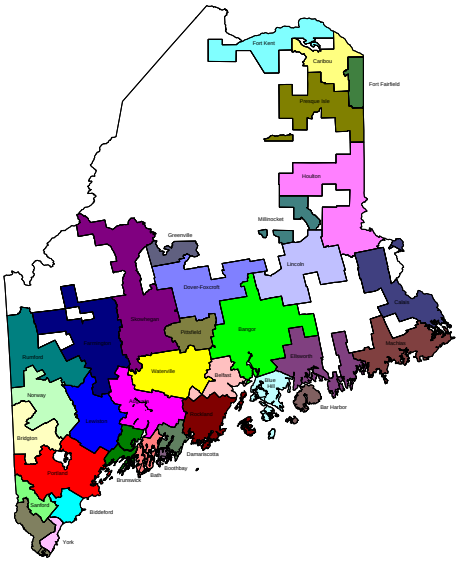
Health Dialog
Analytic Solutions

Maine Quality Forum
Report on Initial Analysis
of
Maine's Paid Claim Database



February 2, 2007

1. Executive Summary

Health Dialog Analytic Solutions (HDAS) entered an agreement and started a cooperative project in January, 2006 with the Maine Quality Forum (MQF) with the following major objectives:

- Assess the suitability of a data warehouse built from the Maine Health Data Organization (MHDO) paid claims databank for use in the analysis of health care quality and to offer suggestions for remediation of problems apparent in the database
- Propose and test indicators of health care quality that can be used with the data in the data warehouse
- Conduct a geographic variation analysis of advanced imaging in the State of Maine
- Conduct a pilot project designed to profile a sample of providers in Maine to demonstrate how these profiles and patient healthcare experience are related, can be analyzed, and can be modified - rendering the evaluations actionable.

Major Project Activities

HDAS received the final shipment of the initial claims data in May, 2006. Since that time Health Dialog Analytic Solutions has:

- Warehoused the MHDO paid claims data
- Assessed the quality and robustness of the MQF warehouse by conducting a comprehensive series of integrity and validity tests on the warehouse contents
- Assessed the capability of the MQF warehouse to support population based, statewide quality measures
- Conducted a pilot provider profiling analysis to demonstrate the capacity of the MQF warehouse to support provider and patient level analyses using a number of statistical models and representative provider measurements for effective and supply sensitive care
- Demonstrated the longitudinal, patient-centric nature of the MQF warehouse by creating patient level claim histories for members of physician panels
- Demonstrated the MQF warehouse can support the above activities - the primary objective of this stage of the project
- Conducted ad hoc studies comparing the MQF warehouse to the Maine Hospital Inpatient Discharge database
- Completed a geographic variation analysis of advanced imaging in the State of Maine, conducted by the Center for Outcomes Research and Evaluation (CORE) at Maine Medical Center

- Prepared a report describing our activities that includes findings, conclusions, recommendations and suggested future actions

MQF Warehouse Build and Assessment

HDAS constructed a standardized patient-centric warehouse using claims provided by the Maine Health Data Organization (MHDO) from January 2003 and June 2005 representing over 700,000 Maine residents. The warehouse includes health care services provided to Maine residents by the 39 acute care hospitals, over 4,000 Maine physicians, and thousands of out of state providers.

HDAS performed a comprehensive series of data integrity and validation tests on the MQF warehouse. These tests included checks for valid codes, checks to test key linkages between data files, checks to compare descriptive statistics against industry norms and trends over time. These checks were performed in aggregate and against significant subsets (typically, payers or groups of payers) to uncover hidden trends. External resources were used to validate the MQF warehouse contents including the Maine Hospital Inpatient Discharge database, the Maine Board of Licensure in Medicine database, the Maine Board of Osteopathic Licensure database, a variety of Maine provider organization websites and national sources such as the American Medical Association and National Commission on Quality Assurance.

In summary, the MQF warehouse does not appear to present any major unique challenges for a paid claims database that would jeopardize intended analyses. With the fixes specified in this report the MQF warehouse will be able to support a wide range of quality and efficiency measures such as geographic variation analyses, analysis of HEDIS and other effective care measures, and HDAS preference sensitive and supply sensitive efficiency measures. As with all administrative claim databases, there are some specific analyses that can not be supported with the current state of the data; users should understand the limitations and specific issues which arise when combining claims data from disparate sources which have variable quality control.

Develop and Assess Quality Performance Measures

Once the MQF warehouse was developed and the integrity and validity checks were completed, MQF and HDAS initiated a process to examine the ability of the MQF warehouse to support measurement of population based quality metrics. HDAS considers healthcare quality to encompass effective evidence based care, preference sensitive, and supply sensitive (efficient) care. HDAS computed a set of agreed upon measures in the dimensions and summarized them by Maine HSA. Measures were consistent with those from other data sources and most demonstrated statewide variation and opportunities to pursue drivers of the unwarranted variation.

Geographic Analysis of Advanced Imaging

The Center for Outcomes Research and Evaluation (CORE) at Maine Medical Center conducted the study on advanced imagining. CORE calculated population based utilization rates of advanced imaging in Maine, described advanced imaging testing practices within cohorts of members with specific diagnoses, and produced variation maps.

The largest amount of variability in the tests CORE evaluated occurred with lumbar CT and abdominal/pelvic MRI. For several tests, there were no areas with rates substantially and significantly lower than the state rate, there was at least one area with rates above the state rate for each test category except overall CT testing. While there were, for various tests evaluated, HSAs with rates substantially and significantly below the state rate, there was no clear pattern associated with these lower utilization rates. However, there was a clear pattern for higher utilization rates. The Presque Isle and Caribou HSAs had rates substantially and significantly higher for several of the test categories examined.

Provider Profiling Analysis Pilot

In order to further test the adequacy of the MQF warehouse to support MQF goals HDAS undertook a pilot provider profiling project based on HDAS Unwarranted Variation™ Analytics. MQF indicated interest to profile all providers in Maine and understand the implication of these profiles at the patient level. The pilot project was designed to profile a sample of providers in Maine using a robust set of effective care and supply sensitive care measures. Another purpose was to demonstrate how these profiles and patient healthcare experiences are related, can be analyzed, and can be modified - rendering the evaluations actionable. Additionally, the project tested whether the MQF warehouse could support assignment of patients to providers and calculation of performance metrics for both PCPs and specialists. The objectives were met by profiling a set of PCPs and cardiologists.

The pilot project demonstrated the all-payer warehouse, with fixes specified in this report, is capable of providing users with analytic resources to meet the above goals. Specifically, MQF can utilize the content of the warehouse, when fixed, to support data-driven initiatives around provider performance and profiling with detailed analysis at the patient level. The results in summary are:

- Information generated from the MQF warehouse can be shared with the public, provider and payer communities in Maine and these communities can be engaged to improve the quality of the all-payer claims database
- The MQF warehouse can support a robust set of measures across the dimensions of effective and efficient care and by extension, preference sensitive care
- The MQF warehouse can be used to identify, demonstrate and report differences in practice performance across the dimensions of unwarranted variation
- Performance differences can be stratified by a number of classifications including geographic, patient characteristics (age, gender, risk level, location, payer), care setting (outpatient, inpatient) and provider characteristics (individual, group, specialty)
- Performance differences across the dimension of care can identify opportunities for improvement

- Differences in patterns of care at the patient level can be described, analyzed, and displayed - identifying opportunities for improvement

Recommendations

HDAS believes that ultimately MQF intends to profile all providers in Maine to support data-driven improvement initiatives across Maine. The following key recommendations indicate the next steps MQF (in cooperation with HDAS, MHDO, and MHIC) should focus on to improve the warehouse. They include issues with provider information and medical claims in the MQF warehouse. The recommendations are:

- Validate providers' assigned specialty.
- Add Diagnosis Related Group (DRG) codes for inpatient stays
- Add facility procedure codes for payer C0108
- Correct duplicate provider identifiers in master provider table
- Correct duplicate links from detail provider table to master provider table
- Correct provider detail file to ensure individual provider names and identifiers are preserved to link claims to individual physicians
- Add practice group name to master provider file
- Correct state identifier for hospitals incorrectly identified as Maine hospitals

Supplemental and less critical recommendations are included in the body of the report.

Proposed Future Actions

The completion of this project suggests further actions that can initiate the introduction of data-driven improvement initiatives throughout Maine. Significant next steps are:

- Address the data issues discussed in the MQF warehouse build and assessment section of this report
- Broaden the provider measurement to all providers in the MQF warehouse for all measures
- Engage providers with information for confidential feedback, make adjustments, and repeat.
- Provide physicians with lists of attributed patients and these patients' measures
- Develop mechanism for 'automate' feedback
- Consider using predictive modeling to identify provider panels which are at high risk for chronic condition care gaps, preference sensitive surgery, or high future medical cost.

This project has demonstrated the potential value and utility of the MQF warehouse as a tool for MQF to further its mission of providing Maine's healthcare stakeholders with objective, comprehensive and actionable information on which to base decisions. The State of Maine possesses a data asset that is unique in the nation – a data warehouse

that links citizens' healthcare experience across payers, over time and contains all payers (Medicare and MaineCare to come).

The value of this asset has relevance to all stakeholders in Maine:

- Consumers are empowered to make informed decisions when significant healthcare tradeoffs exist and are activated to collaborate with their healthcare providers to receive warranted care.
- Providers gain access to comprehensive patient care information for process improvement – no other providers have access to a database that is as complete.
- Policymakers have access to comprehensive, objective information from which to base policy choices and to support regulatory mandates
- Payers have access to information that eliminates sampling bias and increases credibility and stability of analyses.

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2. Introduction

The Maine Quality Forum (MQF) is part of the Dirigo Health Agency and Dirigo Health Reform. The Governor and the Legislature concluded that consumers needed a reliable resource for information about health maintenance and the quality of health care services delivered in the state. MQF has been charged with collecting research, promoting best practices, collecting and publishing comparative quality data, promoting electronic technology, promoting healthy lifestyles and reporting to consumers and the Legislature.

As part of its mission, MQF assists Maine residents to make informed health care choices, in part, by public reporting of health care quality and performance measures.

Maine is the first state in the United States to create an all payer paid claims database. MQF has a unique opportunity to advance quality improvement by using a paid claims database that includes most of the medical care delivered to the commercially insured population in Maine. The Maine Health Data Organization (MHDO) released the All Payers Claim Database to Health Dialog Analytic Solutions (HDAS). The data transfer was completed on May 17, 2006.

HDAS shares key common goals with MQF to improve health care quality and reduce rapidly rising medical costs. As the initial step in the process of laying a foundation for analysis of effective and cost efficient care, HDAS built a data warehouse using the data provided by the MHDO. Based on application of HDAS clinical and administrative algorithms, HDAS also built a series of analytic files containing clinical and administrative events representing the transactional history of each patient's health care experience. These event markers allowed us to flexibly construct cohorts of patients required to generate quality and efficiency measures based on clinical conditions, providers, or geography.

The Center for Outcomes Research and Evaluation (CORE) at Maine Medical Center conducted the geographic variation analysis on advanced imaging services. This analysis demonstrates the capability of the MQF warehouse to support population level, geographic analysis of healthcare service utilization.

HDAS assessed the MQF warehouse not only through HDAS standard assessment procedures and quality checks but also through analysis of outcome measures such as geographical variation, NCQA HEDIS measures, HDAS effective care measures, preference sensitive care measures, efficiency measures including average cost by type of service metrics, and by the attribution or assignment of patients to physician responsible for care.

This report presents the details of our database build and assessment, the impact on analysis of health care metrics and measures, as well as recommendations for remediation.

3. MQF Warehouse Build and Assessment

This section summarizes the HDAS standard activities from data receipt and warehouse construction, through database assessment. Detailed recommendations for remediation of the MQF warehouse are included in this section.

