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# How the CAHPS Clinician and Group Patient Experience Survey Data Have Been Used in Research: A Systematic Review

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<b>Purpose</b>	Patient experience is a key aspect of care quality. The Consumer Assessment of Healthcare Providers and Systems Clinician and Group (CG-CAHPS <sup>®</sup> ) survey measures experiences with ambulatory care providers to inform public reporting, pay-for-performance initiatives, interventions, patient choice of physicians/practices, and quality improvement. Since the survey's 2007 release, no systematic review of its use in research has been published.
<b>Methods</b>	We reviewed English-language, peer-reviewed articles published since 2008 using CG-CAHPS survey data in the U.S. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and used the Checklist for Analytical Cross-Sectional Studies.
<b>Results</b>	We examined 126 articles and included 52. Twenty-seven articles focused on general primary care, and the others focused on ambulatory specialty care. Of the 52 studies, 37 were cross-sectional, and the majority conducted patient-level regression analysis, controlling for patient characteristics. The most-used CAHPS measures were overall provider rating and the provider communication composite. CG-CAHPS data were primarily utilized to evaluate interventions (24 studies) and examine cross-sectional associations (21 studies) of site-level (eg, organizational climate), provider-level (physician empathy), and patient-level (medication adherence) factors with patient experience. Four studies reported disparities in patient experience.
<b>Conclusions</b>	The widespread use of CG-CAHPS data implies the survey's value in measuring and improving care quality. Unlike facility or plan surveys, the CG-CAHPS survey was designed to allow attribution to medical groups and clinicians, which, as evidence shows, is its main strength. Policymakers, researchers, clinicians, and health care leaders can leverage CG-CAHPS data in quality improvement efforts and interventions supporting patient-centered care. ( <i>J Patient Cent Res Rev.</i> 2024;11:88-96.)
<b>Keywords</b>	patient experience; CAHPS Clinician and Group survey; ambulatory care; quality of care

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Because patient experience is an integral aspect of care quality,<sup>1,2</sup> is positively related to recommended clinical processes and desired health outcomes,<sup>1</sup> and is sometimes directly tied to payment, medical groups and other stakeholders are increasingly interested in understanding how to improve patient experiences. Monitoring patient experience can help ambulatory care providers improve the quality, efficiency, and effectiveness of care.

The Consumer Assessment of Healthcare Providers and Systems Clinician and Group (CG-CAHPS<sup>®</sup>) survey was

developed for public reporting, assessing the impact of care delivery interventions, facilitating patient selection of care providers, and providing actionable information to ambulatory care stakeholders.<sup>3,4</sup> Multiple versions of the CG-CAHPS survey exist,<sup>3-8</sup> and it is administered in several modes and multiple languages.<sup>9-11</sup> CG-CAHPS surveys have been administered to millions of patients to assess patient experiences with care received from providers and staff in primary, specialty, and ambulatory care settings in the United States.<sup>12</sup> Dyer et al 2012<sup>3</sup> and Solomon et al 2005<sup>4</sup> provide more detailed background information on the CG-CAHPS survey. Survey domains include provider communication, access to care, and care coordination. Supplemental survey item sets address the patient-centered medical home (PCMH),<sup>13</sup> health literacy,<sup>14</sup> health information technology,<sup>15</sup> cultural competence,<sup>16</sup> and patient narratives.<sup>17</sup>

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Two reviews of CG-CAHPS surveys have been published since the original survey's release in 2007. One review, published in 2019, included 20 studies using CG-CAHPS surveys from 2009 to 2017.<sup>18</sup> The authors concluded that CG-CAHPS surveys capture the perceptions of health care consumers and allow for the inclusion of the patient voice in improvement efforts.<sup>18</sup> In the second review,<sup>19</sup> from 2021, one included study used CG-CAHPS survey scores<sup>20</sup> and found that patients with commercial insurance had significantly worse global ratings of care than those with other insurance types. To date, there has been no systematic review of the types of research that includes CG-CAHPS survey data, the main uses of CG-CAHPS survey data in research, or an examination of the evidence of the associations and interventions using CG-CAHPS measures.

We systematically examine research using CG-CAHPS data in the U.S. from 2008 to 2023 to 1) identify how CG-CAHPS survey data have been used in research and 2) examine the evidence of the associations and interventions using CG-CAHPS measures.

