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World's Best Hospitals 2023 – Methodology

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1 Introduction

Patients are faced with the critical and difficult decision of choosing the right hospital for their medical needs, a choice that was often solely determined by word of mouth or the recommendation of a single physician (e.g. their general practitioner) in the past. Structural characteristics of a hospital such as its number of beds or its number of medical staff are unreliable indicators for quality of care and therefore not suited as a basis for decision making. In the last decade, the number of web-based portals, websites and databases that aim to help with this decision by providing data about hospitals have increased, ranging from relatively short and superficial news articles to specific databases with multiple quality indicators per hospital within a specific country. However, none of the available resources to date have attempted a methodologically sound international ranking of hospitals based on a comprehensive score that gives an indication of where each hospital stands relative to its peers. Most available resources do not even feature a full overview of the major hospitals in one country, instead focusing on certain specialties or diseases, much less a ranking of these hospitals.

The World's Best Hospitals 2023 ranking is a project which aims to close this gap by **ranking the best hospitals across the world**. Its vision is to establish the ranking as the best and most comprehensive resource for global top lists in the hospital sector. A total of 28 countries are featured in the 2023 edition: USA, Germany, Japan, South Korea, France, Italy, United Kingdom, Spain, Brazil, Canada, India, Australia, Mexico, The Netherlands, Austria, Thailand, Switzerland, Sweden, Belgium, Finland, Norway, Denmark, Israel, Singapore, United Arab Emirates, Colombia, Saudi Arabia, and Taiwan. The countries were mainly selected based on standard of living and life expectancy, population size, number of hospitals and data availability.

The current 2023 edition of the ranking is an extension and update of the annual World's Best Hospital ranking which was first published by Newsweek and Statista in March 2019 and featured the top 1,000 hospitals in 11 countries. In the 2023 edition, **28 countries and over 2,300 hospitals are featured in total**, the most extensive and international edition to date. The number of hospitals awarded in each country varies based on the number of existing hospitals, average hospital size (commonly approximated by number of inpatient beds) and data availability in the respective country. The length of the list varies, with 420 USA-based hospitals included, while Israel and Singapore were represented with 10 hospitals each.

Hospitals which are not accessible to the public and / or very small were excluded from the ranking since they were very unlikely to receive enough recommendations to make the final list and are not comparable to general hospitals in the range of services provided. The authors of this study used the average number of beds per hospital in each country as a guideline to identify very small hospitals, resulting in varying thresholds per country. For example, the smallest hospital in national ranking for Italy has 196 inpatient beds, whereas the smallest hospital in the ranking for France has 114 inpatient beds. This approach accounts for the substantial differences in average hospital sizes across countries and ensures a base level of comparability of national hospitals.

Every hospital in each country was rated by a score, which is based on four data sources:

- **Recommendations from medical experts** (doctors, hospitals managers, health care professionals)
- Existing **Patient satisfaction** data
- **Hospital quality metrics**
- **Patient Reported Outcome Measures (PROMs)** implementation survey

These Rankings are only comparable for hospitals within the same country because different sources for patient experience and hospital quality metrics were examined in each country and given the complexity of the various data sources, it was not possible to harmonize this data. For the same reason, cross-country comparisons of the raw values of the scores are also not possible (example: A score of 90 in country A does not necessarily mean that this hospital is better than a hospital with a score of 87 in country B).

Nevertheless, one aim of this project was to create a **Global Top 250 ranking**, mainly based on international recommendations from peers who were not from the same country that the hospital is located in. To achieve this, the number of international recommendations and the national ranking were combined into a global rank, resulting in a Global Top 250 list (see chapter 2.6).

The overall aim of this study is to provide the best possible data-based comparison of hospital reputation and performance across countries.

To this end, the World's Best Hospitals 2023 ranking is intended to be a resource to help patients make a more informed and data driven decision when choosing the right hospital for their medical needs, as well as to provide a composite benchmark for hospitals which is indicative of their relative performance when compared to their national and international peers.

Statista and Newsweek are taking the ongoing COVID-19 pandemic very seriously. Over the last two years, hospitals have often been the center of attention and have faced unprecedented challenges. Statista and Newsweek have put meticulous efforts into evaluating individual hospital responses and researching their situation as of January 2023 and identified critical cases as best possible (based on the information available at the time). Situations where health care systems were strained beyond capacity were considered in the process of measuring the hospital's response. Based on the results of this process several hospitals from different countries were not eligible for the 2023 ranking. Since this is an ongoing situation as of January 2023, Statista and Newsweek will continue to monitor events related to COVID-19, however the rankings presented in this project cannot and should not be used to make any predictions or claims regarding future pandemic responses by individual hospitals.

2 Study Design

The following sections provide an overview of the study design and the underlying methodology used to determine the various rankings. First, the new implemented features and changes in this year's edition will be described. Second, the general approach is outlined in chapter 2.2, followed by a description of the role of the global board of medical experts (chapter 2.3), the scoring model (2.4) and the approaches that were used to create a specialized hospital list and the Global Top 250 list. These approaches differ from the overall study design and are therefore described separately in chapters 2.5 and 2.6. This section is followed by a more in-depth description of specific rankings in chapter 3.

2.1 New features and changes in the 2023 edition

The following list provides a brief overview of all major changes in this year's edition compared to the World's Best Hospitals 2022 ranking:

- **PROMs implementation survey:** For the first time, Statista and Newsweek surveyed hospitals regarding their PROMs implementation status. Results from this survey were included in the scoring process of the ranking.
- **Featuring one new country: Taiwan.** One main goal of this project is to increase the global coverage each year to provide the reader with the most comprehensive ranking of the World's Best Hospitals. The additional country was primarily chosen based on data availability and comparability of health care systems (see chapter 3 – Country Specific Methodology).

- **Addition of accreditations:** The Healthcare Accreditation Institute in Thailand and the Joint Commission of Taiwan have been added to the scoring model. Accreditations reflect a range of structural and/or quality requirements which are now relevant for the national rankings (see chapter 3).
- **New hospital quality metrics data sources:** Several new hospital data sources were added, most notably data from the Israeli National Program for Quality Indicators (INPQ) for Israel and the Danish Clinical Quality Program for Denmark (see chapters 3.17 and 3.16 for details).

2.2 General Methodology

The study design of the 2023 World's Best Hospital project is based upon four pillars:

Hospital evaluation based on four data sources

Data Sources



Hospital recommendations from peers: The peer recommendations were collected in two survey waves. First, Newsweek and Statista performed an online survey among tens of thousands of doctors, health care professionals and hospitals managers in 28 countries. **Over 80,000 medical experts in the 28 surveyed countries were invited to participate** in the online survey.

The data was collected by Newsweek and Statista during an initial survey period from September to November 2022. The survey was also promoted on newsweek.com. Participants were asked to recommend hospitals in their own country as well as in other countries. The questionnaire did not suggest a list of recommended hospitals; therefore, respondents were free to suggest any hospital they deemed recommendable (merely

aided by an autocomplete function for convenience). Self-recommendations were not allowed. Statista performed plausibility checks on all data to prevent self-nomination. For the second survey period, Statista asked physicians (general practitioners and specialists) to classify a set number of hospitals per country (the selected amount per country was relative to the total number of hospitals in the respective country). The list was comprised of the hospitals which received the highest number of national recommendations in the first wave as well as the leading hospitals from the previous year's ranking (both criteria had a huge overlap). Participants were asked to assign a ranking position to these hospitals (e.g. Top 1, Top 5, Top 10, Top 20, Top 30, Top 50, Top 100).

Answers were then weighted by a) the type of respondent by profession (with doctors receiving the highest weight) and b) the confidence respondents had in their vote (0-100%). Combined, the two survey periods resulted in more than 70,000 individual hospital recommendations.

Finally, the combined data was analyzed and a national, as well as an international, recommendation score (0-100%) was calculated for every hospital in each country based on the weighted number of national and international recommendations. The hospital with the highest number of weighted national recommendations always received a national recommendation score of 100%. The next best hospitals, in general, received a score relative to the number of weighted national votes they received, e.g. when hospital A received the most votes with 100, hospital B with 80 votes receives a score of $\frac{80}{100}=80\%$. In some cases, mostly for smaller countries, where one hospital would accumulate significantly more votes than the next best hospitals, the scoring curve was smoothed slightly to reduce the drop-off in relative scores, e.g. the abovementioned hospital B would be adjusted around 85% or 90% in the same situation but always less than the leading hospital. Since the achieved score is only relative to other hospitals within the same country, this is a mathematically correct approach to grade hospitals by the received recommendations. The calculation of the international recommendation score was the same as with the national score, but the scoring drop-off was smoothed for all countries to account for the lower average number of international votes (without the smoothing factor distribution is more skewed).

Patient experience: Publicly available data from existing patient surveys were used to analyze patient experience. Patient surveys are typically conducted by insurance companies among patients after their hospitalization.

Examples of survey topics include:

- General satisfaction with hospital
- Recommendation of hospital
- Satisfaction with medical care
- Satisfaction with service and organization

As a dimension of perceived quality, **patient experience reflects both the quality of care** (from the patient's perspective) **as well as the patient's satisfaction with the hospital stay**, including service factors such as friendliness of the staff or quality of food. Although there is some overlap between medical outcomes and hospital quality metrics, we consider this a separate quality dimension as has been established in scientific literature on patient reported outcomes and patient reported experiences in recent years.

An overview of the patient satisfaction data used in each country is provided in chapter 3. Data on patient' experience from official sources was not available for Austria, Denmark, Finland, Norway, Sweden, Thailand, Belgium, Spain, Mexico, Australia, Canada, Singapore, India, Brazil, Japan, United Kingdom, Colombia, Saudi Arabia, the United Arab Emirates and Taiwan. In these countries evaluations from Google serve as a substitute but were considered with a lower weight in the scoring model (see chapter 2.4). Based on the available data, a patient satisfaction score (0-100%) was calculated for each hospital in each country using the weighted sum of indicators available in the specific data set.

Hospital quality metrics: Hospital quality metrics from a variety of public sources were collected for most countries. These metrics differ greatly between countries. Some examples for indicators are:

- Data on quality of care for specific treatments
- Data on hygiene measures and patient safety
- Data on staffing, e.g. number of patients per doctors / per nurse

An overview of the hospital quality metrics used in each country is provided in chapter 3. The data sources were identified through an extensive research process in each country and through consultation with local experts. Some publicly available data sources were excluded for reasons mostly related to data quality and/or availability, e.g. certain data was only available for a small number of hospitals in a given country or the number of missing values in regard to the hospital quality metrics was too high to perform a valid analysis. As a result of this process, hospital quality metrics were not available for Belgium, Finland, India, The Netherlands, Spain, Mexico, Singapore, Thailand, Colombia,

Saudi Arabia, the United Arab Emirates and Taiwan. For each country with available data, a hospital quality metrics score (0-100%) was calculated based on the characteristics of the specific dataset.

