HCQA Health Care Quality Assessment

Prevention Quality Indicators

New Jersey 2011

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Chris Christie, *Governor*
Kim Guadagno, *Lt. Governor*

Mary E. O'Dowd, MPH
Commissioner

Prevention Quality Indicators

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Health Care Quality Assessment
Office of Policy and Strategic Planning
New Jersey Department of Health

Cathleen Bennett, Director
Office of Policy and Strategic Planning

Emmanuel Noggoh, Director, HCQA
Abate Mammo, PhD, Program Manager, HCQA
Markos Ezra, PhD, Research Scientist*, HCQA
Yong Sung Lee, PhD, Research Scientist, HCQA

* For inquiries, contact Markos Ezra, PhD, by phone at (800) 418-1397 or by email at Markos.Ezra@doh.state.nj.us.

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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. 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 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 2011 New Jersey inpatient hospital discharge data (or UB data).

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 identity 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 in order 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 2011 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 2011 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

- According to AHRQ's specifications, there were about 109,000 potentially preventable hospitalizations for treatment of medical conditions in 2011.

- The 2011 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 (Figures 1 to 6).

- In 2011, there were 4,135 hospital admissions for diabetes with short-term complications in New Jersey for a statewide risk-adjusted rate of 61.4 per 100,000 adults of ages 18 and over. Hospital admission rates for diabetes with short-term complications in Atlantic, Burlington, Camden, Cape May, Cumberland, Essex, Mercer, and Passaic were statistically significantly higher than the statewide average. By comparison, hospitalization rates for Bergen Hunterdon, Middlesex, Monmouth, Morris, Somerset, and Sussex were statistically significantly lower than the statewide average (Table 1).

- Statewide, there were 21,809 preventable hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) in 2011, for a risk-adjusted rate of 524.2 per 100,000 population aged 18 and over. Admission rates for COPD ranged from 221.1 per 100,000 in Somerset County to 815.5 per 100,000 in Hudson County (Table 4).

- Statewide, there were 4,593 preventable hospital admissions for hypertension treatment in 2011, for a risk-adjusted rate of 67.1 per 100,000 population ages 18 or older. Rates of admission for hypertension ranged from 17.9 per 100,000 in Hunterdon County to 107.3 in Essex and 121.3 per 100,000 in Camden County (Table 5).

- Statewide, there were 24,890 preventable Congestive Heart Failure (CHF) hospital admissions for a risk-adjusted average rate of 376.3 per 100,000 adults ages 18 or older. Seven counties (Atlantic, Camden, Cumberland, Essex, Gloucester, Hudson and Passaic) had significantly higher CHF admission rates than the statewide rate. By comparison, eight counties (Bergen, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Somerset, and Union) had rates that were significantly lower than the statewide CHF 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 9 of the 14 PQIs while the state's rates are higher than the national for diabetes with long-term complications, hypertension, low birth weight, angina without procedure, and adult asthma.

- Assuming that charges by hospitals approximate costs of treatment, potentially avoidable hospitalizations on these conditions would have saved approximately six billion dollars ($5,986,905,677) in 2011 if the 109,000 hospitalizations were avoided through better health care management (Table 17).

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 in order to improve the quality indicators.

This report presents findings from the application of the Prevention Quality Indicator (PQI) module (Version 4.4) to the 2011 New Jersey UB data. The report is organized into sections to help the reader follow the discussion better. The description of the Prevention Quality Indicators Module, Interpretation of the PQI Measures as well as 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. 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 2011 New Jersey data show that there are substantial variations in potentially preventable hospital admission rates by county. Some counties exhibit significantly higher rates (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.

According to the latest *News and Numbers* from the Agency for Healthcare Research and Quality (AHRQ)[1], about 1 in 10 of the nearly 40 million hospitalizations in 2008 was potentially avoidable, The four million potentially unnecessary admissions in 2008 were for conditions such as diabetes, dehydration, and certain heart conditions and infections for which hospitalization can be avoided if treated with appropriate outpatient care. With high-quality, community-based primary care, hospitalization for these illnesses often can be avoided.

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 congestive heart

[1] This AHRQ *News and Numbers* report is based on data in *Potentially Preventable Hospitalizations for Acute and Chronic Conditions, 2008*. The report uses data from the 2008 Nationwide Inpatient Sample, a database of hospital inpatient stays in all short-term, non-Federal hospitals. The data are drawn from hospitals that comprise 90 percent of all discharges in the United States and include all patients, regardless of insurance type.

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) Admission Rate (PQI.05)
- Hypertension Admission Rate (PQI.07)
- Congestive Heart Failure (CHF) 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)
- Adult Asthma Admission Rate (PQI.15)
- Rate of Lower-extremity Amputation Among Patients with Diabetes (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 4.4 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 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 HCUP State Inpatient Data (SID) that represents national average patient mix for that year. 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 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 instance, four indicators are related to diabetes – *uncontrolled diabetes, diabetes 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 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 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 two 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.

- 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 2011. 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 2009 HCUP - State Inpatient Data (SID) reported in the AHRQ PQI documentation (see Comparative Data via this link: http://www.qualityindicators.ahrq.gov/Archive/default.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)

The size of the U.S. population with diabetes is large and growing, suggesting that this indicator should be precisely measurable for most areas. In the U.S. in 2010, an estimated 25.6 million people over the age of 20 had diagnosed or undiagnosed diabetes, which is over 11 percent of the population. In 2010, 1.9 million people over the age of 20 were newly diagnosed with diabetes in the U.S. and 35 percent of the U.S. population from 2005 to 2008 had pre-diabetes. Acute diabetic complications were the seventh leading cause of death in the U.S. in 2007 (AHRQ)[2].

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 adult (18 years and older) county population. The indicator

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

includes all non-maternal/non-neonatal discharges of age 18 years and older with International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) principal 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*.

- Statewide, there were 4,135 hospital admissions for diabetes with short-term complications in 2011 for a risk-adjusted rate of 61.4 per 100,000 adult population. The national hospital admission rate for diabetes with short-term complications was 62.0 per 100,000 in 2009.

- 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 90.9 per 100,000 with a 95% confidence interval of 80.1 to 101.7. The statewide risk-adjusted rate of 61.4 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 20.5 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.

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	**4,135**	**61.2**	**64.7**	**61.4**	**59.4 - 63.3**
Atlantic	194	90.3	64.5	90.9 **	80.1 - 101.7
Bergen	179	25.6	63.3	26.3 *	20.2 - 32.3
Burlington	279	79.6	64.2	80.4 **	71.9 - 88.9
Camden	377	96.3	65.2	95.7 **	87.8 - 103.7
Cape May	66	84.2	59.9	91.3 **	72.7 - 109.8
Cumberland	114	94.3	66.2	92.4 **	78.2 - 106.6
Essex	599	102.7	66.2	100.6 **	94.2 - 107.1
Gloucester	154	68.9	65.3	68.5	58.0 - 79.0
Hudson	301	60.4	67.8	57.8	50.9 - 64.7
Hunterdon	20	20.1	63.5	20.5 *	4.5 - 36.5
Mercer	211	74.4	66.0	73.2 **	63.9 - 82.5
Middlesex	269	43.0	66.0	42.2 *	36.0 - 48.5
Monmouth	255	52.9	63.8	53.7 *	46.5 - 61.0
Morris	105	27.8	63.6	28.3 *	20.1 - 36.5
Ocean	235	52.1	60.5	55.9	48.2 - 63.5
Passaic	311	83.2	66.2	81.6 **	73.5 - 89.7
Salem	39	76.1	63.3	78.0	55.7 - 100.3
Somerset	67	27.2	64.2	27.5 *	17.4 - 37.6
Sussex	60	51.9	64.3	52.3 *	37.6 - 67.0
Union	241	59.9	65.3	59.6	51.7 - 67.4
Warren	59	69.7	63.8	71.0	53.7 - 88.3

Source: New Jersey 2011 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 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 1,782 hospital admissions for perforated appendix in 2011. The statewide risk-adjusted rate is 24.4 percent and compares favorably against the 2009 national rate of 28.8 percent.

- In comparing county-level risk-adjusted perforated appendix rates to the statewide risk-adjusted rate, we observe that 17 counties have rates that are similar to the statewide average. Only Cape May, with a risk-adjusted rate of 35.3 percent, has a statistically significantly higher rate than the statewide average of 24.4 percent. Hudson, Passaic and Warren have rates that are statistically significantly lower than the statewide average, suggesting that these three counties performed better compared to the statewide benchmark.

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

County	Hospital Admissions for Perforated Appendix	# of discharges with appendicitis	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**1,782**	**7438**	**24.0**	**28.3**	**24.4**	**23.4 - 25.4**
Atlantic	74	275	26.9	27.2	28.5	23.1 - 33.9
Bergen	174	744	23.4	29.2	23.0	19.9 - 26.1
Burlington	90	375	24.0	29.3	23.5	19.2 - 27.9
Camden	114	515	22.1	27.0	23.6	19.6 - 27.5
Cape May	22	54	40.7	33.2	35.3 **	25.0 - 45.6
Cumberland	48	171	28.1	27.3	29.6	22.8 - 36.4
Essex	140	541	25.9	27.7	26.8	23.1 - 30.6
Gloucester	56	243	23.0	27.0	24.5	18.8 - 30.3
Hudson	92	588	15.6	25.8	17.5 *	13.7 - 21.3
Hunterdon	22	61	36.1	32.8	31.7	21.7 - 41.6
Mercer	95	359	26.5	27.8	27.4	22.8 - 32.0
Middlesex	154	608	25.3	28.5	25.5	22.0 - 29.0
Monmouth	136	525	25.9	29.4	25.3	21.7 - 29.0
Morris	96	390	24.6	29.7	23.9	19.6 - 28.1
Ocean	146	505	28.9	31.0	26.9	23.3 - 30.4
Passaic	85	506	16.8	26.1	18.5 *	14.4 - 22.6
Salem	12	47	25.5	28.1	26.1	13.4 - 38.9
Somerset	50	220	22.7	27.5	23.8	17.8 - 29.8
Sussex	49	169	29.0	30.0	27.8	21.4 - 34.2
Union	119	450	26.4	29.1	26.1	22.1 - 30.1
Warren	8	92	8.7	26.6	9.4 *	0.0 - 18.8

Source: New Jersey 2011 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)

Long-term diabetes complications are an avoidable hospitalization/ambulatory care sensitive condition (ACSC) indicator. 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 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 2011 for diabetes with long-term complications by county along with observed, expected and risk-adjusted rates.

