



NHSN COVID-19 Data for Skilled Nursing Facilities (June 4, 2020 Release)

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Executive Summary

On June 4, 2020, the Centers of Medicaid and Medicaid Services (CMS) released the most expansive data available on COVID-19 in skilled nursing facilities (SNF). In a preliminary analysis of the data, the size of the building and the prevalence of COVID-19 in the community appear to be strong contributing factors to whether COVID-19 enters the building and resident deaths occur.

These preliminary findings are consistent with prior studies using a smaller data set. Those prior studies found larger facilities in urban communities that also had more COVID-19 cases were more likely to have outbreaks.¹⁻²

For this report, we used data released by CMS. We merged the data with facility characteristics data, the latest Five-Star rating data, and county prevalence of COVID-19 data gathered by Johns Hopkins University.

We compared the facility characteristics for.

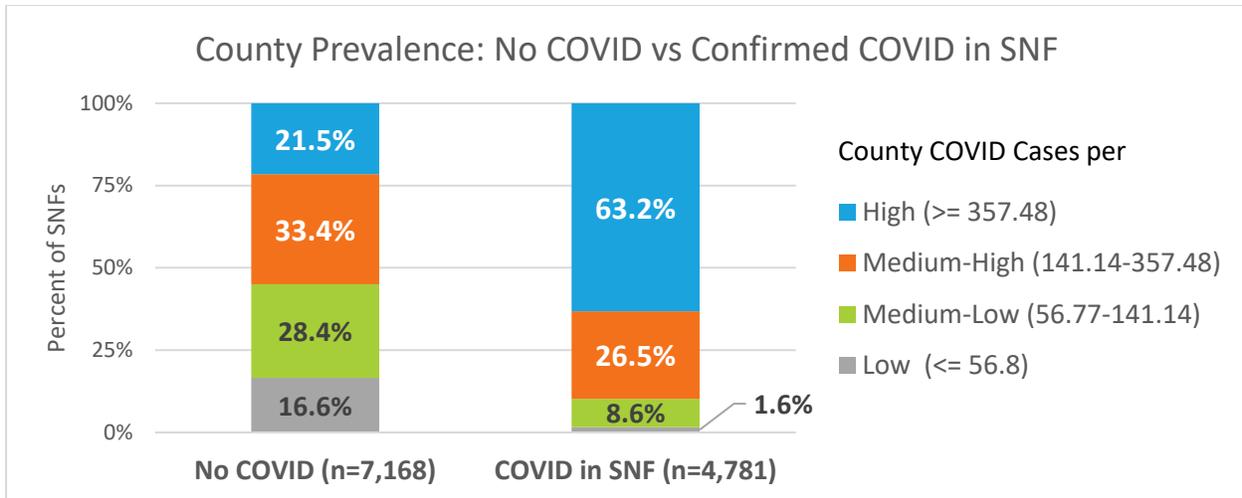
1. SNFs that had at least one confirmed COVID case or death among residents or staff versus those SNFs with no confirmed cases.
2. Only SNFs with a resident death related to COVID versus SNFs with COVID cases but no resident deaths

Facilities that had at least one case or death of COVID-19 compared to those with no infections were much more likely to be larger, urban and reside in communities with high rates of COVID-19. Of the SNFs with COVID-19, 63% had a county prevalence of over 357 cases per 100,000 people, while only 22% of SNFs without COVID-19 were in similar counties. Almost no facilities had COVID-19 in counties with very low rates of COVID-19. On average, SNFs with COVID-19 compared to those without were larger (123 vs 92 beds) and located in an urban setting (85% vs 62%).

There was minimal to no differences between SNFs with and without COVID-19 in the distribution of Five-Star Overall Ratings. Both groups of facilities had 16% of SNFs with 1-Star and 24% with 5-Star. They also did not differ substantially on prior survey performance. Both groups had between 43-44% of SNFs cited for F-880 Infection Control in 2019 or 2020 before CMS began performing infection control focused surveys. At less than 1% of SNFs in both groups, infection control deficiencies were rarely cited at a scope/severity of actual harm (G or higher).

¹ Mendoza, Amy (May 12, 2020) Facility Location Determines COVID Outbreaks, Researchers Say. *Provider Magazine*. <http://www.providermagazine.com/news/Pages/2020/MAY/Facility-Location-Determines-COVID-Outbreaks,-Researchers-Say.aspx>

² Gleckman, Howard (June 1, 2020) Two Strong Signals that a Nursing Home is Likely to Have COVID-19: Its Location and the Race of its Residents. *Forbes*. <https://www.forbes.com/sites/howardgleckman/2020/06/01/two-strong-signals-that-a-nursing-home-is-likely-to-have-covid-19-its-location-and-the-race-of-its-residents/>



The second comparison between SNFs with a resident death related to COVID-19 and SNFs with COVID-19 cases but no resident deaths had similar results to the first comparison. Location and size still differed between the two groups. Of the SNFs with a resident death, 80% were in a county with a high prevalence compared to 51% percent of SNFs with cases but no resident deaths. SNFs with a death had an average bed size of 141 beds and 91% were urban. SNFs in the comparison group had on average 110 beds and 80% were urban.

