HCQA Health Care Quality Assessment

Prevention Quality Indicators

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Prevention Quality Indicators

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Health Care Quality Assessment

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Executive Summary

The Office of Health Care Quality Assessment (HCQA) of the New Jersey Department of Health (Department) assesses health care quality using quantitative data reported mainly by hospitals to support performance monitoring related to patient care and safety. Specifically, HCQA produces consumer reports on cardiac surgery, hospital performance, hospital quality indicators; reviews confidential reports and root-cause analyses of reportable medical errors; and maintains several databases to support licensure requirements. To enrich the information the Department provides to the public on hospital care, HCQA staff routinely evaluate healthcare quality in the State by applying statistical tools developed by the Federal Agency for Healthcare Research and Quality (AHRQ) to the New Jersey hospital Discharge Data Collection System (NJDDCS) commonly known as UB data. This report, presents findings resulting from the application of a statistical tool known as the Prevention Quality Indicators (PQIs) module to the 2014 New Jersey inpatient hospital discharge data (or UB data). The module primarily calculates potentially preventable hospitalizations. Evidence has shown that early intervention to prevent complications and address exacerbations of ambulatory care-sensitive conditions, such as diabetes, chronic obstructive pulmonary disease (COPD), asthma, and congestive heart failure, through good primary care may prevent the need for hospitalization.

PQIs are a set of measures derived from UB data to identify ambulatory care sensitive conditions (ACSCs) or conditions for which hospitalization could be prevented with good outpatient care or for which early intervention could prevent complications or more severe diseases. PQIs measure outcomes of preventive care for both acute illnesses and chronic conditions, reflecting two important components of the quality of preventive care - effectiveness and timeliness. In short, the indicators identify hospital admissions in geographic areas that research suggests may have been avoided through access to high-quality outpatient care. PQIs are valuable tools that help flag potential health care quality problem areas that need further investigation.

The purpose of this report is to provide hospitals, community leaders, and policy makers with information that would help them identify community-level health care needs to target resources and track the impact of programmatic and policy interventions. The PQIs module facilitates such an effort, and has already been applied at the national level, in the National Healthcare Quality Report and the National Healthcare Disparities Report.

This report presents volume of preventable hospitalizations derived from the 2014 UB data in each of the 21 counties. Observed, expected and risk-adjusted rates along with their 95% confidence intervals for each of the 14 indicators and 3 composite indicators are also presented to help assess the quality of preventive health care in each county. Moreover, statewide and national estimates are provided for comparison purposes.

The 2014 PQI statistics show that there are substantial variations in hospitalizations rates by county. Some counties exhibit significantly higher hospitalization rates than others when compared to the statewide rates.

Some Highlights

- Based on AHRQ's specifications of a 'preventable hospitalization', there were about 106,000 potentially preventable hospitalizations for treatment of medical conditions in NJ Hospitals, in 2014.

- Hospitalization cost estimates derived from application of the HCUP cost-to-charge ratio (CCR) estimators indicate that potentially avoidable hospitalizations on these conditions would have saved approximately 1.3 billion dollars ($1, 259,590,375) in 2014 if the 106,000 hospitalizations were avoided through better health care management (Table 17).

- The 2014 New Jersey data show a substantial variation in preventable hospital admissions by county. The variations appear to markedly reflect the socio-economic disparities of the county populations, with more affluent counties having significantly lower rates than the statewide average, and the less affluent counties having significantly higher admission rates than the statewide rate (Figures 1 to 6).

- In 2014, there were 4,300 hospital admissions for diabetes with short-term complications in New Jersey for a statewide risk-adjusted rate of 63.5 per 100,000 adults of ages 18 and over. Hospital admission rates for diabetes with short-term complications in Atlantic, Camden, Cumberland, Essex, Mercer, and Salem were statistically significantly higher than the statewide average. By comparison, hospitalization rates for Bergen, Hudson, Hunterdon, Middlesex, Morris, and Somerset were statistically significantly lower than the statewide average (Table 1).

- Statewide, there were 22,310 preventable hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) in 2014, for a risk-adjusted rate of 506.8 per 100,000 population aged 18 and over. Admission rates for COPD ranged from 247.3 per 100,000 in Hunterdon County to 1,048.8 per 100,000 in Cumberland County (Table 4).

- Statewide, there were 3,997 preventable hospital admissions for hypertension treatment in 2014, for a risk-adjusted rate of 55.7 per 100,000 population ages 18 or older. Rates of admission for hypertension ranged from 11.8 per 100,000 in Hunterdon County to 97.1 per 100,000 in Camden County and 97.9 per 100,000 in Mercer County (Table 5).

Statewide, there were 26,786 preventable Heart Failure (HF) hospital admissions for a risk-adjusted average rate of 370.9 per 100,000 adults ages 18 or older. Six counties (Atlantic, Camden, Cumberland, Essex, Hudson and Passaic) had significantly higher HF admission rates than the statewide rate. By comparison, nine counties (Bergen, Cape May, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Somerset, and Sussex) had rates that were significantly lower than the statewide HF admission rate (Table 6).

- Similar variations are observed on other PQIs among the 21 counties, which suggest that these indicators may be used as important baseline indicators to help examine determinants that led to variations in preventable hospital admissions.

- Compared to the national benchmark, New Jersey has lower hospitalization rates for only 3 of the 14 PQIs while the state’s rates are considerably higher than the national for diabetes with long-term complications, COPD, heart failure, and asthma in younger adults (Table 16).

Introduction

The Office of Health Care Quality Assessment (HCQA) of the New Jersey Department of Health (Department) assesses health care quality using quantitative data reported mainly by hospitals to support performance monitoring related to patient care and safety. Specifically, HCQA produces consumer reports on cardiac surgery, hospital performance, hospital quality indicators; reviews confidential reports and root-cause analyses of reportable medical errors; and maintains several databases to support licensure requirements. In an effort to enhance the information the Department provides to the public on hospital care, HCQA staff routinely apply statistical tools developed by the Federal Agency for Healthcare Research and Quality (AHRQ) to the New Jersey hospital discharge data commonly known as Uniform Billing (UB) data.

The AHRQ Quality Indicators (QIs) are a set of quality indicators organized into four modules, each of which measures quality associated, by and large, with patient care in an outpatient or inpatient setting. These four modules are: Prevention Quality Indicators (PQIs); Inpatient Quality Indicators (IQIs); Patient Safety Indicators (PSIs); and Pediatric Quality Indicators (PDIs). Background information on the development of these modules and the primary purpose they are designed to serve can be found at: http://www.qualityindicators.ahrq.gov/. The modules get updated with new and enhanced information regularly in order to improve the reliability of the quality indicators.

This report presents findings from the application of the Prevention Quality Indicator (PQI) module (Version 5.0) to the 2014 New Jersey UB data. The report is organized into sections. The description of the Prevention Quality Indicators Module, Interpretation of the PQI Measures including definitions of individual indicators presented in subsequent sections are, for the most part, excerpted from AHRQ's Guide and Software Documentation to Prevention Quality Indicators. These sources are provided in the reference section. The PQI report also serves as a supplement to the Department's other quality indicator reports such as the Inpatient Quality Indicators Report, Patient Safety Indicators Report, the Cardiac Surgery Report, and the Patient Safety Reporting System Summary Report.

The 2014 New Jersey data show that there are substantial variations in potentially preventable hospital admission rates by county. Some counties exhibit significantly higher rates (i.e., hospital admission rates) than the corresponding statewide rates while others have significantly lower rates.

The Prevention Quality Indicators (PQIs) Module

The Prevention Quality Indicators (PQIs) are a set of measures that can be used with hospital inpatient discharge data to identify "ambulatory care sensitive conditions" (ACSCs). ACSCs are conditions for which good outpatient-care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe diseases. The PQIs are of most interest to comprehensive health care delivery systems, such as health maintenance organizations (HMOs), or public health agencies.

Although other factors outside the direct control of the health care system, such as poor environmental conditions or lack of patient adherence to treatment recommendations can result in hospitalization, PQIs provide a good starting point for assessing quality of health services in the community. Because PQIs are calculated using readily available hospital administrative data, they provide an easy-to-use and inexpensive regional screening tool. They can be used to provide a window into the community - to identify unmet community healthcare needs, to monitor how well complications from a number of common conditions are being avoided in the outpatient setting, and to compare performance of local healthcare systems across communities.

These indicators measure outcomes of preventive care for both acute illnesses and chronic conditions, reflecting two important components of the quality of preventive care - effectiveness and timeliness. For example, with effective drug therapy in the outpatient setting, hospital admissions for hypertension can be prevented. Likewise, accurate diagnosis and timely access to surgical treatment will help reduce the incidence of a perforated appendix. Thus, the PQI module, which focuses on preventive care services, represents the current state of the art in assessing quality of health services in local communities using inpatient discharge data. It is a valuable tool for identifying potential health care quality problems in outpatient care so that they get timely attention for a more in-depth investigation.

PQIs are used to assess the quality of a health care system as a whole, and especially the quality of ambulatory care, in preventing medical complications. That is why these measures are of greater value when reported at the population level. Such information is valuable for public health groups, state data organizations, and others concerned with community-wide health problems. In particular, policy makers and health care providers can use PQIs to answer questions such as: Does the admission rate for diabetes complications in my community suggest a problem in the provision of appropriate outpatient care to this population? How does the admission rate for heart failure vary over time and from one county to another?

Both researchers and policy makers agree that UB data offer useful information on the quality of preventive care in the community. The goal is for hospitals, community leaders, and policy makers to use such readily available data to identify community-level health care needs, target resources, and track the impact of programmatic and policy interventions. The PQI module is intended to facilitate such an effort, and has already been applied, at the national level, in the National Healthcare Quality Report and National Healthcare Disparities Report.

The PQIs consist of the following 14 indicators that measure hospital admissions for ambulatory care sensitive conditions (ACSC) across geographic areas. AHRQ developed these indicators after a comprehensive literature review, analysis of the International Classification of Diseases, 9th Revision, Clinical Modification, (ICD-9-CM) codes, review by a clinician panel, implementation of risk adjustment, and empirical analyses.

- Diabetes Short-term Complications Admission Rate (PQI.01)
- Perforated Appendix Admission Rate (PQI.02)
- Diabetes Long-term Complications Admission Rate (PQI.03)
- Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults (PQI.05)
- Hypertension Admission Rate (PQI.07)
- Heart Failure (HF) Admission Rate (PQI.08)
- Low Birth Weight Rate (PQI.09)
- Dehydration Admission Rate (PQI.10)
- Bacterial Pneumonia Admission Rate (PQI.11)
- Urinary Tract Infection Admission Rate (PQI.12)
- Angina without Procedure Admission Rate (PQI.13)
- Uncontrolled Diabetes Admission Rate (PQI.14)
- Asthma in Younger Adults Admission Rate (PQI.15)
- Lower-extremity Amputation Among Patients with Diabetes Rate (PQI.16)
- Composite - Overall PQIs (PQI.90)
- Composite - Acute PQIs (PQI.91)
- Composite - Chronic PQIs (PQI.92)

The PQIs Software produces county-level volume of admissions, observed, expected, and risk-adjusted rates for each of the 14 indicators. This report presents the volume of hospital admissions in a county along with the observed, expected, and risk-adjusted rates generated by Version 5.0 of AHRQ's SAS-based Software program. Interpretations and guidelines on when to use the observed, expected, and risk adjusted rates are discussed below. At the outset, however, it should be clear that there are no "right or perfect admission rates" for these conditions. 'Very low' rates could signal inappropriate underutilization of health care resources while 'very high' rates could indicate potential overuse of inpatient care. Therefore, hospital admission for ACSCs is not a measure of hospital quality but a potential indicator of outpatient and community health care need at the county level. For example, if an area has a relatively high hospital admission rate for diabetes complications, local health care providers should work with the community to identify reasons and strategies to address the problem.

Observed and expected rates

The *observed rate, which is defined as* the number of events of interest (numerator) divided by the population at risk (denominator), is the raw rate generated by the Software from the data under analysis. The population at risk (the denominator for calculating a PQI rate) is derived from census population figures defined by county. The *observed rate* is primarily used to help identify cases for further follow-up and quality improvement. Counties or communities needing improvement can be identified by the magnitude of the observed rate by comparing the rate to available benchmarks and/or by the number of patients impacted. In this case, the national and statewide rates would be benchmarks for comparison.

Another approach to identify areas that need more attention for focus is to compare the *observed and expected rates*. The *expected rate* is the rate the county would have if it had the same patient case-mix (i.e. by age, gender, DRG, and comorbidity categories) as the reference population. If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than expected for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

Risk-adjusted rates

Risk-adjusted rates are derived from applying to the observed rates, the average case-mix of a baseline data called State Inpatient Data (SID) that represents national average patient mix for that year. Healthcare Cost & Utilization Project (HCUP) compiles and provides the SID dataset to users at no cost. the County-level risk-adjusted admission rates reflect the age, sex, DRG, and comorbidity distribution of the data in the baseline file rather than the distributions of patients in the user's data. The risk-adjusted rate is the rate the county would have if it had the same patient case-mix as the reference population. Alternatively, a risk-adjusted rate is defined as the estimated performance of a county on the PQI assuming that the county has the case-mix of the reference population. Risk-adjustment also includes an adjustment for the Present on Admission (POA) indicator. The POA indicator identifies instances in which a condition was present on admission (i.e. pre-existing condition) and those that occur during the hospital stay. The POA indicator enables patients with conditions present on admission to be identified and excluded from the quality measures, when appropriate.

Readers may use the statewide risk-adjusted rate as a benchmark to compare county-level risk-adjusted admission rates. If the statewide risk-adjusted rate is completely above the county's confidence interval, then the county's patient case-mix is less severe than the statewide average. On the other hand, if the statewide risk-adjusted rate is completely below the county's confidence interval, then the county's patient case-mix is more severe than that of the statewide average. If the statewide risk-adjusted rate falls within the county's confidence interval, then the county's patient case-mix is the same as the statewide average.

Interpretation of PQI Measures

- Prevention Quality Indicators are not intended to be used as definitive quality measures. But they are useful, low-cost measures that can potentially illuminate differences across geographic areas that hospitals serve by assessing hospital admission rates for ambulatory care sensitive conditions (ACSC).

- Performance on a single PQI often cannot reliably show actual quality differences. For this reason, some indicators have been developed as **measure sets**. For *short-term complications, diabetes long-term complications, and lower-extremity amputation among patients with diabetes*. Examining these indicators together is likely to produce a more complete picture of overall quality of care for this condition.

- Since there are no "*right or perfect admission rates"* established for most indicators, it is often better to compare county-level rates with other similar areas. These "peer groups" would ideally be as similar as possible in potentially important factors, such as socioeconomic status of the population, and urban or rural location. However, the most commonly applied approach is to compare a county's risk-adjusted rate with the statewide risk-adjusted rate.

- A county's performance is measured by comparing its confidence interval to the statewide risk-adjusted rate to see if the 95% confidence interval for its risk-adjusted estimate contains within its lower and upper limits, the statewide risk-adjusted estimate for a particular indicator.