- Statewide, there were 9,055 hospital admissions in 2011 for diabetes with long-term complications. The risk-adjusted hospital admission rate for diabetes with long-term complications is 133.4 per 100,000 and is higher than the national rate of 121.6 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	**9,055**	**134.1**	**134.7**	**133.4**	**130.6 - 136.1**
Atlantic	334	155.4	138.1	150.8 **	135.6 - 166.0
Bergen	589	84.3	142.3	79.4 *	71.1 - 87.7
Burlington	525	149.7	138.4	145.0	133.1 - 156.9
Camden	588	150.1	131.6	152.9 **	141.3 - 164.4
Cape May	141	180.0	163.6	147.4	124.2 - 170.6
Cumberland	252	208.6	128.0	218.3 **	197.2 - 239.4
Essex	1,267	217.1	125.2	232.4 **	222.6 - 242.1
Gloucester	267	119.5	132.4	121.0	105.7 - 136.3
Hudson	875	175.6	112.4	209.3 **	198.3 - 220.4
Hunterdon	52	52.1	143.8	48.6 *	26.7 - 70.5
Mercer	412	145.4	129.4	150.5 **	136.8 - 164.2
Middlesex	627	100.2	127.9	105.0 *	95.7 - 114.2
Monmouth	597	123.7	141.4	117.3 *	107.3 - 127.4
Morris	301	79.6	141.5	75.4 *	64.0 - 86.7
Ocean	593	131.4	158.7	111.0 *	101.2 - 120.8
Passaic	504	134.9	127.5	141.8	129.8 - 153.9
Salem	122	238.2	142.7	223.7 **	193.0 - 254.4
Somerset	125	50.8	136.7	49.8 *	35.5 - 64.1
Sussex	164	141.8	138.6	137.1	116.4 - 157.8
Union	610	151.7	131.2	155.0 **	143.5 - 166.4
Warren	110	130.0	142.0	122.7	98.8 - 146.7

Source: New Jersey 2011 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). The indicator includes all non-maternal discharges age 18 and older with ICD-9-CM principal diagnosis codes for COPD, excluding transfers from another institution, MDC 14 (pregnancy, childbirth, and puerperium) and MDC 15 (newborn and other neonates).

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 21,809 hospital admissions for *COPD* or asthma in older adults in 2011. The statewide risk-adjusted hospital admissions rate for *COPD* or asthma in older adults is 524.2 per 100,000 with a 95% confidence interval of 516.8 to 531.5.

- The national *COPD* admission rate in 2009 was 575.5 per 100,000.

- New Jersey, with a risk-adjusted *COPD* admission or asthma rate of 524.2 per 100,000 performed better compared to the national benchmark of 575.5 per 100,000.

- Readers may assess county performance on COPD admissions by comparing the county rate against the statewide rate.

Table 4. Hospital Admissions for Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults (per 100,000 county population, age 40+)

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**21,809**	**503.5**	**564.7**	**524.2**	516.8 - 531.5
Atlantic	807	569.8	568.9	588.6 **	548.2 - 629.1
Bergen	1,737	368.0	579.7	373.1 *	351.2 - 395.1
Burlington	1,152	492.5	562.1	515.1	483.4 - 546.7
Camden	1,706	696.6	562.6	727.8 **	696.9 - 758.7
Cape May	311	537.1	649.0	486.5	427.3 - 545.7
Cumberland	503	698.8	559.7	733.9 **	676.7 - 791.1
Essex	2,503	713.2	544.0	770.7 **	744.4 - 796.9
Gloucester	819	570.6	546.1	614.3 **	573.3 - 655.2
Hudson	1,920	749.1	539.9	815.5 **	784.7 - 846.4
Hunterdon	162	221.5	523.0	248.9 *	190.2 - 307.5
Mercer	936	538.1	559.2	565.5 **	528.8 - 602.3
Middlesex	1,418	375.1	555.0	397.2 *	372.2 - 422.3
Monmouth	1,560	467.1	555.0	494.7 *	468.1 - 521.4
Morris	727	278.2	554.9	294.6 *	264.5 - 324.8
Ocean	2,004	635.4	670.1	557.3 **	532.4 - 582.3
Passaic	1,305	575.7	553.9	610.9 **	578.6 - 643.3
Salem	228	662.4	582.1	668.9 **	587.9 - 749.9
Somerset	336	200.6	533.3	221.1 *	182.7 - 259.5
Sussex	298	367.4	518.1	416.8 *	360.8 - 472.8
Union	1,037	409.0	551.9	435.6 *	404.9 - 466.2
Warren	340	578.4	555.1	612.5 **	549.0 - 676.0

Source: New Jersey 2011 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 actually 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 care. 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.

- Statewide, there were 4,593 potentially preventable hospital admissions for hypertension treatment in 2011, for a risk-adjusted rate of 67.1 per 100,000 adults of age 18 or older. Rates of admission for hypertension ranged from 17.9 per 100,000 in Hunterdon County to 121.3 per 100,000 in Camden County and 107.3 in Essex.

- With a risk-adjusted rate of 67.1 per 100,000, New Jersey's hypertension rate is higher than the national average of 65.1 per 100,000.

- Nine counties (Atlantic, Burlington, Camden, Essex, Gloucester, Hudson, Mercer, Passaic and Warren) have statistically significantly higher admission rates for hypertension compared to the statewide average.

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

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**4,593**	**68.0**	**65.3**	**67.1**	**65.2 - 69.0**
Atlantic	182	84.7	66.2	82.6 **	72.0 - 93.1
Bergen	272	38.9	69.3	36.2 *	30.5 - 41.9
Burlington	288	82.1	66.8	79.2 **	71.0 - 87.5
Camden	471	120.3	63.9	121.3 **	113.3 - 129.3
Cape May	58	74.0	77.7	61.4	45.2 - 77.6
Cumberland	84	69.5	61.5	72.8	58.2 - 87.5
Essex	594	101.8	61.2	107.3 **	100.6 - 114.0
Gloucester	184	82.4	63.8	83.2 **	72.6 - 93.8
Hudson	383	76.9	54.0	91.7 **	84.0 - 99.4
Hunterdon	19	19.1	68.5	17.9 *	2.7 - 33.2
Mercer	233	82.2	62.9	84.3 **	74.8 - 93.7
Middlesex	330	52.7	61.9	54.9 *	48.5 - 61.3
Monmouth	280	58.0	68.8	54.4 *	47.5 - 61.4
Morris	109	28.8	68.5	27.1 *	19.3 - 35.0
Ocean	283	62.7	77.2	52.4 *	45.6 - 59.2
Passaic	314	84.0	61.7	87.8 **	79.5 - 96.1
Salem	41	80.1	68.9	74.9	53.6 - 96.1
Somerset	98	39.8	66.7	38.5 *	28.6 - 48.3
Sussex	67	57.9	65.8	56.8	42.3 - 71.2
Union	220	54.7	64.3	54.9 *	47.0 - 62.7
Warren	83	98.1	68.9	91.9 **	75.3 - 108.4

Source: New Jersey 2011 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. Congestive Heart Failure (PQI.08)

Somewhere around 5.8 million people in the United States have heart failure (HF), and about 670,000 people are diagnosed with it each year. The most common causes of HF are coronary artery disease (CAD), high blood pressure, and diabetes (AHRQ)[3].

Usually congestive heart failure (CHF) 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 CHF, 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 CHF admissions may include poor quality of care, lack of patient compliance, or problems of access to care, counties may wish to review CHF patient records to identify precipitating causes and potential targets for intervention. As a PQI, CHF is not a measure of hospital quality, but rather a measure of outpatient and other health care. The rate is defined as admissions for CHF per 100,000 county population age 18 or older with ICD-9-CM principal diagnosis codes for CHF. It excludes transfers from another institution, MDC 14 (pregnancy, childbirth, and puerperium), MDC 15 (newborn and other neonates), and those with cardiac procedure codes.

Table 6 shows the number of hospital admissions for c*ongestive heart failure* by county along with their *observed, expected and risk-adjusted rates*.

- Statewide, there were 24,890 hospital admissions for *congestive heart failure* in 2011. The risk-adjusted hospital admissions rate for *congestive heart failure* is 376.3 per 100,000.

- Rates of admission for CHF ranged from a low of 227.1 per 100,000 in Hunterdon to a high of 620.6 per 100,000 in Cumberland.

- Congestive heart failure hospital admission rate for New Jersey in 2011 (376.3 per 100,000) is markedly lower than the national average rate in 2009 (412.6 per 100,000).

