September 2nd, 2020

Best Nursing Homes US 2021 – Methodology

Methodology – Best Nursing Homes US 2021

1. Introduction

America's "Best Nursing Homes 2021" highlights the nation's top nursing homes based on performance data, peer recommendations and the handling of the current COVID-19 situation, relative to in-state competition. Nursing homes in the 20 states with the highest population size, according to The United States Census Bureau (2020) were included in the study[1].

a. Included states

The following states were included in the analysis:

- o Arizona
- o California
- o Florida
- o Georgia
- o Illinois
- o Indiana
- o Maryland
- o Massachusetts
- o Michigan
- o Missouri
- o New Jersey
- o New York
- o North Carolina
- o Ohio
- o Pennsylvania
- o Tennessee
- o Texas
- o Virginia
- o Washington
- o Wisconsin

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[1] Additional information about the distribution of the US Population and the United States Census is available at: https://www.census.gov/

b. Scope of Nursing homes included in the Survey

- o Included are single branches of nursing homes (e. g. Okeechobee Health Care Facility), no nursing home groups or chains.
- o A nursing home had to have a capacity of at least 150 certified beds to be considered.
- o Nursing homes that are included in the Special Focus Facility (SFF) program were not considered.
- o Nursing homes had to achieve a threshold score, calculated by using performance data (see chapter 2a).
- o Nursing homes had to meet defined selection criteria, based on their officially reported data regarding COVID-19 (see chapter 1c).

Out of 10,647 nursing homes[2] in the 20 considered states, 822 nursing homes met the criteria described above. Of these, the best 400 Nursing Homes were awarded by Newsweek and Statista, resulting in a varying number of nursing homes awarded per state: New York had the most nursing homes awarded with 70, while North Carolina and Massachusetts are represented with 5 nursing homes each.

c. Addressing the COVID-19 (Coronavirus) situation

Statista and Newsweek are taking the global outbreak of the COVID-19 (Coronavirus) pandemic very seriously. Extensive measures were taken during the creation of this ranking to address the impact of the COVID-19 outbreak on nursing homes in the US. The objective is to only award nursing homes which have the best possible response and protocols given the current circumstances.

Statista and Newsweek feel that, especially during this difficult time, it is paramount to provide the best possible information to potential nursing home residents and their relatives when choosing the right nursing home in their area.

To this purpose, multiple steps have been taken to create the most accurate and valid picture of the situation the nursing homes are facing:

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[2] According to the August 2020 Nursing Home Compare data files

1. The data analysis put a big emphasis on evaluating the official COVID-19 dataset from the U.S. Centers for Medicare & Medicaid Services (CMS). The Nursing Home COVID-19 data is reported directly to the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) and includes Resident Impact, Facility Capacity, Staff & Personnel and Supplies & Personal Protective Equipment, as well as Ventilator Capacity. This data is updated weekly, therefore it represents the most up to date data available in the US and reflects the current situation from May 24th, 2020[3] until August 2nd, 2020.

Only nursing homes which are actively reporting this data were eligible for this ranking. All nursing homes who did not report their COVID-19 data for the week of August 2nd until the date of August 27th (last available update before the raking process ended) were excluded from the ranking, regardless of the amount of recommendations received or performance in other areas.

Additionally, the data sent by nursing homes had to pass the quality assurance checks performed by the CDC. These checks identify instances were facilities may have entered incorrect data.

To ensure that only nursing homes with an appropriate handling of the situation were awarded, the number of confirmed COVID-19 cases had to be less than 30% of the total number of residents and the number of COVID-19 related deaths had to be less than 20%. To calculate the percentages, two given numbers from the official dataset were used: *Total resident confirmed COVID-19 cases per 1000 residents* and *total resident COVID-19 deaths per 1,000 residents* (until the date of August 2nd). This two-step approach ensures that even nursing homes who fail to do the proper amount of testing are excluded due to a conspicuous number of deaths.

2. With the aim of not only capturing the objective performance of a nursing home, but also the subjective perception from peers, an additional question regarding each nursing homes' COVID-19 response was included in the questionnaire:

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[3] Numbers for Week Ending 05/24/2020 may include reporting for any time between 01/01/2020 through 05/24/2020

Please rate the nursing homes you recommend on a scale from 1 ("Very Poor") to 7 ("Excellent"): "Management in times of the COVID-19 crisis (e.g. safety of residents, communication, hygiene measures)".

