

UCLA

UCLA Previously Published Works

Title

Evaluation of a Care Coordination Measure for the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Medicare Survey

Permalink

<https://escholarship.org/uc/item/3445r8pv>

Journal

Medical Care Research and Review, 71(2)

ISSN

1077-5587

Authors

Hays, Ron D

Martino, Steven

Brown, Julie A

et al.

Publication Date

2014-04-01

DOI

10.1177/1077558713508205

Peer reviewed

Medical Care Research and Review

<http://mcr.sagepub.com/>

Evaluation of a Care Coordination Measure for the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Medicare Survey

Ron D. Hays, Steven Martino, Julie A. Brown, Mike Cui, Paul Cleary, Sarah Gaillot and Marc Elliott

Med Care Res Rev 2014 71: 192 originally published online 13 November 2013
DOI: 10.1177/1077558713508205

The online version of this article can be found at:
<http://mcr.sagepub.com/content/71/2/192>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Medical Care Research and Review* can be found at:

Email Alerts: <http://mcr.sagepub.com/cgi/alerts>

Subscriptions: <http://mcr.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://mcr.sagepub.com/content/71/2/192.refs.html>

>> [Version of Record](#) - Mar 10, 2014

[OnlineFirst Version of Record](#) - Nov 13, 2013

[What is This?](#)

Evaluation of a Care Coordination Measure for the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Medicare Survey

Medical Care Research and Review
2014, Vol. 71 (2) 192–202
© The Author(s) 2013
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1077558713508205
mcr.sagepub.com



Ron D. Hays¹, Steven Martino², Julie A. Brown³, Mike Cui³,
Paul Cleary⁴, Sarah Gaillot⁵, and Marc Elliott³

Abstract

There is widespread interest in assessing care coordination to improve overall care quality. We evaluated a five-item measure of care coordination included in the 2012 Consumer Assessment of Healthcare Providers and Systems (CAHPS) Medicare survey ($n = 326,194$ respondents, 46% response rate). This measure includes patient reports of whether their personal doctor discusses their medicines, has medical records and other relevant information, and is informed about care from specialists, and whether the patient gets help in managing care and timely follow-up on test results. A one-factor categorical confirmatory factor analytic model indicated that five items constituted a coherent scale. Estimated health-plan-level reliability was 0.70 at about 102 responses per plan. The composite had a strong unique association with the CAHPS global rating of health care, controlling for the CAHPS core composite scores. This measure can be used to evaluate relative plan performance and characteristics associated with better care coordination.

Keywords

care coordination, Medicare beneficiaries, patient experience surveys, CAHPS®

This article, submitted to *Medical Care Research and Review* on May 14, 2013, was revised and accepted for publication on September 12, 2013.

¹UCLA Division of GIM/HSR, Los Angeles, CA, USA

²RAND, Pittsburgh, PA, USA

³RAND, Santa Monica, CA, USA

⁴Yale School of Public Health, New Haven, CT, USA

⁵Centers for Medicare & Medicaid Services, Baltimore, MD, USA

Corresponding Author:

Ron D. Hays, UCLA Division of GIM/HSR, 911 Broxton Avenue, Los Angeles, CA 90095, USA.

Email: drhays@ucla.edu

Introduction

Coordination among health care providers is an essential ingredient of high-quality care and essential for optimizing the patient experience (Doty, Fryer, & Audet, 2012; Peikes, Chen, Schore, & Brown, 2009). More complete and accurate transmission of health care information among providers is associated with higher rates of preventive screening (Flocke, Stange, & Zyzanski, 1998; Parkerton, Smith, & Straley, 2004), diabetes monitoring (Parkerton et al., 2004), fewer emergency department visits (Antonelli, Stille, & Antonelli, 2008), and lower hospitalization rates (Palfrey et al., 2004).

Innovative practice models have emerged to facilitate better care coordination across settings and physicians (Institute of Medicine, 2001; Schoen, How, Weinbaum, Craig, & Davis, 2006). Foremost among these is the patient-centered medical home (PCMH), which has coordinated care as one of its central principles (Cassidy, 2010). The PCMH is meant to function as the focal point for communication between health care providers and with the patient and his or her family.