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

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

County	Hospital admissions	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**24,890**	**368.5**	**405.6**	**376.3**	371.5 - 381.2
Atlantic	889	413.7	408.2	419.8 **	392.6 - 447.0
Bergen	2,231	319.3	450.9	293.3 *	279.0 - 307.6
Burlington	1,286	366.8	414.0	367.0	345.9 - 388.1
Camden	1,731	442.0	393.6	465.2 **	444.7 - 485.7
Cape May	392	500.3	553.9	374.1	335.5 - 412.7
Cumberland	678	561.1	374.5	620.6 **	582.8 - 658.4
Essex	2,460	421.6	356.7	489.5 **	471.8 - 507.1
Gloucester	972	435.2	376.5	478.8 **	451.0 - 506.5
Hudson	1,930	387.4	298.7	537.1 **	516.3 - 558.0
Hunterdon	200	200.5	395.7	209.9 *	169.3 - 250.4
Mercer	977	344.7	386.3	369.6	345.3 - 393.9
Middlesex	1,890	302.1	376.2	332.5 *	315.9 - 349.1
Monmouth	1,638	339.5	427.7	328.7 *	311.0 - 346.5
Morris	1,053	278.4	426.9	270.1 *	250.1 - 290.2
Ocean	2,237	495.6	574.1	357.6 *	341.8 - 373.4
Passaic	1,512	404.7	370.6	452.3 **	430.7 - 474.0
Salem	232	453.0	447.4	419.3	366.2 - 472.5
Somerset	535	217.2	396.1	227.1 *	201.4 - 252.9
Sussex	394	340.6	371.4	379.8	341.0 - 418.7
Union	1,304	324.2	393.2	341.5 *	321.3 - 361.7
Warren	349	412.5	428.3	399.0	356.7 - 441.3

Source: New Jersey 2011 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)[4].

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 interuterine 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)[5]. 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 100 newborns excluding premature deliveries and sick babies.

- In 2011, there were 6,688 newborns in New Jersey classified as low birth weight for a risk-adjusted low birth weight rate of 65.4 per 1,000. The rates suggest that New Jersey's performance is worse compared to the national average of 62.9 per 1,000 in 2009, the latest national data available.

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

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

[5] 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 (<2500 gms)	All live births~	Observed rate	Expected rate^	Risk-adjusted rate	95% Confidence Interval
Statewide	**6,688**	**102,295**	**65.4**	**60.9**	**65.4**	**63.9 - 66.8**
Atlantic	211	3,210	65.7	60.9	65.8	57.5 - 74.0
Bergen	516	8,345	61.8	60.9	61.8	56.7 - 67.0
Burlington	325	4,535	71.7	60.9	71.7	64.7 - 78.7
Camden	452	6,180	73.1	61.0	73.1 **	67.1 - 79.0
Cape May	34	926	36.7	60.9	36.8 *	21.3 - 52.2
Cumberland	56	2,272	24.6	61.0	24.6 *	14.8 - 34.4
Essex	858	10,260	83.6	61.0	83.6 **	79.0 - 88.2
Gloucester	198	2,952	67.1	60.9	67.1	58.5 - 75.7
Hudson	622	8,897	69.9	60.9	70.0	65.0 - 74.9
Hunterdon	64	974	65.7	60.7	66.0	50.9 - 81.0
Mercer	304	4,336	70.1	60.9	70.2	63.0 - 77.3
Middlesex	546	9,446	57.8	60.9	57.9 *	53.0 - 62.7
Monmouth	384	6,166	62.3	61.0	62.2	56.2 - 68.2
Morris	248	4,539	54.6	60.9	54.7 *	47.7 - 61.6
Ocean	379	7,861	48.2	60.9	48.2 *	42.9 - 53.5
Passaic	538	6,985	77.0	61.0	77.0 **	71.4 - 82.6
Salem	30	509	58.9	60.9	58.9	38.2 - 79.7
Somerset	162	2,689	60.2	60.9	60.3	51.2 - 69.3
Sussex	106	1,617	65.6	60.8	65.7	54.0 - 77.3
Union	459	6,656	69.0	61.0	68.9	63.2 - 74.7
Warren	40	826	48.4	60.9	48.5 *	32.1 - 64.8

Source: New Jersey 2011 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.

~ Premature deliveries and sick babies are excluded from the denominator.

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 rates of dehydration are identified for a particular hospital, additional study 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 8,307 hospital admissions for dehydration in 2011. The risk-adjusted hospital admissions rate for dehydration is 124.4 per 100,000.

- The national *dehydration* admission rate in 2009 was 147.1 per 100,000. New Jersey, with a risk-adjusted rate of 124.4 performed significantly better compared to the national benchmark of 147.1.

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

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	**8,307**	**123.0**	**174.6**	**124.4**	**121.2 - 127.5**
Atlantic	405	188.5	175.4	189.8 **	172.0 - 207.5
Bergen	808	115.6	189.5	107.8 *	98.3 - 117.3
Burlington	452	128.9	177.2	128.4	114.6 - 142.3
Camden	576	147.1	171.0	151.9 **	138.5 - 165.2
Cape May	178	227.2	222.3	180.4 **	154.3 - 206.5
Cumberland	118	97.7	163.0	105.8	81.2 - 130.4
Essex	793	135.9	159.5	150.4 **	139.1 - 161.8
Gloucester	300	134.3	165.4	143.4 **	125.4 - 161.3
Hudson	615	123.4	139.4	156.4 **	143.3 - 169.5
Hunterdon	78	78.2	171.0	80.8 *	54.3 - 107.2
Mercer	319	112.6	168.2	118.1	102.3 - 133.9
Middlesex	619	98.9	164.6	106.1 *	95.4 - 116.9
Monmouth	564	116.9	182.1	113.3	101.7 - 125.0
Morris	417	110.3	181.4	107.3 *	94.2 - 120.5
Ocean	524	116.1	229.2	89.4 *	78.7 - 100.2
Passaic	481	128.7	163.3	139.2 **	125.2 - 153.2
Salem	101	197.2	188.0	185.2 **	150.0 - 220.3
Somerset	234	95.0	171.9	97.6 *	80.8 - 114.3
Sussex	182	157.3	163.0	170.4 **	145.3 - 195.6
Union	417	103.7	170.9	107.1 *	94.0 - 120.3
Warren	126	148.9	182.1	144.4	116.6 - 172.2

Source: New Jersey 2011 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 an avoidable hospitalization/ambulatory care sensitive condition (ACSC) indicator. High admission rates may reflect a 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 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 particular problem for this indicator. High rates may reflect a 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.

- The national average admission rate for bacterial pneumonia in 2009 was 359.1 per 100,000 population, age 18+.

- In New Jersey, there were 17,917 hospital admissions for bacterial pneumonia in 2011. With a risk-adjusted rate of 269.3 per 100,000, New Jersey had a significantly lower rate than the national benchmark of 359.1.

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

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	**17,917**	**265.3**	**363.8**	**269.3**	**264.7 - 273.9**
Atlantic	656	305.3	366.4	307.8 **	282.1 - 333.5
Bergen	1,731	247.8	398.3	229.8 *	216.2 - 243.4
Burlington	975	278.1	370.8	277.1	257.1 - 297.0
Camden	1,365	348.5	354.6	363.1 **	343.8 - 382.4
Cape May	342	436.5	474.7	339.6 **	302.3 - 376.9
Cumberland	406	336.0	338.5	366.7 **	331.1 - 402.3
Essex	1,496	256.4	327.5	289.2 **	272.7 - 305.7
Gloucester	753	337.1	342.7	363.4 **	337.3 - 389.4
Hudson	1,141	229.0	282.5	299.4 **	280.2 - 318.6
Hunterdon	214	214.5	358.7	221.0 *	182.9 - 259.0
Mercer	712	251.2	348.5	266.3	243.4 - 289.2
Middlesex	1,379	220.4	341.3	238.6 *	223.0 - 254.1
Monmouth	1,338	277.3	380.9	268.9	252.1 - 285.7
Morris	808	213.7	380.8	207.3 *	188.3 - 226.2
Ocean	1,514	335.4	489.1	253.3 *	238.0 - 268.6
Passaic	889	237.9	337.2	260.7	240.4 - 281.0
Salem	218	425.6	394.3	398.7 **	348.1 - 449.4
Somerset	394	160.0	358.0	165.1 *	140.8 - 189.3
Sussex	358	309.5	339.8	336.4 **	300.1 - 372.7
Union	1,002	249.1	354.4	259.7	240.6 - 278.7
Warren	226	267.1	381.6	258.6	218.5 - 298.7

Source: New Jersey 2011 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 12,849 hospital admissions for urinary tract infection in 2011. The risk-adjusted hospital admissions rate for urinary tract infection is 193.6 per 100,000.

- With a risk-adjusted rate of 193.6 per 100,000, New Jersey performed better compared to the national urinary tract infection rate of 212.1 per 100,000 in 2009.

- 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.

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	**12,849**	**190.2**	**203.6**	**193.6**	**190.2 - 197.1**
Atlantic	539	250.8	201.6	257.9 **	238.4 - 277.3
Bergen	1,180	168.9	223.0	157.0 *	146.8 - 167.2
Burlington	919	262.1	204.2	266.1 **	251.0 - 281.2
Camden	1,169	298.5	200.4	308.7 **	294.3 - 323.1
Cape May	182	232.3	260.1	185.1	156.8 - 213.4
Cumberland	297	245.8	188.0	271.0 **	244.1 - 297.8
Essex	1,001	171.6	186.1	191.0	178.8 - 203.3
Gloucester	467	209.1	189.6	228.5 **	208.9 - 248.2
Hudson	966	193.9	161.4	249.1 **	234.8 - 263.3
Hunterdon	136	136.3	188.0	150.4 *	120.8 - 179.9
Mercer	556	196.2	197.5	205.9	188.8 - 223.0
Middlesex	832	133.0	192.1	143.5 *	131.8 - 155.2
Monmouth	892	184.9	211.3	181.4	168.7 - 194.1
Morris	569	150.5	209.2	149.1 *	134.7 - 163.5
Ocean	1,096	242.8	277.5	181.4 *	170.0 - 192.8
Passaic	691	184.9	190.5	201.3	186.1 - 216.5
Salem	154	300.7	220.6	282.5 **	244.5 - 320.6
Somerset	267	108.4	197.8	113.6 *	95.3 - 131.9
Sussex	156	134.9	179.3	156.0 *	127.8 - 184.1
Union	638	158.6	200.9	163.7 *	149.5 - 177.9
Warren	142	167.9	210.5	165.3	135.0 - 195.6

Source: New Jersey 2011 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 health care 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 1,650 hospital admissions for angina (without procedure) in 2011. The statewide risk-adjusted hospital admissions rate for angina (without procedure) is 24.0 per 100,000. By comparison, the 2009 national hospital admissions rate for angina (without procedure) was 23.3 per 100,000.

