

**Environmental Scan and Literature Review for Reevaluation:
PRO-PM: Effective Transfer of Clinical Information**

Submitted by:

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Introduction

The Centers for Medicare & Medicaid Services (CMS) has contracted with Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (YNHHSC/CORE) to develop a patient-reported outcome performance measure (PROPM) evaluating patients' understanding of the information they are provided to inform their recovery from an outpatient surgery or procedure.

As part of measure development, we performed a literature review and environmental scan to identify studies and measures focused on patients' understanding of discharge instructions in settings where they may undergo a surgery or procedure: hospital, emergency department (ED), or outpatient settings. The goal of the literature review was to examine differences in understanding by patient characteristics, timing for when surveys were conducted, cohort definitions, risk-adjustment approaches, and scoring methodologies. The purpose of the environmental scan was to detect measures in the hospital, ED, or outpatient settings that also used surveys with at least one question focused on patients' evaluation of the information they were provided as part of their stay.

Background and Objectives

Medicare outpatient surgeries and procedures are growing in frequency. Between 2005 and 2011, the number of outpatient surgical episodes increased by 14%.^{1,2} Medicare payments for outpatient operations increased by \$8.5 billion between 2008 and 2014.² Moreover, these operations are increasing in complexity. Following Medicare's decision to phase out the inpatient only list, there has been a significant increase in intensive outpatient surgeries. For example, in Florida 15% of total knee arthroplasties were shifted from the hospital setting to hospital outpatient departments (HOPDs) or ambulatory surgical centers (ASCs) following this policy decision.³

Unlike inpatient procedures and surgeries, patients undergoing outpatient operations are sent home the same day, often still under the effects of general anesthesia. This fact, coupled with the evolution in frequency and complexity of outpatient operations, means that it is imperative for patients to have a clear understanding of their recovery plan. Yet, HOPDs and ASCs frequently fail to provide information about recovery at a much higher rate than inpatient hospitals. Inpatient hospitals provide several pieces of vital information more regularly than outpatient providers: continuing medication names and instructions (96% vs. 40%); new medication names and instructions (99% vs. 29%); and pending diagnostic test names and instructions (90% vs. 61%).⁴

Ensuring that patients have access to easy-to-understand information is a vital part of a smooth recovery. A lack of consistently written documentation in the outpatient setting, as demonstrated above, is associated with worse patient understanding⁵ and lower patient activation during their recovery.⁶ As a result, information that is simpler to read and more complete has been associated with fewer follow-up calls to providers as well as less frequent hospital readmissions.⁷⁻⁹ The timing of the development of this PROPM is appropriate given the trend towards shifting more surgeries and procedures to the outpatient setting, along with the evidence that patients do better when they understand the information related to their recovery.

Objective

The goal of this environmental scan and literature review is to examine studies and measures that have quantified patients' understanding (perceived or real) of their discharge instructions.

Literature Review Methods

Objective: Identify studies that assess patient understanding of their discharge instructions using a survey or interview.

Search Strategy

We conducted a literature review of relevant peer-reviewed publications by searching the Ovid MEDLINE® Database. Limitations were applied to the search, including utilizing only articles published between January 1, 2000 and June 1, 2021, and publications in the English language.

Step 1

First, we performed a search that included discharge instruction-specific terms combined with “OR”:

- discharge instruction* (title)
- discharge information* (title)
- discharge education (title)
- discharge communication (title)
- discharge plan* (title)

Step 2

Then, we performed a search that included survey terms combined with “OR”:

- survey (title or abstract)
- questionnaire (title or abstract)
- interview* (title or abstract)

Step 3

The results from searches performed in Steps 1 and 2 were combined using “AND.” This yielded 348 results.

Study Selection

We reviewed all 348 abstracts to select articles for full-text review based upon the following exclusions:

- Qualitative study
- Does not survey patients
- Psychiatric studies
- Pediatric studies
- Patient understanding of instructions not the main outcome
- Non-human

- Abstract only
- Letter/editorial
- Non-English

After applying the additional exclusion criteria, a total of nine articles from the primary search were retained. We then used snowballing to identify five additional articles that were cited by the nine studies detected by our search strategy to arrive at a final number of 14 studies.