This question generated thousands of responses regarding the nursing homes handling of the situation and allowed to differentiate nursing homes by their COVID-19 response.

3. Regardless of the data quality, Statista and Newsweek performed extensive background checks on each of the awarded nursing homes and their response to the COVID-19 outbreak. This exhaustive research ensured that, as of time of publication in September 2020, the awarded nursing homes did not have a critical outbreak of the COVID-19 virus.

2. Ranking Model

A score was calculated for every nursing home that was part of the analysis. The score is based on three data sources:

a. Performance Data Score

The U.S. Centers for Medicare & Medicaid Services (CMS) provides monthly updated performance data for each nursing home that participates in Medicare or Medicaid. The Nursing Home Compare website (medicare.gov/nursinghomecompare) administered by CMS assigns an overall ranking of one to five stars based on a nursing home's performance on three separate measures: health inspections, staffing, and quality measures. All three
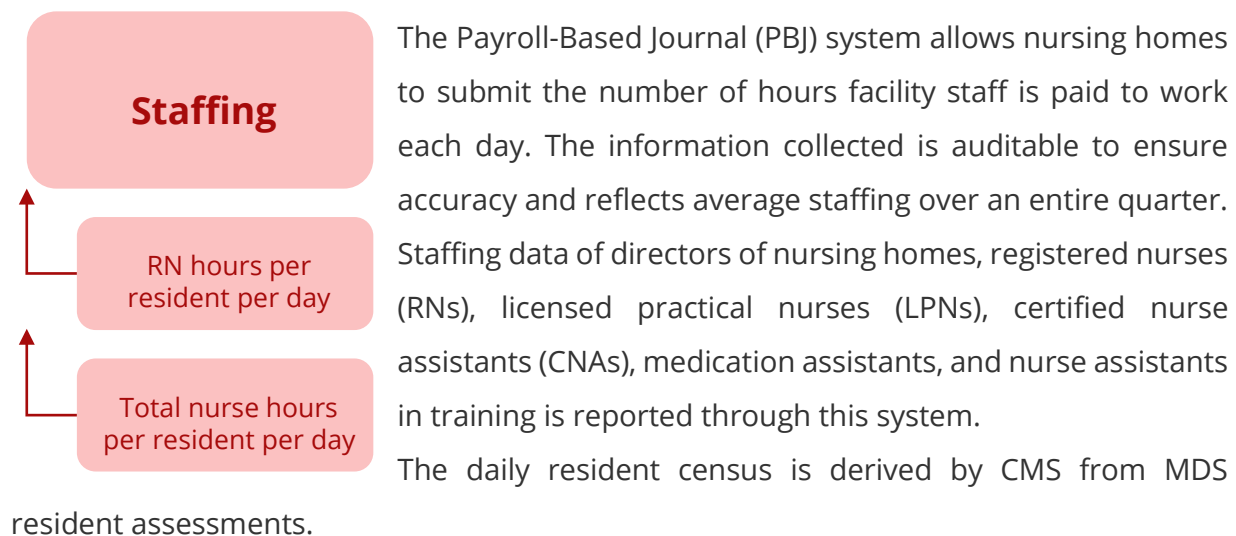
domains have their own star ratings from one to five stars. Better quality is indicated by more stars.

Statista modified the CMS approach by redistributing the assignment of the underlying measures to a 10-point score instead of 5 stars to allow for a finer evaluation of a nursing home performance. In addition, an awarded nursing home must have achieved an average of 5 out of a maximum of 10 points over all three measures, so that only nursing homes that show at least a satisfactory level of performance are awarded.

Statista used CMS data that was published in July 2020 to determine the performance of nursing homes. This data is derived from three main sources: the Minimum Data Set (MDS), a standardized assessment tool that measures health status of nursing home residents, the Centers for Medicare & Medicaid Services' (CMS) health inspection database, and Medicare claims data, representing claims for various types of services that Medicare pays for including prescription drug purchases, inpatient and outpatient utilization, and more.

