AGENCY FOR HEALTHCARE RESEARCH AND QUALITY
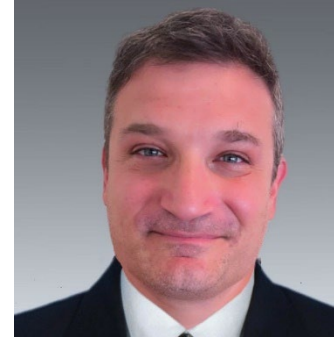
The Compendium of U.S. Health Systems: Data Structure Overview

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Agenda

- Welcome from AHRQ
- Overview of the Compendium of U.S. Health Systems
- Tour of Compendium website resources
- Compendium applications
- Questions and answers

Welcome

Daniel Miller
Agency for Healthcare Research and Quality (AHRQ)

AHRQ's interest in health systems

- Health systems have proliferated over recent decades
  - ► More than **half of all physicians** and **three-quarters of hospitals** are part of vertically integrated systems.

- It is critical to understand the role of systems in care delivery.

- However, most research has focused on individual care settings.

The Comparative Health System Performance (CHSP) Initiative

- In 2015, AHRQ launched the CHSP initiative to
  - ► Classify and characterize health systems
  - ► Identify ways that health systems organize resources to generate and adopt best practices
  - ► Assess the ways that health systems incorporate knowledge from patient-centered outcomes research (PCOR) into practice
  - ► Compare performance on clinical and cost outcomes

- CHSP has produced over 180 publications, listed at https://www.ahrq.gov/chsp/publications/index.html

Compendium of U.S. Health Systems

- Previous research was limited by a lack of health system data.

- Created under the CHSP initiative, the Compendium of U.S. Health Systems is the first publicly available data on health systems and affiliated providers.

- AHRQ plans to release annual Compendium updates and data enhancements.

Overview of the Compendium of U.S. Health Systems

The Compendium: Overview

- The Compendium includes data on:

  Systems

  Hospitals

  Group practices

- AHRQ previously released 2016 and 2018 Compendium data

- **New** 2020 and 2021 data released in June 2023

- Provides data on trends and the changing landscape of health systems
- Links to other resources to aid health systems research
  - ▶ 2016 and 2018 Compendium data has been featured in many high-impact journal articles

Defining health systems

- AHRQ developed a definition of a health system that relies on existing data resources:

  ▶ Based on provider organization ownership or joint management

  ▶ Focuses on vertically integrated systems

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

Health system definition details

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

- Organizations must have at least:
  - ► 1 non-federal general acute care hospital
  - ► 50 total physicians
  - ► 10 primary care physicians

Compendium system files: Data sources

- IQVIA OneKey
- American Hospital Association (AHA) Annual Survey
- Healthcare Provider Cost Report Information System (HCRIS)

They provide system information, including:

- ► Numbers of physicians and hospitals
- ► Teaching intensity
- ► Uncompensated care burden

# New data from the AHRQ Compendium

- Numbers of systems
  - ► 2016: 626 systems
  - ► 2018: 637 systems
  - ► 2020: 629 systems
  - ► 2021: 635 systems

- Increased variation in system size in 2021:
  - ► Fewer and larger systems were at the top of the size distribution
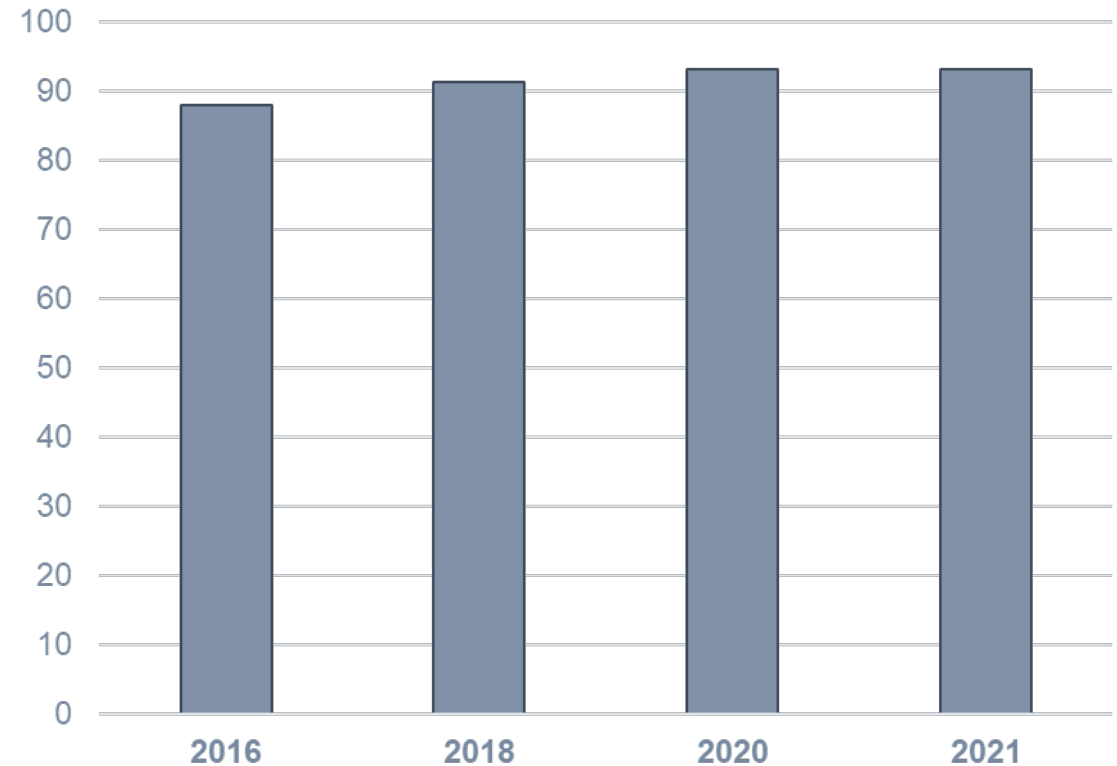 - ► New smaller systems were added at the bottom