There was a small difference in Overall Five-Star ratings (16% vs 18% for 1-Star and 27% vs 21% for 5-Star). Both groups had between 44-45% of SNFs with a recent infection control citation at a low scope/severity.

More robust analyses are needed to further understand the relationship of factors associated with COVID-19 occurring in a SNF and resident outcomes. It would be prudent to conduct such analyses with additional data expected to be routinely released by CMS.

Comparing SNFs with and without confirmed COVID cases and deaths

Facilities are categorized on whether they had one or more confirmed COVID-19 case or death among staff or residents. Suspected cases of COVID-19 were not treated as confirmed case.

Table 1: Summary Statistics for Facilities with Cases and Deaths

Metrics	No COVID	SNFs with Confirmed COVID
# of SNFs*	7,168	4,781
% of SNFs	60%	40%
Facility Characteristics		
Average Number of Residents (PBJ) †	72.7	103.9
Average Number of Certified Beds (NHC) †	91.5	123.2
Average Occupancy (PBJ) †	80.0%	84.3%
# Urban**	4,407	4,040
% Urban	61.5%	84.5%
Ownership (NHC)**		
# For-profit	4,938	3,391
% For-profit	68.9%	70.9%
# Non-profit	1,690	1,150
% Non-profit	23.6%	24.1%
# Public	540	240
% Public	7.5%	5.0%
Average Medicaid % (CASPER)	59.2%	58.9%
County Data (Johns Hopkins University)		
Average County Prevalence (COVID Cases per 100,000 people) †	275.92	754.30
Distribution by County Prevalence Quartiles†		
# Low Prevalence (Prevalence <= 56.77)	1,188	78
% Low	16.6%	1.6%
# Medium-Low Prevalence (56.77 - 141.14)	2,037	412
% Medium-Low	28.4%	8.6%
# Medium-High Prevalence (141.14-357.48)	2,393	1,267
% Medium-High	33.4%	26.5%
# High Prevalence (>= 357.48)	1,544	3,022
% High Prevalence	21.5%	63.2%

Metrics	No COVID	SNFs with Confirmed COVID
Five-Star Rating		
Average Overall Star Rating	3.20	3.17
Average Health Inspection Star Rating [†]	2.88	2.76
Average Quality of Care Star Rating [†]	3.62	3.79
Average LS Quality of Care Star Rating [†]	3.58	3.83
Average SS Quality of Care Star Rating [†]	3.58	3.64
Average Staffing Star Rating	2.93	2.95
Average RN Staffing Star Rating	2.93	2.95
Staffing Hours Per Resident Day (HPRD)		
Average RN HPRD (Case-Mix Adjusted) [†]	0.71	0.69
Average Nurse Aide HPRD (Case-Mix Adjusted) [†]	2.33	2.28
Average Total Direct Care Staff HPRD (Case-Mix Adjusted) [†]	3.89	3.85
Other CMS Metrics		
# of Special Focus Facilities (SFF)	39	23
% of SFF Facilities	0.5%	0.5%
# of SFF Candidates	191	129
% of SFF Candidate	2.7%	2.7%
Survey History		
Average Weighted Inspection Score	59.85	59.73
Infection Control Citations		
# F-880 any S/S in 2019/2020	3,058	2,118
% F-880 any S/S in 2019/2020	42.7%	44.3%
# F-880 S/S G or above in 2019/2020	36	20
% F-880 S/S G or above in 2019/2020	0.50%	0.42%

Statistical Tests and Significance:

