TRICARE INPATIENT SATISFACTION SURVEY (TRISS)

Annual Report of Findings for Fiscal Year 2015

September 2015

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GS-23F-8039H HT0011-14-R-0037

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Contents

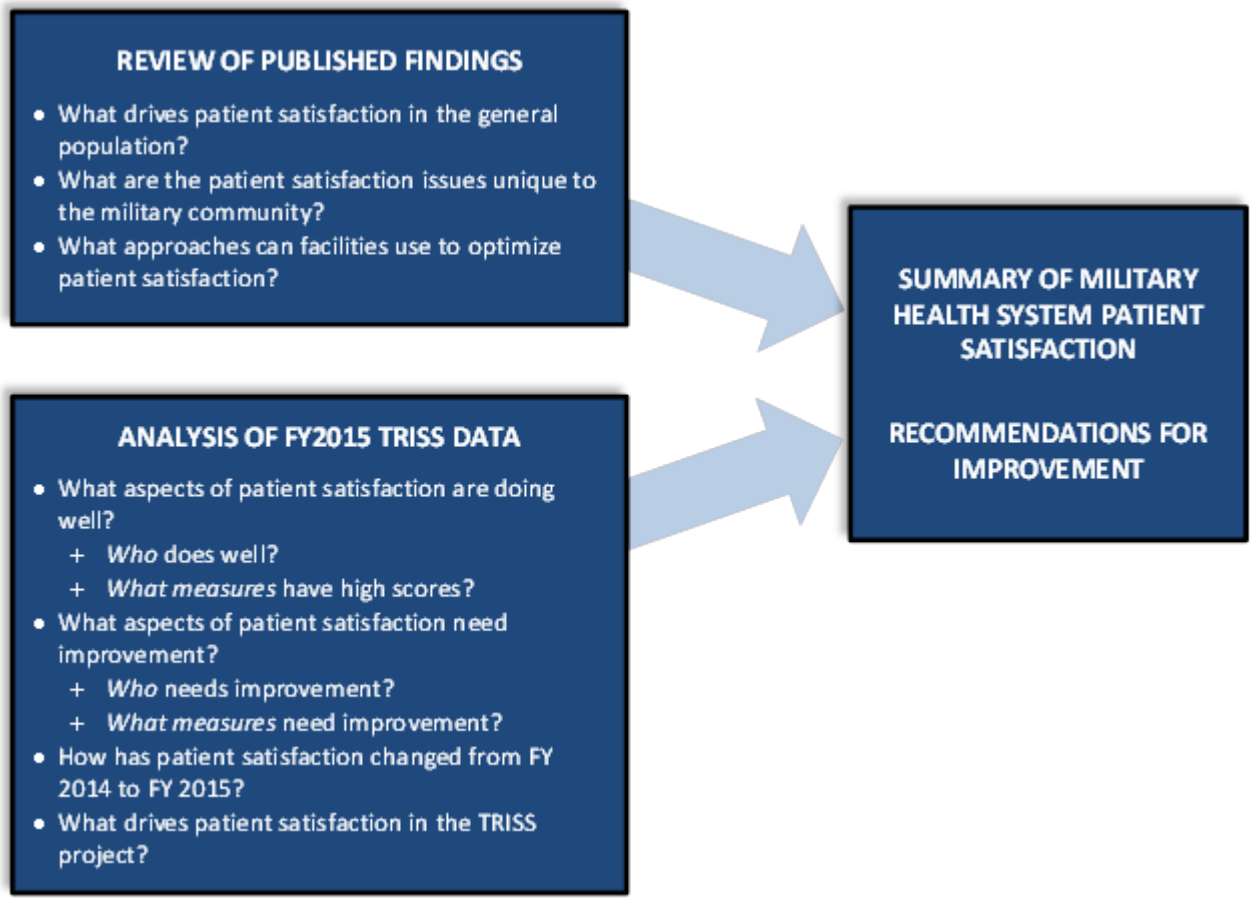
List of Figures

List of Tables

1 EXECUTIVE SUMMARY

The purpose of the Office of the Assistant Secretary of Defense/Defense Health Agency TRICARE Inpatient Satisfaction Survey (TRISS) is to monitor and report on the experience and satisfaction of Military Health System's (MHS) beneficiaries that were admitted to MHS Direct Care (DC) military treatment facilities (MTFs) or its civilian network/Purchased Care (PC) civilian hospitals. The survey instrument incorporates the questions developed by the Agency for Health Care Research and Quality (AHRQ) and the Centers for Medicare and Medicaid Services (CMS) for the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) initiative.

The goal of the HCAHPS initiative is to uniformly measure and publicly report patients' experience with inpatient care through the use of a standardized survey instrument and data-collection methodology. This report summarizes the data from TRISS for the first and second quarters of FY 2015. Results can be used to drive internal quality improvement initiatives, assess the impact of changes in operating procedures, and provide feedback to providers and patients (section 1.4).



This report summarizes survey results from 33,963 TRICARE inpatients of whom 21,905 received care in 58 MTFs and 12,058 received care in 73 PC network hospitals. The 33,963 responses constitute response rates of 39% (Direct Care) and 45% (Purchased Care).

The beneficiaries were discharged between October 2014 and June 2015. We administered the TRISS survey to a random sample of discharge adult patients, 18 years of age and older, across medical conditions using two different survey modes initially: mail with telephone follow-up. For DC patients,

their surveys were administered up to 6 weeks (42 days) after discharge in compliance with the HCAHPS standard. This standard did not apply to PC patients.

Comparison of these results with the results from previous surveys as well as comparisons with civilian benchmark data provides insights into the Department of Defense's (DoD) progress in meeting its goals for patient satisfaction and high-quality health care. The current report provides analysis results of beneficiary survey responses in the following areas:

- Overall rating of hospital and willingness to recommend hospital.
- Nursing Care (courtesy, respect, listening and explanations).
- Doctor Care (courtesy, respect, listening and explanations).
- Communication (with nurses, doctors and about medications).
- Responsiveness of staff.
- Pain management.
- Hospital environment (clean and quiet).

Comparison of these results with the results from previous surveys as well as comparisons with civilian benchmark data will measure the DoD's progress in meeting its goals and objectives of high-quality health care. The TRISS report of findings analyzes these data:

- MHS-wide (DC and PC combined).
- By DC and PC separately.
- By TRICARE Regions.
- By Beneficiary Category.

1.1 Respondent Overview

This report is based on responses from 33,963 patients who visited MTFs or a PC network facility between October 2014 and March 2015 (Q1 and Q2 of FY 2015). There are striking differences in the demographics profiles of Direct Care and Purchased Care patients (section 5.1). For example, where Direct Care patients are roughly evenly distributed across age brackets, the Purchased Care population consists of a much larger proportion of older patients (65+; 59% in Purchased Care versus 20% in Direct Care). Accordingly, the Purchased Care sample contains a higher proportion of older retirees (similarly, 59% in Purchased Care versus 20% in Direct Care). Both care types (DC and PC) include more women than men, and the difference is more pronounced in DC than PC.

The results reported here have been adjusted for differences in demographic profiles among the facilities. Therefore, differences in age and gender between facilities or Care Type (Direct Care or Purchased Care) should not impact the results when considered at a facility level or Care Type. See section 4.3.5 for a discussion of how the data is adjusted for differences in patient profiles among facilities.

1.2 Key Findings

- ❖ Response rates for TRISS are 39% (Direct Care) and 45% (Purchased Care), higher than the U.S. average response rate for HCAHPS reported by CMS (31%).
- ❖ MHS patient satisfaction ratings met or exceeded the national benchmark on all 11 HCAHPS measures (table 13).
- ❖ Patients report the highest satisfaction on Discharge Care and Communication with Doctors measures (table 13).
- ❖ Direct Care users report higher satisfaction than Purchased Care users on most measures (table 13).
- ❖ Direct Care obstetrics patients report significantly higher satisfaction in FY 2015 than in FY 2014 (figure 36).
- ❖ Purchased Care South Region users report significantly lower satisfaction in FY 2015 than in FY 2014 (figure 33).
- ❖ Purchased Care medical patients report lower satisfaction in FY 2015 than in FY 2014 (figure 38).
- ❖ Direct Care users report significantly higher satisfaction with all of the communication, Responsiveness of Hospital Staff and Discharge Information measures, compared to the benchmarks (table 13).
- ❖ Purchased Care users report significantly lower satisfaction with Communication with Doctors, Responsiveness of Hospital Staff and Quietness of Hospital when compared to the benchmarks (table 13).
- ❖ Purchased Care users report higher satisfaction with Discharge Information when compared to the benchmark (table 13).

I. **Many beneficiaries were receptive to the TRISS efforts, yielding response rates of 39% among Direct Care users and 45% among Purchased Care users.**

The validity of the survey depends on achieving a representative sample of TRICARE beneficiaries. The TRISS response rates are above the HCAHPS US average of 31% reported by CMS in July 2015 (http://www.hcahpsonline.org/Files/Report_July_2015_States.pdf). More information on FY 2015 response rates can be found in section 4.3.1.

II. **For the MHS as a whole, patients rated satisfaction as equal or higher than the HCAHPS benchmarks (figure 11, shown on next page).**

MHS users as a whole (MHS Overall) reported statistically greater satisfaction than HCAHPS benchmark on five measures:

- Communication with Nurses.
- Communication with Doctors.
- Responsiveness of Hospital Staff.
- Communication about Medicines.
- Discharge Information.

Direct Care users also rated their satisfaction significantly above the HCAHPS benchmarks on the five measures listed above. Because Direct Care users make up two-thirds of the overall sample, the overlap between MHS overall and Direct Care user ratings is not surprising.

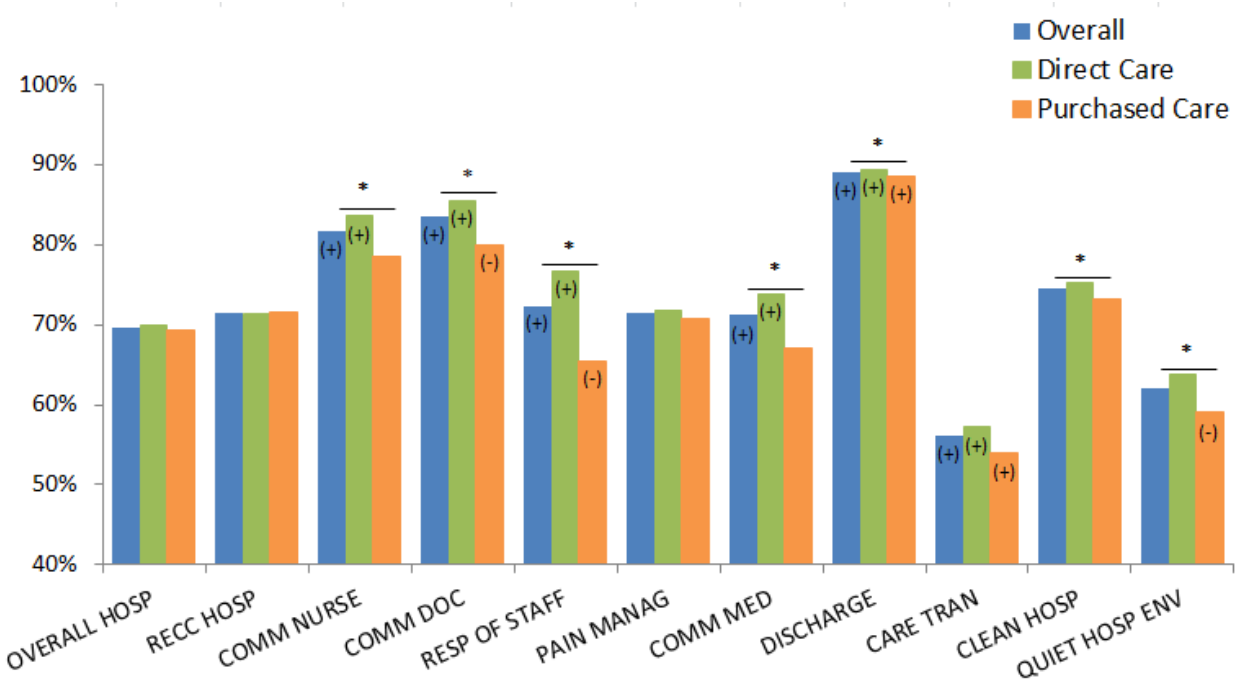
Purchased Care users rated facilities higher than the HCAHPS benchmark on the Discharge Information measure. Purchased Care users reported satisfaction lower than benchmarks on three measures:

- Communication with Doctors.

- Responsiveness of Hospital Staff.
- Quietness of the Hospital Environment.

Scores for Purchased Care users did not differ from the benchmarks on the remaining seven measures.

Figure 11 of the main text of the report is shown below. Here, plus signs (+) indicate that the score is below the benchmark, and minus signs (-) indicate a score below the benchmark. Asterisks (*) denote significant differences in scores between DC and PC users.



III. **Direct Care users gave higher satisfaction ratings than Purchased Care users on seven measures (table 13 and figure 11).**

- Communication with Nurses.
- Communication with Doctors.
- Responsiveness of Hospital Staff.
- Communication about Medicines.
- Discharge Information.
- Cleanliness of Hospital Environment.
- Quietness of Hospital Environment.

There is no difference between Direct and Purchased Care facilities on the remaining four measures (Overall Hospital Rating, Recommend the Hospital, Pain Management, and Care Transition).

IV. **Direct Care Obstetrics users reported *higher* satisfaction in FY 2015 than in FY 2014 (figure 36). Purchased Care Medical users (figure 38) and Purchased Care South Region users reported *lower* satisfaction in FY 2015 than in FY 2014 (figure 33).**

On average, Direct Care users reported significantly higher satisfaction on both global measures (Overall Hospital Rating and Recommend the Hospital) between FY 2014 and FY 2015. The satisfaction ratings of Direct Care users decreased significantly on three measures; the scores for these three measures were at or above HCAHPS benchmarks in FY 2015 in spite of the decrease from FY 2014. The satisfaction ratings of Purchased Care users significantly decreased on 8 of the 11 summary measures over the same period.

The difference between FY 2015 and FY 2014 scores are shown below for Direct Care (figure 26) and Purchased Care (figure 27).

Difference in HCAHPS scores between FY2015 and FY2014
Direct Care and Purchased Care

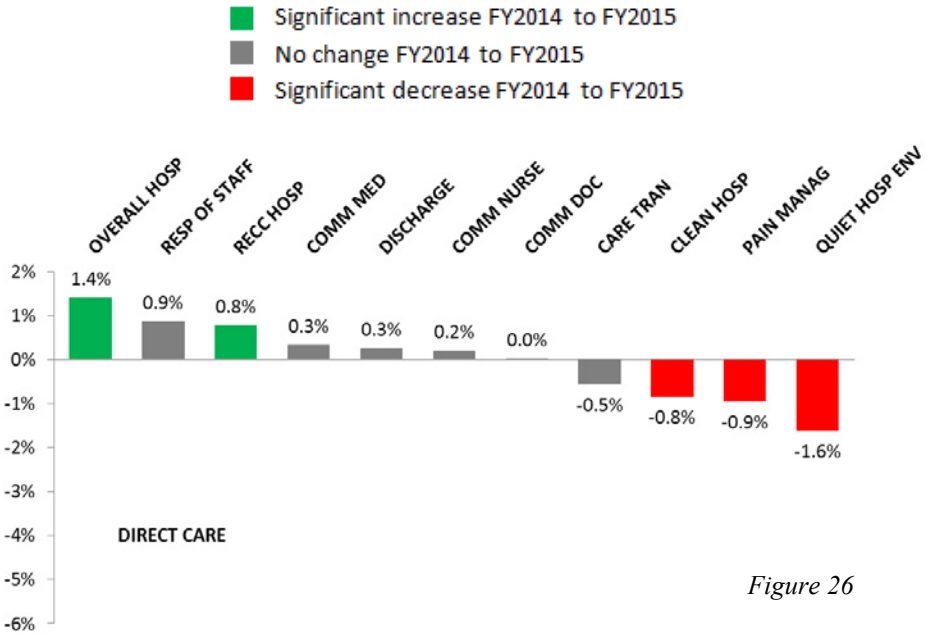


Figure 26

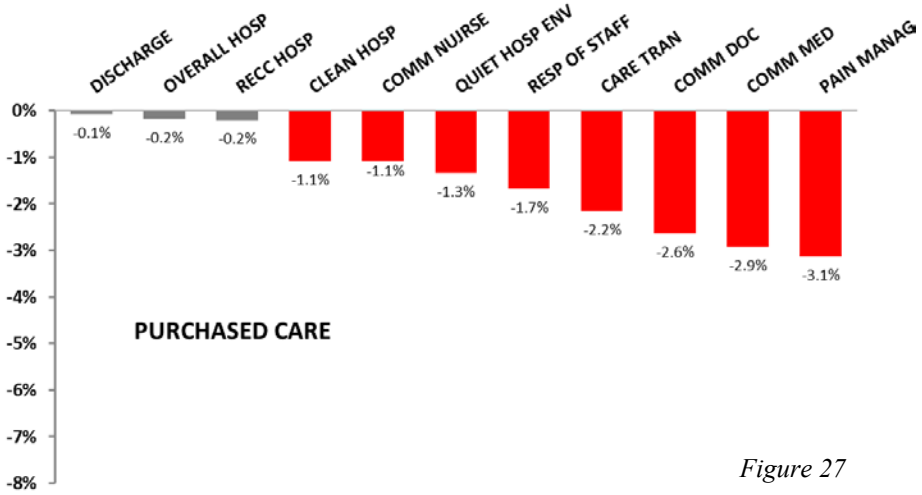


Figure 27

Scores from Purchased Care TRO South users show the greatest decline in scores, compared to TRO North and TRO West, as can be seen in the next three graphs (figure 32 through figure 34).

Difference in HCAHPS scores between FY2015 and FY2014 by Purchased Care Region.

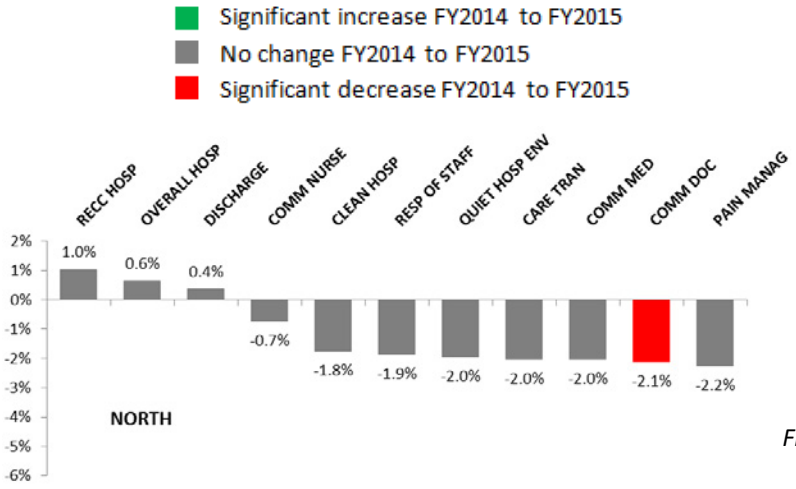


Figure 32

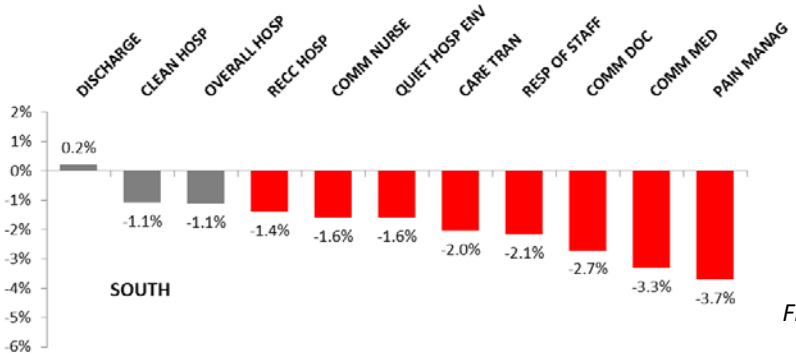


Figure 33

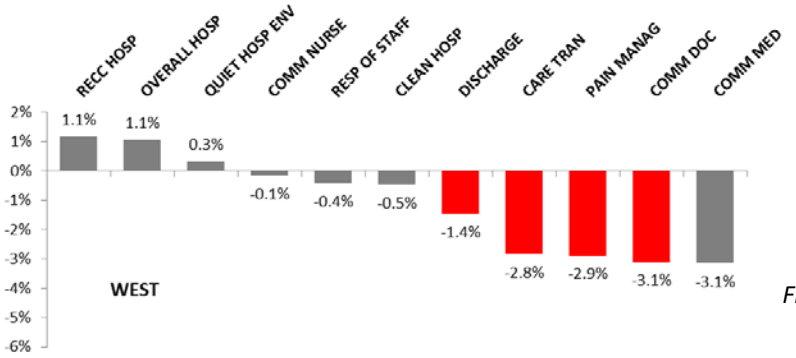


Figure 34

Similar comparisons were made among Direct Care service branches (Army, Navy, and Air Force) and NCR facilities. Although scores from NCR patients showed improvement on more measures than the service branches, the facility categories did not exhibit large differences in score trends.

However, patient scores from the three product lines show differences in the trend analyses. The set of graphs on the next page illustrate that (1) the Purchased Care medical patients gave considerably lower scores across the two years and (2) the Direct Care obstetric patients gave higher scores across the 2 years.

Difference in HCAHPS scores between FY2015 and FY2014
Direct Care (DC) and Purchased Care (PC) by Product Line

Significant increase FY2014 to FY2015
No change FY2014 to FY2015
Significant decrease FY2014 to FY2015

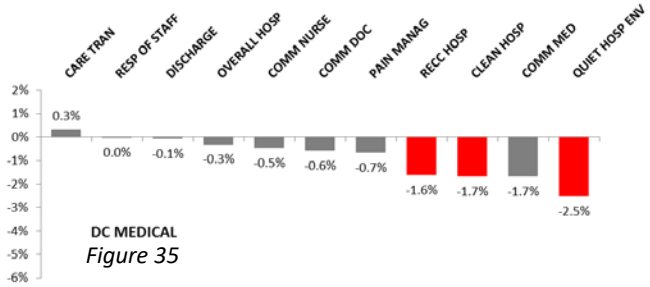


Figure 35

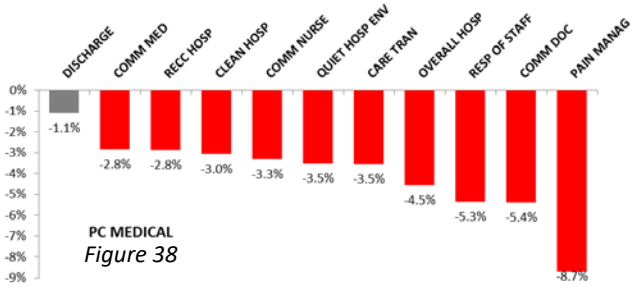


Figure 38

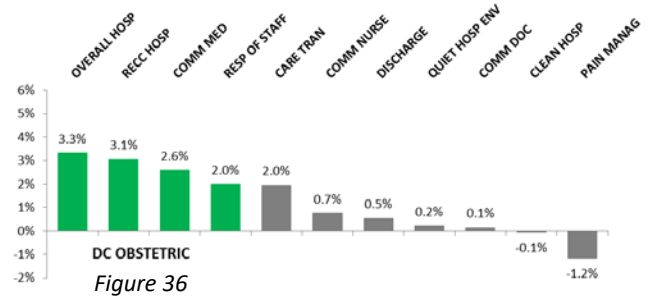


Figure 36

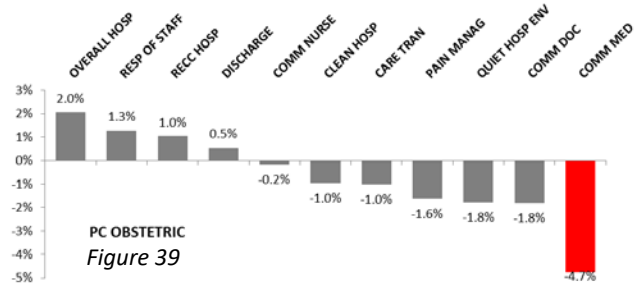


Figure 39

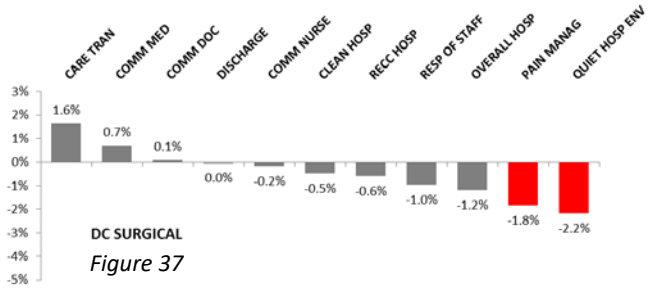


Figure 37

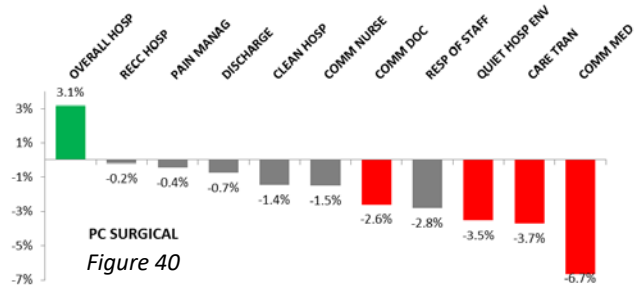


Figure 40

V. **The patients in the Medical, Surgical and Obstetric product lines report differing levels of patient satisfaction for Direct Care and Purchased Care in terms of HCAHPS scores (figure 13 through figure 23).**

Among Direct Care facilities, the Surgical patients gave the highest scores, followed by Medical patients, then Obstetrics patients. Surgical patient scores are significantly above the benchmark on all HCAHPS measures. As noted above, Obstetrics patients exhibit the most improvement year-to-year.

Among Purchased Care facilities, Obstetrics patient scores are the highest, followed by Surgical, then Medical. As described above, scores for the Medical patient decreased on 10 of the 11 HCAHPS measures.

VI. **HCAHPS scores vary by age and beneficiary category among Direct Care facilities but <u>not</u> among Purchased Care facilities (figure 13 through figure 23).**

Satisfaction scores generally increase with age for the Direct Care population, such that younger patients give lower ratings than older patients. In addition, retirees and their dependents in Direct Care give higher ratings than Active Duty members. These trends are not apparent in Purchased Care, although differences in the age distribution between the two Care Types may account for differences in the patter of results. Purchased Care consists of a larger proportion of older patients, and therefore the effect of age on scores may be less apparent.

VII. **Direct Care users give strong scores for measures related to healthcare provider communication, whereas Purchased Care user exhibit mixed results on these measures.**

A review of relevant scientific literature underscores the importance of communication measures, particularly **Communication with Doctors** and **Communication with Nurses**, in overall patient satisfaction (See section 3.3 of the literature review). Scores from Direct Care users are high in these areas, with scores significantly above the HCAHPS benchmarks on both measures (see section 5.3.3).

Purchased Care user report satisfaction that is significantly *lower* than the benchmark for Communication with Doctors. Purchased Care users report satisfaction on par with the benchmark for Communication with Nurses (section 5.3.3). Patient scores are below the benchmark on both Communication with Doctors and Communication with Nurses for two patient segments within Purchased Care: (1) patients that report that they are in "poor", "fair" or "good" health and (2) patients within the Medical product line.

VIII. **Communication measures, Pain Management and Care Transition are strong determinants of overall patient satisfaction.**

An analysis of patient satisfaction drivers was conducted to understand the impact that HCAHPS measures have on the two global measures (Overall Hospital Rating and Recommend the Hospital). See section 5.5 for a discussion of these results.

Among both Direct Care and purchased Care users, the strongest drivers of Overall Hospital Rating were **Communications with Nurses, Care Transition, Pain Management and Communication with Doctors**.

1.3 Top-Performing Facilities

Seven Direct Care facilities stand out as "top performers," scoring in the 75th percentile or higher on the two global HCAHPS measures: Overall Hospital Rating and Recommend the Hospital. Percentile rankings of Direct Care facilities are shown in figure 3 (Overall Hospital Rating) and figure 4 (Recommend the Hospital). The following seven facilities include two NCR hospitals, two Air Force hospitals, two Navy hospitals, and one Army hospital:

- Keesler Medical Center (81st Medical Group) (Air Force).
- Fort Belvoir Community Hospital (formerly DeWitt Army Community Hospital) (NCR).
- Naval Hospital Guam (Navy).
- Walter Reed National Medical Center (NCR).
- Naval Hospital Pensacola (Navy).
- Wright Patterson Medical Center (88th Medical Group) (Air Force).
- Brooke Army Medical Center (Army).

Eighteen Purchased Care facilities stand out as top performers, scoring in the 75th percentile or higher on the two global HCAHPS measures. Percentile rankings of Purchased Care facilities are shown in figure 5 (Overall Hospital Rating) and figure 6 (Recommend the Hospital). The following 18 facilities include 6 North Region hospitals, 6 South Region hospitals, and 6 West Region hospitals:

- University of North Carolina Hospitals (North Region).
- Mercy Hospital Springfield (West Region).
- St. Luke's Regional Medical Center (West Region).
- University of Colorado Hospital (West Region).
- Sharp Memorial Hospital (West Region).
- Flowers Hospital (South Region).
- Vanderbilt University Hospital (South Region).
- Vidant Medical Center (North Region).
- FirstHealth Moore Regional Hospital (North Region).
- Community Hospital of the Monterey Peninsula (West Region).
- New Hanover Regional Medical Center (North Region).
- Sacred Heart Medical Center (South Region).
- Inova Fairfax Hospital (North Region).
- Sentara Norfolk General (North Region).
- Baptist Medical Center (FL) (South Region).
- Huntsville Hospital (South Region).
- University of Alabama Hospital (South Region).
- Penrose Hospital, CO (West Region).

1.4 Recommendations

We present recommendations for optimizing patient satisfaction within the MHS, developed from a synthesis of existing research (section 3) and findings from the presented FY 2015 TRISS data. Recommendations are based on our understanding of (1) areas in need of improvement, (2) the impact that various aspects of patient experience exert on overall satisfaction, (3) healthcare considerations of the military community, and (4) strategies that have demonstrated success in improving satisfaction scores.

- ❖ Recommendation 1: Encourage programs to improve Responsiveness of Hospital Staff scores, especially among Purchased Care facilities.
- ❖ Recommendation 2: Alleviate noise to improve scores on Quietness of the Hospital Environment, especially among Purchased Care facilities.
- ❖ Recommendation 3: Encourage patient communications training for healthcare providers.
- ❖ Recommendation 4: Encourage practices that optimize care transition.
- ❖ Recommendation 5: Better understand why patient satisfaction is lower for Purchased Care facilities than Direct Care facilities and between surgical, medical, and obstetric product lines.
- ❖ Recommendation 6: Increase the level of information-sharing among Tricare providers, providing greater stability in the care received by TRICARE beneficiaries.

Recommendation 1: Encourage programs to improve Responsiveness of Hospital Staff scores, especially among Purchased Care facilities.

Purchased Care users report significantly lower scores than the CMS benchmark on Responsiveness of Hospital Staff (figure 11) and was one of only three measures with a score below the benchmark. Further, this measure consistently emerges as a statistically significant driver of both Overall Hospital Rating and Recommend the Hospital (section 5.5). Therefore, efforts to enhance Staff Responsiveness can both help Purchased Care facilities improve care and drive overall patient satisfaction.

Concrete actions that decrease wait time for patient requests and facilitate hospital staff attentiveness (particularly nurse attentiveness) can help improve these scores. Two institutes within the Cleveland Clinic saw notable increases in Staff Responsiveness scores after implementing "purposeful nurse rounding." Purposeful rounding places an emphasis on the patient's needs and takes a proactive approach to patient care. Specifically, patients are visited by nursing personnel every hour during the day and every 2 hours at night. Importantly, patients are told of the regime and why the regime is in place. In addition, purposeful rounding emphasizes the "Four Ps:"

- **Potty**: Checking on the need for patient trips to the bathroom to avoid falls and other unsafe conditions;
- **Position**: Making sure patients are comfortable and assessing the risk of pressure ulcers;
- **Pain**: Asking patients to describe their pain level on a scale of 0 to 10; and
- **Placement**: Making sure the items patients need are within easy reach, such as water, tissues, the TV remote control, and the telephone.

Also, the call button plays an important part in a patient's hospital experience. The primary reason calls are made is for toileting assistance followed by requests for pain medication and intravenous problems (Tzeng, 2010). Aside from these practical reasons for using the call button, the use of the call light is one of the only ways that a patient can exert control over their care (Deitrick et al., 2006).

While length of response time is often assumed to be the most important aspect of call button response, Deitrick et al. (2006) cites three components of patient satisfaction in regards to the call button:

1. Answering the call button.
2. Communicating the patient's request.
3. Following through with that request.

In order for patients to perceive call button response experience as positive, these three aspects need to be seen as satisfactory. Hospitals should also consider the following steps to increase patient satisfaction surrounding the call button (Deitrick et al., 2006; Meade, Bursell, and Ketelsen, 2006; and Tzeng, 2010):

- Prevent the need for a call button by consistently and effectively rounding.
- Have a protocol in place in regards to who answers the call and how the call is responded to.
- Develop standards for measures of response times and communicate these standards with both patients and staff. On average, initial response to a call bell is usually under four minutes regardless of the time of day. To some patients this may seem excessive, while others may find this to be a quick response.
- Create a culture of importance for employees around call button response. By instilling a sense of importance to these calls, staff members would be more likely to tend to these calls more diligently.

Recommendation 2: Alleviate noise to improve scores on Quietness of the Hospital Environment, especially among Purchased Care facilities.

As with Responsiveness of the Hospital Staff, Purchased Care scores were below the benchmark on Quietness of the Hospital Environment. Noise in the hospital can be a stressor for patients. In addition, noise can impair sleep, which is important for recovery (Massachusetts General Physicians Organization, 2012). The primary sources of noise in the hospital setting include equipment noise, talking, general activity, alarms, overhead paging, and shared room noise (Wolf, 2012). Although these noises cannot be avoided altogether, efforts can be made to minimize them, particularly during designated "quiet times" when many patients are sleeping. The following protocols have been shown to help alleviate noisiness during "quiet time" in the hospital (Mass Gen, 2012 and Wolf, 2012):

- Lights are turned down.
- Overhead paging is minimized.
- Conversations in nursing stations and other areas are minimized.
- Headphones are used to listen to TV and music.
- Phone conversations are held only in designated areas.
- Clinical interventions (blood draws, vital signs) are minimized.
- Rounds moved to hours outside of quiet time.
- Notification of quite time, such as signs and reminders during rounds.

Patients and staff should be informed about expectations and changes to expectations (such as round times) during quiet hours.

Recommendation 3: Encourage patient communications training for healthcare providers.

Scores on Communication with Doctors, Communication with Nurses, and Communication about Medications all fell between FY 2014 and FY 2015 among Purchased Care facilities. In addition, Communication with Doctors is the single measure that fell for all three Purchased Care TRO regions. This measure is consistently among the top four drivers of the two global measures for both Direct Care and Purchased Care users (section 5.5), highlighting the importance of effective communication in overall patient satisfaction. Existing literature echoes our driver analysis (section 3.3.1 and section 3.3.2). Therefore, communication training for hospital staff may be beneficial to patient satisfaction scores both directly (by increasing communication-specific scores) and indirectly (by increasing global satisfaction scores). Although many segments of the MHS perform well on measures that assess communication, there is room for improvement.

Below are some of the interventions that have been proposed or have proven effective in improving communication with patients by physicians and nurses (Radtke, 2013; Robinson and Watters, 2010; Stahel and Butler, 2014; and Singh et al., 2010):

- Providers should avoid using clinical language as much as possible with patients and their families.
- Providers should formally introduce themselves, knock on the door before entering, make sure to never look at their watch, and end conversations with a summary of the key points. At the end of the conversation, they should thank patients and their families and ask if there are any questions or other needs. Notepads should be made available to patients and their families.
- Bedside shift reports can be used to pass information from a nurse to his/her successor at shift change. By having this discussion in the patient's presence, nurses provide valuable context for care to the patients. This approach has been shown to produce higher HCAHPS scores on nursing communication.

- Whiteboards can be used in patient rooms to track assigned physicians' names, schedule tests, outline goals of care, list patient questions and concerns, and state the anticipated discharge date.
- Even when information is communicated clearly, some patients may not be able to understand the information being presented by care staff or follow complex regiments. Hospitals can provide patient navigators to address this issue. These dedicated team members work with patients and their families throughout their visit to ensure that they understand what doctors and nurses are telling them, particularly in terms of the activities that the patients must perform.
- To ensure that they understand the information communicated to them, patients should be asked to repeat back what the physician or nurse has said, which can provide an effective measure of their comprehension.
- Several formal protocols (e.g., ALERT, AIDET, etc.) can teach communications skills to doctors and nurses and may be implemented at a facility level.

Recommendation 4: Encourage practices that optimize care transition.

Care Transition was found have a large impact on patient satisfaction in the current dataset (section 5.5). Effective care transition to an outpatient setting is dependent on (1) communication between providers and patients and (2) communication about medication management. Approximately half of all hospital-related medication errors and 20% of all adverse drug events have been attributed to poor communication at the transitions and interfaces of care (Dudas et al., 2005). Effective communication with inpatient providers and pharmacists may enhance the success of care transition. Pharmacists, although not directly responsible for day-to-day patient care in the in-hospital setting, play a significant role in reducing readmissions by monitoring medication regimen effectiveness and adherence during the inpatient experience. Medication management in consultation with a pharmacist has been found to be useful in identifying drug duplications, drug interactions, and reactions and medication errors (Wiggins et al., 2013).

In addition, Wiggins et al. (2013) identified educational techniques to patient understanding of health management when transition outside of the hospital setting:

- **Discharge counseling**: Education on discharge should be viewed as a continuous effort from the onset of the inpatient experience.
- **Emphasis on self-care**: This includes a patient's active participation in management of his/her disease by encouraging healthy lifestyle choice, adherence to medication management and physician recommendation, and self-identifying signs and symptoms of disease progression.
- **Employment of teach back methods**: Patients teach back to the physician discharge information to ensure retention of information.

Recommendation 5: Better understand why patient satisfaction is lower for Purchased Care facilities than Direct Care facilities and between surgical, medical, and obstetric product lines.

The statistically significant differences between Direct and Purchased Care (e.g., figure 11) and among the three product lines are noteworthy findings of the current report. The discrepancy between Direct and Purchased Care may due to differences in the hospital personnel profiles: Direct Care has far more military staff than Purchased Care. The dynamics between military patients and military healthcare personnel may have an important impact on patient satisfaction. Our review of military health research emphasizes the special needs of the military community, some which stem from sociocultural factors and some which stem from contextual factors of the military (section 3.2). Direct Care providers may be more familiar with these issues, as they are embedded within the military community. Increasing awareness among Purchased Care providers of the military community's healthcare needs may allow these facilities to optimize their care. For instance, some researchers suggest including military status on intake forms to ensure that staff is aware of the patient's military background. In addition, TRICARE beneficiaries should

be encouraged to share their military status with their providers, along with any associated healthcare information (injuries, behavioral health concerns, etc.).

Recommendation 6: Increase the level of information-sharing among TRICARE providers, providing greater stability in the care received by TRICARE beneficiaries.

Military personnel may experience frequent moves, thereby changing healthcare providers more often than the civilian population. Continuity in the facility and personnel involved in healthcare has been shown to support patient satisfaction (see section 3.2.1 of the literature review), but some military personnel and their families may be at a disadvantage in this respect. HCAHPS measures of provider communication (Communication with Doctors and Communication with Nurses) may particularly benefit from continuity, as familiarity between patients and providers may support communication.

Practices that increase continuity of care for patients that relocate frequently may therefore improve overall patient satisfaction. Healthcare providers may make a point to discuss a patient's history with previous providers. They may also play a role in ensuring that medical records are properly transferred between facilities that a patient has visited. These steps may help patients feel that they are in a stable healthcare system, even if they move geographically.

2 ABOUT TRISS

2.1 APPROACH

The TRICARE Inpatient Satisfaction Survey (TRISS) is managed by the Defense Health Agency (DHA). DHA is a joint, integrated Combat Support Agency that enables the Army, Navy, and Air Force medical services to provide a medically ready force and ready medical force to Combatant Commands in both peacetime and wartime. DHA supports the delivery of integrated, affordable, and high-quality health services to MHS beneficiaries. The DHA oversees TRISS as part of these efforts.

TRISS is designed to provide actionable performance feedback to improve overall quality of health care for adult beneficiaries. The main goals of the TRISS are to:

- Provide feedback from beneficiary users to DoD leadership so they may implement process improvement initiatives.
- Establish a uniform measure of beneficiary satisfaction with received healthcare services.
- Provide high-quality survey data for evaluating the satisfaction of MHS beneficiaries and access to health care services utilizing HCAHPS protocol.
- Satisfy Congressional requirements to measure perceptions of beneficiary satisfaction and access to care.

The survey instrument can be found in appendix D. The total length of the questionnaire is four pages and is heavily based on the HCAHPS survey. The survey asks recently discharged patients two global questions: to rank their overall satisfaction with the hospital from which they were discharged (Q21) and whether they would recommend the hospital to their family and friends (Q22). It also asks about their communication with healthcare providers and the responsiveness of hospital staff. In addition to HCAHPS questions, there are several questions have been added by DoD to assess and address specific areas of the military population's patient experience. These survey items are referred to as “DoD-specific questions” (Q26–Q35).