    - If a county's confidence interval contains the statewide risk-adjusted rate, then the county's risk-adjusted rate is not statistically significantly different from the statewide rate.

    - If a county's confidence interval falls entirely below the statewide risk-adjusted rate, then the county's risk-adjusted rate is significantly lower than the statewide rate. In the tables, these rates are marked by single asterisk (*).

    - If a county's confidence interval falls entirely above the statewide risk-adjusted rate, then the county's risk-adjusted rate is significantly higher than the statewide rate. In the tables, these rates are marked by double asterisks (**).

- This report is only a guide for consumers and should not be used by itself to draw a conclusion about a particular county's overall performance in population health.

- Readers can also compare a county's *risk-adjusted rate* with its own *observed and expected rates*. The difference will indicate the impact of risk-adjustment or the impact of differences in case-mix on the indicator.

Strengths and Limitations of PQIs

- Even though these indicators are based on hospital inpatient data, they provide insight into the quality of the health care system *outside* the hospital setting. Patients with diabetes may be hospitalized for diabetic complications if their conditions are not adequately monitored or if they do not receive the patient education needed for appropriate self-management. Patients may be hospitalized for asthma if primary care providers fail to adhere to practice guidelines or to prescribe appropriate treatments. Patients with appendicitis who do not have ready access to surgical evaluation may experience delays in receiving needed care, which can result in a life-threatening condition of perforated appendix. Thus, the PQIs are measures of the impact of preventive care for both acute illnesses and chronic conditions, reflecting two important components of the quality of preventive care - effectiveness and timeliness. In short, the PQI module is a valuable tool to help flag potential health care quality problem areas that need further investigation. Moreover, the indicators can provide a quick check on access to health care or outpatient services in a community by using patient data found in a typical hospital discharge abstract.

- Despite the strengths, however, there are several issues that should be considered when using these indicators. For some PQIs, differences in socioeconomic status have been shown to explain a substantial part of the variation in rates across counties. The complexity of the relationship between socioeconomic status and PQI rates makes it difficult to delineate how much of the observed relationships are due to true access to care in potentially underserved populations, or due to other patient characteristics, unrelated to quality of care. In addition, environmental conditions that are not under the direct control of the health care system can substantially influence some of the PQIs. For example, COPD and asthma admission rates are likely to be higher in areas with poorer air quality.

- The other issue is that not many studies have directly addressed the question of whether effective treatments in outpatient settings would reduce the overall incidence of hospitalizations. Moreover, the extent to which the reporting of admission rates for ambulatory care sensitive conditions (ACSC) may lead to changes in ambulatory care practices and admission rates is still unknown. Providers may admit patients who do not clinically require inpatient care or they may do the opposite - fail to hospitalize patients who would benefit from inpatient care.

PQI Measures for New Jersey

This section presents county-level PQI estimates for New Jersey in 2014. First, the definition of the indicator is provided. Then a summary table showing the number of hospital admissions among residents of the county, the corresponding observed and expected admission rates, and the risk-adjusted rates with their respective 95% confidence intervals is presented. In this section, county-level performance assessments will be made using risk-adjusted rates.

The national rates for all 14 PQIs presented here as benchmarks for comparison purposes, are based on the 2012 HCUP - State Inpatient Data (SID) reported in the AHRQ PQI documentation (see Benchmark Data Tables via this link: http://www.qualityindicators.ahrq.gov/Modules/pqi_resources.aspx). Comparison of a specific county-level PQI rate to the statewide average for the same indicator is one appropriate way to see how well a county does among its peers. Following the recommendation of AHRQ, we have compared county rates against statewide rates. However, one may equally compare the county rates against the national rates since the risk-adjustment was based on national parameters.

1. Diabetes with Short-term Complications (PQI.01)

Diabetes with short-term complications (PQI.01) is an indicator of an avoidable hospitalization or ambulatory care sensitive condition (ACSC). This indicator is not a measure of hospital quality, but rather a measure of outpatient care and other healthcare not related to hospitalizations. Short-term complications of diabetes mellitus include diabetic ketoacidosis, hyperosmolarity, and coma. These life-threatening emergencies arise when a patient experiences an excess of glucose (hyperglycemia) or insulin (hypoglycemia). Hospital admission for diabetes short-term complications is a PQI that would be of most interest to comprehensive health care delivery systems. The assumption is that proper outpatient treatment and adherence to care may reduce the incidence of diabetic short-term complications resulting in lower admission rates, which implies better quality of care. The rate is defined as admissions for diabetic short-term complications per 100,000 (18 years and older) county population. The indicator includes all non-maternal/non-neonatal discharges of age 18 years and older with ICD-9-CM (International Classification of Diseases, 9th Revision, Clinical Modification) diagnosis codes for diabetes short-term complications (ketoacidosis, hyperosmolarity, coma); excluding transfers from another institution, Major Diagnostic Category (MDC) 14 (pregnancy, childbirth and puerperium) and MDC 15 (newborn and other neonates).

Table 1 shows the number of hospital admissions for *diabetes short-term complications* by county along with *observed, expected* and *risk-adjusted rates,* while Tables 19, 20 and 21 show the same numbers by patient's age, sex and race/ethnicity.

- Statewide, there were 4,300 hospital admissions for diabetes with short-term complications in 2014 for a risk-adjusted rate of 63.5 per 100,000 adult population. The national hospital admission rate for diabetes with short-term complications was 63.9 per 100,000 in 2012.

- County-level risk-adjusted rates can be conveniently compared to the statewide risk-adjusted rate to see if there is statistical significance in the difference. For example, the risk-adjusted hospital admission rate for *diabetes with short-term complications* among the adult population of Atlantic County is 86.9 per 100,000 with a 95% confidence interval of 76.1 to 97.8 The statewide risk-adjusted rate of 63.5 is far below the confidence interval - implying that the hospital admission rate for *diabetes with short-term complications* in Atlantic County is statistically significantly higher than that of the statewide average. This can be used as a signal for policy makers to do further investigation into the health care provisions for diabetic patients in the county. In another example, the risk-adjusted rate of 21.4 per 100,000 in Hunterdon County is statistically significantly lower than the statewide average – suggesting that Hunterdon County performed better on this indicator compared to the statewide average. See Tables 19, 20 and 21 for variations by patient's demographic characteristics.

Table 1. Hospital Admissions for Diabetes with Short-term Complications (per 100,000 county population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**4,300**	**63.2**	**65.7**	**63.5**	**61.5 - 65.4**
Atlantic	186	86.4	65.5	86.9 **	76.1 - 97.8
Bergen	189	26.8	64.4	27.5 *	21.4 - 33.5
Burlington	249	70.9	65.2	71.8	63.2 - 80.3
Camden	405	103.8	66.1	103.5 **	95.5 - 111.6
Cape May	59	75.0	62.1	79.7	61.2 - 98.2
Cumberland	168	137.7	67.6	134.4 **	120.1 - 148.6
Essex	554	95.2	67.0	93.7 **	87.2 - 100.3
Gloucester	143	63.2	66.2	63.0	52.4 - 73.6
Hudson	296	57.7	68.9	55.2 *	48.4 - 62.1
Hunterdon	21	21.0	64.5	21.4 *	5.4 - 37.5
Mercer	264	93.1	66.9	91.8 **	82.4 - 101.2
Middlesex	331	52.3	66.8	51.6 *	45.4 - 57.9
Monmouth	296	61.4	64.6	62.7	55.4 - 70.0
Morris	89	23.3	64.4	23.9 *	15.7 - 32.1
Ocean	265	58.7	62.0	62.4	54.6 - 70.1
Passaic	262	70.0	67.1	68.9	60.7 - 77.0
Salem	56	107.4	65.3	108.4 **	86.3 - 130.5
Somerset	79	31.5	65.0	32.0 *	21.9 - 42.1
Sussex	58	50.0	65.2	50.6	35.7 - 65.4
Union	271	66.7	66.3	66.3	58.4 - 74.1
Warren	59	69.3	65.2	70.0	52.7 - 87.3

Source: New Jersey 2014 UB Data.

* = Statistically significantly below state average (i.e. better than average).

** = Statistically significantly above state average (i.e. worse than average).

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

2. Perforated Appendix (PQI.02)

Perforated appendix may occur when appropriate treatment for acute appendicitis is delayed for a number of reasons, including problems with access to ambulatory care, failure by the patient to consider symptoms as important, or misdiagnosis and other delays in obtaining surgery. Hospital admission for perforated appendix is a PQI that would be of most interest to comprehensive health care delivery systems. Areas with high rates of hospital admissions for perforated appendix may want to target points of intervention by using chart reviews and other supplemental data to investigate the reasons for delay in receiving surgery. With prompt and appropriate care, acute appendicitis should not progress to perforation or rupture. The assumption is that timely diagnosis and treatment may reduce the incidence of perforated appendix and this represents better quality of care. The rate is defined as admissions for perforated appendix per 100 appendicitis patients within the county. The indicator includes all discharges with the ICD-9-CM diagnosis code for perforation or abscess of appendix in any field among cases meeting the inclusion criteria for the denominator (population at risk), which is all non-maternal discharges age 18 and older within a county with diagnosis code for appendicitis. Transfers from another institution, MDC 14 (pregnancy, childbirth, and puerperium), and MDC 15 (newborn and other neonates) are excluded from the denominator.

Table 2 shows the number of hospital admissions for *perforated appendix* by county along with the corresponding *rates*.

- Statewide, there were 1,733 hospital admissions for perforated appendix in 2014. The statewide risk-adjusted rate is 30.9 percent and compares favorably against the 2012 national rate of 32.3 percent.

- In comparing county-level hospitalization rates for perforated appendix to the statewide average rate, we observe that 17 counties have rates that are similar to the statewide average. Only Essex and Sussex, with risk-adjusted rates of 36.2 and 42.1 percent respectively, have statistically significantly higher rates than the statewide average of 30.9 percent while Middlesex and Passaic have rates that are statistically significantly lower than the statewide average, suggesting that these two counties performed better compared to the statewide benchmark.

Table 2. Perforated Appendix Admission Rate (per 100 admissions with appendicitis, age 18+)

County	Hospital admissions for perforated appendix	# of discharges with appendicitis	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,733**	**5635**	**30.8**	**32.5**	**30.9**	**29.7 - 32.1**
Atlantic	76	242	31.4	31.9	32.1	26.3 - 37.9
Bergen	208	599	34.7	33.3	34.1	30.5 - 37.7
Burlington	98	338	29.0	33.1	28.6	23.8 - 33.3
Camden	93	328	28.4	32.7	28.4	23.5 - 33.2
Cape May	27	80	33.8	34.9	31.6	22.2 - 41.0
Cumberland	40	132	30.3	31.6	31.3	23.4 - 39.2
Essex	159	458	34.7	31.3	36.2 **	31.9 - 40.5
Gloucester	42	164	25.6	32.8	25.5	18.6 - 32.4
Hudson	115	464	24.8	29.1	27.8	23.3 - 32.3
Hunterdon	23	56	41.1	34.4	39.0	27.7 - 50.4
Mercer	79	273	28.9	31.5	30.0	24.5 - 35.5
Middlesex	127	551	23.0	30.5	24.7 *	20.7 - 28.7
Monmouth	134	380	35.3	34.5	33.4	29.1 - 37.8
Morris	61	161	37.9	36.3	34.1	27.7 - 40.5
Ocean	132	386	34.2	35.8	31.2	27.0 - 35.4
Passaic	93	387	24.0	30.5	25.8 *	21.0 - 30.5
Salem	6	33	18.2	30.4	19.6	3.2 - 36.0
Somerset	55	179	30.7	33.9	29.6	23.2 - 36.1
Sussex	31	61	50.8	39.5	42.1 **	32.2 - 51.9
Union	108	297	36.4	33.1	35.9	30.8 - 41.0
Warren	26	66	39.4	34.3	37.5	27.1 - 47.9

Source: New Jersey 2014 UB Data.

* = Statistically significantly below state average (i.e. better than average).

** = Statistically significantly above state average (i.e. worse than average).

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

3. Diabetes with Long-term Complications (PQI.03)

Area-level hospital admission rate for diabetes with long-term complications is a good indicator of an avoidable hospitalization or ambulatory care sensitive condition (ACSC). This indicator is not a measure of hospital quality, but rather a measure of outpatient care and other healthcare issues not related to hospitalizations. Long-term complications of diabetes mellitus include renal, eye, neurological, and circulatory disorders. Hospital admission for diabetes with long-term complications is a PQI that would be of most interest to comprehensive health care delivery systems. Long-term diabetes complications are thought to arise from sustained long-term poor control of diabetes. Intensive treatment programs have been shown to decrease the incidence of long-term complications in both Type 1 and Type 2 diabetes. The indicator relates to quality because research shows that proper outpatient treatment and adherence to care reduces the incidence of diabetic long-term complications, and that lower rates suggest better quality of care. The rate is defined as admissions for diabetic long-term complications per 100,000 adult county population (i.e., all persons, age 18 years and older). The indicator includes all discharges age 18 years and older with ICD-9-CM principal diagnosis codes for long-term complications of diabetes (renal, eye, neurological, circulatory, or complications not otherwise specified), but excludes cases transferred from another institution, MDC 14 (pregnancy, childbirth, and puerperium), and MDC 15 (newborn and other neonates).

Table 3 shows the number of hospital admissions in New Jersey hospitals in 2014 for diabetes with long-term complications by county along with observed, expected and risk-adjusted rates.

- Statewide, there were 8,788 hospital admissions in 2014 for diabetes with long-term complications. The statewide average risk-adjusted hospital admission rate for diabetes with long-term complications is 124.1 per 100,000 and is higher than the 2012 national rate of 105.7 per 100,000.

- Readers may compare their counties' performances against the statewide as well as the national averages to assess the extent of the problem among their populations.

Table 3. Hospital Admissions for Diabetes with Long-term Complications (per 100,000 county population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**8,788**	**129.2**	**110.6**	**124.1**	**121.7 - 126.5**
Atlantic	335	155.6	113.4	145.7 **	132.4 - 159.0
Bergen	639	90.6	115.9	83.0 *	75.8 - 90.3
Burlington	516	147.0	114.0	136.9 **	126.6 - 147.3
Camden	688	176.3	108.5	172.6 **	162.4 - 182.7
Cape May	74	94.1	129.6	77.1 *	56.5 - 97.7
Cumberland	255	209.0	104.3	212.8 **	194.4 - 231.3
Essex	1,196	205.6	103.5	211.0 **	202.5 - 219.5
Gloucester	254	112.3	109.5	108.9 *	95.7 - 122.1
Hudson	780	152.0	92.3	174.9 **	165.4 - 184.5
Hunterdon	46	46.0	119.6	40.8 *	21.8 - 59.8
Mercer	344	121.3	106.9	120.6	108.6 - 132.5
Middlesex	654	103.4	106.0	103.6 *	95.6 - 111.6
Monmouth	573	118.8	117.0	107.8 *	99.0 - 116.6
Morris	272	71.3	117.0	64.8 *	54.9 - 74.6
Ocean	587	129.9	126.5	109.1 *	100.4 - 117.8
Passaic	503	134.5	105.3	135.6 **	125.1 - 146.1
Salem	75	143.8	114.5	133.4	106.5 - 160.4
Somerset	196	78.2	113.7	73.0 *	60.7 - 85.3
Sussex	125	107.8	116.0	98.8 *	80.8 - 116.7
Union	587	144.4	107.3	142.9 **	133.0 - 152.9
Warren	89	104.5	115.7	95.9 *	74.9 - 116.8

Source: New Jersey 2014 UB Data.