* - Chi-Square Goodness-of-Fit 50% and p<0.05

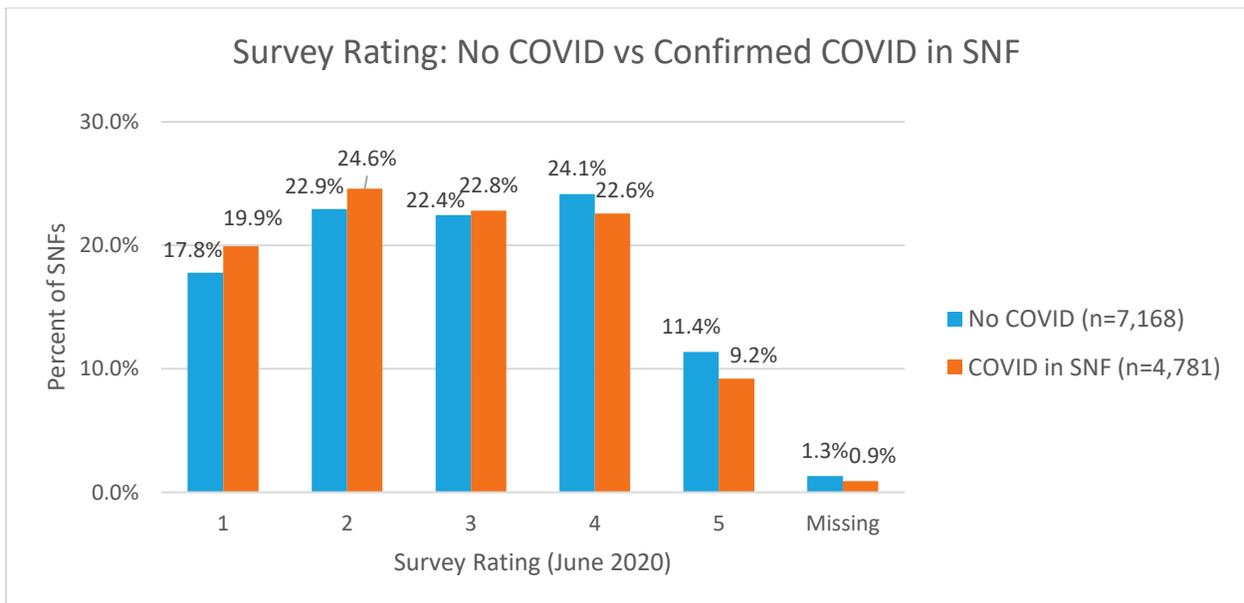
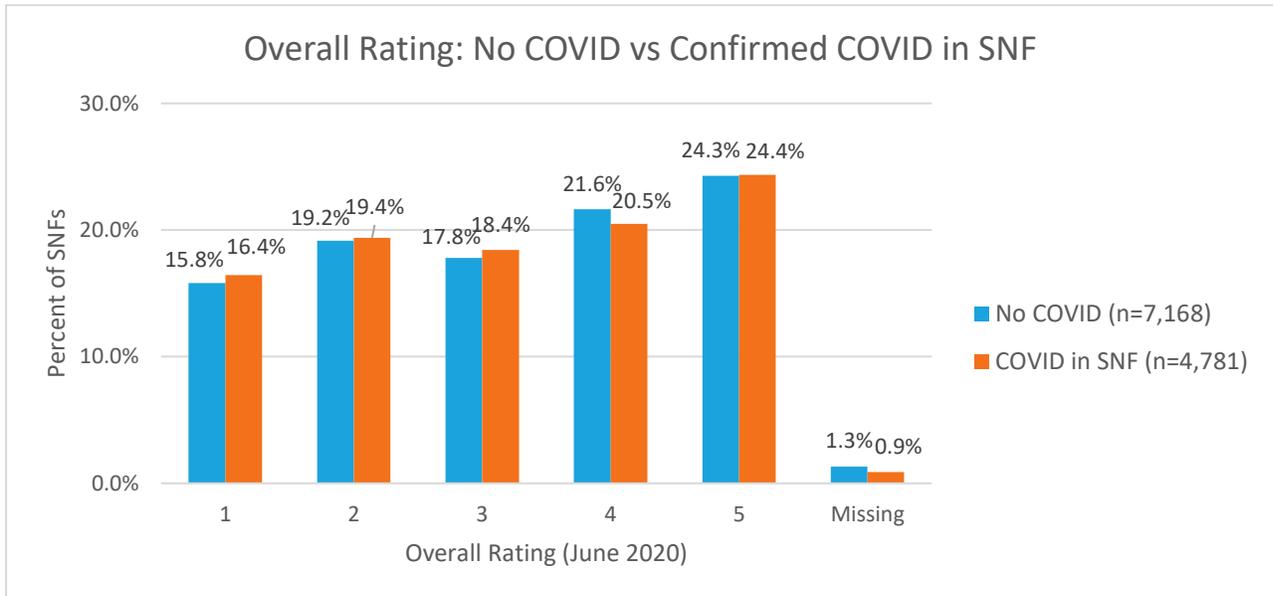
** - Chi-Square Proportions and p<0.05

† - Two-Sample T-Test and p<0.05

†† - Wilcoxon Rank Sum Test and p<0.05

Abbreviations: NHC – Nursing Home Compare; PBJ – Payroll-based Journal; S/S – Scope/Severity

