

Comparative Health System Performance Initiative: Compendium of U.S. Health Systems, 2021, Technical Documentation

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Contents

Updates to This Version.....	v
Acknowledgments.....	vi
I. Introduction	1
II. Health System Definition and Data Sources	3
A. Definition of a Health System.....	3
B. Data Sources.....	3
III. Methodology.....	7
A. Step 1: Matching and Linking Health Systems Across Data Sources.....	7
1. Automated matching process.....	8
2. Manual review of possible matches based on name and location.....	9
B. Step 2: Matching Hospitals Across Data Sources and Aggregating Counts	11
1. Identifying possible additional nested relationships for manual review.....	11
2. Aggregating physician and hospital counts within health systems.....	11
C. Step 3: Applying Exclusion Criteria.....	14
D. Step 4: Conducting Final Manual Review of Consolidated List.....	16
IV. Variables Included in the Consolidated List.....	19
V. Limitations.....	27
A. Definition of a Health System.....	27
1. Hospital Ownership or Comanagement Requirement.....	27
2. Aggregation Rule.....	27
B. Discrepancies Between Data Sources.....	27
C. Data Collection Methods	28
D. Potential Misalignment of System Definitions.....	28
E. Mergers and Acquisitions	28
F. Differences Between 2021 and Previous Consolidated Lists.....	29
Appendix A. OneKey and AHA Methodologies	31
Appendix B. Automated Matches.....	55
Appendix C. Insurance Product Data and Methods	47
Appendix D. Nursing Home Data and Methods.....	57
Appendix E. Data Dictionary	59
Appendix F. Data Sources Not Used	63

Tables

II.1	Comparison of the Compendium’s health system definition with OneKey and AHA data.....	4
II.2	Number of systems contained in each data source.....	5
III.1	Examples of manually matched health systems.....	10
III.2	Summary of matching results.....	10
III.3.	Data sources for generating aggregate counts of physicians and hospitals.....	13
III.4	Definition of exclusion criteria by data source.....	15
III.5	Number of systems excluded from the consolidated list.....	16
III.6	Systems excluded in the final manual review.....	17
III.7	Final consolidated list.....	18
IV.1	Health system types.....	22
IV.2	Health system attributes included in the systems list.....	23
V.1	Examples of discrepancies in physician counts across data sources	28
C.1	Manually matched health system and MA record.....	52
F.1	Potential data sources for health system identification	64

Figures

III.1	Automated and manual matching process.....	8
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Updates to This Version

The February 2024 release of the 2021 systems list contains several updates to the original version of the file released in June 2023. These updates include the addition of variables reporting ownership type; total and net hospital revenue; contract numbers of Medicare Advantage plans offered by health systems and the enrollment in those plans; and counts of nurse practitioners and physician assistants. The updates also include the removal of an indicator variable for systems being predominantly investor owned.

In addition, the February 2024 release of the 2021 systems list contains an update to the system-level counts of outpatient centers. The outpatient center counts in the original version released in June 2023 did not include outpatient centers in subsystems that should have been counted under their parent health systems. We corrected the counts in the February 2024 release. This change affected the outpatient center counts for 18 systems; in every case the count increased. The average count of outpatient centers across these 18 systems increased from 352 to 419, or an average increase of 67 outpatient centers. Across all health systems, this change resulted in the average count of outpatient centers increasing from 115 to 117.

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I. Introduction

In 2015, the Agency for Healthcare Research and Quality (AHRQ) created the Comparative Health System Performance (CHSP) Initiative to study how healthcare systems promote evidence-based practices in delivering care. AHRQ's goal is to understand the factors that affect health systems' use of patient-centered outcomes research (PCOR) and to identify best practices in disseminating and using PCOR.

AHRQ supports the ongoing work of the CHSP initiative by providing the Compendium of U.S. Health Systems, a list of health systems in the United States with details about their structure, staffing, and program participation. The Compendium is available on the AHRQ website: <https://www.ahrq.gov/chsp/index.html>.

This document summarizes the methods used to create the list of systems in the 2021 Compendium. To differentiate the systems-specific files from the broader set of Compendium products, we refer to this file as the systems list. In Section II, we outline the definition of a health system and describe the IQVIA OneKeyⁱ data and the American Hospital Association (AHA) Annual Survey Database that were used to create the list of systems. In Section III, we present the methodology used to create the systems list. In section IV, we describe the variables used to identify system attributes. Finally, in Section V, we present the limitations of the 2021 methodology, and we outline changes from the 2018 methodology.

ⁱ IQVIA maintains two integrated databases relevant to the study of health system performance under the umbrella of Healthcare Relational Services: OneKey Organizations, formerly known as HCOS, and OneKey Professionals, formerly known as HCPS. Throughout the document, we refer to these databases jointly as the OneKey data with the exception of Appendix A, in which we use the full names of both OneKey databases because we describe how they are related to each other.

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II. Health System Definition and Data Sources

A. Definition of a Health System

The Agency for Healthcare Research and Quality (AHRQ) uses the following definition of a health system for the Compendium:

A health system includes at least one hospital and at least one group of physicians that provides comprehensive care (including primary and specialty care) who are connected with each other and with the hospital through common ownership or joint management.ⁱⁱ

This definition is further operationalized as requiring that a health system:

1. Include at least one non-Federal acute care hospital,
2. Include, in total, at least 50 physicians, and
3. Include at least 10 primary care physicians.

While the requirement that a system include an acute care hospital excludes provider organizations that nonetheless provide comprehensive management of their patient populations, this definition is consistent with those used in the source data provided by IQVIA and AHA.

Organizations included in the systems list are aggregated to their highest level of ownership. For example, a national parent system operating subsidiaries in regional markets is reported as a national system. The subsidiary systems do not appear in the systems list. As such, the systems list does **not include all systems operating in specific states or local markets.**

Because of these aggregation rules, it is also possible that a parent system does not meet the Compendium definition of a system in each market where it operates. For example, a system or a subsidiary may operate a hospital that is not co-owned or jointly managed with a group of local physicians, but the parent system can still meet the Compendium definition of a system based on other subsidiaries.

B. Data Sources

The systems list is based on the IQVIA OneKey and AHA Annual Survey databases because these sources (1) contain health system identifiers; (2) include information on hospitals, outpatient centers (including medical group practice sites), and physicians; (3) are nationally representative; and (4) are current.

The OneKey data include frequently updated information on health systems, physicians, advanced practice clinicians, hospitals, and nursing homes nationwide. They contain system- and

ⁱⁱ Foundation models of health system organization are considered a form of joint management. Joint participation in an accountable care organization (ACO) is not by itself indicative of joint management. In addition, “group” is not synonymous with a separately organized medical group. A hospital that employs community-based physicians who provide comprehensive care (but were not organized as a medical group) would be considered a health system.

facility-level data on staffing, beds, and facility type, as well as physician-level data on specialty and affiliations. Data are collected through a combination of telephone surveys and administrative sources. These data describe relationships between providers and hospitals and group practices; they also describe purchasing and contracting relationships among facilities.

AHA data are based on an annual survey of hospitals in the United States. The AHA Annual Survey Database provides facility-level data on organizational structure, services, staffing, expenses, system affiliations, and physician arrangements.

Appendix A contains a brief overview of the data collection methods for OneKey and AHA. Information about how the Compendium’s definition of health system aligns with that of OneKey and AHA is contained in Table II.1.

Table II.1. Comparison of the Compendium’s health system definition with OneKey and AHA data

	CHSP	OneKey	AHA
Unit of study	Health systems	Integrated delivery networks (IDNs) identified in the data	Hospital systems
Health system definition	A health system includes at least one hospital and at least one group of physicians that provides comprehensive care (including primary and specialty care) who are connected with each other and with the hospital through common ownership or joint management.	An organization that has direct responsibility for centralizing the purchasing or contracting of its affiliated hospitals and ancillary care facilities; it also offers a continuum of care through services at acute and nonacute sites. An IDN owns, leases, manages, or establishes a purchasing affiliation with two or more healthcare delivery sites. IDNs include at least one acute care hospital and one nonacute organization.	Either a multihospital or a diversified single hospital system. A multihospital system is two or more hospitals owned, leased, sponsored, or contract managed by a central organization. ⁱⁱⁱ
Required provider types	At least one non-Federal acute care hospital, 50 total physicians, and 10 primary care physicians	At least one hospital and one nonacute care provider	Multihospital or a diversified single hospital
Relationship among entities in system	System owns or manages included providers.	System owns, manages, leases, or establishes purchasing (contracting) affiliations with entities.	System owns, leases, religiously sponsors and/or manages health providers.

The definitions of a health system used in the OneKey and the AHA data are similar to the definition used in the Compendium. They include systems with multiple provider types. Both data sources emphasize inclusion of hospitals, but other included provider types vary. The

ⁱⁱⁱ AHA. Fast Facts on U.S. Hospitals, 2022. <https://www.aha.org/statistics/fast-facts-us-hospitals>. Accessed May 16, 2023.

OneKey and AHA data both focus on system ownership or management of included providers and include purchasing or contracting affiliations.

Because the Compendium uses a different definition of a health system than the OneKey data and AHA Annual Survey Database, manual steps are taken to ensure that the systems list is consistent with the Compendium definition. This alignment process is described in subsequent sections.

Table II.2 presents the time periods reflected in the data and the number of systems included in the data sources before any matching or combining of systems across data sources and exclusions of systems that do not meet the Compendium’s definition.

Table II.2. Number of systems contained in each data source

	OneKey	AHA
Year of data used	2021	2021
Number of systems identified	976	408

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III. Methodology

Due to differences in the two data sources, they provide differing counts of health systems, as shown in Table II.2. The variation is due to differences in the underlying definition of health system in each data source, differences in the way that each data source treats subsidiary health systems (standalone vs. nested under a parent health system), and differences in data collection methods.

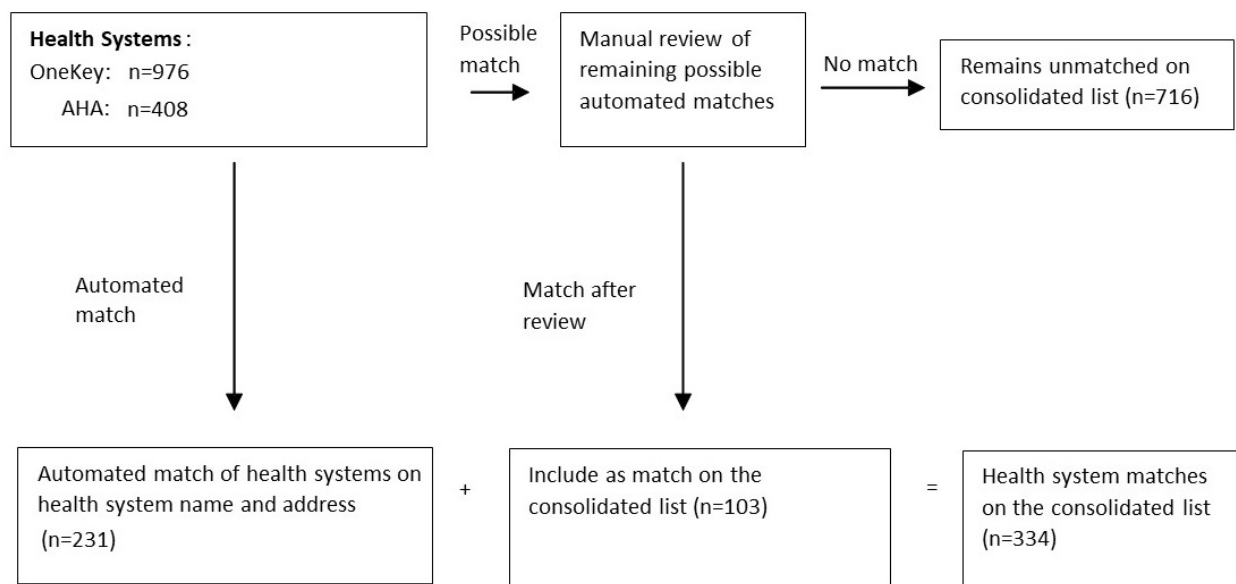
In this section, we provide a detailed description of the approach we took to combine the two data sources to develop a consolidated list of health systems that meet the Compendium's definition of systems:

1. We begin by summarizing the automated and manual techniques we applied to identify and match systems between data sources and create a set of unique systems that are candidates for the final systems list (Step 1).
2. We describe how we linked OneKey and AHA data at the hospital level. We also explain how we aggregated physician and hospital counts within parent health systems (Step 2).
3. We then summarize the exclusion criteria we applied to further refine the systems list to include only health systems that meet the CHSP definition (Step 3).
4. We close the section with a description of the final manual review and editing of the systems list (Step 4).

A. Step 1: Matching and Linking Health Systems Across Data Sources

In this section, we describe the approach used to match systems across the two data sources to form a deduplicated list of unique health systems. We first describe the automated matching techniques used to identify health systems and the results from that process. Then, we describe the approach we used to identify possible additional matches that required further review (manual matching) and the results from that process. Figure III.1 provides a high-level depiction of the matching process.

Figure III.1. Automated and manual matching process



1. Automated matching process

We compared names of health systems to identify systems that matched across the two data sources. We first processed the names by:

- Removing all punctuation,
- Converting all text to uppercase,
- Removing “the,” “and,” and “of” from health system names,
- Removing “inc,” “corp,” “corporation,” and “company” from health system names, and
- Normalizing common terms (that is, system = systems, health care = healthcare).

We then identified potential matches in an automated fashion using a combination of name and address matching, via character-string matching and distance-based matching using geocoding, respectively.

We used the SAS COMPGED function to compare the similarity of health system names across data sources. SAS COMPGED generates a score that reflects the number of deletions, insertions, or replacements needed to make two strings match—the lower the score, the better the match. If a string matches exactly, the SAS COMPGED score is zero. Inserting one character to derive a match results in a score of 100. Adding a punctuation character results in a score of 30.

We aggregated the scores for the different deletions, insertions, and replacements needed for health system names or addresses to match to yield a total score. For example, if a health system required the addition of one character to match, the SAS COMPGED score associated with the match would be 100. We considered only those matches between data sources that yielded a SAS COMPGED score of ≤ 150 , reflecting an extremely close match.

We also used geocoding to determine the linear distance between health system addresses based on the geocoded latitude and longitude of the street addresses of the health systems. When geocoding based on street address was not feasible, as is the case with post office boxes, we geocoded to the next lowest available level of geography (that is, ZIP Code or city).

If the SAS COMPGED score was ≤ 150 and the geocoded addresses were within 1 mile of each other, the health systems were considered an exact match. Of those remaining, if the linear distance between health systems' street addresses was less than one-half of a mile, the health systems were considered an exact match, regardless of name. Automated matching resulted in 231 health system matches (see Appendix B).

In addition to matching organizations identified as systems by OneKey and AHA, we matched unmatched systems in the AHA data to owner subsidiaries (that is, entities that are below the system level in the OneKey hierarchy of organizations) of unmatched systems in the OneKey data. The rationale for this step is that the name and address of an AHA system may be more similar to the name and address of an owner subsidiary in OneKey rather than the name and address of the parent system. This process identified six possible matches, all of which we identified as valid matches. In these cases, we linked the AHA system to the parent system in OneKey.

2. Manual review of possible matches based on name and location

We used the SAS COMPGED scores and distances between systems to identify additional possible matches for manual review. We manually reviewed health systems with the following characteristics:

- Possible matched systems within 0.5 miles of each other
- Possible matched systems with a SAS COMPGED score ≤ 150 but greater than 1 mile apart and in the same city
- Possible matched systems with a SAS COMPGED score > 150 and ≤ 500 and in the same city and State
- Possible matched systems with a SAS COMPGED score ≤ 150 on truncated names (to increase the likelihood of a match based on the beginning portion of the name) and in the same State
- Possible matched systems within 10 miles of each other
- Possible matched systems in the same ZIP Code area or the same city

Manual review included comparison of the full system name and all address information associated with a health system (that is, street and mailing addresses). As part of the manual review, we conducted web searches to assist in identifying matches. When searching, we looked not only for name and address information but also for information about the health system's various locations, the breadth of the health system's services, and evidence of mergers or acquisitions.

The most useful approach to access this information was to select the "About" or "History" link on the health system's website. Historical information about systems and relationships between

systems helped us understand discrepancies in the data—for example, at times the data sources count mergers or acquisitions that were announced in 2021 but were not finalized until 2022, which we would learn about via web searching.

Table III.1 contains examples of manual matching using OneKey–AHA data. Sanford Health has a SAS COMPGED score of 0 across the two data sources, meaning that names matched exactly. However, it failed the automated match because the distance between the address listings of the two identically named systems is greater than 1 mile.

Allina Health had the same address in both datasets. However, it failed the automated match because its SAS COMPGED score was 500.

In the third case, Penn Medicine, a SAS COMPGED score of 500 was also generated. Penn Medicine and University of Pennsylvania Health System were in close proximity (1.1 miles) but not clearly a match based solely on name. Thus, we conducted a web search for University of Pennsylvania Health System and found that it is “doing business as” Penn Medicine, resulting in another match.