Environmental Scan Methods

Objective: Identify inpatient, ED, or outpatient surgery PROPMs that include at least one question assessing patient evaluation of discharge instructions.

The environmental scan is an important aspect of measure development, which entails reviewing web-based sources of information to identify updates in clinical guidelines; changes to related and competing measures; and the need for modifications to the technical specifications of a measure based on shifting care patterns or patient characteristics.¹⁰ We used a standardized approach to structure the search, which CORE developed to be consistent with the CMS Measures Management System Blueprint, relying on pre-specified websites and search engines to identify measures examining patient understanding of discharge instructions. As part of our approach, we searched measure inventory sites, measure databases, state reporting programs, and other relevant resources listed below using the following keywords: “discharge instruction,” “discharge planning,” “discharge information,” “patient understanding,” “patient education,” “patient reported outcome”

- National Quality Forum (NQF) Quality Positioning System (QPS): <http://www.quavisitlityforum.org/QPS/>
- CMS Measures Inventory Tool (CMIT): https://cmit.cms.gov/CMIT_public/ListMeasures
- CMIT Environmental Scan Tool: https://cmit.cms.gov/CMIT_public/EnvironmentalScanAbout
- Most current Measure Applications Partnership (MAP) Pre-Rulemaking Report and MAP List of Measures under Consideration (MUC): <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/Pre-Rulemaking.html>
- American Medical Association (AMA) Physician Consortium for Performance Improvement (PCPI) Measures Directory: <https://www.thepcpi.org/page/Measures-Directory>
- QualityNet: <http://www.qualitynet.org/>
- Leapfrog Hospital Safety Grade Measures: <http://www.hospitalsafetygrade.org/for-hospitals>
- Quality Payment Program: <https://qpp.cms.gov/mips/quality-measures>
- National Committee for Quality Assurance (NCQA): <https://www.ncqa.org/>
- Association of State and Territorial Health Officials (ASTHO): <https://www.astho.org/>

To identify any additional measures not found in the sources listed above, we also performed Google and Google Scholar searches for the following related key terms: “discharge instruction quality measure” and “discharge instruction patient reported outcome.” We reviewed the first three pages of results (30 links) for each search.

We excluded measures that were qualitative, did not survey patients, focused on psychiatric or pediatric patients, or did not include a question on patient evaluation of discharge instructions.

We abstracted the following variables for each measure: measure title and steward, status of National Quality Forum (NQF) endorsement, data source, cohort, outcome, minimum sample size, measurement window, statistical model, risk-adjustment variables, and public reporting status.

Literature Review Results

Our literature review identified 14 articles that surveyed patients on their understanding of their discharge instructions. Below, we describe key features of these articles, including the study population, the timing and mode of the surveys, the survey, how patient characteristics influence understanding, and study limitations. See [Table 1 in the Appendix](#) for a detailed summary of each of the 14 articles.

Study Population

The age of the patients in the studies was distributed as follows: nine were 18 and over,¹¹⁻¹⁹ three were 65 and over,²⁰⁻²² one was 55 and over,²³ and one was 70 and over.²⁴ Eight of the articles focused on patients admitted to a hospital^{14-16,18-20,23,24} and the remaining six included patients admitted to the ED.^{11-13,17,21,22} None of the studies included individuals who underwent an outpatient procedure or surgery. Eleven of the articles did not restrict the cohort to specific conditions,^{11,13,14,16,18-24} while the other three limited admissions to those for either ankle sprain, back pain, head injury, kidney stone, laceration,¹² acute or elective abdominal or colorectal surgical procedure,¹⁵ abdominal pain, chest pain, or nausea and vomiting.¹⁷ The sample size for the studies ranged from 43 – 450 patients, all of whom were admitted to either a single facility (n=12)^{11,12,16-24} or two facilities (n=2).^{13,15}

Survey

The most common survey mode was telephone (n=6),^{12,19-22,24} followed by multi-mode (n=5),^{11,13-16} in person (n=2),^{18,23} and paper (n=1).¹⁷ A majority of the studies only surveyed patients once (n=9),^{12-14,17-21,24} while some surveyed patients twice (n=4)^{11,15,16,23} or three times (n=1).²² The most common time period for patients to be delivered the survey was within 0-48 hours after discharge (n=6),^{12-14,17,18,21} while other time periods included within two weeks of discharge (n=4),^{11,15,16,18} one week of discharge (n=3),^{20,23,24} or 90 days from discharge (n=1).²² Generally, studies waiting two weeks or more to survey patients also conducted a baseline survey as part of the discharge process. The response rate for the surveys ranged from 40-100% with an average response rate of 65%. The number of questions in the surveys ranged from 4-41 with a mean of 18. There did not appear to be a relationship between response rate or survey mode/length.