Changes in provider affiliation from 2016 to 2021

Share of physicians in systems Grew from 40 to 52%
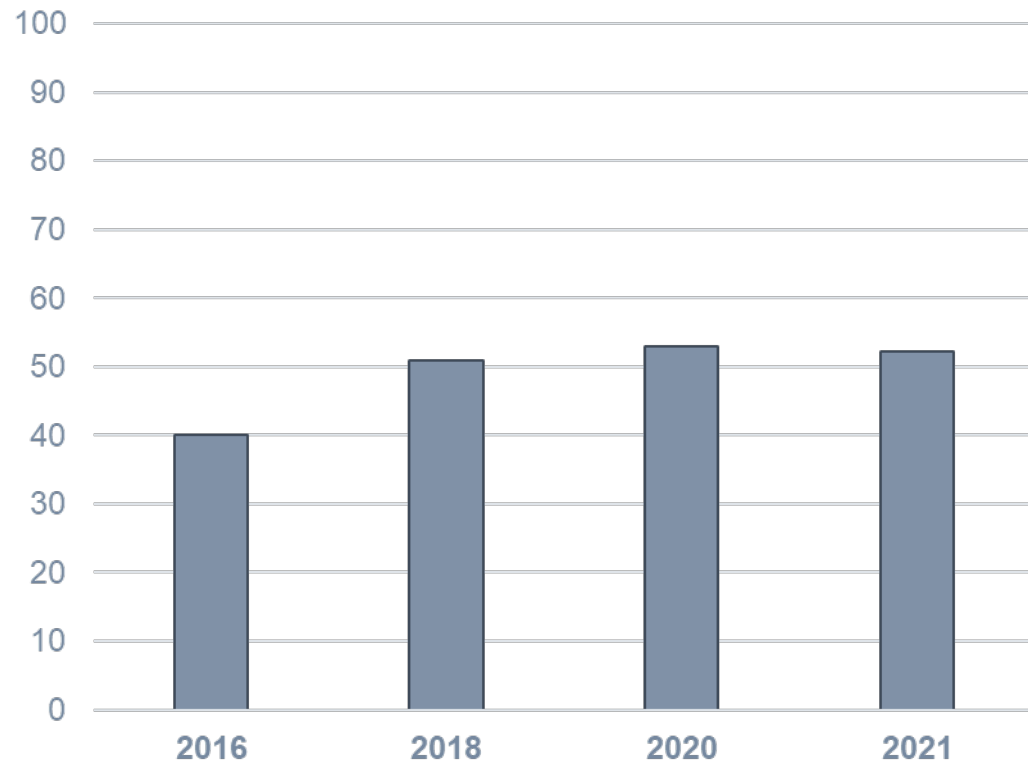
Share of hospital beds in systems Grew from 88 to 93%