2.2 ABOUT HCAHPS

TRISS is modeled after the HCAHPS program. CMS and the Agency for Healthcare Research and Quality (AHRQ) developed HCAHPS to provide the first national, standardized, publicly reported survey of patients’ perspectives of hospital care. HCAHPS created a common metric and national standard for collecting and publicly reporting information about patient experiences of care.

Eleven HCAHPS measures (seven summary measures (referred to as “composites”), two individual items, and two global items) are publicly reported (see section 4.3.2 for details of TRISS scoring and calculation of composites). HCAHPS scores are based on four consecutive quarters of patient surveys and are publicly reported on the Hospital Compare website, www.medicare.gov/hospitalcompare.

CMS also provides “benchmark” scores for each of the 21 core items of the survey, derived from the average performance of the civilian facilities in the CMS database. Benchmarks are the standard target of performance against which hospitals are compared. Benchmarks for the 11 primary HCAHPS measures (7 composites, 2 individual items, and 2 global items) are shown in table 13 of section 5.2.

3 REVIEW OF PATIENT SATISFACTION AND MILITARY HEALTH RESEARCH

Patient satisfaction has become a major component to defining and measuring healthcare quality. This is exemplified by CMS's initiative to penalize hospitals for failing to meet certain thresholds of patient satisfaction, measured through HCAHPS survey. This survey provides a nationally representative means of comparing hospital experiences across a variety of domains, such as provider communication and environmental cleanliness. Given the multifaceted nature of defining patient satisfaction and the challenge that comes with defining this measure, a variety of research studies have been conducted to understand what drives patient satisfaction and how it relates to the goal of improving overall healthcare quality.

For special populations such as military personnel, general results on the drivers of patient satisfaction need to be properly contextualized to understand how to improve the health of that population. In this review, we explore themes of the military health experience, drivers of patient satisfaction, and the connection between satisfaction and health outcomes to better understand the health needs among military personnel.

Because there is little existing research that focuses specifically on patient satisfaction in the military setting, we reviewed research here on patient satisfaction in both the military and civilian settings. Unless otherwise noted, the findings reported refer to the civilian population. In addition, we incorporated findings from both inpatient and outpatient experiences. Special considerations for healthcare within the military community are addressed, and conclusions are based on a synthesis of civilian patient satisfaction findings and knowledge of healthcare issues specific to the military community.

3.1 Overview of HCAHPS

The Consumer Assessment of Healthcare Providers and Systems (CAHPS) is a survey instrument certified by AHRQ to gauge the patient experience of healthcare. These surveys assess quality of care, communication, and ease of access factors.

HCAHPS is a standardized survey instrument commissioned in 2006 to assess patient satisfaction with hospital care. The survey was modeled after CAHPS, which measures patient experience in settings other than hospitals. It is believed that proper assessment of patient satisfaction is necessary to improve patient care and patient satisfaction. The HCAHPS survey provides a standard instrument to achieve this goal, allowing hospitals to be compared on a variety of metrics related to patient satisfaction. CMS provides a downloadable HCAHPS Fact Sheet at http://www.hcahpsonline.org/Facts.aspx. The three main goals of the HCAHPS program are:

1. Large-scale data collection to provide a nationally representative dataset of patient perspectives of care that can provide comparisons among hospitals.
2. Public reporting that incentivizes quality of care measure improvement.
3. Public reporting for accountability and an increase in transparency.

The HCAHPS survey instrument is administered to patients 48 hours to 6 weeks after hospital discharge. It consists of 27 questions: 18 core questions and 9 supplemental questions.

The survey includes two global measures of patient satisfaction:

1. Overall Hospital Rating.
2. Recommend the Hospital.

The survey also addresses seven specific aspects of patient satisfaction:

1. Communication with Nurses and Doctors.
2. The Responsiveness of Hospital Staff.
3. The Cleanliness and Quietness of the Hospital Environment.
4. Pain Management.
5. Communication about Medicines.
6. Discharge Information.
7. Care Transition.

Over 4,000 hospitals participate in HCAHPS, and each hospital aims for 300 completed surveys per year. Respondents typically receive healthcare at short-term, acute, non-specialty hospitals.

The surveys are administered by mail, telephone, and interactive voice response (IVR) (HCAHPS Online, n.d.). Mail surveys are administered in English, Spanish, Chinese, and Russian. Telephone and IVR surveys are administered in English and Spanish (CMS, n.d.(b)).

The survey must be administered by an authorized HCAHPS vendor that is trained by the Federal Government in standardized HCAHPS procedures, thus ensuring consistency and quality of the data. Ipsos is an authorized HCAHPS vendor.

Authorized vendors submit HCAHPS data to CMS where is it cleaned, adjusted, scored, and analyzed. CMS publishes HCAHPS scores for participating hospitals on the publicly accessible Hospital Compare website (www.medicare.gov/hospitalcompare). Results are reported quarterly.

3.2 Military Health

3.2.1 Military Health Overview

Patients from the military experience healthcare differently than civilian population patients. This is due in part to a unique culture and environment that can be attributed to being in the military and/or being a member of a military family.

Experiences between types of MHS beneficiaries vary, too. For instance, active military personnel, retirees, and beneficiaries can differ widely in their healthcare needs and experiences. Even among active personnel, whether the patient was in combat or not may impact healthcare. The type of facility (i.e., Purchased Care or Direct Care) that military and family members visit also influences their patient satisfaction. Lastly, it is important to recognize that the military healthcare experience is not static and that the needs of those in the military change as they move from assignment to assignment, post to post, and active duty to civilian. Overall, there are many distinctive aspects to consider when discussing access to and experiences of military healthcare.

There is a unique experience and culture that can be attributed to being in the military and/or being a member of a military family. Military members and those in their immediate family face cycles of deployment, varying post assignments, and membership to a distinctive culture. Thus, it is important for those who are members of a military family to be recognized as such when they are receiving care.

Kudler and Porter (2013) suggest that public and private institutions, from schools to clinics, inquire about the military connections of families in order to properly serve the needs of this unique and oftentimes invisible population. Interventions designed to improve patient satisfaction scores should take into account the military families' unique cultural experience to be effective.

In terms of beneficiary category, veterans are more likely to have poorer health and self-report negative health behaviors (such as smoking and drinking to excess) than active duty personnel's health status reporting (Bray, 2008). Both veterans and active duty personnel report higher rates of excess alcohol consumption and smoking when compared to civilians and reserve members.

Additionally, the type of duty of a military member may affect health outcomes. Not surprisingly, those who serve as combat soldiers are more likely to experience negative health outcomes than those who serve as noncombatants (Bedard and Deschenes, 2006). Additionally, those who are seen as being in the majority (such as those who are white and/or men) are often more likely to have better access to care as well as better health outcomes than their counterparts in the military setting (Harris, 2011). Overall, there are many aspects of military life that can impact their experience with healthcare. It is important to consider these factors when comparing their health status and overall patient satisfaction to civilian populations.

The military health experience is dynamic due to changes in military status. Military status can include changes in geography, status within the service, and change in service branch (mostly active duty to reserve), and it is particularly true for members that return from deployment.

Those who are deployed (and their families) are more likely to have poorer health than a matched civilian group (Harris, 2011). Related to status change is the fact that some military members move frequently. Continuity of care has a positive impact on patient satisfaction and healthcare satisfaction (Fan et al., 2005). Thus, because many military members and their beneficiaries move so often, they do not receive the benefit of a stable, continuous source of healthcare (Drummet, Coleman, and Cable, 2003).

One positive finding regarding military members is that they experience more preventive care visits (Hoerster, 2012). However, Harris (2011) suggests that members of the active duty military are less likely to seek care when new healthcare issues arise because it is believed by some to show weakness. When juxtaposing these two findings, it may suggest that the preventative measures pushed by the armed forces are anticipatory of this culture of weakness around addressing personal need when entrenched in the active duty culture, underscoring the influence of military culture on healthcare experiences.

3.2.2 Healthcare Facilities

The type of facility is also a potential factor in patient satisfaction within the military community. Direct Care facilities are those operated by the military, while Purchased Care facilities are civilian facilities that TRICARE users may access. Importantly, Direct Care hosts many more military employees, while Purchased Care facilities are largely composed of civilian healthcare providers.

Research suggests that Purchased Care facilities are not properly trained to deal with certain types of military medical situations (Kudler, 2013 and Danker, 2007). As previously mentioned, military members and families experience distinctive events, such as deployment, that civilians are not exposed to. Because of these factors, facilities that solely serve TRICARE members are more sympathetic to these needs. Additionally, care by military doctors in Direct Care (as opposed to civilian doctors in Purchased Care) can lead to higher patient satisfaction scores, as well as better care (Danker, 2007).

Recommendations for improving patient satisfaction for military beneficiaries include making this population more visible, catering to their distinctive needs, and recognizing that these needs are varied within the population (Kudler and Porter, 2013). In order to make this population more visible, there should be indicators on every form that a military beneficiary fills out. These indicators should include questions about military involvement on admission forms to the hospital, regardless of the type of facility. By making this population more detectable, their distinct needs (such as greater attention to psychiatric consequences of wartime, for example) can be considered during treatment. By keeping these recommendations in mind, healthcare providers can better serve the diverse, yet distinct, needs of military members and their dependents.

3.2.3 MHS Review

In 2014, a comprehensive review of MHS was performed to analyze whether (1) access to care in military facilities met access standards, (2) the quality of health care met or exceeded defined benchmarks, and (3) whether MHS has created a culture of safety and has reliable processes to ensure safe, reliable care (DoD, 2015). Findings from these three goals are summarized to provide an overview of the healthcare being used by military beneficiaries and to contextualize satisfaction results with quality metrics.

3.2.3.1 Access to Care

On average, Direct Care facilities meet government standards of access to care. TRICARE Prime patients were able to obtain an appointment with a specialty provider in 12.4 days, well under the standard of 28 days. Patients that needed an appointment for intermediate care averaged less than the 24-hour standard in all but 11 facilities. Despite doing better than access to care standards, patients' satisfaction in their ability to receive timely care was lower than what would be expected with this type of performance. The meaning behind this discrepancy was not explored in the report but does suggest additional factors to satisfaction besides meeting process-based metrics.

3.2.3.2 Quality of Care

The review of quality measures demonstrated mixed results. After analyzing more than 100 measures of quality of care, the reviewers found that the MHS met or exceeded national benchmarks in many areas of inpatient and outpatient care. Facilities met or exceeded the 85% compliance rate on core measures of quality to maintain accreditation by The Joint Commission. Some specific areas suggested underperformance, however, particularly with obstetrical care, which was one of the only inpatient care experiences that were not highly rated. Facilities were lagging in measures like postpartum hemorrhage and undefined neonatal trauma. Reviewers engaged with facility leaders and found that although they were familiar with care quality improvement initiatives, frontline staff was not similarly informed. This suggested that there was still room for improvement in the commitment level to health care quality in MHS.

3.2.3.3 Patient Safety

The culture of safety in MHS was comparable to that found in other health care systems based on averages from nationally standardized surveys of employee perceptions and patient response rates. In general, MHS improved in many measures of hospital-acquired conditions. The biggest areas for improvement were staffing, teamwork within units, and organizational learning. Some of the systems in place were inadequate for providing timely feedback to health care staff regarding safety compromising events.

Having explored the unique health needs of people connected to the military and providing a brief overview of healthcare being delivered in MHS, we can properly contextualize general findings on the drivers of patient satisfaction and better understand their connection to health outcomes.

3.3 Drivers of Civilian Patient Satisfaction

Research on patient satisfaction consistently highlights the importance of provider communication in driving improvements in overall healthcare satisfaction (Rothman et al., 2008). Studies examining what patients value most in care continually reference the importance of provider respect, adequate time to properly discuss health issues, clear medical instructions, and genuine interest in patients' health on the part of the provider.

Nursing communication is also among the strongest drivers of overall patient satisfaction among the civilian population (Iannuzzi et al., 2015). This remains true even when accounting for the contributions of other measures like pain management, cleanliness of the environment, and quietness of the environment. Interestingly, patients' overall satisfaction with care and their perception of care quality can be impacted if nurses take on roles traditionally associated with physicians. These findings provide an additional level of nuance to understanding how patients perceive effective nurse-doctor communication.

3.3.1 The Role of Doctors

Research on doctors' roles in patient satisfaction emphasizes the need for effective communication (Rothman et al., 2008). Finney Rutten et al. (2015) sought to determine how patient-centered communication between patients and physicians impacts ratings of healthcare quality in an outpatient setting. The Health Information National Trends Survey was used to assess the usual source of care, patient-centered communication, ratings of healthcare quality, insurance status, and healthcare-use frequency. Having a usual source of care was associated with higher ratings of care quality and the use of patient-centered communications was also associated with higher ratings of care quality.

Empathy is one dimension of patient-provider communication that can impact a patient's overall satisfaction with care. Menendez et al. (2015) examined the relationship between patient-rated physician empathy and patient satisfaction after a hand surgery outpatient visit. Surveys and validated questionnaires were used to measure patient satisfaction and patient-rated physician empathy. Greater empathy was associated with patient satisfaction, accounting for 65% of the variance in satisfaction scores after controlling for confounding variables. These findings underscore the importance of utilizing effective communication to make patients feel cared for and heard.

Platonova and Shewchuk (2015) examined how patient assessment of primary care physician communication is related to their overall satisfaction and their perception of physician professionalism/ competency. They found that patients stratified in the highly satisfied group (53% of sample) found their primary care doctors showed genuine interest in their health, provided comprehensive description of their problem, and gave them ample opportunity to speak about their health. Interestingly, only half of the highly satisfied patients said they developed a personal relationship with their physician. This suggested that for some patients, satisfaction with physician care is not contingent on the development of a personal doctor-patient relationship.

3.3.2 The Role of Nurses

Nurses' communication with patients also has a significant impact on patient satisfaction with care. Iannuzzi et al. (2015) found that surgical patients' perceptions of whether nurses treated them with respect

led to a tenfold increase in the odds of higher patient satisfaction scores. The factors associated with the greatest odds of satisfaction, in order of greatest to least impact, were:

- Nurses treating patients with respect.
- Nurses always listening carefully.
- Doctors always listening carefully.
- Doctors always treating patients with respect.
- Doctors always listened carefully.
- Nursing explanations.
- Doctor explanations.

In general, the provider-communication skill domains were most predictive of high overall hospital satisfaction among surgical patients.

Craig et al. (2015) evaluated whether a patient's perceived level of pain control influenced the relationship of nursing, doctor, staff communications, and environments on overall satisfaction. They found that no matter what the level of pain control, nursing care always remained the most influential attribute in a patient's overall satisfaction.

Mazurenko and Menachemi (2016) examined the association between the utilization of foreign-educated registered nurses and patient satisfaction scores in acute care hospitals. They hypothesized that more foreign-educated nurses would lead to lower satisfaction because effective communication with patients would be compromised. The use of foreign-educated nurses was associated with lower average scores on overall hospital ratings, recommendations of the hospital, communication with nurses, communication with doctors, communication about medicines, and discharge information. All the remaining measures did not have statistically significant differences between facilities with foreign nurses and those without. Thus, additional training may be beneficial for foreign-educated nurses.

3.3.3 Nurse and Doctor Interaction

Maul et al. (2015) explored patients' perceptions of care delivered at congenital heart disease outpatient clinics among advanced nurse practitioner-managed practices and physician-managed practices. A patient satisfaction survey was administered to adult patients. Physician-managed practices had higher ratings (measured by the percentage of "excellent" responses) on the following indicators: overall experience, provider courtesy, confidence and trust in the provider, quality of received care, and delivery of safe medical care.

Areas without any differences included friendliness of provider, ability to discuss private thoughts, opportunity to ask questions about care, quality of educational materials, comprehension of provider explanations, and lack of feeling rushed by the provider. These findings suggest that patients prefer to seek advice from physicians for medical treatments, particularly if the patients' perceived their symptoms as serious.

In Redsell et al. (2007), patients were interviewed to evaluate what impacted their satisfaction with care. Patients perceived the nurse's role as providing reassurance and caring for minor illnesses. Their satisfaction with care would be negatively impacted if the nurse started to take on an expanded role that necessitated additional expertise. Other studies have shown that patient satisfaction can be improved by lengthening the consultation time provided by nurse-managed clinics (Williams and Jones, 2005). It is possible that additional consultation time allows nurses to incorporate health education, emotional consultation, and psychosocial consultation to adults with CHD. The value placed on additional, meaningful consultation may explain why patients in Maul et al. (2015) were still satisfied with

nurse-managed clinics despite physician-managed clinics receiving higher scores in several patient satisfaction categories.

The care provided by nurses may be just as good as care from physicians, but patients' perceptions about their providers' preparation and their healthcare role may adversely impact patient satisfaction if the nurses' roles expand.

3.3.4 Teamwork Culture

Fostering a teamwork culture in a healthcare setting can improve communications between providers and patients, driving improvements in overall satisfaction. Meterko et al. (2004) found a significant and positive relationship between a teamwork culture and patient satisfaction for inpatient care in the Veterans Health Administration. Out of the four culture types examined (teamwork, entrepreneurial, bureaucratic, and rational), teamwork culture was most associated with inpatient satisfaction after controlling for hospital size, teaching status, geographic location, and urban/rural status. Thus, shifting the culture of a healthcare practice to promote teamwork may be an effective means for improving inpatient satisfaction.

3.3.5 Contact Precautions

"Contact precautions" refer to minimization of provider-patient contact to prevent the spread of a communicable disease or contagious infection, which is an important consideration in healthcare. However, contact minimization has been hypothesized to have an adverse effect on patient perceptions of provider communication and patient satisfaction. Empirical studies of the effect of contact precautions on patient satisfaction are mixed. Mehrotra et al. (2013) explored how contact precautions in hospital settings impact patient satisfaction. The researchers conducted interviews with patients at various stages of a hospital stay as well as after discharge. They found that patients whose providers practiced contact precaution measures often felt that their care suffered from poor coordination and a lack of respect for patient needs and preferences. However, the researchers also observed that HCAHPS scores were not affect by the use of contact precaution measures. This is consistent with the results of a study that found no difference in global rating scores between patients that did and did not experience contact precaution while in care (Gasink et al., 2008). However, Vinski et al. (2013) observed a negative impact on HCAHPS scores specifically among patients with longer lengths of stay and more comorbidities than the general hospital population. In summary, while such measures may have a negative impact on patient satisfaction, more research is needed to substantiate this claim and understand the phenomenon.

3.3.6 Interventions

Some studies measured improvements in HCAHPS scores following the implementation of interventions designed to improve provider-patient communication. Banka et al. (2015) evaluated the effectiveness of an intervention to improve internal-medicine, resident physicians' communication with patients. This was done through an educational conference, frequent individualized patient feedback, and an incentive program.

HCAHPS scores from the department of medicine implementing this intervention were compared to scores from the remaining hospital departments that did not implement the intervention and national averages. The department of medicine found that the percentage of patients who responded positively to all three physician-related HCAHPS questions increased by 8.1% in the intervention group versus 1.5% in control group. The percentage of patients who would recommend the hospital increased by 7.1% in the intervention group versus 1.5% in the control group. The addition of provider-patient communication education led to greater increases in HCAHPS scores.

Kennedy et al. (2013) evaluated the impact of three nursing interventions on patients' ratings of their care. The interventions involved the nurse manager beginning daily rounding of new admissions, post-discharge phone calls, and the implementation of an online program that generates personalized instructions for patient care. These interventions led to a steady upward overall satisfaction trend in the 18 months following implementation.

3.3.7 Counterintuitive Findings in Patient Satisfaction

Some studies suggest additional nuances to the impact of provider communications on patient satisfaction scores, as conditions that would be expected to have a negative impact on satisfaction were surprisingly associated with increased satisfaction.

Wennberg et al. (2009) found that patients with chronic illnesses who received less "intense" hospital care reported better hospital experiences than their counterparts who received more "intense" care. The hospital-care intensity (HCI) index was used as a summary measure of care intensity. It is based on the number of days a patient spends in the hospital and the number of physician visits they experienced during their stay. The researchers compared the Overall Hospital Rating scores of acute care hospitals based on the intensity of care provided. Patients' overall satisfaction ratings negatively correlated to the hospital's HCI index. This indicates that as the intensity of acute hospital care increases, overall patient satisfaction decreases. This pattern was observed for all other measures in the HCAHPS survey. Because hospital care intensity was defined in part by number of physician visits per stay, this suggests attempts to improve satisfaction should not rely solely on adding additional staff to consult with patients.

For instance, Chen at al. (2013) found that inpatient facilities with hospitalist providers had better performance on global measures of patient satisfaction than mixed or "non-hospitalist" facilities. Hospitalists generally have greater expertise in the day-to-day care of patients but do not know a patient's history well enough to cater to his/her preferences as does a primary care physician. Patients may unfavorably rate their experiences with "hospitalist" facilities because of redundancy and/or less-tailored care in comparison to their customary attention from a general physician.

Chen et al. (2013) found that this was not the case, as hospitalist hospitals had modest improvements in all 10 domains of the HCAHPS survey. The Overall Hospital Rating for hospitalist hospitals average was 65.6% versus a non-hospitalist average score of 63.9%. The Recommend the Hospital measure average was 66.0% for hospitalist versus 63.4% for non-hospitalist hospitals. These results suggest that the gulf between effectiveness of care provided by hospitalists and general physicians is not great enough to lead to decreases in hospital satisfaction.

3.3.8 Facility Factors

The relationship between hospital-improvement efforts and patient perceptions of provider communication and their overall satisfaction has also been explored. HCAHPS places importance on environmental factors like cleanliness and quietness to evaluate patient satisfaction.

While some hospital leaders believe that patients are unable to distinguish their positive experiences with a pleasing healthcare environment from their positive experience with care physician/provider care (Swan, 2003), Siddiqui et al. (2015) found the opposite to be true.

They compared satisfaction scores of patients located in a standard hospital setting with those from patients moved to a new clinical building that emphasized patient-centered features. Improvements associated with the move to the patient-centered facility were limited to categories of quietness,

cleanliness, temperature, room décor, and visitor-related satisfaction. There were no significant improvements in satisfaction related to physicians, nurses, housekeeping, or other service staff.

McFarland, Omstein, and Holcombe (2015) assessed the drivers of HCAHPS scores in almost 4,000 U.S. hospitals. They found that hospital size and patient language predicted HCAHPS scores. Specifically, hospital size was negatively associated with HCAHPS score, and non-English patient language status was associated with lower scores than English patient language status. Mazurenko and Menachemi (2016) found that hospitals with fewer beds and those with teaching status had higher overall satisfaction scores. Those hospitals that were defined as being high-technology (a summary measure that captures the use of such high-technology services like organ/tissue transplant and open heart surgery) had lower satisfaction scores.

3.3.9 Obstetrics

Understanding elements of beneficiary satisfaction is integral in improving satisfaction scores. Maternal health and OB-GYN healthcare have unique needs and metrics patients consider when rating provider and facility services. Particularly with the military population, patients may have higher standards of care continuity and communication that could be negatively impacted by the highly mobile lifestyles of active military families.

A study by Sawyer et al. (2013) examined nine patient satisfaction questionnaires to identify satisfaction metrics for maternal healthcare, specifically satisfaction with care during labor and birth. Respondent data were analyzed, and it was found that overall, there was a positive association between social support and higher satisfaction scores with medical staff during labor and birth. Two of the more relevant questionnaires from that review will be highlighted.

The Maternal Satisfaction for Caesarean Section questionnaire instrument is a 22-item questionnaire that is meant to evaluate technical and care satisfaction components during C-Section labor and delivery. Satisfaction is grouped into four dimensions: (1) Healthcare provider interaction with Family/Staff, (2) Anesthetic/Technical effects, (3) Intra/postoperative events, and (4) Side Effects (Sawyer et al., 2013). Of those four dimensions, Interactions with Family/Staff and Anesthetic/Technical effects had the highest association with predicting maternal satisfaction. One study that made use of such instrument found that higher pre-operation anxiety was associated with lower satisfaction in women having elective cesarean section. In another, women who had an epidural anesthesia had higher satisfaction scores than those with spinal anesthesia. These findings not only reinforce general findings of the importance of provider communication in patient satisfaction, but they also suggest that the treatment types may alter patient's threshold for satisfaction.

The Patient Perception Score is a short questionnaire that assesses satisfaction with communication, safety, and respect with care during childbirth. A study found that the tool was able to differentiate how women experiencing childbirth had different satisfaction scores based on the seniority level of staff attending to them. Women who were seen by more junior-level staff had lower satisfaction ratings compared to those seen by staff with more seniority (Sawyer et al., 2013). The question of care quality difference between junior and senior staff was not explored, but the results do suggest that patients' satisfaction with care can change depending on the preparation of staff attending to them.

The literature agrees that satisfaction ratings are based on a variety of factors that may include care that the patient receives, personal preferences, values of respondents, and expectations (Teijlingen et al., 2003). More specifically, maternal satisfaction is dependent on factors such as the following:

Personal factors:

- Having immediate contact with baby.
- Involvement in prenatal classes.
- Choice about place of prenatal care/delivery, type of care, and labor positions.
- Having a realistic expectation of the birth experience.
- Patients having undergone fewer obstetrical/medical interventions in the past.
- Availability of social support—permanent partners.

Communication factors:

- Having continuity of care from a midwife.
- Short length of stay in hospital.
- Early discharge.
- Expectant mother's perceived control/involvement in decision-making.
- Quality of relations and communications between expectant mother and healthcare staff.

Women who had continuous care from a midwife were more likely to be pleased with prenatal, intrapartum, and postnatal care compared to patients who had more standard care. Women who had one or two caregivers were more likely to be satisfied with their care compared to those who had experience with many caregivers during their pregnancy. About 88% of patients believed that it was important to have one person responsible for providing prenatal care, though only 66% of those women did have one of these primary persons. While evidence and patient attitudes agree with the value of having continuity of care, there appears to be barriers present preventing receptive patients from receiving care from a primary person.

The literature supports the association of higher satisfaction scores with continuity of care, provider seniority, the availability of social support, and shared decision-making in aspects of delivery and care. Focusing efforts on improving the availability of communication tools to maternal patients may be key to improving satisfaction in this population.

3.4 Patient Satisfaction Impact on Healthcare

Patient satisfaction is not measured simply for regulatory purposes; it is believed that the pursuit of higher satisfaction ratings will push healthcare facilities to provide higher quality care. Given the relative newness of standardized data on patient satisfaction, there is little research to date on the impact of patient satisfaction on healthcare outcomes. Two systematic literature reviews will act as the base for discussing how patient satisfaction is connected to clinical safety, effective outcomes, and healthcare quality.

Doyle, Lennoz, and Bell (2013) wrote a systematic review of literature that examined the link between patient satisfaction, clinical safety, and effectiveness outcomes. They used two frameworks to examine patient experience: relational and functional aspects.

The relational framework emphasized interpersonal aspects of care such as the ability of clinicians to emphasize and respect patient preferences and properly include them in the decision-making process as well as their transparency/professionalism towards the patient.

The functional framework emphasizes expectations on how care is delivered like paying attention to physical needs, providing timely care, and effectively coordinating care between professionals. Terms

derived from these frameworks were combined with terms representing patient safety and clinical effectiveness outcomes. A total of 55 studies were examined with 556 associations examined.

Anhang Price et al. (2014) also wrote a systematic review that focused on the role of patient experience surveys in measuring healthcare quality. This review built upon the Doyle et al. (2013). They expanded the selection of articles by including literature that used CAHPS surveys to measure patient experience. Out of 368 additional articles identified through this search, 14 were added for this review.

Overall positive patient experience is associated with patient safety and clinical effectiveness for a wide range of disease treatments, population groups, and outcome measures. Some of the benefits of improved patient experience include higher levels of adherence to medication and treatments, lower inefficient healthcare utilization, improved patient safety within hospitals, use of preventative and screening services, and better clinical outcome—both self-reported and objectionably measured.

More often than not, patient satisfaction and clinical outcomes are positively associated regardless of whether clinical outcomes are self-rated or provider-measured. Doyle et al. (2013) found that positive associations between patient satisfaction and clinical outcomes assessments outweigh no-association results for studies examining patient-rated health outcomes (~2:1) and objective, clinically verified measures of health outcomes (~2.5:1). Two studies (Jha et al. 2008 and Isaac et al., 2010) examining acute care were able to show positive associations between overall patient satisfaction and the technical quality-of-care ratings for myocardial infraction, congestive heart failure, pneumonia, and surgery complications.

Adherence to medical treatment is also strongly associated with patient satisfaction. A meta-analysis of 127 studies conducted by DiMatteo (2010) found that the odds of patient adherence were 1.62 times higher when physicians had communication training. An additional review that examined interventions to improve adherence found that those most effective were able to foster a good provider-patient relationship, practice effective communication, and help patients understand the need for treatment (Haynes et al., 2008).

Patient satisfaction is also associated with greater healthcare safety through the reduction of hospital borne infections and complications. Positive patient experiences are associated with a lower prevalence of inpatient care complications. The cleanliness of the hospital environment is also associated with lower prevalence of infections due to medical care (Isaac et al., 2010), and a patient-safety culture has led to more positive satisfaction experiences from patients (Lyu et al., 2013 and Sorra et al., 2012). Higher Overall Hospital Rating and Discharge Planning measures are associated with lower 30-day readmission rates for acute myocardial infarction, heart failure, and pneumonia (Boulding et al., 2011).

3.5 Conclusions

The literature highlights unique attributes of military personnel that adds additional nuance to our understanding of the relationship between patient satisfaction drivers and good health outcomes.

Military personnel, their families, and veterans deal with health issues and barriers not experienced by the general population. This includes issues with keeping care continuity because of changing deployments and adjusting to civilian life after combat experience, a culture that emphasizes resilience over seeking aid. There is also a higher incidence of alcohol, tobacco, and drug use.

Studies of the drivers of overall patient satisfaction with care find that doctor and nurse communications are among the most important aspects of care for overall satisfaction. This remains true even after

attempts to control for other domains like pain management, cleanliness of the hospital, and quietness of the hospital.

If provider communication is the domain with the greatest potential to improve patient satisfaction, then efforts to improve care within military facilities should pay particular attention to lifestyle factors impacting continuity of care.

Because the military healthcare experience is not static, facilities should pay particular attention to how individual providers engage with patients without the luxury of establishing in-depth, long-term personal relationship with them. The positive association between patient satisfaction and good clinical outcomes is well documented. Striving to improve patient satisfaction among military beneficiaries will lead to changes that make the overall healthcare system clinically efficient and effective.

4 METHODOLOGY

The goal of the TRISS study is to understand the inpatient satisfaction experience among the 9.5 million TRICARE beneficiaries in both direct care and purchased care settings. To do so, a census sample was used of beneficiaries that were recently discharged after an overnight admission or longer to a world-wide military treatment facility ((MTF); referred to as "Direct Care"). Likewise, a representative sample was selected for civilian hospitals receiving sufficient numbers of TRICARE beneficiary patients (Purchased Care). Beneficiaries included in this study are active duty family members (AFDM) 18 years and over, retirees, and all active duty (AD) personnel regardless of age.

"Inpatient care" is defined as an overnight stay as an inpatient admission to either an MTF or civilian hospital in which the patient's admission date is different from the patient's discharge date. The admission need not be 24 hours in length. Patients must be 18 years or older at time of admission, have a non-psychiatric MS-DRG principal diagnosis at discharge, and be alive at time of discharge. Non-eligible MS-DRG codes are 283–285, 789–795, 876, 880–887, 894–897, 945, 946, 998, and 999.

The TRISS study methodology follows the HCAHPS protocols set out by CMS. The complete details of the HCAHPS protocol can be found in the CAHPS Hospital Survey Quality Assurance Guidelines Version 10.0 (http://www.hcahps.org/Files/QAG_V10_0_2015.pdf).

Adherence to HCAHPS protocols ensures comparability of the TRISS hospital experience results with civilian hospital results throughout the United States. The protocols include definitions of respondent eligibility criteria, sampling rules, field procedures, data processing, and reporting. This section of the annual report provides details of the methodology and procedures used in the TRISS study in the first and second quarters of FY 2015.

4.1 Sample Frame

The sample consists of respondents who have recently received inpatient care from a MTF or a TRICARE civilian network hospital. The MTF segment of study is referred to as "Direct Care" (DC) and the civilian hospital segment is referred to as "Purchased Care" (PC).

4.1.1 TRISS Sample Requirements

4.1.1.1 Target Sample Size

TRISS requires a target sample size of 300 completed interviews per facility per year. Assuming a 30% response rate per facility, at least 1,000 patients must be contacted each year from each facility. To achieve this sample size, for the DC sample, Ipsos conducts a census of all eligible inpatient discharges and mails out surveys to a maximum of 140,000 patients (130,000 within the continental United States (CONUS) and 10,000 outside of the continental United States (OCONUS)) across the 56 facilities (41 CONUS and 15 OCONUS) per year.

For the PC sample, surveys are mailed to up to 47,000 patients across 73 CONUS facilities per year. Random samples are selected within each PC facility to achieve the required 300 completes. If a facility does not have a sufficient number of discharges to obtain 300 completes with a random sample, the sample consists of a census of all discharged patients.

4.1.1.2 Eligibility

TRISS patient eligibility requirements are identical for the DC and PC samples. The sample frame consists of TRICARE beneficiaries discharged from an overnight stay. The population includes military personnel, retirees, and their beneficiaries. In addition, the TRISS protocol follows HCAHPS eligibility guidelines for inclusion in the sample frame. The HCAHPS Quality Assurance Guidelines for survey eligibility include:

- Patients must be 18 or older at the time of admission.
- At least one overnight stay in the hospital.
- Non-psychiatric principal diagnosis.
- Diagnosis defined by HCAHPS Diagnosis Related Groups (DRGs)[1] V32:
    - Obstetric Product Line.
    - Medical Product Line.
    - Surgical Product Line.
    - Missing.
- Alive at the time of discharge.

The patient's principal diagnosis at the time of discharge determines whether he or she falls into one of the three product line categories (Obstetric, Medical, or Surgical) eligible for HCAHPS.

Patients who meet the eligible population criteria outlined above are to be included in the HCAHPS Sample Frame. However, there are a few categories of otherwise eligible patients who are excluded from the sample frame. These are:

- "No publicity" patients (i.e., patients who request that they not be contacted).
- Court/law enforcement patients (i.e., prisoners); this does not include patients residing in halfway houses.
- Patients discharged to hospice care (hospice home or hospice medical facility).
- Patients who are excluded because of state regulations.
- Patients discharged to nursing homes and skilled nursing facilities.

To reduce respondent burden, HCAHPS guidelines require on a monthly basis to de-duplicate eligible patients based on household and multiple discharges within the same calendar month. De-duplication must be performed within each calendar month, utilizing address information and the patient's medical record number (such as Electronic Data Interchange Person Numbers (EDIPN)). The de-duplication process covers the following two areas:

1. **De-duplication by household**: Only one adult member per household is included in the HCAHPS survey sample frame for a given month. For de-duplication purposes, halfway houses, barracks, and healthcare facilities are not considered to be a household and thus must not be de-duplicated. Examples of healthcare facilities include long-term care facilities, assisted living facilities, and group homes.
2. **De-duplication for multiple discharges**: While patients are eligible to be included in the HCAHPS survey sample in consecutive months, if a patient is discharged more than once within a given calendar month, only one discharge date is included in the sample frame. The method

[1]Based on DRG list as defined by V.32 HCAHPS MS-DRGs effective October 1, 2014.

used for de-duplicating depends on whether sampling is conducted continuously throughout the month, or is conducted only at the end of the month.

At the time that Ipsos receives the initial population file, the DRG code may be missing but will be added to the frame in a future refresh. Table 1 gives the product line and eligibility assignments according to HCAHPS protocol (available at http://www.hcahpsonline.org/Files/V%2029%20Table%20of%20MS-DRG%20codes.pdf). As can be seen from the table, a record with an unknown DRG may be eligible for the survey, but the DRG code must be updated when it becomes available. Ipsos receives updates when changes are made to the population file. The last update is provided as close to the date of the close of field as possible. At that time, final eligibility is determined.

Table 1. Assignment of diagnosis-related groups for TRISS product line designations.

MS-DRG Codes	Product Line	HCAHPS Eligibility
765–768, 774, and 775	Obstetrics	Yes
52–103, 121–125, 146–159, 175–208, 280–282, 286–316, 368–395, 432–446, 533–566, 592–607, 637–645, 682–700, 722–730, 754–761, 776–782, 808–816, 834–849, 862–872, 913–923, 933–935, 947–951, 963–965, and 974–977	Medical	Yes
1–8, 10–14, 16–17, 20–42, 113–117, 129–139, 163–168, 215–265, 326–358, 405–425, 453–517, 570–585, 614–630, 652–675, 707–718, 734–750, 769, 770, 799–804, 820–830, 853–858, 901–909, 927–929, 939–941, 955–959, 969, 970, and 981–989	Surgical	Yes
283–285, 789–795, 876, 880–887, 894–897, 945, 946, 998, and 999	Ineligible	No
A missing MS-DRG code does not exclude a patient from being drawn into the sample frame	M = Missing	Yes

Table 2 provides the target sample sizes for FY 2015 Quarters 1 and 2, the initial cases provided, the number of eligible cases, and the number selected and sent questionnaires for the Direct Care and Purchased Care populations. Further details on eligibility rates by facility can be found in appendix G (for Direct Care) and appendix H (for Purchased Care).

Table 2. Eligible TRISS cases in Quarters 1 and 2 in FY 2015.

Population	Target Sample Sizes	FY 2015 Quarters 1 and 2		
		Records Received	Eligible Cases	Sampled Cases
Direct Care Totals	140,000	66,971	59,024	59,024
Purchased Care Totals	47,000	64,266	32,962	27,714
Totals for DC and PC	187,000	131,237	91,986	86,738

4.1.1.3 DC Sampling Plan

The FY 2015 DC sampling plan for Quarters 1 and 2 is provided in appendix A. The DC sampling plan requires a 100% selection (a census sample) of all eligible discharged patients from participating MTFs. In Quarters 1 and 2 for FY 2015, these discharges occurred at 56 MTFs in the CONUS and OCONUS. The sizes of the MTFs vary, and some facilities have relatively few inpatient admissions.

Appendix G shows the number of DC eligible discharges sampled in FY 2015 Quarters 1 and 2 as well as the response rates for each facility.

4.1.1.4 Purchased Care Sampling Plan

The FY 2015 PC sampling plan for Quarters 1 and 2 is provided in appendix B. The plan shows the number of eligible discharges sampled in FY 2015, the number returned, the response rate, and the ineligible rate from that mailed out—returned undeliverable, ineligible diagnosis type, deceased or incapacitated, etc.

The PC survey program targets the civilian hospitals with high volumes of care for TRICARE beneficiaries. There are a large number of civilian hospitals that provide care to MHS beneficiaries, although most PC hospitals see only a few MHS patients. Appendix B lists the 73 facilities with the highest level of utilization based on 2013 and 2014 statistics. After DHA review, these facilities were included in the 2015 TRISS sampling plan.

For each Purchased Care hospitals, monthly random samples were selected from eligible monthly discharges from each facility using the rate of sampling, f, of the following form:

$$f = \frac{300}{N \times Y}$$

Here, f is the sampling rate, 300 is the minimum number required of completed interviews each year over a 12-month survey period, N is the anticipated number of eligible discharges, and Y is the expected response rate.[2]

Appendix H shows the number of PC eligible discharges sampled in FY 2015 Quarters 1 and 2 as well as the response rates for each facility.

4.1.2 Population Databases and Data Extraction

Figure 1 outlines the sample frame development process. The source of the TRISS sample frame is the DoD Defense Enrollment Eligibility Reporting System (DEERS). DEERS compiles Direct Care inpatient admissions and discharges from the Composite Health Care System database. It also compiles Purchased Care (civilian) inpatient admissions and discharges from the MDR TRICARE Encounter Data (TED) database. The TED consists of claims data from civilian hospitals for services rendered on behalf of TRICARE beneficiaries.

[2]"Response rate used here" refers to the rate of return from the number sent out without removing non-contactable (undeliverable, deceased, etc.) individuals from the calculation.