The National Quality Forum (McDonald et al., 2007) identified a set of 10 performance measures for care coordination focused exclusively on clinical processes of care (e.g., the percentage of patients discharged from an emergency department to ambulatory care or home health care who received a transition record at the time of discharge). These measures emphasize information technology rather than patient experiences (Ferrante, Balasubramanian, Hudson, & Crabtree, 2010). Patient experience measures provide complementary and valuable information about care coordination because patients are the common element linking interdependent providers and care settings (McDonald et al., 2007). Patient experience measures are an integral part of the evaluation of health plans, as health plans are ultimately responsible for the quality of care delivered to their enrolled patients.

There are a variety of existing measures of patients' experiences with care coordination (McDonald et al., 2010). For example, a Commonwealth survey of patients with complex care needs included a number of ambulatory care coordination items, including availability of test results and records during appointments, information sharing among providers, and the extent to which one's regular or primary care doctor is informed about hospital care (Schoen et al., 2011). Recently, a measure of care coordination that assesses follow-up on diagnostic tests, information exchange among primary and specialty providers, and communication about prescription medicines was included in the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) PCMH survey (Scholle et al., 2012) but had inadequate internal consistency reliability in a field test with 1,790 adult respondents (coefficient $\alpha = 0.49$). Because of the high priority stakeholders place on care coordination, the survey developers retained the three items and recommended that they be reported as stand-alone items rather than as a composite measure of care.

Assessing care coordination is especially important for Medicare beneficiaries because many receive care from multiple providers in multiple settings (Bodenheimer, 2008). In fact, the typical beneficiary sees two primary care physicians and five specialists per year; those with particularly complex conditions may see as many as 16 physicians per year (Pham, Schrag, O'Malley, Wu, & Bach, 2007). The current study

was designed to build on prior work by evaluating a new CAHPS measure of care coordination included in the 2012 CAHPS Medicare survey: three items from the CAHPS PCMH survey plus others (see below) assessing different aspects of care coordination that are relevant to the PCMH and other practice models designed to enhance coordination of care.

New Contribution

This study provides some support for the reliability and validity of a brief care coordination measure that can be used to evaluate relative plan performance and characteristics associated with better care coordination in Medicare beneficiaries. Its brevity makes it possible to incorporate it into existing surveys that assess other aspects of patient care experiences.

Method

We analyzed responses to a survey administered to a sample of Medicare beneficiaries to evaluate the reliability and validity of the new care coordination measure. As described below, we performed standard psychometric analyses to examine how well the five items represented a common construct and provided unique information beyond the existing CAHPS survey domains. The health plan is the target unit of analysis because CAHPS Medicare survey data are reported at that level.

Data Collection and Sample

The 2012 CAHPS Medicare Advantage (MA) and fee-for-service (FFS) surveys were administered from February 21 to May 29, 2012, to a random sample of 712,243 MA and FFS beneficiaries. CMS drew the sample, and data were collected by seven vendors certified by CMS. Data were collected using a mixed-mode method with mailing of prenotification letters, up to two mailings of the paper survey, with telephone follow-up of mail nonrespondents.

Respondents totaled 326,194 beneficiaries (46% response rate, 15% of responses by telephone). The response rate was calculated as the number of completed surveys (including partials) divided by the number of eligible respondents, excluding 3,362 individuals who were institutionalized ($n = 882$), deceased ($n = 2,259$), or otherwise ineligible ($n = 221$).

The CAHPS items are only asked of those respondents to which they apply. For example, the care coordination items include screeners that evaluate whether the respondent has a personal doctor, visits the doctor, takes prescription medicine, attempts to make appointments with specialists, number of specialists seen, is getting care from multiple providers or uses more than one kind of health care service, and whether a test was ordered by the personal doctor. The care coordination items did not apply to 35,782 survey respondents (11%), leaving 290,412 respondents. Of these, 23,946 (8%) had missing data on the care coordination items, leaving a final analytic sample of 266,466 cases.