Tour of Compendium website resources

Data sources and file structure
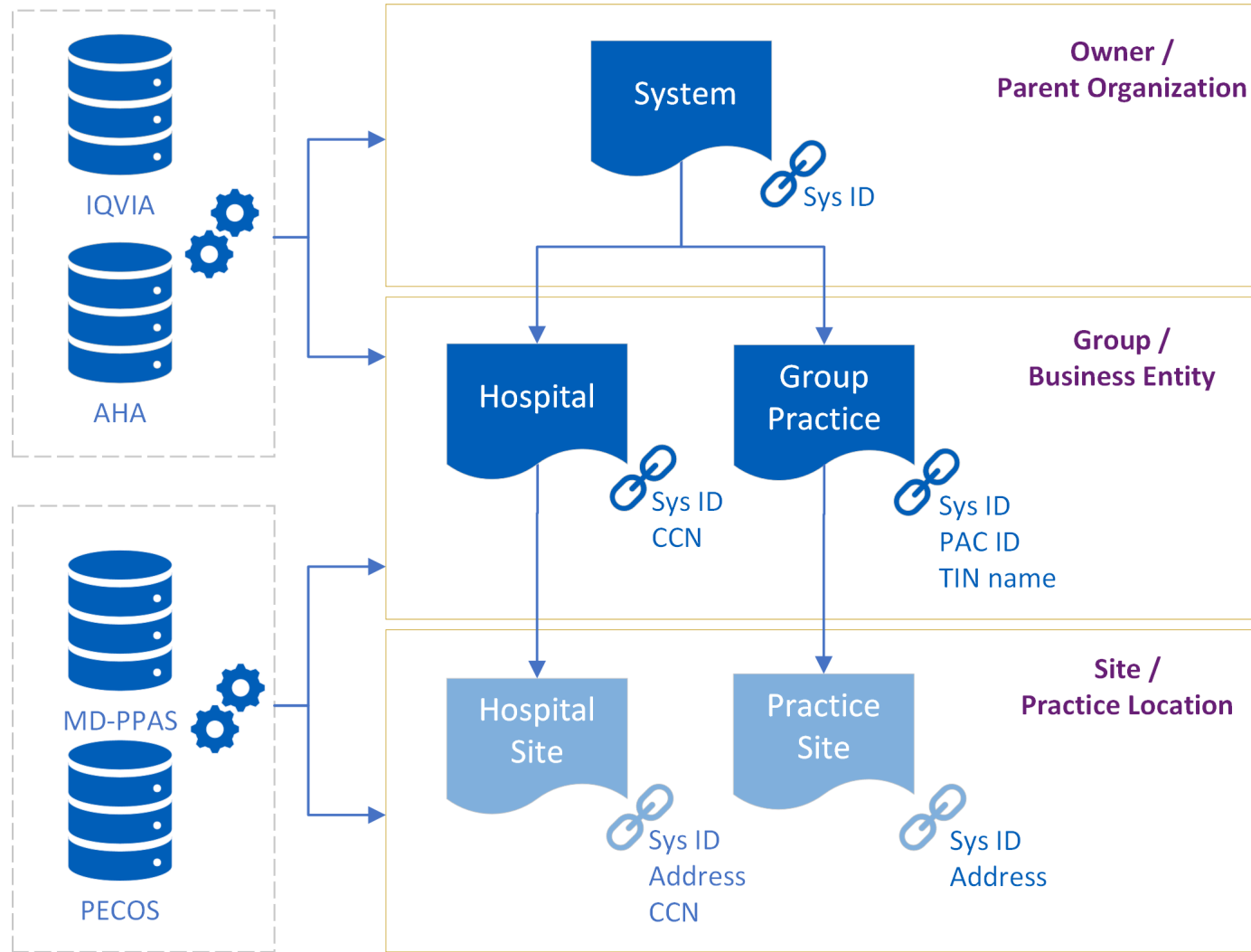
List of Compendium files

- **System** file: A system-level file with one row per health system
  - Each system has a unique Compendium system ID that can link to other files

- Provider files
  - ► **Hospital** linkage file: A hospital-level file with one row per hospital.

  - ► **Group practice** linkage file: A group practice-level file with one row per group practice
    - The provider files include the Compendium system ID that links to the system file

Compendium of U.S. Health Systems files

System-level file

System ID	System name	State	Doctors	Hospitals	Investor-owned
HSI00000008	Adena Health	OH	221	3	0
HSI00000010	Adventist Health System	FL	2,558	34	0

Provider-level files

Hospital name	System ID	System name	State	CCN
Adena Regional Medical Center	HSI00000008	Adena Health	OH	360159
Greenfield Area Medical Center	HSI00000008	Adena Health	OH	361304
Pike Community Hospital	HSI00000008	Adena Health	OH	361334

Group practice name	System ID	System name	Doctors	NPs & PAs
Adena Medical Group	HSI00000008	Adena Health	145	76
Ross Emergency Group	HSI00000008	Adena Health	17	7
Jackson Family Practice	HSI00000008	Adena Health	2	0

CCN: CMS certification number; NP: nurse practitioners; PA: physician assistants.

System files

- Cover 2016, 2018, 2020, and 2021
- Include system type, affiliated provider counts, and location
- Include a unique Compendium ID that links to the hospital and group practice linkage files
- Data sources: IQVIA OneKey and AHA Annual Survey

Health system attributes

- The number of:
  - ▶ Physicians (total and primary care)
  - ▶ Outpatient centers
  - ▶ Nursing homes
  - ▶ Hospitals (total and general acute care)
  - ▶ Hospital beds
  - ▶ Hospital discharges
  - ▶ Full-time-equivalent interns and residents

- Indicators for:
  - ▶ Multistate systems
  - ▶ System offers an insurance product (any product, Medicare Advantage, Medicaid managed care, Health Insurance Marketplace)

Indicators of health system types

- Safety net indicators
  - ► Includes hospital with a high Disproportionate Share Hospital patient percentage
  - ► Includes hospital with a high uncompensated care burden
    - − Systemwide measure of uncompensated care burden
- Teaching intensity
  - ► Includes hospital with a major or very major teaching intensity
    - − Systemwide measure of teaching intensity
- Degree to which the system serves children only
- Predominantly investor-owned