Data Receipt and Warehouse Construction

HDAS constructed the standardized patient-centric warehouse using claims from approximately 720,000 patients between January 2003 and June 2005 reflecting 1.3 million services per month, averaging $150 million per month in payer payments. Claims for these covered lives were submitted by 84 payers. HDAS also incorporated supporting files for provider information and look up tables used for decoding data elements. In addition to health care provided to Maine residents by the 39 acute care hospitals and over 4,000 physicians in Maine, these data represent health care delivery to Maine residents by out of state providers.

Prior to constructing the warehouse, HDAS performed data validation checks on the raw claims and eligibility files. The results of the first level validation checks identified substantial deficiencies in data completeness which required remedial activities by the DPC in conjunction with MHDO. These data were assessed for quality and completeness for all data transmissions. There were a total of 6 data transmissions with the final transmission completed by May 17, 2005.

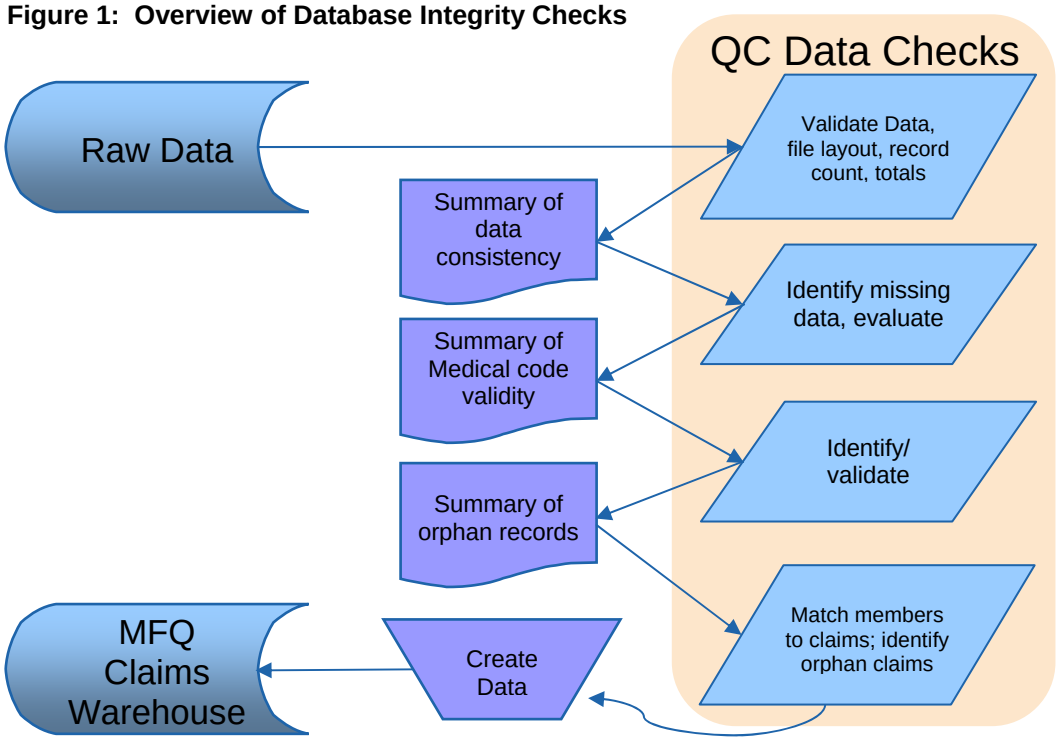
HDAS performed a number of quality audits and checks to assess the integrity of the warehouse. These assessments focused on two main components: database integrity and database validity. Integrity refers to whether key data fields were reliably completed with valid, non-missing data. Validity checks compared descriptive statistics across time.

Database Integrity

A data receipt report was issued for each of the 6 data transmissions for claims and three transmissions for the master and detailed provider files. The purpose of the data receipt report is to confirm that all transmitted claims, eligibility and provider records were received and the data layout was consistent and complete.

The integrity checks assessed that key data fields were reliably completed with valid, non-missing data. Key fields included, but were not limited to, patient identifiers, date of birth, sex, zip code, provider identifiers, date of service, and diagnostic and procedure codes. We performed validity checks on these and other key fields to ensure that the values populating the fields were appropriate. For example, we compared the diagnostic and procedure codes against standard code tables to validate the contents of these fields. We performed a number of data checks across the database files to validate the integrity of the data structures. These tests included matching patient identifiers across the eligibility, medical claims and pharmacy claims files to ensure that the data files could be merged properly for analysis. The process is schematically summarized below.

Figure 1: Overview of Database Integrity Checks



The initial checks showed that all expected data fields were provided in the documented layout and that we received all transmitted patient and provider records. We verified that all data fields contained the expected data (there were exceptions, detailed in this section) and were consistently populated (e.g. medical claims in 2003 contained the same populated data fields as in 2005 except as documented in the Medical Claims Data Dictionary).

We generated a number of metrics to document the validity and integrity of the database, such as claims to patient match rates, claims to provider match rates, ICD-9 and CPT code validation and other key metrics. We compared these values to HDAS benchmark values derived from other commercial client databases containing in excess of 22 million covered lives.

In addition to the medical, pharmacy, and eligibility claims, we also assessed the integrity of the detailed provider file and the master provider file. We assessed the extent to which the medical and pharmacy claims could be matched to providers in the detailed table. We also determined the degree to which the detailed provider file records could be related to a single provider in the master provider table.

Database Validity

The database validity checks compared descriptive statistics across time periods (usually months) within the datasets for key metrics such as utilization rates (e.g., admission rates, ER visit rates, etc.) and occurrence rates (e.g., diabetes rate, asthma rates, etc.). These key metrics were compared to internal HDAS benchmarks and external benchmarks such as National Committee for Quality Assurance (NCQA) and RAND. Where appropriate (e.g., when measuring numbers of patients hospitalized with a certain condition), we used the Maine Hospital Inpatient Discharge and Outpatient Discharge databases to validate the information obtained from the All Payer Paid Claims databank. In particular we focused on admissions for selected conditions. In the discharge databases these conditions are consistently reported and are a good standard for which to assess the MQF warehouse.

These data were assessed for aggregate validity. To ensure that key data trends were not obscured by examining aggregate payer data, HDAS created distinct groupings of providers to further assess and validate these data.

Assessment

Key assessments and findings are presented in this section.

Database Integrity

The integrity of the MQF warehouse is assessed for the following 9 items: overall integrity checks, membership and eligibility, orphan claims, date of claims checks, members for whom no claim was submitted, integrity of health care, procedure, and pharmacy claims coding.

Generally speaking, the key data integrity checks did not reveal any significant issues which required remediation. There were fewer than 2% “orphan” claims that could not be matched to the patient eligibility files. This finding is consistent with commercial databases. All medical claims were matched to a provider in the detailed provider files.

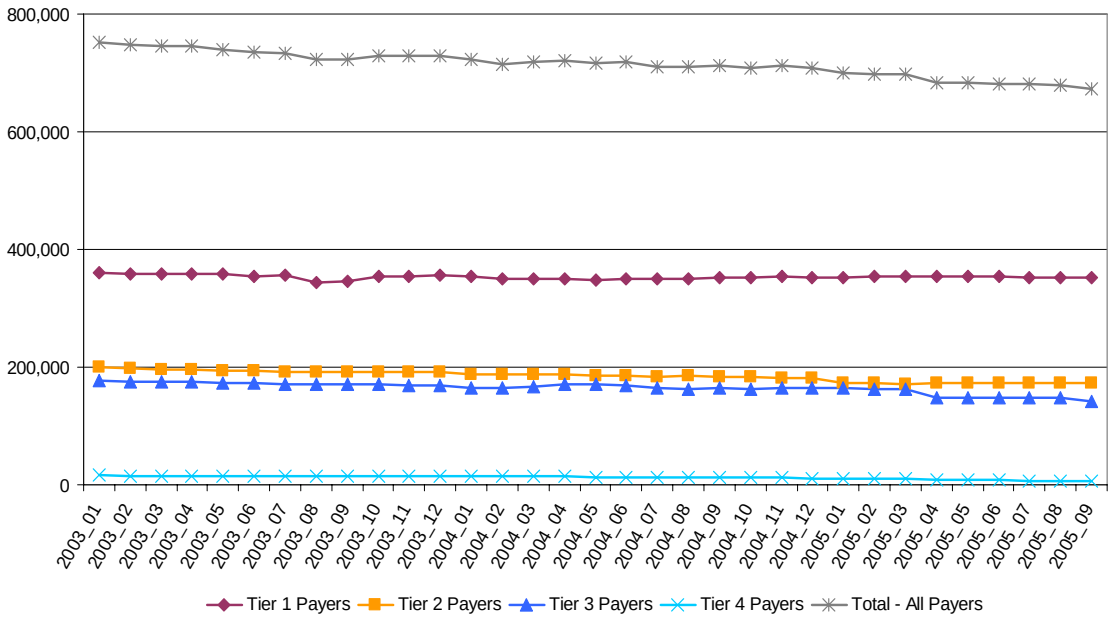
There were no duplicate claims in the database other than those included for purposes of billing adjustments.

Patient Eligibility

The HDAS patient eligibility file contains one record per identified unique individual patient. The patient record contains demographic information (e.g. date of birth, age, separate medical and pharmacy eligibility flags, type of insurance product, the insurer carrier on record as of the patient eligibility file update, the corresponding group and policy number, and relationship of the patient to primary insured policy holder). Analysis of the patient eligibility file in conjunction with medical and pharmacy claims is used to assess the quality and completeness of the warehouse.

The number of covered lives declined over the period from 752,141 in January 2003 to 680,849 in June 2005. The trends in patient coverage is shown in the following figure, shown by “tiers” of payers based on size. Tier 1 was payers with >100,000 members; tier 2, 25,000-100,000; tier 3, 1,000 to 25,000; tier 4, < 1,000. There were no noteworthy findings.

Figure 2: Trends in Patient Coverage by Payer Tier Group: January 2003 – September 2005. See text for tier category definitions.



In most cases, the patient ID was based on the subscriber's encrypted social security number plus payer specific information. In some cases it was based on the insurer contract number, rather than social security number. As a result it may not be possible to track individuals when they change from one payer to another payer.

HDAS conducted extensive analyses to build a unique patient identifier that could be used for individuals over time given changes in insurance carrier or payer. Given that payers do not use the same key variables (e.g., social security number, contract number, etc.) in the patient ID algorithm, it was not always possible to construct a unique patient identifier that will track all individuals over time and across payers.

Future standardization efforts should be considered to enhance the ability for longitudinal studies at the patient level. The number of individuals impacted by this issue is minimal and does not preclude longitudinal studies at the population level.

The HDAS patient eligibility file contains one record per identified unique patient. In addition, if a member is also covered for services which are "carved out," and these services, such as mental health, are provided by a separate payer, the patient information for the "carved out coverage" is in the unique patient record.

Orphan Claims

Orphan claims are those medical claims which could not be matched to a patient. The percent of orphan claims was negligible and within expectations for administrative claims. Even though the percentage was relatively small, there was substantial decrease in orphan claims for claims submitted in 2005. For example, the number of

non Evaluation & Management professional orphan claims was over 10,000 in April 2003; in December 2004, the corresponding number of orphan claims for these services decreased to 4,156. In January 2005, the number of professional non Evaluation & Management claims decreased to 2,640. The same pattern occurred for Professional Evaluation & Management and facility claims.

Users should consider including only those members whose claims can be clearly linked to a distinct individual.

As the percentage of orphan claims has decreased over time, no corrective action is recommended.

Date of Claims

Date validation checks revealed that the some admission dates to facilities were incorrect and in some cases dated back to the 1800s and early 1900s. To overcome this issue, the date of service of the first procedure was substituted as the date of admission. This substitution was made during the construction of the warehouse.

Claims with dates of service "occurring" after the paid date were detected for a small percentage of claims. Due to the small percentage (less than 0.5%) and associated insignificant dollar amount, no action was taken.

There are paid dates occurring prior to January 1, 2003.

Recommendations:

- Improve verification edits to ensure logical consistency for reported dates in the warehouse.