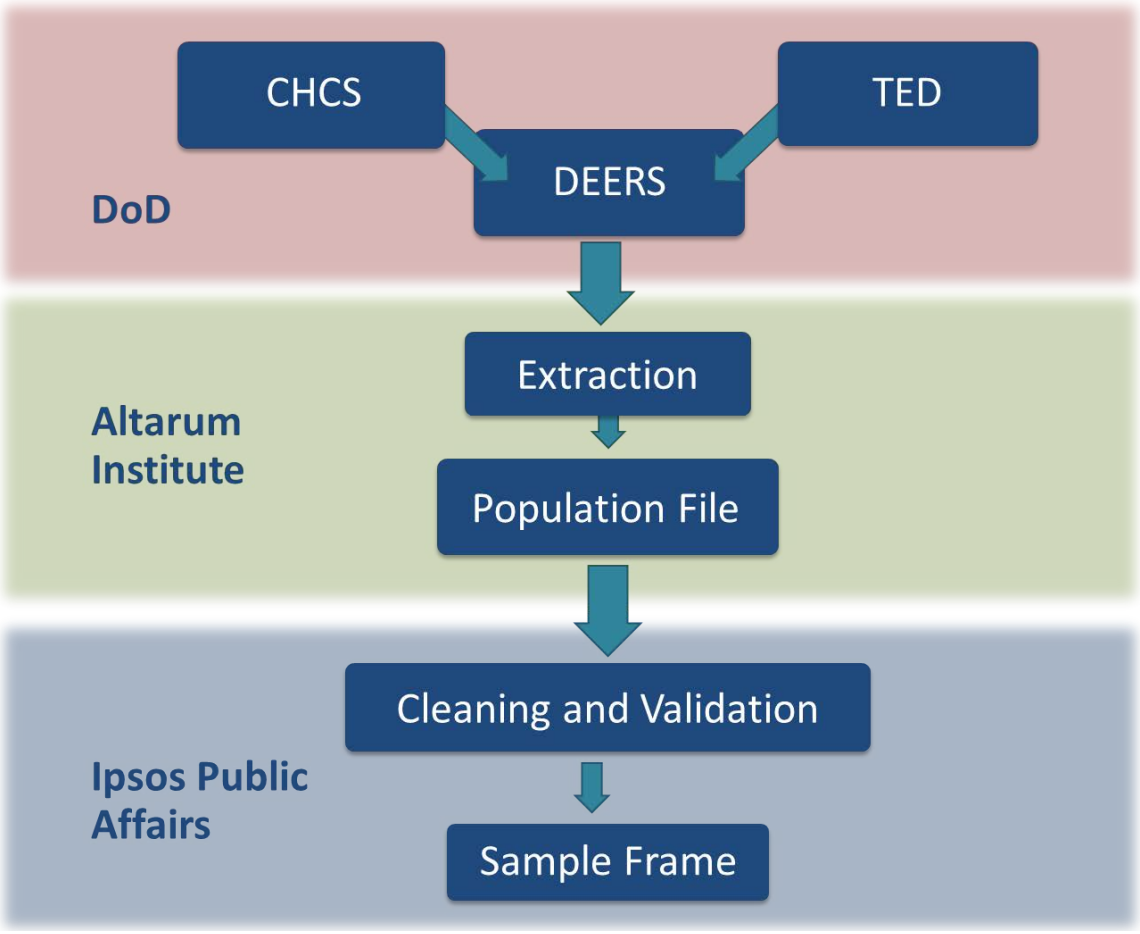


Figure 1. Procedural flow for sample frame development.

On a separate data extraction contract with DHA, Altarum Institute extracts DEERS records for all DHA survey efforts. Twice monthly, Altarum provides Ipsos with a population file of all eligible hospital discharges recorded since the previous file transfer, for both DC and PC. Population files are sent directly from Altarum to Ipsos using a secure FTP site that is accessible only between the two companies.

The TRISS patient discharge data file includes the patient EDIPN along with all necessary information needed to create the sampling frame and contact a potential respondent. Variables included in the TRISS patient discharge data file include (but are not limited to):

- EDIPN.
- Age.
- Admission date.
- Discharge date.
- MTF.
- Diagnosis related group (MS-DRG) codes.
- Discharge code (reason for discharge, includes deceased).
- Date of death (if applicable) or death flag.
- Address for contact and telephone number.

Once received, the population files undergo extensive checking and evaluation. Deceased patients, invalid DRG codes, incomplete information, invalid MTFs, and ineligible civilian facilities are eliminated from the records. The MS-DRG field may not available at the time of data extraction, and/or the fields may be updated at a later time. Such revisions occurred in approximately 20% of the records. Table 3 shows the field cycles with population sample delivery dates, end of field dates and the dates that survey results are available on the TRISS reporting website (www.trissreports.com).

Although the population databases for DC and PC are delivered simultaneously, the field periods and reporting dates do not coincide due to differences between DC and PC sampling building process. The DC results in this report are based on discharge dates from November 1, 2014, through March 31, 2015. The DC field period, following HCAHPS protocols, ended on February 27. PC results are based on discharge dates from October 1, 2014, through March 31, 2015. The PC field period ended on June 25, 2015.

Table 3 shows that the TRISS project for Quarters 1 and 2 FY 2015 followed a twice monthly survey administration schedule. Note that Quarter 1 began with the PC file being transferred once monthly; by Quarter 2, the population database files for both DC and PC were passed from Altarum to Ipsos twice monthly. The files include all available discharges in the period since the previous population file creation. Once the population files were received by Ipsos, they underwent a series of checks and procedures for completeness, eligibility, and address cleaning. The resulting files constitute the sample frame.

Samples were pulled according to the DC and PC sampling plan. The DC sample is a census, so all eligible respondents were selected from the sample frame, and random samples were selected from the PC hospitals to ensure that 300 surveys are completed each year. The samples were formatted per HCAHPS rules and sent to Ipsos operations for National Change of Address (NCOA) updates, printing and mailing, and formatting separate files for follow up telephone interviewing. This occurred within 5 days after population file delivery. The general key dates for the processing of the surveys are:

Key Dates for a given field cycle:

- **Day 0**: Population database is received from Altarum Institute.
- **Days 1–2**: Database cleaned, sample frame constructed, and sample is generated for Ipsos operations.
- **Days 3–4**: Letters and questionnaires are produced and inserted.
- **Day 5**: Questionnaires are mailed.
- **Day 24–25**: Respondents to the mail survey and respondents who have contacted us to tell us they are not eligible are removed from the telephone sample file.
- **Day 26**: Telephone interviewing begins.
- **Day 47**: Telephone interviewing fielding ends.

Table 3. Quarters 1 and 2 FY 2015 twice monthly field cycles population frame, field period, and web reporting upload schedules.

Field Cycle	DC Quarter	DC Discharge Date Ranges		PC Quarter	PC Discharge Date Ranges		Sample Delivered to Ipsos	Field End	DC Data Available	PC Data Available
14-22	DC Q1	11/01/14	11/15/14	PC Q1	10/01/14	10/15/14	12/18/14	02/06/15	3/22/15	05/08/15
14-23		11/16/14	11/30/14		10/16/14	10/31/14	12/18/14	02/06/15	3/22/15	05/08/15
14-24		12/01/14	12/04/14		11/01/14	11/15/14	12/18/14	02/06/15	3/22/15	05/08/15
15-01		12/05/14	12/31/14				01/08/15	02/27/15	3/22/15	05/08/15
15-02	DC Q2	01/01/15	01/15/15		11/16/14	12/15/14	01/22/15	03/13/15	6/19/15	05/08/15
15-03		01/16/15	01/31/15				02/05/15	03/26/15	6/19/15	05/08/15
15-04		02/01/15	02/15/15	PC Q1/2	12/16/14	01/15/15	02/19/15	04/09/15	6/19/15	05/08/15
15-05		02/16/15	02/28/15	PC Q2	01/16/15	01/31/15	03/05/15	04/23/15	6/19/15	07/24/15
15-06		03/01/15	03/15/15		02/01/15	02/15/15	03/19/15	05/07/15	6/19/15	07/24/15
15-07		03/16/15	03/31/15		02/16/15	02/28/15	04/02/15	05/21/15	6/19/15	07/24/15
15-08					03/01/15	03/15/15	04/16/15	06/04/15		07/24/15
15-09					03/16/15	03/31/15	05/07/15	06/25/15		07/24/15

4.1.2.1 Direct Care Sample Frame

Ipsos receives twice monthly a population database of Direct Care patient discharges from Altarum Institute. These are all inpatient discharges from MTFs recorded in the DEERS system since the last data transfer. The Direct Care records must meet all of the criteria described earlier, and the discharge date must be within 42 days of the expected start of field date 5 days after the delivery of the population file. The final file after these eliminations is the Direct Care sample frame. The Direct Care sample frame includes CONUS, OCONUS, MTFs, and patients with non-U.S.A. home addresses.

4.1.2.2 Purchased Care Sample Frame

The population file with purchased care hospital discharges is also provided to Ipsos twice monthly from Altarum. The basis of the discharge information is from the MDR TED. TED consists of claims data from civilian hospitals for services rendered on behalf of TRICARE beneficiaries. Since the TED system is limited to the date of submission and validation of claims, the date of discharge may be past a date to prepare a survey to meet the 42-day requirement. As a result, the Purchased Care survey is not subject to the HCAHPS requirement of a 42-day maximum lag between discharge and survey completion.

4.1.3 Preparation of the sample for mail/phone administration

After sample receipt, Ipsos selects the sample based on HCAHPS rules and then creates mail and telephone files. Each record is appended with a unique Ipsos respondent ID number, which indicates PC/DC and the wave. Only data needed by the specific operations team is appended per HIPAA rules (such as name and address for a mailing file). The telephone file is sent to a third-party for telephone hygiene and telephone appending. The mail file is sent to the mail operations group to use to create letters and questionnaires.

After mail field, mail returns and records dispositioned as refusals or ineligible are removed from the telephone file and this revised file is sent to the telephone operations group.

4.2 Data Collection Protocols

The TRISS project follow HCAHPS protocols except where explicitly indicated (e.g., in the period between discharge and survey mailing for Purchased Care). Full details of quality assurances, survey

completion rules, data security measures, and other procedural details can be found in the Ipsos 2015 HCAHPS Quality Assurance Protocol, available upon request (tricare.survey@ipsos-research.com).

The TRISS survey is first sent to the sample population through a mailed paper survey. The survey instrument is given in appendix D. Completed mail surveys are delivered to Ipsos' Returns Processing Department daily, where surveys are opened and processed. Processing includes scanning in the ID numbers of all returns.

Full surveys, including the barcodes, are scanned on the same day they are received. As surveys are scanned, the scanner endorses a sequential identification number on each page of every questionnaire. This endorsement retains the page order of the documents and provides quicker access to the original documents if they have to be referenced at a later date. The high-speed scanners capture both sides of a form simultaneously. The scanning programs have been preprogrammed to recognize defining characteristics of the TRISS questionnaires in detailed version-specific templates. As each questionnaire passes through the scanner, a black and white "picture" of every page of the questionnaire. The image is cleaned instantaneously and determines pixilation based on a gray-scale image of the document, thus improving the quality of the captured image. The images are then converted into electronic data using FACTS (Fast Accurate Capture Technology Solutions).

Any white mail (written comments from respondents) is delivered to the TRISS team in order to follow up with questions or to disposition records such as notices that the respondent is deceased. The returned questionnaires are imaged into electronic ASCII data.

Respondents are contacted via telephone if a response is not received within 21 days of the paper survey distribution, and a survey identical to the mail instrument is administered via phone to these respondents.

A total of five attempts are made to reach respondents by phone, with calls staggered over the course of 3 weeks and during different time periods. Phone interview answers are recorded by the phone interviewers. Telephone survey responses are appended to the mail survey dataset on a daily basis. A portion of the telephone numbers provided for OCONUS MTFs were not correct, and resolutions are currently being pursued to improve the ability to contact of these respondents.

4.2.1 Data Processing

At the end of phone field, the mail returns and telephone data are compiled into one dataset. If there are returns for both mail and phone, the complete with the most data based on core questions is retained. Respondent data provided with the sample are appended to the survey results. Such data includes gender, beneficiary category, age, DRG code, State/region, MTF code, or the civilian hospital name. These data allow assignment of product line, age category, facility, and TRICARE Regional Office (TRO) or service branch, as applicable.

The individual records in the patient response dataset must be "scored" to determine their final survey status codes. When the patient answers at least 50% of the HCAHPS Core questions applicable to all patients, and there is no evidence that he/she is ineligible, a final survey status code of "1—Completed Survey" is assigned. When a patient provides a response to at least one HCAHPS Core question, but too few Core questions to meet the criteria for a completed survey, a final survey status code of "6—Non-response: Break-off" is assigned. Core questions are Q1–Q10, Q12, Q15, Q18, and Q21–Q25.

Once the data collection field period is closed and the final patient response dataset (including data scoring) is available, the final dispositioning process can begin.

The following files are de-duped within themselves:

- White mail disposition file.
- Survey comments (snippets)/Help line disposition file.
- Return System (SOLARS) undeliverables.
- Scored patient response dataset.
- Deceased dataset removals kept for dispositioning.

Once each is de-duped, the white mail disposition file, the snippets/help line disposition file, and the SOLARS undeliverables file are merged and de-duped again, retaining only one interim disposition record per Survey ID. This file is merged with the patient response dataset and the de-duplication process is repeated, again retaining only one disposition record per ID. Finally, the sample file is compared against this merged file, and any patient without a disposition is assigned a disposition of "8—Non-response after maximum attempts". The rules in the Quality Assurance Guidelines manual are strictly followed for all de-duplication and dispositioning.

There are several items in the HCAHPS Survey that can and should be skipped by certain patients. These gate questions form skip patterns. Four questions in the HCAHPS Survey serve as screener questions (Q10, Q12, Q15, and Q18) that determine whether the associated dependent questions require an answer. The following decision rules are provided to assist in the coding of patient responses to skip pattern questions.

Gate Questions (Q10, Q12, and Q15):

If the gate question is left blank, then code the gate question as "M—Missing/Don't Know."

Dependent Questions (Q11, Q13, Q14, Q16, and Q17):

Gate questions:

- Q10
- Q12
- Q15

Dependent questions:

- Q11
- Q13, Q14
- Q16, Q17

If the gate question is:	And the dependent question:	Then code the dependent question as:
Answered "Yes"	Is left blank	"M"—Missing/Don't Know
Answered "Yes"	Is NOT left blank	Keep the value provided
Answered "No"	Is left blank	"8"—Not applicable
Answered "No"	Is NOT left blank	Keep the value provided
Is left blank	Is left blank	"M"—Missing/Don't Know
Is left blank	Is NOT left blank	Keep the value provided

Dependent Questions (Q18, Q19, and Q20):

Gate question:

- Q18

Dependent questions:

- Q19, Q20

If the gate question is:	And the dependent question:	Then code the dependent question as:
Answered "Own home" or "Someone else's home"	Is left blank	"M"—Missing/Don't Know
Answered "Own home" or "Someone else's home"	Is NOT left blank	Keep the value provided
Answered "Another health facility"	Is left blank	"8"—Not applicable
Answered "Another health facility"	Is NOT left blank	Keep the value provided
Is left blank	Is left blank	"M"—Missing/Don't Know
Is left blank	Is NOT left blank	Keep the value provided

All Other HCAHPS Questions (Q1–Q9, Q21–Q22, Q49–Q53):

If the question is left blank, then code as "M—Missing/Don't Know."

4.3 Analytic Methodology

4.3.1 Nonresponse Analysis

The weighting strategy assumes that the demographic measures identify groups with differential rates of response and respond differently to the survey questions. This section examines the rates of response by looking at the population's distribution for each variable, and their results for overall rating of the hospital.

4.3.1.1 Overall Response Rates

Response rates for Direct Care and Purchased Care are reported in appendix G and appendix H, respectively. The response rates for DC are broken out by service branch, facility, and CONUS/ OCONUS affiliation. The response rates for PC are broken out by TRO and facility.

The overall FY 2015 response rate for Direct Care was 39% and was 45.0% for Purchased Care.[3]

4.3.1.2 Direct Care

Table 4 reports the response distributions for the key weighting variables. Older beneficiaries are more likely to respond than younger beneficiaries. This is seen in both the age and beneficiary category variables. All of the results are statistically significant due to the very large sample sizes. These results show that the sample is overrepresented by older beneficiaries.

Table 4 also shows the Overall Rating scores of both unweighted and weighted for each of the subgroups. Beneficiaries 65 years of age and older have a much higher response rating than beneficiaries less than

[3]Response rate is defined as Response Rate = Completed Surveys / (Number Mailed Out – Ineligibles).

65 years of age (85.3 versus 64.0%, respectively). As a result, wherever other demographic groups are related to age such as beneficiary category, marital status, and, to some degree, product line, and unweighted results would be bias the results due to over-representation of older beneficiaries in the sample.

The weighting plan corrects for this over-representation, and as a result, the bias from the higher proportion of older beneficiaries in the sample is removed. The reported overall rating is 68.3% under the weighting plan rather than 71.2% under the unweighted plan.

Table 4. Direct Care response distributions for key demographic variables.

		Distribution		Overall Rating	
		Population	Sample	Unweighted	Weighted
Gender	Male	35.0%	38.0%	77.6%	74.8%
	Female	65.0%**	62.0%	67.2%	64.8%
Age	Under 65	79.9%	70.1%	65.3%	64.0%
	65+	20.1%**	29.9%	85.2%	85.3%
	18–24	18.0%	12.3%	58.2%	58.2%
	25–34	28.3%	22.7%	56.6%	56.5%
	35–44	12.7%	10.4%	62.9%	64.0%
	45–64	23.2%	24.7%	77.6%	77.3%
	65*	20.0%**	29.9%	85.2%	85.3%
Marital Status	Divorced/widowed	9.0%	10.4%	78.9%	76.7%
	Married	80.5%	82.6%	71.0%	68.2%
	Single	10.1%	7.0%	61.8%	60.9%
	Not specified	0.4%**	0.3%	81.8%	81.3%
Product Line	Medical	40.2%	46.1%	58.7%	58.3%
	Obstetrics/Gynecology	31.4%	25.4%	75.8%	74.0%
	Surgical	27.8%**	27.8%	75.1%	72.1%
Beneficiary Category	AD	24.6%	18.0%	57.8%	58.7%
	ADFM	32.9%	26.7%	59.1%	59.1%
	Retired under 65	22.6%	25.6%	77.0%	77.1%
	Retired over 65	19.9%**	29.7%	85.2%	85.3%
Service	Army	50.9%	51.3%	68.1%	65.2%
	Air Force	13.2%	10.6%	77.4%	75.3%
	Navy	26.3%	23.5%	69.8%	67.0%
	NCR	9.6%**	14.7%	80.7%	78.8%

**Statistical significance at 0.05 level of sample difference to population.

4.3.2 Measures and Scoring

Core to the TRISS and HCAHPS reporting are the HCAHPS composites and individual items. TRISS uses the same scoring protocol as CMS for the items borrowed from the HCAHPS instrument.

HCAHPS measures consist of two global items, seven composite measures, and two individual items, as shown in table 5. The two global items (Overall Hospital Rating and Recommend the Hospital) capture general perceptions of the facility. Composite measures are calculated from two or more individual survey items related to an aspect of care. For instance, the composite item Communication with Nurses consists of three individual items that measure perceptions of (1) nurses' courtesy and respect, (2) nurses listening carefully, and (3) whether nurses explained information in a way the patient could understand.

Finally, two individual items capture perceptions of two aspects of the facility (cleanliness and quietness) within single survey items (e.g., these measures are not composites).

Table 5. HCAHPS measures.

Global Items
Q21: Overall Hospital Rating
Q22: Recommend the Hospital
Composite Measures
1. Communication with Nurses
Q1: During this hospital stay, how often did nurses treat you with courtesy and respect?
Q2: During this hospital stay, how often did nurses listen carefully to you?
Q3: During this hospital stay, how often did nurses explain things in a way you could understand?
2. Communication with Doctors
Q5: During this hospital stay, how often did doctors treat you with courtesy and respect?
Q6: During this hospital stay, how often did doctors listen carefully to you?
Q7: During this hospital stay, how often did doctors explain things in a way you could understand?
3. Responsiveness of Hospital Staff
Q4: During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?
Q11: How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?
4. Pain Management
Q13: During this hospital stay, how often was your pain well controlled?
Q14: During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?
5. Communication about Medicines
Q16: Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?
Q17: Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?
6. Discharge Information
Q19: During this hospital stay, did doctors, nurses, or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?
Q20: During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?
7. Care Transition
Q23: During this hospital stay, staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left.
Q24: When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.
Q25: When I left the hospital, I clearly understood the purpose for taking each of my medications.
Individual Items
Q8: Cleanliness of Hospital Environment
Q9: Quietness of Hospital Environment

4.3.2.1 Individual Item Estimation

Estimates for individual items use the following formulae:

$$\widehat{X} = \frac{\sum_{i=1}^{n} w'_i X_i I_i}{\sum_{i=1}^{n} w'_i I_i} = \sum_{i=1}^{n} w_i X_i I_i$$

And:

$$Var(\widehat{X}) = \frac{1}{n(n-1)} \sum_{i=1}^{n} w_i (X_i - \widehat{X})^2$$

Here, w_i is the sample weight for the respondent i. X_i is the survey response for respondents i, and I_i is an indicator (1 if a response is present; 0 if not present). For an $X_i = 0$ or 1 variable (i.e., estimating a proportion), the formulae are the same, but they are simplified with the forms:

$$\widehat{P} = \frac{\sum_{i=1}^{n} (w_i \times X_i \times I_i)}{\sum_{i=1}^{n} (w_i \times I_i)}$$

And:

$$Var(\hat{P}) = {\hat{P}(1-\hat{P})}/{n}$$

These formulae do not account for the finite population correction factor, the stratification, or the increase in variance due to the weights.

The formulae for one facility use these:

$$Var(\widehat{P}) = \left[1 - \frac{n}{N}\right] {\widehat{P}(1-\widehat{P})}/{n^*} = [1-f]\,{\widehat{P}^{(1-\hat{p})}}/{n^*}$$

Where:

$n^* = n / (1 + CV^2(w))$
f = The correction factor for the finite population.

Formulae for a roll up of two or more facilities are:

$$Var(\widehat{P}) = \sum_{h=1}^{H} \left[1 - \frac{n_h}{N_h}\right] \left(\frac{N_h}{N}\right)^2 {\widehat{P}_h\,(1-\widehat{P}_h)}/{n_h^*} = \sum_{h=1}^{H} [1-f_h]\; W_h^2\; Var(\widehat{P}_h)$$

And:

$$n_h^* = n_h / (1 + CV_h^2(w))$$

4.3.2.2 Composite Estimation

The composite is determined by calculating the mean top box score within a facility for each question, and then summing the scores for the questions and dividing by the number of questions. Where data are weighted as on the TRISS, the response indicators (1 or 0) and the number of responses are multiplied by the weight. The equation for calculating a composite score is:

$$C = \frac{\sum_{j=1}^{k} P_j}{k}$$

Where:

C = The composite.
k = The number of questions in the composite.
P_j = Proportion j (the proportion for the jth question of the composite).

The formula for calculating P_j is:

$$P_j = \frac{\sum_{i=1}^{n} (w_i \times X_{i,j} \times I_{i,j})}{\sum_{i=1}^{n} (w_i \times I_{i,j})}$$

Where:

w_i = The sampling weight of the ith respondent.
$X_{i,j}$ = An indicator (1 or 0) of whether response i,j was "top-box" or not,
$I_{i,j}$ = An indicator of whether a response was provided for respondent I and question j.

Table 6 below provides an example of how the composite score is calculated for the Nursing Communications composite, where there are six respondents. The example does not use weighted data and thus follows the equations above as if w_i is always 1.

Table 6. Example table of Nursing Communications question responses.

Respondent	Question 1 Response	Question 2 Response	Question 3 Response
1	Always (1)	Always (1)	Always (1)
2	No answer (Missing)	Sometimes (0)	No answer (Missing)
3	Never (0)	Never (0)	Usually (0)
4	Usually (0)	Always (1)	Always (1)
5	Always (1)	Sometimes (0)	Sometimes (0)
6	Usually (0)	Usually (0)	Always (1)
Question Score	2 out of 5 = 40%	2 out of 6 = 33.3%	3 out of 5 = 60%

The composite would then be 44% = (40% + 33.3% + 60%)/3.

4.3.3 Variance Estimation and Statistical Testing

TRISS reporting includes statistical tests of significance for percentages and means. Three primary classes of tests are:

1. Tests for a facility for one quarter versus the last.
2. Tests for a facility versus a rolled up value such as region, service branch, or MHS. This can be generalized to a service branch versus the MHS, for example.
3. Tests for a facility, region, service branch, or MHS versus HCAHPS Benchmark.

4.3.3.1 Variance Estimation

The generalized form of a variance estimate for an individual item from a stratified design is:

$$(\widehat{X}) = \sum_{h=1}^{H} \left(\frac{N_h}{N}\right)^2 \left(1 - \frac{n_h}{N_h}\right) \sum_{i=1}^{n_h} (x_i - \widehat{X}_h)^2$$

The actual variances are greater than $V^1(\widehat{X})$ due to corrections to the weights accounting for non-response, so the variance is adjusted by using the following functional form:

$$V(\widehat{X}) = V^1(\widehat{X}) \times [1 + CV^2(w)]$$

$CV^2(w)$ is the coefficient of variation of the weights.

4.3.3.2 Statistical Testing

Reports have statistical tests of significance when indicated. The reports include statistical tests for percentages and means. The tests for the three classes are discussed in turn.

4.3.3.2.1 Tests for a Facility for One Quarter Versus the Previous

This test is equivalent to a *t*-test between two proportions since each result is from an independent sample. The results are always weighted, and the tests are based on the effective sample sizes and not the unweighted sample size. Effective sample size reflects the additional variability in the results due to the weights. The test statistic is:

$$T = \frac{P_t - P_{t-1}}{\sqrt{Var(P_t) + Var(P_{t-1})}}$$

Where P_t is the result at quarter t, and P_{t-1} is the result for the preceding quarter. $Var(P_t)$ is easily calculated using:

$$Var(P_t) = \frac{P_t(1 - P_t)}{n}\left(1 + CV^2(w)\right) = \frac{P_t(1 - P_t)}{n^*}$$

Where n^* is the effective sample size, $n^* = n / \left(1 + CV^2(w)\right)$

More difficult tests are those between two HCAHPS composite estimates. The difficulty is in the calculation of the variance of the composite. For the composite:

$$C = \frac{\sum_{j=1}^{k} P_j}{k}$$

The variance has the form:

$$Var(C) = \sum_{j=1}^{k} Var(P_j) + 2 \sum_{j=1}^{k} \sum_{1=j}^{k} 2\ Cov(P_j, P_1)$$

The test between two composites from mutually exclusive or independent samples is based on the test statistic:

$$T = \frac{C_t - C_{t-1}}{\sqrt{Var(C_t) + Var(C_{t-1})}}$$

4.3.3.2.2 Tests for a Facility Versus a Rolled-Up Value

This test must account for the overlap of the sample for the facility and the roll up. Ipsos has created efficient coding to allow this test within a large reporting system. The test for overlapping samples, such as a test between a facility and the facility's region, includes the facility's score in the region's score. If the second composite, C_2, is the rolled up score (e.g., the region), the test is:

$$T = \frac{C_1 - C_2^{o}}{\sqrt{Var(C_1) + Var(C_2)}}$$

C_2^{o} is the composite for the rolled score with the cases from C_1 removed.

4.3.3.2.3 Tests for TRISS Score Versus the HCAHPS Benchmark

In the case of testing TRISS scores against the HCAHPS Benchmark where C_2 is the HCAHPS benchmark, estimates for $Var(C_2)$ are needed. Table 7 provides estimates for Standard Error for $C_2 = \sqrt{Var(C_2)}$.These are based on the published benchmark scores from 2012 through 2014.

Table 7. Estimated standard errors for HCAHPS benchmarks.

Benchmark Report	Comm. w/ Nurses	Comm, w/ Doctors	Responsiveness of Hosp. Staff	Pain Mgmt.	Comm. about Medicines	Cleanliness of Hosp Env.
2012-2014	0.77	0.60	1.13	0.50	1.04	0.60

Quietness of Hosp. Env.	Discharge of Info.	Care Transition	Overall Hospital Rating	Recomm. the Hospital	Number of Hospitals	Response Rate
54	79		63	67	2,521	34%

4.3.4 Sample Weighting

This section describes the statistical weighting approached applied to the TRISS data. The statistical weights are used to:

1. **Adjust data in the case of unbalanced representation due to the sample design**. The sampling plan for Purchased Care sample randomly selects a sample from each facility to achieve 300 completed surveys regardless of the size of the facility. Each facility has its own probability of selection. The Direct Care sampling plans selects 100% of all eligible patients, so each patient has a probability of selection of 1.
2. **Adjust data for known non-response patterns in TMA surveys**. These patterns may introduce bias into the results. The weights mitigate or correct for this potential bias.
3. **Correct for period-to-period and cross population estimation**. The target population fluctuates from quarter-to-quarter and the PC population is smaller than the DC population. The weights are corrected to allow for estimation of results for the entire quarter and for month-to-month estimates.

The first step calculates weights to account for the design. The general formula for the design weight is

$$dw_i = \frac{\frac{N_{k,h}}{N_k}}{\frac{n_{k,h}}{n_k}} = K^{N_{k,h}}/_{n_{k,h}}$$

Here $N_{k,h}$ is the total number of discharges for the stratum or facility h with population k (k is Direct Care CONUS, Direct Care OCONUS, or Purchased Care), N_k is the total number of discharges for the population, $n_{k,h}$ is the number of completes for stratum h, and n_k is the total number of completes for population k. K is an adjustment factor to assure the weights sum to a designated amount. We separated Direct Care CONUS and OCONUS to deal with very different contact rates for these populations. The DC design weights are then adjusted to bring the weighted proportions into alignment for CONUS and OCONUS populations.

The second step used ratio raking weight adjustments to correct the weighted sample distribution under the design weights to the quarter's demographic and population subgroups totals. The totals are provided in table 8 for Direct Care and table 9 for Purchased Care.

Table 8. Direct Care population targets for Quarters 1 and 2 FY 2015.

Weighting Variables		Targets				Totals	
		Quarter 1 FY 2015		Quarter 2 FY 2015			
		N	%	*N*	%	*N*	%
Age	Under 65	18,173	80.73	27,048	79.41	45,221	79.93
	65+	4,339	19.27	7,014	20.59	11,353	20.07
Marital status	Divorced/widowed	1,950	8.66	3,141	9.22	5,091	9.00
	Single	18,183	80.77	27,372	80.36	45,555	80.52
	Married	2,280	10.13	3,440	10.10	5,720	10.11
	Unspecified	99	0.44	109	0.32	208	0.37
Beneficiary category	Active Duty	5,528	24.56	8,371	24.58	13,899	24.57
	ADFM	7,711	34.25	10,876	31.93	18,587	32.85
	Retirees under 65	4,958	22.02	7,849	23.04	12,807	22.64
	Retirees 65+	4,315	19.17	6,966	20.45	11,281	19.94
MFT service branch	Army	11,380	50.55	17,426	51.16	28,806	50.92
	U.S. Air Force	2,913	12.94	4,523	13.31	7,447	13.16
	Navy	5,999	26.65	8,900	26.13	14,899	26.34
	NCR	2,220	9.86	3,202	9.40	5,422	9.58

Table 9. Purchased Care population targets for Quarters 1 and 2 FY 2015.

Weighting Variables		Targets				Totals	
		Quarter 1 FY 2015		Quarter 2 FY 2015			
		N	%	*N*	%	*N*	%
Age	Under 65	5,346	40.59	10,241	51.52	15,605	47.15
	65+	7,852	59.41	9,636	48.48	17,488	52.85
Marital status	Divorced/widowed	2,545	19.25	3,333	16.77	5,878	17.76
	Single	10,250	77.56	15,752	79.25	26,002	78.57
	Married	343	2.60	693	3.49	1,036	3.13
	Unspecified	78	0.59	99	0.50	177	0.53
Beneficiary category	Active Duty	544	4.12	1,040	5.23	1,584	4.79
	ADFM	2,062	15.60	3,916	19.70	5,978	18.06
	Retirees under 65	2,758	20.87	5,285	26.59	8,043	24.30
	Retirees 65+	7,852	59.41	9,636	48.48	17,488	52.85
TRICARE service region	North	3,442	26.04	4,801	24.15	8,243	24.91
	South	7,234	54.74	10,794	54.30	18,028	54.48
	West	2,540	19.22	4,285	21.54	6,822	20.61

4.3.5 Patient and Mode Mix Adjustment

Not every hospital has the same mix of patients as another. Research has shown significant differences in results depending on the mix of patients and whether a hospital's HCAHPS survey used a telephone only, mail only, or mixed mode methodology.[4,5] CMS has created adjustments algorithms for each HCAHPS composite and reportable item accounting for result differences due to the type of product (medical, surgical, or obstetrics), education, health status, language of person, patient age and response rate of survey.[6]

The HCAHPS Patient and Mode Mix adjustment algorithm first adjusts the results by patient mix and then adjusts for survey administration mode. HCAHPS adjustments for survey mode are generally larger than adjustments for patient-mix.[7]

4.3.5.1 Patient and Mode Mix (PMM) Adjustment Model

The PMM Adjustment model adjusts "Top Box" results and the "Bottom Box" separately for each composite. The TRISS website only reports "Top Box" at this time. Every quarter, CMS releases updated adjustment parameters for the following HCAHPS composites:

- **Communication with Nurses**: Composite of three four-point scale questions.
- **Communication with Doctors**: Composite of two four-point scale questions.
- **Responsiveness of Hospital Staff:** Three four-point scale questions.
- **Pain Management**: Composite of two four-point scale questions.
- **Communication about Medicines**: Composite of two four-point questions.
- **Cleanliness of Hospital Environment**: Individual question.
- **Quietness of Hospital Environment**: Individual question.
- **Discharge Information**: Composite of six yes-no questions.
- **Overall Hospital Rating**: Single 0 to 10 point scale question.
- **Recommend the Hospital**: Single five-point scale question.
- **Care Transition Measures**: Composite of two questions.

The PMM adjustment model is:

$$Y' = \hat{Y} + PMA + M$$

where Y' is the PMM adjusted score for the CMS composite, $\hat{Y}$ is the unadjusted TRISS score for the composite, PMA is the hospital specific patient-mix adjustment for the composite, and M is the published mode adjustment for the composite. The order of estimation is:

1. Calculation of TRISS hospital scores and measures,
2. Calculation of the patient-mix adjustment for the hospital, and
3. Addition of the TRISS score, the patient-mix adjustment and the mode component.

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[4]O'Malley, A.J., Zaslavsky, A.M., Elliott, M.N., Zaborski, L., and Cleary, P.D. (2005). "Case-Mix adjustment of the CAHPS Hospital Survey." *Health Services Research*, *40*(6), 2162–2181.
Jha, A.K., A Orav, E.J., Zheng, J., and Epstein, A.M. (2008). "Patients' Perception of Hospital Care in the United States," N*ew England Journal of Medicine*, *359*(18), 1921–1931.
[5]Elliott, M.N., Zaslavsky, A. M., Goldstein, E., Lehrman, W., Hambarsoomians, K., Beckett, M.K., and Giordano, L. (2009). "Effects of Survey Mode, Patient Mix, and Nonresponse on CAHPS® Hospital Survey Scores," *Health Services Research*, *44*(2), 501–518.
[6]http://www.hcahpsonline.org. Centers for Medicare & Medicaid Services, Baltimore, MD. Month, Date, Year the page HCAHPS.org, (2013), Patient-Mix Coefficients for July 2014 Publicly Reported HCAHPS Results, http://www.hcahpsonline.org/files/Coefficients_for_July_2014_Public_Reporting_03-18-2014.pdf.
[7]Mode and Patient-Mix Adjustment of the CAHPS® Hospital Survey (HCAHPS) April 30, 2008," http://www.hcahpsonline.org.

4.3.5.2 Patient Mix Adjustment (PMA)

The PMA is a linear adjustment with parameters reported each quarter based on multiple regression analyses. The model is:

$$PMA = \sum_{j=1}^{15} a_j(h_j - m_j)$$

This adjustment is just for patient-mix, where a_j are the adjustment regression coefficients supplied by the CMS for each of 15 factors[8], h_j are the patient-mix adjustment category means for the hospital, and m_j are the CMS supplied national patient-mix adjustment category means. Included in the adjustments are factors for age and product line, and the interaction between age and product line. It also accounts for differences in education level, language skills, time between date of release and survey completion, and self-reported health status.

The specific demographics included in the adjustment model are:

- Education (Q24 – ordinal) – Included in the model as the mean of the six scale points with:

  1. 8th grade or less.
  2. Some high school, but did not graduate.
  3. High school graduate or GED.
  4. Some college or 2-year degree.
  5. 4-year college graduate.
  6. More than 4-year college degree.

- Overall Health (Q23 – scalar) – Included in the model as the mean of the five-point scale with:

  1. Excellent.
  2. Very Good.
  3. Good.
  4. Fair.
  5. Poor.

- Non-English Language Spoken (Q27 – English spoken is reference category) – Included in the model as a categorical/dummy variable:

  - Non-specific language (prior to October 2013 discharges).
  - Spanish (post-October 2013 discharges).
  - Chinese (post-October 2013 discharges).
  - Russian, Vietnamese, Other (post-October 2013 discharges).

[8]The HCAHPS website posts the new coefficients every quarter for patient-mix and mode mix, http://www.hcahpsonline.org/modeadjustment.aspx.

- Age (8 categories used as categorical scale) – Included in the model as a categorical/dummy variable:

    1. 18–24.
    2. 25–34.
    3. 35–44.
    4. 45–54.
    5. 55–64.
    6. 65–74.
    7. 75–84
    8. 85 or older (reference age category).

- Product line (Categorical – 3 categories with Medical as reference category) – Included in the model as a categorical/dummy variable:

    - Medical.
    - Surgical.
    - Obstetrics.

- Product line by Age interaction:

    - Obstetrics*Age – MATAGE (Age used as ordinal scale).
    - Surgical * Age – SURGAGE (Age used as ordinal scale).

- Response Percentile – A quasi-measure of response rate:

    - Response Percentile = Lag time rank/Monthly sample size.

CMS publishes every quarter an updated HCAHPS Benchmark for each of its reported composites. Appendix C reports the December 2014 adjustment parameters (a_j) from the CMS website. Comparisons to the benchmarks assume the basic protocols are maintained. An overview of the protocols is:

- A patient must have been admitted to hospital overnight for care under an eligible DRG code.
- The contact with the respondent must occur within 42 days of the discharge date.
- All respondents must be U.S. residents.
- The questions must follow the exact HCAHPS question wordings and response scales.
- The interview can be administered by mail alone, phone alone, or mail with phone follow-up.

Table 10 provides the national means (m_j) reported by CMS for December 2014.

Table 10. PMA means.

Patient-Mix Adjustment (PMA)	National Mean
Education (per level; 1 = 8th grade or less and 6 = more than 4-year college degree)	3.737
Self-rated health (per level; 1 = excellent and 5 = poor)	2.749
Responsible Percentile	15.5%
Non-English Primary Language	
Non-specific languages*	6.7%
Spanish**	4.6%
Chinese**	0.4%
R/V/O (Russian, Vietnamese, Other)**	1.8%
English (REFERENCE)	93.2%
Age	
18–24	4.3%
25–34	11.3%
35–44	7.1%
45–54	10.8%
55–64	18.8%
65–74	23.0%
75–84	17.6%
85+ (REFERENCE)	7.1%
Service Line	
Maternity	13.8%
Surgical	35.6%
Medical (REFERENCE)	50.6%
Interactions	
Surgical line * Age 1	1.887%
Maternity Line * Age 1	0.29%

*January 2013 to September 2013 discharges.
**Post October 2013.

4.3.5.3 Mode Mix Adjustment

As noted earlier, HCAHPS adjustments for survey mode are usually larger than adjustments for patient-mix. Mode mix adjustments provide increases and decreases in the Top Box and Bottom Box scores based on the mode of survey administration. CMS releases model adjustments for Telephone only, Mixed, and Active IVR, as shown in table 11. Mail only is the reference group. The TRISS uses a mixed-mode protocol.

Table 11. HCAHPS survey mode adjustments of Top Box and Bottom Box percentages (after PMA) to adjust other modes to a reference of mail.

	Bottom Box			Top Box		
	Phone Only	Mixed	IVR	Phone Only	Mixed	IVR
HCAHPS Composite Measures						
Communication with Nurses	-0.8%	-0.5%	-0.6%	-4.0%	-0.3%	-1.8%
Communication with Doctors	-2.2%	-1.4%	-1.2%	-1.3%	1.0%	-0.3%
Responsiveness of Hospital Staff	-0.2%	-1.9%	-1.4%	-4.7%	0.1%	-1.9%
Pain Management	-0.6%	-0.9%	-1.3%	-4.7%	-2.3%	-3.4%
Communication about Medicines	0.5%	-1.4%	-1.5%	-3.9%	-0.9%	-1.6%
Discharge Information	1.3%	-0.2%	3.2%	-1.3%	0.2%	-3.2%
Care Transition	2.6%	0.6%	-3.1%	-3.3%	-3.0%	1.0%
HCAHPS Individual Items						
Cleanliness of Hospital Environment	1.0%	0.4%	0.6%	-5.5%	-2.1%	-1.9%
Quietness of Hospital Environment	-1.4%	0.9%	1.4%	-6.3%	-3.1%	-10.2%
HCAHPS Global Items						
Overall Hospital Rating	0.9%	-1.1%	0.8%	-2.8%	-1.8%	-1.6%
Recommend the Hospital	0.4%	-0.4%	0.1%	-4.4%	-1.4%	-2.2%

4.3.5.4 Statistical Testing of Adjusted Scores

The test for comparing the PMM adjusted TRISS score versus the HCAHPS Benchmark is the same as a test between two mutually exclusive or independent samples. The test statistic is:

$$T = \frac{C_1 - C_2}{\sqrt{Var(C_1) + Var(C_2)}}$$

Where C_1 is the TRISS score Y', and C_2 is the HCAHPS benchmark score.

The variance of the TRISS score Y' can be written as:

$$Var(Y') = Var\left(\hat{Y} + PMA + M\right) = Var\left(\hat{Y}\right) + Var(PMA) + Var(M) = Var\left(\hat{Y}\right) + Var(PMA)$$

The values for the Mode adjustments are not revised each quarter, so $Var(M)$ is zero.