Scoring Methodology

Almost all the studies examined the relationship between patient characteristics and responses to individual survey questions (n=12). Only two of the articles combined survey responses into a composite score.^{14,23} The authors of both studies used the same approach which was to transform survey responses into linear scores and then sum those scores to arrive at a final value for each respondent.

Influence of Patient Characteristics on Understanding

Several patient characteristics were associated with lower levels of understanding of discharge instructions and treatment plans. These included: English not being the first language (n=3), lower education levels (n=3),^{11,16,19} lower health literacy (n=2),^{19,23} certain medical diagnoses (n=2),^{12,20} male sex (n=2),^{18,20} a longer time period between discharge and being surveyed (n=2),^{15,22} older age (n=1),²⁰ social isolation (n=1),²⁰ lower reading ability (n=1),¹¹ lower self-efficacy (n=1),²³ worse cognition (n=1),²³ female sex (n=1),¹⁷ and receiving only verbal instructions (n=1).²⁴

Limitations of Modeling Approaches and Interventions

All the studies were limited by the fact that they were conducted in either one or two facilities and included small sample sizes. None of the studies included more than 450 patients and the average sample size of the studies was 188 individuals. Thus, almost all the studies were underpowered, making it difficult to test for statistically significant differences in patient understanding by different characteristics. While most studies discovered associations between the patient characteristics listed above and understanding of discharge instructions, only four^{14,16,20,23} constructed regression models to test these relationships and three used chi-squared tests to compare differences between groups.^{11,15,21}

Summary and Implications for Measure Development

The 14 articles identified in the literature review were generally limited by their smaller sample sizes and modeling approaches. This makes it more challenging to incorporate their findings into our PROPM. However, it also confirms the need for this measure as there is a clear gap in this area.

Nevertheless, there are some lessons that we can take away from these studies. First, all the studies surveyed patients at least once within two weeks of discharge from the hospital or ED. Yet, those studies that included a repeat survey at later dates found that patient comprehension decreased over time. Thus, our measure should make sure to survey patients at very close intervals so not to penalize providers if their patients responded later than other HOPDs or ASCs. Second, as our measure will likely include multiple questions in different domains, we may want to think about applying the same method as Coleman²³ and Erlang¹⁴ and transform our scores linearly to sum them up and model our outcome continuously. Finally, we will want to test for the inclusion of several patient characteristics that were associated with lower levels of understanding. Some of these can be derived from claims data (sex, age, time between discharge and survey date, medical diagnoses) however others would have to be included as part of the survey (education, health literacy, social isolation, reading ability, and self-efficacy).

Environmental Scan Results

Our environmental scan identified 5 measures that included questions about discharge instructions for patients that were admitted to a hospital, ED, or HOPD/ASC. Below, we describe key features of these measures, including the survey type, cohort definition, outcome, minimum sample size, measurement window, and risk-adjustment variables. See [Table 2 in the Appendix](#) for a detailed summary of each of the 14 articles.

Survey Type

Three of the measures use a paper copy of the survey (OAS CAHPS, HCAHPS, S-CAHPS), one utilizes an electronic survey (PROM-ED), and the other relies on a combination of paper, telephone, and electronic (ED CAHPS). However, two of the measures that use a paper survey (HCAHPS and OAS CAHPS) are currently testing the use of an electronic survey.

Cohort Definition

All five of the measures include patients 18 or older and are not restricted to any specific conditions or procedures. The PROM-ED measure limits the cohort to patients who received ED care in the prior 90 days and the S-CAHPS measure also restricts the cohort to patients undergoing a surgery within the prior three to six months.

The four CAHPS measures excluded certain patient populations. Some common exclusions among these measures are patients who do not want to be contacted, patients discharged to psychiatric facilities, nursing homes, or hospice, prisoners, and patients without a permanent United States address.