Compendium system file

	A	B	C	D	E	F	G	H	I	J
1	health_sys_id	health_sys_name	health_sys_city	health_	in_onekey	in_aha	onekey_id	aha_sysid	total_mds	prim_care_mds
2	HSI00000008	Adena Health System	Chillicothe	OH	1	1	17780403	895	341	104
3	HSI00000010	AdventHealth	Altamonte Springs	FL	1	1	17773293	4165	2957	1056
4	HSI00000011	Adventist Health	Roseville	CA	1	1	17773620	235	1725	647
5	HSI00000012	Adventist Healthcare	Gaithersburg	MD	1	1	17773292	214	626	159
6	HSI00000018	Alameda Health System	Oakland	CA	1	1	18283551	225	434	163
7	HSI00000019	Albany Medical Center	Albany	NY	1	0	18202149		1153	268
8	HSI00000021	Alecto Healthcare Services	Irvine	CA	1	1	18394721	1020	64	15
9	HSI00000025	Allegheny Health Network	Pittsburgh	PA	1	1	17773987	199	1839	538
10	HSI00000026	Allegiance Health Management	Shreveport	LA	1	1	18226046	413	63	36
11	HSI00000029	Allina Health	Minneapolis	MN	1	1	17773295	41	1772	866
12	HSI00000032	Altru Health System	Grand Forks	ND	1	0	17830969		253	122
13	HSI00000034	Anderson Regional Health Syste	Meridian	MS	1	0	18359667		103	35
14	HSI00000036	Ann and Robert H Lurie Children	Chicago	IL	1	0	17773934		743	272
15	HSI00000038	Luminis Health	Annapolis	MD	1	1	17830970	1048	520	150
16	HSI00000041	Appalachian Regional Healthcare	Lexington	KY	1	1	17774074	145	262	102
17	HSI00000042	Appalachian Regional Healthcare	Boone	NC	1	1	18197550	866	92	34
18	HSI00000045	Archbold Medical Center	Thomasville	GA	1	1	17830971	104	96	23
19	HSI00000046	Ardent Health Services	Nashville	TN	1	1	17847721	69	849	274
20	HSI00000048	Jefferson Health	Philadelphia	PA	1	1	17773319	7775	3989	1202

Hospital linkage files

- Cover 2016, 2018, 2020, and 2021

- List hospitals and link to Compendium system files
  - ► They link to the system file using a unique Compendium ID
  - ► They also include CCN to link to external data sources

- Data sources: IQVIA OneKey and AHA Annual Survey

Hospital linkage file

	A	B	C	D	E	F	G	I	J
1	compendium_hospital_id	ccn	hospital_name	hospital_street	hospital_city	hospital_state	hospital_zip	health_sys_id	health_sys_name
10	CHSP0000019	140122	Adventist Hinsdale Hospital	120 North Oak Street	Hinsdale	IL	60521	HSI00000010	AdventHealth
11	CHSP0000020	140304	Adventist Bolingbrook Hospital	500 Remington Boulevard	Bolingbrook	IL	60440	HSI00000010	AdventHealth
12	CHSP0000023	140258	Alexian Brothers Medical Center	800 Biesterfield Road	Elk Grove Village	IL	60007	HSI00000055	Ascension Health
13	CHSP0000024	140292	Adventist Glenoaks Hospital	701 Winthrop Avenue	Glendale Heights	IL	60139	HSI00000010	AdventHealth
14	CHSP0000025	140290	St. Alexius Medical Center	1555 Barrington Road	Hoffman Estates	IL	60169	HSI00000055	Ascension Health
15	CHSP0000027	421301	Abbeville Area Medical Center	420 Thomson Circle	Abbeville	SC	29620	HSI00000860	Quorum Health Corporation
16	CHSP0000028	190034	Abbeville General Hospital	118 North Hospital Drive	Abbeville	LA	70510	HSI00000780	Ochsner Health System
17	CHSP0000029	240057	Abbott Northwestern Hospital	800 East 28th Street	Minneapolis	MN	55407	HSI00000029	Allina Health
18	CHSP00000030	454098	Oceans Behavioral Hospital Abilene	4225 Woods Pl	Abilene	TX	79602		
19	CHSP0000031	450558	Hendrick Medical Center South	6250 Us Highway 83	Abilene	TX	79606	HSI00000471	Hendrick Health System
20	CHSP0000032	390231	Abington Memorial Hospital	1200 Old York Road	Abington	PA	19001	HSI00000048	Jefferson Health
21	CHSP0000033	390012	Lansdale Hospital	100 Medical Campus Drive	Lansdale	PA	19446	HSI00000048	Jefferson Health
22	CHSP0000034	141322	Abraham Lincoln Memorial Hospital	200 Stahlhut Drive	Lincoln	IL	62656	HSI00000648	Memorial Health System
23	CHSP0000036	030094	Abrazo Arrowhead Campus	18701 North 67th Avenue	Glendale	AZ	85308	HSI00001066	Tenet Healthcare
24	CHSP0000037	030030	Abrazo Central Campus	2000 West Bethany Home Road	Phoenix	AZ	85015	HSI00001066	Tenet Healthcare
25	CHSP0000039	030083	Abrazo Scottsdale Campus	3929 East Bell Road	Phoenix	AZ	85032	HSI00001066	Tenet Healthcare
26	CHSP0000040	030110	Abrazo West Campus	13677 West Mcdowell Road	Goodyear	AZ	85395	HSI00001066	Tenet Healthcare