The ranking of nursing home domains by survey participants was used to determine the weights for creating the overall performance data score. The nurse staffing score is weighted more heavily with 40% than the quality of care score with 36% followed by 24% for the health inspection score.

i. Staffing Domain

Staffing

RN hours per resident per day

Total nurse hours per resident per day

The Payroll-Based Journal (PBJ) system allows nursing homes to submit the number of hours facility staff is paid to work each day. The information collected is auditable to ensure accuracy and reflects average staffing over an entire quarter. Staffing data of directors of nursing homes, registered nurses (RNs), licensed practical nurses (LPNs), certified nurse assistants (CNAs), medication assistants, and nurse assistants in training is reported through this system.

The daily resident census is derived by CMS from MDS resident assessments.

CMS rates each nursing home based on two measures: **Registered nurse (RN) hours per resident per day** and **total staffing** (the sum of registered nurse, licensed practical nurses and nurse assistants) **hours per resident per day**.

Registered nurse hours per resident per day and total staffing hours per resident per day are calculated by using the sum of registered hours as a numerator and the residents census as the denominator of each nursing home.

$$\frac{\sum \text{PBJhours}}{\sum \text{residentCensus}} = Hours_{Reported}$$

These measures are adjusted for each facility to consider different levels of care needed for individual residents. CMS adjusts the reported staffing ratios for case-mix, using the Resource Utilization Group (RUG-IV) case-mix system.

$$(Hours_{Reported} \ / \ Hours_{Case-Mix}) * Hours_{Case\_Mix\ National\ Average} = Hours_{Adjusted}$$

For both staffing measures, CMS assigns ratings of 1 to 5 stars based on rating cut points. Statista and Newsweek follow this approach but base the rating on a finer evaluation of the adjusted hours per resident day distribution of both staffing types.

Rating cut points[4] are set using a percentile-based method. Each point category from 1 to 10 represents 10 percent of the distribution.

Staff Type	10 points	9 points	8 points	7 points	6 points	5 points	4 points	3 points	2 points	1 point
Registered Nurse	≥ 0.963	≥ 0.773	≥ 0.658	≥ 0.586	≥ 0.520	≥ 0.459	≥ 0.400	≥ 0.347	≥ 0.284	< 0.284
Total	≥ 4.408	≥ 4.100	≥ 3.876	≥ 3.692	≥ 3.529	≥ 3.381	≥ 3.225	≥ 3.062	≥ 2.824	< 2.824

Note: Adjusted staffing values are rounded to three decimal places before the cut points are applied.
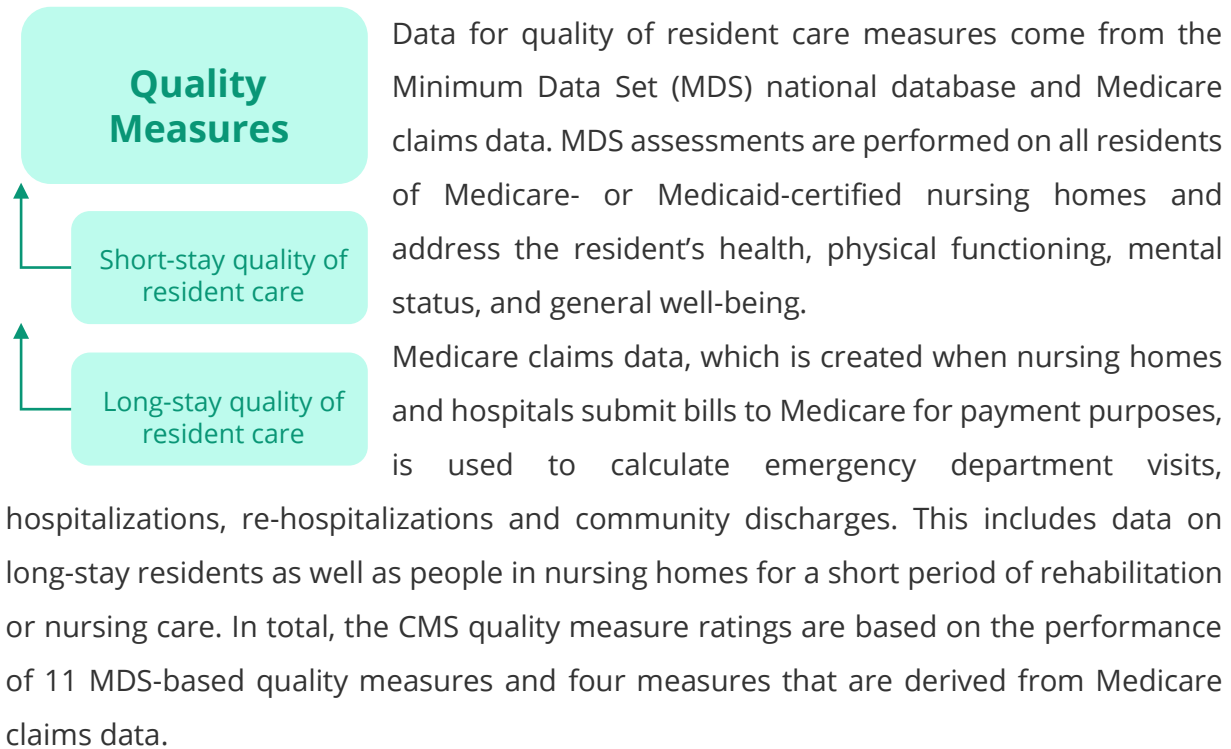
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[4] A rating cut point is the threshold where a rating switches from a rating of 10 to 9 for example.

