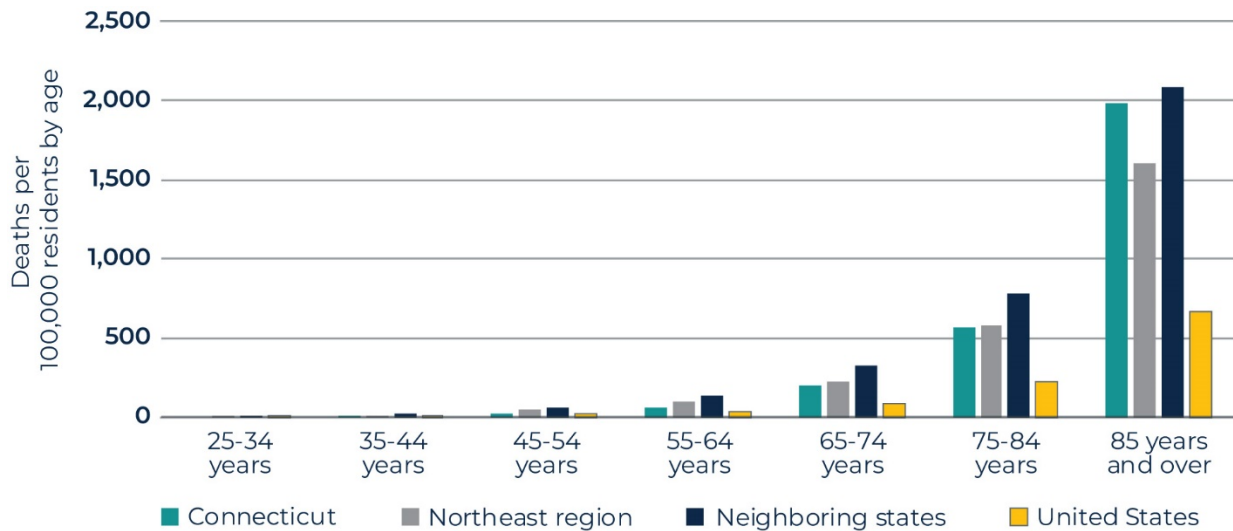
Source: Mathematica's analysis of data collected from Johns Hopkins University, the *New York Times*, and the U.S. Census Bureau.

Note: The figures depict the seven-day moving average of new COVID-19 cases and deaths. The Northeast region includes Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Washington, DC. Analyses are based on cases and deaths reported through the end of July 2020.

⁴ We also analyzed rates of transmission for Connecticut and states in the northeast region, which were mostly comparable from April to July (Appendix Exhibit B.3). We also analyzed rates of transmission for each of Connecticut's counties, with some variation over time by geography (Appendix Exhibit B.4).

Adults ages 85 and older were most severely affected by the pandemic (Exhibit 2). In Connecticut, the death rate among adults ages 85 and older was 1,991 per 100,000 residents, more than 3 times the rate of those ages 75 to 84, and 10 times the rate of those ages 65 to 74. The death rate in Connecticut for adults ages 85 and older was most similar to those in neighboring states, where deaths per 100,000 residents exceeded 2,000. In all regions, death rates increased with age.

Exhibit 2. Total COVID-19 deaths per 100,000 residents, by age group, in Connecticut, neighboring states, and the United States

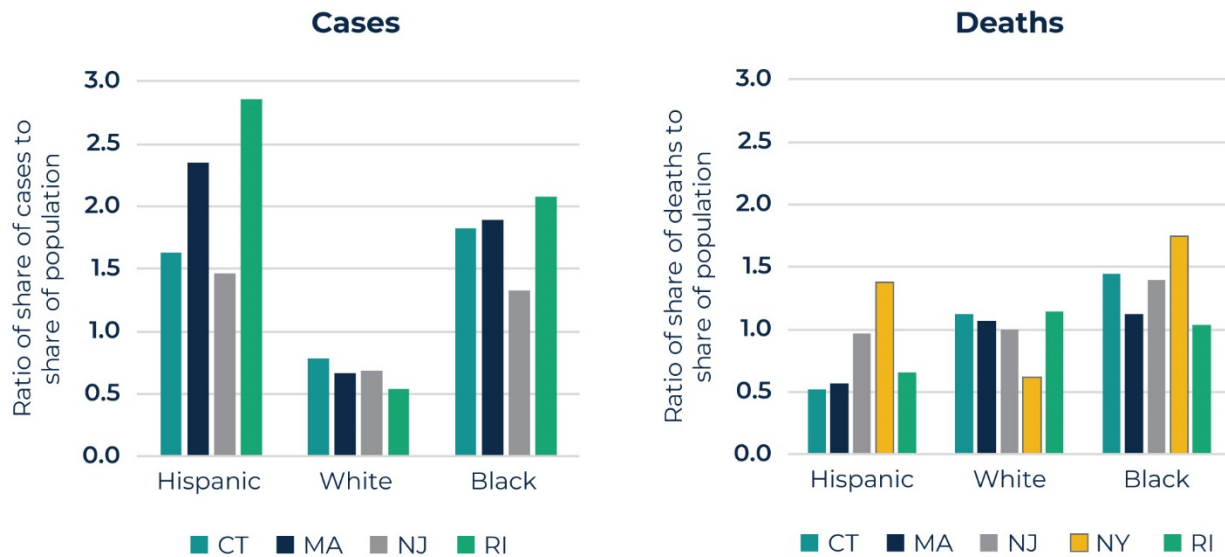


Source: Mathematica's analysis of data collected from the Centers for Disease Control and Prevention and the Census Bureau.

Note: Neighboring states include Massachusetts, New Jersey, New York, and Rhode Island. The Northeast region includes these four states plus Delaware, Maine, Maryland, New Hampshire, Pennsylvania, Vermont, and Washington, DC. Analyses are based on deaths reported through the end of July 2020.

COVID-19 cases in Connecticut were disproportionately higher among Hispanic and Black residents than White residents, but deaths attributable to COVID-19 were higher for Black residents and lower for Hispanic residents relative to White residents (Exhibit 3). The higher relative death rate for White residents is due largely to differences in the age distribution for people of different race and ethnicity; in Connecticut, 88 percent of residents older than 85 are White, whereas only 4 percent are Hispanic. Among Connecticut residents of all ages, however, 66 percent are White and 17 percent are Hispanic. Patterns for COVID-19 cases and deaths by race and ethnicity were similar in Massachusetts and Rhode Island, which also have comparable age and racial distributions to Connecticut. In New York, deaths attributable to COVID-19 were disproportionately higher among Hispanic residents than White residents, which might be because a much larger share of the population older than 85 in New York are Hispanic (10 percent).

Exhibit 3. Ratio of the share of total COVID-19 cases and deaths, by race and ethnicity, to share of population in Connecticut and neighboring states



Source: Mathematica's analysis of data collected from the COVID-19 racial data dashboard as compiled by the COVID Tracking Project and the Census Bureau.

Note: Each bar represents the ratio of the share of COVID-19 cases or deaths for that racial or ethnic group (among those for which race or ethnicity is known) divided by the group's share of the general population. The ratio of cases excludes New York because it does not report the racial composition of cases. Analyses are based on cases and deaths reported through the end of July 2020.

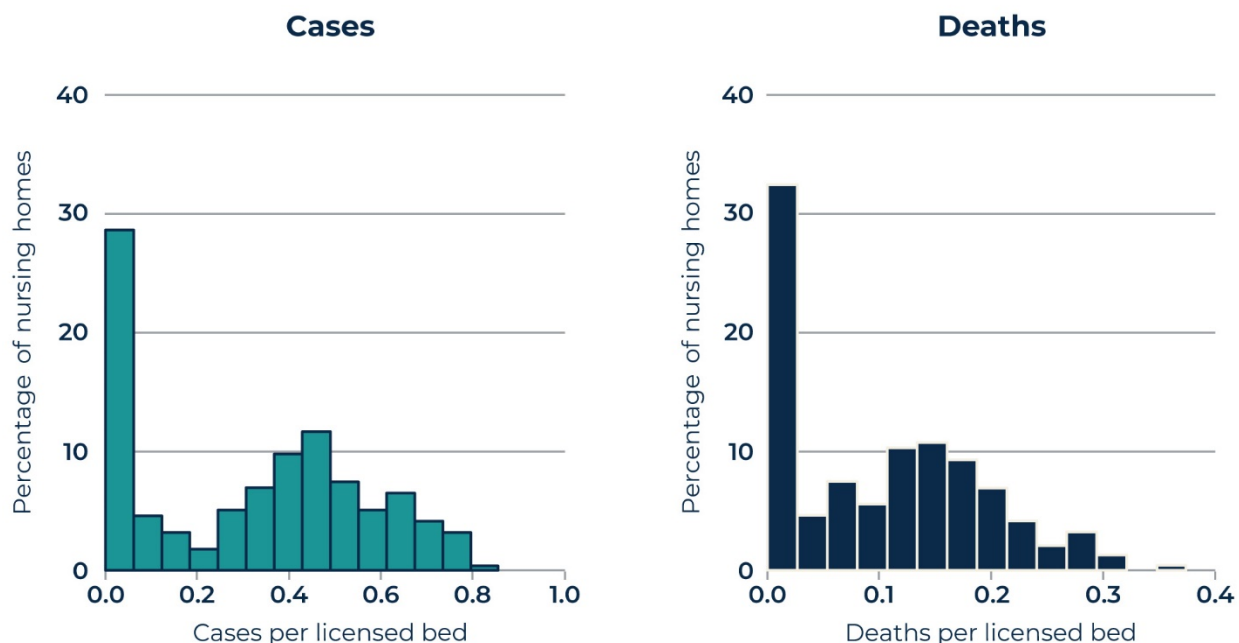
B. Residents of Connecticut nursing homes

The pandemic severely affected residents of Connecticut's nursing homes, with facilities across the state reporting nearly 3,000 residents who died from COVID-19⁵ and almost 9,000 residents who contracted the disease through the end of July. However, COVID-19 cases and deaths were concentrated in certain nursing homes in Connecticut. About 26 percent of nursing homes reported more than 0.5 cases per licensed bed, and 15 percent had more than 0.2 deaths per licensed bed (Exhibit 4). While COVID-19 had a large impact on residents in a subset of nursing homes, 16 percent of nursing homes had no cases and 26 percent had no deaths among their residents.⁶

⁵ Throughout this report, we refer to deaths from COVID-19 as those for which COVID-19 is listed on someone's death certificate. This does not necessarily mean that COVID-19 is the primary cause of death.

⁶ The histogram in Exhibit 4 does not show the share of nursing homes with zero cases or deaths. The first bar in Exhibit 4 corresponds to zero or a low amount cases or deaths. Because histograms show a continuous distribution, not the distribution at a single value, it does not indicate the percentage of nursing homes with zero cases or deaths.

Exhibit 4. Total COVID-19 cases and deaths per licensed bed in Connecticut nursing homes



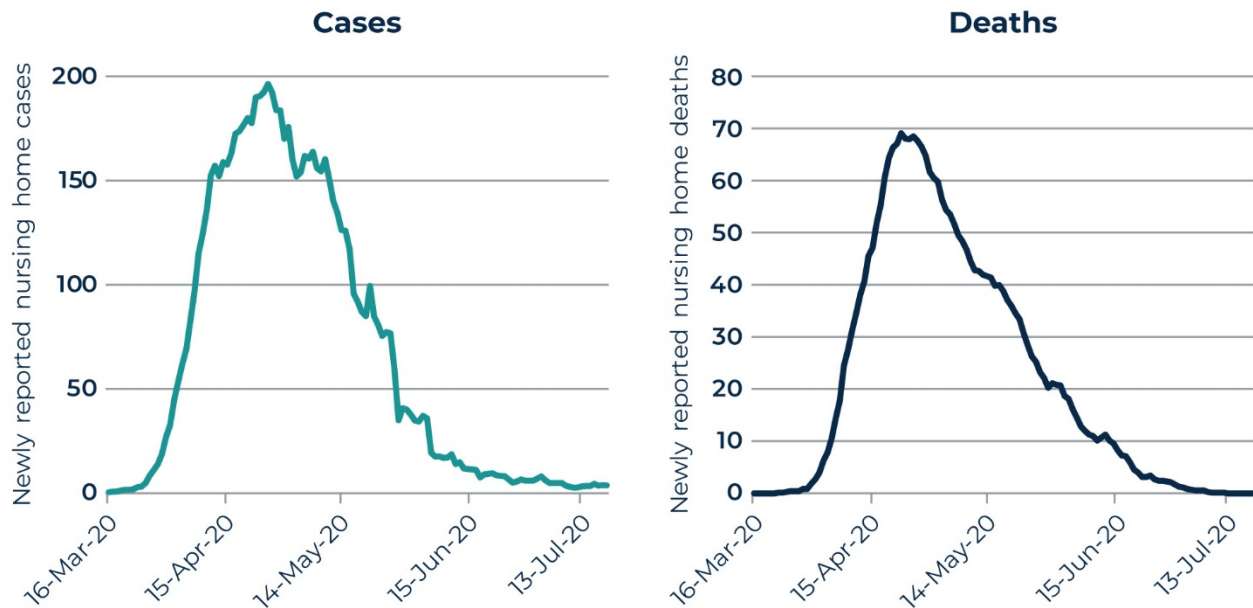
Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. The data reflect total cases and deaths in nursing homes reported by July 22, 2020.

FLIS = Facility Licensing and Investigations Section.

Similar to the patterns for the state as a whole, the COVID-19 outbreak among residents in Connecticut nursing homes peaked in mid-April, when an average of nearly 200 new cases and 70 new deaths were reported daily (Exhibit 5). New cases and deaths dropped to close to zero by mid-July and remained low through mid-September.

Exhibit 5. New COVID-19 cases and deaths in Connecticut nursing homes



Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22, 2020; Connecticut's Vital Records death data; and MDS data.

Note: Cases include only those with a confirmed positive test with a nonmissing date. Deaths include those who died from COVID-19 where the person was in a nursing home. We confirmed this either by matching to the list of residents in each nursing home or by using the address for the place of death or place of residence.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

Across the state, 2,849 people in nursing homes died from COVID-19 through the end of July, of whom we could identify characteristics in nursing home resident assessment data for 2,612 of them (more than 90 percent). About 36 percent of those who died were short-stay residents, meaning they had been in the nursing home for fewer than 100 days at the time of their death (Appendix Exhibit B.5). Most people who died were women (56 percent). More than 80 percent of those who died in nursing homes were White, 13 percent were Black and 5 percent were Hispanic. The average age of those who died from COVID-19 in nursing homes was 83 and ranged from 33 to 108. Three-quarters of those who died in nursing homes were older than 75.

In this section, we present results from a variety of analyses designed to understand the effects of COVID-19 in Connecticut's nursing homes. These analyses identify characteristics of facilities and characteristics of residents that predicted the spread of COVID-19, which help to understand why the disease spread and in turn suggest important ways to prevent the disease from spreading in the event of a second wave.

First, we look at characteristics at the nursing home level, characteristics of both the facility and its residents, to understand the spread across all nursing homes. Second, we analyze patterns within nursing homes to assess how the disease spread across individual residents and across wings within a nursing home. Third, we compare outcomes between Connecticut and other nearby states; if outcomes differed, it might indicate state policies were important to explaining the variation in cases and deaths. Finally, we

analyze the impact of the pandemic on residents' well-being and quality of life, which must be considered in assessing the need for policies designed to mitigate the spread of COVID-19.

1. Spread of COVID-19 across Connecticut nursing homes

a. Summary of findings

Both nursing home and residents' characteristics were important in predicting where and how much COVID-19 spread:

- Nursing homes with high staffing ratings had significantly fewer cases and deaths per licensed bed.
- Nursing homes in towns that had more cases experienced more cases and deaths.
- Nursing homes with more residents that received dialysis and cancer treatments, which tend to be delivered off site, had more cases per licensed bed.

Recommendation SR4

Recognizing that visitation is an important resident right, the state should develop a framework to guide policies on the reopening of LTC facilities to visitors based on a set of criteria.

Taken together, these findings suggest mitigating future risk depends on both reducing the likelihood that COVID-19 can enter the nursing home and limiting the spread if it is introduced.

In total, the multivariate regression model can explain about one-third of the variation in cases per licensed bed ($R^2 = 0.34$) and deaths per licensed bed ($R^2 = 0.33$). Thus, other factors not included in the model that we cannot measure are also important in understanding why some nursing homes experienced more severe outbreaks. These factors include the potential impact of asymptomatic spread by staff early in the outbreak, availability of PPE within each nursing home as well as appropriate use by staff, and random chance.

b. Methodology

To understand the spread of COVID-19 across nursing homes, we analyzed whether certain facility- and resident-level characteristics were correlated with the number of cases and deaths per licensed bed in nursing homes. This analysis identifies where COVID-19 was more pervasive and which types of nursing homes were more susceptible. We considered several nursing home characteristics, such as geographic location, size, profit and chain status, and Nursing Home Compare star ratings. We also considered characteristics of residents in nursing homes, such as residents' demographic and health characteristics. The findings from these analyses can help the state and individual facilities better target their resources and response in the event of a potential second wave of COVID-19.

We first present results from a multivariate regression model, which takes into account that many of the characteristics are correlated. For example, Mathematica's interim report found significant relationships between COVID-19 cases and deaths and facility profit status and staffing ratings, but the two are correlated: for-profit nursing homes are substantially less likely to have high staffing ratings. The multivariate regression model teases out which of the characteristics matters more, holding all others constant. In the example, staffing ratings are more predictive than for-profit status. We used a feature selection model to identify characteristics that were important to understanding the variation in cases and

deaths per licensed bed;⁷ we included this set of important characteristics in the multivariate regression model to subsequently assess their statistical significance. We also present the bivariate (unadjusted) relationship between each nursing home characteristic and COVID-19 outcomes. For a more detailed discussion of the methodology, see Appendix A.

c. Results

Effect of community incidence. Nursing homes that had greater incidence of COVID-19 in the surrounding community were more likely to experience higher numbers of cases and deaths. In particular, as the number of cases increased in the town where the nursing home was located (excluding cases in either nursing homes or assisted living facilities in that town), the number of cases per licensed bed increased significantly (Exhibit 6). For each additional case per 1,000 residents in the town, the number of cases in nursing homes per licensed bed increased by 0.006 and the number of deaths in nursing homes per licensed bed increased by 0.003.⁸

Effect of residents receiving treatment in the community. In nursing homes where a larger share of residents had dialysis or cancer treatments, the cases and deaths per bed were higher (Exhibit 6). In combination with the previous finding, this speaks to the importance of spread from the community into the nursing home, likely as a result of staff entering the nursing home or residents leaving the facility for offsite treatment. Reducing the spread of COVID-19 in a second wave will require limiting the extent to which external cases ultimately lead to cases in the nursing home.

Effect of staffing ratios. Staffing rating was highly predictive of the ability to limit the spread of COVID-19 in nursing homes (Exhibit 6). Nursing homes with a high staffing rating (4 or 5 stars) had 0.06 fewer cases and 0.03 fewer deaths per licensed bed than nursing homes with a lower staffing rating (1, 2, or 3 stars); both results were statistically significant. Relative to the average for nursing homes with lower ratings, this represented a reduction of more than 20 percent in both cases and deaths for nursing homes with higher staffing ratios. These findings are consistent with long-standing, and recent, evidence showing that higher staffing ratios are associated with better quality (Gorges and Konetzka 2020). In nursing homes with high staffing ratios, residents receive more staff care in terms of hours per resident than residents in nursing homes with low staffing ratios. Nursing homes with more staff also might be able to take more time to implement best practices with regard to PPE, thereby limiting the spread of disease.

Recommendation LR14

Connecticut should increase the minimum required staffing ratios in nursing homes.

Effect of size and occupancy rate. The total number of residents and the share of the licensed beds that were filled also significantly predicted greater spread. Nursing homes with more residents at the beginning of the pandemic and with a greater share of beds filled had significantly more cases and deaths per licensed bed than facilities operating at lower capacity. This finding speaks to the importance of density and intrafacility spread; residents in a nursing home with more residents and more beds filled likely have greater physical interaction because there is less open space available.

⁷ We describe this approach in more detail in Appendix A and list all characteristics included in the feature selection model in Appendix Exhibit B.6. The approach relies on Tibshirani (1996).

⁸ Appendix Exhibit B.7 shows a map of the cases and deaths per licensed bed in each nursing home plotted over the cases per 100,000 residents to help visually establish this relationship. However, note that this simply depicts the bivariate relationship and does not adjust for other factors.

Effect of other nursing home characteristics. Nursing homes that had a larger percentage of residents living in the facility as of March 9 who had a recent pressure ulcer also had more cases and deaths per licensed bed.⁹ Though not statistically significant, other characteristics of nursing homes were also important in explaining variation in the spread of COVID-19 across nursing homes. Characteristics such as whether the nursing home was for profit, was part of a chain, the share of male residents, and the share with a recent fall or any depressive symptoms were important in predicting the number of cases and deaths, though were not statistically significantly related to the number of cases and deaths. However, nursing homes that were part of a chain were significantly more likely to have *any* cases (compared to no cases; Appendix Exhibit B.8).¹⁰

In addition to the multivariate analyses discussed above, we conducted bivariate analyses, which revealed that many more characteristics appeared to be significantly related to cases and deaths when considered independently. For example, for-profit nursing homes and nursing homes with more non-White residents had more cases and deaths per licensed bed (Appendix Exhibits B.9 and B.10). However, these findings should be interpreted with caution because they can ultimately be explained by other related factors, as evidenced by either a lack of significance or not being included in the multivariate regression model.¹¹ The bivariate analyses are generally consistent with findings from Li et al. (2020) that also analyzes characteristics associated with nursing home outcomes in Connecticut using a different modeling approach.

Exhibit 6. Summary of findings from analyses of relationship between nursing home characteristics and COVID-19 outcome

Characteristic	Multivariate analyses				Bivariate analyses	
	Cases per licensed bed		Deaths per licensed bed		Cases per licensed bed	Deaths per licensed bed
	Important	Stat. sig.	Important	Stat. sig.	Stat. sig.	Stat. sig.
Nursing homes' characteristics						
Town cases per 100,000 residents ^a	Y	+	Y	+	+	+
Town median household income	Y	+	Y	+		+
Number of licensed beds	N		N		+	+
Profit status	Y		Y		+	+
Chain affiliation	Y		Y		+	+
Memory care unit	N		N			
High overall rating	N		N		–	–
High health inspection rating	Y		Y		–	

⁹ The item only captures whether the resident has an unhealed pressure ulcer, but does not indicate if it was acquired at the facility or in the community.

¹⁰ A recent paper by Dean et al. (2020) found nursing homes in New York that were in a union had fewer deaths per licensed bed than those that were not in a facility. However, in Connecticut, union status was unrelated to nursing home COVID-19 cases and deaths after controlling for other characteristics. We added an indicator variable for part of a union to our multivariate regression model, but this characteristic was not statistically significant and did not add to the predictive power of the model.

¹¹ The multivariate regression model did not include characteristics not flagged as important in Exhibit 6. However, for any characteristics that were significantly predictive of cases or deaths in a bivariate model that were also not considered important from the feature selection model, we confirmed that if they were added to the multivariate model they were not significantly related to cases or deaths.

Characteristic	Multivariate analyses				Bivariate analyses	
	Cases per licensed bed		Deaths per licensed bed		Cases per licensed bed	Deaths per licensed bed
	Important	Stat. sig.	Important	Stat. sig.	Stat. sig.	Stat. sig.
High staffing rating	Y	–	Y	–	–	–
High quality measure rating	Y		N			
Had a recent complaint	N		N		–	–
Total residents as of 3/9/20	Y	+	Y	+	+	+
Share of licensed beds filled as of 3/9/20	Y	+	Y	+	+	+
Residents' characteristics						
Male	Y		Y		+	+
Age in years	N		N		–	
Non-White	N		N		+	+
Needs more help with activities of daily living	N		Y			
Higher cognitive functioning score (more cognitively impaired)	N		N			
Getting dialysis or cancer treatments	Y	+	Y	+	+	+
Had a recent fall	Y		Y			
Had a recent pressure ulcer	Y	+	Y	+	+	+
Had any depressive symptoms	Y		Y	–	–	–
Lost control of bladder	Y		N		–	

Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system, Nursing Home Compare, LTCFocus, MDS data, and Connecticut DPH data on COVID-19.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. A characteristic is important if a feature selection model indicated the characteristic had substantial predictive power in understanding the variation in cases and deaths across nursing homes. The multivariate regression model then incorporated these important characteristics. Blank cells indicate the relationship was not important to understanding variation in COVID-19 cases or deaths, and was thus excluded from the multivariate model or was not statistically significant. Plus or minus signs indicate the characteristic was associated with more (or fewer) cases or deaths and was statistically significant at the 10 percent level. For the detailed regression results, including magnitudes, see Appendix Exhibit B.8.

^a Town cases exclude those reported for all nursing homes and assisted living facilities located in that town.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

2. Spread of COVID-19 within Connecticut nursing homes

a. Summary of findings

COVID-19 cases often were clustered within individual nursing homes, with characteristics of residents correlating somewhat with the likelihood of becoming infected and dying. In this section, we first present a case study showing how, in one large nursing home, specific wings experienced substantially different rates of residents getting sick. This suggests the likely importance of both staff and physical proximity in the role of spread of COVID-19. Next, we report on both wing- and individual-level predictive models to further explain how the disease was transmitted within each nursing home. The individual-level predictive model uses the full sample of more than 17,000 residents who lived in nursing homes as of March 9, 2020. The wing-level predictive model aggregates characteristics and COVID-19 outcomes for residents

in 69 nursing homes for which we had a sufficiently clear floor plan to assign people to a wing based on their room numbers. Important predictors include risk for COVID-19 based on health factors and having greater potential exposure to others either inside or outside the nursing home, consistent with findings about the spread across facilities.

b. Spread within a facility: case study results

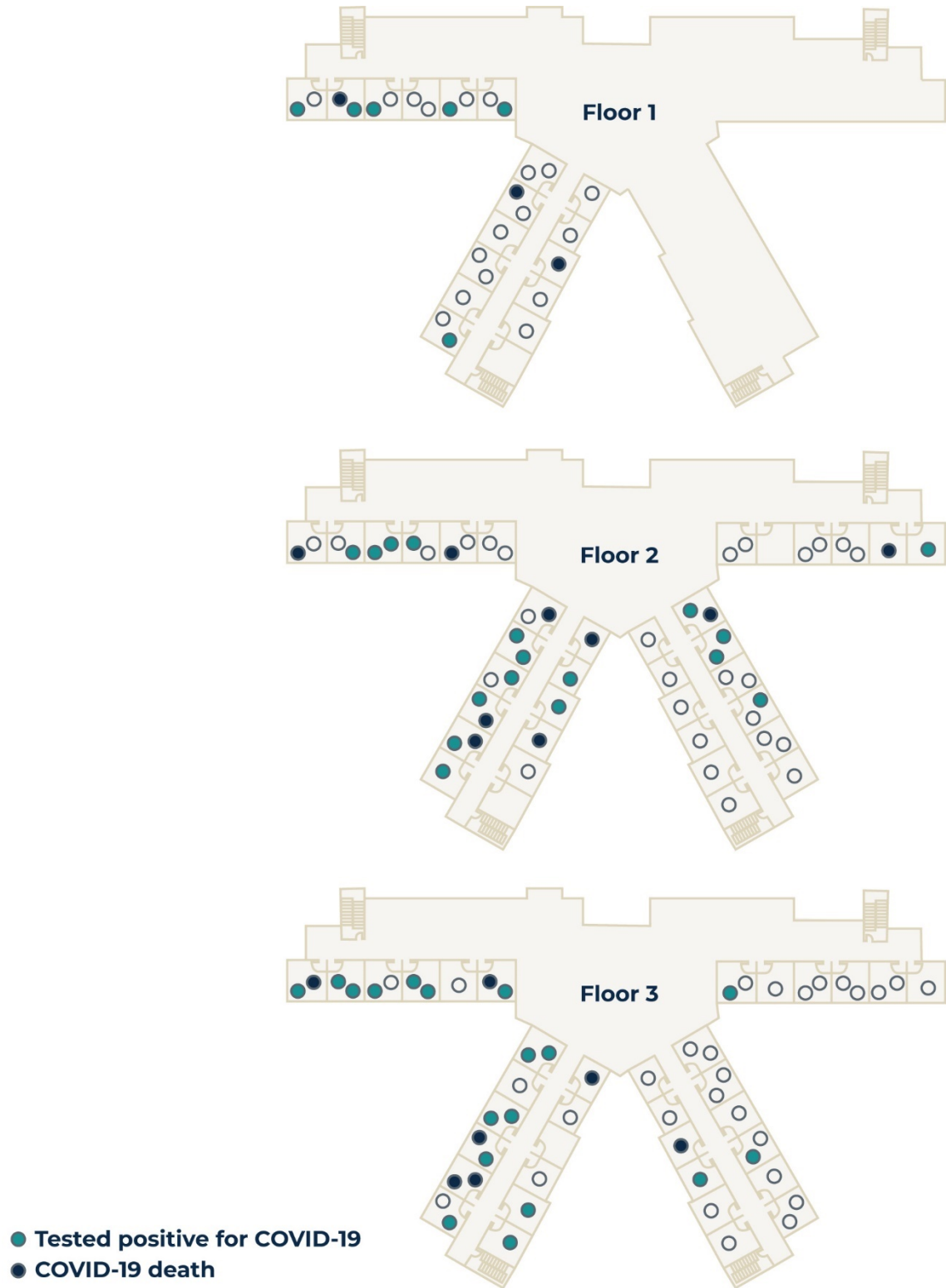
In one nursing home, the share of residents in the facility at the beginning of the pandemic that became infected varied by wing, ranging from as few as 10 percent to as high as 82 percent (Exhibit 7). This analysis considers only people in the nursing home as of March 9, 2020 and assigns them to a wing based on their room number as of that date. This ensures these results do not reflect people with COVID-19 being moved to different units as a result of facility cohorting. We identified 56 residents with confirmed positive tests among those in the facility as of March 9, 2020, which represents about 90 percent of the total cases this nursing home reported to the state. The three wings with the highest share of residents with COVID-19 (second floor, wing 2 and third floor, wings 1 and 2) accounted for 57 percent of the total COVID-19 confirmed cases but only 32 percent of the total residents.

The results underscore the possibility to limit the extent of an outbreak within a facility. Though some wings had nearly all residents become infected, other wings had only one or two infections. In a nursing home that had more than 0.4 cases per licensed bed, the fact that few residents in some wings became infected indicates policies and procedures can be put in place to control the spread of the virus even in the presence of an outbreak. Yet, several rooms had two people living in the nursing home at the outset, but only one of them became infected despite both remaining in the nursing home for the entire duration of the pandemic and sharing the same space and being exposed to each other for extended periods of time. This suggests an element of random chance must also play a role.

Recommendation SR15

Facilities should consider the rooming assignments of high-risk residents on units in such a way that reduces exposure of others on the unit.

Exhibit 7. COVID-19 cases and deaths in an example nursing home, by room location



Source: Mathematica’s analysis of Connecticut DPH FLIS portal on individual residents’ data, as reported by nursing homes, by July 22; Connecticut’s Vital Records death data; and MDS data.

Note: Each circle indicates a room occupied as of March 9, 2020, per MDS data. Cases and deaths depend on whether the person who lived in that room as March 9, 2020 subsequently tested positive for the disease or died and had COVID-19 listed as a cause of death by July 31, 2020. DPH provided floor plans for Connecticut nursing homes to Mathematica. Although this case study reflects actual data, we chose the facility to be illustrative of patterns of within-facility spread of COVID-19 that were broadly observed in our sample; the case study is not representative of all facilities.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

Many other nursing homes experienced similar clustering of cases, suggesting staff and physical proximity play an important role in spread (Appendix Exhibit B.11). Many nursing homes consistently assigned staff to work on a given wing. If one of the staff working in that wing became infected, he or she would be expected to consistently interact with and potentially expose the assigned residents on that wing, but not others. In addition, physical proximity to others who became infected could play an important role given the airborne nature of the virus and the potential role that ventilation may play in patterns of COVID-19 spread (Lu et al. 2020).

c. Factors associated with cases and deaths at the individual-level and wing-level

Characteristics of residents associated with higher risk for COVID-19 increase the likelihood of becoming infected within a nursing home. People who weigh more, are older, and those with a heart or circulation diagnosis were significantly more likely to both become infected with COVID-19 and to die from it (Exhibit 8). This finding is consistent with other research on the greatest risk factors for COVID-19 (CDC 2020b).

Factors that increase potential exposure to others either within or outside the nursing home also put residents at risk. For example, dialysis treatment is an important predictor of cases, both at the individual and the wing levels. People who receive dialysis treatment can be more exposed either to community dialysis patients or to more staff, which puts them at greater risk of becoming infected (Bigelow et al. 2020). People who have a history of wandering are also more likely to become infected, perhaps

because they were exposed to more people inside the nursing home. Conditions that might lead people to require greater staff attention, such as having a recent fall, having a cognitive impairment, having a psychiatric or mood disorder, or losing control of one's bladder, also led to greater likelihood of becoming infected, presumably through closer and more frequent contact with staff who may have been infected.

Recommendation LR8

Facilities should consider increasing the testing frequency of some residents at higher risk, beyond current requirements.

Short-stay residents were less likely to become infected and to die. Other characteristics typically associated with those who are only temporarily in the nursing home for some sort of rehabilitation, such as getting physical therapy and having the stay covered by Medicare, are also similarly associated with lower risk of infection and death. Because these analyses focus on people who were in the nursing home as of March 9, such residents might have been especially likely to exit the facility before the peak of the pandemic. Thus, this could simply reflect a reduction in the likelihood such residents were ever exposed. Consistent with this, in conducting a similar analysis based on those in the facility as of April 15, the relationship between short-stay characteristics and deaths was not significant, and the reduced likelihood that short-stay residents had of getting infected drops by about two-thirds.

Exhibit 8. Summary of findings from analyses of relationship between resident characteristics and COVID-19 outcome

Characteristic	Individual level		Wing level	
	Cases	Deaths	Cases	Deaths
Greater weight	+	+		
Recent unplanned weight loss		+	+	
Had a recent fall	+	+		
Had a recent pressure ulcer				
Has catheter				
Takes anti-psychotic medication	+			
Takes anti-anxiety medication				
Lost control of bladder	+	+	+	
Has any depressive symptoms				
Higher cognitive functioning score (more cognitively impaired)		+		
Needs more help with activities of daily living	–	+		
Short-stay (fewer than 100 days in nursing home)	–		–	+
Months in the nursing home (as of 3/9/20)		+		+
Gets dialysis treatment	+		+	
Gets cancer treatment				
History of wandering	+			
Gets physical therapy	–	–		–
Currently has Medicare stay	–	–		
Age in years	+	+		
Male		+		+
Race is non-White (versus White)				
Cancer diagnosis				
Heart or circulation diagnosis	+	+		
Gastrointestinal diagnosis			–	
Genitourinary diagnosis				
Infections		+	+	
Metabolic diagnosis (e.g., diabetes or thyroid disorder)		+		
Musculoskeletal diagnosis				
Neurological diagnosis			+	
Nutritional diagnosis (malnutrition or at risk of malnutrition)				
Psychiatric or mood disorder	+	+		+
Pulmonary diagnosis		+		
Vision diagnosis				–

Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; Connecticut's Vital Records death data; and MDS data.

Note: Includes only people who lived in a nursing home as of March 9, 2020. Individual-level data indicate if the person tested positive for the disease or died and had COVID-19 listed as a cause of death by July 31, 2020. The wing-level data aggregate the individual-level data for 69 nursing homes with a usable floor plan. The wing-level outcomes are the share of residents who tested positive or who died from COVID-19, whereas the wing-level characteristics are the averages for residents who lived in that wing as of March 9, 2020. Plus or minus signs indicate the characteristic was associated with a higher (or lower) likelihood of the COVID-19 outcome and was statistically significant at the 10 percent level. Blank cells indicate the relationship was not statistically significant. All regressions include a nursing home fixed effect. For the detailed regression results, including magnitudes, see Appendix Exhibits B.12 (individual level) and B.13 (wing level).

FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

3. Cases and deaths in Connecticut nursing homes compared to neighboring states

Our ability to compare outcomes in Connecticut to other states is somewhat limited by the data each state makes available. Exhibit 9 compares how states in the Northeast region collect and report their data on COVID-19 outcomes in LTC facilities. We assessed cases and deaths in nursing homes across all states in the region, ultimately making rigorous comparisons between those in Connecticut and those in neighboring states.

Based on aggregate statistics for cases and deaths in LTC settings, Connecticut is most similar to Massachusetts, New Jersey, and Rhode Island (Appendix Exhibit B.14); each of these states had more than 70 deaths in LTC facilities per 100,000 residents, whereas all other states in the region had fewer than 40. We included New York as a comparison even though its reported deaths per 100,000 residents was substantially lower. New York reports only deaths (not cases) among nursing home residents, and counts only deaths that physically occurred in a nursing home. In contrast, Connecticut (and other states) report deaths among residents whether they died in the facility or elsewhere. Based on deaths of nursing home residents in Connecticut, we estimate that the number of deaths in nursing homes in New York would be at least 68 to 76 percent higher if New York used a similar approach to counting deaths as the method used in Connecticut and other states. Through this extrapolation, the number of deaths in nursing homes in New York per state resident are comparable to the other neighboring states.¹²

¹² To generate this estimate, we linked data on all nursing home residents to Connecticut's Vital Records death data to identify people who died of COVID-19 who were recently in a nursing home. The death data indicate both whether someone died from COVID-19 and where they died. Using this approach, we identified 2,729 deaths from nursing homes (which represents 96 percent of the total of 2,849 nursing home deaths reported by the state). Of these nursing home deaths, only 1,618 physically occurred in the nursing home. Therefore, if Connecticut had reported deaths only that physically occurred in nursing homes, it would have reported 1,111 to 1,231 fewer deaths (depending on how we treat the 120 deaths we were not able to match). Relative to the 1,618 deaths in nursing homes, this represents from 68 to 76 percent. Assuming nursing homes in New York followed similar patterns as those in Connecticut, the number of deaths in New York would therefore be 68 to 76 percent higher. If nursing homes sought to limit the death count by discharging residents to hospitals (Sexton and Sapient 2020), then New York's undercount would be even larger.

Exhibit 9. Data availability for individual nursing home COVID-19 outcomes by state

	Connecticut and comparison states					Other Northeastern states						
	CT	MA	NJ	RI	NY	DE	DC	ME	MD	NH	PA	VT
Cases by nursing home	Yes	Yes*	Yes	Yes*	No	No	Yes	No	Yes	No	Yes	No
Deaths by nursing home	Yes	Yes	Yes	Yes*	Yes*	No	Yes	No	Yes	No	Yes	No
Staff cases and deaths by nursing home	Yes (after 6/17)	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	No

Note: Cases in Massachusetts are reported only in ranges of 0, 1 to 10, 11 to 30, and greater than 30, combining staff and resident cases. Rhode Island reports cases and deaths only in discrete ranges of 5 cases (for example, 41 to 45). New York death data include only deaths that occurred in the nursing home. See Appendix A for more details about data across states.

* Indicates limitations with data on the precise number of cases or deaths. See note for the description of the issues.

We found generally similar patterns in cases and deaths for Connecticut and each neighboring state, adjusting for nursing home characteristics. To make the most robust comparison to each state, we included only nursing homes in Connecticut that were in counties close to the neighboring state and included only nursing homes in the neighboring state that were within 50 miles of Connecticut. We also adjusted for nursing home characteristics,¹³ such as staffing ratings and COVID-19 cases in the nearby community, that were important predictors of nursing home-level outcomes.¹⁴ To compare to New York, we counted only deaths in each nursing home in Connecticut where the death physically occurred in the nursing home.¹⁵

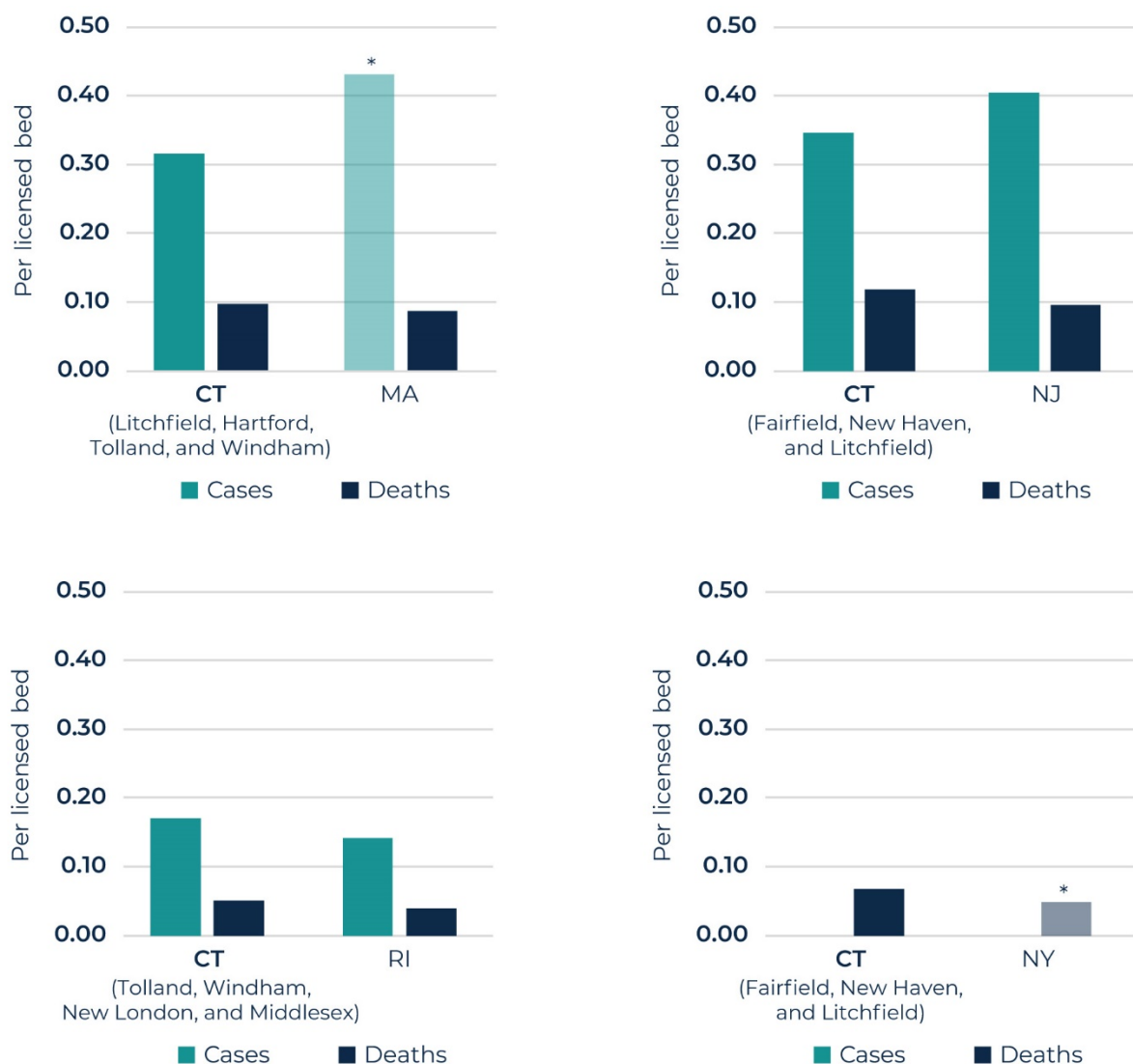
Cases and deaths did not significantly differ between Connecticut and each neighboring state, with two exceptions that may be related to data limitations. The first exception is New York. Nursing homes in New York reported fewer deaths than those in Connecticut, though this may reflect New York's approach to reporting deaths within nursing homes (and not reporting deaths of nursing home residents that occurred outside the facility), so these results should be interpreted with caution. This finding is somewhat unexpected for two reasons: (1) deaths per licensed bed in nursing homes are similar in Connecticut, Massachusetts, New Jersey, and Rhode Island; and (2) total deaths per capita from COVID-19 in counties within fifty miles of Connecticut, which is heavily influenced by patterns in the New York City area, peaked at a level more than twice as high as deaths in Connecticut (Exhibit 1). To compare Connecticut to New York, we restricted our sample to deaths in Connecticut that occurred within the nursing home to approximate New York's approach to counting nursing home deaths. The second exception is Massachusetts, which reported more cases in nursing homes than Connecticut. Because Massachusetts reports cases in each nursing home only in a range, we had to impute total cases, which might not be reliable.