Patients with No Claims during a Service Month

Overall, patients with no reported claims during a service month were relatively stable through June 2005 with the exception of a slight increase for the period October through November 2004.

Health Care Diagnosis and Service Codes

Health care codes recorded on medical claims are used to document patient diagnoses and services provided by physicians, other professionals, hospitals, and facilities. HDAS examined the warehouse for completeness and accuracy of the following health care codes: ICD-9 Diagnosis codes, CPT codes, HCPCS codes, DRG codes, UB-92 Revenue codes, ICD-9 Procedure codes and NDC codes.

ICD9-Diagnosis Codes

Diagnoses are coded by using International Classification of Diseases, Ninth Revision (ICD-9 CM). The data fields containing these codes mapped to valid codes for 99% of the claims. The total dollar amount associated with the 1% of invalid diagnostic codes was approximately 3 million dollars.

In addition to missing invalid diagnostic codes, the principal diagnosis code was not identified for 0.95% claims. These claims were associated with claims from several payers with the most prevalent missing primary diagnosis for C0065A and C0254. All of these claims had at least one secondary diagnosis.

This finding of missing and invalid codes is consistent with other commercial databases and does not pose any challenges for use. However, not all users will be equipped with the resources to review and remap invalid codes.

Diagnosis Related Groups

Diagnosis Related Group (DRG) is a system to classify inpatient hospital stays for payment, originally developed for Medicare. DRGs are reported for most acute inpatient hospitalizations by healthcare facilities. DRG codes are a standard component of HDAS warehouses.

Medicare and many other payers base their hospital inpatient reimbursement on DRGs. DRGs are also used for research purposes to assess patient and utilization profiles across inpatient acute care facilities. In addition, the Health Plan Employer Data and Information Set (HEDIS), also relies on DRGs for classification of services.

During quality review of the warehouse, DRGs were extracted from other data code fields and placed into a separate DRG variable during the building of the MQF warehouse. These DRGs were on medical claims with room and board charges which is consistent with the use of DRGs. There were no DRGs identified on any outpatient records. The DRGs that we extracted were evenly distributed between the payers C0108 and C0125.

Measures which depend on DRGs may be in error, such as the HEDIS measure Beta-Blocker Prescribed within 7 Days following an AMI).

Recommendation:

The following recommendation is critical to the ability to use the MQF warehouse to accurately profile physicians and hospitals and should be addressed prior to initiation of profiling activities.

- **Add diagnostic related group (DRG) codes for inpatient stays**

Current Procedural Terminology (CPT) and HCPCS Codes

CPT procedure codes are a set of codes for procedures and services performed by physicians and other health care providers. Each service performed is assigned a service code using the AMA's Current Procedural Terminology (CPT). Services and supplies, such as durable medical equipment, may also be coded using the HCFA Common Procedure Coding System (HCPCS).

In addition to the procedural codes described above, some payers reported their own "local" codes.

Examination of the CPT codes indicated that DRG codes were reported in the CPT code data field for some payers. Codes were moved to the proper data field as described in the DRG section above.

Some of the medical claims contained CPT codes that are not considered active by the AMA (often referred to as "retired"). The HDAS Clinical Development team, under the direction of the medical director, mapped the retired codes to valid CPT codes. Some payers did not follow the standard procedure coding guidelines and instead used

their own local codes. Again, the HDAS Clinical team assigned a valid current CPT code if the payer provided a description of the service.

Claims with a CPT code value of "99999" (invalid code) were higher in the first seven months of 2003 than in other months suggesting improvement as the All Payer Paid Claims databank submissions matured.

The occurrence of CPT code 99213, the most common established patient E&M service code, declined by approximately 20% over the period covered by the MQF warehouse. This decline is substantial even when taking into account the drop in eligible patients over the analysis period in the MQF warehouse. The MHDO has been informed of this issue and is investigating.

Among facility claims, the billing for a blood draw requiring a complete blood count with automated white blood cell differential increased from 8,000 counts in 2003 to 10,000 in 2004 and 2005. Further investigation is needed to determine if this is a shift in billing or an underlying increase in the number of blood draws. In addition, for Payer C0065A, we observed an abnormal spike for the CPT code, 36415 (venipuncture or blood collection service) from December 2004 (4,486 counts) to January 2005 (10,287 counts).

Recommendations:

- Investigate drop in report of CPT code 99213.
- Investigate spike in CPT code 36415 for payer C0065A

Revenue Codes

Revenue codes are used for billing inpatient facility services to classify the services provided. These codes are overseen by the American Hospital Association and National Uniform Billing Committee.

These codes are used to report services billed by cost center and are also used to identify claims for inpatient hospitalizations in the MQF warehouse. There are indications that revenue codes in the database may not be complete. For example, there was a low frequency of revenue codes during the fourth quarter of 2004 for payer C0423. The low frequency of revenue codes for this payer is associated with a decrease in Per Patient Per Month (PPPM) cost. In addition, services typically performed in acute care hospitals, such as hysterectomies, hip replacement, and knee replacement surgeries were detected on claims that did not contain any revenue codes associated with room and board charges (100-219).

Revenue codes mapped to a valid number for approximately 97% of the medical codes. These findings are consistent but slightly lower than HDAS commercial benchmarks. After data review and correction by the HDAS Clinical Development team, this percent rose slightly to 98.6%.

Missing revenue codes could lead to undercounting of hospital inpatient stays. Comparisons of inpatient versus outpatient expenditures could be impacted for any affected payer. In addition, selected HEDIS measures such as Low Back Pain could be affected.

Recommendations:

- Ensure completeness of revenue codes to ensure identification of inpatient stays
- Review procedure and revenue codes for payer T0007

ICD-9 Procedure Codes

ICD9-Procedure codes are codes that classify medical diagnostic and therapeutic procedures performed during an inpatient or outpatient facility encounter. Facilities use these codes to document the procedures performed during an inpatient or outpatient facility encounter and as input to DRG grouping algorithms. ICD-9 Procedure codes are used by acute care hospitals and outpatient facilities such as ambulatory surgical centers.

The ICD-9 Procedure codes are also used to monitor facility procedures in a variety of performance measurement systems. For example, HEDIS requires these codes for several measures including Colorectal Cancer screening.

These procedure codes are completely missing for payer C0108.

Recommendations:

The following recommendation is critical to the ability to use the MQF warehouse to accurately profile physicians and hospitals and should be addressed prior to initiation of profiling activities.

- **Add facility procedure codes for payer C0108**

National Drug Codes (NDC)

The prescription drug or NDC codes were validated against a standard pharmacy dictionary which is updated on a quarterly basis. NDC drug codes are assigned by the Federal Food and Drug Administration (FDA) to uniquely identify a manufacturer, drug, dose, and formulation combinations. NDC codes were valid in over 99% of the cases.

No remedial action is required.

Institutional Bill Type

The values in the MC036_Bill_Type field were identified as unreliable. This data element is used to identify the type of facility (e.g. Hospital, Skilled Nursing Facility, Home Health, and Ambulatory Surgical Center) submitting the bill and to identify if the bill was for an inpatient or outpatient episode or for a step down unit within an acute care facility.

For example, of the 1,379 distinct patients with an Acute Myocardial Infarction (AMI), the institutional bill type was missing for 11% of the patients even though those patients were identified as having a room and board charge.

Analysis of all the facilities claims with a Room and Board Charge indicated that the institutional bill type code for facility type was missing for 17% of those patient bills. The payers with the greatest frequency of missing information were C0125, C0108, T0037A, T0043, and T0037B.

These analyses were restricted to dates of service between July 1, 2004 and June 30, 2005 which is after the deadline for payers to report this field to MHDO.

Recommendation:

- Require completeness for type of institutional bill

Patient Discharge Status

During the time period from July 1, 2004 through June 30, 2005, Patient Discharge Status is missing for 11,521 of 96,215 patients, or 12%, of patients who had a room and board charge. This is a key field which could be used to examine mortality rates, rates of discharges to skilled nursing facilities and other types of institutions, overall and by type of admission. The MHDO Data Dictionary contains a warning that this field is inconsistently reported among payers.

Recommendation:

- Require completeness for patient discharge status

Geographical Identifiers

Over 99% of the patient's zip codes could be mapped to a town and county name. The MHDO Hospital Service Area (HSA) assignment was conducted by mapping zip codes to HSA for those cases where the assignment of a zip code to HSA was unique. In several instances, zip codes mapped to two HSAs. In those cases, town names were used for in the assignment. In a small percentage of the claims (less than 1%), an assignment to a HSA was not made due to idiosyncratic spelling of town names.

No remedial action is required.

Warehouse Validity

The validity of the warehouse was assessed using the patient eligibility files, medical claims, and pharmacy claims. HDAS conducted overall analyses as well as analysis by type of claim (e.g. professional, facility, pharmacy).

Total Paid Claims by Paid and Incurred Month

The following table (Table 1) provides a summary of the total paid medical costs for the commercial payers in Maine. The purpose of this analysis is to assess claims maturity by month and determine the appropriate number of months of claims run-out necessary for any analysis.

Over 96% of the claims incurred on or before June 30, 2005 have been paid by the plan. The current warehouse will support analyses through June 30, 2005 and may be characterized as having at least a three month run-out period for claims incurred during the third quarter of 2005. On average, all payers incurred approximately 150 million dollars monthly. Within 3 months, 92% of all claims had been paid. Appendix 1 displays the Paid vs. Incurred dollars matrix for the period from January 1, 2003 through September 30, 2005.

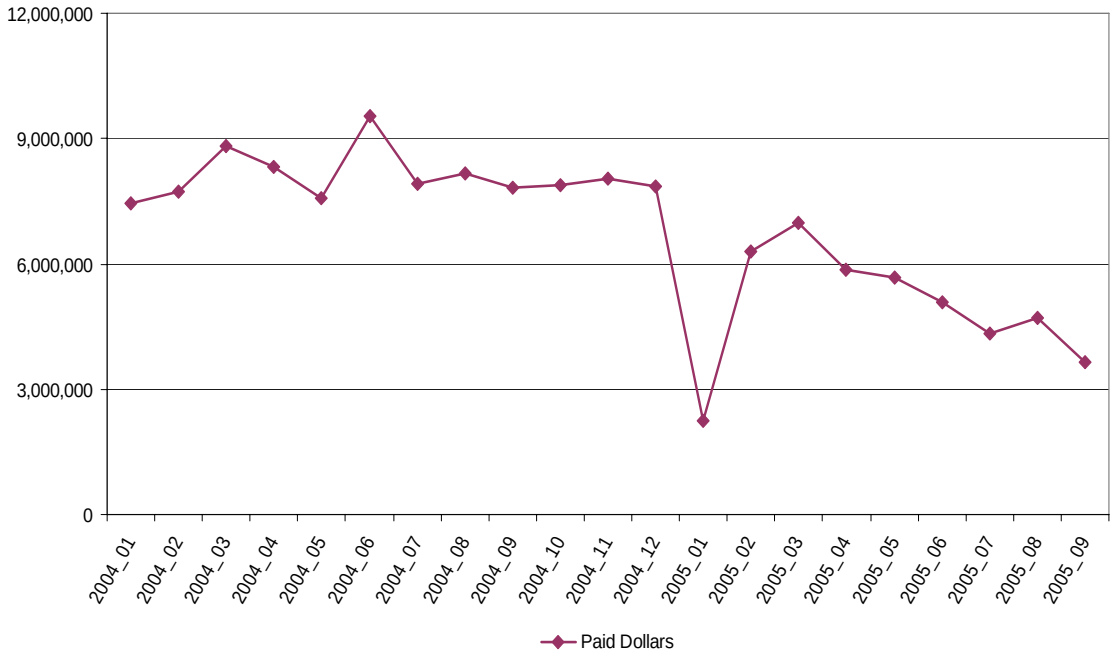
These analyses were repeated for each payer to ensure that the overall trends did not mask any underlying data completeness issues for selected payers. Two payers have been identified as missing claims.