- Essex, Hudson, Passaic and Warren have statistically significantly higher angina admission rates than the statewide average while Bergen, Burlington, Hunterdon, Middlesex, Monmouth, Morris, Somerset and Sussex have statistically significantly lower rates.

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	**1,650**	**24.4**	**27.9**	**24.0**	**22.7 - 25.2**
Atlantic	63	29.3	28.7	28.0	21.2 - 34.9
Bergen	123	17.6	29.7	16.3 *	12.5 - 20.0
Burlington	38	10.8	28.9	10.3 *	5.0 - 15.6
Camden	79	20.2	27.3	20.3	15.1 - 25.5
Cape May	23	29.4	34.2	23.6	13.2 - 34.0
Cumberland	28	23.2	26.2	24.3	14.7 - 33.8
Essex	158	27.1	25.8	28.7 **	24.4 - 33.1
Gloucester	48	21.5	27.5	21.4	14.6 - 28.3
Hudson	155	31.1	22.4	38.1 **	33.0 - 43.1
Hunterdon	9	9.0	30.5	8.1 *	0.0 - 17.9
Mercer	60	21.2	26.8	21.7	15.5 - 27.9
Middlesex	107	17.1	26.3	17.8 *	13.6 - 22.0
Monmouth	76	15.8	29.8	14.5 *	10.0 - 19.0
Morris	46	12.2	29.6	11.3 *	6.2 - 16.3
Ocean	137	30.4	32.9	25.3	20.9 - 29.7
Passaic	294	78.7	26.3	82.1 **	76.7 - 87.5
Salem	14	27.3	29.8	25.2	11.4 - 38.9
Somerset	21	8.5	28.7	8.1 *	1.8 - 14.5
Sussex	12	10.4	29.2	9.7 *	0.5 - 19.0
Union	109	27.1	27.2	27.3	22.1 - 32.4
Warren	50	59.1	29.8	54.3 **	43.6 - 65.0

Source: New Jersey 2011 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 picture of glycemic control. However, it is unclear whether poor glycemic control arises from poor quality medical care, non-compliance of patients, lack of education, or access to care problems. 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, which include diabetic ketoacidosis, hyperosmolarity, and coma (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 1,454 hospital admissions for uncontrolled diabetes in 2011. The risk-adjusted rate is 21.2 per 100,000. By comparison, the national admission rate for uncontrolled diabetes in 2009 was 22.5 per 100,000.

- Hospital admission rates for uncontrolled diabetes in Camden, 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	**1,454**	**21.5**	**22.8**	**21.2**	**20.1 - 22.4**
Atlantic	45	20.9	23.2	20.3	14.1 - 26.6
Bergen	99	14.2	23.7	13.5 *	10.0 - 16.9
Burlington	61	17.4	23.3	16.8	11.9 - 21.7
Camden	119	30.4	22.4	30.5 **	25.8 - 35.2
Cape May	15	19.1	25.6	16.8	7.0 - 26.7
Cumberland	31	25.7	22.0	26.3	17.7 - 34.8
Essex	219	37.5	21.8	38.7 **	34.8 - 42.6
Gloucester	37	16.6	22.6	16.5	10.3 - 22.6
Hudson	190	38.1	20.1	42.6 **	38.2 - 47.0
Hunterdon	3	3.0	24.2	2.8 *	0.0 - 11.8
Mercer	73	25.8	22.2	26.1	20.6 - 31.7
Middlesex	117	18.7	22.0	19.1	15.4 - 22.9
Monmouth	85	17.6	23.7	16.7 *	12.6 - 20.8
Morris	32	8.5	23.7	8.0 *	3.4 - 12.7
Ocean	61	13.5	24.9	12.2 *	8.0 - 16.3
Passaic	102	27.3	21.9	28.0 **	23.1 - 32.9
Salem	28	54.7	23.6	52.1 **	39.4 - 64.8
Somerset	27	11.0	23.4	10.6 *	4.7 - 16.4
Sussex	20	17.3	23.6	16.5	8.1 - 24.9
Union	74	18.4	22.5	18.4	13.8 - 23.0
Warren	16	18.9	23.8	17.9	8.1 - 27.7

Source: New Jersey 2011 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 a common and growing health issue for younger and older adults. Data from the National Health Interview Survey (NHIS), 2009, show that a total of 39,930,000 people ages 18 years and older in the U.S. reported as having been diagnosed for asthma between 2008 and 2009. Many studies have associated increased asthma hospitalization rates with lower socioeconomic status, though in many of these studies confounding factors were not properly controlled for. Surveys covering patients admitted for asthma in low income areas have found lack of inadequate outpatient care as a prevalent problem. One well designed study noted that 70 percent of the variance in asthma admission rates is explainable by household income (AHRQ)[1].

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 young adult asthma per 100,000. The measure includes all non-maternal discharges age 18 and older 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.

- In New Jersey, there were 1,787 hospital admissions for asthma in young adults (ages 18 to 40) in 2011 for a risk-adjusted rate of 73.1 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 2009, of 63.6 per 100,000.

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

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

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	**1,787**	**73.7**	**65.5**	**73.1**	69.9 - 76.3
Atlantic	76	103.8	65.2	103.3 **	84.9 - 121.8
Bergen	103	45.4	66.7	44.3 *	33.9 - 54.6
Burlington	97	83.1	65.0	83.0	68.4 - 97.6
Camden	170	115.9	65.3	115.3 **	102.3 - 128.3
Cape May	26	127.1	62.5	132.1 **	96.5 - 167.7
Cumberland	44	90.1	62.0	94.3	71.2 - 117.5
Essex	267	114.8	66.4	112.4 **	102.2 - 122.6
Gloucester	70	87.7	66.1	86.2	68.7 - 103.7
Hudson	187	77.3	64.6	77.8	67.6 - 87.9
Hunterdon	11	41.4	65.4	41.1 *	10.6 - 71.6
Mercer	78	71.2	64.6	71.7	56.6 - 86.9
Middlesex	79	31.9	65.3	31.8 *	21.7 - 41.8
Monmouth	122	82.1	65.6	81.3	68.4 - 94.2
Morris	36	30.8	66.8	30.0 *	15.6 - 44.4
Ocean	98	72.1	64.7	72.4	58.8 - 85.9
Passaic	161	109.6	65.0	109.6 **	96.5 - 122.6
Salem	20	119.0	65.3	118.5 **	80.0 - 156.9
Somerset	28	35.5	67.5	34.2 *	16.7 - 51.6
Sussex	14	40.5	66.2	39.8 *	13.2 - 66.4
Union	80	53.8	66.0	53.0 *	40.1 - 65.8
Warren	20	77.5	66.7	75.5	44.8 - 106.2

Source: New Jersey 2011 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. 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 940 admissions for lower-extremity amputation in 2011. The is risk-adjusted hospital admissions rate for lower-extremity amputation is 13.9 per 100,000, suggesting that the rate at which incidence of lower-extremity amputation occurs in New Jersey is significantly lower than the national average of the national average rate in 2009 of 17.2 per 100,000.

- Essex, Hudson and Passaic counties have rates that are statistically significantly higher than the statewide average, while four counties (Bergen, Hunterdon, Monmouth, Middlesex, Morris, and Somerset) have rates that are statistically significantly lower than the statewide average.

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	**940**	**13.9**	**18.1**	**13.9**	**12.9 - 14.9**
Atlantic	37	17.2	18.8	16.6	11.0 - 22.1
Bergen	77	11.0	19.3	10.3 *	7.3 - 13.4
Burlington	57	16.3	18.7	15.7	11.3 - 20.1
Camden	55	14.0	17.5	14.5	10.2 - 18.8
Cape May	21	26.8	23.6	20.5	12.3 - 28.7
Cumberland	21	17.4	17.0	18.4	10.6 - 26.2
Essex	133	22.8	16.3	25.3 **	21.7 - 28.9
Gloucester	30	13.4	17.7	13.7	8.1 - 19.4
Hudson	79	15.9	14.1	20.3 **	16.1 - 24.5
Hunterdon	1	1.0	19.8	0.9 *	0.0 - 8.9
Mercer	38	13.4	17.2	14.1	9.0 - 19.2
Middlesex	57	9.1	16.9	9.8 *	6.3 - 13.2
Monmouth	49	10.2	19.2	9.6 *	5.9 - 13.2
Morris	24	6.4	19.2	6.0 *	1.8 - 10.1
Ocean	59	13.1	22.4	10.5	7.0 - 14.1
Passaic	79	21.1	16.8	22.7 **	18.2 - 27.2
Salem	4	7.8	19.6	7.2	0.0 - 18.4
Somerset	20	8.1	18.2	8.1 *	2.8 - 13.4
Sussex	13	11.2	18.9	10.8	3.2 - 18.3
Union	70	17.4	17.3	18.2	13.9 - 22.4
Warren	16	18.9	19.3	17.7	8.9 - 26.5

Source: New Jersey 2011 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 in-side or out-side 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 2011.

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 2009, were 1,811.2, 717.9 and 1093.9 per 100,000.

- By comparison, the corresponding composite rates for New Jersey were 1,628.8, 587.2 and 1041.1 per 100,000, respectively. This suggests that preventable hospitalization rates were lower compared to national figures.