Group practice linkage files: Background

- Cover 2016 and 2018
- List group practices and link to Compendium systems files
  - ► They include all group practices with 2+ physicians billing Medicare
  - ► They link the group practices and the physician NPIs billing those TINs to health systems
  - ► They also include PAC ID to link to external data sources

Group practice linkage files

- Data sources
  - ▶ Medicare Data on Provider Practice and Specialty (MD-PPAS)
  - ▶ Medicare Advantage data
  - ▶ Medicare fee-for-service claims
  - ▶ Medicare Provider Enrollment, Chain, and Ownership System (PECOS) data
  - ▶ IQVIA OneKey
  - ▶ Compendium hospital linkage file

Group practice linkage file

	A	B	C	D	E	F
1	tin_name	pecos_pac_ids	health_sys_id	health_sys_name	tin_name_md_ppas	state_md_ppas
742	Adventist Health St. Helena Ob/Gyn	9234038209	HSI00000011	Adventist Health	Adventist Health St. Helena Ob/Gyn	CA
743	Adventist Health System Georgia Inc	4486568037	HSI00000010	Adventist Health System	Adventist Health System Georgia Inc	GA
744	Adventist Health System/Sunbelt, Inc.	6406849256	HSI00000010	Adventist Health System	Adventist Health System/Sunbelt, Inc.	FL
745	Adventist Health System-Sunbelt Inc	0749232445	HSI00000010	Adventist Health System	Adventist Health System-Sunbelt Inc	FL
746	Adventist Healthcare Urgent Care Centers Inc	0244559540	HSI00000012	Adventist Healthcare	Adventist Healthcare Urgent Care Centers Inc	MD
747	Adventist Midwest Health	4486556727	HSI00000010	Adventist Health System	Adventist Midwest Health	IL
748	Adventist Midwest Health	2769790401	HSI00000010	Adventist Health System	Adventist Midwest Health	IL
749	Adventist Physician Services Inc.	4284631540	HSI00000012	Adventist Healthcare	Adventist Physician Services Inc.	MD
750	Advivum Anesthesiology Pc	7416942891	HSI00000935	Saint Lukes Health System	Advivum Anesthesiology Pc	MO
751	Advocare Llc	3678562188			Advocare Llc	NJ
752	Advocate Health And Hospitals Corporation	7810800935	HSI00001277	Advocate Aurora Health	Advocate Health And Hospitals Corporation	IL

AHRQ Compendium website

Accessing the Compendium on the AHRQ website

2021 Compendium Files

- **Excel File**—Your computer should automatically prompt you to open the file in a spreadsheet application to view the data.
  - Compendium of U.S. Health Systems (CSV, 77 KB)
  - Compendium with searchable and sortable fields (XLS, 94 KB)
- **Hospital Linkage File**—We recommend that Excel users download only the Excel version of the file. If Excel is used to open the CSV file, the program will automatically drop the zeros in fields with leading zeros.
  - Excel (554 KB)
  - CSV file (800 KB)
- **Technical Documentation**
  - Technical Documentation Report (PDF, 6 MB)
  - Compendium Hospital Linkage File, Technical Documentation (PDF, 469 KB)
    - Appendix A. Non-Federal General Acute Care Flag (PDF, 261 KB)
    - Appendix B. Data Dictionary – Hospital Linkage File (PDF, 262 KB)

Future Compendium updates

Compendium applications

Compendium as a springboard for research

- Valuable as a standalone resource for examining **systems**
- Can link to other data sources, creating possibilities to study:
  - ▶ **Physicians** (for example, IQVIA OneKey, CMS MIPS)
  - ▶ **Hospitals** (for example, AHA, CMS Hospital Compare)
  - ▶ **Patients** (for example, claims and administrative data)
  - ▶ **Geography** (for example, AHRQ SDOH database, CDC Social Vulnerability Index)

CMS: Centers for Medicare & Medicaid Services; MIPS: Merit-Based Incentive Payment System; AHA: SDOH: Social Determinants of Health;
CDC: Centers for Disease Control and Prevention

Describe health systems

- Rich in system-level information
- Can shed light on health system characteristics nationally

By the end of 2016, there were 626 health systems* in the United States.