To achieve 10 points in both staffing measures a nursing home must have provided an adjusted average of at least 4.408 hours of total nursing staff per resident per day and at least 0.963 hours of registered nurse hours per resident per day.

An overall staffing rating is derived by calculating the arithmetic average of both staffing ratings. If the overall staffing is not a whole number, the average is "rounded towards" the registered nurse rating. E.g., if a nursing homes RN rating is 10 and total staff rating 7, the average is 8.5. This result is rounded to an overall staffing rating of 9. The table on the following page shows the rounding rules in detail.

RN rating and adjusted hours		Total nurse staffing rating and adjusted hours (RN, LPN and nurse aide)									
		10	9	8	7	6	5	4	3	2	1
		≥4.408	≥4.100	≥3.876	≥3.692	≥3.529	≥3.381	≥3.225	≥3.062	≥2.824	<2.824
10	≥ 0.963	10	10	9	9	8	8	7	7	6	6
9	≥ 0.773	9	9	9	8	8	7	7	6	6	5
8	≥ 0.658	9	8	8	8	7	7	6	6	5	5
7	≥ 0.586	8	8	7	7	7	6	6	5	5	4
6	≥ 0.520	8	7	7	6	6	6	5	5	4	4
5	≥ 0.459	7	7	6	6	5	5	5	4	4	3
4	≥ 0.400	7	6	6	5	5	4	4	4	3	3
3	≥ 0.347	6	6	5	5	4	4	3	3	3	2
2	≥ 0.284	6	5	5	4	4	3	3	2	2	2
1	< 0.284	5	5	4	4	3	3	2	2	1	1

ii. Quality Measure Domain

Quality Measures

↑
Short-stay quality of resident care

↑
Long-stay quality of resident care

Data for quality of resident care measures come from the Minimum Data Set (MDS) national database and Medicare claims data. MDS assessments are performed on all residents of Medicare- or Medicaid-certified nursing homes and address the resident's health, physical functioning, mental status, and general well-being.

Medicare claims data, which is created when nursing homes and hospitals submit bills to Medicare for payment purposes, is used to calculate emergency department visits, hospitalizations, re-hospitalizations and community discharges. This includes data on long-stay residents as well as people in nursing homes for a short period of rehabilitation or nursing care. In total, the CMS quality measure ratings are based on the performance of 11 MDS-based quality measures and four measures that are derived from Medicare claims data.

The quality measure domain consists of three ratings. An overall QM rating, a long-stay QM rating and a short-stay QM rating. Short-stay resident quality measures show the average quality of resident care in a nursing home for those who stayed in a nursing home for 100 days or less. Long-stay resident quality measures show the average quality of care for certain care areas in a nursing home for those who stayed in a nursing home for 101 days or more. Some nursing homes only have long-stay or only short-stay QM ratings. In this case, the overall QM rating is equal to the long-stay or the short-stay QM rating.