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

County	Overall		Acute		Chronic	
	Volume	Rate	Volume	Rate	Volume	Rate
Statewide	**108,924**	**1,628.8**	**39,073**	**587.2**	**69,851**	**1,041.1**
Atlantic	4,211	1,957.2 **	1,600	754.5 **	2,611	1,201.9 **
Bergen	9,098	1,213.9 *	3,719	494.5 *	5,379	719.2 *
Burlington	6,112	1,727.2 **	2,346	670.0 **	3,766	1,056.8
Camden	8,384	2,213.1 **	3,110	823.9 **	5,274	1,388.8 **
Cape May	1,748	1,758.9 **	702	705.1 **	1,046	1,053.8
Cumberland	2,558	2,289.6 **	821	742.2 **	1,737	1,544.4 **
Essex	11,419	2,170.5 **	3,290	630.9 **	8,129	1,536.0 **
Gloucester	4,088	1,941.1 **	1,520	734.6 **	2,568	1,205.2 **
Hudson	8,701	2,221.8 **	2,722	705.5 **	5,979	1,511.7 **
Hunterdon	904	917.0 *	428	450.4 *	476	471.4 *
Mercer	4,582	1,699.8 **	1,587	590.5	2,995	1,108.9 **
Middlesex	7,686	1,318.6 *	2,830	488.1 *	4,856	830.1 *
Monmouth	7,430	1,486.8 *	2,794	563.3	4,636	923.1 *
Morris	4,218	1,079.3 *	1,794	463.2 *	2,424	616.5 *
Ocean	8,814	1,512.1 *	3,134	525.2 *	5,680	990.1 *
Passaic	6,607	1,912.5 **	2,061	601.4	4,546	1,308.9 **
Salem	1,200	2,196.9 **	473	866.3 **	727	1,330.6 **
Somerset	2,144	889.3 *	895	376.1 *	1,249	513.6 *
Sussex	1,730	1,587.8	696	664.4 **	1,034	925.0 *
Union	5,765	1,485.3 *	2,057	530.5 *	3,708	954.7 *
Warren	1,525	1,737.9 **	494	568.2	1,031	1,167.7 **

Source: NJ UB 2011

Rates shown in this table are the risk-adjusted rates. * = 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 their 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 2011 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 2011.

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.

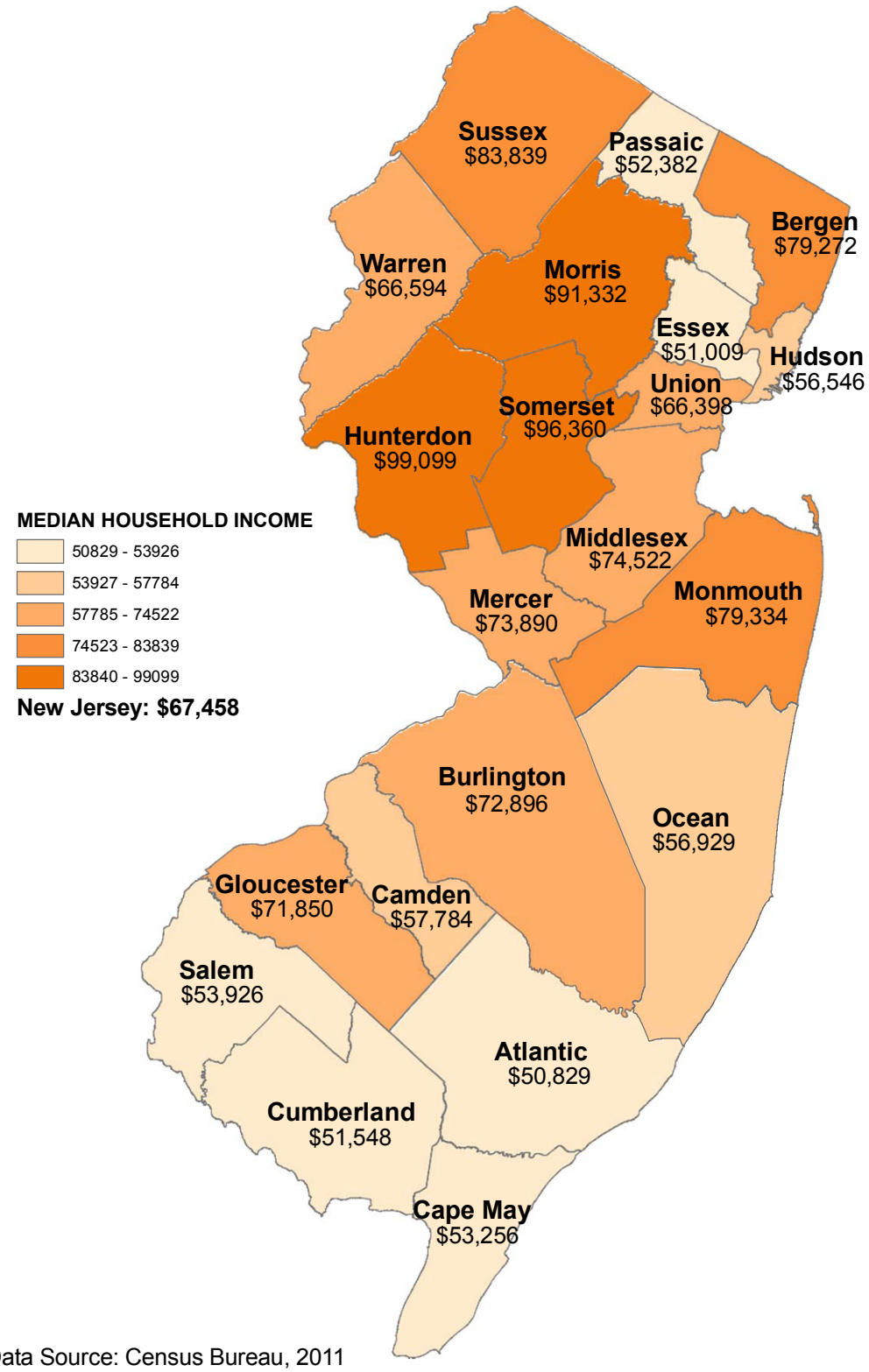
Figure 3 presents hypertension, angina and congestive heart failure (CHF) hospital admission rates by county. Hypertension, angina and CHF point to potentially associated health problems. We observe that counties have similar patterns in admission rates, with Warren, Morris, Hunterdon and Burlington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

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, 2011



Data Source: Census Bureau, 2011 American Community Survey.
(dollar estimates are inflation-adjusted.)

Figure 2. Diabetes-Related Hospital Admission Rates by County New Jersey, 2011

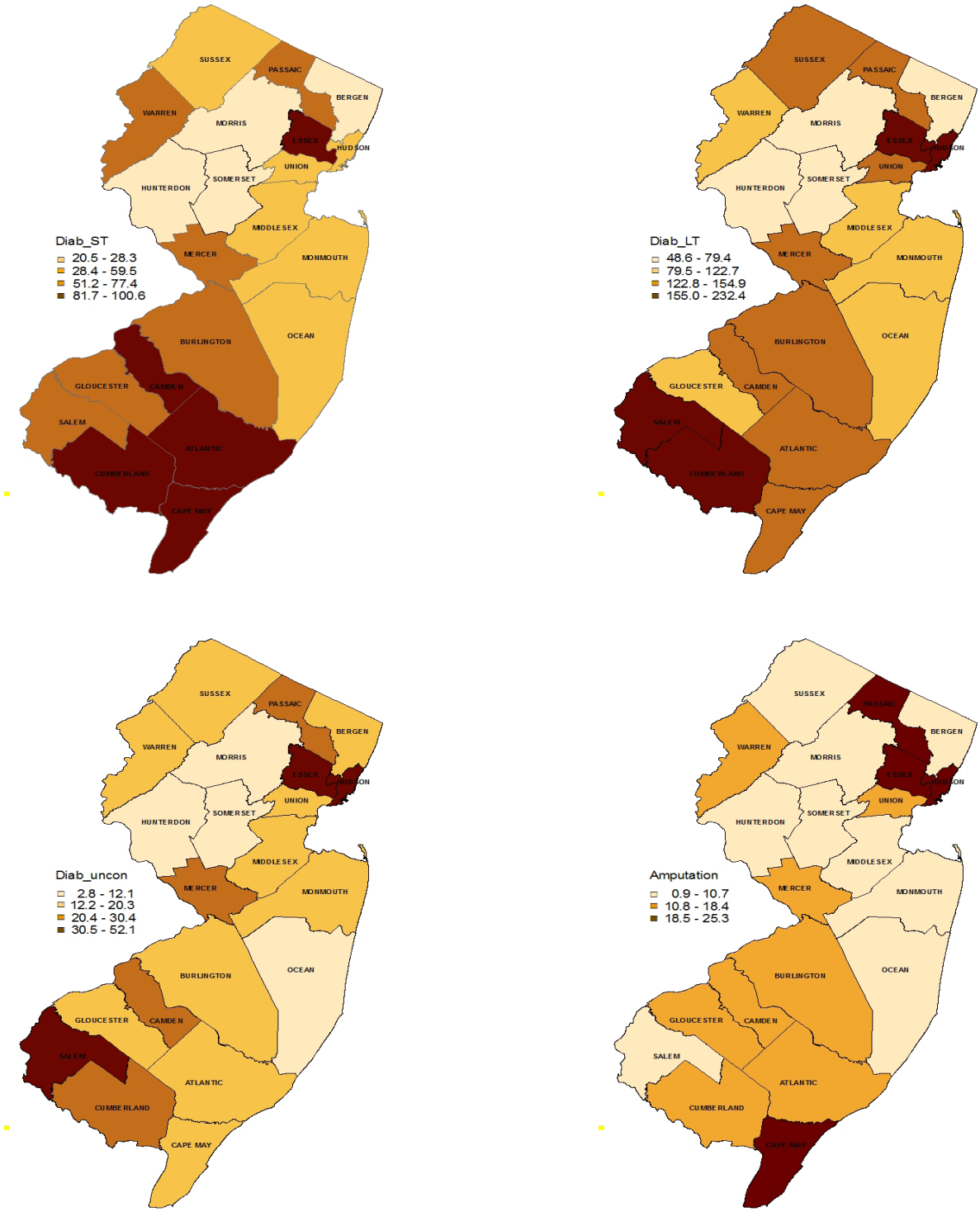


Figure 3. Hypertention, Angina, and Congestive Heart Disease Hospital Admission Rates by County, New Jersey 2011