* = Statistically significantly below state average (i.e. better than average).

** = Statistically significantly above state average (i.e. worse than average).

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

4. Chronic Obstructive Pulmonary Disease or Asthma in Older Adults (PQI.05)

Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults includes three primary diseases that cause respiratory dysfunction - asthma, emphysema, and chronic bronchitis - each with distinct etiologies, treatments, and outcomes. This indicator examines emphysema, bronchitis and asthma in older adults. Asthma in younger adults and children is discussed separately. COPD or Asthma in older adults can often be controlled in an outpatient setting. Admissions for COPD include exacerbations of COPD, respiratory failure, and (rarely) lung volume reduction surgery or lung transplantation.

With appropriate outpatient treatment and compliance, hospitalizations for exacerbations of COPD and decline in lung function should be minimized. Counties may wish to use chart reviews to understand more clearly whether admissions are a result of poor quality care or other problems. Counties may also wish to identify hospitals that contribute the most to the overall area rate for this indicator. Proper outpatient treatment may reduce admissions for COPD, and lower rates suggest better quality of care. Evidence has shown that hospital admission rate for COPD is a good indicator of avoidable hospitalization or ambulatory care sensitive condition (ACSC). The rate is defined as admissions for COPD per 100,000 county population (i.e., all persons, age 18 and older in a county). In other words, all non-maternal discharges age 18 and older with ICD-9-CM principal diagnosis codes for COPD with the exception of MDC 14 (pregnancy, childbirth, and puerperium) and MDC 15 (newborn and other neonates), are included in the rate calculation.

Table 4 shows the number of hospital admissions for c*hronic obstructive pulmonary disease (COPD)* or asthma in older adults by county along with their *observed, expected* and *risk-adjusted rates*.

- In New Jersey, there were 22,310 hospital admissions for *COPD* or asthma in older adults in 2014. The statewide risk-adjusted hospital admissions rate for *COPD* or asthma in older adults is 506.8 per 100,000 with a 95% confidence interval of 500.1 to 513.5. The national *COPD* or asthma admission rate in 2012 was 495.7 per 100,000.

- Readers may assess county performance on COPD admissions by comparing the county rate against the statewide rate. Tables 19, 20 and 21 show COPD or adult asthma patients by demographic characteristics.

Table 4. Hospital Admissions for Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults (per 100,000 county population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**22,310**	**500.5**	**511.6**	**506.8**	**500.1 - 513.5**
Atlantic	925	639.0	519.1	637.6 **	600.8 - 674.5
Bergen	1,553	320.2	523.9	316.6 *	296.5 - 336.7
Burlington	1,274	532.2	513.3	537.0 **	508.2 - 565.9
Camden	1,714	685.0	510.9	694.5 **	666.2 - 722.8
Cape May	166	287.8	596.5	250.0 *	195.4 - 304.5
Cumberland	751	1019.9	503.7	1048.8 **	996.3 - 1101.3
Essex	2,171	601.9	487.9	639.0 **	614.9 - 663.2
Gloucester	901	603.9	496.6	629.9 **	592.7 - 667.1
Hudson	1,858	694.9	480.3	749.5 **	721.3 - 777.7
Hunterdon	173	230.7	483.2	247.3 *	194.2 - 300.5
Mercer	1,093	609.8	505.4	625.0 **	591.4 - 658.6
Middlesex	1,559	395.7	501.2	408.9 *	386.2 - 431.7
Monmouth	1,474	430.3	508.4	438.4 *	414.1 - 462.6
Morris	696	257.2	507.0	262.8 *	235.5 - 290.1
Ocean	2,176	679.9	607.1	580.1 **	557.2 - 603.0
Passaic	1,406	603.1	500.9	623.7 **	594.1 - 653.3
Salem	284	812.6	532.3	790.8 **	716.6 - 864.9
Somerset	440	251.4	488.9	266.4 *	231.8 - 301.0
Sussex	268	322.1	480.3	347.3 *	296.7 - 398.0
Union	1,093	418.1	493.9	438.4 *	410.3 - 466.6
Warren	335	558.4	506.1	571.6 **	513.5 - 629.6

Source: New Jersey 2014 UB Data.

* = Statistically significantly below state average (i.e. better than average).
** = Statistically significantly above state average (i.e. worse than average).

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

5. Hypertension (PQI.07)

Hypertension or high blood pressure is a chronic cardiac medical condition in which systemic arterial blood pressure is elevated. Hypertension is a good indicator of avoidable hospitalizations. Hypertension is a chronic condition that is often controllable in an outpatient setting with appropriate use of drug therapy. Hospital admission for hypertension is a PQI that would be of most interest to comprehensive health care delivery systems. Counties may wish to identify hospitals that contribute the most to the overall county rate for this indicator. As a PQI, hypertension is not a measure of hospital quality per se, but rather one measure of outpatient health care. Providers may reduce admission rates without necessarily improving quality by shifting care to an outpatient setting. Proper outpatient treatment may reduce admissions for hypertension, and lower admission rates represent better quality of community healthcare. The rate is defined as admissions for hypertension per 100,000 adult county population (i.e., all persons in the county age 18 and older). The indicator includes all non-maternal discharges age 18 or older with ICD-9-CM principal diagnosis codes for hypertension, but excludes transfers from another institution, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates) and cases with cardiac procedure codes in any field.

Table 5 shows the number of hospital admissions for hypertension by county along with their observed, expected and risk-adjusted rates, while Tables 19, 20 and 21 show distribution of hypertension patients by demographic characteristics.

- Statewide, there were 3,997 potentially preventable hospital admissions for hypertension treatment in 2014, for a risk-adjusted rate of 55.7 per 100,000 adults of age 18 or older. Rates of admission for hypertension ranged from 11.8 per 100,000 in Hunterdon County to 97.9 per 100,000 in Mercer and 97.1 in Camden.

- Six counties (Atlantic, Camden, Essex, Hudson, Mercer, and Passaic) have statistically significantly higher admission rates for hypertension compared to the statewide average while eight counties (Bergen, Cape May, Hunterdon, Middlesex, Monmouth, Morris, Ocean and Somerset) have statistically significantly lower admission rates than the statewide average.

Table 5. Hospital Admissions for Hypertension (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**3,997**	**58.8**	**58.3**	**55.7**	**54.0 - 57.4**
Atlantic	177	82.2	58.9	77.1 **	67.5 - 86.7
Bergen	224	31.8	61.8	28.4 *	23.2 - 33.5
Burlington	237	67.5	60.0	62.2	54.7 - 69.6
Camden	392	100.4	57.1	97.1 **	89.9 - 104.4
Cape May	34	43.2	68.6	34.8 *	20.1 - 49.6
Cumberland	80	65.6	54.1	66.9	53.6 - 80.2
Essex	481	82.7	54.5	83.8 **	77.7 - 89.9
Gloucester	140	61.9	56.9	60.1	50.5 - 69.6
Hudson	304	59.3	47.2	69.4 **	62.4 - 76.3
Hunterdon	13	13.0	61.0	11.8 *	0.0 - 25.6
Mercer	283	99.8	56.3	97.9 **	89.3 - 106.5
Middlesex	283	44.7	55.5	44.6 *	38.8 - 50.3
Monmouth	233	48.3	61.8	43.1 *	36.9 - 49.4
Morris	85	22.3	61.7	20.0 *	12.9 - 27.0
Ocean	265	58.7	69.5	46.6 *	40.5 - 52.7
Passaic	300	80.2	55.0	80.5 **	73.0 - 88.1
Salem	25	48.0	60.4	43.8	24.5 - 63.1
Somerset	90	35.9	59.9	33.1 *	24.3 - 41.9
Sussex	58	50.0	58.6	47.2	34.0 - 60.3
Union	238	58.5	56.8	56.9	49.8 - 64.0
Warren	55	64.6	60.8	58.6	43.6 - 73.7

Source: New Jersey 2014 UB Data.

* = Statistically significantly below state average (i.e. better than average).

** = Statistically significantly above state average (i.e. worse than average).

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county’s actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

6. Heart Failure (PQI.08)

Somewhere around 5.8 million people in the United States experience heart failure (HF) each year, and about 670,000 people are diagnosed for it. The most common causes of HF are coronary artery disease (CAD), high blood pressure, and diabetes (AHRQ)[1].

Usually heart failure (HF) can be controlled in an outpatient setting. However, the disease is a chronic progressive disorder for which some hospitalizations are appropriate. Congestive heart failure relates to quality because research shows that proper outpatient treatment reduces admissions for HF, which in turn lowers admission rates, suggesting a better quality of care. Congestive heart failure is a PQI that would be of most interest to comprehensive health care delivery systems. As the causes for HF admissions may include poor quality of care, lack of patient compliance, or problems of access to care, counties may wish to review HF patient records to identify precipitating causes and potential targets for intervention. As a PQI, HF is not a measure of hospital quality, but rather a measure of outpatient care and other community level health conditions. The rate is defined as admissions with a principal diagnosis of heart failure per 100,000 population ages 18 years and older. The measure excludes cardiac procedure admissions, obstetric admissions, and transfers from other institutions.

Table 6 shows the number of hospital admissions for heart failure by county along with their observed, expected and risk-adjusted rates, while Tables 19, 20 and 21 show the distribution of these patients by age, sex and race/ethnicity.

- Statewide, there were 26,786 hospital admissions for *heart failure* in 2014. The risk-adjusted hospital admissions rate for *heart failure* is 370.9 per 100,000.

- Admission rates for HF ranged from a low of 199.3 per 100,000 in Hunterdon to a high of 691.9 per 100,000 in Cumberland.

[1] http://www.qualitymeasures.ahrq.gov/search/search.aspx?term=prevention+quality+indicators.

Table 6. Hospital Admissions for Heart Failure (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**26,786**	**393.9**	**352.0**	**370.9**	366.7 - 375.0
Atlantic	997	462.9	356.5	430.4 **	407.1 - 453.6
Bergen	2,329	330.1	388.8	281.4 *	269.1 - 293.7
Burlington	1,444	411.3	365.2	373.3	355.3 - 391.3
Camden	1,860	476.5	342.5	461.2 **	443.6 - 478.9
Cape May	291	370.1	472.3	259.7 *	226.3 - 293.2
Cumberland	814	667.1	319.6	691.9 **	659.2 - 724.5
Essex	2,866	492.7	309.0	528.5 **	513.3 - 543.7
Gloucester	823	363.8	329.9	365.5	341.9 - 389.1
Hudson	1,992	388.2	252.9	508.8 **	490.8 - 526.7
Hunterdon	212	211.8	352.2	199.3 *	165.0 - 233.7
Mercer	1,075	379.1	336.5	373.4	352.5 - 394.2
Middlesex	2,036	321.8	328.2	325.0 *	310.8 - 339.1
Monmouth	1,941	402.4	376.5	354.2 *	339.1 - 369.3
Morris	1,064	279.0	378.1	244.6 *	227.6 - 261.6
Ocean	2,336	517.0	492.7	347.8 *	334.1 - 361.4
Passaic	1,555	415.6	321.7	428.3 **	409.7 - 446.8
Salem	240	460.3	382.4	399.0	353.4 - 444.6
Somerset	576	229.7	350.7	217.1 *	195.4 - 238.8
Sussex	320	276.0	331.4	276.0 *	243.1 - 309.0
Union	1,665	409.5	334.3	406.0	388.5 - 423.5
Warren	350	410.9	369.2	368.8	332.5 - 405.2

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.

** = Statistically significantly above the state average.

^ Expected rate is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

7. Low Birth Weight (PQI.09)

Low birth weight has been implicated as an indicator of access to prenatal care. 'Healthy People 2020' has set a goal to reduce the percentage of low birth weight infants from 8.2 to 7.8 percent. Although less than 10 percent of total births are low birth weight neonates, the large number of total births suggests that this indicator should be precisely measurable for most areas (AHRQ)[2].

Low birth weight (LBW) is the single most important factor affecting death among newborns and is a significant determining factor in infant deaths (1 to 12 months of age). Infants may be low birth weight because of inadequate intrauterine growth or premature birth. Risk factors include nutritional status and behavioral risk factors such as tobacco use during pregnancy. Proper preventive care may reduce incidence of low birth weight, and this represents better quality of care. Low birth weight is a PQI that would be of most interest to comprehensive health care delivery systems. As a PQI, low birth weight is not a measure of hospital quality, but rather a measure of outpatient health care. This indicator could have substantial bias that would require additional risk adjustment from birth records or clinical data. Risk factors for low birth weight may be addressed with adequate prenatal care and education. Prenatal education and care programs have been established to help reduce low birth weight and other complications in high-risk populations. The rate is defined as the number of low birth weight infants per 100 live births. Low birth weight refers to births with ICD-9-CM diagnosis codes for birth weight less than 2500 grams (5½ pounds) in any field (analysis excludes transfer cases)[3]. PQI.09 is computed using the Pediatric Quality Indicators (PDIs) module.

Table 7 shows the number of newborn babies (0 - 28 days old) with birth weight of less than 2500 grams by county along with corresponding observed, expected and risk-adjusted rates. LBW rates are per 1000 newborns excluding premature deliveries and sick babies.

- In 2014, there were 6,411 newborns in New Jersey classified as low birth weight for a risk-adjusted low birth weight rate of 63.7 per 1,000. The rates suggest that New Jersey's performance is worse compared to the national average of 62.1 per 1,000 in 2012, the latest national data available.

- Readers are advised to assess individual county performance by comparing them against the statewide and/or national LBW rates presented in Table 16.

[2] http://www.qualitymeasures.ahrq.gov/search/search.aspx?term=prevention+quality+indicators.

[3] The denominator includes any neonate (a neonate is defined as any discharge with age in days at admission between zero and 28 days) with either 1) an ICD-9-CM diagnosis code for an in-hospital live birth or 2) an admission type of newborn (ATYPE=4), age in days at admission equal to zero, and not an ICD-9-CM diagnosis code for an out-of-hospital birth. If age in days is missing, then a neonate is defined as any DRG in MDC 15, an admission type of newborn (ATYPE=4), an ICD-9-CM diagnosis code for neonate observation and evaluation, or an ICD-9-CM diagnosis code for an in-hospital live birth.