¹³ The analysis controlled for the number of licensed beds in the nursing home, the share of beds typically filled, the overall quality rating, the staffing rating, whether the nursing home was for profit, whether it was part of a chain, whether it had a memory care unit, and the number of COVID-19 cases per capita in the county it was located in (excluding all cases in nursing homes).

¹⁴ The findings are mostly similar if we do not make assorted adjustments, as can be seen in an unadjusted comparison of outcomes across states presented in Appendix Exhibit B.15.

¹⁵ For more details on this approach, see footnote 12.

Exhibit 10. Total nursing home COVID-19 cases and deaths per licensed bed in Connecticut and nearby states, adjusted for nursing home characteristics



Source: Mathematica's analysis of state-reported data by individual nursing home, Nursing Home Compare data, LTCFocus data, Johns Hopkins University data, and Connecticut Vital Records death data.

Note: Analyses are based on total cases and deaths in nursing homes through the end of July 2020. We shade the bars to be more transparent for cases in Massachusetts and deaths in New York because of data limitations surrounding these estimates that suggest the results should be interpreted with caution. Massachusetts reported cases in nursing homes in ranges; we used the number of deaths to impute the number of cases, resulting in total cases that approximately matched the total nursing home cases reported across the state. See Appendix A for details. Because New York does not report cases, no information on cases is presented in the bottom right panel for the comparison to New York. Additionally, New York reports deaths only that occurred in the nursing home. For Connecticut, we therefore included only deaths that physically occurred in the nursing home (using Vital Records death data). See footnote 12 for more details. Rhode Island and New Jersey do not report information on nursing homes that had zero cases or deaths; the licensed nursing homes not included in the state's data are assumed to have zero cases and zero deaths. For comparisons with other states, we included only nursing homes that were within 50 miles of the

Connecticut border. In addition, we included Connecticut nursing homes only in counties that were sufficiently close to the comparison state, which explains the difference in outcomes for Connecticut. The exhibit lists counties included for each comparison.

* = statistically significant difference from Connecticut at the 5 percent level.

4. Individual-level changes in well-being

a. Summary of findings

Residents' well-being declined as a result of the pandemic, affecting nursing home residents in ways beyond the direct effects of COVID-19. Though policies put in place to limit the spread of the virus might have been successful in doing so, they also imposed a cost in terms of declines in residents' well-being. The results of this analysis demonstrate the tradeoffs associated with public health measures implemented to limit the spread of the virus.

- On several measures—such as rates of depression, incidence of substantial unplanned weight loss, and the presence of severe pressure ulcers—nursing home resident outcomes worsened. The timing of these changes corresponded to the timing of the evolution of the pandemic.
- Indirect changes in well-being might have stemmed from a variety of causes. These include fears associated with the virus; changes in care practices such as declines in the provision of therapy; and policies put in place to limit the spread of the virus, such as restricting residents to their room and limiting visitation, which increased isolation of nursing home residents.

Recommendation SR1

LTC facilities and their state regulators must balance strict measures designed to limit the spread of the virus with the need to support the physical, emotional, and psychosocial needs of LTC residents.

b. Methodology

The analysis compares outcomes observed in every week from March 17, 2020 to July 31, 2020 to those observed the week of March 10, 2020 among residents present in a nursing home as of March 9, 2020. Because many of the findings related to well-being could reflect changes in the composition of remaining residents in nursing homes, our analyses controlled for this to the extent possible. We also controlled for patterns in the period from 2017 to 2019 that indicate how these outcomes generally evolved over time for residents remaining in nursing homes.¹⁶ Such patterns could reflect seasonality, as well as selection bias in who remains in a nursing home.¹⁷ We also reweight residents in each week to ensure the average

¹⁶ We also considered simple descriptive trends that showed the average outcomes observed in each week for all residents or all long-stay residents with a regular follow-up observation. We compared patterns for those in 2019 to 2020, considering all observations from January 1 to July 31. The results were generally similar to the more careful, regression-adjusted analyses. The results of these descriptive analyses are available upon request.

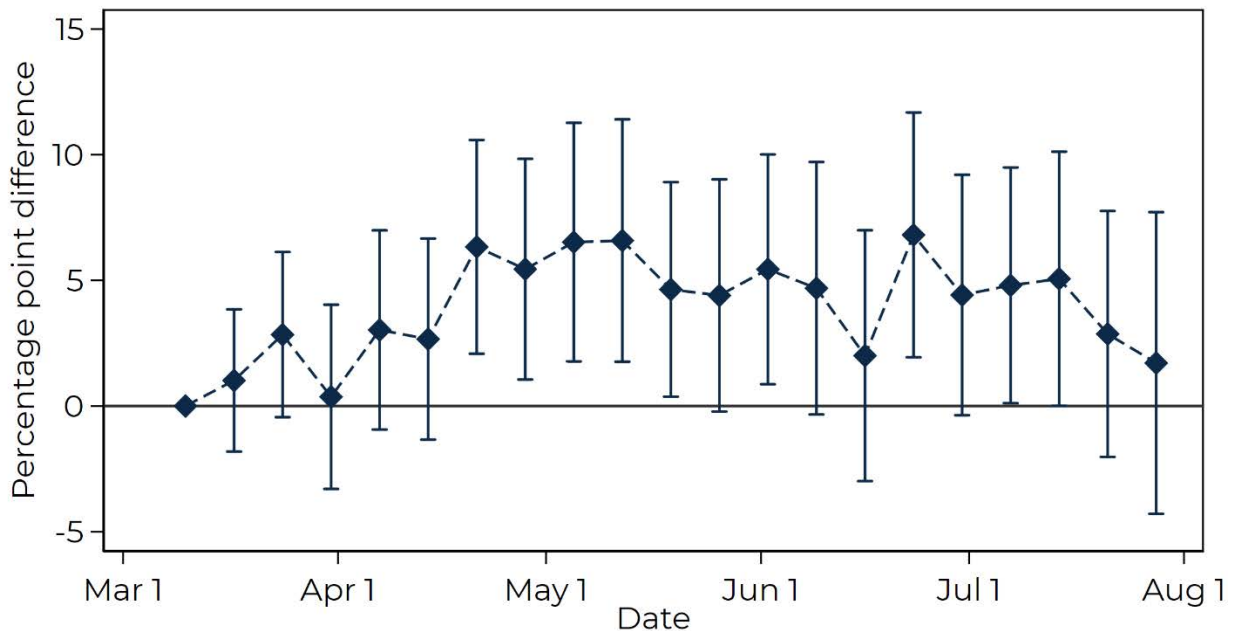
¹⁷ We also estimated all results using only long-stay residents (those who had been in the nursing home for at least 100 days as of March 9, 2020) because they are likely to stay in the nursing home for a long time. Results are essentially the same, with findings available upon request. Though understanding well-being among short-stay residents is important, the fact that they are likely to leave the facility more quickly, and might have done so differentially because of the pandemic, could have influenced the analysis. However, because results are similar, it provides suggestive evidence that selection bias does not play an outsize influence in the findings.

characteristics of observed residents are constant over all time periods, as well as directly control for characteristics. For further details on the ways our analysis controls for possible selection bias, as well as limitations of this analysis, see Appendix A. Finally, a substantial reason for differing samples over time is that more than 10 percent of nursing home residents living in a nursing home as of March 9, 2020 died from COVID-19. However, those who died likely would have experienced decreases in physical and mental well-being before their death, but these are not observed in the data. Thus, if anything, these analyses underestimate the total impact of the pandemic on residents' well-being.

c. Results

Shortly after the peak of the pandemic in April, the percentage of nursing home residents with any depressive symptoms increased by about 7 percentage points relative to the percentage before the epidemic in mid-March (Exhibit 11). Before the outbreak, about 46 percent of residents experienced any depressive symptoms. The increase of 7 percentage points in mid-April to mid-May therefore represents a relative increase of more than 15 percent. The percentage of residents with depressive symptoms started to decline slightly in mid-May, both after the peak of the pandemic and when Connecticut started to allow visitors again in an outdoor setting. Toward the end of July, depression levels were no longer significantly higher than before the pandemic.

Exhibit 11. Changes in any depressive symptoms among Connecticut nursing home residents, March through July



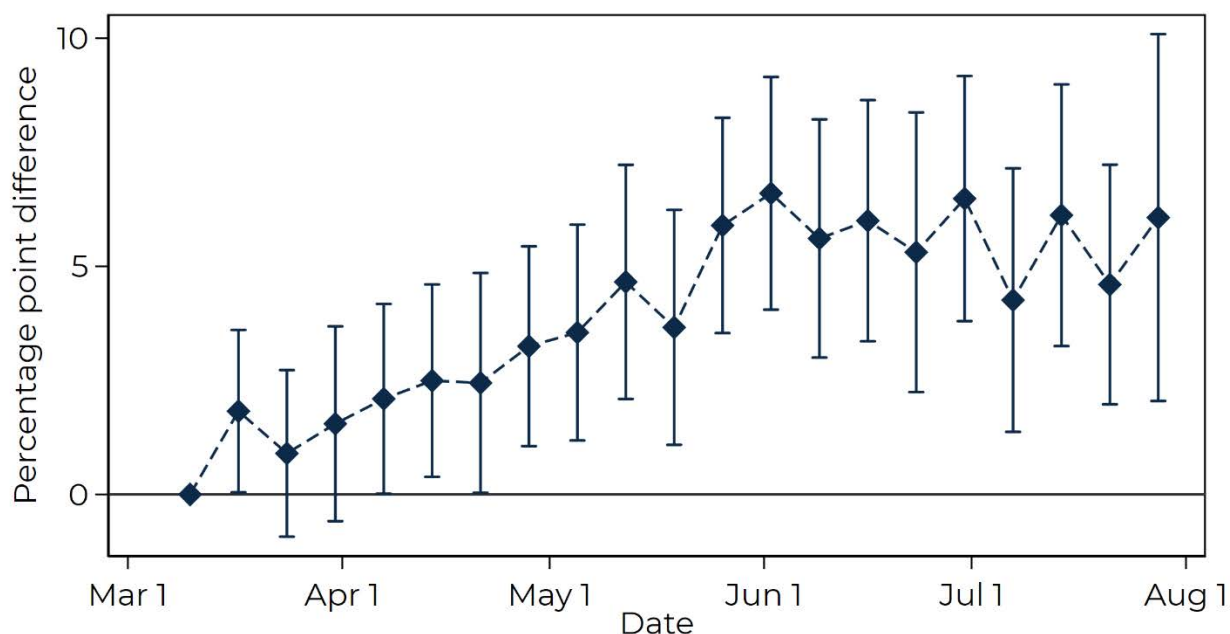
Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: We defined *any depressive symptoms* as having the presence of any of the symptoms listed in the residents' mood interview or staff assessment of a resident's mood (Personal Health Questionnaire-9). This is based on items D0300 and D0600 from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9,

2020, and includes all subsequent observations. It also controls for patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level. For more details, see Appendix A.

Nursing home residents also experienced faster physical deterioration, as the results indicate large increases in unplanned substantial weight loss (Exhibit 12). The share of residents who lost more than 5 percent of their weight in the past month (or more than 10 percent in the past six months) started to slowly increase in mid-April—the height of the pandemic. Each week in June and July, the share experiencing substantial weight loss doubled relative to the beginning of March (an increase of about 6 percentage points).¹⁸ This likely reflects both the direct effects of COVID-19 among those who contracted it and indirect effects on those who did not become infected. For residents who contracted COVID-19, about 12 percent of residents observed each week experienced unplanned substantial weight loss from the last week of May to the end of July (Appendix Exhibit B.16). Though the percentage of residents with unplanned weight loss was lower for those who did not become infected—about 9 percent each week over the same period—it still meaningfully increased relative to the 6 percent baseline in early March.

Exhibit 12. Changes in unplanned substantial weight loss among Connecticut nursing home residents, March through July



Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: We defined *unplanned substantial weight loss* as someone having lost 5 percent or more in the last month or 10 percent or more in the past six months. This is based on item K0300 from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9, 2020, and includes all subsequent observations. It also controls for

¹⁸ Note that the timing of observations means the weight loss likely occurred earlier than the date the person is observed.

patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level. For more details, see Appendix A.

Other measures of residents' well-being also indicated people were affected beyond the direct effects of COVID-19. For example, in early May, residents were 2 to 3 percentage points more likely to have a severe pressure ulcer (Appendix Exhibit B.17). This represents an increase of more than 50 percent relative to the 4.7 percent with a severe pressure ulcer in early March. Cognitive function scores and scores of activities of daily living also indicated temporary but meaningful deterioration of functioning (Thomas et al. 2017; Appendix Exhibits B.18 and B.19) Residents also experienced a significant increase in episodes of incontinence (Appendix Exhibit B.20).

Taken together, these findings suggest that the pandemic substantially reduced well-being of nursing home residents. The nature of the pandemic required immediate and substantial policy actions to limit the number of fatalities, such as restricting visitors and limiting resident movement outside of one's room. Though these policies may have successfully prevented more deaths among nursing home residents, they came at a cost. Both nursing home staff and family members play an important role in resident care, through providing homemade food, helping residents eat, conducting other activities of daily living, and giving them opportunities for social interaction. During interviews with residents and family members, we heard that nursing home staffing was often not sufficient to provide the same level of care and attention that family members or other unpaid caregivers normally provide to nursing home residents, and as a result, residents fared worse. Future policy changes to limit the spread of COVID-19 or other infectious disease outbreaks should consider these additional costs beyond the direct effects of morbidity and mortality due to COVID-19.

Recommendation SR2

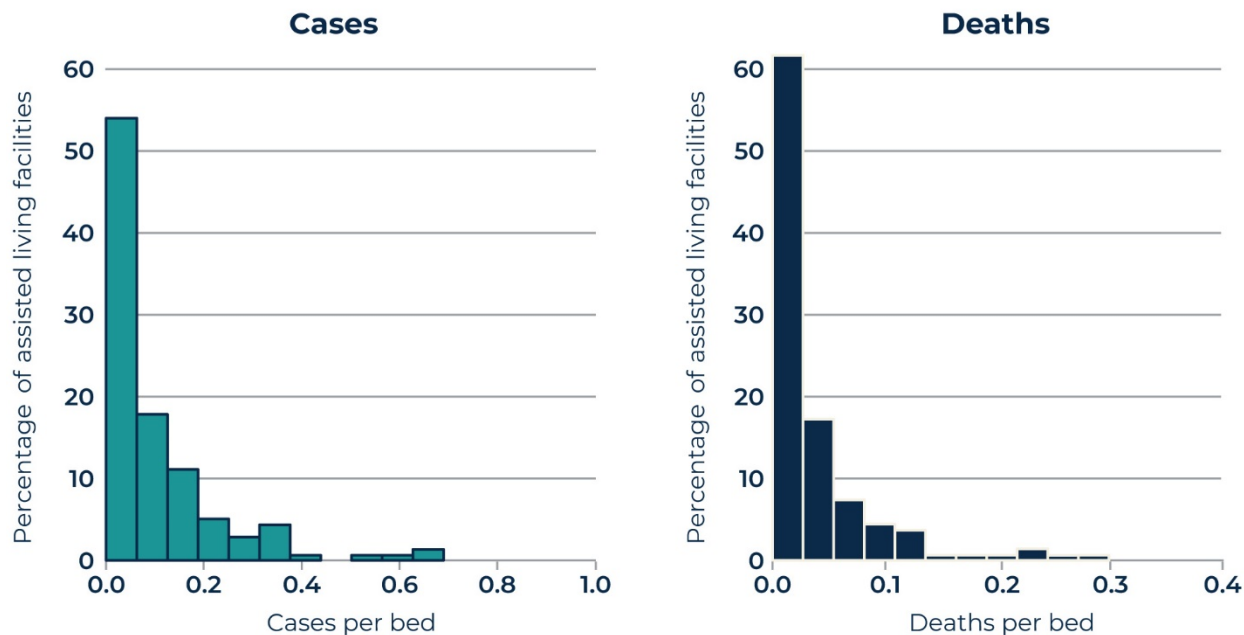
Facilities should ensure residents' care plans reflect COVID-19-specific impacts on individual residents.

C. Connecticut assisted living facilities

Although many assisted living facilities had COVID-19 outbreaks, they were typically less severe than in nursing homes (Exhibit 13). In total, assisted living facilities in Connecticut had 1,073 cases and 379 deaths by the end of July 2020. About 37 percent of assisted living facilities had no COVID-19 cases or deaths. Only three percent of assisted living facilities had more than 50 percent of residents who contracted COVID-19, and only 3 percent had more than 20 percent of residents who died. In nursing homes, about 26 percent of nursing homes had at least 50 percent of residents who contracted COVID-19, and 15 percent had at least 20 percent of residents who died.¹⁹

¹⁹ Similar to Exhibit 4, the histogram in Exhibit 13 does not show the share of assisted living facilities with zero cases or deaths. The first bar in Exhibit 13 corresponds to zero or a low amount cases or deaths. Because histograms show a continuous distribution, not the distribution at a single value, the exhibit does not indicate the percentage of assisted living facilities with zero cases or deaths.

Exhibit 13. Total COVID-19 cases and deaths per bed in Connecticut assisted living facilities



Source: Mathematica's analysis of assisted-living facility reported data included in Connecticut's FLIS system.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. Analyses are based on cases and deaths in assisted living facilities by July 22, 2020.

FLIS = Facility Licensing and Investigation Section.

Similar to the findings for nursing homes, the prevalence of COVID-19 in the surrounding community was an important predictor of assisted living facility cases and deaths, and larger facilities had more cases and deaths per licensed bed (Appendix Exhibits B.21 and B.22).

Because of limited data availability for assisted living facilities, we cannot conduct the same level of comprehensive analyses of assisted living facilities as we can for nursing homes. In particular, due to the challenges in reliably comparing outcomes in assisted living facilities across states, we were unable to compare outcomes in Connecticut assisted living facilities with neighboring states. See Appendix A for more details.

Recommendation LR2

The state should make participation in the MAP mandatory for assisted living communities to ensure access to data in future outbreaks.

IV. Assessment of the State's Preparedness and Response to COVID-19 in LTC Facilities

In responding to COVID-19 in LTC facilities, Connecticut faced an unprecedented challenge. Gaps in scientific knowledge about how the virus spreads, the range and severity of symptoms (especially in older adults), and underlying factors that might place an individual at greater risk undermined its early responses to the outbreak. State officials made policy decisions and issued guidance based on the available knowledge at the time from federal and state epidemiologists and public health experts. Although scientific knowledge and understanding of the virus has evolved over time, much remains unknown.

This section describes the state government's preparedness for and response to COVID-19 in LTC facilities. It largely focuses on the role of DPH but acknowledges additional resources from other state agencies and units brought in to support the response, including the Connecticut National Guard.

It is important to note the state's role in responding to the COVID-19 pandemic was significantly greater than for previous disease outbreaks such as H1N1 or Ebola because the federal government delegated many decisions about how to respond to COVID-19 to states. In addition, the federal government did not provide resources from the Strategic National Stockpile, as state officials had expected under the Federal Emergency Management Agency's (FEMA) National Preparedness System, nor did it provide clear, timely, and unbiased scientific guidance on the evolving understanding of the disease and or expected response. Assessing the federal response is beyond the scope of our work here and is well documented elsewhere, we have included information on how the federal response affected the state's actions in our report (Government Accountability Office 2020; *New York Times* 2020; Sanger et al. 2020; Drew 2020; Ed 2020). Appendix C provides a timeline of federal response actions.

A. Surveillance and outbreak response

Though Connecticut had several systems in place to collect information from LTC facilities on cases, deaths, and resource needs, the state modified and enhanced these systems throughout the spring and summer of 2020 to better manage the outbreak. The state also retooled its routine surveys of LTC facilities to focus on infection control in accordance with guidance from CMS. Despite these changes, data users at both the state and LTC facilities have identified the need for additional system modifications. State and facility staff have also identified resources and requirements to strengthen the utility of surveys. This section details the state's preparedness and response regarding surveillance and outbreak response and identifies related SRs and LR.

1. Preparedness

a. Data availability and reporting by LTC facilities

Before the COVID-19 outbreak, state officials report that DPH, including FLIS staff, relied on data collection systems in which facilities reported information to the department via paper or fax. The design of such systems supported existing reportable outbreaks from facilities, including seasonal influenza, salmonella, and other diseases. The state also collected electronic data on bed capacity, staffing, transportation, and supply need and availability via the MAP website (Mutual Aid Plan 2020). The state had activated the MAP for previous natural disasters, and state staff involved in those activities report that

LTC facilities were “used to daily reporting” to this platform whenever the reporting requirement was activated in response to an emergency. However, the information MAP collected was designed to support potential evacuation of a facility, not long-term shelter in place or incidents affecting a large number of facilities at one time.

The state’s existing reporting systems could not fully support its needs in response to COVID-19. Before modifying the FLIS system in mid-April, the reportable disease data DPH received did not specifically identify cases among residents in nursing homes and assisted living facilities separate from those reported by hospitals or among people who lived in the community.

b. Licensing and inspection of LTC facilities, and investigation of complaints

A federal and state partnership regulates nursing homes certified by Medicare or Medicaid: CMS sets the conditions of participation for certification and oversees state compliance with inspection requirements. The state’s DPH FLIS conducts regular inspections (known as surveys) of licensed nursing homes to ensure compliance with federal and state requirements and reports the results to CMS. The state LTC ombudsman’s office ensures residents and families are aware of their rights and assists in resolving concerns.

2. Response

a. Suspension of civil liability

The Governor’s Executive Order 7U (Lamont 2020b) on April 5 granted nursing homes immunity from civil liability for any injury or death sustained in support of the state’s COVID-19 response. The order covered “acts or omissions undertaken because of a lack of resources that renders the facility unable to

“Liability holds people accountable and ensures best practices are followed.... At the same time you’ve taken resident’s eyes and ears away” [by restricting visitation].

—Senator Kevin Kelly

provide the level or manner of care that otherwise would be required in the absence of the COVID-19 pandemic.” In the interviews conducted for this assessment, consumer advocates and family members, as well as several elected officials, expressed concerns with this removal of an important mechanism for holding facilities accountable for their actions.

b. Modifications to data systems and reporting requirements

Because the existing data systems did not sufficiently capture cases in nursing homes and assisted living facilities, the state had to develop new systems and refine existing systems to monitor COVID-19 by facility type. At the beginning of the pandemic, there were no national data standards in place regarding how to report cases among LTC residents, so DPH developed its own methodology. It overhauled its reporting systems in real time, including the MAP website it used to share needs and availability of resources across LTC facilities. This evolution resulted in differences in reporting requirements over the course of the pandemic.

At the time of this study (July to September 2020), Connecticut collected and used COVID-19 related data from LTC facilities through three systems:

1. **The Connecticut DPH FLIS portal.** Data reported to this portal include the number of positive and pending tests, deaths, transfers of nursing home residents to the hospital, and nursing home bed availability; assisted living facilities are not required to report to the system or the National Healthcare Safety Network (NHSN), discussed below (Lamont 2020a). Health care-acquired infection (HAI) staff and FLIS nurse consultants review this information daily. Daily electronic reporting from facilities to the state began on May 8, 2020.
2. **LTC MAP portal.** This website collects daily counts of bed availability, new COVID-19 cases, and PPE resource availability and needs categorized according to their urgency. The site updates each minute and FLIS uses it to make decisions about which facilities to inspect, among other things. Before COVID-19, all nursing homes and about 25 percent of assisted living facilities reported to MAP. The MAP system activated on April 3 for daily reporting on COVID-19 from nursing homes; Executive Order Number 7EE extended the daily reporting requirement to assisted living facilities on April 23, 2020.
3. **NHSN.** This national website, maintained by the CDC, collects information on nursing home resident impact and facility capacity, staff and personnel impact, supplies and PPE, and ventilator capacity and supplies. On May 8, CMS issued guidance requiring weekly reporting to NHSN by nursing homes beginning on May 17. DPH staff report using this site primarily to determine whether nursing homes comply with the Department's requirements regarding resident and staff testing, which allow a facility to pause testing if it meets certain criteria outlined by the state.

Data for all three of these reporting streams remain largely self-reported by facilities, and stakeholders reported that FLIS staff (or students at the Yale School of Public Health under contract with DPH) verify the data primarily through direct calls to facilities. Some lawmakers have raised concerns about data accuracy because facilities might be motivated to keep case counts low. However, our study found a high degree of validity in the data; 96 percent of the deaths self-reported to DPH through the FLIS portal could be matched in the state's vital records. Our study also found Connecticut reported its data in a similar format to most neighboring states, except New York (Exhibit 9 provides more information).

Recommendation LR1

The state should explore ways to reduce duplicate case reporting to minimize burden on facilities and the state and reduce the risk of data errors.

Despite significant improvements in the state's ability to collect data, there are still challenges related to duplication of data reporting and specificity. DPH has acknowledged that some of the information reported across systems is duplicative, particularly that regarding PPE availability and testing. At the same time, DPH needs to obtain more detail from the data than it currently can—for example, by tracking new cases by facility and location, and disaggregating cases among residents and staff. State leadership and the media also increasingly demand new and more frequent data, even though the staff available to implement system changes and provide information has not increased. Improving data systems and honing reporting will require further work.

c. *Infection control focused surveys*

In accordance with federal requirements issued March 20, 2020, Connecticut stopped normal survey operations at the start of the outbreak and focused its resources on COVID-19-related tasks, such as conducting inspections of infection control practices and investigating complaints about issues that

endangered the life of a resident (CMS 2020b). During this time, DPH surveyed most facilities every two weeks but prioritized surveys based on the teams' assessment of (1) the ombudsman reports of resident and family concerns; (2) data on new outbreaks (that is, facilities with at least one new case within three days); and (3) concerns raised through meetings with the labor union representing LTC employees (1199 Service Employees International Union [SEIU] 1199). The state conducted virtual surveys from March 20 to April 6, 2020; during this time residents and families could report complaints over the phone to the ombudsman related to abuse and neglect, rather than in person. In-person surveys resumed April 7, 2020, but were modified to limit the number of staff entering a building. One person we interviewed reported the first wave of surveyors entering buildings did not have proper PPE and were not tested for COVID-19 before entering.

Beginning in May, DPH assigned staff to survey facilities by region to enhance relationships and ensure continuity. Under the model, inspection nurses oversaw 10 nursing homes and consistently visited those homes; each supervisor oversaw 20 nursing homes.

From March 1 to August 13, FLIS conducted 1,658 focused infection control surveys and issued 205 citations for deficient practice related to infection control.²⁰ Mathematica's interim report included a reference to CMS data indicating the state had not issued any infection control citations; afterward, DPH identified a problem in the process of uploading data to CMS reporting systems. DPH has resolved this issue and DPH staff have received training on reporting requirements according to leadership at FLIS.

d. Use of National Guard members to augment facility inspection

On April 27, the state began using National Guard members to help conduct focused surveys alongside per diem nurse consultants hired to augment existing FLIS survey staff (Carlesso 2020). Two National Guard members and one FLIS nurse consultant staffed the visits to facilities. DPH protocols specified that survey observations, interviews, and reviews should focus on hand hygiene, PPE, PPE supplies on the units and secured areas, transmission-based precautions, resident care, infection surveillance, visitor entry, education, monitoring, screening of staff, and staff schedules (CMS 2020c). Inspection teams observed the environment and checked on the cleaning and disinfecting of supplies. DPH reported National Guard members enforced staff screening requirements upon entering the building, distributed PPE, and monitored cleaning and disinfection practices and supplies. Industry stakeholders reported National Guard staff also helped count facilities' inventory of PPE; facilities used the Guard's hand counts of PPE to verify facility reporting of PPE availability to the MAP website.

e. Impact of changes to the survey process

Catalyst for changes in infection control. Overall, most stakeholders reported focused infection control surveys were an important tool for ensuring compliance with infection control requirements and in communicating needed changes directly to facilities, particularly as state guidance on appropriate use of PPE and infection control evolved over the course of the pandemic. Advocates, however, felt conducting surveys while facilities were immune from civil liability meant the results could not be used as evidence in potential lawsuits thus "removing a level of accountability" that resulted in a lower standard of care (Lamont 2020b). A representative of one facility we spoke with identified a need for additional support implementing changes identified through surveys, requesting either a dedicated monitoring partner or hotline that facilities could call for technical assistance.

²⁰ Documentation provided by DPH to Mathematica.

Recommendations related to surveillance and outbreak response

- **SR6.** DPH should continue infection control focused surveys, targeting more frequent surveys in nursing homes with ongoing or increasing infections.
- **SR7.** DPH should ensure all temporary survey staff, including National Guard personnel, complete basic and ongoing training to conduct surveys consistently and thoroughly, including training on infection control and prevention.
- **SR8.** All FLIS staff or other personnel conducting in-person surveys in nursing homes should be regularly tested for COVID-19 to ensure surveyors do not become a possible source of infection for residents or staff.

Uneven application of guidance. Stakeholders reported mixed experiences with surveyors over time. Frequent changes in the process for deploying survey teams felt “confusing” and “inconsistent” to FLIS staff, and the nurse consultants who participated in the surveys felt especially “out of the loop” in receiving timely guidance to use for the inspections. Although DPH felt using the National Guard to augment survey teams enabled direct care staff to focus on the care-related issues and made the entire team more efficient, industry representatives suggested the mix of surveyors (which included National Guard members) interpreted the survey guidelines differently, resulting in uneven inspections. Issues

“Calling in FLIS forced corporations to respond to concerns about faulty infection control practices ... and improved the situation in their facilities.”

—*Industry stakeholder*

related to consistent enforcement of nursing home regulations across survey teams has long been a challenge, but the COVID-19 outbreak might have exacerbated these inconsistencies across surveyors when facilities needed real-time information in the face of evolving guidance from the state (Kramer et al. 2020).

Emphasis on PPE. Some staff also reported National Guard members inspecting facilities were primarily concerned with counting PPE, a focus that might have stemmed from the Guard’s role in coordinating the distribution of PPE through the point of distribution (POD) system set up by the state (Section IV.B.2.c provides more information). In addition, many facility staff interviewed reported administrators would prepare for scheduled visits by filling PPE stocks or making PPE more widely available to direct care staff, only to restrict PPE immediately following the visit.

B. Infection control, including PPE

Infection control practices and personal protective equipment are frontline tools in preventing the spread of COVID-19. When COVID-19 arrived in Connecticut, however, the state found itself short of staff with infection control expertise and PPE to supplement supplies at facilities. Despite intense efforts from DPH staff and the National Guard, over 19 percent of Connecticut nursing homes did not have a one-week

supply of at least type of PPE reported to NHSN the week of September 6, 2020.²¹ The state needs a long-term strategy regarding state staff and supplies.

1. Preparedness

a. Staff dedicated to infection prevention

Facility-based infection preventionists. Federal requirements (42 CFR §483.80b) and the State Public Health Code (§19-13-D8t) require nursing facilities to dedicate staff to infection control by employing a dedicated infection preventionist and convening an infection control committee at least quarterly. The infection preventionist must have specialized training, work at least part time, and be employed directly by the facility. However, due in part to high turnover among staff filling this role, 10 of the 70 nursing facilities in the state whose staff are represented by 1199 SEIU did not have an infection preventionist on staff when the COVID-19 outbreak began, according to an 1199 SEIU representative. In addition, there is some concern that having the infection preventionists report to the facility, not the state, influences “whether they will stand up to bad practices.”

Assisted living service agencies (which provide services to individuals living in assisted living facilities) must be licensed by DPH but are not subject to the same infection control requirements that govern nursing homes and, therefore, are not required to dedicate staff to infection control. According to a 2019 review of assisted living regulations across the United States, Connecticut was one of only nine states that does not have regulations related to infection control policy or staff training requirements for staff in assisted living services agencies (Bucy et al. 2020).

Recommendation LR10

Connecticut should broaden qualifications for an infection preventionist and expand the role to full-time in all nursing homes.

State infection control staff. Various waves of federal grant funding, including the Infection Control Assessment and Response (ICAR) program prompted by the 2015 Ebola outbreak, supported state agency staff extenders and training activities on infection control. Specifically, ICAR supported hiring five infection control nurse consultants and an administrative assistant who, together with contractors, conducted numerous in-person and webinar trainings during 2017 and 2018.²² However, when ICAR funding ended in 2019, the state team dedicated to infection control shrunk.

b. Availability and use of PPE

Like the reported experience in other states, Connecticut LTC facilities had insufficient PPE at the start of the outbreak. Facilities were expected to procure and stockpile their own PPE, and the state expected to receive emergency PPE from the Strategic National Stockpile, so the state did not have its own cache

²¹ Similar to our multivariate regression model presented in Section III, we also used these data to try to predict recent nursing home outcomes across the entire country as well as in areas with substantial spread of COVID-19 throughout the summer. Because there were so many fewer cases and deaths in nursing homes during the summer than in Connecticut during the early stages of the pandemic, the predictive power of this model was substantially weaker than the multivariate regression model for Connecticut only. Yet one key finding was the importance of PPE, with nursing homes that had a PPE shortage in June having more cases per licensed bed in July. Therefore, ensuring PPE is widely available is likely important to mitigating the effects of a potential second wave.

²² Ebola-Associated Supplement Healthcare Infection Control Assessment and Response. Documentation provided to Mathematica by DPH on September 8, 2020.

(Hay 2020; Connecticut DPH 2020a). According to state officials, they had received training to rely on and use the Strategic National Stockpile.

“Every [emergency preparedness] plan focused on the Strategic National Stockpile to provide resources that would be needed by a state in an incident.”

—Unified Command Leadership

During two waves of visits and trainings supported by ICAR and conducted from 2014 to 2016, the state identified LTC facilities as having high staff turnover and low resources that suggested a strong need and demand for infection prevention training, particularly donning and doffing of PPE (Connecticut DPH 2020a). In 2019, DPH sponsored PPE training programs for high-consequence pathogens, but trainings occurred in the state’s two designated Ebola treatment hospitals, not LTC facilities (Connecticut DPH 2020a).

2. Response

a. Infection control guidelines for staff and residents

Connecticut developed its infection control guidelines for LTC facilities in March and April 2020; the guidelines covered visitation, PPE, screening and testing, and movement in and out of the facility. On March 9, 2020, DPH restricted visitors entering nursing and convalescent homes to only those visiting someone residing at one of these facilities in hospice or end-of-life care, and the visitors had to wear proper PPE. DPH issued nursing home-specific guidance, recommending assessing symptoms and temperatures for all staff at the beginning of each shift, limiting staff movement within the facility, reinforcing social distancing guidelines, and assessing residents for symptoms at least once daily (Office of Governor Ned Lamont 2020b). It also included guidance on appropriate transfers of residents with confirmed or suspected COVID-19 to and from hospitals. On April 4, 2020, DPH issued guidance requiring all health care personnel in all settings to be universally masked while working. Fewer than two weeks later, on April 16, 2020, Connecticut’s first COVID-19 recovery facility opened for hospital discharges.

“The evolving nature of CDC guidance resulted in DHHS continuously shifting their messaging; confusion came from unclear shifting federal guidance.”

—DPH official

From the beginning of the COVID-19 outbreak, state officials worked around the clock to provide accurate and timely guidance to facilities on infection control requirements, but given the rapidly changing understanding of the virus, many stakeholders felt the guidance was inadequate. First, some stakeholders said state guidance on infection

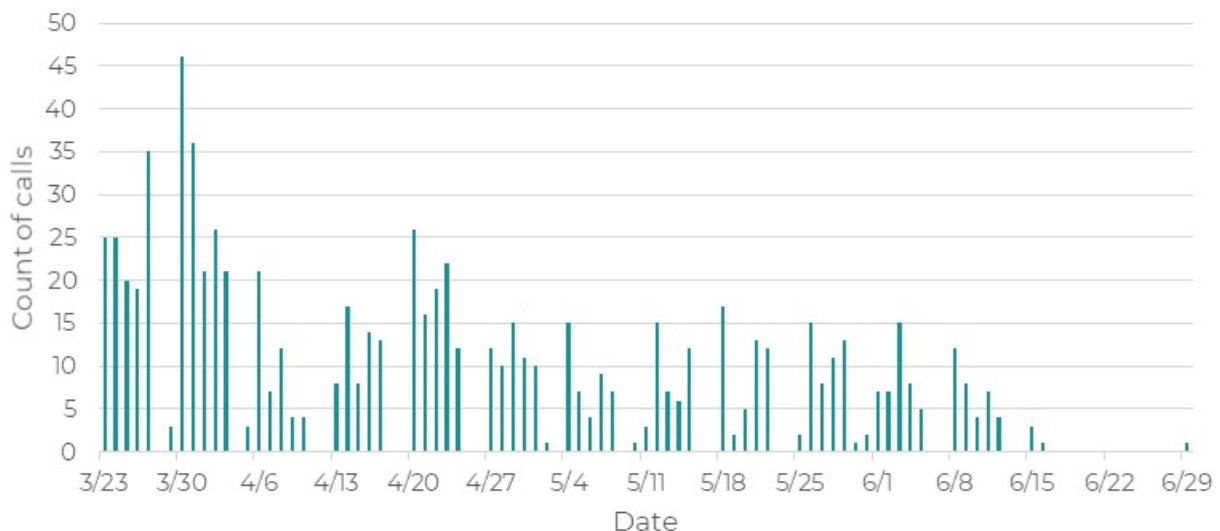
control tended to follow federal guidelines, which was less restrictive in its recommendations than guidance in neighboring states experiencing a peak outbreak. For example, Connecticut issued a universal masking order for personnel in all health care facilities on April 4, 2020, one day after the U.S. Coronavirus Task Force called for universal masking for the general public. In contrast, New York implemented a masking order for personnel in all health care facilities on March 13, 2020 (New York State Department of Health 2020b). Second, CDC guidance also differed from that issued by the World Health Organization (WHO), leading to confusion about differences in the guidance. For example, infection control staff reported the WHO recommended using an N95 mask in LTC settings, but the CDC guidance did not. “Staff in nursing homes would say they won’t work without an N95,” which was consistent with WHO guidance, but not CDC guidance. Third, the state provided guidance entirely in

English, and at least one facility noted it would have been helpful to also have guidance in Spanish to better reach its many Spanish-speaking staff.

b. Direct assistance to facilities on how to implement infection control guidance

DPH's Infectious Disease section and local public health nurses provided direct assistance to LTC facilities on how to implement guidance on infection control. Such support was critical to nursing facilities that needed more help than their infection preventionist could provide, and to assisted living facilities that did not have infection control personnel on staff. Call logs obtained for this study showed DPH staff fielded an average of nearly 12 calls per day from health care and LTC facility staff, media, and the general public with questions related to COVID-19 (for example, how to interpret infection control guidance, where to obtain PPE, requests for test kits, and so on), with up to 46 on a single day in late March (Exhibit 14).

Exhibit 14. Calls to DPH infection control staff related to COVID-19, March through June 2020



Source: Mathematica's analysis of call logs provided by DPH.

Note: This analysis includes all telephone calls fielded by the HAI and infection control staff at DPH. Callers included representatives of LTC facilities, other health care providers, media, and general public callers with questions related to COVID-19.

DPH = Department of Public Health; LTC = long-term care; HAI = health care acquired infection.

Facilities found this assistance helpful, but DPH staff reported being challenged by the need to directly help facilities while balancing their surveillance duties. Local public health nurses were stretched thin because neighboring towns that did not employ their own nurses would look to their neighbors for support. Local public health nurses also reported DPH often released information to the public before sharing it with local public health authorities; as one public health nurse reported, "when we don't learn about changes being made [before facilities ask questions about them], we lose our credibility." FLIS nurse consultants also provided infection control guidance to facilities; however, they felt they could not fully address the needs of facilities for technical assistance. One person we spoke with reported several open nurse consultant and supervisor positions. DPH hired per diem FLIS nurse consultants to perform

enhanced monitoring, but officials we spoke with reported these staff did not get as much training as the permanent nurse consultant staff.

c. Procuring and distributing PPE

Ad hoc distribution. When the COVID-19 outbreak first began, state staff did their best to obtain and distribute PPE from whatever sources were available. When the federal government failed to play a role in centralized procurement and distribution of PPE to the states, leaving the responsibilities to procure PPE to states and facilities, competition among many small purchasers created price spikes and uneven allocation. Nevertheless, early in its response, DPH coordinated donation and distribution of PPE supplies to medical settings, including to LTC facilities. DPH staff and local public health nurses also made emergency deliveries to LTC facilities whose management was not delivering PPE as quickly as needed. United Way's 211 service coordinated donations from the public and distributed them to facilities. The state also received supplies from FEMA; however, supplies did not show up as timely as expected and Connecticut prioritized distribution to hospitals (though there were two shipments to nursing homes²³). State officials also reported FEMA did not communicate the amount of PPE it provided to health care providers, so Connecticut had a hard time understanding how to prioritize additional PPE to hospitals, LTC facilities, and other recipients. As one facility lamented, "It was the wild west."

Coordinated, regional distribution. From mid-April to mid-August, the state distributed PPE to health care settings, including LTC facilities, through five regional PODs (Connecticut DPH 2020b). The National Guard staffed these PODs. The state procured materials through existing contracts, with the National Guard supporting logistics. The state considered a regional approach to purchasing PPE that would have pooled purchasing power across Connecticut, Delaware, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island, but it never came to fruition (Office of Governor Ned Lamont 2020c).