Figure 1: Five-Star Rating Distributions with Cases and Deaths



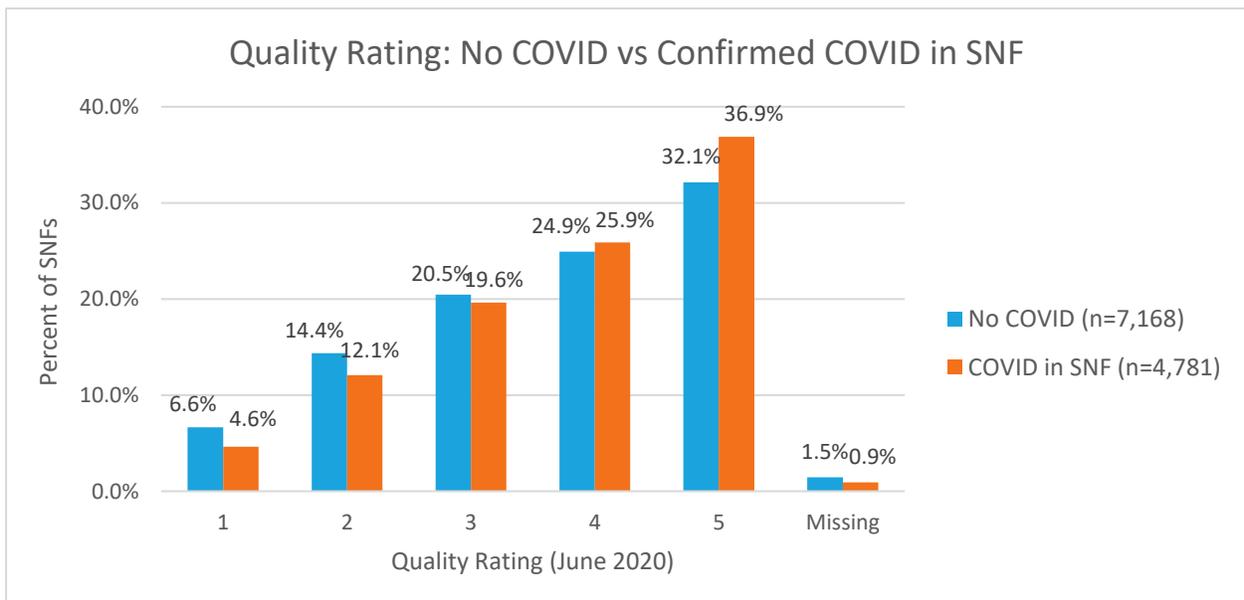
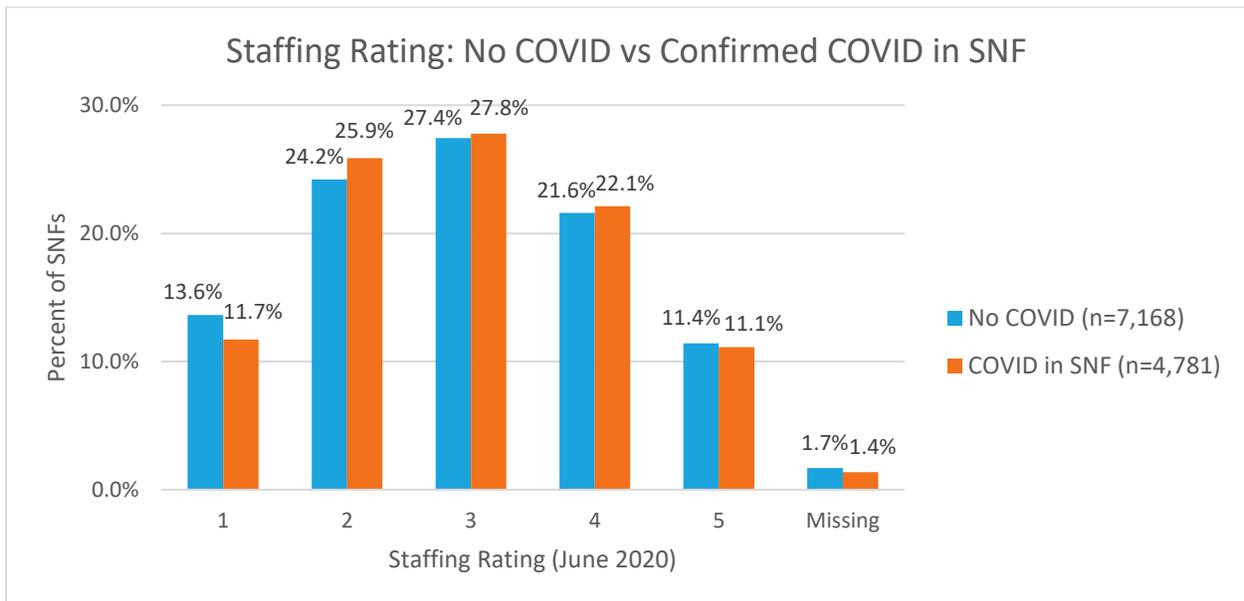
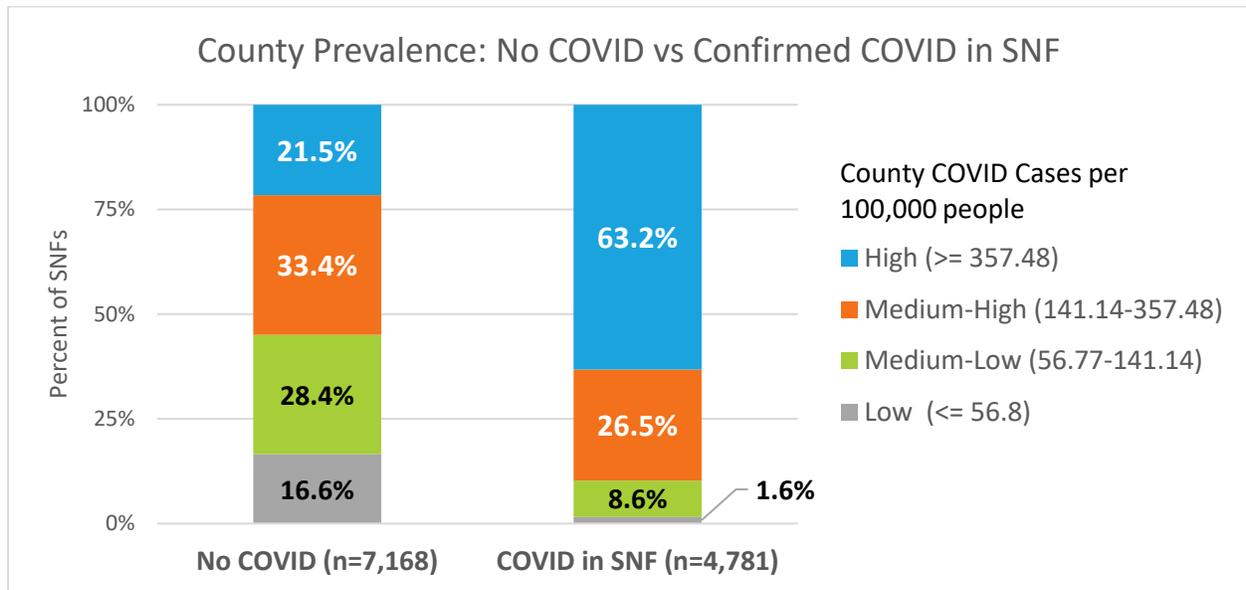