Table III.1. Examples of manually matched health systems

OneKey Health System Name	AHA Health System Name	Distance	SAS COMPGED Score
Sanford Health	Sanford Health	5.0	0
Allina Health System	Allina Health	0	500
Penn Medicine	University of Pennsylvania Health System	1.1	500

The manual review of the possible health system matches identified through the automated process yielded an additional 103 confirmed matches.

Summary of final automated matches. We identified 334 health system matches, 231 through automated means and 103 through automated means with manual review. After this phase of matching, 716 unmatched health systems remained (Table III.2).

Table III.2. Summary of matching results

Data	N
Number of health systems matched	334
Number of health systems unmatched	
OneKey only	642
AHA only	74
Total unmatched	716
Total health systems	1,050

B. Step 2: Matching Hospitals Across Data Sources and Aggregating Counts

As we developed the systems list, we were aware that some medium and large health systems have smaller, geographically defined health systems nested within them. In developing the systems list, we referred to the nested health systems as subsystems within parent systems. We identified possible nested relationships through automated hospital-to-hospital matching across data sources, with subsequent manual review.

1. Identifying possible additional nested relationships for manual review

Hospital-to-hospital matching. We also matched hospitals across data sources, using CMS Certification Numbers (CCNs). The purpose of this match was to identify health systems with previously unidentified relationships, including subsystem to parent system relationships. This step was particularly useful in identifying health systems that merged or were acquired by another health system. For example, in a few cases, a hospital name matched across two data sources, but the health system name for the two hospitals differed. Through web searching, we determined that one system acquired the other or the two health systems merged. In these cases, we updated the names to reflect the correct updated health system name. For more information about hospital-to-hospital matching, refer to the technical documentation for the 2021 hospital linkage file on the AHRQ CHSP website.^{iv}

2. Aggregating physician and hospital counts within health systems

Once the automated matching and identification of nested relationships were complete, we aggregated the components of parent systems (physicians, outpatient centers, and hospitals) to obtain the total system-level counts before applying exclusion criteria (discussed below in Step 3). First, we assigned hospitals to health systems at the highest level (for example, hospitals of subsystems were assigned to its parent system). We then aggregated physicians, outpatient centers, and hospitals to the highest health system level.^v For example, we summed the total count of physicians across all hospitals in the health system and applied the count to the health system as the total number of physicians in the health system.

Assigning hospitals to health systems. To assign hospitals to health systems, we applied the following rules:

1. First, we deduplicated hospitals between sources based on hospital name and location. This task was needed because not all hospitals in the AHA and OneKey data had CCNs or AHA IDs. We also removed hospitals that did not report a CCN or AHA ID and did not match another hospital based on name or location.

^{iv} The HospitalLinkage File and technical documentation for the Compendium of U.S. Health Systems, 2021, are at <https://www.ahrq.gov/chsp/Compendium/index.html>.

^v Outpatient centers include medical group practice sites, clinics, and other outpatient facility types.

2. Hospitals reported as being affiliated with only one health system were assigned to that health system. Of the 6,725 unique hospitals with a CCN or AHA ID reported in the two data sources, several hundred were identified as being in two or more health systems.
3. We manually reviewed hospitals that were identified as being in more than one health system due to either discrepancies between data sources or multiple systems listed in a single data source to determine the system to which the hospital belonged. In most cases, the multiple systems were in fact the same system with a different name or address or systems that were nested within each other (that is, subsystems and parent systems). In the former case, we updated the systems list to indicate that these systems were a match, and the hospital belonged to this system; in the latter case, we assigned the hospital to the parent system.

In some cases, the systems were system-level joint ventures, in which multiple systems have a formal relationship with a subsystem. In these cases, we assigned the subsystem to one of its two parent systems using the following decision rules (in order):

- When it is clear based on a manual review of systems' websites that one parent system is the majority owner or taking responsibility for running the day-to-day operations of the subsystem, we assign the subsystem to this system.
- In the absence of other information, we assign the subsystem to the system whose headquarters location is closest to the location of the subsystem; that is, we aim to assign local systems over regional or national systems.

The remaining cases were hospital-level joint ventures, in which multiple systems have a formal relationship with a hospital(s). In these cases, we assigned the hospitals using the following decision rules (in order):

- When it is clear based on a manual review of systems' and hospitals' websites that one system is the majority owner or taking responsibility for running the day-to-day operations of the hospital, we assign the hospital to this system.
- In the absence of other information, we assign the hospital to the system whose headquarters location is closest to the location of the hospital; that is, we aim to assign local system over regional or national systems.

Aggregating hospital and physician counts within health systems. The next step after assigning hospitals to health systems was to create the aggregate counts needed to apply the exclusion criteria. This step included an aggregate count of non-Federal general acute care hospitals, all physicians, and primary care physicians. In cases of parent-subsystem relationships, we ensured that the counts for the parents reflected the total counts for the entire system, including the counts of the subsystems that compose the parent system. Table III.3 summarizes the data sources used to generate the aggregate counts.

Counts of the number of physicians affiliated with health systems varied substantially between OneKey and AHA. The variation represents several differences in the physicians included in the counts from the data sources. The highest counts were typically found in OneKey, which is in part because IQVIA attempts to enumerate both hospital-based physicians and those working in office-based practices. We limited the OneKey counts to physicians who had close affiliations with facilities in the system based on conversations with IQVIA staff. These close affiliations are

identified as attending for hospitals; staff and treating for long-term care facilities; and all affiliations for other facility types. This approach excludes physicians from the counts with looser affiliations such as admitting privileges at hospitals.^{vi}

The AHA data do not enumerate individual physicians, but the survey asks about counts of physicians in various hospital-physician relationships; we sum physicians across integrated salary, equity, and foundation models. The data collection methods used by each source to count the number of physicians in a health system are described in Appendix A.

Table III.3. Data sources for generating aggregate counts of physicians and hospitals

Aggregate Counts	OneKey	AHA
Non-Federal general acute care hospital	(1) Not a government or veteran-owned/run facility and (2) flagged as an acute care general hospital, critical access hospital, or children’s hospital.	(1) Not Department of Defense, Public Health Service, veteran, Federal, Indian Health Service, or Department of Justice facilities and (2) the hospital provides one or more of the following services: general medical and surgical or children’s general medical and surgical care or is a critical access hospital or a major or minor teaching hospital based on resident to bed ratio.
Physicians (total)	Aggregate count at the health-system level of all medical doctors and doctors of osteopathy, regardless of specialty who had attending, staff, or treating affiliations with facilities in the system.	Aggregate count of medical doctors and doctors of osteopathy across different hospital-physician alignment models: Integrated Salary Model, Equity Model, and Foundation Model.
Primary care physicians	Aggregate count of all medical doctors and doctors of osteopathy within each health system in the following specialties: adolescent medicine, adolescent medicine/internal medicine, family medicine, family medicine/geriatrics, general practice, general preventive medicine, internal medicine, internal medicine/family medicine, internal medicine/geriatric medicine, internal medicine/pediatrics, internal medicine/preventive medicine, or pediatrics.	Variable not available ^a

^a AHA includes data on the number of employed and contract primary care physicians with privileges at a given hospital. We do not use those data when counting primary care physicians in systems for two reasons: (1) they may not be comparable to how we count total physicians in AHA data, and (2) they may not be comparable to how we

^{vi} Although we include physicians’ affiliations with all facility types in systems, the vast majority of the physicians in systems had affiliations with hospitals or outpatient centers (for example, clinics, medical groups, and outpatient surgical centers).

count primary care physicians in OneKey, in which we include physicians who are directly affiliated with systems (that is, not only through their affiliations with hospitals).

C. Step 3: Applying Exclusion Criteria

Through the data sources described above, we identified the hospitals and physicians included in each system (see Tables II.1 and III.3 for more detail regarding the methods each data source uses to identify the hospitals and physicians in systems) consistent with the Compendium's definition of health systems. We then applied criteria that are intended to exclude health systems without a qualifying hospital or lack a sufficient number of physicians to plausibly provide to their patients comprehensive care (including primary and specialty care).

After hospitals were assigned to health systems and aggregate counts of physicians were generated, we sequentially applied three criteria to exclude systems that do not have a qualifying hospital or comprehensive care capability. First, we excluded health systems that did not have at least one non-Federal general acute care hospital based on either data source (Table III.4). Next, we excluded health systems that had fewer than 50 physicians, which would be insufficient to plausibly offer a comprehensive range of services to their patients. Finally, we excluded health systems with fewer than 10 primary care physicians.

For the second exclusion criterion, we chose a total of 50 physicians as the threshold. When we constructed the 2016 systems list of systems, we explored the consequences of lowering or raising the threshold. Web searches of the potential new systems added after lowering the threshold suggested we risked adding some systems offering a limited scope of services in their community. If we were to raise the threshold, we risked excluding some systems that seemed potentially important healthcare systems in their community. Therefore, we required at least 50 physicians from at least one of the two data sources.

Our approach may result in underrepresentation of health systems serving patients in rural or frontier areas, or other systems that use other networking approaches (including tele-consultation) to provide comprehensive care to their population and thus require fewer physicians.

Finally, we excluded health systems that had fewer than 10 primary care physicians in the OneKey data. While the estimated size of the population that can be managed by a single primary care physician varies based on patient complexity, range of services provided, and composition of the primary care team, estimates of primary care panel size suggest that a system would need at least 10 primary care physicians to offer basic primary care to 25,000 patients.^{vii, viii} Increasing the threshold would have excluded some systems that manage practice locations providing primary care services. Therefore, we retained the threshold at 10.

^{vii} Altschuler J, Margolius D, Bodenheimer T, et al. Estimating a reasonable patient panel size for primary care physicians with team-based task delegation. *Ann Fam Med* 2012;10(5):396–400.

^{viii} Yarnall KS, Pollak KI, Østbye T, et al. Primary care: is there enough time for prevention? *Am J Public Health* 2003;93(4):635–41.

It should be noted that the threshold of 10 primary care physicians may lead to exclusions of some health systems that serve populations smaller than 25,000 or that rely more heavily on advanced practice clinicians to provide primary care services. This threshold might particularly affect the enumeration of health systems serving rural or frontier populations.

Also, as cited in the preceding section, physician counts vary across data sources. We opted to use the largest counts when applying the exclusion criteria. If one source reported 40 physicians and another reported 70 physicians, we opted to use the count of 70, erring on the side of inclusion rather than exclusion.

We applied these exclusion criteria for the 2021 consolidated list of systems without regard to whether a system was on the 2020 systems list.

When we constructed the 2016 list of systems, we considered additional criteria, including thresholds for key medical and surgical specialties. We found considerable variability across systems and communities, with no clear pattern that ensured these additional exclusions were helping identify systems providing comprehensive care.

Table III.4. Definition of exclusion criteria by data source

Exclusion Criteria	OneKey	AHA
Non-Federal general acute care hospitals	Health system has no non-Federal general acute care, critical access, or children’s hospitals.	Health system has no non-Federal hospitals providing general medical and surgical services for adults or children, no critical access hospitals, and no major or minor teaching hospitals.
Number of physicians	Health system has fewer than 50 medical doctors and/or doctors of osteopathy who have attending, staff, or treating affiliations with facilities in the system.	Health system has fewer than 50 physicians participating in the following: Integrated Salary Model, Equity Model, and/or Foundation Model.
Number of primary care physicians	Health system has fewer than 10 medical doctors and/or doctors of osteopathy practicing in the following specialty areas: adolescent medicine, adolescent medicine/internal medicine, family medicine, family medicine/geriatrics, general practice, general preventive medicine, internal medicine, internal medicine/family medicine, internal medicine/geriatric medicine, internal medicine/pediatrics, internal medicine/preventive medicine, or pediatrics.	Information not available in the AHA data. ^a

^a AHA includes data on the number of employed and contract primary care physicians with privileges at a given hospital. We do not use those data when counting primary care physicians in systems for two reasons: (1) they may not be comparable to how we count total physicians in AHA data, and (2) they may not be comparable to how we

count primary care physicians reported in the OneKey data, in which we include physicians who are directly affiliated with systems (that is, not only through their affiliations with hospitals).

Starting with 1,050 health systems reported in Table III.2, we limited the systems list to 1,009 systems after addressing (1) multiple systems that were in fact the same system with a different name or address and (2) subsystems (stand-alone or joint venture) that were nested within a parent system. From this list of 1,009 systems, we first removed 90 systems that lacked at least one non-Federal general acute care hospital in the U.S. in both data sources (Table III.5); this process excluded systems whose hospitals were solely in U.S. territories. Next, across the remaining 919 health systems, we removed 269 systems that did not have at least 50 physicians in both data sources. Finally, of the remaining 650 systems, we removed 5 that lacked at least 10 primary care physicians in the OneKey data.

Table III.5. Number of systems excluded from the consolidated list

Exclusion Criteria	Data Source	Number of Systems Excluded	Number Remaining
No non-Federal general acute care hospitals	OneKey, AHA	90	919
Fewer than 50 physicians	OneKey, AHA	269	650
Fewer than 10 primary care physicians	OneKey	5	645

D. Step 4: Conducting Final Manual Review of Consolidated List

After completing all matching activities, identifying and implementing nested relationships, and applying exclusion criteria, we manually reviewed the systems list to confirm accurate implementation of the process described above and to identify any obvious misclassification.

In addition, we considered whether the systems list included entities that might not meet the Compendium’s definition of health systems even though at least one of the data sources included them as systems and they passed the exclusion criteria. For example, the systems list could include specialty systems, such as those that provide surgical care only. Or the systems list could include hospital management companies that might not provide comprehensive care through close connections between hospitals and medical groups but provide high-level management or consulting services to hospitals and their medical groups.

In an effort to identify these candidate specialty systems, we examined the list of systems and reviewed the corporate website of entities for which a member of the research team indicated that the system might provide specialty care only. In an effort to identify candidate hospital management companies, we reviewed the corporate website of entities for which the AHA data indicated they had a hospital under contract management and the management organization name matched the system name. We also reviewed systems classified as primarily investor owned (see section IV for a definition of investor owned).

To be retained as a system on the list, the corporation website had to either document: (1) common ownership of at least one acute care general hospital and one group of physicians providing comprehensive primary care and specialty care, or (2) tight joint management of at least one acute care general hospital and one group of physicians providing comprehensive primary and specialty care. For this website review, we defined tight joint management as a foundation model, shared governance (for example, substantially overlapping board membership

of a hospital and comprehensive medical group), or explicit co-branding of physicians with the system. We did not consider physician-hospital organizations, by themselves, to represent tight joint management.^{ix}

We also excluded one Federal system that was classified incorrectly as having at least one non-Federal general acute care hospital in the data.

Based on these criteria, 10 systems were excluded from the final systems list, which reduces the number of systems from 645 to 635 (Table III.6).

We note that the systems list may still include hospital management companies. It is not always possible to assess systems’ business models based on the information available for our review, and we did not conduct a separate detailed review of each system on the list. Likewise, the systems list may include systems that could be considered specialty care systems, rather than systems devoted to providing comprehensive care for their patient population.

Table III.6. Systems excluded in the final manual review

Excluded System	Reason for Exclusion
Adeptus Health	Specialty care only
AHMC Healthcare, Inc.	Hospital management company
Alliant Management Services	Hospital management company
Great Plains Health Alliance, Inc.	Hospital management company
HealthTechS3	Hospital management company
Indian Health Service	Federal system
KPC Healthcare Inc	Hospital management company
Nuehealth LLC	Hospital management company
QHR	Hospital management company
Surgery Partners, Inc.	Specialty care only

We endeavored to exclude specialty systems through visual inspection and through such means as requiring that at least one data source indicate that the system included at least one general acute care hospital and the system included at least 10 primary care physicians. Nonetheless, it is possible some specialty care-focused systems remain in the final systems list.

The current systems list contains 635 health systems, 310 matched across the two data sources and 325 unmatched systems (Table III.7).

^{ix} Note, when creating the 2018 Compendium of U.S. Health Systems, we identified Quorum Health Corporation as a hospital management company, and thus, it was not included in the 2018 systems list. However, through the review of potential hospital management companies for the 2020 and 2021 system lists, we determined that Quorum Health Corporation met the criteria to be retained as a system on the lists in 2020 and 2021. More specifically, we identified that Quorum Health Corporation owned hospitals that had ownership or tight management relationships with a range of physician group practices in 2020 and 2021.

Table III.7. Final consolidated list

Data	Number of Health Systems
Matched health systems	310
Unmatched health systems	
OneKey	323
AHA	2
Total health systems	635

IV. Variables Included in the Consolidated List

The systems list contains the name and location (city, State, and ZIP Code) of each health system we identified through the process outlined above. In addition, we provide the numbers of total physicians, primary care physicians, nurse practitioners, physician assistants, outpatient centers, and hospitals (see Table III.3).

The systems list also contains contextual variables constructed by linking hospital cost report data available through the Healthcare Cost Report Information System (HCRIS) data.^x CMS requires Medicare-certified institutional providers to submit annual cost reports, which make up the HCRIS cost report data. HCRIS data are publicly available and contain information on facility characteristics, utilization data, revenue, and charges. The systems list uses HCRIS data for calendar year 2021 (January–December) for individual hospitals and provides summary information calculated at the system level.^{xi} These variables are described in Tables IV.1 and IV.2. A full data dictionary for the consolidated list is available in Appendix E.