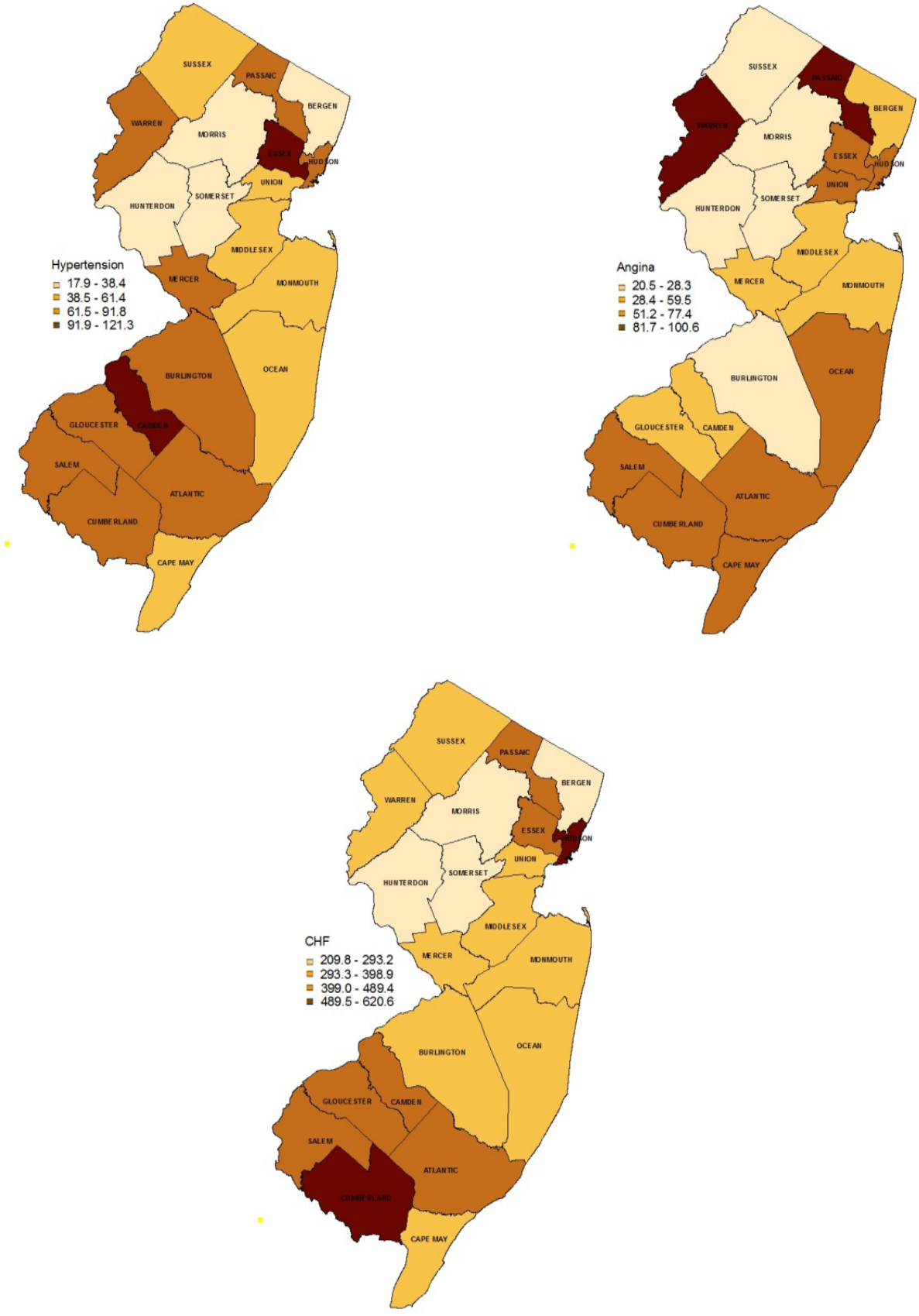


Figure 4. Asthma, Chronic Obstructive Pulmonary Disease, Dehydration, and Low Birth Weight Hospital Admission Rates by County, New Jersey 2011