Data for payer C0254 indicates that only one-third of the normal paid amount was processed in January 2005 (Table 1 and Figure 3) resulting in a lower than expected PPPM for November 2004 through January 2005, inclusive. Data for payer C0254 is shown below.

Table 1: Paid incurred matrix for facility claims for payer C0254, November 2004 – April 2005.

	Incurred Date						
Paid Date	Nov 2004	Dec 2004	Jan 2005	Feb 2005	Mar 2005	Apr 2005	Total
Nov 2004	$3,041,335						$8,045,599
Dec 2004	$3,154,706	$3,242,690					$7,846,557
Jan 2005	$230,045	$1,005,222	$717,341				$2,242,483
Feb 2005	$359,820	$542,237	$2,836,021	$2,143,236			$6,301,994
Mar 2005	$134,049	$305,652	$842,992	$2,658,447	$2,631,641		$6,991,760
Apr 2005	$472,665	$86,121	$163,304	$438,222	$2,348,222	$2,156,050	$5,871,239
May 2005	$28,785	$96,506	$73,315	$169,200	$433,368	$2,282,424	$5,679,069
Jun 2005	$34,120	$48,813	$56,135	$58,833	$129,825	$304,960	$5,080,558
Jul 2005	$24,456	$68,968	$40,161	$64,869	$130,542	$115,131	$4,328,955
Aug 2005	$7,187	$15,407	$46,366	$76,534	$43,517	$109,671	$4,707,686
Sep 2005	$84,207	$15,323	$13,152	$24,661	$26,109	$31,612	$3,646,200
Total	$7,571,375	$5,426,938	$4,788,787	$5,634,001	$5,743,223	$4,999,849	

Figure 3: Total paid facility and professional claims for payer C0254, January 2004 – September 2005.



For payer C0423, there were no claims paid in January 2005 for any service months prior to January 2005 (Table 2). This pattern is associated with a 40% decline in the number of claims. The results are summarized in Table 2 which follows.

Table 2. Paid incurred facility claims for payer C0423, November 2004 – June 2005.

	Incurred Date								
Paid Date	Nov 2004	Dec 2004	Jan 2005	Feb 2005	Mar 2005	Apr 2005	May 2005	Jun 2005	Total
Dec 2004	$1,892,860	$1,211,150							$3,104,010
Jan 2005			$118,734						$118,734
Feb 2005	$277,828	$439,300	$1,979,263	$790,920					$3,487,311
Mar 2005	$90,465	$235,301	$907,950	$1,540,440	$1,383,982				$4,158,138
Apr 2005	$243,731	$252,324	$323,318	$442,150	$2,105,052	$1,104,023			$4,470,599
May 2005	$34,988	$99,445	$116,437	$135,077	$910,603	$2,288,663	$1,508,276		$5,093,489
Jun 2005	$34,814	$44,983	$125,889	$103,911	$316,979	$575,517	$2,409,762	$1,405,534	$5,017,388
Jul 2005	$123,105	$49,453	$44,861	$107,212	$93,204	$221,958	$520,676	$2,184,690	$3,345,158
Aug 2005	$20,896	$33,084	$234,415	$107,753	$110,221	$253,142	$695,389	$954,732	$2,409,632
Sep 2005	$11,668	$23,004	$37,728	$45,059	$101,924	$115,470	$94,438	$325,311	$754,603
Total	$2,730,354	$2,388,045	$3,888,595	$3,272,521	$5,021,965	$4,558,773	$5,228,539	$4,870,268	$31,959,060

Recommendation:

- Augment missing claims for payers C0254 and C0423
- Add indicators for defined contribution plans if paid amounts are going to be used in the future.

Paid per Patient per Month Summary

This section of this report summarizes PPPM payments. These PPPM costs are standardized to a 30 day period. The PPPM was relatively stable across the analysis time period. Table 3 summarizes the total PPPM overall and by medical services category.

Table 3: Total Plan Paid Claims by Paid and Incurred Months January 2003 – June 2005

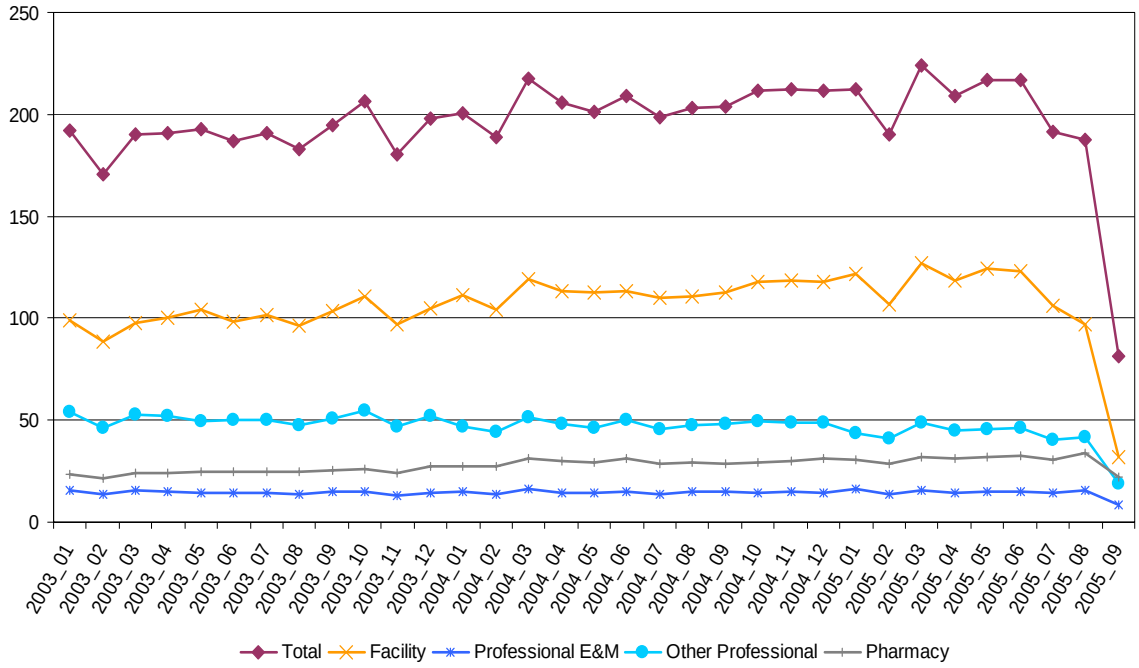
Service Category	Expected PPPM Commercial Range	MQF warehouse PPPM Range
Total PPPM	$185-$245	$170 - $223
Facility PPPM	$85-$110	$88 - $126
Professional Evaluation & Management	$18 - $27	$13 - $16
Other Professional	$49 - $68	$41 - $55
Pharmacy PPPM	$33 - $40	$38 - $43[1]

[1] Pharmacy PPPM from first quarter 2005.

The PPPM costs in the warehouse are consistent with commercial benchmarks for the same time period with the exception Professional Evaluation & Management plan costs

which are slightly lower. The PPPM for June 2005 was $217 for 680,649 covered lives. The percent of claims by service category was also consistent with commercial benchmarks. Shown below in Figure 4 are PPPM summaries by type for claims received to date.

Figure 4: Plan Paid PPPM by Type of Claim Paid Months January 2003 – September 2005



High-Cost Patients

High-cost patients are defined as those patients with 12 month costs in excess of $50,000. The percent of high-cost patients, calculated on a "rolling" 12 month basis, was stable overall and for each payer.

Analyses for Patients at Least 65 Years and Older

HDAS examined if the warehouse would support any analyses on patients >64 years of age. In summary, it appears valid procedure rates are estimable in the 65 and older population. The entire aged population is not represented in the data set, however, and the possibility for a small bias in this age group exists if Medicare participants with increased morbidity elect to purchase supplemental insurance at an increased rate. A full assessment will be possible when Medicare data becomes available.

Figures 5 and 6 shows the eligible patients and PPPM by age category. The first graph shows the number of patients eligible each month from Jan 2003 through Oct 2005. The totals for ages 60-69, 60-64, and 65-69 are displayed. It is important to note that the two groups were created from patients' ages calculated as of December 31, 2005. This means that in 2003, about half of the 65-69 group is, in fact, younger than 65.

There are fewer patients in the older group reflecting the difference between those who do and don't have supplemental insurance and any mortality effect.

Figure 5: Patient Eligibility by Age Cohort: January 2003 – September 2005

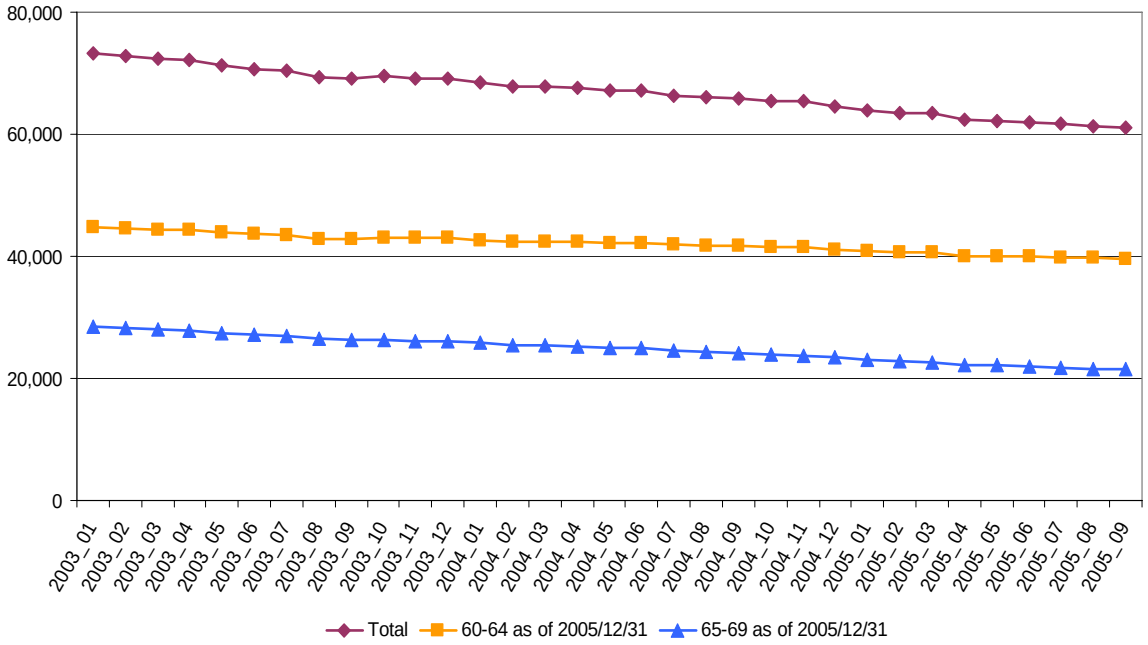
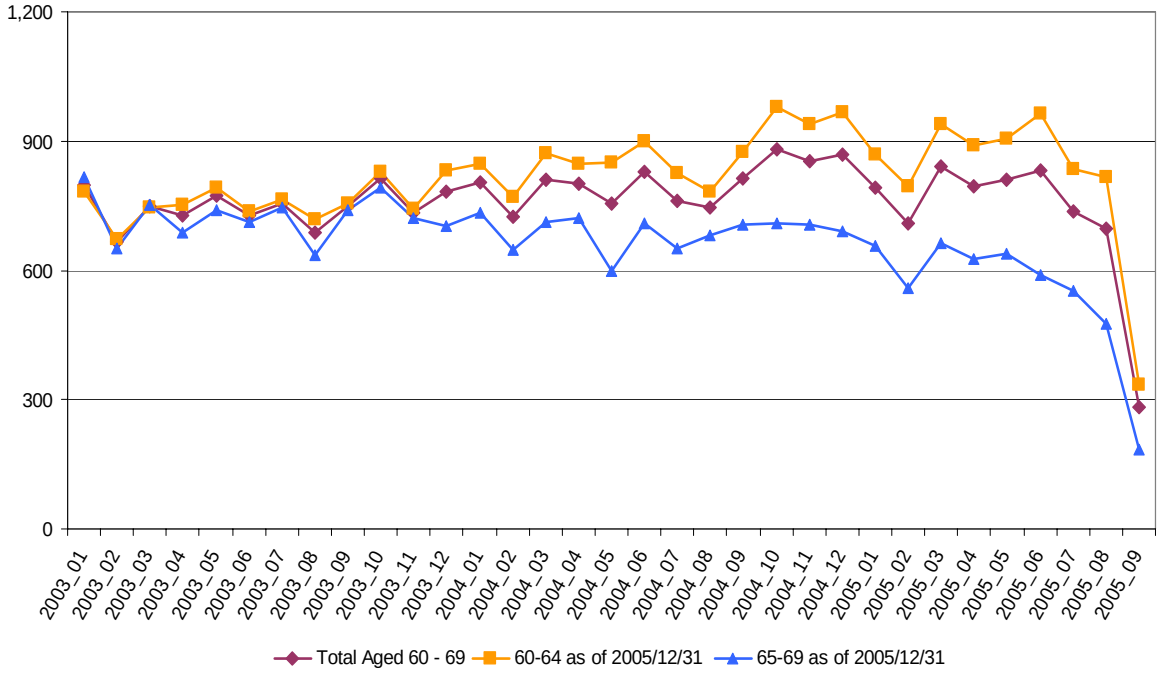


Figure 6: Plan Paid PPPM by Age Cohort: January 2003 – September 2005



Utilization

HDAS examined inpatient admission rates and Emergency Department (ED) utilization patterns. Generally speaking the rates were within the expected commercial population benchmark even though the rates for ED visits were near the upper limit of the range. The results are summarized in Table 4 below.