PROMs implementation survey: PROMs are defined as standardized, validated questionnaires completed by patients to measure their perception of their functional well-being and quality of life. In recent years, PROMs measurement and the pursuit for patient centered care has become a key topic in health care systems worldwide.

Newsweek and Statista recognize the importance of this topic for global advancements in health care delivery and, together with the guidance of the global board of medical experts, have developed a survey about the implementation and use of PROMs across different specialties and departments in hospitals. The survey was sent out to hospitals in fall/winter 2022 and participation was also possible on Newsweek.com.

The overall **purpose of this survey is to determine the status quo of implementation of generic and condition specific PROMs** in hospital settings as well as the hospital's efforts towards reporting and using the data both internally and externally for the purpose of improving health care delivery. For this, the global board of medical experts provided methodological input and guidance regarding the importance and development of the PROMs topic in a clinical setting. Furthermore, the board provided feedback on each of the questions within the survey to capture the most relevant PROMs information from the hospitals. An outline of the questions can be found below and the full questionnaire can be accessed via this [link](#).

PROMs Questions:

- The hospital has a unified platform for PROMs collection? (Yes/No)
- Number of standardized PROM instruments measured and the departments they are being measured for.
- The condition and/or departments measuring PROMs, whether case-mix adjustment was taken into account, and the percentage of patients that complete the PROMs questionnaire for each condition
- Auditing of the data prior to being published? (Internal/External/Both)
- Internal reporting of PROMs data to clinicians and/or patients? (Yes/No)
- External reporting of PROMs results? (Yes/No)
- Use of PROMs data to optimize care processes? (Yes/No)
- Use of PROMs data to support therapeutic decisions in real-time? (Yes/No)
- Sharing and comparing of PROMs data with other institutions to learn from each other? (Yes/No)

Furthermore, a grading system was built to determine the PROMs implementation score which has been added for the first time to the project. The PROMs implementation score range was defined as 70-100%, meaning that only hospitals which achieved a minimum of 70% (of the maximum 100% score) were eligible to be graded on the PROMs implementation score curve (as shown in the scoring model in 2.4).

The long-term goal is to establish this questionnaire, as the leading measure for PROMs implementation on an international level.

To highlight hospitals which participated in the survey and received a PROMs implementation score, those that reported measuring PROMs are displayed in the corresponding column of the ranking.

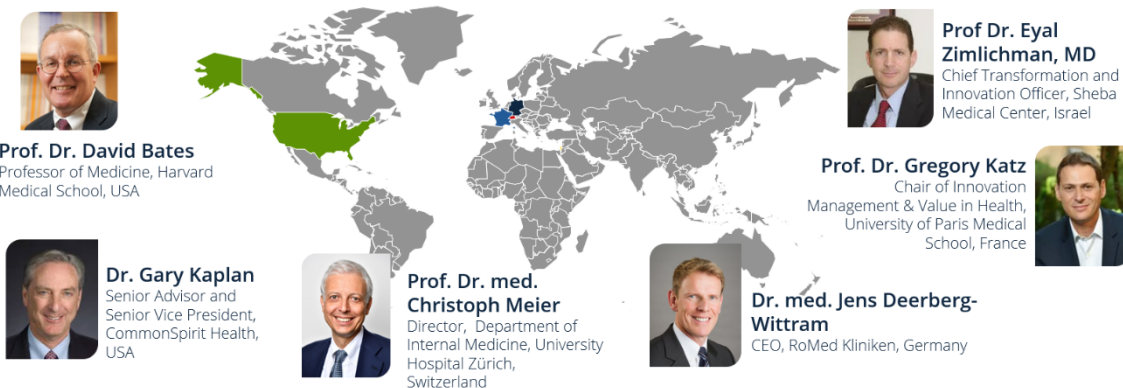
The national recommendation score, the international recommendation score, the patient satisfaction score, the hospital quality metrics score (when available) and the PROMs implementation score were used to calculate a **hospital score**.

2.3 The Global Board of Medical Experts

The following section outlines the function of the global board of medical experts which was founded by Statista to support the World's Best Hospital Project.

The idea behind the global board of medical experts is to create an independent body that is tasked with the continuous development of the quality and scope of the project. The global board of medical experts is therefore tasked with providing guidance and input for the continuous development and future expansions of the methodology. This includes input regarding new data sources, future methodological considerations, as well as the ongoing development of the PROMs implementation survey. The members of the global board of medical experts were carefully chosen based on their national and international expertise and decade-long experience in their respective medical fields as well as their scientific output. Current members of the global board of medical experts are:

The global board of medical experts

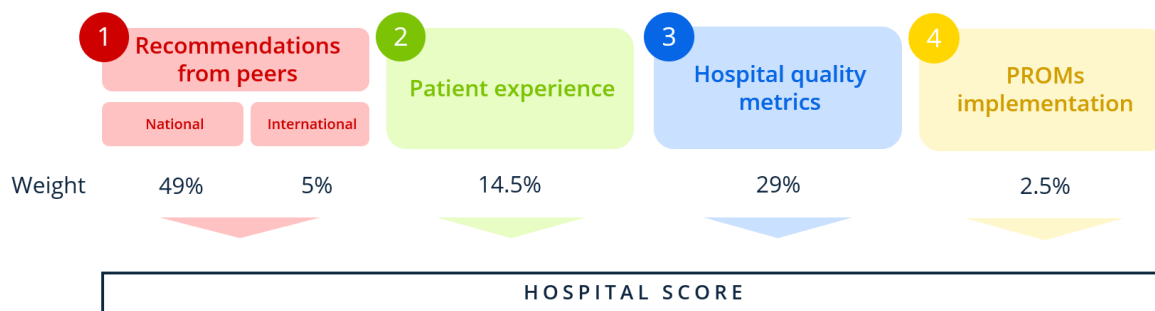


The global board of medical experts and the Statista team also gather for an annual conference where they discuss the status quo as well as new ideas and future improvements to the methodology in person.

2.4 Scoring Model

The scoring model is based on the national recommendation score, the international recommendation score, the patient satisfaction score, the hospital quality metrics score, and the PROMs implementation score, using different weights for the individual components as shown in this overview:

Scoring model



As shown above, recommendations from peers (doctors, hospital managers and healthcare professionals) account for 54% (49% national recommendations from peers from the respective country and 5% international recommendations from peers from

other countries) of each hospitals score. They are assigned the highest weighting in the calculation of the score because medical experts are best suited to assess the quality of a hospital. If patient experience data was not available for a certain country Google Star Ratings were used to approximate patient satisfaction. Because these are less reliable as a data source the weight of patient experience in the Scoring Model was reduced to 7%¹.

For countries where hospital quality metrics were not available the weights were re-proportioned accordingly, e.g. the weight of national recommendations from peers increases from $\frac{49}{100}$ to $\frac{49}{71}$ (69%).

The PROMs implementation survey score accounts for 2.5% of the overall hospital score. As PROMs survey participation is optional, for hospitals who did not submit a survey, the three other pillars were used with adjusted weights in the scoring model.

The hospital score is the weighted average of the available scores for each hospital. Based on this score and the chosen cut-off for list length in the given country, hospitals are ranked top to bottom in each country. The results of this ranking are displayed in the country lists published by Newsweek:

Result: tables of the best hospitals in each country

 Example: World's Best Hospitals - USA

Rank	Hospital	Score	City
1	Mayo Clinic - Rochester	97.5	Rochester, MN
2	Cleveland Clinic	92.6	Cleveland, OH
3	Massachusetts General Hospital	92.3	Boston, MA
4	The John Hopkins Hospital	89.9	Baltimore, MD
5	UCLA Health - Ronald Reagan Medical Center	87.8	Los Angeles, CA

[...]

 Example: World's Best Hospitals - Germany

Rank	Hospital	Score	City
1	Charité - Universitätsmedizin Berlin	93.5	Berlin
2	Universitätsklinikum Heidelberg	92.4	Heidelberg
3	Klinikum rechts der Isar der Technischen Universität München	87.1	München
4	LMU Klinikum	86.6	München
5	Medizinische Hochschule Hannover	86.0	Hannover

[...]

2.5 Specialty Hospitals

The study is aimed at rating the reputation and performance of general hospitals. Due to the open design of the study, participants could not be restrained from

¹ Patient Experience Data was not available for: Austria, Denmark, Finland, Norway, Sweden, Thailand, Belgium, Spain, Mexico, Australia, Canada, Singapore, India, Brazil, Japan, United Kingdom, Colombia, Saudi Arabia, the United Arab Emirates and Taiwan.

recommending specialty hospitals. However, these hospitals were not ranked by their performance in the respective medical fields due to the survey structure used, e.g. there was no ranking among hospitals that specialize in treating cancer because the survey questions did not specifically ask for recommendations regarding cancer patients.

The same data sources were used for hospital quality metrics and patient satisfaction scores of specialized hospitals as for general hospitals, but the score calculated using the approach described in 2.4 was removed from the national rankings, resulting in these specialized hospitals not being a part of the main country list. The underlying reason is that specialized hospitals like heart or cancer hospitals differ greatly in their services from general hospitals and should therefore not be compared in their performance to these hospitals. On the other hand, since these hospitals did receive a number of peer recommendations and performed well enough in regard to hospital quality metrics and Patient Satisfaction Scores to enter the national rankings in their respective countries (despite usually being smaller and much more specialized than their general counterparts), the authors of this study decided not to omit specialized hospitals completely. Instead, these are displayed in a separate country list. This list is sorted alphabetically because, as outlined above, specialties are very heterogenous, not only in the treatment/procedures required, but also in the patient population, e.g. when comparing patients from heart clinics to patients from psychiatric clinics. No conclusion should be drawn from the order of the specialized hospitals in this list. Since only a relatively low number of hospitals per country is represented in this list the fact that these specialized hospitals were recommended by peers frequently enough to make the list is a huge distinction compared to other specialized hospitals in the same medical field in their respective country which did not make the list.

2.6 Global Top 250 List

In addition to the country lists, a global list was created to identify the Top 250 best hospitals worldwide.

The **Global Top 250 list** was **determined by the number of international recommendations** received in the survey and their national rank. The ranking in the **global list does not consider any national data sources** for hospital quality data or patient satisfaction because this data is too heterogenous between countries to allow for further cross-country comparison. The logic behind this approach is that hospitals which are ranked higher in the national rankings should not be ranked lower than their national

peers in the international ranking (to ensure internal validity), e.g. #1 in country A was ranked above #2 in country A on the global list.