Figure 2: County COVID Prevalence Distributions with Cases and Deaths



Comparing SNFs with and without COVID resident deaths

Facilities with COVID-19 cases are categorized by whether they had one or more confirmed COVID-19 deaths among residents.

Table 2: Summary Statistics for Facilities with Resident Deaths

Metrics	No Resident Deaths	Had Resident Deaths
# of SNFs*	2,748	2,033
% of SNFs	57%	43%
# COVID Resident Deaths	0	17,889
# All Resident Deaths	9,767	30,592
# COVID Staff Deaths	138	290
Facility Characteristics		
Average Number of Residents (PBJ) †	92.0	119.9
Average Number of Certified Beds (NHC) †	110.1	140.9
Average Occupancy (PBJ) †	83.8%	85.1%
# Urban**	2,200	1,840
% Urban	80.1%	90.5%
Ownership**		
# For-profit	1,880	1,511
% For-profit	68.4%	74.3%
# Non-profit	708	442
% Non-profit	25.8%	21.7%
# Public	160	80
% Public	5.8%	3.9%
Average Medicaid % (CASPER) †	57.2%	61.2%
County Data (Johns Hopkins University)		
Average County Prevalence (COVID Cases per 100,000 people) †	582.38	986.51
Distribution by County Prevalence Quartiles†		
# Low Prevalence (Prevalence <= 56.77)	73	5
% Low	2.7%	0.2%
# Medium-Low Prevalence (56.77 - 141.14)	367	45
% Medium-Low	13.4%	2.2%
# Medium-High Prevalence (141.14 - 357.48)	918	349
% Medium-High	33.4%	17.2%
# High Prevalence (>= 357.48)	1,388	1,634
% High Prevalence	50.5%	80.4%

Metrics	No Resident Deaths	Had Resident Deaths
Five-Star Rating		
Average Overall Star Rating¶	3.26	3.05
Average Health Inspection Star Rating¶	2.86	2.63
Average Quality of Care Star Rating	3.76	3.82
Average LS Quality of Care Star Rating¶	3.76	3.93
Average SS Quality of Care Star Rating	3.65	3.62
Average Staffing Star Rating¶	3.02	2.86
Average RN Staffing Star Rating¶	2.99	2.89
Staffing Hours Per Resident Day (HPRD)		
Average RN HPRD (Case-Mix Adjusted) †	0.72	0.65
Average Nurse Aide HPRD (Case-Mix Adjusted) †	2.34	2.20
Average Total Direct Care Staff HPRD (Case-Mix Adjusted) †	3.94	3.72
Other CMS Metrics		
# of SFF Facilities**	7	16
% of SFF Facilities	0.3%	0.8%
# of SFF Candidates	75	54
% of SFF Candidate	2.7%	2.7%
Survey History		
Average Weighted Inspection Score †	57.26	63.07
Infection Control Citations		
# F-880 any S/S in 2019/2020	1234	884
% F-880 any S/S in 2019/2020	44.9%	43.5%
# F-880 S/S G or above in 2019/2020	12	8
% F-880 S/S G or above in 2019/2020	0.4%	0.4%

Statistical Tests and Significance:

* - Chi-Square Goodness-of-Fit 50%/50% and p<0.05

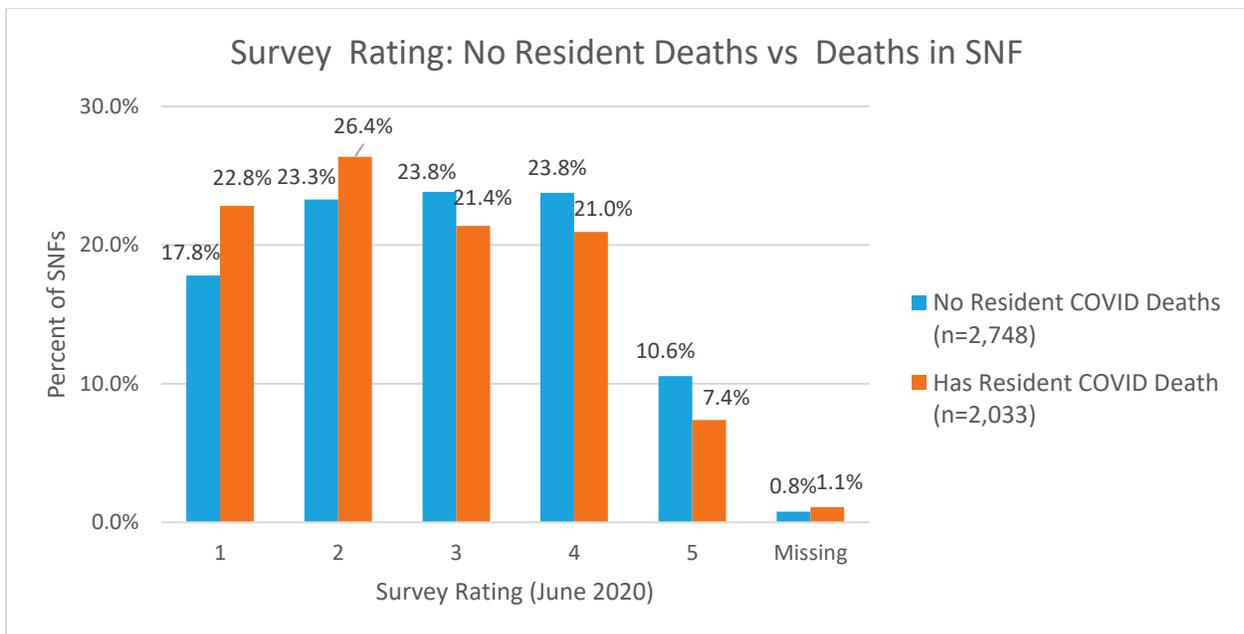
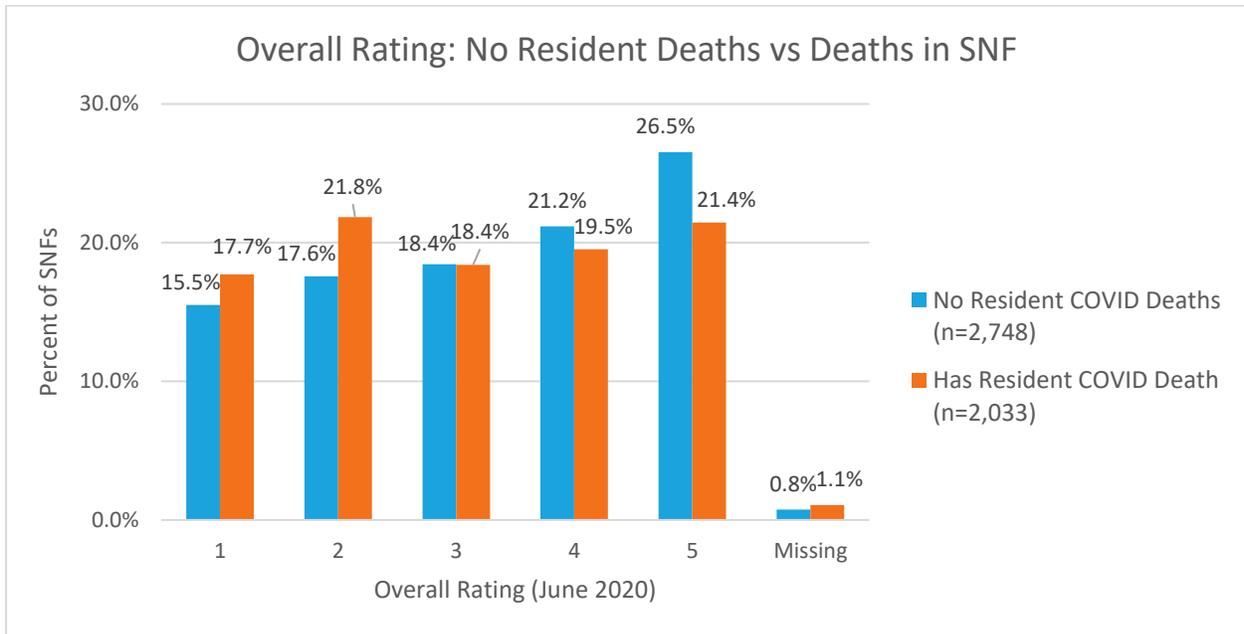
** - Chi-Square Proportions and p<0.05

† - Two-Sample T-Test and p<0.05

¶ - Wilcoxon Rank Sum Test and p<0.05

Abbreviations: NHC – Nursing Home Compare; PBJ – Payroll-based Journal; S/S – Scope/Severity