Measures to determine the long-stay rating are:

- o Number of hospitalizations per 1000 long-stay resident days
- o Number of outpatient emergency department visits per 1000 long-stay resident days
- o Percentage of long-stay residents whose need for help with daily activities has increased
- o Percentage of long-stay residents who received an antipsychotic medication
- o Percentage of long-stay residents whose ability to move independently worsened

- o Percentage of long-stay residents with a catheter inserted and left in their bladder
- o Percentage of long-stay residents with a urinary tract infection
- o Percentage of long-stay residents experiencing one or more falls with major injury
- o Percentage of high risk long-stay residents with pressure ulcers

Measures to determine the short-stay rating are:

- o Percentage of short-stay residents who were rehospitalized after a nursing home admission
- o Risk-Standardized discharge to Community Rate
- o Percentage of short-stay residents who made improvements in function
- o SNF residents with pressure ulcers that are new or worsened
- o Percentage of short-stay residents who newly received an antipsychotic medication

CMS used imputation for nursing homes with missing data that do not reach the minimum of 20 MDS assessments or 20 nursing home stays in terms of missing claims data. All available assessments (or stays) are used by CMS and are supplemented by state average values to reach the minimum number. Data for quality measures that use imputed data are not reported on the Nursing Home Compare website and are also not included in the downloadable datasets at data.medicare.gov.

The four most recent quarters for which data is available are used to determine the ratings. In the case of claims-based measures and the short-stay pressure ulcer measure a full year of data is used without being broken out by quarter.

Different weights are used to assign QM points to individual quality measures. Some measures have a maximum of 150 points whereas others have a maximum of 100 points. In case of a maximum of 150 points Nursing homes are grouped into deciles based on the national distribution of the individual QMs. The lowest performing decile receives 15 points, increased incrementally each decile by 15 to a maximum of 150 points for the best performing decile.

Nursing homes are grouped into quantiles where the maximum of QMs is 100 points. Nursing homes in the lowest performing quantile receive 20 points. Points are increased in 20-point steps for each quantile to a maximum of 100 points.

All long-stay QM points and all short-stay QM points are then summed for each nursing home. The difference in weightings and number of measures results in a maximum of 1150 points for the long-stay QM score and a maximum of 800 for the unadjusted short-stay QM score. A factor of 1150/850 is applied to the unadjusted short-stay QM score, so that both QM sub-scores count equally in the overall QM score.

Statista and Newsweek modify this approach by not interpolating missing data from MDS assessments or nursing home stays with the state average. Instead, only the available QMs of the respective nursing home are used. The achievable maximum score of the long-stay and short-stay measures are calculated individually for each nursing home. In order to calculate a maximum score, a minimum of 3 out of 6 QMs for the short-stay score and a minimum of 5 out of 9 QMs for the long-stay score are set. The individual short-stay and long-stay score is then adjusted with a factor of 1150 divided by the individual maximum score.

For example, if data for 5 long-stay measures is reported that each have a maximum score of 150 the individual maximum score for the respective nursing home is 750. If the summed score of these 5 measures is 580 the adjusted long-stay score is determined by multiplying the value with an adjustment factor of 1150/750. This is done so that both QM sub scores count equally in the overall score. Both scores and the combined overall QM score of these two are then assigned a rating by using the thresholds in the table below. Statista and Newsweek follow the CMS approach but base the rating assignment on a finer evaluation of the score distributions.

QM Rating	Long-Stay QM Rating Treshold	Short-Stay QM Rating Treshold	Overall QM Rating Treshold
1 Point	120 – 455	115 – 438	452 – 972
2 Points	456 – 520	439 – 525	973 – 1087
3 Points	521 – 570	526 – 575	1088 – 1174
4 Points	571 – 615	576 – 625	1175 – 1245