In addition, the systems list contains variables indicating whether systems offered an insurance product and the number of system-affiliated nursing homes. We include summaries of the variables in Table IV.2 and Appendix E. We provide detailed information regarding the data and methods used to construct the insurance product and nursing home variables in Appendices C and D, respectively.

Safety net systems. The systems list provides three indicators related to safety net systems. To identify systems serving low-income and potentially underserved populations, the systems list draws on two common measures used in the literature to define safety net hospitals. First, we flag systems that have at least one hospital with a high Disproportionate Share Hospital (DSH) patient percentage, which is a measure of a hospital’s overall caseload of low-income insured patients. Hospitals paid under the Medicare inpatient prospective payment system (IPPS) report the DSH patient percentage to CMS, which uses it to calculate Medicare DSH payments.^{xii} Systems are categorized as having at least one hospital with a high DSH patient percentage if they have a non-Federal general acute care system hospital in the top quintile of DSH patient percentage among IPPS hospitals.

^x CMS. Cost Reports. <https://www.cms.gov/research-statistics-data-and-systems/downloadable-public-use-files/cost-reports/>. Accessed May 24, 2023.

^{xi} For non-Federal general acute care system hospitals not matching 2021 data, we used HCRIS data for calendar year 2020. In our final systems list, 93 percent of non-Federal general acute hospitals with a CCN or AHA ID have HCRIS data. Three systems are missing HCRIS data for all of their non-Federal general acute hospitals.

^{xii} The DSH patient percentage is equal to the sum of the percentage of Medicare inpatient days attributable to patients eligible for both Medicare Part A and Supplemental Security Income (SSI), and the percentage of total inpatient days attributable to patients eligible for Medicaid but not Medicare Part A. The DSH patient percentage is defined as: $DSH\ Patient\ Percent = (Medicare\ SSI\ Days / Total\ Medicare\ Days) + (Medicaid,\ Non-Medicare\ Days / Total\ Patient\ Days)$. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/dsh.html>. Accessed May 24, 2023.

In addition, the systems list provides two indicators of uncompensated care burden. Uncompensated care is defined as hospitals' total unreimbursed and uncompensated care costs (including charity care for uninsured and insured patients) as well as bad-debt expenses.^{xiii} Uncompensated care burden is calculated as the ratio of uncompensated care to total operating expenses. Systems are categorized as having at least one hospital with a high uncompensated care burden if they have a non-Federal general acute care hospital in the top quintile of uncompensated care burden (the ratio of total uncompensated care to total operating expenses for an individual system hospital).

We also calculated a measure of systemwide uncompensated care burden defined as the ratio of total uncompensated care to total operating expenses across systems' non-Federal general acute care hospitals. Systems are flagged as having *systemwide uncompensated care burden* if they are in the top quintile of uncompensated care burden among U.S. health systems.

Teaching intensity. The systems list also includes three indicators of teaching intensity. Using system hospitals' ratio of residents to beds, systems are categorized as a *system that includes at least one major teaching hospital* if the system has at least one non-Federal general acute care hospital with a high (≥ 0.25) resident-to-bed ratio. Systems are categorized as a *system that includes at least one very major teaching hospital* if the system has at least one non-Federal general acute care hospital with a very high (≥ 0.60) resident-to-bed ratio.^{xiv}

To categorize systems based on their systemwide teaching intensity, we calculated a measure of systemwide resident-to-bed ratio defined as total residents divided by total beds across systems' non-Federal general acute care hospitals. Using this measure, *systemwide teaching intensity* is categorized as nonteaching, minor teaching, or major teaching based on their systemwide resident-to-bed ratio. As noted in Table IV.1, a minor teaching system is defined as a resident-to-bed ratio greater than zero but less than 0.25 across system non-Federal general acute care hospitals. A major teaching system is defined as a resident-to-bed ratio greater than or equal to 0.25 across member hospitals. Systems with no residents reported among member non-Federal general acute care hospitals are considered nonteaching systems.

Children's systems. We also report on the degree to which a system primarily serves children. Children's hospitals are identified if the hospital facility type was listed as children in HCRIS.^{xv} To create a system measure, we calculated a ratio of system beds in children's general acute care hospitals to total system beds in general acute care hospitals. Specifically, systems are categorized as having no children's hospitals, having at least one children's hospital but not predominantly delivering care at children's hospitals, or predominantly delivering care at

^{xiii} Bad-debt expenses include the cost of non-Medicare and nonreimbursable Medicare bad-debt expenses.

^{xiv} Thresholds used to identify hospitals with high teaching intensity were selected to align with previous literature, including Patel MS, Volpp KG, Small DS, et al. Association of the 2011 ACGME resident duty hour reforms with mortality and readmissions among hospitalized Medicare patients. *JAMA* 2014;312(22):2364–73.

^{xv} Some children's hospitals do not care for a substantial number of Medicare patients and may not file Medicare cost reports. This finding was noted by the Medicaid and CHIP Payment and Access Commission in their February 2016 report to Congress available here: <https://www.macpac.gov/wp-content/uploads/2016/01/Report-to-Congress-on-Medicaid-DSH.pdf>. Accessed May 24, 2023. Thus, children's systems may be underreported in the systems list.

children’s hospitals. Systems are categorized as predominantly delivering care at children’s hospitals if a majority of hospital beds in the system are in children’s hospitals.^{xvi}

System ownership type. The systems list also provides information on the ownership of systems’ hospitals. The ownership types are nonprofit, public/government, church operated, and for profit/investor owned. The variable indicates the ownership type for the greatest number of non-Federal general acute care hospital beds in each system. For example, if most non-Federal general acute care beds in the system are in nonprofit hospitals, the system is categorized as nonprofit (Table IV.2 includes more detail regarding the approach used to define ownership type).

Health system attributes. We describe additional health system attributes included in the systems list in Table IV.2. These variables describe the number of hospitals (acute and total), beds, discharges, full-time-equivalent interns and residents per system, total hospital patient revenue, and net hospital patient revenue. These variables are summed across system hospitals for all non-Federal general acute care hospitals. The systems list also includes the number of total physicians, primary care physicians, nurse practitioners, physician assistants, and outpatient centers per system. In addition, the systems list includes an indicator for multistate systems. Specifically, systems are categorized as having hospitals in a single State, two States, or three or more States. This variable includes all member hospitals, even if the member hospital is not acting as a local system in the market in which it is operating.

Finally, the systems list includes variables that indicate: (1) whether systems offered an insurance product, including any insurance product, a Medicare Advantage (MA) plan, a Medicaid Managed Care plan or a Health Insurance Marketplace plan; (2) the list of MA contracts offered by the system and total MA enrollment across these contracts; and (3) the count of nursing homes affiliated with each system.

^{xvi} We identified two systems (Shriners Hospitals for Children and East Tennessee Children’s Hospital Association) with missing values in HCRIS for the relevant variables for their hospitals as predominantly delivering care at children’s hospitals based on a review of the systems’ websites. In addition, we reviewed all non-Federal general acute care hospitals with CCNs and missing HCRIS data for “child” in the hospital name. We identified any systems with at least one such hospital with “child” in the hospital name as having at least one children’s hospital but not predominantly delivering care at children’s hospitals. This approach resulted in changing the values for seven systems.

Table IV.1. Health system types

System Type Variables	Definition
System includes at least one hospital with a high Disproportionate Share Hospital (DSH) patient percentage	The DSH patient percentage is defined as: $DSH\ Patient\ Percentage = (Medicare\ SSI\ days / total\ Medicare\ days) + (Medicaid,\ non-Medicare\ days / total\ days)$. Hospitals paid under the IPPS report the DSH patient percentage to CMS, which uses it to calculate Medicare DSH payments. It is a measure of the hospital's overall caseload of low-income insured patients. Systems are categorized as having at least one hospital with a high DSH patient percentage if they have a non-Federal general acute care system hospital in the top quintile ^{xvii} of DSH patient percentage among IPPS hospitals.
System includes at least one hospital with a high uncompensated care burden	Uncompensated care is defined for system hospitals as the sum of charity care and bad-debt expense adjusted by the hospital-specific ratio of cost to charges. Uncompensated care burden is calculated as the ratio of uncompensated care to total operating expense. Systems are categorized as having at least one hospital with a high uncompensated care burden if they have a non-Federal general acute care hospital in the top quintile of uncompensated care burden (the ratio of total uncompensated care to total operating expense for a non-Federal general acute care hospital). ^{xviii}
Systemwide uncompensated care burden	Uncompensated care is defined for the system as the sum of system hospitals' charity care and bad-debt expense adjusted by the hospital-specific ratio of cost to charges. The systemwide uncompensated care burden is calculated as the ratio of total uncompensated care to total operating expense across systems' non-Federal general acute care hospitals.
System includes at least one major teaching intensity hospital	Systems are categorized as having at least one major teaching intensity hospital if they have at least one non-Federal general acute care hospital with a resident-to-bed ratio greater than or equal to 0.25.
System includes at least one <i>very major</i> teaching intensity hospital	Systems are categorized as having at least one very major teaching intensity hospital if they have a non-Federal general acute care hospital with a resident-to-bed ratio greater than or equal to 0.60.

^{xvii} Quintiles are used to align with prior health services research on defining the safety net, including: Office of the Assistant Secretary for Planning and Evaluation. Social risk factors and performance under Medicare's Value-Based Purchasing Programs: a report required by the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014. Washington, DC: U.S. Department of Health and Human Services; December 2016.

^{xviii} This definition extends work from previous literature on defining safety net hospitals, including Zuckerman S, Bazzoli G, Davidoff A, et al. How did safety-net hospitals cope in the 1990s? *Health Aff.* 2001;20(4):159-68. <https://www.healthaffairs.org/doi/10.1377/hlthaff.20.4.159>. Accessed January 23, 2024; and Bazzoli GJ, Kang R, Hasnain-Wynia R, et al. An update on safety-net hospitals: coping with the late 1990s and early 2000s. *Health Aff.* 2005;24(4):1047-6. <https://www.healthaffairs.org/doi/10.1377/hlthaff.24.4.1047>. Accessed January 23, 2024. In these studies, high uncompensated care burden for hospitals was defined as the top decile of uncompensated care burden.

System Type Variables	Definition
Systemwide teaching intensity	Systems are categorized as nonteaching, minor teaching, or major teaching. A minor teaching system is defined as a resident-to-bed ratio greater than zero but less than 0.25 across the non-Federal general acute care system hospitals. A major teaching system is defined as a resident-to-bed ratio greater than or equal to 0.25 across non-Federal general acute care system hospitals. Systems with no residents reported among non-Federal general acute care system hospitals are considered nonteaching systems.
Degree to which system serves children only	Systems are categorized as having no children’s hospitals, having at least one children’s hospital but not predominantly delivering care at children’s hospitals, or predominantly delivering care at children’s hospitals. Systems are categorized as predominantly delivering care at children’s hospitals if a majority of non-Federal general acute care hospital beds in the system are in children’s hospitals.

Note: Previous versions of the systems list included a variable that indicated whether a system was predominantly investor owned. The new ownership type variable added to the 2021 systems list (Table IV.2), which indicates ownership type (investor owned is one of the possible types), replaces the previous investor-owned variable.

Table IV.2. Health system attributes included in the systems list

Health System Attributes	Definition
Number of hospitals in systems	A systemwide count of system hospitals of any type (including general, specialty, rehabilitation, and psychiatric) reported with a CCN or AHA ID in one or both data source.
Number of general acute care hospitals in systems	A systemwide count of non-Federal general acute care system hospitals (defined in Table III.3) reported with a CCN or AHA ID in one or both data source.
Number of total physicians	A systemwide count of system physicians (defined in Table III.3). We report the largest number of physicians reported between the two data sources to be consistent with the values used for the exclusion criteria.
Number of primary care physicians	A systemwide count of system primary care physicians (defined in Table III.3). If a system was identified by AHA only (not also OneKey), then the number of primary care physicians is missing.
Number of nurse practitioners	A systemwide count of nurse practitioners identified as affiliated with systems in the OneKey data. Affiliations are identified using a similar approach used to identify physicians affiliated with systems in the OneKey data (described in section III.B and Table III.3). Because of changes made to nurse practitioner affiliations in the OneKey data in 2021, these counts should not be compared with counts in system lists prior to 2021. See section V.F for more detail on the issue.

Health System Attributes	Definition
Number of physician assistants	A systemwide count of physician assistants identified as affiliated with systems in the OneKey data. Affiliations are identified using a similar approach used to identify physicians affiliated with systems in the OneKey data (described in section III.B and Table III.3). Because of changes made to physician assistant affiliations in the OneKey data in 2021, these counts should not be compared with counts in system lists prior to 2021. See section V.F for more detail on the issue.
Number of outpatient centers* * The variable name in the system file is grp_cnt.	A systemwide measure of the count of outpatient centers. We report the number of outpatient centers reported in the OneKey data (AHA data does not report the count of outpatient centers). In the OneKey data, outpatient centers include facilities such as medical group practice sites, health clinics, and imaging centers. Medical groups are outpatient healthcare centers that provide general and/or specialized services to patients. Typically, they comprise two or more prescribers and one to many nonprescribers, such as nurses and medical technicians.
Multistate system	A categorical variable for whether a system's hospitals are located in one State, two States, or three or more States. System hospitals were counted if they were reported with a CCN or AHA ID in one or both of the two data sources. The State for each hospital reflects the address listed in HCRIS unless that information was not available, in which case it reflects the address reported in the AHA or OneKey data, in that order.
Number of beds in systems	A systemwide measure of the total count of hospital beds in the system in non-Federal general acute care hospitals according to HCRIS.
Number of discharges in systems	A systemwide measure of the total count of hospital discharges in the system from non-Federal general acute care hospitals according to HCRIS.
Number of residents in systems	A systemwide measure of the total count of full-time-equivalent interns and residents in the system in non-Federal general acute care hospitals according to HCRIS.
System offers any insurance product	An indicator for whether any of a system's non-Federal general acute care hospitals reported in the AHA data that the hospital or its system owns or jointly owns a health plan, or whether the hospital or its system has a joint venture or significant partnership with an insurer.
System offers a Medicare Advantage (MA) product	An indicator for whether any of a system's non-Federal general acute care hospitals reported in the AHA data that the hospital or its system offers an MA plan via ownership or joint venture.
System offers a Medicaid managed care product	An indicator for whether any of a system's non-Federal general acute care hospitals reported in the AHA data that the hospital or its system offers a Medicaid managed care plan via ownership or joint venture.

Health System Attributes	Definition
System offers a Health Insurance Marketplace product	An indicator for whether any of a system's non-Federal general acute care hospitals reported in the AHA data that the hospital or its system offers a Health Insurance Marketplace plan via ownership or joint venture.
List of MA contracts offered by the system	Lists the MA contracts offered by the system, including MA Cost plans, Program of All-inclusive Care for the Elderly (PACE), and demonstration plans according to matches between systems or subsystems and MA data from the CMS MA Plan Directory.
Total enrollment across all MA contracts owned by the system	Aggregates MA enrollment across all MA contracts offered by the system according to matches between systems or subsystems and MA data from the CMS MA Plan Directory.
Number of system-affiliated nursing homes	A systemwide count of the number of system-affiliated nursing homes in the OneKey data.
Ownership type	The most common ownership type among systems' non-Federal general acute care hospital beds: nonprofit, public/government, church operated, or for profit/investor owned. The variable combines information from HCRIS and AHA data. If the <i>majority</i> of a system's beds are a given ownership type in the HCRIS data, that is the ownership type for the system. If there is no majority using the HCRIS data, but the <i>majority</i> of beds are a given ownership type in the AHA data, that is the ownership type for the system. If there is no majority based on HCRIS or AHA data, the ownership type is based on the <i>plurality</i> of beds in the AHA data. Note, ownership type is based on a majority of beds for nearly all systems (that is, very few are based on a plurality of beds that is not also a majority).
Total hospital patient revenue	The sum of total patient revenue among the non-Federal general acute care hospitals in a given system as reported in the HCRIS data.
Total net patient revenue	The sum of total patient revenue less contractual allowances and discounts on patients' accounts among the non-Federal general acute care hospitals in a given system as reported in the HCRIS data.

AHA = American Hospital Association Annual Survey Database; CCN = CMS Certification Number; CMS = Centers for Medicare & Medicaid Services; HCRIS = Healthcare Provider Cost Reporting Information System; MA = Medicare Advantage; OneKey = IQVIA OneKey Organizations, formerly known as HCOS, and OneKey Professionals.

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V. Limitations

Stakeholders should consider the limitations of the methodology when using the systems list.

A. Definition of a Health System

1. Hospital Ownership or Comanagement Requirement

The Compendium definition of a health system excludes health systems that do not own hospitals. This approach excludes physician organizations that provide comprehensive management of their patient populations without an ownership or comanagement relationship with a hospital. In addition, the thresholds set for physician numbers may result in the exclusion of health systems using advanced practice clinicians, tele-consultation, or other innovative collaborations to provide comprehensive care to their population. This issue may be especially relevant to systems in rural and frontier communities.