$Var(\hat{Y})$ is the variance or the square of the standard error of a TRISS estimate[9]. $Var(PMA)$ is based on the variance of a mean value under a multiple regression model, where:

$$PMA = \tilde{Y} - \hat{\mu} = \left[a_0 + \sum_{j=1}^{15} a_j h_j\right] - \left[a_0 + \sum_{j=1}^{15} a_j m_j\right] = \left[\sum_{j=1}^{15} a_j h_j\right] - \left[\sum_{j=1}^{15} a_j m_j\right]$$

[9]The variance for a roll up of two or more facilities is $Var(\hat{P}) = \sum_{h=1}^{H}\left[1 - \frac{n_h}{N_h}\right]\left(\frac{N_h}{N}\right)^2 \hat{P}_h\left(1 - \hat{P}_h\right) \Big/ n_h^* = \sum_{h=1}^{H}\left[1 - f_h\right] W_h^2\, Var(\hat{P}_h)$ with $n_h^* = n_h / (1 + CV_h^2(w))$.

The expression for $Var(PMA)$[10] expands to be:

$$Var(PMA) = Var\left(\sum_{j=1}^{15} a_j h_j\right) + Var\left(\sum_{j=1}^{15} a_j m_j\right) =$$
$$\left[\sum_{j=1}^{15} (h_j - m_j)^2 V(a_j) + 2\sum_{j=1}^{15}\sum_{k>j} (h_j - m_j)(h_k - m_k)\, Cov(a_j, a_k)\right] +$$
$$\left[\sum_{j=1}^{15} (m_j - m_j)^2 V(a_j) + 2\sum_{j=1}^{15}\sum_{\mathrm{k>j}}^{15} (m_j - m_j)(m_k - m_k)\, Cov(a_j, a_k)\right] =$$
$$\left[\sum_{j=1}^{15} (h_j - m_j)^2 V(a_j) + 2\sum_{j=1}^{15}\sum_{k>j}^{15} (h_j - m_j)(h_k - m_k)\, Cov(a_j, a_k)\right]$$

The test statistic for the Patient and Mode Adjusted TRISS estimate versus C_2 is:

$$T = \frac{Y' - C_2}{\sqrt{Var(Y') + Var(C_2)}}$$

Ipsos estimates the variances and covariances for the adjustment coefficients using the 2012–2014 quarterly adjustment coefficients. The TRISS Survey and Sample Design Plan reports tables with these values.

[10]Variance expression is based on variance of the mean predicted from a multiple regression. See Chaterjee and Price (1991), *Regression Analysis by Example,* Wiley, New York, NY.

5 RESULTS

Results are reported for data during the first and second quarters of FY 2015. The discharge periods for this data are as follows:

All scores reported here have been weighted (see section 4.3.4 for a discussion of data weighting). In addition, Patient and Mode Mix Adjustments are applied to all data reported at the facility level, Care Type level (i.e., DC or PC aggregated), or across the entire MHS. Adjustments are not possible for data reported below the facility level, such as means by Product Line, age group, or other demographic variables. See Section 4.3.5 for a discussion on adjustments and under what circumstances they are applied.

The following sections provide a detailed review of the FY 2015 TRISS data. Sections are organized as follows:

- **Section 5.1** includes a description of the survey population in terms of demographic variables.
- **Section 5.2** provides patient satisfaction scores of individual facilities on key measures.
- **Section 5.3** provides scores for the eleven primary HCAHPS measures, organized by various demographic and MHS categories (Product Line, Service Branch, and TRICARE Region).
- **Section 5.4** provides a comparison on FY 2015 results to FY 2014 results.
- **Section 5.5** describes analyses on the determinants of patient satisfaction.

5.1 Demographics of the Survey Population

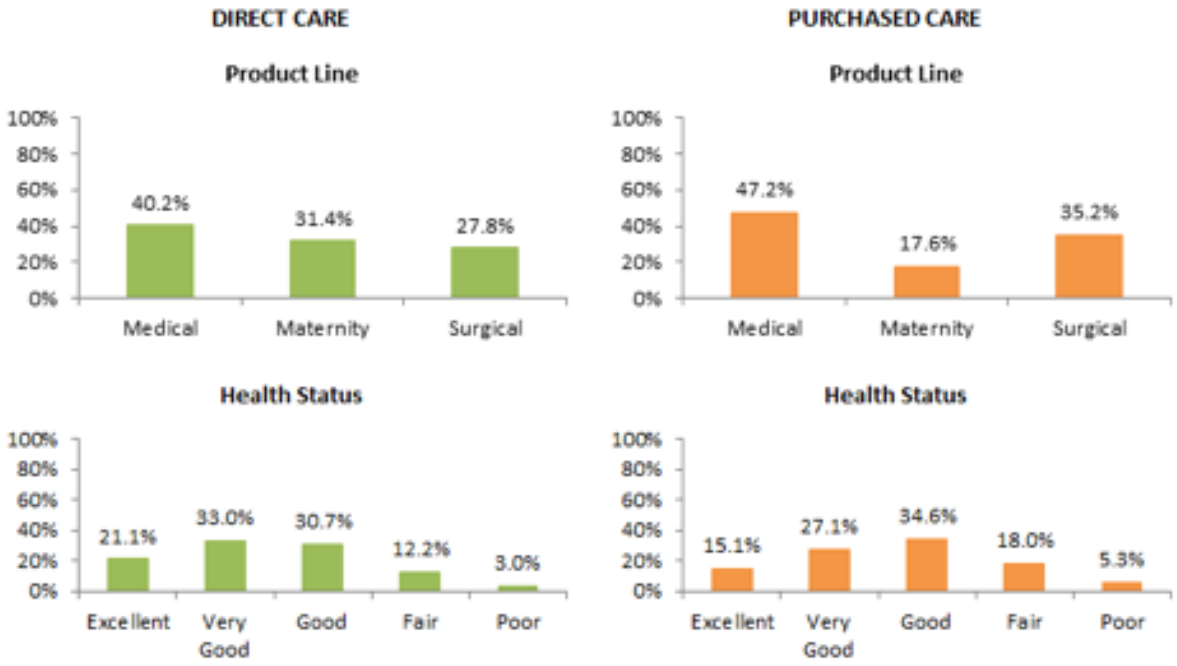
The Quarters 1 and 2 FY 2015 TRISS dataset includes 21,905 DC patients and 12,058 of PC patients for a total of 33,963 respondents. Demographics of each Care Type are discussed below and show in figure 2 on the following page.

The TRISS sample consists of a higher proportion of white respondents than respondents of any other race category (75% and 85% among DC and PC, respectively), and more women than men (65% and 58% among DC and PC, respectively). A majority of respondents received at least some post-high school education (78% and 71% among DC and PC, respectively).

There are notable differences between the DC and PC survey populations in terms of age and beneficiary category distribution. The PC sample includes more respondents that are 65 years of age or older than DC (59% and 20% for PC and DC, respectively). Accordingly, there are more respondents in the beneficiary category ‘retirees and dependents 65+’ in PC than in DC (59% and 20%, respectively; these values are parallel to the age proportions).

Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 2. Demographics of Direct Care and Purchased Care respondents. ***Figure continues on next page.***



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 2, *continued*. Demographics of Direct Care and Purchased Care respondents.

5.1.1 Direct Care Demographics (TRISS Respondents)

Most Direct Care inpatient respondents fall in the 25–34 age group (28.5%), followed by 45–64 (23.4%), 65+ (19.6%), 18–24 (16.1%), and finally 35–44 (12.5%). Most respondents are either on active duty (24.7%) or are family members of active duty personnel (33.0%). Retirees and dependents below the age of 65 comprise 22.8% of respondents, while those aged 65 or above comprise 19.5% of respondents. Most Direct Care inpatients are female (64.8%). In terms of race, a large majority of patients are white, with this group making up 75.3% of respondents, followed by Black or African American (17.5%).

In terms of highest level of education achieved, 17.3% of respondents reported graduating from a 4-year college, while 18.3% managed to get additional education beyond the undergraduate level. In addition, 42% of inpatients reported having some college experience or a 2-year degree. High school graduates or those with GED comprised 20.1% of respondents. Only 2.3% of respondents did not attain a high school degree.

5.1.2 Purchased Care Demographics (TRISS Respondents)

Purchased Care inpatients are generally much older than Direct Care inpatients. Most Purchased Care respondents fall under the 65+ age group (59%), followed by 45–64 (18.6%), 25–34 (12.0%), 18–24 (5.8%), and finally the 35–44 age group (4.6%). Purchased Care respondents are more likely to be retirees or dependents. A total of 59% of Purchased Care respondents were retirees or dependents over the age of 65, while 21% were retirees or dependents under the age of 65.Those on active duty comprised only 4.3% of respondents, while their families comprised 15.7% of respondents. There is a smaller gender gap in Purchased Care respondents compared to Direct Care respondents, with 58.1% identifying as female. A majority of PC respondents are White (85.3%) followed by 11.2% Black or African American.

In terms of education, 40.7% of respondents have some college experience or a 2-year degree, followed by 24.3% of respondents who earned a high school degree or GED as their highest educational achievement. A total of 14% of respondents graduated with a 4-year degree, while 15.9% gained additional education beyond undergraduate school. Only 5.0% of respondents did not attain a high school degree.

5.2 Performance of Individual Facilities

A comprehensive table of scores aggregated by Care Type (MHS overall, Direct Care, Purchased Care), TRICARE region, and facility can be found in appendix E (HCAHPS measures) and appendix F (DoD-specific questions). In this section, we present facility scores categorized by Care Type (Direct or Purchased Care) relative to CMS percentile. More information on CMS percentile quartiles can be found at http://www.hcahpsonline.org/SummaryAnalyses.aspx#percentile. Percentiles are shown in table 12.

Table 12. HCAHPS Percentiles: April 2015 Public Report (July 2013–June 2014 discharges).

Hospital Percentile	Overall Hospital Rating	Recommend Hospital
95th (near best)	86	87
90th	82	83
75th	76	78
50th	71	72
25th	65	65
10th	60	59
5th (near worst)	56	55

Seven Direct Care facilities stand out as "top performers," scoring in the75th percentile or higher on the two global HCAHPS measures: Overall Hospital Rating and Recommend the Hospital. Percentile rankings of Direct Care facilities are shown in figure 3 (Overall Hospital Rating) and figure 4 (Recommend the Hospital). These seven facilities include two NCR hospitals, two Air Force hospitals, two Navy hospitals, and one Army hospital:

- Keesler Medical Center (81st Medical Group).
- Fort Belvoir Community Hospital (formerly DeWitt Army Community Hospital.
- Naval Hospital Guam.
- Walter Reed National Medical Center.
- Naval Hospital Pensacola.
- Wright Patterson Medical Center (88th Medical Group).
- Brooke Army Medical Center.

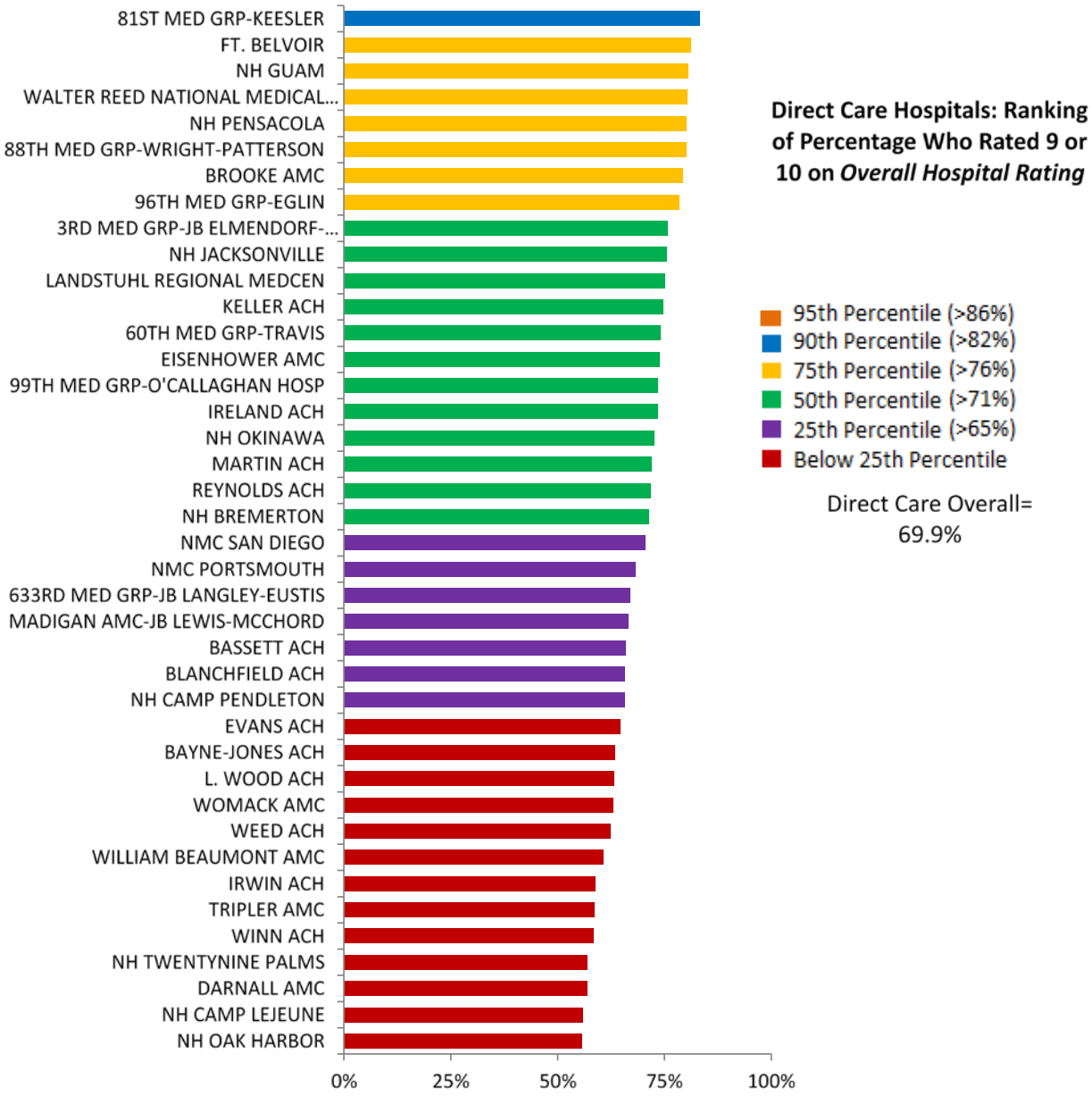
Eighteen Purchased Care facilities stand out as top performers, scoring the75th percentile or higher on the two primary HCAHPS measures of Overall Hospital Rating and Recommend the Hospital. Percentile rankings of Purchased Care facilities are shown in figure 5 (Overall Hospital Rating) and figure 6 (Recommend the Hospital). These 18 facilities include 6 North region hospitals, 6 South region hospitals, and 6 West region hospitals:

- University of North Carolina Hospitals (North region).
- Mercy Hospital Springfield (West region).
- St. Luke's Regional Medical Center (West region).
- University of Colorado Hospital (West region).
- Sharp Memorial Hospital (West region).

- Flowers Hospital (South region).
- Vanderbilt University Hospital (South region).
- Vidant Medical Center (North region).
- FirstHealth Moore Regional Hospital (North region).
- Community Hospital of the Monterey Peninsula (West region).
- New Hanover Regional Medical Center (North region).
- Sacred Heart Medical Center (South region).
- Inova Fairfax Hospital (North region).
- Sentara Norfolk General (North region).
- Baptist Medical Center (FL) (South region).
- Huntsville Hospital (South region).
- University of Alabama Hospital (South region).
- Penrose Hospital, CO (West region).

5.2.1 Overall Hospital Rating (Global Rating)

Adult MHS beneficiaries were asked to rate their hospital on a scale of 0 to 10, with 0 being the "worst hospital possible" and 10 being the "best hospital possible." Figure 3 on the next page shows the Rating of Hospital top-box rates for Direct Care. Top box rates are those who rated their hospital a "9" or "10." Keesler Medical Center (81st Medical Group) ranked within the top 10% of HCAHPS national ratings. Three military hospitals ranked in the top 5 and 10% of HCAHPS national ratings for patients reporting that they would "definitely" recommend their hospital to others: Naval Hospital Guam-Agana (91.7%), Keesler Medical Center (81st Medical Group) (86.7%), and Walter Reed National Medical Center (83.1%). Twenty MTFs earn marks above the 50th percentile line, with twenty falling below this mark, as well, suggesting that MTF results are comparable to the greater population. There are 14 MTFs not shown due to low base size.

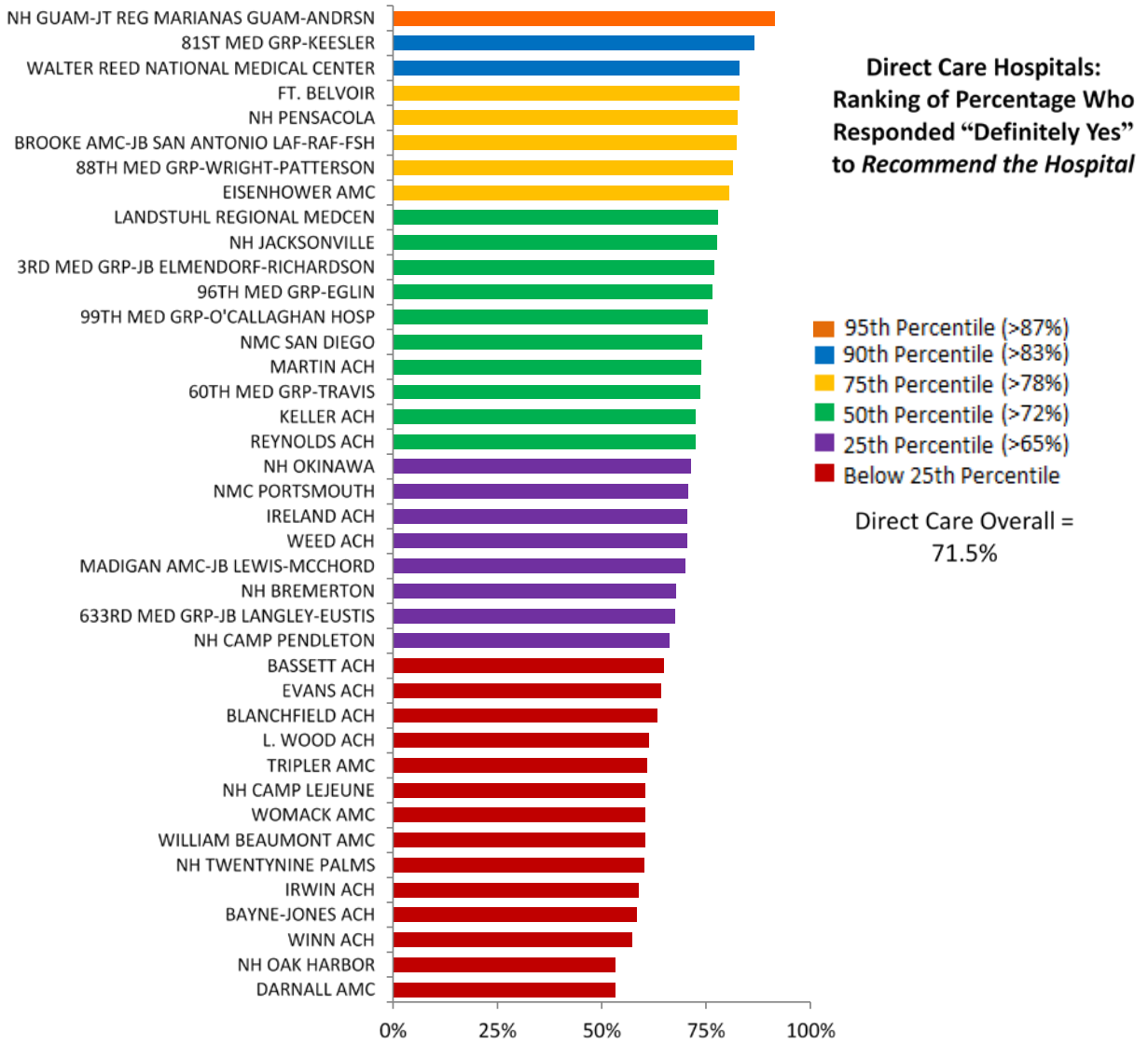


Note: This figure shows the percentage of 9 or 10 responses to question 21, "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?"

Figure 3. Direct Care hospitals—ranking overall hospital rating scores.

5.2.2 Recommend the Hospital (Global Rating)

Figure 4 shows the ranking of MTFs based on responses of "Definitely Yes" to Recommend the Hospital for Direct Care respondents for Quarters 1 and 2 of FY 2015. Three military hospitals ranked in the top 5 and 10% of HCAHPS national ratings for patients reporting that they would "definitely" recommend their hospital to others: Naval Hospital Guam-Agana (91.7%), Keesler Medical Center (81st Medical Group) (86.7%), and Walter Reed National Medical Center (83.1%).



Note: This figure shows the percentage of "definitely yes" responses to question 22, "Would you recommend this hospital to your friends and family?"

Figure 4. Direct Care hospitals—ranking recommend hospital to family and friends.

Figure 5 below shows the ranking for Overall Hospital Ranking of Purchased Care hospitals for Quarters 1 and 2 of FY 2015. University of North Carolina scores above the 95th percentile with a score of 92.5%. There are two facilities that earn scores over the 90th percentile of HCAHPS civilian scores: Mercy Hospital Springfield (85.7%) and St. Luke's Regional Medical (82.2%). Overall, PC hospitals scored 69.0% for Overall Hospital Rating. Thirty-eight hospitals earn score above the 50th percentile, while thirty-six fall below the 50th percentile. There is one hospital not shown due to low base size.

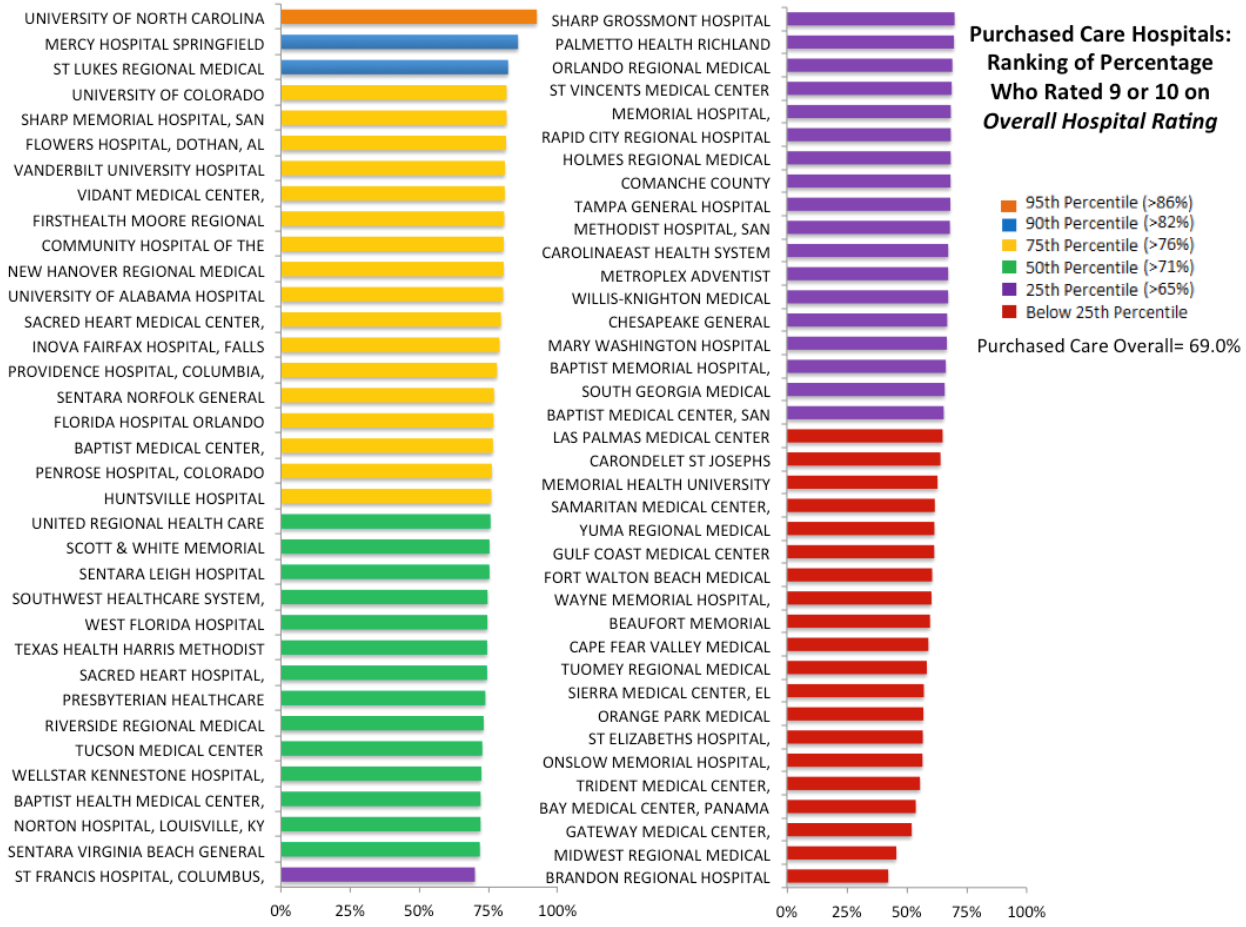


Figure 5. Purchased Care hospitals—ranking overall hospital rating scores.

Figure 6 below shows the ranking of Recommend the Hospital among Purchased Care hospitals during Quarters 1 and 2 of FY 2015. Overall, PC Hospitals scored 71.0%. Forty-two hospitals scored above the 50th percentile mark for HCAHPS, while 30 fell below the 50th percentile mark. There are four hospitals not shown due to low base size.

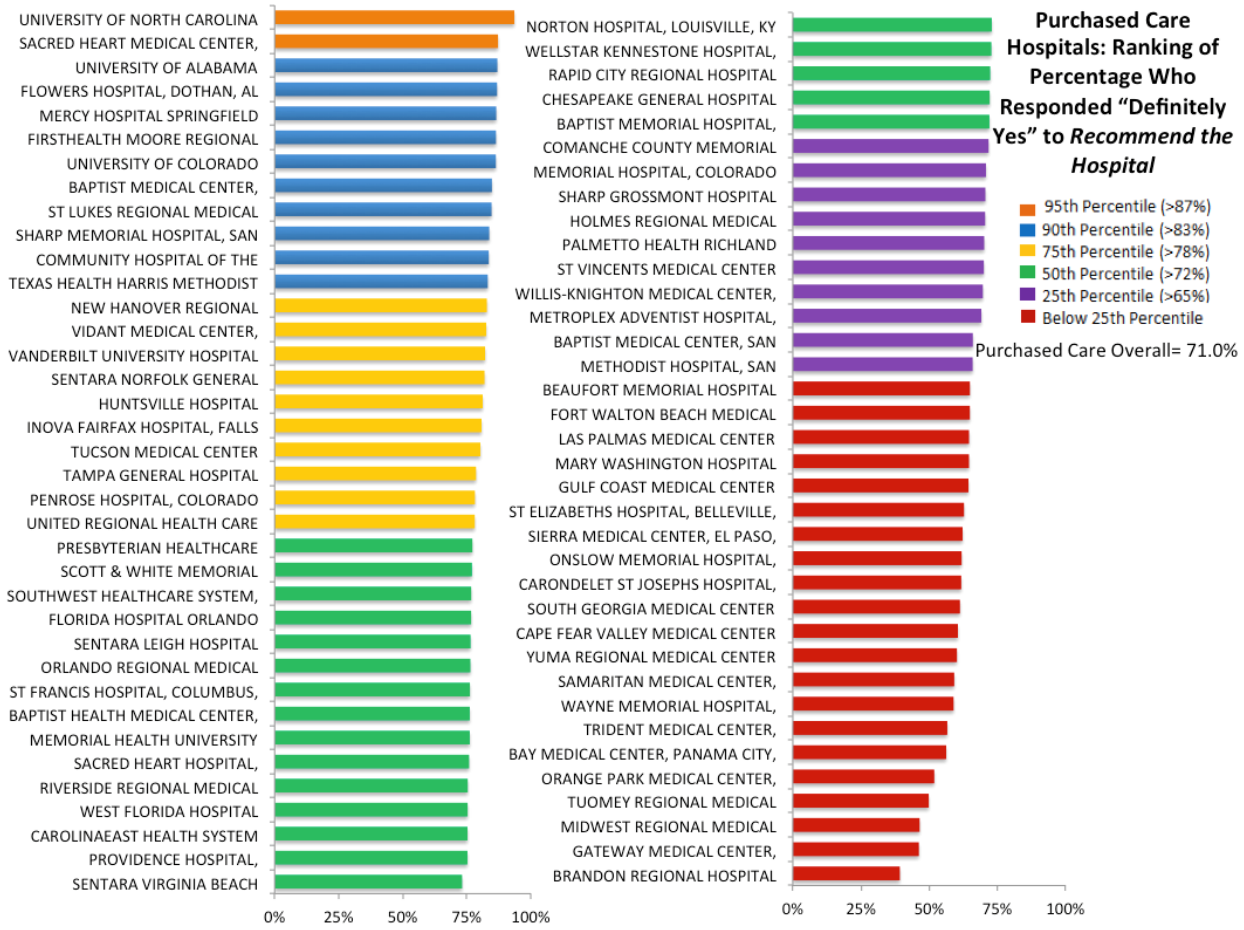


Figure 6. Purchased Care hospitals—ranking recommend the hospital to family and friends.

Figure 7 on the following page shows the ranking for Communication with Doctors of MTFs used by Direct Care respondents for Quarters 1 and 2 of FY 2015. There are two facilities that scored over the 95th percentile of HCAHPS civilian scores, namely Ireland Army Community Hospital-Fort Knox (92.9%) and the 88th Medical Group at Wright Patterson (91.1%). There are six hospitals that scored over the 90th HCAHPS percentile: Martin Army Community Hospital-Fort Benning (90.3%), Landstuhl Regional Medical Center (90.1%), Keller Army Community Hospital-West Point (89.5%), the 96th Medical Group at Eglin (89.2%), Reynolds Army Community Hospital-Ft. Sill (89.1%), and Naval Hospital Guam (89.0%). An additional 15 MTFs were above the 75th percentile, 14 above the 50th percentile, and 3 below the 50th percentile. Overall Direct Care facilities scored 85.5%. Fourteen MTFs are not shown due to low base size.

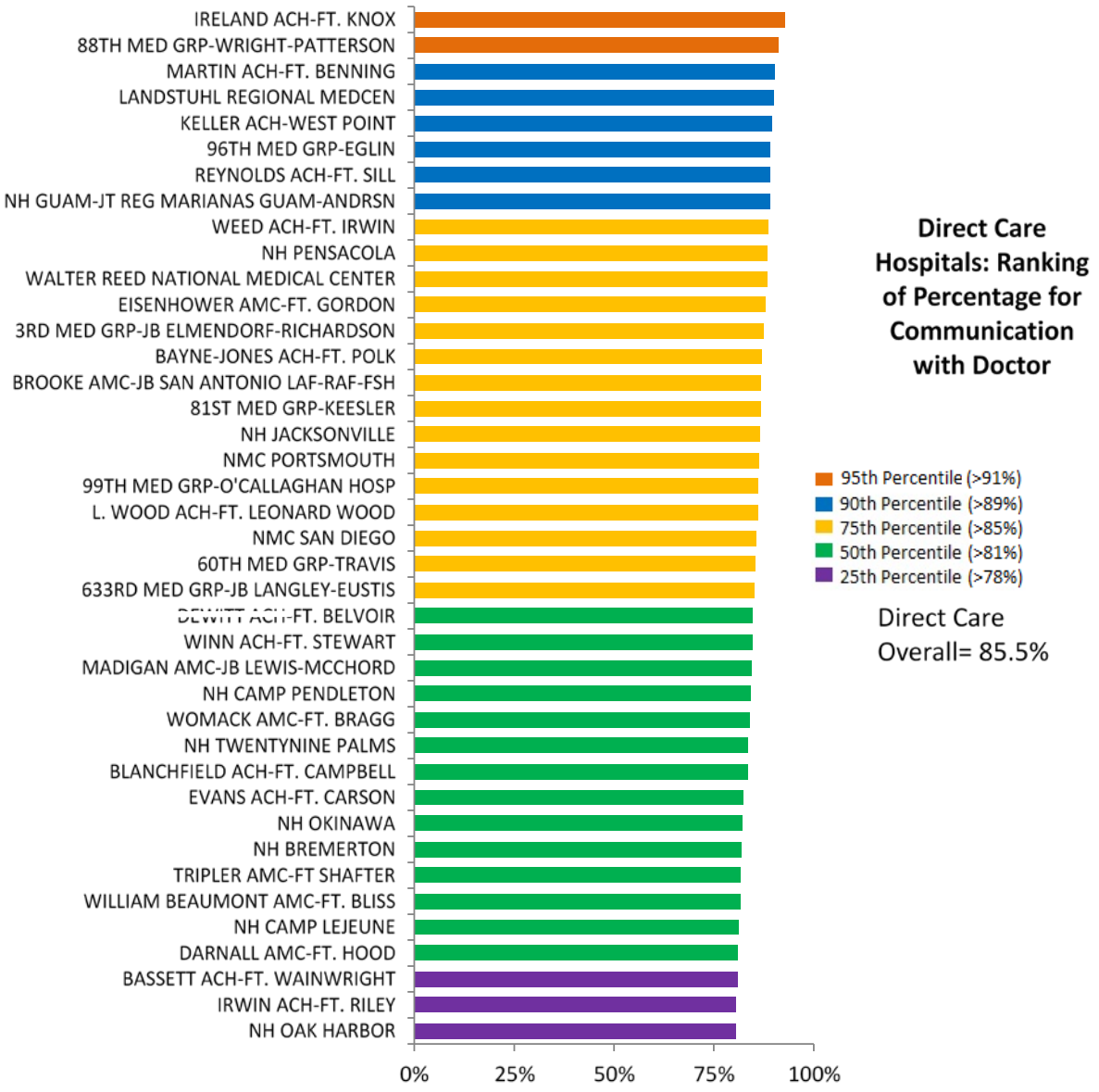


Figure 7. Direct Care hospitals—ranking communication with doctor scores.

Figure 8 on the following page shows the ranking for Communication with Nurses of MTFs for Direct Care respondents for Quarters 1 and 2 of FY 2015. The 88th Medical Group at Wright-Patterson leads this measure with a score of 90.8%. This puts the facility above the 95th percentile when compared to civilian HCAHPS scores, alongside the 81st Medical Group at Keesler with 89.5% and the 3rd Medical Group at JB Elmendorf-Richardson with 89.3%. An additional 8 facilities score above the 90th percentile, 17 above the 75th percentile, 9 above the 50th percentile, and 3 below the 50th percentile. Overall Direct Care facilities scored an 83.6%. Fourteen MTFs are not shown due to low base size.

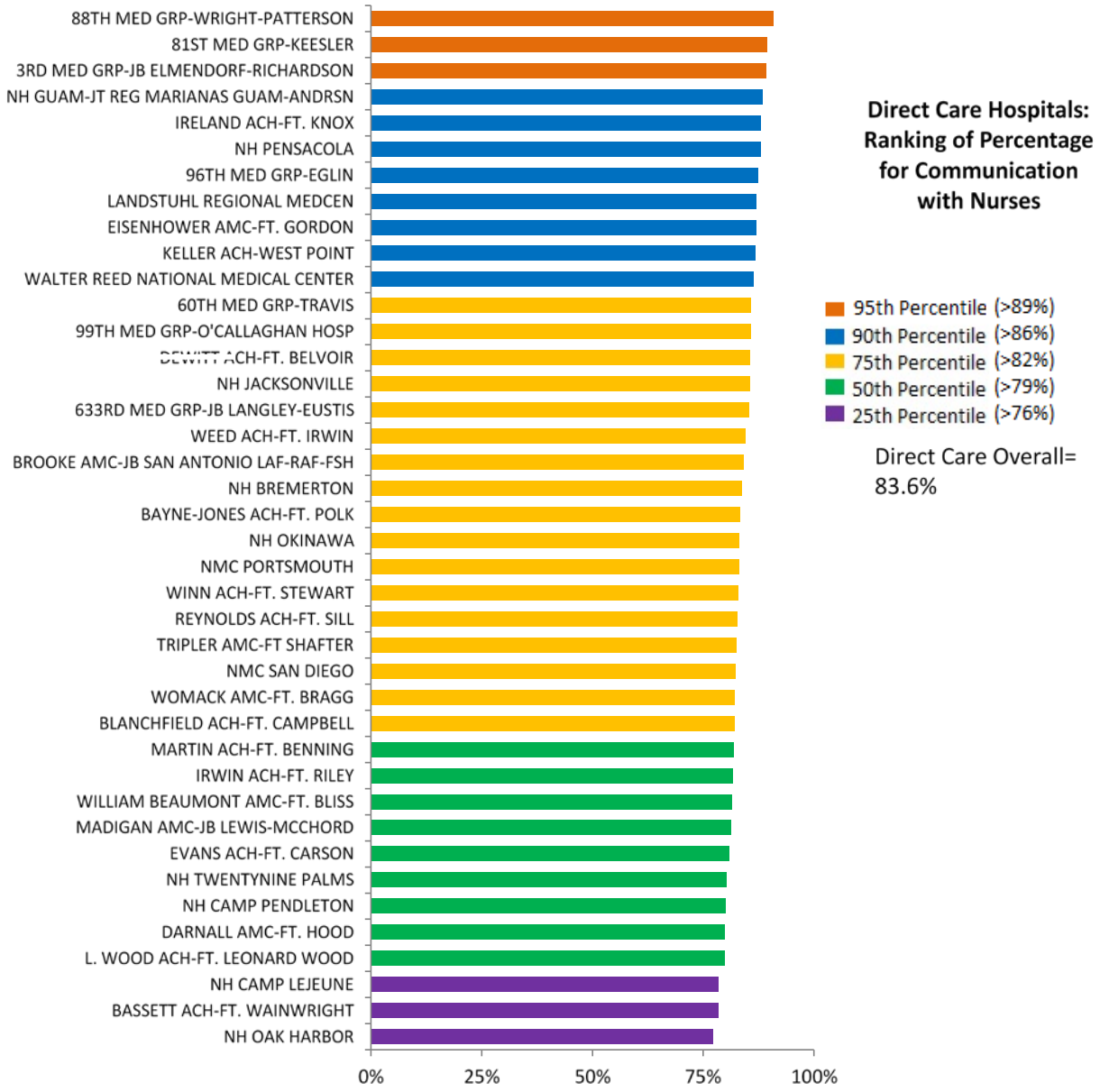


Figure 8. Direct Care Hospitals—ranking communication with nurses scores.

Figure 9 below shows the ranking for Communication with Doctors for Purchased Care respondents for Quarters 1 and 2 of FY 2015. Only one Purchased Care hospital surveyed scores over the 95th percentile of HCAHPS civilian scores: University of North Carolina Hospitals (94.2%). The next two highest-scoring hospitals are Comanche County Memorial Hospital (88.7%) and Memorial Health University Medical (86.5%), with scores above the 75th percentile. In total, 34 hospitals scored above the 50th percentile, while 39 scored below. Hospitals located in the North fared the best with a score of 80.9%, followed by the South with 79.8%, and finally the West with 79.1%. Overall Purchased Care facilities scored 79.3%. One hospital is not shown due to low base size.

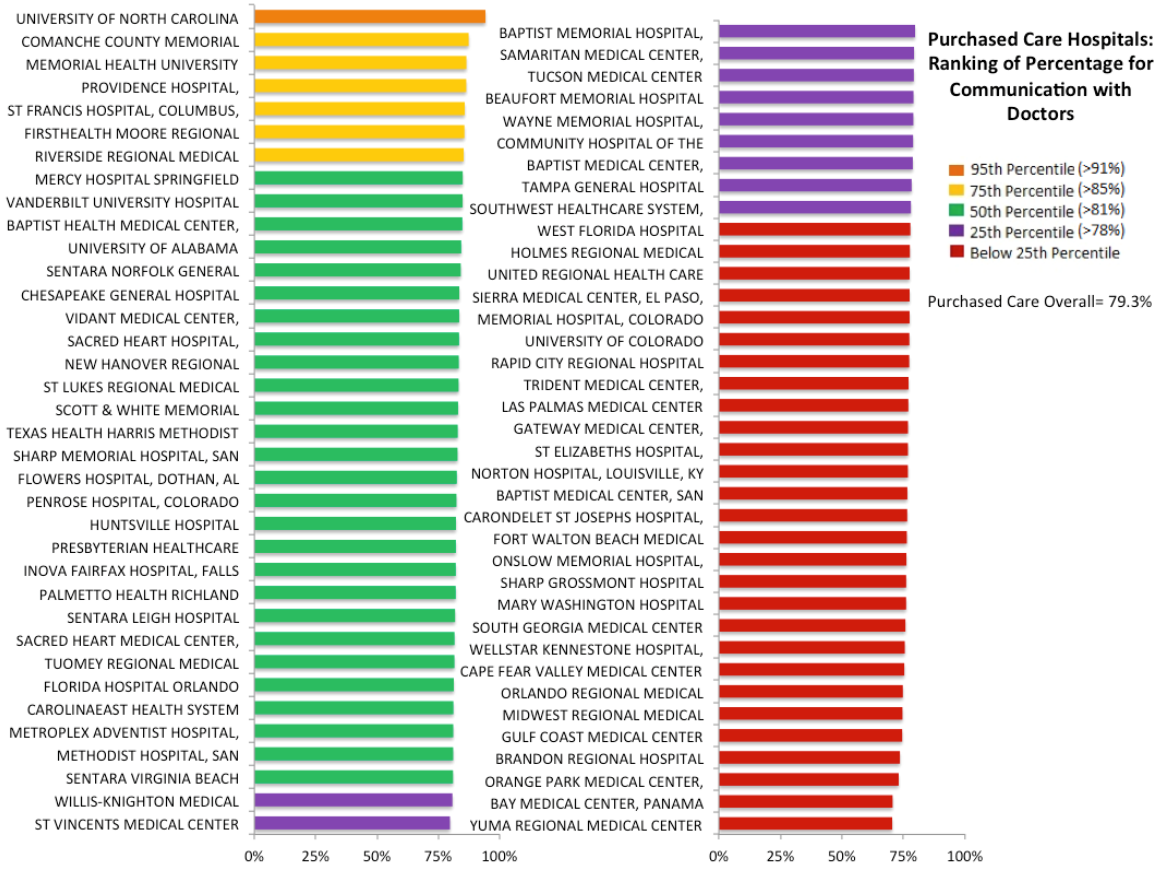


Figure 9. Purchased Care hospitals—ranking communication with doctor scores.