Table 7. Low Birth Weight Infants (per 1,000 births)

County	Low birth weight infants	All live births^	Observed rate	Expected rate	Risk-adjusted rate	95% Confidence Interval
Statewide	**6,411**	**100,608**	**63.7**	**62.8**	**63.7**	**62.2 - 65.2**
Atlantic	220	3,023	72.8	62.6	72.9 **	64.2 - 81.5
Bergen	492	8,632	57.0	62.8	57.0 *	51.9 - 62.1
Burlington	306	4,303	71.1	62.7	71.1 **	63.9 - 78.4
Camden	412	5,904	69.8	62.7	69.8	63.6 - 76.0
Cape May	44	960	45.8	62.7	45.8 *	30.5 - 61.2
Cumberland	167	2,369	70.5	62.7	70.5	60.7 - 80.3
Essex	750	9,904	75.7	62.7	75.7 **	71.0 - 80.5
Gloucester	225	2,864	78.6	62.8	78.5 **	69.7 - 87.4
Hudson	569	8,764	64.9	62.8	64.9	59.8 - 70.0
Hunterdon	51	892	57.2	62.9	57.0	41.1 - 72.9
Mercer	345	4,431	77.9	62.7	77.9 **	70.7 - 85.0
Middlesex	576	9,307	61.9	62.8	61.8	56.9 - 66.8
Monmouth	342	5,879	58.2	62.8	58.1	52.0 - 64.3
Morris	252	4,423	57.0	62.8	56.9	49.8 - 64.1
Ocean	358	8,147	43.9	62.7	43.9 *	38.7 - 49.2
Passaic	417	6,357	65.6	62.8	65.5	59.6 - 71.5
Salem	31	485	63.9	62.7	64.0	42.4 - 85.6
Somerset	177	2,697	65.6	62.7	65.7	56.5 - 74.8
Sussex	60	1,259	47.7	62.6	47.7 *	34.3 - 61.1
Union	385	6,565	58.6	62.8	58.6	52.8 - 64.5
Warren	30	763	39.3	62.5	39.5 *	22.2 - 56.7
Unknown	202	2,680	75.4	62.8	75.3 **	66.2 - 84.5

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ = Premature deliveries and sick babies are excluded from the denominator.

Expected rate is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

8. Dehydration (PQI.10)

Dehydration is a serious acute condition that occurs mostly in elderly patients and patients with other underlying illnesses, following insufficient attention and support for fluid intake. It is treatable with oral rehydration therapy and/or intravenous (IV) fluids. Dehydration can for the most part be treated in an outpatient setting, but it is potentially fatal for the elderly, very young children, frail patients, or patients with serious comorbidity conditions. Proper outpatient treatment may result in lower admission rates, suggesting a better quality of care. When high admission rates of dehydration are identified against any hospital, additional studies may uncover problems in primary or emergency care in the community. The risk adjustment process appears to modestly affect counties with the highest and lowest rates. Since age may be a particularly important risk factor, the indicator should be risk-adjusted for age. The rate is defined as admissions for dehydration per 100,000 adult county population. The indicator includes all non-maternal discharges age 18 or older with ICD-9-CM principal diagnosis code for hypovolemia (276.5). It excludes transfers from another institution, MDC 14 (pregnancy, childbirth, and puerperium), and MDC 15 (newborn and other neonates).

Table 8 shows the number of hospital admissions for dehydration by county along with their observed, expected and risk-adjusted rates

- Statewide, there were 8,612 hospital admissions for dehydration in 2014. The risk-adjusted hospital admissions rate for dehydration is 120.1 per 100,000.

- The national *dehydration* admission rate in 2012 was 135.7per 100,000. New Jersey, with a risk-adjusted rate of 120.1 performed significantly better compared to the national benchmark of 135.7.

- Hospital admission rates for *dehydration* are statistically significantly higher than the statewide average in Atlantic, Camden, Cumberland, Essex, Gloucester, Hudson, Passaic, and Salem.

Table 8. Hospital Admissions for Dehydration (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**8,612**	**126.6**	**149.2**	**120.1**	**117.4 - 122.9**
Atlantic	347	161.1	150.9	151.1 **	135.8 - 166.5
Bergen	839	119.0	162.1	103.9 *	95.7 - 112.1
Burlington	498	141.9	153.9	130.5	118.5 - 142.4
Camden	685	175.5	146.0	170.1 **	158.5 - 181.7
Cape May	112	142.4	191.9	105.1	82.6 - 127.6
Cumberland	252	206.5	137.1	213.3 **	191.9 - 234.7
Essex	798	137.2	134.5	144.4 **	134.5 - 154.3
Gloucester	338	149.4	141.6	149.3 **	133.9 - 164.8
Hudson	593	115.6	113.9	143.6 **	132.2 - 155.1
Hunterdon	93	92.9	148.9	88.3 *	65.6 - 111.0
Mercer	357	125.9	143.6	124.1	110.3 - 137.8
Middlesex	560	88.5	140.5	89.2 *	79.9 - 98.4
Monmouth	651	135.0	158.0	120.9	110.9 - 131.0
Morris	419	109.9	158.2	98.3 *	87.1 - 109.6
Ocean	567	125.5	199.3	89.2 *	79.9 - 98.4
Passaic	531	141.9	138.6	145.0 **	132.8 - 157.1
Salem	121	232.1	159.7	205.7 **	175.4 - 236.0
Somerset	182	72.6	148.8	69.1 *	54.7 - 83.4
Sussex	145	125.1	141.5	125.1	103.5 - 146.7
Union	414	101.8	143.0	100.8 *	89.3 - 112.3
Warren	110	129.1	155.3	117.7	93.7 - 141.8

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

9. Bacterial Pneumonia (PQI.11)

Bacterial pneumonia is a relatively common acute condition, treatable for the most part with antibiotics. If left untreated in susceptible individuals - such as the elderly - pneumonia can lead to death. Proper outpatient treatment may reduce admissions for bacterial pneumonia in non-susceptible individuals, and lower admission rates represent better quality of care. Specifically, bacterial pneumonia is a good indicator of an avoidable hospitalization or ambulatory care sensitive condition (ACSC). High admission rates are often a reflection of large number of inappropriate admissions or low-quality treatment with antibiotics. As a PQI, admission for bacterial pneumonia is not a measure of hospital quality, but rather a measure of outpatient care and other community-level health care issues.

The elderly population is particularly susceptible to pneumonia, and in this population, a vaccine is suggested to prevent pneumonia. Areas may wish to examine the outpatient care for pneumonia and pneumococcal vaccination rates to identify potential processes of care that may reduce admission rates. Appropriateness of admissions appears to be a problem for this indicator. High rates may reflect large number of inappropriate admissions, and/or poor quality outpatient care, among other things.

The rate is defined as admissions for bacterial pneumonia per 100,000 county population. The indicator includes all non-maternal discharges age 18 and older with the ICD-9-CM principal diagnosis code for bacterial pneumonia. It excludes transfer cases, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), and those with diagnosis code for sickle cell anemia or HB-S disease.

Table 9 shows the number of hospital admissions for bacterial pneumonia by county along with the observed, expected and risk-adjusted rates, while Tables 19, 20 and 21 present hospital admission rates of bacterial pneumonia patients by age, sex, and race/ethnicity.

- The national average admission rate for bacterial pneumonia in 2012 was 248.2 per 100,000 population, age 18+.

- In New Jersey, there were 14,770 hospital admissions for bacterial pneumonia in 2014. With a risk-adjusted rate of 206.1 per 100,000, New Jersey had a significantly lower rate than the national benchmark of 248.2.

- Readers are advised to assess individual county performance by comparing them against the statewide rate and the national average bacterial pneumonia admission rate shown in Table 16.

Table 9. Hospital Admissions for Bacterial Pneumonia (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**14,770**	**217.2**	**281.8**	**206.1**	**202.3 - 209.8**
Atlantic	572	265.6	285.5	248.7 **	227.6 - 269.7
Bergen	1,255	177.9	307.1	154.9 *	143.7 - 166.1
Burlington	942	268.3	291.2	246.4 **	230.1 - 262.7
Camden	1,107	283.6	275.2	275.5 **	259.6 - 291.4
Cape May	169	214.9	364.7	157.5 *	126.8 - 188.3
Cumberland	396	324.5	257.9	336.4 **	307.0 - 365.8
Essex	1,146	197.0	252.5	208.6	195.0 - 222.2
Gloucester	559	247.1	267.1	247.2 **	226.0 - 268.5
Hudson	1,073	209.1	213.1	262.4 **	246.6 - 278.2
Hunterdon	186	185.8	282.8	175.7	144.7 - 206.7
Mercer	684	241.2	270.6	238.3 **	219.5 - 257.1
Middlesex	1,304	206.1	265.2	207.8	195.1 - 220.6
Monmouth	1,146	237.6	298.7	212.7	198.9 - 226.4
Morris	583	152.9	300.1	136.2 *	120.8 - 151.6
Ocean	1,277	282.6	378.3	199.7	187.1 - 212.3
Passaic	784	209.6	261.0	214.7	198.0 - 231.4
Salem	135	258.9	301.6	229.5	187.9 - 271.0
Somerset	308	122.8	281.3	116.7 *	97.1 - 136.4
Sussex	207	178.6	268.3	177.9	148.3 - 207.5
Union	777	191.1	269.4	189.7 *	173.9 - 205.4
Warren	160	187.8	293.8	170.9 *	137.9 - 203.8

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

10. Urinary Tract Infection (PQI.12)

Urinary tract infection (UTI) is a common acute condition that can, for the most part, be treated with antibiotics in an outpatient setting. However, this condition can progress to more clinically significant infections, such as pyelonephritis, in vulnerable individuals with inadequate treatment. Proper outpatient treatment is believed to reduce admissions for urinary tract infection, and lower admission rates represent better quality of care. Hospital admission for urinary tract infection is a PQI that would be of most interest to comprehensive health care delivery systems. As a PQI, admission for urinary tract infection is not a measure of hospital quality, but rather one measure of outpatient care and other health care issues.

The rate is defined as admissions for urinary tract infection per 100,000 adult county population. The indicator includes all non-maternal discharges age 18 and older with ICD-9-CM principal diagnosis code for urinary tract infection. It excludes transfer cases, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), patients with diagnosis code of kidney/urinary tract disorder, patients with diagnosis code of immunocompromised state, and those with immunocompromised state procedure code.

Table 10 shows the number of hospital admissions for urinary tract infection by county along with the observed, expected and risk-adjusted rates.

- In New Jersey, there were 12,149 hospital admissions for urinary tract infection in 2014. The risk-adjusted hospital admissions rate for urinary tract infection is 167.8 per 100,000.

- The national average admission rate for urinary tract infection in 2012 was 167.0 per 100,000 population, age 18+.

- County-level urinary tract infection rates can be compared to the statewide average as well as the national average to see where specific counties stand on this particular indicator. Admission rate variations by age, sex and race/ethnicity are shown in Tables 19, 20 and 21.

Table 10. Hospital Admissions for Urinary Tract Infection (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**12,149**	**178.7**	**184.4**	**167.8**	**164.8 - 170.8**
Atlantic	532	247.0	183.5	233.1 **	216.1 - 250.1
Bergen	1,118	158.5	201.7	136.1 *	127.1 - 145.0
Burlington	783	223.0	188.4	205.0 **	191.8 - 218.1
Camden	960	246.0	181.4	234.8 **	222.1 - 247.5
Cape May	93	118.3	235.4	87.0 *	62.2 - 111.8
Cumberland	323	264.7	167.4	273.8 **	250.2 - 297.5
Essex	991	170.4	167.2	176.4	165.6 - 187.2
Gloucester	390	172.4	172.5	173.1	156.0 - 190.2
Hudson	908	177.0	140.8	217.7 **	205.2 - 230.3
Hunterdon	165	164.8	174.2	163.9	138.3 - 189.5
Mercer	600	211.6	178.7	205.1 **	190.1 - 220.1
Middlesex	974	154.0	173.7	153.5 *	143.3 - 163.7
Monmouth	798	165.4	194.1	147.6 *	136.6 - 158.6
Morris	593	155.5	193.4	139.2 *	126.8 - 151.7
Ocean	924	204.5	253.2	139.9 *	129.9 - 149.9
Passaic	687	183.6	171.2	185.7 **	172.4 - 199.1
Salem	121	232.1	198.6	202.3 **	169.2 - 235.5
Somerset	304	121.2	182.2	115.2 *	99.4 - 131.0
Sussex	125	107.8	164.9	113.2 *	88.8 - 137.7
Union	620	152.5	178.2	148.2 *	135.7 - 160.8
Warren	140	164.3	189.9	149.9	123.3 - 176.4

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

11. Angina without Procedure (PQI.13)

Both stable and unstable anginas are symptoms of potential coronary artery diseases. Effective management of coronary disease reduces the occurrence of major cardiac events such as heart attacks, and may also reduce admission rates for angina. Admission for angina is relatively common, suggesting that the indicator will be measured with good precision. As a PQI, angina without procedure is not a measure of hospital quality, but rather one measure of outpatient and other population health issues.

The rate is defined as admissions for angina (without procedure) per 100,000 adult county population. The indicator includes all non-maternal discharges age 18 and older with ICD-9-CM principal diagnosis codes for angina and excludes transfers, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), and those with a code for cardiac procedure.

Table 11 shows the number of hospital admissions for angina (without procedure) by county along with the observed, expected and risk-adjusted rates.

- In New Jersey, there were 1,132 hospital admissions for angina (without procedure) in 2014. The statewide risk-adjusted hospital admissions rate for angina (without procedure) is 15.8 per 100,000. By comparison, the 2012 national hospital admissions rate for angina (without procedure) was 13.3 per 100,000.

Table 11. Hospital Admissions for Angina without Procedure
(per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,132**	**16.7**	**14.6**	**15.8**	**15.0 - 16.7**
Atlantic	49	22.8	15.0	21.0 **	16.3 - 25.9
Bergen	75	10.6	15.5	9.5 *	6.9 - 12.1
Burlington	25	7.1	15.1	6.5 *	2.8 - 10.3
Camden	40	10.3	14.3	9.9 *	6.3 - 13.6
Cape May	14	17.8	17.7	13.9	6.7 - 21.3
Cumberland	26	21.3	13.5	21.8	15.3 - 28.7
Essex	135	23.2	13.5	23.8 **	20.9 - 27.0
Gloucester	25	11.1	14.4	10.6 *	5.9 - 15.5
Hudson	91	17.7	11.4	21.4 **	18.0 - 25.1
Hunterdon	5	5.0	15.9	4.3 *	0.0 - 11.2
Mercer	73	25.7	14.0	25.4 **	21.2 - 29.8
Middlesex	68	10.8	13.8	10.8 *	7.9 - 13.7
Monmouth	51	10.6	15.7	9.3 *	6.2 - 12.5
Morris	35	9.2	15.6	8.1 *	4.6 - 11.7
Ocean	97	21.5	17.3	17.1	14.1 - 20.3
Passaic	197	52.7	13.7	53.0 **	49.5 - 57.1
Salem	12	23.0	15.3	20.8	11.3 - 30.6
Somerset	22	8.8	15.1	8.0 *	3.7 - 12.5
Sussex	11	9.5	15.3	8.6 *	2.2 - 15.1
Union	63	15.5	14.1	15.2	11.7 - 18.9
Warren	18	21.1	15.5	18.9	11.5 - 26.5

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

12. Uncontrolled Diabetes (PQI.14)

Uncontrolled diabetes indicates an excess of glucose in a patient's bloodstream. In diabetics, glucose levels are stabilized by proper administration of insulin, and may involve other activities such as home blood-glucose monitoring, that contribute to the overall problems with glycemic control. However, it is unclear whether poor glycemic control arises from poor quality medical care, non-compliance of patients, lack of education, or problems of access to care. Areas with high rates may wish to examine these factors when interpreting this indicator. Proper outpatient treatment and adherence to care may reduce the incidence of uncontrolled diabetes, and lower admission rates represent better quality of care.