The characteristics of the sample appear in Table 1. Those in the analysis subset ($n = 266,466$) were similar to the overall beneficiary sample in terms of age, gender, education, race/ethnicity, chronic conditions, insurance, and whether a proxy completed the survey.

Survey. Coordination of care has been a focus of development for the CAHPS Consortium for several years. This survey included existing supplemental items from the CAHPS health plan survey (Items 1, 4, and 5 in Table 2), the CAHPS PCMH survey (Items 2 and 3), and one new item (Item 6). Each item reflects content that has been identified in prior focus groups and item wording refined based on multiple rounds of cognitive testing in English and Spanish. The items were adapted to Medicare health plan-level assessment—that is, the reporting interval was changed from last 12 months to last 6 months and the reference changed from this provider to your personal doctor. In addition, we changed the response scale for the item assessing communication from the dichotomous yes/no scales used to describe a specific visit that is in the CAHPS PCMH survey to the CAHPS standard “never” to “always” response scale. These two items are Items 2 and 3 in Table 2. We also included a new item to expand on the existing CAHPS item on getting test results by asking if the results were provided as soon as the patient needed them (Item 6), an existing item to assess availability of medical records (Item 1), and an existing item evaluating management of care among different providers and services (Item 4).

Because Item 6 (getting test results as soon as needed) was locally dependent (i.e., had a large residual correlation) with Item 5 (getting test results) after controlling for underlying care coordination, we combined Items 5 and 6 in the analysis to create a single indicator. This measure, which represents getting test results promptly, is a better indicator of getting test results than either individual item. Thus, we had five indicators (four individual items and one indicator combining the two locally dependent items) of care coordination for the analyses. The care coordination items we used were constrained by the need to include them along with the standard CAHPS multi-item composites (communication, getting needed care, getting care quickly, health plan customer service) and global rating items (personal doctor, specialty care, all health care, health plan). The five indicators we included focus on provider communication and management of care issues fundamental to coordination of ambulatory care.

Statistical Analyses. To test the coherence of the proposed five-indicator composite, we estimated a patient-level categorical confirmatory factor analysis model that evaluated the fit of the five care coordination indicators to a single-factor model. Because individual-level factor analyses may be inaccurate when clustering exists (Muthén, 1994), we also estimated a multi-level categorical confirmatory factor analytic model with patients nested within plan for the MA beneficiaries. We also estimated internal consistency reliability for the five indicators.

To assess the ability of the indicators to distinguish plan performance, we estimated the reliability of the individual indicators at the health plan level and the number of patients needed to obtain a reliability of 0.70 at that level based on the estimated

Table 1. 2012 CAHPS Medicare Advantage and Fee-for-Service Survey Respondents.

Characteristic	Overall (n = 326,194)	Care coordination subset (n = 266,466)
Age (years)		
18-24	<1%	<1%
25-34	<1%	<1%
35-44	1%	1%
45-54	3%	3%
55-64	7%	8%
65-69	25%	24%
70-74	23%	23%
75-79	17%	18%
80-84	13%	13%
85 or older	10%	10%
Gender		
Male	43%	42%
Female	57%	58%
Education		
8th grade or less	8%	8%
Some high school	11%	11%
High school graduate or GED	34%	34%
Some college or 2-year degree	26%	26%
4-year college graduate	10%	10%
More than 4-year college degree	11%	12%
Race/ethnicity (mutually exclusive categories)		
Hispanic	9%	9%
White	77%	77%
Black	8%	8%
Asian	3%	3%
Native Hawaiian or other Pacific Islander	<1%	<1%
American Indian or Alaska Native	<1%	<1%
Self-reported chronic conditions		
Heart attack	13%	14%
Angina/coronary heart disease	19%	21%
Stroke	10%	10%
Cancer (excluding skin cancer)	18%	19%
Emphysema, asthma or COPD	20%	21%
Diabetes	35%	38%
Lives alone	30%	30%
Insurance		
Fee-for-service ^a	36%	37%
Medicare Advantage	64%	63%
Survey completion		
Self	89%	89%
Proxy helped	7%	8%
Proxy answered questions	3%	4%

Note. CAHPS = Consumer Assessment of Healthcare Providers and Systems; COPD = chronic obstructive pulmonary disease.