5 Points	616 – 655	626 – 667	1246 – 1312
6 Points	656 – 695	668 – 704	1313 – 1378
7 Points	696 – 735	705 – 748	1279 – 1450
8 Points	734 – 790	749 – 798	1451 – 1532
9 Points	791 – 855	799 – 863	1533 – 1634
10 Points	856 – 1150	864 – 1150	1635 – 2300

iii. Health Inspection Domain

Health Inspections

Annual Inspection 1

Annual Inspection 2

Annual Inspection 3
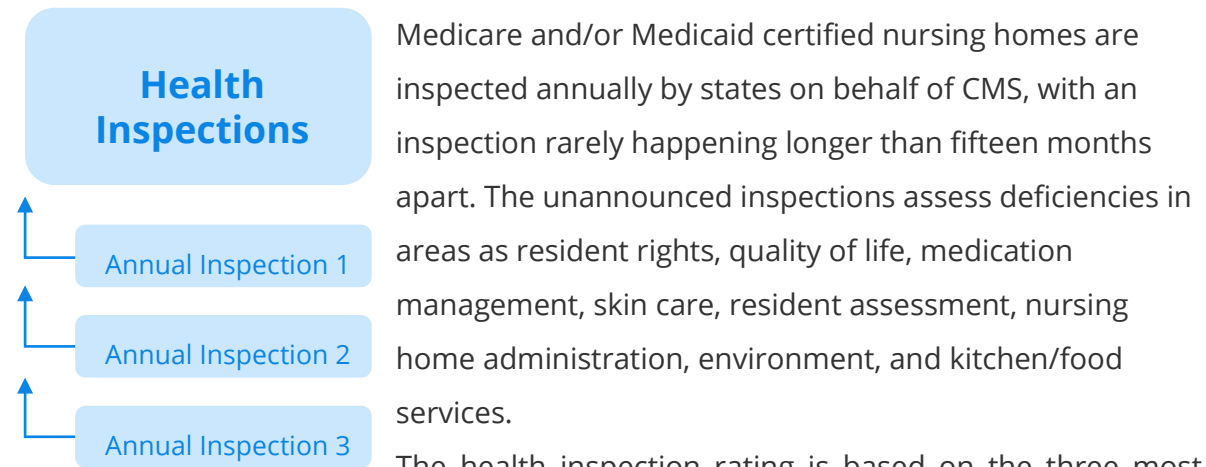
Medicare and/or Medicaid certified nursing homes are inspected annually by states on behalf of CMS, with an inspection rarely happening longer than fifteen months apart. The unannounced inspections assess deficiencies in areas as resident rights, quality of life, medication management, skin care, resident assessment, nursing home administration, environment, and kitchen/food services.

The health inspection rating is based on the three most recent inspection surveys that are conducted by a team of healthcare professionals. More recent surveys are weighted more heavily than earlier surveys. The most recent survey is weighted with 1/2, the previous survey with a factor of 1/3 and the third survey with a factor of 1/6.

CMS assigns points to individual health deficiencies according to their extent and severity. Widespread deficiencies receive more points than isolated deficiencies and severe deficiencies receive more points than those which pose minimal harm for residents.[5]

As health inspections are based on federal regulations, the inspection process and outcome vary between states. The variations derive from many factors, which include but are not limited to differences in survey management, state licensing laws and policies

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[5] Scores for different types of deficiencies can be looked up in the Technical User's Guide of the Nursing home compare website on
https://www.medicare.gov/nursinghomecompare/Data/About.html#technicalDetails

in the state-administered Medicaid program. To address this, CMS health inspection ratings are based on the relative performance of a nursing home within a state.

Statista and Newsweek follow this approach but base the rating on a finer evaluation of the health inspection point distribution in each state.

- o The top 10 percent (with the lowest health inspection weighted scores) in each state receive a health inspection rating of ten points.
- o The middle 70 percent of facilities receive a rating of two, three, four, five, six, seven, eight or nine points. The 70 percent is divided into eight sections, each representing 8.75% of the distribution, with points awarded according to where they placed.
- o The bottom 20 percent receive a one-point rating.

Nursing homes, that are included in the Special Focus Facility (SFF) program and nursing homes which have not been assigned a weighted score by CMS have not received a health inspection rating from Statista and Newsweek.

b. Reputation Score

In cooperation with Newsweek, Statista invited about 12,500 medical experts (registered nurses, nursing home managers and administrators, licensed practical nurses / licensed vocational nurses, nursing assistants, therapists and physicians) to an online survey. Additionally, experts from all over the US could participate in the survey of the Best Nursing Homes by State on newsweek.com. It was mandatory to perform an email verification and self-recommendation was not possible (e.g. recommendations for the same nursing home at which a respondent was employed were not counted in the evaluation). The survey data was collected from July to August 2020.