Figure 10 below shows the ranking for Communication with Nurses for Purchased Care respondents for Quarters 1 and 2 of FY 2015. University of North Carolina hospitals scored in the top 5% of HCAHPS scores with 91.7%. An additional four hospitals scored above the 90th percentile. These hospitals include Flowers Hospital (88.0%), FirstHealth Moore Regional (87.5%), Florida Hospital Orlando (86.3%), and Mercy Hospital Springfield (86.2%). In total, 39 hospitals scored above the 50th percentile, while 34 scored below. Overall Purchased Care hospitals scored 78.5%. Regionally, the North fared best with 79.5%, followed by the West (78.7%), and finally the South (77.9%). One hospital is not shown due its low base size.

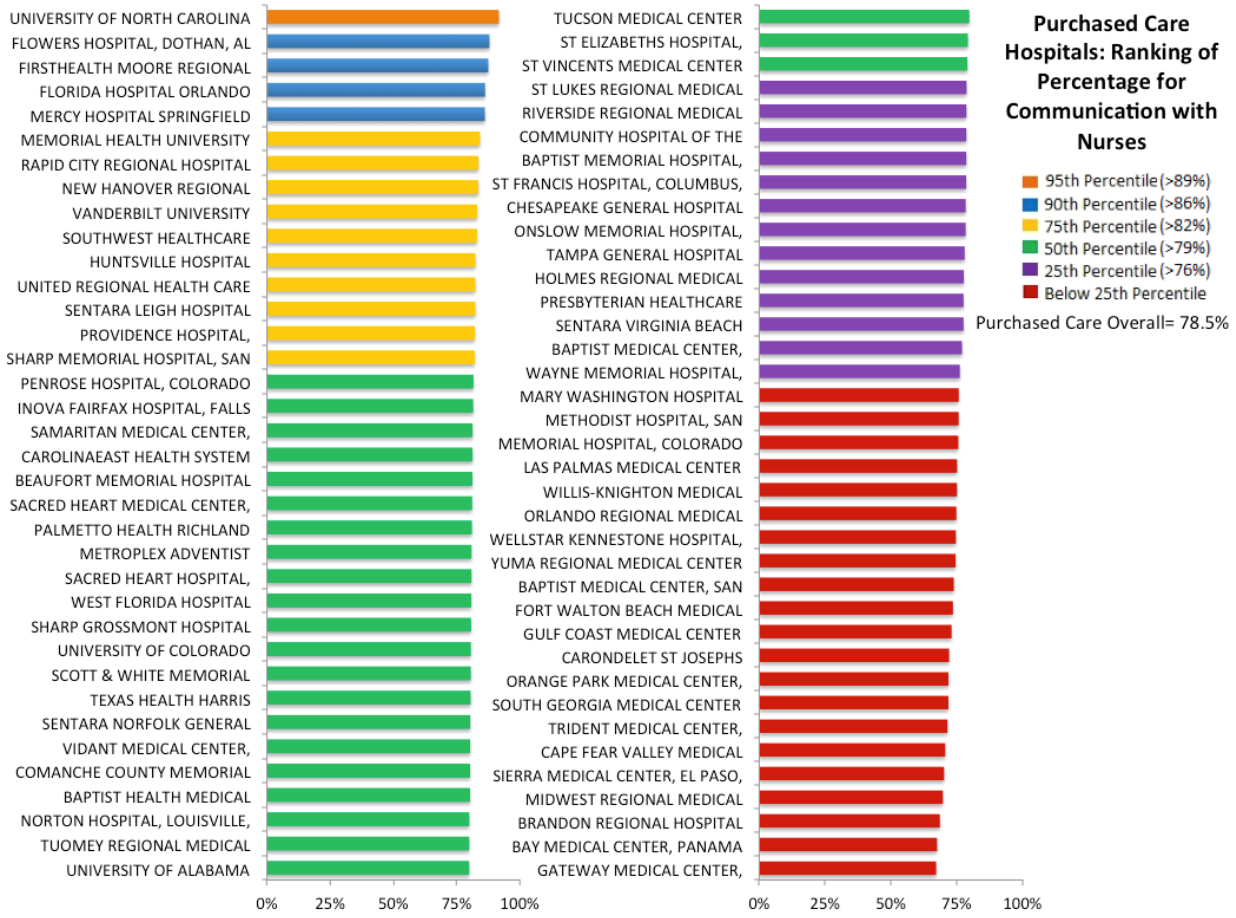


Figure 10. Purchased Care hospital—ranking communication with nurses scores.

5.3 Detailed Analysis of HCAHPS Scores

An overview of the TRISS measures can be found in section 4.3.2, and the survey instrument can be found in appendix D. Comprehensive tables of scores aggregated by Care Type (MHS overall, Direct Care, Purchased Care), TRICARE region, and facility can be found in appendix E (HCAHPS measures) and appendix F (DoD-specific questions). Results of HCAHPS measures are presented in this section.

Table 13 shows adjusted scores for the eleven primary measures. Figure 11 displays the data in table 13 in graph form. Aggregating the data for all MHS facilities, the satisfaction reported by beneficiaries met the HCAHPS benchmarks for all 11 primary measures. Satisfaction reported by beneficiaries across the MHS exceeded the HCAHPS benchmark on five measures: Communication with Nurses, Communication with Doctors, Communication about Medicines, Responsiveness of Hospital Staff, and Discharge Information.

The MHS aggregated results are largely driven by the DC scores, as DC accounts for almost two-thirds of the sample. As such, the DC results mirror the overall results: DC users report satisfaction significantly greater than the HCAHPS benchmarks on the same five measures (Communication with Nurses, Communication with Doctors, Communication about Medicines, Responsiveness of Hospital Staff, and Discharge Information).

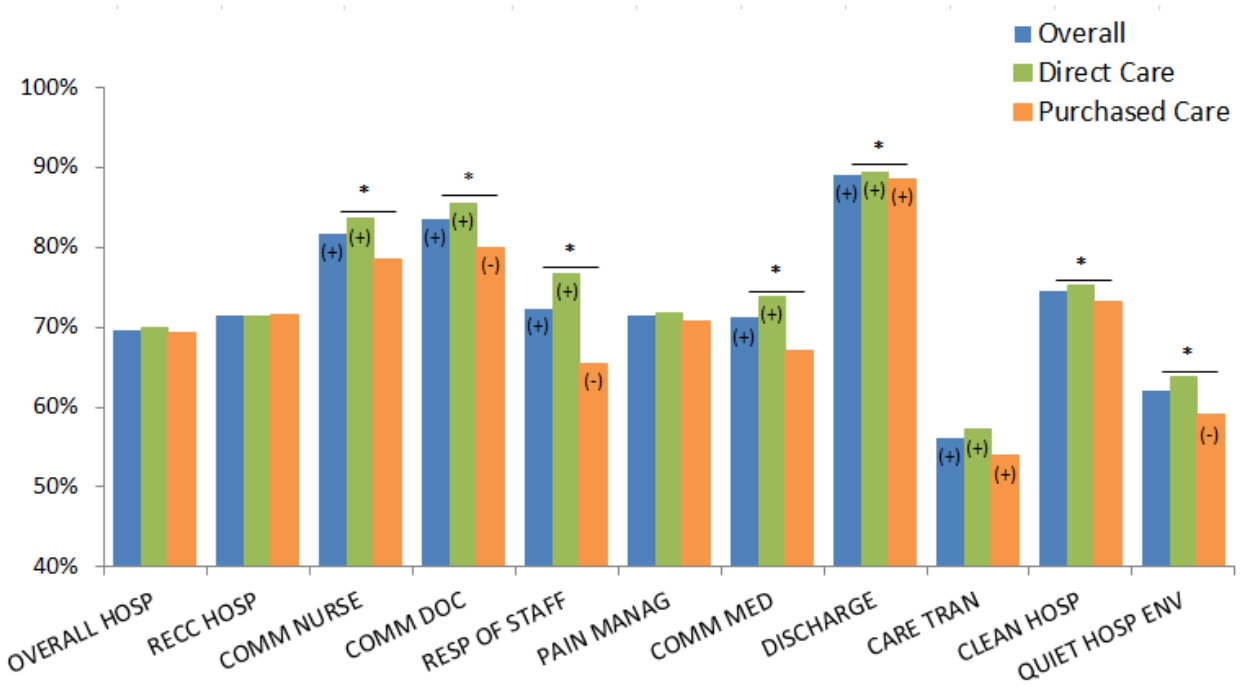
Satisfaction among PC users is significantly greater than the HCAHPS benchmark on one measure: Discharge Information. Satisfaction among PC users is significantly lower than the HCAHPS benchmarks on three measures: Communication with Doctors, Responsiveness of Hospital Staff, and Quietness of the Hospital Environment. Direct comparison of DC and PC scores shows that DC users report significantly greater PC users on seven measures: Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, Communication about Medicines, Discharge Information, Cleanliness of Hospital Environment, and Quietness of Hospital Environment.

The next sections provide detailed descriptions of the results for each measure.

Table 13. Comparisons of HCAHPS scores for MTF Overall and Care Type.

Measure	MHS Overall (%)	DC (%)	PC (%)	Benchmark Scores (%)	DC and PC Significantly Different
Overall Hospital Rating	69.7	69.9	69.3	71	*n.s.*
Recommend the Hospital	71.5	71.5	71.6	71	*n.s.*
Communication with Nurses	81.7 (+)	83.6 (+)	78.5	79	DC > PC
Communication with Doctors	83.5 (+)	85.5 (+)	80.0 (-)	82	DC > PC
Responsiveness of Hospital Staff	72.3 (+)	76.6 (+)	65.5 (-)	68	DC > PC
Pain Management	71.5	71.9	70.7	71	*n.s.*
Communication about Medicines	71.3 (+)	73.8 (+)	67.0	65	DC > PC
Discharge Information	89.0 (+)	89.3 (+)	88.6 (+)	86	DC > PC
Care Transition	56.1	57.3	54.0	52	*n.s.*
Cleanliness of Hospital Environment	74.5	75.2	73.3	74	DC > PC
Quietness of Hospital Environment	62.1	63.9	59.0 (-)	62	DC > PC

Note: A plus (+) sign indicates that the score is significantly greater than the benchmark, and a minus (-) sign indicates that the score is significantly less than the benchmark. The last column indicates significant differences between DC and PC scores.

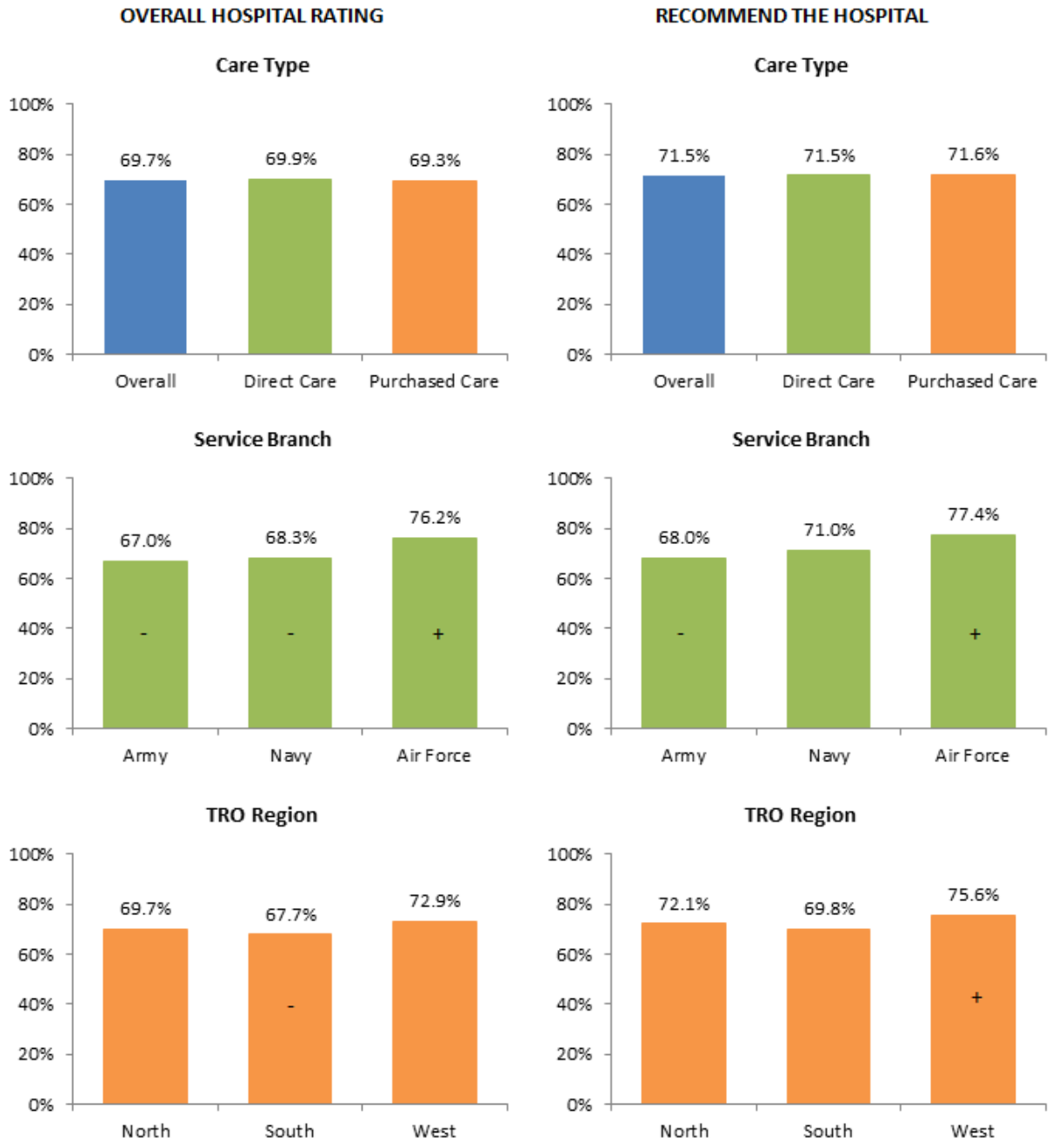


Note: A plus (+) sign inside a bar indicates that the score is significantly greater than the benchmark, while a minus (-) sign indicates that the score is significantly less than the benchmark. Horizontal bars marked with asterisks (*) indicate a significant difference between the DC and PC values. All statistical tests use $\alpha = 0.05$ as the threshold for significance.

Figure 11. HCAHPS scores by care type.

5.3.1 Overall Rating

Figure 12 shows both Overall Hospital Rating and Recommend the Hospital scores by Care Type, service branch (for DC), and TRO (for PC).



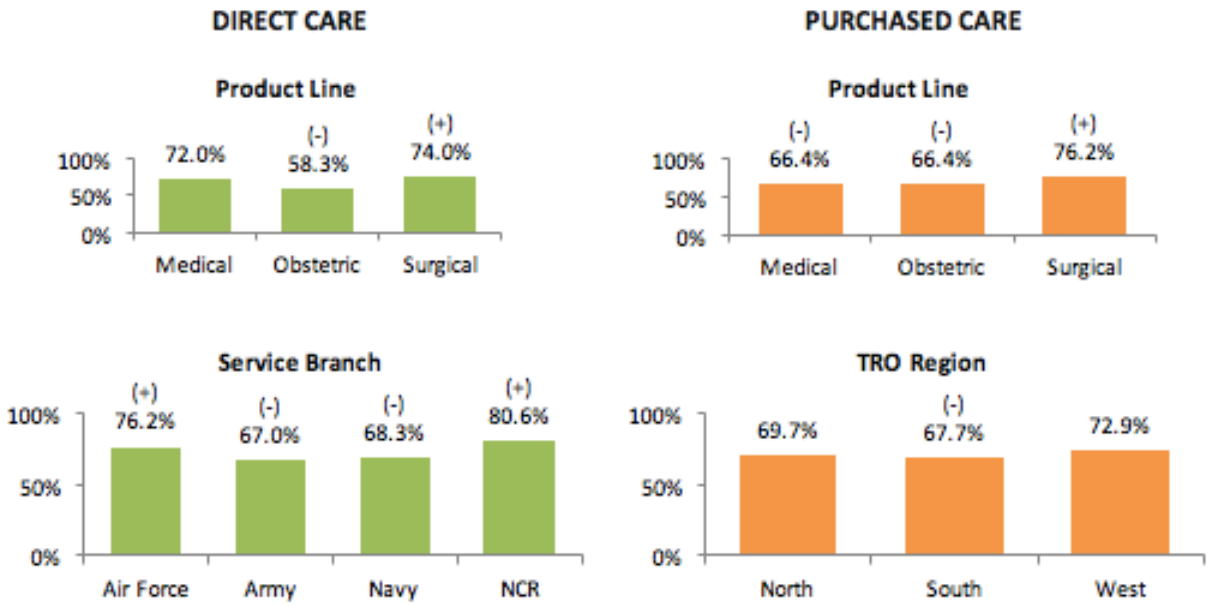
Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 12. Overall hospital rating (left) and recommend the hospital (right) scores by care type, service branch, and TRO region.

Figure 13 shows Overall Hospital Rating scores aggregated on four demographic variables as well as product line.

Note: Adjusted scores are not available for these analyses; the figure shows unadjusted scores only. A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 13. Overall hospital rating scores by care type and demographic group. ***Continued on next page.***



Note: Adjusted scores are not available for these analyses; the figure shows unadjusted scores only. A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 13, *continued.* Overall hospital rating scores by care type and demographic group.

Direct Care users gave a score of 69.9% for the Overall Hospital Rating score, while Purchased Care users gave a score of 69.3%; this difference is not significant. When aggregated, TRICARE users score their Overall Rating of their inpatient experiences as 69.7%. None of these scores are statistically significant different from the HCAHPS Benchmark of 71%.

Of Direct Care MTFs, there are 10 with scores significantly higher than the HCAHPS Benchmark. These facilities include 3rd Medical Group, JB Elmendorf-Richardson (75.8%), Naval Hospital Pensacola (80.2%), Naval Hospital Jacksonville (75.5%), 96th Medical Group, Elgin (78.5%), Walter Reed National Medical Center (80.4%), 81st Medical Group, Keesler (83.2%), 88th Medical Group, Wright-Patterson (80.1%), Brooke Army Medical Center (79.2%), Fort Belvoir Community Hospital (formerly DeWitt Army Community Hospital; 81.1%), and Naval Hospital Guam (80.5%).

Both the Air Force (76.2%) and NCR (80.6%) scored above the HCAHPS benchmark, while the Army (67.0%) and the Navy (68.3%) fell short. All scores are significant. As for Purchased Care, there are no TRO scores that are significantly higher than the HCAHPS benchmark, though the South TRO scores significantly under the benchmark with a score of 67.7%.

5.3.1.1 Overall Rating Results by Demographic Group (MHS Overall)

In the aggregated data, AD members rate the Overall experiences as lower than any other beneficiary category, with a score of 59.8%. AD, along with ADFM (60.6%), exhibit scores that are significantly lower than the HCAHPS benchmark. Retirees and Dependents are more likely to rate their experiences as positive regardless of age. Retirees and Dependents under the age of 65 rate their experiences with a score of 73.6%, while Retirees and Dependents over the age of 65 rate their experiences with a score of 77.4%. Both of these scores are significantly higher than the benchmark.

In terms of age, scores increase as patients' ages increase, with the bottom three age brackets showing scores significantly lower than the HCAHPS benchmark, while the higher two brackets are significantly higher than the benchmark.

Age	Score
18–24	59.7% (-)
25–34	58.6% (-)
35–44	64.0% (+)
45–64	74.4% (+)
65+	77.4% (+)

Scores also have a positive correlation with self-reported health status. Those who report poor, fair, or good health have scores significantly lower than the HCAHPS benchmark, while those who report excellent health have scores significantly higher than the benchmark.

Health Status	Score
Poor	61.8% (-)
Fair	66.7% (-)
Good	68.0% (-)
Very Good	68.8%
Excellent	73.7% (+)

Men are much more likely to report higher scores than women. Male scores are significantly higher than the benchmark, and female scores are significantly lower. Men give an overall rating of 74.2%, and women give an overall rating of 65.8%. Lastly, product line also has an impact on scores. Visits are broken into three products: medical, obstetric, and surgical. Those who are inpatient for medical score their overall visit as 69.7%, while those who are hospitalized for surgical reasons give scores of 74.9%. This score is significantly higher than the benchmark, while Obstetric patients score a score that is significantly lower than the benchmark at 60.3%. This suggests that product line may influence the gendered scores previously reported above.

5.3.2 Recommend the Hospital

Figure 14 shows both Overall Hospital Rating and Recommend the Hospital scores by Care Type, service branch (for DC), and TRO (for PC). Aggregating Direct Care and Purchased Care, the MHS overall score for this measure is 71.5%, which is not significant against the HCAHPS benchmark of 71.0%. Individually, Direct Care visits score 71.5% and Purchased Care visits score a total of 71.6%, showing that Purchased Care visits score slightly higher than those visits in Direct Care facilities.

Of those Direct Care facilities, 14 have scores that are significantly higher than the HCAHPS benchmark. These facilities include Naval Hospital Guam (91.7%), 81st Medical Group Keesler (86.7%), Walter Reed National Medical Center (83.1%), and Fort Belvoir Community Hospital (formerly DeWitt Army Community Hospital; 83.0%), among others. Of the service branches, both the Air Force (77.4%) and NCR (83.0%) were significantly higher than the benchmark. The Navy (71.0%) did not have a significant score and the Army (68.0%) scored significantly lower than the benchmark.

There are 28 Purchased Care facilities that have scores that are significantly higher than the HCAHPS benchmark. These facilities include University of North Carolina Hospitals (93.6%), Sacred Heart Medical Center, Spokane, WA (87.2%), University of Alabama Hospitals (87.0%), and Flowers Hospital,

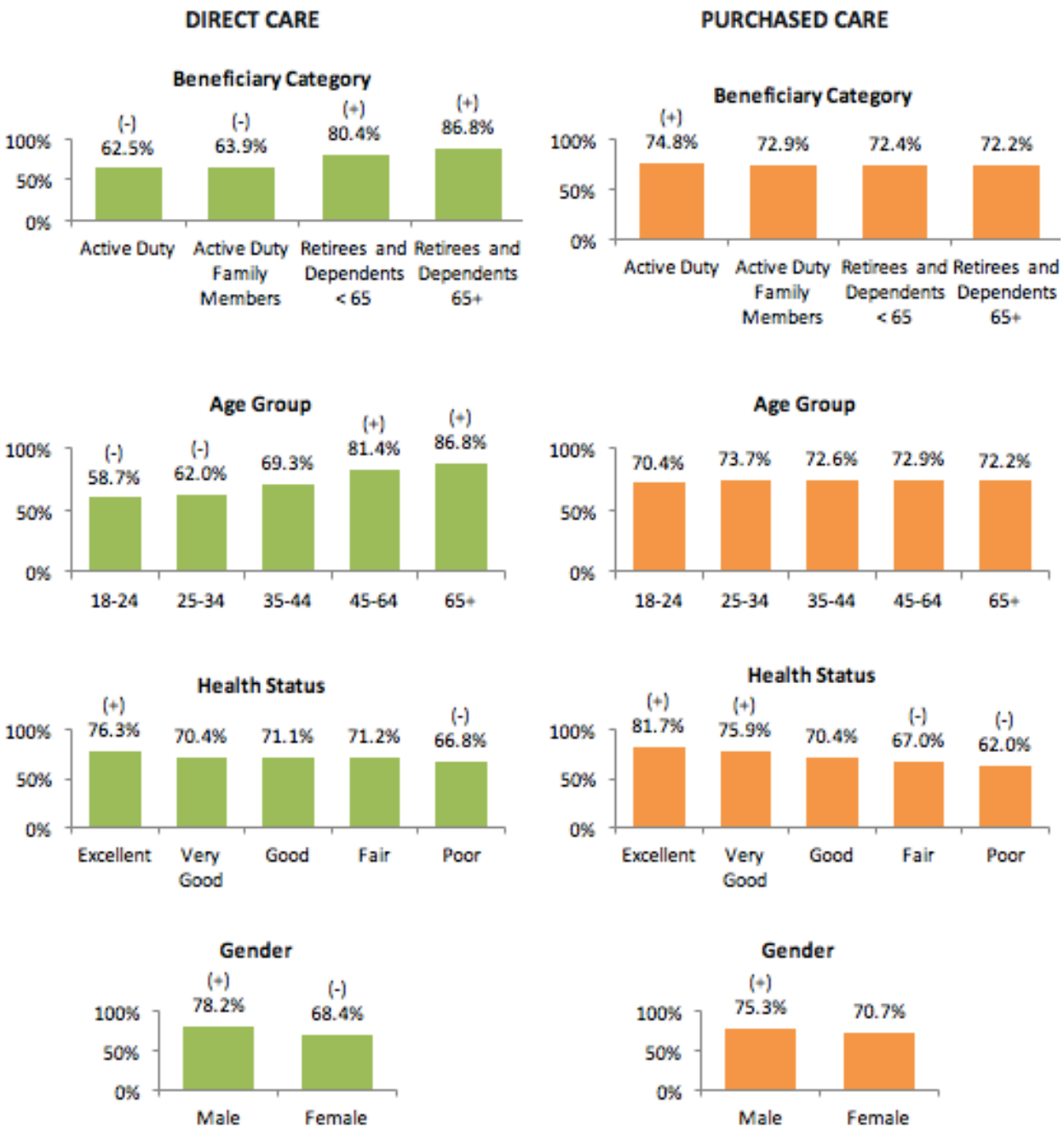
Dothan, AL (86.8%). The North region scored 72.1%, while the South region scored 69.8%. The West region is the only TRO with a score significantly different from the benchmark at 75.6%.

In the aggregated data, AD members rate the Overall experiences as lower than any other beneficiary category, with a score of 63.7%. AD, along with ADFM (66.1%), give scores that are significantly lower than the HCAHPS benchmark. Retirees and Dependents are more likely to rate their experiences as positive, regardless of age. Retirees and Dependents under the age of 65 rate their experiences with a score of 77.3%, while Retirees and Dependents over the age of 65 rate their experiences with a score of 77.9%. Both of these scores are significantly higher than the benchmark.

In terms of age, those beneficiaries that fall into lower age categories are more likely to give lower recommendation scores than those who are older. Those in the 18–24 category give scores of 60.7%, while those 25–34 give scores of 64.7%. Both are significantly lower than the benchmark. Respondents who fall within 35–44 give scores of 69.9%, which is not significant, while those who are 45–64 and 65+ give significantly higher scores, scoring 78.4% and 77.9% respectively.

There is also a relationship evident between self-reported health status and scores of recommendation. Those who self-report excellent health are more likely to give better ratings, with the overall score of 77.9%, which is significantly higher than the benchmark. Those with fair and poor health are less likely to recommend with scores significantly lower than the benchmark, at 69.3% and 64.4% respectively. Those who self-report very good health (77.2%) and good health (70.8%) do not have scores that are significant.

Male beneficiaries are more likely to recommend the facility (77.1%), while female beneficiaries are less likely (69.2%). Male scores are significantly higher and female scores are significantly lower. Finally, those who are inpatient for medical visits give an overall recommendation score of 72.2%, while those who are hospitalized for surgical reasons give scores of 77.3%. This surgical score is significantly higher than the benchmark, while Obstetric patients score a score that is significantly lower than the benchmark at 65.7%.



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

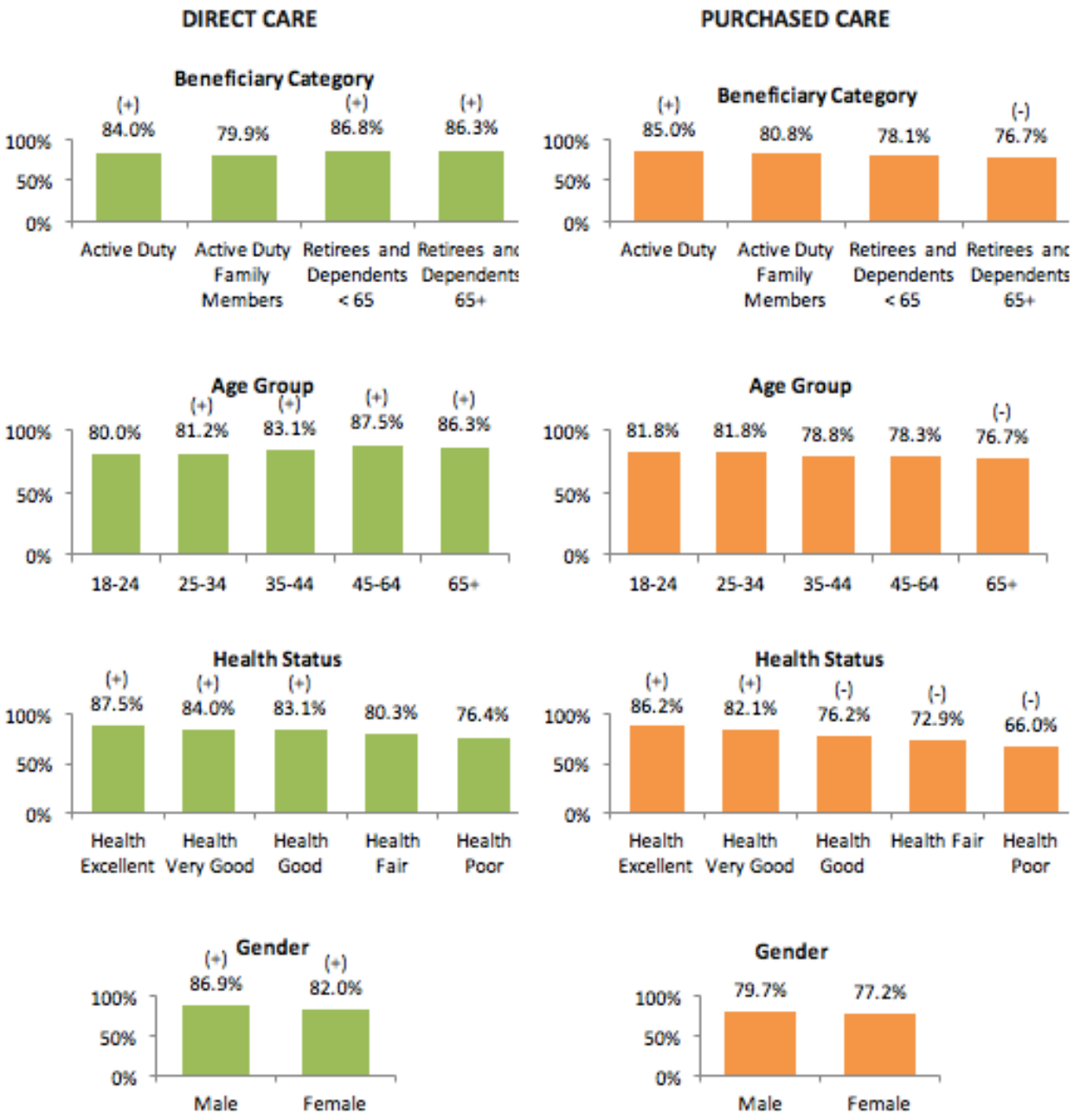
Figure 14. Recommended the hospital scores by care type and demographic group.

5.3.3 Communication with Doctors and Communication with Nurses

Figure 15 and figure 16 show results for Communication with Doctors and Communication with Nurses, respectively. Patients that were treated in Direct Care facilities provided higher scores for both measures compared to patients treated in Purchased Care facilities. Direct Care MTFs scored better in the Communication with Doctors measure (85.5%) compared to the benchmark (82.0%), while Purchased Care facilities scored lower (82.0%). When scored as an aggregate, both Direct Care and Purchased Care facilities together received a score that was higher (83.5%) than the benchmark. In the Communication with Nurses measures, both Direct Care and Purchased Care facilities scored within the benchmark (79.0%) or had scores that were significantly higher. Direct Care MTFs scored 83.6%, higher than Purchased Care facilities at 78.5%. Overall both Direct Care and Purchased Care together scored 81.7%.

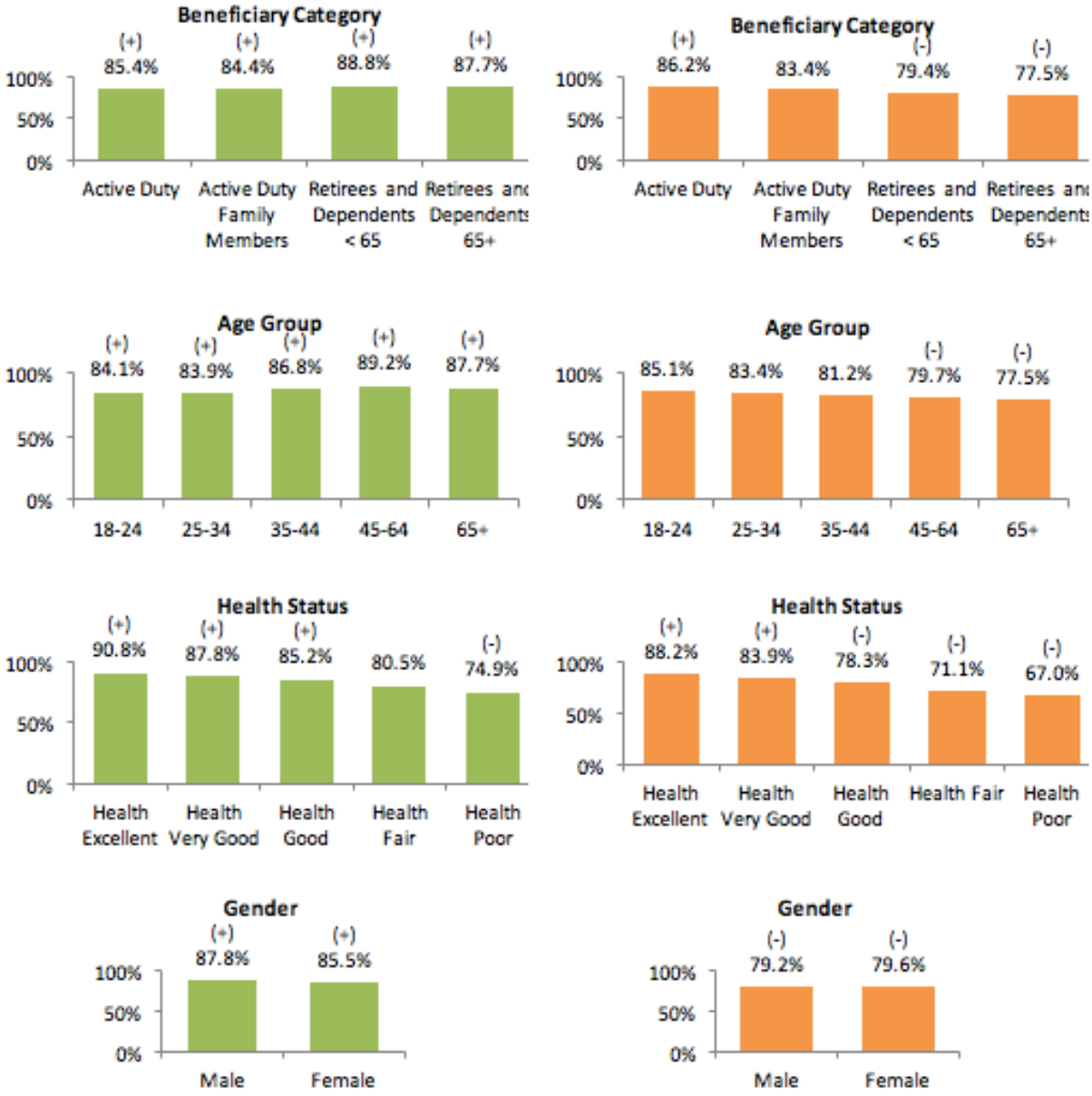
All three military branches received scores for both the Communication with Doctors and Communication with Nurses measures that were higher than their respective benchmarks. For the Communication with Doctors measure the Air Force scored best at 87.9%, followed by the Navy at 85.0%, and finally the Army at 84.8%. For the Communication with Nurses measure the Air Force scored best at 87.7%, followed by the Army at 82.7%, and finally the Navy at 82.5%. In both measures, the Air Force received the highest scores.

Purchased Care facilities in all three TRO regions did not receive scores that were significantly higher than the benchmark for both measures. For the Communication with Doctors measure, facilities located in the South and West received scores that were below the benchmark at 79.8% and 79.1%, respectively. Facilities located in the North scored within the benchmark at 80.9%. For the Communication with Nurses measure, all three regions received scores that did not differ significantly from the benchmark. The North received a score of 79.5%, the South a score of 77.9%, and the West a score of 78.8%.



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 15. Communication with Nurses scores by care type and demographic group.



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 16. Communication with Doctors scores by care type and demographic group.

5.3.4 Highlights from Remaining Measures

The sections below summarize findings for the remaining seven measures. Figure 17 through figure 23, following the text, show the results.

5.3.4.1 Responsiveness of Hospital Staff

MHS users overall report satisfaction above the benchmark (68.0%) with a score of 72.3%. Direct Care users alone gave scores higher than the benchmark at 76.6%, while Purchased Care users gave scores below the benchmark at 65.5%. Users of facilities located in the south region reported satisfaction lower than the benchmark. All three military branches had significant improvements with the Army exhibiting a score of 73.6%, the Navy with 78.5%, and the Air Force with 81.2%.

5.3.4.2 Pain Management

In terms of care type, military branch and TRO region all subdivisions were able to at least meet the benchmark (71.0%) for Pain Management. Only the Air Force was able to score significantly higher than the benchmark with a score of 74.7%.

5.3.4.3 Communication about Medicine

All subdivisions were able to at least meet the benchmark (65.0%) on Communication about Medicine. Overall, Direct Care and Purchased Care together got a higher score than the benchmark with a score of 71.3%, while Direct Care along scored higher with 73.8%. All three military branches had significant improvements from the benchmark with the Navy getting a score of 72.6%, the Army with 73.6%, and the Air Force with 78.2%.

5.3.4.4 Discharge Information

Almost all subdivisions were able to score significantly higher than the benchmark of 86.0%. Overall, Direct Care and Purchased Care together got 89.0%, Direct Care got 89.3%, and Purchased Care got 88.5%. All three military branches did well with the Air Force scoring best at 90.6%, followed by the Navy with 89.3%, and finally the Army with 88.9%. Only facilities located in the West and South scored within the benchmark instead of scoring significantly above it. The North TRO had a score statistically higher than the benchmark at 90.0%.

5.3.4.5 Care Transition

All subdivisions, with the exception of facilities located in the South, were able get scores significantly over the benchmark (52.0%).

5.3.4.6 Cleanliness of Environment

Facilities located in the North scored lower than the benchmark (74.0%) with a score of 71.9%. Only the Army had a score significantly higher than the benchmark with 76.3%. All remaining measures met the benchmark.

5.3.4.7 Quietness of Environment

Facilities located in the west and north regions scored below the benchmark (62.0%) with scores of 58.4% and 57.6%, respectively. Purchased Care facilities overall scored below the benchmark as well, with a score of 59.0%. Only the Air Force managed to score over the benchmark with 65.1%.

Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

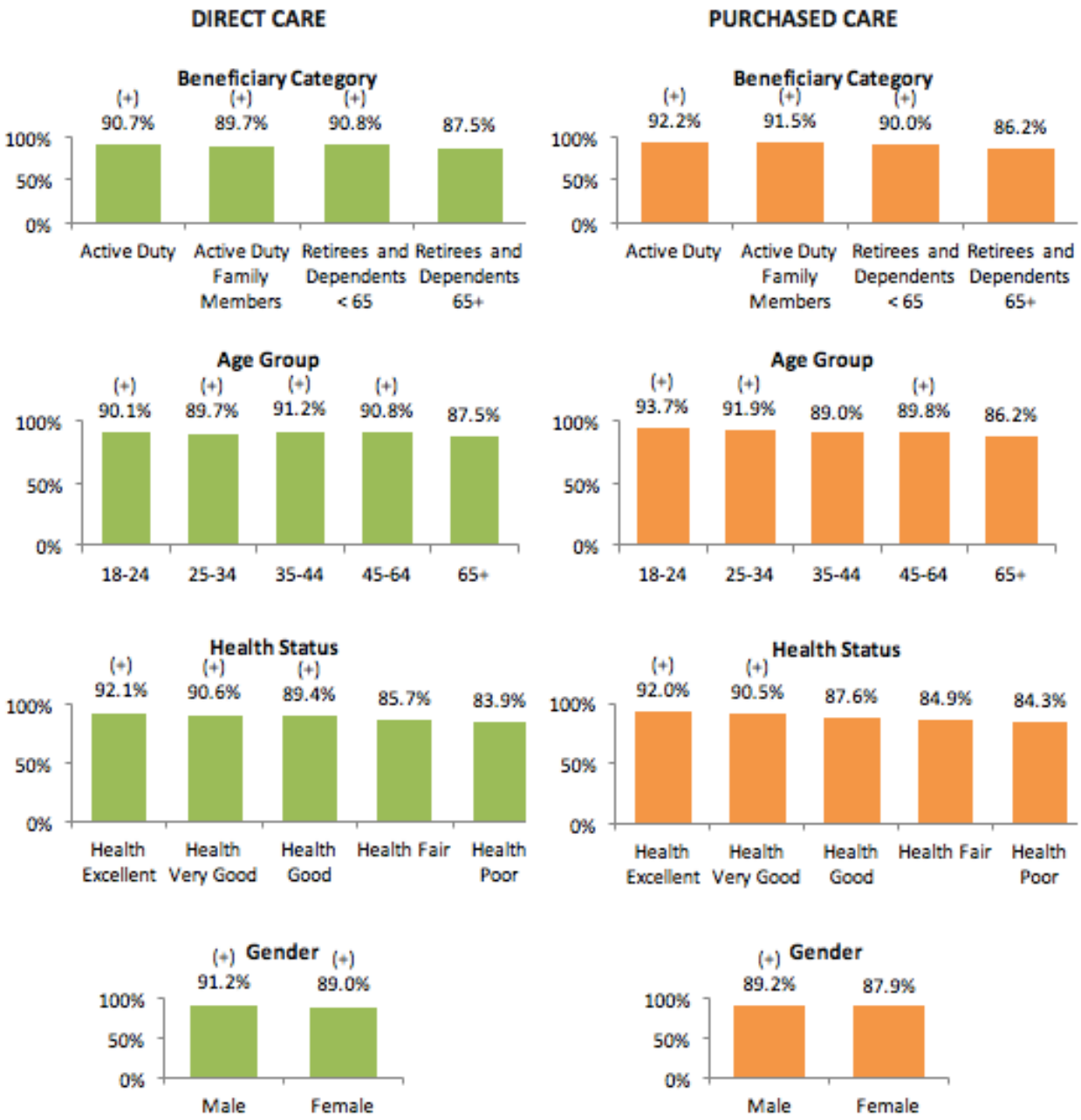
Figure 17. Responsiveness of hospital staff scores by care type and demographic group.

Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 18. Pain management scores by care type and demographic group.

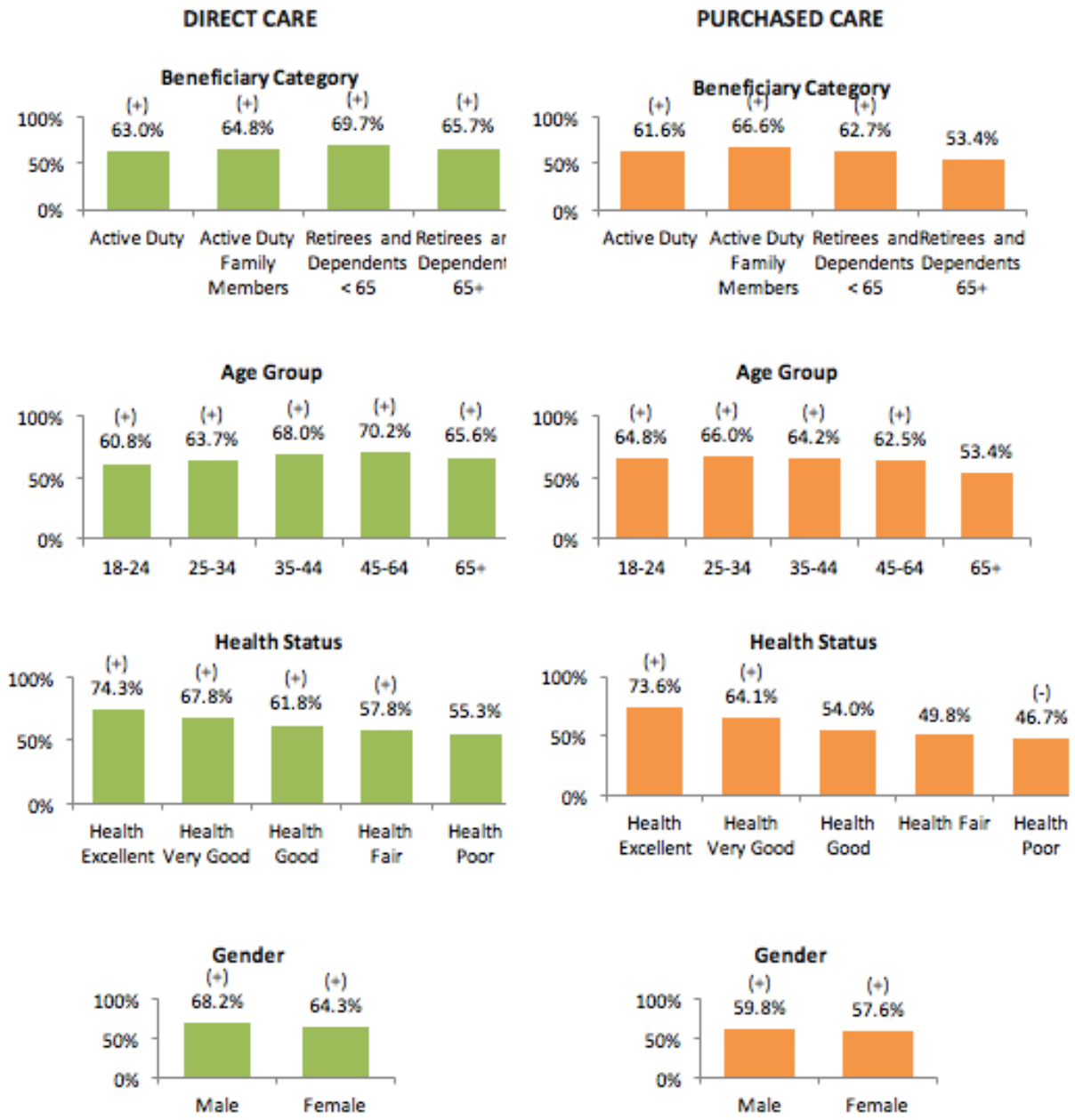
Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 19. Communications about medicines scores by care type and demographic group.



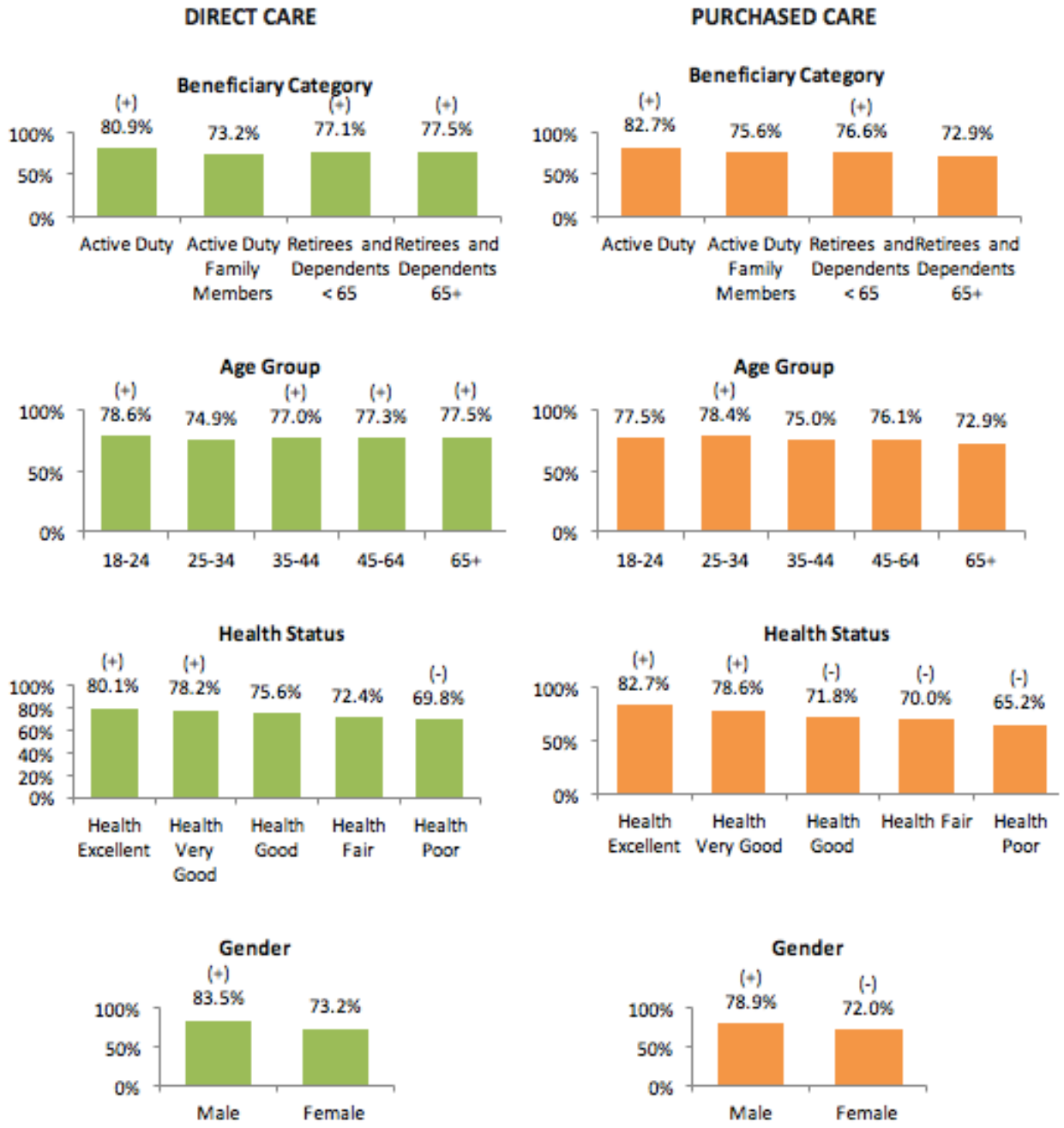
Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 20. Discharge information scores by care type and demographic group.



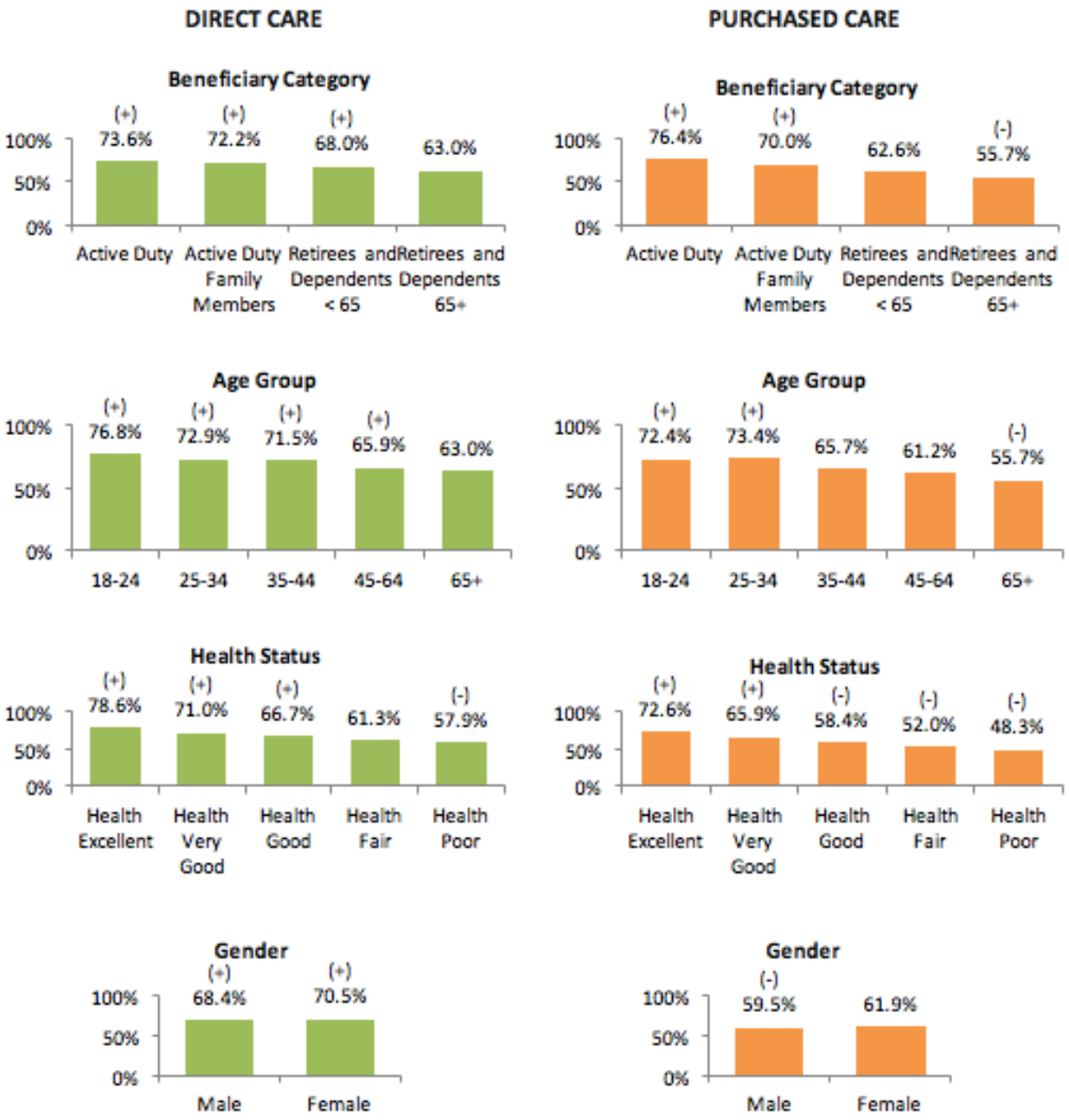
Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 21. Care transition scores by care type and demographic group.



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 22. Cleanliness of hospital environment scores by care type and demographic group.



Note: A plus (+) sign on a bar indicates that the score is significantly ($p < 0.05$) higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark.

Figure 23. Quietness of hospital environment scores by care type and demographic group.

5.3.5 HCAHPS Scores across Product Lines

Within Direct Care, the surgical product line shows scores significantly above the benchmark on all HCAHP measures. The medical product line shows scores significantly above the benchmark in 8 out of the 11 measures (see figure 13–figure 23). Obstetrics is the only product line in which Direct Care facilities scored significantly below the benchmark on any measure. Obstetrics received scores significantly lower than the benchmark on both global measures (Overall Hospital Rating and Recommend the Hospital). Despite not meeting the benchmark on the two global measures, obstetrics scored higher than the benchmark in 8 out of 11 measures.

Among Purchased Care facilities, obstetrics show the highest scores of the three product lines (see figure 13–figure 23), in contrast to scores of this product line in Direct Care. Obstetric scores, were significantly above the benchmark in eight of the eleven measures. Obstetrics scored significantly lower than the benchmark in Overall Hospital Rating, however. Surgical scored significantly higher than the benchmark in 7 of the 11 measures. Unlike obstetrics; however, surgical care did not score significantly below the benchmark for any measure. Medical care exhibited the lowest performance of all the product lines for Purchased Care. Eight out of eleven measures had scores significantly below the benchmark, with no measures scoring significantly higher than the benchmark.

5.4 Year-to-Year Analysis: Comparison of Scores between FY 2014 and FY 2015

In order to understand trends over time of the TRISS measures, we compared TRISS results from Quarters 1 and 2 of FY 2015 to results from Quarters 2 and 3 of FY 2014. Data for FY 2014 was restricted to two quarters due to a change in vendor on the project, limiting the availability of all the required data for 2014. Adjusted scores were used in all analyses.

5.4.1 Results

Figure 24 and figure 25 show the FY 2014 and FY 2015 scores for DC and PC, respectively. The HCAHPS benchmark is shown as green line. A green upward arrow indicates that the score significantly improved between 2014 and 2015. A red downward arrow indicates that the score significantly worsened between FY 2014 and FY 2015. Unmarked scores showed no change between years. The vertical axis reflects a range of 30% in each panel. Figure 26 and figure 27 show the same data represented as difference scores between the two years.

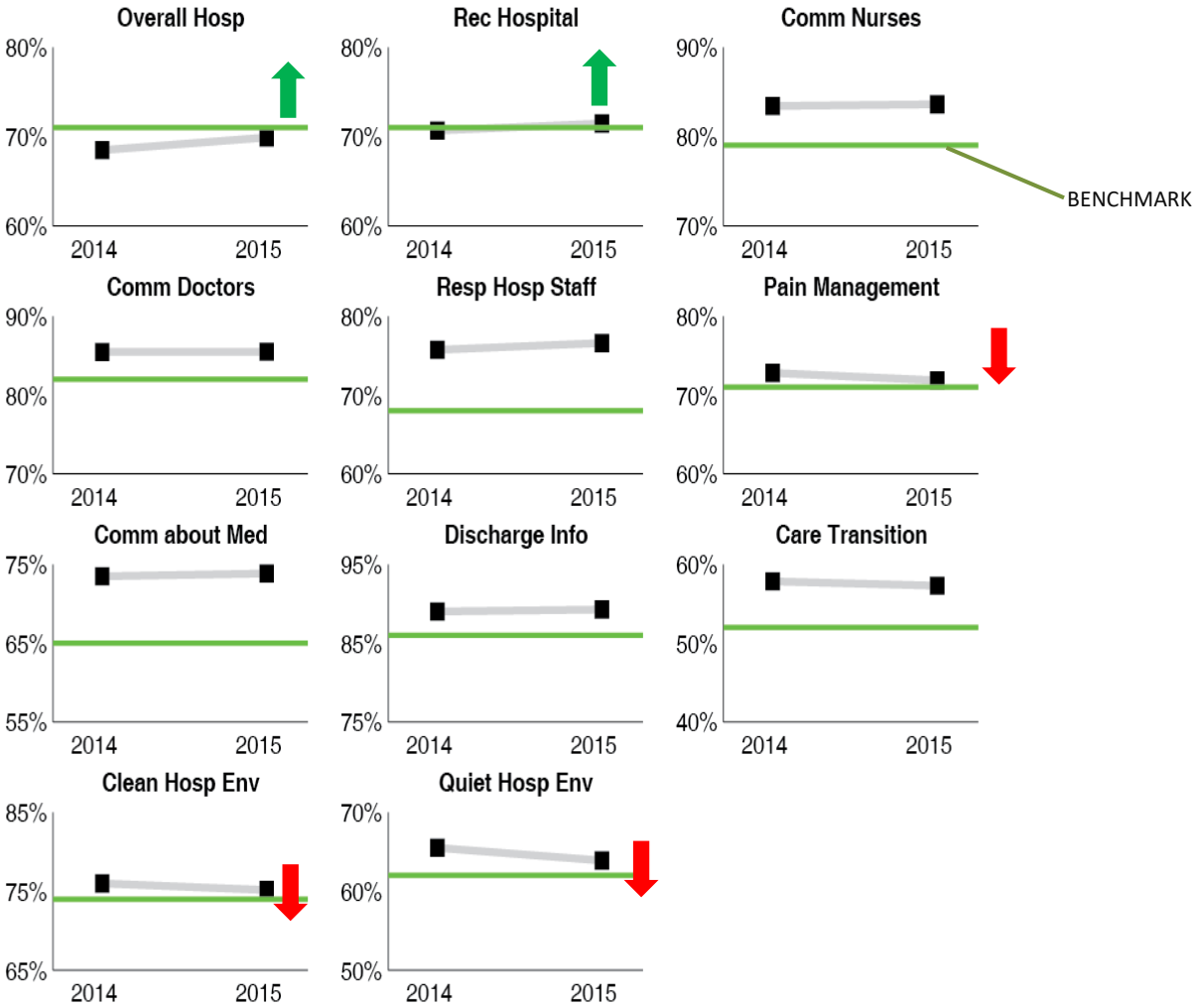
Both DC and PC facilities exhibit lower scores in 2015 than in 2014 on multiple measures; in fact, more measures decreased between years than increased. DC facilities, on aggregate, improved on two measures (Overall Ratings and Recommend the Hospital) but worsened on three measures (Pain Management, Cleanliness of Hospital, and Quietness of Hospital Environment). PC facilities, on aggregate, show worse scores on 8 of the 11 measures and did not improve on any measures. The magnitude of the change in scores that fell is also worse for PC than DC: while the greatest score decrease for DC is 1.6% (Quietness of Hospital Environment), the greatest decrease for PC is 3% (Pain Management).

The three measures that decreased for DC, however, remain at or above the benchmark. Thus, even though scores fell slightly, overall DC met or exceeded HCAHPS benchmarks for Quarters 1 and 2 of FY 2015. Notably, both of the two HCAHPS global items (Overall Hospital Rating and Recommend the Hospital, which are crucial broad indicators of patient satisfaction) exhibit improvement.

Among PC facilities, even though scores worsened for eight measures, the two primary indicators (Overall Rating and Recommend the Hospital) remained stable from FY 2014 to FY 2015. Thus, lower satisfaction on specific aspects of patient care did not seem to translate to a general decline in patient

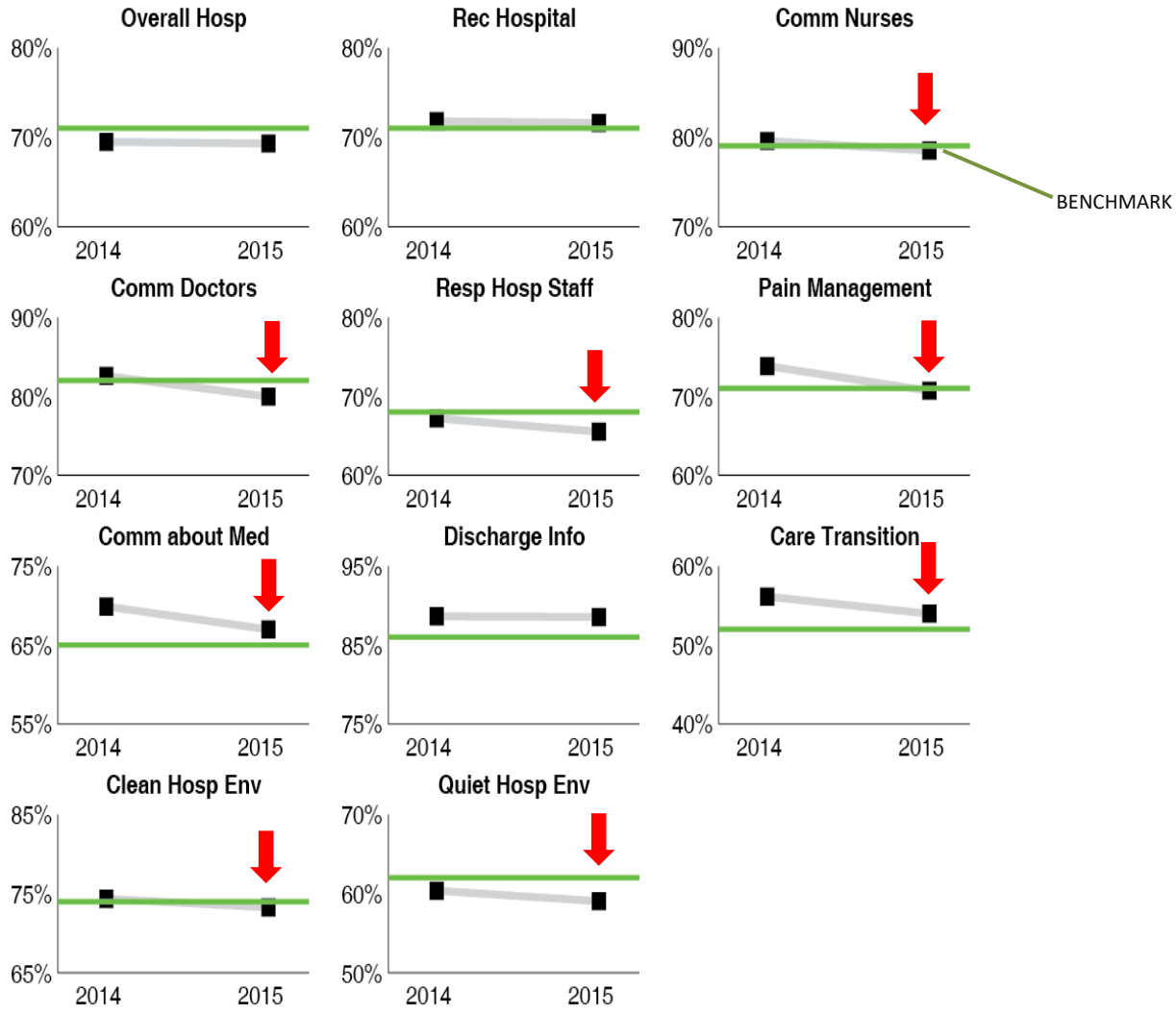
satisfaction for PC facilities. Of the eight measures that fell between FY 2014 and FY 2015, two were above the HCAHPS benchmarks in FY 2014 and are now are no different than the benchmark.

In summary, both DC and PC showed more decreases than increases in HCAHPS scores between FY 2014 and FY 2015. The decline is less severe for DC facilities, as this Care Type improved on two metrics, and the change in scores is less than 2%. PC facilities, on aggregate, decreased on 8 of the 11 measures, with a maximum decrease of 3%. Nevertheless, the two primary measures remained stable for PC between FY 2014 and FY 2015.



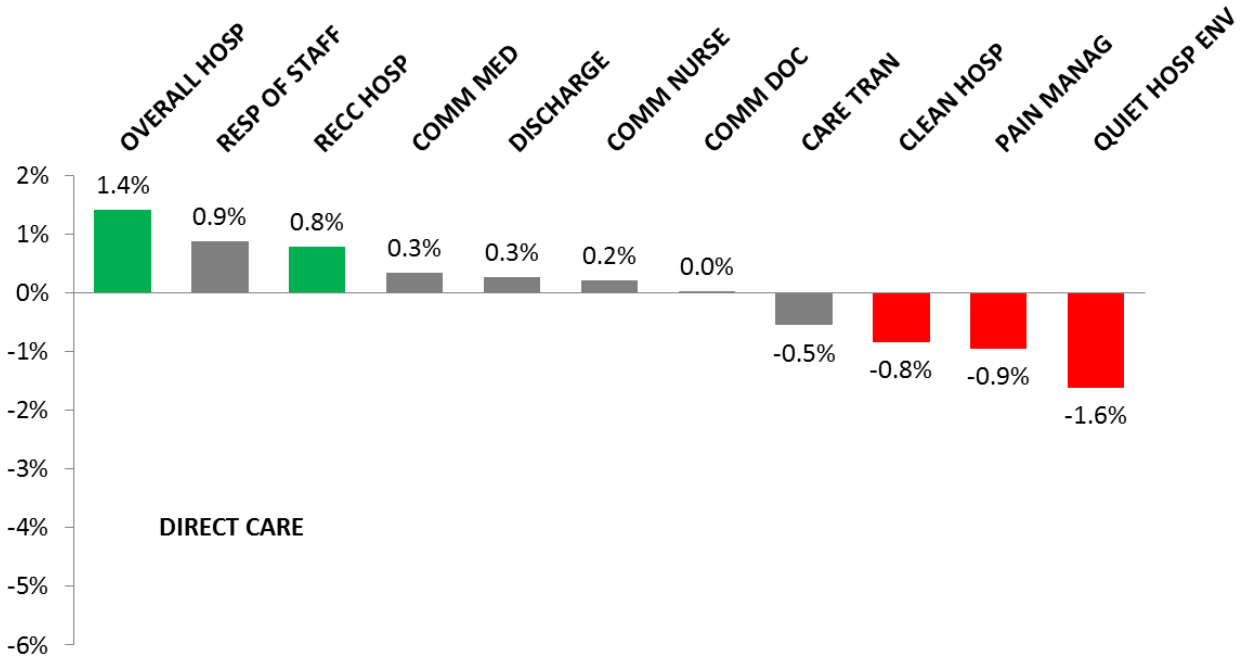
Note: Green arrows represent statistically significant increases from FY 2014 to FY 2015. Red arrows represent statistically significant decreases from FY 2014 to FY 2015.

Figure 24. Comparison of Direct Care adjusted composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green arrows represent statistically significant increases from FY 2014 to FY 2015. Red arrows represent statistically significant decreases from FY 2014 to FY 2015.

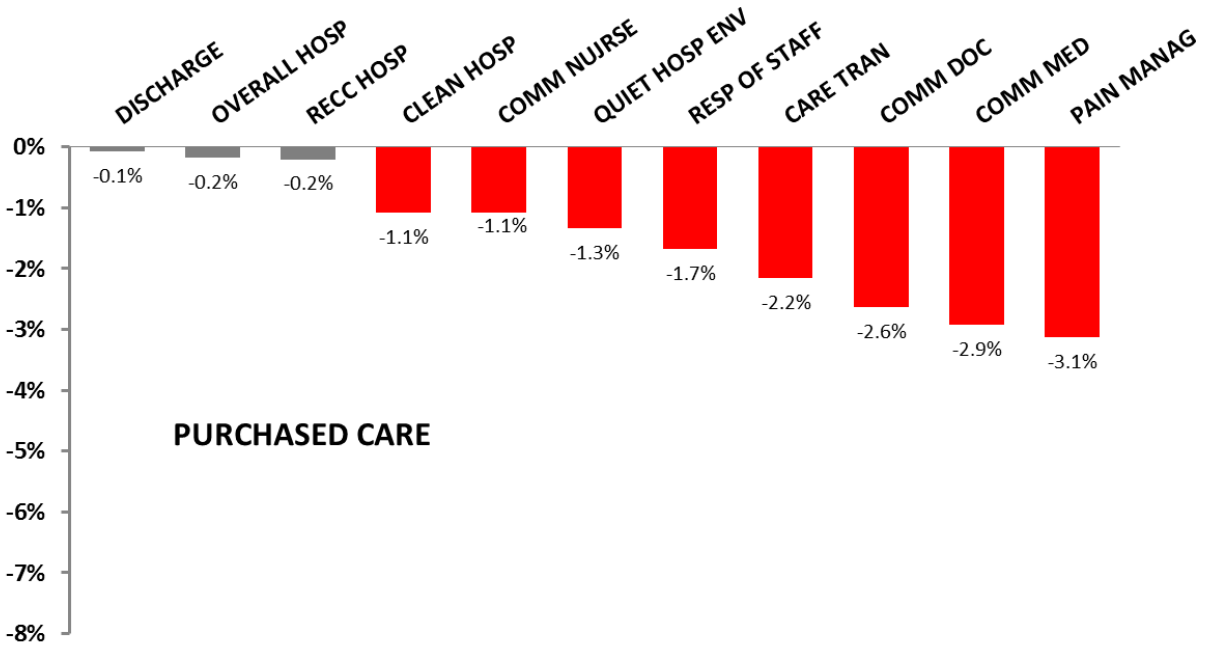
Figure 25. Comparison of Purchased Care adjusted composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.[11]

Figure 26. Difference scores for Direct Care HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

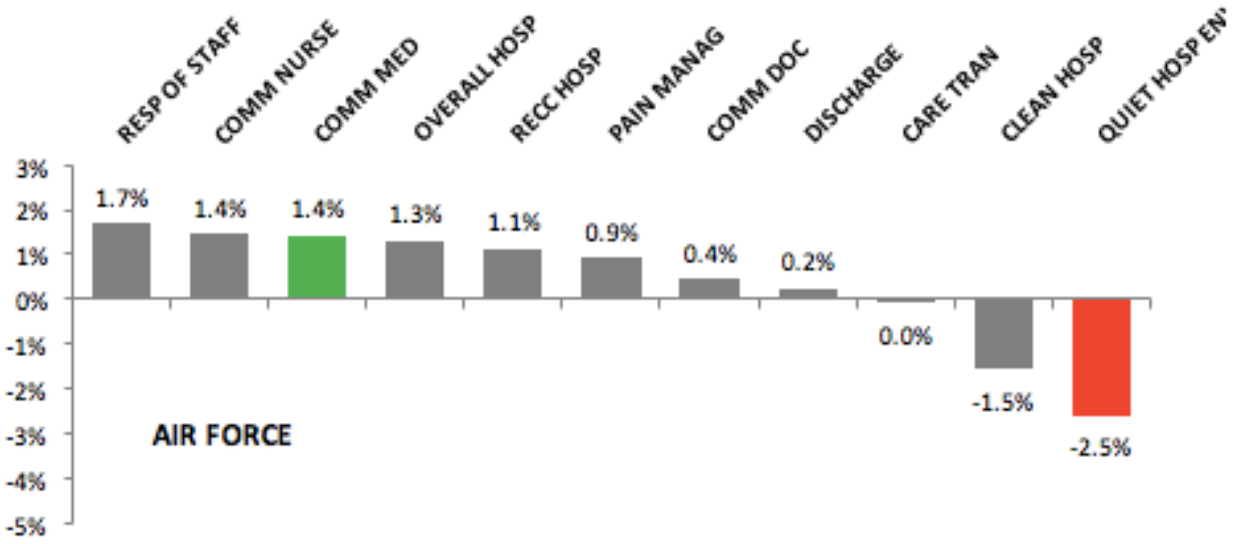
[11]Note that although the magnitude of the year-to-year difference for Responsiveness of the Hospital Staff is greater than the year-to-year difference for Recommend the Hospital, the Recommend the Hospital is significantly different between years and Responsiveness of the Hospital Staff is not significant. This counter-intuitive finding is possible because statistical significance is function of both the difference between years and the variance of the difference. Here, the variance of Responsiveness of the Hospital Staff is greater than the variance of Recommend the Hospital.



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

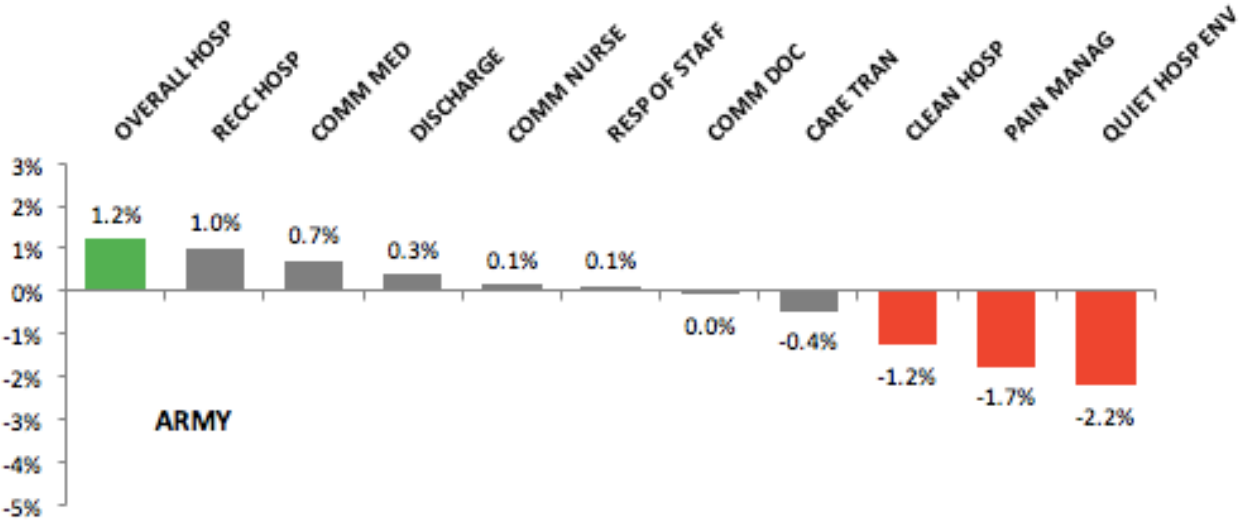
Figure 27. Difference scores for Purchased Care HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

Figure 28 through figure 31 show DC changes in measures from FY 2014 to FY 2015 by military branch and NCR. NCR facilities fared best with improvements on two measures (Overall Hospital Rating and Responsiveness of Hospital Staff), only worsening on one measure (Care Transition.) The Air Force showed improvements in the Communication about Medicines measure and worsened in Quietness of the Hospital Environment. While Army facilities did show improvements in their Overall Hospital Rating, they scored lower in three measures (Cleanliness of the Hospital Environment, Quietness of the Hospital Environment, and Pain Management), more than any other military branch category. Navy facilities' scores remained unchanged between years.



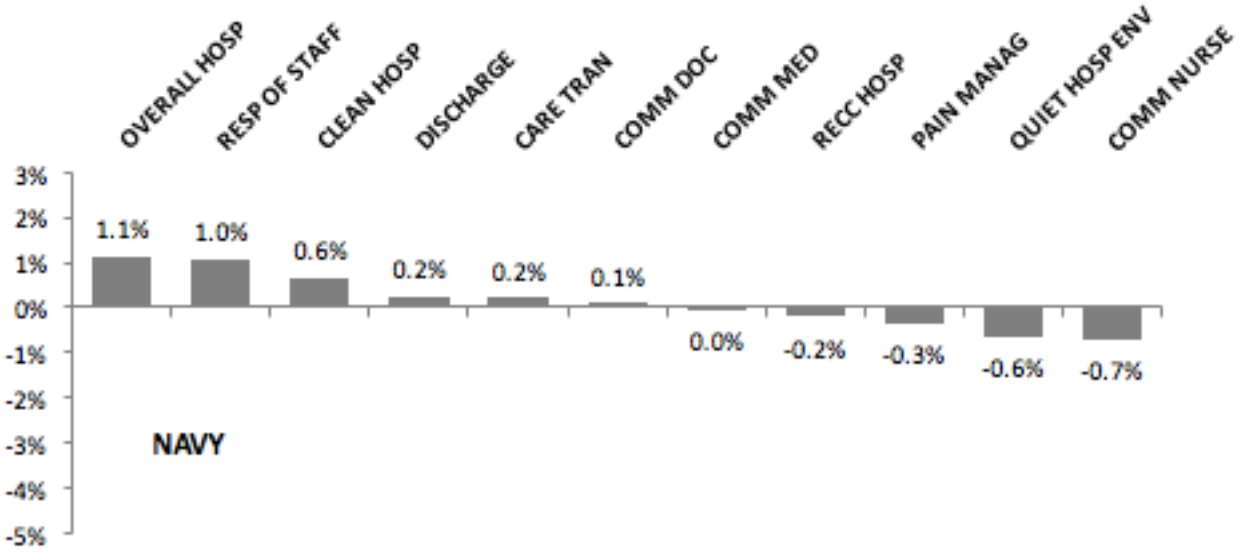
Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 28. Difference scores for Air Force HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



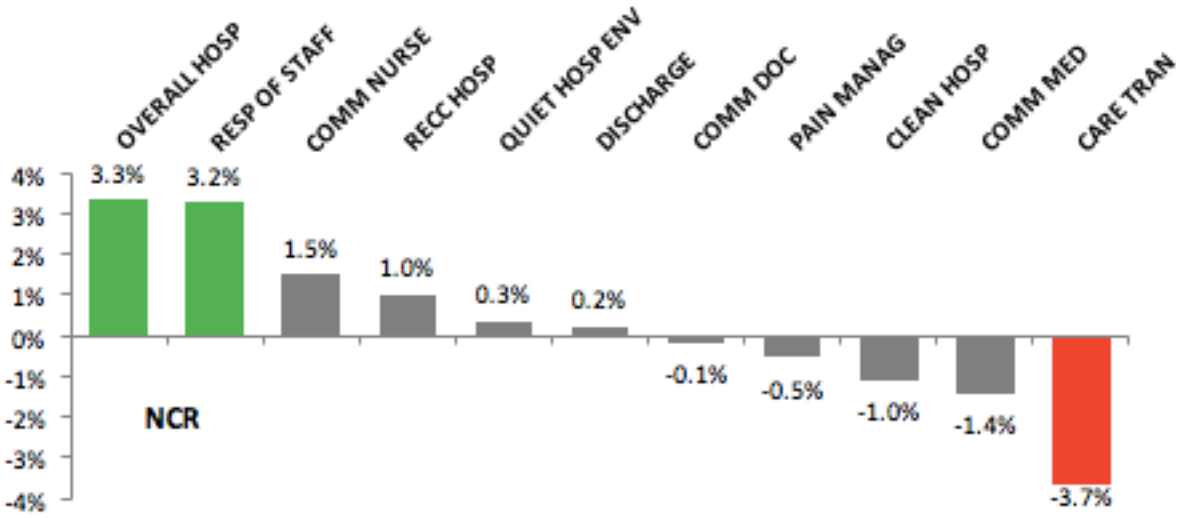
Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 29. Difference scores for Army HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 30. Difference scores for Navy HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

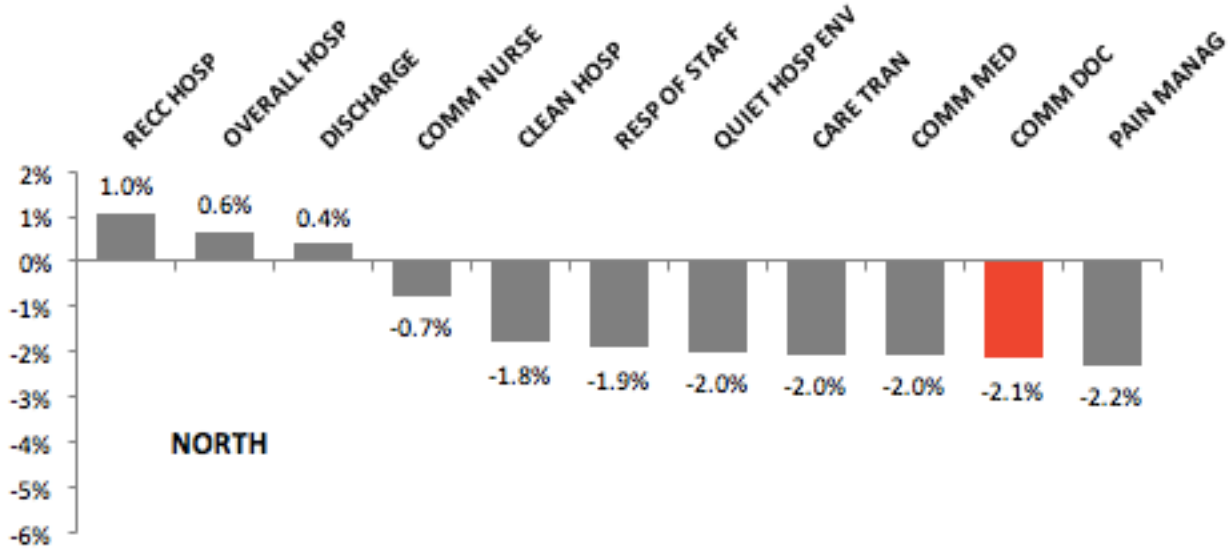


Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015

Figure 31. Difference scores for Navy HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

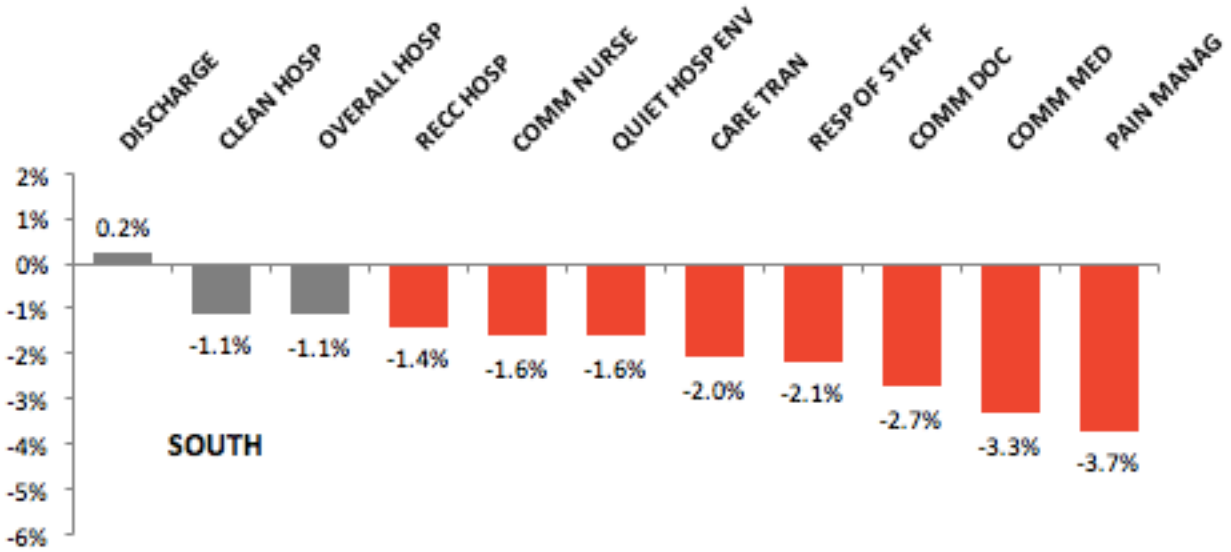
Figure 32 through figure 34 show PC changes in measures from FY 2014 to FY 2015 by TRO Region. Facilities in the TRO North remained the most stable, with only one significant score decrease in the Communication with Doctors measure. Facilities located in the TRO West scored significantly lower in FY 2015 in the Discharge Planning, Care Transition, Pain Management, and Communication with Doctors measure. Facilities located in the TRO South had significantly lower scores across eight measures. The only measures that did not decrease year-to-year were Discharge Planning, Cleanliness of

the Hospital Environment, and Overall Hospital Rating. No measures in this breakdown had significant score improvements in FY 2015.



