TRICARE INPATIENT SATISFACTION SURVEY (TRISS)

Annual Report of Findings (April 2015–March 2016)

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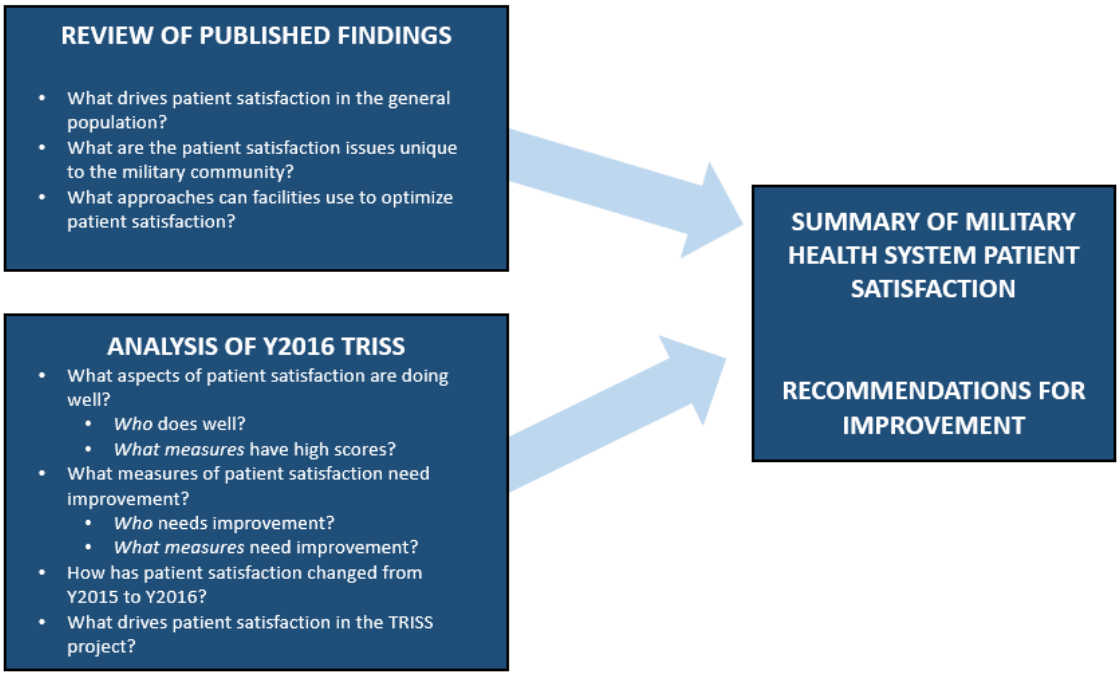
1 EXECUTIVE SUMMARY

The TRICARE Inpatient Satisfaction Survey (TRISS) Annual Report for April 2015 to March 2016 presents findings intended to inform the Defense Health Agency's (DHA) understanding of patient satisfaction within the Military Health System (MHS) through a formal review and synthesis of relevant published literature and a comprehensive analysis of TRISS data. This Executive Summary summarizes the survey content, defines the total population surveyed and subgroups used in tabulations of responses, summarizes the survey methodology, and analyzes results. The analytic results were interpreted in the context of trends, challenges, and lessons learned in patient satisfaction and military healthcare to develop the conclusions and recommendations presented here. In this way, the report offers both an in-depth understanding of current user perceptions of TRICARE services and a broad understanding of patient satisfaction in the military community.



1.1 Project Overview

This report summarizes TRISS user scores from April 1, 2015, to March 31, 2016. DHA administers the TRISS instrument to understand perceptions of inpatient care among adult TRICARE users. The survey instrument incorporates methodological and analytical protocols and many questionnaire items from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) protocol developed by the Centers for Medicare and Medicaid Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ). More information about HCAHPS can be found at http://www.hcahpsonline.org.

Details concerning the TRISS methodology can be found in Section 5 of this report. The survey is administered to TRICARE users and their dependents after a recent discharge from either a Military Treatment Facility (MTF) or a civilian hospital. MTF care is referred to here as "Direct

Care" (DC), and civilian hospital care is referred to as "Purchased Care" (PC). DC facilities are classified by service branch (i.e., Army, Navy, or Air Force) and National Capital Region (NCR). PC facilities are classified by TRICARE regional offices (including North Region, South Region, and West Region). Within each facility, analyses are conducted by product line (i.e., type of care received by patient), age, beneficiary, gender, and health status.

Appendix D shows the TRISS instrument and its measures are described in Section 5.3.2. Questionnaire items are aggregated into 11 principle HCAHPS measures, which are the focus of these analyses. The HCAHPS measures pertain to key aspects of patient experience. The measures are as follows:

- Overall Hospital Rating.
- Recommend the Hospital.
- Communication with Nurses.
- Communication with Doctors.
- Responsiveness of Hospital Staff.
- Pain Management.
- Communication about Medicines.
- Discharge Information.
- Care Transition.
- Cleanliness of Hospital Environment.
- Quietness of Hospital Environment.

In addition, the Department of Defense (DoD) added the following eight questions to the TRISS survey to assess areas of interest for military health:

- Staff Introduced Self.
- Communication among Staff.
- Family Member Stayed.
- OB Repeat Care.
- Education on Breastfeeding.
- Staff Washed Hands.
- Staff Check ID.
- Overall Nursing Care.

1.2 Respondent Overview

Results are reported for time periods throughout Y2015 and Y2016. Y2015 covers responses from 33,963 users who visited MTFs or a PC network facility between October 1, 2014, and March 31, 2015. Y2016 covers responses from 83,276 users who visited MTFs or a PC network facility between April 1, 2015, and March 31, 2016.

Notable differences exist between the DC and PC survey populations in terms of age and beneficiary category distribution. Compared to the DC sample, the PC sample includes more respondents 65 years of age or older (47.1% and 20.1% for PC and DC, respectively). Accordingly, there are more respondents in the beneficiary category "retirees and dependents 65+" in PC than in DC (47.1% and 20.0%, respectively). These values are parallel to the age proportions.

The TRISS sample consists of a higher proportion of White respondents than any other race (74.7% and 84.7% among DC and PC, respectively) and includes more women than men (65.6% and 61.4% among DC and PC, respectively).

Results reported here have been adjusted for differences in demographic profiles among facilities. Therefore, differences in age and gender between facilities or care type should not

impact results when considered at a facility level or care type level. See Section 5.3.4 for how data were adjusted for differences in patient profiles among facilities.

1.3 Key Findings

- **BENCHMARK COMPARISON**: Satisfaction scores among DC and PC users met or exceeded CMS benchmarks.
- **HCAHPS MEASURES:** DC users reported higher satisfaction than PC users on 8 of the 11 HCAHPS measures.
- **PRODUCT LINE:** Medical care scores were higher for DC users compared to PC users. Surgical care and Obstetrics care user scores were significantly higher than the benchmark on most measures for both DC and PC.
- **SATISFACTION TRENDS:** Trend analyses reveal improvements in both DC and PC user satisfaction scores when compared to the previous two quarters.
- **AGE:** Among both DC and PC users, satisfaction generally increased with age (i.e., older users reported higher satisfaction than younger users).
- **BENEFICIARY CATEGORY:** Retirees and their dependents reported higher satisfaction scores than Active Duty (AD) members and Active Duty Family Members (ADFMs). Note that beneficiary category and age are highly correlated.
- **GENDER:** Male users generally reported higher satisfaction than female users.
- **STAR RATINGS:** The majority of DC facilities received at least three stars for the HCAHPS Summary Star Rating.
- **DRIVERS:** The top driver of high hospital ratings and recommendations was Overall Nursing Care. The second and third largest drivers were Care Transition and the Communications measures.
- **INDIVIDUAL FACILITIES:** A total of 6 DC facilities and 14 PC facilities stand out as "top performers," receiving user scores in the 75th percentile or higher on ***both*** the Overall Hospital Rating and Recommend the Hospital HCAHPS measures.

I. Satisfaction scores among DC and PC users met or exceeded the HCAHPS benchmarks on all satisfaction measures (see Section 4.2.1).

DC user scores were significantly ***higher*** than the HCAHPS benchmarks on 9 of the 11 HCAHPS measures as follows:

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

The remaining two measures, Overall Hospital Rating and Recommend the Hospital, did not differ from the benchmark.

PC user scores were significantly ***higher*** than the HCAHPS benchmark on three measures: Communication about Medicines, Discharge Information, and Care Transition.

The remaining eight measures did not differ from the benchmark. These measures include Overall Hospital Rating, Recommend the Hospital, Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, Pain Management, Cleanliness of Hospital Environment, and Quietness of Hospital Environment.

II. Scores from DC users were significantly higher than scores from PC users on most measures (see Section 4.2.1).

Scores from DC users were significantly ***higher*** than PC users on 8 of the 11 HCAHPS measures:

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

DC and PC user scores did not differ significantly on the remaining three HCAHPS measures.

III. Medical care scores were higher for DC users compared to PC users. Surgical care and Obstetric care user scores were significantly higher than the benchmark on most measures for both DC and PC (see Section 4.2.3).

Among **DC** users, Surgical users gave the highest scores. Scores from Surgical users were higher than benchmarks for all 11 HCAHPS measures. Scores from Medical and Obstetric care users were higher than benchmarks on 8 of 11 HCAHPS measures. Obstetric care users reported lower scores than the benchmark for both Overall Hospital Rating and Recommend the Hospital.

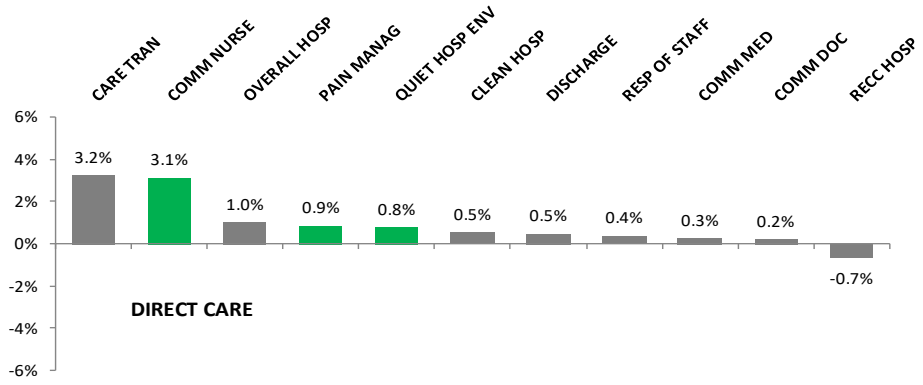
Among **PC** users, Obstetric care users reported the highest satisfaction on the three product lines, with scores above the benchmark on 10 of 11 HCAHPS measures. Surgical users reported scores higher than the benchmark on 9 of 11 HCAHPS measures. Medical users reported scores lower than the benchmark on 8 of 11 HCAHPS measures.

IV. Trend analyses show an increase in both DC and PC user satisfaction compared to the previous two quarters (see Section 4.6).

Scores from both DC and PC users improved or remained stable between Y2015 and Y2016, with no measure experiencing significant decreases.

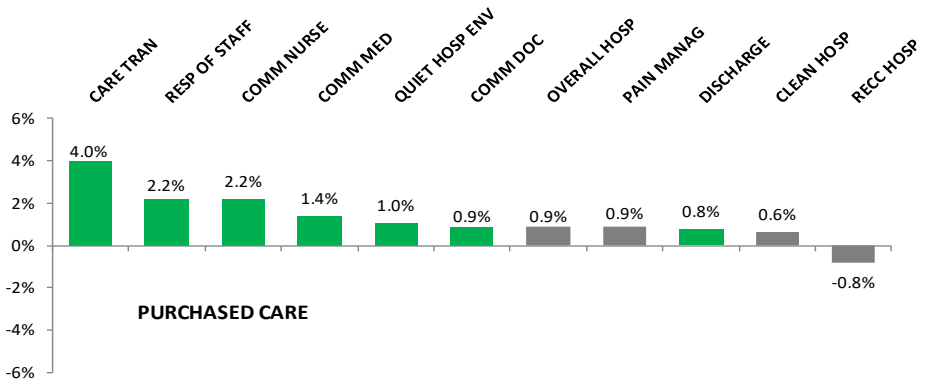
Scores from DC users were higher compared to the previous 4 quarters on 3 of 11 HCAHPS measures: Communication with Nurses, Pain Management, and Quietness of Hospital Environment. This information is displayed in Figure 25. Scores from PC were higher compared to the previous 4 quarters on 7 of 11 HCAHPS measures: Communication with Doctors, Communication with Nurses, Responsiveness of Hospital Staff, Communication about Medicines, Discharge Information, Care Transition, and Quietness of Hospital Environment. This information can be found in Figure 26.

Overall Hospital Rating and Recommend the Hospital scores did not differ significantly between years among both DC and PC users. Although DC users tended to report higher satisfaction ratings than PC users, scores among PC users showed notable improvement compared to the previous year.



Note: Green bars indicate a significant increase in scores between Y2015 and Y2016, and grey bars indicate no change between Y2015 and Y2016.

Figure 25. Difference in Scores for DC HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Green bars indicate a significant increase in scores between Y2015 and Y2016, and grey bars indicate no change between Y2015 and Y2016.

Figure 26. Difference in Scores for PC HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

V. HCAHPS scores varied by age, gender, and beneficiary category among DC and PC users (see Appendix J).

Users' satisfaction generally increased with age for both DC and PC populations. In addition, DC retirees and their dependents gave higher ratings than AD members and ADFMs; note that these beneficiary categories correlate with age, as younger users are more likely to be AD and ADFMs. Male users tend to report higher satisfaction scores than female users among both DC and PC facilities.

VI. The majority of DC facilities received at least three stars for the HCAHPS Summary Star Rating (see Section 4.2.4).

The HCAHPS Summary Star Rating, created to enable consumers to more easily interpret and compare hospital patient experience information, is calculated as an average of the user scores for each of the 11 HCAHPS measures. All but one facility received at least three stars for the HCAHPS Summary Star Rating. Two facilities received five-star ratings: Keesler Medical Center (81st Medical Group) and Wright-Patterson Medical Center (88th Medical Group). Twenty-four facilities received a four-star rating, sixteen facilities received a three-star rating, and one facility received a two-star rating.

VII. Overall Nursing Rating, Care Transition, and Communication measures are strong determinants of satisfaction among both DC and PC users (see Section 4.3).

User satisfaction drivers were analyzed to understand the impact of the HCAHPS measures on the two global measures: Overall Hospital Rating and Recommend the Hospital. The analyses included HCAHPS measures as well as questions added to the TRISS survey by DoD. See Figure 4 for results.

Overall Nursing Care, a DoD question, is the single greatest driver of both Overall Hospital Rating and Recommend the Hospital among both DC and PC users, accounting for 22–38% of the outcome variance. This observation is consistent with the literature on the importance of nurses and nursing care quality in patient satisfaction.

Care Transition, an HCAHPS measure, is also a top driver of both outcome measures among both DC and PC users, accounting for 11–21% of the outcome variance.

Communication with Doctors, an HCAHPS measure, is a top driver of Overall Hospital Rating and Recommend the Hospital among DC users, accounting for 12–14% of the outcome variance. Among PC users, Communication with Doctors is a top driver of Overall Hospital Rating (11% of outcome variance) and Communication among Staff, a DoD question, is a top driver of Recommend the Hospital (10% of outcome variance).

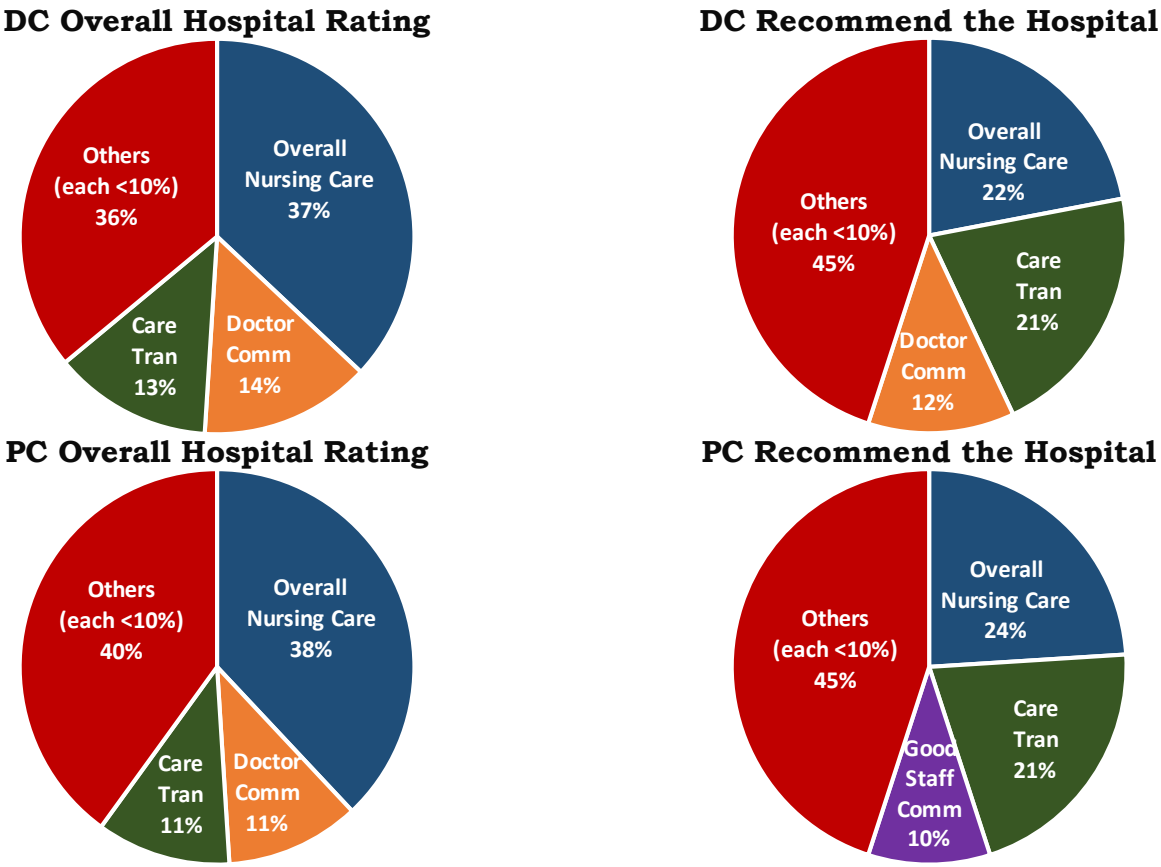


Figure 4. Drivers of Overall Hospital Rating and Recommend the Hospital among DC and PC Users.

VIII. A total of 6 DC facilities and 14 PC facilities stand out as "top performers," receiving user scores in the 75th percentile or higher of HCAHPS national ratings on both the Overall Hospital Rating and Recommend the Hospital measures (see Section 4.2.2).

Percentile rankings of DC facilities are shown in Figure 6 (Overall Hospital Rating; see Section 4.4.1.4) and Figure 9 (Recommend the Hospital; see Section 4.4.2.4,). DC facilities with user scores in the 75th percentile or higher of national HCAHPS ratings on ***both*** Overall Hospital Rating and Recommend the Hospital include the following:

- Keesler Medical Center (81st Medical Group) (Air Force)*.
- Brooke Army Medical Center (Army).
- Fort Belvoir Community Hospital (NCR).
- Naval Hospital Guam (Navy).
- Naval Hospital Okinawa (Navy).
- Walter Reed National Medical Center (NCR).

**Facility scores in the 90th percentile for both Overall Hospital Rating and Recommend the Hospital.*

Percentile rankings of PC facilities are shown in Figure 7 (Overall Hospital Rating; see Section 4.4.1.4) and Figure 10 (Recommend the Hospital; see Section 4.4.2.4). PC facilities with user scores in the 75th percentile or higher of HCAHPS national ratings on ***both*** Overall Hospital Rating and Recommend the Hospital include the following:

- University of Colorado Hospital (West Region)**.
- University of North Carolina Hospitals (North Region)*.
- University of Alabama Hospital (South Region)*.
- New Hanover Regional Medical Center (North Region)*.
- Community Hospital of the Monterey Peninsula (West Region).
- FirstHealth Moore Regional Hospital (North Region).
- Sharp Memorial Hospital (West Region).
- Penrose Hospital (West Region).
- Vanderbilt University Hospital (South Region).
- St. Luke's Regional Medical Center (West Region).
- Sentara Leigh Hospital (North Region).
- Inova Fairfax Hospital (North Region).
- Presbyterian Healthcare Services (West Region).
- Flowers Hospital (South Region).

**Facility scores in the 90th percentile for both Overall Hospital Rating and Recommend the Hospital.*
***Facility scores in the 95th percentile for both Overall Hospital Rating and Recommend the Hospital.*

1.4 Recommendations

Recommendations for optimizing user satisfaction within the MHS are presented in this section. Recommendations are based on (1) the analysis of the TRISS data, (2) a thorough literature review, and (3) a drivers of satisfaction analysis.

Recommendation 1: Facilitate a high level of nurse-patient interaction and engage in practices that support nursing excellence.

A driver analysis of the TRISS Y2016 data revealed that Overall Nursing Care is the single greatest driver of both Overall Hospital Rating and Recommend the Hospital among DC and PC users. The relative importance of Nursing Care is particularly pronounced for Overall Hospital Rating: the importance of Nursing Care is over twice the importance of the next greatest driver for both DC and PC populations. This observation is consistent with research among the civilian population (Abramowitz and Berry, 1987; Larrabee et al., 2004; Vahey et al., 2004). Therefore, practices that support satisfaction by focusing on delivering high-quality nursing care are crucial to high levels of patient satisfaction.

One approach to facilitate quality nursing care is simply to maintain a high ratio of nurses to patients. Nurse workload and the nurse-to-patient ratio are predictors of overall patient satisfaction (Kutney-Lee et al., 2009). Nurse burnout can negatively impact patient satisfaction (Vahey et al., 2004). Positive doctor-nurse relationships are also shown to be key to strong nurse-doctor communication and, in turn, positive impressions of nursing care (Kutney-Lee et al., 2009; Vahey et al., 2004).

Johansson et al. (2002) presented a model that identified the following eight domains that impact satisfaction with nursing care:

- Patients' socio-demographic background (including age, gender, and education).
- Patients' expectations of nursing care.
- Physical environment.
- Communication and information.
- Participation and involvement.
- Interpersonal relations between nurse and patient.
- Nurses' medical–technical competence.
- Influence of the healthcare organization on both patients and nurses.

Notably, the eight domains touch on other aspects of patient care included in the HCAHPS and TRISS instruments, such as physical environment, nursing communications, and communications among staff.

Recommendation 2: Encourage communications training for healthcare providers.

Communications 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). Both existing literature and the analyses show that doctor and nurse communication are among the greatest determinants of overall patient satisfaction.

The following list highlights interventions that have been proven effective in improving patient-staff communication (Radtke, 2013; Robinson and Watters, 2010; Stahel and Butler, 2014; 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, never look at their watch, and end conversations with a summary of key points. At the end of the conversation, providers should thank patients and their families and ask if there are any questions or other needs. Providers should make notepads 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. 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, scheduled tests, outline care goals, list patient questions and concerns, and note anticipated discharge date.
- Even when information is communicated clearly, some patients may not be able to understand it or follow complex regimens. Hospitals can provide Patient Navigators to work with patients and their families throughout their visit to ensure they understand what doctors and nurses tell them, particularly about activities patients must perform.
- To ensure they understand information communicated to them, physicians and nurses should ask patients to repeat back what they have said. This can provide an effective measure of their comprehension.
- Several formal protocols (e.g., Acknowledge, Introduce, Duration, Explanation, Thank You protocol) teach communications skills to doctors and nurses and may be implemented at a facility level.

Recommendation 3: Encourage practices that optimize care transition.

Care Transition was found to have a large impact on user satisfaction in the current dataset (see Section 4.3). Effective care transition to an outpatient setting is dependent on provider and patient communication and communication about medication management. Approximately half of hospital-related medication errors and 20% of all adverse drug events have been attributed to poor communication at care transitions and interfaces (Dudas et al., 2001). 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 inpatient medication regimen effectiveness and adherence. 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 the following educational techniques to improve patient understanding of health management once discharged from the hospital:

- **Discharge counseling:** Education on discharge should be viewed as a continuous effort from the onset of the inpatient experience, including the patient's participation in disease management.
- **Emphasis on self-care:** Ensure a patient's active participation in management of their disease by encouraging healthy lifestyle choices, adherence to medication management, and self-identifying signs and symptoms of disease progression.
- **Employment of teach-back methods:** Encourage patients to repeat discharge information to ensure retention of information.

Recommendation 4: Increase awareness among PC providers of the military community's unique healthcare needs.