162 (25.9%) are high teaching intensity

31 (5.0%) predominantly serve children

221 (35.3%) include at least one hospital with a high uncompensated care burden

193 (30.8%) include at least one hospital with a high percentage of low-income patients

18 (2.9%) comprise predominantly investor-owned hospitals

43 (6.9%) include hospitals in 3+ States

626 Health Systems

Heeringa, J., D. Jones, R. Machta, M. Furukawa, D. Miller, and E. Rich. "U.S. Health System Characteristics, 2016." CHSP Data Brief No. 2, September 2017.

Link the Compendium to other data sources

- Facilitates granular analysis on topics such as size and ownership:

  ► What type of health system ownership is most common?

  ► How large are health systems?

  ► Does health system size vary by ownership type?

Furukawa, M., L. Kimmey, D.J. Jones, R.M. Machta, J. Guo, and E. Rich. "Consolidation And Health Systems In 2018: New Data From The AHRQ Compendium." Health Affairs Blog, November 25, 2019.
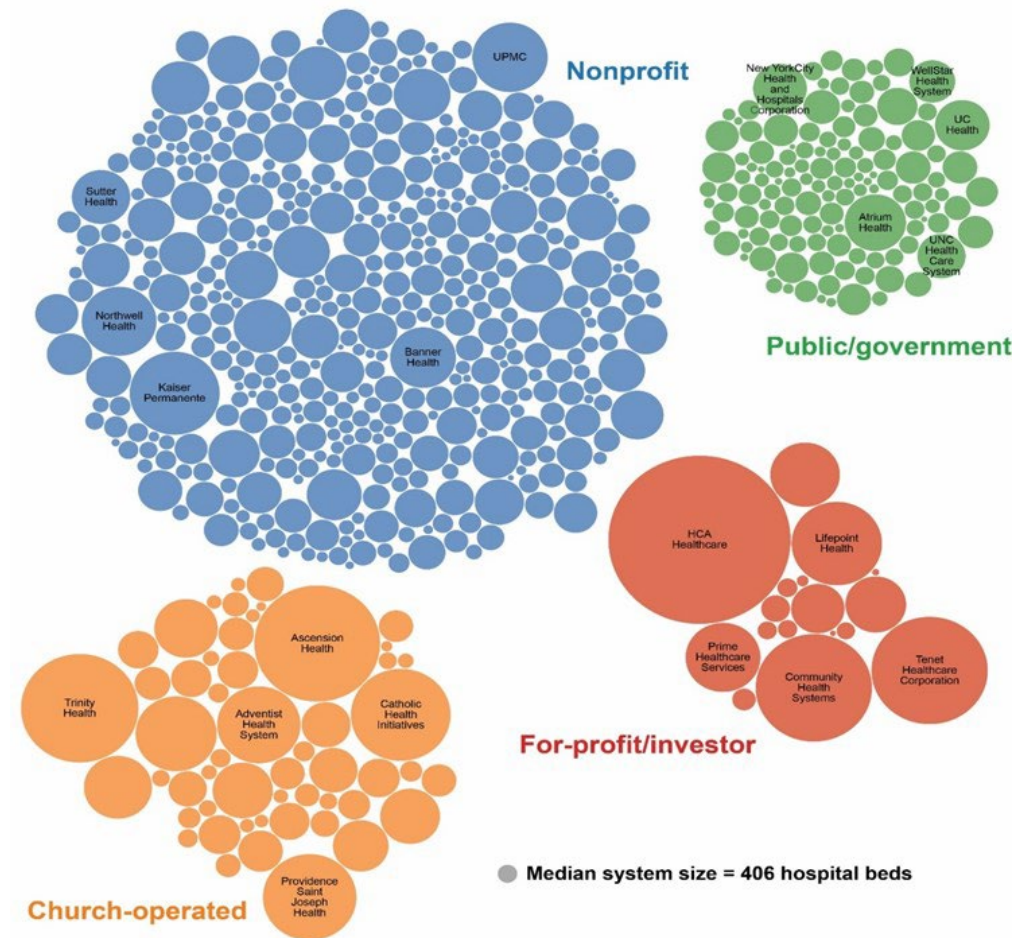
- Facilitates analysis of health system **variation over time**
  - ▶ How did physician integration with systems change from 2016 to 2018?
  - ▶ Does physician alignment with systems vary by specialty?
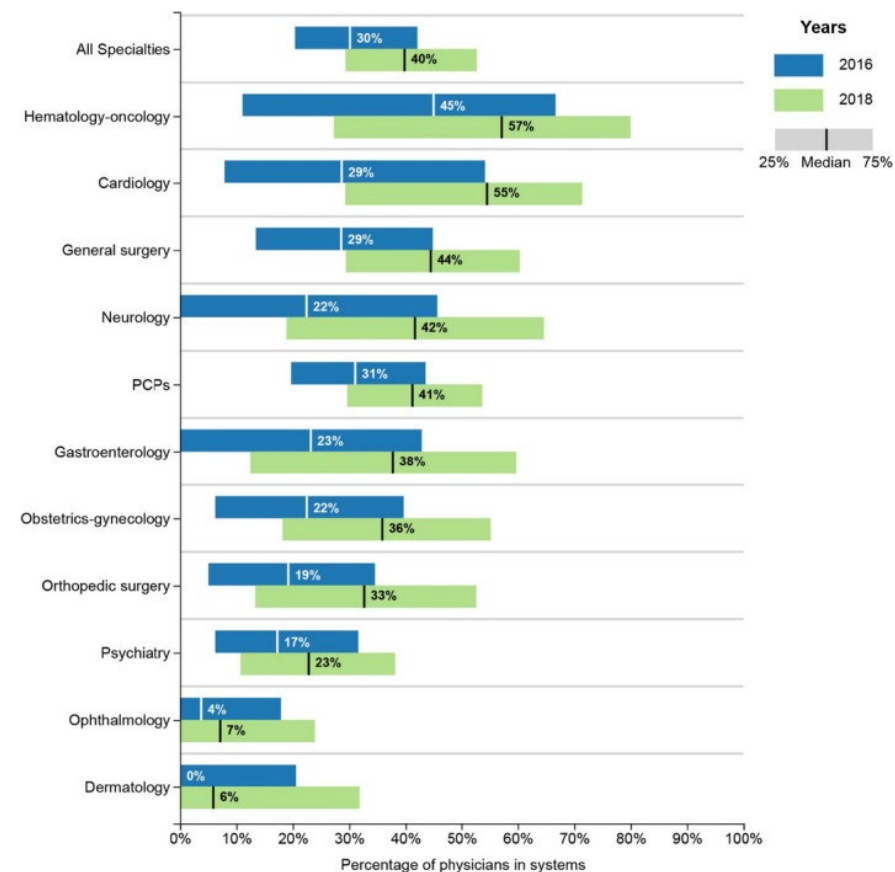
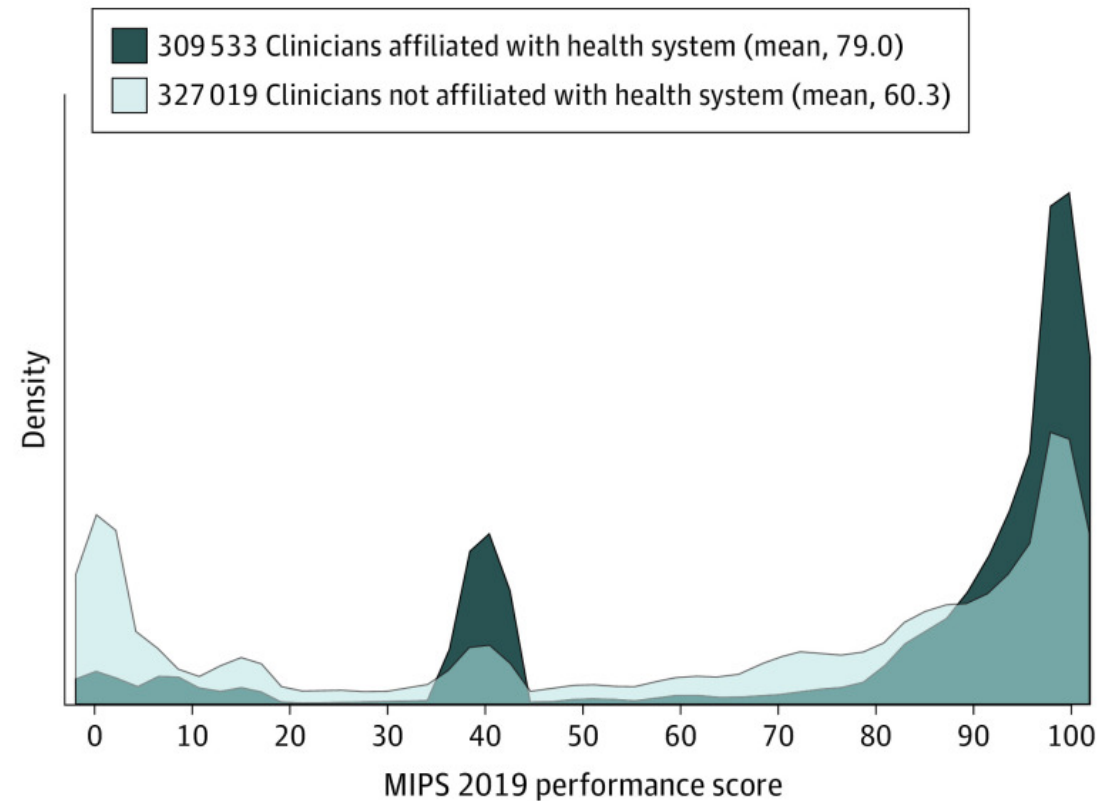Kimmey, L., M. Furukawa, D. Jones, R. Machta, J. Guo, and E. Rich. "Geographic Variation in the Consolidation of Physicians into Health Systems, 2016-2018." Health Affairs, vol. 40, no. 1, 2021.