Participants were distributed as follows - 65% therapists and medical doctors, 25% registered nurses, 6% LPN, LVN and nursing assistants, and 4% managers and administrators.

Participants were asked to name up to five of the best nursing homes in the US and up to five of the best nursing homes in their respective home states. They were asked to recommend nursing homes by considering the quality of care offered, staff training level, and the number of on-duty personnel.

Entry of recommendations was aided by an autocomplete function, which showed nursing homes based on the letters that have already been entered. It was also possible to recommend any nursing home that was not proposed by the autocomplete list. The number of state and national recommendations were summed equally. A score was assigned to each nursing home based on the number of recommendations.

In addition to the recommendations, participants were asked to rank a list of nursing homes from their own state by assigning a ranking position to these nursing homes (Top 1, Top 5, Top 10, Top 20, Top 50, etc.). The average ranking position was subsequently converted into a ranking score.

The ranking score and the score based on the number of recommendations were combined and make up 60% of the reputation score (as shown in the ranking model at the beginning of chapter 2).

Last, participants were asked to rate the recommended nursing homes in their own state in 4 different categories:

1. Management in times of the COVID-19 crisis (e.g. safety of residents, communication, hygiene measures)
2. Quality of care (e.g. treatments/ therapies, consultation with doctor/ therapist)
3. Accommodation & Service (e.g. size of room, quality of furnishing, meals, leisure activities)
4. Overall nurse staffing (e.g. Qualifications, experience, number of nurses)

For each category, the respondents were asked to rate the respective nursing home on a scale from 1 ("Very poor") to 7 ("Excellent").

The first category was then used to calculate the COVID-19 score, that accounts for 20% of the total reputation score. The other 3 categories were used to calculate the quality score, which also accounts for 20% of the total reputation score (as shown in the ranking model at the beginning of chapter 2).

c. Covid-19 Score

As described in chapter 1c, the numbers "total resident confirmed COVID-19 cases per 1000 residents" and "total resident COVID-19 deaths per 1,000 residents" were used to

make sure that only nursing homes with less than 30% Cases and 20% are included in the ranking. These numbers are also used to calculate a score for the remaining nursing homes. The ones with the least cases/deaths received the highest score. The score calculated for "total resident confirmed COVID-19 cases per 1000 residents" accounts for 20% of the COVID-19 score, the score for "total resident COVID-19 deaths per 1,000 residents" accounts for 30%.

The remaining 50% of the COVID-19 score is calculated based on 11 different indicators for medical supply and staffing, taken from the officially reported data. Among other information, nursing homes had to respond to the following statements with either yes or no:

- o Shortage of Nursing Staff
- o Shortage of Clinical Staff
- o Shortage of Aides
- o Shortage of Other Staff
- o One-Week Supply of N95 Masks
- o One-Week Supply of Surgical Masks
- o One-Week Supply of Eye Protection
- o One-Week Supply of Gowns
- o One-Week Supply of Gloves
- o One-Week Supply of Hand Sanitizer
- o Resident Access to Testing in Facility

For the first 4 statements, nursing homes received a higher score if they responded with no, for the remaining 7 they received a higher score if they answered with yes. As with the other COVID-19 data, the reports from August 2nd were used.

d. Overall Rating and State Rank

The overall rating is the weighted average of the performance data score, the reputation score and the COVID-19 score. Each score is weighted with 1/3.

The best 400 nursing homes are awarded with a rank in their own state, resulting in 20 individual lists that are published by Newsweek.

3. Disclaimer

The ranking is comprised exclusively of nursing homes that are eligible regarding the above-mentioned scope; a mention is therefore a positive recognition and is an indication of quality. The ranking was created through an elaborate process. The information provided in this ranking should be considered together with other information about nursing homes or, if possible, accompanied by a visit to a facility. The quality of nursing homes that are not included in the list is not disputed.