The statistically significant differences between DC and PC user scores (Figure 3) are noteworthy in the current report. Discrepancy between DC and PC user scores may be due to differences in the hospital personnel profiles: DC has far more military staff than PC. The dynamics between military users and military healthcare personnel may have an important impact on user satisfaction. This review of military health research emphasizes the military community's special needs, some that stem from socio-cultural factors and some that stem from contextual factors of the military (see Section 3.2). DC providers may be more familiar with these issues, as they are embedded within the military community. Increasing awareness among PC providers of the military community's unique healthcare needs may allow these facilities to optimize their care. For instance, some researchers suggest including military status on intake forms to ensure staff is aware of the patient's military experience. 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 5: Conduct additional research on factors that drive the two HCAHPS global measures: Overall Hospital Rating and Recommend the Hospital.

The data analyses revealed an interesting lack of consistency between user scores on the two global HCAHPS measures: Overall Hospital Rating and Recommend the Hospital, as well as the remaining HCAHPS and DoD measures. While the driver analysis (see Section 4.3) quantifies the relative impact of each HCAHPS measure and DoD questions on the global measures, it does not speak to outside factors not included in the TRISS survey that may also influence user scores on the global measures. It is likely that there are, indeed, additional factors that contribute to the global measures, as evidenced by the fact that the global measures do not always mirror the remaining measures. For instance, scores from DC users were significantly higher than the CMS benchmarks for all nine of the non-global HCAHPS measures; however, user scores for the global measures were not higher than the benchmark (see Table 1). Trend analyses (see Section 4.6) showed improvement on multiple measures for both DC and PC, but user scores for the global measures did not change year-to-year. In fact, scores from users in the North Region showed improvements on some measures, but Recommend the Hospital user scores significantly *decreased* year-to-year. If users are more

satisfied with multiple aspects of care, why are they less likely to recommend the hospital? Thus, it is unlikely that users treat the global measures as an amalgam of the non-global measures. Exploration of other factors, including those in the DoD questions, may offer key missing pieces to the full story of user satisfaction. This may be achieved through qualitative research, such as analysis of patient comments or focus groups with patients.

2 ABOUT TRISS

2.1 Approach

TRISS is managed by DHA, which is a joint integrated Combat Support Agency that enables the Army, Navy, and Air Force medical services to provide a 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 and, as a part of these efforts, oversees TRISS.

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

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

Assessing user satisfaction with hospital care is complex. Myriad factors can create or affect a user's perception of his or her hospital experience and of the hospital's quality of healthcare.

Notwithstanding the complexities inherent in collecting patient experience data, the MHS strives to make each user's inpatient experience the best it can be. HCAHPS is a nationally recognized CMS-sponsored survey that assesses patients' perceptions of their recent hospital experiences. By using this standardized patient experience survey, the MHS can compare its results directly with other hospitals.

2.2 About this Report

This report presents results for all TRISS surveys administered from April 2015 to March 2016. The report describes the design of the TRISS survey and compares MTFs and MHS user subgroups on a wide array of dimensions and, where applicable, compares results with previous surveys. The report includes responses from a census of all users worldwide who received care in the DC system and from a random sample of users eligible for MHS benefits who received inpatient care at selected civilian network hospitals in the United States.

HCAHPS was developed by CMS and AHRQ. Please note that TRISS results may differ slightly from official CMS Hospital Compare results because the case-mix adjustment that CMS applies to survey results may vary slightly from the simulated case-mix adjustment DHA used to generate this data.

3 REVIEW OF PATIENT SATISFACTION AND MILITARY HEALTH RESEARCH

Patient satisfaction has become a major component in defining and measuring healthcare quality. This is exemplified by the CMS initiative to create a national standard for collecting and reporting information on patient satisfaction measured through the 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 definition of patient satisfaction and the challenge with defining it, 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 proper context to understand how to improve that populations' health. In this review, themes related to the military health experience, drivers of patient satisfaction, and the connection between satisfaction and health outcomes are explored to better understand military personnel health needs.

Because little research exists specifically focused on military patient satisfaction, this chapter provides a research review on patient satisfaction in both military and civilian settings. Unless otherwise noted, findings refer to the civilian population. In addition, findings are incorporated 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

TRISS is modeled after the HCAHPS program. CMS and 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.

A total of 11 HCAHPS measures (7 composite measures, 2 individual items, and 2 global items) are publicly reported (see Section 5.3.2.1 and Section 5.3.2.2 for details on 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, https://www.medicare.gov/hospitalcompare.

CMS provides "benchmark" scores for each of the 21 core survey items derived from the average performance of 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 composite measures, 2 individual items, and 2 global items) are shown in Table 1 of Section 4.2.1.

CMS also developed the HCAHPS Star Ratings to provide a summary of each HCAHPS measure in a format more familiar to consumers. HCAHPS Star Ratings are reported using a five-star scale, allowing respondents to quickly and easily assess hospital patient experience data. The scores are based on the same data used to create the HCAHPS measures (See Section 5.3.2.3 for details on HCAHPS Star Ratings calculations). The TRISS report includes star ratings for each DC facility.

Because the TRISS program is modeled after HCAHPS, an understanding of the HCAHPS structure helps in understanding TRISS. HCAHPS is a standardized survey instrument commissioned in 2006 to assess patient satisfaction with hospital care. The survey was modeled after the Consumer Assessment of Healthcare Providers and Systems, 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 hospital comparisons 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 to provides accountability and an increase in transparency.

The HCAHPS survey asks recently discharged patients about various aspects of their hospital experience. It is administered to a random sample of patients 48 hours to 6 weeks after hospital discharge. Over 4,000 hospitals participate in HCAHPS, and each aims for 300 completed surveys per year. Respondents typically receive healthcare at short-term, acute, non-specialty hospitals.

A total of 11 HCAHPS measures are calculated from survey responses, including:

Two global measures of patient satisfaction:

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

Seven composite measures constructed from two to three survey questions:

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

Two individual measures:

1. Quietness of Hospital Environment.
2. Cleanliness of Hospital Environment.

Appendix D shows the TRISS survey instrument. The questionnaire is four pages and is closely modeled on the HCAHPS survey. In addition to HCAHPS questions, DoD added several questions to assess and address specific areas of the military population's user experience. These survey items are referred to as “DoD-specific questions” (questions 26–35).

The surveys are administered by mail, telephone, and interactive voice response (IVR) (HCAHPS Online, 2013). The HCAHPS protocol permits mail survey administration in English, Spanish, Chinese, and Russian. The protocol also permits telephone and IVR surveys to be administered in English and Spanish (CMS, 2013). The TRISS is administered in English only.

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

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

3.2 MHS

To understand military health complexities, it is essential to consider the unique culture and environment associated with military service. Even within the military system, healthcare needs and experiences between different types of MHS beneficiaries may differ. Combat soldiers are more likely to experience negative health outcomes than noncombatants (Bedard and Deschenes, 2006). It is important to consider factors such as beneficiary type when comparing military health status and overall patient satisfaction to civilian populations.

Military members and their immediate families face cycles of deployment and varying post assignments that impacts their health. Those who are deployed (and their families) may be more likely to have poorer health than a matched civilian group (Harris, 2011). Related to status change is the frequent relocation of some military members. Continuity of care has a positive impact on patient and healthcare satisfaction (Fan et al., 2005). Thus, because many military members and their beneficiaries move so often, they may have difficulties receiving care from the same provider (Drummet, Coleman, and Cable, 2003).

The military health experience is dynamic due to the many potential life changes many members face. For instance, military members can experience changes in geography, changes in status within the service, and changes in service branch, which all have the potential to impact their experience with healthcare. Thus, it is important for members of a military family to be recognized as such when 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 this unique and oftentimes invisible population. To be effective, interventions designed to improve patient satisfaction scores should account for military families' unique cultural experience.

Having explored the unique health needs of people connected to the military, it is possible to properly contextualize general findings on 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 the patient's health.

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 Hospital Environment, and Quietness of Hospital Environment.

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 et al. (2015) found that the use of **patient-centered communications**, characterized by responsiveness to patient needs and incorporation of patient perspectives and experiences in care planning and decision-making (National Cancer Institute, 2014), was associated with higher patient ratings of care quality. Furthermore, primary care physician communication is an important factor in patients' overall satisfaction with care and their perception of physician professionalism/competency (Platonova and Schewchuk, 2015). Patients highly satisfied with their care believed that their primary care doctors showed genuine interest in their health, provided comprehensive description of their problem, and gave ample opportunity to speak about their health.

Empathy is another dimension of patient-provider communication that can impact patients' overall satisfaction with care. Menendez et al. (2015) found that greater physician empathy was associated with patient satisfaction. Indeed, when patients are distressed or when their relationship with a physician is strong, display of genuine emotion is positively associated with higher ratings of patient satisfaction (Yagil and Shnapper-Cohen, 2016). These findings underscore the importance of utilizing effective, genuine communication to make patients feel cared for and heard.

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 who perceived that their nurses treated them with respect were 10 times more likely to report higher patient satisfaction scores. Lake, Germack, and Viscardi (2015) found that hospitals with frequently missed nursing care (defined as any aspect of required care that is omitted, either in part or in whole, or delayed) had lower satisfaction ratings. Nurses in hospitals that missed care frequently reported being unable to find time to comfort or talk with their patients, indicating they had trouble finding time to teach or counsel patients and their family.

Craig, Otani, and Hermann (2015) evaluated whether a patient's perceived level of pain control influenced the relationship of nurse, doctor, and staff communications as well as environments on overall satisfaction. The authors 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) hypothesized that using more foreign-educated nurses in a hospital would lead to lower satisfaction because effective communication with patients would be compromised. Survey findings indicated that the use of foreign-educated nurses was indeed associated with lower average scores on Overall Hospital Rating, Recommend the Hospital, Communication with Nurses, Communication with Doctors, Communication about Medicines, and Discharge Information. All of the remaining measures did not have statistically significant differences between facilities with foreign nurses and those without. These findings highlight the importance of effective communication for improving overall patient satisfaction.

3.3.3 Provider Communications and Collaboration

Fostering a culture that emphasizes communication and collaboration between providers and patients can drive improvements in overall satisfaction. Meterko, Mohr, and Young (2004) found a significant and positive relationship between a teamwork culture and patient satisfaction for inpatient care in the Veterans Health Administration. Hospitals with collaborative cultures were also found to have higher patient satisfaction scores than hospitals with non-collaborative cultures (Manary et al., 2014). Wang et al. (2015) reported a positive association between care coordination scores and patient satisfaction. Chronically ill patients that gave high care coordination ratings were found to be more satisfied with their doctors, the organization of their care, and their overall care. Thus, shifting the culture of a healthcare practice to promote effective communications and collaboration may be an effective means for improving inpatient satisfaction.

3.3.4 Interventions

Some studies measured improvements in HCAHPS scores following 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. The department that implemented this intervention received higher satisfaction ratings for physician-related HCAHPS questions

than comparable departments that did not. 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, making post-discharge phone calls, and implementing 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.

3.3.5 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.

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

Some hospital leaders believe that patients are unable to distinguish positive experiences due to a pleasing healthcare environment from positive experiences due to physician/provider care (Swan, 2003). In other words, offering a pleasing healthcare environment may be enough to mask deficiencies in physician/provider care. However, research from Siddiqui et al. (2015) suggests that this may not be the case. They compared satisfaction scores of patients located in a standard hospital setting with satisfaction scores from patients that moved to a new clinical building emphasizing patient-centered features, like reduced noise, improved natural light, visitor-friendly facilities, and well-decorated rooms. 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. This suggests that patients were able to differentiate their positive experience with the hospital environment from their experience with physicians/providers.

3.3.6 Obstetrics

Understanding elements of beneficiary satisfaction is integral in improving satisfaction scores. Patients in maternal health and OB-GYN units have unique needs and metrics to 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 during labor and birth. Respondent

data were analyzed, and a positive association was found between social support and higher satisfaction scores with medical staff during labor and birth. 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:

Personal factors:

- Having immediate contact with baby.
- Being involved in prenatal classes.
- Having a choice about place of prenatal care/delivery, type of care, and labor positions.
- Having a realistic expectation of the birth experience.
- Having undergone fewer obstetrical/medical interventions in the past.
- Having an available social support network (e.g., permanent partners).

Communication factors:

- Having continuity of care from midwife.
- Having a short length of stay in hospital.
- Being discharged early.
- Having perceived control/involvement in decision making as an expectant mother.
- Having 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 pregnancy. About 88% of patients believed 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 (Teijlingen et al., 2003). While evidence and patient attitudes agree with the value of having continuity of care, there appear 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, availability of social support, and shared decision-making in aspects of delivery and care (Teijlingen et al., 2003; Sawyer et al., 2013). Focusing efforts on improving continuity of care for 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 pursuit of higher satisfaction ratings will push healthcare facilities to provide higher quality care. Two systematic literature reviews act as the base for discussing how patient satisfaction is connected to clinical safety, effective outcomes, and healthcare quality (Doyle, Lennoz, and Bell, 2013; Anhang et al., 2014).

Overall positive patient experience is associated with patient safety and clinical effectiveness for a wide range of disease treatments, population groups, and outcome measures. Benefits of

improved patient experience include higher 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 objectively measured (Doyle, Lennoz, and Bell, 2013; Anhang et al., 2014).

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 (Isaac et al., 2010; Jha et al., 2008) 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. Zolnierek and DiMatteo (2010) found that patients were more likely to adhere to medications when physicians had communication training. The most effective interventions to improve adherence focused on helping patients understand the need for treatment, promoting effective communication, and improving the provider-patient relationship (Nieuwlaat et al., 2014).

Patient satisfaction is also associated with greater healthcare safety through the reduction of hospital-borne infections and complications and with positive patient experiences found to be associated with a lower prevalence of inpatient care complications. Cleanliness of Hospital Environment scores are also associated with lower prevalence of infections due to medical care (Isaac et al., 2010). Additionally, a patient safety culture has been linked to more positive satisfaction experiences from patients (Lyu et al., 2013; Sorra et al., 2012). Higher scores on the Overall Hospital Rating and Discharge Information 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 nuance to understanding the relationship between drivers of patient satisfaction and good health outcomes. Military personnel, veterans, and military families deal with health issues and barriers not experienced by the general population, including challenges with care continuity because of changing deployments.

Studies of the drivers of overall patient satisfaction found that doctor and nurse communications are among the most important aspects. This remains true even after attempts to control for other domains like Pain Management, Cleanliness of the Hospital Environment, and Quietness of the Hospital Environment. 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 an in-depth, long-term personal relationship. 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 more clinically efficient and effective.

4 RESULTS

Results are reported for time periods from Y2015 and Y2016. Y2015 covers responses from 33,963 users who visited a MTF or a PC network facility between October 1, 2014, and March 31, 2015. Y2016 covers responses from 83,276 users who visited MTFs or a PC network facility between April 1, 2015, and March 31, 2016.

All scores reported here have been weighted (Section 5.3.4 discusses data weighting). In addition, Patient and Mode Mix (PMM) Adjustments are applied to HCAHPS measures 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. Adjustments are not applied to data reported for supplemental DoD questions. Section 5.3.5 discusses adjustments and under what circumstances they are applied.

The following sections provide a detailed review of the Y2016 TRISS data. Sections are organized as follows:

- **Section 4.1** includes a description of the survey population's demographic variables.
- **Section 4.2** provides a broad overview of user satisfaction scores.
- **Section 4.3** describes analyses on determinants of user satisfaction.
- **Section 4.4** describes user scores and Star Ratings for the 11 primary HCAHPS measures organized by MHS categories (product line, service branch, and TRICARE region).
- **Section 4.5** describes user scores for the eight supplemental DoD questions added to the TRISS questionnaire.
- **Section 4.6** provides a comparison of Y2016 results to Y2015 results.

4.1 Demographics of the Survey Population

The Y2016 TRISS dataset includes 55,933 DC users and 27,343 PC users for a total of 83,276 users.

Across both care types, the TRISS sample population is mostly White and includes more women than men. The majority of respondents received at least some post-high school education. However, as outlined in the following subsections, notable differences exist between the DC and PC survey populations in terms of age and beneficiary category distribution. The PC sample includes more users 65 years of age or older. Accordingly, there are more retirees and dependents over the age of 65 in PC than in DC.

4.1.1 DC Survey Respondents

DC inpatient users represent a wide spread of ages, although the largest proportion falls in the 25–34 age group. Slightly over half of the users are either on AD or are family members of AD personnel. Most DC users are female, and almost three-fourths are White. For education, a majority received education past the high-school level.

Figure 1 has pie charts depicting the DC sample demographic characteristics and proportions.

4.1.2 PC Survey Respondents

PC users are generally much older than DC users, as almost half of PC users fall in the 65+ age group. Relatedly, PC users are also more likely to be retirees or dependents—almost three-fourths of PC users are retirees or dependents either over or under the age of 65. As with the DC sample, a majority of PC users identify as female, and most are White. Additionally, most PC respondents received at least some post-high school education.

Figure 2 has pie charts depicting the PC sample demographic characteristics and proportions.

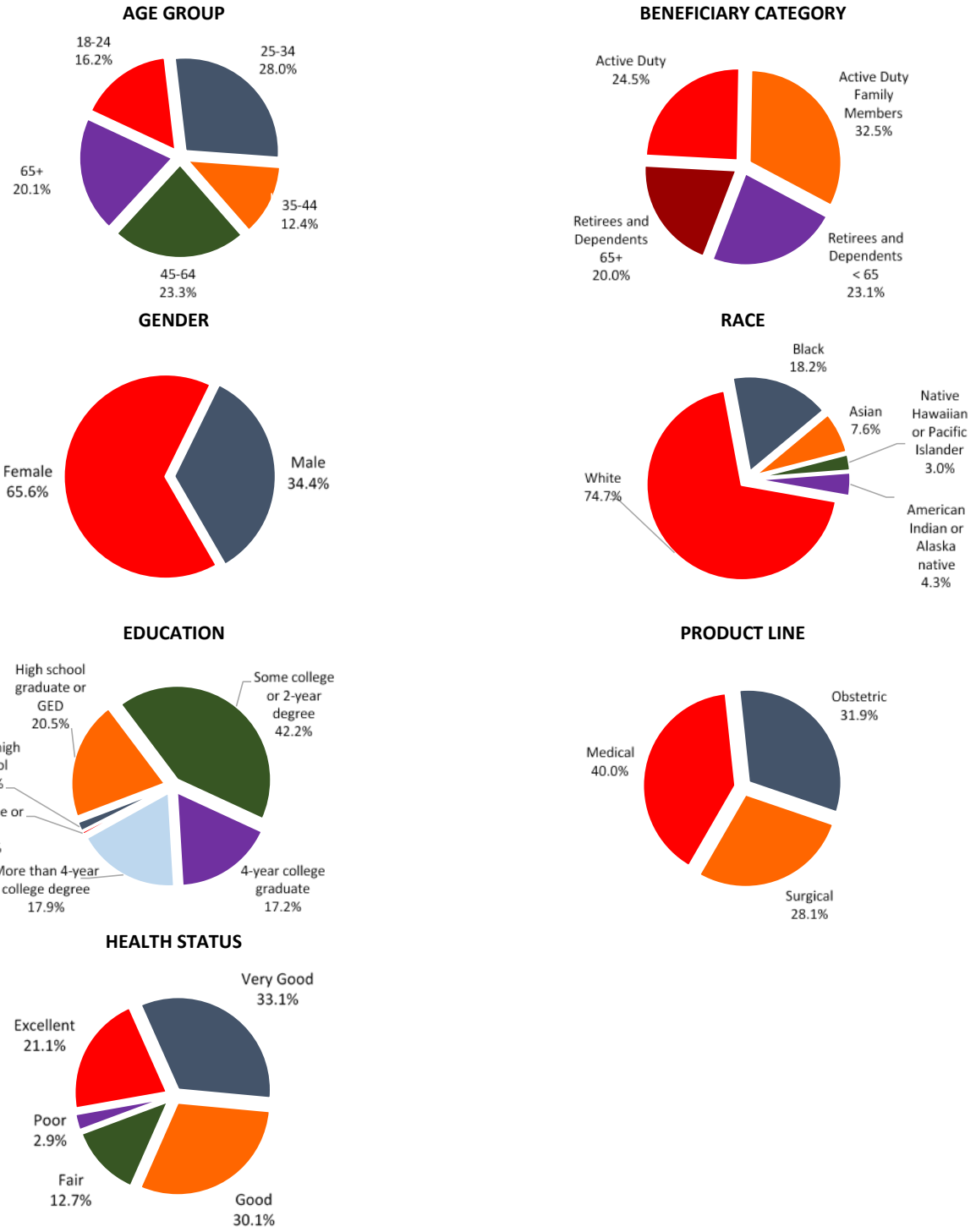


Figure 1. Demographics of DC Respondents.

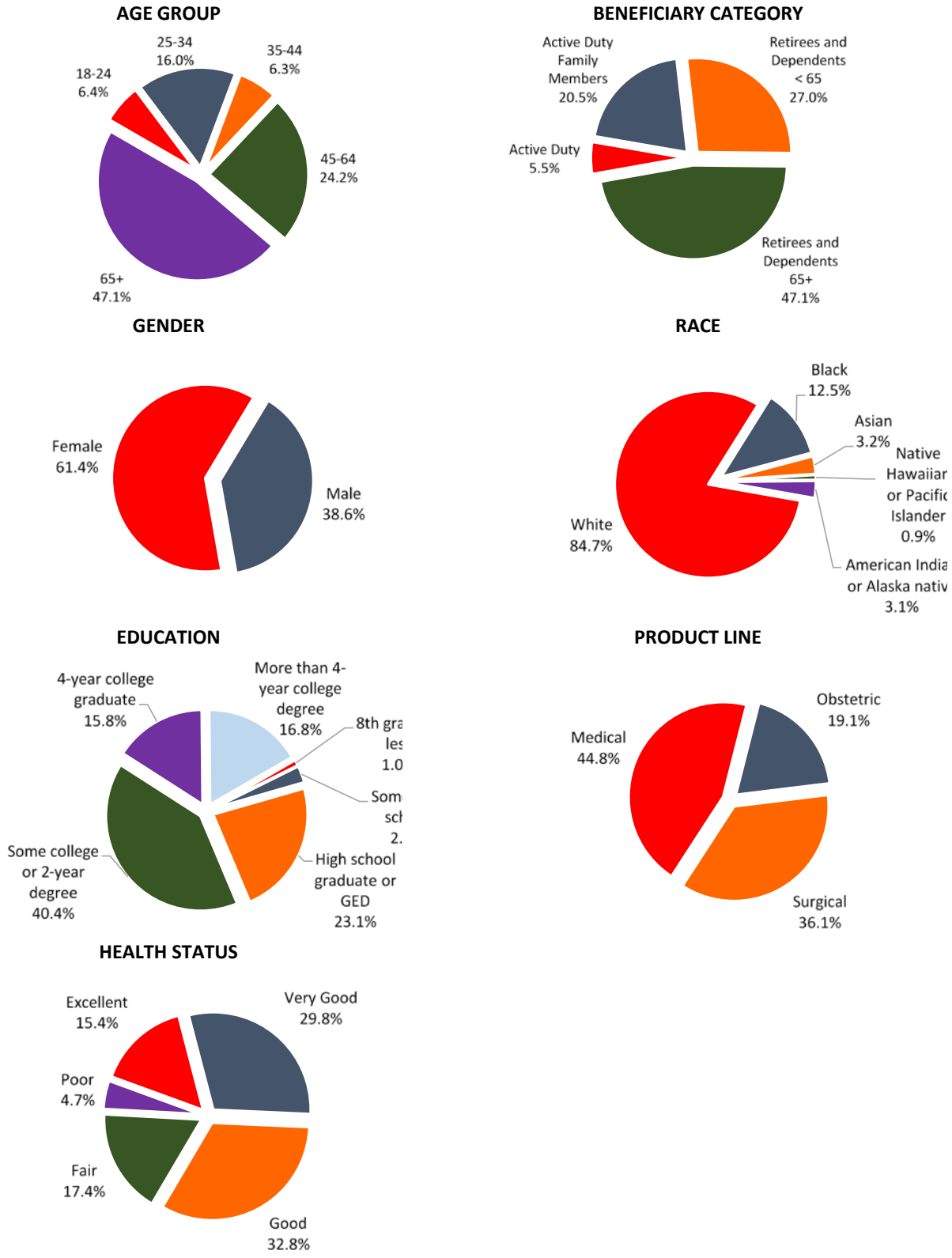


Figure 2. Demographics of PC Respondents.

4.2 HCAHPS Scores: A Broad Overview

This section provides a broad overview of HCAHPS results. Section 5.3.2 has an overview of the TRISS measures, and Appendix D shows the survey instrument. Appendix E has comprehensive tables of HCAHPS scores aggregated by care type (DC and PC), TRICARE region, and facility (for HCAHPS measures). Appendix F shows the scores for the DoD-specific questions.