The global list does not include specialized hospitals for the same reasons they were separated from the national rankings. Hospitals that were distinguished in this Global Top 250 List are the very best hospitals in each country and therefore, across the world. Out of 2330 hospitals included in the 2023 World's Best Hospital Ranking, this elite group represents 10% of all hospitals, making this the most prestigious ranking available to date.

3 Country Specific Methodology

The following section expands on the general methodology outlined in chapter 2 by describing country specific lists and data sources for each country.

3.1 United States of America

There are currently around 6,093 hospitals in the USA according to the American Hospital Association (American Hospital Association 2022). The majority of Hospitals (around 84%) are classified as Community Hospitals, which are defined as all nonfederal, short-term general, and other specialized hospitals. Hospitals that are not accessible to the general public, such as prison hospitals or college infirmaries, are excluded. The number of total staffed beds in all community hospitals in the US is currently 789,354 (American Hospital Association 2022).

Community hospitals differ in terms of ownership type, with around 2,960 being non-government not-for-profit community hospitals, around 1,200 being for-profit community hospitals and the remaining ca. 950 being state and local government community hospitals. There is also a smaller number of other hospitals such as federal government hospitals (around 200) and nonfederal psychiatric hospitals (around 600). Texas and California have the highest number of community hospitals with 523 and 353 respectively, while Delaware and the District of Columbia have the smallest number with 7 and 10.

The hospital quality metrics used for the USA ranking are part of the Medicare "Hospital Compare" dataset published by the Centers for Medicare & Medicaid Services (CMS). This comprehensive dataset revolves around an "Overall Hospital Quality Star Rating", developed by the Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (CORE) and is available for over 4,500 hospitals publicly reporting quality information on the Hospital Compare platform. Each hospital is assigned one to

five stars based on the hospital's overall performance across a number of quality measures regarding common conditions that hospitals treat. Hospitals are only assigned a Star Rating upon meeting certain data availability thresholds (outlined further below). Some more complex or specialty procedures are not reflected in the summary rating. The aim is to generate a comprehensive representation of overall quality that can be interpreted by patients and consumers, but also to identify performance categories within the large number of hospitals in the US.

The following section describes the methodology used by CMS to generate the Star Rating which is crucial to understand as a basis for the hospital quality metrics score used in the World's Best Hospital Ranking for the USA. The latest Star Rating available at the time of the ranking process (October 2022) was used for the scoring model.

To define the aforementioned Star Rating, measures that are relevant in the context of assessing overall hospital quality were identified through stakeholder and expert feedback. Measures that are only reported by a small number of hospitals or which were not necessarily indicative of higher quality were excluded, reducing the total number of included measures to 47 in the currently reported Star Rating. In 2021, CMS implemented a new methodology as a result of stakeholder and expert feedback. In the current methodology, the selected measures were standardized into 5 group performance categories which make up the overall rating:

- Mortality (7)
- Safety of Care (8)
- Readmission (11)
- Patient experience (8)
- Timely and Effective Care (13)²

The hospital quality metrics score for US hospitals in the World's Best Hospital 2023 Ranking was calculated using the latest Star Rating available at the time of the ranking process, which is the October 2022 edition³. The data samples for the group performance rankings were collected from:

² While CMS includes 13 measures for Timely and Effective care, only 11 were reported in the October 2022 data. We thus, consider these 11 measures to build the score for this measure group.

³ Note that the asterisk in the tables of measures indicates measure reporting periods which would have normally included 1Q and 2Q 2020.

Mortality		Data collection	
		From	Through
1.	Death rate for heart attack patients	7/1/2017	12/1/2019*
2.	Death rate for coronary artery bypass graft (CABG) surgery patients	7/1/2017	12/1/2019*
3.	Death rate for chronic obstructive pulmonary disease (COPD) patients	7/1/2017	12/1/2019*
4.	Death rate for heart failure patients	7/1/2017	12/1/2019*
5.	Death rate for pneumonia patients	7/1/2017	12/1/2019*
6.	Death rate for stroke patients	7/1/2017	12/1/2019*
7.	Deaths among patients with serious treatable complications after surgery	7/1/2018	12/31/2019*

Safety of Care		Data collection	
		From	Through
1.	Central line-associated bloodstream infections (CLABSI)	4/1/2019	9/30/2020*
2.	Catheter-associated urinary tract infections (CAUTI)	4/1/2019	9/30/2020*
3.	Surgical site infections from colon surgery (SSI: Colon)	4/1/2019	9/30/2020*
4.	Surgical site infections from abdominal hysterectomy (SSI: Hysterectomy)	4/1/2019	9/30/2020*
5.	Methicillin-resistant Staphylococcus Aureus (MRSA) Blood Laboratory-identified Events (Bloodstream infections)	4/1/2019	9/30/2020*
6.	Clostridium difficile (C.diff.) Laboratory-identified Events (Intestinal infections)	4/1/2019	9/30/2020*
7.	Rate of complications for hip/knee replacement patients	4/1/2017	10/2/2019*
8.	Serious complications	7/1/2018	12/31/2019*

Readmission		Data collection	
		From	Through
1.	Hospital return days for heart attack patients	7/1/2017	12/1/2019*
2.	Rate of readmission for coronary artery bypass graft (CABG) surgery patients	7/1/2017	12/1/2019*

Readmission		Data collection	
		From	Through
3.	Rate of readmission for chronic obstructive pulmonary disease (COPD) patients	7/1/2017	12/1/2019*
4.	Hospital return days for heart failure patients	7/1/2017	12/1/2019*
5.	Rate of readmission after hip/knee surgery	7/1/2017	12/1/2019*
6.	Hospital return days for pneumonia patients	7/1/2017	12/1/2019*
7.	Rate of readmission after discharge from hospital (hospital-wide)	7/1/2019	12/1/2019*
8.	Rate of unplanned hospital visits after an outpatient colonoscopy	1/1/2017	12/24/2019*
9.	Rate of unplanned hospital visits for patients receiving outpatient chemotherapy	1/1/2019	12/1/2019
10.	Rate of emergency department (ED) visits for patients receiving outpatient chemotherapy	1/1/2019	12/1/2019
11.	Ratio of unplanned hospital visits after hospital outpatient surgery	1/1/2019	12/1/2019

Patient experience		Data collection	
		From	Through
1.	Patients who reported that their nurses communicated well	1/1/2019	12/31/2019
2.	Patients who reported that their doctors communicated well	1/1/2019	12/31/2019
3.	Patients who reported that they received help as soon as they wanted	1/1/2019	12/31/2019
4.	Patients who reported that staff explained about medicines before giving it to them	1/1/2019	12/31/2019
5.	Patients who reported that their room and bathroom were clean/ Patients who reported that the area around their room was quiet at night	1/1/2019	12/31/2019
6.	Patients who reported that they were given information about what to do during their recovery at home	1/1/2019	12/31/2019

Patient experience		Data collection	
		From	Through
7.	Patients who understood their care when they left the hospital	1/1/2019	12/31/2019
8.	Patients who gave their hospital a rating on a scale from 0 (lowest) to 10 (highest)/ Patients who would recommend the hospital to their friends and family	1/1/2019	12/31/2019

Timely and effective care		Data collection	
		From	Through
1.	Percentage of healthcare workers given influenza vaccination	10/1/2019	3/31/2020
2.	Percentage of patients who left the emergency department before being seen	1/1/2019	12/31/2018
3.	Percentage of patients who came to the emergency department with stroke symptoms who received brain scan results within 45 minutes of arrival	10/1/2019	9/30/2020*
4.	Percentage of patients receiving appropriate recommendation for follow-up screening colonoscopy	1/1/2019	12/31/2019
5.	Percentage of mothers whose deliveries were scheduled too early (1-2 weeks early), when a scheduled delivery was not medically necessary	10/1/2019	9/30/2020*
6.	Percentage of patients who received appropriate care for severe sepsis and septic shock.	10/1/2019	9/30/2020*
7.	Percentage of outpatients with chest pain or possible heart attack who got drugs to break up blood clots within 30 minutes of arrival	10/1/2019	9/30/2020*
8.	Percentage of patients receiving appropriate radiation therapy for cancer that has spread to the bone	1/1/2019	12/31/2019
9.	Average (median) number of minutes before outpatients with chest pain or possible heart attack who needed specialized care were transferred to another hospital	10/1/2019	9/30/2020*
10.	Average (median) time patients spent in the emergency department before leaving from the visit	10/1/2019	9/30/2020*

11.	Percentage of outpatients with low-back pain who had an MRI without trying recommended treatments first, such as physical therapy	7/1/2019	12/31/2019 *
12.	Percentage of outpatient CT scans of the abdomen that were "combination" (double) scans	7/1/2019	12/31/2019 *
13.	Percentage of outpatients who got cardiac imaging stress tests before low-risk outpatient surgery	7/1/2019	12/31/2019 *

Hospitals may not be able to report data on all measures due to low patient volume. The new 2021 methodology implemented by CMS, uses a simple average of measure scores and Z-score standardization to standardize the measure scores for the previously mentioned 5 measure groups.

Once the group score is estimated for each hospital and each group, the weighted average is calculated to combine the 5 group scores into a single hospital summary score. The weights are proportionally redistributed in case a hospital is missing a measure category or group.

After calculating the summary scores, hospitals are assigned into one of 3 peer groups based on the number of measures for which they report at least three measures: three measure groups, four measure groups, or five measure groups. Finally, hospitals are assigned to star ratings within each peer group using k-means clustering. This way, the summary scores in a particular star rating category are more similar to each other and more different to those in another star rating category.

Group importance: Outcome groups (Mortality, Safety, Readmission) should be weighted higher than process groups (Timely and Effective Care).

- Consistency with existing CMS Policies and Priorities: Weights should be consistent with existing weighting schemes of other CMS programs and the CMS Quality Strategy.
- Stakeholder input: weighting should consider the priorities of medical professionals and patients.

The weighting scheme was also vetted by other stakeholders such as the Patient & Patient Advocate Work Group through a public input period during which feedback was collected. The final weights used were:

Category	Weight
Mortality	22%

Safety of Care	22%
Readmission	22%
Patient Experience	22%
Timely and Effective Care	12%

Based on this weighting scheme the formula for the calculation of the hospital summary score is:

$$\text{Hospital Summary Score}_h = \frac{\sum_{d=1}^5 W_d \alpha_{hd}}{\sum_{d=1}^5 W_d}$$

In a penultimate step, **minimum thresholds** were applied to ensure hospitals with low numbers of certain patient types that were not able to report data on all measures get excluded from public reporting if the total number of reported measures or groups is below the threshold. In the current methodology, the minimum number of measures per group is set at three and the minimum group threshold for a star rating is three groups. Furthermore, CMS now requires that one of the measure groups reported must be the Mortality or Safety of Care outcome group.