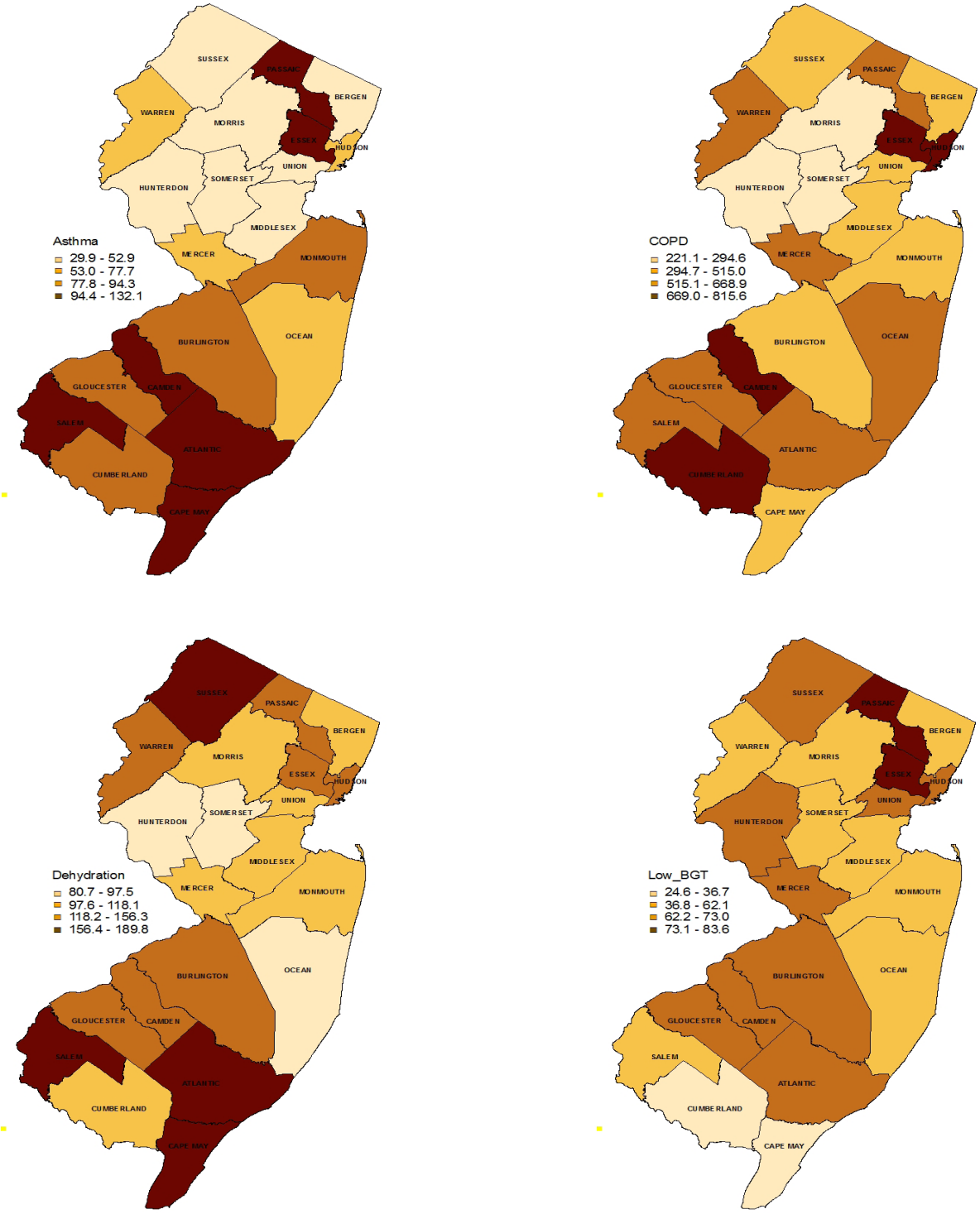


Figure 5. Other Prevention Indicators by County New Jersey, 2011

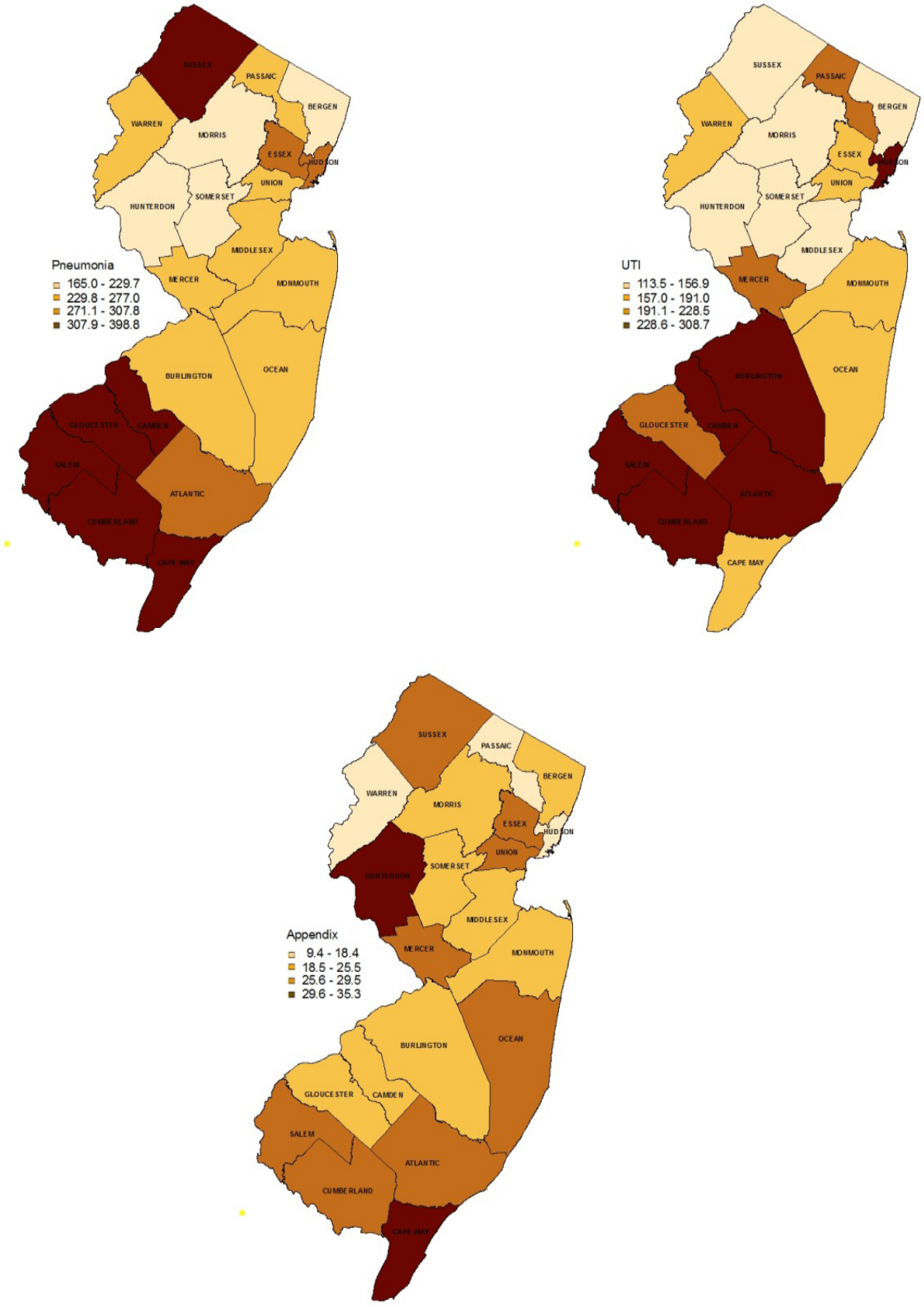
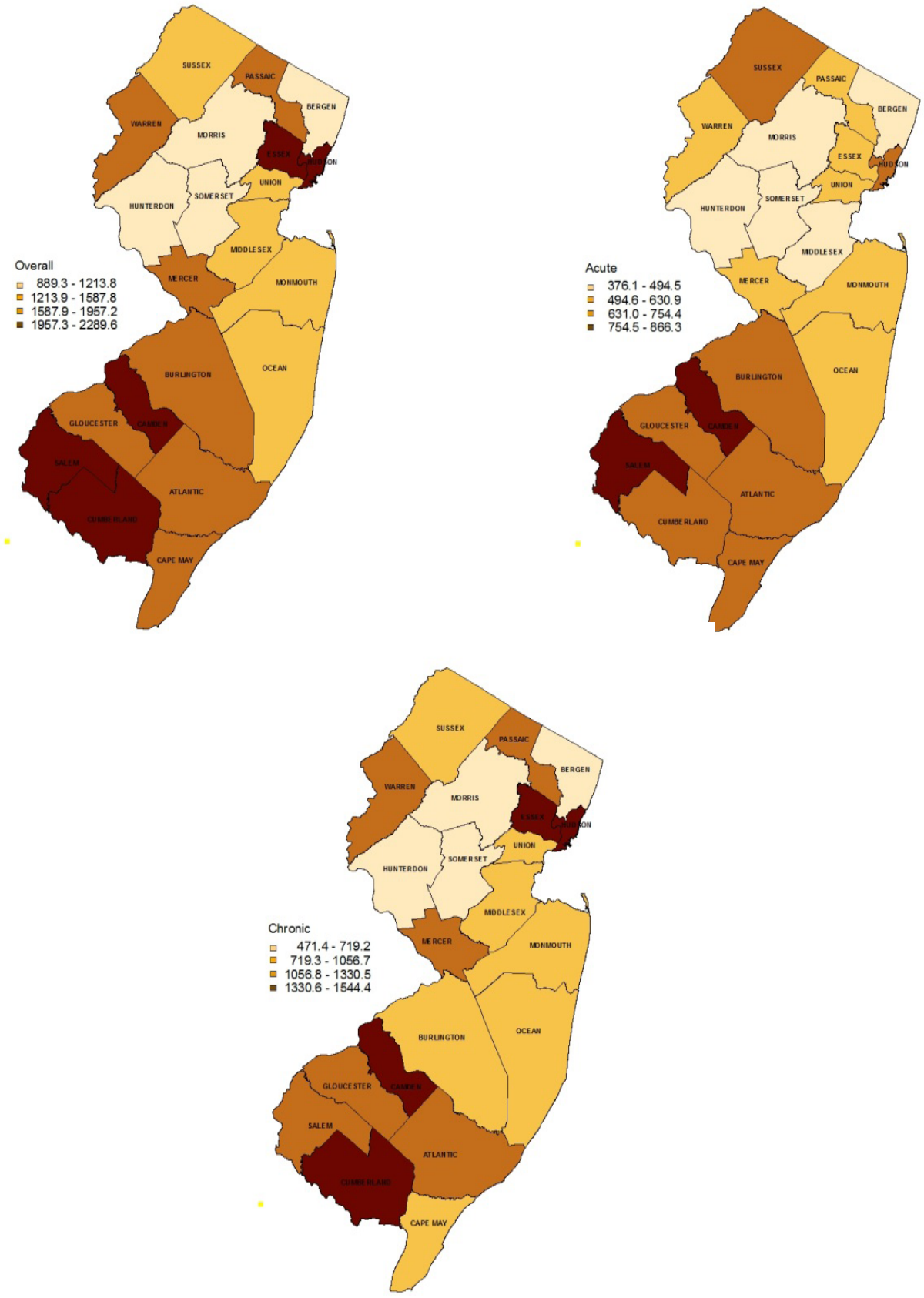


Figure 6. Composite Indicators by County
New Jersey 2011



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 2011 UB data using the PQIs module (SAS Version 4.4) while the national estimates are derived from the 2009 State Inpatient Data (SID) using the PQIs module (Version 4.4) - as reported in AHRQ's own Comparative Data Report released in 2012.

- Compared to the national benchmark, New Jersey appears to have lower hospitalization rates for 9 of the 14 PQIs.

- New Jersey's hospitalization rates for *diabetes with long term complication, hypertention, angina without procedure, low birth weight*, and *adult asthma,* were higher than the national average.

- The composite measures suggest that New Jersey has lower hospitalization rates overall compared to the nation.

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

PQIs	National	New Jersey
Diabetes with Short Term Complications (PQI.01)	62.0	61.4
Perforated Appendix (PQI.02)	28.8	24.4
Diabetes with Long Term Complication (PQI.03)	121.6	133.4
Chronic Obstructive Pulmonary Disease (PQI.05)	575.5	524.2
Hypertention (PQI.07)	65.1	67.1
Congestive Heart Failure (PQI.08)	412.6	376.3
Low Birth Weight (PQI.09)	62.9	65.4
Dehydration (PQI.10)	147.1	124.4
Bacterial Pneumonia (PQI.11)	359.1	269.3
Urinary Tract Infection (PQI.12)	212.1	193.6
Angina Without Procedure (PQI.13)	23.3	24.0
Uncontrolled Diabetes (PQI.14)	22.5	21.2
Adult Asthma (PQI.15)	63.6	73.1
Lower Extremity Amputation (PQI.16)	17.2	13.9
Overall PQIs - Composite (PQI.90)	1,811.2	1628.8
Acute PQIs - Composite (PQI.91)	717.9	587.2
Chronic PQIs - Composite (PQI.92)	1,093.9	1041.1

Source: New Jersey numbers are derived from the 2011 UB Data using AHRQ SAS Software Version 4.4 while the national averages are drived from the 2009 Nationwide Inpatient Sample (NIS) using the same software version. The NIS is drawn from the 2009 State Inpatient Data (SID).

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.

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.

In 2011, NJ hospitals reported about 109,000 hospitalizations for treatment of all the medical conditions outlined under the PQIs, which according to AHRQ’s specifications, are considered preventable. Assuming that charges by hospitals approximate the costs of treatment, potentially avoidable hospitalizations on the conditions presented in this report would have saved about six billion dollars ($5,986,905,677) in a year.

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

Area-level PQIs	# of Preventable hospitaliza-tions	Total charges for all cases ($)	Average charge per case for all days ($)	Length of in-hospital stay (days)	Average charge per case per day ($)
Diabetes with Short Term Complications	4,135	210,134,188	50,818	4.06	12,517
Perforated Appendix	1,782	121,117,091	67,967	5.39	12,610
Diabetes with Long Term Complication	9,055	675,150,128	74,561	6.73	11,079
Chronic Obstructive Pulmonary Disease	21,809	114,815,391	52,646	4.95	10,636
Hypertention	4,596	179,882,894	39,165	3.06	12,799
Congestive Heart Failure	24,890	1,570,711,204	63,106	5.43	11,622
Dehydration	8,307	350,180,368	42,155	4.11	10,257
Bacterial Pneumonia	17,917	1,043,425,483	58,237	5.46	10,666
Urinary Tract Infection	12,849	554,346,018	43,143	4.49	9,609
Angina Without Procedure	1,650	52,727,668	31,956	2.08	15,364
Uncontrolled Diabetes	1,454	53,334,346	36,681	3.63	10,105
Adult Asthma	1,787	60,389,530	33,794	3.04	11,116
Lower Extremity Amputation	940	161,300,947	171,597	14.86	11,548
Overall	108,924	5,986,905,677	54,964	5.04	10,906
Acute	39,073	1,947,951,869	49,854	4.85	10,279
Chronic	69,851	4,038,953,808	57,822	5.15	11,228

Source: NJ UB 2011.