4.2.1 HCAHPS Measure Scores

Satisfaction scores reported by DC and PC users met or exceeded the HCAHPS benchmarks for all 11 HCAHPS measures. Table 1 shows adjusted user scores for the 11 HCAHPS measures. Figure 3 displays the data from Table 1 in graph form.

DC users reported satisfaction significantly higher than the HCAHPS benchmarks on 9 of the 11 HCAHPS measures (Communication with Nurses, Communication with Doctors, Communication about Medicines, Responsiveness of Hospital Staff, Pain Management, Care Transition, Discharge Information, Cleanliness of Hospital Environment, and Quietness of Hospital Environment).

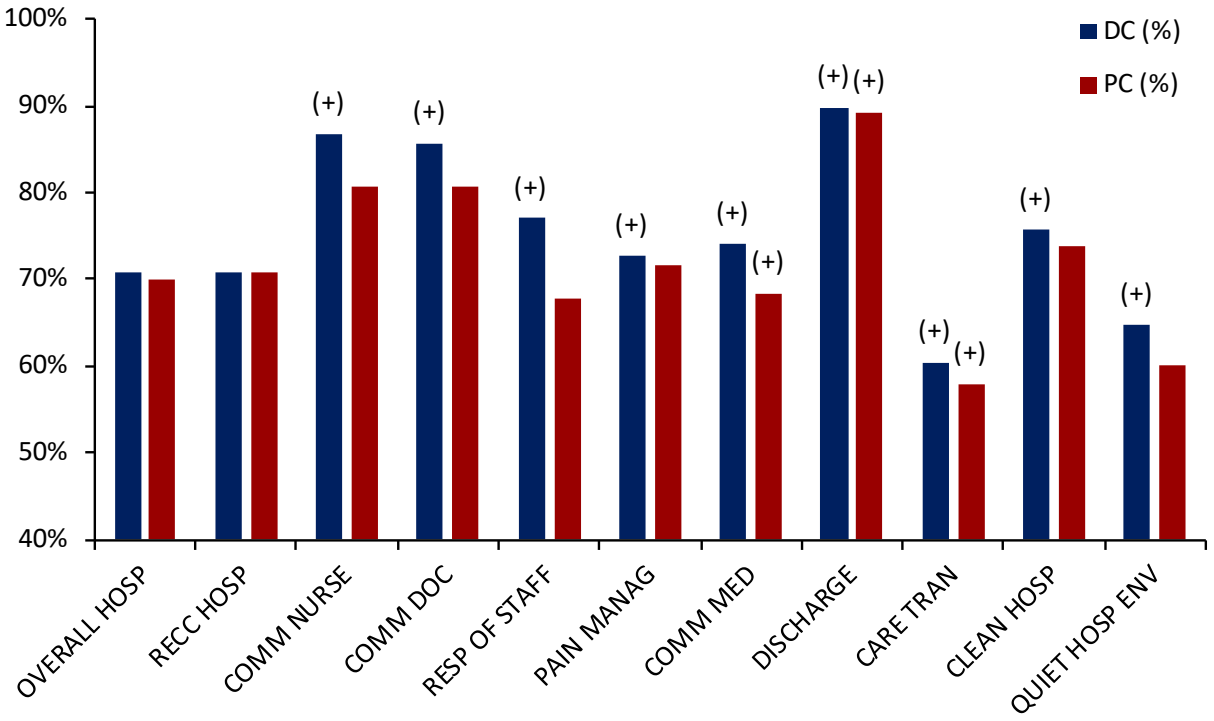
Satisfaction among **PC** users was significantly higher than the HCAHPS benchmark on three measures: Communication about Medicines, Discharge Information, and Care Transition.

DC users reported significantly higher satisfaction than PC users on eight measures: Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, Pain Management, Communication about Medicines, Discharge Information, Cleanliness of Hospital Environment, and Quietness of Hospital Environment.

Table 1. Comparisons of HCAHPS Scores by Care Type.

Measure	DC (%)	PC (%)	Benchmark Scores (%)	Significant Difference Between DC and PC
Overall Hospital Rating	70.9	70.1	71	*n.s.*
Recommend the Hospital	70.8	70.8	71	*n.s.*
Communication with Nurses	86.7	80.7	80	DC > PC
Communication with Doctors	85.7	80.8	82	DC > PC
Responsiveness of Hospital Staff	77.0	67.7	68	DC > PC
Pain Management	72.7	71.5	71	DC > PC
Communication about Medicines	74.1	68.4	65	DC > PC
Discharge Information	89.8	89.3	86	DC > PC
Care Transition	60.5	57.9	52	*n.s.*
Cleanliness of Hospital Environment	75.7	73.9	74	DC > PC
Quietness of Hospital Environment	64.7	60.1	62	DC > PC

n.s. = Not significant.
Note: Green shading indicates that the user score is significantly higher than the benchmark. Cells that have green shading include 86.7, 85.7, 77.0, 72.7, 74.1, 89.8, 60.5, 75.7, and 64.7 from the DC (%) column and 68.4, 89.3, and 57.9 from the PC (%) column.



Note: A plus (+) sign above a bar indicates that the score is significantly higher than the benchmark, while a minus (-) sign indicates that the score is significantly lower than the benchmark. All statistical tests use α = 0.05 as the threshold for significance.

Figure 3. HCAHPS Scores by Care Type.

4.2.2 Top-Performing Facilities

A total of 7 DC facilities and 14 PC facilities stand out as "top performers," receiving user scores in the 75th percentile or higher of HCAHPS national ratings on both the Overall Hospital Rating and Recommend the Hospital measures. CMS publishes percentiles reports quarterly that encompass the results of all civilian hospitals that received HCAHPS scores. Facility user scores, categorized by care type, were compared to these CMS percentiles to identify "top performers." More information on CMS percentiles can be found at http://www.hcahpsonline.org/SummaryAnalyses.aspx#percentile.

Table 2 shows percentile cut-offs for Overall Hospital Rating and Recommend the Hospital. Appendix E has a comprehensive table of user HCAHPS scores aggregated by care type (DC and PC), TRICARE region, and facility. Appendix F has the same breakdowns for DoD-specific question scores.

Table 2. HCAHPS Percentiles from April 2016 Public Report (July 2014–June 2015 Discharges).

Hospital Percentile	Overall Hospital Rating (%)	Recommend Hospital (%)
95th (near best)	86	87
90th	82	83
75th	77	78
50th	71	72
25th	66	65
10th	60	59
5th (near worst)	56	55

4.2.2.1 DC

Six DC facilities stand out as "top performers," receiving scores from users in the 75th percentile or higher of HCAHPS national ratings on both Overall Hospital Rating and Recommend the Hospital:

- Keesler Medical Center (81st Medical Group) (Air Force)*.
- Brooke Army Medical Center (Army).
- Fort Belvoir Community Hospital (formerly DeWitt Army Community Hospital) (NCR).
- Naval Hospital Guam (Navy).
- Naval Hospital Okinawa (Navy).
- Walter Reed National Medical Center (NCR).

**Facility scores in the 90th percentile for both Overall Hospital Rating and Recommend the Hospital.*

4.2.2.2 PC

A total of 14 PC facilities stand out as top performers, with scores from users in the 75th percentile or higher of HCAHPS national ratings on both Overall Hospital Rating and Recommend the Hospital:

- University of Colorado Hospital (West Region)**.
- University of North Carolina Hospitals (North Region)*.
- University of Alabama Hospital (South Region)*.
- New Hanover Regional Medical Center (North Region)*.
- Community Hospital of the Monterey Peninsula (West Region).
- FirstHealth Moore Regional Hospital (North Region).
- Sharp Memorial Hospital (West Region).
- Penrose Hospital (West Region).
- Vanderbilt University Hospital (South Region).
- St. Luke's Regional Medical Center (West Region).
- Sentara Leigh Hospital (North Region).
- Inova Fairfax Hospital (North Region).

- Presbyterian Healthcare Services (West Region).
- Flowers Hospital (South Region).

**Facility scores in the 90th percentile for both Overall Hospital Rating and Recommend the Hospital.*
*** Facility scores in the 95th percentile for both Overall Hospital Rating and Recommend the Hospital.*

4.2.3 Analysis Within Product Lines

Across all HCAHPS measures, differences emerged among the Medical, Surgical, and Obstetrics product line scores.

Surgical care scores either met or were significantly higher than the benchmark for both DC and PC users.

Medical care scores for DC users were significantly higher than the benchmark on most measures, whereas PC user scores were significantly lower than the benchmark on most measures.

Obstetric care scores were either met or were significantly higher than the benchmark for both DC and PC on most measures, with the exception of the two global measures, Overall Hospital Rating and Recommend the Hospital. For these global measures, Obstetric care users reported scores that were generally significantly below the benchmark.

4.2.3.1 DC

Table 3 compares DC user scores by product line. Within DC, Surgical care users reported scores significantly higher than the benchmarks on all 11 HCAHPs measures. Medical care users reported scores significantly higher than the benchmark on 8 out of 11 measures. Obstetrics care users reported scores significantly lower than the benchmark on both global measures. Despite not meeting the benchmark on these two global measures, Obstetrics care users reported scores higher than the benchmark in eight of the nine remaining measures, including Communication with Doctors and Communication with Nurses.

Table 3. Comparison of DC HCAHPS Scores by Product Line.

Measure	Medical (%)	Surgical (%)	Obstetric (%)	Benchmark Scores (%)
Overall Hospital Rating	72.6	74.8	59.4	71
Recommend the Hospital	76.1	77.7	64.4	71
Communication with Nurses	85.3	86.2	81.9	80
Communication with Doctors	84.1	90.9	86.0	82
Responsiveness of Hospital Staff	75.8	77.7	80.0	68
Pain Management	69.7	78.2	75.7	71
Communication about Medicines	75.4	78.8	78.9	65
Discharge Information	87.6	93.8	90.5	86
Care Transition	63.1	71.1	64.8	52
Cleanliness of Hospital Environment	77.6	80.6	74.6	74
Quietness of Hospital Environment	66.9	70.4	75.5	62

Note: Green shading indicates that the user score is significantly higher than the benchmark, and red shading indicates that the user score is significantly lower than the benchmark. Green shading includes 76.1, 85.3, 84.1, 75.8, 75.4, 63.1, 77.6, and 66.9 in the Medical (%) column, all cells in the Surgical (%) column, and 81.9, 86.0, 80.0, 75.7, 78.9, 90.5, 64.8, and 75.5 in the Obstetric (%) column. Red shading includes 69.7 in the Medical (%) column and the first two cells (59.4 and 64.4) in the Obstetric (%) column.

4.2.3.2 PC

Table 4 compares PC user scores by product line. Among PC facilities, Obstetrics users reported the greatest number of scores significantly higher than the HCAHPS benchmarks out of the three product lines. Obstetric users reported scores significantly higher than the benchmark in 10 of 11 measures, though user scores for this product line were significantly lower than the benchmark for Overall Hospital Rating. Surgical users scored significantly higher than the benchmark in 9 of 11 measures. Unlike Obstetrics users, however, Surgical users did not report scores significantly lower than the benchmark for any measure. Medical users reported the lowest performance of all of the product lines for PC, with 8 of 11 measures scoring significantly lower than the benchmark and no measures that scored significantly higher than the benchmark.

Table 4. Comparison of PC HCAHPS Scores by Product Line.

Measure	Medical (%)	Surgical (%)	Obstetric (%)	Benchmark Scores (%)
Overall Hospital Rating	66.8	76.7	65.9	71
Recommend the Hospital	68.8	78.1	75.2	71
Communication with Nurses	76.5	82.1	83.5	80
Communication with Doctors	74.0	85.7	86.9	82
Responsiveness of Hospital Staff	60.9	69.2	77.0	68
Pain Management	64.9	77.7	77.8	71
Communication about Medicines	64.3	71.1	75.4	65
Discharge Information	85.7	93.3	91.1	86
Care Transition	53.2	65.5	68.7	52
Cleanliness of Hospital Environment	71.7	79.4	77.6	74
Quietness of Hospital Environment	56.2	64.3	74.4	62

Note: Green shading indicates that the user score is significantly higher than the benchmark, and red shading indicates that the user score is significantly lower than the benchmark. Green shading includes all cells in the Surgical (%) column (except for 69.2 and 64.3) and all cells in the Obstetric (%) column (except for the first, which is red). Red shading also includes all cells in the Medical (%) column (except for 64.3, 85.7, and 53.2).

4.2.4 HCAHPS Summary Star Rating

Table 5 shows HCAHPS Summary Star Ratings for DC facilities. The HCAHPS Summary Star Rating is calculated as an average of the Star Ratings for the 11 HCAHPS measures. See Section 5.3.2.3 for more information on how HCAHPS Star Ratings are calculated.

All but one DC facility received at least three stars for the HCAHPS Summary Star Rating. A total of 2 facilities received five-star ratings: Keesler Medical Center (81st Medical Group) and Wright-Patterson Medical Center (88th Medical Group), 24 facilities received four-star ratings, 16 facilities received three-star ratings, and 1 facility received a two-star rating. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have an HCAHPS Summary Star Ratings calculated.

Table 5. HCAHPS Summary Star Ratings for Each Facility.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Keesler Medical Center (81st Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Elmendorf Medical Center (673rd Medical Group) • Lakenheath Medical Center (48th Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Brian Allgood Army Community Hospital, Seoul • Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Medical Center, Ft. Gordon • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Reynolds Army Community Hospital, Ft. Sill • William Beaumont Army Medical Center, Ft. Bliss • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Guam • Naval Hospital Jacksonville • Naval Hospital Okinawa • Naval Hospital Pensacola • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Three-Star	Air Force	• Langley-Eustis Medical Center (633rd Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Evans Army Community Hospital, Ft. Carson • Irwin Army Community Hospital, Ft. Riley • Martin Army Community Hospital, Ft. Benning • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Pendleton • Naval Hospital Camp Lejeune • Naval Hospital Twentynine Palms • Naval Hospital Yokosuka
Two-Star	Navy	• Naval Hospital Oak Harbor

4.3 Key Drivers of Satisfaction

This section presents the results of a key driver analysis conducted for the two global measures: Overall Hospital Rating and Recommend the Hospital. The analysis was conducted to understand how user scores on the remaining HCAHPS measures and the DoD-specific questions impacted scores on the two global measures. Driver importance are presented as a percentage, which represents the total impact on the global measures explained by each measure in the analysis. The DoD-specific measures of OB Repeat Care and Education on Breastfeeding were excluded from this analysis as they pertain only to Obstetrics care users.

The DoD-specific Overall Nursing Care measure is the single greatest driver for both global measures among both DC and PC users. This measure accounts for anywhere between 22% and 38% of the variance observed in global measure user scores. This finding is consistent with the general population literature which finds that nurse communication and nursing care have a significant impact on overall patient satisfaction (see Section 3.3.2 for more details).

Care Transition, an HCAHPS measure, is also a top driver for both global measures. Currently there is little mention of this measure in existing general population literature, as the Care Transition measure was only recently introduced to the HCAHPS instrument (data were first reported by HCAHPS in December 2014). **Communication with Doctors** and the DoD-specific **Good Staff Communication** measure emerged as top drivers, reinforcing findings that highlight the importance of communication on overall patient satisfaction (see Section 3.3.1 through Section 3.3.4 for more details). Figure 4 shows these results in pie chart form.

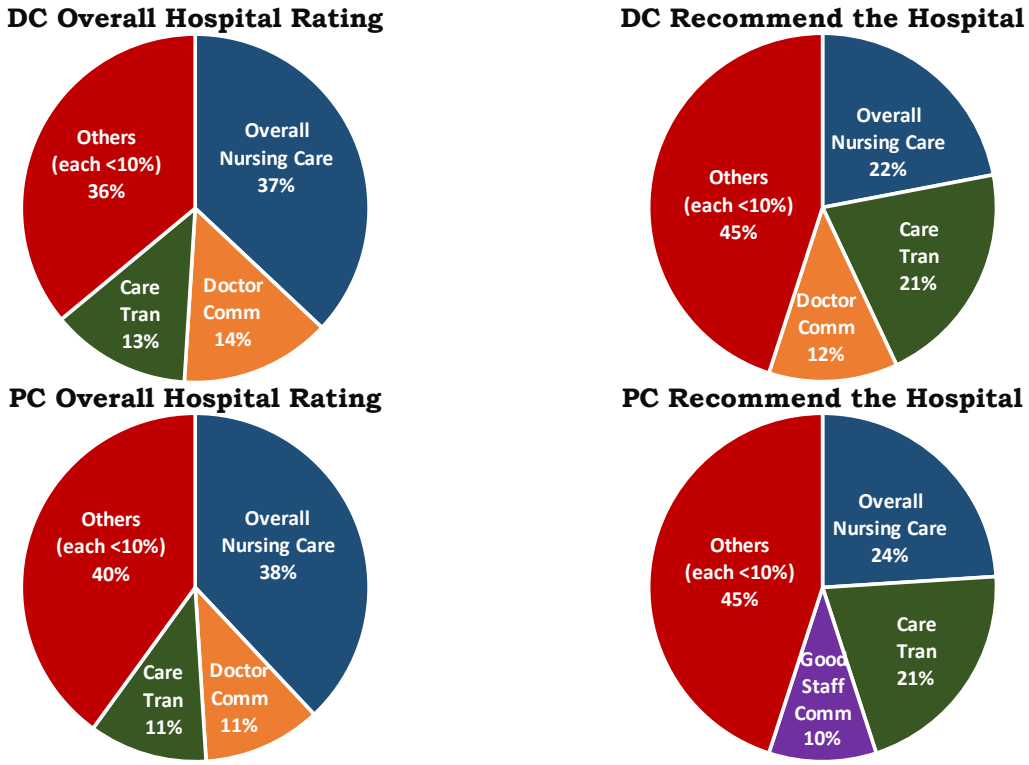


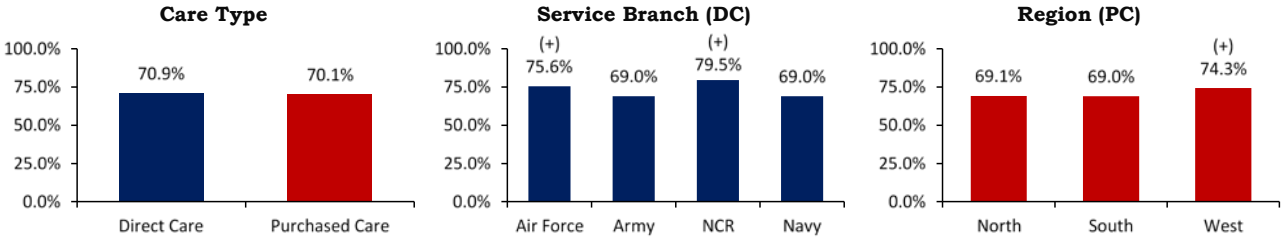
Figure 4. Drivers of Overall Hospital Rating and Recommend the Hospital among DC and PC Users.

4.4 HCAHPS Measures

This section breaks down findings regarding each of the 11 HCAHPS measures.

4.4.1 Overall Hospital Rating

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 5 shows Overall Hospital Rating by care type, service branch (for DC), and region (for PC).



Note: A plus (+) sign over 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 5. Overall Hospital Rating Scores by Care Type, Service Branch, and Region.

4.4.1.1 Comparison to CMS Benchmark

Scores from **DC** and **PC** users for Overall Hospital Rating met but were not significantly different from the benchmark of 71%.

4.4.1.2 Measure by Subgroup

For DC, both **Air Force** and **NCR** users reported scores significantly higher than the benchmark, while **Army** and **Navy** user scores met but were not significantly different from the benchmark.

As for PC, **West** Region users reported scores significantly higher than the benchmark, while scores from users in the **North** and **South** Regions met but were not significantly different from the benchmark.

4.4.1.3 Measure by Product Line

For both DC and PC, **Obstetric** care users reported scores significantly lower than the benchmark. Scores from **Medical** care users met the benchmark for DC patients but were significantly below the benchmark for PC patients. For both DC and PC, **Surgical** care users reported scores significantly higher than the benchmark.

4.4.1.4 Top Performing Facilities

Figure 6 shows DC user scores for Overall Hospital Rating. Keesler Medical Center (81st Medical Group) and Brooke Army Medical Center received user scores that rank between the 90th and 99th percentiles of national HCAHPS rankings. A total of 8 MTFs received user scores between the 75th and 89th percentiles, while 11 MTFs received user scores between the 50th and 74th percentiles. A total of 11 facilities received user scores between the 25th and 49th percentiles, and 15 received scores below the 25th percentile benchmark.

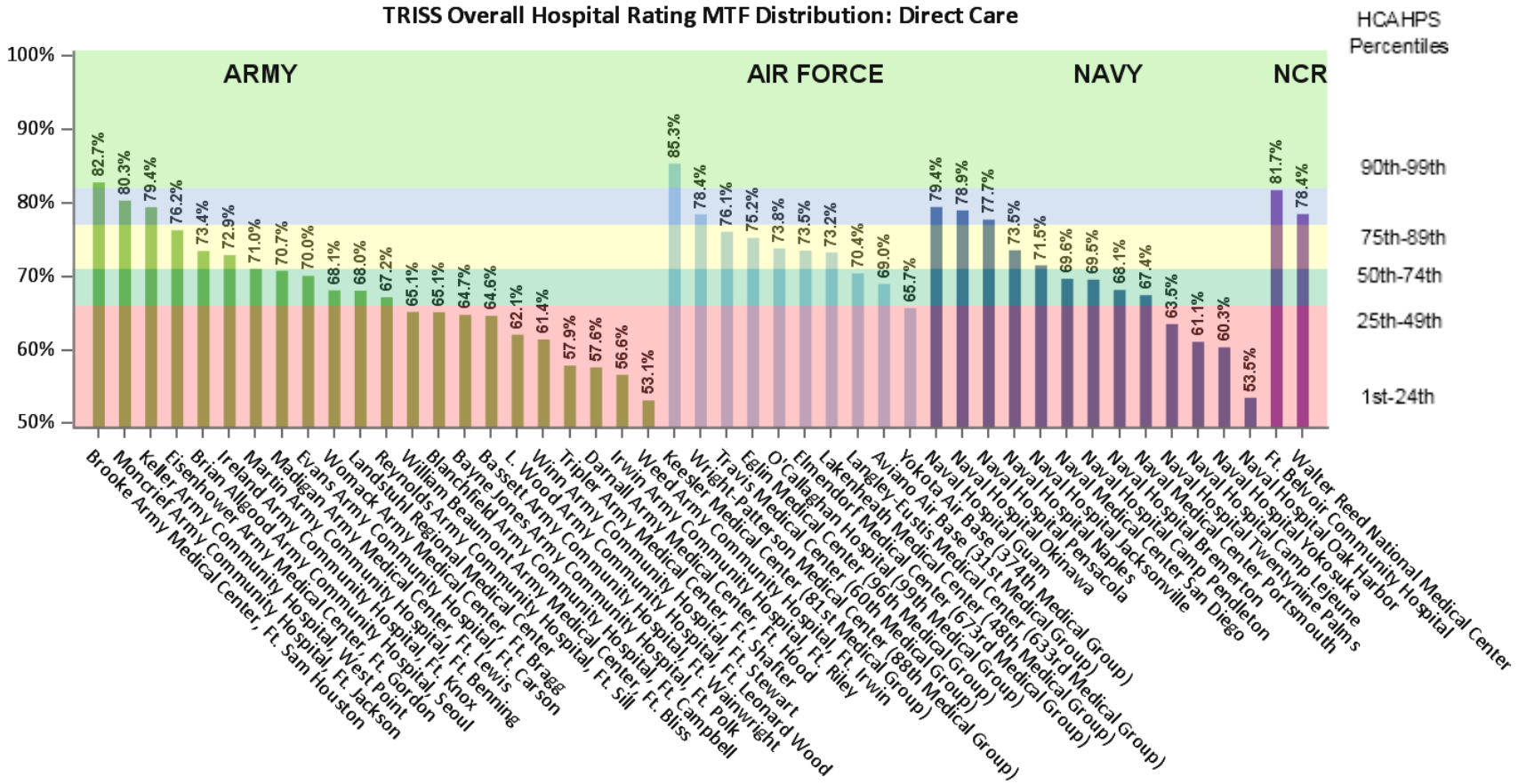


Figure 6. Ranking of User Overall Hospital Rating Score for DC Hospitals.