Lastly, the summary scores were clustered into five categories to assign the final star ratings. In this classification, a three-star rating is considered average. The classification into star ratings does not conclude that hospitals with the same star rating have identical quality, rather the rating reflects the weighted average of the summarized, group-level quality information for a hospital. Due to this approach, by definition, some hospitals will be close to the boundaries of the next higher/lower star category. Therefore, to get a clearer understanding of the quality of each hospital, the different set of measures contributing to its star ranking are considered.

The distribution of the Star Ratings based on July 2022 results is the following:

Star Rating	Number of Hospitals
5 Stars	431 (13.81%)
4 Stars	895 (28.68%)
3 Stars	895 (28.68%)
2 Stars	702 (22.49%)
1 Star	198 (6.34%)

Because the Star Ratings are highly aggregated, the World's Best Hospital 2023 rankings for the USA do not merely take the Overall Star Rating into account to calculate the hospital quality metrics score. Instead, scores for each measure group were calculated using the approach described in the following. For the measure groups of Mortality, Safety of Care, and Readmissions the percentage of measures which are better than, no different to, and worse than the national average were calculated. We then constructed the hospital quality metrics scoring based on thresholds & conditions specific to each group (e.g. for the mortality group, facilities with 10% of their reported measures above the national average and less than 20% below the national average receive one point). For the groups of Timely and Effective care as well as Patient Satisfaction, percentiles on a national level for each metric within the measure groups were calculated. In the next step, the scores of each metric were compared to the national percentiles and points were assigned according to where they fall in the percentiles. Finally, we averaged the points of all measures within a measure group to build a single measure group score for each facility. The CMS group weighting was then applied to calculate the final CMS score. This ensures that the approach is comparable with CMS but allows for a more differentiated hospital quality metrics score than merely using an overall Star Rating. As a result, our calculation closely approximates the star rating distribution shown above. Furthermore, within our ranking over 70% of the hospitals awarded received a 4- and 5-star rating by the CMS.

The full methodology report for the Hospital Compare Quality Star Rating can be found at:

<https://qualitynet.cms.gov/inpatient/public-reporting/overall-ratings/resources>

Additionally, we took the **Joint Commission** accreditations into account, for which the list of accredited institutions can be found here:

<https://www.qualitycheck.org/>

Hospitals who were on this list, then had the category as a part of their hospital quality metrics score.

Patient Satisfaction

In the US, the Patient Satisfaction Score is based on Medicare HCAHPS data. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey is a standardized survey of hospital patients in the USA regarding their experiences during a recent inpatient hospital stay (HCAHPS 2022). While many hospitals in the US already

collected information on patient satisfaction, prior to HCAHPS there was no national standard for collecting or publicly reporting patients' perspectives of care information that would enable valid comparisons to be made across all hospitals. The most recent dataset available is the October 2022 edition and is based on surveys from patients discharged in 2021. Based on the collected survey data, the CMS reports eleven HCAHPS Star Ratings on Hospital Compare: 10 for the publicly reported HCAHPS measures, as well as an HCAHPS Summary Star Rating. The specific measures are derived from certain items in the HCAHPS survey as shown below:

HCAHPS Composite Measures		Questions
1.	Communication with Nurses	1,2,3
2.	Communication with Doctors	5,6,7
3.	Responsiveness of Hospital Staff	4,11
4.	Communication about Medicines	13,14
5.	Discharge Information	16,17
6.	Care Transition	20,21,22
HCAHPS Individual Items		Questions
7.	Cleanliness of Hospital Environment	8
8.	Quietness of Hospital Environment	9
HCAHPS Global Items		Questions
9.	Hospital Rating	18
10.	Recommend the Hospital	19

Hospitals had to have at least 100 completed HCAHPS surveys over a given four-quarter period to receive a Star rating.

The HCAHPS Summary Star Rating is the average of the Star Ratings. It is constructed from the Star Ratings from the 6 HCAHPS Composite Measures, a single Star Ratings for the two HCAHPS Individual Items listed above and a single Star Rating for the two HCHAPS Global Items (also listed above). The Star Ratings for the HCAHPS Individual Items and HCHAPS Global Items are constructed by calculating the average of the Star Rating for the two individual items contained in these composite measures. The resulting

8 Star Ratings are combined into a simple average and rounded using normal rounding rules:

HCAHPS Summary Star Rating	Rounded Star Rating
≥1.00 and <1.50	1 Star
≥1.50 and <2.50	2 Stars
≥2.50 and <3.50	3 Stars
≥3.50 and <4.50	4 Stars
≥4.50 and ≤5.00	5 Stars

To avoid the loss of information on the individual measures, the World's Best Hospital Patient Satisfaction Score for US Hospitals is based on the more precise individual measures described above rather than the simple Summary Star Rating. This approach also allows for a more precise differentiation of hospitals which are at the upper or lower boundaries of their respective Summary Star Rating category.

The full methodology for the HCAHPS Star Rating is published at:

<https://hcahpsonline.org/en/hcahps-star-ratings/>

Infection Prevention

Hospitals in the US are required to report data about certain infections to the Centers for Disease Control and Prevention (CDC). This data includes the following measures:

- Catheter Associated Urinary Tract Infections
- Central Line Associated Bloodstream Infection
- Clostridium Difficile - laboratory-identified events
- MRSA Bacteremia - laboratory-identified events
- Surgical site infection - Abdominal Hysterectomy
- Surgical site infection - Colon Surgery

For each measure and hospital, a Standardized Infection Ratio is calculated by the CDC and compared to the national average, resulting in a value that is either "above national average", "same as national average" or, "below national average".

To identify, which of the US hospitals that are featured in the national ranking were performing “above national average”, measurement data from 1/1/2021 to 12/31/2021 (most recent data publicly available from CMS by October 2022) was used. A hospital needs to meet the following criteria to be awarded with the Best Infection Prevention award (US only):

- At least 4 of the 6 measures need to be available for the mentioned time period of 2021.
- None of the available measures equals to the value “below national average”.
- At least one available measure equals to the value “above national average”.

All used data was accessed from and is available at:

<https://data.cms.gov/provider-data/dataset/77hc-ibv8>

3.2 Germany

Germany currently has 1,887 hospitals (Statistisches Bundesamt 2021) which can be classified into four groups defined by the type and level of care provided. This classification is based on existing health policy regulations:

- Basic and standard care hospital
- General care hospital
- Maximum/tertiary care hospital
- Specialized hospitals

Basic and standard care hospitals are usually the smallest types of hospitals, providing only general services or basic surgeries. They usually do not have specialty wards. Because of these limitations they are mostly not represented in the World’s Best hospital ranking for Germany.

General care hospitals usually have several specialty wards and even provide maternity care. They usually do not have highly specialized specialty wards, instead referring their patients to specialized hospitals or maximum care hospitals if needed.

Maximum care hospitals usually treat the most complex and resource intensive cases. They are therefore most often equipped with expensive and cutting edge technical and diagnostic equipment as well as specialized physicians. Many maximum care hospitals are university hospitals.

Specialized hospitals, while often providing a range of general services, are focused on certain specialties (e.g. Cardiology) or complex diagnoses (e.g. Cancer). They are represented in the national ranking for Germany relatively often (compared to other countries) because the German hospital landscape is still relatively heavy on specialized hospitals which are known for their expertise in certain medical fields. Their number has been slowly decreasing over the last several years, with a tendency towards centralization into larger and more diversified medical centers.

Hospitals in Germany can be differentiated further by ownership type, with 29% of hospitals being under public, 32% under private non-profit and 39% under private for-profit ownership (Statistisches Bundesamt 2021). The average size of a hospital in Germany is 256 inpatient beds, with public hospitals on average being by far the largest and private hospitals being the smallest on average.

The 2023 edition of the World's Best Hospital list for Germany ranks the top 220 hospitals, which is the second longest list due to the large number of recommendations and the good quality of available hospital quality metrics and patient experience data (see below).

German hospitals are required to publish freely available annual **quality reports** online since 2005 (originally published bi-annually from 2005 - 2012), therefore data on wide ranging hospital quality metrics for German hospitals is readily available. The quality reports provide in-depth information about the structure and services of each hospital, such as range of diagnoses and number of provided treatments, number of staff, hygiene measures, number of complications or barrier-free accessibility. The reports not only feature descriptive information but also quality indicators which give an indication of the quality of the care provided in each hospital. The quality reports of 2020 are the most recent ones available. Further information about hospital quality reports in Germany is available at:

<https://www.g-ba.de/institution/themenschwerpunkte/qualitaetssicherung/qualitaetsdaten/qualitaetsbericht/>

The following hospital quality metrics from the quality reports were used for the World's Best Hospital ranking in Germany because they are most comparable across hospitals and representative of a hospital's general performance:

- Medical Staffing: Number of cases per doctor
- Nurse Staffing: Number of cases per nurse

- Patient safety & Hygiene: Number of measures to increase patient safety (e.g. standardized pre-surgery checklists) and number of measures to increase hygiene (e.g. hospital infection surveillance system)

Additionally, quality of care data from **Qualitätssicherung mit Routinedaten (QSR)** and **Institut für Qualitätssicherung und Transparenz im Gesundheitswesen (IQTiG)** were used for the ranking. QSR is based on claims data from the large German health insurer AOK and includes a substantial number of indicators for a range of surgeries which are analyzed in regard to quality of care. The eleven publicly reported measures which were considered in the scoring model are:

- Hip replacement (Osteoarthritis)
- Surgery for a femoral fracture near the hip joint
- Knee replacement (Osteoarthritis)
- Gallbladder removal for gallstones
- Appendectomy
- Therapeutic cardiac catheter (PCI) in patients without a heart attack
- Surgery for benign prostate enlargement
- Complete prostate removal for prostate cancer
- Closure of inguinal hernia
- Hip replacement (not for fracture or infection)
- Knee replacement (not for fracture or infection)

German hospitals are required to document quality-relevant data on their patients. IQTiG evaluates these data comparatively. The quality indicators documented by a hospital are rated by IQTiG as "Unobtrusive", "Conspicuous", and "Other". These results were taken into account in the scoring model.

The data used for the 2023 ranking was published by the AOK in October 2022 and includes surgeries performed in 2018 to 2020 (with follow up treatment including up until 2021). Additional information about QSR and IQTiG are available at:

<http://www.qualitaetssicherung-mit-routinedaten.de/>

<https://iqtig.org/>

Additionally, the quality results from **Initiative Qualitätsmedizin** (IQM) were used for the ranking. About 500 hospitals from Germany and Switzerland are involved in the IQM to improve the quality of medicine. The six publicly reported measures which were considered in the scoring model are:

- Deaths with primary diagnosis of myocardial infarction
- Deaths with primary diagnosis of heart failure
- Deaths from all forms of stroke
- Cerebral infarction deaths
- Deaths with primary diagnosis of pneumonia
- COPD deaths

Hospitals participating in the IQM received an additional score as part of their hospital quality metrics score.