Outcome

The outcomes for the measures are either transformed into overall linear scores or include a composite score for each of the survey domains. The PROM-ED measure asks multiple questions on four different domains and then rescales questions on a 0-100 scale to arrive at composite scores for each domain. The OAS CAHPS and S-CAHPS measures both report an overall provider score which ranges from 0-10 as well as domain scores using linear transformations of the survey responses. The HCAHPS and ED CAHPS measures also transform scores linearly but the HCAHPS measure then calculates eight star ratings using 19 of the questions included in the survey.

Minimum Sample Size

The minimum sample size required for the measure to be considered reliable varies by the measure. Since the PROM ED is still under development this value has not yet been defined. The S-CAHPS measure does not define a minimum sample size either, although it is possible that it exists and is not documented in the information we accessed as part of the environmental scan. HCAHPS only requires hospitals complete 100 surveys. This number is 300 for OAS CAHPS and 375 for ED CAHPS.

Measurement Window

The five measures identified as part of this environmental scan all included different measurement windows. The PROM ED measure requires the survey be sent to patients within 90 days of their ED visit. OAS CAHPS surveys patients within 60 days of their operation. Both HCAHPS and ED CAHPS send out the survey as little as 48 hours after discharge, but the window extends longer for HCAHPS (up to six weeks) than ED CAHPS (up to 35 days). We could not identify a specific measurement window for S-CAHPS.

Risk-Adjustment Variables

All the CAHPS measures adjust for age and self-rated health status. In addition, the OAS CAHPS, HCAHPS, and ED CAHPS measures control for education and primary language. The HCAHPS and ED CAHPS measures also adjust for the length of time between when the patient was discharged and when they responded to the survey, while OAS CAHPS and HCAHPS control for self-rated mental health. Other variables that are included in each measures' case-mix adjustment include surgery type (OAS CAHPS); sex, surgical line, and maternity line (HCAHPS); and reason for the ED visit, ambulance transportation, and use of a proxy respondent (ED CAHPS).

Summary and Implications for Measure Development

None of the five measures included in our environmental scan focused entirely on patients' evaluation of their discharge summaries. However, all the surveys included at least one question on this topic. The various goals of the measures are all distinct and differ from the purpose of our PROPM. Although we cannot align our specifications and be fully harmonized with the other measures, there are several items that we can incorporate into our measure development process.

Many of the CAHPS measures have been in existence for a decade or more and as such were developed during a time when electronic forms of survey communication were not as robust and ubiquitous. However, all the measures, except for S-CAHPS, either use an electronic mode of survey or are experimenting with adding this as an option. This supports our decision to utilize a phone/email survey for our PROPM. All five measures were also developed for patients 18 and older, which is the approach we are taking as well. We will want to contemplate if we want to apply any of the measure exclusions used by the CAHPS measures. Those most applicable to our measure include patients who decline to be surveyed, patients not residing at home, and patients without a home address.

Almost all the measures utilized a similar methodology for arriving at their outcome, which was to transform categorical responses into linear scores and sum them to arrive at a continuous outcome. We believe it makes sense to examine this as an option for our measure when it comes time to create the measure methodology. The minimum case count also varied depending on the measure, from a minimum of 100 to a maximum of 375 in a single year. Given that our measure is for HOPDs and ASCs we may examine the possibility of aligning our minimum sample size with OAS CAHPS (300). The timing of the survey also varied although none of the measures waited longer than 90 days and several began surveying patients almost immediately after discharge. We have not finalized our measurement window and we may decide to test several options as part of the pilot. Finally, the CAHPS measures all include patient-mix adjustments as part of their measures. We are planning on testing several patient-mix variables as part of the pilot but we will also need to determine if we want to include some of the variables that are used by the CAHPS measures like if a caregiver or patient responded to the survey or length of time between surgery date and survey completion date.

Conclusion

Overall, the literature review identified multiple studies focused on evaluating patients' understanding of their discharge instructions. Although the majority of the studies were not of the highest quality, taken together they convey three important points. First, there is a general dearth of high-quality evidence on the topic of patient understanding of discharge instructions. Furthermore, no studies focus on all the information provided over an entire episode of care, from the day a patient decides to get a surgery to when they are discharged. This PROPM will fill an important gap in the knowledge base and hopefully improve the quality of care for HOPD and ASC patients. Second, patient understanding is mediated by several important factors, most notably patients' primary language, education, and literacy. These are all factors that must be gathered through the survey itself as they are not available in claims data. And third, the patient responses will likely vary depending on when they receive the survey and we will want to pay close attention to this fact during our pilot studies.