2. Aggregation Rule

Health systems are aggregated to their highest level of ownership. For example, a national parent system operating subsidiaries in regional markets is reported as a national system. The subsidiary systems do not appear in the systems list. As such, **the systems list does not include all systems operating in specific states or local markets.** Because of these aggregation rules, it is also possible that a parent system does not meet the Compendium definition of a system in each market where it operates. For example, a system or a subsidiary may operate a hospital that is not co-owned or jointly managed with a group of local physicians, but the parent system can still meet the Compendium definition of a system based on other subsidiaries.

B. Discrepancies Between Data Sources

There are discrepancies between systems' attributes as reported in the OneKey and AHA data sources. The differences include the number of physicians in some systems appearing in both the OneKey and AHA data.^{xix} Table V.1 provides the largest discrepancies in physician counts between the two data sources. The discrepancies are partially due to the inclusion of hospital staff physicians in the OneKey data. In addition, IQVIA uses Drug Distribution Data that enable quick identification of new organizations to investigate and potentially add to their database.^{xx} Therefore, the OneKey data report the highest number of physicians for the vast majority of systems. The differences in the way the data are collected, the sets of physicians included in the data, and the types of physician-system relationships reported in the data also contribute to the discrepancies (Table III.3).

^{xix} Note, the physician counts reflect some double counting of physicians, as physicians can be attributed to more than one system.

^{xx} Information on the data collection methods was gathered through a conversation with staff at QuintilesIMS on May 19, 2017 and reviewed for accuracy by IQVIA in 2019.

Table V.1. Examples of discrepancies in physician counts across data sources

Health System	OneKey	AHA
Kaiser Permanente	24,888	2,842
Hospital Corporation of America, Inc.	14,610	179
CommonSpirit Health	14,820	690

C. Data Collection Methods

Each data source has its own proprietary methodology for collecting data. However, both the OneKey and AHA data rely on some self-reporting by representatives at hospitals and medical groups (see Appendix A). For example, IQVIA links professionals to organizations via a combination of a proprietary address algorithm and a manual process. IQVIA periodically calls practices and asks the practice managers to confirm or update the accuracy of the information contained within their database and uses hospital web data to enumerate physicians within hospitals once the hospital confirms the website is current.

AHA data are derived from a cross-sectional survey of more than 6,200 hospitals operating in the United States. Respondents self-report the characteristics and attributes of their hospital, including counts of affiliated physicians. As with all self-reported data, the accuracy of the information depends on the knowledge of the respondent, the salience of the task to the respondent, and the meaning the respondent ascribes to key terms such as affiliation and ownership.

D. Potential Misalignment of System Definitions

It is difficult to identify the exact nature of the relationships between systems and their members to determine whether an entity meets the Compendium’s definition of a health system. For example, while we removed a handful of hospital management companies that were determined to not meet the definition, it is possible that the current systems list contains other such companies that were not found during the manual review.

Similarly, the data identify several systems as having a general acute care hospital that appears to focus on delivering specialty care to a select population, which might mean the system is not providing comprehensive care according to the definition. While we refine each data source’s list of systems to align with the Compendium definition, the systems list is reliant on the data sources’ definitions for identifying most systems.

E. Mergers and Acquisitions

The systems list reflects health systems in the United States at the end of 2021. However, since OneKey and AHA data vary in the periodicity of their updates, lags may occur in updating changes to systems, such as mergers, acquisitions, and name changes, that occurred before the end of 2021.

Through the process of merging the two data sources and developing the systems list, we identified a host of health systems that were acquired by or merged with other systems, and it is possible that some additional transactions are not captured. The calendar year 2021 represented

by the systems list aligns with the periods covered by the data sources, with some level of updating accomplished through manual review of select systems.

F. Differences Between 2021 and Previous Consolidated Lists

Mid-year in 2021, IQVIA enhanced their methodology for assigning physicians' affiliations with health systems through hospitals. Of particular importance to the systems list, these updates to IQVIA's business rules resulted in some physicians being recategorized from attending affiliations to other affiliations and, vice versa, from other affiliations to attending. As mentioned above, we include attending affiliations with systems through hospitals but not other affiliations (for example, admitting affiliations).

The number of physicians moved from attending to other affiliations were roughly equal to those moved in the opposite direction from other affiliations to attending. Three systems no longer met the 50-physician minimum threshold and were therefore not included in the 2021 systems list: College Health Enterprises Inc (HSI00000234), Graham Health System (HSI00001310), and Jefferson Healthcare (HSI00000526). One system was not included because it no longer met the required number of primary care physicians: San Antonio Regional Hospital (HSI00000954).

At the same time, IQVIA also changed their methodology for assigning nurse practitioner and physician assistant affiliations with systems through hospitals. Previously, nurse practitioners and physician assistants could have either an attending or an admitting affiliation with a hospital. Now, attending and admitting affiliations for nurse practitioners and physician assistants are combined into a more general category: standard affiliation.

In the past, we included attending affiliations when identifying nurse practitioners and physician assistants affiliated with systems, but not admitting affiliations. With this update in methodology for nurse practitioner and physician assistant affiliations, we can no longer distinguish between attending and admitting affiliations. Thus, we changed the methodology to include standard affiliations for nurse practitioners and physician assistants with systems through hospitals.

This change in methodology led to substantial increases in the counts of nurse practitioners and physician assistants in systems. For example, the average count of nurse practitioners per system increased from 196 in 2020 to 266 in 2021 (36 percent), and the average count of physician assistants increased from 101 in 2020 to 139 in 2021 (38 percent). This increase for nurse practitioners was more than three times as large as the increase between 2018 and 2020, and the increase for physician assistants was more than two times as large. Thus, the counts of nurse practitioners and physician assistants in 2021 are not comparable to counts in previous years of system lists.

We updated the approach to calculating system counts of physicians from the AHA data in the 2020 and 2021 system lists. In the 2016 and 2018 lists of systems, we summed the reported numbers of physicians across all hospitals in each system. However, hospitals have the option of reporting physician counts for their hospital (which is the most common option chosen) or the entire health system, and more than one hospital in a system can report the system-level count. Thus, we revised the approach to calculating physician counts from the AHA data to use the system-level count if any of a system's hospitals report at the system level. If more than one hospital reports a system-level count, and the counts differ, we use the larger of the two counts.

If the hospitals in a system report a mix of hospital- and system-level counts, we use whichever is larger: the largest value of system-level counts or the sum of the hospital-level counts. If none of a system's hospitals report a system-level count, we sum the hospital-level counts as done previously in the 2016 and 2018 lists of systems. Note, we only report the count of physicians from the AHA data for 18 systems. We report the count of physicians from the OneKey data for all other systems.

In contrast to the 2018 systems list, the 2021 systems list includes three variables that were also new to the 2020 systems list: ownership type, total hospital patient revenue, and net hospital patient revenue. In addition, the 2021 systems list does not include variables on systems' participation in alternative payment models or the variable indicating if a system is predominantly investor owned, both of which were in the 2016 and 2018 systems list but not in the 2020 systems list.

For the insurance product variables, in cases in which a hospital was missing 2021 data, we used responses from the 2020 AHA data to fill in the relevant information. This strategy is consistent with the approach used in the 2018 systems list. In contrast, we did not fill in missing 2020 Compendium information with 2019 AHA data.

Finally, although the underlying data did not change and we did not change the way the system-level group count variable is calculated in 2020 and 2021 compared to the 2016 and 2018 system lists, we revised the way we describe the contents of the counts in the technical documentation for the 2020 systems file and throughout this document. The counts include outpatient centers as defined in the OneKey data. While they are primarily medical group practice sites, outpatient centers also include other facility types, such as health clinics and imaging centers. The group count variable is consistent across all years; only the description has been updated to better reflect the organizations included in the counts.

Appendix A. OneKey and AHA Methodologies

IQVIA maintains two integrated databases relevant to the study of health system performance under the umbrella of Healthcare Relational Services (HCRS). The first, the Healthcare Professional Services (OneKey Professionals) database, focuses on health professionals (for example, physicians, residents, and advanced practice clinicians, such as nurse practitioners and physician assistants) and contains healthcare administrators.

IQVIA maintains OneKey Professionals by using manual stewardship and updates from industry source data (including American Medical Association, CMS' National Plan and Provider Enumeration System [NPPE], State Controlled Substance Registration, Drug Enforcement Administration [DEA] identifier, and other established industry source data). OneKey Professionals providers are integrated into the OneKey Organizations database, the second of the two OneKey databases.

The providers in OneKey Professionals are bridged to the organizations in OneKey Organizations as provider affiliations via a combination of a proprietary address intelligence algorithm and manual stewardship, in which individual provider addresses are processed against organizations in OneKey Organizations through established business rules to create a provider affiliation.

OneKey Professionals addresses are run through proprietary address intelligence software and given a rank from negative 5 to 10. A rank of 6 or higher triggers an attempt to match to organizations in OneKey Organizations. Most professionals in OneKey Professionals will have at least one address with a score of 6 or higher.

The OneKey Organizations data we used to create the 2020 systems list contains information on nearly 600,000 outpatient centers, hospitals, nursing homes, accountable care organizations (ACOs), and other organizations. Fields include organizational characteristics such as bed count, provider counts, health information technology infiltration, and finances.

OneKey Organizations is periodically verified via telephone; the timing of verification calls varies by organization type. Each time a medical group practice is verified, so too are the providers within that group. For hospital verification, IQVIA confirms with hospitals that their website is up to date. Then, IQVIA uses web-based information to determine which providers are affiliated with that hospital. They also break down affiliation types for physicians' relationships to hospitals—attending or admitting. All relationships between organizations in OneKey Organizations are researched and the relationship is verified with both entities to confirm that a relationship exists and to determine the nature of the relationship.

AHA fields an annual cross-sectional survey of the more than 6,200 U.S. hospitals; the survey typically has a response rate of more than 80 percent. The objective of the survey is to track and monitor the evolution of new systems of care, care coordination functions, and various payment models used in providing care to a population as they are experienced by hospitals. Data are supplied by hospital administrators online, as well as by paper. Although the survey has a cross-sectional design, the unique hospital identifier (AHA ID) can be used for cohort studies to

monitor changes in hospitals over time. Data from the survey are stored in the AHA Annual Survey Database.

The AHA survey provides several mechanisms for identifying healthcare delivery systems. The data may be used to identify horizontally integrated hospitals, identify hospitals that have vertical relationships with physicians, and characterize the nature of these relationships in a health system taxonomy. The relationships include hospital affiliations with physicians through integrated salary models or equity models; medical group or physician ownership of hospitals; hospital participation in foundation models; and hospital-physician alignment through management services organizations and physician hospital organizations. In creating the systems list, we used a system membership variable that identifies multihospital and diversified single hospital healthcare systems.

Appendix B. Automated Matches

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
ADVENTIST HEALTHCARE	820 W DIAMOND AVE, GAITHERSBURG, MD, 20878	Adventist HealthCare	820 WEST DIAMOND AVENUE, Gaithersburg, MD, 20878
ADVENTHEALTH	900 HOPE WAY, ALTAMONTE SPRINGS, FL, 32714	AdventHealth	900 HOPE WAY, Altamonte Springs, FL, 32714
ADVOCATE AURORA HEALTH	3075 HIGHLAND PKWY, DOWNERS GROVE, IL, 60515	Advocate Aurora Health	3075 HIGHLAND PKWY SUITE 600, Downers Grove, IL, 60515
ALLINA HEALTH	2925 CHICAGO AVE, MINNEAPOLIS, MN, 55407	Allina Health	2925 CHICAGO AVENUE, Minneapolis, MN, 55407
ATLANTICARE	2500 ENGLISH CREEK AVE, EGG HARBOR TOWNSHIP, NJ, 8234	AtlantiCare	2500 ENGLISH CREEK AVENUE, BUILDING 500, Egg Harbor Township, NJ, 8234
BAPTIST HEALTH CARE	1717 N E ST, PENSACOLA, FL, 32501	Baptist Health Care Corporation	1717 NORTH 'E' STREET, Pensacola, FL, 32501
BAPTIST HEALTH	9601 BAPTIST HEALTH DR, LITTLE ROCK, AR, 72205	Baptist Health	9601 BAPTIST HEALTH DRIVE, Little Rock, AR, 72205
CAPE COD HEALTHCARE INC	27 PARK ST, HYANNIS, MA, 2601	Cape Cod Healthcare, Inc.	27 PARK STREET, Hyannis, MA, 2601
EMANATE HEALTH	210 W SAN BERNARDINO RD, COVINA, CA, 91723	Emanate Health	210 WEST SAN BERNARDINO ROAD, Covina, CA, 91723
COMMUNITY HEALTH SYSTEMS INC	4000 MERIDIAN BLVD, FRANKLIN, TN, 37067	Community Health Systems, Inc.	4000 MERIDIAN BOULEVARD, Franklin, TN, 37067
MEDISYS HEALTH NETWORK	8900 VAN WYCK EXPY, JAMAICA, NY, 11418	MediSys Health Network	8900 VAN WYCK EXPRESSWAY, Jamaica, NY, 11418
JEFFERSON HEALTH	111 S 11TH ST, PHILADELPHIA, PA, 19107	Jefferson Health	1101 MARKET STREET, 31ST FLOOR, Philadelphia, PA, 19107
MCLAREN HEALTH CARE CORP	1 MCLAREN PKWY, GRAND BLANC, MI, 48439	McLaren Health Care Corporation	3373 REGENCY PARK DRIVE, Grand Blanc, MI, 48439
MYMICHIGAN HEALTH	4000 WELLNESSDR, MIDLAND, MI, 48670	MyMichigan Health	4000 WELLNESS DRIVE, Midland, MI, 48670
NORTHWELL HEALTH	2000 MARCUS AVE, NEW HYDE PARK, NY, 11042	Northwell Health	1979 MARCUS AVE STE E 124, Lake Success, NY, 11042
SAINT FRANCIS HEALTH SYSTEM	6161 S YALE AVE, TULSA, OK, 74136	Saint Francis Health System	6161 SOUTH YALE AVENUE, Tulsa, OK, 74136

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
THE UNIVERSITY OF KANSAS HEALTH SYSTEM	4000 CAMBRIDGE ST, KANSAS CITY, KS, 66160	University of Kansas Health System	4000 CAMBRIDGE STREET, Kansas City, KS, 66160
WAKEMED HEALTH AND HOSPITALS	3000 NEW BERN AVE, RALEIGH, NC, 27610	WakeMed Health & Hospitals	3000 NEW BERN AVENUE, Raleigh, NC, 27610
RENOWN HEALTH	50 W LIBERTY ST, RENO, NV, 89501	Renown Health	50 WEST LIBERTY STREET, Reno, NV, 89501
WEST TENNESSEE HEALTHCARE	620 SKYLINE DR, JACKSON, TN, 38301	West Tennessee Healthcare	620 SKYLINE DRIVE, Jackson, TN, 38301
ATLANTIC HEALTH SYSTEM	475 SOUTH ST, MORRISTOWN, NJ, 7960	Atlantic Health System	475 SOUTH STREET, Morristown, NJ, 7960
BAYSTATE HEALTH	280 CHESTNUT ST, SPRINGFIELD, MA, 1199	Baystate Health, Inc.	280 CHESTNUT STREET, Springfield, MA, 1199
BRYAN HEALTH	1600 S 48TH ST, LINCOLN, NE, 68506	Bryan Health	1600 SOUTH 48TH STREET, Lincoln, NE, 68506
CARILION CLINIC	1906 BELLEVIEW AVE SE, ROANOKE, VA, 24014	Carilion Clinic	1906 BELLEVIEW AVENUE SE, Roanoke, VA, 24014
NORTHERN LIGHT HEALTH	43 WHITING HILL RD, BREWER, ME, 4412	Northern Light Health	43 WHITING HILL ROAD, Brewer, ME, 4412
EMORY HEALTHCARE INC	1440 CLIFTON RD NE, ATLANTA, GA, 30322	Emory Healthcare	1440 CLIFTON ROAD NE, Atlanta, GA, 30322
UOFL HEALTH	200 ABRAHAM FLEXNER WAY, LOUISVILLE, KY, 40202	UofL Health	530 SOUTH JACKSON STREET, Louisville, KY, 40202
LEGACY HEALTH	1919 NW LOVEJOY ST, PORTLAND, OR, 97209	Legacy Health	1919 NW LOVEJOY STREET, Portland, OR, 97209
MOUNT SINAI HEALTH SYSTEM	1 GUSTAVE L LEVY PL, NEW YORK, NY, 10029	Mount Sinai Health System	ONE GUSTAVE L. LEVY PLACE, New York, NY, 10029
NORTH MEMORIAL HEALTH	3300 OAKDALE AVE N, ROBBINSDALE, MN, 55422	North Memorial Health Care	3300 OAKDALE AVENUE NORTH, Robbinsdale, MN, 55422
RWJBARNABAS HEALTH	95 OLD SHORT HILLS RD, WEST ORANGE, NJ, 7052	RWJBarnabas Health	95 OLD SHORT HILLS ROAD, West Orange, NJ, 7052
SENTARA HEALTHCARE	6015 POPLAR HALL DR, NORFOLK, VA, 23502	Sentara Healthcare	6015 POPLAR HALL DRIVE, Norfolk, VA, 23502
SPARTANBURG REGIONAL HEALTHCARE SYSTEM INC	101 E WOOD ST, SPARTANBURG, SC, 29303	Spartanburg Regional Healthcare System	101 EAST WOOD STREET, Spartanburg, SC, 29303
SAINT LUKES HEALTH SYSTEM	901 E 104TH ST, KANSAS CITY, MO, 64131	Saint Luke's Health System	901 EAST 104TH STREET, MAILSTOP 900N, Kansas City, MO, 64131