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.

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 UB

- Over 77 percent of the 24,890 potentially preventable hospitalizations for congestive heart failure were paid for by Medicare. Similarly, close to 64 percent of the 21,809 hospitalizations for chronic obstructive pulmonary disease were paid for by Medicare.

- Not surprisingly, more than 60 percent of all hospitalizations for dehydration, bacterial pneumonia, urinary tract infections, and lower extremity amputation were paid for by Medicare.

- Overall, more than 62 percent of potentially preventable hospitalizations both for acute and chronic conditions were paid for by Medicare.

- Hospitalizations for perforated appendix are the only ones where more than 50 percent of them were paid for by private insurance.

- 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	4,135	25.6	7.7	32.7	13.9	15.2	4.9
Perforated Appendix	1,782	22.0	2.6	52.6	10.7	8.5	3.6
Diabetes with Long Term Complication	9,055	57.5	5.3	24.3	4.5	5.1	3.3
Chronic Obstructive Pulmonary Disease	21,809	63.7	5.1	20.5	3.4	3.9	3.4
Hypertention	4,593	44.1	3.4	29.0	10.1	9.7	3.7
Congestive Heart Failure	24,890	77.4	2.8	13.4	2.1	2.5	1.9
Dehydration	8,307	63.9	2.7	24.7	3.0	3.1	2.6
Bacterial Pneumonia	17,917	60.7	3.2	25.2	4.0	3.9	3.0
Urinary Tract Infection	12,849	66.6	3.5	19.4	3.7	3.6	3.2
Angina Without Procedure	1,650	37.6	4.4	36.7	8.7	6.6	6.1
Uncontrolled Diabetes	1,454	41.5	6.1	25.5	11.8	10.7	4.3
Adult Asthma	1,787	9.1	11.1	40.8	15.4	13.4	10.1
Lower Extremity Amputation	940	66.1	5.0	20.5	2.3	3.8	2.2
Overall	108,924	62.4	4.0	21.6	4.4	4.5	3.1
Acute	39,073	63.3	3.2	23.2	3.7	3.6	3.0
Chronic	69,851	61.8	4.5	20.7	4.7	5.0	3.2

Source: NJ UB 2011

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, Gender and Race/Ethnicity

Tables 19-21 show preventable unadjusted (crude) hospitalization rates by age, sex and race/ethnicity, respectively, derived from the 2011 data for eight 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 shade some light for prevention services planning.

Table19 presents the crude hospitalization rates by broad age groups. Among the 18-39 years old, hospitalization rates were the highest for Asthma (73.7/100,000) followed by diabetes hospitalizations with short term complications (69.4/100,000). Among 40-64 years old, COPD hospitalizations were more pronounced at 287.7/100,000 followed by Bacterial Pneumonia hospitalizations (176.1/100,000) and Congestive Heart Failure (CHF) hospitalizations at 167.0/100,000. Among the age group 65-74, the rate of hospitalizations for COPD was the highest at 860.8 per 100,000 followed by CHF (769.0/100,000) and Bacterial Pneumonia (506.4/100,000). Among the 75 and older population, the highest hospitalization rate was due to CHF at 2,520.0/100.000 with COPD, Bacterial Pneumonia and Urinary Tract Infection (UTI) hospitalizations having very high rates of over 1,000 per 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 400.5/100,000 hospitalization rate was the most prominent closely followed by CHF (388.2/100,000). Among females, COPD was also associated with the highest rate followed by CHF at 350.3/100,000. Though the rates for major hospitalization are consistent for males and females, there are differences between them in the relative magnitudes of the rates with each condition.

Table 21 shows variations in potentially preventable hospitalizations of patients by race/ethnicity for the selected eight PQIs and two composite measures. Among all race/ethnic groups, COPD hospitalizations were associated with the highest rates followed by CHF except for the race/ethnic group “Other”, which has Bacterial Pneumonia as the second highest rate. 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 except for Bacterial Pneumonia and UTI. Hispanics and Asians/Pacific Islanders tend to have lower rates of hospitalizations than both blacks and whites.

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 that could avoid preventable hospitalizations or a combination of both.

Table 19. Preventable Hospitalization Rates by Age for Selected PQIs

(Rates are per 100,000 population)

Selected PQIs	18 to 39		40 to 64		65 to 74		75+		Total	
	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate
Diabetes w/Short Term Complications	1,682	69.4	1,844	58.5	342	57.4	267	45.9	4,135	61.2
Hospitalizations for COPD age 40+	-	-	9,072	287.7	5,128	860.8	7,609	1,307.5	21,809	503.5
Hypertention	369	15.2	2,168	68.8	723	121.4	1,333	229.1	4,593	68.0
Congestive Hear Failure (CHF)	350	14.4	5,294	167.9	4,581	769.0	14,665	2,520.0	24890	368.5
Bacterial Pneumonia	1,456	60.07	5,552	176.1	3,017	506.4	7,892	1,356.2	17,917	265.3
Urinary Tract Infection (UTI)	1,567	64.7	2,670	84.7	1,746	293.1	6,866	1,179.9	12,849	190.2
Lower Extremity Amputations	23	1.0	408	12.9	249	41.8	260	44.7	940	13.9
Asthma (ages 18-39 only)	1,787	73.7	-	-	-	-	-	-	1,787	73.7
Acute conditions	3,717	153.4	10,600	336.1	6,173	1,036.2	18,583	3,193.3	39,073	578.5
Chronic conditions	5,184	213.9	24,440	775.0	13,385	2,246.8	26,842	4,612.5	69,851	1,034.1
2011 Population Estimates Ages 18+	**2,423,658**	-	**3,153,456**	-	**595,731**	-	**581,936**	-	**6,754,781**	-

Table 20. Preventable Hospitalization Rates by Gender for Selected PQIs

(Rates are per 100,000 population)

Selected PQIs	Male		Female		Total	
	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate	# of Hospital Admissions	Rate
Diabetes w/Short Term Complications	2,238	69.1	1,897	54.0	4,135	61.2
Hospitalizations for COPD age 40+	8,087	400.5	13,722	593.6	21,809	503.5
Hypertention	1,862	57.5	2,731	77.7	4,593	68.0
Congestive Hear Failure (CHF)	12,579	388.2	12,311	350.3	24890	368.5
Bacterial Pneumonia	8,296	256.0	9,621	273.8	17,917	265.3
Urinary Tract Infection (UTI)	3,742	115.5	9,107	259.1	12,849	190.2
Lower Extremity Amputations	619	19.1	321	9.1	940	13.9
Asthma (ages 18-39 only)	544	44.6	1,243	103.4	1,787	73.7
Acute conditions	15,458	477.0	23,615	672.0	39,073	578.5
Chronic conditions	32,532	1,004.0	37,319	1,061.9	69,851	1,034.1
2011 Population Estimates Ages 18+	**3,240,413**	-	**3,514,368**	-	**6,754,781**	-

Table 21. Preventable Hospitalization Rates by Race/ethnicity for Selected PQIs

(Rates are per 100,000 population)

Selected PQIs	White		Black		Hispanic		Asian and NH/PI		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 w/Short Term Complications	1,879	47.3	1,446	167.1	622	50.9	38	6.4	150	146.9	4,135	61.2
Hospitalizations for COPD age 40+	13,779	528.2	4,744	880.2	2,335	311.6	306	82.9	645	992.1	21,809	503.5
Hypertention	2,080	52.3	1,656	191.4	562	46.0	120	20.3	175	171.3	4,593	68.0
Congestive Hear Failure (CHF)	16,778	422.1	4,966	574.0	1,989	162.7	426	72.2	731	715.7	24890	368.5
Bacterial Pneumonia	12,914	324.9	2,470	285.5	1,589	130.0	377	63.9	567	720.4	17,917	265.3
Urinary Tract Infection (UTI)	8,980	225.9	1,635	189.0	1,486	121.6	290	49.1	458	635.8	12,849	190.2
Lower Extremity Amputations	456	11.5	302	34.9	145	11.9	14	2.4	23	50.7	940	13.9
Asthma (ages 18-39 only)	654	47.9	642	196.8	375	79.3	30	13.6	86	281.4	1,787	73.7
Acute conditions	27,812	699.7	5,350	618.4	3,795	310.5	834	141.3	1,282	1,713.2	39,073	578.5
Chronic conditions	41,634	1,047.4	16,983	1,963.0	7,751	634.2	1,183	200.4	2,300	3,309.5	69,851	1,034.1
2011 Population Estimates Ages 18+	**3,974,908**	-	**865,149**	-	**1,222,199**	-	**590,385**	-	**102,140**	-	**6,754,781**	-

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 2011 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, Bergen, Morris, and Somerset counties are 20.5, 26.3, 28.3 and 27.5 per 100,000, respectively. By comparison, the rates for Atlantic, Camden, Cumberland, and Essex counties are 90.9, 95.7, 92.4 and 100.6 per 100, 000, respectively.

In another example, the lowest rate of admission for hypertension is recorded in Hunterdon county (17.9 per 100,000) followed by Morris county (27.1 per 100,000) and Bergen county (36.2 per 100,000). By comparison, the highest rate of admission for hypertension is reported in Camden county (121.3 per 100,000), followed by Essex county (107.3 per 100,000) and Hudson county (91.7per 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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For inquiries, contact the New Jersey Department of Health, Office of Health Care Quality Assessment, by phone at (800) 418-1397 or by email at Markos.Ezra@doh.state.nj.us.

Prevention Quality Indicators

Application of the AHRQ Module to New Jersey Data