Our environmental scan revealed five measures that can be used to inform measure development. None of these measures can be considered as competing or related measures. However, they all include at least one question that is at least tangentially related to our outcome. The measure specifications that are most applicable to this PROPM include the measurement window, minimum sample size, and scoring methodology. The HCAHPS measure in particular is useful as it is used in both public reporting and payment programs and utilizes a robust modeling approach that takes into account patient-mix. However, all the CAHPS measures suffer from lower response rates, likely related to the length and complexity of the surveys. So, while we may want to model some of our decisions based on these measures, we will also want to avoid those characteristics that make it less likely patients will respond.

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Appendix

Table 1. Summary of Findings from the Literature Review

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
1. Albrecht JS, Gruber-Baldini AL, Hirshon JM, Brown CH, Goldberg R, Rosenberg JH, Comer AC, Furuno JP. Hospital discharge instructions: comprehension and compliance among older adults. J Gen Intern Med. 2014 Nov;29(11):1491-8. doi: 10.1007/s11606-014-2956-0.	To quantify the prevalence of non-comprehension and non-compliance with discharge instructions and to identify associated patient characteristics	450 patients ≥ 65 admitted to medical and surgical units of a hospital	Age, sex, race, marital status, ADLs, education, number of hospital admissions in past 6 months, depression, number of falls in past 6 months, social isolation, number of medications, discharge diagnosis, Charlson score, length of stay	Telephone survey within 5 days of discharge. # of questions: 6. Response rate: 60%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Non-comprehension of the discharge instructions was 5 % for follow-up appointments, 27% for medications, 48% for exercise, and 50% for diet recommendation. Age, male sex, discharge diagnosis, and social isolation were significantly associated with lower comprehension.	Small sample size of patients from one hospital.
2. Clarke C, Friedman SM, Shi K, Arenovich T, Monzon J, Culligan C. Emergency department discharge instructions comprehension and compliance study. CJEM. 2005 Jan;7(1):5-11. doi: 10.1017/s1481803500012860.	To assess patient comprehension of ED discharge instructions and to describe other predictors of patient compliance with discharge instructions	88 adult patients who attended the ED for all causes and were not admitted to hospital	Age, English as a first language, reading level, years of education, years residing in English-speaking country	In person interviews when patients were discharged from the ED and then phone interview 2 weeks after discharge. # of questions: not stated. Response rate: 83%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Higher comprehension scores were significantly associated with English as first language and with higher reading ability	Small sample size of patients from a single hospital. Only examined correlation coefficients but did not construct a risk-adjustment model.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
3.Coleman EA, Chugh A, Williams MV, Grigsby J, Glasheen JJ, McKenzie M, Min SJ. Understanding and execution of discharge instructions. Am J Med Qual. 2013 Sep-Oct;28(5):383-91. doi: 10.1177/1062860612472931.	To explore factors that predict understanding and execution of discharge instructions	237 patients 55 or older hospitalized for all causes	Health literacy, cognition, self-efficacy, sex, marital status	In person interview before discharge and another one week after discharge. # of questions: not stated. Response rate: 48%	Responses were transformed linearly and summed to create a continuous outcome ranging from 0-23.	Lower health literacy, self-efficacy, and cognition were all significantly associated with lower levels of understanding.	Small sample size of patients from a single hospital.
4.Engel KG, Buckley BA, Forth VE, McCarthy DM, Ellison EP, Schmidt MJ, Adams JG. Patient understanding of emergency department discharge instructions: where are knowledge deficits greatest? Acad Emerg Med. 2012 Sep;19(9):E1035-44. doi: 10.1111/j.1553-2712.2012.01425.x.	To further characterize the deficits and identify gaps in knowledge that may place ED patients at risk for complications or poor outcomes after discharge.	159 ED patients 18 or older discharged from the ED for either ankle sprain, back pain (muscle strain), head injury, kidney stone, or laceration (closed with staples or stitches)	None	Telephone survey 24-36 hours after discharge from the ED. # of questions: 5. Response rate: 52%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Patients who reported reading their discharge instructions were found to be less likely to demonstrate knowledge deficits. Knowledge deficits were most common for head injury and back pain.	Small sample size of patients from a single hospital. Did not construct a risk-adjustment model. Did not examine how knowledge differed by patient characteristics.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
5.Engel KG, Heisler M, Smith DM, Robinson CH, Forman JH, Ubel PA. Patient comprehension of emergency department care and instructions: are patients aware of when they do not understand? Ann Emerg Med. 2009 Apr;53(4):454-461.e15. doi: 10.1016/j.annemergmed.2008.05.016.	To assess, at discharge, patients' comprehension of their ED care and instructions and their awareness of deficiencies in their comprehension	140 adult ED patients or caregivers admitted for all causes	None	In person or telephone interviews within 24 hours of discharge. # of questions: 41. Response rate: 40%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	78% of patients demonstrated a comprehension deficiency in at least 1 domain of their ED visit, most often post-ED care.	Small sample size of patients from two hospitals. Did not construct a risk-adjustment model. Did not examine how knowledge differed by patient characteristics.
6.Erlang AS, Schjødt K, Linde JKS, Jensen AL. An observational study of older patients' experiences of involvement in discharge planning. Geriatr Nurs. 2021 Jun 2;42(4):855-862. doi: 10.1016/j.gerinurse.2021.04.002	To describe older medical patients' experiences of involvement in discharge planning	210 patients hospitalized for all causes	Age, sex, length of stay, Charlson Comorbidity Index	Patients filled in an electronic or printed questionnaire during hospitalization the day before or the day of discharge. # of questions: 24. Response rate: 79%	Responses were transformed linearly and summed to create domain scores	No convincing associations between age and comorbidities and the subjective experience of high involvement in the discharge process.	Denmark is more homogenous and has a national health system so findings may not be as applicable. Small sample size of patients from a single hospital.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