Table 4. Inpatient admissions and ED utilization.

Type of Service	Commercial Population	MQF
Inpatient Admissions (1,000 members per month)	3 – 7	6
ED Visits (1,000 members per month)	10 – 20	20

Examination of claims for individual payers indicated that payer C0065A has slightly higher ED visit rate and rates of admission as compared with the other payers.

Recommendation:

- Confirm ED visit rate for payer C0065A

Bundled Billing Practices

Payer specific information is needed to identify bundled bills. For example, some payers may elect to bill all maternity and obstetric charges in a global bill. The practices may vary by individual payer. This documentation is needed to correctly identify cost and utilization especially for maternity and newborns.

Recommendation:

- Document payer specific bundled billing practices

Provider Data Files

The MQF warehouse contains provider information in two data files. The first file contains detailed payer specific information for each provider and facility. Providers and facilities may have multiple data records in this file. The second file, the master provider table, is designed to contain one record for each provider and facility. The master provider table not only contains demographic and geographical information but contains the classification of the type of specialty or facility.

Linkage of Provider Table to Claims

HDAS assessed the completeness, accuracy and consistency of both the master provider file and the detailed provider file. The initial checks focused on the ability to link claims to providers. All claims in the warehouse were successfully linked to providers in the detailed provider file. Approximately 95% of the claims could be successfully linked to the master provider file. The majority of the claims that could not be linked appear to be most likely associated with out of state providers.

Twenty-five percent of the providers in the detailed provider table could not be matched to a provider in the master provider table. The majority are out of state providers.

Taxonomy or Specialty Codes

The Health Care Provider Taxonomy code (HPTC) set is designed to classify health care providers according to provider type or practitioner specialty. These HIPAA mandated codes are maintained by the National Uniform Claim Committee (NUCC).

Generally speaking, the taxonomy codes used to identify physician specialty in the master provider table are of high quality. HDAS verified the concordance of the taxonomy codes in the MQF warehouse to the specialty listed on the Maine Physician Hospital Organization website. Several specialties including cardiology, emergency medicine, general surgery, nephrology, and urology were compared. For example, of the 60 cardiologists compared, the specialties matched for all but 4. Two cardiologists shown on the Maine PHO website were not found. One adult cardiologist, as identified by the website, was identified as a pediatric cardiologist on the master provider table. One pediatric cardiologist, identified on the website, was identified as a pediatrician on the master provider table.

Programming for selected HEDIS measures uses taxonomy codes to identify place of service. There was no issue in identifying taxonomy codes for Maine acute care hospitals with the possible exception of the taxonomy code assigned to the Maine Heart Center. General acute care facilities are identified using the taxonomy code 282N00000X. Maine Medical Center and the Portland area cardiologists and cardiothoracic surgeons established the Maine Heart Center, a taxable non–profit entity. The taxonomy code associated with the Maine Heart Center is 261Q00000X which is a designation for a specialized ambulatory care facility with no inpatient facilities. This coding may cause misclassification of some inpatient cardiac events associated with the Maine Heart Center and therefore may influence interpretation of analyses.

We have further identified an issue requiring clarification. We observed records in the master provider file for some Osteopathic physicians who are classified with the taxonomy code for the neuromuscular medicine and osteopathic manipulation medicine specialty (204D00000X). Review of several other sources including the Maine PHO website and the Maine State Board of Osteopathic Medicine license database show these individuals as family practitioners.

The master provider table contains only one specialty taxonomy field. For example, if a physician is certified by two medical boards or is certified in a subspecialty and practices in two specialties such as Internal Medicine and Infectious Diseases, only one specialty is available on the master provider file. This limitation could impact the analysis of cost and utilization of practice patterns for specialists. In addition, please refer to the Provider Identification and Loss of Provider Specific Information for additional details.

Geographical Identifiers

The designation of a Maine provider in the master provider table is not 100% accurate. For example, a detailed review of the acute care hospitals designated as Maine hospitals indicated that 4 of the hospitals were out of state hospitals with one of the

hospitals in Canada. This finding was in both the May and August 2006 transmissions of the master provider table.

Provider Identifiers and Loss of Provider Specific Information

A key variable in the MQF warehouse is the unique provider identifier (DPCID). The DPCID provides the link between the detail provider file and the master provider file. HDAS examined the provider identifier (DPCID) in both the master and the detailed provider tables to test for validity and reliability. We identified 2 key issues; duplicate DPCIDs for individuals in the master provider file and records in the detail provider file pointing an individual to multiple DPCIDs. We observed a relatively small number (33 occurrences) of duplicate DPCIDs in the master provider table.

The occurrence of many to many DPCIDs links in the detailed provider table is more prominent. To illustrate, we selected two Primary Care or Family Practitioners from the websites for two large southern Maine group practices. The first physician had one DPCID in the master provider table and 5 distinct DPCIDs in the detailed provider table. The second physician also had one DPCID in the master provider file and 5 distinct DPCIDs in the detailed provider table. This is a key finding as the DPCID is the essential link between the master provider table and the individual claims through the detailed provider file. If the detailed provider table does not consistently link individuals to the same DPCID, then the linkage to the master provider table is compromised.

We investigated an additional issue with a substantial impact. Detailed provider file records with specific physician information have been modified resulting in loss of specificity. 86 of the 259 (33%) records in the detailed provider table for one physician group practice we examined had a first name of a provider and it appears that the last name of the provider has been overwritten with the group name and group's DPCID assigned in the detailed provider file record.

Overall, approximately 16% of records in the detailed provider table for Primary Care practices appear to have once contained more detailed individual provider information. This finding impacts primary care, specialty and multi-specialty practices, as well. For example, one large group practice in southern Maine with providers specializing in cardiology, family practice, internal medicine, pediatrics, sports medicine, obstetrics and gynecology, podiatry, dermatology, radiology and infectious disease is impacted by this issue. When the last name of the provider is replaced with the Group practice name and taxonomy code, it becomes impossible to accurately identify the individual provider delivering the services detailed on the claim.

Hospital-Owned Physician Group Practices

As previously discussed in the Health Care coding section, the billing practices of hospital-owned physician group practices has resulted in a loss of specificity for services provided by the servicing versus the billing provider. The MHDO has been informed and is further investigating this issue.

Physician Groups

The practice patterns of physicians and other health care providers are affected by the systems in which they practice, especially by their affiliated physician groups.

Profiling of physician quality, cost, and utilization would be greatly enhanced if the master provider table contained the name of the Physician Group. Corrective action could be supported in large part by the proliferation of PHO and Physician Group websites.

Recommendations:

The following recommendations are critical to the ability to use the MQF warehouse to accurately profile physicians and hospitals and should be addressed prior to initiation of profiling activities.

- **Correct duplicate provider identifiers in the master provider file**
- **Correct duplicate provider identifiers in the detailed provider table**
- **Correct provider detail table to ensure individual provider names and identifiers are preserved to link claims to individual physicians**
- **Correct state identifier for hospitals incorrectly identified as Maine hospitals**

The following recommendations will improve the MQF warehouse, but are not critical to proceeding with profiling.

- Ensure completeness of servicing provider identifiers versus billing provider identifiers for hospital-owned physician practices
- Ensure accuracy of provider taxonomy specialty assignment
- Add additional provider taxonomy codes to the master provider table for dual boarded and practicing specialists
- Add practice group name to master provider table
- Correct taxonomy code for Maine Heart Center

Validation versus External Sources

Project specifications required HDAS to use the Maine hospital inpatient discharge database for validating the data quality and completeness of the MQF warehouse. The hospital inpatient discharge database is well established and widely used to analyze inpatient healthcare in Maine. However, using it as a true "gold standard" for the MQF warehouse has a number of significant problems. First, patients can't be linked between the two, so at best probabilistic linking can be performed. This makes diagnosing any differences between the databases unresolvable.

Secondly, the discharge database is not based on the same population as the current MQF warehouse. For instance, Medicare, Medicaid, federal employees, military, etc. patients are not in the MQF warehouse at this time. Further, investigation showed hundreds of payers who have members in the discharge database apparently don't submit claims to the database the MQF warehouse is based on. This problem is not limited to out-of-state residents. These payers may not be individually responsible for a large number of claims, but the large number of these payers can make them responsible, in aggregate, for a significant number of claims. This defeats the

usefulness of comparing numerators and denominators between the two databases. Payers in the discharge database are identified by names, many with numerous variations, which can't be reliably linked to MQF payer IDs.

For the validation of selected procedures versus the Maine hospital inpatient discharge database, correspondence of 80% is considered an upper limit of achievable performance because of the uncontrollable factors mentioned above.

It is important to note that even if claim counts are not identical between two databases, it does not follow that comparable rates can not be reliably computed from them. In fact, the evidence in this report suggests the MQF warehouse, even before required fixes, produces rates comparable to those from external databases.

Analyses focused on two "signal" procedures, appendectomies and Caesarian sections (C-Sections). Besides the two procedures, rates were calculated for NCQA specified HEDIS measures for which national benchmarks were available (Appendix 2). Rates were also calculated for preference sensitive surgeries for Maine HSAs, and variation among these can be compared to MQF variation analysis based on the discharge database for similar surgeries (Appendix 3).

Validation of Selected Procedures versus Maine Inpatient Hospital Discharge Database

Analyses focused on the "signal" procedures of appendectomies and Caesarian sections (C-Sections). We excluded out of state patients and removed Medicare, Federal Employee Plan, MaineCare, Workers Compensation and Champus patients from the Hospital Inpatient Discharge database. We attempted to "match" records between the MQF warehouse and hospital inpatient discharge database using a linkage algorithm requiring exact matches on the patient identifiers – zip code, sex and date of birth.

Caesarian Section

Caesarian sections were identified by both facility and professional claims. This analysis focused on the ability to link patients in the MQF warehouse to the hospital inpatient discharge database. The linkage was conducted for the period from January 1, 2003 through June 30, 2005. Additionally, the linkage was conducted on three discrete time periods summarized in the table below.

Using a linkage algorithm requiring exact matches on a derived patient identifier based upon zip code, gender, and date of birth, the overall match rate for individuals in the discharge database and warehouse was 70.3%.

Table 5. Summary of C-Section Linkage Rates between the MQF warehouse and inpatient hospital discharge database, January 2003-June 2005.