Figure 7 shows PC user scores for Overall Hospital Rating. Scores from University of Colorado users rank between the 90th and 99th percentiles of national HCAHPS ratings along with scores from University of North Carolina Hospitals, Community Hospital of the Monterey Peninsula, University of Alabama Hospital, and New Hanover Regional Medical Center users. A total of 10 facilities received scores between the 75th and the 89th percentiles, 25 facilities received user scores between the 50th and 74th percentiles, 11 received scores between the 25th and 49th percentiles, and 22 received user scores below the 25th percentile.

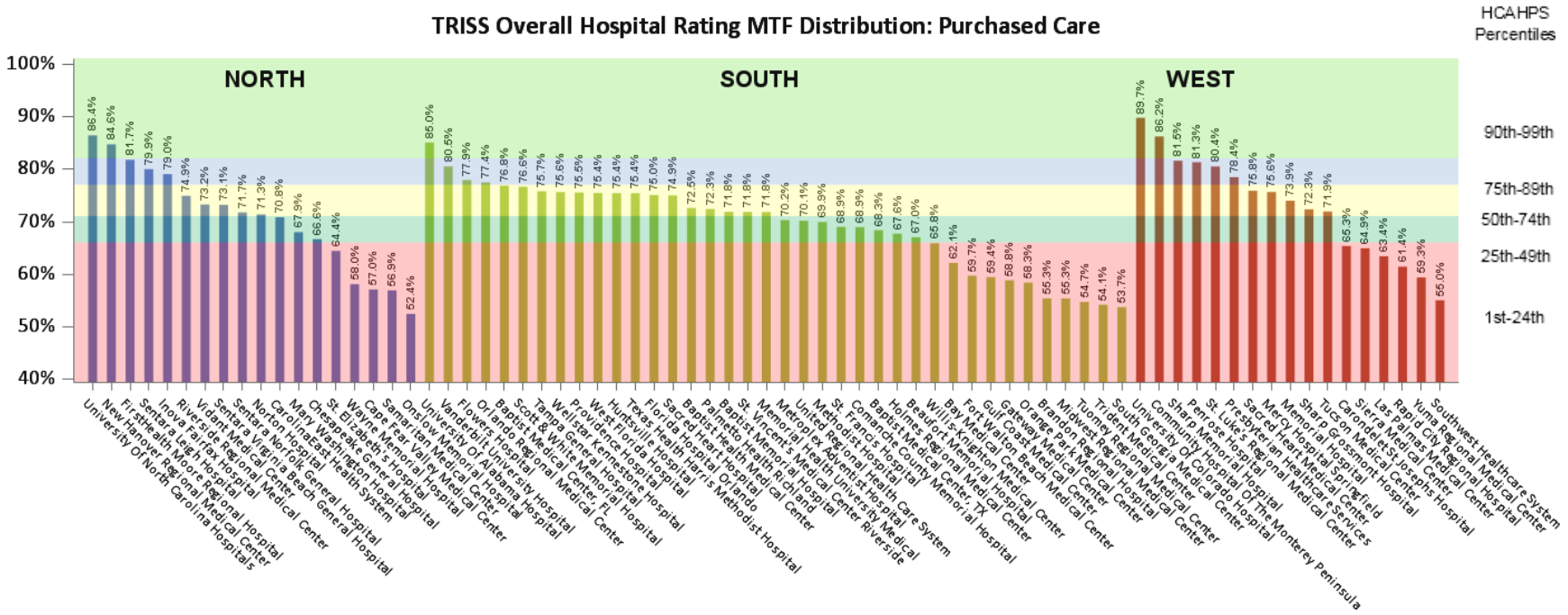


Figure 7. Ranking of User Overall Hospital Rating Score for PC Hospitals.

4.4.1.5 HCAHPS Star Ratings

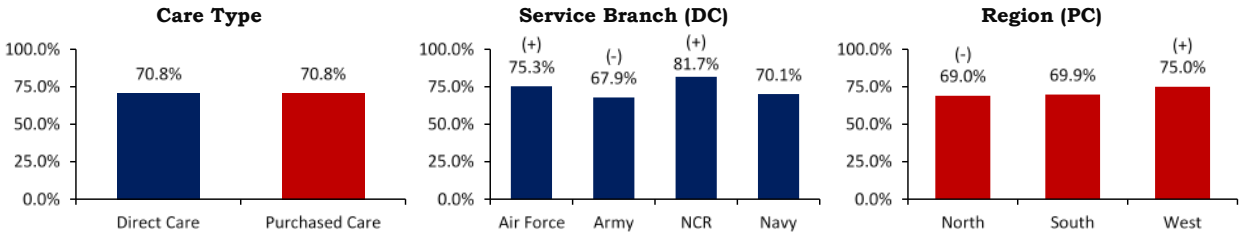
Table 6 shows HCAHPS Star Ratings calculated from DC user scores of Overall Hospital Rating. Twelve DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 6. HCAHPS Star Ratings for Overall Hospital Rating.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Keesler Medical Center (81st Medical Group)
	Army	• Brooke Army Medical Center, Ft. Sam Houston
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Lakenheath Medical Center (48th Medical Group) • Travis Medical Center (60th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Eisenhower Army Community Hospital, Ft. Gordon • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point
	Navy	• Naval Hospital Guam • Naval Hospital Okinawa • Naval Hospital Pensacola
	NCR	• Ft. Belvoir Community Hospital (NCR) • Walter Reed National Medical Center (NCR)
Three-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Brian Allgood Army Community Hospital, Seoul • Evans Army Community Hospital, Ft. Carson • Landstuhl Regional Medical Center • Madigan Army Medical Center, Ft. Lewis • Martin Army Community Hospital, Ft. Benning • Reynolds Army Community Hospital, Ft. Sill • William Beaumont Army Medical Center, Ft. Bliss • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Pendleton • Naval Hospital Jacksonville • Naval Hospital Yokosuka • Naval Medical Center Portsmouth • Naval Medical Center San Diego
Two-Star	Army	• Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Oak Harbor • Naval Hospital Twentynine Palms

4.4.2 Recommend the Hospital

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 8 shows Recommend the Hospital scores by care type, service branch (for DC), and region (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 8. Recommend the Hospital Scores by Care Type, Service Branch, and Region.

4.4.2.1 Comparison to CMS Benchmark

Scores from both **DC** and **PC** users for Recommend the Hospital met but were not significantly different from the benchmark of 71%.

4.4.2.2 Measure by Subgroup

For DC, **Air Force** and **NCR** user scores were significantly higher than the benchmark, while scores from **Army** users were significantly lower than the benchmark. Scores from **Navy** users met but were not significantly different from the benchmark.

For PC, scores from **West** Region users were significantly higher than the benchmark, while scores from **North** Region users were significantly lower than the benchmark. Scores from **South** Region users met but were not significantly different from the benchmark.

4.4.2.3 Measure by Product Line

Surgical care user scores were significantly higher than the benchmark for both DC and PC. However, PC **Obstetric** care users reported scores significantly higher than the benchmark, while DC Obstetric care users reported scores significantly lower than the benchmark. Additionally, PC **Medical** care users reported scores that were significantly lower than the benchmark, while DC Medical care users reported scores that were significantly higher than the benchmark.

4.4.2.4 Top Ranking Facilities

Figure 9 shows DC user scores for Recommend the Hospital. One military hospital, Keesler Medical Center (81st Medical Group), received user scores that rank between the 90th and 99th percentiles of HCAHPS national ratings. A total of 19 MTFs received scores between the 50th and 74th percentiles, with 28 receiving scores below the 50th percentile.

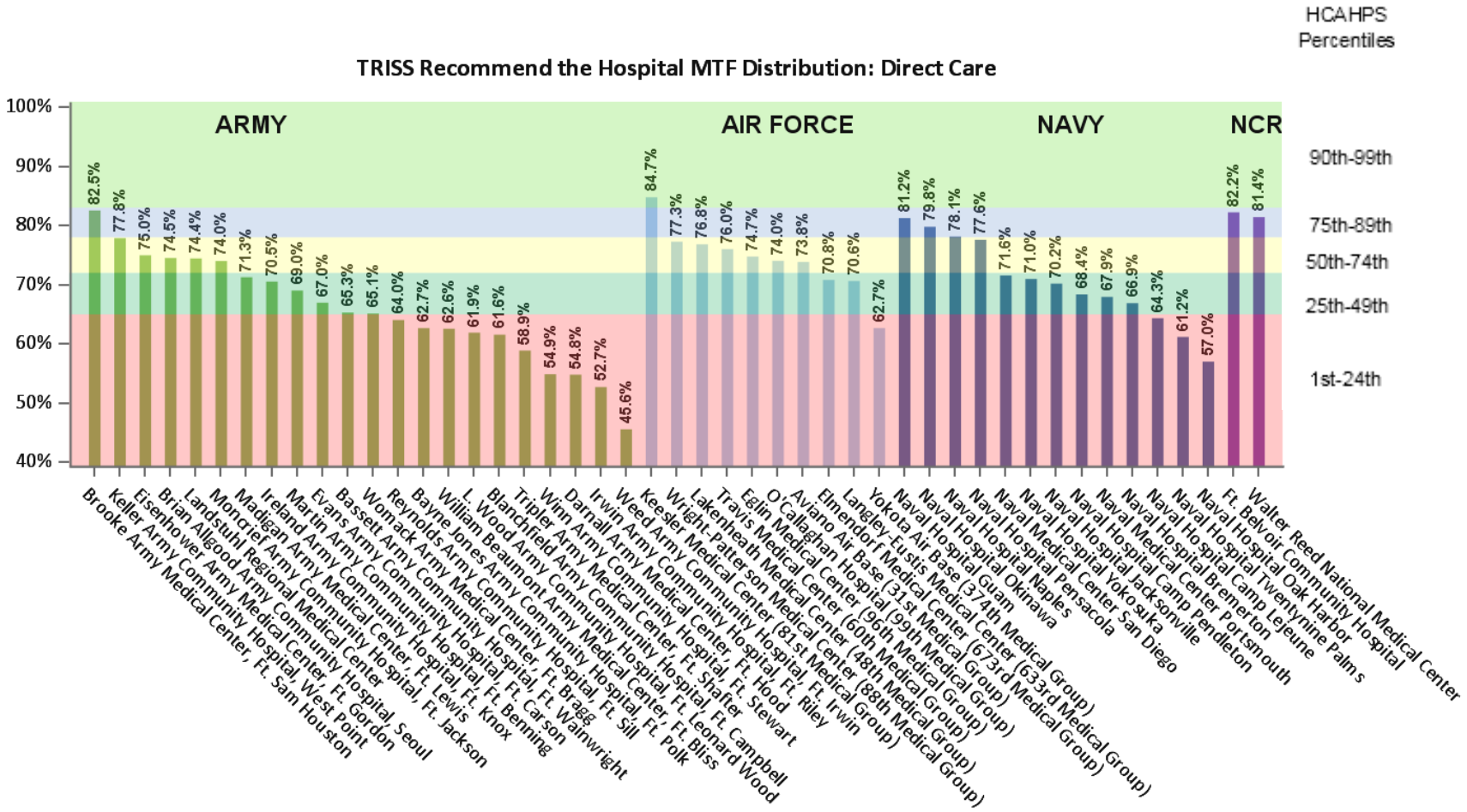


Figure 9. Ranking of User Recommend the Hospital Score for DC Hospitals.

Figure 10 shows PC user scores for Recommend the Hospital. A total of 6 hospitals (University of Colorado Hospital, University of Alabama Hospital, New Hanover Regional Medical Center, University of North Carolina Hospitals, FirstHealth Moore Regional Hospital, and Vanderbilt University Hospital) scored between the 90th and 99th percentiles, 14 scored between the 75th and 89th percentiles, 19 received scores between the 50th and 74th percentiles, 16 scored between the 25th and 49th percentiles, and 18 hospitals scored below the 25th percentile.

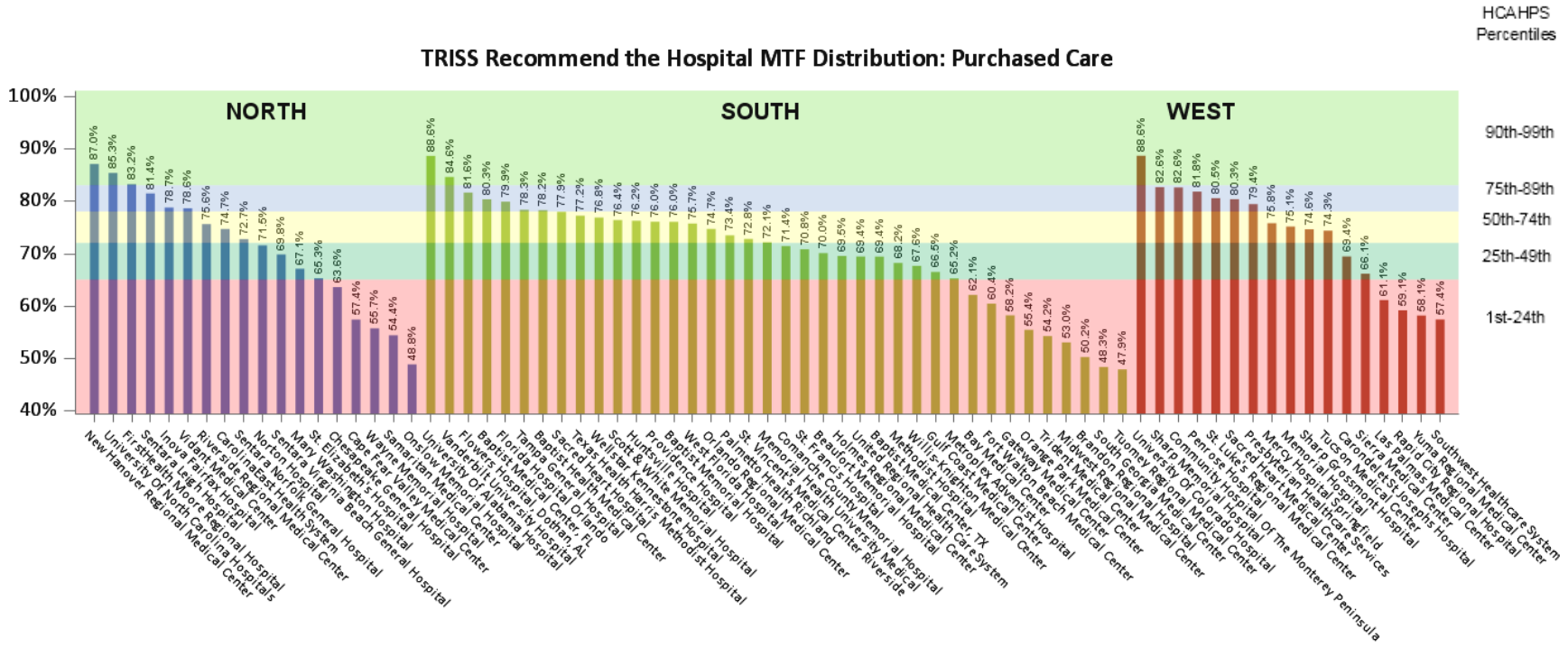


Figure 10. Ranking of User Recommend the Hospital Score for PC Hospitals.

4.4.2.5 HCAHPS Star Ratings

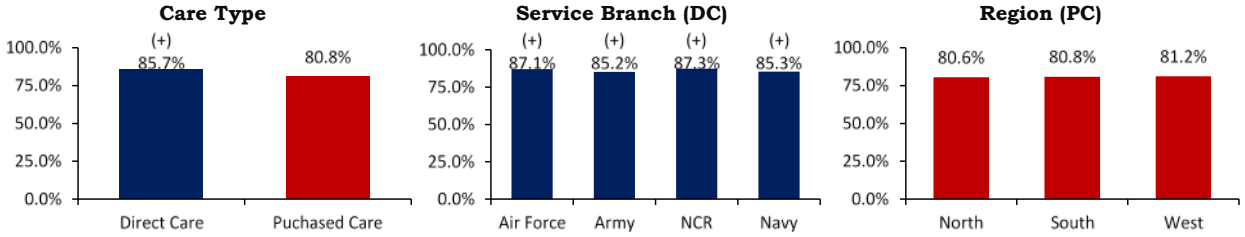
Table 7 shows HCAHPS Star Ratings calculated from DC user scores of Recommend the Hospital. Twelve DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 7. HCAHPS Star Ratings for Recommend the Hospital.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Keesler Medical Center (81st Medical Group)
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Lakenheath Medical Center (48th Medical Group) • Travis Medical Center (60th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Brian Allgood Army Community Hospital, Seoul • Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Community Hospital, Ft. Gordon • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center
	Navy	• Naval Hospital Guam • Naval Hospital Pensacola • Naval Hospital Okinawa • Nava Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Three-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Evans Army Community Hospital, Ft. Carson • Ireland Army Community Hospital, Ft. Knox • Madigan Army Medical Center, Ft. Lewis • Martin Army Community Hospital, Ft. Benning • Reynolds Army Community Hospital, Ft. Sill • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Jacksonville • Naval Medical Center Portsmouth • Naval Medical Center San Diego
Two-Star	Army	• Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Tripler Army Medical Center, Ft. Shafter • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Oak Harbor • Naval Hospital Twentynine Palms
One-Star	Army	• Weed Army Community Hospital, Ft. Irwin

4.4.3 Communication with Doctors

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 11 shows Communication with Doctors scores by care type, service branch (for DC), and region (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 11. Communication with Doctors Scores by Care Type, Service Branch, and Region.

4.4.3.1 Comparison to CMS Benchmark

Scores from **DC** users for Communication with Doctors were significantly higher than the benchmark of 82%.

On the other hand, scores from **PC** users met but were not significantly different from this benchmark.

4.4.3.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, **NCR**, and **Navy** users were significantly higher than the benchmark.

As for PC, users from the **West**, **North**, and **South** Regions reported scores that met but were not significantly different from the benchmark.

4.4.3.3 Measure by Product Line

For DC, users in all three product lines gave scores that were significantly higher than the benchmark.

For PC, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark. Scores from **Medical** care users were significantly lower than the benchmark.

4.4.3.4 Top Performing Facilities

Figure 12 shows DC user scores for Communication with Doctors. Users scores from five hospitals (Moncrief Army Community Hospital, Ireland Army Community Hospital, Keesler Medical Center (81st Medical Group), Keller Army Community Hospital, and Eglin Medical Center (96th Medical Group)) were between the 90th and 99th percentiles. An additional 24 MTFs received user scores between the 75th and 89th percentiles, and the remaining 18 received user scores between the 50th and 74th percentiles. Seven MTFs are not shown due to low base size.

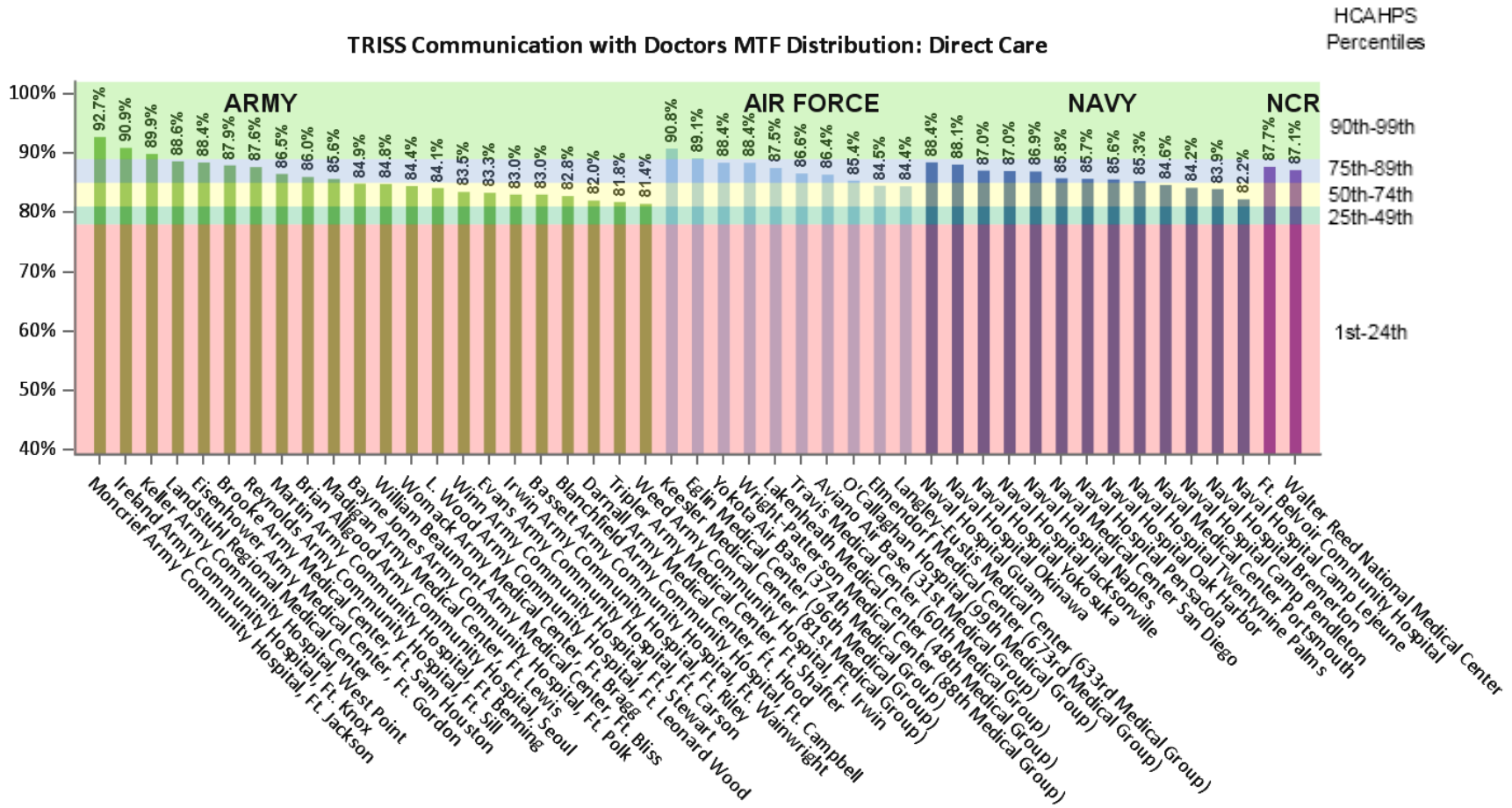


Figure 12. Ranking of User Communication with Doctor Scores for DC Hospitals.

Figure 13 shows PC user scores for Communication with Doctors. Only one PC hospital (University of Alabama Hospital) received user scores between the 90th and 99th percentiles of national HCAHPS rankings. Nine hospitals received scores from users between the 75th and 89th percentiles, which include Sharp Memorial Hospital, University of North Carolina Hospitals, Providence Hospital, Vanderbilt University Hospital, FirstHealth Moore Regional, University of Colorado Hospital, Pitt County Memorial Hospital, Flowers Hospital, and the Community Hospital of the Monterey Peninsula. User scores from 31 hospitals were between the 50th and 74th percentiles, while user scores from 32 hospitals were below the 50th percentile.

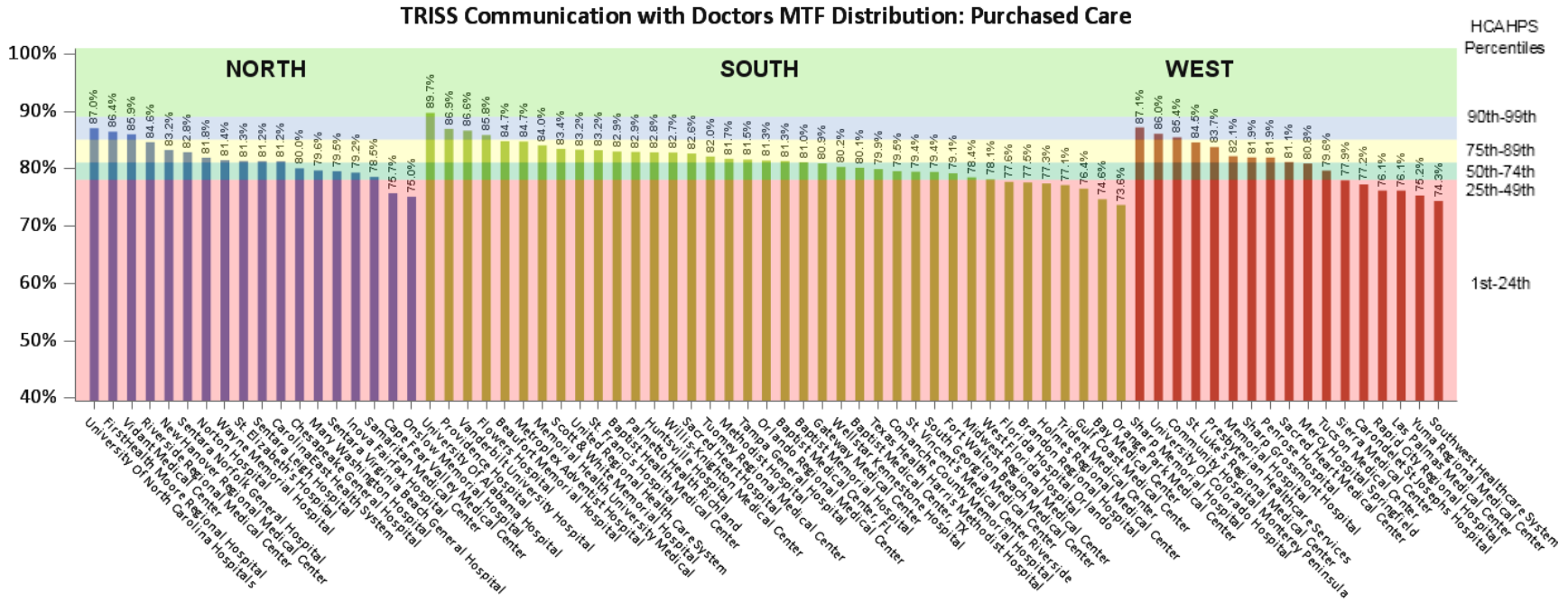


Figure 13. Ranking of User Communication with Doctor Scores for PC Hospitals.