Uncontrolled diabetes is an avoidable hospitalization/ambulatory care sensitive condition (ACSC) indicator. The indicator is not a measure of hospital quality, but rather a measure of outpatient care and other healthcare issues not related to hospitalizations. Hospital admission for uncontrolled diabetes is a PQI that would be of most interest to comprehensive health care delivery systems, such as some health maintenance organizations (HMOs), or public health agencies. Uncontrolled diabetes as a measure of potentially avoidable hospitalizations should be used in conjunction with short-term complications of diabetes (PQI.01
The rate is defined as admissions for uncontrolled diabetes per 100,000 adult county population. The indicator includes all non-maternal discharges age 18 and older with ICD-9-CM principal diagnosis codes for uncontrolled diabetes, without mention of a short-term or long-term complication. It excludes transfer cases, MDC 14 (pregnancy, childbirth, and puerperium), and MDC 15 (newborn and other neonates).

Table 12 shows the number of hospital admissions for uncontrolled diabetes by county along with the observed, expected and risk-adjusted rates

- In New Jersey, there were 1,061 hospital admissions for uncontrolled diabetes in 2014. The risk-adjusted rate is 15.0 per 100,000. By comparison, the national admission rate for uncontrolled diabetes in 2012 was 15.7 per 100,000.

- Hospital admission rates for uncontrolled diabetes in Atlantic, Cumberland, Essex, Hudson, Passaic and Salem counties are statistically significantly higher compared to the statewide average.

Table 12. Hospital Admissions for Uncontrolled Diabetes (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,061**	**15.6**	**16.5**	**15.0**	**14.1 - 15.9**
Atlantic	46	21.4	16.8	20.2 **	15.1 - 25.4
Bergen	59	8.4	17.1	7.8 *	4.9 - 10.6
Burlington	58	16.5	16.9	15.5	11.5 - 19.6
Camden	68	17.4	16.3	17.0	13.1 - 20.9
Cape May	9	11.5	18.3	9.9	1.7 - 18.1
Cumberland	28	23.0	15.8	23.1 **	16.0 - 30.2
Essex	120	20.6	15.8	20.8 **	17.5 - 24.0
Gloucester	37	16.4	16.4	15.8	10.7 - 21.0
Hudson	149	29.0	14.4	32.0 **	28.4 - 35.6
Hunterdon	3	3.0	17.5	2.7 *	0.0 - 10.1
Mercer	51	18.0	16.1	17.8	13.2 - 22.4
Middlesex	78	12.3	16.0	12.3	9.2 - 15.3
Monmouth	57	11.8	17.3	10.9 *	7.5 - 14.3
Morris	30	7.9	17.2	7.2 *	3.4 - 11.1
Ocean	54	12.0	18.1	10.5 *	7.0 - 13.9
Passaic	91	24.3	15.9	24.3 **	20.3 - 28.3
Salem	16	30.7	16.8	29.0 **	18.5 - 39.5
Somerset	15	6.0	16.9	5.6 *	0.8 - 10.4
Sussex	12	10.4	17.1	9.6	2.6 - 16.6
Union	72	17.7	16.2	17.4	13.5 - 21.2
Warren	8	9.4	17.1	8.7	0.6 - 16.9

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.

** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

13. Asthma in Younger Adults (PQI.15)

Asthma is one of the most common reasons for hospital admission and emergency room care. Most cases of asthma can be managed with proper ongoing therapy on an outpatient basis. The assumption is that proper outpatient treatment may reduce the incidence or exacerbation of asthma requiring hospitalization, and that lower admission rates suggest better quality of care. Environmental factors such as air pollution, occupational exposure to irritants, or other exposure to allergens have been shown to increase hospitalization rates or exacerbate asthma symptoms. Counties may wish to identify hospitals that contribute the most to the overall county rate for this indicator. The patient populations served by these hospitals may be a starting point for interventions.

As a PQI, asthma in young adults is not a measure of hospital quality, but rather one measure of overall outpatient care in a community. The rate is defined as admissions for asthma per 100,000 population age 18 to 40. The measure includes all non-maternal discharges age 18 to 40 with ICD-9-CM principal diagnosis codes for asthma, but excludes transfer cases, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), and those with any diagnosis code of cystic fibrosis and anomalies of the respiratory system.

Table 13 shows the number of hospital admissions for adult asthma by county along with their observed, expected and risk-adjusted rates (Disparities in admissions for asthma in younger adults by sex and race/ethnicity can be seen in Tables 20 and 21).

- In New Jersey, there were 1,662 hospital admissions for asthma in young adults (ages 18 to 40) in 2014 for a risk-adjusted rate of 68.8 per 100,000. The rate shows that asthma is still a significant problem in New Jersey as evidenced by the significantly higher statewide admission rate compared to the national young adult asthma admission rate, in 2012, of 46.0 per 100,000.

- Atlantic, Camden, Cumberland, Essex, Mercer, Passaic and Sussex counties have young adult asthma admission rates that are statistically significantly higher than the statewide average.

Table 13. Hospital Admissions for Asthma in Younger Adults (per 100,000 population, age 18-40)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,662**	**70.9**	**48.6**	**68.8**	**66.1 - 71.6**
Atlantic	87	123.2	48.2	120.5 **	104.7 - 136.4
Bergen	76	34.5	49.5	32.9 *	24.0 - 41.7
Burlington	69	61.8	48.1	60.7	48.0 - 73.3
Camden	168	119.9	48.6	116.4 **	105.2 - 127.6
Cape May	10	47.7	45.9	49.1	19.2 - 78.9
Cumberland	67	138.5	46.2	141.4 **	121.8 - 160.9
Essex	225	101.8	49.4	97.3 **	88.4 - 106.1
Gloucester	59	76.6	48.8	74.0	59.0 - 89.1
Hudson	132	53.7	48.6	52.1 *	43.7 - 60.6
Hunterdon	10	39.8	47.1	39.9 *	13.0 - 66.8
Mercer	94	90.1	48.0	88.6 **	75.5 - 101.6
Middlesex	124	52.0	48.8	50.2 *	41.7 - 58.8
Monmouth	85	60.8	48.4	59.3	48.1 - 70.6
Morris	29	26.2	49.0	25.2 *	12.7 - 37.8
Ocean	69	52.4	48.0	51.5 *	39.9 - 63.1
Passaic	158	112.1	48.5	109.1 **	97.9 - 120.3
Salem	16	93.1	47.5	92.5	60.1 - 124.8
Somerset	28	37.0	49.7	35.1 *	20.0 - 50.2
Sussex	32	97.8	47.9	96.3 **	73.0 - 119.7
Union	110	75.8	49.1	72.9	61.9 - 83.8
Warren	14	55.6	48.0	54.7	28.1 - 81.3

Source: New Jersey 2014 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

14. Lower-extremity Amputation among Patients with Diabetes (PQI.16)

Diabetes is a major risk factor for lower-extremity amputation, which can be caused by infection, neuropathy, and microvascular disease. Proper long-term glucose control, diabetes education, and foot care are some of the interventions that can reduce the incidence of infection, neuropathy, and microvascular diseases. As a PQI, lower-extremity amputations among patients with diabetes, is not a measure of hospital quality but rather one measure of outpatient care and other health care problems in a community. Proper and continued treatment and glucose control may reduce the incidence of lower-extremity amputation; and lower rates represent better quality of care. Areas may wish to identify hospitals that contribute the most to the overall area rate for this indicator. The patient populations served by these hospitals may be a starting point for interventions.

The rate is defined as admissions for lower-extremity amputation in patients with diabetes per 100,000 county population age 18 years and older. The indicator includes all non-maternal discharges age 18 and older with ICD-9-CM procedure codes for lower-extremity amputation and diagnosis code for diabetes and excludes transfer cases, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), and those with trauma diagnosis code.

Table 14 shows the number of hospital admissions for lower-extremity amputation by county along with their observed, expected and risk-adjusted rates.

- In New Jersey, there were 1,207 admissions for lower-extremity amputation in 2014. The risk-adjusted hospital admissions rate for lower-extremity amputation is 17.1 per 100,000, suggesting that the rate at which incidence of lower-extremity amputation occurs in New Jersey is slightly higher than the national average rate in 2012 of 15.5 per 100,000.

- Camden, Cumberland, Essex, Hudson and Union counties have rates that are statistically significantly higher than the statewide average, while five counties (Hunterdon, Middlesex, Morris, Somerset and Sussex) have rates that are statistically significantly lower than the statewide average.

- Disparities in admissions for lower-extremity amputation in patients with diabetes by age, sex and race/ethnicity are shown in Tables 19, 20 and 21.

Table 14. Hospital Admissions for Lower-extremity Amputation among Patients with Diabetes (per 100,000 population, age 18+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,207**	**17.8**	**16.2**	**17.1**	**16.2 - 18.0**
Atlantic	51	23.7	17.0	21.8	16.8 - 26.9
Bergen	131	18.6	17.2	16.9	14.1 - 19.7
Burlington	63	17.9	16.9	16.6	12.6 - 20.6
Camden	96	24.6	15.8	24.3 **	20.4 - 28.2
Cape May	25	31.8	20.6	24.2	16.6 - 31.8
Cumberland	47	38.5	15.1	39.8 **	32.7 - 47.0
Essex	156	26.8	14.7	28.6 **	25.3 - 31.9
Gloucester	28	12.4	16.1	12.1	7.0 - 17.1
Hudson	87	17.0	12.5	21.1 **	17.3 - 25.0
Hunterdon	3	3.0	18.2	2.6 *	0.0 - 9.8
Mercer	39	13.8	15.5	13.9	9.2 - 18.5
Middlesex	81	12.8	15.3	13.1 *	10.0 - 16.2
Monmouth	76	15.8	17.5	14.1	10.8 - 17.4
Morris	25	6.6	17.4	5.9 *	2.1 - 9.6
Ocean	83	18.4	19.5	14.7	11.5 - 18.0
Passaic	77	20.6	15.2	21.2	17.1 - 25.2
Salem	12	23.0	17.3	20.9	10.6 - 31.1
Somerset	18	7.2	16.7	6.7 *	2.0 - 11.5
Sussex	11	9.5	17.5	8.5 *	1.7 - 15.3
Union	88	21.6	15.4	21.9 **	18.1 - 25.8
Warren	10	11.7	17.3	10.6	2.6 - 18.6

Source: New Jersey 20114 UB Data.

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

^ Expected rate = (Observed rate/Risk-adjusted rate) * Standard deviation. It is the rate the county would have if it performed the same as the national average (reference population) given the county's actual case-mix (e.g., age, gender, DRG, and comorbidity categories). If the observed rate is higher than the expected rate (i.e., the ratio of observed/expected is greater than 1.0), then the implication is that the county performed worse than the reference population for that particular indicator. If the observed rate is lower than the expected rate (i.e., the ratio of observed/expected is less than 1.0), then the implication is that the county performed better than the reference population.

15. Composite PQIs (Overall - PQI.90, Acute - PQI.91, and Chronic - PQI.92)

As mentioned earlier, the PQIs are currently implemented at the county level based on the location of the patient's residence, not on the location of the hospital. In other words, the PQI are hospitalization rates for residents of the county, regardless of whether the hospital is located inside or outside the county (or state). The PQI composites are intended to improve the statistical precision of the individual PQI, allowing for greater discrimination in performance among areas, and improved ability to identify potentially determining factors in performance.

An overall composite captures the general concept of potentially avoidable hospitalization connecting the individual PQI measures, which are all rates at the area level. The composite measures - acute and chronic – are created to investigate different factors influencing hospitalization rates for acute and chronic conditions. Table 15 shows composite PQI measures for New Jersey for 2014.

The PQI composites are designed to help provide quick information on issues such as assessment of quality and disparity, baselines to track progress, and identify information gaps, and emphasize interdependence of quality and disparities. They are also intended to provide national, state and county level estimates that can be tracked over time.

Table 15 shows the number of hospital admissions for overall, acute and chronic conditions by county along with their risk-adjusted rates (observed and expected rates are excluded for reasons of brevity).

- The national overall, acute and chronic composite rates, respectively, in 2012, were 1,457.5, 550.9 and 905.9 per 100,000 age 18 and older.

- By comparison, the corresponding composite rates for New Jersey were 1,484.3, 494.0 and 992.5 per 100,000, respectively. This suggests that preventable hospitalization rates were about the same as the national figures.

Table 15. Composite PQIs (per 100,000 population, age 18+)

County	Overall		Acute		Chronic	
	Volume	Rate	Volume	Rate	Volume	Rate
Statewide	**106,188**	**1,484.3**	**35,531**	**494.0**	**70,659**	**992.5**
Atlantic	4,276	1,856.7 **	1,451	632.4 **	2,825	1,226.0 **
Bergen	8,430	1,051.8 *	3,212	394.8 *	5,218	659.2 *
Burlington	6,125	1,608.8 **	2,223	581.7 **	3,902	1,028.1 **
Camden	8,145	2,026.9 **	2,752	680.8 **	5,393	1,348.3 **
Cape May	1,043	995.0 *	374	349.5 *	669	647.0 *
Cumberland	3,186	2,698.2 **	971	823.5 **	2,215	1,875.0 **
Essex	10,758	1,938.8 **	2,935	529.8 **	7,823	1,409.1 **
Gloucester	3,683	1,615.7 **	1,287	569.5 **	2,397	1,047.0 **
Hudson	8,224	1,953.4 **	2,574	622.9 **	5,650	1,336.9 **
Hunterdon	928	867.8 *	444	426.1 *	484	445.8 *
Mercer	4,940	1,721.0 **	1,641	568.0 **	3,299	1,154.6 **
Middlesex	8,009	1,275.3 *	2,838	450.5 *	5,171	826.0 *
Monmouth	7,332	1,365.6 *	2,595	481.2	4,737	885.1 *
Morris	3,907	919.6 *	1,595	373.6 *	2,312	546.4 *
Ocean	8,665	1,403.7 *	2,768	429.2 *	5,897	983.3
Passaic	6,523	1,775.1 **	2,002	545.5 **	4,522	1,231.6 **
Salem	1,111	1,904.2 **	377	637.6 **	734	1,269.7 **
Somerset	2,249	850.3 *	794	300.9 *	1,455	549.9 *
Sussex	1,367	1,156.5 *	477	416.6 *	890	739.0 *
Union	5,946	1,450.2	1,811	438.9 *	4,135	1,013.3
Warren	1,341	1,436.0	410	438.3 *	931	998.5

Source: NJ UB 2014

* = Statistically significantly below the state average.
** = Statistically significantly above the state average.