7.Flacker J, Park W, Sims A. Hospital discharge information and older patients: do they get what they need? J Hosp Med. 2007 Sep;2(5):291-6. doi: 10.1002/jhm.166.	To describe patient recall of predischage communication of discharge instructions by hospital staff, and to demonstrate the feasibility a posthospitalization survey in this population	269 patients age 70 years or older who were discharged from a hospital for all causes	None	Telephone interviews conducted between 1-10 days after discharge. # of questions: 37. Response rate: 100%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Patients who received both verbal and written instructions were more likely to report that they understood the care instructions "very well" versus "somewhat" or "very little"	Small sample size of patients from a single hospital. Did not construct a risk-adjustment model. Did not examine how knowledge differed by patient characteristics.
8.Hastings SN, Barrett A, Weinberger M, Oddone EZ, Ragsdale L, Hocker M, Schmader KE. Older patients' understanding of emergency department discharge information and its relationship with adverse outcomes. J Patient Saf. 2011 Mar;7(1):19-25. doi: 10.1097/PTS.0b013e31820c7678.	To describe older patients' understanding of emergency department (ED) discharge information and to explore the relationship between understanding of ED discharge information and adverse outcomes.	92 patients 65 years or older admitted to the ED for all causes	None	Telephone interviews within 72 hours of discharge from the ED, follow up telephone interviews at 14 and 90 days after discharge. # of questions: not stated. Response rate: 46%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Patients were significantly less likely to understand their diagnosis, symptom duration, or instructions as time went on	Small sample size of patients from a single hospital. Did not construct a risk-adjustment model. Did not examine how understanding differed by patient characteristics.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
9.Hastings S, Stechuchak K, Oddone E, Weinberger M, Tucker D, Knaack W, Schmader K. Older veterans and emergency department discharge information. BMJ Qual Saf. 2012 Oct;21(10):835-42. doi: 10.1136/bmjqs-2011-000538.	To assess older veterans' understanding of their ED discharge information and to determine the association between understanding discharge information and patient assessment of overall quality of care.	305 Veterans Affairs patients 65 or older discharged from the ED for all causes.	Age, race, education, lives alone, health literacy, self-rated health, comorbidities, use of a proxy respondent, ADLs, history of ED or hospital use, weekend visit, evening/night arrival at ED, nurse triage score	Telephone survey 48 hours after discharge from the ED. # of questions: not stated. Response rate: 72%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	No statistically significant associations between patient attributes and incomplete perceived understanding of the contingency plan, although lower education level may have been associated with worse understanding if the sample size had been larger	Small sample size of patients from a single hospital. Only examined correlation coefficients but did not construct a risk-adjustment model.
10.Henderson A, Zernike W. A study of the impact of discharge information for surgical patients. J Adv Nurs. 2001 Aug;35(3):435-41. doi: 10.1046/j.1365-2648.2001.01857.x.	To establish whether the routine information surgical patients receive about the management of pain and wound care during their hospitalization is sufficient for them to care for themselves without seeking assistance from a health professional or health care agency	158 patients hospitalized for an acute or elective abdominal or colorectal surgical procedure	Age, sex, type of surgery, length of stay	Patients completed 2 surveys. The first was a paper survey within 24 hours of discharge and the second was a telephone survey 1-2 weeks after discharge. # of questions: 4. Response rate: 76%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	91% thought information about pain and wound care was sufficient at discharge but this dropped to 83 and 78%, respectively, 1-2 weeks after discharge.	Smaller sample size and only limited to two types of surgeries. Does not include risk-adjustment model to see if patient characteristics impact responses.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
11.Karliner LS, Auerbach A, Nápoles A, Schillinger D, Nickleach D, Pérez-Stable EJ. Language barriers and understanding of hospital discharge instructions. Med Care. 2012 Apr;50(4):283-9. doi: 10.1097/MLR.0b013e318249c949.	To investigate the association of a language barrier with patient understanding of discharge instructions	308 adult patients hospitalized in the general medical or surgical floors	Primary language, sex, age, education, insurance, comorbidities, number of appointments, medication history	The first survey was in person during the hospitalization and the second was a telephone survey 2 weeks after discharge. # of questions: not stated. Response rate: 50%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Chinese or Spanish speaking patients were significantly less likely than English speaking patients to understand information in their discharge instructions related to medications. This relationship was strongest for patients with the lowest level of education.	Small sample size of patients from two hospitals.
12.Lin MJ, Tirosh AG, Landry A. Examining patient comprehension of emergency department discharge instructions: Who says they understand when they do not? Intern Emerg Med. 2015 Dec;10(8):993-1002. doi: 10.1007/s11739-015-1311-8.	To evaluate patients perceived understanding of their discharge instructions from an ED	75 adult patients admitted to the ED for abdominal pain, chest pain, and nausea and vomiting	age, gender, race/ethnicity, highest level of education achieved, literacy, income, insurance, reason for ED visit, and medical diagnosis	Written survey conducted when the patient was discharged. # of questions: 23. Response rate: not stated.	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Male patients and patients with higher education levels had higher perceived levels of understanding but the sample was too small to test for significance	Small sample size of patients from a single hospital. Did not construct a risk-adjustment model.