Machta, R.M., D. Reschovsky, D.J. Jones, L. Kimmey, M.F. Furukawa, and E.C. Rich. "Health System Integration with Physician Specialties Varies Across Markets and System Types." Health Services Research, vol. 55, suppl. 3, 2020.

- Linking to **data from the Merit-based Incentive Payment System (MIPS)** helped answer whether clinicians affiliated with health systems had better performance ratings than their peers

Legend:
- 309 533 Clinicians affiliated with health system (mean, 79.0)
- 327 019 Clinicians not affiliated with health system (mean, 60.3)

Y-axis: Density
X-axis: MIPS 2019 performance score

Johnston, K.J., T.L. Wiemken, J.M. Hockenberry, J.F. Figueroa, and K.E. Joynt Maddox. "Association of Clinician Health System Affiliation With Outpatient Performance Ratings in the Medicare Merit-based Incentive Payment System." JAMA, vol. 324, no. 10, 2020, pp. 984–992.
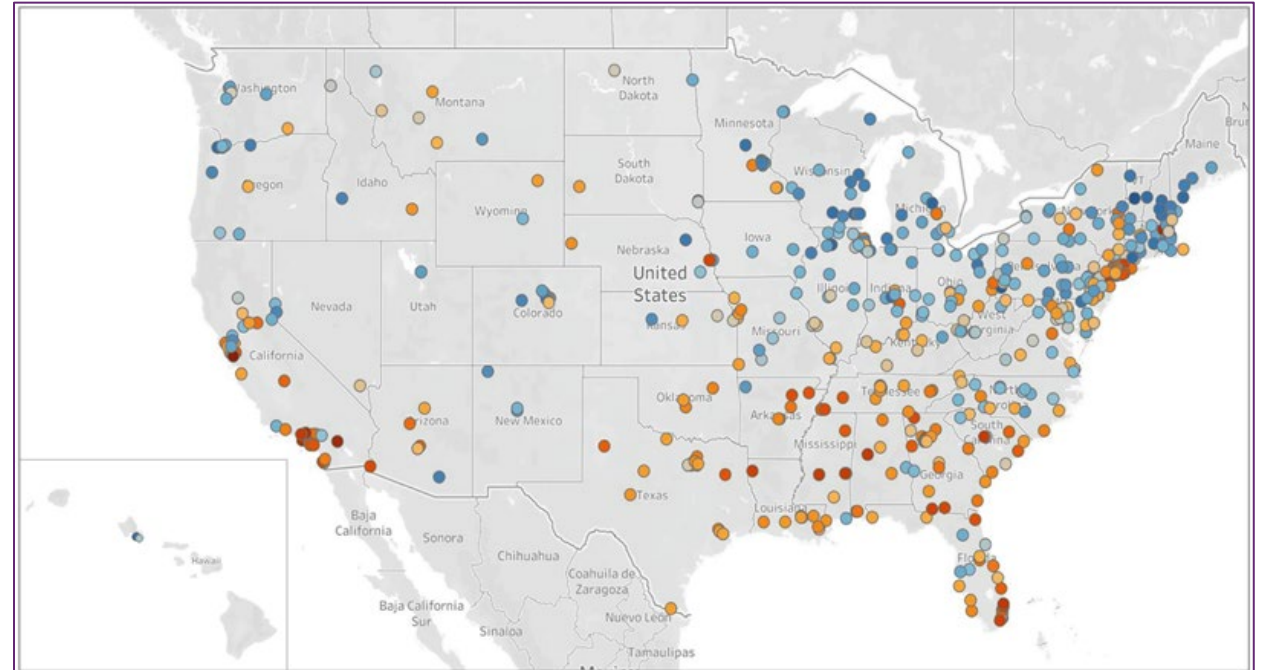
Test hypotheses about system performance

- Linking to **hospital cost and quality data from CMS** helped answer whether system providers perform better than nonsystem providers under an alternative payment model that incentivizes high-quality, cost-efficient care

Outcomes	System hospitals		Nonsystem hospitals
	Locally integrated	Not locally integrated	
Per-episode cost, mean	$26 800.8	$29 814.9	$28 854.3
HCAHPS patient experience survey measure, mean	85.5	84.2	85.5
THA/TKA complication measure, mean	2.6	2.6	2.5

Machta, R.M., J. Reschovsky, D.J. Jones, M.F. Furukawa, and E.C. Rich. "Can Vertically Integrated Health Systems Provide Greater Value: The Case of Hospitals Under the Comprehensive Care for Joint Replacement Model?" Health Services Research, vol. 55, no. 4, 2020, pp. 541–547.

- Linking to Medicare fee-for-service administrative data and claims provided a view into system-level variation in receipt of low-value care

Ganguli, I., N. Morden, and C. Yang. "Low-Value Care at the Actionable Level of Individual Health Systems." JAMA Intern Medicine, vol. 181, no. 11, 2021, pp. 1490–1500.

Questions and Answers