OVERALL - includes all 12 PQIs except PQI.02 and PQI.09
ACUTE - includes PQI.10, PQI.11, and PQI.12 only
CHRONIC - includes all 9 of the non-acute PQIs included under the composite - OVERALL.

Note: PQI.02 and PQI.09 are excluded from the PQI Composite measures.

Prevention Quality Indicator Patterns by County

Prevention quality indicators are best understood by grouping indicators that potentially describe similar health problems. As an example, all risk-adjusted diabetes related admission rates by county are presented on a map side-by-side to assess patterns (Figure 2). In some instances, (e.g. Figures 3 and 4) our maps may not necessarily suggest similarities of health indicators. In Figures 3 and 4, the maps include indicators that we found easier to show on the same page for presentation purposes only.

The 2014 New Jersey data show a substantial variation in preventable hospital admissions by county. Not surprisingly, the variations appear to reflect the socio-economic disparities of the county populations, with more affluent counties having significantly lower rates than the statewide average, and the less affluent counties having significantly higher admission rates than the statewide rate. Figure 1 shows county-level median household income in New Jersey in 2014.

We observe a remarkable consistency in levels of admission rates by county for diabetes with short term complications, diabetes with long term complications, uncontrolled diabetes, and lower-extremity amputation among patients with diabetes [See Figure 2].

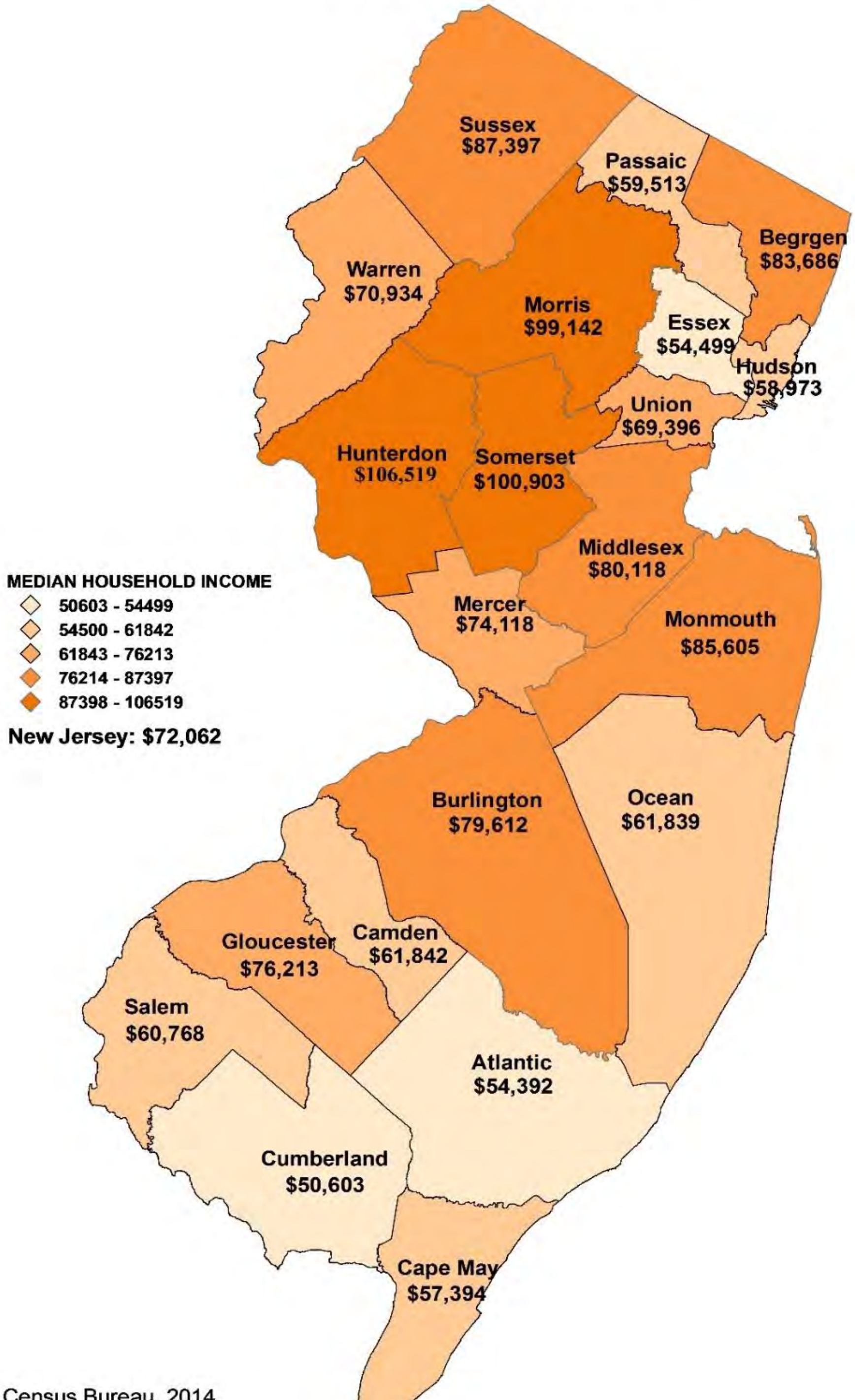
Figure 3 presents hospital admission rates for hypertension, angina and heart failure (HF) by county. Hypertension, angina and HF point to potentially associated health problems. We observe that counties have similar patterns in admission rates, with Warren, Morris, Hunterdon and Burlington showing stronger similarities in patterns of admission for hypertension, angina and HF.

The top panel of Figure 4 presents asthma and chronic obstructive pulmonary disease (COPD) admission rates by county. Not surprisingly, asthma and COPD admission rates show similar patterns by county.

Figure 4 also presents dehydration and low birth weight admission rates by county and shows that the patterns are remarkably consistent.

Figure 5 presents admission rates for bacterial pneumonia and urinary tract infection admission rates. Perforated appendix admission rates are also presented in Figure 5. Perforated appendix admission rates appear to be highest in rural counties suggesting potential limitations in access to hospitals in a timely manner. Figure 6 shows composite PQIs by county.

Figure 1. Median Household Income by County New Jersey, 2014



Data Source: Census Bureau, 2014 American Community Survey.
(dollar estimates are inflation-adjusted.)

Figure 2. Diabetes-Related Hospital Admission Rates (per 100,000 population) by County, New Jersey 2014

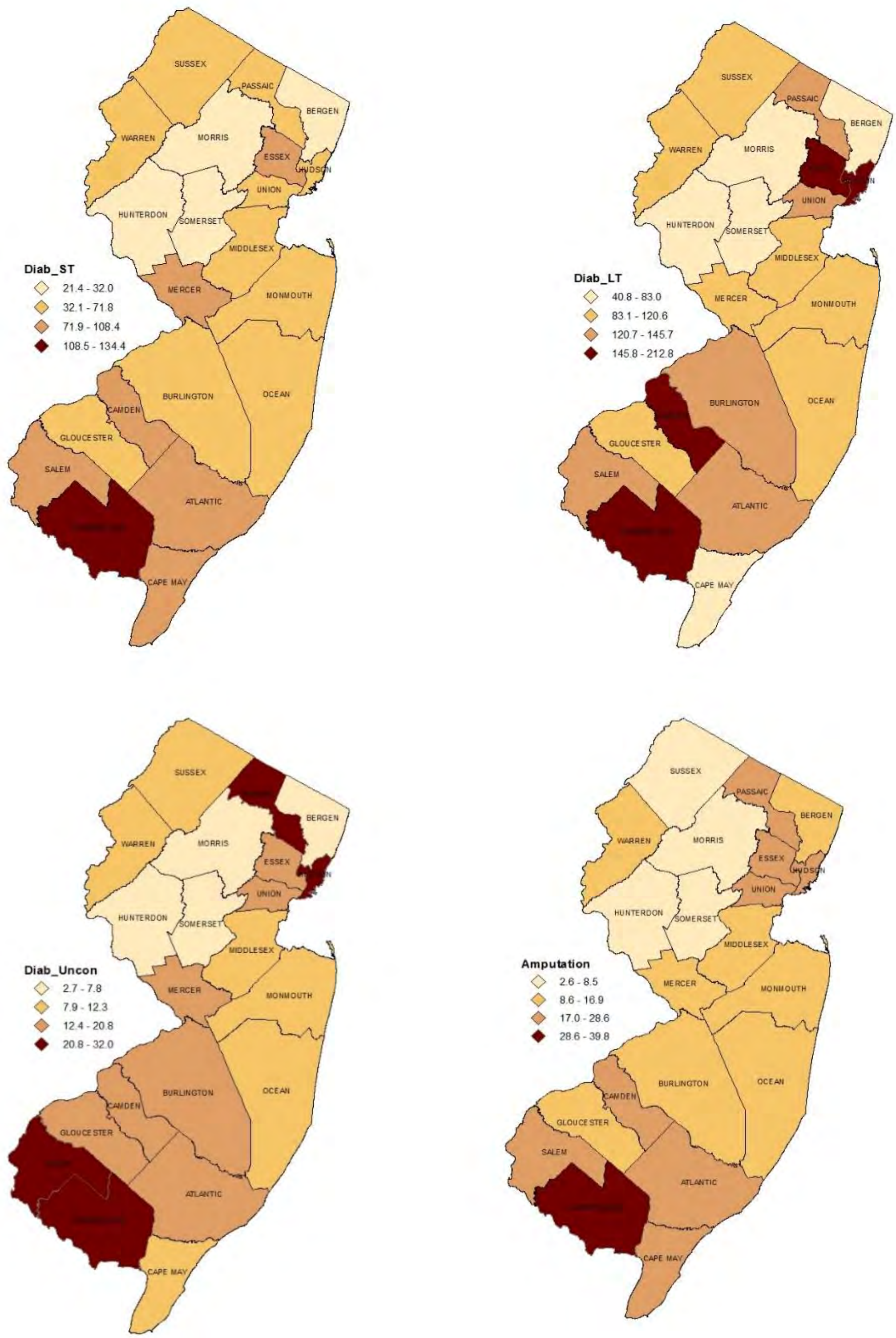


Figure 3. Hospital Admission Rates for Hypertension, Angina, and Heart Disease by County, New Jersey 2014

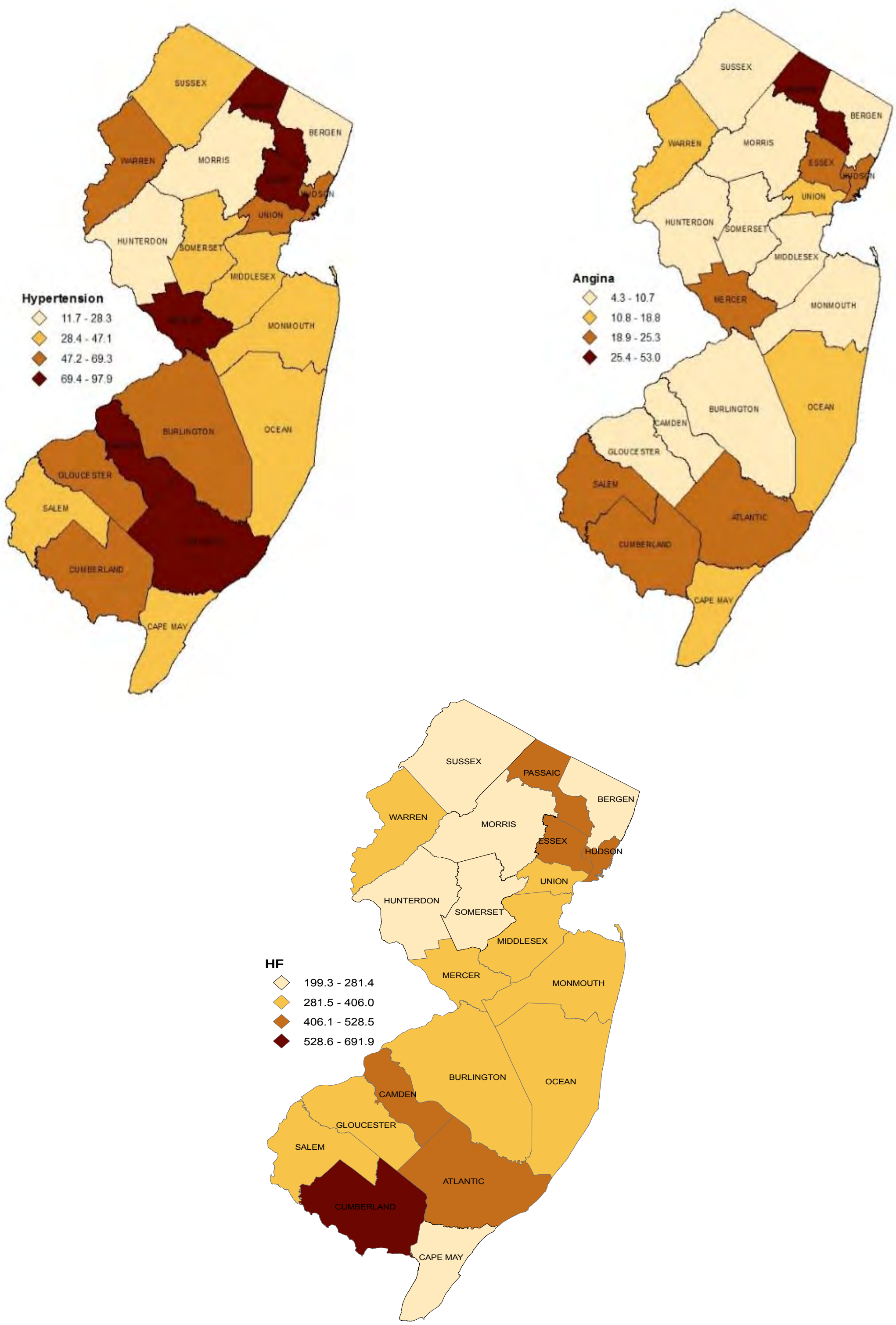


Figure 4. Hospital Admission Rates for Asthma, COPD, Dehydration (per 100,000), and Lower Birth Weight (per 1,000) by County, New Jersey 2014