## METHODS

We adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.<sup>21,22</sup>

**Search Strategy and Selection Criteria.** We applied a structured search strategy to PubMed (using OVID Medline), Web of Science, Scopus, CDSR (via Wiley), APA PsycInfo, and Cumulative Index of Nursing and Allied Health Literature (CINAHL) to identify peer-reviewed U.S. English-language articles from January 1, 2008, to July 31, 2023. Supplemental Table S1 provides our key words and Boolean operator strategy including patient experience terms, outcome terms, survey terms, and CG-CAHPS terms.

**Screening.** We (Quigley, Qureshi, and Predmore) reviewed the titles and abstracts of identified articles. After an initial five-study review by the full team to establish consistency across reviewers, individual reviewers independently screened abstracts for inclusion. All articles were double reviewed (Quigley and Qureshi or Quigley and Predmore). If initial assessments differed, the reviewers discussed discrepancies and resolved disagreements to reach consensus on inclusion. All three reviewers agreed on abstracts/articles for full-text review.

**Data Abstraction and Quality Assessment.** Once we ensured that all three reviewers employed a similar abstraction approach (via 3 studies), the articles were assigned equally to individual reviewers for abstraction. After initial abstraction, a second reviewer examined

each article to ensure the accuracy of abstracted content and, where necessary, discussed it with the reviewer team to reach consensus. Figure 1 details our screening and inclusion process.

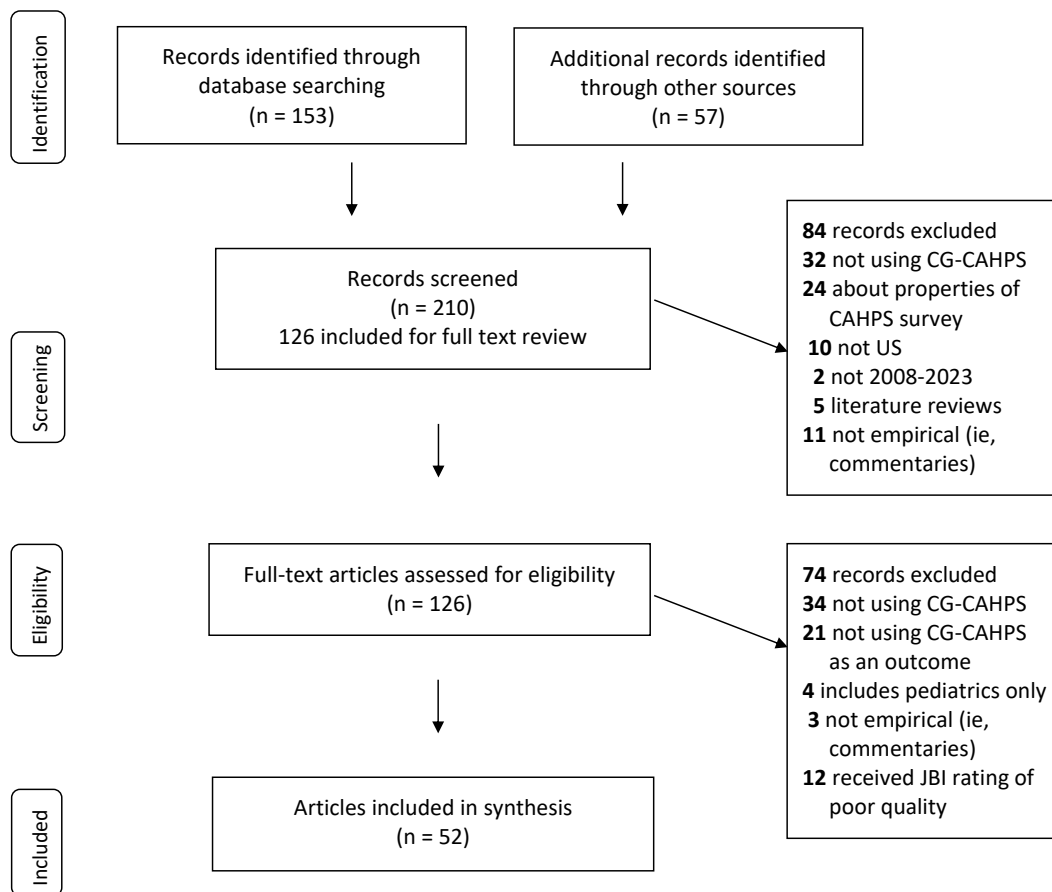
The reviewers abstracted information into a form noting the following: first author and year; objective; use of CG-CAHPS and relevant findings; study design (descriptive, comparative, correlational); study type (randomized control, case control, cohort, cross-sectional); statistical approach; methods; control variables; sample size; type of ambulatory care; sample description; population description; main and secondary outcomes; CG-CAHPS version and timeframe; disparities evaluated, if any; and limitations. The lead reviewer (Quigley) provided a final review of the abstracted information to gain consistent detail (sample size, P-values) for constructing tables.