Facilities did not place orders or request specific supplies but they received equipment based on their size and the extent of the outbreak in each facility; this resulted in some confusion among facilities: they reported receiving what was available, not what they needed or requested via the MAP website. In deciding how to allocate PPE across various recipients (including health care settings and the community), Connecticut officials placed the highest priority on nursing homes, which received 40 percent of all supplies; home health and hospice, assisted living, and residential care homes received 15, 10, and 10 percent of the allocation, respectively. The state determined the allocation to each facility based on reported need via the MAP site, and adjusted the need based on burn rates, bed counts, and other factors.

Facility representatives reported that although the state-provided PPE comprised a small share of their total PPE, the state played a useful role as supplier of last resort. In total, according to DPH data, by mid-July, Connecticut had distributed nearly 600,000 N95 filtering face-piece respirators, more than 3.7

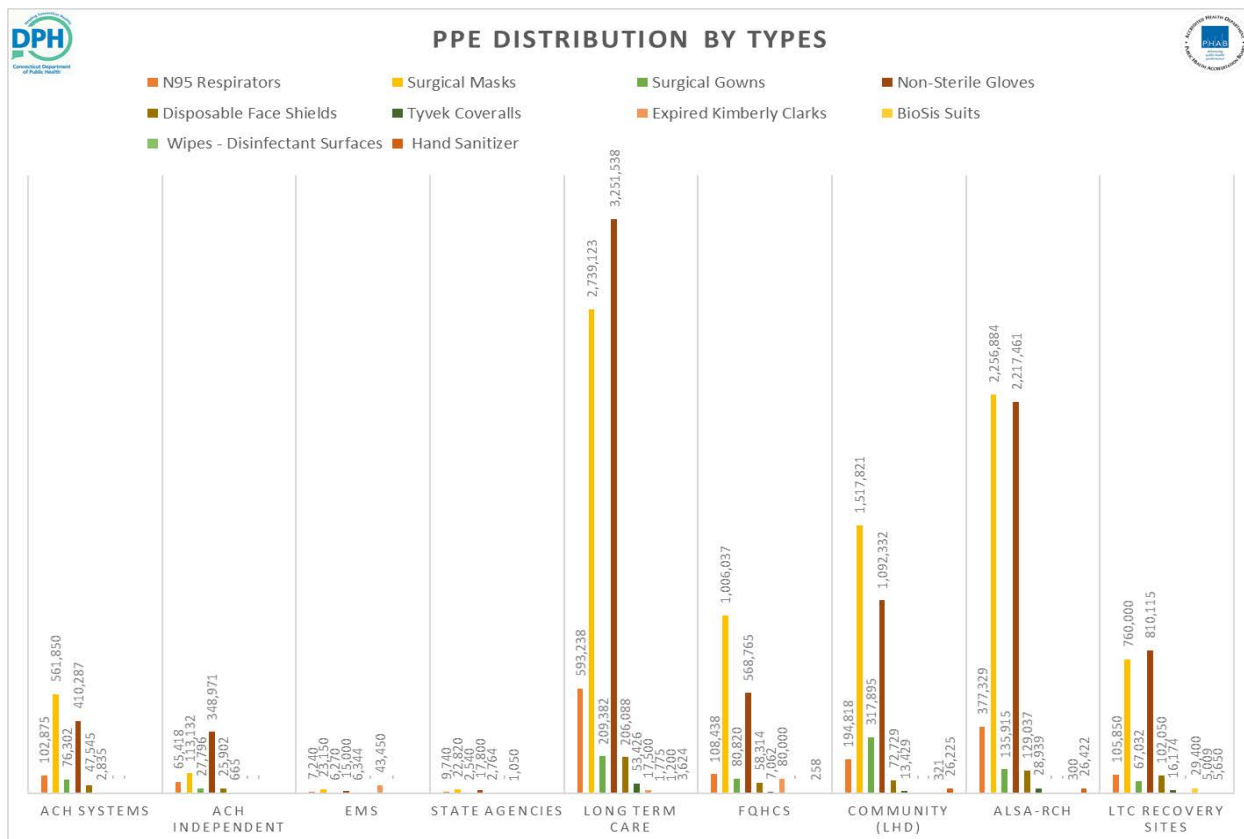
Recommendation SR19

The state should designate qualified staff or contractors that can provide technical assistance to LTC facilities regarding infection control guidelines.

²³ On April 30, 2020, FEMA announced (Release No. HQ-20-126) it was coordinating two shipments totaling a 14-day supply of PPE to nearly 15,000 nursing homes across the United States (a number of PPE to be included in the two shipments was not listed in FEMA announcement). See <https://www.fema.gov/news-release/20200727/personal-protective-equipment-medicare-and-medicaid-nursing-homes>.

million surgical masks, nearly 170,000 face shields, more than 200,000 surgical gowns, and over 3.2 million gloves to LTC facilities (Exhibit 15).

Exhibit 15. DPH count of PPE distribution by setting, as of July 16, 2020



Source: DPH documentation provided to Mathematica.

ACH = acute care hospitals, ALSA-RCH = assisted living service agencies and residential care homes, EMS = emergency medical services, FQHCS = federally qualified health centers, LDH = local departments of health, LTC = long-term care.

However, despite the state's best efforts to support PPE procurement and distribution, many LTC facility staff reported PPE availability in March through May was not adequate, though availability had improved by the time of our interviews in August and September. Uncertainty remains as to whether facilities have stockpiled enough PPE to address a potential second wave. State officials are concerned counts of PPE remain inaccurate, and one facility administrator confirmed this possibility: they are fearful that if they accumulate too much PPE, the state will take it away. As a result, they feel they have to hide their PPE supply and are more inclined to inaccurately report existing supplies. Questions remain regarding who should pay for future distribution and stockpiles. Though DPH expected to only provide PPE "where truly needed," stakeholders on all sides recognize the critical importance of adequate PPE to protect staff and residents.

Recommendation LR11

The state should maintain a stockpile of PPE that is available to LTC facilities in case of future increases in COVID-19 or other infectious disease outbreaks that are accompanied by breakdowns in the supply chain and lack of availability from the Strategic National Stockpile.

d. Visitor restrictions and visitation policies

Policies restricting visitation. When the COVID-19 outbreak appeared in Connecticut in mid-March, the Governor issued a series of executive orders prohibiting visitors, including nonessential workers, from entering nursing facilities (Office of Governor Ned Lamont 2020d; Lamont 2020c). These restrictions barred most family members and other caregivers from entering nursing homes except when residents were near the end of life. During this time, communications between residents and families were limited to phone, video conference, and window visits (where possible). DPH guidance issued on May 9 emphasized that facilities should adopt "reasonable and practicable alternative means of communication between residents and family members," which included at least weekly window visits, virtual visitation, social media communications, and phone calls that should occur on at least a weekly basis (Connecticut DPH 2020c). However, some of the stakeholders we interviewed reported facilities varied in how they chose to comply with this guidance, resulting in vastly different experiences across the state. Despite differences in methods and frequency of visitations, nearly all family members reported the physical and emotional health of residents declined significantly without frequent, in-person interactions with the family members and caregivers who had provided critical support for activities of daily living. This concern is consistent with our analysis that found significant declines in physical and emotional well-being (Section III.B.4 provides more information).

Virtual support from the ombudsman. During this time, the state LTC ombudsman supported families and residents by hosting daily Facebook Live video conferences to provide information to families; DPH staff attended on occasion. These events enabled "residents and family members to sign on, hear updates on the outbreak, and ask questions directly or message the Ombudsman office privately." Many family members reported these events were helpful; some even felt they were more effective than in-person visits, letters, and phone calls the ombudsman's office used to communicate with families before COVID-19.

Compassionate care visits and the need for expanded visitation. The deterioration of the health and well-being of residents when visitor restrictions were in place points to the critical role family members play in caring for residents. Before the pandemic, many family members made frequent visits to their

loved ones to ensure they received an adequate level of care. When the pandemic hit, residents were locked in the facilities away from their families and many did not receive the same level of care. For this reason, on August 27 DPH (1) clarified the obligation for LTC facilities to facilitate visitations; and (2) expanded visitations for purposes of “compassionate care” beyond end-of-life to include visits for residents who undergo significant change in physical, mental, or psychosocial condition (Connecticut DPH 2020d). Compassionate visits can take place indoors with appropriate PPE, as long as the facility is not experiencing an active outbreak.

““Why are we separating mental health from medical health? ... [Existing policies are] not speaking to the long-term effects of this isolation on everybody, but especially for the most fragile people who have no one but their family to sit by their side daily. To cut that off at a moment's notice at this stage of their life is harmful, and it's avoidable. ”

—Family member of an NF resident

While allowing compassionate care visits is a step forward, it does not address the daily support needs residents have that facility staff do not fully meet, nor does it offer a longer-term plan that would allow more in-person, indoor visitation to resume when appropriate. Other states have taken steps to address both issues. In June and July, respectively, Indiana and Minnesota allowed residents in LTC facilities to designate essential caregivers for each resident (Indiana State Department of Health 2020; Minnesota Department of Health 2020b). Caregivers who comply with PPE and infection control requirements may enter the facility for two to three hours a day.

Michigan is working on a similar but expanded concept for visitation volunteers, which it would implement in areas with low community spread (Michigan Nursing Homes COVID-19 Task Force 2020). Michigan’s recommendation states nursing homes that follow all visitation guidance be assured they will not be cited by the state for an adverse event as a result of visitation (University of Michigan 2020).

CMS guidance on June 23, 2020, identified steps nursing homes should take before reopening to visitors, and stakeholders in several states have adapted this guidance to create frameworks for facilities to use to decide how to move toward reopening (CMS 2020d).

Decision-making frameworks from LeadingAge Minnesota and American Medical Facilities Management in West Virginia provide examples (LeadingAge Minnesota 2020; American Medical Facilities Management 2020). In these examples, changes to visitation depend on facility factors—including active cases, access to PPE, current staffing, and access to testing—as well as community prevalence. As shown in these two states, DPH can work with its LTC facility associations and other stakeholder groups to create a practical framework that provides a pathway to reopening facilities for visitation.

Recommendation SR5

The state should work with facilities to designate essential caregivers who would have increased access to LTC facilities to fill a defined role for specific residents.

e. Cohorting

DPH guidance on May 11 and June 22 recommended cohorting residents into three separate units or areas: Positive, Negative, Exposed (Connecticut DPH 2020e, f). However, one elected official reported providing the first guidance on cohorting two months into the pandemic was too late. And like guidance on PPE use, guidance on cohorting changed over time. Specifically, the state changed its plans to

physically separate every symptomatic and asymptomatic nursing home resident after the CDC announced individuals can be asymptomatic and still transmit the virus. Until DPH issued very strict cohorting guidance for residents who tested positive (versus negative and unknown), it was not clear which cohort the nursing home should put the asymptomatic patient in. Perhaps as a result of the changing guidance, stakeholders we spoke with provided conflicting reports on whether facilities performed cohorting as directed, which might be due to referring to different time periods (Section V.B.2.c provides more information). In addition to containing viral spread, accurate and appropriate cohorting is needed to prevent moving residents unnecessarily, because transferring people increases the risk of failure to thrive, mobility issues, maladaptive behaviors, limited time out of bed, and lack of interaction among residents.

f. Physical changes to facilities, including ventilation

To our knowledge, the DPH did not provide guidance to facilities on changes to the physical environment, other than through cohorting. Therefore, facilities were on their own to identify needed changes to ventilation or other systems. One facility reported it found research developed by the Minnesota Department of Health that identified how to develop temporary negative pressure isolation rooms in response to deadly airborne diseases (Minnesota Department of Health 2019). According to this facility, the state did not support the negative pressure isolation rooms because “they were skeptical of their efficacy.”

C. Emergency response structure and communications

Connecticut activated its response to the COVID-19 emergency in January 2020, well before the first outbreak in the state; however, the state’s previous experience and existing emergency response plans did not fully prepare the state to respond to an event of this scope and duration. Over time, Connecticut adjusted its operations by improving communications with LTC facilities and opening COVID-19 recovery facilities, among other things. Stakeholders we spoke with urged the state to continue these successful practices throughout the remainder of its response.

1. Preparedness

Connecticut’s DPH had a robust emergency response continuity of operations plan that outlined roles and responsibilities, the structure of the joint incident command, and communication expectations, but the plan did not sufficiently address LTC facilities. First, the Public Health and Medical Services component of the state’s disaster and emergency operations plan focused exclusively on hospitals and did not mention LTC facilities in the list of health care assets of the state (Connecticut DPH 2019). The FEMA Pandemic Flu planning guidance document also did not mention LTC facilities (FEMA n.d.). Perhaps as a result of the existing plans, during the initial outbreak of COVID-19, hospitals were the priority for emergency planning and response.

Recommendation LR4

The state should revise its emergency response plans to explicitly include LTC facilities and HCBS providers as health care assets.

Recommendation LR5

Planning for and responding to future infectious disease outbreaks should include representatives of the LTC and HCBS industries.

Second, the state's plan focused on responding to disasters that needed evacuations, but did not sufficiently consider how to respond to long-term sheltering in place in residential care settings. State officials confirmed previous emergency preparedness exercises and data collection through the mutual aid plan were designed to support evacuation. Nursing facilities have planned and participated in these exercises since 2017, though assisted living facilities are not required to do so (only 25 percent voluntarily participated in the mutual aid plan before 2020; initiation and membership fees might have deterred the others from participating) (81 FR 63860).

“Facilities couldn't help each other because they were all worried that they were going to be next.”

—Connecticut state official

Third, the state designed its plan to respond to an event that might affect only a handful of facilities, but COVID-19 affected every facility at the same time.

This limited the state's ability to respond and help facilities share resources. Officials familiar with the MAP reported that in previous emergencies, facilities

willingly shared resources. However, when the COVID-19 outbreak began, facilities stockpiled PPE and were reluctant to share. This hamstrung the ability for the MAP to share resources because all groups were perceived as challenged at the same time.

Fourth, the plan assumed a sufficient supply of PPE and that only noninfected staff would work in health care facilities. The plan also assumed the Strategic National Stockpile would provide resources, including PPE, that a state would need in a widespread incident. However, as discussed in Section IV.B.1.b, receipt of PPE from the Strategic National Stockpile was not timely or adequate, and Connecticut was left to procure and distribute PPE without support from federal resources.

State emergency preparedness staff were also spread thin before the COVID-19 outbreak. As of January 2020, six of nine positions in the Office of Public Health Preparedness and Response were vacant. The state filled these positions by July 2020, but the vacant positions in January indicate insufficient capacity to monitor and manage an emergency of this magnitude at the start of the pandemic.

2. Response

a. Emergency response and decision making

Well before the governor declared a public health emergency, Connecticut activated its emergency plan and filled many of its critical roles creatively—for example, by using the National Guard to help establish COVID-19 recovery facilities and inspecting nursing homes, and by working with United Way's 211

center to provide information to and from the public.

“When DPH finally paid attention to nursing homes, it didn't feel as collaborative as it could've been.”

—Facility representative

Though the earliest planning conversations did not include legislators, by April they received invitations, though several lawmakers expressed a desire to be more fully included in future planning and response efforts. Connecticut also collaborated with other states, which one official reported has been helpful in both “brainstorming strategies and knowing that Connecticut isn't facing these challenges alone.”

“Better communication happened in the second half of the ballgame.”

—Facility representative

Many stakeholders, however, report the state's decision making early in the pandemic was “slow and insular,” particularly regarding the response in nursing facilities. Connecticut officials reported they expected the federal government to provide decision-making support and supplies to assist its response to

COVID-19; however, the federal government did not meet the state's needs and expectations, resulting in a delayed and siloed response.

Another reason for the delay and disconnect is that the state's early decision making did not involve LTC industry representatives. State officials acknowledged LTC facilities became a focus later in the pandemic, but coordination with these facilities improved over time (for example, mid-way through the state's response to the COVID-19 outbreak, it began coordinating weekly calls with LTC facilities). One facility reported communications largely improved due to the encouragement and involvement of Leading Age and Connecticut Association of Health Care Facilities [the two trade associations], which pushed the state to communicate more openly and frequently with providers. DPH acknowledged its shortcomings in communications, and DPH officials report they are currently thinking about additional congregate care settings they need to include in planning conversations going forward, such as residential care homes and the settings that care for people with intellectual and developmental disabilities.

b. COVID-19 recovery facilities (CRFs)

Connecticut DPH partnered with the nursing home industry to open CRFs across the state. These facilities sought to be part of the state's medical surge plan to expand the state's capacity and alleviate burden on hospitals. On April 11, the Governor's Executive Order 7Y authorized the designation and operation of two CRFs, one in Sharon and one in Bridgeport (Lamont 2020d). Consent orders were issued to an additional five facilities from April 15 to May 8 in Torrington, Meriden, East Hartford, Wallingford, and New Canaan.²⁴ Among these seven facilities, 634 CRF beds were available across the state. Initially CRFs could accept only individuals being discharged from the hospital; this was later changed to allow CRFs to accept admissions directly from other nursing homes or the community.

"Everyone was panicked about dealing with a surge on the hospitals, but the surge came from within the long-term care industry"

**—Athena Health Care System
Representatives**

Nearly all stakeholders from the state, elected officials, and industry officials expressed support for creating CRFs as an alternative to nursing homes caring for COVID-19 residents in place. In addition, several nursing home operators we spoke with, as well as representatives from assisted living communities, valued CRFs because their own facility was not equipped to provide adequate care for COVID-19 residents and preferred to transfer them to the hospital or another location like a CRF.

Planning for CRFs. Planning for CRFs began on March 13, within days of the first confirmed COVID-19 case in the state. The state's Unified Command emergency response structure provided the emergency support functions necessary for the state to lease buildings and procure supplies to get CRFs up and running as quickly as possible. The first CRF admissions took place on April 15.

On March 22, DPH finalized a nursing home surge plan that identified three models for CRFs: Model 1 referred to nursing homes already in operation that operate as CRFs after discharging their current residents to other locations; Model 2 referred to vacant nursing homes or other empty buildings that could be operational relatively quickly after receiving authority to operate from the state; Model 3 referred to distinct units in existing nursing homes with enough empty beds and separate entrances. State officials

²⁴ Consent orders provided by DPH to Mathematica.

identified up to 11 possible sites for CRFs. They identified those locations across the state and opened them in areas with the greatest need depending on prevalence in the community.

State officials expressed concerns with Model 1 from the beginning given the potential trauma of having to discharge and move residents who lived in those facilities. Athena Health Care Systems, which operated the CRF in Bridgeport and had existing residents in needed of transfer, agreed this process was difficult on both residents and staff. For this reason, Mathematica recommends the state continue to use Models 2 and 3 in the future if the state has to expand CRF capacity to deal with future waves of COVID-19 or other infectious disease outbreaks. Michigan, which set up distinct units within nursing facilities similar to Connecticut's Model 3, found no significant evidence of COVID-19 transmission between residents in the COVID-dedicated units and those in non-COVID units, suggesting that dedicating separate wings as CRFs in existing nursing homes can operate safely with adequate PPE, testing, and dedicated staff who do not work across these units (University of Michigan 2020).

CRF reimbursement and use. The state agreed to reimburse CRFs at \$600 per bed per day for the care of COVID-19 positive residents and to review monthly cost and expense reports for consideration of expenses that exceeded the per diem of \$600. Athena shared with Mathematica in August that it was still in the process of having the state audit its cost reports but felt its actual costs were much higher than \$600 per resident per day because it only ever filled about 45 percent of its beds. Had use been higher, Athena felt the \$600 per resident per day reimbursement would have been appropriate to cover costs.

Five of the seven CRFs ever accepted residents according to documentation provided by the state; 386 admissions across these five facilities took place from April 15 to July 15.²⁵ Exhibit 16 presents a graph of the number of daily admissions to CRFs. Daily admissions quickly declined, consistent with the decline in total COVID-19 cases in the state, which peaked in mid-April.

Exhibit 16. Daily CRF admissions, April 15 through June 30, 2020



Source: Mathematica's analysis of MDS data for five CRFs that had non-zero admissions.

Notes: State data based on documentation provided by DPH to Mathematica. The state data rely on daily reporting by CRFs to DPH, which differs slightly from the MDS assessments we observe in our data set, though the patterns are consistent in both sources.

²⁵ Documentation provided by DPH to Mathematica.

CRF = COVID-19 recovery facility; DPH = Department of Public Health; MDS = Minimum Data Set.

State officials felt CRFs provided a higher standard of COVID-19-related care than other nursing homes could offer. The CRF consent orders required higher staffing levels than other nursing homes, with a nurse aide-to-patient ratio of 1:10 during the first and second shifts and 1:15 during the third shift and a licensed nurse ratio of 1:15 during first and second shifts, and 1:30 during the third shift.

During an interview with Athena Health Care Systems, which operated four of the facilities that received the majority of all CRF admissions, representatives shared that they saw a higher proportion of COVID-positive residents recover successfully compared to Athena's non-CRF facilities in the state. In CRFs, the recovery ratio was 10:1 (10 recoveries of COVID-positive residents for every 1 death); in Athena's non-CRFs the recovery ratio was 2.5:1. This finding is consistent with the experience in Michigan; the COVID-19 death rate in Michigan dedicated COVID facilities was 17 percent compared to 26 percent in other nursing homes (University of Michigan 2020).

Future planning for CRFs. As of mid-August, only two CRFs were operational with a total of 270 beds between them. These facilities also accepted non-COVID residents at the time of our interview with Athena. Planning to quickly scale up CRF capacity could be critical to mitigating a potential second wave of COVID-19 in Connecticut. According to Athena, it takes about 30 days of planning before a CRF can begin admitting patients to procure the appropriate equipment, hire and train staff, and receive all necessary building inspections and operating permits. If additional CRFs open in the future, the state should continue to allow these facilities to admit patients from any setting, including hospitals, other nursing homes, and assisted living and general community settings. The state is continuing to lease the facilities with the CRF consent orders to enable these facilities to quickly become operational again should the added capacity be needed to deal with future waves of COVID-19 or other similar outbreaks.

Recommendation SR10

The state should continue its planning efforts to scale up CRF capacity and deploy it quickly in response to the scope and severity of a second wave.

D. State agency roles, expertise, and skills

Recognizing the COVID-19 outbreak is greater in scale and severity than any disease outbreak in recent memory, it is not surprising that Connecticut, like most other states, found itself without sufficient staff to respond to the pandemic. It is difficult to assess the adequacy of state agency roles, expertise, and skills without objective criteria for the ideal composition of backgrounds, training, and skill set for a given position to use as a point of reference. Based on our assessment, Connecticut generally had staff with the appropriate skills and training to address the pandemic in LTC facilities, but many stakeholders suggested there were not enough staff to ensure an efficient and quick response. Where the state was missing skill sets, it reached out to contractors to fill the gap, such as those from Yale School of Medicine Department of Infectious Diseases. However, stakeholder interviews suggested the right people were not always at the table during relevant conversations. For example, weekly DPH leadership calls did not include infection control staff at the beginning of the outbreak.

Connecticut DPH was the lead agency under the Unified Command structure for the COVID-19 response in LTC facilities. Although many offices within DPH engaged in the response, the primary offices according to state agency stakeholders were FLIS, the Infectious Disease Section and the Healthcare Associated Infections and Antibiotic Resistance program within that section, and the Public Health Preparedness and Local Health Section. All of these sections had some vacant positions before the outbreak according to organizational charts provided by DPH to Mathematica. FLIS had 6 vacancies in its survey and certification unit (of 62 total positions) and 9 vacancies (of 37 total positions) in its licensure and enforcement unit as of February 3, 2020. The Infectious Disease Section had 6 vacancies (of 66 total positions) on January 13, 2020. The Public Health Preparedness and Local Health Section had 6 of 17 total positions vacant on January 13, 2020. (At the time, new hires were pending for 3 of these positions.)

Recommendation LR17

The state should conduct a comprehensive assessment of DPH staffing needs, including number of staff, skills required for topics including infection control and emergency response, and interaction with groups within and outside of DPH.

DPH also experienced a change in leadership in May when the former commissioner, Renée Coleman-Mitchell, left her post. The Commissioner of the DSS, Dr. Deidre Gifford, was appointed as the acting DPH commissioner on May 12. Stakeholders we spoke with believed following this change in leadership the DPH issued more timely guidance than it had previously. It is impossible to disentangle how much of this improvement might be due to the change in leadership, reduction in the number of cases and deaths being reported by May, or the experience gained by the Department over the previous two months.

E. Screening and testing of residents and staff

Connecticut's approach to developing guidance for screening and testing of LTC facility residents and staff reflected changing federal guidance as the scientific understanding of the virus evolved. Insufficient testing supplies also drove the response, particularly during the early stages of the outbreak.

1. Screening and testing of residents and staff

In March, COVID-19 testing was generally limited to hospital patients, so LTC residents suspected of having COVID-19 had to be transferred to hospitals for testing and care. At that time, DPH guidance to health care facilities reflected federal guidance to focus screening and testing on individuals with respiratory symptoms, those with international travel within the past 14 days to restricted countries, or contact with someone with or suspected of having COVID-19 (CMS 2020e). The first nursing home-specific guidance from the DPH, released on March 26, 2020, recommended assessing symptoms and temperatures for all staff at the beginning of the shift, assessing residents for symptoms at least once daily, and guidance on testing for symptomatic residents only (Connecticut DPH 2020a).

2. Testing capacity

Like other states at the beginning of the pandemic, Connecticut had insufficient testing capacity, and prioritized available test kits for use in hospitals. The state public health laboratory was the first lab in the state to receive approval from the CDC to begin testing samples itself rather than sending samples to CDC testing sites in Atlanta. After receiving this approval on February 28, the state lab started with four individuals who could conduct testing. Within a week it more than doubled the staff to nine people, but

social distancing requirements and material shortages limited the lab's capacity. State laboratory staff reached out to encourage partner labs to ramp up to prepare for increased testing and to leverage other labs' purchasing power (especially the national lab chains) to mitigate shortages of testing supplies. A March 9 press release indicated the state lab at that time could conduct 15 to 20 tests per day, that a second lab had become operational, and a third was preparing to come online. At that time, the state required a physician's order for testing by these facilities (Office of Governor Ned Lamont 2020b).

3. Point prevalence survey and increased testing requirements

Connecticut conducted a state-funded point prevalence survey (PPS) over the course of three weeks in early May, with a goal of testing all nursing home residents for COVID-19 (Connecticut DPH 2020e). The DPH Infectious Disease Section and FLIS worked to coordinate the survey and the National Guard delivered and collected test kits from facilities. DPH strongly encouraged but did not require facilities to participate in the survey. Most did, which enabled individual facilities to assess their residents' COVID-19 status and implement appropriate cohorting accordingly. DPH processed results in 24 to 48 hours and instructed facilities to cohort residents based on test results. The PPS provided the state with an understanding of details such as the percentage of residents who were positive but asymptomatic and the percentage who were negative and had a positive roommate, statewide and within individual facilities. The PPS excluded residents who had previously tested positive for COVID-19 and facility staff. During interviews, stakeholders shared that although they thought it would be best to test staff as well during this survey, testing capacity was limited and the state felt it should prioritize testing of residents.

On May 6, DPH issued an order removing the requirement for a licensed practitioner order for COVID-19 testing (Connecticut DPH 2020g). On June 1, the Governor issued Executive Order UU, which required weekly testing of LTC staff for the duration of the pandemic (Lamont 2020e). A June 5 DPH memo recommended weekly retesting of previously negative residents and staff until no new cases are identified for 14 days (Connecticut DPH 2020h). The administration expanded this weekly testing requirement to include assisted living facilities on June 17, 2020 (Lamont 2020f).

4. Care Partners program

Shortly after the Governor's June 1 order mandating weekly testing of facility staff and DPH's June 5 memo recommending weekly testing of residents, the state notified facilities that it would cover the costs of testing for anyone not covered under Medicare Part B or Medicare Advantage. The state also paired facilities with area testing contractors, referred to as Care Partners. The state funded these testing Care Partners to order, conduct, and report testing results to the state. Care Partners were also responsible for providing physicians orders for tests, collecting the insurance information for non-Medicaid qualified residents, and billing the relevant insurers directly (Connecticut DPH 2020i). The state initially committed to funding the testing contractors program through August 31, and, on August 6, extended the policy through at least October 31 (Office of Governor Ned Lamont 2020e). The number of Care Partners has expanded since its implementation and the state continues to revisit the assignments as new testing contractors join the program.

Recommendation SR13

DPH should continue to assess the Care Partners testing program to ensure it meets its intended goals.

5. Current screening and testing policies and capacity

DPH's current testing policy reflects CMS guidance, updated August 26, that includes guidance on routine tests of nursing facility staff (CMS 2020f). The guidance suggests symptomatic staff have access to rapid testing and weekly testing of asymptomatic nursing home residents and staff who have not previously tested positive until there are no new positive test results for 14 days among residents or staff. After these criteria are met, facilities with 100 or more staff are recommended to test 25 percent of staff weekly, and facilities with fewer than 100 staff to test 50 percent of the staff every other week. The policy notes testing strategy can be adjusted based on trends in community spread. Weekly testing of all residents and staff resumes if a single new confirmed or suspected case is identified (Connecticut DPH 2020j).

Recommendation SR12

DPH should continuously revisit its guidance on testing LTC facility residents and staff as new information becomes available or testing guidance from the CDC evolves.

Stakeholders shared mixed opinions about the state's current and ongoing capacity to conduct needed COVID-19 testing. One state official expressed confidence in the state's testing supplies and its capacity to continue to meet testing demand, noting the state has "figured out the supply chains." However, facility staff note sometimes even Care Partners do not process and report the results of all tests in a timely way. And when asked if there is sufficient testing capacity now, state lab staff also noted "turnaround time can still be a challenge. There can be shortages of collection kits, and there are concerns about testing doubling once flu season begins."

F. Reimbursement mechanisms to support increasing LTC system costs

1. Preparedness

Connecticut Medicaid is the funding source for more than 70 percent of nursing home care provided in the state. For state fiscal year 2020, the average Medicaid nursing facility rate in the state was \$243.46 a day (Connecticut Department of Social Services 2019). In June 2020, the reported national average Medicaid reimbursement in the United States was \$230 per day, although this did not adjust for state differences in wages and cost of living (National Investment Center for Seniors Housing & Care 2020). Connecticut is part of a multiyear project to revise its nursing facility payment rates from a cost-based to an acuity-based system. The goals of these changes are to move to a more data-driven and transparent methodology, lay the groundwork for developing value-based payment approaches, and use payment policy to drive right-sizing of the supply of nursing home beds and rebalancing of the LTSS system (Connecticut Department of Social Services 2020a).

Recommendation LR21

The state should ensure that ongoing cost of nursing home resident and staff COVID-19 testing, as well as PPE, are adequately covered by the state's Medicaid rates.

Nursing homes faced higher costs as a result of COVID-19 combined with decreased revenues due to loss of higher-paying short-stay skilled nursing patients, whose admissions are usually covered by Medicare, as well as further decreased census in the long-stay population due to some residents choosing to move to

or remain in the community. This trend is consistent with patterns observed across the country (National Investment Center for Seniors Housing & Care 2020).

2. Response

a. State financial support for LTC facilities in response to the COVID-19 pandemic

Connecticut provided a variety of financial supports to nursing homes in response to the COVID pandemic. The state provided a 10 percent Medicaid rate increase effective March 1 through April 30. It also used part of its \$1.4 billion in federal CARES Act Coronavirus Relief Funds to make payments to each skilled nursing facility, except CRFs. This funding approximated the value of an additional 10 percent increase in April and 20 percent for May and June. Facilities could use both the Medicaid rate increases and the Coronavirus Relief Funds for employee wages, new costs related to visitor screening, PPE, and cleaning and housekeeping supplies, and other COVID-related costs (Connecticut Office of Policy and Management 2020b). In addition, facilities could submit hardship payment requests for consideration of expenses that exceeded those covered by these additional funds for the period of March through June (Connecticut Department of Social Services 2020b). Hardship payments also came out of the state's Coronavirus Relief Funds and it granted them in some cases to "avoid substantial deterioration of the nursing facility's financial condition that might adversely affect resident care and the continued operation of the facility" (Connecticut Office of Policy and Management 2020c). The state paid a cost-adjusted rate of \$600 per bed per day to CRFs (Connecticut Department of Social Services 2020c). Section IV.C.2.b provides more information on these facilities.

Connecticut set aside about \$123 million of the federal CARES Act Coronavirus Relief Funds to support nursing homes, which represents about 9 percent of the state's overall allocation from the federal government. Funding includes \$14 million for designated CRFs, \$52 million in grants to support nondesignated CRFs, and \$57 million for hardship grants for facilities. However, the state reports a significant portion of the funding allocated for hardship grants will remain unexpended due to the low number of requests received that represented allowable uses for grant funding (Connecticut Office of Policy and Management 2020b, d).

b. State methods to determine financial supports

Beginning in March, the CT DSS partnered with the Office of Policy and Management (OPM) to analyze short-term cost reports to understand nursing home revenue loss and costs associated with response to the pandemic and determine allocation of the federal Coronavirus Relief Funds (the primary vehicle for funding Medicaid providers) to assist these facilities. State staff noted it was challenging to understand the full picture of funding coming to each facility through the various streams of funding (CARES Act, Paycheck Protection Program, and State Medicaid funding), and they are currently conducting an analysis to understand nursing home costs and funds received since the COVID-19 outbreak.

G. Communications with LTC industry stakeholders and other key stakeholders

1. Preparedness

State and facility stakeholders described the LTC MAP website as an important source of information and guidance from the state for use in emergency preparedness situations. The MAP establishes a commitment and agreed-upon procedures for facilities to assist one another during a disaster. In addition

to the MAP, the state provided updated guidance to LTC industry and other key stakeholders through two other main communication channels: (1) the DPH's Blast Fax page and (2) its COVID-19 Healthcare Guidance page (Connecticut DPH 2020k, l). Both of these sites served as repositories of the state guidance for health care facilities and providers.

The Connecticut LTC Ombudsman Program provides a mechanism for communication between the state and residents and family members. The ombudsman's role is to work on behalf of residents and family members to investigate residents' complaints and assist them in resolving problems. Before the outbreak, the LTC Ombudsman Program investigated cases in person (Connecticut Long-Term Care Ombudsman Program, n.d.a).

2. Response

Several stakeholders reported the state's response to the outbreak in LTC facilities was not quick enough, particularly early on. For example, although the first confirmed positive case in the state was identified on March 8, the Department of Public Health's first nursing-home specific COVID-19 guidance was not issued until March 26 (Connecticut DPH 2020a). Like other states that had COVID cases early on, Connecticut's response prioritized managing the outbreak in hospitals first, and focused on long-term care facilities later on. One stakeholder noted that, given the outbreaks observed in nursing facilities in Washington State, Connecticut should have anticipated and prepared for the possibility the virus would hit nursing homes hard.

a. Pace of communications

Multiple interview respondents reported the state was slow to provide guidance to facilities, which often left facilities unsure how to implement practices suggested by other sources such as the CDC or national associations, for example regarding cohorting or testing practices. Respondents from one facility reported written guidance sometimes came out weeks after calls with DPH. In the meantime, facilities, in some cases, were unsure how to implement policies discussed in these calls. The state has improved the speed and accessibility of communications since the beginning of the pandemic, but some stakeholders indicated a need for further improvements. For example, the state released guidance on expanded visitation policies for nursing homes on August 27, 2020. A state official said during an interview on September 10, 2020 that the state was still working on writing a frequently asked questions document for that guidance. At the time of this report in September 2020, state respondents report they have hired additional contract staff to help make guidance available more quickly going forward.

b. Modes of communication

FLIS and staff from HAI teams held a weekly call with LTC facilities to provide guidance and answer questions on infection control and other topics. This is a main channel for facilities to obtain more information about how DPH would like them to implement guidance. Facility staff shared it can be difficult to attend these calls due to scheduling conflicts. They requested that the state post summaries after each call, along with a transcript to make it easier for those who cannot attend live to review the

Recommendation SR20

DPH should supplement its weekly calls with LTC facilities by providing written summaries following each call and archiving guidance in a central place.

information quickly. As of the end of August, DPH has begun posting written summaries of these calls on the MAP website.

c. Including key stakeholders

Several respondents requested that DPH be more transparent about the issues and policies under consideration by consulting with key stakeholders and requesting their input into policy decisions. Several stakeholders suggested developing state plans for a potential second wave in consultation with legislative representatives, representatives from the LTC industry, HCBS providers, residents, and family members.

V. Assessment of the LTC Industry's Preparedness and Response to COVID-19

Nursing homes are subject to numerous federal and state laws and regulations in a broad range of areas, including comprehensive resident assessments; minimal licensed nursing staff requirements; and the protection and promotion of residents' rights such as freedom from restraints, accommodation of needs, grievances, and refusal of certain transfers. Federal and state rules also govern the use of certain drugs, advance directives, access and visitation, sanitary and infection control, and physical environment standards (Muscumeci and Chidambaram 2020).

Consequently, LTC industry stakeholders interviewed in Connecticut believed they had to wait for guidance and direction from DPH on actions that were allowable for nursing home providers at the beginning of the COVID-19 outbreak. Many of these stakeholders indicated DPH delayed providing guidance on what proactive measures nursing homes could or should implement to prevent the spread of the coronavirus, and avoid the COVID-19 outbreak at Life Care Center of Kirkland, a nursing facility in Washington State in February 2020.

This section contains an overview of the LTC industry's preparedness and response to the COVID-19 outbreak in Connecticut. The information in this section relies primarily on interviews with industry stakeholders, residents and family members, and direct care staff working in nursing homes around the state. It also includes secondary reporting on the number of COVID-19 cases and deaths among LTC staff.

A. Surveillance and outbreak response

Before the COVID-19 outbreak, DPH required nursing homes to report infectious disease outbreaks to the state when there were three or more cases of a lab-confirmed infection for most health care-associated infections, such as influenza, viral gastroenteritis, or chickenpox. DPH rules required reporting Category 1 diseases—defined as those that require an immediate public health response—to the state via telephone the same day (Connecticut DPH 2015). On February 5, 2020, the commissioner of DPH added COVID-19 as a Category 1 disease, which required immediate reporting by health care facilities to DPH and the local department of health in their town (Connecticut DPH 2020m). Nursing homes were generally well practiced in responding to infectious disease outbreaks based on their experiences with seasonal flu or bacterial infections.

Some industry stakeholders who spoke with Mathematica shared that when they began to see the impact of COVID-19 at Life Care Center of Kirkland, they met with their leadership teams to prepare their response. Many of these facilities based their earliest plans on their experiences with flu and other outbreaks, without realizing that COVID-19 would be very different from other infectious disease outbreaks.

Some of the earliest surveillance mechanisms that facilities put in place included displaying posters to raise awareness about the symptoms of COVID-19 to watch for and reinforce good hand hygiene. That quickly evolved into a surveillance approach that included regular temperature checks for staff and screening questionnaires asking about symptom or travel history. Direct care staff interviewed reported that, in February and March, they received very little training or communication from their facility management on how they should prepare to respond if COVID-19 arrived in Connecticut.

B. Infection control within and outside of facilities, including PPE

1. Preparedness

Before the outbreak, LTC facilities had established PPE supply chains and relationships with medical suppliers and generally did not have problems acquiring sufficient PPE. One industry stakeholder remarked that due to tight financial margins, many “nursing homes operated on a three- to five-day supply of PPE.” Another nursing home operator said nursing homes do not traditionally use N95 masks, “so it was harder for them to obtain those than hospitals” as the need for N95 masks rose during the outbreak. Industry stakeholders also reported the state’s initial focus on addressing the impact of the outbreak in hospitals led to a delayed response in developing infection control guidance related to COVID-19 specific to nursing homes.

2. Response

Efforts to respond to the COVID-19 outbreak focused on infection control and the availability of PPE, according to most stakeholders. This section describes the experience of the LTC industry as it relates to infection control and PPE and describes the variation in facilities’ approaches to prevent or limit the spread of COVID-19 in LTC facilities. Industry stakeholders reported substantial variation in approaches to limit the spread of COVID-19, but struggled with frequently changing guidance from DPH.

a. Within-facility source control

On April 4, DPH ordered universal masking for personnel in all health care facilities in response to emerging evidence on presymptomatic shedding of the virus and transmission. Based on interviews with industry stakeholders, before the state’s universal masking order for direct care staff, nursing home operators took different approaches to implementing source control measures. Some nursing homes adopted universal masking policies for their own staff before the state’s requirement, whereas others did not, citing lack of guidance on what they needed for protection or the inability to secure surgical or N95 masks. In some cases, direct care staff workers and industry stakeholders observed nursing homes did not

“The most frustrating part was to stand back and watch because as a family member, my hands have been tied since March.”

—Family member

require masking for all personnel who were susceptible to COVID-19. For example, staff in housekeeping, laundry, and dietary services did not receive PPE from the facility or their employer if the facility contracted these services. Others shared that requiring masks for residents, especially those with dementia or other cognitive issues, was difficult to enforce.

In accordance with the March 9 DPH order restricting visitation in nursing homes, facilities limited entry of nonessential personnel, including family members, vendors, and food or mail delivery. Facilities transitioned nonessential medical services to virtual appointments or telemedicine. Facilities also took different approaches to changes to staff and residents’ movements that included confining residents to rooms, restricting residents from congregating and sitting in hallways, and limiting residents’ social and recreational activities to those in their immediate cohort or unit to limit exposure. Finally, some facilities implemented a 14-day quarantine of residents who returned after a hospital stay.

b. PPE

Procuring PPE. On March 5, 2020, DPH issued recommendations to nursing homes to “inventory their PPE supplies, evaluate current usage, and ensure staff are using PPE properly” noting that PPE, particularly N95 masks were limited or unavailable through the supply chain by that point (Ortelle 2020). Based on PPE shortage requests from April to July 2020, DPH most frequently received reports of urgent needs for isolation gowns and N95 masks reports from facilities through the LTC MAP portal.

With no single approach to procurement, the widespread lack of PPE from traditional suppliers challenged facilities. As nursing homes had always been responsible for procuring their own PPE, operators of nursing homes shared that it felt like the “wild, wild West” and they were “largely left to compete against each other” to procure PPE in the face of a nationwide shortage. Smaller nursing homes felt constrained, with some sharing that they lacked the collective buying power of the larger chains, which generally centralized PPE procurement efforts for all facilities in their chain by leveraging their size to increase purchasing power. The typical medical supply chains were largely out of stock of PPE at the beginning of the outbreak, so LTC facilities had to quickly diversify their supply chains. Some turned to nontraditional suppliers, such as eBay or Amazon, to procure the necessary equipment.

In the face of a nationwide PPE shortage and compounded by the lack of a centralized approach to procurement for the LTC industry, industry stakeholders reported the cost of PPE increased drastically from prepandemic levels. One nursing home shared that a “a six-cent mask cost \$1.00 to \$1.20; a 60-cent gown cost \$6.00 to \$12.00; and gloves went up in price but not as dramatically.” In other cases, nursing

“At the beginning, we were confused about the PPE, what to wear and how to wear it.”