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
TOWER HEALTH	420 S 5TH AVE, WEST READING, PA, 19611	Tower Health	SIXTH AVENUE AND SPRUCE STREET, West Reading, PA, 19611
UPMC	600 GRANT ST, PITTSBURGH, PA, 15219	UPMC	600 GRANT STREET, US STEEL TOWER, Pittsburgh, PA, 15219
VIRTUA HEALTH	303 LIPPINCOTT DR, MARLTON, NJ, 8053	Virtua Health	303 LIPPINCOTT DRIVE, 4TH FLOOR, Marlton, NJ, 8053
ADVENTIST HEALTH	1 ADVENTIST HEALTH WAY, ROSEVILLE, CA, 95661	Adventist Health	ONE ADVENTIST HEALTH WAY, Roseville, CA, 95661
BJC HEALTHCARE	4901 FOREST PARK AVE, SAINT LOUIS, MO, 63108	BJC HealthCare	4901 FOREST PARK AVENUE, Saint Louis, MO, 63108
CAPE FEAR VALLEY HEALTH SYSTEM	1638 OWEN DR, FAYETTEVILLE, NC, 28304	Cape Fear Valley Health System	1638 OWEN DRIVE, Fayetteville, NC, 28304
CARE NEW ENGLAND HEALTH SYSTEM INC	45 WILLARD AVE, PROVIDENCE, RI, 2905	Care New England Health System	45 WILLARD AVENUE, Providence, RI, 2905
STEWARD HEALTH CARE SYSTEM LLC	1900 N PEARL ST, DALLAS, TX, 75201	Steward Health Care System, LLC	1900 NORTH PEARL STREET, Dallas, TX, 75201
HCA HEALTHCARE INC	1 PARK PLZ, NASHVILLE, TN, 37203	HCA Healthcare	ONE PARK PLAZA, Nashville, TN, 37203
COMMUNITY HEALTH NETWORK INC	7330 SHADELAND STA, INDIANAPOLIS, IN, 46256	Community Health Network	7330 SHADELAND STATION, Indianapolis, IN, 46256
FRANCISCAN MISSIONARIES OF OUR LADY HEALTH SYSTEM INC	4200 ESSEN LN, BATON ROUGE, LA, 70809	Franciscan Missionaries of Our Lady Health System, Inc.	4200 ESSEN LANE, Baton Rouge, LA, 70809
GENESIS HEALTH SYSTEM	1227 E RUSHOLME ST, DAVENPORT, IA, 52803	Genesis Health System	1227 EAST RUSHOLME STREET, Davenport, IA, 52803
HENDRICK HEALTH SYSTEM	1900 PINE ST, ABILENE, TX, 79601	Hendrick Health System	1900 PINE STREET, Abilene, TX, 79601
LIFEPOINT HEALTH	330 SEVEN SPRINGS WAY, BRENTWOOD, TN, 37027	LifePoint Health	330 SEVEN SPRINGS WAY, Brentwood, TN, 37027
MEMORIAL HERMANN HEALTHCARE SYSTEM	929 GESSNER RD, HOUSTON, TX, 77024	Memorial Hermann Health System	929 GESSNER, Houston, TX, 77024
CONE HEALTH	1200 N ELM ST, GREENSBORO, NC, 27401	Cone Health	1200 NORTH ELM STREET, Greensboro, NC, 27401
NOVANT HEALTH INC	2085 FRONTIS PLAZA BLVD, WINSTON SALEM, NC, 27103	Novant Health	2085 FRONTIS PLAZA BOULEVARD, Winston Salem, NC, 27103

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
ORLANDO HEALTH	1414 KUHL AVE, ORLANDO, FL, 32806	Orlando Health	1414 KUHL AVENUE, Orlando, FL, 32806
RIVERSIDE HEALTH SYSTEM	701 TOWN CENTER DR, NEWPORT NEWS, VA, 23606	Riverside Health System	701 TOWN CENTER DRIVE, Newport News, VA, 23606
SHARP HEALTHCARE	8695 SPECTRUM CENTER BLVD, SAN DIEGO, CA, 92123	Sharp HealthCare	8695 SPECTRUM CENTER BOULEVARD, San Diego, CA, 92123
SPARROW HEALTH SYSTEM	1200 E MICHIGAN AVE, LANSING, MI, 48912	Sparrow Health System	1215 EAST MICHIGAN AVENUE, Lansing, MI, 48912
TEXAS HEALTH RESOURCES	612 E LAMAR BLVD, ARLINGTON, TX, 76011	Texas Health Resources	612 EAST LAMAR BOULEVARD, Arlington, TX, 76011
UNIVERSITY OF MISSOURI HEALTH CARE	1 HOSPITAL DR, COLUMBIA, MO, 65212	University of Missouri Health Care	ONE HOSPITAL DRIVE, DC 031, Columbia, MO, 65212
VANDERBILT HEALTH	1161 MEDICAL CENTER DR, NASHVILLE, TN, 37232	Vanderbilt Health	1211 22ND AVENUE SOUTH, Nashville, TN, 37232
BAPTIST HEALTH SOUTH FLORIDA	6855 RED RD, CORAL GABLES, FL, 33146	Baptist Health South Florida	6855 RED ROAD, Coral Gables, FL, 33143
BAPTIST MEMORIAL HEALTH CARE CORPORATION	350 N HUMPHREYS BLVD, MEMPHIS, TN, 38120	Baptist Memorial Health Care Corporation	350 NORTH HUMPHREYS BOULEVARD, Memphis, TN, 38120
BRONSON HEALTHCARE GROUP INC	601 JOHN ST, KALAMAZOO, MI, 49007	Bronson Healthcare Group	301 JOHN STREET, Kalamazoo, MI, 49007
ATRIUM HEALTH	1000 BLYTHE BLVD, CHARLOTTE, NC, 28203	Atrium Health, Inc.	1000 BLYTHE BLVD, Charlotte, NC, 28203
CEDARS SINAI HEALTH SYSTEM	8700 BEVERLY BLVD, WEST HOLLYWOOD, CA, 90048	Cedars-Sinai Health System	8700 BEVERLY BOULEVARD, West Hollywood, CA, 90048
CHILDRENS HEALTH	1935 MEDICAL DISTRICT DR, DALLAS, TX, 75235	Children's Health	1935 MEDICAL DISTRICT DRIVE, Dallas, TX, 75235
HARTFORD HEALTHCARE	1 STATE ST, HARTFORD, CT, 6103	Hartford HealthCare	ONE STATE STREET, 19TH FLOOR, Hartford, CT, 6103
COVENANT HEALTH	100 FORT SANDERS WEST BLVD, KNOXVILLE, TN, 37922	Covenant Health	100 FORT SANDERS WEST BOULEVARD, Knoxville, TN, 37922
DUKE UNIVERSITY HEALTH SYSTEM	2301 ERWIN RD, DURHAM, NC, 27705	Duke University Health System	201 TRENT DRIVE, Durham, NC, 27710
LOS ANGELES COUNTY DEPARTMENT OF HEALTH SERVICES	313 N FIGUEROA ST, LOS ANGELES, CA, 90012	Los Angeles County-Department of Health Services	313 NORTH FIGUEROA STREET, ROOM 912, Los Angeles, CA, 90012

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
VCU HEALTH SYSTEM	1250 E MARSHALL ST, RICHMOND, VA, 23298	VCU Health System	1200 EAST MARSHALL STREET, Richmond, VA, 23298
MEDSTAR HEALTH	10980 GRANTCHESTER WAY, COLUMBIA, MD, 21044	MedStar Health	10980 GRANTCHESTER WAY, Columbia, MD, 21044
MEMORIAL HEALTHCARE SYSTEM	3501 JOHNSON ST, HOLLYWOOD, FL, 33021	Memorial Healthcare System	3501 JOHNSON STREET, Hollywood, FL, 33021
NORTH MISSISSIPPI HEALTH SERVICES	830 S GLOSTER ST, TUPELO, MS, 38801	North Mississippi Health Services, Inc.	830 SOUTH GLOSTER STREET, Tupelo, MS, 38801
OHIOHEALTH	3430 OHIO HEALTH PKWY, COLUMBUS, OH, 43202	OhioHealth	3430 OHIO HEALTH PARKWAY, Columbus, OH, 43202
MASS GENERAL BRIGHAM	800 BOYLSTON ST, BOSTON, MA, 2199	Mass General Brigham	800 BOYLSTON STREET, Boston, MA, 2199
PRESBYTERIAN HEALTHCARE SERVICES	9521 SAN MATEO BLVD NE, ALBUQUERQUE, NM, 87113	Presbyterian Healthcare Services	9521 SAN MATEO BLVD. NE, Albuquerque, NM, 87113
SCRIPPS HEALTH	4275 CAMPUS POINT CT, SAN DIEGO, CA, 92121	Scripps Health	4275 CAMPUS POINT COURT CP112, San Diego, CA, 92121
SAINT LUKES UNIVERSITY HEALTH NETWORK	801 OSTRUM ST, BETHLEHEM, PA, 18015	St. Luke's University Health Network	801 OSTRUM STREET, Bethlehem, PA, 18015
UNIVERSITY OF MARYLAND MEDICAL SYSTEM	250 W PRATT ST, BALTIMORE, MD, 21201	University of Maryland Medical System	250 WEST PRATT STREET, 24TH FLOOR, Baltimore, MD, 21201
UW HEALTH	600 HIGHLAND AVE, MADISON, WI, 53792	UW Health	600 HIGHLAND AVENUE, Madison, WI, 53792
KINDRED HEALTHCARE INC	680 S 4TH ST, LOUISVILLE, KY, 40202	Kindred Healthcare	680 SOUTH FOURTH STREET, Louisville, KY, 40202
NUVANCE HEALTH	24 HOSPITAL AVE, DANBURY, CT, 6810	Nuvance Health	24 HOSPITAL AVENUE, Danbury, CT, 6810
UC HEALTH	3200 BURNET AVE, CINCINNATI, OH, 45229	UC Health	3200 BURNET AVENUE, Cincinnati, OH, 45229
HEALTH FIRST INC	6450 US HIGHWAY 1, ROCKLEDGE, FL, 32955	Health First, Inc.	6450 US HIGHWAY 1, Rockledge, FL, 32955
INFIRMARY HEALTH SYSTEM INC	5 MOBILE INFIRMARY CIR, MOBILE, AL, 36607	Infirmary Health System	5 MOBILE INFIRMARY CIRCLE, Mobile, AL, 36607
INOVA HEALTH SYSTEM	8110 GATEHOUSE RD, FALLS CHURCH, VA, 22042	Inova Health System	8110 GATEHOUSE ROAD, Falls Church, VA, 22042

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
UNITYPOINT HEALTH	1776 WEST LAKES PKWY, WEST DES MOINES, IA, 50266	UnityPoint Health	1776 WEST LAKES PARKWAY, West Des Moines, IA, 50266
LIFEBRIDGE HEALTH INC	2401 W BELVEDERE AVE, BALTIMORE, MD, 21215	LifeBridge Health	2401 WEST BELVEDERE AVENUE, Baltimore, MD, 21215
LIFESPAN	167 POINT ST, PROVIDENCE, RI, 2903	Lifespan Corporation	167 POINT STREET, Providence, RI, 2903
MAINEHEALTH	110 FREE ST, PORTLAND, ME, 4101	MaineHealth	110 FREE STREET, Portland, ME, 4101
MEMORIAL HEALTH SYSTEM	701 N 1ST ST, SPRINGFIELD, IL, 62781	Memorial Health System	701 NORTH FIRST STREET, Springfield, IL, 62781
METHODIST LE BONHEUR HEALTHCARE	1211 UNION AVE, MEMPHIS, TN, 38104	Methodist Le Bonheur Healthcare	1211 UNION AVENUE, Memphis, TN, 38104
PROVIDENCE	1801 LIND AVE SW, RENTON, WA, 98057	Providence	1801 LIND AVENUE SOUTHWEST, 9016, Renton, WA, 98057
HONORHEALTH	8125 N HAYDEN RD, SCOTTSDALE, AZ, 85258	HonorHealth	8125 NORTH HAYDEN ROAD, Scottsdale, AZ, 85258
SHRINERS HOSPITALS FOR CHILDREN	2900 N ROCKY POINT DR, TAMPA, FL, 33607	Shriners Hospitals for Children	2900 NORTH ROCKY POINT DRIVE, Tampa, FL, 33607
UNIVERSITY OF ROCHESTER MEDICAL CENTER	601 ELMWOOD AVE, ROCHESTER, NY, 14642	University of Rochester Medical Center	601 ELMWOOD AVE BOX 623, Rochester, NY, 14642
UAB HEALTH SYSTEM	500 22ND ST S, BIRMINGHAM, AL, 35233	UAB Health System	500 22ND STREET SOUTH, Birmingham, AL, 35233
UNITED HEALTH SERVICES INC	10 42 MITCHELL AVE, BINGHAMTON, NY, 13903	United Health Services	10-42 MITCHELL AVENUE, Binghamton, NY, 13903
UMASS MEMORIAL HEALTH CARE	365 PLANTATION ST, WORCESTER, MA, 1605	UMass Memorial Health Care, Inc.	1 BIOTECH PARK, Worcester, MA, 1605
WMC HEALTH	100 WOODS RD, VALHALLA, NY, 10595	WMCHHealth	100 WOODS ROAD, Valhalla, NY, 10595
ALLEGHENY HEALTH NETWORK	120 5TH AVE, PITTSBURGH, PA, 15222	Allegheny Health Network	120 5TH AVENUE, FAPHM-294E, Pittsburgh, PA, 15222
APPALACHIAN REGIONAL HEALTHCARE INC	2260 EXECUTIVE DR, LEXINGTON, KY, 40505	Appalachian Regional Healthcare, Inc.	2260 EXECUTIVE DRIVE, Lexington, KY, 40505
AULTMAN HEALTH FOUNDATION	2600 6TH ST SW, CANTON, OH, 44710	Aultman Health Foundation	2600 SIXTH STREET SW, Canton, OH, 44710
AVERA HEALTH	3900 W AVERA DR, SIOUX FALLS, SD, 57108	Avera Health	3900 WEST AVERA DRIVE, Sioux Falls, SD, 57108
CHRISTUS HEALTH	919 HIDDEN RDG, IRVING, TX, 75038	CHRISTUS Health	919 HIDDEN RIDGE DRIVE, Irving, TX, 75038

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
CHRISTIANACARE	501 W 14TH ST, WILMINGTON, DE, 19801	ChristianaCare	501 WEST 14TH STREET, Wilmington, DE, 19801
INDIANA UNIVERSITY HEALTH	340 W 10TH ST, INDIANAPOLIS, IN, 46202	Indiana University Health	340 WEST 10TH STREET, Indianapolis, IN, 46202
COOK COUNTY HEALTH AND HOSPITAL SYSTEM	1950 W POLK ST, CHICAGO, IL, 60612	Cook County Health and Hospitals System	1900 WEST POLK STREET, Chicago, IL, 60612
COXHEALTH	1423 N JEFFERSON AVE, SPRINGFIELD, MO, 65802	CoxHealth	1423 NORTH JEFFERSON AVENUE, Springfield, MO, 65802
DCH HEALTH SYSTEM	809 UNIVERSITY BLVD E, TUSCALOOSA, AL, 35401	DCH Health System	809 UNIVERSITY BOULEVARD EAST, Tuscaloosa, AL, 35401
HACKENSACK MERIDIAN HEALTH	343 THORNALL ST, EDISON, NJ, 8837	Hackensack Meridian Health	343 THORNALL STREET, 8TH FLOOR, Edison, NJ, 8837
INTERMOUNTAIN HEALTHCARE	36 S STATE ST, SALT LAKE CITY, UT, 84111	Intermountain Healthcare, Inc.	36 SOUTH STATE STREET, 22ND FLOOR, Salt Lake City, UT, 84111
MERCY	14528 SOUTH OUTER 40 RD, CHESTERFIELD, MO, 63017	Mercy	14528 SOUTH OUTER 40, Chesterfield, MO, 63017
BALLAD HEALTH	303 MED TECH PKWY, JOHNSON CITY, TN, 37604	Ballad Health	303 MED TECH PARKWAY, Johnson City, TN, 37604
NORTON HEALTHCARE INC	4967 US HIGHWAY 42, LOUISVILLE, KY, 40222	Norton Healthcare	4967 US HIGHWAY 42, Louisville, KY, 40222
PEACEHEALTH	1115 SE 164TH AVE, VANCOUVER, WA, 98683	PeaceHealth	1115 SE 164TH AVENUE, Vancouver, WA, 98683
PHOEBE PUTNEY HEALTH SYSTEMS	417 W 3RD AVE, ALBANY, GA, 31701	Phoebe Putney Health System	417 WEST THIRD AVENUE, Albany, GA, 31701
PREMIER HEALTH	110 N MAIN ST, DAYTON, OH, 45402	Premier Health	110 NORTH MAIN STREET SUITE 390, Dayton, OH, 45402
FRANCISCAN HEALTH INC	1515 W DRAGON TRL, MISHAWAKA, IN, 46544	Franciscan Health	1515 DRAGON TRAIL, Mishawaka, IN, 46544
SAINT ELIZABETH HEALTHCARE	1 MEDICAL VILLAGE DR, EDGEWOOD, KY, 41017	St. Elizabeth Healthcare	1 MEDICAL VILLAGE DRIVE, Edgewood, KY, 41017
SUTTER HEALTH	2200 RIVER PLAZA DR, SACRAMENTO, CA, 95833	Sutter Health	2200 RIVER PLAZA DRIVE, Sacramento, CA, 95833
THE QUEENS HEALTH SYSTEMS	1301 PUNCHBOWL ST, HONOLULU, HI, 96813	Queen's Health Systems	1301 PUNCHBOWL STREET, Honolulu, HI, 96813