	January 2003-June 2003	July 2003-June 2004	July 2004-June 2005	All
Number Patients: MQF warehouse	1,005	1,761	1,686	4,452
Number Linked to Hospital Inpatient Discharge database	717	1,503	1,432	3,652
Linkage (%)	71	72	68	70
Portion in warehouse linked or not (%)	89	85	80	84

The portion of claim numbers in the warehouse compared to the discharge database ranged from 80-89%.

Central Maine Medical Center, Eastern Maine Medical Center, Maine Medical Center, and Mercy Hospital were selected for detailed analysis. The patient level linkage rates for these four hospitals ranged from approximately 62% to 75%. The corresponding rates when matched at the procedure level, rather than individual patient, ranged from 67% to 84%, respectively.

If the facility claims only had been used, the linkage would have been considerably less.

Appendectomies

HDAS compared the appendectomies reported in the MQF warehouse and inpatient hospital discharge database. There are 2,876 appendectomies reported in the discharge database compared with 2,201 appendectomies in the MQF warehouse for the period from January 1, 2003 through June 30, 2005, inclusive.

Due to missing facility claims as well as missing ICD-9 surgical codes for a major payer, both professional and facility bills were needed to increase the accuracy of procedure rates. Despite these efforts, the linkage rate of 61% was lower than the anticipated 80% linkage. While large gaps in the completeness of facility claims have been identified, future analyses may reveal other missing claims.

Table 6. Summary of appendectomy linkage rates between the MQF warehouse and inpatient hospital discharge database, January 2003-June 2005.

	January 2003-June 2003	July 2003-June 2004	July 2004-June 2005	All
Number Patients: MQF warehouse	429	892	880	2,201
Number in Hospital Inpatient Discharge database	558	1,114	1,204	2,876
Number Linked to Hospital Inpatient Discharge database	270	533	531	1,334
Linkage (%)	63	60	60	61
Portion in warehouse linked or not (%)	77	80	73	77

The portion of claim numbers in the warehouse compared to the discharge database ranged from 73-80%.

The following four hospitals were again selected for detailed analyses: Central Maine Medical Center, Eastern Maine Medical Center, Maine Medical Center, and Mercy Hospital. The patient level linkage rate for these four hospitals ranged from approximately 48% to 74%. The corresponding rates when matched at the procedure level ranged from 74% to 98%, respectively. The lowest linkage rate was associated with EMMC.

HEDIS and preference sensitive surgery rates are discussed in the next section.

4. Test Indicators of Health Care Quality

Once the MQF warehouse was developed and the integrity and validity checks were completed, MQF and HDAS initiated a process to examine the ability of the MQF warehouse to support measurement of population based quality metrics. In order to demonstrate the capability of the MQF warehouse to support a broad range of measurements, HDAS reviewed potential measures that represent a comprehensive approach to healthcare performance measurement, recognizing that quality performance encompasses effective care, preference sensitive and measures of efficient or supply driven costs. MQF and HDAS agreed to compute 10 HEDIS measures, 6 preference sensitive measures, and 4 cost measures from the MQF warehouse. These measures were computed on the statewide patient population by HSA.

In summary, the results of these measurements are in general agreement with those from other commercial claims sources, but in specific circumstances will be affected by warehouse issues, such as no facility procedure codes for payer C0108 (a large payer). All measures demonstrated statewide variation and clear opportunities to use such measures to increase quality and reduce cost of healthcare.

The following paragraphs describe the test measurements.

Effective Care Measures

The HEDIS measures developed and maintained by the National Committee for Quality Assurance (NCQA), are a comprehensive set of measures of health plan performance. We chose ten HEDIS measures to test the MQF warehouse and report by HSA. Specific inclusion criteria define the denominators and those that received the appropriate care are included in the numerator. The results, expressed as percentages, with higher rates indicate that more patients qualifying for specific care received it. We used the HEDIS 2005 Technical Specifications when calculating these measures. The effective care measures agreed on were:

- Beta Blocker Following Heart Attack
- Breast Cancer Screening
- Cervical Cancer Screening
- Colorectal Cancer Screening
- Diabetes Eye Exam Performed
- Diabetes Hemoglobin A1c Tested
- Diabetes Nephropathy Monitored
- Diabetes LDL-C Screening
- Use of Imaging for Low Back Pain
- Appropriate Medication For Asthma: All Ages Group Combined.

The results of these data analyses are shown in Appendix 2. Rates are compare to NCQA national HMO/POS administrative rates because managed care plans encourage

preventive care with either full coverage or a nominal patient co-payment. The results of the Effective Care measurements by HSA are also in Appendix 2.

Preference Sensitive Measures

For a number of medical conditions there is no clinical evidence in favor of one type of treatment over another. Treatment of these conditions has significant tradeoffs in terms of risks and benefits for the patient. The choice of treatment is, or should be, driven by the patient's own preferences. For example, there are many options for treatment of low back pain, including watchful waiting, medications, exercise, and surgery. Research has shown that patients, when fully informed about risks and benefits, most often select less invasive treatments.

Preliminary analyses indicated that surgery rates varied by HSA, age and gender. To estimate the effect of HSA on surgery rate, a logistic regression model was employed to calculate expected number of surgeries by adjusting for age and gender. Both crude rates and age and gender adjusted rates were calculated for each of HSA. Since prostate surgery only occurs in males and hysterectomies in females, surgery rates for these procedures were only age adjusted. The Preference sensitive procedures agreed upon were:

- Benign Prostatic Hyperplasia Surgery (BPH)
- Hysterectomy (BUC)
- Hip surgery
- Knee Surgery
- Lumbar Back Surgery
- Cardiac Revascularization

The results of the Preference Sensitive Care measurements by HSA are shown in Appendix 3.

Cost Measures

MQF and HDAS agreed on 4 cost measures to evaluate the MQF warehouse. The measures are listed below. As with most commercially insured populations, we found a large number of the insured members in the MQF warehouse have incurred no costs during the analysis period, and very few incurred inpatient costs. In order to account for this situation correctly, a two stage model was used. First, a logistic model was used to predict which members would have cost (greater than zero). Then, for those with cost greater than zero, a generalized linear model was used to predict the amount of cost. A logarithmic transformation was applied to the cost data prior to analysis. This transformation was used because the cost data is highly skewed with a long "tail" to the right indicating there are a number of patients with high costs far above the median cost, and some with extremely high cost. This is typical of healthcare cost data. An exploratory analysis of the patients in the top 10% for cost showed that cost increased at an accelerating rate in the top 1% and because these patents are probably unique medical situations, they were considered to be true outliers and where excluded.

The models adjusted for age, gender and comorbidities. Comorbidity adjustment was done using the Diagnostic Cost Group Hierarchical Condition Category (HCC) score. The HCC algorithm uses 70 diagnostic categories from both outpatient and inpatient claims to calculate an overall score. The scoring algorithm takes the demographic characteristics of age and gender into account and reflects the clinical relationship between specific diseases as well as expected resource use. The cost measures agreed upon were:

- Professional Office Visits (Evaluation & Management CPT Codes)
- Other Professional Services
- Inpatient Facility Costs
- Outpatient Facility Costs

The results for the cost measurements by HSA are in Appendix 4.

Any limitations to computing these measures are detailed in the MQF warehouse build and assessment section of this report.

Summary

The analysis of test indicators demonstrated that the MQF warehouse is capable of supporting measurement of healthcare quality across all three dimensions of care, effective care, preference sensitive care and efficiency or supply driven care cost. Results from all the measurements demonstrated statewide performance variation and show clear opportunities to use such measures to increase the quality and reduce cost of healthcare in Maine.

5. Advanced Imaging Study Geographic Variation Analysis

The Center for Outcomes Research and Evaluation (CORE) at Maine Medical Center conducted the study on advanced imagining. CORE calculated population based utilization rates of advanced imaging in Maine, described advanced imaging testing practices within cohorts of members with specific diagnoses, and produced variation maps. The details of this analysis are presented in Appendix 5.

The largest amount of variability in the tests CORE evaluated occurred with lumbar CT and abdominal/pelvic MRI. For several tests, there were no areas with rates substantially and significantly lower than the state rate, while there was at least one area with rates above the state rate for each test category except overall CT testing. While there were, for various tests evaluated, HSAs with rates substantially and significantly below the state rate, there was no clear pattern associated with these lower utilization rates. However, there was a clear pattern for higher utilization rates. The Presque Isle and Caribou HSAs had rates substantially and significantly higher for several of the test categories examined.

6. Provider Profiling Pilot Project

In order to further test the adequacy of the MQF warehouse to support MQF goals, HDAS undertook a pilot provider profiling project based on HDAS Unwarranted Variation™ Analytics. MQF indicated its interest to profile all providers in Maine and understand the implication of these profiles at the patient level. The pilot project was designed to profile a sample of Maine providers using a large number of effective care, preference sensitive and supply sensitive care measures. Overall, the purpose was to describe patterns of care, not to second guess an individual treatment on an individual patient. Another purpose was to demonstrate how these profiles and patient healthcare experience are related, can be analyzed, and can be modified - rendering the evaluations actionable. Additionally, the project tested whether the MQF warehouse could support assignment of patients to providers, both Primary Care Providers (PCPs) and specialists. The objectives were met by profiling a set of PCPs and cardiologists.

There are two parts to the pilot project: one is an analysis of a subset of PCPs in Maine, the other a subset of cardiologists. The purpose is to describe variation in practice patterns in these two groups using a robust set of measures, and relate this variation to specific patient level events and effects. HDAS' methodology and clinical insights using Unwarranted Variation™ Analytics expands beyond the limitations of analyzing single clinical episodes because it assesses the longitudinal health care record of the patient, including multiple episodes.

Both parts of the project use supply sensitive and effective care measures, but the effective care measures differ for the specialties. Effective care measures, such as the HEDIS or HDAS' effective care measures are derived from evidence based medical guidelines. HDAS effective care measures (GAP measures) measure "gaps" in care for common chronic conditions. The individual GAP measures are weighted aggregations of specific clinical procedures, the weights depending on the relative importance of each procedure in the care of chronic conditions.

The roots of the supply sensitive care measures are several decades of research into the drivers of variation in the cost and quality of health care. This research revealed that one of the primary drivers of cost is the resources available to deliver services. The more resources (hospital beds, imaging machines, medical specialists, etc.) existing to serve a defined population, the more services patients loyal to that system will receive. Most supply sensitive measures are medical service based (as opposed to surgical) and are aggregated into related categories of supply sensitive care. The supply sensitive measures are used to reveal variation in provider performance and identify providers who are delivering care more or less efficiently than their peers.

Measures

For purposes of this pilot, HDAS selected from our list of over 60 measures a set of representative measures for demonstration purposes. A list of the measures reported in this project to evaluate providers is in Appendix 6. The measures for the pilot project include:

- 5 supply sensitive (efficiency) measure
- 2 utilization (efficiency) measures
- 3 composite (8 components) HDAS effective care measures (GAP) used for cardiologists
- 8 HEDIS measures used for PCPs

Measures were selected for the pilot project based on the purpose of the project and status of the MQF warehouse. All measures were computed at the patient level and through statistical modeling were rolled up to the provider panel level. Each provider was evaluated for all the efficiency measures and the appropriate effective care measures detailed in Appendix 6.

Paid claims in the period July 1, 2004 and June 30, 2005 were analyzed. Efficiency measures were calculated using the insurer or plan paid costs as well as the member paid costs which included deductible, member co-payment amounts, coinsurance, and any member prepaid costs. Patients who were enrolled during the entire measurement period or had no more than one month of gap in coverage between July 1, 2004 and June 30, 2005 were included in the analysis. Costs were annualized for any members with eleven months of data collection.

Attribution of patients to providers

The specialty, primary care or cardiology, was identified from the taxonomy codes reported in the master provider file received August 8, 2006. Primary care providers included the specialties of family practice, internal medicine, pediatrics and geriatrics. Patients were attributed to a primary care provider based on rules using a cascade of timing and frequency of office based face-to-face provider encounters. Based on application of these rules, we selected 31,507 members were attributed to 67 primary care providers from one region of the state.