4.4.3.5 HCAHPS Star Ratings

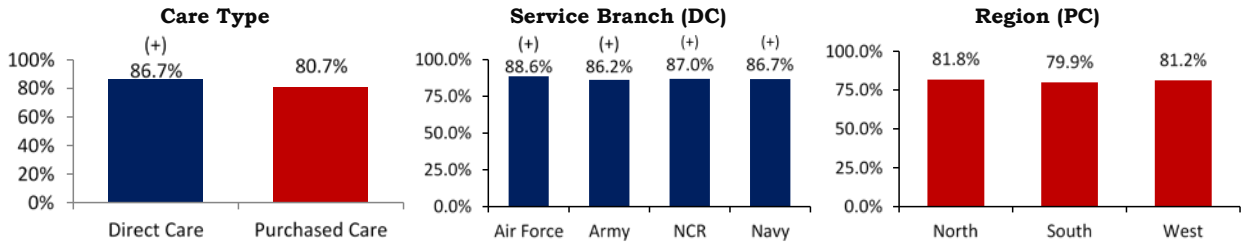
Table 8 shows HCAHPS Star Ratings calculated from DC user scores of Communication with Doctors. Ten DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 8. HCAHPS Star Ratings for Communication with Doctors.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Medical Center, Ft. Gordon • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • Reynolds Army Community Hospital, Ft. Sill
	Navy	• Naval Hospital Guam • Naval Hospital Okinawa • Naval Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Four-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Bayne-Jones Army Community Hospital, Ft. Polk • Bassett Army Community Hospital, Ft. Wainwright • Brian Allgood Army Community Hospital, Seoul • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Martin Army Community Hospital, Ft. Benning • William Beaumont Army Medical Center, Ft. Bliss • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Pendleton • Naval Hospital Jacksonville • Naval Hospital Oak Harbor • Naval Hospital Pensacola • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
Three-Star	Army	• Blanchfield Army Community Hospital, Ft. Hood • Darnall Army Medical Center, Ft. Hood • Evans Army Community Hospital, Ft. Carson • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Camp Lejeune

4.4.4 Communication with Nurses

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 14 shows Communication with Nurses scores by care type, service branch (for DC), and region (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 14. Communication with Nurses Scores by Care Type, Service Branch, and Region.

4.4.4.1 Comparison to CMS Benchmark

Scores from **DC** users for Communication with Nurses were significantly higher than the benchmark of 80%.

Scores from **PC** users met but were not significantly different from this benchmark.

4.4.4.2 Measure by Subgroup

For DC, users scores from **Air Force**, **Army**, **NCR**, and **Navy** were significantly higher than the benchmark.

For PC, users scores from **North**, **South**, and **West** Regions met but were not significantly different from the benchmark.

4.4.4.3 Measure by Product Line

For both DC and PC, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark.

For **Medical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that were significantly lower than the benchmark.

4.4.4.4 Top Rating Facilities

Figure 15 shows scores from DC users for Communication with Nurses. A total of 22 facilities received user scores between the 95th and 99th percentiles of national HCAHPS ratings, led by Naval Hospital Naples, Yokota Air Base (374th Medical Group), and Naval Hospital Oak Harbor. An additional 9 MTFs received user scores between the 90th and 94th percentile, and 15 MTFs received user scores between the 75th and 89th percentiles. The remaining facility received user scores between the 50th and 74th percentiles. Seven MTFs are not shown due to low base size.

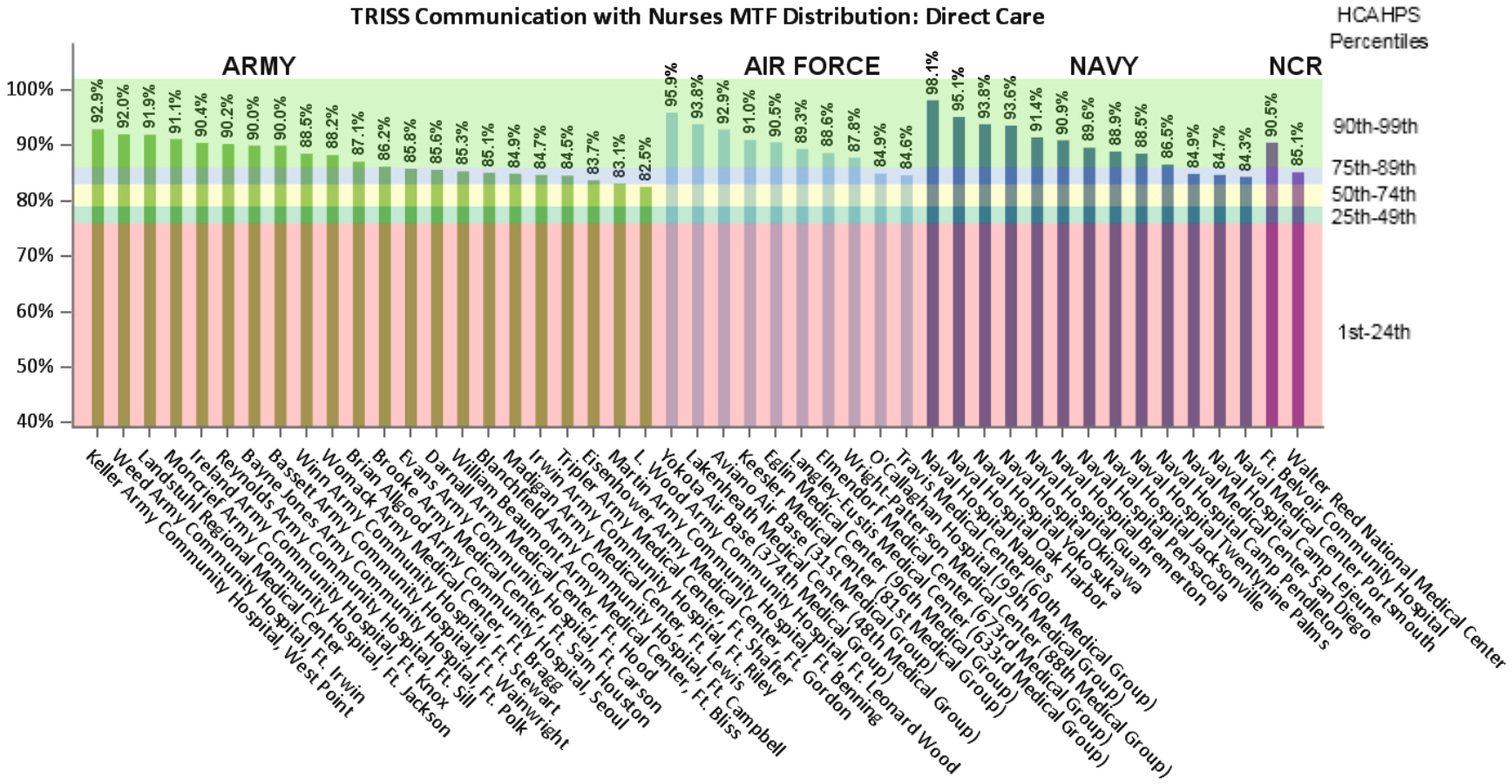


Figure 15. Ranking of User Communication with Nurses Scores for DC Hospitals.

Figure 16 shows scores from DC users for Communication with Nurses. Seven hospitals received scores from users between the 90th and 99th percentiles of national HCAHPS ratings. These include University of North Carolina Hospitals, Community Hospital of the Monterey Peninsula, New Hanover Regional Medical Center, FirstHealth Moore Regional Hospital, Sharp Memorial Hospital, St. Elizabeth's Hospital, and Beaufort Memorial Hospital. An additional 13 facilities scored between the 75th and 89th percentiles, 28 facilities received scores between the 50th and 74th percentiles, 17 facilities scored before the 25th and 49th percentiles, and the remaining 8 facilities scored below the 25th percentile.

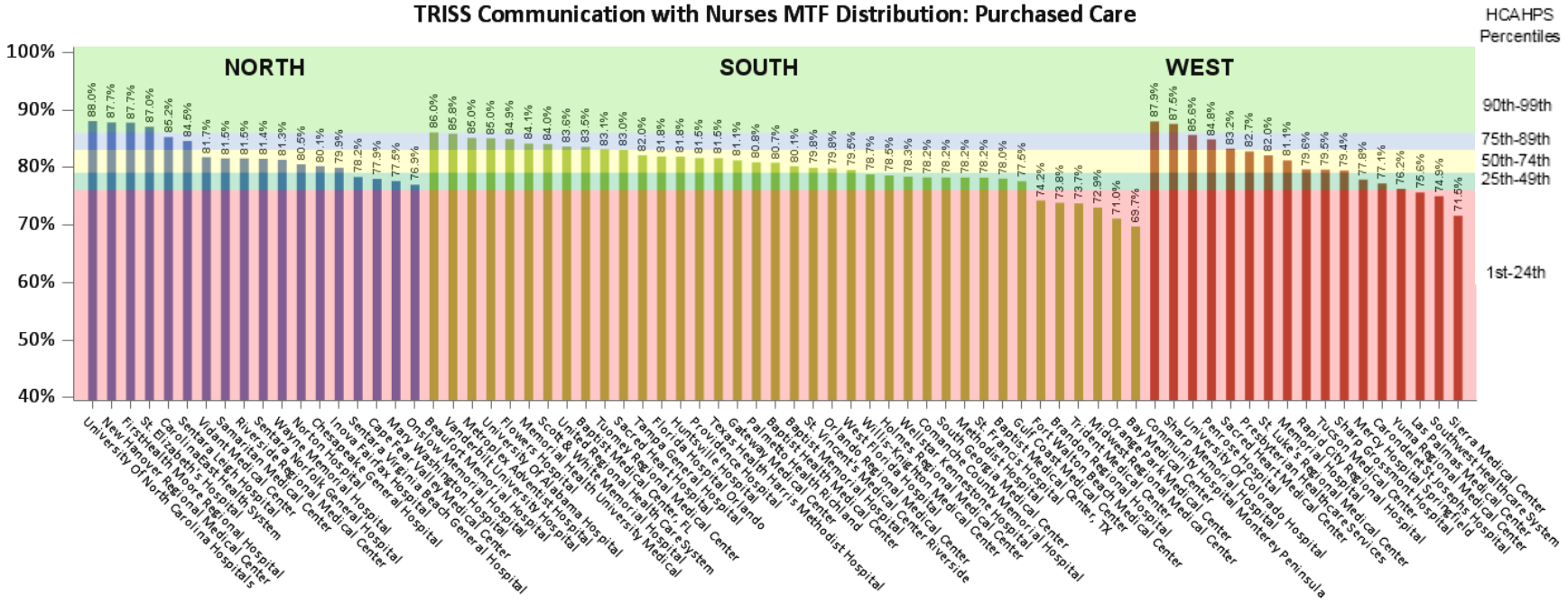


Figure 16. Ranking of User Communication with Nurses Scores for PC Hospitals.

4.4.4.5 HCAHPS Star Ratings

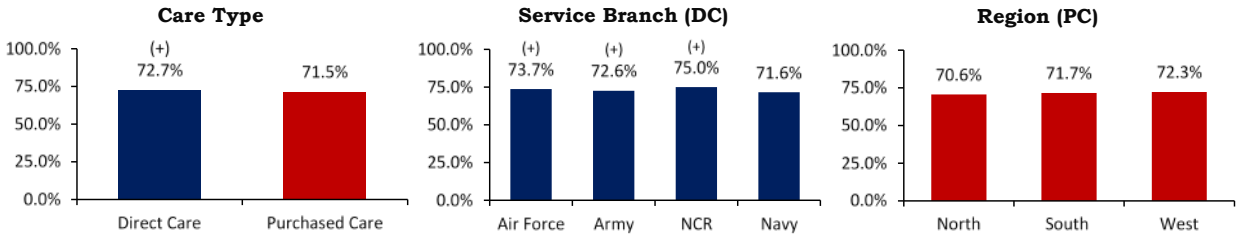
Table 9 shows HCAHPS Star Ratings calculated from DC user scores of Communication with Nurses. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 9. HCAHPS Star Ratings for Communication with Nurses.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Brooke Army Medical Center, Ft. Sam Houston • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center
	Navy	• Naval Hospital Guam • Naval Hospital Jacksonville • Naval Hospital Pensacola • Naval Hospital Okinawa • Naval Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital
Four-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Brian Allgood Army Community Hospital, Seoul • Eisenhower Army Medical Center, Ft. Gordon • Madigan Army Medical Center, Ft. Lewis • Reynolds Army Community Hospital, Ft. Sill • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Oak Harbor • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Walter Reed Medical Center
Three-Star	Army	• Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Evans Army Community Hospital, Ft. Carson • Irwin Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Martin Army Community Hospital, Ft. Benning • Tripler Army Medical Center, Ft. Shafter
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton

4.4.5 Pain Management

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 17 shows Pain Management scores by care type, service branch (for DC), and region (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 17. Pain Management Scores by Care Type, Service Branch, and Region.

4.4.5.1 Comparison to CMS Benchmark

Scores from **DC** users for Pain Management were significantly higher than the benchmark of 71%.

Scores from **PC** users met but were not significantly different from this benchmark.

4.4.5.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, and **NCR** users were significantly higher than the benchmark, while scores from **Navy** users met but were not significantly different from the benchmark.

For PC, scores from users in the **North**, **South**, and **West** Regions all met but were not significantly different from the benchmark.

4.4.5.3 Measure by Product Line

Medical care users reported scores that were significantly lower than the benchmark for both DC and PC. However, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark.

4.4.5.4 HCAHPS Star Ratings

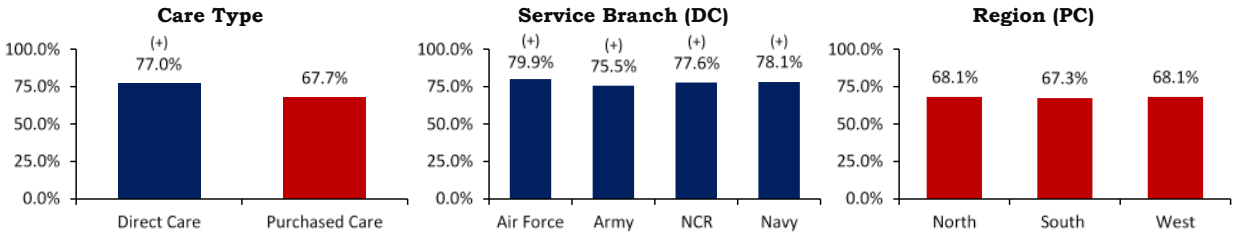
Table 10 shows HCAHPS Star Ratings calculated from DC user scores of Pain Management. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 10. HCAHPS Star Ratings for Pain Management.

Type of Facility	Military Branch	Facility
Five-Star	Army	• Keller Army Community Hospital, West Point
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Group (88th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Brian Allgood Army Community Hospital, Seoul • Ireland Army Community Hospital, Ft. Knox • Landstuhl Regional Medical Center • Reynolds Army Community Hospital, Ft. Sill
	Navy	• Naval Hospital Bremerton • Naval Hospital Guam • Naval Hospital Pensacola • Naval Hospital Oak Harbor • Naval Hospital Okinawa • Naval Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital
Three-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Blanchfield Army Community Hospital, Ft. Campbell • Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Medical Center, Ft. Gordon • Evans Army Community Hospital, Ft. Carson • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Martin Army Community Hospital, Ft. Benning • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Jacksonville • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Walter Reed National Medical Center
Two-Star	Army	• Darnall Army Medical Center, Ft. Hood

4.4.6 Responsiveness of Staff

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 18 shows Responsiveness of Staff scores by care type, service branch (for DC), and region (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 18. Responsiveness of Staff Scores by Care Type, Service Branch, and Region.

4.4.6.1 Comparison to CMS Benchmark

Scores from **DC** users for Responsiveness of Hospital Staff were significantly higher than the benchmark of 68%.

Scores from **PC** users met but were not significantly different from this benchmark.

4.4.6.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, **NCR**, and **Navy** users were significantly higher than the benchmark.

For PC, users scores from **North**, **South**, and **West** Regions met but were not significantly different from the benchmark.

4.4.6.3 Measure by Product Line

Both DC and PC **Obstetric** care users reported scores that were significantly higher than the benchmark. For **Surgical** care, DC users reported scores that were significantly higher than the benchmark, while PC user scores met but were not significantly different from the benchmark.

For **Medical** care, DC users reported scores that were significantly higher than the benchmark. PC users reported scores that were significantly lower than the benchmark.

4.4.6.4 HCAHPS Star Ratings

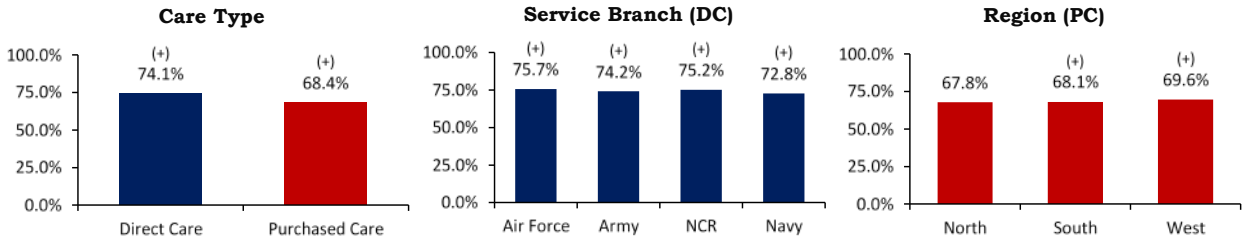
Table 11 shows HCAHPS Star Ratings calculated from DC user scores of Responsiveness of Hospital Staff. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 11. HCAHPS Star Ratings for Responsiveness of Hospital Staff.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • Reynolds Army Community Hospital, Ft. Sill
	Navy	• Naval Hospital Bremerton • Naval Hospital Okinawa • Naval Hospital Pensacola • Naval Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital
Four-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Brian Allgood Army Community Hospital, Seoul • Brooke Army Medical Center, Ft. Sam Houston • Darnall Army Medical Center, Ft. Hood • Eisenhower Army Medical Center, Ft. Gordon • Evans Army Community Hospital, Ft. Carson • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Guam • Naval Hospital Jacksonville • Naval Hospital Oak Harbor • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Walter Reed Medical Center
Three-Star	Army	• Irwin Army Community Hospital, Ft. Riley • Martin Army Community Hospital, Ft. Benning

4.4.7 Communication about Medicines

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 19 shows Communication about Medicines scores by care type, service branch (for DC), and region (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 19. Communication about Medicines Scores by Care Type, Service Branch, and Region.

4.4.7.1 Comparison to CMS Benchmark

Scores from both **DC** and **PC** users for Communication about Medicines were significantly higher than the benchmark of 65%.

4.4.7.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, **NCR**, and **Navy** users were significantly higher than the benchmark.

For PC, scores from **South** and **West** Region users were significantly higher than the benchmark. Users in the **North** Region reported scores that met but were not significantly different from the benchmark.

4.4.7.3 Measure by Product Line

Both DC and PC, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark.

For the **Medical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that met but were not significantly different from the benchmark.

4.4.7.4 HCAHPS Star Ratings

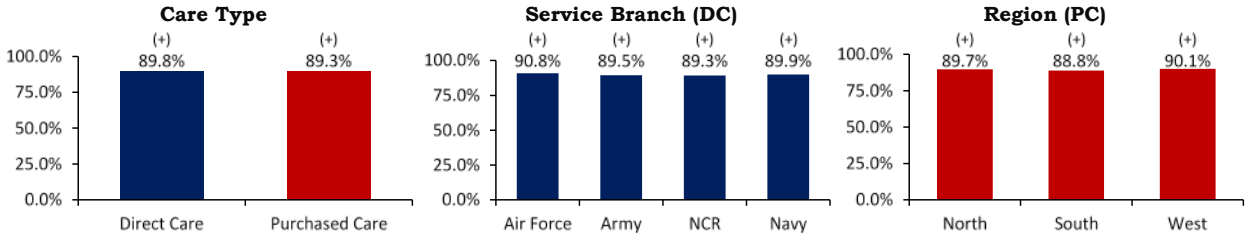
Table 12 shows HCAHPS Star Ratings calculated from DC user scores of Communication about Medicines. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 12. HCAHPS Star Ratings for Communication about Medicines.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Elmendorf Medical Center (673rd Medical Group) • Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • O'Callaghan Hospital (99th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Brian Allgood Army Community Hospital, Seoul • Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Medical Center, Ft. Gordon • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • Reynolds Army Community Center, Ft. Sill
	Navy	• Naval Hospital Guam • Naval Hospital Jacksonville • Naval Hospital Oak Harbor • Naval Hospital Pensacola • Naval Hospital Yokosuka
	NCR	• Walter Reed National Medical Center • Ft. Belvoir Community Hospital
Four-Star	Air Force	• Langley Medical Center (633rd Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Evans Army Community Hospital, Ft. Carson • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Okinawa • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
Three-Star	Army	• Martin Army Community Hospital, Ft. Benning

4.4.8 Discharge Information

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 20 shows Discharge Information scores by care type, service branch (for DC), and region (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 20. Discharge Information Scores by Care Type, Service Branch, and Region.

4.4.8.1 Comparison to CMS Benchmark

Scores from both **DC** and **PC** users for Discharge Information were significantly higher than the benchmark of 86%.

4.4.8.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, **NCR**, and **Navy** users were significantly higher than the benchmark.

As for PC, users in the **North**, **South**, and **West** Regions reported scores that were significantly higher than the benchmark.

4.4.8.3 Measure by Product Line

For both DC and PC, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark.

For **Medical** care, both DC and PC users reported scores that met but were not significantly different from the benchmark.

4.4.8.4 HCAHPS Star Ratings

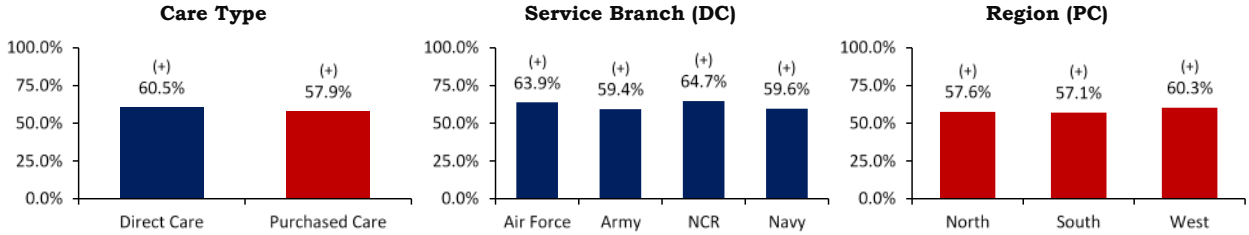
Table 13 shows HCAHPS Star Ratings calculated from DC user scores of Discharge Information. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 13. HCAHPS Star Ratings for Discharge Information.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Lakenheath Medical Center (48th Medical Group)
	Navy	• Naval Hospital Yokosuka
Four-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Keesler Medical Center (81st Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point
	Navy	• Naval Hospital Guam
Three-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Brooke Army Medical Center, Ft. Sam Houston • Darnall Army Medical Center, Ft. Hood • Eisenhower Army Medical Center, Ft. Gordon • Evans Army Community Hospital, Ft. Carson • Irwin Army Community Hospital, Ft. Riley • Landstuhl Regional Medical Center • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Reynolds Army Community Hospital, Ft. Sill • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Shafter • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Jacksonville • Naval Hospital Pensacola • Naval Hospital Okinawa • Naval Hospital Oak Harbor • Naval Hospital Twentynine Palms • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Two-Star	Army	• Brian Allgood Army Community Hospital, Seoul • Martin Army Community Hospital, Ft. Benning

4.4.9 Care Transition

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 21 shows Care Transition scores by care type, service branch (for DC), and region (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 21. Care Transition Scores by Care Type, Service Branch, and Region.