The quality results of 2022 are the most recent ones available. Further information about hospital quality results in Germany and Switzerland is available at:

<https://www.initiative-qualitaetsmedizin.de/qualitaetsmethodik>

Additionally, the **Emergency Care Levels** provided by the **GKV Spitzenverband** were considered, for which the list of hospitals can be found here:

<https://www.gkv-spitzenverband.de/startseite/startseite.jsp>

Patient Satisfaction

BARMER and AOK, two of Germany's largest health insurers, are performing a patient satisfaction survey since 2011 in cooperation with "Weisse Liste", the leading hospital quality directory in Germany. The survey is based on the Patients' Experience Questionnaire (PEQ) which has been validated scientifically. Since 2018, KKH, a medium sized German health insurer, has joined the survey. In total, over a million patient questionnaires are sent out with a response rate of close to 50%. The survey includes about 15 questions covers the following areas:

- Recommendation of Hospital
- Satisfaction with medical care
- Satisfaction with nursing care
- Satisfaction with service and organization

Results are calculated for each department and aggregated to a total score per hospital. Results are reported for hospitals that have at least 75 completed surveys (or at least 50

for a single department). The detailed description of the survey can be found at the Weisse Liste website:

<https://www.weisse-liste.de/de/service/ueber-krankenhaussuche/versichertenbefragung/>

3.3 Japan

There are currently 8,182 hospitals in Japan, of which 7,128 are general hospitals. Regarding the 47 prefectures in Japan, Tokyo prefecture has the highest number of hospitals with 632 hospitals and Tottori prefectures has the lowest number of hospitals with 43 hospitals (MHLW 2022). The number of hospital beds in relation to the population is one of the highest worldwide (The World Bank 2023), with 11.95 hospital beds per 1,000 inhabitants (MHLW 2020).

The hospital quality metrics for Japanese hospitals from the diagnosis procedure combination (DPC) are published by the Ministry of Health, Labour and Welfare in Japan. Diagnosis procedure combination (DPC) is a Japanese evaluation system for healthcare costs, length of hospital stays, and the healthcare needs. DPC hospitals are hospitals which meet the defined criteria. For this project, the hospital quality metrics score was calculated with the Function Evaluation Coefficient II data. The following data from April 2022 was used which was the most current data at the time of the ranking process:

- Coefficient of Insurance coverage
- Coefficient of Efficiency
- Coefficient of Complexity
- Coefficient of Coverage
- Coefficient of Emergency

The **coefficient of insurance coverage** evaluates whether DPC data was determined appropriately. The base value of the coefficient is 1, minus and plus points of 0.05 are possible. For example, the regularly announcing DPC score of hospitals leads to an improvement and a decrease in score will occur if more than 2% of the diagnosis in a hospital are uncategorized. The **coefficient of efficiency** keeps track on patients' length of stay. The average length of stay in a hospital is compared with the average length of stay in all DPC hospitals. The **coefficient of complexity** measures how many patients with a complicated diagnosis are treated by the hospital. The variety of categories that the

hospital can diagnose and treat compared to all DPC hospitals are captured by the weighting factor of coverage. The **coefficient of emergency** measures the capacity of the hospitals taking emergency patients. Emergency is defined as the first two days of a patient's stay.

All used data was accessed from and is available at:

<https://www.mhlw.go.jp/index.html>

Additionally, **Joint Commission** accreditations were considered, for which the list of accredited institutions can be found here:

<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>

Hospitals who were on this list, then had the category as a part of their hospital quality metrics score.

3.4 South Korea

The healthcare system in South Korea has two components, health insurance and medical aid. The national health insurance system provides coverage to all citizens, and it is managed comprehensively in the form of social insurance (Health Insurance Review & Assessment Service 2020). According to the Korean Statistical Information Service, in 2022 the country had 327 large general hospitals and 1,447 long-term care hospitals. According to the Ministry of Health and Welfare (2022), there are 111 specialized hospitals. Seoul is the region with the most hospitals in South Korea and Jeju is the region with the fewest. The number of hospital beds in relation to the population is one of the highest worldwide, with 14.0 beds per 1,000 inhabitants (Korean Statistical Information Service 2022).

The hospital quality metrics used for ranking South Korean hospitals are published by the national Health Insurance Review & Assessment Service (HIRA). Besides other activities, HIRA monitors the health care system through on-site investigations of hospitals, quality assessments, medical claim reviews, etc. HIRA provides an open-data platform with assessments of different quality indicators. For this project, the following indicators from hospital investigations were used:

- ICU evaluation
- Acute disease evaluation
- Cancer Disease Evaluation

- Drug evaluation

HIRA publishes ratings for each category, based on the results of their evaluation. The ratings for each indicator are presented on a 5-point scale.

All used data was accessed from and is available at:

<https://www.data.go.kr/tcs/dss/selectApiDataDetailView.do?publicDataPk=15094093>

Patient Satisfaction

The Health Insurance Review and Assessment Service (HIRA) conducts patient experience evaluations to spread a patient-centered medical culture and to improve the quality of care experienced by the public. The target institutions are high-level general hospitals and general hospitals with more than 300 beds. For this ranking, survey data from 2021 was used. The patients were asked to rate the hospitals for the following criteria:

- Nurse Services
- Physician Services
- Dosing and treatment process
- Hospital environment
- Guarantee of patient rights
- Overall evaluation

The evaluation results are released as a 100-point score for each of the six areas.

All used data was accessed from and is available at:

<https://www.hira.or.kr/ra/eval/getDiagEvlView.do?pgmid=HIRAA030004000100&WT.gnb=%EB%B3%91%EC%9B%90%ED%8F%89%EA%B0%80>

3.5 France

According to the OECD, France currently has 2,989 hospitals (OECD 2022). Public institutions account for about 65 percent of hospital capacity and activity. Private for-profit facilities account for another 25 percent, and private nonprofit facilities make up the remainder (The Commonwealth Fund 2020). To calculate the hospital quality metrics score for French hospitals, publicly available data from the Haute Autorité de Santé (HAS) was

analyzed. HAS is an independent public authority that contributes to the regulation of the French health system and assures quality standards in health care measurements. It publishes data regarding the quality and safety of French hospitals, following a consistent methodology to guarantee validated and comparable data measures. HAS also measures patient satisfaction and experience, resulting in a comprehensive dataset, allowing for a detailed comparison of different hospitals.

The certification of hospitals is carried out every four years. The reference frame from 2014 was replaced in favor of a new system published in 2021. Since the assessment rhythm of a hospital is every four years, the results of the hospital quality metrics and patient satisfaction include hospitals that were certified under the old system and hospitals that are already certified under the new system.

For the World's Best Hospitals Ranking, nine different hospital quality metrics were used. If available, the following metrics were used to calculate an overall score (reference frame 2014):

- Patient rights
- Patient journey
- Medication management
- Quality and risk management
- Infection risk
- Patient records
- Management of emergencies
- Organization of the operating rooms
- Safety of endoscopy patients

The measures above were chosen due to their availability for most hospitals as well as for their relevance as a measure of the general quality of a hospital. HAS used a four-point grading scale system, where A is the best achievable grade and D is the worst. **Patient rights** assesses whether a hospital is treating the patients according to their rights, respecting their privacy and ensuring the confidentiality of their data. **Patient journey** refers to the organization of a patient's entire journey during their stay. The received rating is an indicator of the continuity and coordination of care, the cooperation between different teams, as well as the accessibility of information by all healthcare professionals. **Medication management** shows if a hospital ensures patient security at all

stages of medical treatment, including adequate information regarding the treatment. **Quality and risk management** assesses whether a hospital has a well-defined policy for improving the quality and safety of care. **Infection risk** is an indicator for measures that are taken by a hospital to avoid infections during hospitalizations. Hospitals also get a higher score if their employed personnel are correctly trained in hygiene regulations. The correct use of antibiotics also contributes to the control of the infection risk. **Patient records** measures the traceability of information in the patient's file, which is important to guarantee coordinated and continuous care. **Management of emergencies** assesses whether the establishment is organized to receive patients in the emergency department 24 hours a day, 7 days a week. It involves reception by trained professionals, care adapted according to the degree of emergency, reorientation or transfer, and knowledge of the availability of hospital beds. **Organization of the operating rooms** indicates whether a hospital has set up an organization in the operating room to ensure maximum patient safety. Since operating rooms often handle difficult, complex cases, a highly structured organization is crucial for patient safety. **Safety of endoscopy patients** assesses whether the hospital has identified the major risks that may arise at each stage of an endoscopy. Endoscopy is a medical examination that explores the interior of an organ or a body cavity by inserting a small camera.

For hospitals that were already assessed according to the new reference system, three different hospital quality metrics were used. If available, the following metrics were used to calculate an overall score:

- Facility
- Patient
- Care Teams

The three hospital quality metrics are composed of several sub scores. For example, the metric "Patient" includes scores for "Involvement of the patient", "Involvement of relatives and/or carers", "Respect for the patient" and "The patient's living conditions and social ties are taken into account". HAS assigns a score between 0 and 100 for each of the three metrics mentioned. All the data and the description of the hospital quality metrics are also available at:

<https://www.has-sante.fr/>

Patient Satisfaction

Patient satisfaction data was also used in determining the overall score of French hospitals. HAS provides comprehensive data from patient surveys. For this project, the overall score given by hospitalized patients was used, as well as the share of patients who would recommend the hospital that they were treated in. The overall score is calculated using a range of different variables such as the level of support from doctors and/or nurses, the organization of the whole treatment process, the quality of food, patient satisfaction with the accommodation, etc. The recommendation of a hospital was assessed by asking the patients, whether they would recommend the respective hospitals to friends and family members.

All the data and the description of patient satisfaction are available at:

<https://www.has-sante.fr/>

3.6 Italy

There are currently around 1,045 hospitals in Italy. The healthcare system is based on a national health service known as Servizio Sanitario Nazionale (SSN). 570 hospitals are owned by the public while 478 hospitals are owned by private organizations accredited with the SSN (Istat, 2020).

In order to provide measures for these hospitals, publicly available data was used for both hospital quality metrics and patient satisfaction.