Cardiology patients were attributed to a provider based on the first cardiologist seen during the analysis period based on a face-to-face encounter with the physician. Eighty-eight percent of patients saw only one cardiologist and were assigned to that cardiologist. Tie breaker rules were applied if patient encountered more than one cardiologist. Over 12, 900 patients were assigned to 86 cardiologists during the analysis period.

Risk Adjustment

HDAS believes risk adjustment is appropriate for supply sensitive and utilization measures only. Effective care measures are specifically defined to apply to only qualifying patients, all of whom should receive the appropriate care.

For supply sensitive and utilization measures, these data were adjusted for the health status of all provider panel patients. The community based Diagnostic Cost Group Hierarchical Condition Category (HCC) score was included in the statistical model as a risk adjustment. The HCC algorithm uses 70 diagnostic categories from both outpatient and inpatient claims to calculate an overall score. The scoring algorithm takes the demographic characteristics of age and gender into account. The HCCs reflect the clinical relationship between specific diseases as well as expected resource

use. Hierarchies are imposed so that credit is given (in terms of predicted expense) for only the most costly of clinically related conditions. For example, within the cancer hierarchy, each person is assigned only to the single highest cost category that applies. The cost category that remains after this hierarchical pruning process is called an HCC. The set of HCCs for a person forms the basis for predicting his or her resource use and is the assigned risk score.

Statistical Methodology

These data were analyzed using hierarchical (multi-level) modeling techniques. This technique accounts for the clustered nature of the data, varying panel sizes, and patient characteristics. The result is a more equitable comparison between providers based on case mix adjusted basis. In this project, providers are compared to the community norm of peers. This approach is inherently conservative for providers because it adjusts for sample size and it requires substantial evidence (panel size) for the provider to be evaluated different from the norm.

The continuous cost measure data were analyzed using a natural logarithm transformation to account for the underlying skewed nature of these data. The dichotomous or binary response HEDIS measures (compliant or non-compliant) were analyzed using a logistic transformation. The utilization measures, which are counts of the number of services provided, were analyzed using hierarchical Poisson regression techniques.

Provider evaluations are reported either as indexes or in the original units of the measurement, such as dollars. For demonstration, a sample of the PCP evaluations is given in dollars while the indexes and confidence intervals for cardiologists are graphed. For indexes, a value of 1.0 indicates the provider is at the median of all providers in the analysis. An index of 1.5 indicates the provider is 1.5 times higher than the median. These indexes are readily converted into original units of measurement such as dollars, number of visits, etc. Indexes are declared as statistically significant if the one-sided 90% confidence interval for the risk adjusted index does not contain 1.0.

General Provider Level Results

Summaries of the provider evaluations are in Appendix 7. The histograms in Figure 7 illustrate how the PCP evaluations for total cost, supply sensitive outpatient cost, total imaging, and the HEDIS measure for Hemoglobin A1c testing are distributed. These graphs show the expected variation and opportunity to identify outliers in both tails of the distributions. The graph of HEDIS evaluations show remarkable variation in performance for an evidence based measure. It also demonstrates the upper limit for effective care measures.

Table 8 is a sample listing for 14 primary care providers showing their evaluations for efficiency measures. Measures for which the provider is statistically higher than the regional benchmark are highlighted. These evaluations include adjustments for patient characteristics, comorbidities, and panel size as explained above.

Plots of cardiologist indexes and confidence intervals for selected measures are shown in Figure 8. There are 2 supply sensitive measure plots and 2 for effective care. These

plots display the rank for the providers by their index for the measures, show the confidence intervals for the evaluations, and indicate whether the confidence intervals include the median of all providers in the evaluation. Outliers can be quickly identified and the degree to which they differ from the median seen.

Figure 7: Distributions of selected PCP measures - total, total supply sensitive outpatient, and total imaging costs, and Hemoglobin A1c testing in diabetics.

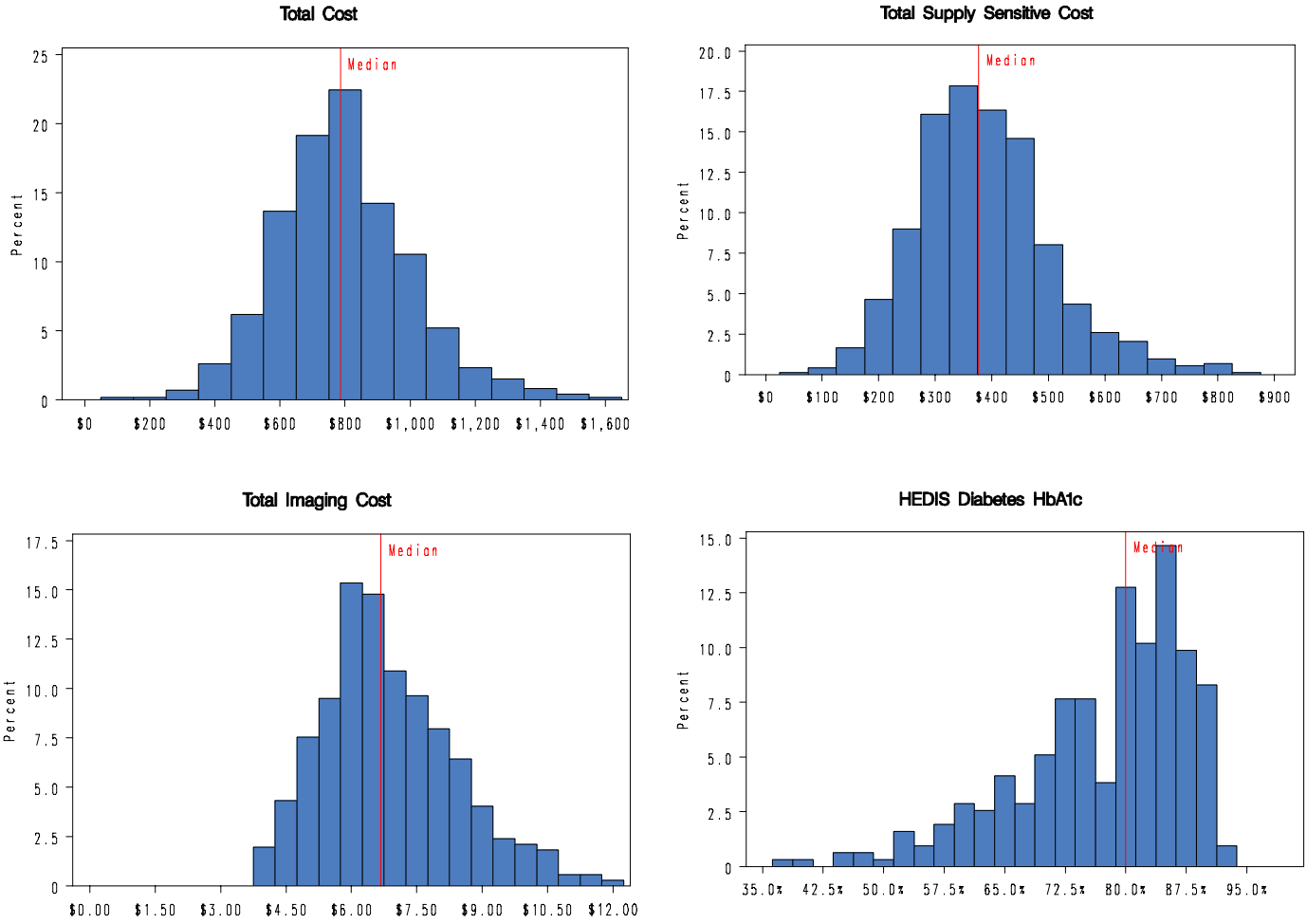


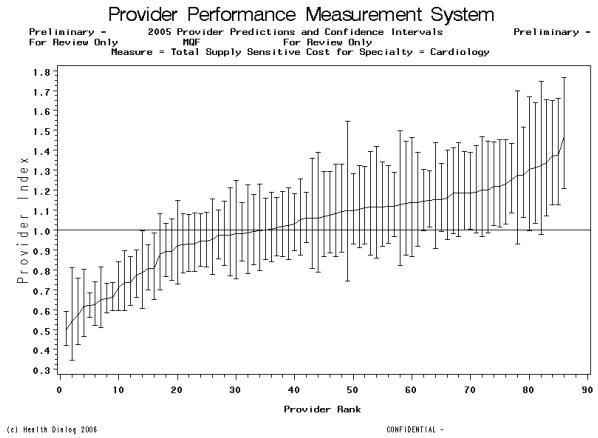
Table 8: Provider performance sample primary care report, costs in dollars.

(Highlighted cells indicate adjusted values statistically higher than regional benchmark)

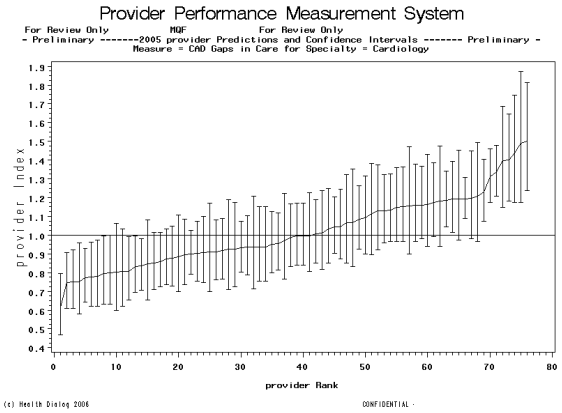
Primary Care Physician	No. of Members	Mean Risk	Total (PPPY)	Total SS (PPPY)	Outpatient Contact (PPPY)	Imaging (PPPY)	Cardiac Testing (PPPY)
Provider 1	225	.3045	536	272	133.3	4.59	1.86
Provider 2	519	.5169	692	324	159.4	6.01	2.62
Provider 3	679	.4003	809	446	190.8	6.89	2.69
Provider 4	448	.6416	488	185	86.69	4.64	1.72
Provider 5	293	.4791	1070	413	191.5	8.01	4.06
Provider 6	446	.3222	667	310	155.5	5.50	2.00
Provider 7	2006	.6302	475	257	136.2	3.79	2.14
Provider 8	216	.8026	656	310	167.9	4.68	2.56
Provider 9	313	.3008	994	479	248.1	6.63	2.85
Provider 10	11	.4136	647	346	125.3	6.20	1.77
Provider 11	249	.3872	955	374	200.0	7.29	2.13
Provider 12	36	.4200	833	474	238.3	8.60	3.03
Provider 13	694	.3265	635	349	175.9	5.00	2.17
Provider 14	452	.3771	1125	670	290.3	13.23	3.48

Figure 8: Plots of cardiology provider indexes and confidence intervals for selected measures.

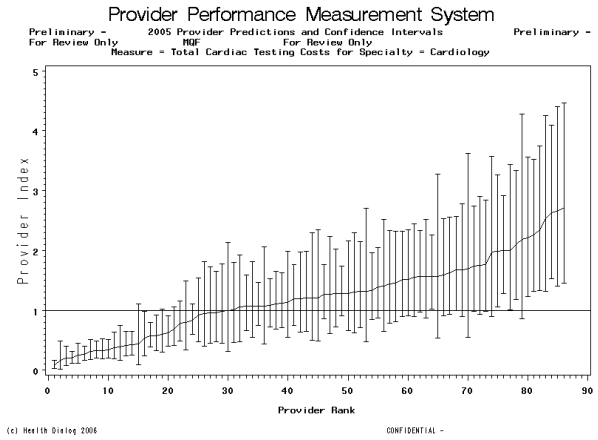
Total Supply Sensitive Cost
Median = $3,929.72



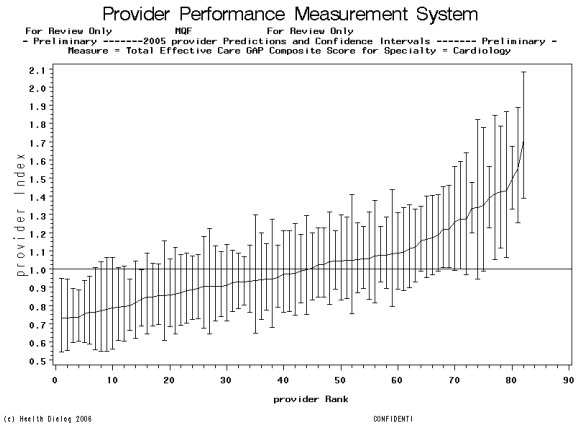
Coronary Artery Disease Gap
Median = 2.84



Total Cardiac Testing
Median = $72.60



Total Gap Score
Median = 3.05



PCP Results

This section presents the results of the detailed PCP analysis at two levels. The first, PCP level illustrates variation between PCP providers; the second describes examples of differences between individual patients. We selected three PCPs to illustrate the comprehensive analyses that can be performed utilizing these evaluations. These are examples only and the results shown in this section may not be generalized to all PCPs.