4.4.9.1 Comparison to CMS Benchmark

Scores from both **DC** and **PC** users for Care Transition were significantly higher than the benchmark of 52%.

4.4.9.2 Measure by Subgroup

For DC, scores from **Air Force**, **Army**, **NCR**, and **Navy** users were all significantly higher than the benchmark.

For PC, users in the **North**, **South**, and **West** Regions also reported scores that were significantly higher than the benchmark.

4.4.9.3 Measure by Product Line

For both DC and PC, **Obstetric** care and **Surgical** care users reported scores that were significantly higher than the benchmark.

For **Medical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that met but were not significantly different from the benchmark.

4.4.9.4 HCAHPS Star Ratings

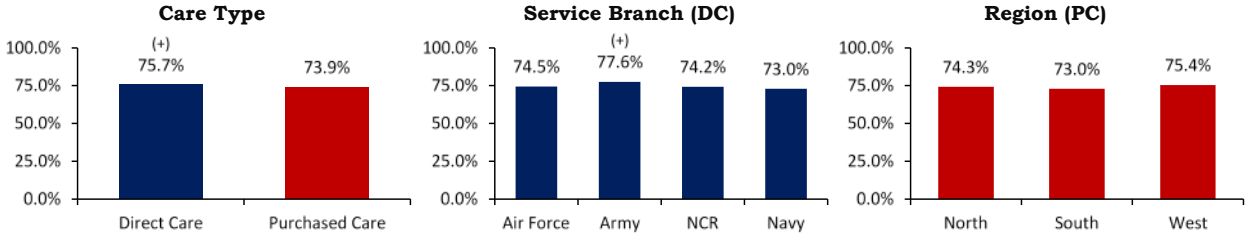
Table 14 shows HCAHPS Star Ratings calculated from DC user scores of Care Transition. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 14. HCAHPS Star Ratings for Care Transition.

Type of Facility	Military Branch	Facility
Five-Star	Air Force	• Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group)
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Elmendorf Medical Center (673rd Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group) • Travis Medical Center (60th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Brian Allgood Army Community Hospital, Seoul • Brooke Army Medical Center, Ft. Sam Houston • Eisenhower Army Medical Center, Ft. Gordon • Evans Army Community Hospital, Ft. Carson • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • Madigan Army Medical Center, Ft. Lewis • Reynolds Army Community Hospital, Ft. Sill • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Guam • Naval Hospital Jacksonville • Naval Hospital Pensacola • Naval Hospital Oak Harbor • Naval Hospital Okinawa • Naval Hospital Yokosuka • Naval Medical Center Portsmouth • Naval Medical Center San Diego
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Three-Star	Army	• Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Darnall Army Medical Center, Ft. Hood • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • Martin Army Community Hospital, Ft. Benning • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Camp Pendleton • Naval Hospital Twentynine Palms

4.4.10 Cleanliness of Hospital Environment

Appendix J has full demographic breakdowns (by beneficiary category, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 22 shows Cleanliness of Hospital scores by care type, service branch (for DC), and region (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 22. Cleanliness of Hospital Scores by Care Type, Service Branch, and Region.

4.4.10.1 Comparison to CMS Benchmark

Scores from **DC** users for Cleanliness of Hospital Environment were significantly higher than the benchmark of 74%.

Scores from **PC** users met but were not significantly different from this benchmark.

4.4.10.2 Measure by Subgroup

For DC, **Army** users reported scores that were significantly higher than the benchmark. Scores from **Air Force**, **NCR**, and **Navy** users met but were not significantly different from the benchmark.

As for PC, scores from **North**, **South**, and **West** Region users met but were not significantly different from the benchmark.

4.4.10.3 Measure by Product Line

For both DC and PC, **Surgical** care users reported scores that were significantly higher than the benchmark.

For **Medical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that were significantly lower than the benchmark. For **Obstetric** care, PC users reported scores that were significantly higher than the benchmark, while DC users reported scores that met but were not significantly different from the benchmark.

4.4.10.4 HCAHPS Star Ratings

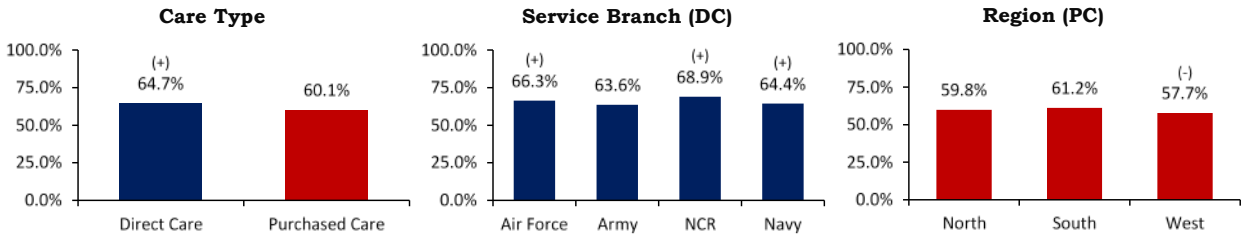
Table 15 shows HCAHPS Star Ratings calculated from DC user scores of Cleanliness of Hospital Environment. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 15. HCAHPS Star Ratings for Cleanliness of Hospital Environment.

Type of Facility	Military Branch	Facility
Five-Star	Army	• Reynolds Army Community Hospital, Ft. Sill
Four-Star	Air Force	• Keesler Medical Center (81st Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Blanchfield Army Community Hospital, Ft. Campbell • Brooke Army Medical Center, Ft. Sam Houston • Evans Army Community Hospital, Ft. Carson • Ireland Army Community Hospital, Ft. Knox • Keller Army Community Hospital, West Point • Landstuhl Regional Medical Center • Martin Army Community Hospital, Ft. Benning • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Pensacola • Naval Hospital Okinawa • Naval Hospital Yokosuka
	NCR	• Ft. Belvoir Community Hospital
Three-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • Travis Medical Center (60th Medical Group)
	Army	• Brian Allgood Army Community Hospital, Seoul • Darnall Army Medical Center, Ft. Hood • Eisenhower Army Medical Center, Ft. Gordon • L. Wood Army Community Hospital, Ft. Leonard Wood • Madigan Army Medical Center, Ft. Lewis • Tripler Army Medical Center, Ft. Shafter • Weed Army Community Hospital, Ft. Irwin • William Beaumont Army Medical Center, Ft. Bliss • Winn Army Medical Center, Ft. Stewart
	Navy	• Naval Hospital Jacksonville • Naval Hospital Oak Harbor • Naval Medical Center San Diego
Two-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Langley Medical Center (633rd Medical Group) • O'Callaghan Hospital (99th Medical Group)
	Army	• Irwin Army Community Hospital, Ft. Riley
	Navy	• Naval Hospital Bremerton • Naval Hospital Camp Lejeune • Naval Hospital Guam • Naval Hospital Pendleton • Naval Medical Center Portsmouth
	NCR	• Walter Reed National Medical Center
One-Star	Navy	• Naval Hospital Twentynine Palms

4.4.11 Quietness of Hospital Environment

Appendix J has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on this measure. Figure 23 shows Quietness of Hospital scores by care type, service branch (for DC), and region (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 23. Quietness of Hospital Scores by Care Type, Service Branch, and Region.

4.4.11.1 Comparison to CMS Benchmark

Scores from **DC** users for Quietness of Hospital Environment were significantly higher than the benchmark of 62%.

Scores from **PC** users met but were not significantly different from the benchmark.

4.4.11.2 Measure by Subgroup

For DC, scores from **Air Force**, **NCR**, and **Navy** users were significantly higher than the benchmark. Scores from **Army** users met but were not significantly different from the benchmark.

For PC, scores from **West** Region users were significantly lower than the benchmark. Scores from **North** and **South** Region users met but were not significantly different from the benchmark.

4.4.11.3 Measure By Product Line

For both DC and PC, **Obstetric** care users reported scores that were significantly higher than the benchmark.

For **Medical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that were significantly lower than the benchmark. For **Surgical** care, DC users reported scores that were significantly higher than the benchmark, while PC users reported scores that met but were not significantly different from the benchmark.

4.4.11.4 HCAHPS Star Ratings

Table 16 shows HCAHPS Star Ratings calculated from DC user scores of Quietness of Hospital. Eleven DC facilities did not have enough completed responses over a four-quarter reporting period to have HCAHPS Star Ratings calculated.

Table 16. HCAHPS Star Ratings for Quietness of Hospital Environment.

Type of Facility	Military Branch	Facility
Five-Star	Army	• Brian Allgood Army Community Hospital, Seoul • Keller Army Community Hospital, West Point
	Navy	• Naval Hospital Jacksonville
Four-Star	Air Force	• Eglin Medical Center (96th Medical Group) • Keesler Medical Center (81st Medical Group) • Langley Medical Center (633rd Medical Group) • Lakenheath Medical Center (48th Medical Group) • Wright-Patterson Medical Center (88th Medical Group)
	Army	• Bassett Army Community Hospital, Ft. Wainwright • Bayne-Jones Army Community Hospital, Ft. Polk • Evans Army Community Hospital, Ft. Carson • Ireland Army Community Hospital, Ft. Knox • Landstuhl Regional Medical Center • Martin Army Community Hospital, Ft. Benning • Reynolds Army Community Hospital, Ft. Sill • Weed Army Community Hospital, Ft. Irwin • Winn Army Community Hospital, Ft. Stewart
	Navy	• Naval Hospital Camp Pendleton • Naval Hospital Guam • Naval Hospital Pensacola • Naval Hospital Oak Harbor • Naval Hospital Okinawa • Naval Medical Center Portsmouth
	NCR	• Ft. Belvoir Community Hospital • Walter Reed National Medical Center
Three-Star	Air Force	• Elmendorf Medical Center (673rd Medical Group) • O'Callaghan Hospital (99th Medical Group)
	Army	• Blanchfield Army Community Hospital, Ft. Campbell • Brooke Army Medical Center, Ft. Sam Houston • Darnall Army Medical Center, Ft. Hood • Irwin Army Community Hospital, Ft. Riley • L. Wood Army Community Hospital, Ft. Leonard Wood • William Beaumont Army Medical Center, Ft. Bliss • Womack Army Medical Center, Ft. Bragg
	Navy	• Naval Hospital Bremerton • Naval Hospital Twentynine Palms
Two-Star	Air Force	• Travis Medical Center (60th Medical Group)
	Army	• Eisenhower Army Medical Center, Ft. Gordon • Madigan Army Medical Center, Ft. Lewis • Tripler Army Medical Center, Ft. Shafter
	Navy	• Naval Hospital Camp Lejeune • Naval Hospital Yokosuka • Naval Medical Center San Diego

4.5 DoD Supplemental Questions

The TRISS reports on 8 measures other than the 11 HCAHPS measures: Family Member Stayed, Staff Introduced Self, Communication among Staff, Repeat Care, Education on Breastfeeding, Staff Washed Hands, Staff Checked Identification, and Overall Nursing Care Rating. Appendix K has full demographic breakdowns (by beneficiary, age, health status, gender, product line, service branch, and region) for data on these measures. Table 21 lists the DoD supplemental questions wording.

4.5.1 Measures by Care Type

DC and PC users reported similar scores (i.e., within two points) for five measures: Family Member Stayed, Communication Among Staff, Education on Breastfeeding, Staff Washed Hands, and Overall Nursing Care. DC users reported higher scores for Staff Introduced Self than PC users. PC users reported higher scores for Repeat Care and Staff Checked Identification than DC users. Figure 24 depicts the scores on individual measures given by DC and PC users.

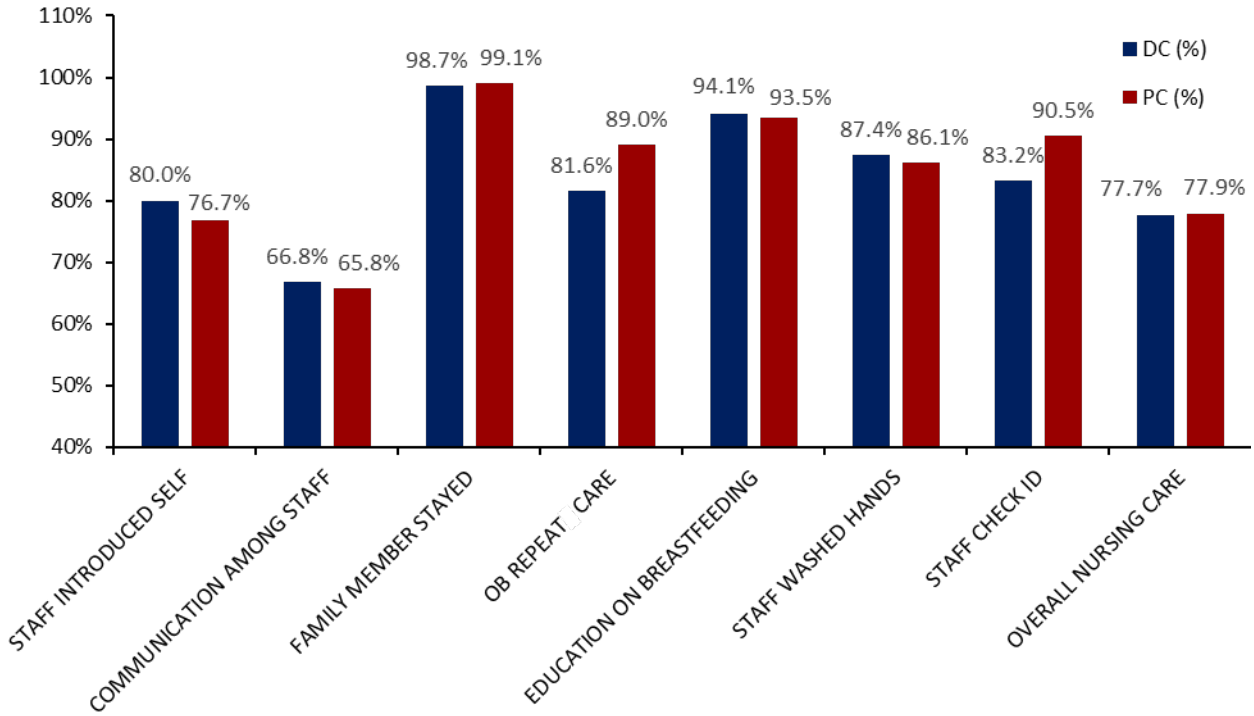


Figure 24. Comparison of Supplemental DoD Scores.

4.5.2 Measures by Subgroup

For DC, there was little variability by service branch for many measures. Even so, Air Force stands out on the Communication Among Staff measure. Additionally, users at Air Force and NCR facilities reported higher ratings for Overall Nursing Care.

There was also little variability between PC Regions. For Repeat Care and Education on Breastfeeding, the North Region lags behind both the South and West Regions. Otherwise, the scores reported for each region are very similar.

4.5.3 Measures by Product Line

For DC, Obstetric care users reported slightly lower scores for the Staff Introduced Self and considerably lower scores for Communication Among Staff when compared to Medical care and Surgical care users. DC Surgical care users reported considerably higher scores on OB Repeat Care and Communication Among Staff compared to Obstetric and Medical care users.

For PC, Medical care users reported lower scores than the Obstetric and Surgical care users on the Staff Introduced Self Measure. Similarly to DC, PC Surgical care users reported higher scores on Communication Among Staff. Additionally, PC Surgical care users also reported higher scores for Overall Nursing Care. Obstetric care users reported higher scores on Repeat Care and Education on Breastfeeding.

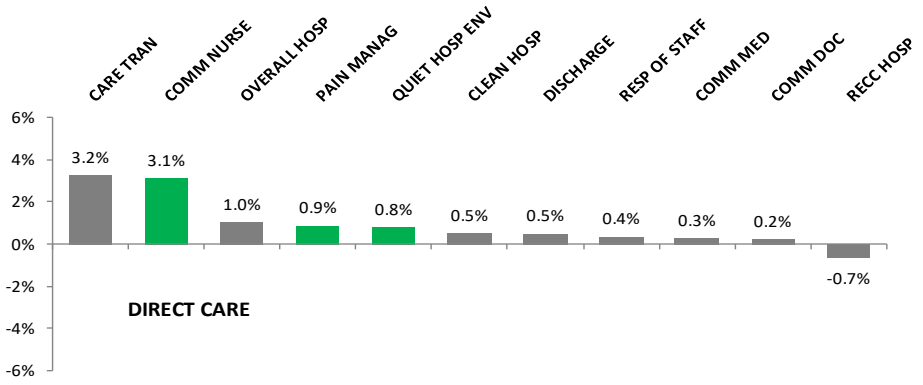
4.6 Year-to-Year Analysis: Comparison Between Y2015 and Y2016

This section compares TRISS results between Y2015 and Y2016. Y2015 covers responses from 33,963 users who visited MTFs or a PC network facility between October 1, 2014, and March 31, 2015. Y2016 covers responses from 83,276 users who visited MTFs or a PC network facility between April 1, 2015, and March 31, 2016.

4.6.1 Overall Trends

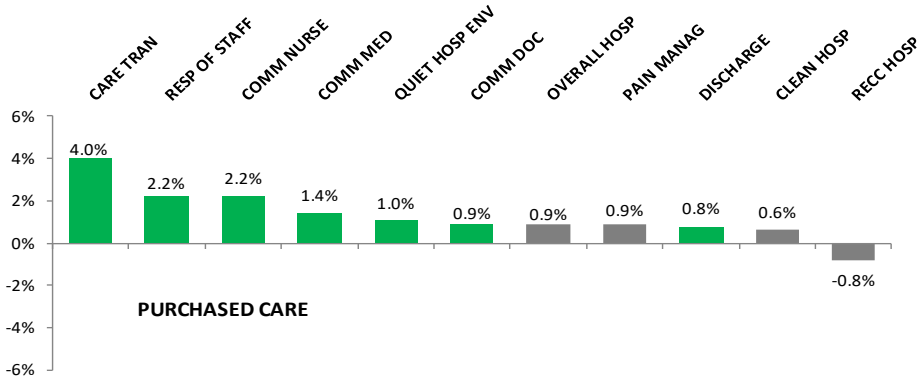
Both DC and PC had user scores that improved or remained stable between Y2015 and Y2016, with no measure experiencing significant decreases.

Scores from DC users significantly improved on three metrics, with the largest significant increase of 3.1% (see Figure 25). Scores from PC users, on aggregate, increased on 7 of the 11 measures, with a maximum increase of 4.0% (see Figure 26). These improvements, however, did not include any significant change in user scores for the two global measures of Overall Hospital Rating and Recommend the Hospital between Y2015 and Y2016 for either care type.



Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 25. Difference in Scores for DC HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

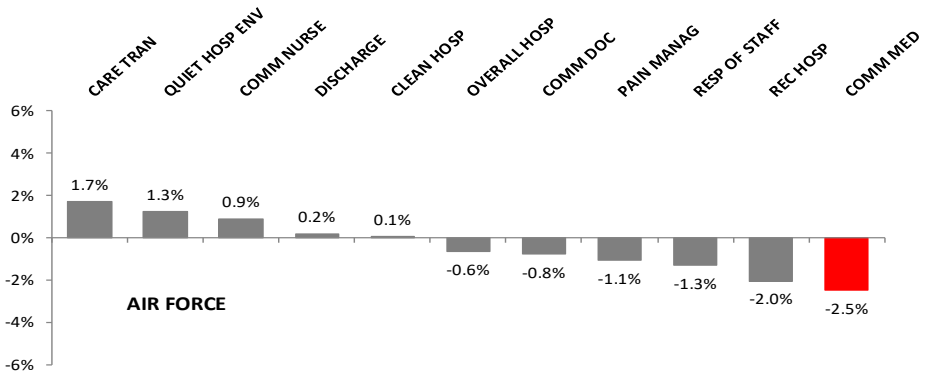
Figure 26. Difference in Scores for PC HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

4.6.2 DC Trends

4.6.2.1 Service Branch

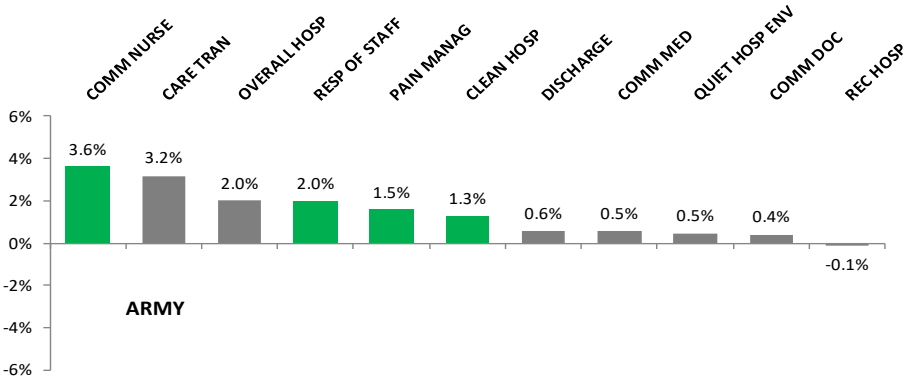
Figure 27 through Figure 30 show DC changes in HCAHPS measures from Y2015 to Y2016 by military branch and NCR.

Overall, DC user scores remained stable across service branches. Scores from Army users fared best with significant improvements on four measures: Communication with Nurses, Responsiveness of Hospital Staff, Pain Management, and Cleanliness of Hospital Environment. Scores from Navy users improved in the Communication with Nurses measure. Scores from both the Air Force and NCR users generally remained stable, though scores from NCR users had a significant decrease in Responsiveness of Hospital Staff, and scores from Air Force users were lower on Communication about Medicines.



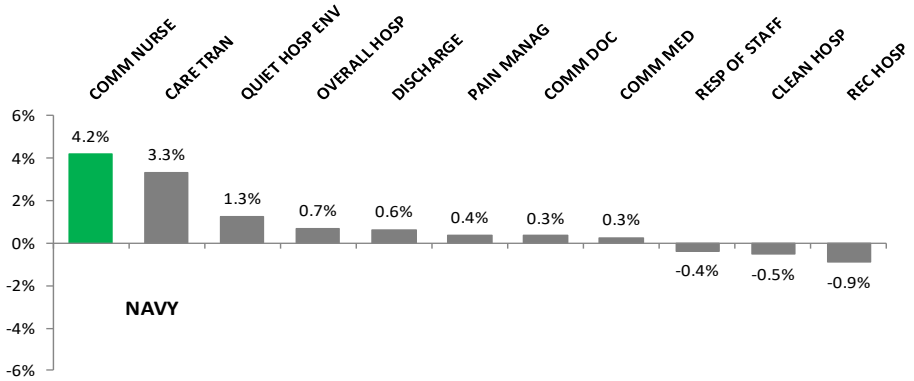
Note: Red bars indicate a significant decrease in score, and grey bars indicate no change in score.

Figure 27. Difference in Scores for Air Force HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



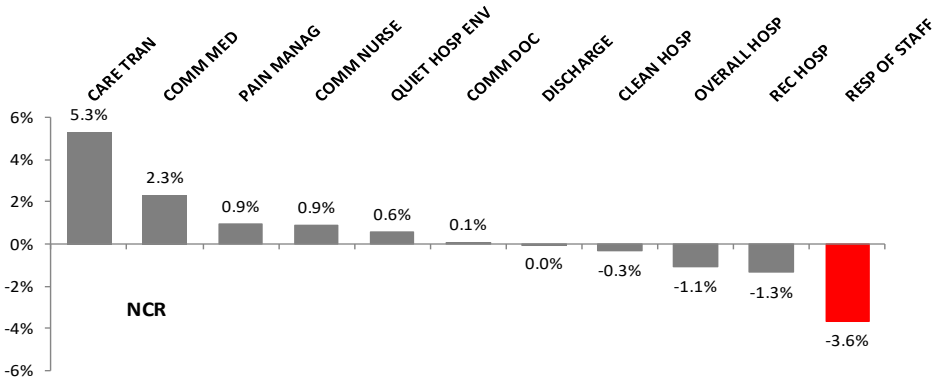
Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 28. Difference in Scores for Army HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 29. Difference in Scores for Navy HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



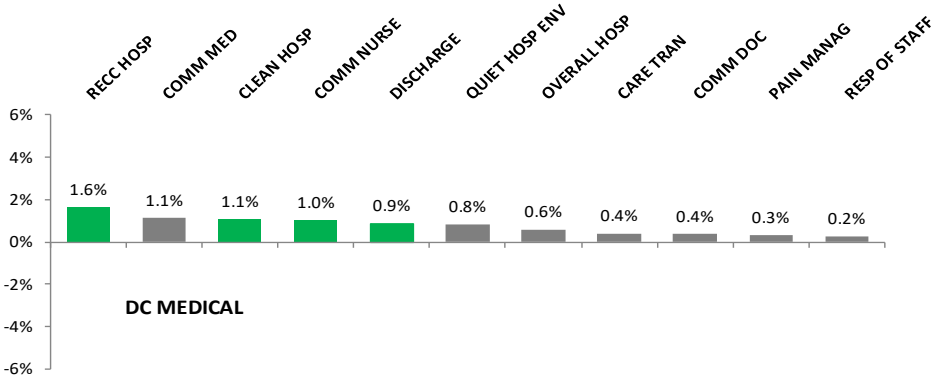
Note: Red bars indicate a significant decrease in score, and grey bars indicate no change in score.