Most of the articles were cross-sectional; therefore, we used the Checklist for Analytical Cross-Sectional Studies<sup>23</sup> to assess study quality and risk of bias. We excluded 12 studies because they did not possess at least six of the eight Joanna Briggs Institute (JBI) Critical Appraisal Tool Checklist elements. These 12 studies reported information about exposure and outcomes but did not report information on sample selection and/or did not control for confounding factors during analysis. Supplemental Table S2 lists the eight elements of the JBI-Checklist for each included article.

## RESULTS

As shown in Figure 1, the search identified 210 articles (153 unique articles from the search databases and subject-matter experts and an additional 57 articles from a grey literature search). During the screening and review process, we excluded articles that did not use CG-CAHPS (n=66), were only about the measurement properties of CAHPS surveys (n=24), used CG-CAHPS but not as an outcome (n=21), were not conducted in the U.S. (n=10), involved only pediatric care (n=4), were a literature review (n=5), were prior to 2008 (n=2), or were not empirical studies (ie, commentaries) (n=14). In total, 52 articles remained for our synthesis.

We reviewed the use of CG-CAHPS survey data across study types and design, statistical methods used, and most common aspects of patient experience (ie, measures) studied, followed by a description of the main uses (ie, interventional impact, associations with patient experience, disparities, public reporting) of CG-CAHPS survey data. We organized these results by the type of ambulatory care setting to allow readers to identify the most relevant findings to their care setting.



**Figure 1.** PRISMA flow diagram.

### CG-CAHPS Survey Data Used in Research

**Type of Care and Patients.** Twenty-seven of the 52 studies focused on general primary care settings including primary care<sup>24-38</sup> (n=14), primary care clinics within Federally Qualified Health Centers (FQHCs)<sup>39-45</sup> (n=7), both primary and specialty care<sup>46-51</sup> (n=6), and primary care limited to Medicare beneficiaries<sup>52-55</sup> (n=4) or primary care for adults with diabetes<sup>56</sup> (n=2). The other 19 studies examined a specific ambulatory setting or patient population including orthopedic/neurology clinics<sup>20,57-69</sup> (n=14), dermatology<sup>70</sup> (n=1), oncology<sup>71</sup> outpatient care (n=1), ophthalmology (n=1),<sup>72</sup> and rheumatology<sup>73</sup> (n=1). Supplemental Table S3 summarizes the methods, population, measures, and main topic for each included study organized by setting.

**Study Types.** Thirty-seven studies were cross-sectional, nine were case-control comparisons,<sup>28,33,41,44,49,52,53,55,70</sup> three used cohorts,<sup>54,62,74</sup> and three were randomized controlled trials.<sup>29,38,68</sup>

**Statistical Methods.** Forty-eight studies included regression analysis. This includes 27 studies using linear regression (of which two used linear and logistic regression),<sup>20,24-26,30,33-37,39,43,46-48,54,55,57,59,64,66-70,73,74</sup> 12 that conducted logistic regression,<sup>27,40,43,51,55,56,58,60-62,65,72</sup>

seven that employed difference-in-differences analysis,<sup>28,29,38,41,49,52,53</sup> three that used spline analysis,<sup>42,44,45</sup> and one that used ordered probit regression.<sup>50</sup> Four studies performed significance testing using other models.<sup>31,32,63,71</sup>