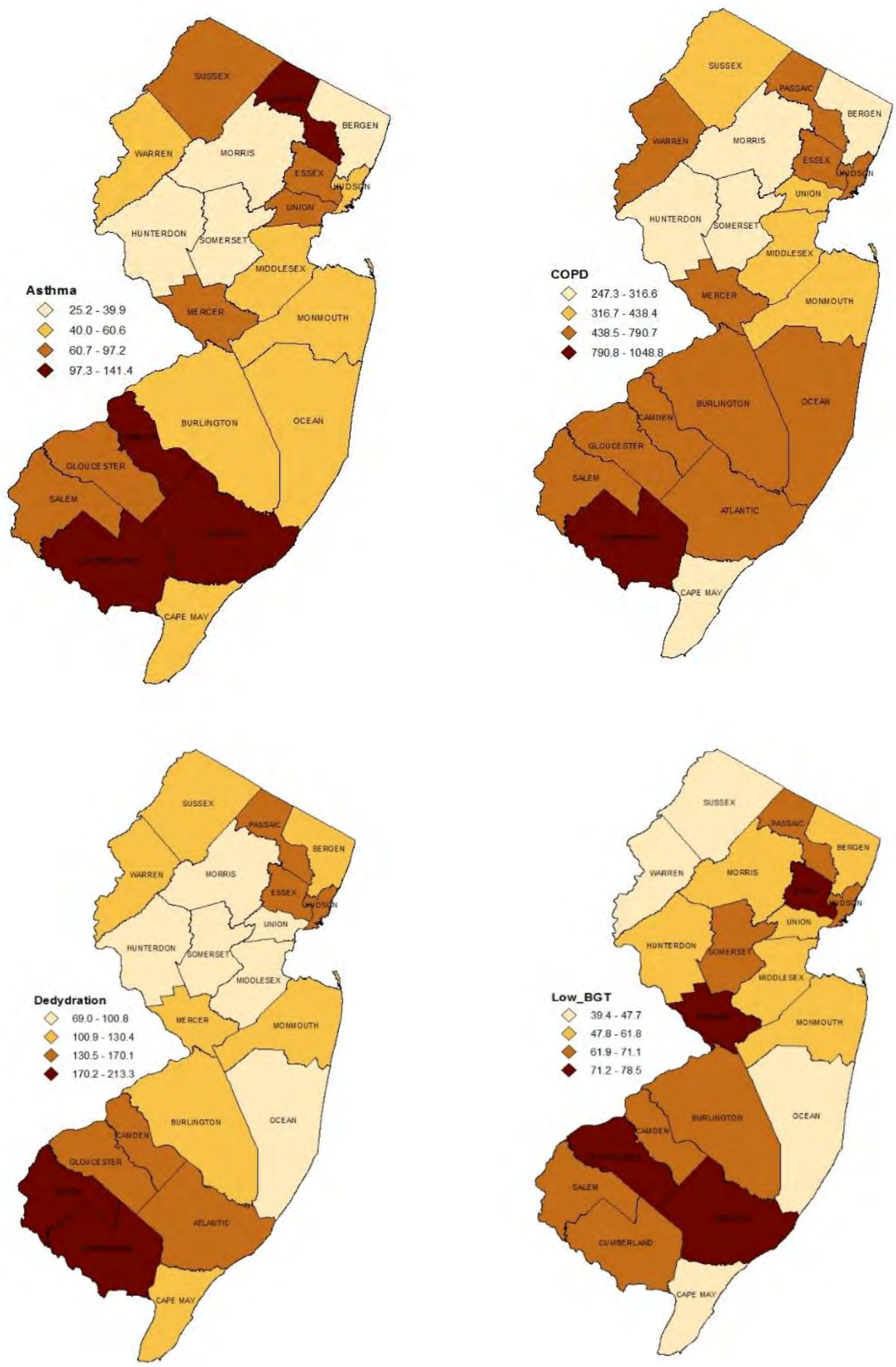
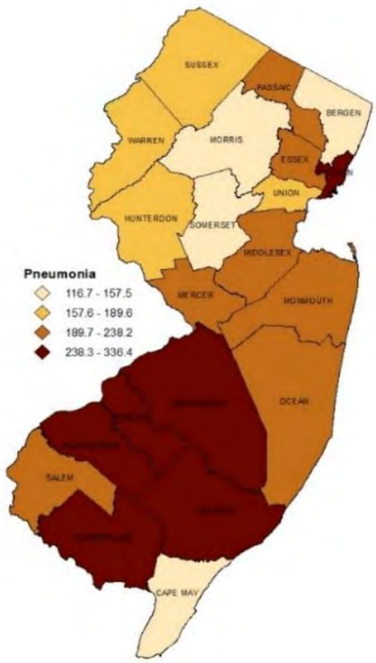
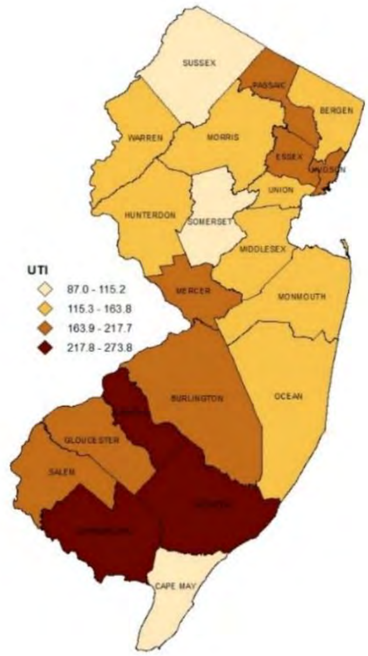


Figure 5. Hospital Admission Rates for Pneumonia, UTI (100,000), and Perforated Appendix (per 100) by County, New Jersey 2014





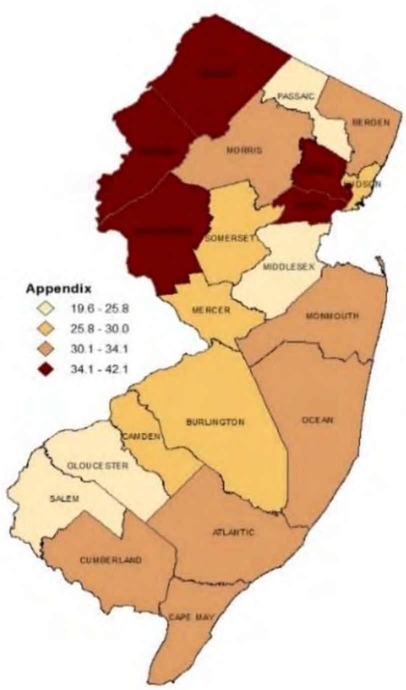
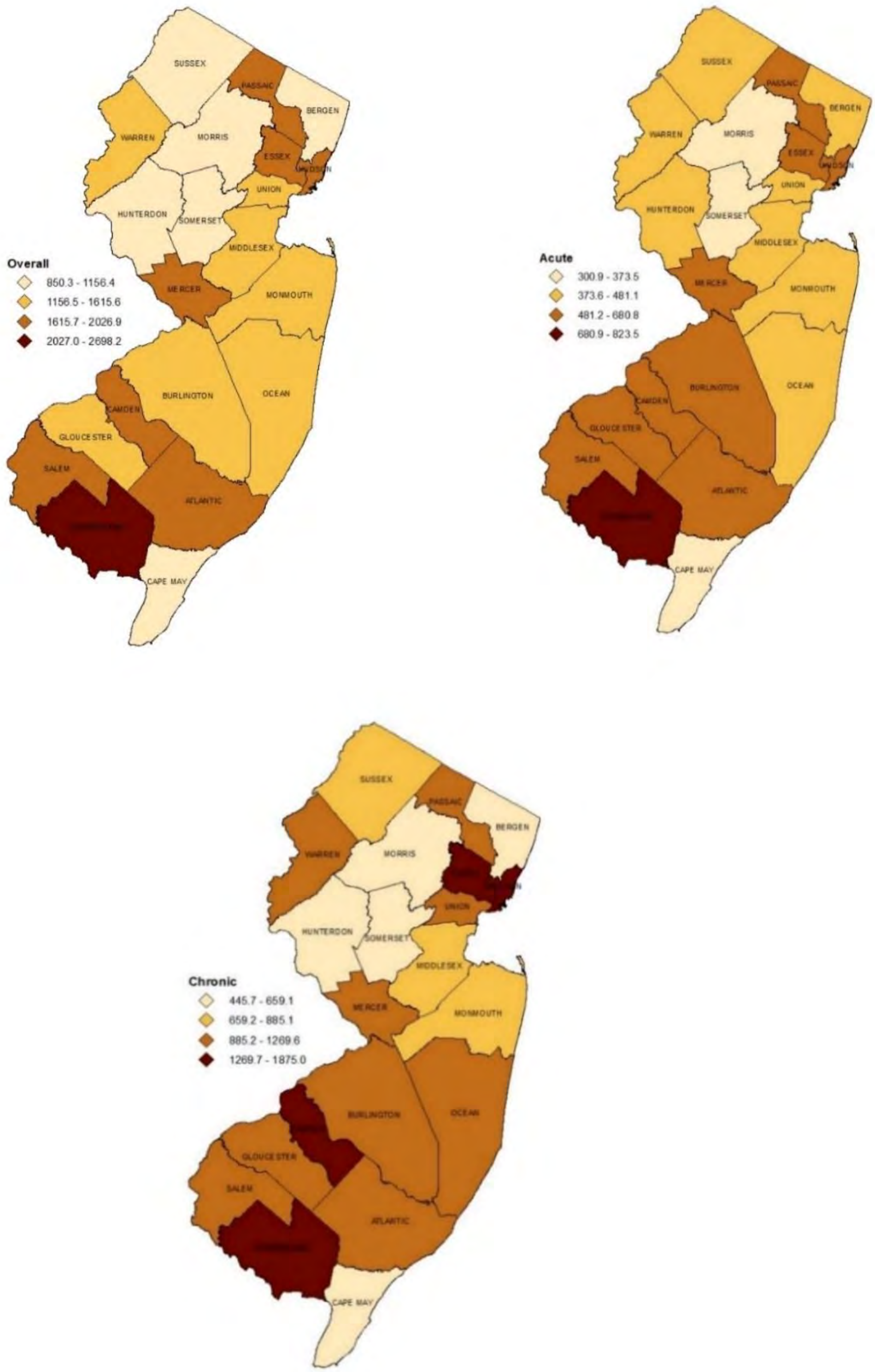


Figure 6. Composite Indicators by County, New Jersey 2014



Statewide PQI Measures Compared to National Estimates

Table 16 shows national and New Jersey's statewide-level prevention quality indicator estimates for the 14 individual PQIs and the 3 Composite PQIs analyzed in this report. The New Jersey statewide estimates are derived from the 2014 UB data using the PQIs module (SAS Version 5.0) while the national estimates are derived from the 2012 State Inpatient Data (SID) using the PQIs module (Version 5.0) - as reported in AHRQ's own Comparative Data Report released in March 2015.

- New Jersey's hospitalization rates for diabetes with long term complication, COPD, heart failure, asthma in younger adults, and lower extremity amputation were considerably higher than the national average.

- The composite measures suggest that New Jersey has higher hospitalization rates for chronic diseases compared to the national average.

Table 16. Comparing New Jersey's Statewide PQI Rates with National Rates

PQIs	New Jersey	National
Diabetes with Short Term Complications (PQI.01)	63.5	63.9
Perforated Appendix (PQI.02)	30.9	32.3
Diabetes with Long Term Complication (PQI.03)	124.1	105.7
COPD or Asthma in Older Adults (PQI.05)	506.8	495.7
Hypertension (PQI.07)	55.7	54.3
Heart Failure (PQI.08)	370.9	321.4
Low Birth Weight (PQI.09)	63.7	62.1
Dehydration (PQI.10)	120.1	135.7
Bacterial Pneumonia (PQI.11)	206.1	248.2
Urinary Tract Infection (PQI.12)	167.8	167.0
Angina Without Procedure (PQI.13)	15.8	13.3
Uncontrolled Diabetes (PQI.14)	15	15.7
Asthma in Younger Adults (PQI.15)	68.8	46.0
Lower Extremity Amputation (PQI.16)	17.1	15.5
Overall PQIs - Composite (PQI.90)	1,484.3	1,457.5
Acute PQIs - Composite (PQI.91)	494	550.9
Chronic PQIs - Composite (PQI.92)	992.5	905.9

Source: New Jersey numbers are derived from the 2014 UB Data using AHRQ SAS Software Version 5.0 while the national averages are drived from the 2012 Nationwide Inpatient Sample (NIS) using the same software version.

Note: Rate for Perforated Appendix is per 100 hospital admissions while rate for Low Birth Weight is per 1,000 livebirths. The rest of the rates are per 100,000 county population.

OVERALL - includes all 12 PQIs except PQI.02 and PQI.09

ACUTE - includes PQI.10, PQI.11, and PQI.12 only

CHRONIC - includes all 9 of the non-acute PQIs included under the composite - OVERALL.

Note: PQI.02 and PQI.09 are excluded from the PQI Composite measures.

Costs of Potentially Preventable Hospitalizations

This section presents potentially preventable hospitalizations and their associated costs. The terms “preventable hospitalizations” and “unnecessary hospitalizations” are often used interchangeably with “avoidable hospitalizations” to indicate the presence of hospital care for patients whose primary condition or diagnosis is one that, if detected and cared for effectively at an earlier point, may not lead to hospitalization. While not every hospitalization can be prevented through improvement in health care delivery, early detection, care, and education of persons with ambulatory care sensitive conditions may reduce rates of potentially avoidable hospitalizations and save both lives and cost.

Table 17 shows the amount of money that could be saved by reducing potentially avoidable hospitalizations among all the PQIs. These statistics would assist health care planners in identifying communities for future interventions to improve preventive and primary care services, improve patient safety as well as in tracking the impacts of such interventions over time. Such information is particularly relevant in assessing the role hospitals and physicians may play in containing health care expenditures arising from potentially avoidable hospitalizations.

As is well known, the UB database contains information on total charges for each patient’s in-hospital stay. This hospital charge information represents the amount that hospitals bill for services, but does not reflect how much hospital services actually cost or the specific amounts that hospitals received in payment. Often, users are interested in seeing how hospital charges translate into actual costs. The HCUP Cost-to-Charge Ratio (CCR) Files enable this conversion.

The HCUP Cost-to-Charge Ratio (CCR) files contains hospital-specific cost-to-charge ratios based on all-payer inpatient cost for nearly every hospital in the corresponding National Inpatient Sample (NIS) or State Inpatient Data (SID) sets. Cost information is obtained from the hospital accounting reports collected by the Centers for Medicare and Medicaid Services (CMS).

Hospitalization costs presented in this report are calculated using the HCUP Cost-to-charge-ratio (CCR) estimators. These estimates are obtained by multiplying total charges reported in the UB by cost-to-charge ratio (CCR) after data elements on the HCUP prepared CCR file for New Jersey were merged with our UB data using the appropriate procedure of merging different data sets.

In 2014, NJ hospitals reported about 106,188 hospitalizations for treatment of all the medical conditions outlined under the PQIs, which according to AHRQ’s specifications, are considered preventable. Using the cost-to-charge ratio estimators, potentially avoidable hospitalizations on the conditions presented in this report would have saved about 1.3 billion dollars ($1,259,590,375) in 2014 alone.