The data about hospital quality metrics derives from the National Outcome Assessment Program (PNE), managed by the National Agency for Regional Health Services on behalf of the Ministry of Health and is published and presented at *Dove e Come Mi Curo* (<https://www.doveecomemicuro.it/>). For this project, only the indicators that are comparable to the national reference values are used. These reference values are recognized and validated by the Italian Ministry of Health. All quality indicators that are published fulfill the same criteria: scientific validity, expressiveness, and operational feasibility, making it possible to compare them on a national level. The individual indicators are rated using a five-point scale.

The number of available indicators differs from hospital to hospital, based on their size and range of treatment. In general, all indicators can be divided into four different categories:

- Effectiveness
- Safety

- Appropriateness
- Competence

Hospital quality metrics from the category **Effectiveness** indicate whether a hospital achieves the expected results in terms of patient health. An example for this category is the indicator “mortality within 30 days after surgery”. It’s a measure that compares the number of patients that died within 30 days after a conducted surgery to the total number of patients who had the same surgery. The lower the relative number of patients that died, the higher the value for this indicator. Hospital quality metrics that belong to the category **Safety** measure how well a hospital avoids or prevents adverse events during the care process. One of the indicators in this category is “complications within 30 days after surgery”, which measures the number of patients that experience at least one complication in the 30 days following a surgery. The third category, **Appropriateness**, comprises measures that indicate if a hospital offers adequate clinical services to a patient. The offered services should meet the needs of a patient and aim for the best medical outcome. An example for this case would be the measure “number of primary caesarean sections”. Sometimes cesarean delivery is performed without there being a need (medical indication), and therefore exposes the mother and unborn child to an avoidable risk. A low number of caesarean sections may therefore indicate a higher degree of appropriateness. The last category, **Competence**, lists indicators that can be associated with the competence and experience of the hospital’s personnel. A typical indicator in this category is the “annual volume of a specific type of surgery”. A higher volume of the same surgical procedure indicates more experienced physicians and a higher level of routine for the given procedure. Still, it cannot be associated with the outcome of a single surgery.

All the data and the descriptions of the hospital quality metrics are also available at:

<https://www.doveecomemicro.it/>

Additionally, the **Joint Commission** accreditations were taken into account, for which the list of accredited institutions can be found here:

<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>

Furthermore, the Emergency Care Levels provided by the Ministero della Salute were considered, for which the list can be found here:

https://www.salute.gov.it/portale/documentazione/p6_2_8_1_1.jsp?lingua=italiano&id=17

Hospitals who were on these lists, then had the categories as a part of their hospital quality metrics score.

Patient Satisfaction

Dove e Come Mi Curo also provides an online platform for patients to rate their hospital stay from 1 to 5 in different areas. The categories are: Overall recommendation to family and friends, cleanliness, privacy, general quality, availability and kindness of the staff, medical information received, administrative organization, food, visits.

All the data and the description of patient satisfaction are available at:

<https://www.doveecomemicuro.it/>

3.7 United Kingdom

In the UK, there are currently around 1,229 hospitals (Interweave Healthcare 2021). 875 of these are located in England, 229 in Scotland, 82 in Wales and 40 in Northern Ireland. Most of them are owned by the government and run by the National Health System (NHS) but there are also a few private hospitals. The healthcare system is tax-based and guarantees universal coverage for all UK citizens.

The data used for this project is derived from the Care Quality Commission's (CQC) database as of November 2022. CQC is an independent regulator of health and social care in England. The commission monitors, inspects, and rates health services that are provided to the public. After a comprehensive inspection, CQC publishes a rating on a location-by-location basis in five different categories:

- Safe
- Effective
- Caring
- Responsive
- Well-led

For each of these categories, a health care organization can be graded as "outstanding", "good", "requires improvement" or "inadequate". The achieved grade is a result from findings during the inspection, done by a professional team. **Safe** is an indicator for the overall protection of patients. The inspectors gather evidence that patients are protected from abuse and avoidable harm. Several different factors play a role for the patient's

safety, e.g. an appropriate number of staff, the correct use of medicine, prevention of infections, etc. **Effective** assesses whether a patient's treatment and the support they receive lead to good outcomes and promote a good quality of life. This metric also results from the inspection of different variables: level of training and experience of staff, assessment of patient needs, cooperation with other organizations to secure the best outcome, etc. The next category, **Caring**, refers to the compassion, kindness, dignity, and respect that patients are treated with during their stay. Inspectors determine whether patients' equality, diversity, and privacy are respected, and whether they are involved in decisions regarding their care. For the fourth category, **Responsive**, CQC is looking for evidence that the service meets patients' needs. This is the case if a hospital meets the individual needs of their patients, if the staff is learning from and responding to complaints and concerns, and if the hospital is planning ahead in order to improve access and flow. The last category, **Well-led**, is an indicator for the quality of leadership, management, strategy, and improvement of the inspected organization. Organizations receive a higher grade if the management is promoting a person-centered and open culture, if they are being clear about their roles, if they work in partnership with others to improve outcomes, and if they are continuously improving their service.

Since CQC only rates hospitals in England, data is not available for hospitals in Scotland, Wales, and Northern Ireland.

All used data was accessed from and is available at:

<https://www.cqc.org.uk/>

3.8 Brazil

In Brazil, healthcare is structured in a National Healthcare System, resulting in universal, free coverage for all permanent Brazilian residents. Currently operating around 7,191 Hospitals, of which 2,725 are provided by public institutions and 4,466 by private institution (Confederação Nacional de Saúde 2022). Despite the large number of hospitals, the average Hospital size is quite small. The density of hospital beds is also quite low with 1.99 hospital beds per 1,000 inhabitants in 2022 (Confederação Nacional de Saúde 2022). Based on the minimum size of 100 inpatient beds to be considered in this project, 1,914 general and 432 specialized Brazilian hospitals qualified for further analysis.

In addition to the peer recommendations, hospital quality metrics were used to calculate the overall score. The analyzed hospital quality metrics were published by the Brazilian national supplementary health agency (orig. Agência Nacional de Saúde Suplementar),

which is responsible for the health insurance sector in their country. For the analysis, three different published hospital quality metrics were used:

- Readmission Rate
- Patient Safety
- Quality Factor (Fator de Qualidade)

Readmission Rate is a measure that shows whether a hospital exceeded the nationally defined readmission quota. The quota is calculated by the number of patients that are readmitted to the hospital within 30 days of the last hospital discharge. The data used for this analysis is available at:

<http://www.ans.gov.br/planos-de-saude-e-operadoras/espaco-do-consumidor/qualidade-de-hospitais-clinicas-laboratorios-e-profissionais-de-saude>.

Patient Safety displays the hospitals that are officially registered patient safety centers at ANVISA (Agência Nacional de Vigilância Sanitária). ANVISA is the Brazilian regulatory agency responsible for the approval and supervision of pharmaceuticals, health services, medical devices and other areas. Established in 1999, it's an independent acting agency. The most recent Patient Safety data is available at:

<https://www.gov.br/anvisa/pt-br/acessoainformacao/dadosabertos/informacoes-analiticas>.

The **Quality Factor**, established by ANS (Agência Nacional de Saúde Suplementar) measures the fulfillment of quality requirements, established in the normative resolution No. 364 / 2014. It includes both the Readmission Rate and Patient Safety centers, as well as other criteria. The more criteria a hospital meets, the higher the score of the Quality Factor is. The most recent data (as of August 2021) is available at:

<https://hmg.dados.gov.br/dataset/fator-de-qualidade-hospitais-105>

Additionally, three accreditations were considered as a part of the hospital quality metrics score. More information and the lists of accredited organizations can be found under the following links:

- **Joint Commission**
<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>
- **Quality Global Alliance**
<https://qmentum.com.br/instituicoes-acreditadas/>
- **Organização Nacional de Acreditação (ONA)**
<https://www.ona.org.br/mapa-de-acreditacoes/>

3.9 Canada

In total, there were 1,300 hospitals in Canada as of 2021. The hospitals are funded publicly, acting as independent institutions incorporated under provincial Corporations Acts. The most populated provinces in Canada, Ontario and Quebec, also have the largest number of hospitals (387 in Ontario and 225 in Quebec). Prince Edward Island on the other hand only has ten hospitals (Statistics Canada, 2021).

The hospital quality metrics used for the ranking of Canadian hospitals is published by the **Canadian Institute for Health Information (CIHI)**. In Canada, hospitals in all provinces except Quebec submit data to the Discharge Abstract Database (DAD) and/or the National Ambulatory Care Reporting System (NACRS) that is governed by CIHI. In Quebec, hospitals submit their data to the Maintenance et Exploitation des Données pour l'Étude de la Clientèle Hospitalière (MED-ÉCHO) database, which in turn submits their data to CIHI. The combined data is entered into the Hospital Morbidity Database (HMDB) and contains a wide range of risk-adjusted clinical indicators that indicate health system performance. Data is only reported if a certain number of cases per treatment/measure is met or if certain stability criteria (based on the risk adjustment) are met. CIHI also applies statistical outlier analysis to detect values that lie outside of the range of acceptable indicator values, and subsequently removes these outliers in order to prevent bias in the reported averages.

The data used is based on the most recent reporting period for 2021/2022 (except for Quebec, where only data from 2020/2021 was available). The 22 indicators used to determine the score were:

- All Patients Readmitted to Hospital
- Hip Fracture Surgery Within 48 Hours
- Hospital Deaths (Hospital Standardized Mortality Ratio)
- Hospital Deaths Following Major Surgery
- Medical Patients Readmitted to Hospital
- Obstetric Patients Readmitted to Hospital
- Obstetric Trauma (With Instrument)
- Pediatric Patients Readmitted to Hospital
- Emergency Department Wait Time for Physician Initial Assessment

- Experience Pain in Long-Term Care
- Experiencing Worsened Pain in Long-Term Care
- Falls in the Last 30 Days in Long-Term Care
- Improved Physical Functioning in Long-Term Care
- In-Hospital Sepsis
- Potentially Inappropriate Use of Antipsychotics in Long-Term Care
- Restraint Use in Long-Term Care
- Surgical Patients Readmitted to Hospital
- Total Time Spent in Emergency Department for Admitted Patients
- Worsened Depressive Mood in Long-Term Care
- Worsened Physical Functioning in Long-Term Care
- Worsened Pressure Ulcer in Long-Term Care
- Low-Risk Caesarean Sections

All Patients Readmitted to Hospital is a measure for the risk-adjusted rate of urgent readmissions within 30 days of discharge for obstetric, pediatric, surgical and medical patients. **Hip Fracture Surgery Within 48 Hours** is the risk-adjusted proportion of hip fractures that were surgically treated within 48 hours of a patient's initial admission to an acute care hospital. **Hospital Deaths** or Hospital Standardized Mortality Ratio (HSMR) refers to the ratio of the observed number of in-hospital deaths to expected in-hospital deaths, based on the types of patients treated in the respective hospital. **Hospital Deaths following Major Surgery** measures the rate of in-hospital deaths due to all causes within 30 days after a major surgery.