Figure 30. Difference in Scores for NCR HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

4.6.2.2 Product Line

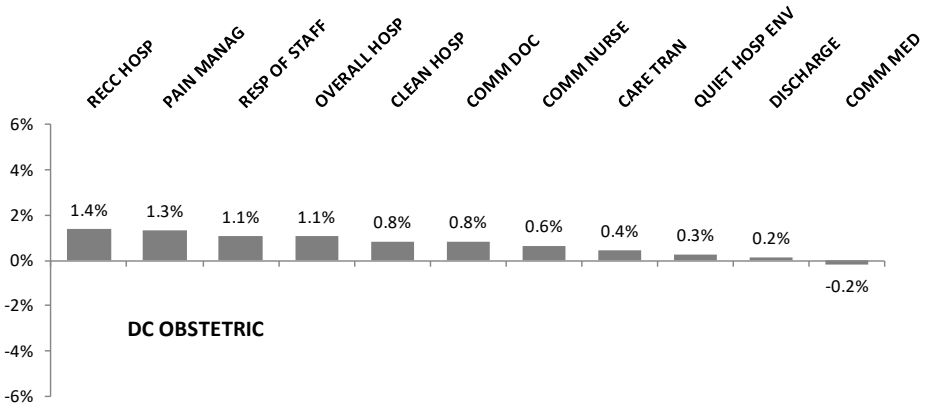
Figure 31 through Figure 33 show DC changes from Y2015 to Y2016 by product line.

DC user scores either improved or remained stable between Y2015 to Y2016 when examined by product line. Medical user scores fared best with improvements in four measures: Recommend the Hospital, Cleanliness of the Hospital Environment, Communication with Nurses, and Discharge Planning. Both Surgical care user and Obstetric care user scores for all HCAHPS measures remained stable from Y2015 to Y2016.



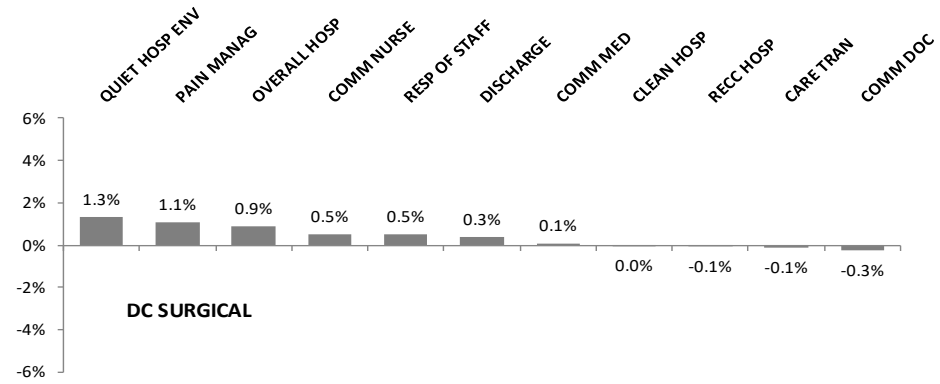
Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 31. Difference in Scores for DC Medical HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Grey bars indicate no change in score.

Figure 32. Difference in Scores for DC Obstetric HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Grey bars indicate no change in score.

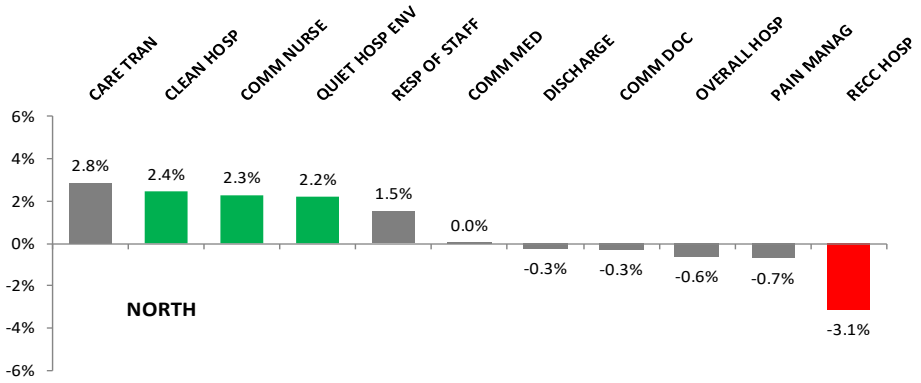
Figure 33. Difference in Scores for DC Surgical HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

4.6.3 PC Trends

4.6.3.1 Region

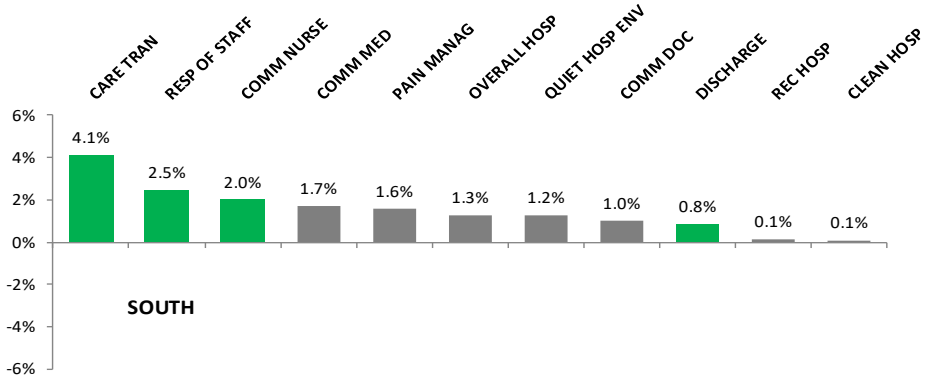
Figure 34 through Figure 36 show PC changes in measures from Y2015 to Y2016 by Region.

Overall, scores from PC users improved or remained stable between Y2015 and Y2016 across regions. Scores from West Region users fared best, with improvements on five measures including Care Transition, Communication with Nurses, Responsiveness of Hospital Staff, Communication with Doctors, and Discharge Planning. Scores from South Region users significantly improved on four measures: Care Transition, Responsiveness of Hospital Staff, Communication with Nurses, and Discharge Planning. Scores from North Region users saw improvements in Cleanliness of Hospital Environment, Communication with Nurses, and Quietness of Hospital Environment. Scores from North Region users significantly decreased from Y2015 to Y2016 for the Recommend the Hospital Rating.



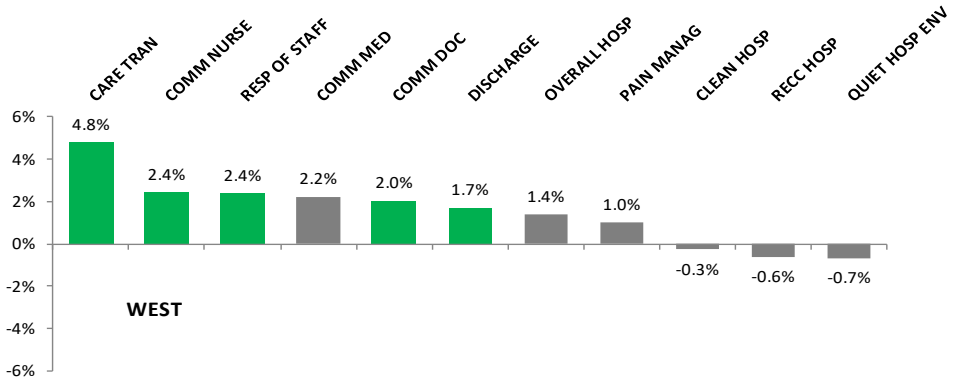
Note: Green bars indicate a significant increase in score, red bars indicate a significant decrease in score, and grey bars indicate no change in score.

Figure 34. Difference in Scores for North Region HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Green bars indicate a significant increase in score, red bars indicate a significant decrease in score, and grey bars indicate no change in score.

Figure 35. Difference in Scores for South Region HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



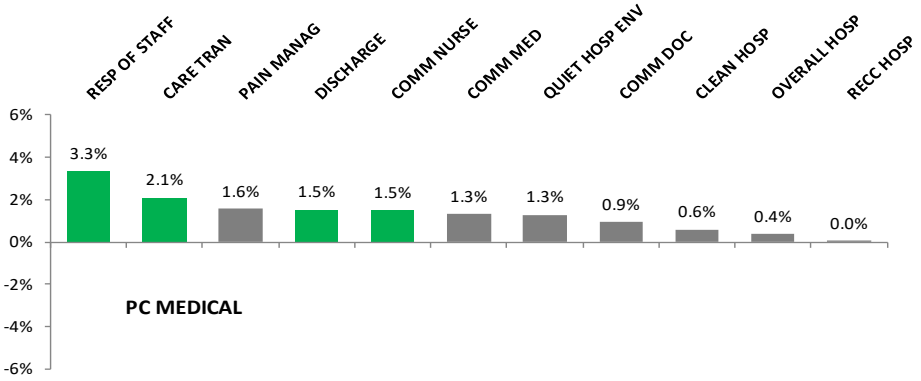
Note: Green bars indicate a significant increase in score, red bars indicate a significant decrease in score, and grey bars indicate no change in score.

Figure 36. Difference in Scores for West Region HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

4.6.3.2 Product Line

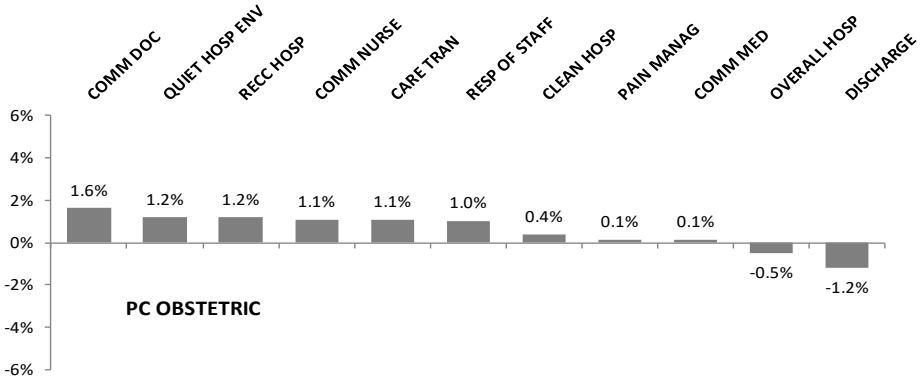
Figure 37 through Figure 39 break down PC changes in measures from Y2015 to Y2016 by product line.

Scores from PC users across product lines either improved or remained stable, with the most significant improvements found among Medical care and Surgical care users. Medical care user scores improved for Responsiveness of Hospital Staff, Care Transition, Discharge Planning, and Communication with Nurses. Surgical care user scores improved on four measures as well, including Communication about Medicines, Responsiveness of Hospital Staff, Communication with Nurses, and Discharge Planning. Obstetric care user scores remained stable with no significant changes from Y2015 to Y2016.



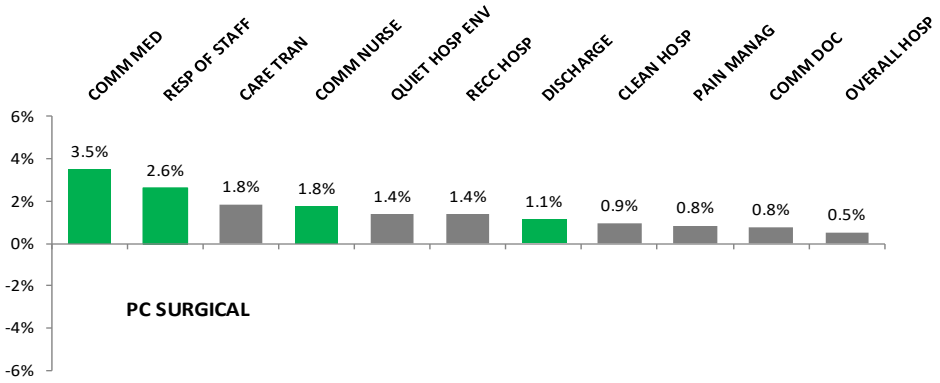
Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 37. Difference in Scores for PC Medical HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Grey bars indicate no change in score.

Figure 38. Difference in Scores for PC Obstetric HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).



Note: Green bars indicate a significant increase in score, and grey bars indicate no change in score.

Figure 39. Difference in Scores for PC Surgical HCAHPS between Y2015 (Q1 and Q2 aggregated) and Y2016 (Y2015 Q3 through Y2016 Q2 aggregated).

5 METHODOLOGY

The goal of the TRISS study is to understand the inpatient satisfaction experience among the 9.4 million TRICARE users in both DC and PC settings. To do so, a census of users who were recently discharged after an overnight admission or longer from a worldwide MTF (i.e., DC) are surveyed. In addition, a representative sample is selected for civilian hospitals receiving sufficient numbers of TRICARE users (i.e., PC). Users included in this study are ADFMs who are 18 years of age and older, retirees and their family members, and all 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 their discharge date. The admission need not be 24 hours in length. Patients must be 18 years of age or older at time of admission, have a non-psychiatric Medical Severity Diagnosis-Related Group (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. See Table 17 for all eligible MS-DRG codes.

The TRISS study methodology follows the HCAHPS protocols set out by CMS. The complete details of the HCAHPS protocol can be found in the *HCAHPS Quality Assurance Guidelines* Version 11.0 (http://www.hcahpsonline.org/Files/QAG_V11.0_2016.pdf).

Adherence to HCAHPS protocols ensures comparability of TRISS and civilian hospital experience results throughout the United States. The protocols include definitions of user eligibility criteria, sampling rules, field procedures, data processing, and reporting. This section of the report provides details of the methodology and procedures used in the TRISS study in the third and fourth quarters of Y2015 and the first and second quarters of Y2016 for both DC and PC.

5.1 Sample Frame

The sample consists of all TRICARE users who recently received inpatient care from an MTF or a TRICARE civilian network hospital. The next sections outline the specific sampling parameters.

5.1.1 TRISS Sample Requirements

5.1.1.1 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 DC, the vendor conducts a census of all eligible inpatient discharges and mails surveys to a maximum of 140,000 users (130,000 within the continental United States [CONUS] and 10,000 outside of the continental United States [OCONUS]) across 54 facilities (40 CONUS and 14 OCONUS) per year.

This section reports on sampling procedures for time periods Y2015 and Y2016. Y2015 covers responses from 33,963 users who visited MTFs or a PC network facility between October 1, 2014, and March 31, 2015. Y2016 covers responses from 83,276 users who visited MTFs or a PC network facility between April 1, 2015, and March 31, 2016.

Two facilities included in the Y2015 Annual Report are no longer sampled or only sampled for part of the reporting period for the Y2016 Annual Report because they no longer accept inpatients. These two facilities are Fort Jackson and Shaw Air Force Base.

For the PC sample, surveys are mailed to up to 47,000 users 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 users.

The sampling rate is a function of the requirement to collect 300 completed cases per 12-month period and of the expected response rate. The PC sample was generated from select civilian hospitals on a monthly basis. Civilian hospitals were selected for sampling based on historical claims data to determine whether they have enough discharges to collect 300 completed cases per 12 months. Hospitals with too few inpatient discharges to generate the full 300 completed cases may still comply with the protocol by conducting a census of all eligible inpatients. The sample plan was reviewed each quarter and adjusted to account for variations in the estimated response rate.

5.1.1.2 Eligibility

TRISS user eligibility requirements are identical for the DC and PC samples. The sample frame consists of TRICARE users discharged from an overnight stay (as defined previously). The population includes military personnel, retirees, and their beneficiaries. The target population includes AD service members; ADFMs; survivors of deceased ADMFs; active National Guard and Reserve members; family members of active National Guard and Reserve members; retired service members; family members of retired service members; and others who use military healthcare.

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 years of age or older at the time of admission.
- Patients must have at least one overnight stay in the hospital.
- Patients must have a non-psychiatric principal diagnosis.
- Patients must have a diagnosis defined by HCAHPS DRGs[1] V33, which include the following:
    - Obstetric Product Line.
    - Medical Product Line.
    - Surgical Product Line.
    - Missing.

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

- Patients must be 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 are to be included in the HCAHPS sample frame. However, several categories of otherwise eligible patients are excluded from the sample frame. These include the following:

- "No Publicity" (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 excluded because of State regulations.
- Patients discharged to nursing homes and skilled nursing facilities.

To reduce respondent burden, HCAHPS guidelines require monthly de-duplication of 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 Number [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 used for de-duplicating sample received at the end of the month is to include only the last discharge date of the month in the sample frame.

When the vendor receives the initial population file, the DRG code may be missing, but it is added to the frame in a future refresh.

Table 17 has product line and eligibility assignments according to HCAHPS protocol (available at http://www.hcahpsonline.org/Files/MS-DRG_V.33.pdf). As can be seen from the table, a record with a missing DRG may be eligible for the survey, but the DRG code must be updated when available. The vendor 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 17. Assignment of Diagnosis-related Groups for TRISS Product Line Designations.

MS-DRG Code	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, 215–236, 239–274, 326–358, 405–425, 453–483, 485–489, 492–520, 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

*Codes 216–236, 239–264, 264–274, 454–483, 485–489, 492–516, and 518–520 are new to this reporting time period.

Table 18 provides the target sample sizes for Y2015 Q3 and Q4 and Y2016 Q1 and Q2, the initial cases provided, the number of eligible cases, and the number selected and sent questionnaires for the DC and PC populations. Appendix G has further details on DC eligibility rates by facility, and Appendix H has the details for PC.

Table 18. Eligible TRISS Cases in Y2015 Q3 and Q4 and Y2016 Q1 and Q2.

Population	Target Sample Size	Number of Records Received	Number of Eligible Cases	Number of Sampled Cases
DC Total	140,000	154,081	148,084	148,084
PC Total	47,000	119,695	71,855	60,918
DC and PC Total	187,000	273,776	219,939	209,002

5.1.1.3 DC Sampling Plan

Appendix A has the Y2016 DC sampling plan. It requires a 100% selection (a census sample) of all eligible discharged patients from participating MTFs. These discharges occurred at 54 MTFs both in 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 Y2015 Q3 and Q4 and Y2016 Q1 and Q2 as well as the response rates for each facility.

5.1.1.4 PC Sampling Plan

Appendix B has the PC sampling plan for Y2015 Q3 and Q4 and Y2016 Q1 and Q2. The plan shows the number of eligible discharges sampled, the number returned, the response rate, and the ineligible rate from that mail out (returned undeliverable, ineligible diagnosis type, deceased or incapacitated, etc.).

The PC survey program targets civilian hospitals with high volumes of care for TRICARE users. A large number of civilian hospitals provide care to MHS users, though most PC hospitals see only a few MHS patients. Each year, the list of PC facilities and their TRICARE patient discharge volumes are reviewed by representatives of the TRICARE regions. No changes were requested between Y2015 and Y2016. Appendix B lists the 73 facilities with the highest level of MHS beneficiary utilization based on 2013 and 2014 statistics. After DHA review, these facilities were included in the Y2015 and Y2016 TRISS sampling plan.

For each PC hospital, monthly random samples were selected from eligible monthly discharges using the rate of sampling, *f*, of the following form:

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

In the formula, *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 Y2015 Q3 and Q4 and Y2016 Q1 and Q2 as well as response rates for each facility.

5.1.2 Population Databases and Data Extraction

Figure 40 outlines the sample frame development process. The source of the TRISS sample frame is the DoD Defense Enrollment Eligibility Reporting System (DEERS). DEERS compiles DC inpatient admissions and discharges from the Composite Health Care System (CHCS) database. It also compiles PC (civilian) inpatient admissions and discharges from the MDR TRICARE Encounter Data (TED) database, which consists of claims data from civilian hospitals for services rendered on behalf of TRICARE users.

[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.

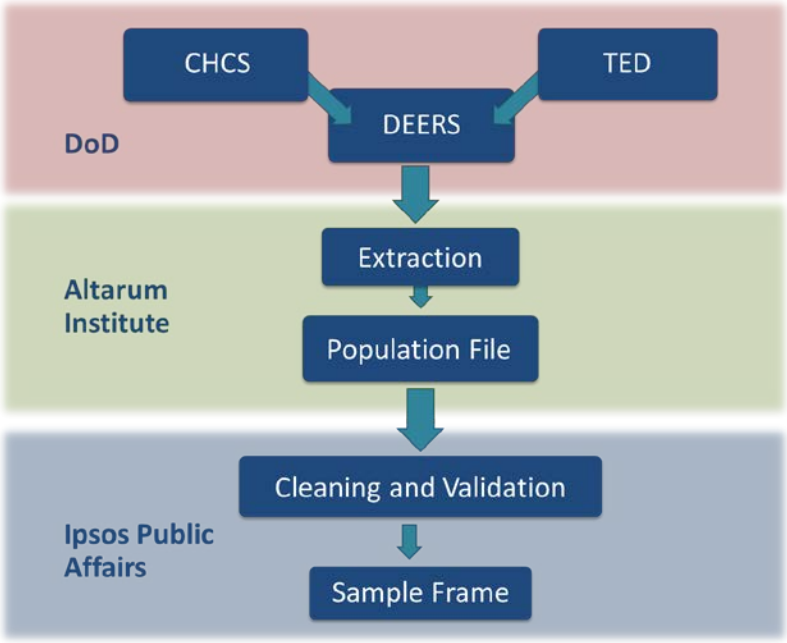


Figure 40. Procedural Flow for Sample Frame Development.

On a separate data extraction contract with DHA, a vendor extracts DEERS records for all DHA survey efforts. Twice monthly, the data extraction vendor provides the survey vendor 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 the data extraction vendor to the survey vendor using a secure FTP site 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.
- 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 be 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 19 shows the field cycles with population sample delivery dates, end of field dates, and dates that survey results are available on the TRISS reporting website (https://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 sample build process. DC results in this report are based on discharge dates from April 1, 2015, through March 31, 2016. The DC field period, following HCAHPS protocols, ended on June 2, 2016. PC results are based on discharge dates from January 1, 2015, through December 31, 2015. The PC field period ended on March 31, 2016.

Table 19 shows that the TRISS project for Y2015 Q3 and Q4 and Y2016 Q1 and Q2 followed a twice-monthly survey administration schedule. The files include all available discharges in the period since the previous population file creation. Once the population files were received by the vendor, 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 for each facility are completed each year. The samples were formatted per HCAHPS rules and sent to the vendor operations for National Change of Address 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 processing the surveys are as follows:

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

Table 19. Y2015 Q3 and Q4 and Y2016 Q1 and Q2 Twice-monthly Field Cycles Population Frame, Field Period, and Web Reporting Upload Schedules.