Of the 46 studies for which investigators controlled for variables in the modeling, 38 controlled for patient characteristics, 20 controlled for health system or clinic factors (eg, clinic site or specialty), and 15 controlled for physician factors (eg, years in practice). Patient covariates included age (n= 35), health status (n=27) [19 used self-reported health status, six measured presence of health conditions,<sup>27,39,56,61,64,70</sup> and eight used a health status index such as Charlson comorbidity index and Hierarchical Condition Category (HCC) Coding<sup>29,30,52-56,73</sup>], race/ethnicity (n=30), sex/gender (n=27), education (n=22), and survey language<sup>25,40,42-44,56</sup> (preferred language; n=6). Five studies assessed a disparity: one examining disparities by Hispanic ethnicity and acculturation,<sup>30</sup> another by socioeconomic status,<sup>27</sup> the third by homelessness,<sup>24</sup> the fourth by patient/provider gender concordance,<sup>35</sup> and the fifth by patient language preference.<sup>45</sup> Four studies examined differences by provider type.<sup>32,48,50,57</sup>

Forty-three studies conducted patient-level analysis; of these, 34 included all patients who completed the CG-CAHPS survey, and eight studies examined a specific subset of patients (eg, patients who are homeless,<sup>24</sup> are covered by Medicare,<sup>52,53</sup> underwent shoulder arthroplasty,<sup>62</sup> underwent foot and ankle surgery,<sup>68</sup> or have diabetes,<sup>39,56,74</sup> psoriasis,<sup>70</sup> or hypertension<sup>39</sup>). Eight studies conducted provider-level analysis,<sup>26,37,46,49,54,57,69,71</sup> and one was a clinic-level analysis;<sup>67</sup> of these, eight studies included all patients who completed the CG-CAHPS survey for the providers participating in the study period, and one included patients seeing an orthopedic surgeon.<sup>69</sup> Sample size varied from small local studies (50–144 patients)<sup>62,63</sup> or studies with providers as the unit of analysis (with 25–246 providers)<sup>26,57</sup> to large-scale nationwide studies<sup>32,53</sup> (25,000 to 53,885 patients).

**CG-CAHPS Survey Version.** Most (n=36) studies used the CG-CAHPS survey 2.0, 15 used CG-CAHPS survey 3.0, and one used CG-CAHPS survey 1.0. Twenty-seven

studies included data since 2015, three included data pre-2007,<sup>48,56,70</sup> and three did not report years of data.<sup>41,62,67</sup> More (n=29) included data from one or two years, rather than three or more years (n=23).

**CG-CAHPS Measures.** The most commonly used CAHPS measures were the overall provider rating (n=42 studies) and provider communication composite (N=41). Other frequent measures included access (n=22), a global recommendation item (n=17), office staff courteousness (n=12), and PCMH items (n=9).

**Use of CG-CAHPS.** The studies primarily used CG-CAHPS data to assess interventions' impact (n=24 studies) and associations of factors of interest with patient experience (n=21 studies). Six studies compared subgroups, and one conducted external benchmarking. No studies used CG-CAHPS to examine consumer choice or public reporting. Table 1<sup>20,24-74</sup> presents studies

**Table 1.** Included Studies' Main Use of CG-CAHPS Survey by Type of Ambulatory Care

Use of CG-CAHPS	Primary & specialty care	Primary care	Orthopedics/Neurology ambulatory care	Other specialty ambulatory care
<b>Impact of intervention (N=24)</b>	Boissy 2016**V Fareed 2022***V Hays 2022***S	Behl-Chadha 2017**T Dale 2016**T De Leon 2012**V DiCapua 2017**T Dorr 2016**T Kern 2013**T Lin 2020**T Nembhard 2012**V Nembhard 2020***S Quigley 2021**V Quigley 2023a**V Sarinopoulos 2017***S Setodji 2017**V Spiegel 2023**V Swankoski 2017**T Swankoski 2018**T	Bernstein 2019**V Bernstein 2023***V Oladeru 2017**V Zakare-Fagbamila 2019***S	<u>Rheumatology:</u> Honomichl 2020**T
<b>Associations to patient experience (N=21)</b>	Chaitoff 2017**TV Bosko 2016**TV Quigley 2014**T	Bauer 2014***T Chung 2020***S Hasnain 2013**T Lee 2020**T Lin 2017**T Nembhard 2015**V Ratanawongsa 2013***T Willard-Grace 2021***S	Hageman 2015**T Johnson 2019**V Khan 2021**T Lanz 2018**V Lapin 2019**V Matar 2021***S Rabah 2021a**T Rabah 2021b**T Zakare-Fagbamila 2020***S	<u>Ophthalmology:</u> Han 2021**V
<b>Comparison of subgroups (N=6)</b>		Carvajal 2014**T Kippenbrock 2019**T Prasad 2021***S Quigley 2023b**V	Agarwal 2019**V	<u>Dermatology:</u> Cheng 2022**T
<b>External benchmarking (N=1)</b>				<u>Oncology:</u> Kim 2021***S