—Nursing home CNA

home operators reported adopting cost-saving measures, finding it too costly to continue to purchase disposable PPE. For example, one nursing home chain reported investing in reusable gowns, which represented a more significant investment of \$40.00 per gown, but felt this was more reasonable, with potential for hundreds of uses with appropriate laundering.

Regional distribution of PPE from the state. On April 11, 2020, the state set up five PODs staffed by the National Guard (Connecticut DPH 2020b). The National Guard distributed bundles of PPE on a routine schedule, and facility operators picked up the packs at regional dispensing sites. (Section IV.B.2.c provides more information on the state’s role in distributing PPE.) Although the state expected its distribution formula to take into account the supply of PPE that facilities reported through the MAP, and the status of the outbreak in their facilities, industry stakeholders reported the information National Guard staff had at the POD was often inaccurate. Industry stakeholders had mixed perspectives on the value of the PPE received from the state, claiming they received whatever was available at the time and the PPE they received was not specific to the needs or requests of operators. For example, one operator “received body wash that week but they really needed gloves and gowns.” Another operator said that “while distribution has been somewhat sporadic in terms of the items and quantities that were available, it really helped many providers accomplish [procurement of PPE], get through shortages, as well as create stockpiles.” This sentiment was consistent across industry stakeholders; although the PPE they received from the state represented only a fraction of the total need, the state was an important “supplier of last resort,” especially for facilities that found their PPE supply approaching a critical shortage.

Availability of PPE within facilities. At the outset of the COVID-19 outbreak, many direct care staff reported varying experiences with obtaining adequate PPE needed to provide direct care to COVID-19 patients. In some instances, staff reported receiving masks with differing filtering standards (that is, N95 and KN95 masks) and felt guidance was unclear on appropriateness of use of KN95 masks for direct care. Many staff also shared that they were never fitted for N95 masks or that fit tests were performed late in the summer. A few nursing home operators shared that they lacked the appropriate equipment for fit tests and, in some cases, nursing home operators reached out to and partnered with the local fire department to fit their staff for N95 masks.

Nursing home direct care staff reported varying guidance from administrators on appropriate use of PPE and having to reuse PPE for longer periods than before the outbreak. Most direct care staff reported experiences with multiple uses of respirators and gowns. Some staff said they received a single surgical mask for up to a week or longer before receiving another mask, and frequently masks became damaged or visibly contaminated.²⁶ In other cases, staff reported they received paper bags to keep masks in after their shift, but that at times these bags became mixed up, and use of others' PPE became an issue.

Some staff felt the gowns provided by facilities were not adequate to protect against splashes or sprays of infectious materials. Staff reported receiving cloth gowns or gowns that did not overlap in the back or provide protection or were not fluid-resistant or impermeable materials. Staff also felt reuse of gowns exposed residents and staff to cross-contamination. In one case, a staff member said the same gown for the resident was hung in the room, and each worker who entered the resident's room had to wear the same gown, at one point. During focus groups with direct care staff, several reported some staff chose to wear plastic trash bags on top of the PPE provided by the facility to add an extra layer of protection if they felt that they did not have sufficient PPE.

Recommendation SR16

Facilities should ensure they have an adequate stockpile of PPE that is available and accessible to staff on every shift.

LTC industry representatives and staff at nursing homes reported using different approaches to providing PPE to staff and residents. Some said their facility immediately posted hand sanitizer stations at the entrance of residents' rooms, but others reported hand sanitizers were "locked up" and removed from walls. Nursing home direct care staff frequently observed that administrators locked PPE and it was not readily accessible when needed for direct patient care. At some points, direct care staff reported facilities ran out of PPE, such as masks and gowns, and staff received inadequate PPE. In one case, staff said second and third shift workers could not reach the administrator after hours to access PPE locked in storage or, in some cases, staff reported calling the facility administrator to get PPE from the locked supplies during the weekend. During industry stakeholder interviews, we observed a tension between the experience of direct care staff and the perspective of nursing home leadership. Most facility managers we spoke with acknowledged keeping PPE supplies locked in closets or offices, but did so to protect the supply that was available. Guidance from the CDC on PPE optimization strategies evolved over the course of the COVID-19 outbreak (CDC 2020c). Nursing home management frequently changed their approach to distributing PPE to staff based on evolving guidance and the availability of PPE in the building. Staff perceived this as management hoarding supplies or not being willing to provide what staff

²⁶ CDC guidance on PPE optimization strategies evolved over the course of the pandemic. The guidance includes acceptable standards of PPE used based on the available supply of PPE (conventional capacity, contingency capacity, or crisis capacity).

felt was necessary to protect themselves. Management also felt staff at times had “unreasonable” expectations of what PPE they should have based on media coverage showing hospital staff in full PPE suits.

c. Cohorting

DPH issued guidance related to cohorting of LTC residents on May 11, 2020 based on the results of the point prevalence survey conducted in the first three weeks of May (Connecticut DPH 2020e). Some industry representatives reported adopting cohorting practices earlier to separate residents based on COVID-19 status. Other nursing home operators and staff began to cohort residents as a result of the PPS effort. Some facility managers and staff reported struggling at times to implement the cohorting guidance due to lack of timely test results and insufficient training. For example, one staff member said they received no guidance for cohorting residents based on test results that became available over the weekend.

In interviews with nursing home direct care staff, staff reported a lack of training from management on the facility’s changing policies in response to COVID-19, including clearly communicating which residents had tested positive for COVID-19, how to effectively cohort residents, appropriate use and reuse of PPE, and changes to other rules and procedures.

d. Changes to physical environment

Industry stakeholders reported taking different approaches to changes in the physical environment in response to the COVID-19 outbreak. Some of the strategies included the increased use of high-efficiency particulate air (HEPA) filters in ventilation and air conditioning systems, equipping rooms with negative air pressure machines for isolating COVID-19 positive patients, and designating single staff entrances. DPH issued guidance for routine cleaning and disinfection procedures on May 11, 2020 (Connecticut DPH 2020n). Some nursing home staff and industry stakeholders observed that housekeeping staff were not provided adequate PPE initially, potentially exposing them to the virus.

Recommendation LR12

As evidence emerges regarding the role of building design and ventilation, LTC facilities should consider changing their physical environments to better limit the spread of an airborne virus similar to COVID-19.

C. LTC facility staffing and workforce availability

There is a well-documented relationship between the level of staffing in nursing homes and the quality of care outcomes among residents (Schnelle et al. 2004). Industry stakeholders said they had challenges related to recruiting and retaining staff before COVID-19, and these challenges increased during the outbreak.

1. Preparedness

a. Make-up of the LTC workforce

In the first quarter of 2020, unemployment in Connecticut was less than 4 percent (Connecticut Department of Labor 2020). A tight labor market exacerbates existing challenges hiring staff for low-wage jobs in LTC facilities. In 2018, Black and Hispanic individuals made up 47 percent of the total LTC workforce and 57 percent of aides and personal care workers, who have the closest and most frequent

interaction with residents in these settings (Kaiser Family Foundation 2020). With minorities overrepresented in the LTC workforce, this group was at increased risk of becoming infected given their frequent contact with patients, which might explain some of the patterns observed in the distribution of COVID-19 cases across racial groups (Exhibit 3).

b. Connecticut LTC staffing requirements

DPH regulations set minimum staffing ratios in licensed nursing homes and staffing expectations for assisted living services agencies. Nursing homes must have a registered nurse in the building 24 hours a day, seven days a week (§19-13-D8t.M.4). In addition, these regulations require nursing homes to maintain minimum staffing ratios: one licensed nurse (a licensed practical nurse [LPN] or registered nurse [RN]) per 30 residents between 7 am and 9 pm and one licensed nurse per 60 residents between 9 pm and 7 am; and one aide per 10 residents between 7 am and 9 pm, and 20 residents between 9 pm and 7 am. Nursing homes also must have a dedicated infection preventionist. This individual does not have to be full-time at the facility.

Assisted living services agencies must have a registered nurse on call 24 hours a day, seven days a week, who is reachable by telephone and available to make an on-site visit if necessary. They must also have an RN supervisor on site part or full time depending on the size of the community and the number of staff working there (§19-13-D105(j)).

Nursing homes must report staffing levels to CMS as part of the payroll-based journal initiative, which requires nursing homes to report staffing data that is auditable to the facility's payroll records (CMS 2020g). In the final quarter of 2019, Connecticut nursing homes reported staffing levels largely in line with the national average and those in neighboring states, but with slightly lower registered nurse hours per resident than New Jersey and Rhode Island, and slightly higher nurse aide hours per resident than Massachusetts and New Jersey (Exhibit 17).

Recommendation LR14

Connecticut should increase the minimum required staffing ratios in nursing homes and consider financing mechanisms to raise the Medicaid reimbursement rate to support greater increases in direct care workers' pay and benefits.

Exhibit 17. Pre-COVID staffing levels reported by nursing homes in Connecticut, the United States, and nearby states

	All U.S.	CT	MA	NJ	NY	RI
Nurse aide staffing hours per resident per day	2.30	2.23	2.13	2.06	2.22	2.41
LPN staffing hours per resident per day	0.87	0.78	0.89	0.87	0.80	0.38
RN staffing hours per resident per day	0.69	0.71	0.70	0.83	0.69	0.83

Source: Mathematica's analysis of Nursing Home Compare data.

Note: Staffing levels cover the time period October through December 2019.

LPN = licensed practical nurse; RN = registered nurse

2. Response

a. State strategies to address workforce availability shortages

As part of its response, Connecticut implemented a variety of strategies to address LTC workforce availability shortages. First, the state authorized creating a temporary nurse aide position to address LTC facility staffing shortages, which enabled people who completed eight hours of online training to work under the supervision of nursing staff with residents who were COVID negative. Through the end of August 2020, 116 individuals had completed this training in Connecticut.²⁷ DPH does not track whether those individuals work within nursing homes in the state.

In addition, the state temporarily allowed staff licensed in other states to work in Connecticut health care facilities. Before the outbreak, Connecticut was 1 of only 10 states without a nurse licensing compact in place to allow licensed staff from out of state to work in its health care facilities (National Council of State Boards of Nursing 2020). Industry stakeholders reported the temporary lifting of licensing requirements gave them needed flexibility to hire additional staff. This was especially critical for large chains of nursing homes that could move staff from facilities in other states that were relatively unaffected by COVID-19 at the time Connecticut was at the peak of the first wave.

b. Staff absences and shortages

Facilities reported increased staff absences as a result of difficulties related to child care, preexisting conditions that placed them at greater risk, and fear of catching the virus or bringing it home to their families. Facilities also had to compete for direct care staff throughout the region, including New York City, where hospitals and other settings offered very competitive financial incentives.

Recommendation SR18

The state should extend the temporary suspension of in-state licensure requirements for as long as the public health emergency is in effect.

The Families First Coronavirus Response Act excluded nursing homes, like other health care providers; the act extended paid sick leave and expanded family and medical leave to individuals at companies with fewer than 500 employees (U.S. Department of Labor 2020).²⁸ Some nursing homes we interviewed chose to offer paid sick leave to discourage staff from coming to work while sick, but many staff members interviewed said they did not have access to paid sick leave. Although Connecticut does guarantee some paid sick leave to service workers, the lack of universal paid sick leave creates a potential incentive for employees to downplay their own symptoms or exposure risk, and possibly come to work when they should stay home (Connecticut Department of Labor 2015).

c. Industry strategies to address workforce shortages

Bonuses and hazard pay. Facilities used both financial and nonfinancial incentives to attract and keep staff, such as bonuses, hazard pay, and providing meals during shifts. In focus groups with direct care staff, we heard that nursing homes tied many of the financial incentives to on-time arrival. Staff expressed frustrations with these requirements because public transportation was limited at the height of the outbreak, and many staff had caregiving responsibilities at home that might have occasionally made them

²⁷ Documentation provided by DPH to Mathematica on August 26, 2020.

²⁸ In order to access funds from the Coronavirus Relief Funds, Connecticut required that facilities elect to provide paid sick leave through the Families First Coronavirus Response Act or the equivalent.

a few minutes late to work. Staff also reported bonuses or hazard pay were available only during a short period (even though the pandemic has lasted for months), or that agency staff or other temporary staff from out of state received higher pay or financial incentives than did those staff who had longer tenure at the facility.

Staff working in multiple locations. One potential source of COVID-19 spread is staff who work in multiple locations. Although they often decide to do so based on economic considerations, understanding the overlap of staff across multiple facilities might be important for limiting future spread of COVID-19. Recent research that used geolocation data from more than 30 million smartphones found 7 percent of smartphones used in a nursing home appeared in at least one other facility (Chen et al. 2020). This analysis estimated that, on average, each facility's workers have connections to 15 other facilities and eliminating staff linkages between nursing homes could reduce COVID-19 infections in nursing homes by more than 40 percent (Chen et al. 2020).

Facility management reported although they could not require staff who worked in multiple locations to quit one of their jobs, many did try to limit the number of staff who worked in multiple locations. Strategies to address this included limiting the use of per diem staff, offering additional shifts or hours to staff who worked in multiple facilities to encourage them to work in one building, and limiting staff from working in different units within a campus that had both a nursing home and assisted or independent living. One nursing home operator reported several nursing homes initially wanted to work together to identify staff working in multiple locations so that facilities could alert one another if they had an outbreak; that effort quickly fell apart as the outbreak spread rapidly through almost all facilities in town at nearly the same time.

Recommendation SR17

Facilities should adopt staffing policies that can help limit potential exposure for staff and residents.

d. Staff infections and deaths

Data on the number of staff infections and deaths are limited. Connecticut DPH began requiring daily reporting of staff known to have COVID-19 beginning on May 8, 2020. Nursing homes then also had to report data on staff infections and deaths to the NHSN beginning on June 17, 2020. Both of these reporting requirements began weeks after the peak of COVID-19 cases in April. Given the lack of data—combined with the limited availability of testing for nursing home staff early in the outbreak—it is nearly impossible to verify the true number of staff who have contracted the virus.

According to an analysis done by the *Connecticut Mirror* on data reported by facilities to CMS, 2,234 Connecticut nursing home employees have tested positive and another 1,166 are presumed to have contracted COVID-19; 14 deaths among LTC staff have also been reported (Carlesso and Pananjady 2020). Representatives from 1199 SEIU shared during an interview that they have had up to 4,000 of their 7,000 members who work in various health care settings either test positive or have symptoms that required self-quarantine or time off from work; they also reported 9 of their members have died and more than 40 family members of staff members have reported contracting COVID-19 from their family members who work in nursing homes.

D. Screening and testing of residents and staff

The LTC industry's approach to screening and testing of residents and staff was largely driven by changing guidance from the state and federal agencies as the scientific understanding of the virus evolved. However, the response was constrained by limited testing availability, particularly in the early stages of the outbreak.

a. Screening and testing residents



“Initially in March, the only way individuals could be tested was if residents were transferred to hospitals. Then, per guidance from DPH, there was a focus on care in place to avoid overburdening the hospitals, but then some of the nursing homes became overwhelmed.”

—Industry stakeholder

In March and early April, screening and testing of residents was limited to individuals exhibiting COVID-related symptoms or those being transferred to the hospital for a higher level of care. At that point, residents also needed to have other potential causes for their symptoms ruled out (flu, urinary tract infections, or gastrointestinal issues) to be eligible for COVID-19 testing. This delayed a confirmed diagnosis, which facilities need to cohort residents appropriately. Family members interviewed expressed frustration with this approach when they wanted quick action in response to the symptoms their loved ones had developed.

The state provided nursing homes with a limited number of testing swabs for their residents in March and April. Staff had to pick up testing swabs at the state lab in Rocky Hill and drop them back off there (which was difficult for facilities not located nearby).

In June, the state assigned Care Partner labs to each nursing home to process all their resident and staff tests. During interviews, many facility stakeholders reported that even with the Care Partners, it still took several days to receive results of residents' tests. Results are needed almost immediately to implement appropriate cohorting of residents. Some facilities reported continuing to do resident testing with their previously negotiated testing vendors (at their own cost) if their assigned Care Partner could not provide results in a timely manner. Direct care staff reported facility management frequently told them which residents had tested positive or that this information spread only by word of mouth, which increased staff anxiety at the beginning of the outbreak.

b. Screening and testing staff

Early screening of staff focused on symptoms and travel outside the region but evolved to include temperature checks and more specific screening questions about behavior outside of work. Facilities differed in their approach to the screening, with some asking staff to self-report symptoms and temperatures, and others dedicating staff to physically conduct this screening of all staff every day. Many facilities reported designating a person at the front door who was responsible for screening staff and taking temperatures at the beginning of each shift. In some cases, this was a licensed nurse with training in infection control, which proved to be burdensome for facilities to maintain while meeting the needs of residents. Facility leadership also reported different approaches to handling staff who screened positive for certain symptoms, particularly at the beginning of the outbreak when testing capacity was constrained. Some reported they would ask staff to go home and stay home for at least 24 hours, and others asked staff

to stay out of work for up to two weeks. Return-to-work guidance from the CDC also evolved. At the time of interviews in July and August, most facilities reported they followed current CDC guidance and/or used a testing-based strategy to allow staff to return to work only after receiving a negative test.

Direct care staff reported varying experiences with screening; those who worked the night shift reported less consistency in staff screening. Staff also reported that as facilities changed their approach to screening staff, the process became confusing as management frequently did not clearly communicate changes to staff. Finally, staff said the time it took to complete the screening could sometimes delay them from clocking in for their shift; in many cases, this caused them to lose hazard pay that depended on on-time arrival.

For the first several months of the outbreak when testing capacity was limited, industry stakeholders reported only symptomatic staff could get tested. Before the Care Partners program, staff had to secure access to testing themselves through their primary care doctor or other testing sites in the state; the facilities did not initially coordinate testing. The PPS conducted by the state in May did not include staff. Industry stakeholders, including representatives from 1199 SEIU, and family members criticized the state for not including staff in the PPS because these stakeholders believed staff were primarily responsible for bringing the virus into the facility (because few residents were leaving the building then).

Beginning in June with the Governor's executive order to test staff regularly, nursing homes were assigned a Care Partner lab to process all their resident and staff tests. Some nursing homes reported the Care Partner assignments interrupted previously negotiated testing contracts they had arranged with labs, and others reported having a dedicated testing partner alleviated challenges with test processing times at the national labs such as Quest. Representatives from assisted living facilities reported challenges complying with this requirement because they have to "test any regular caregivers." Because residents of assisted living communities can hire their own private caregivers directly, the management of the assisted living service agency finds it difficult to keep track of everyone and ensure they are being regularly tested.

Direct care staff interviewed generally said they have been tested regularly in accordance with the Governor's order. Staff reported inconsistent experiences with testing if they worked nights or weekends. Sometimes testing is done on certain days or shifts, so if they are not scheduled to work that day, they are not tested appropriately. Staff also reported different approaches to how their facility administered tests. In some cases, nursing home staff would administer tests and in other cases staff from a lab would administer tests. Several LPNs reported they conduct tests on themselves. Given the discomfort associated with a nasal swab, some staff who have administered their own tests suggested self-administration can be inconsistent and might affect the quality of the results. Supervised self-collection of testing specimens is allowable according to CDC and DPH guidance, particularly because staff testing administered by Care Partners only occurs during the day shift.²⁹

E. Care transitions

Care transitions refer to the transfer of a resident from an LTC facility to another setting, such as the hospital or to a community home. Research has demonstrated that transfers between a nursing home and a hospital can have potentially negative impacts on residents, including disorientation, failure to thrive, and

²⁹ Documentation provided by DPH to Mathematica, which cited the CDC guidance on specimen collection that is incorporated into the Care Partner testing contracts. See <https://www.cdc.gov/coronavirus/2019-ncov/lab/guidelines-clinical-specimens.html>.

other negative outcomes (Levine et al. 2020). Before COVID-19, regulations outlined in Section 19a-533(h) of the Connecticut General Statutes governed residents' discharges and transfers. Executive Order Number 7L on March 24 granted additional flexibilities for resident transfers and discharges based on their COVID-19 status (Lamont 2020g). Unlike New York, Connecticut DPH did not require LTC facilities to admit residents with COVID-19; it left that decision to individual facilities to assess their ability to care for these residents (Connecticut DPH 2020a). Executive Order Number 7XX on June 5, 2020 suspended involuntary discharges of nursing home residents to homeless shelters, except during emergency situations or with respect to COVID-19-recovered discharges (Lamont 2020h).

1. Transfers to and from hospitals

Industry stakeholders in many locations reported they did their own assessment of their ability to care for COVID-19 residents in place and concluded it was in their best interest—and that of the resident—to have a policy of transferring out any residents with symptoms. Early in the outbreak, the only option was to transfer residents to a hospital; later, facilities could transfer directly to a CRF if needed.

Care transitions during COVID-19 introduced an added element of uncertainty for residents and family members. Some nursing homes would accept residents back to the facility only after two negative tests if they had been treated for COVID-19 in the hospital; others required residents to convalesce at CRFs before returning to their home of origin.

Some involuntary transfers of residents did occur among those residents residing at Northbridge Health Care Center in Bridgeport when that facility transitioned to a CRF. The LTC Ombudsman Office said those involuntary transfers were due to the resident's physician attesting that the resident would be at high risk of death if he or she stayed in the facility when its status changed to a CRF.

Family members reported they were frequently informed afterward their loved one changed rooms as a result of cohorting efforts or was transferred to a hospital for treatment for COVID-19 or any other ailment requiring hospital care. Family members and residents also reported inconsistent experiences with whether they had to quarantine when returning to the nursing home after leaving the facility to go to the hospital or for other outpatient appointments. Residents and family members reported if people leave for the hospital overnight, they must be isolated after coming back. If people only leave for an outpatient visit, they are not isolated upon return but precautions are taken during transport to limit exposure, such as sanitizing the resident's room while the resident is gone, using separate entrances and exits for residents going to outpatient visits, and using masks and other PPE while out of the facility.

Recommendation LR19

The state should ensure all LTC resident receive counseling on their options to receive services in the community and support those who want to return to the community.

Nursing home operators interviewed reported different approaches to whether their facilities currently accepted new admissions. Some facilities accept new admissions from the hospital only with a negative test first. Others accept new admissions from hospitals or the community and isolating new admissions for up to two weeks before new residents can join the rest of the facility population.

2. Transitions to home and community-based settings

Home and community-based settings are safe alternatives to nursing home care for people who choose them. Connecticut's LTSS Rebalancing Plan, an initiative of the Governor and General Assembly, aims to increase choice in where people receive LTSS (Connecticut Department of Social Services 2020d). Aligning with the 1999 *Olmstead vs L.C.* Supreme Court decision requiring states to provide community choices for people with disabilities, the plan provides a strategy for increasing access to HCBS and providing Connecticut residents with informed choices about their LTSS options. More than 30,000 Connecticut residents who meet Medicaid financial and functional eligibility criteria for nursing home level of care receive that care in community settings every year, representing 64 percent of all LTSS Medicaid clients (Connecticut Long-Term Care Planning Committee 2020). This percentage has climbed consistently for two decades, demonstrating the ongoing trend toward rebalancing the LTSS system, responding to people's preferences to live and receive care in community settings while simultaneously reducing per client Medicaid costs.

Although individuals and families might prefer nursing home care under a variety of circumstances, the state has several programs to provide information and counseling about LTSS options, whether they live in community or institutional settings, to consider their preferences and optimize choices for care. People already residing in a nursing home or other congregate setting might wish to move out to a community setting, particularly during a pandemic, to avoid heightened risk of exposure.

However, nursing home residents who wanted to transition back to the community during COVID-19 encountered difficulties related to accessing the appropriate supports to transition home or to the community, according to the LTC Ombudsman Office and the Cross Disability Lifespan Alliance. In addition, during the pandemic, people who received LTSS in community settings and the workforce that supports them also needed assurances of available PPE and robust emergency back-up plans in case they contract the disease or their workers cannot come to work. Many of them also need grocery and medication delivery, to minimize their exposure outside of home. As part of the response to COVID-19, the Connecticut Department of Aging and Disability Services provided meals to older adults in a drive-through setting or arranged for home-delivered meals when senior centers could no longer offer meal services. Social isolation due to extended separation from family and friends were also concerns for the HCBS population.

In response to pandemic related-declines in nursing home occupancy rates, which could lead facilities to close, it becomes even more important to maintain and potentially strengthen Connecticut's Rebalancing Plan strategies, including increasing transitions of institutional residents to community settings through the Money Follows the Person program, Medicaid waiver programs, workforce development, connecting people to information about care options through MyPlaceCT.org, improving housing and transportation supports, and assisting the nursing home industry with aligning its business model with rebalancing trends while delicensing excess skilled nursing beds. Workforce retraining could also help nursing home staff shift to HCBS jobs.

F. Communication between LTC facilities and the state, and between facilities and residents and family members

COVID-19 highlighted the need for strong channels of communication, both between the state and LTC facilities and between facilities and their residents and family members. This section details the

preparedness and response surrounding communications between LTC facilities and the state, and between facilities and residents and family members.

1. Preparedness

Section IV.G.2.b presents the primary venues for communication between the state and LTC industry before the outbreak. Resident and Family Councils are also a conduit of communication between nursing homes and residents and families. With the support of the Connecticut Long-Term Care Ombudsman Program, the Executive Board of Resident Council Presidents, a 40-member council made up of the presidents of resident councils from around the state, encourages residents to be informed about legislative issues to encourage greater self-advocacy (Connecticut Long Term Care Ombudsman Program n.d.b).

2. Response

a. Communication between LTC facilities and state

Blast faxes and webinars. DPH communicated guidance and orders to nursing homes and assisted living facilities through blast fax notifications distributed to facility leadership and archived on the MAP website. LTC facility leadership reported delayed communication about key provisions, such as universal mask wearing and cohorting, contributed to spread in facilities. Communications between the state and facilities improved as DPH began to hold weekly webinars for facilities at the beginning of April (MAP 2020). Some nursing home operators observed that although webinars conveyed policy updates, some found the format less useful because guidance was communicated orally and written guidance did not accompany the webinars. (At the end of August, DPH began adding written summaries and webinar recordings to the MAP website.)

Many nursing home operators reported they struggled to consolidate rapidly changing guidance when developing their own policies and disseminating information to staff. In some cases, nursing home operators who wanted to disseminate information to their staff struggled to centralize and, at times, to reconcile differences in guidance from various sources, including the DPH, CDC, and CMS. In addition, nursing home operators reported DPH offered guidance in accordance with CDC recommendations, but operators felt DPH did so without additional interpretation or direction. Without adequate support, operators said the information felt “vague and left too much to discretion” to facilities that needed to translate guidance into updated policies and procedures for their staff. Nursing home leadership suggested a range of potential improvements, including providing facilities with templates for policies, creating a “monitoring partner” within DPH or another agency who can get to know the facility and help answer its questions, or establishing a hotline dedicated to facilities questions.

The LTC trade associations—LeadingAge Connecticut, Connecticut Association of Healthcare Facilities, and the Connecticut Assisted Living Association—served an important role as a communication liaison between the LTC industry and DPH. In response to the outbreak, nursing home and assisted living trade associations began to hold weekly calls for their members. These calls served several purposes, including disseminating information from the state and federal agencies, receiving and fielding questions from members about policies, and allowing members to ask questions and share useful information with one another. Leadership of one trade association reported timely information sharing was key, as some regions with earlier outbreaks could share their experiences with other parts of the state experiencing outbreaks as time went on.

b. Communications between facilities and residents/family members

In response to restricted visitation in LTC facilities, facility leadership used different approaches to ensuring adequate communication between the facility and residents or family members. (Section IV.B.2.d provides more information on the state's policy response.)

Alternatives to in-person visitation. Family members and residents said facilities took different approaches to implementing alternatives to in-person visits, such as outdoor and window visits. To comply with the state's May 9 guidance, facilities implemented outdoor visitation several days of the week for residents to visit with family and friends. Typically, facilities would have at least some outdoor visitation appointments available on weekends or evenings. Visitors had to make appointments and were subject to screening measures such as temperature checks; visits took place with appropriate PPE and social distancing in place. Family members reported several challenges related to outdoor visits, including ensuring privacy of conversations with loved ones as staff oversaw

Recommendation SR21

Facilities should ensure family members can obtain accurate and timely information on residents' health and well-being.

"It is key to keep the communication open and just pay the staff more money and reward people for keeping the virus outside of the building."

—Nursing home resident

visits, variability of weather conditions that could affect visits, and difficulty scheduling outdoor visits within the limited appointments available. Window visits were feasible only for residents whose rooms had windows that were safely accessible to family members (that is, on the first floor, windows not obscured by heating or cooling systems). Some

facilities also restricted window visits given security concerns with having family members or others lurking in the parking lot.

In May—before Mother's Day weekend—Connecticut DPH used resources from its civil monetary penalty funds to purchase 800 iPads, which it distributed to nursing homes to facilitate virtual visitation between residents and their families (Massaro 2020). Industry stakeholders and family members reported these devices were useful for expanding virtual visitation, but some family members also expressed concerns related to privacy during FaceTime calls, the devices not being charged and available for scheduled calls, and limited staff availability to facilitate calls. A few stakeholders and family members noted that virtual visitation and use of iPads posed challenges for residents, particularly those with physical dexterity or cognitive issues or with hearing loss. On August 27, DPH expanded its visitation policy and clarified that outdoor visits could take place more than once a week and extended the visitation minimum duration from 20 to 30 minutes (Connecticut DPH 2020d).

Person-centered care plans. DPH also required facilities to assess the psychosocial needs of residents to develop individualized visitation plans and enable compassionate care visits in additional cases. Before the changes, family members and industry stakeholders relayed concerns for person-centered care planning during the outbreak, in the absence of family members being physically present with residents. Family members were concerned that in changes to care plans precipitated by the outbreak in facilities, facilities did not appropriately consider the social and emotional needs of residents. One individual gave an example of cases of weight loss and decline in loved ones, as family members could no longer enter facilities to help with feeding loved ones during meals. Family members frequently shared stories of observing deterioration and decline in the physical and emotional or mental well-being of loved ones in facilities, including an increase in aggressive behaviors, delirium, and mental deterioration, in addition to

weight loss. One stakeholder recommended reviewing each resident's care plan for how the outbreak has affected the resident in terms of physical, social, and emotional well-being.

Information about facility outbreaks and residents.

Facilities took different approaches to inform residents and family of the status of the outbreak in the facility, as well as specific updates on individual residents' status and care. Based on experiences reported by family members, some facilities were very responsive but others provided limited information during the outbreak. Families and stakeholders also reported facilities adopted a range of approaches to informing residents and families, with some facilities proactively hosting drop-in Zoom calls for family members when an outbreak occurred or involving management's regional ombudsman on calls; others reported facilities rarely provided details in communications such as daily and total COVID-19 positive case counts. A few family members recommended that facilities designate a single point of contact, after experiencing delays in reaching administrators or nursing staff, or calls were unreturned. For example, one individual learned the facility routed all calls to the facility through a single person at the front desk, and there was a shortage of staff to field calls.

Best practices for facility communication with family members

- Hosting drop-in Zoom calls for family members when an outbreak occurred
- Designating a point of contact at the facility to field questions and calls from family members
- Bringing in management's regional ombudsman staff to support family members and residents

VI. Conclusion

The COVID-19 pandemic represents a public health emergency unlike any the world has faced in the past century. Residents who remain in LTC facilities have experienced the trauma of losing friends and loved ones, all while undergoing significant declines in their physical, emotional, and psychosocial well-being. Family members lost loved ones without the opportunity to say a proper goodbye or hold a funeral in the face of state restrictions on the size of gatherings.

Connecticut state officials made policy decisions and issued guidance based on the available knowledge at the time from national and state epidemiologists and public health experts. However, early efforts that focused on addressing the surge in demand for hospital resources hampered Connecticut's preparedness and response to the COVID-19 outbreak in LTC facilities. LTC facilities were not recognized as critical health care assets in the state's emergency preparedness plans, nor were LTC representatives at the table at the beginning of the outbreak. In an industry that is subject to extensive federal and state regulation, neither federal nor state governments provided clear guidance to nursing homes and assisted living facilities soon enough to prevent the tragic loss of life. Compounded by a lack of knowledge about how the virus spreads, LTC facilities did not take prompt and immediate action to limit entry to their buildings, enforce staff screening measures, and implement universal mask wearing. Facilities also lacked the PPE necessary to protect their staff and residents, and some failed to make the equipment readily accessible to staff. Some family members were left without information about their loved ones, often going days without a returned phone call from a facility. Despite these issues, the state granted the LTC industry immunity from liability, which removed a critical mechanism for holding facilities accountable for negligence.

State efforts to designate CRFs and distribute PPE to LTC facilities are commendable even if they were too late to make a large impact (in the case of CRFs) or have recently been discontinued by the state (in the case of PPE distribution). Further, FLIS staff should be recognized for making concerted efforts to respond to the industry's request for more information and technical assistance. The relationship between nursing homes and surveyors is not typically a collaborative one, but FLIS staff pivoted to meet the needs of the industry during a quickly evolving situation to ensure facilities were aware of, and prepared to implement, the latest guidelines and requirements.

This report contains dozens of recommendations, both short and long term, that the state and LTC industry can implement to mitigate a potential second wave of COVID-19 and to prevent future infectious disease outbreaks. Implementing all of these recommendations will require political will; financial resources; and a strong, sustained, and unwavering commitment to protect the health and well-being of some of the state's most vulnerable residents.

References

- Altman, Drew. “Understanding the US Failure on Coronavirus.” *BMJ*, vol. 370, no. m3417, 2020. Available at <https://www.bmj.com/content/370/bmj.m3417>.
- American Medical Facilities Management. “AMFM Family Visitation Information.” August 25, 2020. Available at <https://www.amfmwv.com/visitation-information>. Accessed September 14, 2020.
- Arizona Department of Health Services. “COVID-19 Guidance for Visitation at Congregate Settings for Vulnerable Adults and Children.” Phoenix, AZ: Arizona Department of Health Services, August 28, 2020. Available at <https://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/infectious-disease-epidemiology/novel-coronavirus/community/congregate-visitation.pdf>.
- Bigelow, B.F., O. Tang, G.R. Toci, N. Stracker, F. Sheikh, K.M. Jacobs Slifka, S.A. Novosad, et al. “Transmission of SARS-CoV-2 Involving Residents Receiving Dialysis in a Nursing Home — Maryland, April 2020.” *Morbidity and Mortality Weekly*, vol. 69, no. 32, 2020, pp. 1089–1094. <http://dx.doi.org/10.15585/mmwr.mm6932e4>.
- Bucy, Taylor, Lindsey Smith, Paula Carder, Jaclyn Winfree, and Kali Thomas. “Variability in State Regulations Pertaining to Infection Control and Pandemic Response in US Assisted Living Communities.” *Journal of Post-Acute and Long-Term Care Medicine*, vol. 21, no. 5, 2020, pp. 701–702.
- Carlesso, Jenna. “National Guard Members Join Health Officials in Nursing Home Inspection Efforts.” *Connecticut Mirror*, April 27, 2020.
- Carlesso, Jenna, and Kasturi Pananjady. “‘Sad and Tragic:’ Federal Nursing Home Data Show at Least 3,400 Staffers Infected, 14 Dead.” *Connecticut Mirror*, July 2, 2020. Available at <https://ctmirror.org/2020/07/02/sad-and-tragic-federal-nursing-home-data-show-at-least-3400-staffers-infected-14-dead>.
- Centers for Disease Control and Prevention (CDC). “Preparing for COVID-19 in Nursing Homes.” June 25, 2020a. Available at <https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html>. Accessed September 14, 2020.
- CDC. “People with Certain Medical Conditions.” Updated September 11, 2020b. Available at <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>. Accessed September 14, 2020.
- CDC. “Summary for Healthcare Facilities: Strategies for Optimizing the Supply of PPE during Shortages.” July 16, 2020c. Available at <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/strategies-optimize-ppe-shortages.html>. Accessed September 14, 2020.
- CDC. “Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens for COVID-19.” Updated July 8, 2020d. Available at <https://www.cdc.gov/coronavirus/2019-ncov/lab/guidelines-clinical-specimens.html>. Accessed September 14, 2020.
- Centers for Medicare & Medicaid Services (CMS). “Design for Nursing Home Compare Five-Star Quality Rating System: Technical User’s Guide.” Woodlawn, MD: Centers for Medicare & Medicaid Services, July 2020a. Available at <https://www.cms.gov/medicare/provider-enrollment-and-certification/certificationandcompliance/downloads/usersguide.pdf>.
- CMS. “Interim Final Rule Updating Requirements for Notification of Confirmed and Suspected COVID-19 Cases Among Residents and Staff in Nursing Homes.” Woodlawn, MD: CMS, May 6, 2020b. Available at <https://www.cms.gov/files/document/qso-20-29-nh.pdf>.

References

- CMS. "Prioritization of Survey Activities." Woodlawn, MD: CMS, March 23, 2020c. Available at <https://www.cms.gov/files/document/qso-20-20-allpdf.pdf-0>.
- CMS. "Frequently Asked Questions (FAQs) on Nursing Home Visitation." Woodlawn, MD: CMS, June 23, 2020d. Available at <https://www.cms.gov/files/document/covid-visitation-nursing-home-residents.pdf>.
- CMS. "Guidance for Infection Control and Prevention of Coronavirus Disease 2019 (COVID-19) in Nursing Homes." Woodlawn, MD: CMS, March 4, 2020e. Available at <https://www.cms.gov/medicareprovider-enrollment-and-certificationsurveycertificationengeninfopolicy-and/qso-20-14-nh.pdf>.
- CMS. "Interim Final Rule (IFC), CMS-3401-IFC, Additional Policy and Regulatory Revisions in Response to the COVID-19 Public Health Emergency related to Long-Term Care (LTC) Facility Testing Requirements and Revised COVID19 Focused Survey Tool." Woodlawn, MD: CMS, August 26, 2020f. Available at <https://www.cms.gov/files/document/qso-20-38-nh.pdf>.
- CMS. "Staffing Data Submission Payroll Based Journal (PBJ)." Updated June 6, 2020g. Available at <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Staffing-Data-Submission-PBJ>. Accessed September 14, 2020.
- Chen, M.K., J. Chevalier, and E. Long. "Nursing Home Staff Networks and COVID-19." NBER Working Paper No. 27608. Cambridge, MA: National Bureau of Economic Research, July 2020. Available at <https://www.nber.org/papers/w27608>.
- Colorado Department of Public Health & Environment. "COVID-19 Health Equity Response Team." Updated May 15, 2020. Available at <https://covid19.colorado.gov/covid-19-in-colorado/health-equity-response-team>. Accessed September 14, 2020.
- Connecticut Department of Labor. "General Statute 31-57r: Paid Sick Leave." Updated 2015. Available at <https://www.ctdol.state.ct.us/wgwkstnd/SickLeave.htm>.
- Connecticut Department of Labor. "State of Connecticut vs. United States Unemployment Rate – State of Connecticut." July 16, 2020. Available at <https://www1.ctdol.state.ct.us/lmi/unemprateCTUS.asp>. Accessed August 9, 2020.
- Connecticut Department of Public Health (DPH). "Draft 2: Connecticut Reportable Diseases, Emergency Illnesses and Health Conditions, and Reportable Laboratory Findings, Forms, and Instructions." September 9, 2015.
- Connecticut DPH. "Public Health Emergency Response Plan, Emergency Support Function #8." Hartford, CT: Connecticut Department of Public Health, March 2019.
- Connecticut DPH. "COVID-19 Guidance for Long-Term Care Facilities." Hartford, CT: Connecticut Department of Public Health, March 26, 2020a. Available at https://portal.ct.gov/-/media/DPH/HAI/COVID19-LTCF-Guidance_03262020.pdf.
- Connecticut DPH. "Distribution of Personal Protective Equipment (PPE)." Letter to Directors of Health and CRI Regional Leads Long-Term Care Facilities, Assisted Living Facilities, and Residential Care Homes." Hartford, CT: Connecticut Department of Public Health, April 11, 2020b. Available at <http://www.mutualaidplan.org/Common/Document.aspx?DDID=17194&klv=1&key=DtNFwKsBT4MSbt6%2bgI%2bWEWP8VEc%3d>.

References

- Connecticut DPH. “Order.” Hartford, CT: Connecticut Department of Public Health, May 9, 2020c. Available at <https://portal.ct.gov/-/media/Coronavirus/20200509-DPH-Order-modifying-the-requirements-regarding-visitor-restrictions-at-nursing-homes-reside.pdf?la=en>.
- Connecticut DPH. “Order.” Hartford, CT: Connecticut Department of Public Health, August 27, 2020d. Available at <https://portal.ct.gov/-/media/Coronavirus/20200827-DPH-order-expanding-nursing-home-visitations.pdf>.
- Connecticut DPH. “COVID-19 Point Prevalence Survey Testing and Cohorting in Nursing Homes, Interim Guidance.” Hartford, CT: Connecticut Department of Public Health, May 11, 2020e. Available at <https://files.constantcontact.com/f46e0904401/3cff55a6-e726-4dc1-a405-bf94a4cd86b3.pdf>.
- Connecticut DPH. “COVID-19 Infection Control Guidance for Nursing Homes, Updated Guidance.” Hartford, CT: Connecticut Department of Public Health, June 22, 2020f. Available at https://portal.ct.gov/-/media/DPH/HAI/COVID19-NH-guidance_06222020.pdf.
- Connecticut DPH. “Order.” Hartford, CT: Connecticut Department of Public Health, May 6, 2020g. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/News/20200507-DPH-order-on-testing-without-need-for-a-licensed-practitioner-order.pdf>.
- Connecticut DPH. “COVID-19 Infection Control and Testing Guidance for Nursing Homes.” Hartford, CT: Connecticut Department of Public Health, updated June 5, 2020h. Available at https://portal.ct.gov/-/media/DPH/HAI/COVID19-NH-guidance_06052020.pdf.
- Connecticut DPH. “Nursing Home Staff and Resident Testing: Summary of State Support for Initial Implementation.” Hartford, CT: Connecticut Department of Public Health, June 17, 2020i. Available at <https://portal.ct.gov/-/media/Coronavirus/20200618-Nursing-Home-COVID19-Testing-Implementation-Summary.pdf>.
- Connecticut DPH. “Interim Guidance for the Use of Molecular Tests to Diagnose Adults and Children with Current Infection with SARS-CoV-2, the Virus that Causes COVID-19.” Hartford, CT: Connecticut Department of Public Health, updated September 11, 2020j. Available at https://portal.ct.gov/-/media/DPH/HAI/COVID-19-Testing-Recs_09112020.pdf.
- Connecticut DPH. “Facility Licensing and Investigations Section Current Blast Faxes.” 2020k. Available at <https://portal.ct.gov/DPH/Facility-Licensing--Investigations/Facility-Licensing--Investigations-Section-FLIS/Blast-Fax-Page>. Accessed September 14, 2020.
- Connecticut DPH. “COVID-19 Healthcare Guidance.” Updated September 11, 2020l. Available at <https://portal.ct.gov/DPH/HAI/COVID-19-Healthcare-Guidance>. Accessed September 14, 2020.
- Connecticut DPH. “Change to the List of Reportable Diseases, Emergency Illnesses and Health Conditions and the List of Reportable Laboratory Findings.” Hartford, CT: Connecticut Department of Public Health, February 5, 2020m. Available at <http://www.mutualaidplan.org/Common/Document.aspx?DDID=17109&klv=1&key=gJf0Ga%2brC7Ur9YX%2bxKYUQHInJEE%3d>.
- Connecticut DPH. “Example COVID-19 Cleaning Protocol for Long-Term Care.” Hartford, CT: Connecticut Department of Public Health, May 11, 2020n. Available at https://portal.ct.gov/-/media/DPH/HAI/COVID19-LTCF-Cleaning_05112020.pdf.