Medical Patients Readmitted to Hospital is the indicator for the risk-adjusted rate of readmission for medical patients within 30 days. Similarly, **Obstetric Patients Readmitted to Hospital** measures the risk-adjusted rate of urgent readmissions for obstetric patients. **Obstetric Trauma (with Instrument)** measures the rate of obstetric trauma for instrument-assisted vaginal deliveries. **Pediatric Patients Readmitted to Hospital** refers to the risk-adjusted rate of urgent readmissions for patients aged 17 and younger. The **Emergency Department Wait Time for Physician Initial Assessment** measures the time interval between registration and initial assessment in the emergency department in hours (90% of the patients spent less than the recommended maximum waiting time).

Some hospitals in Canada also perform long-term care, therefore **Experiencing Pain in Long-Term Care** (in %) was used for those hospitals. **Experiencing Worsened Pain in Long-Term Care** refers to the percentage of long-term care residents who experienced worsened pain. Worsened pain is connected to a resident's health status and the quality of care received. **Falls in the Last 30 Days in Long-Term Care** is an indicator for the percentage of residents in long-term care who fell in the last 30 days before their quarterly clinical assessment. Less falls indicate higher safety and quality of care for residents.

Improved Physical Functioning in Long-Term Care indicates the percentage of long-term care residents who improved or remained independent in transferring and locomotion. This is an indicator of overall health status and autonomy of the resident. **In-Hospital Sepsis** refers to the risk-adjusted rate of sepsis after admission.

The percentage of residents on Antipsychotics Without a Diagnosis of Psychosis is captured by the **Potentially Inappropriate Use of Antipsychotics in Long-Term Care** indicator. The lack of careful monitoring might indicate concerns about safety and quality of care. **Restraint Use in Long-Term Care** measures how many long-term residents are in daily physical restraints. A high rate carries potential physical and psychological risks. The indicator **Surgical Patients Readmitted to Hospital** measures the risk-adjusted rate of urgent readmissions for surgical patients within 30 days. Furthermore, **Total Time Spent in Emergency Department for Admitted Patients** is used to determine the time interval between registration, admissions, and release from the emergency department (90% of the patients spent less than the recommended maximum waiting time). **Worsened Depressive Mood in Long-Term Care** indicates the percentage of long-term care residents whose mood from symptoms of depressions worsened, whereas **Worsened Physical Functioning in Long-Term Care** indicates the percentage of residents whose transfer and locomotion functioning worsened or remained completely dependent. **Worsened Pressure Ulcer in Long-Term Care** shows the percentage of long-term care residents whose stage 2 to 4 pressure ulcer worsened since the previous assessment. Lastly, **Low-Risk Caesarean Sections** measures the rate of deliveries via Caesarean section (C-section) among singleton term cephalic pregnancies for low-risk nulliparous women in spontaneous labor.

In order to account for differences in patient characteristics across hospitals, CIHI used established regression-based risk-adjustment methods to control for patient characteristics and other risk factors that may affect outcomes. As a result, risk-adjusted indicators report the risk-adjusted rate, e.g. by dividing the observed number of cases by the expected number of cases, multiplied by the Canadian average.

Not all indicators were relevant for all hospitals depending on the type of patients treated, e.g. if the hospital does not have any or enough ulcer patients the indicator does not apply (applies mostly to long-term care indicators). Only relevant indicators were incorporated in the calculation of the hospital quality metrics score of a hospital.

All used data was accessed from and is available at:

<https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/>

Additionally, the **Accreditation Canada** were taken into account, for which the list of accredited institutions can be found here:

<https://accreditation.ca/>

Hospitals who were on this list, then had the category as a part of their hospital quality metrics score.

3.10 Australia

According to the Australian Institute of Health and Welfare, there are approximately 1,354 hospitals in Australia as of 2020. 697 of these are public, while 657 are private hospitals. The total number of available hospital beds per 1,000 inhabitants is 2.5 (AIHW 2022).

For the World's Best Hospitals ranking, the following data provided by the Australian Institute of Health and Welfare was used for comparison:

- Time spent in emergency departments
- Healthcare associated bloodstream infections
- Waiting times for elective surgery

The available dataset for **Time spent in emergency departments** displays data for public Australian hospitals in the time period between 2021 and 2022. It measures how many patients from the emergency department were seen within the recommended maximum waiting time. Recommended maximum waiting times vary depending on the urgency of the patient's need for care and are clustered in five different categories: resuscitation, emergency, urgent, semi-urgent, and non-urgent. For each reporting unit, the percentage of patients seen on time is compared to their peer group average. The hospitals are clustered into seven different peer groups: large metropolitan hospitals, large regional hospitals, major hospitals, medium metropolitan hospitals, medium regional hospitals, small hospitals, and children's hospitals. The differentiation by urgency levels and hospital sizes allows for a fairer basis of comparison and more precise measures.

Healthcare associated bloodstream infections measures how many bloodstream infections can be associated with care provided at a hospital. Hospitals are also clustered into different peer groups for better comparison: major hospitals, large hospitals, medium hospitals, and children's hospitals. Private hospitals are listed in their own peer group. The infection is displayed as a rate per 10,00 patient days, next to the peer group average. The available data relates to the time period between 2019 and 2020. The last indicator, **waiting times for elective surgery**, measures the percentage of elective surgeries within the recommended maximum waiting time. The hospitals are clustered in the same peer groups as in the first described indicator. Additionally, the treating doctor determines how urgently surgery is needed and then assigns the patient to one of three urgency categories: recommended within 30 days, recommended within 90 days, or recommended within 365 days. Each hospital then has three values that are comparable to their peer group average. The data derives from the time period between 2021 and 2022.

All used data was accessed from and is available at:

<https://www.aihw.gov.au/>

3.11 Austria

The health care system in Austria is publicly funded and follows the principle of statutory health insurance, leading to a 99% coverage of all Austrian citizens. In the beginning of 2022, a total of 270 hospitals existed in Austria, 114 of which were general hospitals (BMSGPK (Österreich) 2022).

The hospital quality metrics used for the national ranking of Austrian hospitals are published by the Austrian Federal Ministry of Social Affairs, Health, Care and Consumer Protection. There are seven different quality indicators for 51 different medical treatments available. These quality indicators are received from a nationwide quality measurement program, the Austrian Inpatient Quality Indicators (A-IQI), where hospitals need to provide information at regular intervals. The following indicators were used as part of the hospital quality metrics score:

- Patient orientation
- Complaint / feedback management
- Patient safety / risk management
- Discharge management

- Safety in the operating room
- Hospital hygiene
- Minimum requirements for quality management

For each indicator, a degree of fulfillment is displayed, divided into a) fulfilled, b) partially fulfilled or c) not fulfilled.

Additionally, the length of stay compared to the nationwide average is used to calculate the overall hospital quality metrics score. The median serves as the statistical method to either indicate if a hospital is a) equal to / above the national comparison value or if b) a hospital is below the nationwide comparison value. The indicator for the length of stay is only shown if a hospital treated more than 10 cases in the given time frame.

All used data was accessed from and is available at:

<https://kliniksuche.at/>

3.12 The Netherlands

There are 113 hospitals in the Netherlands, 98 of them are general hospitals, 8 are University Medical Centers and 7 are specialized pediatric clinics (Inventarisatie ziekenhuislocaties, RIVM 2022). Health care is managed by the government and is universal for all Dutch citizens. Anyone living or working in the Netherlands must obtain basic level health insurance from a private insurance company.

For the hospital ranking in the Netherlands, patient satisfaction data was used. This data is provided by Patiëntenfederatie Nederland (Patients Federation of the Netherlands). The data is available on ZorgkaartNederland, an online platform where patients can give their (subjective) rating of hospitals where they received treatment. The hospitals can obtain a grade between 1 and 10, based on the number of recommendations they receive from patients.

All used data was accessed from and is available at:

<https://www.zorgkaartnederland.nl/>

Additionally, the **Joint Commission** Accreditation was taken into account, for which the list of accredited institutions can be found here:

<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>

3.13 Switzerland

The Swiss health care system is highly decentralized, divided among three levels of the government: the federal level, that of the respective cantons, and the municipal level. As health care insurance is mandatory for every citizen, coverage is universal. According to the Swiss Federal Office for statistics (Bundesamt für Statistik 2022) there are 276 Hospitals in Switzerland as of 2021; 104 are classified as general hospitals and 172 as specialized hospitals.

The BAG publishes standardized mortality ratios for each hospital, which are used as hospital quality metrics for the Swiss national ranking. Up until the end of 2022, the most recent data available was from 2020. The mortality rates are risk-adjusted by age and sex.

All used data was accessed from and is available at:

<https://www.bag.admin.ch/bag/en/home/zahlen-und-statistiken/zahlen-fakten-zu-spitaelern.html>

Additionally, the quality results from **Initiative Qualitätsmedizin** (IQM) were used for the ranking. About 500 hospitals from Germany and Switzerland are involved in the IQM to improve the quality of medicine. The six publicly reported measures which were considered in the scoring model are:

- Deaths with primary diagnosis of myocardial infarction
- Deaths with primary diagnosis of heart failure
- Deaths from all forms of stroke
- Cerebral infarction deaths
- Deaths with primary diagnosis of pneumonia
- COPD deaths

The quality results of 2022 are the most recent ones available. Further information about hospital quality results in Germany and Switzerland is available at:

<https://www.initiative-qualitaetsmedizin.de/qualitaetsmethodik>

Patient Satisfaction

In Switzerland, the ANQ is a national association for quality improvement in Swiss hospitals. They have measured patient satisfaction in general hospitals among adults since 2009. Patient satisfaction is assessed in different categories. The following were used for this ranking:

- Quality of treatment
- Questions asked
- Answers given
- Medication management
- Hospital discharge

For all categories, patients could rate their hospital stay from 1 to 5, 5 being the highest grade possible. For the first question, patients were asked how satisfied they were with their **quality of treatment** in general. **Questions asked** assesses whether patients had the possibility to ask questions of the medical staff. **Answers given** asks the patient if they received satisfying and understandable answers to their questions. **Medication management** relates to whether the use of medication at home was explained to the patient in an understandable way. Finally, patients were asked about their experience with the organization of their **hospital discharge**.

3.14 Sweden

Sweden currently has over 100 hospitals (Vården i siffror 2021). The Swedish counties are grouped into 6 health care regions to facilitate cooperation and keep the high level of medical care. Emergency services are provided by 70% of the region hospitals and the university hospitals. The latter are also focused on specialized care (The Commonwealth Fund 2020). Sweden has a low density of hospital beds per inhabitant, with 2.1 beds per 1,000 inhabitants in 2020 (OECD 2022).