^aWith or without prescription drug plan (PDP) enrollment.

Table 2. Care Coordination Items in 2012 CAHPS Medicare Advantage and Fee-for-Service Surveys.

-
- *Item 1:* In the last 6 months, when you visited your personal doctor for a scheduled appointment how often did he or she have your medical records or other information about your care? Never/Sometimes/Usually/Always
 - *Item 2:* In the last 6 months, how often did you and your personal doctor talk about all the prescription medicines you were taking? Never/Sometimes/Usually/Always
 - *Item 3:* In the last 6 months, how often did your personal doctor seem informed and up-to-date about the care you got from specialists? Never/Sometimes/Usually/Always/I do not have a personal doctor/I did not visit my personal doctor in the last 6 months
 - *Item 4:* In the last 6 months, did you get the help you needed from your personal doctor's office to manage your care among these different providers and services? Yes, definitely/ Yes, somewhat/No
 - *Item 5:* In the last 6 months, when your personal doctor ordered a blood test, x-ray, or other test for you, how often did someone from your personal doctor's office follow up to give you those results? Never/Sometimes/Usually/Always
 - *Item 6:* In the last 6 months, when your personal doctor ordered a blood test, x-ray, or other test for you, how often did you get those results as soon as you needed them? Never/Sometimes/Usually/Always
-

Note. CAHPS = Consumer Assessment of Healthcare Providers and Systems. If the response to Item 5 was *never*, then the combined 5/6 item was scored as 1. If the response to Item 5 was *sometimes*, then the combined item was scored 2 if Item 6 was *never*, 3 if Item 6 was *sometimes*, 4 if Item 6 was *usually*, and 5 if Item 6 was *always*. If the response to Item 5 was *usually*, then the combined item was scored 3 if Item 6 was *never*, 4 if Item 6 was *sometimes*, 5 if Item 6 was *usually*, and 6 if item 6 was *always*. If the response to Item 5 was *always*, then the combined item was scored 4 if Item 6 was *never*, 5 if Item 6 was *sometimes*, 6 if Item 6 was *usually*, and 7 if Item 6 was *always*.

intraclass correlation (ICC). This was computed as the difference between the mean square within plans and the mean square between plans, divided by the mean square between plans plus the average number of respondents per plan (minus one) times the mean square within plans. The 0.70 threshold has been used as a minimum reliability level for comparison of health plans (e.g., Hays et al., 1999). These analyses indicate the sample size needed to obtain sufficient reliability of measurement in this study and future studies.

We estimated the bivariate correlations of the care coordination composite with the core CAHPS multi-item composites (communication, getting needed care, getting care quickly, health plan customer service) and global ratings of the personal doctor, specialty care, all health care, and health plan. In addition, we regressed the global rating items on the CAHPS core composites and the care coordination composite, adjusting for patient age, education, self-rated general health, and self-rated mental health. We hypothesized that the new care coordination measure would be positively correlated with existing composites and have substantial partial associations with the global ratings after controlling for existing CAHPS composites (i.e., discriminant validity). We report standardized regression coefficients to provide an indication of the direction and strength (effect size) of the linear relationships between the CAHPS composites and the global rating items.

Table 3. Standardized Factor Loadings for Care Coordination Items From One-Factor Categorical Factor Analysis Models ($n = 266,466$).

Item	Standardized loading	Standard error
Personal doctor has medical records or other information about your care during visits	0.729	0.003
Personal doctor talks about all medicines you are taking	0.636	0.002
Personal doctor informed and up-to-date about care from specialists	0.683	0.003
Got help from personal doctor's office to manage care from providers and services	0.728	0.006
Follow-up on test results ordered by personal doctor	0.703	0.003

Note. The model fit the data well (comparative fit index = 0.996).

Confirmatory factor analysis models were estimated using Mplus version 6.12 (Muthén & Muthén, 2010). All other analyses were conducted with SAS 9.2 (SAS Institute, Inc., Cary, NC).