Citation	Study Objective	Study Population	Patient Characteristics	Survey (Timing, Modes, # Questions, Response Rate)	Scoring Methodology	Main Finding	Limitations
13.Makaryus AN, Friedman EA. Patients' understanding of their treatment plans and diagnosis at discharge. Mayo Clin Proc. 2005 Aug;80(8):991-4. doi: 10.4065/80.8.991.	To ascertain whether patients knew their discharge diagnoses, treatment plan, and common side effects of prescribed medications	43 adult patients hospitalized for all causes	Age, sex	In person survey at discharge. # of questions: 4. Response rate: not stated	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	72% of patients were not able to list the names of all their medications and even less could list the side effects. There was a trend toward women tending to recall the correct answers more than men but this was not significant due to small sample size.	Small sample size of patients from a single hospital. Did not construct a risk-adjustment model.
14.Smith PC, Brice JH, Lee J. The relationship between functional health literacy and adherence to emergency department discharge instructions among Spanish-speaking patients. J Natl Med Assoc. 2012 Nov-Dec;104(11-12):521-7. doi: 10.1016/s0027-9684(15)30218-2.	To investigate associations between functional health literacy and ED discharge instruction adherence in Spanish-speaking populations, and compare the ED adherence rates of Spanish speakers to English speakers.	50 Spanish-speaking adult patients matched with a like number of English-speaking adult patients, for a total of 100 patients admitted for all causes	Age, health insurance status, education level, functional health literacy, self-reported health, income level, household size, own a car, own a phone, on food stamps, type of residence	Telephone interview within 12 days of discharge from the ED. # of questions: not stated. Response rate: 69%	Scores on individual responses were analyzed, no composite measure or top-box approach was used.	Functional health literacy as associated with higher rates of patient understanding of instructions. 62% of Spanish speakers were in the low to marginal FHL level, while only 2% of English speakers had low FHL	Small sample size of patients from a single hospital. Only examined correlation coefficients but did not construct a risk-adjustment model.