References

- Connecticut Department of Social Services. “Nursing Facility Rate Analysis [Excel file].” 2019. Available at <https://portal.ct.gov/-/media/Departments-and-Agencies/DSS/Health-and-Home-Care/Reimbursement/Nursing-Facility/NH-Rate-Analysis-82719Rate-Calc.xlsx>. Accessed September 14, 2019.
- Connecticut Department of Social Services. “Modernization of Connecticut Medicaid Nursing Facility Reimbursement: An Essential Component of Long-Term Services and Supports ‘Rebalancing.’” February 6, 2020a. Available at <https://portal.ct.gov/-/media/Departments-and-Agencies/DSS/Medicaid-Nursing-Home-Reimbursement/Nursing-Home-Forum-for-the-Committees-of-Cognizance-2620.pdf>. Accessed September 14, 2020.
- Connecticut Department of Social Services. “Nursing Facility COVID-19 Emergency Period Reporting Form/Hardship Request [Excel file].” 2020b. Available at https://portal.ct.gov/-/media/Departments-and-Agencies/DSS/Medicaid-Nursing-Home-Reimbursement/Attestations_CostReport-and-Hardship-Request-June-2020.xlsx. Accessed September 14, 2020.
- Connecticut Department of Social Services. “Medicaid Nursing Home Reimbursement.” 2020c. Available at <https://portal.ct.gov/DSS/Health-And-Home-Care/Medicaid-Nursing-Home-Reimbursement/Medicaid-Nursing-Home-Reimbursement>. Accessed September 14, 2020.
- Connecticut Department of Social Services. “Strategic Rebalancing Plan: A Plan to Rebalance Long Term Services And Supports.” 2020d. Available at https://portal.ct.gov/-/media/Departments-and-Agencies/DSS/Health-and-Home-Care/Medicaid-Long-Term-Care-Demand-Projections/strategic_rebalancing_plan-2020.pdf?la=en. Accessed September 14, 2020.
- Connecticut Long Term Care Ombudsman Program. “About the Long Term Care Ombudsman Program.” n.d.a. Available at <https://portal.ct.gov/LTCOP/Content/About-LTCOP/About-The-Long-Term-Care-Ombudsman-Program>. Accessed September 14, 2020.
- Connecticut Long Term Care Ombudsman Program. “Executive Board of Resident Council Presidents.” n.d.b. Available at <https://portal.ct.gov/LTCOP/Content/Executive-Board-RCP/Executive-Board-RCP>. Accessed September 14, 2020.
- Connecticut Long Term Care Planning Committee. “CT Rebalancing: Medicaid Long-Term Care Clients and Expenditures SFY 2019.” January 1, 2020. Available at https://portal.ct.gov/-/media/OPM/HHS/LTC_Planning_Committee/Long-Term-Care-Planning-Committee-Report---January-2020.pdf. Accessed September 14, 2020.
- Connecticut Office of Policy and Management. “Long-Term Care Planning Committee.” 2020a. Available at <https://portal.ct.gov/OPM/PDPD-HHS/Long-Term-Care-Planning-Committee/Long-Term-Care-Planning-Committee/>. Accessed September 14, 2020.
- Connecticut Office of Policy and Management. “Coronavirus Relief Fund.” 2020b. Available at <https://portal.ct.gov/OPM/Coronavirus/Coronavirus-Relief-Fund/CRF-Overview>. Accessed September 14, 2020.
- Connecticut Office of Policy and Management. “State Letter to Nursing Home Associations.” Provided by DPH to Mathematica. May 7, 2020c.
- Connecticut Office of Policy and Management. “Letter to Kevin Lembo, State Comptroller.” August 20, 2020d. Available at https://portal.ct.gov/-/media/OPM/Budget/ComptrollerLetter/FY2021/FY_2021_AUG_20_2020_Comptroller_Letter.pdf. Accessed September 14, 2020.

References

- COVID Tracking Project. “The Long-Term Care COVID Tracker.” 2020. Available at <https://covidtracking.com/data/longtermcare>. Accessed September 14, 2020.
- Dean, Adam, Atheendar Venkataramani, and Simeon Kimmel. “Mortality Rates From COVID-19 Are Lower In Unionized Nursing Homes: Study Examines Mortality Rates in New York Nursing Homes.” *Health Affairs*, 2020.
- Federal Emergency Management Agency. “Pandemic Influenza Continuity of Operations Annex Template.” Washington, DC: Federal Emergency Management Agency, n.d. Available at https://www.fema.gov/pdf/about/org/ncp/pandemic_influenza.pdf.
- Gordon, Robert. “Emergency Order Under MCL 333.2253 – Exceptions to temporary restrictions on entry into residential care facilities.” Lansing, MI: Michigan Department of Health and Human Services, June 30, 2020. Available at https://www.michigan.gov/documents/coronavirus/MDHHS_Epidemic_order_-_nursing_home_visitation_695378_7.pdf.
- Gorges, R.J., and R.T. Konetzka. “Staffing Levels and COVID-19 Cases and Outbreaks in U.S. Nursing Homes.” *Journal of the American Geriatrics Society*, August 8, 2020. doi:10.1111/jgs.16787
- Government Accountability Office. “COVID-19: Opportunities to Improve Federal Response and Recovery Efforts.” Jun 25, 2020. Available at https://www.gao.gov/products/GAO-20-625?utm_campaign=usgao_email&utm_content=topic_health&utm_medium=email&utm_source=govdelivery. Accessed September 14, 2020.
- Hainmuller, Jens. “Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies.” *Political Analysis*, vol. 20, no. 1, 2012, pp. 25–46.
- Hay, A. “‘On Our Own Now’: U.S. Strategic Stockpile Empty of Medical Supplies.” Reuters, Sunday, March 31, 2020. Available at <https://www.reuters.com/article/us-health-coronavirus-usa-stockpile/on-our-own-now-u-s-strategic-stockpile-empty-of-medical-supplies-idUSKBN21I3FE>.
- Indiana State Department of Health. “Essential Family Caregivers in Long-term Care Facilities.” Indianapolis, IN: Indiana State Department of Health, Updated June 5, 2020. Available at https://www.coronavirus.in.gov/files/IN_COVID-19%20EFCs%206.5.20.pdf.
- Kaiser Family Foundation. “COVID-19 and Workers at Risk: Examining the Long-Term Care Workforce.” April 23, 2020. Available at <https://www.kff.org/report-section/covid-19-and-workers-at-risk-examining-the-long-term-care-workforce-tables>. Accessed September 14, 2020.
- Kramer, A.M., J. Grigsby, and D. Cooper. “Analysis of the Validity of Quality of Care Determinations. Chapter 4 in Evaluation of the Long-Term Care Survey Process.” Bethesda, MD: Abt Associates, 1996.
- Lamont, Ned. “Executive Order No. 7EE: Protection Of Public Health And Safety During Covid-19 Pandemic And Response – Mandatory Reporting For Nursing Homes And Assisted Living Facilities, Medicaid Administrative Waivers.” Hartford, CT: Office of the Governor of Connecticut, April 23, 2020a. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7EE.pdf>.
- Lamont, Ned. “Executive Order No.7U: Protection Of Public Health And Safety During COVID-19 Pandemic And Response - Protections From Civil Liability For Healthcare Providers And Billing Protections For Patients.” Hartford, CT: Office of the Governor of Connecticut, April 5, 2020b. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7U.pdf>.

- Lamont, Ned. "Executive Order No. 7A: Protection of Nursing Home Facilities, Residential Care Homes and Chronic Disease Hospitals During COVID-19 Pandemic." Hartford, CT: Office of the Governor of Connecticut, March 13, 2020c. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7A.pdf>.
- Lamont, Ned. "Executive Order No. 7Y: Protection of Public Health and Safety During Covid-19 Pandemic and Response – Nursing Home Surge Plan." Hartford, CT: Office of the Governor of Connecticut, April 11, 2020d. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7Y.pdf?la=en>.
- Lamont, Ned. "Executive Order No. 7UU: Protection of Public Health and Safety During Covid-19 Pandemic and Response – Staff Testing for Nursing Homes and Assisted Living; Definition of Suitable Work." Hartford, CT: Office of the Governor of Connecticut, June 1, 2020e. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7UU.pdf>.
- Lamont, Ned. "Executive Order No. 7AAA: Protection of Public Health and Safety During Covid-19 Pandemic and Response – Modifications of Previous Executive Orders." Hartford, CT: Office of the Governor of Connecticut, June 17, 2020f. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7AAA.pdf>.
- Lamont, Ned. "Executive Order No. 7L: Protection of Public Health and Safety During Covid-19 Pandemic and Response - Extension of School Cancellation, Municipal Retiree Reemployment, Open Fishing Season and Additional Public Health Measures." Hartford, CT: Office of the Governor of Connecticut, March 24, 2020g. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7L.pdf>.
- Lamont, Ned. "Executive Order No. 7XX: Protection of Public Health and Safety During Covid-19 Pandemic and Response – Safety Precautions For Drive-In Ceremonies, Suspension Of Involuntary Discharges From Nursing Homes To Homeless Shelters." Hartford, CT: Office of the Governor of Connecticut, June 5, 2020h. Available at <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7XX.pdf>.
- LeadingAge Minnesota. "COVID-19: Visitation Decision-Making Grid." Updated July 17, 2020. Available at <https://www.leadingagemn.org/assets/docs/C19-VisitationDecisionMakingGrid-071720a.pdf>. Accessed September 14, 2020.
- Levine, S., A. Bonner, A. Perry, D. Melady, and K. Unroe. "COVID-19 in Older Adults: Transfers Between Nursing Homes and Hospitals." *Journal of Geriatric Emergency Medicine*, vol. 1, no. 5, March 27, 2020. Available at <https://gedcollaborative.com/article/jgem-volume-1-issue-5>.
- Li, Y., H. Temkin-Greener, G. Shan, and X. Cai. "COVID-19 Infections and Deaths Among Connecticut Nursing Home Residents: Facility Correlates." *Journal of the American Geriatrics Society*, 2020. doi:10.1111/jgs.16689
- Lu, J., J. Gu, K. Li, C. Xu, W. Su, Z. Lai, D. Zhou, et al. "COVID-19 Outbreak Associated with Air Conditioning in Restaurant, Guangzhou, China, 2020." *Emerging Infectious Diseases*, vol. 26, no. 7, 2020, pp. 1628–1631. doi:10.3201/eid2607.200764.
- Manatt Health. "Recommendations to Strengthen the Resilience of New Jersey's Nursing Homes in the Wake of COVID-19." Available at <https://www.manatt.com/Manatt/media/Documents/NJ-LTC-Report.pdf>. Accessed September 14, 2020.

References

- Massaro, M. “iPads Distributed by DPH to Some State Nursing Homes.” NBC CT, May 10, 2020. Available at <https://www.nbcconnecticut.com/news/coronavirus/ipads-distributed-by-dph-to-some-state-nursing-homes/2268663>.
- MassHealth. “MassHealth Investment to Support Signing Bonuses for Nursing Facility Staff.” Updated May 15, 2020. Available at <https://www.mass.gov/doc/masshealth-investment-to-support-signing-bonuses-for-nursing-facility-staff/download#:~:text=MassHealth%20will%20make%20supplemental%20payments,for%20the%20expense%20they%20incur.&text=The%20estimated%20investment%20is%20over%20%241%20million.&text=Payments%20are%20subject%20to%20EOHHS%20audit%20of%20compliance%20with%20criteria%20stated%20below>. Accessed September 14, 2020.
- Michigan Nursing Home COVID-19 Task Force. “Final Recommendations.” August 31, 2020. Available at https://www.michigan.gov/documents/coronavirus/Nursing_Home_Final_Report_701082_7.pdf. Accessed September 14, 2020.
- Minnesota Department of Health. “k. How to Make a Temporary Negative Pressure Room: High Consequence Infectious Disease (HCD) Readiness Binder.” St. Paul, MN: Minnesota Department of Health, September 2019. Available at <https://www.health.state.mn.us/diseases/hcid/negpressure.pdf>.
- Minnesota Department of Health. “Recommendations for Long-Term Care Visitation and Activities: How and When to Safely Transition to the Next Level Throughout the COVID-19 Pandemic.” St. Paul, MN: Minnesota Department of Health, August 10, 2020a. Available at <https://www.health.state.mn.us/diseases/coronavirus/hcp/ltcvisit.pdf>.
- Minnesota Department of Health. “Essential Caregiver Guidance for Long-Term Care Facilities.” St. Paul, MN: Minnesota Department of Health, July 10, 2020b. Available at <https://www.health.state.mn.us/diseases/coronavirus/hcp/ltccaregiver.pdf>.
- MITRE. “Coronavirus Commission on Safety and Quality in Nursing Homes.” McClean, VA: MITRE Corp, 2020. Available at <https://edit.cms.gov/files/document/covid-final-nh-commission-report.pdf>.
- Morris JN, Fries BE, Mehr DR, Hawes C, Phillips C, Mor V, Lipsitz LA. J Gerontol. 1994 Jul; 49(4):M174-82.
- Mutual Aid Plan. “The Connecticut Hospital and Long Term Care Mutual Aid Plan Facility Information Website.” 2020. Available at <http://www.mutualaidplan.org/Info/Default.aspx?OrgID=101>. Accessed September 14, 2020.
- National Council of State Boards of Nursing. “Nurse Licensure Compact (NLC).” 2020. Available at <https://www.ncsbn.org/nurse-licensure-compact.htm>. Accessed September 14, 2020.
- National Investment Center for Seniors Housing & Care. “NIC MAP Data Services. Skilled Nursing Monthly Report.” June 2020. Available at https://info.nic.org/hubfs/NIC_MAP/Skilled%20Nursing/NIC_MAP_Skilled_Nursing_Report_06_20_20.pdf?hsCtaTracking=4d4bc1ed-8856-4f27-bfd5-3da1fccf0799%7Ccb7000a8-4657-4d44-8f26-fc18402607ff. Accessed September 14, 2020.
- New York State Department of Health. “Factors Associated with Nursing Home Infections and Fatalities in New York State During the COVID-19 Global Health Crisis.” Revised July 20, 2020a. Available at https://www.health.ny.gov/press/releases/2020/docs/nh_factors_report.pdf. Accessed September 14, 2020.

References

- New York State Department of Health. “Health Advisory: COVID-19 Cases in Nursing Homes and Adult Care Facilities.” March 13, 2020b. Available at <https://coronavirus.health.ny.gov/system/files/documents/2020/03/acfguidance.pdf>. Accessed September 14, 2020.
- New York Times. “How Many of These 68,000 Deaths Could Have Been Avoided?” *New York Times*, September 5, 2020. Available at <https://www.nytimes.com/2020/09/05/opinion/sunday/coronavirus-nursing-homes-deaths.html>.
- Office of Governor Ned Lamont. “Governor Lamont Orders Independent Analysis of COVID-19 in Connecticut’s Nursing Homes and Assisted Living Facilities.” June 8, 2020a. Available at <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/06-2020/Governor-Lamont-Orders-Independent-Analysis-of-COVID19-in-Nursing-Homes>. Accessed September 14, 2020.
- Office of Governor Ned Lamont. “Governor Lamont Provides Update on Connecticut’s Coronavirus Preparedness and Response Efforts.” March 9, 2020b. Available at <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/03-2020/Governor-Lamont-Provides-Update-on-Connecticuts-Coronavirus-Preparedness-and-Response-Efforts>. Accessed September 14, 2020.
- Office of Governor Ned Lamont. “Governor Lamont, Governor Cuomo, Governor Murphy, Governor Baker, Governor Raimondo, Governor Wolf, and Governor Carney Announce Multi-State Agreement to Develop Regional Supply Chain for PPE and Medical Equipment.” May 3, 2020c. Available at <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/05-2020/Governor-Lamont-Announces-Multi-State-Agreement-to-Develop-Regional-Supply-Chain-for-PPE>. Accessed September 14, 2020.
- Office of Governor Ned Lamont. “Governor Lamont Provides Update on Connecticut’s Coronavirus Preparedness and Response Efforts.” March 9, 2020d. Available at <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/03-2020/Governor-Lamont-Provides-Update-on-Connecticuts-Coronavirus-Preparedness-and-Response-Efforts>. Accessed September 14, 2020.
- Office of Governor Ned Lamont. “Governor Lamont Provides Update on Connecticut’s Coronavirus Response Efforts.” August 6, 2020e. Available at <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/08-2020/Governor-Lamont-Coronavirus-Update-August-6>. Accessed September 14, 2020.
- Ortelle, D. “COVID 19 and Centers for Disease Control and Prevention (CDC) Guidance.” Hartford, CT: Connecticut Department of Public Health, March 5, 2020. Available at <https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/Facility-Licensing--Investigations/Blast-Faxes/Blast-Fax-202005-COVID-19-and-Centers-for-Disease-Control-CDC-Guidance.pdf>.
- Rowan, Patricia, Rebecca Lester, Michael Levere, Jenna Libersky, Debra Lipson, and Julie Robison. “A Study of the COVID-19 Outbreak and Response in Connecticut Long-Term Care Facilities.” Washington, DC: Mathematica, August 14, 2020. Available at <https://portal.ct.gov/-/media/Coronavirus/20200818-Mathematica-interim-report.pdf>.
- Sanger, David E., Eric Lipton, Eileen Sullivan, and Michael Crowley. “Before Virus Outbreak, a Cascade of Warnings Went Unheeded.” *New York Times*, March 29, 2020. Available at <https://www.nytimes.com/2020/03/19/us/politics/trump-coronavirus-outbreak.html>.
- Schnelle, John F., Sandra F. Simmons, Charlene Harrington, Mary Cadogan, Emily Garcia, and Barbara M Bates-Jensen. “Relationship of Nursing Home Staffing to Quality of Care.” *Health Services Research*, vol. 39, no. 2, 2004, pp. 225–250.

- Sexton, Joe, and Joaquin Sapien. "Local Officials Say a Nursing Home Dumped Residents to Die at Hospitals." *ProPublica*, August 11, 2020. Available at <https://www.propublica.org/article/local-officials-say-a-nursing-home-dumped-residents-to-die-at-hospitals>.
- Thomas, Kali S., David Dosa, Andrea Wysocki, and Vincent Mor. "The Minimum Data Set 3.0 Cognitive Function Scale." *Medical Care*, vol. 55, no. 9, 2017, pp. e68–e72. doi:10.1097/MLR.0000000000000334.
- Tibshirani, Robert. "Regression Shrinkage and Selection via the Lasso." *Journal of the Royal Statistical Society: Series B (Methodological)*, vol. 58, no. 1, 1996, pp. 267–288.
- University of Michigan. "Keeping Nursing Home Residents Safe and Advancing Health in Light of COVID-19." Ann Arbor, MI: August, 31, 2020. Available at https://www.michigan.gov/documents/coronavirus/CHRT_NH_COVID_Response_Presentation_8-31-20_701084_7.pdf.
- U.S. Department of Labor. "Families First Coronavirus Response Act: Questions and Answers [question 56]." 2020. Available at <https://www.dol.gov/agencies/whd/pandemic/ffcra-questions#56>. Accessed September 14, 2020.
- Virginia Department of Health. "Virginia Long-Term Care Task Force." 2020. Available at <https://www.vdh.virginia.gov/coronavirus/health-professionals/virginia-long-term-care-task-force/>.
- Yong, Ed. "How the Pandemic Defeated America." *The Atlantic*, August 4, 2020. Available at <https://www.theatlantic.com/magazine/archive/2020/09/coronavirus-american-failure/614191>.
- Zou, Hui, and Trevor Hastie. "Regularization and variable selection via the elastic net." *Journal of the royal statistical society: series B (statistical methodology)* 67.2 (2005): 301-320.

APPENDIX A

Methods

A. Document review

Upon contract award, Mathematica requested a list of relevant documents from state agencies for review:

- Continuity of operation plans for relevant state agencies
- Documentation related to the state's emergency response plan and structure, including the uses of National Guard resources and allocation of personal protective equipment (PPE) to long-term care (LTC) facilities
- Regulations governing nursing homes and assisted living facilities
- Documentation of nursing home inspections and outcomes
- All relevant guidance and communication from the Department of Public Health (DPH) to LTC facilities
- Organizational charts, head counts, and other information related to state agency staffing
- Prior planning for infectious disease outbreaks in long-term care facilities
- Allocation of federal CARES Act funding to nursing homes
- Documentation related to facility reporting requirements

As we learned about the existence of additional relevant information, Mathematica requested additional documentation from various state agencies.

In total, Mathematica received and reviewed 190 documents from Connecticut state agencies, including DPH, the Department of Social Services (DSS), Office of Policy and Management (OPM), and others. At least two members of the Mathematica team reviewed each document and we extracted and coded relevant information according to category and themes (PPE, testing, communications, regulatory framework, reimbursement, facility staffing, COVID-19 recovery centers, infection control, and other).

B. Interviews

Mathematica conducted 52 interviews with 132 people from July 27 to September 10. We used semistructured discussion guides to obtain comparable information about the major topics from each interview, while allowing respondents to offer their observations, experiences, and recommendations on other issues.

We recorded interviews with permission, and generated summary notes from each interview. At least two members of the Mathematica team who extracted and coded key points related to the interview topics listed in Exhibit A.1 also systematically analyzed each interview transcript.

Exhibit A.1. Interview topics, by stakeholder

	Elected officials	Executive branch officials	LTC industry stakeholders	Resident, family, and staff	LTC advocacy groups
1. Assessment of the state's capacity to detect and respond to infectious disease outbreaks	X	X			
2. PPE and testing of residents and staff	X	X	X	X	X

	Elected officials	Executive branch officials	LTC industry stakeholders	Resident, family, and staff	LTC advocacy groups
3. LTC regulations and survey certification processes	X	X	X		
4. State agency structure, emergency response systems, and communication systems and practices	X	X	X		
5. Reimbursement mechanisms to support increasing LTC system costs, including uses of funding increases	X	X	X		X
6. Cohorting of COVID-19 suspected or confirmed positive individuals			X	X	
7. Establishment of COVID-19 recovery facilities	X	X	X		
8. Facility response, including changes to the physical environment, experiences with procuring PPE, screening and testing of residents and staff			X	X	X
9. Staffing challenges and LTC workforce availability		X	X		X
10. Infection control		X	X	X	X
11. Care transitions and communication with other parts of the health care system		X	X	X	X
12. Communication with residents/families, other facilities, and state health authorities			X	X	X

LTC = long-term care; PPE = personal protective equipment.

1. Organizational affiliation of stakeholder interviews

Mathematica did not conduct any in-person visits to nursing homes or assisted living communities because of state requirements restricting visitation in these settings. Instead, Mathematica conducted all stakeholder interviews by telephone and video conference. We interviewed a sample of state agency staff, facility administrators, nursing home and assisted living trade association representatives, labor representatives, legislators, direct care staff working in nursing homes, LTC advocacy groups, nursing home residents, and family members of residents living in LTC facilities. We interviewed the following list of individuals and groups from each of these entities.

a. Elected officials

- Representative Cathy Abercrombie
- Senator Cathy Osten
- Representative Toni Walker
- Senator Paul Formica
- Representative Gail Lavielle
- Representatives for Senator Len Fasano
- Representatives for Representative Joe Aresimowicz

- Senator Mary Abrams
- Representative William Petit
- Senator Saud Anwar
- Senator Kevin Kelly
- Senator Heather Somers
- Representative Johnathan Steinberg
- Senator Marilyn Moore

b. Executive branch officials

- Deidre Gifford, Acting Commissioner of the Department of Public Health and Commissioner of the Department of Social Services
- Adelita Orefice, Senior Advisor to the Commissioner
- Amy Porter, Commissioner of the Department of Aging and Disability Services
- Josh Geballe, Commissioner of the Department of Administrative Services
- Melissa McCaw, Secretary of the Office of Policy and Management
- Michelle Gilman, Deputy Incident Commander for COVID-19 and Deputy Chief Operations Officer
- Leadership from CT Unified Command, including leadership of Connecticut National Guard and the Division of Emergency Management and Homeland Security
- Facility Licensing and Investigations Section (FLIS) at the Department of Public Health, including nurse consultant surveyors
- Healthcare Associated Infections and Antimicrobial Resistance Section at the Department of Public Health
- Infectious Diseases Section at the Department of Public Health
- Representatives from the Connecticut 211 Hotline
- Representatives from the Connecticut Medicaid program within the Department of Social Services
- Representatives from the Department of Public Health's Public Health Laboratory
- Representatives from the Long-Term Care Ombudsman Program
- Representatives from the Long-Term Care Mutual Aid Plan vendor
- Representatives from Yale School of Public Health involved in supporting DPH's COVID-19 response

c. LTC industry stakeholders

- Representatives from LeadingAge and the Connecticut Association of Health Care Facilities
- Representatives from the Connecticut Assisted Living Association
- Leadership from Athena Health Care
- Leadership from iCare Health Network
- Leadership from Genesis Health Care

- Leadership from Arbors of Hop Brook Limited Partnership
 - Leadership from Greenwich Woods
 - Leadership from Brookdale Assisted Living
 - Leadership from Mansfield Center for Nursing and Rehabilitation
 - Leadership from LiveWell
- d. *Resident, family, and staff stakeholders*
- 10 residents and family members of residents in LTC facilities
 - Representatives from the New England Health Care Employees Union, District 1199
 - 21 direct care staff members working in nursing homes
- e. *LTC resident advocates*
- Representatives from the Connecticut Cross Disability Lifespan Alliance
 - Representatives from Connecticut Legal Services

C. Data analysis

1. Data sources

Our data analysis drew upon a wide range of data sources, relying on both publicly available and proprietary data. For publicly available data, we include a link to the data source. In this section, we provide information on data sources corresponding to each of the three primary subsections of Section III.

a. *Assessment of the COVID-19 outbreak in Connecticut as a whole*

Johns Hopkins University and the New York Times. The Johns Hopkins University Coronavirus Resource Center publishes daily data about new and cumulative cases and new and cumulative deaths for each county in the U.S.³⁰ The New York Times publishes similar data, but for states and nationally.³¹ We used these data to construct seven-day moving averages of new cases and deaths in the relevant states and counties through the end of July 2020. We then scaled these counts by the total state or county population.

Centers for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS). The CDC NCHS is producing the most recent data available on deaths, mental health, and access to health care, loss of work due to illness, and telemedicine due to the COVID-19 pandemic.³² The death counts are produced weekly for the U.S. overall and by state, and by certain demographic characteristics, such as age group. We used data reported through the end of July 2020 for the number of deaths by age group. We then scaled these counts by the total state population by age.

COVID Tracking Project and Census Bureau. The COVID Tracking Project at The Atlantic consolidates race and ethnicity data for COVID-19 cases and deaths from every state and territory that reports it.³³ We used data on cases and deaths reported through the end of July 2020. Each state only

³⁰ <https://coronavirus.jhu.edu/data>

³¹ <https://github.com/nytimes/covid-19-data>

³² <https://www.cdc.gov/nchs/covid19/index.htm>

³³ <https://covidtracking.com/race/dashboard>

reports race and ethnicity data on a subset of all cases, and the share with race and ethnicity data differs by state). Therefore, for each race and ethnicity group, we calculated the share of cases (deaths) for that group out of the total number of cases (deaths) with known race or ethnicity.

rt.live. rt.live produces up-to-date values for R_t , which is a key measure of the speed of transmission of COVID-19.³⁴ We used state-level data reported through the end of July 2020. Additionally, we used their model code (provided on the website) to create county level estimates for R_t using daily data on total positive tests and total tests by county.

Census Bureau. To capture a variety of population estimates, we used data from the Census Bureau. At the state level, we used the data on age, sex, race, and Hispanic origin.³⁵ We also used total county population.³⁶

b. Assessment of the COVID-19 outbreak in Connecticut's nursing homes

Connecticut DPH weekly data on COVID-19 cases and deaths included in Connecticut's FLIS system. Connecticut provides weekly updates on COVID-19 cases and deaths in individual nursing homes, as reported directly by the facilities.³⁷ In this report, we used data on the total cases and deaths in each nursing home through July 22, 2020. Information is reported for 212 nursing homes in Connecticut. Cumulative data for residents was re-baselined on July 15 and on July 21 to account for false positives detected that week. Due to the different data collection and processing methods that went into effect in mid-June to report on COVID-19 cases and deaths, DPH does not sum the data before and after the re-baselining on July 21, 2020 due to possible duplication of cases and deaths between prior and current data reported. Therefore, we also focused only on the period through the end of July. However, as of September 10, the state reported only 58 new cases and 28 new deaths since July 22, so all findings would be essentially unchanged if we considered a broader time horizon.

Minimum Data Set. The Long-Term Care Minimum Data Set (MDS) is an assessment tool used for all residents (regardless of payer) of nursing homes certified to participate in Medicare or Medicaid. Mathematica was added as an authorized user of this data under a data use agreement between the state of Connecticut and CMS which gave Mathematica access to all MDS assessments for nursing homes in Connecticut between 2012 and the end of July 2020. Assessments are conducted on admission or discharge, as well as every three months or when there is a substantial change in someone's status. The assessment captures numerous characteristics of health and well-being.³⁸ We requested historical data to be able to look back in the data and discern seasonal patterns during previous years to compare to the time period of this study.

Connecticut DPH FLIS portal on individual resident data. Starting on May 8, 2020, Connecticut required each nursing home to report data on individual residents in nursing homes who tested positive or died from COVID-19. The data capture whether the resident is presumed positive or had a positive test, as well as the date of the positive test. In this report, we only consider people who had a positive test. We merged these data with MDS data to identify nursing home residents that got COVID-19 using a

³⁴ <https://rt.live/>

³⁵ <https://www2.census.gov/programs-surveys/popest/tables/2010-2019/state/asrh/sc-est2019-alldata6.csv>

³⁶ <https://www2.census.gov/programs-surveys/popest/tables/2010-2019/counties/totals/co-est2019-annres.xlsx>

³⁷ <https://portal.ct.gov/Coronavirus/Nursing-Homes-and-Assisted-Living-Facilities>

³⁸ The assessment form is available at <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/Archive-Draft-of-the-MDS-30-Nursing-Home-Comprehensive-NC-Version-1140.pdf>.

combination of name and date of birth. Of the 8,799 residents that are listed as testing positive and were not transferred into the facility, we identified 8,168 of them in MDS data (93 percent). For any residents in the MDS who did not match, we assumed that they did not test positive for COVID-19.

DPH Vital Records. The Connecticut DPH maintains statewide registries for births, deaths, marriages, and fetal deaths for all vital events occurring in Connecticut. DPH provided vital records on deaths through the end of July 2020. The vital records data capture whether one of the causes of death is COVID-19. It also indicates whether someone died in a nursing home. We merged these data with MDS data using a combination of name, date of birth, and address to identify nursing home residents who died from COVID-19. Based on this merge, we identified 2,612 people in nursing homes who died from COVID-19. We also used the information from the vital records themselves (address of residence and address of place of death) to identify an additional 115 people who had been in a nursing home and who subsequently died from COVID-19. In total, we therefore identified 96 percent of the total of 2,849 nursing home deaths reported in aggregate from the aggregate DPH data on deaths reported in Connecticut's FLIS system.

Nursing Home Compare. Nursing Home Compare is a website maintained by CMS that allows people to find and compare nursing homes certified by Medicare and Medicaid.³⁹ The website contains general information about nursing homes (such as name and address), quality of resident care, and staffing for more than 15,000 nursing homes nationwide. Nursing Home Compare includes a five-star rating system for each facility that provides a rating between one and five stars for health inspections, staffing, and quality of resident care outcomes, as well as an overall rating calculated from the three individual ratings. We used the provider info dataset to capture various characteristics of the nursing home as of June 1, 2020.⁴⁰

LTCFocus. LTCFocus.org is a website that contains data on nursing homes across the United States produced through the Shaping Long-Term Care in America Project conducted by the Brown University Center for Gerontology and Healthcare Research and supported in part by the National Institute on Aging.⁴¹ The website combines data from a variety of sources, including MDS, Online Survey Certification and Reporting (OSCAR), and a variety of other sources. The data reports numerous measures about the health and functional status of nursing home residents, characteristics of nursing homes, state policies relevant to nursing home financing and care, and local market conditions. We used data summarizing the nursing home from 2017, the most recently available information.

³⁹ <https://www.medicare.gov/nursinghomecompare/search.html>

⁴⁰ <https://data.medicare.gov/Nursing-Home-Compare/Provider-Info/4pq5-n9py>

⁴¹ <http://ltcfocus.org/>

Nursing home COVID-19 cases and deaths from northeast states. We used publicly reported data from Massachusetts,⁴² New Jersey,⁴³ New York,⁴⁴ and Rhode Island⁴⁵ on COVID-19 cases and deaths that occurred in individual nursing homes reported through the end of July 2020.

Google Maps API. We used Google Maps API to calculate distances from Connecticut for counties and for individual long-term care facilities in nearby states. The distance captured the number of miles (along roads) to the border of Connecticut for 56 border crossing points, and then selected the minimum distance. For counties in nearby states, this measured the distance from the geographic center of the county. Based on distance, we identified both relevant counties to include in our comparison of aggregate patterns in COVID-19 and relevant nursing homes to include in our comparison of nursing home outcomes across states.

c. Assessment of the COVID-19 outbreak in Connecticut's assisted living facilities

Connecticut DPH weekly data on COVID-19 cases and deaths included in Connecticut's FLIS system. Connecticut provides weekly updates on COVID-19 cases and deaths in individual assisted living facilities, as reported directly by the facilities.⁴⁶ In this report, we used data on the total cases and deaths in each assisted living facility through July 14, 2020. Similar to the approach for nursing homes, we only used data through July 14 because of changes in data reporting that led to re-baselining on July 14, 2020. However, as of September 10, the state reported only 20 new cases and 0 new deaths in assisted living facilities since July 14, so all findings would be essentially unchanged if we considered a broader time horizon.

Connecticut DPH assisted living facility data. The Connecticut DPH provided us with a list of assisted living facilities and their licensed size. For facilities that report a licensed bed size in the database, we used the total number of beds in the state's assisted living facilities weekly report from June 19, 2020. There were still 28 facilities that neither had a licensed bed size nor were included in the June 19, 2020 report. For these facilities, we used the current census from the July 30, 2020 report as the number of beds (the same report used to capture total cases and deaths).

2. Analytic approach

a. Connecticut as a whole

We conducted several analyses to understand the impact of COVID-19 cases and deaths in Connecticut as a whole compared to surrounding states in the region and the United States, including an analysis of new COVID-19 cases and deaths by date, COVID-19 deaths by age group, COVID-19 cases and deaths by race and ethnicity, and COVID-19 transmission rates by date.

⁴² Cases and deaths in long-term care facilities from the report as of July 29, 2020 are available at <https://www.mass.gov/doc/weekly-covid-19-public-health-report-july-29-2020/download>.

⁴³ Only the most recent data are available online. The most recent data also only include current outbreaks, but exclude cases and deaths for individual facilities that are no longer experiencing an outbreak. https://www.nj.gov/health/cd/topics/covid2019_dashboard.shtml

⁴⁴ Only the most recent data are available online. https://www.health.ny.gov/statistics/diseases/covid-19/fatalities_nursing_home_acf.pdf.

⁴⁵ Only the most recent data are available online. <https://docs.google.com/spreadsheets/d/1c2QrNMz8pIbYEkzMJL7Uh2dtThOJa2j1sSMwiDo5Gz4/edit#gid=500394186>

⁴⁶ <https://portal.ct.gov/Coronavirus/Nursing-Homes-and-Assisted-Living-Facilities>

To understand new COVID-19 cases and deaths per 100,000 residents through the end of July 2020, we examined the seven-day moving average in Connecticut, the Northeast region, and the United States using data from Johns Hopkins University and The New York Times. We aggregated state-level data from Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Washington, DC to capture the Northeast region. We also identified counties that were within 50 miles of Connecticut based on geocoding analyses from Google Maps. We then calculated the seven-day moving average of new cases and deaths in these counties to construct a comparison to Connecticut. For each of the different groups, we scaled the number of new cases and deaths per 100,000 residents using population data from the Census Bureau.

For COVID-19 deaths by age group, we used state-level data from the CDC for age groups 25 years and older. We aggregated data from Massachusetts, New Jersey, New York, and Rhode Island to define deaths in neighboring states by age group. We also aggregated data from these four states plus Delaware, Maine, Maryland, New Hampshire, Pennsylvania, Vermont, and Washington, DC to define deaths in the Northeast region by age group. We defined all counts per 100,000 residents using population data from the Census Bureau.

For COVID-19 cases and deaths by race and ethnicity, we used data from the COVID Tracking Project and Census Bureau from Connecticut, Massachusetts, New Jersey, New York, and Rhode Island. For each race or ethnicity group, we used data from the COVID Tracking Project to calculate the percentage of cases (deaths) with known race or ethnicity that occurred in the specific group. Race and ethnicity information could be missing for a substantial share of cases or deaths depending on the state (for example, for deaths, it ranged from less than 1 percent for Connecticut and Massachusetts to as high as 19 percent for Rhode Island). Calculating the case and death numbers as a percentage with known race or ethnicity avoids attributing a smaller number of cases in a given group to less prevalence, which we cannot be certain of when there is substantial missing data. To provide context for this percentage, we used data from the Census Bureau to calculate each race or ethnicity groups share of the state's total population. We then took the ratio of the percentage of cases or deaths to the percentage of the population for each group. Ratios greater than 1.0 for a particular racial or ethnic group indicate disproportionately higher number of cases or deaths among the group relative to their share of the general population in the state. We were unable to calculate the ratio of the share of cases to the share of the general population for New York because it does not report the racial composition of cases.

We used state-level data on transmission rates from *rt.live* to compare Connecticut to neighboring states and the Northeast region over time. The rate of transmission is estimated as the number of new people each infected person gets sick. Neighboring states included Massachusetts, New Jersey, New York, and Rhode Island. The Northeast region included these four states plus Delaware, Maine, Maryland, New Hampshire, Pennsylvania, Vermont, and Washington, DC. We also used county-level data on the number of positive tests and total tests from Connecticut to estimate the Connecticut county-level transmission rates over time using the *rt.live* model. The model calculates each county's rate of transmission independently, and therefore assumes that all new infections in each county only came from prior infections in that county. Though this assumption is likely reasonable at the state-level, it is more questionable at the county-level. However, especially early in the pandemic, limited movement may make the county-level estimates more reasonable.

b. Connecticut nursing homes

We conducted four main sets of analyses in Connecticut’s nursing homes: (1) assessing the spread of COVID-19 across nursing homes; (2) assessing the spread of COVID-19 within nursing homes; (3) comparing cases and deaths in Connecticut nursing homes to cases and deaths in nursing homes in neighboring states; and (4) reporting on individual-level changes in well-being. For the first three analyses, our primary outcomes were measures of cases and deaths within individual nursing homes. To make more reliable comparisons across facilities, we limited the sample of nursing homes to those licensed by CMS and therefore in Nursing Home Compare data and we also scaled the reported number of cases and deaths by the number of licensed beds.

Assessing the spread of COVID-19 across nursing homes. The goal of this analysis was to assess the characteristics that were associated with greater spread of COVID-19. For the 212 nursing homes in Connecticut with reported information on cases and deaths, we gathered measures of nursing home characteristics reported in Nursing Home Compare and LTCFocus data and measures of resident characteristics calculated from MDS data. The resident characteristics were based on those present in the facility as of March 9, 2020 and used the regular assessment immediately prior to March 9, 2020 to determine their characteristics.⁴⁷ We aggregated resident characteristics to the facility level by taking the average for all residents present in the facility.

Our primary regression model was a linear regression model that used resident and nursing home characteristics to predict cases and deaths per licensed bed. The regression was of the form:

$$y_f = \alpha + \beta X_f + \varepsilon_f \quad (1)$$

Equation (1) takes outcome y (either cases or deaths per licensed bed) for a given facility f as a function of various characteristics X at the facility-level. In our main specification, we conducted a multivariate analysis by including multiple characteristics in the vector X . We report heteroskedasticity robust standard errors. This model indicates which characteristics are positively or negative correlated with nursing home outcomes but cannot be viewed as the causal effect of having the characteristic on an outcome. For example, if a nursing home increased its staffing rating, it does not mean that the outcomes would necessarily change; instead, the analysis tells us the difference in outcomes between those with higher and lower staffing ratings.

Because we had a large number of potential characteristics both at the nursing home and resident level to include in the regression model, we first used a feature selection model to identify which characteristics were most important in improving the predictive power of the multivariate regression model. With only 212 nursing homes, including too many characteristics would likely reduce the number that would ultimately be found significant due to correlations across multiple characteristics. Instead, the feature selection model uses the lasso⁴⁸ to limit the number of characteristics and only identify those which were important to understanding the variation in cases and deaths per licensed bed. Appendix Exhibit B.6 lists the characteristics that were entered into the feature selection model. We consider the characteristics

⁴⁷ For residents admitted to the facility in the two weeks prior to March 9, if they did not have a subsequent regular ongoing assessment by March 9, we considered a regular ongoing assessment up to March 23 as indicating their status as of the beginning of the outbreak.

⁴⁸ For more information, see Tibshirani (1996) and Zou and Hastie (2005).

identified by the feature selection model as being “important”, and subsequently include these important characteristics in the regression. Exhibit 6 indicates the characteristics that were found to be important.

Results from the multivariate regression model that only includes important characteristics can be found in Appendix Exhibit B.8. In addition to reporting coefficients and standard errors, the table reports standardized coefficients, which are based on re-scaling each characteristic to have a mean of 0 and standard deviation of 1. The standardized coefficients are helpful in understanding the relative magnitude of the relationship between each characteristic and the number of cases and deaths and indicate which are more highly correlated.

In addition to the multivariate regression model, we also used a bivariate regression model that compares the patterns in outcomes by a given characteristic independent of all others. This bivariate regression, which we used in the interim report, is simpler to understand and present, but ignores potential correlations between characteristics. These correlations can be better controlled for in the context of a multivariate model. To estimate this model, we used Equation (1) but only included a single characteristic in the vector X_f .