Results

A one-factor categorical confirmatory factor analysis model for the five care coordination indicators (see Table 3) fit the data well: $\chi^2(df = 5, n = 266,466) = 557.156$ (comparative fit index [CFI] = .996; root mean square error of approximation [RMSEA] = 0.020). The factor loadings ranged from 0.64 to 0.73.

The multi-level (individual and plan) one-factor categorical confirmatory factor analytic model for the MA beneficiaries only from 480 health plans also fit the data well (see Table 4): $\chi^2(df = 10, n = 168,452) = 317.309$ (CFI = 0.997; RMSEA = 0.014). The within-plan standardized factor loadings were very similar to those reported in Table 3, ranging from 0.65 to 0.72.

The standardized root mean square residual for the within-plan part of the model was 0.019 and for the between-plan part of the model was 0.076. The estimated ICCs for the five indicators ranged from 0.008 to 0.070 (see Table 4).

Internal consistency reliability (standardized coefficient alpha) for the five-indicator composite was 0.70. The ICC for the composite was 0.022 at the health plan level. The number of patients per health plan needed to obtain 0.70 reliability for the composite was 102. Mean scores on the composite for health plans ranged from 73.3 to 93.3 (mean = 85.2, $SD = 3.1$).

Product-moment correlations of the care coordination composite with CAHPS core composites and global rating items (listed in order of decreasing magnitude) were $r = 0.58$ ($n = 255,244$) with communication, $r = 0.51$ ($n = 254,210$) with the personal doctor global rating, $r = 0.37$ ($n = 261,405$) with the care global rating, $r = 0.33$ ($n = 208,534$) with getting needed care, $r = 0.29$ ($n = 162,388$) with the specialty

Table 4. Standardized Factor Loadings (Standard Errors) for Care Coordination Items From Multi-Level One-Factor Categorical Factor Analysis Model Among Medicare Advantage Beneficiaries ($n = 168,452$ Patients and 480 Plans).

Item	Within level	Between level	Intraclass correlation
Personal doctor has medical records or other information about your care during visits	0.724 (0.003)	0.865 (0.025)	0.043
Personal doctor talks about all medicines you are taking	0.647 (0.003)	0.580 (0.035)	0.008
Personal doctor informed and up-to-date about care from specialists	0.695 (0.003)	0.490 (0.042)	0.022
Got help from personal doctor's office to manage care from providers and services	0.709 (0.006)	0.974 (0.032)	0.039
Follow-up on test results ordered by personal doctor	0.709 (0.003)	0.715 (0.023)	0.070

Note. The multi-level model fit the data well (comparative fit index = 0.997).

Table 5. Standardized Regression Coefficients in Models Regressing CAHPS Global Rating Items on Care Coordination and Other CAHPS Composites.

CAHPS composite	Global rating items			
	Personal doctor	All care	Specialty care	Health plan
Communication	0.618	0.244	0.068	0.063
Getting care quickly	0.030	0.193	0.054	0.062
Getting needed care	0.012	0.162	0.258	0.235
Customer service	-0.002+	0.074	0.056	0.343
Care coordination	0.166	0.102	0.135	0.050
Adjusted R2	0.565	0.342	0.198	0.335
Sample size	69,868	69,437	56,095	68,778

Note. CAHPS = Consumer Assessment of Healthcare Providers and Systems. Models adjusted for patient age, education, self-rated general health, and self-rated mental health.

*Not statistically significant, $p > .05$.

global rating, $r = 0.29$ ($n = 254,229$) with getting care quickly, $r = 0.25$ ($n = 86,558$) with health plan customer service, and $r = 0.24$ ($n = 253,855$) with the plan global rating.

Standardized coefficients from multivariate regressions of the global rating items on the CAHPS core composites and care coordination composite appear in Table 5. Care coordination had the second largest unique association with the global rating of the doctor and the rating of specialty care, the fourth largest association with rating of all care, and the smallest association with the plan global rating. This is especially

notable given the substantial common variance indicated by the bivariate association between care coordination and communication ($r = 0.58$).