The hospital quality metrics used for Swedish hospitals are based on data published by regional governments and local municipalities. Indicators are selected by Swedish officials in cooperation with different data holders such as specific registry data or the National Board of Health and Welfare in Sweden. However, not all indicators are published on a hospital-level (e.g. only on a regional level) and others are not comparable across hospitals. Therefore, the most generally applicable indicators for the process were selected to determine the hospital quality metrics score which was calculated using the most current data:

- Waiting time in emergency room for patients 19 years and older (2020)
- Waiting time in emergency room for patients 80 years and older (2020)
- Mortality rate 28 days after hospitalized stroke (2020)
- Mortality rate 28 days after hospitalized heart attack (2020)

The data used is available at:

<https://vardenisiffror.se/>

3.15 Norway

In Norway health care is publicly tax-financed, providing universal coverage for all residents. The public health care system is structured in four different regional health authorities (RHAs), where each authority operates several trusts. There are public hospitals trusts and not-for-profit private hospitals in Norway. With 94% of all hospital stays the public sector is significantly larger than the private sector. Private hospitals and RHAs can have tender agreements (The Commonwealth Fund 2020).

Hospital quality metrics for Norwegian Hospitals is provided by the Norwegian Directorate of Health. The directorate is an executive agency and professional authority under the Ministry of Health and Care Services, which aims to improve the quality of health services and to promote factors that ensure the population remains in good health (Helsedirektoratet 2022). Data about the quality of hospitals is displayed for each hospital trust. For hospital quality metrics, the following data was used:

- 30-day Survival Rate (Overall, Stroke, Heart Attack, Hip Fracture)
- 5-year Survival Rate (Breast Cancer, Rectal Cancer Men/Women)
- On-time planned operations

The **30-day Survival Rate (Overall, Stroke, Heart Attack, Hip Fracture)** is a hospital quality metric often used to measure the quality of treatment. In this case, it shows the percentage of patients that survived a time period of 30 days after their discharge from the hospital. It is differentiated between four different categories: Overall survival rate, survival rate of stroke patients, survival rate of patients who had a heart attack, and survival rate of patients with a hip fracture. The most recent data was available for 2019. The **5-year Survival Rate (Breast Cancer, Rectal Cancer Men/Women, Lung Cancer, Colon Cancer)** displays the number of patients that survived a 5-year time

period after being diagnosed with different cancer types. The most current data at the time of the ranking process was available for 2020. Finally, **In-time planned operations** indicates how many planned operations were executed on time. This metric is an often-used measure for the structure and organization of a hospital. The most recent data was available for 2021.

The hospital quality metrics were assigned to individual hospitals. If a metric was not reported for an individual facility, the metric from the health trust (Helseforetak) was used.

All used data was accessed from and is available at:

<https://www.helsedirektoratet.no/>

3.16 Denmark

The Danish health system is decentralized and largely tax funded. The national government provides block grants from tax revenues to the regions and municipalities providing health services. All residents are entitled to publicly funded care, including largely free primary, specialist, hospital, psychiatric, preventive, and long-term care services. Approximately 97 percent of hospital beds are publicly owned. Private hospitals are relatively small and mostly provide specialized care. Patients can choose between public hospitals, and payment follows the patient to the receiving hospital if the facility is located in another region (The Commonwealth Fund, 2020).

The **Danish Clinical Quality Program – National Clinical Registries (RKKP)** manages about 85 clinical registries which contain information about individual patients and are used for improvement of quality, research, and surveillance purposes (RKKP, 2022). Hospital quality metrics from two databases were taken into account for the analysis of the ranking: the Danish Intensive Database (DiD) and the database for Acute Hospital Contacts.

The **Danish Intensive Database (DiD)** is a nationwide clinical quality database whose purpose is to record the incidence and results of intensive therapy to assess whether treatment and treatment results are up to the desired level and to maintain or to improve an achieved level of treatment. The most recent report was published in June 2022 and took patient data from 2021 into account. The following measures were part of the analysis:

- Share of readmissions to intensive care units within 48 hours of discharge for patients admitted > 24 hours
- Proportion of patients transferred to another intensive care unit due to capacity problems
- Proportion of readmissions to intensive care unit within 48 hours after discharge to permanent ward for patients admitted \leq 24 hours

The **Database for Acute Hospital Contacts (DAH)** is a national quality monitoring database of acute patient procedures in Danish hospitals to ensure uniformly high quality of treatment in acute patient care. The most recent report was published in June 2022 and took patient data from 2021 into account. The following measures were part of the analysis:

- Proportion of acute hospital stays of <24 hours resulting in a new acute hospital stay \leq 72 hours after discharge
- Proportion of patients with acute ischemic stroke treated with thrombolysis where treatment is started within 1 hours of arrival at the first hospital

All data was accessed from and is accessible at:

<https://www.rkkp.dk/>

3.17 Israel

There are currently 85 hospitals in Israel out of which 45 are general hospitals. 37 are classified as public hospitals, 26 as non-profit private hospitals and 22 as for-profit private hospitals. The density of beds per inhabitants is average in comparison to most other countries in the ranking, with 2.9 beds per 1,000 inhabitants in 2020 (OECD 2021).

Since 2013, **the Israeli National Program for Quality Indicators (INPQ)** promotes the continuous improvement in Israeli healthcare quality, through both measuring the quality of care in major care and treatment areas and publicizing the results to the public (Ministry of Health Israel, 2022). The following hospital quality metrics were taken into account for the analysis:

- Acute Myocardial Infarction: PCI within 90 minutes for patients presenting with STEMI
- Cerebral Vascular Accident: median time from hospitals to head CT/MRI for patients with acute ischemic stroke
- Femoral Neck Fracture: femoral neck fracture repair within 48 hours

- Emergency Department: median time from arrival at emergency department to triage

All used data was accessed from and is accessible at:

<https://www.gov.il/he/Departments/publications/reports/quality-national-prog-2013-2021>

Patient Satisfaction

The Ministry of Health performs a bi-annual National Patient Experience Survey in general hospitals in Israel. The latest survey was conducted during May to October 2021. Patients over the age of 18 who were hospitalized for at least two nights were surveyed. Approximately 12,000 patients from 26 hospitals were interviewed.

The questionnaire contained over 40 questions regarding patient-reported experiences: attitude of staff, information delivery, treatment continuity and patient empowerment, efficiency perception as well as environmental conditions. The number of answers per hospital was adjusted by the ratio of respondents in the sample to the number of actual discharges in each hospital to reflect the national distribution of patients (Ministry of Health Israel 2021).

Measurements used for the calculation of the patient satisfaction score in the World's Best Hospitals ranking for Israel were:

- Efficiency Measures Index
- Patient Empowerment Index
- Sequence of treatment Index
- Information and Clarity of Expectations index
- Attitude and Respect for Patient Index
- Willingness to Recommend Score
- General Satisfaction Score

The data for the 2021 survey is available at:

<https://www.gov.il/he/Departments/publications/reports/satisfaction-patients-hospitalization-2021>

Additionally, the **Joint Commission Accreditation** was taken into account, for which the list of accredited institutions can be found here:

<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>

3.18 Other Countries

Hospital quality metrics and patient satisfaction data were not available for a few countries. These countries are:

- Belgium
- Colombia
- Finland
- India
- Mexico
- Saudi Arabia
- Singapore
- Spain
- Thailand
- United Arab Emirates
- Taiwan

For those countries, the national score is based on national and international recommendations as well as Google-Scores, albeit with a lower weight than the preferable patient satisfaction data sources (7%). Additionally, the following national accreditations and certifications were taken into account:

- **Accreditation Canada** (for Belgium and United Arab Emirates):
<https://accreditation.ca/find-intl-accredited-service-provider/>
- **Joint Commission** (for Belgium, Colombia, India, Mexico, Saudi Arabia, Spain, Taiwan, Thailand, and United Arab Emirates):
<https://www.jointcommissioninternational.org/about-jci/accredited-organizations/>
- **National Accreditation Board for Hospitals & Healthcare Providers (NABH)** (for India): <https://www.nabh.co/frmViewAccreditedHosp.aspx>
- **Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI)** (for Saudi Arabia): <https://portal.cbahi.gov.sa/english/StatusAccreditation/hospitals>

- **Healthcare Accreditation Institute (HAI)** (for Thailand):
<https://www.ha.or.th/EN/Hospitals/Certificate%20Status>
- **Joint Commission of Taiwan** (for Taiwan)⁴:
<https://www.jct.org.tw/mp-2.html>

The length of these lists is relatively short compared to the total amount of hospitals in these countries to reflect the fact that less data was available than for the other countries.

4 Distribution of participants

Professional activity	% Share of participants
Medical Doctor	84%
Health care professional	13%
Hospital manager/director	3%

The table above shows the percentage share of all participants by professional activity. In accordance with the study design, the majority of survey participants were medical doctors, followed by healthcare professionals (e.g. nurses).

In several participating countries, the distribution of survey participants was slightly different:

While for some countries like Denmark, Norway and the Netherlands the survey participants were all medical doctors, the biggest group of Saudi Arabian participants were healthcare professionals (e.g. nurses, paramedics, physiotherapists, midwives) as they accounted for 63% of participants. The share of medical doctors from Saudi Arabia was 29% and the share hospital managers/directors 8% respectively. On the other end of the spectrum, in the United States of America, 99% of the participants were medical doctors, and just 1% of all survey participants were healthcare professionals. On the other hand, a relatively high number of hospital managers / directors participated in Finland, with a

⁴ The National Healthcare Quality Award as well as the Health Check-Up Program Certification was taken into account.

share of 25% of the total votes from Finland. In contrast, in India the share of medical doctors from India was 71% and of hospital managers / directors 11% respectively.

In conclusion, in all participating countries, except for Saudi Arabia, most participants were medical doctors. The percentage share of healthcare professionals and hospital managers / directors differed across participating countries, but these variations did not significantly impact voting behavior in any of the national samples.

5 Disclaimer

The rankings are comprised exclusively of hospitals that are eligible regarding the scope described in this document. A mention in the ranking is a positive recognition based on peer recommendations and publicly available data sources at the time. The ranking is the result of an elaborate process which, due to the interval of data-collection and analysis, is a reflection of the last calendar year. Furthermore, events preceding or following the period 01/01/2022-31/12/2022 and/or pertaining to individual persons affiliated/associated to the facilities were not included in the metrics. As such, the results of this ranking should not be used as the sole source of information for future deliberations. The information provided in this ranking should be considered in conjunction with other available information about hospitals or, if possible, accompanied by a visit to a facility. The quality of hospitals that are not included in the rankings is not disputed.

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