Figure 3: Five-Star Rating Distributions with Resident Deaths



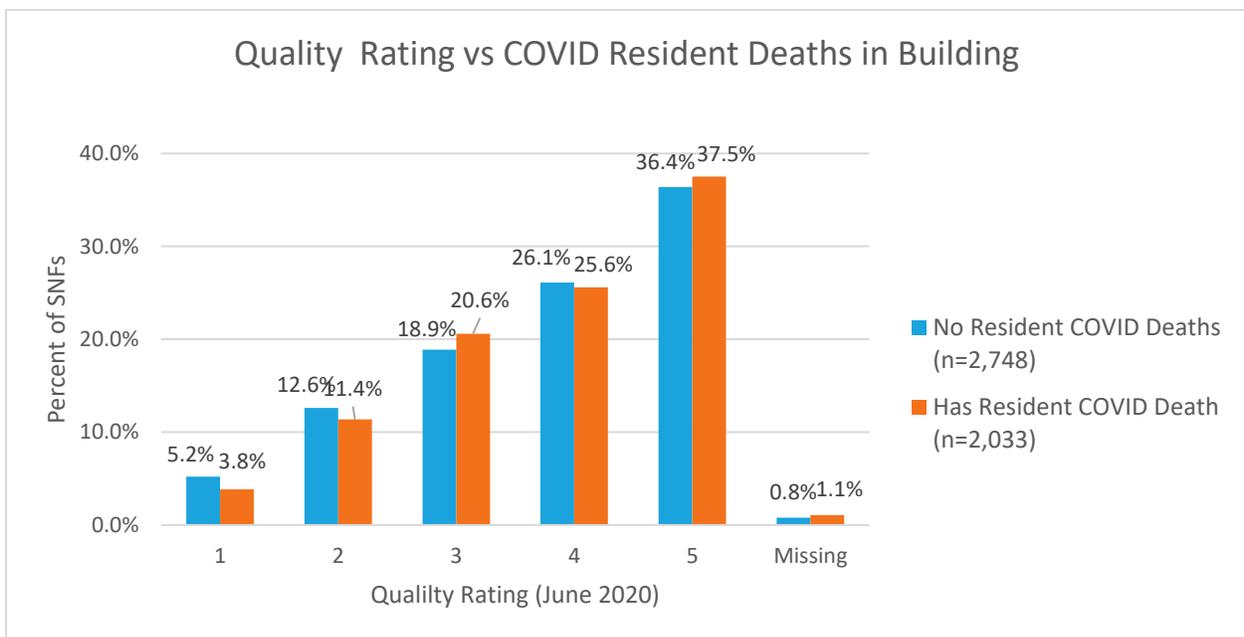
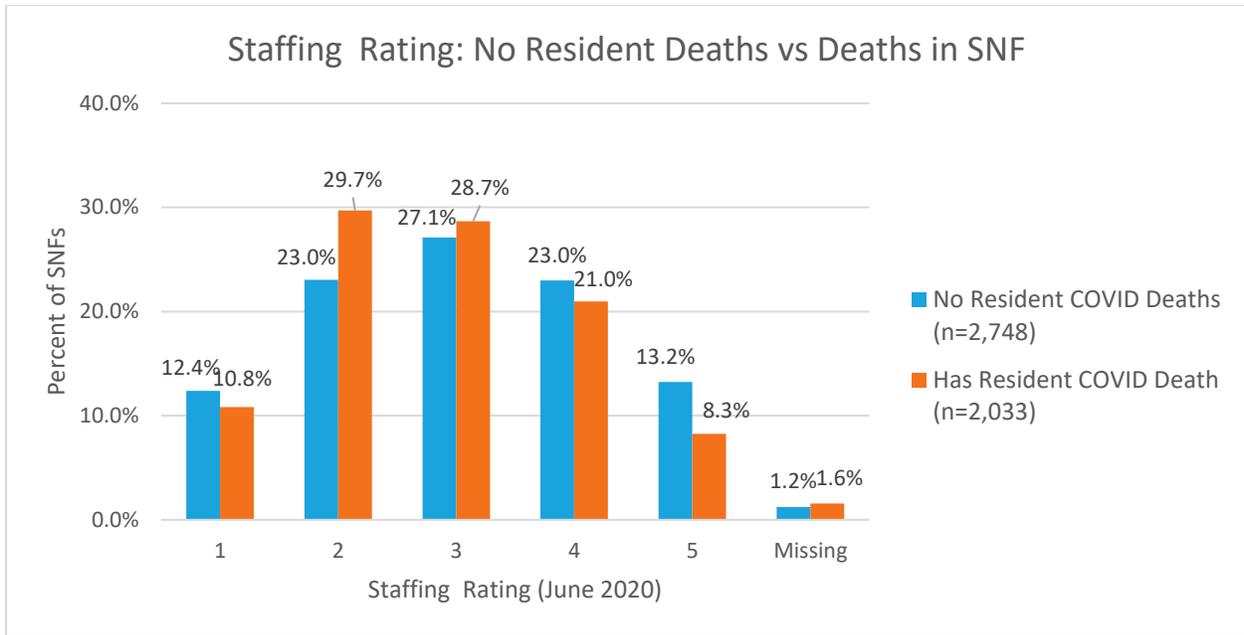
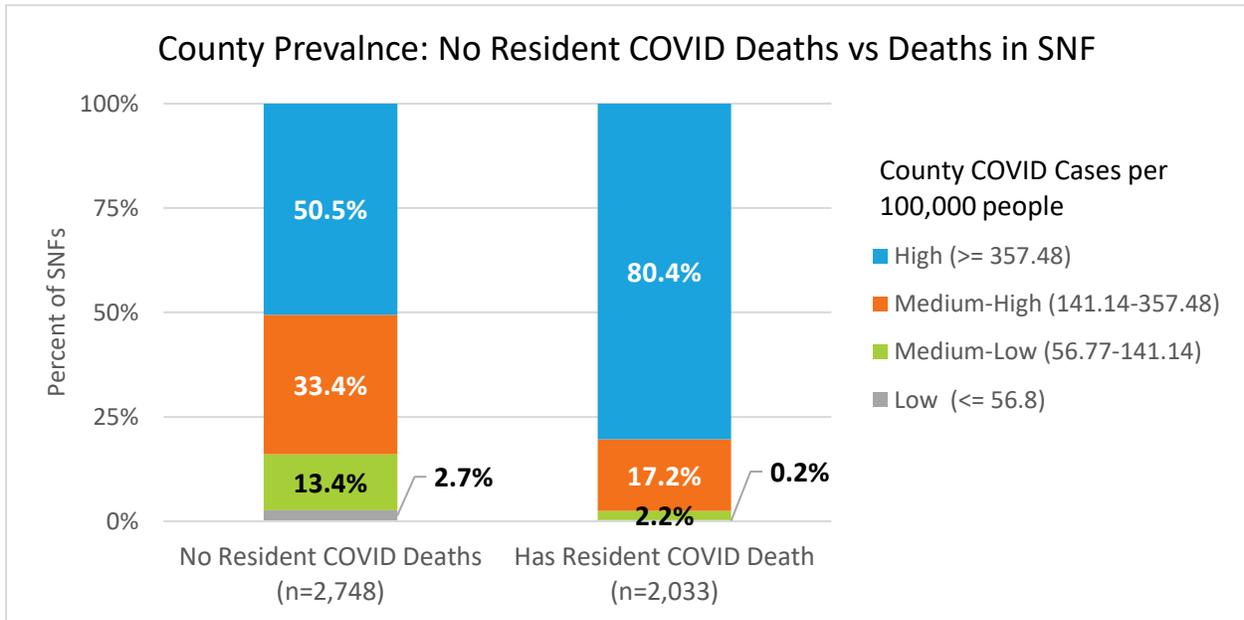