Table 2. Summary of Related Measures from the Environmental Scan

Specification	PROM-ED	OAS CAHPS	HCAHPS	S-CAHPS	ED CAHPS
Measure Steward	St. Michael's Hospital	CMS	CMS	American College of Surgeons	CMS
NQF #, endorsed	No: Not submitted still in development	CMIT ID: 2931, Endorsed: No	NQF ID: 0166, Endorsed: Yes	NQF ID: 1741, Endorsed: Yes	No
Survey Type	Electronic	Paper	Paper	Paper	Paper, telephone, and electronic
Cohort					
Eligible patients	18 and over and received care in an ED in the last 90 days.	18 and over who had both medically and non-medically necessary surgeries and/or procedures	18 and over admitted in the medical, surgical and maternity care service lines	Patients 18 and over undergoing a major surgery within 3 to 6 months prior to the start of the survey	18 and over and received care in an ED and then discharged home
Exclusions	Not detailed	1) children under 18; 2) patients with no outpatient surgery or procedure in a hospital as defined in OAS CAHPS Protocols and Guidelines; 3) patients that reside in a nursing home; 4) a prisoner; 5) patient requested that ASCs not release their name and contact info; 6) patients whose address is not a U.S. domestic address; 7) patient who cannot be surveyed because of State regulations; 8) patient's survey or procedure does not meet the eligibility CPT or G-codes; 9) patients who are deceased.	1) No-Publicity patients; 2) Patients discharged to hospice; 3) Patients who are excluded because of state regulations; 4) Patients discharged to nursing homes and skilled nursing facilities; 5) Discharged/transferred to court/law enforcement with a planned acute care hospital inpatient readmission; 6) Patients with a foreign home address	(1) Surgical patients whose procedure was greater than 6 months or less than 3 months prior to the start of the survey; (2) Surgical patients younger than 18 years old; (3) Surgical patients who are institutionalized (e.g., psychiatric facility, nursing facility, or imprisoned) or deceased; (4) Surgery performed had to be scheduled and not an emergency procedure	1) children under 18; 2) patients not discharged to home; 3) patients admitted to the hospital from the ED; 4) patients who left the ED without being seen and did not receive a billing code; 5) patient who died in the ED; 6) patients who request that they not be contacted; 7) prisoners; 8) patients with a foreign home address; 9) patients excluded because of state regulations that place further restrictions on who may be contacted after discharge

Specification	PROM-ED	OAS CAHPS	HCAHPS	S-CAHPS	ED CAHPS
Outcome	Score on 4 domains: symptom relief, understanding, feeling reassured, having a plan	A global rating from 0-10 and composite scores for domains	Linear score on the survey and composite score using star ratings	A global rating from 0-10 and composite scores for domains	Linear score on the survey and composite score
Minimum Sample Requirement	Not defined	300 surveys in a year	100 surveys in a year	Not defined	375 surveys in a year
Measurement window	90 days from prior ED visit	60 days from surgery/procedure date	48 hours to 6 weeks after hospital discharge	Not defined	48 hours to 35 days after hospital discharge
Risk-adjustment variables	Not developed yet	surgery type, self-rated health, overall mental health, age, education, and how well the patient speaks English	Education, self-rated health, language, age, sex, surgical line, maternity line, and response percentile	Age self-rated health	Age, education, self-rated health, language, reason for the ED visit, whether the patient was taken to the ED in an ambulance, whether the patient had a proxy answer for them, whether the patient used proxy assistance in some way other than answering for them, and response percentile
Public Reporting	No	Yes, on a voluntary basis	Yes	No; CMS has not yet finalized the public reporting plans for the measure	No