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
THE UNIVERSITY OF CHICAGO MEDICINE	5841 S MARYLAND AVE, CHICAGO, IL, 60637	University of Chicago Medicine	5841 SOUTH MARYLAND AVENUE, Chicago, IL, 60637
UNIVERSAL HEALTH SERVICES INC	367 S GULPH RD, NORRISTOWN, PA, 19406	Universal Health Services, Inc.	367 SOUTH GULPH ROAD, King of Prussia, PA, 19406
UW MEDICINE	1959 NE PACIFIC ST, SEATTLE, WA, 98195	UW Medicine	1959 NE PACIFIC STREET, Seattle, WA, 98195
WILLIS KNIGHTON HEALTH SYSTEM	2600 GREENWOOD RD, SHREVEPORT, LA, 71103	Willis-Knighton Health System	2600 GREENWOOD ROAD, Shreveport, LA, 71103
WELLSTAR HEALTH SYSTEM INC	793 SAWYER RD, MARIETTA, GA, 30062	WellStar Health System	793 SAWYER ROAD, Marietta, GA, 30062
MULTICARE HEALTH SYSTEM	315 MARTIN LUTHER KING JR WAY, TACOMA, WA, 98405	MultiCare Health System	820 A STREET, Tacoma, WA, 98402
BERKSHIRE HEALTH SYSTEMS INC	725 NORTH ST, PITTSFIELD, MA, 1201	Berkshire Health Systems, Inc.	725 NORTH STREET, Pittsfield, MA, 1201
STANFORD HEALTH CARE	300 PASTEUR DR, STANFORD, CA, 94305	Stanford Health Care	300 PASTEUR DRIVE, Palo Alto, CA, 94304
WEST VIRGINIA UNIVERSITY HEALTH SYSTEM INC	1 MEDICAL CENTER DR, MORGANTOWN, WV, 26506	West Virginia University Health System	ONE MEDICAL CENTER, Morgantown, WV, 26506
ADENA HEALTH SYSTEM	272 HOSPITAL RD, CHILLICOTHE, OH, 45601	Adena Health System	272 HOSPITAL ROAD, Chillicothe, OH, 45601
SALINA REGIONAL HEALTH CENTER INC	400 S SANTA FE AVE, SALINA, KS, 67401	Salina Regional Health Center	400 SOUTH SANTA FE AVENUE, Salina, KS, 67401
MARY WASHINGTON HEALTHCARE	2300 FALL HILL AVE, FREDERICKSBURG, VA, 22401	Mary Washington Healthcare	1001 SAM PERRY BOULEVARD, Fredericksburg, VA, 22401
HAWAII HEALTH SYSTEMS CORPORATION	3675 KILAUEA AVE, HONOLULU, HI, 96816	Hawaii Health Systems Corporation	3675 KILAUEA AVENUE, Honolulu, HI, 96816
ESSENTIA HEALTH	502 E 2ND ST, DULUTH, MN, 55805	Essentia Health	502 EAST SECOND STREET, Duluth, MN, 55805
GEISINGER	100 N ACADEMY AVE, DANVILLE, PA, 17822	Geisinger	100 NORTH ACADEMY AVENUE, Danville, PA, 17822
WELLSPAN HEALTH	45 MONUMENT RD, YORK, PA, 17403	WellSpan Health	45 MONUMENT ROAD, York, PA, 17403
ASANTE HEALTH SYSTEM	2650 SISKIYOU BLVD, MEDFORD, OR, 97504	Asante Health System	2650 SISKIYOU BOULEVARD, Medford, OR, 97504
MED CENTER HEALTH	800 PARK ST, BOWLING GREEN, KY, 42101	Med Center Health	800 PARK STREET, Bowling Green, KY, 42101

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
GREAT PLAINS HEALTH ALLIANCE INC	250 N ROCK RD, WICHITA, KS, 67206	Great Plains Health Alliance, Inc.	250 NORTH ROCK ROAD, Wichita, KS, 67206
FREEMAN HEALTH SYSTEM	1102 W 32ND ST, JOPLIN, MO, 64804	Freeman Health System	1102 WEST 32ND STREET, Joplin, MO, 64804
TRINITY HEALTH	20555 VICTOR PKWY, LIVONIA, MI, 48152	Trinity Health	20555 VICTOR PARKWAY, Livonia, MI, 48152
BAPTIST HEALTH	800 PRUDENTIAL DR, JACKSONVILLE, FL, 32207	Baptist Health	841 PRUDENTIAL DRIVE, Jacksonville, FL, 32207
METHODIST HEALTH SYSTEM	1441 N BECKLEY AVE, DALLAS, TX, 75203	Methodist Health System	1441 NORTH BECKLEY AVENUE, Dallas, TX, 75203
HAWAII PACIFIC HEALTH	55 MERCHANT ST, HONOLULU, HI, 96813	Hawaii Pacific Health	55 MERCHANT STREET, Honolulu, HI, 96813
LUMINIS HEALTH	2001 MEDICAL PKWY, ANNAPOLIS, MD, 21401	Luminis Health	2001 MEDICAL PARKWAY, Annapolis, MD, 21401
ARCHBOLD MEDICAL CENTER	910 S BROAD ST, THOMASVILLE, GA, 31792	Archbold Medical Center	910 SOUTH BROAD STREET, Thomasville, GA, 31792
THEDACARE INC	122 E COLLEGE AVE, APPLETON, WI, 54911	ThedaCare, Inc.	122 EAST COLLEGE AVENUE, Appleton, WI, 54911
JOHN MUIR HEALTH	1400 TREAT BLVD, WALNUT CREEK, CA, 94597	John Muir Health	1400 TREAT BOULEVARD, Walnut Creek, CA, 94597
SOUTHERN ILLINOIS HEALTHCARE	1239 E MAIN ST, CARBONDALE, IL, 62901	Southern Illinois Healthcare	1239 EAST MAIN STREET, Carbondale, IL, 62901
MOSAIC LIFE CARE	5325 FARAON ST, SAINT JOSEPH, MO, 64506	Mosaic Life Care	5325 FARAON STREET, Saint Joseph, MO, 64506
HERITAGE VALLEY HEALTH SYSTEM	1000 DUTCH RIDGE RD, BEAVER, PA, 15009	Heritage Valley Health System	1000 DUTCH RIDGE ROAD, Beaver, PA, 15009
PRIME HEALTHCARE SERVICES INC	3480 E GUASTI RD, ONTARIO, CA, 91761	Prime Healthcare Services	3300 EAST GUASTI ROAD, Ontario, CA, 91761
THE GUTHRIE CLINIC	1 GUTHRIE SQ, SAYRE, PA, 18840	Guthrie Clinic	ONE GUTHRIE SQUARE, Sayre, PA, 18840
MON HEALTH SYSTEM	1200 J D ANDERSON DR, MORGANTOWN, WV, 26505	Mon Health System	1200 J. D. ANDERSON DRIVE, Morgantown, WV, 26505
SISTERS OF CHARITY HEALTH SYSTEM	2475 E 22ND ST, CLEVELAND, OH, 44115	Sisters of Charity Health System	2475 EAST 22ND STREET, Cleveland, OH, 44115
DAVIS HEALTH SYSTEM	812 GORMAN AVE, ELKINS, WV, 26241	Davis Health System	812 GORMAN AVENUE, Elkins, WV, 26241

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
CENTRA HEALTH	1920 ATHERHOLT RD, LYNCHBURG, VA, 24501	Centra Health, Inc.	1901 TATE SPRINGS ROAD, Lynchburg, VA, 24501
FIRSTHEALTH OF THE CAROLINAS	155 MEMORIAL DR, PINEHURST, NC, 28374	FirstHealth of the Carolinas	155 MEMORIAL DRIVE, Pinehurst, NC, 28374
TRINITY HEALTH	1 BURDICK EXPY W, MINOT, ND, 58701	Trinity Health	ONE BURDICK EXPRESSWAY WEST, Minot, ND, 58701
INSPIRA HEALTH NETWORK	165 BRIDGETON PIKE, MULLICA HILL, NJ, 8062	Inspira Health Network	165 BRIDGETON PIKE, Mullica Hill, NJ, 8062
BANNER HEALTH	2901 N CENTRAL AVE, PHOENIX, AZ, 85012	Banner Health	2901 NORTH CENTRAL AVENUE SUITE 160, Phoenix, AZ, 85012
ARDENT HEALTH SERVICES	1 BURTON HILLS BLVD, NASHVILLE, TN, 37215	Ardent Health Services	1 BURTON HILLS BOULEVARD, Nashville, TN, 37215
NORTHEAST GEORGIA HEALTH SYSTEM INC	743 SPRING ST NE, GAINESVILLE, GA, 30501	Northeast Georgia Health System	743 SPRING STREET NE, Gainesville, GA, 30501
MONUMENT HEALTH	353 FAIRMONT BLVD, RAPID CITY, SD, 57701	Monument Health	353 FAIRMONT BOULEVARD, Rapid City, SD, 57701
SELECT MEDICAL CORP	4714 GETTYSBURG RD, MECHANICSBURG, PA, 17055	Select Medical Corporation	4714 GETTYSBURG ROAD, Mechanicsburg, PA, 17055
MARSHFIELD CLINIC HEALTH SYSTEM	1000 N OAK AVE, MARSHFIELD, WI, 54449	Marshfield Clinic Health System	1000 NORTH OAK AVENUE, Marshfield, WI, 54449
AMG INTEGRATED HEALTHCARE MANAGEMENT	101 LA RUE FRANCE, LAFAYETTE, LA, 70508	AMG Integrated Healthcare Management	101 LA RUE FRANCE, Lafayette, LA, 70508
CENTRAL MAINE HEALTHCARE CORP	300 MAIN ST, LEWISTON, ME, 4240	Central Maine HealthCare	300 MAIN STREET, Lewiston, ME, 4240
SOUTHEAST GEORGIA HEALTH SYSTEM	2415 PARKWOOD DR, BRUNSWICK, GA, 31520	Southeast Georgia Health System	2415 PARKWOOD DRIVE, Brunswick, GA, 31520
EPHRAIM MCDOWELL HEALTH	217 S 3RD ST, DANVILLE, KY, 40422	Ephraim McDowell Health	217 SOUTH THIRD STREET, Danville, KY, 40422
MCLEOD HEALTH	555 E CHEVES ST, FLORENCE, SC, 29506	McLeod Health	555 EAST CHEVES STREET, Florence, SC, 29506
BUTLER HEALTH SYSTEM	1 HOSPITAL WAY, BUTLER, PA, 16001	Butler Health System	1 HOSPITAL WAY, Butler, PA, 16001
NORTH OAKS HEALTH SYSTEM	15790 PAUL VEGA MD DR, HAMMOND, LA, 70403	North Oaks Health System	15790 PAUL VEGA MD DRIVE, Hammond, LA, 70403
TANNER HEALTH SYSTEM	705 DIXIE ST, CARROLLTON, GA, 30117	Tanner Health System	705 DIXIE STREET, Carrollton, GA, 30117

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
EXCELA HEALTH	532 W PITTSBURGH ST, GREENSBURG, PA, 15601	Excela Health	532 WEST PITTSBURGH STREET, Greensburg, PA, 15601
GOOD SHEPHERD REHABILITATION NETWORK	850 S 5TH ST, ALLENTOWN, PA, 18103	Good Shepherd Rehabilitation Network	850 SOUTH FIFTH STREET, Allentown, PA, 18103
PROHEALTH CARE	N17W24100 RIVERWOOD DR, WAUKESHA, WI, 53188	ProHealth Care, Inc.	N17 W24100 RIVERWOOD DRIVE, Waukesha, WI, 53188
AHMC HEALTHCARE INC	500 E MAIN ST, ALHAMBRA, CA, 91801	AHMC & Healthcare, Inc.	55 SOUTH RAYMOND AVENUE, Alhambra, CA, 91801
CORNERSTONE HEALTHCARE GROUP	2200 ROSS AVE, DALLAS, TX, 75201	Cornerstone Healthcare Group	2200 ROSS AVENUE, Dallas, TX, 75201
FAITH REGIONAL HEALTH SERVICES	2700 W NORFOLK AVE, NORFOLK, NE, 68701	Faith Regional Health Services	2700 WEST NORFOLK AVENUE, Norfolk, NE, 68701
SAMARITAN HEALTH SERVICES	3600 NW SAMARITAN DR, CORVALLIS, OR, 97330	Samaritan Health Services	3600 NW SAMARITAN DRIVE, Corvallis, OR, 97330
ERNEST HEALTH INC	7770 JEFFERSON ST NE, ALBUQUERQUE, NM, 87109	Ernest Health, Inc.	7770 JEFFERSON STREET NE, Albuquerque, NM, 87109
DEACONESS HEALTH SYSTEM	600 MARY ST, EVANSVILLE, IN, 47710	Deaconess Health System	600 MARY STREET, Evansville, IN, 47710
BON SECOURS MERCY HEALTH INC	1701 MERCY HEALTH PL, CINCINNATI, OH, 45237	Bon Secours Mercy Health	1701 MERCY HEALTH PLACE, Cincinnati, OH, 45237
MAIN LINE HEALTH	130 S BRYN MAWR AVE, BRYN MAWR, PA, 19010	Main Line Health	130 SOUTH BRYN MAWR AVENUE, Bryn Mawr, PA, 19010
ARNOT HEALTH	600 ROE AVE, ELMIRA, NY, 14905	Arnot Health	600 ROE AVENUE, Elmira, NY, 14905
BEACON HEALTH SYSTEM	615 N MICHIGAN ST, SOUTH BEND, IN, 46601	Beacon Health System	615 NORTH MICHIGAN STREET, South Bend, IN, 46601
SOUTH GEORGIA MEDICAL CENTER	2501 N PATTERSON ST, VALDOSTA, GA, 31602	South Georgia Medical Center	2501 NORTH PATTERSON STREET, Valdosta, GA, 31602
LHC GROUP INC	901 HUGH WALLIS RD S, LAFAYETTE, LA, 70508	LHC Group	901 HUGH WALLIS ROAD SOUTH, Lafayette, LA, 70508
NOLAND HEALTH SERVICES INC	600 CORPORATE PKWY, BIRMINGHAM, AL, 35242	Noland Health Services, Inc.	600 CORPORATE PARKWAY, Birmingham, AL, 35242
MERCYONE	1449 NW 128TH ST, CLIVE, IA, 50325	MercyOne	1449 NW 128TH STRET, Clive, IA, 50325
APPALACHIAN REGIONAL HEALTHCARE SYSTEM	336 DEERFIELD RD, BOONE, NC, 28607	Appalachian Regional Healthcare System	336 DEERFIELD ROAD, Boone, NC, 28607