Discussion

This study reports the development of a five-indicator care coordination composite that has satisfactory psychometric properties for measuring the intended construct and distinguishing among the experiences of Medicare beneficiaries in different health plans. Before discussing the study results, it is important to acknowledge limitations of the study. In particular, the response rate to the survey was not high, and it is uncertain if nonrespondents would provide similar information as reported here. Moreover, the measure we have developed is parsimonious and does not capture all aspects of care coordination. In addition, the analyses are based on self-reported cross-sectional data. Thus, the correlations and regression models indicate associations among composites and global rating items that are not necessarily causal and include common method variance. Despite these limitations, the study yields important information about patient reports of aspects of care coordination and shows that they are associated with overall perceptions of care.

The fit of the single-factor model and the significance and size of the factor loadings provide support for the coherence of the care coordination composite. The care coordination composite had substantial unique associations with the CAHPS global rating items (especially personal doctor, specialty care, and all health care), after controlling for the CAHPS core health plan composites, including the second largest unique association with the global ratings of the personal doctor and of specialty care. These results indicate significant covariation among patient perceptions of care coordination and how they perceive their physicians and care and suggest that the new care coordination measure provides distinct information from the existing CAHPS composites. Weaker associations with plan ratings may indicate that patients do not perceive care coordination as a plan function but more closely associate it with physicians. The importance of care coordination as a predictor of global ratings has been observed in other studies as well. For example, the strongest correlations with the CAHPS global rating of the hospital and reports of willingness to recommend the hospital to family and friends were found for a nurse communication composite and care coordination composite in data from 181 hospitals in the California Hospitals Assessment and Reporting Taskforce (Rothman, Park, Hays, Edwards, & Dudley, 2008). Future work should examine the reliability and discriminant validity of modifications of this care coordination measure in medical group and inpatient settings.

Given the interest in care coordination measures for patients in integrated care settings and the psychometric support for the care coordination composite evaluated in this study, we feel that the care coordination items should be administered along with core items in future CAHPS Medicare and other health plan surveys. Assessing care coordination at the health plan as well as the physician group level is appropriate because health plans can prioritize coordination and implement policies and strategies that promote coordination (e.g., integrated electronic health records); mean

performance and plan-level reliability may increase as plans take a more active role in doing so. Publicly reported data are often available only at the health plan level, and patients are interested in the extent to which different organizations provide coordinated care. In addition, the items can be administered with the CAHPS Clinician and Group survey with minor wording modifications. In particular, the expanded item set described here represents a major improvement over the three existing CAHPS PCMH care coordination items (Scholle et al., 2012).

Not enough is known about plan characteristics that facilitate coordination. The new item set can be used to identify plan and group characteristics related to better care coordination. For example, plans that have NCQA PCMH recognition might score higher than other plans on the CAHPS Medicare care coordination composite. The CAHPS Medicare care coordination questions focus on aspects of coordination that are directly experienced and understood by patients. It will be informative to examine how the new patient-reported composite relates to other ways of assessing care coordination, such as external observer ratings of scheduling, work flow, documentation, and safety.

In summary, this study provides support for the reliability and validity of the care coordination composite evaluated here. This measure and the CAHPS core composites provide a strong basis for assessing how well health plans coordinate care for Medicare beneficiaries. The five-indicator care coordination composite can be scored to evaluate care delivered to MA and FFS beneficiaries. Future work is needed to evaluate how well this measure performs in non-Medicare populations.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The study was funded by CMS contract HHSM-500-2005-000281 to RAND. Ron D. Hays was also supported in part by grants from AHRQ (2U18 HS016980), NIA (P30AG021684), and the NIMHD (2P20MD000182).