Assessing the spread of COVID-19 within nursing homes. This analysis looks at patterns in COVID-19 among residents who were in the nursing home as of March 9, 2020. We report both resident-level and wing-level analyses. The resident-level analyses include 21,808 residents across 211 nursing homes from MDS resident assessments (see Appendix Exhibit B.5 for a summary of resident characteristics). For wing-level analyses, we aggregate resident-level outcomes among the people who resided in each wing based on their room number from the MDS.⁴⁹ The wings were defined based on floor plans that DPH provided to Mathematica, only including floor plans where the room numbers were clearly readable and able to differentiate the rooms that corresponded to each wing in the nursing home. In total, the wing-level analysis includes 6,731 residents across 69 nursing homes with readable floor plans.

Restricting the sample to only include people in the nursing home as of the beginning of the pandemic is important because of challenges around selection bias. People who entered facilities after this point may be importantly different than those who were not already in the facility, and also may not be representative of typical residents – given the spotlight on nursing homes and the risk they posed, people likely tried to avoid entering a nursing home to the extent possible. From the perspective of the wing-level analysis, this is especially important because nursing homes may have placed people into different parts of the facility or cohorted residents who experienced symptoms, which would affect the measurement of where the disease was located. Additionally, residents newly admitted to nursing homes after March 9 accounted for fewer than 10 percent of COVID-19 cases, though made up a larger proportion of deaths (Appendix Exhibit B.5). Therefore, even though the analyses were limited to those in the facility as of March 9, we capture most residents who were directly affected by COVID-19.

To estimate the relationship between characteristics and COVID-19 outcomes, we used a regression model similar to Equation (1) but augmented with a nursing home fixed effect. Because data are either at the resident-level or the wing-level, the nursing home fixed effect lets us control for all characteristics of the nursing home. All differences in outcomes are entirely explained by averaging for residents or wings within a single nursing home. Additionally, whereas the outcome for the facility-level analysis was the number of cases or deaths per licensed bed, for the resident-level analysis, the outcome is an indicator for whether the person got COVID-19 or died from COVID-19. We still used a linear regression, meaning

⁴⁹ Room numbers are missing for less than 1 percent of observations.

that for the resident-level analysis our model is a linear probability model. For the wing-level analysis, the outcome was the share of residents who got sick or died from COVID-19. We controlled for the same characteristics in both models, though in the resident-level analysis the characteristics are reflective of the individual person whereas in the wing-level analysis the characteristics are the average for people who lived in that wing. In both models, standard errors are clustered at the nursing home level.

Comparing cases and deaths in Connecticut nursing homes to neighboring states. To compare COVID-19 outcomes in Connecticut nursing homes to those in other states, we used data from Massachusetts, New Jersey, New York and Rhode Island about all cases and deaths in nursing homes through the end of July 2020. For each of the states, we had to make some adjustments to ensure that the comparison with Connecticut was as valid as possible.

- **Massachusetts.** We needed to impute the number of cases in each nursing home. Massachusetts reports case counts in ranges (0; 1-10; 11-30; 31 or more). To impute the number of cases by nursing home, we first calculated a potential number of cases by multiplying the number of deaths by 4.75. For nursing homes with cases in the 1-10 and 11-30 range, if the number of potential cases was larger than the midpoint of the range (i.e., 5 or 20) but smaller than the maximum value, we used the number of potential cases. If the number of potential cases was below the midpoint, we used the midpoint. If the number was above the maximum value, we used the maximum value. For nursing homes with more than 30 cases, if the number of potential cases was larger than 30 but less than the number of licensed beds, we used the number of potential cases. If the number of potential cases was less than 30, we estimated the nursing home had 45 cases. If the number of potential cases was more than the number of licensed beds, we used the number of licensed beds. After imputing, the total number of cases summed across all individual facilities (24,148) nearly exactly matched the aggregate numbers reported by the state as of July 29 (24,124).
- **New York.** New York does not report cases in individual nursing homes and only reports deaths in nursing homes among residents who physically died in the facility. For the comparison with Connecticut, we re-calculated deaths in each Connecticut nursing home only including the people who physically died in the nursing home. We were able to capture this information by merging MDS data to Vital Records death data in Connecticut, and only counting people as having died from COVID-19 if a cause of death was COVID-19 and the place of death was a nursing home. As described in footnote 12, only 1,618 COVID-19 deaths occurred in a nursing home, with many more occurring outside of the nursing home. Though this approach is more comparable to the way New York reports deaths, it assumes that nursing homes in New York had a similar share of residents die inside and outside of the facility. In reality, it may be different, potentially because of New York's policy to only count deaths if the person died in the nursing home, which incentivizes nursing homes to discharge people to a hospital to keep death counts lower.
- **New Jersey.** The New Jersey data only lists nursing homes that had non-zero cases or deaths. We therefore needed to add back in all CMS-licensed nursing homes that were not included in the state's data and assume that they had zero cases and deaths.
- **Rhode Island.** We needed to impute the number of cases and deaths in each nursing home. Rhode Island reports cases and death counts in ranges of five (for example, 45-49). For these data, we imputed the number of cases or deaths to equal the midpoint of the range (for example, 47). Additionally, the Rhode Island data only lists nursing homes that had non-zero cases or deaths. We therefore needed to add back in all CMS-licensed nursing homes that were not included in the state's data and assume that they had zero cases and deaths.

After these adjustments, we matched the individual nursing homes from each state dataset with Nursing Home Compare data and excluded any nursing home from the analysis that could not be matched to the Nursing Home Compare data. For example, Massachusetts reported data on nursing homes that do not accept Medicare payments and are thus not regulated by CMS; these nursing homes were excluded as outcomes might inherently differ.

We then estimated separate regression models using Equation (2) for each state that compared outcomes at nursing homes within Connecticut but close to the neighboring state to outcomes at nursing homes in the neighboring state that were within 50 miles of the border with Connecticut.⁵⁰ The coefficient β indicates the difference between cases or deaths per licensed bed for the average nursing home in Connecticut and the average nursing home in the neighboring state. For the comparison to Massachusetts, Connecticut counties included Litchfield, Hartford, Tolland, and Windham; for the comparison to New York and New Jersey, Connecticut counties included Fairfield, Litchfield, and New Haven; for the comparison to Rhode Island, Connecticut counties included Tolland, Windham, New London, and Middlesex. In the vector X_f , the regression model controlled for the number of licensed beds in the nursing home, the share of beds typically filled, the overall quality rating, the staffing rating, whether the nursing home was for profit, whether it was part of a chain, whether it had a memory care unit, and the number of COVID-19 cases per capita in the county it was located in (excluding all cases in nursing homes).

$$y_f = \alpha + \beta \text{Connecticut}_f + \delta X_f + \varepsilon_f \quad (2)$$

In addition to the regression model, we also conducted some descriptive analyses to summarize differences in outcomes in long-term care facilities relative to the northeast region as a whole and to the neighboring states. Appendix Exhibit B.14 shows total cases and deaths in long-term care facilities reported as of the end of July scaled by the state's total population. These data were reported by the New York Times. Though informative, particularly for states in the northeast region that do not report statistics in individual facilities, the primary drawback is that it is not clear exactly what facilities are included in the total numbers; for example, Connecticut includes cases and deaths in nursing homes and assisted living facilities, while others may not. Differences in what is defined as an assisted living facility in each state may also make comparisons challenging. We therefore use this figure as motivation for the states to include in a more careful, rigorously adjusted comparison with Connecticut. For the neighboring states (excluding New York), we also report simple summary statistics on total nursing home cases and deaths per licensed bed in each state as well as in facilities that are within 15, 30, and 50 miles of Connecticut (Appendix Exhibit B.15).

Individual-level changes in well-being. We analyzed changes in well-being as measured in resident assessments over time to measure the indirect effects of COVID-19. These well-being measures included indicators for any depressive symptoms, unplanned substantial weight loss, presence of a severe pressure ulcer, and any episode of incontinence. We also assessed the cognitive functioning scale and activities of daily living score. We made several adjustments to the sample to address potential selection bias issues. First, similar to the analysis of patterns within nursing homes, we limited individual-level data to only include those residing in a nursing home as of March 9, 2020 to counteract selection bias. Second, for those in a nursing home as of March 9, 2020, we then considered all subsequent assessments with observed outcomes. We grouped these assessments by the week of the observation date. Our analysis

⁵⁰ Results were approximately similar if using facilities only within 35 miles of the border.

measures the average difference in outcomes for people observed in each week relative to the week of March 10. To the extent that the pandemic is an important factor in patterns in outcomes, we would expect to find changes grow over time, likely peaking sometime in mid-April to early May to correspond with the peak of the pandemic.

In addition to controlling for selection bias by limiting the sample, we also took several other steps to limit the extent to which differences in who is observed are likely to drive the results:

- We control for average patterns from 2017 to 2019 using the same approach to the data as we took for 2020 (e.g., limiting to people in the facility as of March 9 in that year and looking at all subsequent observations for those people grouped by week up until the end of July). This controls for the way that residents' well-being is likely to deteriorate over time, both because of general aging as well as from changes in the composition of the sample, such as the exit of many short-stay residents.
- For each outcome, we re-weighted residents in each week to ensure that that average characteristics of observed residents match the average composition of residents observed in the week of March 10. To do this, we used entropy balancing (Hainmuller 2012). This process balances covariates to ensure two groups exactly match on a broad array of characteristics. We matched on residents' age, gender, race/ethnicity, active diagnoses, whether they were a short-stay resident, whether they were currently covered under Medicare, and the value for the well-being outcome observed in the period most recently preceding March 9, 2020.

The analysis is therefore based on a regression model of the form:

$$y_{iwy} = \alpha + \sum_w \beta_w (Year = 2020) * (Week = w) + \sum_w \delta_w (Week = w) + \gamma (Year = 2020) + \theta X_i + \varepsilon_f \quad (3)$$

Outcomes y are measured for individual i in week w in year y . All people with observations in 2017 to 2020 are pooled together in the regression. The coefficients β_w capture the average difference in outcomes relative to those observed in March 10, controlling for the same difference observed in 2017 to 2019. The model is therefore similar to a difference-in-differences specification. The covariates included in X_i are the same as those that were used as matching characteristics using entropy balancing. Standard errors are clustered at the nursing home level.

c. Connecticut assisted living facilities

To examine the impact of COVID-19 in Connecticut assisted living facilities, we used the cumulative data on COVID-19 cases and deaths from DPH through July 14, 2020. After defining the licensed size for each facility as described above, we produced descriptive characteristics of the assisted living facilities and COVID-19 cases and deaths by location, size, and whether the facility had joint offerings. For our analysis of town cases per capita and size of the facility, we used a bivariate linear regression model similar to Equation (1) to assess whether more local cases or a larger facility were associated with more cases or deaths.

3. Limitations

These analyses provide important insights into the effect of COVID-19 on nursing home and assisted living facility residents, but there are several limitations that are important to consider in interpreting the findings. We provide a list of potential limitations, though there may be others that are not listed.

- In analyses that required knowing whether individual residents of nursing homes either got sick or died from COVID-19, we relied on merging data by name, date of birth, and potentially address. Though we were able to match over 90 percent of positive cases and deaths to resident assessment data, we were not able to match everyone. The data therefore include a small percentage of people who presumably tested positive or died from COVID-19, but who we were not able to identify as such. We do not know whether the characteristics of the residents that were excluded were significantly different than those included in our analyses. However, because such a small percentage of people were missed, it is unlikely to affect our final results in any meaningful way.
- Our wing-level analysis was limited to a subset of nursing homes with floor plans, and thus may not be representative of the spread within all nursing homes. We only had usable floor plans for about one-third of nursing homes (69 out of 212). Among those with floor plans, about 20 percent had no cases or deaths (13 nursing homes), and therefore did not contribute to the analysis; because there was no variation in outcomes within the wings of the facility, the nursing home fixed effect essentially excludes these facilities.
- Selection bias in the MDS data could be an important factor for individual-level outcomes, both in terms of who got sick and in terms of well-being. Resident assessments are supposed to be done upon admission, upon discharge, every three months, and if there is a significant change in status. The pandemic could have influenced who is included in these resident assessments data in a variety of ways. First, the people entering and exiting the facility could change, with (presumably) fewer people entering and more people exiting than usual to avoid any possible exposure to COVID-19 in nursing homes. Second, residents may be more likely to have a significant change in their status, particularly if they got COVID-19. Third, staff may have had limited time to complete regular resident assessments because they needed to focus all energies on controlling the outbreak to the extent possible. Taken together, these factors make it challenging to make reliable comparisons, both because the residents included may change and because it is not inherently obvious how the changes in resident composition might influence their outcomes. However, particularly in our analysis of resident outcomes, we controlled for various types of selection bias to the extent possible. We limited the sample to only include residents who were already in the nursing home as of March 9, we controlled for trends in previous years, and we re-weighted the samples to guarantee that they were equal in observable characteristics. Nonetheless, it is possible that there are important unobserved characteristics that we were unable to account for, and some selection bias could have impacted our findings. The findings should thus be considered cautiously.
- Lastly, in order to compare Connecticut outcomes to other states, we had to make several adjustments to other states' data. However, we do not know exactly how each state classifies and counts cases and deaths, nor the way that the method for counting cases and deaths could influence behavior and thus observed outcomes. The adjustments we made therefore may not guarantee that the numbers between states are measured in the same way, and thus they may not be directly comparable.

Additionally, because of data limitations, we were unable to conduct the same types of comprehensive analysis of the pandemic in assisted living facilities as we could in nursing homes. Beyond the number of cases and deaths, we have little other quantitative information about residents of assisted living facilities. We were also unable to compare outcomes in Connecticut assisted living facilities to those in neighboring states. Although some states report cases and deaths from COVID-19 in individual assisted living facilities, the data structure differs substantially from the data in Connecticut. In Massachusetts assisted living facilities, cases are reported in broad ranges, similar to the approach for nursing homes, but because

they do not report deaths, we could not estimate true case counts. New Jersey includes more than 500 total long-term care facilities in its data but does not indicate the type of facility. We were able to identify comparable nursing homes in New Jersey for our nursing home analysis by merging the data with Nursing Home Compare, but we were unable to identify assisted living facilities to compare to those in Connecticut. Rhode Island only reported data for 12 assisted living facilities, which did not allow us to do a robust comparison to Connecticut outcomes. Though we could adjust deaths in nursing homes in Connecticut to match the reporting structure used in New York, this was not possible for assisted living facilities; we did not have access to resident-level data on who was present in assisted living facilities at the outset of the pandemic and at subsequent time periods, similar to what we can measure with the MDS for nursing homes.

APPENDIX B

Supplemental Tables and Figures

This appendix contains supplemental tables and figures from our assessment of facility and resident-level data presented in Chapter III of this report.

Exhibit B.1. Characteristics of Connecticut nursing homes

Characteristic	Percentage
Number of licensed beds	
<25	0.5
25-49	6.1
50-74	15.1
75-99	16.0
100-124	21.7
125-149	16.0
150-174	12.3
175-199	5.2
200-249	3.3
250-299	1.9
300+	1.9
Profit status	
For profit	83.0
Non-profit	17.0
Chain affiliation	
Part of a chain	52.9
Not part of a chain	47.1
Memory care unit	
Has memory care unit	19.5
No memory care unit	80.5
Nursing home star rating: overall	
1 star	9.5
2 stars	20.5
3 stars	13.3
4 stars	27.6
5 stars	29.1
Nursing home star rating: health inspections	
1 star	17.6
2 stars	23.8
3 stars	23.3
4 stars	25.7
5 stars	9.5

Characteristic	Percentage
Nursing home star rating: staffing	
1 star	2.9
2 stars	12.9
3 stars	40.5
4 stars	29.1
5 stars	14.8
Nursing home star rating: quality measures	
1 star	1.0
2 stars	7.1
3 stars	17.6
4 stars	31.4
5 stars	42.9

Source: Mathematica's analysis of Nursing Home Compare and LTCFocus data.

Note: The analyses included 212 licensed nursing homes in the state of Connecticut with data on COVID-19 cases and deaths that could be matched to data reported by Nursing Home Compare. Chain affiliation and presence of a memory care unit were obtained from LTCFocus, and these characteristics were only available for 210 of the 212 nursing homes included in these analyses.

Exhibit B.2. Characteristics of Connecticut assisted living facilities

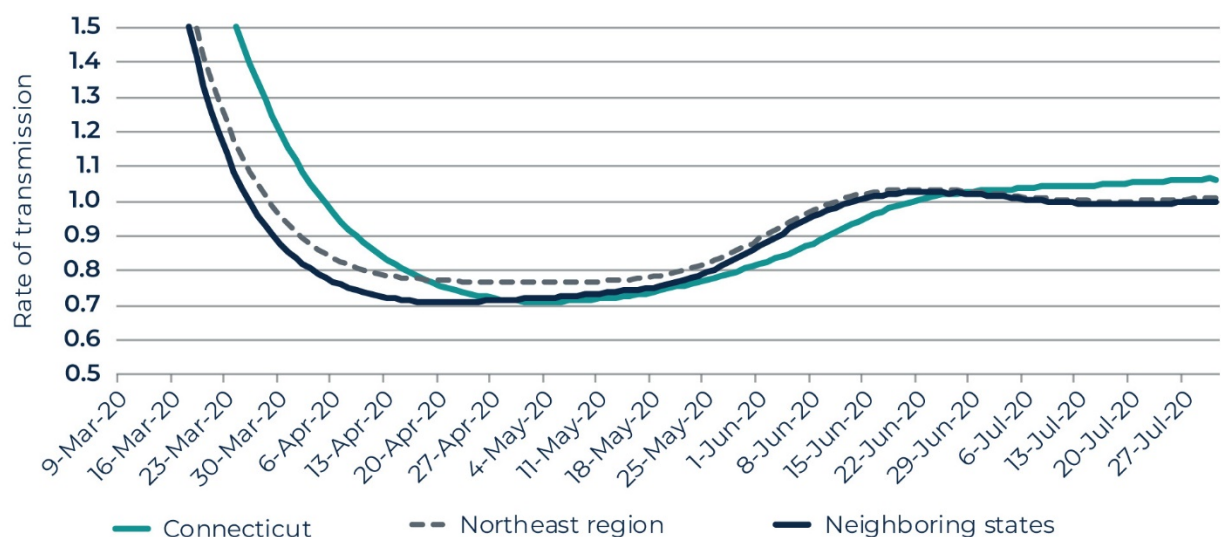
Characteristic	Percentage
Number of licensed beds	
<25	12.8%
25-49	12.8%
50-74	21.8%
75-99	24.8%
100-124	20.3%
125+	7.5%
Joint offerings	
Has joint offerings	26.3%
No joint offerings	73.7%

Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data as reported by assisted living facilities.

Note: This includes 133 assisted living facilities in Connecticut that reported COVID-19 cases or deaths. Joint offerings include those that also have a nursing home, senior independent living, or residential care facility at the same location as reported by assisted living facilities to DPH.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section.

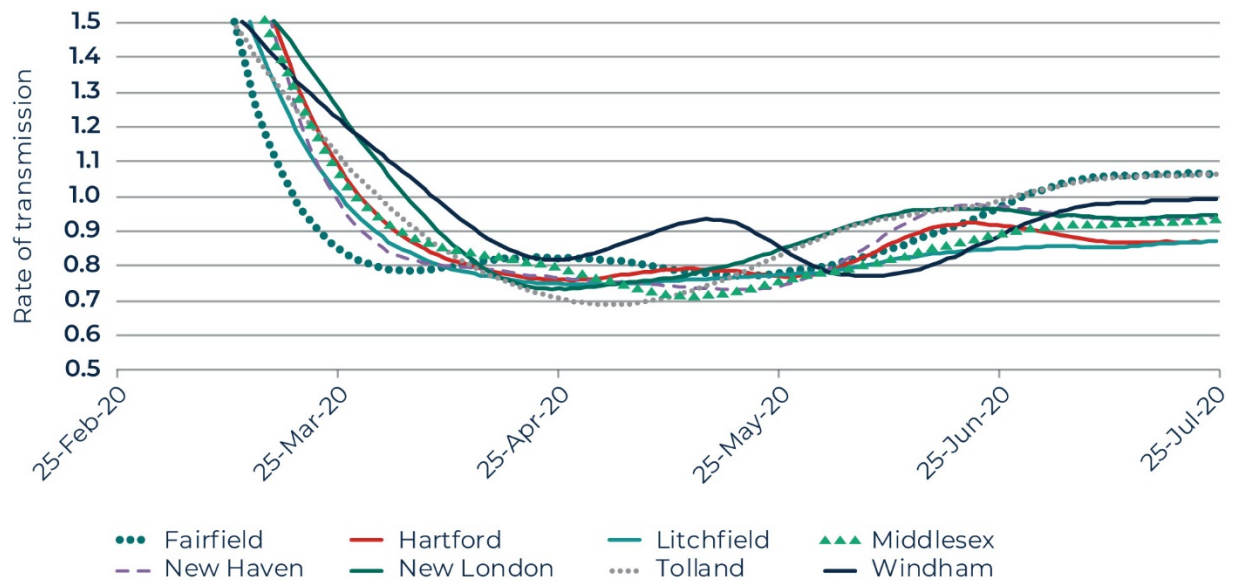
Exhibit B.3. Rates of COVID-19 transmission in Connecticut and neighboring states



Source: Mathematica's analysis of transmission data compiled by rt.live.

Note: Neighboring states include Massachusetts, New Jersey, New York, and Rhode Island. The Northeast region includes these four states plus Delaware, Maine, Maryland, New Hampshire, Pennsylvania, Vermont, and Washington, DC. The rate of transmission is estimated as the number of new people each infected person gets sick. The figure is capped at a rate of transmission of 1.5, so data is not displayed for earlier dates where the rate of transmission was higher than 1.5. Analyses are based on rates of transmission from March 9, 2020 to August 1, 2020.

Exhibit B.4. Rates of COVID-19 transmission in Connecticut by county



Source: Mathematica's analysis of the number of tests and positive tests reported by DPH using the model developed by rt.live.

Note: The rate of transmission is estimated as the number of new people each infected person gets sick. The figure is capped at a rate of transmission of 1.5, so data is not displayed for earlier dates where the rate of transmission was higher than 1.5. Analyses are based on rates of transmission from February 25, 2020 to July 29, 2020.

DPH = Department of Public Health;

Exhibit B.5. Characteristics of Connecticut nursing home residents

Characteristic	All residents			Existing stay residents			New stay residents		
	All	Tested positive	Died	All	Tested positive	Died	All	Tested positive	Died
Number of people	31,827	8,168	2,612	21,808	7,380	2,191	10,019	788	421
Age (years)	78.3	78.3	82.6	79.3	78.6	82.9	76.2	75.9	81.2
Male	38.5	38.4	43.8	36.0	37.8	42.0	44.1	44.7	53.4
Race and ethnicity									
Non-Hispanic White	82.3	78.8	80.7	81.7	78.8	80.2	83.6	78.3	83.6
Non-Hispanic Black	10.8	13.1	12.9	11.0	13.1	13.6	10.3	13.4	9.2
Hispanic	6.0	7.2	5.2	6.3	7.2	5.1	5.4	7.2	5.9
Health conditions									
Cancer diagnosis	10.9	9.3	11.2	9.7	9.0	10.3	13.9	12.4	16.7
Heart/circulation diagnosis	52.7	52.4	57.7	50.8	51.7	57.2	57.2	59.0	60.2
Gastrointestinal diagnosis	0.9	0.5	0.7	0.7	0.5	0.8	1.3	0.7	0.0
Genitourinary diagnosis	3.3	2.8	4.1	2.7	2.5	3.6	4.8	5.6	6.9
Infections	27.5	28.0	29.7	26.4	27.2	28.4	30.3	34.7	37.2
Metabolic diagnosis	5.2	3.2	3.8	3.7	2.7	2.9	8.8	8.4	8.6
Musculoskeletal diagnosis	25.0	31.0	32.4	29.6	32.1	34.4	14.0	20.4	20.5
Neurological diagnosis	7.2	5.1	6.3	5.8	4.5	5.5	10.5	10.6	11.2
Nutritional diagnosis	29.4	36.6	33.4	34.4	38.4	37.0	17.6	20.0	12.1
Psychiatric/mood disorder	4.4	2.9	3.9	3.4	2.6	3.4	6.7	5.7	7.2
Pulmonary diagnosis	7.0	6.5	7.8	6.2	6.1	7.5	8.7	10.3	9.8
Short-stay resident	53.0	30.4	36.2	31.4	23.0	23.9	100.0	100.0	100.0
Received physical therapy	46.6	27.6	30.3	28.3	21.6	21.6	89.9	83.6	81.8
Gets dialysis treatment	2.2	2.6	2.3	1.7	2.2	1.9	3.4	6.5	4.6
Gets cancer treatment	0.9	0.7	0.8	0.7	0.7	0.7	1.5	0.8	0.9
Has any depressive symptoms	51.0	45.3	45.8	48.3	44.4	44.5	57.4	53.9	53.8
Has cognitive impairment	37.3	43.3	54.8	43.1	44.9	57.2	23.4	28.3	40.3
Recent unplanned weight loss	2.7	3.7	4.8	3.7	4.0	5.6	0.1	0.4	0.6
Recent fall	14.6	17.8	20.2	17.4	18.7	21.7	7.7	8.9	11.2
Any pressure ulcer	7.2	4.7	6.5	4.9	3.8	4.8	12.6	13.7	17.3
Has catheter	5.6	4.2	4.4	4.4	3.8	4.2	8.2	8.3	5.8
Anti-psychotic medication	13.5	13.7	14.9	13.5	13.5	14.5	13.4	15.8	17.6
Anti-anxiety medication	16.4	17.1	14.9	16.5	17.3	15.2	16.1	15.8	13.3

Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; Connecticut's Vital Records death data; and MDS data.

Note: All characteristics are percentages unless otherwise noted. Uses nursing home resident assessment data to identify people who lived in a nursing home as of March 9, 2020 (existing stay residents) or were admitted to the nursing home between March 10, 2020 and July 31, 2020 (new stay residents).

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

Exhibit B.6. Characteristics included in feature selection model

Characteristic	Source
Nursing home characteristics	
Town cases per 100,000 residents ^a	Connecticut Department of Public Health
Town deaths per 100,000 residents ^a	Connecticut Department of Public Health
Town median household income	Connecticut Department of Economic and Community Development
Town population	Connecticut Department of Public Health
Nursing home ownership type	Nursing Home Compare
Number of licensed beds	Nursing Home Compare
Overall rating	Nursing Home Compare
Health inspection rating	Nursing Home Compare
Staffing rating	Nursing Home Compare
Quality measure rating	Nursing Home Compare
Total health deficiencies (most recent rating cycle)	Nursing Home Compare
Standard health deficiencies (most recent rating cycle)	Nursing Home Compare
Complaint health deficiencies (most recent rating cycle)	Nursing Home Compare
Health deficiency score (most recent rating cycle)	Nursing Home Compare
Total health score (most recent rating cycle)	Nursing Home Compare
Total weighted health survey score	Nursing Home Compare
Number of facility reported incidents	Nursing Home Compare
Number of substantiated complaints	Nursing Home Compare
Number of fines	Nursing Home Compare
Total amount of fines in dollars	Nursing Home Compare
Number of payment denials	Nursing Home Compare
Total number of penalties	Nursing Home Compare
Continuing care retirement community	Nursing Home Compare
Percent of residents paid with Medicaid	LTCFocus
Percent of residents paid with Medicare	LTCFocus
Average acuity index	LTCFocus
Memory care unit	LTCFocus
Chain affiliation	LTCFocus
Total residents as of 3/9/20	MDS
Share of licensed beds filled as of 3/9/20	Nursing Home Compare, MDS
Resident characteristics (averaged across all residents in each nursing home as of 3/9/2020)	
Male	MDS
Age in years	MDS
Non-white	MDS
Recent unplanned weight loss	MDS
Had a recent fall	MDS
Had a recent pressure ulcer	MDS
Has catheter	MDS

Characteristic	Source
Anti-psychotic medication	MDS
Anti-anxiety medication	MDS
Lost control of bladder	MDS
Had any depressive symptoms	MDS
Cognitive functioning score	MDS
Activity of daily living score	MDS
Short-stay (less than 100 days in nursing home)	MDS
Months in the nursing home (as of 3/9/20)	MDS
Getting dialysis or cancer treatments	MDS
History of wandering	MDS
Gets physical therapy	MDS
Currently has Medicare stay	MDS
Cancer diagnosis	MDS
Heart/circulation diagnosis	MDS
Gastrointestinal diagnosis	MDS
Genitourinary diagnosis	MDS
Infections	MDS
Metabolic diagnosis	MDS
Musculoskeletal diagnosis	MDS
Neurological diagnosis	MDS
Nutritional diagnosis	MDS
Psychiatric/mood disorder	MDS
Pulmonary diagnosis	MDS
Vision diagnosis	MDS
Recently isolated or quarantined	MDS

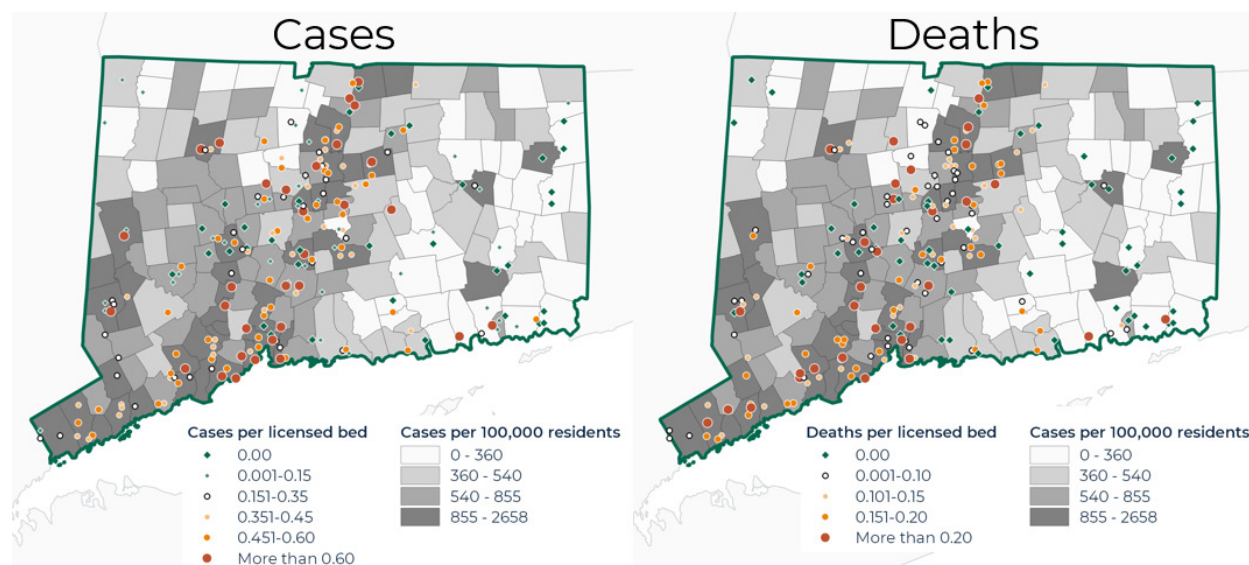
Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; Connecticut's Vital Records death data; and MDS data.

Note: All characteristics are percentages unless otherwise noted. Uses nursing home resident assessment data to identify people who lived in a nursing home as of March 9, 2020 (existing stay residents) or were admitted to the nursing home between March 10, 2020 and July 31, 2020 (new stay residents).

^a Town cases exclude those reported for all nursing homes and assisted living facilities located in that town.

FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

Exhibit B.7. COVID-19 cases and deaths in Connecticut nursing homes compared to cases in the surrounding town



Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system.

Note: The relationship between cases and deaths in nursing homes and cases per 100,000 residents was statistically significant for cases ($p = 0.003$) and death ($p = 0.004$). Deaths include both confirmed and probable deaths attributable to COVID-19. Cases in each town exclude all cases reported in nursing homes and assisted living facilities within that town. Analyses are based on cases and deaths between March 16, 2020 and July 19, 2020.

FLIS = Facility Licensing and Investigations Section.

Exhibit B.8. Facility-level multivariate regression model

Characteristic	Any cases			Cases per licensed bed			Deaths per licensed bed		
	Estimate	Standard error	Standardized coefficient	Estimate	Standard error	Standardized coefficient	Estimate	Standard error	Standardized coefficient
Nursing home characteristics									
Town cases per 100,000 residents ^a	0.013***	0.005	0.214	0.005*	0.003	0.128	0.003***	0.001	0.205
Town median household income	0.003***	0.001	0.228	0.001**	0.001	0.163	0.001***	0.000	0.268
Profit status	-0.055	0.081	-0.054	0.027	0.043	0.040	0.014	0.018	0.056
Chain affiliation	0.099**	0.050	0.133	0.054	0.033	0.109	0.018	0.012	0.098
High health inspection rating	-0.053	0.054	-0.068	-0.040	0.035	-0.076	-0.009	0.013	-0.047
High staffing rating	-0.080	0.062	-0.106	-0.080**	0.039	-0.159	-0.032**	0.014	-0.172
High quality measure rating	0.045	0.061	0.053	0.042	0.037	0.073	0.018	0.015	0.084
Total residents as of 3/9/20	0.002***	0.001	0.194	0.001***	0.000	0.162	0.000**	0.000	0.130
Share of licensed beds filled as of 3/9/20	0.004	0.002	0.104	0.006***	0.001	0.260	0.002***	0.001	0.256
Resident characteristics									
Male	0.006*	0.003	0.189	0.002	0.002	0.109	0.000	0.001	0.041
Activities of daily living score	0.064***	0.018	0.314	0.009	0.011	0.066	0.003	0.005	0.067
Getting dialysis or cancer treatments	0.003	0.007	0.019	0.014**	0.006	0.152	0.004*	0.002	0.114
Had a recent fall	0.001	0.004	0.012	0.001	0.002	0.023	0.000	0.001	0.024
Had a recent pressure ulcer	0.004	0.006	0.041	0.011**	0.005	0.152	0.004**	0.002	0.161
Had any depressive symptoms	-0.002**	0.001	-0.144	-0.001	0.001	-0.087	-0.000*	0.000	-0.108
Lost control of bladder	-0.002	0.003	-0.074	-0.000	0.002	-0.000	0.000	0.001	0.053

Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system, Nursing Home Compare, LTCFocus, MDS data, and Connecticut DPH data on COVID-19.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. Standard errors are robust to heteroskedasticity. Standardized coefficients are based on re-scaling all variables to have a mean of zero and standard deviation of one, and therefore give a sense of the relative magnitudes of each of the characteristics. For binary nursing home characteristics, the coefficient can be interpreted as the difference in outcomes between nursing homes with and without that characteristic. Resident characteristics are based on the mean of all residents living in the nursing home as of March 9, 2020. Therefore, the coefficients can be interpreted as the change in outcomes for a one percent increase in residents with that characteristic (or for activities of daily living, an increase of one in the average score of all residents).

^a Town cases exclude those reported for all nursing homes and assisted living facilities located in that town.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

***/**/* indicate statistical significance at the 1/5/10 percent level.

Exhibit B.9. Bivariate analyses of the relationship between nursing home characteristics and COVID-19 cases and deaths per licensed bed in Connecticut

Characteristic	N	Cases per licensed bed	Deaths per licensed bed
Licensed bed capacity		***	***
<75	46	0.18	0.06
75-99	34	0.31	0.09
100-124	46	0.34	0.11
125-149	34	0.35	0.12
150-199	37	0.44	0.13
200+	15	0.35	0.12
Profit status		***	**
For profit	176	0.34	0.11
Non-profit	36	0.21	0.07
Chain affiliation		***	***
Part of a chain	111	0.37	0.12
Not part of a chain	99	0.26	0.09
Memory care unit			
Has memory care unit	41	0.37	0.12
No memory care unit	169	0.31	0.10
Nursing home star rating: overall		***	**
1 star	20	0.29	0.09
2 stars	43	0.38	0.13
3 stars	28	0.41	0.13
4 stars	58	0.29	0.10
5 stars	61	0.27	0.09
Nursing home star rating: health inspections		**	
1 star	37	0.31	0.09
2 stars	50	0.40	0.14
3 stars	49	0.32	0.09
4 stars	54	0.27	0.09
5 stars	20	0.28	0.10
Nursing home star rating: staffing		***	***
1 star	6	NR	NR
2 stars	27	0.42	0.14
3 stars	85	0.39	0.13
4 stars	61	0.25	0.08
5 stars	31	0.20	0.07

Characteristic	N	Cases per licensed bed	Deaths per licensed bed
Nursing home star rating: quality measures			
1 star	2	NR	NR
2 stars	15	0.20	0.07
3 stars	37	0.33	0.10
4 stars	66	0.32	0.11
5 stars	90	0.34	0.11
Recent complaint		**	**
No recent complaints	64	0.25	0.08
Had a recent complaint	148	0.35	0.11

Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system, and Nursing Home Compare and LTCFocus data.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. Stars in the top row for each characteristic indicate whether there is a statistically significant difference in the outcome by characteristic. For characteristics with two categories, the test compares the outcome between the two groups. For nursing home star ratings, the test compares the outcome for facilities with 1, 2, or 3 stars to facilities with 4 or 5 stars. For licensed bed capacity, the test assesses whether there is a linear relationship between the number of beds and the outcome. Outcomes for groups with fewer than 10 nursing homes are not reported due to the unreliability associated with a small sample size.

FLIS = Facility Licensing and Investigations Section; NR = not reported.

***/**/* indicate statistical significance at the 1/5/10 percent level.

Exhibit B.10. Bivariate regression coefficients from analyses of the relationship between nursing home characteristics and COVID-19 cases and deaths per licensed bed in Connecticut

Characteristic	Cases per licensed bed			Deaths per licensed bed		
	Estimate	Standard error	Standardized coefficient	Estimate	Standard error	Standardized coefficient
Town cases per 100,000 residents ^a	0.007***	0.002	0.161	0.003***	0.001	0.165
Town median household income	0.001	0.001	0.063	0.001***	0.000	0.172
Total residents as of 3/9/20	0.002***	0.000	0.323	0.001***	0.000	0.276
Share of licensed beds filled as of 3/9/20	0.005***	0.001	0.230	0.002***	0.001	0.216
Male	0.005***	0.001	0.250	0.001*	0.000	0.123
Age	-0.009***	0.003	-0.240	-0.001	0.001	-0.075
Non-white	0.004***	0.001	0.255	0.001**	0.000	0.170
Activities of daily living score	-0.029	0.063	-0.033	0.016	0.024	0.047
Cognitive functioning score	-0.008	0.010	-0.057	0.002	0.003	0.044
Getting dialysis or cancer treatments	0.025***	0.009	0.275	0.007**	0.003	0.196
Had a recent fall	-0.003	0.003	-0.079	-0.001	0.001	-0.066
Had a recent pressure ulcer	0.010**	0.004	0.146	0.005***	0.002	0.190
Had any depressive symptoms	-0.001*	0.001	-0.126	-0.000*	0.000	-0.126
Lost control of bladder	-0.005**	0.002	-0.148	-0.001	0.001	-0.074

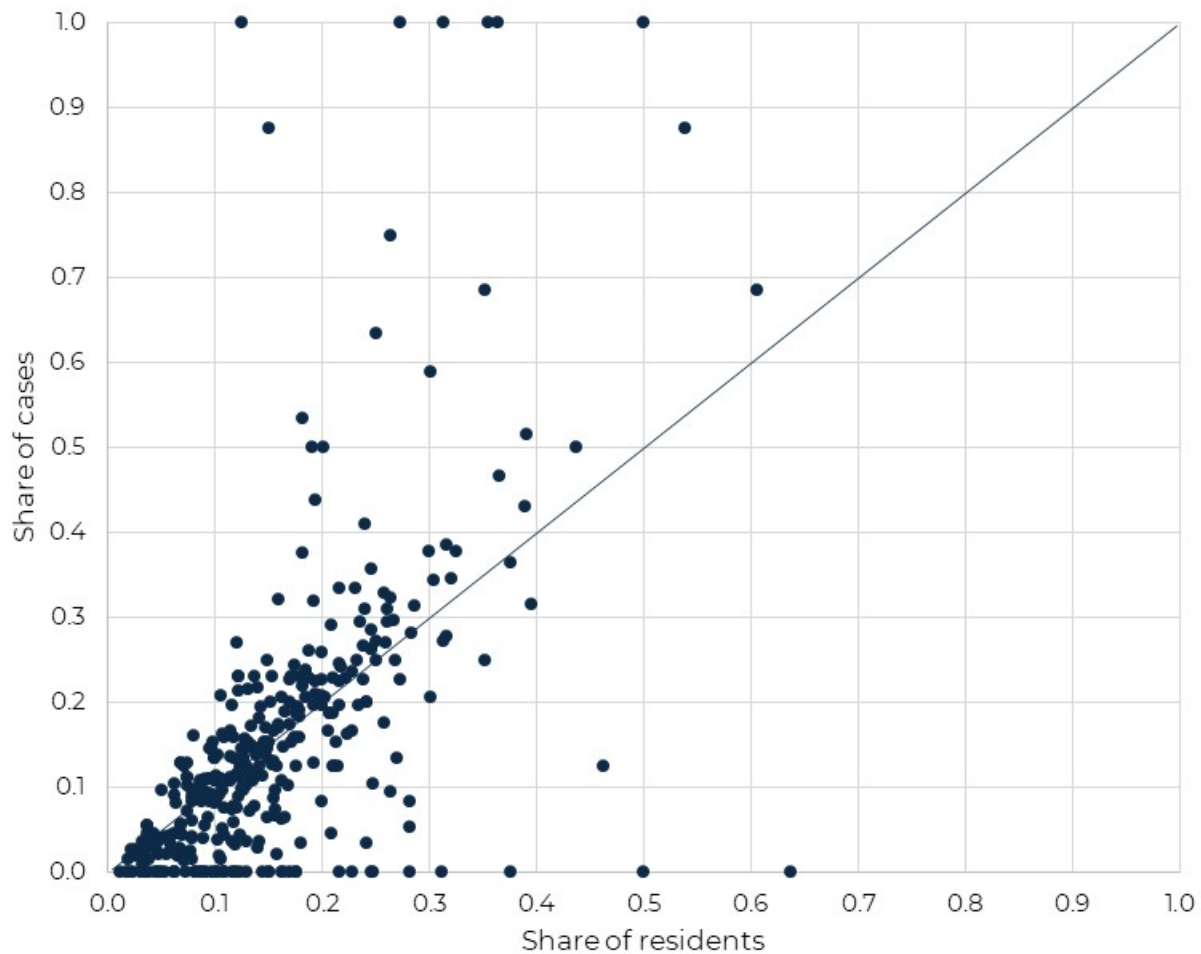
Source: Mathematica's analysis of nursing home reported data included in Connecticut's FLIS system and MDS data.

Note: Deaths include both confirmed and probable deaths attributable to COVID-19. Resident characteristics are based on the average for all residents in the nursing home as of March 9, 2020 using the resident assessment observed most immediately preceding that date. The coefficients can be interpreted as the change in outcomes for a one percent increase in residents with that characteristic (or for age, activities of daily living, and cognitive functioning score, an increase of one in the average for of all residents).

FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

***/**/* indicate statistical significance at the 1/5/10 percent level.

Exhibit B.11. Concentration of COVID-19 cases in wings within nursing homes



Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; and MDS data.

Note: Includes 56 nursing homes with a floor plan that allowed us to identify room numbers associated with each wing and that had non-zero COVID-19 cases (thirteen nursing homes that had a floor plan had zero cases, so were excluded from this graph). Each circle represents a single wing of the facility. We calculated the share of residents by dividing the number of residents living in that wing by the total number of residents living in the facility as of March 9, 2020. DPH provided floor plans for Connecticut nursing homes to Mathematica.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Datasets.

Exhibit B.12. Individual-level multivariate regression model

Characteristic	Cases		Deaths	
	Estimate	Standard error	Estimate	Standard error
Weight	0.000***	0.000	0.000**	0.000
Recent unplanned weight loss	0.003	0.018	0.036**	0.014
Had a recent fall	0.020**	0.009	0.024***	0.007
Had a recent pressure ulcer	-0.022	0.015	0.006	0.012
Has catheter	-0.019	0.014	-0.008	0.011
Anti-psychotic medication	0.015	0.009	0.004	0.007
Anti-anxiety medication	-0.002	0.008	-0.000	0.006
Lost control of bladder	0.027***	0.009	0.013**	0.006
Has any depressive symptoms	-0.005	0.008	0.004	0.005
Cognitive functioning score	0.006	0.004	0.018***	0.003
Activity of daily living score	-0.003***	0.001	0.002**	0.001
Short-stay (less than 100 days in nursing home)	-0.085***	0.013	-0.008	0.007
Months in the nursing home (as of 3/9/20)	0.000	0.000	0.000**	0.000
Gets dialysis treatment	0.065**	0.028	0.015	0.016
Gets cancer treatment	-0.020	0.032	0.015	0.027
History of wandering	0.041**	0.018	0.010	0.014
Gets physical therapy	-0.045***	0.011	-0.014**	0.006
Currently has Medicare stay	-0.065***	0.015	-0.023**	0.009
Age in years	0.001***	0.000	0.003***	0.000
Male	0.006	0.008	0.045***	0.006
Race is non-white (versus white)	-0.003	0.010	-0.008	0.007
Cancer diagnosis	-0.002	0.011	0.009	0.008
Heart/circulation diagnosis	0.024***	0.006	0.015***	0.005
Gastrointestinal diagnosis	0.013	0.039	0.049	0.033
Genitourinary diagnosis	-0.006	0.025	0.017	0.015
Infections	0.008	0.020	0.033**	0.015
Metabolic diagnosis	0.007	0.007	0.013***	0.005
Musculoskeletal diagnosis	-0.024	0.015	-0.009	0.012
Neurological diagnosis	0.012	0.008	-0.003	0.006
Nutritional diagnosis	-0.009	0.013	-0.009	0.009
Psychiatric/mood disorder	0.022***	0.008	0.015***	0.005
Pulmonary diagnosis	-0.024	0.017	0.025*	0.013
Vision diagnosis	0.000	0.014	0.015	0.010

Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; Connecticut's Vital Records death data; and MDS data.

Note: Only includes people who lived in a nursing home as of March 9, 2020. Characteristics are based on the resident assessment observed immediately preceding March 9, 2020. Individual-level data indicates if the person tested positive for the disease or died and have COVID-19 listed as a cause of death by July 31, 2020. The regression model includes a nursing home fixed effect. For binary characteristics, the coefficient can be interpreted as the difference in the probability of having COVID-19 or dying from COVID-19 for people who have that characteristic relative to the people who do not. For non-binary characteristics, the coefficient can be interpreted as the increased probability of having COVID-19 or dying from COVID-19 associated with an increase of one unit in the characteristic (e.g., a one-year increase in age or an increased score of one in activities of daily living).

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

***/**/* indicate statistical significance at the 1/5/10 percent level.

Exhibit B.13. Wing-level multivariate regression model

Characteristic	Cases		Deaths	
	Estimate	Standard error	Estimate	Standard error
Weight	0.084	0.067	0.039	0.038
Recent unplanned weight loss	0.261*	0.143	0.118	0.125
Had a recent fall	-0.026	0.079	-0.022	0.046
Had a recent pressure ulcer	0.122	0.155	-0.009	0.075
Has catheter	0.125	0.134	-0.002	0.093
Anti-psychotic medication	0.049	0.092	0.021	0.052
Anti-anxiety medication	-0.141	0.091	0.054	0.048
Lost control of bladder	0.151*	0.090	0.053	0.047
Has any depressive symptoms	-0.021	0.045	0.008	0.032
Cognitive functioning score	-3.088	3.398	0.311	1.587
Activity of daily living score	-1.022	0.749	0.029	0.439
Short-stay (less than 100 days in nursing home)	-0.200***	0.071	0.083**	0.037
Months in the nursing home (as of 3/9/20)	0.127	0.113	0.159**	0.075
Gets dialysis treatment	0.359*	0.188	0.096	0.155
Gets cancer treatment	-0.194	0.359	0.228	0.224
History of wandering	0.241	0.199	0.075	0.091
Gets physical therapy	0.022	0.075	-0.066*	0.039
Currently has Medicare stay	-0.050	0.119	-0.018	0.052
Age in years	0.008	0.318	0.397	0.238
Male	-0.057	0.057	0.054**	0.024
Race is non-white (versus white)	0.034	0.085	0.052	0.036
Cancer diagnosis	-0.107	0.087	0.020	0.067
Heart/circulation diagnosis	-0.016	0.060	-0.038	0.036
Gastrointestinal diagnosis	-0.544*	0.292	0.041	0.151
Genitourinary diagnosis	0.046	0.161	0.021	0.090
Infections	0.263*	0.150	0.018	0.065
Metabolic diagnosis	-0.078	0.080	0.049	0.035
Musculoskeletal diagnosis	-0.072	0.118	-0.016	0.060
Neurological diagnosis	0.171***	0.062	0.030	0.032
Nutritional diagnosis	-0.125	0.129	0.086	0.055
Psychiatric/mood disorder	0.044	0.074	0.078*	0.044
Pulmonary diagnosis	-0.152	0.135	0.027	0.078
Vision diagnosis	-0.086	0.155	-0.144*	0.075

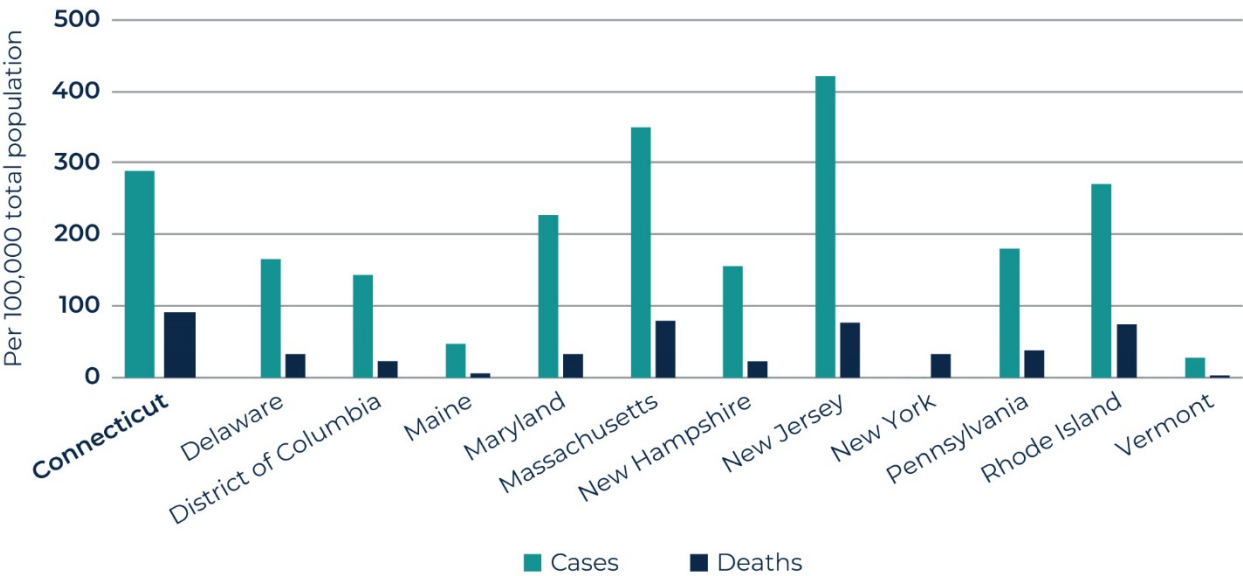
Source: Mathematica's analysis of Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22; Connecticut's Vital Records death data; and MDS data.

Note: Only includes people who lived in a nursing home as of March 9, 2020. Characteristics are based on the resident assessment observed immediately preceding March 9, 2020. Aggregates the individual-level data for 69 nursing homes with a usable floor plan. Outcomes are the share of residents who tested positive or who died from COVID-19, while the characteristics are the averages for residents who lived in that wing as of March 9, 2020. Individual-level data indicates if the person tested positive for the disease or died and have COVID-19 listed as a cause of death by July 31, 2020. The regression model includes a nursing home fixed effect. For binary characteristics, the coefficient can be interpreted as the change in the percentage of residents testing positive for COVID-19 of dying from COVID-19 given an increase of one percent of people in that wing with the characteristic. For non-binary characteristics, the coefficient can be interpreted as the change in the percentage of residents testing positive for COVID-19 of dying from COVID-19 given an increase of one unit in the average characteristic among all residents in that wing (e.g., a one-year increase in age or an increased score of one in activities of daily living).

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section; MDS = Minimum Data Set.

***/**/* indicate statistical significance at the 1/5/10 percent level.

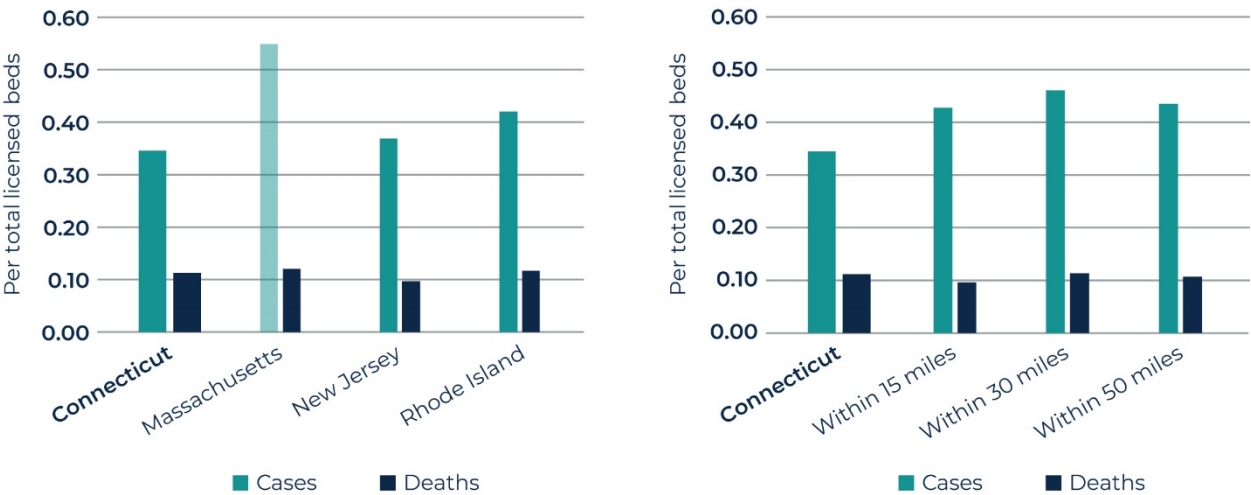
Exhibit B.14. Total COVID-19 cases and deaths in long-term care facilities per 100,000 total population in Northeast states



Source: Mathematica’s analysis of aggregate long-term care facility data across states reported by the New York Times combined with Census Bureau population estimates.

Note: Analyses are based on cases and deaths in nursing homes reported through the end of July 2020.

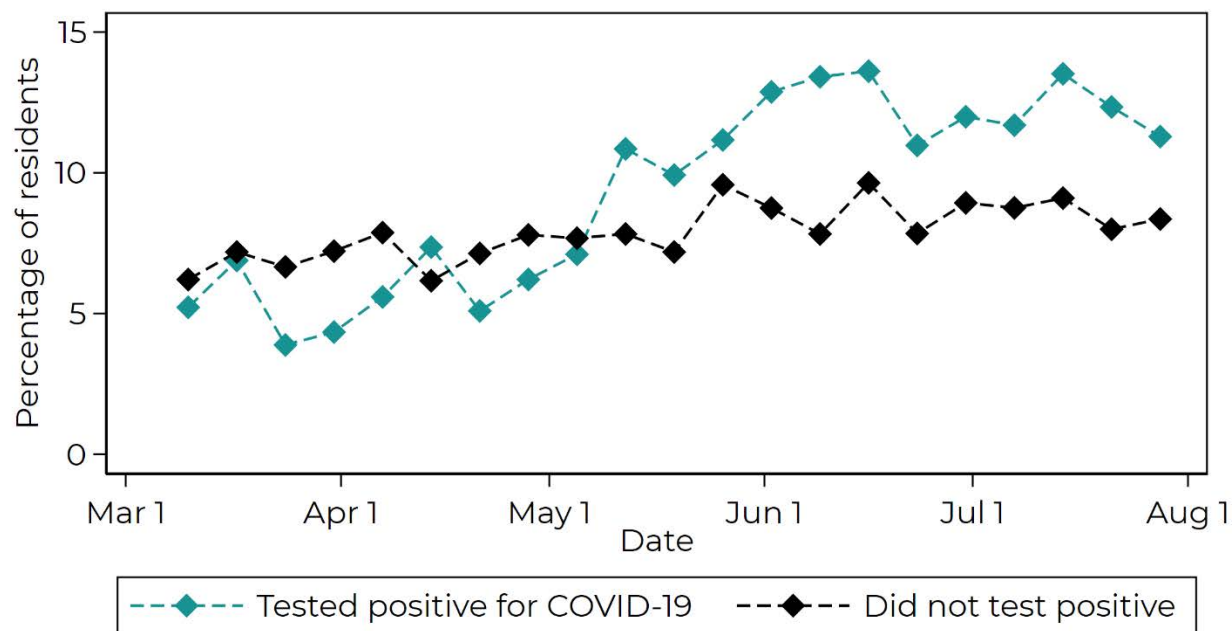
Exhibit B.15. Total nursing home COVID-19 cases and deaths per licensed bed in Connecticut and nearby states and nearby nursing homes



Source: Mathematica’s analysis of state-reported data by individual nursing home matched to Nursing Home Compare and LTCFocus data.

Note: Analyses are based on cases and deaths in nursing homes reported by July 31, 2020. Massachusetts reported cases in nursing homes in ranges; we used the number of deaths to impute the number of cases, resulting in total cases that approximately matched the total nursing home cases reported across the state. Therefore, we shade the bar for Massachusetts to be more transparent to indicate the potential unreliability of this number. Rhode Island and New Jersey do not report information on nursing homes that had zero cases or deaths; the licensed nursing homes not included in the state’s data are assumed to have zero cases and zero deaths. Our analysis of nearby nursing homes excludes New York because of data reliability concerns.

Exhibit B.16. Unplanned substantial weight loss, by COVID-19 status

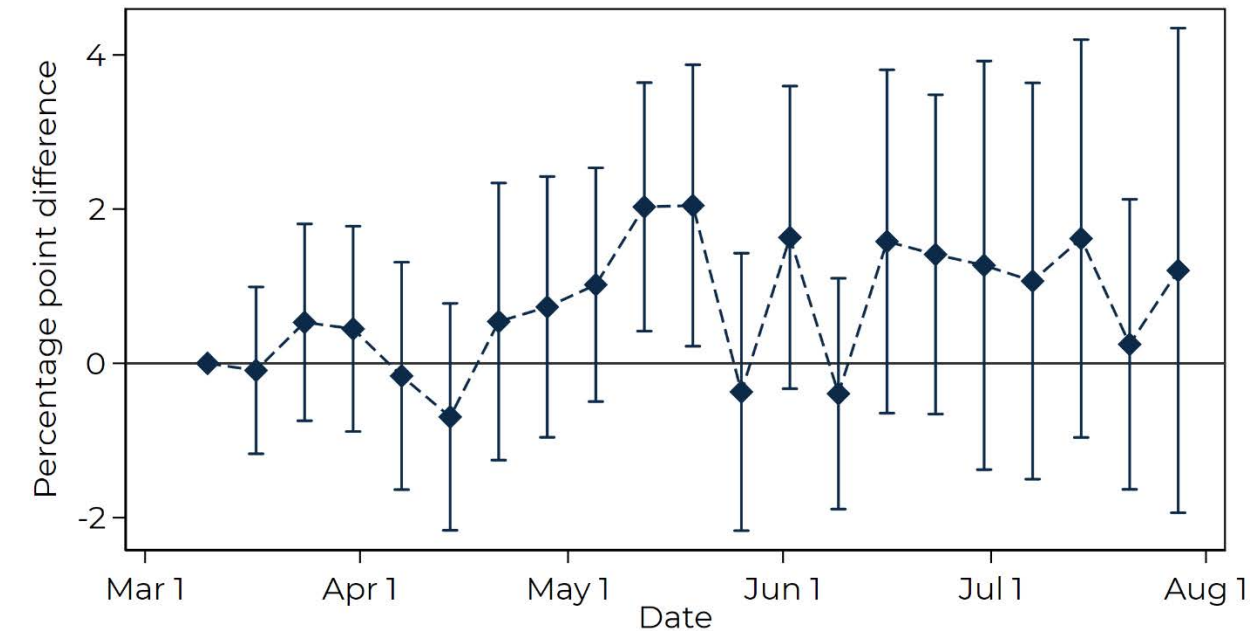


Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents and Connecticut DPH FLIS portal on individual resident data, as reported by nursing homes, by July 22.

Note: Unplanned substantial weight loss is defined as someone having lost 5 percent or more in the last month or 10 percent or more in the last six months. This is based on item K0300 from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the percentage of residents observed that week with unplanned substantial weight loss, reporting separately by their final COVID-19 status.

DPH = Department of Public Health; FLIS = Facility Licensing and Investigations Section.

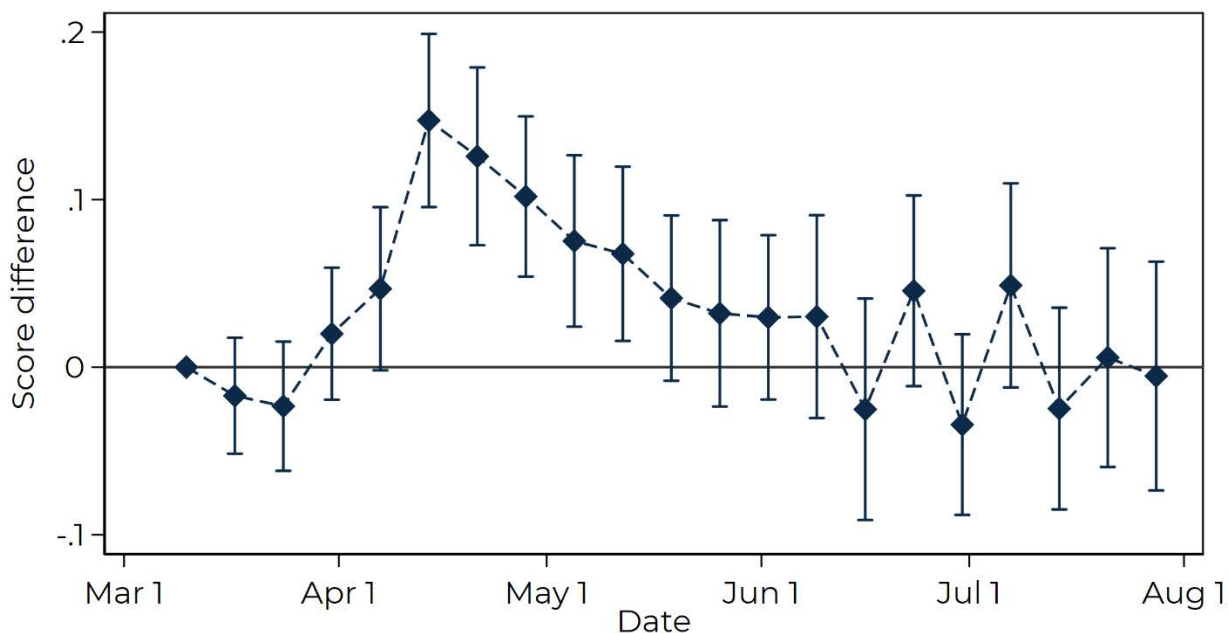
Exhibit B.17. Changes in severe pressure ulcers among Connecticut nursing home residents, March through July



Source: Mathematica’s analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: This is based on item M0300 from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9, 2020, and includes all subsequent observations. It also controls for patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level.

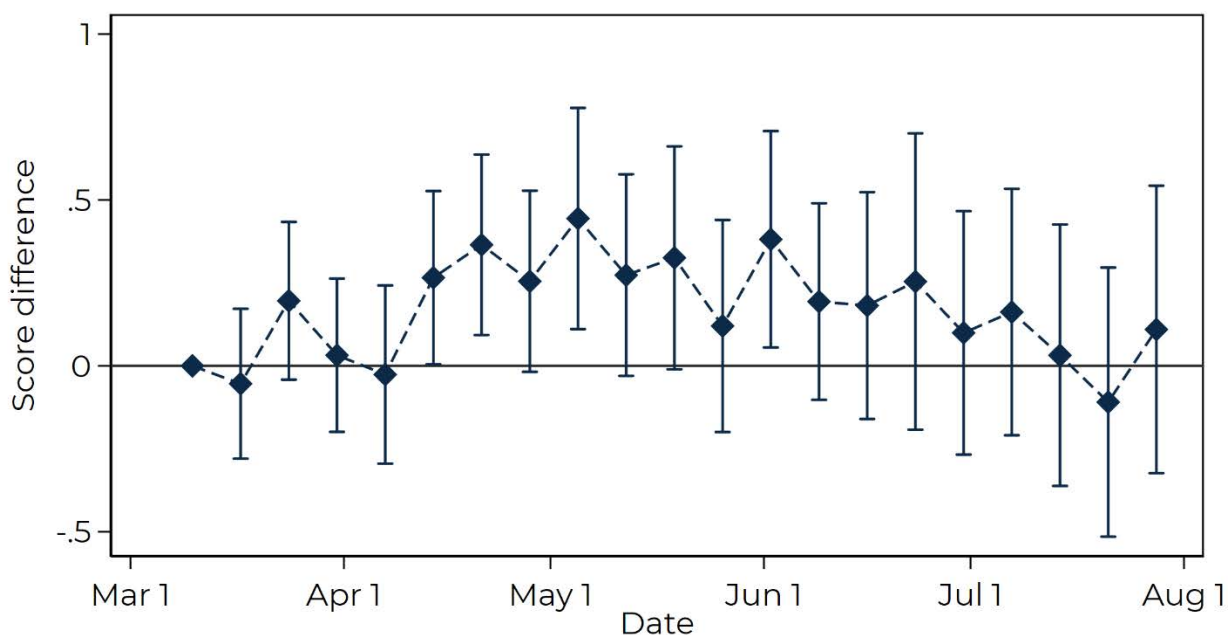
Exhibit B.18. Changes in cognitive functioning scale among Connecticut nursing home residents, March through July



Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: This is based on item C0500 from the Minimum Data Set Version 3.0 resident assessment form for those who could complete the Brief Interview for Mental Status, and from an array of items used to create the Cognitive Performance Scale (Morris et al. 1994) for those who could not complete the interview on their own. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9, 2020, and includes all subsequent observations. It also controls for patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level.

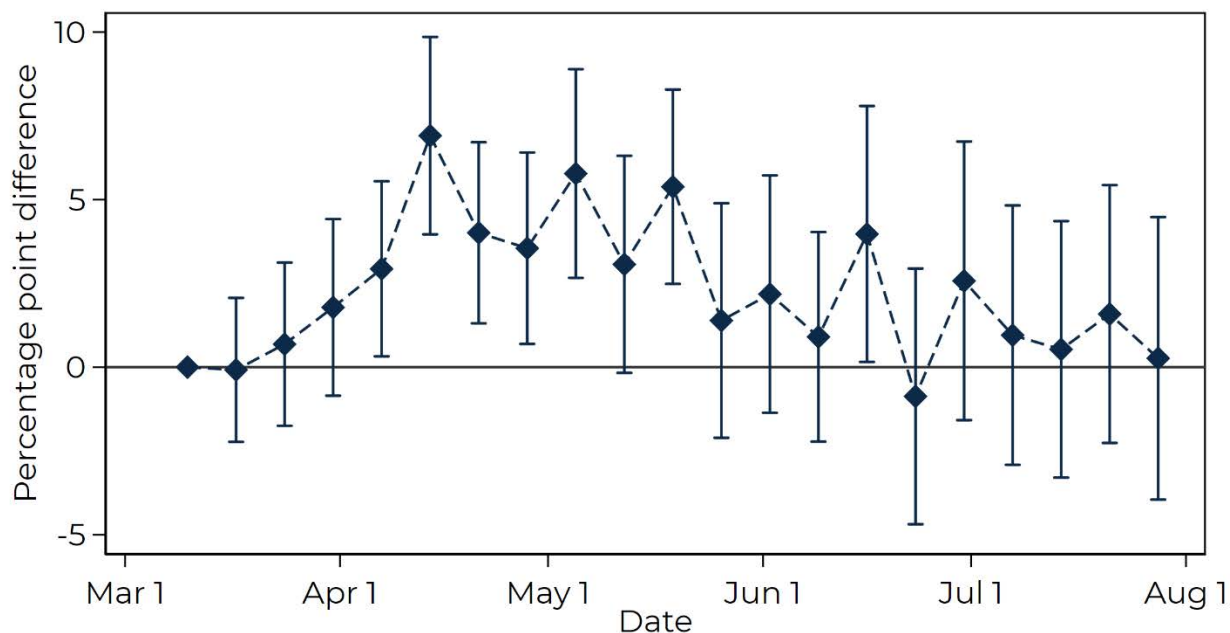
Exhibit B.19. Changes in activities of daily living score among Connecticut nursing home residents, March through July



Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: This is based on items G0110A, G0110B, G0110H, and G0110I from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9, 2020, and includes all subsequent observations. It also controls for patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level.

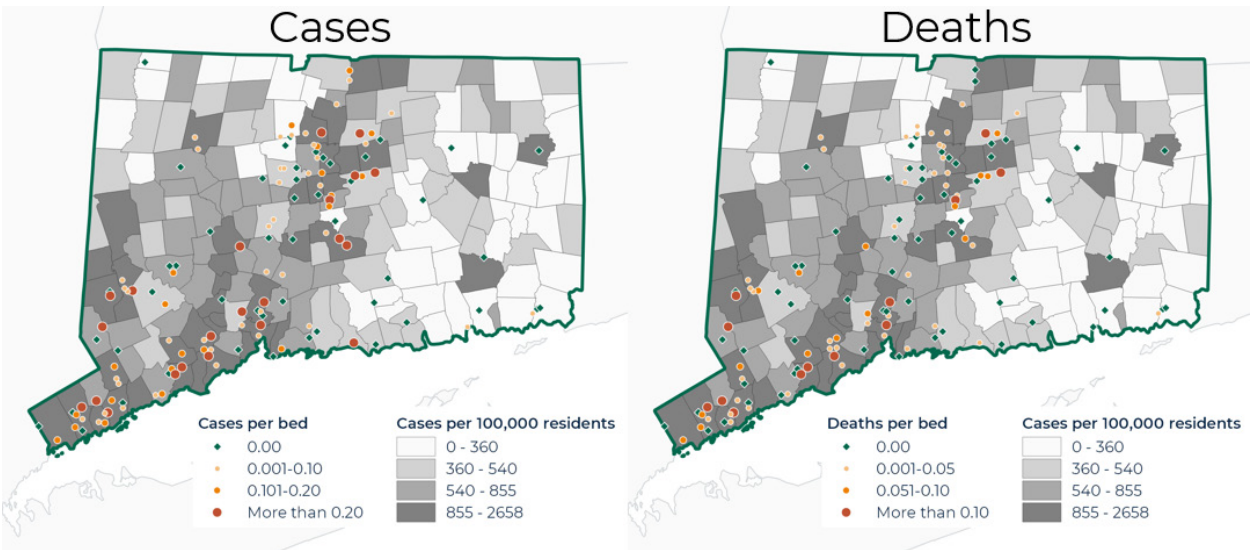
Exhibit B.20. Changes in episodes of incontinence among Connecticut nursing home residents, March through July



Source: Mathematica's analysis of nursing home assessment data from Minimum Data Set assessments of Connecticut nursing home residents.

Note: This is based on items H0300 and H0400 from the Minimum Data Set Version 3.0 resident assessment form. Each point represents the difference in average outcomes for that week relative to outcomes observed in the week of March 10, 2020. The sample includes people who lived in the nursing home as of March 9, 2020, and includes all subsequent observations. It also controls for patterns from 2017 to 2019 using the same approach, and reweights the sample to ensure observable characteristics are similar for all time periods. Bars represent the 95 percent confidence interval accounting for standard errors clustered at the nursing home level.

Exhibit B.21. Total COVID-19 cases and deaths in Connecticut assisted living facilities compared to cases in the surrounding town

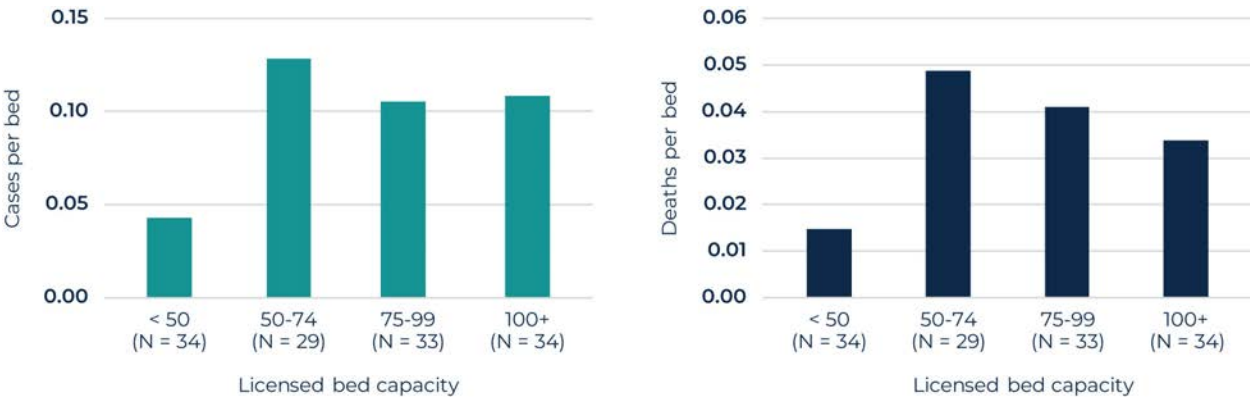


Source: Mathematica’s analysis of assisted-living reported data included in Connecticut’s FLIS system.

Note: The relationship was highly statistically significant for cases ($p = 0.035$) and deaths ($p = 0.023$). Deaths include both confirmed and probable deaths attributable to COVID-19. Cases in each town exclude all cases reported in nursing homes and assisted living facilities within that town.

FLIS = Facility Licensing and Investigations Section.

Exhibit B.22. Total COVID-19 cases and deaths in Connecticut assisted living facilities by size of facility



Source: Mathematica’s analysis of assisted-living reported data included in Connecticut’s FLIS system.

Note: The relationship is significant for both cases per bed ($p = 0.018$) and deaths per bed ($p = 0.049$). Deaths include both confirmed and probable deaths attributable to COVID-19. The size of the facility was missing for 28 assisted living facilities; in these instances, we used the current census as the size. Some facilities also might have reported their current census rather than the potential size as the size.

FLIS = Facility Licensing and Investigations Section.

APPENDIX C

Timelines

Federal-Level Timeline of Policy Changes and Guidance

January 2020

January 31, 2020: The U.S. Department of Health and Human Services [determines](#) a public health emergency exists and has existed since January 27, 2020.

March 2020

March 6, 2020: President Donald Trump [signs an \\$8.3 billion spending package](#), the Coronavirus Preparedness and Response Supplemental Appropriations Act of 2020 (CARES Act) (COVID-19 Package #1), which provides supplemental funding for the Department of Health and Human Services, the State Department, and the Small Business Administration to respond to the coronavirus outbreak.

March 8, 2020: The Centers for Disease Control and Prevention issues [guidance](#) prioritizing testing of symptomatic people who are hospitalized, in a high risk group, or who had close contact with a suspected or confirmed COVID-19 case.

March 13, 2020: The [president declares a national emergency](#).

March 13, 2020: The Centers for Medicare & Medicaid Services [announces the activation of blanket 1135 waivers](#). Blanket waivers activate to ease certain requirements for providers to respond to COVID-19, including providing flexibility and relief for state Medicaid agencies via 1135 waivers and temporary suspension of non-emergency survey inspections (allowing for a focus on infectious disease and other most serious health and safety threats).

March 13, 2020: The Centers for Medicare & Medicaid Services releases memo [QSO-20-14-NH](#), which directs nursing homes to restrict all visitors, including non-essential workers. The memo provides additional guidance to help nursing homes improve infection control and prevention practices to prevent transmission of COVID-19.

March 15, 2020: The Centers for Disease Control and Prevention issues [guidance](#) recommending that gatherings of 50 or more people should be canceled for the next eight weeks.

March 18, 2020: The federal government enacts the [Families First Coronavirus Response Act](#) (COVID-19 Package #2), which included paid sick leave, insurance coverage of coronavirus testing, nutrition assistance, and unemployment benefits

March 23, 2020: The Centers for Medicare & Medicaid Services releases memo [QSO-20-20-All](#), which announces changes to the nursing home inspection process, including a new COVID-19 infection control survey. This guidance establishes a three-week time period during which only complaints, targeted infection control surveys, and self-assessments would be conducted. It stipulates that surveyors should not enter facilities if they do not have the appropriate personal protective equipment to do so.

March 24, 2020: The Federal Emergency Management Agency announces [use of Defense Production Act](#) to acquire 60,000 coronavirus testing kits.

March 27, 2020: The [president signs the CARES Act \(COVID-19 Package #3\) into law](#), which includes direct payments to Americans, extended unemployment benefits, and more than \$140 billion to support

the U.S. health system, including funding for personal protective equipment, testing supplies, and workforce supports, as well as funding to states.

April 2020

April 3, 2020: The Centers for Disease Control and Prevention [issues a recommendation](#) encouraging the use of a cloth face covering when out in public.

April 6, 2020: The Centers for Medicare & Medicaid Services publishes [Interim Final Rule I](#), regulations retrospectively effective March 31, 2020. The rule changes payment policy to allow Medicare-certified providers flexibility to use remote communications technology (telehealth) to minimize COVID-19 exposure risks.

April 19, 2020: The Centers for Medicare & Medicaid Services releases memo [QSO-20-26](#), Upcoming Requirements for Notification of Confirmed COVID-19 (or COVID-19 Persons under Investigation) Among Residents and Staff in Nursing Homes, summarizing new facility reporting requirements that would soon be released through rulemaking.

April 21, 2020: The U.S. Department of Health and Human Services [renews](#) determination that a public health emergency exists and has existed since January 27, 2020.

April 23, 2020: The U.S. Department of Health and Human Services announces [funding to states](#) through the CARES Act; Connecticut will receive \$20,252,520.70 total funding.

April 27, 2020: The Trump Administration [releases](#) a testing blueprint for “[Opening Up America Again](#),” outlining roles of federal government, states, and private sector.

April 30, 2020: The Centers for Medicare & Medicaid Services and President Trump announce the formation of the Coronavirus [Commission](#) for Safety and Quality in Nursing Homes that will conduct a comprehensive assessment to help inform immediate and future responses to COVID-19 in nursing homes.

April 30, 2020: The Federal Emergency Management Agency announces (Release No. HQ-20-126) it is coordinating [two shipments](#) totaling a 14-day supply of personal protective equipment to nearly 15,000 nursing homes across the U.S.

May 2020

May 6, 2020: The Centers for Medicare & Medicaid Services publishes [interim final rule/QSO-20-29-NH](#), Updating Requirements for Notification of Confirmed and Suspected COVID-19 Cases Among Residents and Staff in Nursing Homes, which requires nursing homes to report COVID-19 facility data to the Centers for Disease Control and Prevention, their residents, and their residents’ family members and representatives.

May 8, 2020: The Centers for Disease Control and Prevention shares the Infection Prevention and Control Assessment Tool ([ICAR](#)) for Nursing Homes Preparing for COVID-19, provides guidance for nursing homes and assisted living facilities on topics including visitor restrictions; education, monitoring, and screening of staff; education, monitoring, and screening of residents; ensuring availability of personal protective equipment and other supplies; ensuring adherence to infection prevention and control practices; and communicating with the health department and other health care facilities.

May 11, 2020: The Food and Drug Administration [issues](#) guidance, effective immediately, providing policy to accelerate COVID-19 testing for the duration of the public health emergency.

May 11, 2020: In a [call with state governors](#), Vice President Mike Pence states that the federal government recommends states test all nursing home staff and residents over the next two weeks.

May 12, 2020: The Centers for Disease Control and Prevention issues [guidance](#) on infection control processes for memory care units in long-term care facilities (for example, considerations of potential risks and benefits of moving residents out of the memory care unit to a designated COVID-19 care unit).

May 13, 2020: The Centers for Medicare & Medicaid Services [publishes](#) the first version of the Nursing Homes Best Practices Toolkit, a resource cataloging innovative practices on a variety of topics key to nursing home operations and infection control collected from states, provider associations, and other stakeholders.

May 15, 2020: President Trump announces the creation of [Operation Warp Speed](#), an administration task force meant to help develop a coronavirus vaccine.

May 18, 2020: The Centers for Medicare & Medicaid Services issues guidance memo [QSO-20-30-NH](#), Nursing Home Reopening Recommendations for State and Local Officials, which establishes three phases of reopening and included general and recommendations specific to phases one to three regarding (1) the criteria for relaxing certain restrictions, (2) visitation and service considerations, and (3) types of surveys conducted.

May 22, 2020: The U.S. Department of Health and Human Services announces a [~\\$4.9 billion distribution to nursing facilities](#) impacted by COVID-19. The department will distribute relief funds to skilled nursing facilities on fixed and variable bases; each facility receives a fixed \$50,000 distribution and then an additional \$2,500 per certified bed.

May 29, 2020: The Centers for Medicare & Medicaid Services updates [Interim U.S. Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to COVID-19](#) (not specific to long-term care or nursing homes).

June 2020

June 2020: The U.S. Department of Health and Human Services' Office of the Inspector General [rolls out](#) two long-term care investigations: (1) a study focused on the overall industry response to the COVID-19 pandemic and (2) an evaluation study of the ongoing federal effort to compile comprehensive data on COVID-19 deaths and infections in nursing facilities.

June 1, 2020: The Trump Administration [announces](#) enhanced enforcement activities based on nursing home COVID-19 data and inspection results. It notes that states that had not completed 100 percent of focused infection control surveys for their nursing homes by July 31, 2020, would be required to submit a corrective action plan to the Centers for Medicare & Medicaid Services and be subject to potential reductions to their CARE Act funding.

June 1, 2020: The Centers for Medicare & Medicaid Services and the Centers for Disease Control and Prevention issue [a joint letter](#) to governors. The letter outlines the importance of completing infection control surveys and reporting COVID-19 nursing facility data (including cases and deaths) to the recently implemented nationwide COVID-19 surveillance system via the Centers for Disease Control and

Prevention’s National Healthcare Safety Network for America’s Medicare and Medicaid-certified nursing homes. The letter describes technical assistance to states being provided by Centers for Disease Control and Prevention consultants and by Quality Improvement Organizations, notes that the Centers for Medicare & Medicaid Services has tied survey funding to State Survey Agency performance and completion of infection control surveys, and urges states to create a comprehensive testing plan and submit the plan to the Centers for Medicare & Medicaid Services.

June 4, 2020: The Centers for Medicare & Medicaid Services posts the [first set of COVID-19 nursing home data](#) and results from targeted inspections conducted by the agency since March 4, 2020, linked on [Nursing Home Compare](#).

June 19, 2020: The Centers for Medicare & Medicaid Services announces the Membership of Independent Coronavirus Commission on Safety and Quality in Nursing Homes. [Commission members](#) will conduct a comprehensive assessment of the overall response to the COVID-19 pandemic in nursing homes. Commission recommendations will be included in a final report to be released in fall 2020.

June 23, 2020: The Centers for Medicare & Medicaid Services releases a set of [frequently asked questions](#) on nursing home visitation that covers topics such as considerations before reopening and clarification the definition of “compassion care situations.”

June 25, 2020: The Centers for Disease Control and Prevention updates its [Preparing for COVID-19 in Nursing Homes](#) webpage. Changes to guidance include tiered recommendations to address nursing homes in different phases of COVID-19 response, a new recommendation to assign an individual to manage the facility’s infection control program, additional guidance about new requirements for nursing homes to report to the National Healthcare Safety Network, and a recommendation to create a plan for testing residents and health care personnel for COVID-19.

July 2020

July 1, 2020: The Centers for Disease Control and Prevention releases updated [Testing Guidelines for Nursing Homes](#).

July 9, 2020: The Centers for Medicare & Medicaid Services shares the [video](#) Five Things to Know About Nursing Homes During COVID-19, reiterating federal actions and recommendations in response to COVID-19.

July 10, 2020: The Centers for Medicare & Medicaid Services announces a [targeted approach](#) to provide additional resources to nursing homes in COVID-19 hotspot areas. It plans to deploy Quality Improvement Organizations to provide immediate assistance and implement an enhanced survey process tailored to meet specific concerns of hotspot areas and coordination among federal, state, and local efforts to leverage all available resources to the facilities

July 10, 2020: In an updated [COVID-19 Guidance for Hospital Reporting and FAQs document](#), the Trump Administration and the U.S. Department of Health and Human Services direct hospitals to report COVID-19 data to a central departmental database in efforts to streamline real-time data gathering and assist the White House task force in allocating resources; hospitals will no longer report data to the Centers for Disease Control and Prevention.

July 14, 2020: The Centers for Medicare & Medicaid Services and the U.S. Department of Health and Human Services [announce](#) COVID-19 point-of-care testing kits will be sent to nursing homes. Nursing

homes would receive devices in an order ranked by the administrator of the Centers for Medicare & Medicaid Services and her team. Point-of-care tests are described as rapid on the spot and can test 20 people per hour.

July 16, 2020: The Centers for Medicare & Medicaid Services and Quality Improvement Organization Program hold a [webcast](#) called Establishing an Infection Prevention Program in a Nursing Home, With an Emphasis on COVID-19.