Table 17. Estimated Costs over Potentially Preventable Hospitalizations (in $)

Prevention Quality Indicators (PQIs)	# of Preventable Hospitaliza-tions	Average length of in-hospital stay (days)	Total estimated cost for all Preventable Hospitaliza-tions ($)	Average estimated cost per patient for all days ($)	Average estimated cost per patient per day ($)
Diabetes with Short Term Complications	4,300	4.6	51,042,505	11,870	2,558
Perforated Appendix	1,733	4.7	20,834,663	12,022	2,552
Diabetes with Long Term Complication	8,788	4.7	107,304,819	12,210	2,617
COPD or Asthma in Older Adults	22,310	4.6	265,268,131	11,890	2,599
Hypertension	3,997	4.7	50,036,484	12,519	2,689
Heart Failure	26,786	4.6	317,524,458	11,854	2,584
Dehydration	8,612	4.6	101,718,657	11,811	2,577
Bacterial Pneumonia	14,770	4.4	168,949,894	11,439	2,591
Urinary Tract Infection	12,149	4.5	140,922,447	11,600	2,554
Angina Without Procedure	1,132	4.7	13,267,629	11,721	2,513
Uncontrolled Diabetes	1,061	4.6	12,277,033	11,571	2,495
Asthma in Younger Adults	1,662	4.4	20,571,488	12,378	2,784
Lower Extremity Amputation	1,207	4.8	19,847,421	11,942	2,603
Overall PQIs - Composite	106,188	4.6	1,259,590,375	11,862	2,605
Acute PQIs - Composite	35,531	4.5	411,710,133	11,587	2,570
Chronic PQIs - Composite	70,659	4.6	848,854,831	12,013	2,624

Source: NJ UB 2014.

Cost = TOTCHG * GAPICC.

TOTCHG stands for Total Charges reported in UB data, while GAPICC stands for Group average all-payer inpatient cost/charge ratio (CCR). HCUP constructed the CCR files using all-payer, inpatient cost and charge information that hospitals report to CMS. CCR provides an estimate of all-payer inpatient cost-to-charge ratio for hospitals in states that participate in HCUP.

Note: The HCUP Cost-to-Charge Ratio (CCR) Files enable users to convert total charges reported in UB databases to estimated actual costs. Each file contains hospital-specific cost-to-charge ratios based on all-payer inpatient cost for nearly every hospital in the corresponding National Inpatient Sample (NIS) or State Inpatient Data (SID). Cost information was obtained from the hospital accounting reports collected by the Centers for Medicare and Medicaid Services (CMS). Using the merged data elements from the cost-to-charge ratio files and the total charges reported in the UB data sets, users may convert the hospital total charge data to cost estimates by simply multiplying total charges with the appropriate cost-to-charge ratio.

Potentially Preventable Hospitalizations by Payer Type

Table 18 shows the percentage distribution of potentially preventable hospitalizations for each PQI by health insurance payer type as reported in the 2014 UB database.

- Over 40 percent of the 26,786 potentially preventable hospitalizations for heart failure were paid for by Medicare. Similarly, close to 42 percent of the 22,310 hospitalizations for COPD were paid for by Medicare.

- Not surprisingly, more than 40 percent of all hospitalizations for dehydration, bacterial pneumonia, urinary tract infections, and lower extremity amputation were paid for by Medicare.

- Overall, more than 40 percent of potentially preventable hospitalizations both for acute and chronic conditions were paid for by Medicare. In 2011 (i.e., data reported in the 2013 Report), more than 60 percent of both acute and chronic conditions, were paid for by Medicare. Payment by private insurance for both acute and chronic conditions improved from about 20% in 2011 to about 35% in 2014.

- Hospitalizations for perforated appendix and bacterial pneumonia are the only ones where more than 36 percent of them were paid for by private insurance. It should also be noted that 34 percent of hospital admissions for asthma in younger adults (ages 18-39) were paid by private insurance, implying significant gain in health insurance coverage among young adults.

- Both HCUP and AHRQ reports have shown that hospital stays paid for by Medicare were over three times more likely to be potentially preventable than were stays paid for by private insurance.

Table 18. Preventable Hospitalizations by Payer Type

PQIs	# of Preventable hospitaliza-tions	Paid by (%)					
		Medicare	Medicaid	Private	Self Pay	Indigent	Other
Diabetes with Short Term Complications (PQI.01)	4,300	38.4	12.8	33.6	5.1	2.2	7.9
Perforated Appendix (PQI.02)	1,733	40.3	9.4	36.8	3.1	2.0	8.4
Diabetes with Long Term Complication (PQI.03)	8,788	39.8	10.8	35.4	4.2	1.7	8.1
COPD or Asthma in Older Adults (PQI.05)	22,310	41.5	11.0	34.5	4.0	2.2	6.9
Hypertension (PQI.07)	3,997	41.1	10.8	34.1	4.9	2.1	7.1
Heart Failure (PQI.08)	26,786	40.6	10.3	35.4	4.0	2.0	7.7
Dehydration (PQI.10)	8,612	41.2	9.9	35.7	4.0	2.1	7.1
Bacterial Pneumonia (PQI.11)	14,770	39.9	10.2	36.0	4.0	1.8	8.2
Urinary Tract Infection (PQI.12)	12,149	47.7	8.9	32.1	3.1	1.7	6.5
Angina Without Procedure (PQI.13)	1,132	39.6	12.0	33.2	5.0	2.1	8.1
Uncontrolled Diabetes (PQI.14)	1,061	35.3	15.2	35.6	3.6	2.2	8.2
Asthma in Younger Adults (PQI.15)	1,662	40.2	9.2	34.4	9.0	1.0	6.2
Lower Extremity Amputation (PQI.16)	1,207	40.6	11.3	32.2	4.9	2.2	8.9
Overall PQIs - Composite (PQI.90)	106,188	41.7	10.2	34.5	4.4	1.9	7.2
Acute PQIs - Composite (PQI.91)	35,531	43.9	9.5	34.1	3.6	1.8	7.1
Chronic PQIs - Composite (PQI.92)	70,659	40.5	10.6	34.8	4.9	1.9	7.3

Source: NJ UB 2014

OVERALL - includes all 12 PQIs except PQI.02 and PQI.09

ACUTE - includes PQI.10, PQI.11, and PQI.12 only

CHRONIC - includes all 9 of the non-acute PQIs included under the composite - OVERALL.

Note: PQI.02 and PQI.09 are excluded from the PQI Composite measures.

Selected Preventable Hospitalizations by Age, Sex and Race/Ethnicity

Tables 19-21 show potentially preventable hospital admission rates (adjusted) by age, sex and race/ethnicity, respectively, derived from the 2014 data for eight selected PQIs and two composite measures. The purpose of these tables is to assess the extent to which hospitalizations vary by socio-demographic characteristics with the hope that such information will shine some light for prevention services planning.

Table19 presents adjusted hospital admission rates by broad age groups. Among the 18-39 years old, hospitalization rates were higher for Heart Failure (321.1/100,000) followed by Bacterial Pneumonia (256.2/100,000) compared to other indicators. Among 40-64 years old, COPD hospitalizations were more distinct at 474.8/100,000 followed by Heart Failure (HF) at 320.8/100,000 and Bacterial Pneumonia at 208.7.0/100,000. Among the age group 65-74, the rate of hospitalizations for COPD was the highest at 516.1 per 100,000 followed by Heart Failure (390.6/100,000) and Bacterial Pneumonia (212.5/100,000). Among the 75 and older population, the highest hospitalization rate was due to COPD at 545.7/100.000; Heart Failure at 390.4/100,000 and Bacterial Pneumonia at 196.6/100,000. For all age groups, hospitalizations for chronic conditions were consistently higher compared with hospitalizations for acute conditions.

Table 20 shows potentially preventable hospitalizations of patients by gender for the eight PQIs and two composite measures. Among males, COPD with 496.5/100,000 hospitalization rate was the most prominent closely followed by HF (392.0/100,000). Likewise, COPD at 514.1 and Heart Failure at 351.8 per 100,000 stood out to reflect the highest hospital admission rates among females.

Table 21 shows variations in potentially preventable hospitalizations of patients by race/ethnicity for the selected eight PQIs and two composite measures. Diabetes w/short term complication hospitalization rate was much higher for Blacks (179.9) compared to the statewide average of 63.5 per 100,000. Except for race/ethnic ‘Asian NH’, COPD hospitalizations were associated with the highest rates followed by HF. The highest rate for Asian was Heart Failure. Though the patterns are similar across race/ethnic groups, the magnitudes of the rate vary substantially with blacks (African Americans) having higher rates compared to Whites for all measures. Non-Hispanic Asians showed consistently, lower rates of hospitalizations, than all the other race/ethnic groups.

Preventable hospitalization rates by socio-demographic characteristics clearly show wide variation. Some of these variations may result from lifestyle differences, lack of access to the healthcare system, or other social determinants of health.

Table 19. Hospitalized Patients for selected PQIs by Age

(Rates are per 100,000 population)

Selected PQIs	18 to 39		40 to 64		65 to 74		75+		Total (18+)	
	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate
Diabetes with Short Term Complications	1,782	61.2	1,836	59.7	381	95.1	301	97.4	**4,300**	**63.5**
COPD or Asthma in Older Adults (age 40+)	-	-	9,180	474.8	5,551	516.1	7,579	545.7	**22,310**	**507.3**
Hypertension	353	65.3	1,772	51.4	662	59.3	1,210	59.1	**3,997**	**55.9**
Heart Failure	444	321.1	5,914	320.8	5,250	390.6	15,178	390.4	**26,786**	**370.9**
Bacterial Pneumonia	1,095	256.2	4,389	208.7	2,715	212.5	6,571	196.6	**14,770**	**206.1**
Urinary Tract Infection	1,361	196.3	2,439	162.1	1,822	177.6	6,527	164.0	**12,149**	**167.8**
Asthma in Younger Adults	1,662	68.8	-	-	-	-	-	-	**1,662**	**68.8**
Lower Extremity Amputation	22	11.3	526	14.4	349	21.3	310	19.8	**1,207**	**17.1**
Acute PQIs - Composite	3,000	573.0	8,935	464.8	6,203	516.9	17,393	493.8	**35,531**	**494.0**
Chronic PQIs - Composite	5,222	1,022.3	24,227	890.6	14,372	1,058.0	26,838	1,070.7	**70,659**	**992.5**
NJ 2014 Population Estimate (by age group)	**2,513,046**		**3,099,545**		**727,091**		**586,412**		**6,926,094**	

Source: NJ UB 2014.

Table 20. Hospitalized Patients for selected PQIs by Sex

(Rates are per 100,000 population)

Selected PQIs	Male		Female		Total	
	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate
Diabetes with Short Term Complications	2,231	65.4	2,069	63.0	4,300	63.5
COPD or Asthma in Older Adults (age 40+)	8,475	496.5	13,835	514.1	22,310	507.3
Hypertension	1,667	58.8	2,330	53.9	3,997	55.7
Heart Failure	13,751	392.0	13,035	351.8	26,786	370.9
Bacterial Pneumonia	7,068	218.0	7,702	197.1	14,770	206.1
Urinary Tract Infection	3,441	183.9	8,708	163.3	12,149	167.8
Asthma in Younger Adults	592	76.3	1,070	67.3	1,662	68.8
Lower Extremity Amputation	848	18.2	359	15.1	1,207	17.1
Acute PQIs - Composite	14,244	513.3	21,287	484.6	35,531	494.0
Chronic PQIs - Composite	33,608	1,040.3	37,051	958.4	70,659	992.5
NJ 2014 Population Estimate	**3,334,777**		**3,591,317.0**		**6,926,094**	

Source: NJ UB 2014.

Table 21. Hospitalized Patients for selected PQIs by Race/Ethnicity

(Rates are per 100,000 population)

Selected PQIs	White NH		Black NH		Hispanic		Asian NH		Other		Total	
	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate
Diabetes with Short Term Complications	1,801	47.0	1,554	179.9	712	55.8	35	5.5	198	66.5	**4,300**	**63.5**
COPD or Asthma in Older Adults (age 40+)	14,231	457.1	4,651	986.9	2,128	440.8	299	100.8	1,001	436.8	**22,310**	**507.3**
Hypertension	1,681	34.6	1,552	195.9	456	50.0	115	21.8	193	56.1	**3,997**	**55.7**
Heart Failure	17,061	317.4	5,760	842.6	2,193	317.6	587	142.5	1,185	393.5	**26,786**	**370.9**
Bacterial Pneumonia	10,336	200.1	2,104	294.1	1,322	172.4	348	77.6	660	273.1	**14,770**	**206.5**
Urinary Tract Infection	8,300	158.4	1,633	226.4	1,358	178.4	248	58.2	610	174.6	**12,149**	**167.8**
Asthma in Younger Adults	668	60.3	536	160.6	340	57.6	13	4.4	105	48.1	**1,662**	**68.8**
Lower Extremity Amputation	652	13.3	333	44.5	132	15.8	19	3.7	71	16.0	**1,207**	**17.1**
Acute PQIs - Composite	24,503	472.8	5,226	727.0	3,380	440.1	761	172.1	1,661	396.3	**35,531**	**494.0**
Chronic PQIs - Composite	41,320	831.7	17,283	2,305.7	7,433	894.2	1,265	259.6	3,358	667.1	**70,659**	**992.5**
NJ 2014 Population Estimate	**4,104,115**		**876,252**		**1,224,896**		**640,319**		**80,512**		**6,926,094**	

Source: NJ UB 2014.

Summary of Findings

Potentially preventable hospitalizations (inpatient stays that might be avoided with the delivery of high quality outpatient treatment and disease management) serve as useful indicators of possible unmet community health needs. By measuring the frequency of such hospitalizations among patient subpopulations, policymakers and providers can identify those communities most in need of improvements in outpatient care as well as the conditions for which care is most needed. Rates of potentially preventable hospitalizations are higher for vulnerable populations with limited access to care. Targeting issues in access to primary care may serve to narrow disparities in health outcomes and improve the quality of care while reducing costs.

This report presents the number of preventable hospital admissions in each of the 21 counties. In addition, observed, expected and risk-adjusted rates for 14 prevention quality indicators are provided to help assess the quality of health care in each county. Statewide and national estimates are also provided to facilitate county to state and county to national comparisons.

According to the 2014 New Jersey data, there are substantial variations in preventable hospital admissions by county. Some counties exhibit significantly higher admission rates than the state while others have significantly lower rates. Not surprisingly, the variations appear to reflect the socio-economic disparities of the county populations, with more affluent counties having significantly lower rates than the state and the less affluent counties having significantly higher admission rates than the state. For example, hospital admissions for diabetes with short-term complications in Hunterdon, Morris, Bergen and Somerset counties are 21.4, 23.9, 27.5, and 32.0 per 100,000, respectively. By comparison, the rates for Cumberland, Atlantic, Essex, and Cape May counties are 134.4, 86.9, 93.7 and 79.7 per 100, 000, respectively.

In another example, the lowest rate of admission for hypertension is recorded in Hunterdon county (11.8 per 100,000) followed by Morris county (20.0 per 100,000) and Bergen county (28.4 per 100,000). By comparison, the highest rate of admission for hypertension is reported in Mercer county (97.9 per 100,000) followed by Camden county (97.1 per 100,000) and Essex county (83.8 per 100,000).

Other indicators also show similar variations by county, suggesting that PQIs are useful as baseline measures for the study of health disparities in geographic areas. A closer examination of PQI measures may help planners identify the socio-economic determinants of such huge variation in costly and potentially preventable hospitalizations. More importantly, this report can be used in promoting the expansion of primary health care facilities to provide better health care access to those in need. This will lower preventable and costly hospital admissions.

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