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
HEALTHGROUP OF ALABAMA	3304 WESTMILL DR SW, HUNTSVILLE, AL, 35805	Huntsville Hospital Health System	101 SIVLEY ROAD SW, Huntsville, AL, 35801
UNION GENERAL HOSPITAL INC	35 HOSPITAL RD, BLAIRSVILLE, GA, 30512	Union General Hospital, Inc.	35 HOSPITAL ROAD, Blairsville, GA, 30512
WHITE RIVER HEALTH SYSTEM INC	1710 HARRISON ST, BATESVILLE, AR, 72501	White River Health System	1710 HARRISON STREET, Batesville, AR, 72501
ALLEGIANCE HEALTH MANAGEMENT	504 TEXAS ST, SHREVEPORT, LA, 71101	Allegiance Health Management	504 TEXAS STREET, Shreveport, LA, 71101
ANMED HEALTH	800 N FANT ST, ANDERSON, SC, 29621	AnMed Health	800 NORTH FANT STREET, Anderson, SC, 29621
ASPIRUS INC	2200 WESTWOOD DR, WAUSAU, WI, 54401	Aspirus, Inc.	2200 WESTWOOD DRIVE, Wausau, WI, 54401
MEADVILLE MEDICAL CENTER	751 LIBERTY ST, MEADVILLE, PA, 16335	Meadville Medical Center	751 LIBERTY STREET, Meadville, PA, 16335
BENEFIS HEALTH SYSTEM	1101 26TH ST S, GREAT FALLS, MT, 59405	Benefis Health System	1101 26TH STREET SOUTH, Great Falls, MT, 59405
RIDGEVIEW MEDICAL CENTER	500 S MAPLE ST, WACONIA, MN, 55387	Ridgeview Medical Center	500 SOUTH MAPLE STREET, Waconia, MN, 55387
OWENSBORO HEALTH	1201 PLEASANT VALLEY RD, OWENSBORO, KY, 42303	Owensboro Health	1201 PLEASANT VALLEY ROAD, Owensboro, KY, 42303
MEMORIAL HEALTH SYSTEM	401 MATTHEW ST, MARIETTA, OH, 45750	Memorial Health System	401 MATTHEW STREET, Marietta, OH, 45750
SOUTHEAST HEALTH	1701 LACEY ST, CAPE GIRARDEAU, MO, 63701	SoutheastHEALTH	1701 LACEY STREET, Cape Girardeau, MO, 63701
COLLEGE HEALTH ENTERPRISES INC	11627 TELEGRAPH RD, SANTA FE SPRINGS, CA, 90670	College Health Enterprises	11627 TELEGRAPH ROAD, Santa Fe Springs, CA, 90670
DELTA HEALTH SYSTEM	1400 E UNION ST, GREENVILLE, MS, 38703	Delta Health System	1400 EAST UNION STREET, Greenville, MS, 38703
PHYSICIANS FOR HEALTHY HOSPITALS INC	1117 E DEVONSHIRE AVE, HEMET, CA, 92543	Physicians for Healthy Hospitals	1117 EAST DEVONSHIRE AVENUE, Hemet, CA, 92543
SAINT LAWRENCE HEALTH SYSTEM	50 LEROY ST, POTSDAM, NY, 13676	St. Lawrence Health System	50 LEROY STREET, Potsdam, NY, 13676
COMMUNITY MEMORIAL HEALTH SYSTEM	147 N BRENT ST, VENTURA, CA, 93003	Community Memorial Health System	147 NORTH BRENT STREET, Ventura, CA, 93003
COMMUNITY HOSPITAL CORP	7800 DALLAS PKWY, PLANO, TX, 75024	Community Hospital Corporation	7800 NORTH DALLAS PARKWAY, Plano, TX, 75024

COMPENDIUM OF U.S. HEALTH SYSTEMS 2021

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
BAYLOR SCOTT AND WHITE HEALTH	4005 CRUTCHER ST, DALLAS, TX, 75246	Baylor Scott & White Health	301 NORTH WASHINGTON AVENUE, Dallas, TX, 75246
MISSISSIPPI COUNTY HOSPITAL SYSTEM	1520 N DIVISION ST, BLYTHEVILLE, AR, 72315	Mississippi County Hospital System	1520 NORTH DIVISION STREET, Blytheville, AR, 72315
PALOMAR HEALTH	456 E GRAND AVE, ESCONDIDO, CA, 92025	Palomar Health	456 EAST GRAND AVENUE, Escondido, CA, 92025
PIPELINE HEALTH	898 N PACIFIC COAST HWY, EL SEGUNDO, CA, 90245	Pipeline Health	898 NORTH PACIFIC COAST HIGHWAY SUITE 700, El Segundo, CA, 90245
KPC HEALTHCARE INC	1301 N TUSTIN AVE, SANTA ANA, CA, 92705	KPC Healthcare, Inc.	1301 NORTH TUSTIN AVENUE, Santa Ana, CA, 92705
GARNET HEALTH	707 E MAIN ST, MIDDLETOWN, NY, 10940	Garnet Health	707 EAST MAIN STREET, Middletown, NY, 10940
CAREPOINT HEALTH	10 EXCHANGE PL, JERSEY CITY, NJ, 7302	CarePoint Health	10 EXCHANGE PLACE, 15TH FLOOR, Jersey City, NJ, 7302
HEYWOOD HEALTHCARE	242 GREEN ST, GARDNER, MA, 1440	Heywood Healthcare	242 GREEN STREET, Gardner, MA, 1440
BASSETT HEALTHCARE NETWORK	1 ATWELL RD, COOPERSTOWN, NY, 13326	Bassett Healthcare Network	1 ATWELL ROAD, Cooperstown, NY, 13326
SAINT CHARLES HEALTH SYSTEM	2500 NE NEFF RD, BEND, OR, 97701	St. Charles Health System, Inc.	2500 NE NEFF ROAD, Bend, OR, 97701
UNIVERSITY OF COLORADO HEALTH	12605 E 16TH AVE, AURORA, CO, 80045	UCHealth	2315 EAST HARMONY ROAD, Fort Collins, CO, 80528
HEALTHPARTNERS INC	8170 33RD AVE S, MINNEAPOLIS, MN, 55425	HealthPartners	8170 33RD AVENUE SOUTH, Bloomington, MN, 55425
WASHINGTON HEALTH SYSTEM	155 WILSON AVE, WASHINGTON, PA, 15301	Washington Health System	155 WILSON AVENUE, Washington, PA, 15301
THOMAS HEALTH SYSTEM	4605 MACCORKLE AVE SW, CHARLESTON, WV, 25309	Thomas Health System, Inc.	4605 MACCORKLE AVENUE SW, South Charleston, WV, 25309
QUORUM HEALTH CORP	1573 MALLORY LN, BRENTWOOD, TN, 37027	Quorum Health	1573 MALLORY LANE, Brentwood, TN, 37027
SISTERS OF MARY OF THE PRESENTATION HEALTH SYSTEM	1202 PAGE DR S, FARGO, ND, 58103	Sisters of Mary of the Presentation Health System	1202 PAGE DRIVE SW, Fargo, ND, 58103
THE UNIVERSITY OF TEXAS SYSTEM	210 W 7TH ST, AUSTIN, TX, 78701	University of Texas System	601 COLORADO STREET, Austin, TX, 78701

OneKey health system name	OneKey health system address	AHA health system name	AHA health system address
COMMONSPIRIT HEALTH	444 W LAKE ST, CHICAGO, IL, 60606	CommonSpirit Health	444 WEST LAKE STREET SUITE 2500, Chicago, IL, 60606
BETH ISRAEL LAHEY HEALTH	20 UNIVERSITY RD, CAMBRIDGE, MA, 2138	Beth Israel Lahey Health	20 UNIVERSITY ROAD, Cambridge, MA, 2138
THE CARPENTER HEALTH NETWORK	10615 JEFFERSON HWY, BATON ROUGE, LA, 70809	Carpenter Health Network	10615 JEFFERSON HIGHWAY, Baton Rouge, LA, 70809

Appendix C. Insurance Product Data and Methods

Introduction

This appendix describes the data and methods used to construct the variables indicating whether a health system offered any insurance product and insurance products by type.

System Offers an Insurance Product

We used the 2021 American Hospital Association (AHA) Annual Survey Database to construct measures of whether a system in the 2021 Compendium offered any insurance product or one of the following types of products: Medicare Advantage (MA), Medicaid managed care, or Health Insurance Marketplace. For 176 hospitals that were missing 2021 AHA data but not missing 2020 AHA data, we used 2020 data.

As described in Chapter II, AHA data are based on an annual survey of hospitals in the United States. The AHA Annual Survey Database provides facility-level data about organizational structure, services, staffing, expenses, system affiliations, and physician arrangements.

We used responses to several 2021 AHA survey questions:

1. Whether the hospital or system owns or jointly owns a health plan;
2. Whether the hospital or system has a significant partnership with an insurer or insurance company/health plan; and
3. Whether the hospital or system owns a product, has a joint venture in a product, or offers a new product for each of several types of insurance products (MA, Medicaid managed care, Health Insurance Marketplace, other individual market, large group, small group, other).

In cases in which a hospital was missing 2021 data, we used responses to the analogous 2020 AHA survey questions.

We constructed a system-level variable equal to one if at least one non-Federal general acute care hospital within the system reported owning an insurance product or offering an insurance product through a partnership or joint venture at the hospital level or system level. For example, a system could have been identified as offering an insurance product because one of its hospitals reported owning a plan. Another system could have been identified as offering an insurance product because one of its hospitals reported that its system offered an MA product through a joint venture.

When we constructed system-level variables, we used data for a system's hospital in 2020 if that hospital had missing data in 2021. For example, if a system had two hospitals, and one hospital reported not offering an MA product in 2021 and 2020, and the other hospital had missing data in 2021 and reported offering an MA product in 2020, then we would have classified the system as offering an MA product.

Out of 197 systems that we identified as offering an insurance product, there were only 3 cases in which the system was classified as such based on this particular scenario. The more common

scenario in which we used 2020 data was that all hospitals in a system were missing data in 2021, but at least one hospital was not missing data in 2020.

The variable indicating whether a system offered any insurance product represents the broadest possible measure of activity as an insurer based on AHA data, and it produced three mutually exclusive groups:

- Systems that offered any insurance product; that is, at least one hospital in the system reported an insurance product at the hospital or system level or through a partnership or joint venture. These systems have a value of 1 for the any insurance product variable.
- Systems that had at least one hospital with nonmissing data on insurance products and zero hospitals that reported an insurance product at the hospital or system level or through a partnership or joint venture. These systems have a value of 0 for the any insurance product variable.
- Systems that had missing data on insurance products for all hospitals; either all of their hospitals that responded to the survey had missing data on insurance products, or their hospitals did not respond to the AHA survey. These systems have missing data for the any insurance product variable (details reported in the caveat on Missing Data below).

We constructed the variables for offering an MA, Medicaid managed care, or Health Insurance Marketplace product using an analogous approach.

List of MA Contracts Owned by the System and MA Enrollment

We used the January 2022 MA Plan Directory from the Centers for Medicare & Medicaid Services (CMS) website, referred to here as the 2021 MA Plan Data, to construct variables that list all MA contracts offered by each system and enrollment in those contracts.^{xxi} The 2021 MA Plan Data lists MA, cost, Program of All-inclusive Care for the Elderly (PACE), and demonstration plans.

To determine whether a system offered an MA plan, we matched the 2021 MA Plan Data to the systems list. In doing so, we identified systems that offered an MA plan and the MA contracts associated with each system, according to three steps:

- Step 1: Identifying systems that offered the same MA contract in 2020 and 2021
- Step 2: Matching the 2021 MA Plan Data to the systems list
- Step 3: Constructing a variable for total enrollment in MA contracts offered by the system

^{xxi} We used January 2022 data because December 2021 data were not available. We confirmed that the January 2022 MA Plan Directory does not include any MA plans with a contract effective date later than December 31, 2021, ensuring that the 2021 MA Plan Data reflects MA contracts at the end of 2021. We also compared the January 2022 MA Plan Directory with the October 2021 MA Plan Directory and found no differences in the plan data between the files.

In the following sections, we refer to this three-step process as the CMS Data matching process to distinguish it from the MA variable constructed using AHA data that we describe earlier in this appendix.

Step 1: Identifying Systems That Offered the Same MA Contract in 2020 and 2021

We identified systems in the 2021 systems list that we categorized as offering an MA plan in the 2020 systems list. For each of these systems, we checked whether the MA contract(s) associated with them in 2020 still existed in the 2021 MA Plan Data. If the contract(s) existed in the 2021 MA Plan Data under the same MA parent organization, we continued to categorize that system as offering an MA plan, and we assigned to the system all of its previous contracts except those that terminated before 2021. Finally, for each of these systems, we assigned any additional 2021 MA contract(s) that had the same MA parent organization to the system.^{xxii} Thus, the MA-system linkages at this point make up all systems that owned MA plans in both 2020 and 2021 along with all the associated contract numbers, whether they were 2020 contracts that were still active in 2021 or new contracts that were launched in 2021 under the same parent organization.

Next, we focused on reviewing the remaining contracts from the 2021 MA Plan Data for potential matches to systems. We refer to the remaining contracts as the MA data.

Step 2: Matching the 2021 MA Plan Data to the Systems List

Data Preparation

We refer to Step 2 as the CMS Data matching process. To match MA plan parent organization and address in the MA data to health system name and address, we first processed names and addresses using the following steps:

- Removed all punctuation,
- Converted all text to uppercase,
- Removed multiple spaces in a row,
- Removed “the,” “and,” and “of” from names,
- Removed “inc,” “corp,” “corporation,” and “company” from names,
- Removed terms such as “c/o” from addresses, and
- Normalized common terms (i.e., system = systems, health care = healthcare, N = north).

Next, we deduplicated the MA data using the variables we later used for matching: parent organization, street, city, and ZIP Code.

^{xxii} An exception is contracts with organization marketing name Ascension Complete matched to the system Ascension Health. Contracts with marketing name Ascension Complete are listed in the CMS Data under the MA parent organization Centene Corporation, a large insurer, so in this case we did not identify all Centene Corporation plans as owned by Ascension Health. Instead, only the MA plans with the organization marketing name Ascension Complete were matched to that system.

Automated Matching

We identified possible matches between the systems list and the MA data. We used a combination of name and address matching, via character-string matching and distance-based matching using geocoding, respectively. Because an MA parent organization may match a subsystem of one of the 635 systems on the systems list, we also searched for possible MA-system matches among subsystems (that is, cases in which an entity defined as a system in the 2021 OneKey or AHA data is nested within one of the 635 systems).

Using the approach described in Chapter III, we used the SAS COMPGED function to compare the similarity of health system name and MA parent organization name, and we used geocoding to determine the linear distance between health system address and the MA legal entity's address. As we discussed previously, SAS COMPGED generates a score that reflects the number of deletions, insertions, or replacements needed to make two strings match—the lower the score, the better the match. If a string matches exactly, the SAS COMPGED score is zero. Inserting one character to derive a match results in a score of 100. Adding a punctuation character results in a score of 30.

If the SAS COMPGED score was ≤ 150 and the geocoded addresses were within 1 mile of each other, then we considered the health system and the MA record to be an automated match. We identified only two automated matches in 2021, largely because we set aside MA parent organizations already matched to systems in Step 1 before matching systems and MA parent organizations.

Manual Review of Possible Matches Based on Name, Location, or Name and Location

We used the SAS COMPGED scores and distances between systems to identify additional possible matches for manual review. We manually reviewed possible matches of health systems and MA parent organizations in the following seven categories, where the first category includes the most likely matches:

1. Possible match with a SAS COMPGED score >150 and ≤ 500 and within 1 mile of each other
2. Possible match with a SAS COMPGED score ≤ 150 and matching city and State
3. Possible match with a SAS COMPGED score >150 and ≤ 500 and matching city and State
4. Possible match with a SAS COMPGED score ≤ 150 on truncated names (to increase the likelihood of a match based on the beginning portion of the name) and matching State
5. Possible match with a SAS COMPGED score ≤ 150 on truncated names
6. Possible match within 0.5 miles of each other
7. Possible match within 10 miles of each other

For all seven categories of possible matches, we compared the full system name with the full MA parent organization name and compared address information for the system and the MA record. Relative to the first two categories of possible matches, we were less confident in the possible matches in categories three through seven, because their names or addresses were

slightly less similar. Therefore, we conducted web searches to validate possible matches in categories three through seven.

We also reviewed the list of parent organizations to identify possible health system matches that did not fall into one of the seven match categories above. In this review we considered all parent organizations that included the words “system,” “hospital,” “health care,” “health services,” or “medical center”; we then compared this list of parent organizations against the systems list to identify possible matches for further consideration. Examples of parent organizations considered in this step include DLP Marquette General Hospital, LLC, and Piedmont Health Services, Inc. As with match categories three through seven, we conducted web searches to validate possible matches identified via this exercise.

When web searching, we looked not only for name and address information but also for information about the health system’s or MA parent organization’s locations, breadth of the health system’s services, and evidence of mergers or acquisitions. Our goal was to confirm that the health system had equity interest in the MA plan or that the MA plan itself was a joint venture between the health system and another organization, such as an insurer.

The most useful approach to access this information was to select the “About” or “History” link on the website of the health system, MA parent organization, or MA plan owned by the MA parent organization. We also looked for corroborating evidence elsewhere, such as Modern Healthcare and news releases on the health system website. Only one possible match was determined to be valid based on manual review; this match is shown in Table C.1.^{xxiii}

Table C.1. Manually matched health system and MA record

Health System or Subsystem Name	MA Parent Organization Name	Distance	SAS COMPGED Score for Full Name (Truncated Name)
University of Utah Hospitals and Clinics	University of Utah	14.9 miles	501 (0)

After matching using MA parent organization name, we repeated matching using MA organization marketing name and address. That process identified a small number of possible matches that required manual review.

Finally, for each system matched to an MA parent organization in Step 2, we constructed a variable that included all contract numbers for the MA parent organization that was matched to a given health system. By including contract numbers for the MA parent organization, a user can link the systems list to the 2021 MA Plan Data to obtain information about the MA plans such as the organization type, plan type, and enrollment.

^{xxiii} In researching one potential link between MA parent organization NJ Collaborative Care, LLC, and a Compendium system identified via the CMS Data matching process, we were able to confirm that NJ Collaborative Care, LLC, was instead jointly owned by two other systems: Hackensack Meridian Health and RWJBarnabas Health.

Step 3: Constructing a Variable for Total Enrollment in MA Contracts Offered by the System

We used the 2021 MA Plan Data from CMS's website to determine enrollment by MA contract. For each system linked to MA contracts, we aggregated enrollment across all contracts linked to the system and created a system-level MA enrollment variable.