Figure 4: County COVID Prevalence Distributions with Resident Deaths



Appendix

Table 3: Summary Statistics for Nation

Metrics	Nation
# of SNFs	15,427
Facility Characteristics	
Average Number of Residents (PBJ)	85.9
Average Number of Certified Beds (NHC)	106.3
Average Occupancy (PBJ)	81.1%
# Urban	11,133
% Urban	72.2%
Ownership (NHC)	
# For-profit	10,817
% For-profit	70.1%
# Non-profit	3,616
% Non-profit	23.4%
# Public	994
% Public	6.4%
Average Medicaid % (CASPER)	59.1%
County Data (Johns Hopkins University)	
Average County Prevalence (COVID Cases per 100,000 people)	505.17
Distribution by County Prevalence Quartiles	
# Low Prevalence (Prevalence <= 56.77)	1,565
% Low	10.1%
# Medium-Low Prevalence (56.77 - 141.14)	2,957
% Medium-Low	19.2%
# Medium-High Prevalence (141.14-357.48)	4,608
% Medium-High	29.9%
# High Prevalence (>= 357.48)	6,280
% High Prevalence	40.7%
Five-Star Rating	
Average Overall Star Rating	3.16
Average Health Inspection Star Rating	2.81
Average Quality of Care Star Rating	3.70
Average LS Quality of Care Star Rating	3.68
Average SS Quality of Care Star Rating	3.61
Average Staffing Star Rating	2.92
Average RN Staffing Star Rating	2.92

Metrics	Nation
Staffing Hours Per Resident Day (HPRD)	
Average RN HPRD (Case-Mix Adjusted)	0.70
Average Nurse Aide HPRD (Case-Mix Adjusted)	2.31
Average Total Direct Care Staff HPRD (Case-Mix Adjusted)	3.87
Other CMS Metrics	
# of Special Focus Facilities (SFF)	84
% of SFF Facilities	0.5%
# of SFF Candidates	442
% of SFF Candidate	2.9%
Survey History	
Average Weighted Inspection Score	61.42
Infection Control Citations	
# F-880 any S/S in 2019/2020	6,725
% F-880 any S/S in 2019/2020	43.6%
# F-880 S/S G or above in 2019/2020	68
% F-880 S/S G or above in 2019/2020	0.44%

Data Sources

- Centers for Medicaid and Medicare Services (CMS). COVID-19 Nursing Home Data. Accessed on June 4, 2020 representing data through May 31, 2020 <https://data.cms.gov/stories/s/COVID-19-Nursing-Home-Data/bkwz-xpvg>
- CMS. Nursing Home Compare. Updated on June 4, 2020. <https://data.medicare.gov/data/nursing-home-compare>
- Johns Hopkins University. COVID-19 United States Cases by County. Downloaded on June 3, 2020. https://github.com/govex/COVID-19/tree/master/data_tables/JHU_USCountymap

Methods

Due to reports of some data being inaccurate in the initial CMS release³, we applied our own exclusion criteria, which is described in Figure 5 below. We then merged the CMS COVID-19 data with Nursing Home Compare and county prevalence of COVID-19 from Johns Hopkins University. We conducted Chi-Squares, T-Tests, and Wilcoxon Rank Sum Tests depending on the independent variable type to test for statistical significance with a threshold of $p < 0.05$.

³ Clark, Cheryl (June 9, 2020) Nursing Homes Shocked at 'Insanely Wrong' CMS Data on COVID-19. *Medpage Today*. <https://www.medpagetoday.com/infectiousdisease/covid19/86967?trw=no>

Figure 5: Analysis Tree with Exclusion Criteria