July 17, 2020: The administrator of the Centers for Medicare & Medicaid Services holds a [webcast](#) called COVID-19: Lessons from the Front Lines Call — July 17 with the commissioner of the Food and Drug Administration and the White House Coronavirus Task Force. The webcast urges physicians and other clinicians to share experiences, ideas, strategies, and insight related to COVID-19 response as well as to ask questions.

July 17, 2020: The Federal Emergency Management Agency shares [COVID-19 Best Practice Information: Considerations for People with Disabilities](#), addressing several areas including public assistance from the agency, technology, and COVID-19 testing. The document shares areas of improvement and mitigation actions related to nursing homes, assisted living, and group homes:

1. The challenge of instituting infection disease prevention protocols because of limited access to personal protective equipment and ventilators
 - Mitigating action: The Centers for Disease Control and Prevention guidance documents for nursing home to ensure safety of patients and staff
2. Resident isolation from families and support networks
 - Mitigating action: Use technological solutions to interact with loved ones
3. Barriers people with disabilities might face transitioning out of nursing homes and assistance care facilities because of limited staff and house for in-home care
 - Mitigating action: Find government and local disability program and services
- The Federal Emergency Management Agency identifies a potential best practice: The state of Alaska developed and published guidance to support people with disabilities and their caregivers and family members. Specifically, resources on the page address assisting people with disabilities and face coverings.

July 22, 2020: The Centers for Medicare & Medicaid Services and the Trump Administration [announce](#) new resources to protect nursing home residents against COVID-19, including a provider relief fund to long-term care facilities such as nursing homes.

- New funding: The U.S. Department of Health and Human Services will devote \$5 billion to the Provider Relief Fund under the CARES Act to long-term care facilities and nursing homes. To receive funding, nursing homes must participate in Nursing Home COVID-19 Training.
- Enhanced testing: The Centers for Medicare & Medicaid Services will begin requiring, instead of recommending, that all nursing homes in states with a 5-percent or greater positivity rate test all nursing home staff each week. More than 15,000 testing devices will be deployed over the next few months; 600 devices will be shipped this week.

- Technical assistance and support: The Centers for Medicare & Medicaid Services reports deploying technical assistance and education efforts in 18 nursing homes in Illinois, Florida, Louisiana, Ohio, Pennsylvania, and Texas from July 18 to July 20.
- Weekly data on high-risk nursing homes: In addition to collecting data from all nursing homes weekly, the Centers for Medicare & Medicaid Services will release a list of nursing homes with an increase in cases that it will send to states each week.

July 23, 2020: The U.S. Department of Health and Human Services [renews](#) determination that a public health emergency exists and has existed since January 27, 2020.

July 23, 2020: The Centers for Disease Control and Prevention updates its [Considerations for Retirement Communities and Independent Living Facilities](#) COVID-19 webpage. The page redirects those seeking guidance for long-term care facilities to the [Preparing for COVID-19 in Nursing Homes webpages](#), last updated on June 25, 2020.

July 31, 2020: The Centers for Medicare & Medicaid Services [updates](#) Medicare payment policies for several types of health care providers, including skilled nursing facilities. The agency also shares that aggregated payments to skilled nursing facilities will increase by \$750 million (2.2 percent) for fiscal year 2021 compared with 2020. Updates include the following:

- Updates routine technical-rate setting to skilled nursing facility Prospective Payment System payment rates
- Finalizes adoption of the most recent Office of Management and Budget statistical area delineations
- Applies a 5-percent cap on wage index decreases from fiscal year 2020 to 2021
- [Updates](#) the 30-day Phase One Review and Correction deadline for the baseline period quality measure quarterly report for the Skilled Nursing Facility Value-Based Purchasing program; scoring policies, payment policies, and performance measures of the program are not changing

August 2020

August 3, 2020: The Trump Administration [announces](#) it is temporarily exercising enforcement discretion to allow issuers, when consistent with state law, to offer premium reductions for one or more months for 2020 coverage. This announcement follows the Centers for Medicare & Medicaid Services' adoption of several relaxed enforcement policies providing issuers the flexibility to assist their enrollees impacted by the ongoing public health emergency.

August 3, 2020: The vice president [discusses](#) local, state and federal COVID-19 response and recovery best practices with chief executive of about 50 states, territories, and the White House Coronavirus Task Force. Items discussed related to COVID-19 are the following:

- The vice president encourages Americans to adhere to state and local guidelines and to wear face coverings when social distancing cannot be maintained.
- Ambassador Deborah Birx provides an update on trends and data and discusses the need for ongoing coordination between state and local officials.

August 7, 2020: The U.S. Department of Health and Human Services [announces](#) details of the CARES Act Provider Relief Fund distribution:

- The Agency for Healthcare Research and Quality will oversee the implementation of specialized learning networks.
- A \$5 billion distribution will be linked to nursing home performance. Evaluation of performance will consider the prevalence of the virus in the nursing home's local geography and will be based on the nursing home's ability within this context to minimize COVID spread and COVID-related fatalities among its residents.
- Half of the \$5 billion will support increase testing, staffing, and personal protective equipment needs.
- There will be additional funding available for those establishing COVID-19 isolation facilities.
- Project ECHO, a consortium of about 250 health system hubs located across the United States, will be available to support nursing homes seeking help.
- An initial \$2.5 billion distribution will occur in mid-August, followed by additional performance-based distributions throughout the fall.

August 14, 2020: The Centers for Medicare & Medicaid Services [issues](#) a press release stating Trump Administration has imposed more than \$15 million in civil money penalties to nursing homes during the COVID-19 pandemic for non-compliance with infection control requirements and failure to report COVID-19 data. As of August 3, 2020, Centers for Medicare & Medicaid Services has also cited more than 3,300 deficiencies and imposed more than \$5.5 million in civil money penalties to nursing homes for failing to report required COVID-19-related data to the Centers for Disease Control and Prevention. As of August 3, 2020, more than 99 percent of facilities are reporting data. The press release includes the following data from inspections:

- The Centers for Medicare & Medicaid Services and the state survey agencies have completed infection control surveys in more than 15,276 of nursing homes (99.2 percent).
- Surveys have resulted in more than 180 immediate jeopardy-level findings (which represent a situation in which a nursing home's noncompliance with Centers for Medicare & Medicaid Services requirements of participation has caused or is likely to cause serious injury, serious harm, serious impairment, or death to a resident) for infection control, which is triple the rate of such deficiencies found in 2019.
- The Centers for Medicare & Medicaid Services has imposed civil money penalties for these violations, totaling nearly \$10 million to nursing homes in 22 states.
- The average civil money penalties imposed was \$55,000.

August 17, 2020: The Centers for Medicare & Medicaid Services issues memo [QSO-20-35-ALL](#) announcing it will resume routine inspections for nursing home providers. The memo includes the following information:

- The Centers for Medicare & Medicaid Services is revising guidance on the expansion of survey activities to authorize on-site revisits and other survey types.
- The Centers for Medicare & Medicaid Services is providing guidance on resolving enforcement cases that were previously directed to be held and on collecting civil money penalties.
- The Centers for Medicare & Medicaid Services is temporarily expanding the desk review policy to include review of continuing noncompliance following removal of immediate jeopardy, which would otherwise have required an on-site revisit from March 23, 2020, to May 31, 2020.

- The Centers for Medicare & Medicaid Services is also issuing updated guidance for the re-prioritization of routine Survey Agency Clinical Laboratory Improvement Amendments survey activities, subject to the Survey Agency’s discretion, in addition to lifting the restriction on processing Clinical Laboratory Improvement Amendments enforcement actions, and issuing the Statement of Deficiencies and Plan of Correction (Form CMS-2567).

August 20, 2020: Quality Improvement Organizations [announces](#) it is moving to an on-demand, pre-recorded format for nursing home trainings. Live questions and answer sessions will be available biweekly.

August 20, 2020: Quality Improvement Organizations [hosts](#) a nursing home training, CMS-CDC Fundamentals of COVID-19 Prevention for Nursing Home Management.

August 24, 2020: The Centers for Medicare & Medicaid Services [releases](#) a [Medicaid Informational Bulletin](#) on Medicaid reimbursement strategies to prevent spread of COVID-19 in nursing facilities. The bulletin does the following:

- Provides guidance to states on flexibilities that are available to increase reimbursement for nursing facilities that implement specific infection control practices, such as designating a quarantine or isolation wing for COVID-19 patients
- Encourages states to use the flexibilities that are available and in alignment with applicable Centers for Disease Control and Prevention guidance and coordinated with the state agency responsible for nursing facility compliance

August 24, 2020: The Centers for Disease Control and Prevention [updates](#) guidance on testing, no longer recommending testing of asymptomatic people. Considerations for who should receive testing includes symptomatic people, people who have had close contact with someone with confirmed COVID-19, and people who have been asked or referred to testing by their health care provider or local or state health department.

August 25, 2020: The Centers for Medicare & Medicaid Services issues a [press release](#) to announce the Trump Administration’s national training program to strengthen nursing home infection control practices, available immediately to all Medicare and Medicaid certified nursing homes. Quality Improvement Organizations will include the training as part of action plans developed in collaboration with each nursing home they assist. The training program has the following qualities:

- It is designed to equip frontline caregivers and their management with the knowledge required to stop the spread of COVID-19 in nursing homes.
- It features a tailored course that incorporates the most recent lessons learned from nursing homes.
- It consists of 5 modules designed for nursing home staff and 10 modules for nursing home management:
 - Modules for nursing home staff
 1. Module 1: Hand Hygiene and PPE
 2. Module 2: Screening and Surveillance
 3. Module 3: Cleaning the Nursing Home
 4. Module 4: Cohorting

5. Module 5: Caring for Residents with Dementia in a Pandemic
- Modules for nursing home management
 1. Module 1: Hand Hygiene and PPE
 2. Module 2: Screening and Surveillance
 3. Module 3: Cleaning the Nursing Home
 4. Module 4: Cohorting
 5. Module 5: Caring for Residents with Dementia in a Pandemic
 6. Module 6: Basic Infection Control
 7. Module 7: Emergency Preparedness and Surge Capacity
 8. Module 8: Addressing Emotional Health of Residents and Staff
 9. Module 9: Telehealth for Nursing Homes
 10. Module 10: Getting Your Vaccine Delivery System Ready

August 25, 2020: The Centers for Medicare & Medicaid Services [announces](#) a requirement for nursing homes to test staff and offer testing to residents when there is an outbreak or residents show symptoms for COVID-19. Laboratories and nursing homes using point-of-care testing devices will have to report diagnostic test results as required by the CARES Act. The new rules also require hospitals to provide COVID-19 cases and related data to the U.S. Department of Health and Human Services.

- To ensure accountability with the testing requirement, the Trump Administration directs surveyors to inspect nursing homes for adherence to the new testing requirements.
- Facilities that do not comply with the new requirements will be cited for non-compliance and might face sanctions based on the severity of the noncompliance, such as civil money penalties in excess of \$400 per day, or more than \$8,000 for an instance of noncompliance.
- Labs will have a one-time, three-week grace period to begin reporting required test data.
- The Centers for Medicare & Medicaid Services is also revising its previous policy that covered repeated COVID-19 testing for Medicare beneficiaries without practitioner orders. The revised policy states that each beneficiary can receive one COVID-19 test without the order of a physician or other health practitioner, but Medicare will require an order for all further COVID-19 tests.

August 26, 2020: The Centers for Medicare & Medicaid Services posts guidance for implementing new testing requirements in nursing homes and labs, [QSO-20-37-CLIA, NH](#):

- Facilities must test staff and offer testing to all nursing home residents.
- Clinical Laboratory Improvement Amendments of 1988 regulations have been updated to require all laboratories to report SARS-CoV-2 test results in a standardized format and at a frequency specified by the Secretary of Health and Human Services.
- Failure to report SARS-CoV-2 test results will result in civil money penalties.
- Long-Term Care Enforcement requirements of 42 CFR Part 488 have been revised to include requirements specific to the imposition of a civil money penalties for nursing homes that fail to report requisite COVID-19 related data to the Centers for Disease Control and Prevention National Healthcare Safety Network per §483.80(g)(1) and (2).

August 27, 2020: The Centers for Medicare & Medicaid Services publishes [QSO-20-38-NH](#), revising the survey tool for surveyors to assess compliance with the new testing requirements. The agency also adds to the survey process an assessment of compliance with the requirements for facilities to designate one or more people as the infection preventionists who are responsible for the facility's infection prevention and control program at 42 CFR §483.80(b).

August 27, 2020: Through the U.S. Department of Health and Human Services, the Trump Administration [announces](#) it has distributed ~\$2.5 billion of the planned \$5 billion to nursing homes to support increased testing, staffing, and personal protective equipment needs.

August 31, 2020: Under the Public Readiness and Emergency Preparedness Act, the U.S. Department of Health & Human Services [announces](#) it is extending coverage for prescribing or administering point-of-care COVID-19 tests. It preempts state or local provisions that restrict or prohibit the use of such tests.

September 2020

September 2, 2020: The U.S. Department of Health and Human Services [announces](#) assisted living facilities can now apply for funding under the Provider Relief Fund Phase 2 General Distribution allocation. Eligible assisted living facilities will receive 2 percent of their annual revenue from patient care.

September 3, 2020: The U.S. Department of Health and Human Services [announces](#) the details of the \$2 billion Provider Relief Fund performance-based incentive payment distribution to nursing homes. The department will measure nursing home performance through required nursing home data submissions and distributing payments based on these data. The announcement outlines the following:

- **Qualifications:** Facilities must have an active state certification as a nursing home or skilled nursing facility and receive reimbursement from the Centers for Medicare & Medicaid Services. Facilities must also report data to at least one of three data sources that will serve to establish eligibility and collect necessary provider data to inform payment: Certification and Survey Provider Enhanced Reports (CASPER), Nursing Home Compare (NHC), or Provider of Services (POS).
- **Performance and payment cycle:** The incentive payment program is scheduled to be divided into four performance periods (September, October, November, December), lasting a month each, with \$500 million available to nursing homes in each period. Nursing homes will be assessed based on a full month's worth of the aforementioned data submissions, which will then undergo additional U.S. Department of Health and Human Services scrutiny and auditing before payments are issued the following month after the prior month's performance period.
- **Methodology:** Performance will be measured on two outcomes: the ability to keep new COVID infection rates low among residents and the ability to keep COVID mortality low among residents.

State-Level Timeline of Policy Changes and Guidance

February 2020

February 5, 2020: [Department of Public Health Directive](#)

- Connecticut's Department of Public Health adds coronavirus to list of reportable diseases, requiring any physician in the state to report a case or possible case to the department.

February 28, 2020: [Governor Lamont Press Release](#)

- The state announces that the Department of Public Health's laboratory in Rocky Hill received approval from the Centers for Disease Control and Prevention to begin testing samples itself rather than delivering all samples to Centers for Disease Control and Prevention testing sites in Atlanta.

March 2020

March 5, 2020: [Department of Public Health Memo](#)

- This department of Public Health guidance to all facilities refers to the Centers for Disease Control and Prevention's webpage on "Preparing for Community Transmission of COVID-19 in the United States" and "Steps Healthcare Facilities Can Take Now to Prepare for COVID-19."

March 8, 2020: [Governor Lamont Press Release](#)

- Governor Lamont announces that the Department of Public Health State Laboratory has confirmed the first positive case of coronavirus involving a Connecticut resident.

March 9, 2020: [Governor Lamont Press Release](#)

- The second positive case of COVID-19 was identified in Connecticut, bringing the state's total to two.
- The state receives a second COVID-19 test kit, which boosted state testing capacity to about 1,200. The lab can complete 15 to 20 tests per day, and each kit allows for 600 people to be tested.
- LabCorp becomes fully operational with COVID-19 testing. Quest Diagnostics expected to have testing available soon. All people being tested by these facilities must receive advance physician referral.

March 9, 2020: [Department of Public Health Directive](#)

- The Department of Public Health restricts visitors entering nursing and convalescent homes to only those visiting someone residing at one of these facilities in hospice or end-of-life care, and the visitors must wear proper personal protective equipment.

March 10, 2020: [Declaration of Public Health and Civil Preparedness Emergency](#)

- Governor Lamont declares civil preparedness and public health emergencies.
- The Connecticut Insurance Department notifies travel insurance companies about the emergency declarations and begins monitoring their compliance with the terms of their policies.

- The declarations trigger price gouging laws and make clear that municipal leaders have emergency powers to mitigate disasters and emergencies.
- This provides the governor with the authority to take specific, swift actions determined necessary to protect the safety and health of residents in the state, including temporarily suspending certain state laws and regulations.

March 11, 2020: [Governor Lamont Press Release](#)

- The Department of Public Health confirms a third presumptive positive COVID-19 case in the state.
- Governor Lamont made an emergency request from the Strategic National Supply for a total of 540,000 additional N-95 protective masks.
- To make testing more widely available, the department is working on obtaining alternate sites approved at local hospitals at locations around the state. Those hospitals will work with commercial testing labs by Quest Diagnostics and LabCorp to complete the testing.

March 12, 2020: [Executive Order No. 7](#)

- This order prohibits gatherings of 250 people or more for social and recreational activities (excludes churches).
- It creates a waiver of the 180-day school year requirement.
- It enables the Commissioner of Public Health to issue restrictions on the number, category, and frequency of outside visitors and on the screening and protective measures in nursing homes, residential care homes, or chronic disease hospitals.

March 13, 2020: [Executive Order No. 7A](#)

- This order grants the Commissioner of Public Health authority to restrict visitors at nursing homes, residential care homes, and chronic disease hospitals. Note this order supersedes Executive Order No. 7.

March 15, 2020: [Executive Order No. 7C](#)

- This order cancels classes in public schools for at least two weeks.

March 16, 2020: [Executive Order No. 7D](#)

- This order further limits recreational and social gatherings to 50 people. It closes gyms; sports, fitness, and recreational facilities; and movie theaters.

March 18, 2020: [Governor Lamont Press Release](#)

- This statement regarded the first death in Connecticut because of complications from COVID-19. The person was an elderly patient who had been a resident of an assisted living facility in Ridgefield.

March 18, 2020: [News Article](#)

- Governor Lamont reports that the state is currently able to conduct hundreds of COVID-19 tests per day compared with 20 or 30 people per day in the prior week, at which time testing was “focused mainly on those who are very sick in the hospitals.”

March 18, 2020: [Chief Medical Examiner Notice](#)

- Notice from Office of Chief Medical Examiner (OCME) that all suspected and confirmed COVID-19 cases be reported to OCME

March 20, 2020: [Executive Order No. 7H](#)

- This order places "Stay Safe, Stay Home" restrictions on all workplaces for non-essential businesses.

March 23, 2020: [Executive Order No. 7K](#)

- This order temporarily suspends the requirement to submit background checks to the Department of Public Health before extending an employment offer to long-term care service providers or volunteers.

March 24, 2020: [Executive Order No. 7L](#)

- This order extends the time period for nursing home transfers. It grants additional flexibilities for residents that might have to move or transfer facilities based on their COVID-19 status.

March 24, 2020: [Department of Public Health Guidance](#)

- This guidance from the state's Department of Public Health regards personal protective equipment stewardship and conservation.

March 26, 2020: [Department of Public Health Guidance](#)

- This is the first nursing-home specific guidance from the state's Department of Public Health. The recommendations include assessing symptoms and temperatures for all staff at the beginning of the shift, limiting staff movement within the facility as much as practicable, social distancing guidelines, cleaning and janitorial services, assessing residents for symptoms at least once daily, and guidance on testing for symptomatic residents only.
 - It also includes guidance on appropriate transfers of residents with confirmed or suspected COVID-19 to and from hospitals.

March 27, 2020: [Centers for Medicare & Medicaid Services Section 1135 Waiver Response \(First Request\)](#)

- Connecticut receives approval of its 1135 waiver, with a retroactive effective date of March 1, 2020. The waiver included the following:
 - Suspension of Medicaid fee-for-service prior authorization requirements
 - Extension of existing prior authorizations through the end of the public health emergency
 - Modification of timeframe for managed care entities to resolve appeals
 - Temporary enrollment of providers enrolled with another state Medicaid agency (out-of-state providers) or Medicare and may reimburse payable claims, which applies to the Children's Health Insurance Program as well
 - For providers not already enrolled with a state Medicaid agency or Medicare, approved waiving payment of application fee, criminal background checks, site visits, and in-state or territory licensure requirements

- Temporary ceasing of revalidation requests from providers located in the state
- Full reimbursement for services rendered during emergency to an unlicensed facility that meet minimum standards (nursing facilities, intermediate care facilities for individuals with intellectual and developmental disabilities, psychiatric residential treatment facilities, and hospital nursing facilities)
- State plan amendment flexibilities to provide or increase beneficiary access to items and services related to COVID-19 (for example, cost-sharing waivers, alternative benefit plans to add services or providers)

March 27, 2020: [Centers for Medicare & Medicaid Services Approval Letter](#) and Waiver Approvals

- Nine Section 1915(c) HCBS waivers received time-limited amendment approvals (retroactive to March 16, 2020), including the following:
 - Temporary increase in cost limits for participants necessary to assist with continued safe support in the community and to avoid institutionalization
 - Temporary permission to pay for services (companion services) rendered by family caregivers
 - Temporary modification to level of care evaluations or reevaluations (allowing these to be conducted virtually) and delay of reassessment of up to one year
 - Allowance of electronic method (that is, telephonic) for case management, monthly monitoring, and counseling or day programs
 - Adjust prior approval and authorization elements in waivers
 - Add electronic method of signing off on person-centered service plan

April 2020

April 1, 2020: [Department of Public Health Guidance](#)

- The Department of Public Health issues return-to-work guidance for health care workers and first responders for those who are symptomatic with suspected or confirmed COVID-19 or those who are asymptomatic with high or medium risk exposures including, timeframes for return to work, use of personal protective equipment, and reassignment if necessary.

April 3, 2020: [Press Release](#)

- The governor announces that the state's 213 nursing homes are receiving a 10-percent across-the-board increase in Medicaid payments to help meet extraordinary costs from the public health emergency.
- The 10-percent funding increase runs from April 1 to June 30, with an initial payment of \$11.6 million scheduled to be received by nursing homes on April 7. The three-month increase is expected to total \$35.3 million.

April 4, 2020: [Department of Public Health Guidance](#)

- This guidance requires all health care personnel in all settings to be universally masked while working in facilities, including long-term care facilities.

April 6, 2020: [Section 1115 Waiver Application](#)

- The state requested flexibility for a number of provisions for its 1915(i) state population, including waiving face-to-face requirement for assessments, cost limit service changes, and electronic provision of mental health and adult day health counseling via a Section 1115 demonstration application. (The application was later withdrawn because the Centers for Medicare & Medicaid Services notified Connecticut that the requested flexibilities were already allowed under blanket waivers that it issued.)

April 8, 2020: [Governor's Press release](#)

- The governor announces a partnership with Connecticut's long-term care facilities to collaborate on a medical surge plan that includes the establishment of COVID-19 recovery centers in nursing homes to accept patients who can be discharged from acute care hospitals but are still impacted by COVID-19 infection.
- In total, the state designated four COVID-19 recovery facilities in Torrington, Bridgeport, Meriden, and Sharon with a total of 500 beds across them.
- The Department of Public Health is working with hospitals to ensure more people can meet the requirement of negative tests 24 hours apart before being discharged back to a nursing home.
- The Connecticut Department of Social Services and the Office of Policy and Management determined a payment rate of \$600 per day for the COVID-19 recovery centers and additional payments of 10 percent across the board for all nursing homes in Connecticut during the pandemic.

April 11, 2020: [Executive Order No. 7Y](#)

- This order implements a nursing home surge plan for the duration of the public health and civil preparedness emergency, allowing flexibility in transfer of residents to and from the hospital, a COVID-19 recovery facility, or discharge from institutional setting.

April 11, 2020: [Department of Public Health Memo](#)

- This is a notice of distribution of personal protective equipment bundles of N95 respirators, surgical masks, gowns, gloves, and face shields to nursing homes at five regional point of dispensing sites.

April 15, 2020: [Executive Order No. 7AA](#)

- This order grants the Department of Social Services the authority to approve temporary additional nursing home beds for COVID-19 recovery.

April 16, 2020: [Press Release](#)

- The first COVID-19 recovery facility opens for hospital discharges.

April 17, 2020: [Executive Order No. 7BB](#)

- The governor issues a statewide order that cloth face coverings or higher level of protection required in public wherever close contact is unavoidable.

April 19, 2020: [Governor's Press Release](#)

- The governor announces that he is directing his administration to boost Medicaid payments for all of the state's nursing homes by an additional 5 percent above the recently announced 10-percent increase.
- The state will provide an across-the-board rate increase of 10 percent for non-COVID beds retroactive to March 1 (previously, the 10-percent increase was to occur April 1).
- The state will provide an additional across-the-board rate increase of 5 percent for non-COVID beds for the period of April 1 to June 30, bringing the total increase during this period to 15 percent.
- The state will reimburse at \$400 per day for COVID-positive residents in non-COVID recovery facilities. This rate is in effect for a maximum of 30 days per bed.
- The state's advance of \$11.6 million from the initial 10-percent rate increase, which was received by skilled nursing facilities on April 7, is now being extended back to March 1, adding \$12 million in immediate revenue.

April 22, 2020: [Executive Order No. 7DD](#)

- This order adds to existing list of out-of-state health care providers not required to pursue licensure, certification, or registration for a period of 60 days and allows them to render services if appropriately licensed, certified, or registered in another state or territory.
- New providers include occupational therapist, alcohol and drug counselor, radiography, and others.

April 23, 2020: [Office of Policy Management Guidance](#) and [U.S. Department of Health and Human Services Funding Announcement](#)

- Connecticut was allocated \$1.382 billion by the U.S. Department of the Treasury for the Coronavirus Relief Fund established by the CARES Act (Public Law 116-136).
- This established allocation for \$600 per diem, per bed grant to COVID-19 recovery facilities and alternative COVID-19 recovery facilities. Note that this is the sole reimbursement for these facilities from the state; the guidance indicates that the Department of Social Services would conduct a cost audit for expenses in excess of the \$600 per diem payment. The \$600 per diem is more than double the standard Connecticut Medicaid per diem for nursing home services. It established grant payments of a 10-percent increase for April and 20 percent for May and June 2020 for nursing homes that are not COVID-19 recovery facilities or alternate COVID-19 recovery facilities. These increases are intended to be used for employee wages (including staff retention and overtime), costs related to screening visitors for COVID-19, personal protective equipment, cleaning and housekeeping supplies, and other COVID-related costs.

April 23, 2020: [Executive Order No. 7EE](#)

- This order mandates nursing homes and residential communities in the state to provide daily status reports in the form and manner required by the Connecticut Hospital and Long-Term Care Mutual Aid Plan.
- It establishes civil penalties for failure to comply with mandatory reporting.

- It gives the Commission of Social Services (where Medicaid resides) the ability to waive certain Medicaid prior authorization requirements as the commissioner deems necessary.
- It waives Medicaid bed reservation requirements for residents on leave from intermediate care facilities for people with intellectual disabilities in the hospital or on home leave.

April 24, 2020: [Press Coverage](#)

- This article indicates testing capacity of the state public health lab in Rocky Hill has expanded from 15 to 20 tests per day at the start of the pandemic to 80 to 160 tests per day. In addition, reports that “multiple commercial, university and medical laboratories around Connecticut have also since been certified for COVID-19 testing.” The biggest factor limiting ability to test is a shortage of key materials.

May 2020

May 3, 2020: [Governor’s Press Release](#)

- Governor Lamont, along with New York Governor Andrew M. Cuomo, New Jersey Governor Phil Murphy, Massachusetts Governor Charlie Baker, Rhode Island Governor Gina Raimondo, Pennsylvania Governor Tom Wolf, and Delaware Governor John Carney, announce a joint multi-state agreement to develop a regional supply chain for personal protective equipment and other medical equipment and testing.

May 7, 2020: [Press Release](#) and [Department of Public Health Implementation Order](#)

- The state announces expansion of testing for COVID-19, including increased screening of asymptomatic people in nursing homes
- The state suspends regulation requiring prior referral for COVID-19 test from medical providers, enacted through an implementation order from the Department of Public Health.

May 7, 2020: [Executive Order No. 7KK](#)

- This order modifies state statute to allow pharmacists to order and administer tests approved by the Food and Drug Administration for COVID-19.
- It requires pharmacists to report all testing activities and any other information required by the Department of Public Health in accordance with applicable orders, guidelines, or other directives issued by the Commissioner of Public Health or her designees.

May 8, 2020: [Department of Public Health Webinar](#)

- Webinar led by Facility Licensing and Investigations section on donning and doffing of personal protective equipment.

May 9, 2020: [Department of Public Health Guidance](#)

- The Department of Public Health issues guidance for ensuring that long-term care facilities take reasonable and practicable alternative means of communication between residents and family members. This included window visits, virtual visitation, social media communications, and phone calls that should occur on at least a weekly basis.

May 10, 2020: [Press Coverage](#)

- The governor issues an order implementing standards at nursing homes to ensure loved ones can speak with their families either through windows or video conferencing.

May 11, 2020: [Department of Public Health Guidance](#)

- This interim guidance regards COVID-19 point prevalence survey testing and cohorting in nursing homes.

May 11, 2020: [Department of Public Health Memo](#)

- This memo provides sample long-term care cleaning protocol guidance for nursing and environmental services personnel when cleaning and auditing cleaning in areas where people with suspected or laboratory-confirmed COVID-19 have been.
- It includes guidance from the Centers for Disease Control and Prevention on personal protective equipment use, cleaning of high touch services, and aerosolization (increasing airflow in rooms).

May 12, 2020: [Centers for Medicare & Medicaid Services Section 1135 Waiver Response](#) (Updated First Request)

- The Centers for Medicare & Medicaid Services temporary approves the state's request to provide services in settings that have not been determined to meet the home and community-based settings criteria under the 1915(c) HCBS waiver program, 1915(i) home and community-based services state plan benefit, and Community First Choice State plan option at 1915(k).

May 13, 2020: [Executive Order No. 7NN](#)

- This authorizes the Office of Policy and Management to direct the Department of Social Services to provide Coronavirus Relief Fund distributions to nursing home facilities.
- It also authorizes the Office of Policy and Management to direct the Department of Social Services to provide Coronavirus Relief Fund distributions to COVID-19 recovery facilities and alternate COVID-19 recovery facilities
- It authorizes additional COVID-19-related hardship relief funding under the Coronavirus Relief Fund to nursing home facilities.
- It waives certain limits on the amount that could be provided to caregiver relatives.

May 20, 2020: [Press Release](#), [State Guidance](#), [Press Coverage](#)

- This outlines phase one of reopening for businesses.
- Businesses reopening during phase one include outdoor dining, offices, retail and malls, museums and zoos, university research, and outdoor recreation businesses.
- It includes restaurant-specific guidance: only outdoor dining permitted (open up to 50-percent capacity and no bars open); retail and malls open up to 50-percent capacity; offices allowed to open up to 50-percent capacity, but employees should work from home when possible; and museums and zoos can open outdoor exhibits at up to 50-percent capacity.

May 24, 2020: [Press Coverage](#)

- This article compares progression of testing for asymptomatic patients in nursing homes and staff of nursing homes in Connecticut.
- The state announces broader testing efforts in nursing homes on May 7, but states in the New England region such as Massachusetts expand testing of asymptomatic residents on April 13, and state officials send testing kits to nursing homes and arranged for mobile testing at the facilities.
- The article says the state cites a lack of testing supplies as delaying widespread testing.

May 27, 2020: [Executive Order No. 7SS](#)

- This order creates a temporary nurse aide position in nursing homes. People holding this temporary licensure must complete eight hours of online training and work under the supervision of nursing staff, and they are ineligible to work with COVID-19 positive residents.

June 2020

June 1, 2020: [Executive Order No. 7UU](#)

- This order mandates COVID-19 testing for staff of private and municipal nursing homes, residential communities, and assisted living agencies. It requires nursing homes and assisted living facilities to test staff at least weekly for the duration of the public health emergency; this order specifically includes agency staff and contractors.
- It requires testing to begin no later than June 14, per Department of Public Health guidance.

June 1, 2020: [Press Coverage](#)

- This outlines a modified phase one, which includes reopening of hair salons and barbershops.

June 5, 2020: [Department of Public Health Memo](#)

- This memo includes COVID-19 guidelines for infection control in nursing homes. Outlines additional cohorting guidance, new admissions and readmissions, testing of staff and residents, use of AC and fans, and recreation and visitation.

June 5, 2020: [Executive Order No. 7XX](#)

- This order suspends the involuntary discharge of nursing facility residents and residential care home residents who could previously be discharged to homeless shelters, except during emergency situations or with respect to COVID-19-recovered discharges.
- It modifies safety rules for drive-in religious gatherings and safety rules for drive-in graduations.

June 8, 2020: [Department of Public Health Guidance](#)

- This blast fax provides guidance on resident quarantine/isolation, cohorting, testing, visitation and outdoor time
- Topics include new admissions and readmissions, residents leaving for medical appointments and other visits, testing staff and residents, contact tracking within the nursing home, use of air conditioning and fans, resident room doors, recreation and outdoor time by cohort, and visitation by cohort.

June 17, 2020: [Executive Order No. 7AAA](#)

- This order updates Executive Order 7UU regarding mandatory COVID-19 staff testing of nursing facility and ALFs as follows:
 - Only staff who have not previously tested positive for COVID-19 must be tested weekly. Weekly testing should continue until the facility has no new cases of COVID-19 for at least 14 days. Weekly testing must restart whenever there is a new positive case in the facility among residents or staff.

June 17, 2020: [Centers for Medicare & Medicaid Services Section 1135 Waiver Response](#) (Second Request)

- This is the Centers for Medicare & Medicaid Services response to the second Section 1135 Waiver request from Connecticut:
 - The Centers for Medicare & Medicaid Services approves the state’s request to modify the deadline for initial and annual level of care determinations required for the Section 1915(k) state plan benefit.
 - o The state does not need to complete assessment before start of care, and reassessment can be postponed for one year.
 - The Centers for Medicare & Medicaid Services approves the state’s request to modify the timeline for initial evaluations and assessments and reevaluate and reassess the Section 1915(i) HCBS state plan option.
 - o Similar to Section 1915(k) provisions.
 - The Centers for Medicare & Medicaid Services approves the waiver of written consent from beneficiaries for services delivered under Section 1915(c) waiver program, Section 1915(i) home and community-based services state plan, and Section 1915(k) Community First Choice programs.

June 17, 2020: [Press Coverage](#), [State Guidance](#), and [Press Coverage](#)

- These outlines set forth phase two of reopening businesses and recreation with capacity limits and requirements for compliance with health and safety guidelines, including all personal services (nail salons, tattoo parlors, and so on); movie theaters; outdoor arts, entertainment and events up to 50 people; bowling alleys; social clubs and pools; indoor restaurants; hotels (but no bars); museums; zoos; outdoor amusement parks; public libraries; and youth sports.
- Any business seeking to reopen in phase two must complete a self-certification and receive a Reopen CT badge. They must also comply with industry-specific health and safety guidelines; a non-exhaustive list includes personal protective equipment for employees, provided at no cost to the employee; a cleaning plan; training programs to ensure all workers are aware of the details of the state’s reopening guidelines and cleaning requirements; adjustment of the physical space in the business to encourage social distancing; avoidance of unnecessary physical contact or the use of shared items; and increased ventilation where possible.
- It provides additional sector-specific capacity guidelines including, for example, that restaurants with indoor dining can open at 50-percent occupancy (outdoor dining is still encouraged).
- It allows for private (in-home) gatherings of up to 25 indoors and 100 outdoors.

June 22, 2020: [Department of Public Health Memo](#)

- This memo includes updated COVID-19 Infection Control Guidelines for Nursing Homes from the Connecticut Department of Public Health Infectious Diseases Section supplements and updates prior Department of Public Health guidance. It addresses common questions regarding resident quarantine and isolation, cohorting, and testing.

June 24, 2020: [Press Coverage](#)

- A travel advisory requires people coming from states with (1) a positive test rate higher than 10 per 100,000 residents or (2) a 10-percent or higher positivity rate over a seven-day rolling average to self-quarantine for 14 days.
- At the time of this advisory, the requirement affected travelers visiting Connecticut from a total of 19 states.

June 25, 2020: [Press Release](#) and [Executive Summary of Reopening Model](#)

- Governor Lamont announces plans for 2020–2021 school year with an aim of allowing all students opportunity to access in-school, full-time instruction at beginning of 2020–2021 academic year, if it is supported by public health data.

June 29, 2020: [Press Coverage](#)

- Summer day camps reopen (overnight camps not included).
- Puts into place guidance including health screenings, limiting group size to no more than 10 children, requiring that employees wear cloth face masks, implementing hand and respiratory hygiene, developing protocols for intensified cleaning and disinfection, and implementing social distancing strategies.

July 2020

July 6, 2020: [Press Coverage](#)

- This establishes that K–12 summer school can reopen with limits on group size and requires using face masks, employing social distancing (maintaining six feet between students), developing protocols for sanitizing and cleaning bathrooms, and restricting sharing of materials (that is, books).

July 10, 2020: [Press Coverage](#)

- This pauses phase three of reopening, keeping the state at phase two.

July 14, 2020: [Executive Order No. 7EEE](#)

- This order authorizes continued temporary suspension of the requirements for licensure, certification, or registration of out-of-state providers. It allows the commissioner of the Department of Public Health to temporarily suspend the requirements for licensure, certification, or registration for certain out-of-state health care providers in order to supplement the state's ability to respond to the pandemic.
- It supersedes Executive Order No. 7DD, which suspended requirements for licensure for a period of 60 days issued on April 22, 2020.

July 21, 2020: [Executive Order No. 7III](#)

- This order announces mandatory self-quarantine for travelers from states with high COVID-19 infection levels. Travelers are required to complete a form upon entry into CT for submission to CT DPH.

July 22, 2020: [Press Release](#)

- The state of Connecticut has received an additional extension from the Federal Emergency Management Agency for approval to apply for reimbursement for statewide emergency feeding efforts until August 19, 2020.

July 28, 2020: [Press Release](#)

- The Federal Emergency Management Agency approved a 30-day extension of the non-congregate sheltering authorization under the Federal Emergency Management Agency Public Assistance program until September 1, 2020, previously set to expire on August 1, 2020.
- It provides non-congregate housing to certain high-risk people, including those who have COVID-19 or have been in contact with people who have COVID-19.

August 2020

August 6, 2020: [Press Release](#)

- This press release announces that Connecticut will continue covering the costs of COVID-19 testing at long-term care facilities for at least an additional two months.

August 7, 2020: [Press Release](#)

- This press release announces that Connecticut received federal approval to extend full federal funding for use of the National Guard in the state's ongoing response to the COVID-19 pandemic through September 30.
- In March, Connecticut received approval for full federal reimbursement for all costs associated with activities with the National Guard through August 21.

August 12, 2020: [Department of Public Health Guidance](#)

- This document updates guidance for issues concerning cohorting new admissions with unknown COVID-19 status, contact tracing and case investigation in nursing homes, when to test and screen asymptomatic residents and staff in nursing homes, and antigen testing in nursing homes.

August 27, 2020: [Department of Public Health Directive](#)

- This directive expands visitation in Connecticut nursing homes and clarifies for all long-term care facilities their obligations to facilitate visitations and to enable compassionate care visits.
- Key provisions for general visitation and compassionate care visits include the following:
 - It clarifies that visits can occur more than once per week, requires nursing homes to develop a facility-wide visitation policy, requires facilities to assess the psychosocial needs of each resident and develop individualized visitation plans, extends the minimum time for perimeter visits (for example, window visits, socially distanced outdoor visits) from 20 to 30 minutes, and requires

facilities to designate no less than five days per week as visitation days (one of which must be a Saturday or Sunday, from which a resident's visitation schedule can be devised).

- It expands compassionate care visits beyond end-of-life visits to include visits for residents who undergo significant change in physical, mental, or psychosocial conditions, including weight loss, increased sleeping, confusion or agitation, delirium or other decline in cognition, and new onset or increase of symptoms of mental illness.

August 27, 2020: [Press Release](#)

- Governor Lamont, Governor Andrew M. Cuomo of New York, and Governor Phil Murphy of New Jersey released joint statement on the weakening of COVID-19 testing guidelines from the Centers for Disease Control and Prevention for asymptomatic individuals.
- The statement notes that New York, New Jersey, and Connecticut will not be changing guidance that prioritizes testing for asymptomatic people.

September 2020

September 1, 2020: [Public Health Emergency Declaration Extension](#)

- Governor Lamont announces the extension of the Public Health and Civil Preparedness Emergencies to February 9, 2021, originally in effect through September 9, 2020.
- The renewal also describes several risks that contribute to the renewal, including managing the reopening and continued operation of schools, colleges, and universities as well as economic, fiscal, and operational challenges facing residents, businesses, and government agencies.

September 8, 2020: [Executive Order No. 9A](#)

- This order reissues and extends COVID-19 executive orders and agency and municipality orders to November 9, 2020.

September 9, 2020: [Department of Public Health Order](#)

- This order modifies training requirements for nurse's aides to allow them to complete their training using virtual clinical resources or through two weeks of employment as a temporary nurse aide.
- It allows facilities to use any nurse aide who has satisfactorily completed training, but not yet satisfactorily completed the competency evaluation because of COVID-19 restrictions, to satisfy staffing requirements as set forth in the Public Health Code for longer than 120 days as long as the facility ensures that nurse aides can demonstrate competency in skills and techniques necessary to care for residents' needs. Such use of nurse aides can continue through the end of the public health emergency or until the nurse aide can take a competency exam.

September 15, 2020: [Executive Order No. 9B](#)

- This order amends mandatory self-quarantine for travelers from states with high COVID-19 levels. It modifies the state's previously issued self-quarantine and travel advisory order for people arriving to Connecticut from impacted states, expanding the testing exemption to all travelers who test negative for COVID-19 in the 72 hours before arrival.
- It authorizes the Commissioner of Public Health, local health departments, municipal chief elected officers, and state and local police to issue fines for violations of certain COVID-19 protective measures. These include the following:
 - A fine of \$100 for an person who fails to wear a mask or cloth face covering as required under [Executive Order No. 7NNN](#).
 - A fine of \$500 for any person or business entity who organizes, hosts, or sponsors a gathering that violates the gathering size restrictions set forth in the Department of Economic and Community Development [Rules for Gatherings and Venues and Sector Rules for Outdoor Events](#).
 - A fine of \$250 for any person who attends a gathering that violates the gathering size restrictions set forth in the Department of Economic and Community Development [Rules for Gatherings and Venues and Sector Rules for Outdoor Events](#).

Mathematica

Princeton, NJ • Ann Arbor, MI • Cambridge, MA
Chicago, IL • Oakland, CA • Seattle, WA
Tucson, AZ • Woodlawn, MD • Washington, DC

EDI Global, a Mathematica Company

Bukoba, Tanzania • High Wycombe, United Kingdom



mathematica.org