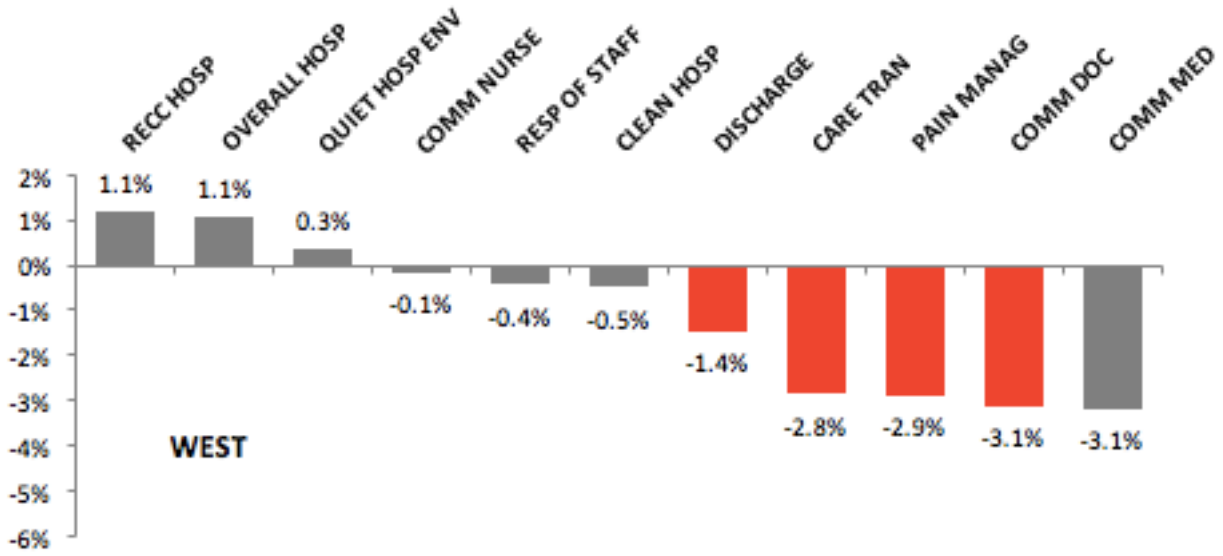
Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 32. Difference scores for TRO North HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

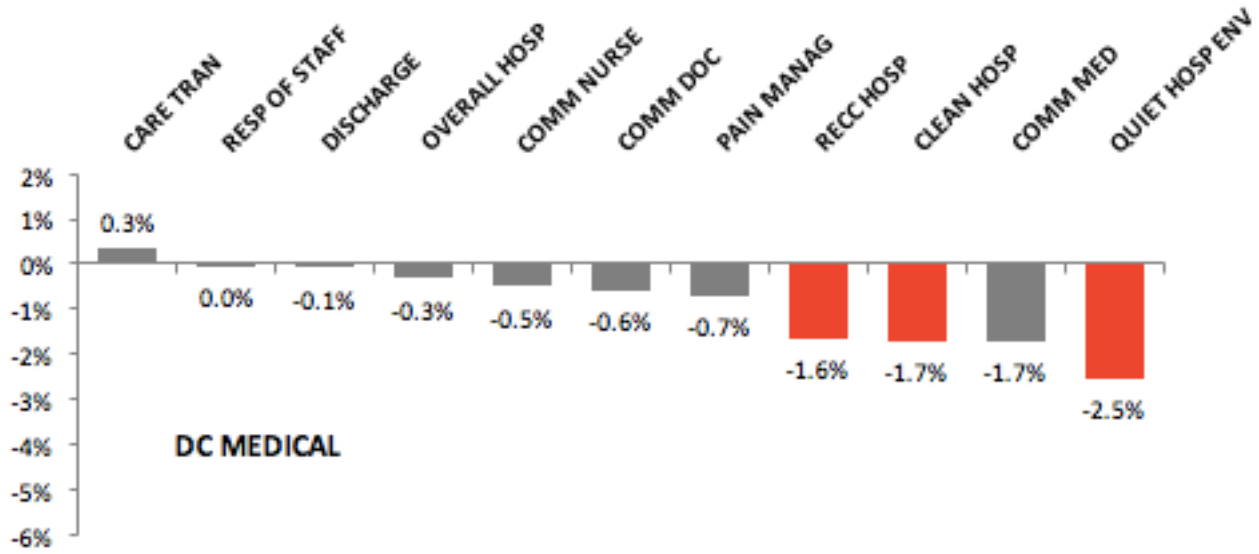
Figure 33. Difference scores for TRO South HCAHPS Composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

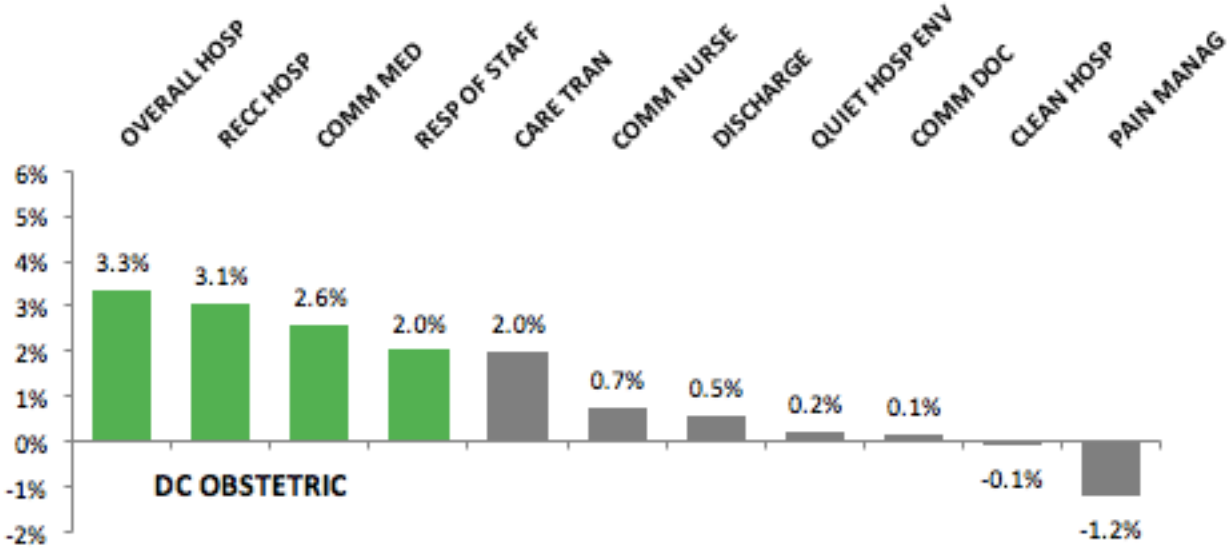
Figure 34. Difference scores for TRO West HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

Figure 35 through figure 37 show DC changes from FY 2014 to FY 2015 by product line. Obstetrics scores improved in four measures (Overall Hospital Rating, Recommend the Hospital, Communication about Medicines, and Responsiveness of Hospital Staff) and had no significant decreases. Medical scores had the most decreases from FY 2014 to FY 2015 (Recommend the Hospital, Cleanliness of the Hospital Environment, and Quietness of the Hospital Environment), followed by surgical care scores (Pain Management and Quietness of the Hospital Environment.) Neither medical care nor surgical care showed significant improvements in any measure score.



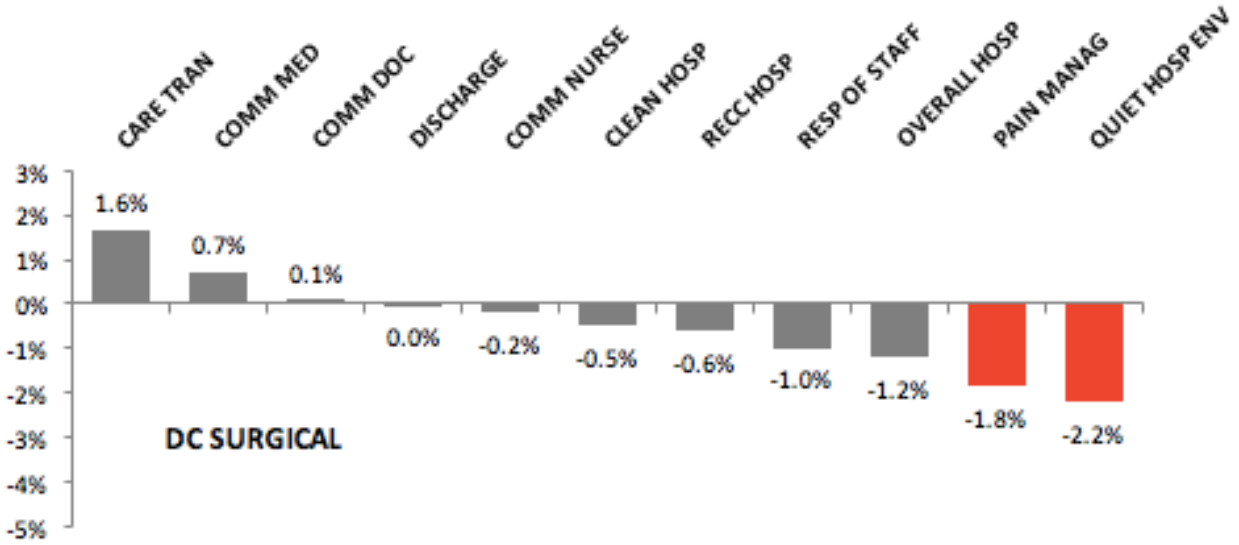
Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 35. Difference scores for Direct Care Medical HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

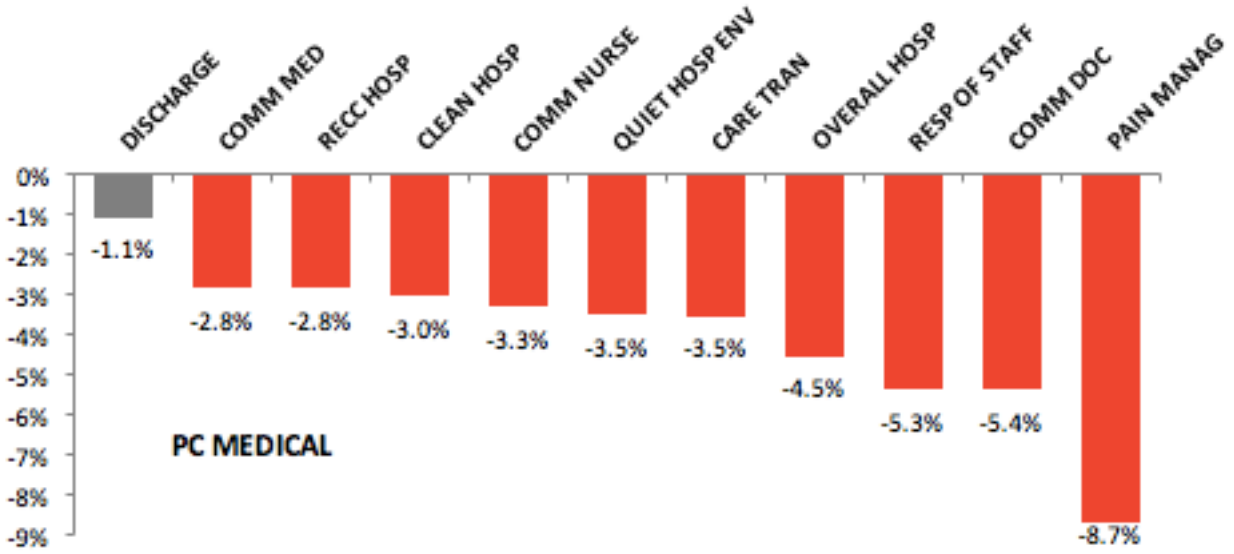
Figure 36. Difference scores for Direct Care Obstetric HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

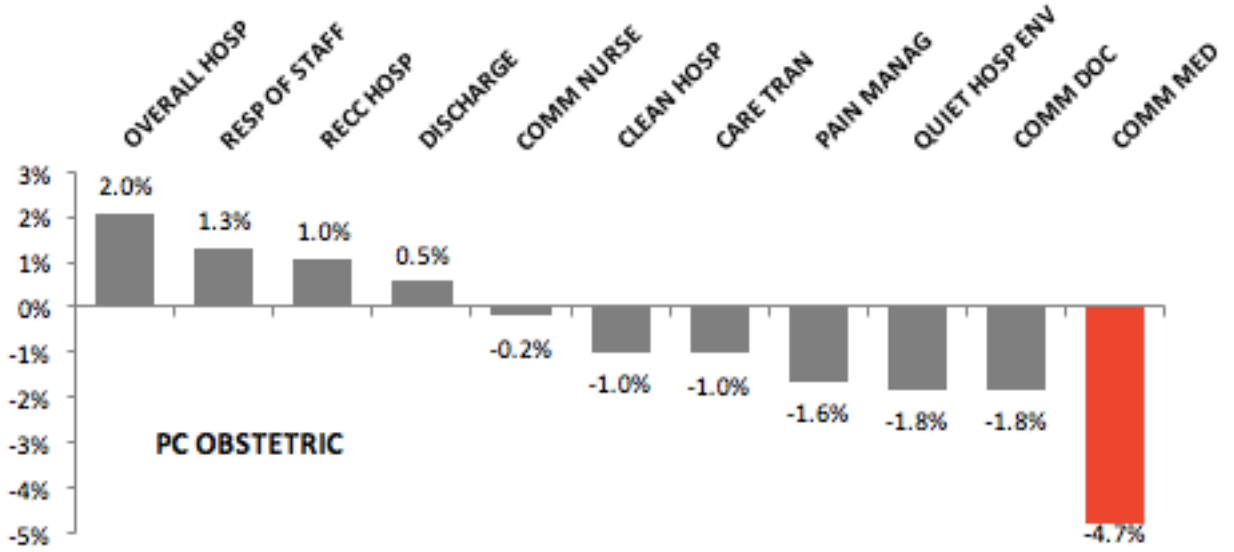
Figure 37. Difference scores for Direct Care Surgical HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

Figure 38 through figure 40 breaks down PC changes in measures from FY 2014 to FY 2015 by product line. Medical care scores had lower scores across almost all measures. Only the Discharge Planning score remained unchanged. Obstetric care remained relatively stable, with the only significant decrease in the Communication about Medicines measure. Surgical care had the only instance of score improvement across the product lines (Overall Hospital Rating.) Surgical care scored lower in the Communication with Doctors, Quietness of the Hospital Environment, Care Transition, and Communication about Medicines measures.



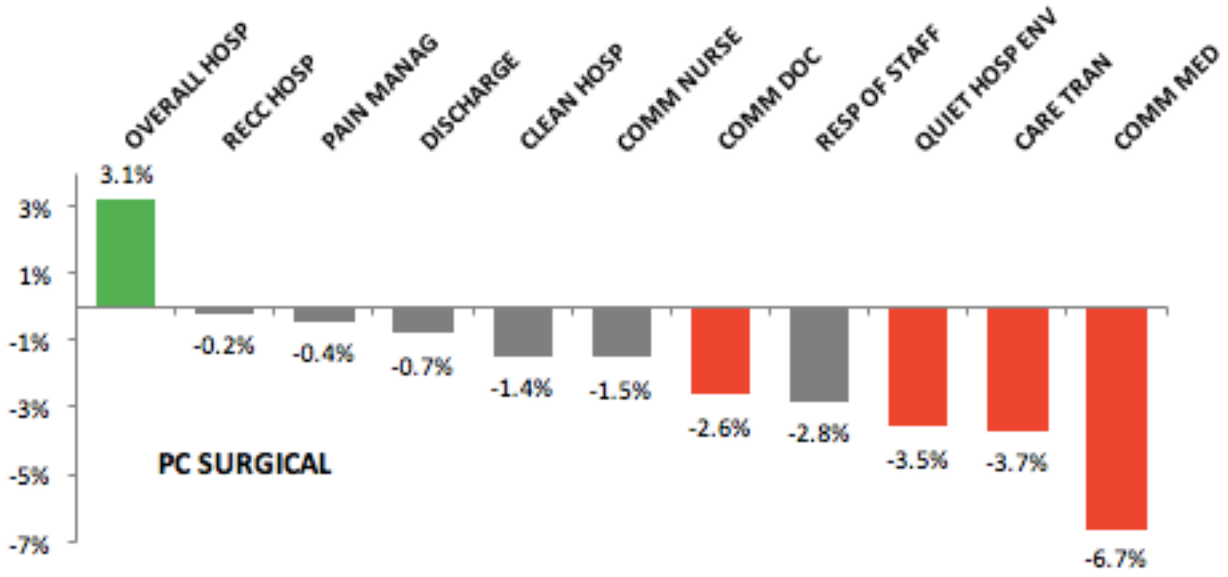
Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 38. Difference scores for Purchased Care Medical HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 39. Difference scores for Purchased Care Obstetric HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).



Note: Green bars indicate a significant increase in scores between FY 2014 and FY 2015. Red bars indicate a significant decrease in scores between FY 2014 and FY 2015. Grey bars indicate no change between FY 2014 and FY 2015.

Figure 40. Difference scores for Purchased Care Surgical HCAHPS composite scores between FY 2014 (Quarters 2 and 3 aggregated) and FY 2015 (Quarters 1 and 2 aggregated).

5.5 Determinants of Patient Satisfaction in the FY 2015 TRISS Dataset

In this section, the impact of HCAHPS measures the two global measures, Overall Hospital Rating, and Recommend the Hospital is assessed using the data from Quarters 1 and 2 of FY 2015. Because respondent-level data is used for these analyses, the data is weighted but not adjusted for patient or mode mix (these adjustment require facility-level aggregation). The purpose of these drivers' analyses is to identify the dimensions of the hospital experience with the strongest impact on patient satisfaction.

For this report, two drivers' analysis methods are used—logistic regression and attributable effects. The results for the logistic regression models are presented first, and are then augmented with findings from the attributable effects analyses.

5.5.1 Drivers' Analysis Methodology

Because the outcome measures (Overall Hospital Rating and Recommend the Hospital) are binary variables[12], logistic regression was used for the regression portion of the drivers' analysis (Long, 1997). As with other regression procedures, logistic regression helps to identify the impact of each predictor (referred to in this context as a "driver") on the outcome measure, after adjusting for the impact other drivers in the model also have on the outcome measure.

In order for drivers' analysis to be performed at the respondent level, the HCAHPS composite measures, which are currently calculated at aggregate levels (such as the facility), must be generated at the respondent level. Then, after the composites are included as predictors in a logistic regression, the results must be converted into a metric that is interpretable, and which allows direct comparisons of impact

[12]Overall Rating was measured on a 0–10 scale (0 = lowest, 10 = highest) and was dichotomized such that values 9 and 10 were recoded to be 1, and all other values were recoded as zero. Recommend was measured on a 1–4 scale (1 = lowest, 4 = highest) and was dichotomized so that value 4 was recoded as 1, and all other values were recoded as zero.

across all the drivers. The metric that was used here in presenting final results from the logistic regression drivers' analysis is an "importance" metric, where driver importance represents the proportion of total variance explained by a driver on a 0–100% scale.

The logistic regression drivers' analyses involved four main steps:

1. **Create composite measures at the respondent level**: Composite measures were constructed at the respondent level. The use of respondent-level composites was validated with Categorical Principal Components Analysis (CATPCA) in SPSS, using the respondent-level HCAHPS components as inputs. For each composite, CATPCA was performed to obtain an object score (similar to a factor score in confirmatory factor analysis) for each respondent. These object scores are respondent-level analogues of the aggregate-level HCAHPS composite scores. The CATPCA analyses revealed high levels of correspondence among the components of each composite as measured by Cronbach's alpha, as well as the component weights (which were approximately always equal, as would be the case in a simple averaging of the relevant raw components, and as is used in the creation of the aggregate HCAHPS composite scores). As a result, the CATPCA process creates respondent-level composites highly analogous to the HCAHPS composites. The CATPCA procedure was performed using the survey weights to account for the sample design.
2. **Standardize all predictor variables**: The two non-composite reported HCAHPS measures included in the analysis—Cleanliness of Hospital and Quietness of the Hospital Environment—were standardized to have means of zero and standard deviations of 1 prior to including them in logistic regressions. The object scores from CATPCA were centered at zero and scaled to have a standard deviation of 1 during the creation of the composite scores. The standardization of drivers allows for easy interpretation of the coefficients from the regression analysis, since the estimated coefficients refer to individuals at the average levels of all drivers included in the model.
3. **Perform the logistic regression analyses**: SAS PROC SURVEYLOGISTIC was used to estimate the logistic regression models. PROC SURVEYLOGISTIC was designed for the analysis of data drawn via complex sample designs and requiring weights to adjust for unequal probabilities of selection. This SAS procedure differs from most logistic regression algorithms in that it accurately accounts for the sample design (weighting, clustering, etc.) when generating parameter estimates as well as their standard errors and any related statistical tests. For these analyses, logistic regressions were run separately for the dependent variables Overall Hospital Rating and Recommend the Hospital, using facility as a clustering variable to account for the non-independence of observations in the sample. Regressions were run for the sample of all direct care patients together, and then for all direct care product lines separately (Obstetrics patients alone, etc.) using product line as a subgroup/domain variable.[13] As indicated above, the explanatory variables used for the logistic regression drivers' analyses were the seven HCAHPS composites plus the two individual measures—Cleanliness of Hospital and Quietness of the Hospital Environment. In a subsequent auxiliary set of analyses, the basic logistic regression models were extended by evaluating the effect of patient age and facility size (i.e., patient load) on both outcome variables to assess whether or not these measures mediated or moderated the impact of the HCAHPS and hospital environment measures – that is to say, whether the impact of these measures varies by patient age and/or facility size, etc. To the extent that size or age are strong predictors of the outcome measures, their inclusion in the regression analysis increases the power of the analysis.
4. **Convert logistic regression coefficients to driver importances**: The coefficients from each logistic regression were converted to driver importances to aid in interpretation and numerical comparison. Driver importances represent the "percent of total impact" explained by each driver

[13]Subdomain analysis is required to obtain accurate standard errors and subtests when analyzing a subset of the full sample. Refer to Korn, E.L., and Graubard, B.I. (1999). *Analysis of Heath Surveys*. Wiley.

included in the model (regardless of the direction of the effect), expressed on a 0–100 scale, where the sum of all driver importances is 100. By displaying the variable importances on a bar chart, it is easy to visualize and compare their net impact on a given outcome measure.

5.5.2 Drivers' Analysis Results

5.5.2.1 Direct Care Drivers' Analysis Results

Figure 41 reports the impact of the HCAHPS measures on Overall Hospital Rating for Direct Care.[14] The literature consistently reports that nurse care and communication is viewed as a central component of reported service quality. The Overall Hospital Rating logistic regression drivers' analysis performed on the current data corroborates this finding, as Communication with Nurses is the largest single net driver, accounting for approximately 24% of the variance explained by the model. The next greatest driver is Care Transition (20%), followed by Pain Management (16%), and Communication with Doctors (16%). The remaining dimensions have lesser importance (importance values < 10%) but are statistically significant ($p < 0.05$) with the exception of Communication about Medicines.

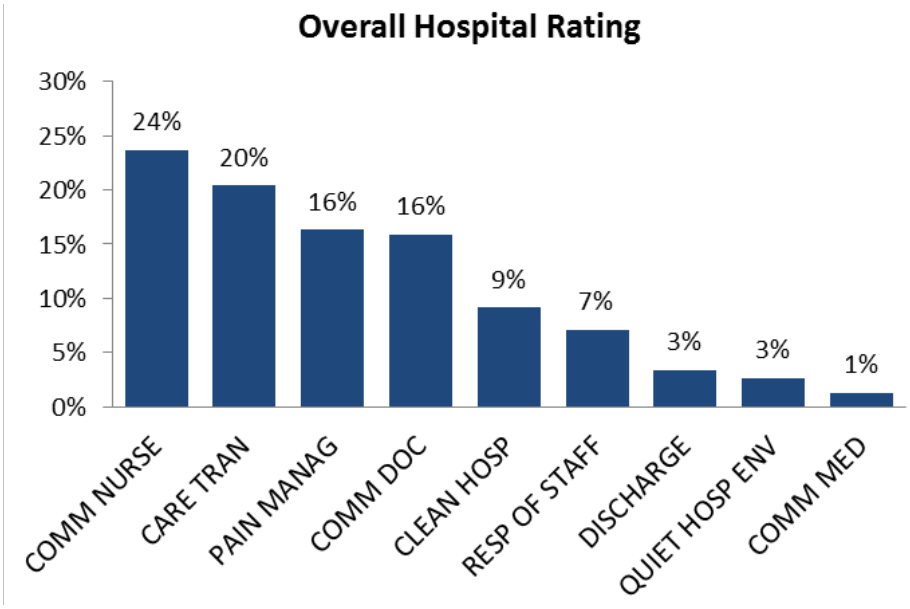


Figure 41. Drivers' analysis of overall hospital rating for Direct Care.

Figure 42 presents the importance values of the HCAHPS measures on Recommend the Hospital.[15] Here, Care Transition (28%) switches place with Communication with Nurses (21%) in terms of importance ranking, while Communication with Doctors (16%) switches with Pain Management (14%). In addition, two of the measures, Communication about Medications and Quietness of the Hospital environment, are not statistically significant. All other effects are statistically significant.

[14]The corresponding model $R^2 = 0.58$.
[15]The corresponding model $R^2 = 0.55$.

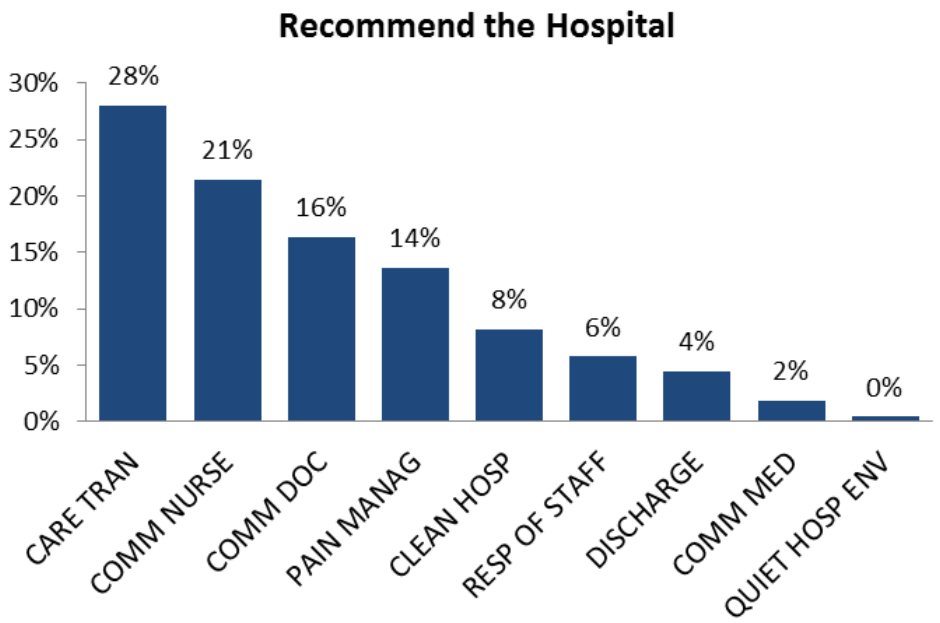


Figure 42. Drivers' analysis of Recommend the Hospital for Direct Care.

The preceding models were augmented with a separate set of logistic regression drivers' analyses which included patient age and facility size (patient load) as predictors. The models were then elaborated to include quadratic effects for both age and facility size (i.e., age^2, size^2). These auxiliary models were fit to evaluate the net impact of these additional covariates on the Overall Hospital Rating and Recommend the Hospital, as well as to evaluate whether patient age or facility size mediated or moderated the impact of the remaining HCAHPS measures.

Adding facility size to the logistic regression models had no substantive impact on the magnitude or order of the driver effects (and indeed, the net effect of facility size, while statistically significant, was very small). Age similarly had a trivial importance in the model (< 1%) and did not substantively alter the impact of the other predictors. Given the very small effects for size and age, they are not discussed further here.

Similar models were run separately for each Direct Care product line. The results of the logistic regression drivers' analysis for obstetrics are presented in full in figure 43 and figure 44, followed by a summary comparison of the top five drivers across each of the three product lines in table 14 and table 15.

The two greatest drivers of Overall Hospital Rating (figure 43) for obstetrics patients are Care Transition and Communication with Doctors.[16] The top four drivers of Overall Hospital Rating among obstetric patients are the same as the top four drivers for the total Direct Care population. Discharge Information, Communication about Medications, and Quietness of the Hospital Environment are not statistically significant at the $\alpha = 0.05$ level.

[16]The corresponding model $R^2 = 0.25$.

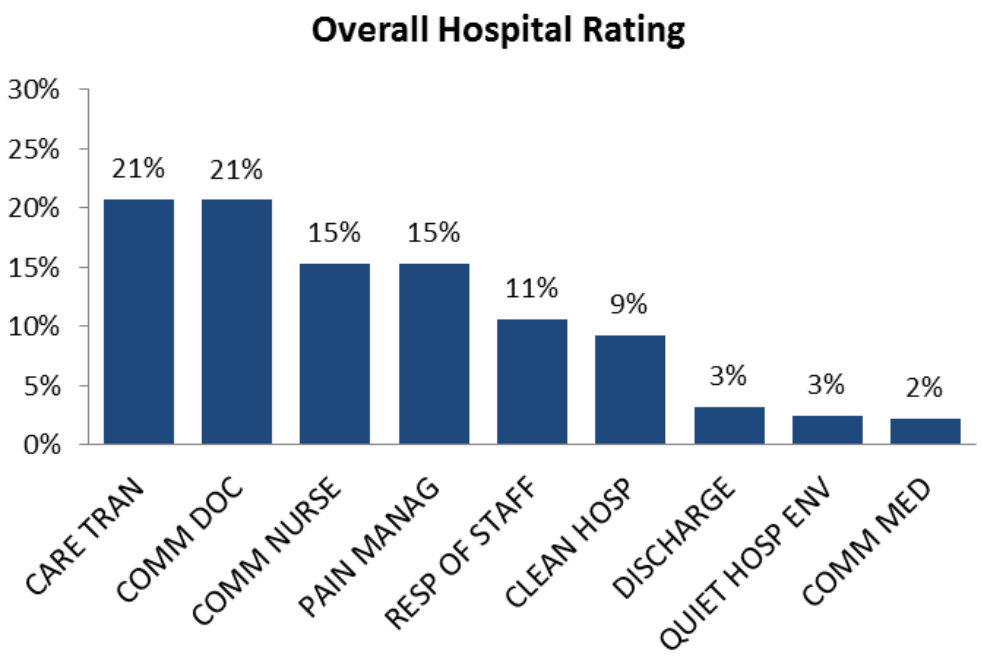


Figure 43. Drivers' analysis for Overall Hospital Rating among Direct Care obstetrics patients.

Figure 44 presents importance measures for Recommend the Hospital for obstetrics patients.[17] All the drivers are statistically significant, $p < 0.05$ except Communication about Medicines and Quietness of the Hospital Environment. Note that the order of importance is the same as Overall Hospital Rating for obstetrics patients. Responsiveness of the Hospital Staff has a slightly higher importance in the order of importance for the obstetrics patients than for all DC patients combined.

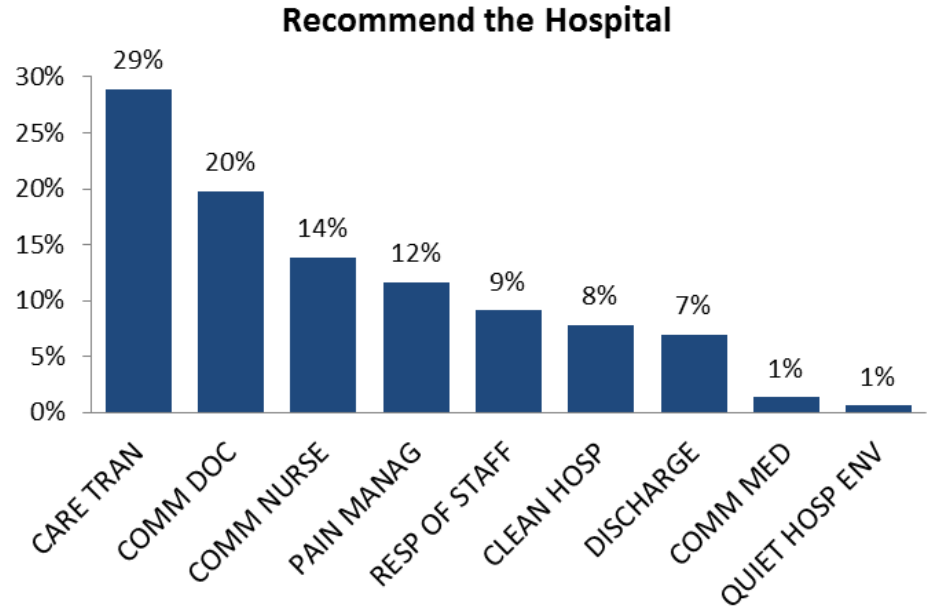


Figure 44. Drivers' analysis for Recommend the Hospital among Direct Care obstetrics patients.

[17]The corresponding model $R^2 = 0.22$.

Table 14 and table 15 provide summary comparisons of the top five drivers across all three main product lines (along with their importances) for Overall Hospital Rating and Recommend the Hospital. In some cases the drivers are nearly tied in terms of rank order, and this is reflected in the table. Note that these comparisons are based on strictly quantitative comparisons of the top drivers across the five product lines rather than a formal statistical comparison.

Table 14. Overall Hospital Rating drivers: summary of five strongest drivers for each product line.

Driver Strength	Medical	Obstetrics	Surgical
Strongest driver	Care Transition (23%)	Communication with Doctors (21%)	Care Transition (25%)
Second strongest driver	Communication with Doctors (18%)	Care Transition (21%)	Pain Management (18%)
Third strongest driver	Communication with Nurses (17%)	Communication with Nurses (15%)	Communication with Nurses (14%)
Fourth strongest driver	Pain Management (14%)	Pain Management (15%)	Communication with Doctors (12%)
Fifth strongest driver	Cleanliness of the Hospital Environment (10%)	Responsiveness of Hospital Staff (11%)	Cleanliness of the Hospital Environment (11%)

Table 15. Recommend the Hospital drivers: summary of five strongest drivers for each product line.

Driver Strength	Medical	Obstetrics	Surgical
Strongest driver	Care Transition (34%)	Care Transition (29%)	Care Transition (30%)
Second strongest driver	Communication with Doctors (18%)	Communication with Doctors (20%)	Pain Management (16%)
Third strongest driver	Communication with Nurses (16%)	Communication with Nurses (14%)	Communication with Doctors (15%)
Fourth strongest driver	Pain Management (12%)	Pain Management (12%)	Cleanliness of the Hospital Environment (12%)
Fifth strongest driver	Cleanliness of the Hospital Environment (7%)	Responsiveness of Hospital Staff (9%)	Communication with Nurses (11%)

The core drivers of Overall Hospital Rating and Recommend the Hospital are identical across the three product lines shown here. The relative ranking within each subgroup may differ somewhat (Communication with Doctors tend to vary the most across the three product lines for both outcomes, while Responsiveness of Hospital Staff falls in the top five for obstetrics for both outcomes but for not the other two product lines), but these differences are likely to be of little substantive importance. In essence, therefore, the key drivers of patient satisfaction do not vary appreciably across produce line.

5.5.2.2 Purchased Care Drivers' Analysis Results

Figure 45 reports the impact of the HCAHPS measures on Overall Hospital Rating.[18] The greatest impact on Overall Hospital Rating for Purchased Care is Communication with Nurses (26%), followed by Care Transition (21%) and Cleanliness of the Hospital Environment (13%). Both Care Transition and Pain Management have importances of 11%. The remaining drivers have lesser importance (importance values < 10%), but all are statistically significant, $p < 0.05$.

[18]The corresponding model $R^2 = 0.58$.

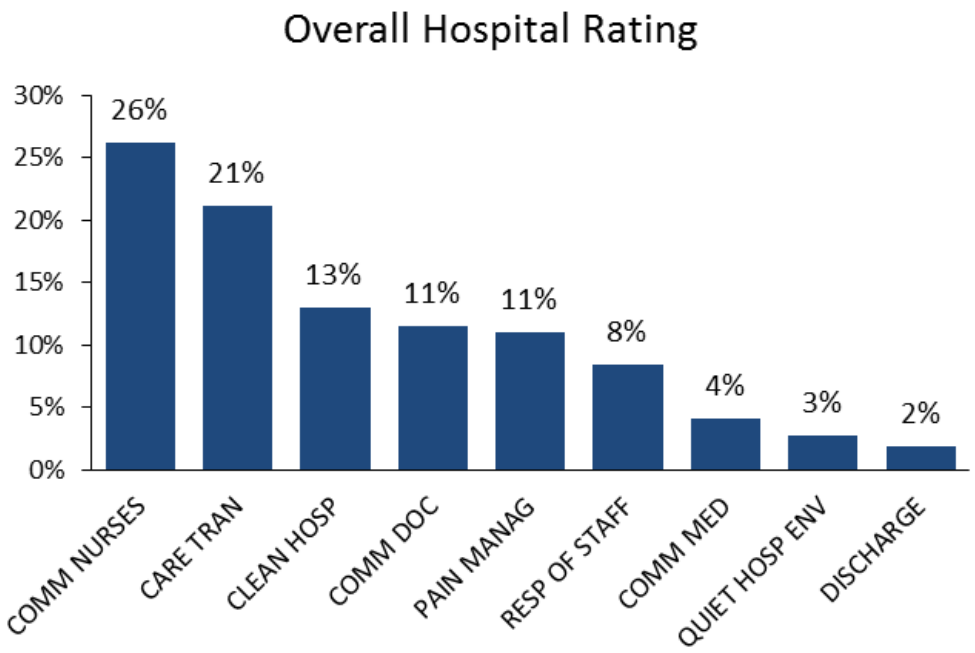


Figure 45. Drivers' analysis of Overall Hospital Rating for Purchased Care.