Field Cycle	DC Quarter	DC Discharge Date	PC Quarter	PC Discharge Date	Sample Delivered to Ipsos	Field End	DC Data Available	PC Data Available
1508	Y2015 Q3	04/01/15–04/10/15	Y2015 Q3	04/01/15–04/05/15	04/16/15	06/04/15	09/25/15	10/23/15
1509	Y2015 Q3	04/01/15–04/30/15	Y2015 Q3	04/01/15–04/27/15	05/07/15	06/25/15	09/25/15	10/23/15
1510	Y2015 Q3	05/01/15–05/14/15	Y2015 Q3	04/01/15–05/14/15	05/21/15	06/09/15	09/25/15	10/23/15
1511	Y2015 Q3	05/15/15–05/29/15	Y2015 Q3	04/16/15–05/25/15	06/04/15	07/23/15	09/25/15	10/23/15
1512	Y2015 Q3	05/29/15–06/11/15	Y2015 Q3	05/01/15–06/07/15	06/18/15	08/06/15	09/25/15	10/23/15
1513	Y2015 Q3	06/12/15–06/30/15	Y2015 Q3	05/16/15–06/26/15	07/09/15	08/27/15	09/25/15	10/23/15
1514	Y2015 Q4	07/01/15–07/16/15	Y2015 Q3/Q4	06/01/15–07/13/15	07/23/15	09/10/15	12/23/15	01/22/16
1515	Y2015 Q4	07/17/15–07/30/15	Y2015 Q3/Q4	06/16/15–07/26/15	08/06/15	09/24/15	12/23/15	01/22/16
1516	Y2015 Q4	07/31/15–08/13/15	Y2015 Q4	07/01/15–08/10/15	08/20/15	10/08/15	12/23/15	01/22/16
1517	Y2015 Q4	08/14/15–08/31/15	Y2015 Q4	07/16/15–08/30/15	09/10/15	10/29/15	12/23/15	01/22/16
1518	Y2015 Q4	09/01/15–09/15/15	Y2015 Q4	08/01/15–09/14/15	09/24/15	11/12/15	12/23/15	01/22/16
1519	Y2015 Q4	09/16/15–09/30/15	Y2015 Q4	08/16/15–09/29/15	10/08/15	11/26/15	12/23/15	01/22/16
1520	Y2016 Q1	10/01/15–10/15/15	Y2015 Q4	09/01/15–09/30/15	10/22/15	12/10/15	04/06/16	01/22/16
1521	Y2016 Q1	10/16/15–10/29/15	Y2015 Q4/ Y2016 Q1	09/16/15–10/19/15	11/05/15	12/24/15	04/06/16	05/04/16
1522	Y2016 Q1	10/30/15–11/12/15	Y2016 Q1	10/01/15–11/08/15	11/19/15	01/08/16	04/06/16	05/04/16
1523	Y2016 Q1	11/13/15–11/30/15	Y2016 Q1		12/03/15	01/21/16	04/06/16	05/04/16
1524	Y2016 Q1	12/01/15–12/15/15	Y2016 Q1	10/16/15–12/12/15	12/17/15	02/03/16	04/06/16	05/04/16
1601	Y2016 Q1	12/16/15–12/31/15	Y2016 Q1/Q2	11/16/15–01/03/16	01/14/16	03/04/16	04/06/16	05/04/16
1602	Y2016 Q2	01/01/16–01/15/16	Y2016 Q1/Q2	12/01/15–01/18/16	01/28/16	03/17/16	07/06/16	08/03/16
1603	Y2016 Q2	01/16/16–01/31/16	Y2016 Q1/Q2	12/16/15–02/01/16	02/11/16	04/01/16	07/06/16	08/03/16
1604	Y2016 Q2	02/01/16–02/15/16	Y2016 Q2	01/01/16–02/14/16	02/25/16	04/14/16	07/06/16	08/03/16
1605	Y2016 Q2	02/16/16–02/29/16	Y2016 Q2	01/16/16–02/29/16	03/10/16	04/28/16	07/06/16	08/03/16
1606	Y2016 Q2	03/01/16–03/15/16	Y2016 Q2	02/01/16–03/14/16	03/24/16	05/12/16	07/06/16	08/03/16
1607	Y2016 Q2	03/16/16–03/31/16	Y2016 Q2	02/16/16–03/31/16	04/14/16	06/02/16	07/06/16	08/03/16
1608			Y2016 Q2	03/01/16–03/31/16	04/28/16	06/16/16		08/03/16
1609			Y2016 Q2	03/16/16–03/31/16	05/12/16	06/30/16		08/03/16

Twice per month, the survey vendor receives a population database of DC patient discharges from the data extraction vendor. These are all inpatient discharges from MTFs recorded in the DEERS system since the last data transfer. DC records must meet all of the criteria described previously, 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 DC sample frame, and it includes CONUS, OCONUS, MTFs, and patients with non-U.S. home addresses.

For the DC sample frame, the Government uses the TRICARE Operations Center to produce twice-monthly DC inpatient admission files derived from the CHCS. These CHCS data form the basis of the DC sampling frame and support the requirement for initiating field data collection within 42 days of date of discharge.

The twice-monthly CHCS extracts reflect all discharges for the 6 weeks prior to harvest and contain a minimum set of data elements for identifying discharges and applying *HCAHPS Quality Assurance Guidelines* inclusion/exclusion criteria. Remaining data elements, such as patient demographics and contact information, are retrieved from DEERS data. The Government then provides the extract sample file of all DC inpatients twice a month as of the reference date for the month. The reference date used is as close as possible to the file extraction date. To the extent possible, the Government removes duplicate beneficiaries from the sampling frame.

5.1.2.1 PC Sample Frame

The population file with PC hospital discharges is also provided to the survey vendor twice a month by the data extraction vendor. The basis of the discharge information is from the MDR TED, which 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 PC survey is not subject to the HCAHPS requirement of a 42-day maximum lag between discharge and survey completion.

For the PC sample frame, PC inpatient discharge records resulting from claims may take months to be submitted and processed and therefore will not meet the targeted 42-day survey completion requirement. The main data source for PC admissions is the TED. Similar to the DC frame process, the discharge record is used to provide only the most fundamental data elements—patient ID, care dates, provider ID, and descriptors for categorizing care into product line and applying exclusions. Remaining data elements, such as patient demographics and contact information, are retrieved from the DEERS data available in the MDR. The Government provides an electronic sample member file of the population of all inpatients, contact information, and all necessary inpatient attributes by accessing various DHA databases. The data files are based on the most recent inpatient information. Claims data, Standard Inpatient Data Record (for DC), TED (for PC), and demographic information are extracted and merged into one file by the Government. The unit of analysis for this sampling is unique individuals. The resulting file includes inpatient contact data (including patient name and address). These data constitute the sampling frame.

The PC frame covers discharges from the 15th of the previous month (prior to sampling) back to the 16th of the month before (i.e., 2 months prior to sampling). The data sources are collected from DHA electronic transmissions for DC or claims for PC services. The survey operations include a PC component at every other field cycle due to the once-per-month update schedule of the source TED data. The survey cycle occurring latest in the month includes the PC component due to the update schedule of TED data.

5.1.3 Preparation of the Sample for Mail/Phone Administration

After sample receipt, the vendor selects the sample based on HCAHPS rules and then creates mail and telephone files. Each record is appended with a unique respondent ID number, which indicates PC/DC and the wave. Only data needed by the specific operations team are 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 the mail field period has ended, 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.

5.2 Data Collection Protocols

The TRISS project follows HCAHPS protocols except where explicitly indicated (e.g., in the period between discharge and survey mailing for PC). Full details of quality assurances, survey completion rules, data security measures, and other procedural details can be found in the 2016 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 included in Appendix D. Completed mail surveys are delivered daily to the vendor's Returns Processing Department, 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 as 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" is created of every page of the questionnaire. The image is cleaned instantaneously, and pixilation is determined 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 Fast Accurate Capture Technology Solutions.

Any white mail (i.e., 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.

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

A total of five attempts is made to reach users by phone, with calls staggered over the course of 3 weeks 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 these users.

5.2.1 Data Processing

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

Individual records in the user response dataset must be "scored" to determine their final survey status codes. When the user 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 user 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 include questions 1–10, 12, 15, 18, and 21–25.

Once the data collection field period is closed and the final user 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.
- Synovate Offline Labels and Return System (SOLARS) undeliverables.
- Scored user response dataset.
- Deceased dataset removals kept for dispositioning.

Once each file 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 user 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 user without a disposition

is assigned a disposition of "8 – Non-response after maximum attempts." The *HCAHPS Quality Assurance Guidelines* rules are strictly followed for all de-duplication and dispositioning.

Several items in the HCAHPS Survey can and should be skipped by certain users. These gate questions form skip patterns. Four questions in the HCAHPS Survey serve as screener questions (questions 10, 12, 15, and 18) that determine whether the associated dependent questions require an answer. The following decision rules are provided to assist coding user responses to skip pattern questions:

Gate questions: Questions 10, 12, 15, and 18: If the gate question is left blank, then code the gate question as "M – Missing/Don't Know."

Dependent questions: Questions 11, 13, 14, 16, and 17.

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

Gate question: Question 18.

Dependent questions: Questions 19 and 20.

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

For all other HCAHPS questions (questions 1–9, 21–22, and 49–53): If the question is left blank, then code as "M – Missing/Don't Know."

5.3 Analytic Methodology

5.3.1 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 Hospital Rating.

5.3.1.1 Overall Response Rates

Response rates for DC and PC are reported in Appendix G and Appendix H, respectively. DC response rates are broken out by service branch, facility, and CONUS/OCONUS affiliation. PC response rates are broken out by region and facility.

The overall Y2016 response rate for DC was 41% and 46% for PC.[3]

5.3.1.2 DC

Table 20 reports response distributions for the key weighting variables (the Population column shows demographic distributions for the universe of users eligible to take TRISS, while the Sample column shows demographic distributions for the users who responded to the survey). Older users are more likely to respond than younger users. This is seen in both the age and beneficiary category variables. All results are statistically significant due to the very large sample sizes. These results show that the sample is overrepresented by older users.

Table 20 also shows the unweighted and weighted overall rating scores for each of the subgroups. Users 65 years of age and older have a much higher response rating than users less than 65 years of age. As a result, wherever other demographic groups are related to age, such as beneficiary category, marital status, and, to some degree, product line, unweighted results would bias the results due to over-representation of older users in the sample. The weighting plan corrects for this over-representation, thus removing the bias from the higher proportion of older users.

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

Table 20. DC Response Distributions for Key Demographic Variables.

Weighting Variables		Distribution (Percent)		Overall Rating (Percent)	
		Population	Sample	Unweighted	Weighted
Gender	Male	34.5	35.9	78.2	75.3
	Female	65.5*	64.1	68.2	65.7
Age	18–24	19.3	20.8	61.1	60.9
	25–34	27.8	27.9	57.9	58.0
	35–44	12.1	12.1	62.2	61.9
	45–64	20.7	20.0	78.4	78.1
	Under 65 (total)	79.9	80.8	66.4	64.7
	65+*	20.1*	19.2	85.1	85.0
Marital status	Divorced/widowed	9.1	8.9	78.9	76.8
	Married	80.2	79.1	72.0	69.1
	Single	10.3	11.6	62.1	61.8
	Unspecified	0.4*	0.4	79.0	77.6
Product Line	Medical	40.8	39.4	75.6	72.6
	Obstetrics/Gynecology	29.3	28.3	59.6	59.4
	Surgical	23.3*	22.8	77.1	74.8
Beneficiary category	AD	24.5	27.2	59.6	59.7
	ADFM	32.5	31.4	60.3	60.3
	Retirees under 65	23.1	22.4	77.5	77.4
	Retirees 65+	20.0*	19.1	85.1	85.0
MRF Service Branch	Army	51.7	51.7	70.2	66.9
	Air Force	13.2	12.6	76.8	74.4
	Navy	25.5	26.1	69.9	67.4
	NCR	9.7*	9.6	78.9	77.2

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

5.3.2 Measures and Scoring

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

HCAHPS measures consist of two global items, seven composite measures, and two individual items, as shown in Table 21. 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 nurses' courtesy and respect, nurses listening carefully, and 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 (these measures are not composites).

In addition to the HCAHPS measures, the TRISS instrument includes items added by the DoD to address areas of interest among the military community. Table 21 shows these items under the heading, "Supplemental DoD Questions."

Table 21. TRISS Measures, Including HCAHPS and DoD Questions.

Global Items
Q21: Overall Hospital Rating
Q22: Recommend the Hospital
Composite Measures
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?
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?
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?
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?
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?
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?
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.
Supplemental DoD Questions
Staff Introduced Self
Q26: During this hospital stay, when doctors, nurses, or other hospital staff first came to your room, how often did they introduce themselves?
Communication among Staff
Q27: During this hospital stay, how often did you feel there was good communication between team members about your health needs?
Family Member Stayed

Q28: Did staff allow family members or someone close to you to be with you when you wanted them there?
Hospital Room Privacy*
Q29: Which best describes your hospital room?
Product Line*
Q30: For this stay, were you admitted to the hospital for childbirth (including C-section), a surgical procedure or operation, or another medical condition or illness.
Obstetrics Repeat Care
Q31: If you were just beginning your pregnancy, and you had a choice, would you use the same hospital for your OB care?
Education on Breastfeeding
Q32: Were you offered education or support about breastfeeding while in the hospital?
Staff Washed Hands
Q33: How often did your staff wash or sanitize their hands before touching you?
Staff Check Identification
Q34: How often did staff ask your name, check your ID band, or confirm who you were before giving you any medications, treatments, or tests?
Overall Nursing Care Rating
Q35: Using any number from 0 to 10, where 0 is the worst nursing care possible and 10 is the best nursing care possible, what number would you use to rate the care you received during your stay?

*Q29, Hospital Room Privacy, is not included in the current analysis because the question is a categorical (i.e., question responses consist of three room types as opposed to the scaled ratings used in other questions). Q30, Product Line, is not included in the current analysis because the question is used to identify obstetric users to ask Q31 and Q32.

5.3.2.1 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 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

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

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:

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

Where:

$$n^* = n/(1 + CV^2(\omega))$$

f is the correction factor for the finite population.

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

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

And

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

5.3.2.2 Composite Estimation

The composite is determined by calculating the mean top box score within a facility for each question and then summing 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 22 provides an example of how the composite score is calculated for the Nursing Communications composite among six respondents. The example does not use weighted data and thus follows the equations above as if w_i is always 1.

Table 22. 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.

5.3.2.3 HCAHPS Star Ratings Estimation

CMS created the HCAHPS Star Ratings system to enable consumers to more easily interpret and compare hospital patient experience information. HCAHPS Star Ratings are calculated using the same data as the HCAHPS measures. A total of 12 HCAHPS Star Ratings are reported: 11 for each of the HCAHPS measures and 1 overall "HCAHPS Summary Star Rating." A five-star scale is calculated for each hospital, where more stars indicate better quality of care. The TRISS reporting website began reporting the HCAHPS Summary Star Rating in July 2015.

HCAHPS Star Ratings are not published for facilities with less than 100 completed responses over a four-quarter reporting period. This criterion is different from the criterion to report results of the TRISS measures where 30 is the minimum number of responses over 4 quarters for TRISS scores. The 100-response criterion is mandated by CMS. Therefore, a hospital may have sufficient responses to report TRISS measures, but not enough to report the facility's HCAHPS Star Rating.

HCAHPS Star Ratings are calculated from the 11 HCAHPS measures. HCAHPS Star Ratings are calculated in the following four steps:

1. **Construct HCAHPS linear mean scores**: Each question is converted to a linear scale from 0 to 100. Negative survey responses such as "never," "no, "definitely no," "strongly disagree," and "overall rating 0" receive a 0 on the linear scale. The most positive responses receive 100 points on the scale, including "always," "yes," "definitely yes," "strongly agree," and "overall rating 10." Depending on the number of responses for a question, the scale is divided into equal units. For example, responses on a scale of "never," "sometimes," "usually," and "always" would score 0, 33.3, 66.6, and 100, respectively.
2. **Adjust HCAHPS linear mean scores**: The linear scores are adjusted for patient mix and survey mode. As with TRISS scores, the mix of patients and mode of survey administration is used to level scores between hospitals based on patient

characteristics and survey mode. Finally, four-quarter linear score averages are rounded to integers.

3. **Convert linear mean scores to HCAHPS Star Ratings**: CMS provides a conversion algorithm that takes a question linear score and maps onto the number of stars. The algorithm was created by CMS such that groups of hospitals receiving scores within the same groups are as similar as possible and those within different clusters are as different as possible. The cut off points vary based on each measure.
4. **Calculate the HCAHPS Summary Star Rating**: The HCAHPS Summary Star Rating is the average of the Star Ratings for the seven HCAHPS composite measures, the Overall Hospital Rating, the Recommend the Hospital measure, and a combined rating for Cleanliness of the Hospital Environment and Quietness of the Hospital Environment. The final averages are rounded to full star ratings.

5.3.3 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.

5.3.3.1 Variance Estimation

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

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

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

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

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

5.3.3.2 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.

5.3.3.2.1 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:

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

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

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

5.3.3.2.2 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. The vendor 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.

5.3.3.2.3 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 23 provides estimates for standard error

for $C_2 = \sqrt{Var(C_2)}$. These are based on the published benchmark scores from July 2014 through June 2015.

Table 23. Estimated Standard Errors for HCAHPS Benchmarks.

Benchmark Report	Comm with Nurses	Comm with Doctors	Responsiveness of Hospital Staff	Pain Management	Comm about Medicines	Cleanliness of Hospital Environment
2014–2015	0.89	0.63	0.12	0.45	1.25	0.75
Quietness of Hospital Environment	Discharge Information	Care Transition	Overall Hospital Rating	Recommend the Hospital	Number of Hospitals	Response Rate
1.14	1.17	0.41	1.06	0.45	4182	30%

5.3.4 Sample Weighting

This section describes the statistical weighting approach applied to TRISS data. Statistical weights are used to:

1. **Adjust data in the case of unbalanced representation due to the sample design.** The sampling plan for the PC sample randomly selects a sample from each facility to achieve 300 completed surveys regardless of facility size. Each facility has its own probability of selection. The DC sampling plans selects 100% of all eligible patients, so each patient has a probability of selection of one.
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 DC CONUS, DC OCONUS, or PC), 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 weights sum to a designated amount. DC CONUS and OCONUS were separated 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 24 for DC and Table 25 for PC.

Table 24. DC Population Targets for Y2015 Q3 and Q4 and Y2016 Q1 and Q2.

Weighting Variables		Targets								Totals	
		Q3 Y2015		Q4 Y2015		Q1 Y2016		Q2 Y2016			
		N	%	*N*	%	*N*	%	*N*	%	*N*	%
Age	Under 65	29,127	79.39	29,110	80.99	27,282	80.38	27,322	78.86	112,841	79.91
	65+	7,560	20.61	6,831	19.01	6,660	19.62	7,326	21.14	28,377	20.09
Marital status	Divorced/widowed	3,298	8.99	3,104	8.64	3,168	9.33	3,237	9.34	12,807	9.07
	Single	3,693	10.07	3,924	10.92	27,194	80.12	3,459	9.98	14,523	10.28
	Married	29,539	80.52	28,752	80.00	3,447	10.16	27,827	80.31	113,312	80.24
	Unspecified	157	0.43	161	0.45	133	0.39	125	0.36	576	0.41
Beneficiary category	AD	8,980	24.48	8,969	24.95	8,251	24.31	8,336	24.06	34,536	24.46
	ADFM	11,806	32.18	12,008	33.41	11,168	32.90	10,950	31.60	45,932	32.53
	Retirees under 65	8,388	22.86	8,171	22.73	7,910	23.30	8,084	23.33	32,553	23.05
	Retirees 65+	7,513	20.48	6,793	18.90	6,613	19.48	7,278	21.01	28,197	19.97
MRF Service Branch	Army	19,228	52.41	18,464	51.37	17,452	51.42	17,809	51.40	72,953	51.66
	Air Force	4,808	13.11	4,733	13.17	4,353	12.82	4,701	13.57	18,595	13.17
	Navy	9,259	25.24	9,324	25.94	8,731	25.71	8,722	25.17	36,036	25.52
	NCR	3,392	9.25	3,420	9.52	3,406	10.03	3,416	9.86	13,634	9.65

Table 25. PC Population Targets for Y2015 Q3 and Q4 and Y2016 Q1 and Q2.

Weighting Variables		Targets								Totals	
		Q3 Y2015		Q4 Y2015		Q1 Y2016		Q2 Y2016			
		N	%	*N*	%	*N*	%	*N*	%	*N*	%
Age	Under 65	10,370	53.82	10,928	57.40	7,651	48.60	9,220	51.04	38,169	52.93
	65+	8,897	46.18	8,109	42.60	8,092	51.40	8,843	48.96	33,942	47.07
Marital status	Divorced/widowed	3,086	16.02	2,911	15.29	2,656	16.87	2,963	16.40	11,616	16.11
	Single	637	3.31	651	3.42	463	2.94	578	3.20	2,329	3.23
	Married	15,449	80.18	15,404	80.92	12,551	79.72	14,440	79.94	57,844	80.22
	Unspecified	95	0.49	71	0.37	74	0.47	82	0.45	322	0.45
Beneficiary category	AD	1,046	5.43	1,142	6.00	807	5.13	941	5.21	3,936	5.46
	ADFM	4,017	20.85	4,353	22.87	3,000	19.05	3,386	18.75	14,756	20.46
	Retirees under 65	5,309	27.55	5,433	28.54	3,847	24.43	4,895	27.10	19,484	27.02
	Retirees 65+	8,895	46.17	8,109	42.60	8,090	51.38	8,841	48.95	33,935	47.06
Region	North	4,806	24.94	5,000	26.26	4,336	27.54	4,595	25.44	18,737	25.98
	South	10,382	53.88	10,017	52.62	8,125	51.61	9,388	51.97	37,912	52.57
	West	4,079	21.17	4,020	21.12	3,283	20.85	4,080	22.59	15,462	21.44

5.3.5 PMM Adjustment

Not every hospital has the same mix of patients. 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 (Elliot et al., 2009). CMS created adjustment 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 survey response rate.[4]

The HCAHPS Patient-Mix and Mode Adjustment algorithm first adjusts results by patient mix and then adjusts for survey administration mode. HCAHPS adjustments for survey mode are generally larger than adjustments for patient-mix.[5]

5.3.5.1 PMM Adjustment Model

The PMM Adjustment model adjusts "top-box" and "bottom-box" results 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 three four-point scale questions.
- **Responsiveness of Hospital Staff**: Composite of two 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 four-point scale question.
- **Quietness of Hospital Environment**: Individual four-point scale question.
- **Discharge Information**: Composite of two 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 three four-point scale questions.

The PMM Adjustment model is:

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

Where Y' is the PMM adjusted score for the CMS composite, $\widehat{Y}$ is the unadjusted TRISS score for the composite, PMA is the hospital-specific patient-mix adjustment (PMA) 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 PMA for the hospital.
3. Addition of the TRISS score, the PMA, and the mode component.

[4]Mode and Patient-Mix Adjustment of the CAHPS® Hospital Survey (HCAHPS) April 30, 2008, http://www.hcahpsonline.org.
[5]Mode and Patient-Mix Adjustment of the CAHPS® Hospital Survey (HCAHPS) April 30, 2008, http://www.hcahpsonline.org.

5.3.5.2 PMA

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 is the adjustment regression coefficient supplied by CMS for each of 15 factors[6], h_j is the PMA category means for the hospital, and m_j is the CMS-supplied national PMA 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 (Q39; ordinal)**: Included in the model as the mean of the six-point scale 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 (Q37; 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 (TRISS is administered in English only):
    - Non-specific language (prior to October 2013 discharges).
    - Spanish (post-April 2016 discharges).
    - Chinese (post-April 2016 discharges).
    - Russian, Vietnamese, or Other (post-April 2016 discharges).

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

- **Age (eight 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; three 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 where 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 April 2016 adjustment parameter (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.
- Contact with the respondent must occur within 42 days of 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 26 provides the national means (m_j) reported by CMS for April 2016.

Table 26. PMA Means.

PMA	National Mean
Education (per level; 1 = 8th grade or less and 6 = More than 4-year college degree)	3.765
Self-rated health (per level; 1 = Excellent and 5 = Poor)	2.756
Response Percentile	14.3%
Non-English Primary Language	
Non-specific languages*	6.7%
Spanish**	4.8%
Chinese**	0.3%
Russian, Vietnamese, Other**	1.8%
English (REFERENCE)	93.1%
Age	
18–24	3.9%
25–34	10.9%
35–44	6.8%
45–54	10.2%
55–64	19.1%
65–74	24.0%
75–84	17.7%
85+ (REFERENCE)	7.4%
Service Line	
Maternity	13.3%
Surgical	35.6%
Medical (REFERENCE)	51.2%
Interactions	
Surgical line × Age1	1.904
Maternity line × Age1	0.28

*January 2013–September 2013 discharges.
**Post-January 2016.

5.3.5.3 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 and mixed and active IVR, as shown in Table 27. Mail-only is the reference group. The TRISS uses a mixed-mode protocol.

Table 27. HCAHPS Survey Mode Adjustments of Top Box and Bottom Box Percentages (after PMA) to Adjust Other Modes to a Reference of Mail.

HCAHPS Measures	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 Medicine	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%	-1.3%	-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%

5.3.5.4 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:

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

Values for 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.[7] $Var(PMA)$ is based on the variance of a mean value under a multiple regression model, where:

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

[7]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 $n_h^* = n_h/(1 + CV_h^2(\omega))$.

The expression for $Var(PMA)$ expands to be[8]:

$$Var(PMA) = Var\left(\sum_{j=1}^{15} a_j h_j\right) + Var\left(\sum_{j=1}^{15} a_j m_j\right)$$

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

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

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

The test statistic for the patient and mode adjusted TRISS estimate versus C_2 is:

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

The vendor 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.

[8]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.

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