NOTE: \* CG-CAHPS Version 1.0, \*\* CG-CAHPS Version 2.0, \*\*\* CG-CAHPS Version 3.0, V indicates visit survey, S indicates 6-month reference period, and T indicates 12-month reference period.

by their use of CG-CAHPS data by type of ambulatory care setting. Supplemental Table S4 shows the studies by their use of data and the specific CAHPS measures used grouped by setting. CG-CAHPS was used most often in the primary care setting; however, the survey was appropriately used in research across both primary and specialty settings of ambulatory care.

**Associations of Interventions With Changes in CG-CAHPS Measures.** Twenty-four intervention studies used CG-CAHPS data to assess improvement in patient experience after implementing interventions. Table 2<sup>24,27-29,31,33,36,38,41-44,47,49,51-55,58,63,66,68,73</sup> shows these intervention studies using the CG-CAHPS survey data grouped by type of ambulatory care.

**Cross-Sectional Associations With CAHPS Measures.** Twenty-one studies used CG-CAHPS survey data to examine relationships of patient experience with other variables (one study each), including associations with a wide range of patient-, provider-, and site level-factors. Table 3<sup>20,26,30,34,37,39,40,46,48,50,56,59-62,64,65,67,69,72,74</sup> shows these cross-sectional association studies using the CG-CAHPS data grouped by type of ambulatory care.

## DISCUSSION

The CG-CAHPS survey was developed to be used in public reporting, assess impacts of ambulatory care delivery system interventions, facilitate patient selection of ambulatory care physicians and ambulatory care practices, and provide actionable information to ambulatory care stakeholders. This review systematically assessed the use of CG-CAHPS survey data since the survey's inception. We found evidence that it has been used to evaluate interventions, understand cross-sectional associations with patient experience, and compare subgroups across multiple primary and specialty care settings. The review also found that there was no published literature on CG-CAHPS use for consumer choice and public reporting, only one study conducted external benchmarking, and three studies used CG-CAHPS as the main outcome of a randomized control trial. The lack of literature focusing on internal or external benchmarking is likely because activity alone may not lend itself to peer-reviewed publication. The studies about consumer choice that were identified were excluded because they did not use CG-CAHPS data but rather used simulated or hypothetical patient ratings of providers. The synthesized information presented in our review can assist policymakers, researchers, clinicians, and health care leaders to leverage CG-CAHPS survey data for quality improvement, evaluations, and interventions in the pursuit of improving and providing patient-centered care.

**Table 2.** Interventions Assessed Using CG-CAHPS Survey Data by Type of Ambulatory Care (n=24 studies)

Author, year	Intervention
<b>Primary and specialty care</b>	
Boissy 2016	Communication training
Hays 2022	Telehealth during COVID-19
Fareed 2022	Patient portal activation
<b>Primary care (PC)</b>	
Di Capua 2017	Care coordination
De Leon 2012	EHR implementation
Behl-Chadha 2017	PCMH for homeless patients
Dorr 2016	PCMH high value elements
Kern 2013	PCMH implementation
Sarinopoulos 2017	PCMH type (multipayer/PCMH/not PCMH)
Spiegel 2023	CDS vs. patient education (PE)
Nembhard 2012	Quality collaborative
<b>PC in federally qualified health centers</b>	
Nembhard 2020	Care coordination
Quigley 2021	Shadow coaching
Quigley 2023a	Second shadow coaching
Setodji 2017	PCMH with high use of chronic care management
<b>PC for Medicare beneficiaries</b>	
Dale 2016	Comprehensive Primary Care
Lin 2020	Access interventions~
Swankoski 2017	Comprehensive Primary Care
Swankoski 2018	Comprehensive Primary Care
<b>Ortho/Neuro</b>	
Bernstein 2019	Use of PROMs assessment
Bernstein 2023	Use and discuss PROMs
Oladeru 2017	Communication training
Zakare-Fagbamila 2019	Use of real-time feedback
<b>Rheumatology</b>	
Honomichl 2020	PROMs implementation

NOTE: ~ indicates interventions designed to enhance access of extended hours, flexible appointments, after-hours coverage, email, home visits, group visits, web visits, text messages, and telemedicine in CPC clinics.