Figure 46 presents the impact of the HCAHPS measures on Recommend the Hospital.[19] Here, Care Transition and Communication with Nurses show the greatest impact, with both composites having importance value of 25%. These two composites are followed by Cleanliness of the Hospital Environment (12%) and Communication with Doctors (11%). In addition, in the Recommend the Hospital analyses, the Communication about Medicines measure is not statistically significant. All other effects are statistically significant, $p < 0.05$.

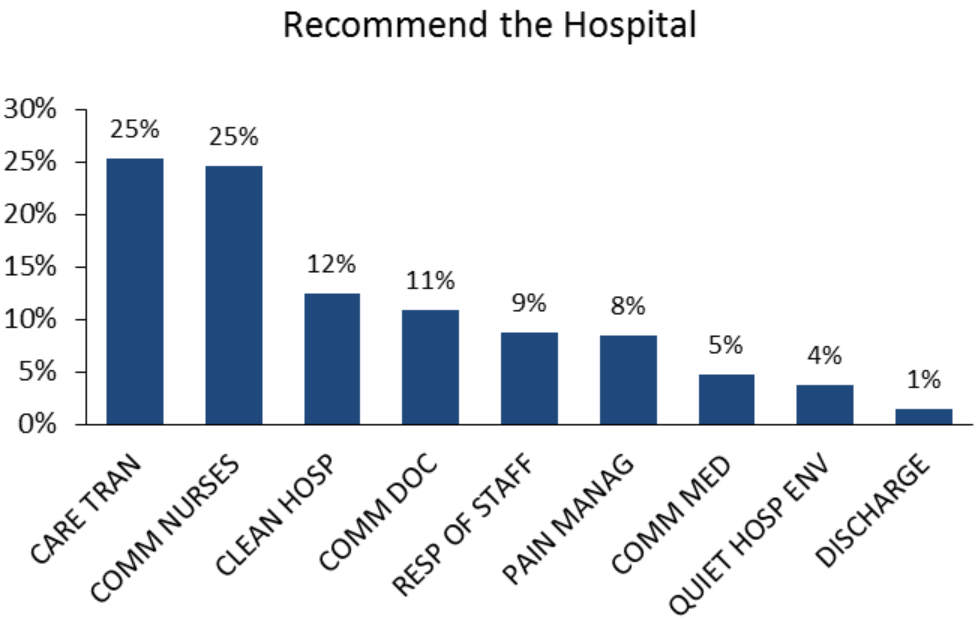


Figure 46. Drivers' analysis of Recommend the Hospital for Purchased Care.

[19]The corresponding model $R^2 = 0.55$.

As with Direct Care, we next examined key drivers among the obstetrics product line. Figure 47 presents the impact of the HCAHPS measures on the Overall Rating of Hospitals for these patients. Care Transition is the largest single net driver with an importance of 19%, closely followed by Communication with Nurses (18%), and then Cleanliness of the Hospital Environment (15%). All results are statistically significant with the exception of Quiet Hospital Environment and Communication about Medicine.

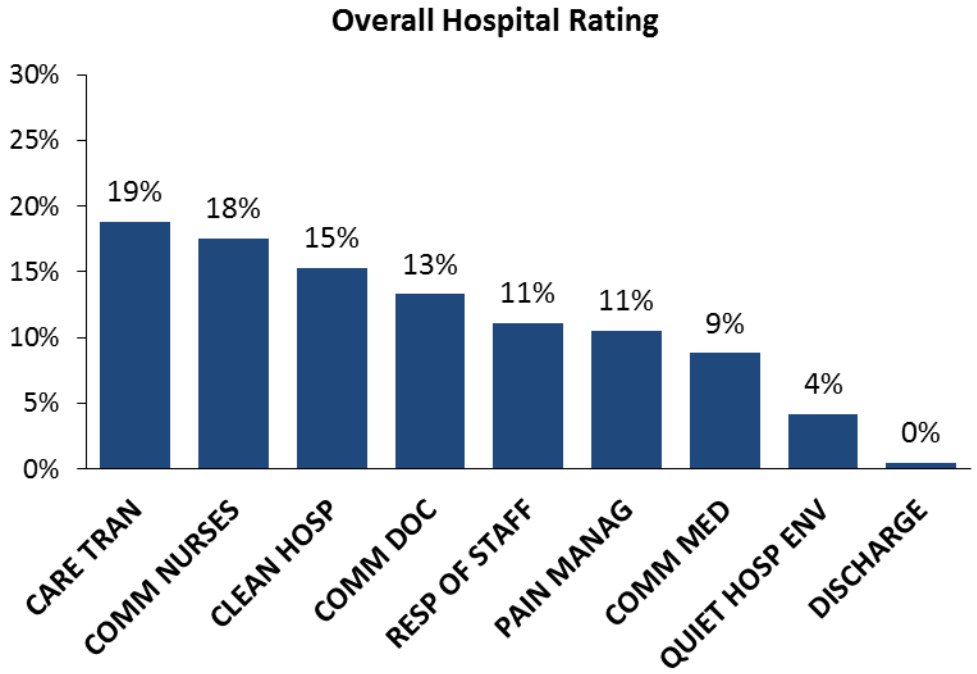


Figure 47. Drivers' analysis of HCAHPS Measures on Overall Rating of Hospital for obstetrics patients.

Figure 48 presents the importance of the HCAHPS measures on the Recommend the Hospital scores for obstetric patients. Care Transition has the strongest influence with an importance of 23%, followed by Communication with Nurses and Clean Hospital Environment, with importances of 18% and 17%, respectively. Communication with Doctors has an importance of 13%. Quiet Hospital Environment, Communication about Medicine and Discharge Information are not statistically significant.

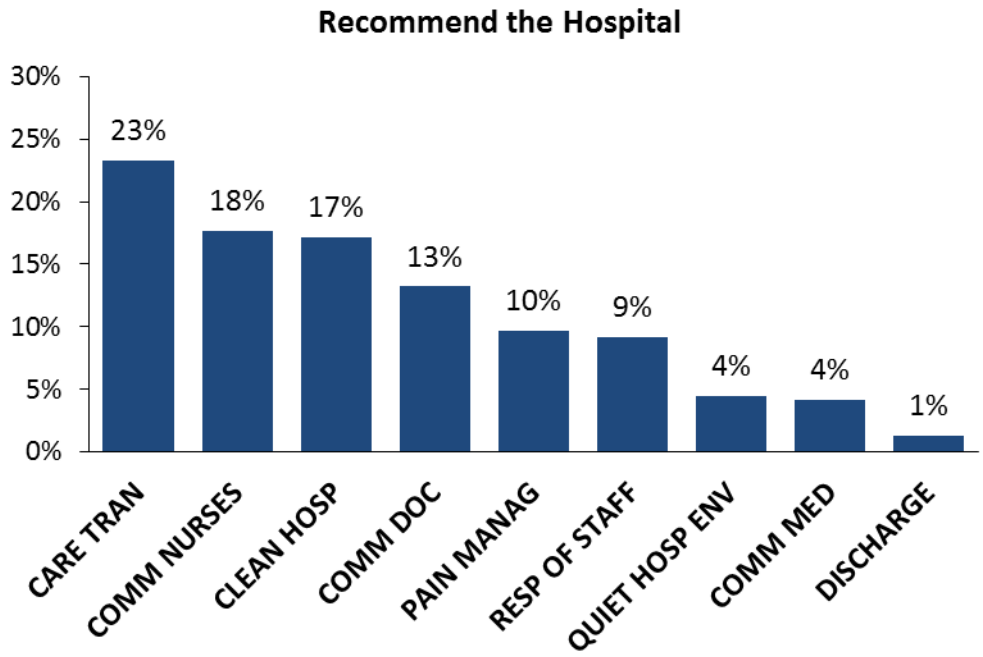


Figure 48. Drivers' analysis of HCAHPS Measures on Recommend the Hospital for obstetric patients.

Table 16 and table 17 on the following page provide summary comparisons of the top five drivers across all three main product lines within the Purchased Care. In some cases the drivers are nearly tied in terms of rank order, and this is reflected in the table. In some cases the drivers are nearly tied in terms of rank order, and this is reflected in the table. Note that these comparisons are based on strictly quantitative comparisons of the top drivers across the five product lines, rather than a formal statistical comparison.

Table 16. Overall Hospital Rating drivers: summary of five strongest drivers for each product line.

Driver Strength	Medical	Obstetrics	Surgical
Strongest driver	Care Transition (26%)	Care Transition (19%)	Care Transition (25%)
Second strongest driver	Communication with Doctors (17%)	Communication with Nurses (18%)	Communication with Nurses (18%)
Third strongest driver	Communication with Nurses (16%)	Cleanliness of Hospital Environment (15%)	Responsiveness of Hospital Staff (17%)
Fourth strongest driver	Cleanliness of Hospital Environment (13%)	Pain Management (13%)	Cleanliness of Hospital Environment (13%)
Fifth strongest driver	Pain Management (10%)	Communication with Doctors (11%)	Quietness of Hospital Environment (8%)

Table 17. Recommend the Hospital drivers: summary of five strongest drivers for each product line.

Driver Strength	Medical	Obstetrics	Surgical
Strongest driver	Care Transition (29%)	Care Transition (23%)	Care Transition (32%)
Second strongest driver	Communication with Doctors (17%)	Communication with Nurses (18%)	Communication with Nurses (18%)
Third strongest driver	Communication with Nurses (16%)	Cleanliness of Hospital Environment (17%)	Responsiveness of Hospital Staff (14%)
Fourth strongest driver	Cleanliness of Hospital Environment (13%)	Communication with Doctors (13%)	Cleanliness of Hospital Environment (13%)
Fifth strongest driver	Pain Management (10%)	Pain Management (10%)	Quietness of Hospital Environment (6%) Communication with Doctors (6%)

The Purchased Care driver results largely mirror the Direct Care results in that the four most prominent drivers are Care Transition, Communication with Nurses, Communication with Doctors, and Pain Management. An exception is observed within the surgical product line, where Pain Management does not emerge as a primary driver. Instead, Responsiveness of the Hospital Staff and measures related to the hospital environment (Quietness and Cleanliness of the Hospital Environment) are important drivers for surgical patient.

Overall, we conclude that drivers of satisfaction do not vary substantively between Purchased and Direct Care facilities, and among product lines. Communication and Care Transition are consistently high drivers of patient satisfaction within the MHS.

5.5.3 Drivers' Analysis: Attributable Effects

5.5.3.1 Attributable Effects Methodology

Attributable effects drivers' analysis provides another way to assess the impact of drivers, especially in the context where drivers are thought of as potential levers to improve outcomes. Conceptually, attributable effects considers drivers as having two dimensions. One dimension is defined by a driver's potential to produce ***gains*** in the outcome measure (here, Overall Hospital Rating and Recommend) if the driver level could be increased. The other dimension pertains to the potential of a driver to ***decrease*** performance on the outcome measure.

However, unlike in a logistic regression analysis, within an attributable effects analysis, the potential for gain and potential for loss associated with a given driver are ***not*** necessarily symmetric. This is because performance levels on a particular driver may be so high that there is not much further gain that could be achieved via increasing performance on that driver, and thus improvements in outcomes that could be expect to be realized in "topping out" on this driver would be negligible. On the other hand, decreased performance in the same driver may result in dramatic decreases for the outcome measure. Therefore, while it may not make sense to seek increased performance on a particular driver, maintaining current performance might still be very important.

Attributable effects are interpreted via potential gain and potential loss measures for each driver, both of which are oriented toward answering "what if" types of questions: What if respondents were to move from a lower rating on that attribute, what would be the potential gain in Overall Hospital Rating? Similarly, what if respondents were to move from a high rating on that attribute to the low rating, what would be the potential loss in Overall Hospital Rating? In answering these questions, attributable effects

examines what would happen if all low performing people on a driver go from a low score to a high score—what would the potential gain in the overall score be? Similarly, what if all the respondents giving a high performance score instead gave a low score—what would be the potential loss in the overall rating?

Ultimately, attributable effects is a bivariate form of drivers' analysis, and thus does not evaluate the net effects of drivers, adjust for multicollinearity, nor point to intermediary/moderating relationships between drivers. Attributable effects is thus a potential penalty/gain form of drivers' analysis used to complement conventional drivers' analysis and provide a methodology for guiding thinking about allocating resources to increasing outcomes (here, customer satisfaction) in a world of scarce resources.

5.5.3.2 Attributable Effects Results

Figure 49 shows the Potential Loss and Potential Gain metrics from an Attributable Effects analysis for the Overall Rating Hospital outcome measure. Here the respondent-level inputs to the HCAHPS analogue composite scores (***not*** the composite scores generated via CATPCA themselves) are featured in the analysis, to provide a more granular portrait of the gain/loss scenarios for individual components of patient satisfaction.

Each component of patient satisfaction is considered individually in figure 49, and its potential for loss (left hand side of figure) and gain (right hand side of figure) are ranked against all the other driver's individual results. The red and dark blue bars designate the top five measures in terms of potential loss (red) and gain (dark blue). The numeric values on the left hand side of the graph indicate the percentage of people in the favorable rating category on Overall Hospital Rating who would drop to the unfavorable rating if everyone in the population who gave a high level of support for the corresponding driver shifted to the low level of support for that driver. The numeric values on the right hand side of the graph indicate the percentage of people in the unfavorable rating category on Overall Hospital Rating who would move to the unfavorable rating if everyone in the population who gave a low level of support for the corresponding driver shifted to the high level of support for that driver.

From figure 49 it can be seen that two of the five primary drivers with the great potential for gain (Overall Nursing Care, Nurse Listened) were also among those with the greatest potential for loss. The remaining three drivers with the greatest potential for gain (Patient Preferences Considered, Communication Among Staff, and Explained Side Effects) fall outside the set of factors with the greatest potential for loss. Finally, three of the drivers with the greatest potential for loss (Help Controlling Pain, Nurses treat with Courtesy and Respect, and Doctors treat with Courtesy and Respect) fall outside the set of factors with the greatest potential for gain. Overall, there is considerable asymmetry in the drivers.

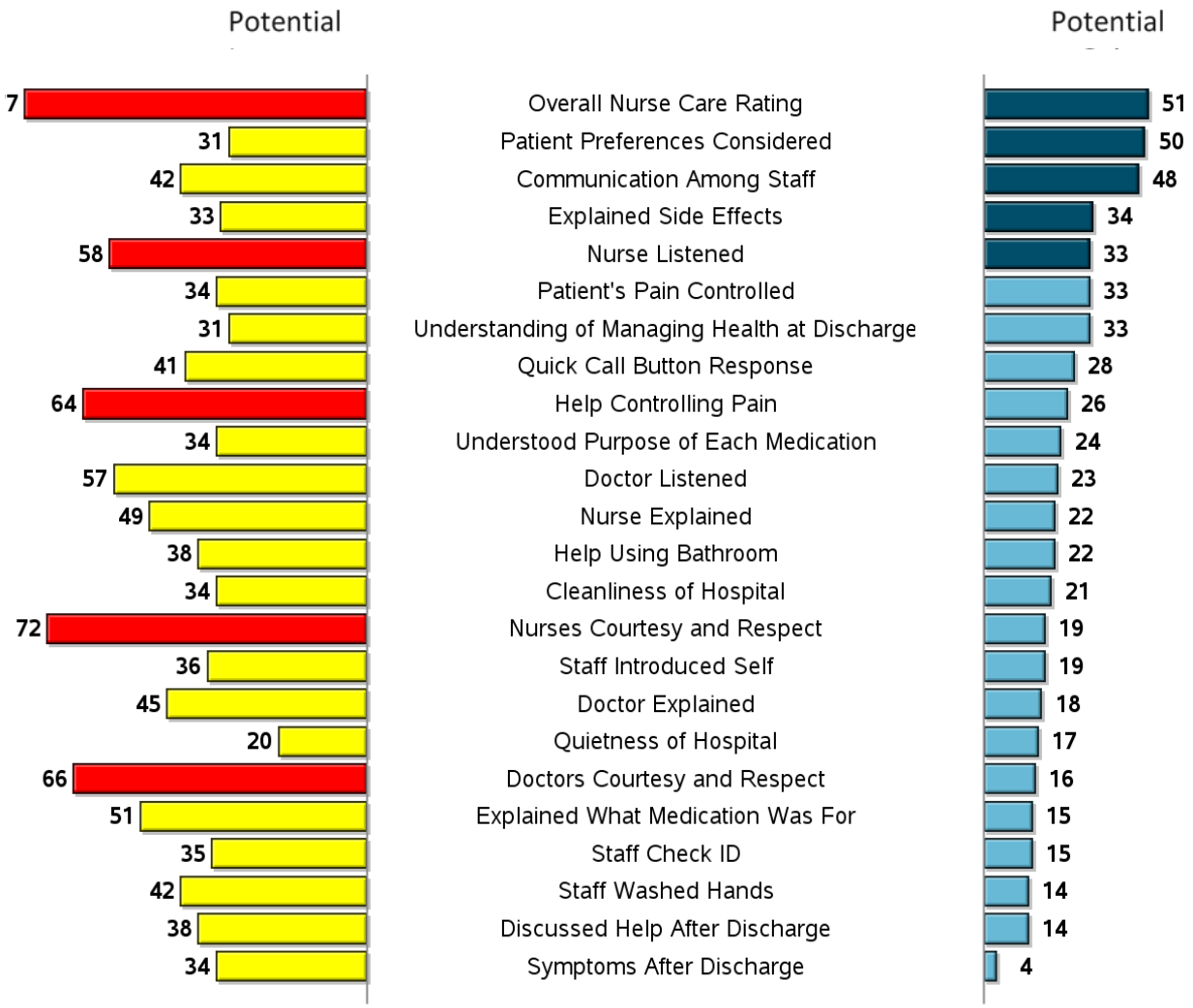


Figure 49. Attributable effect analysis results—overall rating outcome.

With regards to the logistic regression drivers analyses presented previously, the attributable effects analysis corroborates the previous finding that among the dimensions of care considered in these analyses, nursing care and communication has the largest potential to improve a hospitals rating. It also has the greatest potential for loss, however. Therefore, even if no initiatives are implemented to improve nursing care and communication, programs should be in place to support these aspects of patient health care, since the drop off in satisfaction that would be associated with a decrease in performance would be quite large. Indeed, it would have the largest negative impact on Overall Rating of all the service components considered here.

Courtesy and Respect from Doctors is a component of the composite dimension Communication with Doctors considered in the logistic regression analyses. It reflects a dimension with little opportunity for potential for gain in the overall rating of a hospital (potential gain is 16%). However, it also reflects a dimension where lack of support or changes in the interrelationships between the doctors and patients or doctors and other staff may jeopardize the Overall Rating of a hospital (potential loss is 66%).

The Potential for Gain is high for Staff Communications (gain score of 48%). Patients recognize the interaction between staff doctors, nurses, orderly, etc., and this factor has an impact on patient

satisfaction. Patient Preferences in Care Transition also has a large potential for gain. Each patient faces uncertainties, and even fear, following their release from a hospital. Success in addressing patients' post-discharge anxieties plays a sizeable role in the rating of the hospital.

6 REFERENCES

AHRQ. (n.d.). *About CAHPS*. https://www.cahps.ahrq.gov/about-cahps/index.html.

Anhang Price, R., Elliott, M.N., Zaslavsky, A.M., Hays, R.D., Lehrman, W.G., Rybowski, L., and Cleary, P.D. (2014). "Examining the Role of Patient Experience Surveys in Measuring Health Care Quality." *Medical Care Research and Review: MCRR*. http://doi.org/10.1177/1077558714541480.

Banka, G., Edgington, S., Kyulo, N., Padilla, T., Mosley, V., Afsarmanesh, N., and Ong, M.K. (2015). "Improving Patient Satisfaction through Physician Education, Feedback, and Incentives." *Journal of Hospital Medicine*, *10*(8). http://doi.org/10.1002/jhm.2373.

Bedard, K. and Deschenes, O. (2006). "The Long-Term Impact of Military Service on Health: Evidence from World War II and Korean War Veterans." *American Economic Review*, *96*(1), 176–194.

Boulding, W., Glickman, S.W., Manary, M.P., Schulman, K.A, and Staelin, R. (2011). "Relationship Between Patient Satisfaction with Inpatient Care and Hospital Readmission Within 30 Days." *The American Journal of Managed Care*, *17*(1), 41–48.

Bray, R.M., Pemberton, M.R., Hourani, L.L., Witt, M., Olmsted, K.L., Brown, J.M., and Scheffler, S. (2009). *Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel*, (No. RTI/10940-FR). Research Triangle Institute (RTI) Research, Triangle Park, NC.

Brousseau, D.C., Bergholte, J., and Gorelick, M.H. (2004). "The Effect of Prior Interactions with a Primary Care Provider on Nonurgent Pediatric Emergency Department Use." *Archives of Pediatrics and Adolescent Medicine*, *158*(1), 78–82. http://doi.org/10.1001/archpedi.158.1.78.

Chandra, A. and London, A.S. (2013). "Unlocking Insights About Military Children and Families." *Future of Children*, *23*(2), 187–198. https://doi.org/10.1353/foc.2013.0010.

Chen, L.M., Birkmeyer, J.D., Saint, S., and Jha, A.K. (2013). "Hospitalist Staffing and Patient Satisfaction in the National Medicare Population." *Journal of Hospital Medicine*, *8*(3), 126–131. http://doi.org/10.1002/jhm.2001.

Clark, N.M., Cabana, M. D., Nan, B., Gong, Z. M., Slish, K. K., Birk, N. a, and Kaciroti, N. (2008). "The Clinician-Patient Partnership Paradigm: Outcomes Associated with Physician Communication Behavior." *Clinical Pediatrics*, *47*(1), 49–57. http://doi.org/10.1177/0009922807305650.

CMS. (n.d.(a)). *HCAHPS: Patients' Perspectives of Care Survey*. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-instruments/HospitalQualityInits/HospitalHCAHPS.html.

CMS. (n.d.(b)). T*he HCAHPS Survey—Frequently Asked Questions*. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/Downloads/HospitalHCAHPSFactSheet201007.pdf.

Conard, P.L., Young, C., Hogan, L., and Armstrong, M.L. (2014). "Encountering Women Veterans with Military Sexual Trauma." *Perspectives in Psychiatric Care*, *50*, 280–286. http://doi.org/10.1111/ppc.12055.

Craig, A.R., Otani, K., and Herrmann, P.A. (2015). "Evaluating the Influence of Perceived Pain Control on Patient Satisfaction in a Hospital Setting." *Hospital Topics, 93*(1), 1–8. http://doi.org/10.1080/00185868.2015.1012926.

Danker, R., Rieck, J., Bentacur, A., Dayan, Y.B., and Shahar, A. (2007). "Civilian Doctors in Military Clinics—Outsourcing for Better Medicine." *Military Medicine*. *172*(1:75), 75–78.

Deitrick, L., Bokovoy, J., Stern, G., and Panik, A. (2006). "Dance of the Call Bells: Using Ethnography to Evaluate Patient Satisfaction with Quality of Care." *Journal of Nursing Care Quality*, *21*(4), 316–324.

Department of Defense. (2015). *Military Health System Review*.

Dimatteo, M.R. (2010). "Physician Communication and Patient Adherence to Treatment: A Meta-Analysis." *International Journal*, *47*(8), 826–834. http://doi.org/10.1097/MLR.0b013e31819a5acc.

Dolan, T.C. (1996). "Military and Civilian Healthcare—The Facts." *Healthcare Executive*, *7*(3), 5.

Doyle, C., Lennox, L., and Bell, D. (2013). "A Systematic Review of Evidence on the Links Between Patient Experience and Clinical Safety and Effectiveness." *BMJ Open*, *3*(1), 1–18. http://doi.org/10.1136/bmjopen-2012-001570.

Drummet, A.R., Coleman, M., and Cable, S. (2003). "Military Families Under Stress: Implications for Family Life Education." *Family Relations*, *52*(3), 279–287.

Dudas, V., Bookwalter, T., Kerr, K.M., and Pantilat, S.Z. (2002). "The Impact of Follow-Up Telephone Calls to Patients After Hospitalization." *Disease-A-Month: DM*, *48*(4), 239–248.

Fan, V.S., Burman, M., McDonell, M.B., and Fihn, S.D. (2005). "Continuity of Care and Other Determinants of Patient Satisfaction with Primary Care." *Journal of General Internal Medicine*, *20*(3), 226–233.

Figley, C.R. (1997). "The National Defense Flaw: Reservist Family Healthcare." *Families, Systems, and Health*, *15*(1), 75–78. http://doi.org/10.1037/h0089808.

Finney Rutten, L.J., Agunwamba, A.A., Beckjord, E., Hesse, B.W., Moser, R.P., and Arora, N.K. (2015). "The Relation Between Having a Usual Source of Care and Ratings of Care Quality: Does Patient-Centered Communication Play a Role?" *Journal of Health Communication*, (August), 1–7. http://doi.org/10.1080/10810730.2015.1018592.

Frayne, S.M., Yano, E.M., Nguyen, V.Q., Yu, W., Ananth, L., Chiu, V.Y., and Phibbs, C.S. (2008). "Gender Disparities in Veterans Health Administration Care: Importance of Accounting for Veteran Status." *Medical Care*, *46*(5), 549–553. http://doi.org/10.1097/MLR.0b013e3181608115.

Gasink, L.B., Singer, K., Fishman, N.O., Holmes, W.C., Weiner, M.G., Bilker, W.B., and Lautenbach, E. (2008). "Contact Isolation for Infection Control in Hospitalized Patients: Is Patient Satisfaction Affected?" *Infection Control and Hospital Epidemiology: The Official Journal of the Society of Hospital Epidemiologists of America*, *29*(3), 275–278. http://doi.org/10.1086/527508.

Glassman, P.A., Tanielian, T., Harris, K., Suarez, A., Bradley, M., Atkinson, S.W., and Williams, T. (2004). "Provider Perceptions of Pharmacy Management: Lessons from the Military Health System." *Medical Care*, *42*(4), 361–366. http://doi.org/10.1097/01.mlr.0000118862.92043.9b.

Harris, G.L.A. (2011). "Reducing Healthcare Disparities in the Military through Cultural Competence." *Journal of Health and Human Services*, (Fall), 145–181.

Haynes, R.B., Ackloo, E., Sahota, N., McDonald, H.P., and Yao, X. (2008). "Interventions for Enhancing Medication Adherence." *Cochrane Database of Systematic Reviews*, (2). http://doi.org/10.1002/14651858.CD000011.pub3.

HCAHPS. *HCAHPS Website*. http://www.hcahpsonline.org/home.aspx.

Heatley, M.L., Watson, B., Gallois, C., and Miller, Y.D. (2015). "Women's Perceptions of Communication in Pregnancy and Childbirth: Influences on Participation and Satisfaction with Care." *Journal of Health Communication*, *20*(7), 827–834. http://doi.org/10.1080/10810730.2015.1018587.

Hisnanick, J. (2015). "Matching Administrative Databases for Investigating Public Policy Issues: Impact of Medicare on Inpatient Usage of VA Hospitals." *Public Administration Quarterly*, *20*(2), 180–200.

Hoerster, K.D., Lehavot, K., Simpson, T., McFall, M., Reiber, G., and Nelson, K.M. (2012). "Health and Health Behavior Differences: U.S. Military, Veteran, and Civilian Men." *American Journal of Preventive Medicine*, *43*(5), 483–489. http://doi.org/10.1016/j.amepre.2012.07.029.

Hynes, D.M., Koelling, K., Stroupe, K., Arnold, N., Mallin, K., Sohn, M.-W., and Kok, L. (2007). "Veterans' Access to and Use of Medicare and Veterans Affairs Health Care." *Medical Care*, *45*(3), 214–223. http://doi.org/10.1097/01.mlr.0000244657.90074.b7.

Iannuzzi, J.C., Kahn, S.A., Zhang, L., Gestring, M.L., Noyes, K., and Monson, J.R.T. (2015). "Getting Satisfaction: Drivers of Surgical Hospital Consumer Assessment of Health Care Providers and Systems Survey Scores." *Journal of Surgical Research*, *197*(1), 155–161. http://doi.org/10.1016/j.jss.2015.03.045.

Isaac, T., Zaslavsky, A.M., Cleary, P.D., and Landon, B.E. (2010). "The Relationship Between Patients' Perception of Care and Measures of Hospital Quality and Safety." *Health Services Research*, *45*(4), 1024–1040. http://doi.org/10.1111/j.1475-6773.2010.01122.x.

Jallinoja, P., Tuorila, H., Ojajärvi, A., Bingham, C., Uutela, A., and Absetz, P. (2011). "Conscripts' Attitudes Towards Health and Eating. Changes During the Military Service and Associations with Eating." *Appetite*, *57*(3), 718–721. http://doi.org/10.1016/j.appet.2011.08.019.

Jha, A.K., Orav, E.J., Zheng, J., and Epstein, A.M. (2008). "Patients' Perception of Hospital Care in the United States." *The New England Journal of Medicine*, *359*(18), 1921–1931. http://doi.org/10.1056/NEJMsa0804116.

Kennedy, B., Craig, J.B., Wetsel, M., Reimels, E., and Wright, J. (2013). "Three Nursing Interventions and Impact on HCAHPS Scores." *Journal of Nursing Care Quality*, *28*(4), 327–34. http://doi.org/10.1097/NCQ.0b013e31828b494c.

Kudler, H. and Porter, C.R.I. (2013). "Building Communities of Care for Military Children and Families." *Future of Children*, *23*(2), 163–185.

Lehavot, K., Hoerster, K.D., Nelson, K.M., Jakupcak, M., and Simpson, T.L. (2012). "Health Indicators for Military, Veteran, and Civilian Women." *American Journal of Preventive Medicine*, *42*(5), 473–480. http://doi.org/10.1016/j.amepre.2012.01.006.

Long, J.S. (1997). *Regression Models for Categorical and Limited Dependent Variables*. Sage Publications.

Lyu, H., Wick, E.C., Housman, M., Freischlag, J.A., and Makary, M.A. (2013). "Patient Satisfaction as a Possible Indicator of Quality Surgical Care." *JAMA Surgery*, *148*(4), 362–367. http://doi.org/10.1001/2013.jamasurg.270.

Massachusetts General Physicians Organization. (2012). *Addressing Quietness of Units: Best Practice Implementation Guide*. Massachusetts General Hospital.

Maul, T.M., Zaidi, A., Kowalski, V., Hickey, J., Schnug, R., Hindes, M., and Cook, S. (2015). "Patient Preference and Perception of Care Provided by Advance Nurse Practitioners and Physicians in Outpatient Adult Congenital Clinics," *Congenital Heart Disease*, 1–5.

Mazurenko, O. and Menachemi, N. (2016; e-publication available ahead of print). "Use of Foreign-Educated Nurses and Patient Satisfaction in U.S. Hospitals." *Health Care Management Review*, 1. http://doi.org/10.1097/HMR.0000000000000077.

Meade, C.M., Bursell, A.L., and Ketelsen, L. (2006). "Effects of Nursing Rounds on Patients' Call Light Use, Satisfaction, and Safety." *The American Journal of Nursing*, *106*(9), 58–71.

Medicare.gov. (n.d.). *Survey of Patients' Experiences (HCAHPS)*. https://www.medicare.gov/hospitalcompare/Data/Overview.html.

McFarland, D.C., Ornstein, K.A., and Holcombe, R.F. (2015). "Demographic Factors and Hospital Size Predict Patient Satisfaction Variance—Implications for Hospital Value-Based Purchasing." *Journal of Hospital Medicine*, *10*(8), 503–509. http://doi.org/10.1002/jhm.2371.

McWhorter, S.K., Stander, V.A., Thomsen, C.J., Merrill, L.L., and Milner, J.S. (2014). "Changes in Healthcare Use Across the Transition from Civilian to Military Life," (April 2013), 186–204.

Mehrotra, P., Croft, L., Day, H.R., Perencevich, E.N., Pineles, L., Harris, A.D., and Morgan, D. J. (2013). "Effects of Contact Precautions on Patient Perception of Care and Satisfaction: A Prospective Cohort Study." *Infection Control and Hospital Epidemiology: The Official Journal of the Society of Hospital Epidemiologists of America*, *34*(10), 1087–1093. http://doi.org/10.1086/673143.

Menendez, M.E., Chen, N.C., Mudgal, C.S., Jupiter, J.B., and Ring, D. (2015). "Physician Empathy as a Driver of Hand Surgery Patient Satisfaction." *The Journal of Hand Surgery*. http://doi.org/10.1016/j.jhsa.2015.06.105.

Merkel, W.T. (1984). "Physician Perception of Patient Satisfaction: Do Doctors Know Which Patients are Satisfied?" *Medical Care, 22*(5), 453–459.

Meterko, M., Mohr, D.C., and Young, G.J. (2004). "Teamwork Culture and Patient Satisfaction in Hospitals." *Medical Care*, *42*(5), 492–498. http://doi.org/10.1097/01.mlr.0000124389.58422.b2.

Mundell, B.F., Friedberg, M.W., Eibner, C., and Mundell, W.C. (2013). "U.S. Military Primary Care: Problems, Solutions, and Implications for Civilian Medicine." *Health Affairs*, *32*(11), 1949–1955. http://doi.org/10.1377/hlthaff.2013.0586.

O'Leary, K.J., Darling, T.A., Rauworth, J., and Williams, M.V. (2013). "Impact of Hospitalist Communication-Skills Training on Patient-Satisfaction Scores." *Journal of Hospital Medicine*, *8*(6), 315–320.

Olson, D.P. and Windish, D.M. (2010). "Communication Discrepancies Between Physicians and Hospitalized Patients." *Archives of Internal Medicine*, *170*(15), 1302–1307.

Platonova, E.A. and Shewchuk, R.M. (2015). "Patient Assessment of Primary Care Physician Communication: Segmentation Approach." *International Journal of Health Care Quality Assurance*, *28*(4), 332–342. http://doi.org/10.1108/IJHCQA-11-2013-0136.

Radtke, K. (2013). "Improving Patient Satisfaction with Nursing Communication Using Bedside Shift Report." *Clinical Nurse Specialist*, *27(1),* 19–25.

Redsell, S., Stokes, T., Jackson, C., Hastings, A., and Baker, R. (2007). "Patients' Accounts of the Differences in Nurses' and General Practitioners' Roles in Primary Care." *Journal of Advanced Nursing*, *57*(2), 172–180. http://doi.org/10.1111/j.1365-2648.2006.04085.x.

Redshaw, M. (2008). "Women as Consumers of Maternity Care: Measuring "Satisfaction" or "Dissatisfaction"?" *Birth: Issues in Perinatal Care, 35*(1), 73–76. http://doi.org/10.1111/j.1523-536X.2007.00215.x.

Robinson, K.L. and Watters, S. (2010). "Bridging the Communication Gap Through Implementation of a Patient Navigator Program." *Pennsylvania Nurse*, *65*(2), 19–22.

Rothman, A.A., Park, H., Hays, R.D., Edwards, C., and 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*(6), 2201–2222.

Sawyer, A., Ayers, S., Abbott, J., Gyte, G., Rabe, H., and Duley, L. (2013). "Measures of Satisfaction with Care During Labor and Birth: A Comparative Review." *BMC Pregnancy and Childbirth, 13*(1), 1–10. http://doi.org/10.1186/1471-2393-13-108.

Siddiqui, Z.K., Zuccarelli, R., Durkin, N., Wu, A.W., and Brotman, D.J. (2015). "Changes in Patient Satisfaction Related to Hospital Renovation: Experience with a New Clinical Building." *Journal of Hospital Medicine*, *10*(3). http://doi.org/10.1002/jhm.2297.

Singh, S., Fletcher, K.E., Pandl, G.J., Schapira, M.M., Nattinger, A.B., Biblo, L.A., and Whittle, J. (2010). "It's the Writing on the Wall: Whiteboards Improve Inpatient Satisfaction with Provider Communication." *American Journal of Medical Quality*, *26*(2), 127–131. doi:1062860610376088.

Sorra, J., Khanna, K., Dyer, N., Mardon, R., and Famolaro, T. (2012). "Exploring Relationships Between Patient Safety Culture and Patients' Assessments of Hospital Care." *Journal of Patient Safety*, *8*(3), 131–139. http://doi.org/10.1097/PTS.0b013e318258ca46.

Stahel, P.F. and Butler, N. (2014). "Effective Communication—Tips and Tricks." In *Patient Safety in Surgery*, 115–121, Springer, London.

Swan, J.E., Richardson, L.D., and Hutton, J.D. (2003). "Do Appealing Hospital Rooms Increase Patient Evaluations of Physicians, Nurses, and Hospital Services?" *Health Care Management Review*, *28*(3), 254–264. http://doi.org/10.1097/00004010-200307000-00006.

Tanofsky-Kraff, M., Sbrocco, T., Theim, K.R., Cohen, L.A., MacKey, E.R., Stice, E., and Stephens, M.B. (2013). "Obesity and the U.S. Military Family." *Obesity*, *21*(11), 2205–2220. http://doi.org/10.1002/oby.20566.

Teachman, J. (2011). "Are Veterans Healthier? Military Service and Health at Age 40 in the All-Volunteer Era." *Social Science Research*, *40*(1), 326–335. http://doi.org/10.1016/j.ssresearch.2010.04.009.

Teijlingen, E.R., Hundley, V., Rennie, A., Graham, W., and Fitzmaurice, A. (2003). "Maternity Satisfaction Studies and Their Limitations: 'What Is Must Still Be Best.'" *Birth: Issues in Perinatal Care, 30*(2), 75–82. http://doi.org/10.1046/j.1523-536X.2003.00224.x.

Tzeng, H.M. (2010). "Perspectives of Staff Nurses of the Reasons for and the Nature of Patient-Initiated Call Lights: An Exploratory Survey Study in Four USA Hospitals." *BMC Health Services Research*, *10*(52), 1–13.

Vinski, J., Bertin, M., Sun, Z., Gordon, S.M., Bokar, D., Merlino, J., and Fraser, T.G. (2012). "Impact of Isolation on Hospital Consumer Assessment of Healthcare Providers and Systems Scores: Is Isolation Isolating?" *Infection Control and Hospital Epidemiology*, *33*(5), 513–516. http://doi.org/10.1086/665314.

Weeks, W.B., West, A.N., Wallace, A.E., and Fisher, E.S. (2008). "Comparing the Characteristics, Utilization, Efficiency, and Outcomes of VA and Non-VA Inpatient Care Provided to VA Enrollees: A Case Study in New York." *Medical Care*, *46*(8), 863–871. http://doi.org/10.1097/MLR.0b013e31817d92e1.

Wennberg, J.E., Bronner, K., Skinner, J.S., Fisher, E.S., and Goodman, D.C. (2009). "Inpatient Care Intensity and Patients' Ratings of Their Hospital Experiences." *Health Affairs*, *28*(1), 103–112. http://doi.org/10.1377/hlthaff.28.1.103.

Wiggins, B.S., Rodgers, J.E., DiDomenico, R.J., Cook, A.M., and Page, R.L. (2013). "Discharge Counseling for Patients with Heart Failure or Myocardial Infarction: A Best Practices Model Developed by Members of the American College of Clinical Pharmacy's Cardiology Practice and Research Network Based on the Hospital to Home (H2H)." *Pharmacotherapy*, *33*(5), 558–580. http://doi.org/10.1002/phar.1231.

Williams, A. and Jones, M. (2006). "Patients' Assessments of Consulting a Nurse Practitioner: The Time Factor." *Journal of Advanced Nursing*, *53*(2), 188–195. http://doi.org/10.1111/j.1365-2648.2006.03714.x.

Wilson, I.B., Ding, L., Hays, R.D., Shapiro, M.F., Bozzette, S.A., and Cleary, P.D. (2002). "HIV patients' Experiences with Inpatient and Outpatient Care: Results of a National Survey." *Medical Care*, *40*(12), 1149–1160. https://doi.org/10.1097/00005650-200212000-00003.

Wolf, J. (2012). *Charting a Course to Quiet*. The Beryl Institute.

Yorkshire, H.E. (2014). *Supporting Military Personnel into Civilian Life*. 1–3.

Young, G.J., Meterko, M., and Desai, K.R. (2000). "Patient Satisfaction with Hospital Care: Effects of Demographic and Institutional Characteristics. *Medical Care*, *38*(3), 325–334. https://doi.org/10.1097/00005650-200003000-00009.

Zeber, J.E., Noel, P.H., Pugh, M.J., Copeland, L.A., and Parchman, M.L. (2010). "Family Perceptions of Post-Deployment Healthcare Needs of Iraq/Afghanistan Military Personnel." *Mental Health in Family Medicine*, *7*(3), 135–143.