References

- Antonelli, R. C., Stille, C. J., & Antonelli, D. M. (2008). Care coordination for children and youth with special health care needs: A descriptive, multisite study of activities, personnel costs, and outcomes. *Pediatrics*, *122*, e209-e216.
- Bodenheimer, T. (2008). Coordinated care—A perilous journey through the health care system. *New England Journal of Medicine*, *358*, 1064-1071.
- Cassidy, A. (2010). *Patient-centered medical homes: A new way to deliver primary care may be more affordable and improve quality. But how widely adopted will the model be?* Retrieved from http://www.healthaffairs.org/healthpolicybriefs/brief_pdfs/healthpolicybrief_25.pdf
- Doty, M. M., Fryer, A. K., & Audet, A. M. (2012). The role of care coordinators in improving care coordination: The patient's perspective. *Archives of Internal Medicine*, *172*, 587-588.

- Ferrante, J. M., Balasubramanian, B. A., Hudson, S. V., & Crabtree, B. F. (2010). Principles of the patient-centered medical home and preventive services delivery. *Annals of Family Medicine*, 8, 108-116.
- Flocke, S. A., Stange, K. C., & Zyzanski, S. J. (1998). The association of attributes of primary care with the delivery of clinical preventive services. *Medical Care*, 36(8), AS21-AS30.
- Hays, R. D., Shaul, J. A., Williams, V. S. L., Lubalin, J. S., Harris-Kojetin, L., Sweeny, S. F., & Cleary, P. D. (1999). Psychometric properties of the CAHPS™ 1.0 survey measures. *Medical Care*, 37, MS22-MS31.
- Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st Century*. Washington, DC: National Academies Press.
- McDonald, K. M., Schultz, E., Albin, L., Pineda, N., Lonhart, J., Sundaram, . . . Malcolm, E. (2010). *Care coordination measures atlas version 3* (AHRQ Publication No. 11-0023-EF). Rockville, MD: Agency for Healthcare Research and Quality.
- McDonald, K. M., Sundaram, V., Bravata, D. M., Lewis, R., Lin, N., Kraft, S., . . . Owens, D. K. (2007). *Closing the quality gap: A critical analysis of quality improvement strategies: Vol. 7. Care coordination* (K. G. Shojania, K. M. McDonald, R. M. Wachter, & D. K. Owens Eds.). Rockville, MD: Agency for Healthcare Research and Quality.
- Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research*, 22, 376-398.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Palfrey, J. S., Sofis, L. A., Davidson, E. J., Liu, J., Freeman, L., Ganz, M. L., & Pediatric Alliance for Coordinated Care. (2004). The pediatric alliance for coordinated care: Evaluation of a medical home model. *Pediatrics*, 113(5 Suppl.), 1507-1516.
- Parkerton, P. H., Smith, D. G., & Straley, H. L. (2004). Primary care practice coordination versus physician continuity. *Family Medicine*, 36(1), 15-21.
- Peikes, D., Chen, A., Schore, J., & Brown, R. (2009). Effects of care coordination on hospitalization, quality of care, and health care expenditures among Medicare beneficiaries: 15 randomized trials. *Journal of the American Medical Association*, 301, 603-618.
- Pham, H. H., Schrag, D., O'Malley, A. S., Wu, B., & Bach, P. B. (2007). Care patterns in Medicare and their implications for pay for performance. *New England Journal of Medicine*, 356, 1130-1139.
- Rothman, A. A., Park, H., Hays, R. D., Edwards, C., & Dudley, R. A. (2008). Can additional patient experience items improve the reliability of and add new domains to the CAHPS® hospital survey? *Health Services Research*, 43, 2201-2222.
- Schoen, C., How, S. K. H., Weinbaum, I., Craig, J. E., & Davis, K. (2006). *Public views on shaping the future of the U.S. health system*. New York, NY: Commonwealth Fund.
- Schoen, C., Osborn, R., Squires, D., Doty, M., Pierson R., & Applebaum, S. (2011). New 2011 survey of patients with complex needs in eleven countries finds that care is often poorly coordinated. *Health Affairs*, 30, 2437-2448.
- Scholle, S. H., Vuong, O., Ding, L., Fry, S., Gallagher, P., Brown, J. A., . . . Cleary, P. D. (2012). Development of and field-test results for the CAHPS PCMH survey. *Medical Care*, 50(11, Suppl. 3), S2-S10.