Our work has limitations. Studies in which patient experience was not the focus or main outcome and hence not mentioned in titles or abstracts may have been missed. Our study, however, does identify 52 relevant articles that use CG-CAHPS survey data, providing insights about patient experiences of care across multiple primary care and specialty care settings. Evidence about the survey's use for consumer choice and public reporting is limited. Thus, additional work examining the use of CG-CAHPS survey data concerning consumer choice and/or its use for public reporting would be beneficial to understand how collecting

**Table 3.** CG-CAHPS Used in Association Studies by Type of Ambulatory Care (n=23 studies)

Author, year	Intervention
<b>Primary and specialty care</b>	
Bosko 2016	HEDIS clinical quality metrics
Chaitoff 2017	Provider empathy
Quigley 2014	Provider specialty
<b>Primary care (PC)</b>	
Chung 2020	Provider burnout
Hasnain 2013	Hispanic ethnicity/acclulturation
Nembhard 2015	Organizational climate
Willard-Grace 2021	Provider burnout & engagement
<b>PC in federally qualified health centers</b>	
Lee 2020	PCP-team communication and chronic disease management
Lin 2017	Colorectal screening
<b>PC for adult diabetes patients</b>	
Bauer 2014	Antidepressant adherence
Ratanawongsa 2013	Cardiometabolic medication refill adherence
<b>Ophthalmology</b>	
Han 2021	Patient demographics, visual acuity, and appointment factors
<b>Ortho/Neuro</b>	
Hageman 2015	Coworker feedback scores based on Quality PULSE 360
Johnson 2019	Patient demographics and survey mode
Khan 2021	Preoperative depression for patients after lumbar surgery
Lanz 2018	Emotional stability
Lapin 2019	Patient reported outcome measures (PROMs)
Matar 2021	Pre-operative/surgical factors
Rabah 2021a	Lumbar postoperative outcomes
Rabah 2021b	Provider communication
Zakare-Fagbamila 2020	Clinic performance metrics (eg, waiting-room times)

CG-CAHPS data enhances or improves these aspects of patient experience. In addition, the strong evidence associating CG-CAHPS measures with critical provider, site, and patient factors supports the survey's use as a key outcome measure to be selected and used in clinical trials.

## CONCLUSIONS

Overall, since its release in 2007, evidence indicates that the CG-CAHPS survey is being used by health care providers successfully to assess a wide range of pre-post interventional changes in global ratings, such as overall provider rating, and in specific aspects of patient experience, such as provider communication, access, courteous office staff and patient-centeredness. CG-CAHPS data are also widely used to understand important cross-sectional relationships with patient experience of care at the site level, provider level, and patient level, in addition to assessing differences across patient and

provider groups. CG-CAHPS has untapped potential for studying consumer choice. These uses of the CG-CAHPS survey are consistent with the design of the survey and fulfill a variety of needs for health care organizations. One of the unique strengths of the CG-CAHPS survey is that it is designed to allow attribution to medical groups and clinicians, as opposed to facility or plan surveys. This broad use of CG-CAHPS survey data and measures by health care providers supports its value in measuring, understanding, and improving care quality. This implies that CG-CAHPS is valued by health care providers as a means of assessing change, evaluating interventions, and making improvements to critical aspects of patient care experiences and health care delivery. Policymakers, researchers, clinicians, and health care leaders can leverage this evidence on the uses of CG-CAHPS data to support patient-centered care.



## Patient-Friendly Recap

- It is important to understand the experience of patients while they receive care, and the “Consumer Assessment of Healthcare Providers and Systems Clinician and Group” (CG-CAHPS®) survey is a well-known way to measure this experience.
- There has not been a thorough review of CG-CAHPS and its use, so we reviewed scholarly articles that included CG-CAHPS survey data in the U.S.
- We found that the wide use and effectiveness of CG-CAHPS demonstrate the survey’s value in improving patient care quality.
- We recommend that policymakers, researchers, clinicians, and health care leaders should refer to CG-CAHPS data when planning quality improvement efforts to further support patient-centered care.

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## Author Contributions

Study design: Quigley. Data acquisition or analysis: Quigley, Qureshi, Predmore. Manuscript drafting: Quigley, Qureshi, Predmore. Critical revision: Quigley, Elliott, Hays.

## Conflicts of Interest

None.

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