Through this process to construct variables that list all MA contracts offered by each system and enrollment in those contracts, we identified 74 systems with MA plans. Of the systems with any MA plans and when enrollment was reported, the average was 2.5 plans per system and 52,503 enrollees per system. By comparison, the 2020 systems list identified 73 systems with MA plans. The 2021 variables for MA contracts and enrollment build on the data from the 2020 systems list as described in Step 1 above.

Caveats and Limitations

Missing Data

Our analyses suggest that missing AHA data on insurance products was not a major issue for most systems on the list. Among the 635 systems on the list, 10 percent (62 systems) had no reported information on insurance products for any of the system's non-Federal general acute care hospitals in 2021 or 2020. We examined the percentage of non-Federal general acute care hospitals within a system that were missing insurance product data from the AHA:

- Among the 376 systems that we classified as not having an insurance product, 74 percent (279 systems) were not missing data for any non-Federal general acute care hospitals. Another 12 percent (45 systems) were missing data for at least one hospital but fewer than half of all hospitals in the system. The remaining 14 percent (52 systems) were missing data for more than half of all hospitals in the system. It is possible that some of the 97 systems that were missing data for at least one hospital actually offered an insurance product, even though the non-missing AHA survey responses for their hospital(s) did not indicate that the system offered an insurance product.
- Among the 197 systems that we classified as offering an insurance product, 58 percent (114 systems) were not missing data for any non-Federal general acute care hospitals. Another 32 percent (64 systems) were missing data for at least one hospital but fewer than half of all hospitals in the system. The remaining 10 percent (19 systems) were missing data for at least half of all hospitals in the system. However, since we classified a system as offering an insurance product if at least one hospital in the system reported an insurance product at the hospital or system level or a joint venture with insurers, these missing data do not directly affect the insurance product variable.

Potential Misalignment of Health System Definitions

Some of the questions in the AHA Annual Survey asked whether the hospital or system offered an insurance product. In cases in which the respondent reported affirmatively based on the system offering an insurance product (rather than the respondent's hospital), we cannot confirm whether the entity that the respondent was thinking of is the system we identified in the Compendium. However, we do not have reason to think this type of misidentification was common.

Among the 197 systems that we classified as having an insurance product, 146 systems had at least half of their non-Federal general acute care hospitals report an insurance product. In other words, for the 74 percent of systems that had an insurance product, at least half of the non-Federal general acute care hospitals within that system reported an insurance product at the hospital level or system level, or as a joint venture with insurers.

Further, 35 percent of the 197 systems that we classified as having an insurance product had at least one hospital that reported that the hospital itself had an insurance product. These data suggest that it is unlikely that we incorrectly identified a system as having any insurance product because of misalignment of health system definitions between the AHA respondent and the Compendium.

Reasons Data on Offering an MA Product May Differ Across Sources

Of the 74 systems we identified as offering an MA plan through the CMS Data matching process, 57 systems also reported offering an MA product in the AHA data. There were 17 systems that offered an MA product according to the CMS Data matching process but not according to the AHA data, while 63 systems offered an MA plan based on responses to the AHA survey but not according to the CMS Data matching process.

We conducted internet searches for a subset of the 63 systems that reported offering an MA plan in the AHA survey but were not matched to a contract in the CMS Data. In these cases, we could not find references to any MA product owned by the system, or we found references to MA products owned by the system but were unable to identify the specific contracts in the CMS Data. For example, the Cleveland Clinic Health System advertises MA plans offered with the insurer Humana; however, the CMS Data do not allow us to identify which specific Humana plans are offered in partnership with the Cleveland Clinic Health System.

In this section, we detail four reasons that data on offering an MA product may differ across the two sources: (1) an AHA survey respondent's frame of reference; (2) limitations of matching by name and address in the CMS Data matching process; (3) challenges in verifying ownership of an MA plan in the CMS Data matching process; and (4) potential misalignment of data source time periods.

AHA survey respondent's frame of reference. AHA data are derived from a cross-sectional survey of more than 6,200 hospitals operating in the United States. Respondents self-report much of the data on the characteristics and attributes of their hospitals, including information on insurance products that their hospital or system owns or offers through a partnership or joint venture with insurers. AHA data on whether a hospital offers an MA product could differ from the CMS Data if, for example:

- An MA product was owned by the parent organization of the system or by a subsidiary other than the respondent's hospital. For instance, Allegheny Health Network does not itself offer any MA products; however, its parent organization (Highmark Health) offers multiple MA products.
- A hospital or its system differed from the CMS and Compendium in their definition of an MA plan. Of the 17 systems that offered an MA product according to the CMS Data

matching process but not according to the AHA data, several systems offered a PACE plan; examples include Franciscan Health and Prisma Health. It is possible that some AHA respondents did not consider PACE plans to be an MA product, whereas the CMS Data matching process and the Compendium definitions classify PACE plans as MA plans.

- The parent organization for an MA plan changed in the CMS Data, and we could not identify whether the new parent organization should be linked to the original health system. For example, the MA parent organization UAB Health System was linked to UAB Health System in 2018, but the MA plan under that parent organization reported a new parent organization, Triton Health Systems, L.L.C., in 2020. We were unable to identify a health system owner for Triton Health Systems, L.L.C., so that plan is no longer linked to a Compendium system and no MA plans are listed for UAB Health System in the systems list.

It is possible that even though we could not confirm a link between this plan and the system, a link may still exist. Conversely, it is possible that the plan is no longer affiliated with the health system and the AHA data do not accurately reflect this change.

Limitations of matching by name and address in the CMS Data matching process. The MA Plan Directory lists one parent organization for each MA contract; it does not identify all entities (systems, health insurance companies, or other organizations) that own a particular contract. Only having access to the parent organization, marketing name, and legal entity address of each plan limited our ability to identify systems that offer MA contracts through complex subsidiary relationships or through partnerships or joint ventures with an insurance company or another system. This limitation accounts for some of the cases in which the AHA data (which asks about these types of relationships) indicated that a system offered an MA product but the CMS Data matching process did not identify the system as owning an MA contract because the names and addresses were substantially different. An example of this scenario is the Cleveland Clinic Health System and Humana. These entities partnered in 2017 to offer two MA plans; however, we were unable to identify these plans using the name or address data available in the MA Plan Directory. Similarly, Mount Sinai Health System and Healthfirst offer an MA plan, but we could not identify these plans in the MA Plan Directory nor link them using our matching algorithm.

In a few cases, we determined that two systems offered an MA contract through a joint venture because it was apparent from the web search we conducted to confirm the linkage of the MA parent organization and one of the two systems. For example, contracts under the MA parent organization Oscar Health are a joint venture between Memorial Healthcare System and Holy Cross Health (a Trinity Health subsystem). In these cases, we listed the same MA contract number for both systems. However, there may be other cases in which a second system co-owned an MA contract, but co-ownership was not apparent based on web searches for the match between the first system and the MA parent organization.

Challenges verifying ownership of an MA plan in the CMS Data matching process. It can be difficult to determine the exact nature of the relationships between an MA parent organization or MA plan and a health system. In particular, it is challenging to determine precisely whether a health system has an equity interest in the MA plan. It is possible that we identified a system and

MA parent organization as a potential match but could not confirm that the system should be matched to this particular CMS record and erroneously identified the system as not having an MA contract.

For example, the MA parent organization DLP Marquette General Hospital, LLC, was identified in our review of parent organizations as a potential match for Marquette General Hospital, part of the Lifepoint Health system; however, the listed address is an exact match for another system, Upper Peninsula Healthcare Solutions. Ultimately, we were unable to find evidence via web searching of an equity stake or ownership relationship between either of those systems and the MA parent organization.

In another example, the MA parent organization Western Health Advantage was identified as a potential match to Dignity Health (which is part of the Compendium system CommonSpirit Health) and NorthBay Health. Western Health Alliance was founded by and has a partnership with these systems, but we were unable to confirm an ongoing ownership relationship. Thus, our identification of systems that offer an MA contract as identified by matching and web searches is likely conservative.

Misalignment of data source time periods. The list reflects health systems in the United States at the end of 2021. That time period differed slightly from the time periods represented by the insurance product variables. The AHA data were collected throughout 2021. The MA data reflect all active Medicare Advantage contracts with an effective date of December 31, 2021, or earlier.

It is possible that a system could have sold its MA plan (or its stake in the plan) or closed the plan between when the AHA survey data were collected and the end of 2021. The alternative is also true: there could be cases in which a system first offered an MA plan in 2021 and we identified a contract number for that plan, but the survey data reported no AHA plan because the data were collected earlier in the year. Thus, for some systems, it is possible we misclassified their ownership of insurance products as of the end of 2021 because the AHA data do not necessarily reflect the end of 2021.

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Appendix D. Nursing Home Data and Methods

Introduction

This appendix describes the data and methods used to construct a variable that reports the number of nursing homes affiliated with each health system in 2021.

Nursing Home Affiliation with Systems

We used the OneKey data to count the number of system-affiliated nursing homes. This data source is described in more detail in section II.B.

To construct a count variable that indicates the number of nursing homes affiliated with each system, we first identified all nursing homes in the OneKey data (N=15,466) and their corporate parent owners. According to the OneKey data, a nursing home (cot_id = 94) is defined as, “an extended-care facility that provides medical nursing or custodial care to people who cannot care for themselves but who do not require hospitalization.” We used the OneKey data’s class of trade variables to identify nursing homes in the OneKey data: cot_clas_id = 20 (residential) and cot_fclt_type_id = 48 (nursing home).

Next, we applied the crosswalk developed in Step 2 of section III.B to aggregate nursing homes linked to subsystems (smaller systems that are nested within larger systems) to their parent systems. We then aggregated all affiliated nursing homes for each system to determine a system-level count of nursing homes. Finally, we linked the system-level count of nursing homes to the Compendium for each system included in the 2021 list of systems. In the final list of systems, 1,100 nursing homes (7 percent) were affiliated with 261 Compendium health systems.

Caveats and Limitations

Two health systems in the Compendium are not found in the OneKey data, and therefore have missing data for nursing homes. In addition, we rely on the relationships identified by the OneKey data, which may not capture all relationships between nursing homes and health systems.

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Appendix E. Data Dictionary

Variable name	Variable Type	Description
health_sys_id	Character	Unique system ID (assigned by Mathematica; links to other years of the Compendium of U.S. Health Systems ^a)
health_sys_name	Character	Health system name
health_sys_city	Character	Health system city
health_sys_state	Character	Health system State
in_onekey	Numeric	Flag for whether the system appears in the OneKey data
in_aha	Numeric	Flag for whether the system appears in the American Hospital Association (AHA) data
onekey_id	Character	OneKey system ID
aha_sysid	Character	AHA system ID
total_mds	Numeric	Total number of physicians
prim_care_mds	Numeric	Total number of primary care physicians
total_nps	Numeric	Total number of nurse practitioners
total_pas	Numeric	Total number of physician assistants
grp_cnt	Numeric	Total number of outpatient centers (including medical group practice sites, clinics, and other outpatient facility types)
hosp_cnt	Numeric	Total number of hospitals
acutehosp_cnt	Numeric	Total number of non-Federal general acute care hospitals
nh_cnt	Numeric	Total number of system-affiliated nursing homes
sys_multistate	Numeric	Multistate system flag: 1=system hospitals located in one state, 2=system hospitals located in two states, 3=system hospitals located in 3 or more states
sys_beds	Numeric	Number of beds per system
sys_dsch	Numeric	Number of discharges per system
sys_res	Numeric	Number of interns and residents per system in non-Federal general acute care hospitals
deg_children	Numeric	Degree to which health systems serves children: 0=no children's hospitals, 1=at least one children's hospital but not predominantly delivering care at children's hospitals, 2=predominantly delivering care at children's hospitals

COMPENDIUM OF U.S. HEALTH SYSTEMS

Variable name	Variable Type	Description
sys_incl_majteachhosp	Numeric	System includes at least one major teaching hospital: 1=yes, 0=no
sys_incl_vmajteachhosp	Numeric	System includes at least one very major teaching hospital: 1=yes, 0=no
sys_teachint	Numeric	Systemwide teaching intensity: 0=nonteaching, 1=minor teaching, 2=major teaching
sys_incl_highdpphosp	Numeric	System includes at least one high Disproportionate Share Hospital (DSH) patient percentage hospital: 1=yes, 0=no
sys_highucburden	Numeric	Systemwide uncompensated care burden flag: 1=yes, 0=no
sys_incl_highuchosp	Numeric	System includes at least one high uncompensated care burden hospital: 1=yes, 0=no
sys_anyins_product	Numeric	System includes at least one non-Federal general acute care hospital that reported in the AHA data that the hospital or its system owns or jointly owns a health plan, or that the hospital or its system has a joint venture or significant partnership with an insurer: 1=yes, 0=no.
sys_mcare_adv	Numeric	System includes at least one non-Federal general acute care hospital that reported in the AHA data that the hospital or its system offers an MA plan via ownership or joint venture: 1=yes, 0=no.
sys_mcaid_mngcare	Numeric	System includes at least one non-Federal general acute care hospital that reported in the AHA data that the hospital or its system offers a Medicaid managed care plan via ownership or joint venture: 1=yes, 0=no.
sys_healthins_mktpic	Numeric	System includes at least one non-Federal general acute care hospital that reported in the AHA data that the hospital or its system offers an Health Insurance Marketplace plan via ownership or joint venture: 1=yes, 0=no.
sys_ma_plan_contracts	Character	Medicare Advantage (MA) contract numbers offered by the system according to matches between systems or subsystems and MA data from the CMS MA Plan Directory.
sys_ma_plan_enroll	Numeric	Aggregate enrollment across all MA contracts offered by the system according to matches between systems or subsystems and MA data from the CMS MA Plan Directory.
sys_ownership	Numeric	System ownership type based on ownership type of non-Federal general acute care hospitals in the system, weighted by the number of non-Federal general acute care hospital beds. This is a categorical variable taking the following values: nonprofit=1, church-operated=2, public/government=3, and for-profit/investor owned=5.
hos_net_revenue	Numeric	Sum of total patient revenue among the non-Federal general acute care hospitals in a given system reported in the HCRIS data.
hos_total_revenue	Numeric	Sum of total patient revenue less contractual allowances and discounts on patients' accounts among the non-Federal general acute care hospitals in a given system reported in the HCRIS data.

^a If a 2021 system had the same HCOS and/or AHA identification number as a 2020 system, then we assigned the 2021 system the same unique system identification number as 2020.

Note: Previous versions of the systems list included a variable that indicated whether a system was predominantly investor owned (`maj_inv_owned`). The ownership type variable added to the 2020 system list (`sys_ownership`), which indicates ownership type (investor owned is one of the possible types), replaced the previous investor-owned variable.

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Appendix F. Data Sources Not Used

Multiple data sources are needed to identify health systems, characterize providers and affiliated organizations, and describe organizational and professional relationships. Several additional organizational level data sources were considered but not used in the final methodology. We provide a brief overview of those sources.

PECOS and IRS 990 data are timely and publicly available, and they contain information reported directly to the Federal Government. These data sources represent promising options for constructing a detailed list of health systems and the providers that make up those systems from information submitted by individual providers and provider organizations themselves. However, work by the CHSP team highlights challenges yet to be fully resolved when using these data sources to identify health systems that meet the definition of a system. For example, IRS 990 data are only applicable to provider organizations owned by not-for-profit organizations.

PECOS data submission requirements apply primarily to Medicare providers; furthermore, the submission requirements do not ensure that ownership linkages between individual clinicians and hospitals are reported in a complete and consistent manner. In addition, medical groups may be represented using a variety of approaches in PECOS, with some medical groups represented by a single tax identification number (TIN) but other groups clustering their physicians across multiple different TINs.

Because of the limitations in these data sources, we opted to use the OneKey and AHA data for developing the systems list rather than the IRS 990 or PECOS data. However, AHRQ continues to explore these and other approaches to enumerating health systems and the providers that are part of these systems.

Table F.1 provides a brief description of each data source, including the name of the data holder, the intended use of the data, the types of health system identified, the health system components included, and data availability.

Table F.1. Potential data sources for health system identification

Source	Data Holder	Intended Purpose	Types of Systems Identified	System Components	Availability
OneKey	IQVIA	Reference database for sales and marketing purposes	Integrated healthcare delivery networks (IDNs)	Physicians, advanced practice clinicians, outpatient centers (medical group practice sites and other outpatient facility types), hospitals, and nursing homes	Available for purchase
AHA Annual Survey Database	American Hospital Association (AHA)	Hospital database for health services research and trend analyses	Common ownership among providers and organizations	Hospitals	Available for purchase
Medicare Provider Enrollment and Chain Ownership System (PECOS)	Centers for Medicare & Medicaid Services (CMS)	Enrollment database enumerating Medicare program participation	Vertical integration among associated organizations	Chain home office and owner/manager reported for providers/hospitals	Public for a limited version; through data use agreement for the full version
IRS 990 and Schedule R	IRS	Financial database for the purpose of tax reporting	Vertical integration among associated organizations	Related organizations under not-for-profit systems	Publicly available

Source: Cohen GR, Jones DJ, Heeringa J, et al. Leveraging diverse data sources to identify and describe U.S. healthcare delivery systems. eGEMs 2017 Dec;5(3). Revised to reflect changes in potential data sources since publication of Cohen et al. (2017).