PCP Provider Level

Despite evidence based guidelines, not all primary care physicians performed the necessary tests for diabetics. The results for 3 sample providers are summarized in the following table.

Table 9: Diabetic effective care performance for three primary care providers.

Measure	Provider A N, %	Provider B N, %	Provider C N, %	Benchmark
Hemoglobin A1c Tested	4 , 31%	9, 50%	7, 54%	79%
Kidney Disease Monitored	1, 8%	2, 11%	0, 0%	44%

N= number of panel members receiving the effective care procedure; % = percent of panel qualifying for the procedure that received it.

As in shown in the Table 9 above, the percentage of the members tested was significantly below their peer benchmark and the recommended testing percentage of 100%.

Failure to follow evidence based guidelines for chronically ill may lead to higher that average cost and utilization, we examined selected costs and utilization for patients in these provider panels. The results are summarized in Table 10 below.

Table 10: Cost and utilization performance for three primary care providers.

Service	Provider A PPPY	Provider B PPPY	Provider C PPPY	Benchmark PPPY
Total Cost	994‡	1,169‡	973‡	773
Outpatient Visit Cost	248‡	290‡	199	174
ED Visit Cost	1.71‡	1.23	2.15‡	1.28
PCP Visits	2.82	2.41	2.46	2.53
Specialist Visits	0.86‡	0.91	0.94‡	0.76

‡ Indicates statistically significant at the one tailed 10% level of significance

The median Per Patient Per Year (PPPY) costs for all 3 of these providers exceeded the benchmark by at least $200 PPPY. One of the key cost drivers accounting for these findings was outpatient visit costs. The benchmark for outpatient visit costs was $174 compared with $199 for Provider C, $248 for Provider A and $290 for Provider C.

Emergency department (ED) utilization and ED visit costs were significantly higher than the benchmark for both Providers A and C. While the number of PCP visits did not statistically differ from the norm or regional benchmark, the number of specialist visits was statistically higher for these 2 providers.

PCP Patient Level

We selected 3 representative diabetic members from Providers A, B, and C described in the previous section and generated member level claims profiles. These are examples only and the results shown in this section may not be generalized. The following table is a brief summary of comorbid conditions, reported in the administrative claims, the specific member level costs and ED and specialist utilization.

Table 11: Profile for three diabetic members for providers A, B, and C

Patient	Co-morbid Conditions	Total Cost (PPPY)	ED Visits (PPPY)	PCP & Specialist Visits (PPPY)
Diabetic Patient A	Hyperlipidemia & Diabetic Retinopathy Neuropathy Hypertension & Other Cardiac Symptoms Infection in Foot	2,422	5	6
Diabetic Patient B	Hyperlipidemia Hypertension & Ocular Hypertension Syncopal Episodes & Cerebral Hemorrhage	14,735	2	9
Diabetic Patient C	Hyperlipidemia & Morbid Obesity Hypertension Diabetic Eye manifestation	2,730	4	5

The providers did not conduct the recommended Hemoglobin A1c tests or the nephropathy tests for any of these patients despite their diabetic status and co-morbidity profile.

Cardiology Results

For the cardiology analysis, providers were selected based on cardiac testing costs and total effective care score. To select providers for analysis, we arrayed total cardiac testing costs vs. Total Gap score (Figure 9) to identify providers with similar levels of effective care with differences in cardiac testing efficiency. As Figure 9 below shows, there is no relationship between spending more on cardiac testing and the overall effective care outcome (for this measure, a lower score is better performance) for providers in Maine. This is consistent with other commercial and Medicare analyses. These data have been adjusted for age, gender and risk.

Two cardiologists were chosen for further analysis. These are examples only and the results shown in this section may not be generalized to all cardiologists. Both providers are members of group practices, are male and have been practicing medicine for between 15 and 20 years. As shown in the figure, providers A and B had panels with similar age, sex and risk characteristics and their panel sizes were near the state mean (145 patients).

Figure 9: Selection of Providers for Drill Down

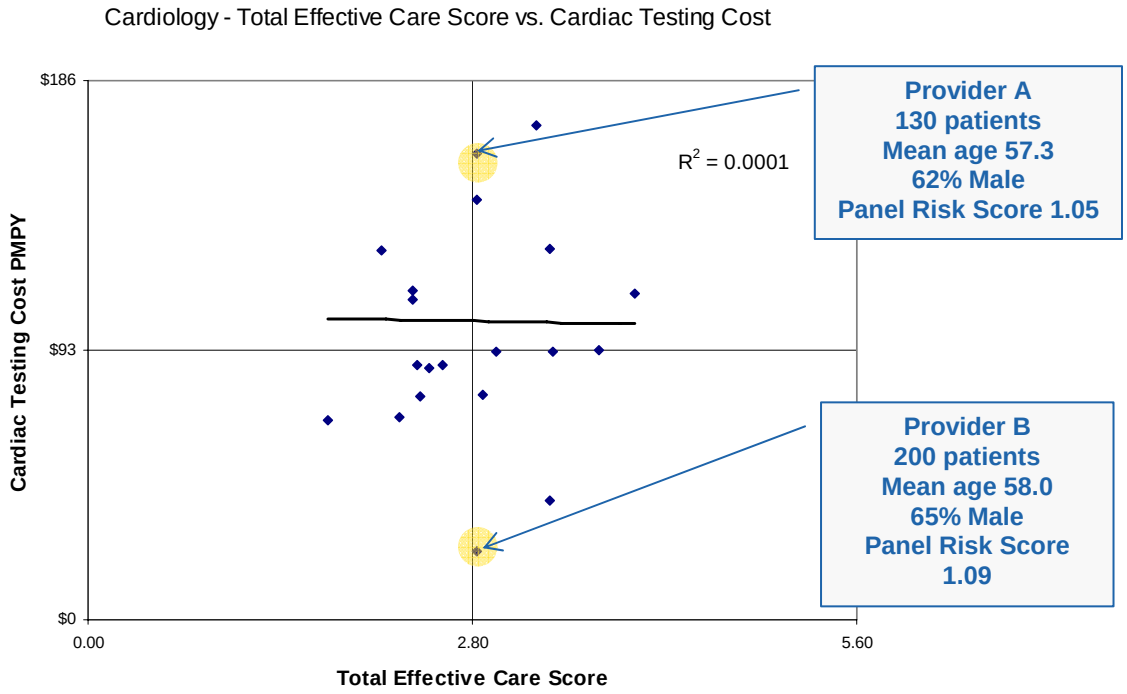


Figure 9 shows the providers' effective care scores were nearly identical and at the median for the providers analyzed. Yet, there was a substantial difference in cardiac testing costs. The cardiac testing measure included cardiac catheterizations, echocardiography exams, cardiac stress tests, ECGs, and other cardiac tests such as perfusion tests.

As Table 12 below shows, Provider A's panel received 13% more cardiology testing services than Provider B's panel. In addition, Provider A's panel received almost 20% more cardiologist Evaluation and Management (face to face visits) than Provider B's panel. This difference translates to 39 additional cardiac tests and 117 additional E&M visits. Depending on payer specific reimbursement levels, this represents a cost difference of over $45,000 per year.

Table 12: Cost comparison between two selected cardiologists with similar panels and the same effective care evaluation.

	Provider A (Higher Cost Performance)	Provider B (Lower Cost Performance)	Difference
Average Number of Cardiology Tests per Patient Per Year[1]	2.6	2.3	0.3 (13.0%)
Average Number of Cardiology E&M Visits per Patient Per Year[2]	5.5	4.6	0.9 (19.5%)
Total	8.1	6.9	1.2 (17.3%)

Notes:

1. The average number of cardiology testing procedures (cardiac catheterizations, ECHO, stress tests, ECGs and other diagnostic tests) for the panel of members assigned to each cardiologist.
2. The average number of Evaluation and Management (E&M) services provided by providers with a cardiology specialty for the panel of members assigned to each cardiologist

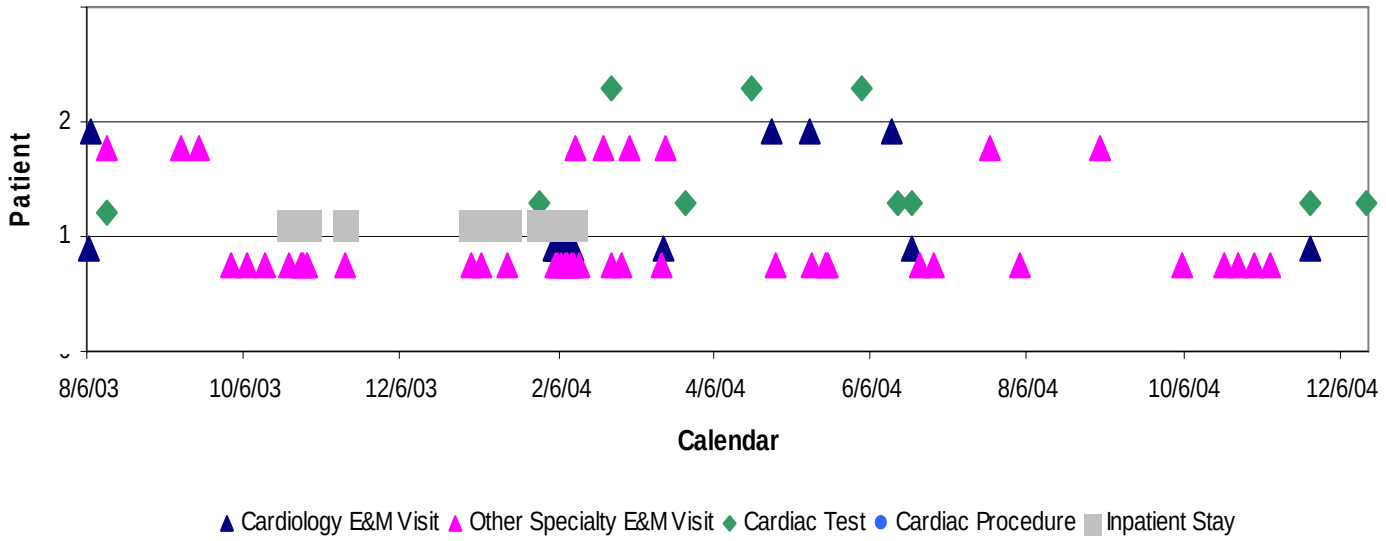
Further analysis of the differences in the cardiology services (testing and E&M visits) shows that patients in Provider A's panel were seen by more providers for their care than patients in Provider B's panel (following table).

Table 13: Number cardiologists seen by panel members for two cardiologists.

Number of Providers Seen for Cardiology Services	Provider A (Higher Cost Performance)	Provider B (Lower Cost Performance)
Only 1 Provider	40%	51%
2 – 3 Providers	37%	29%
4 or More Providers	23%	20%

Finally, differences in care at the patient level were examined. Two patients from each panel with similar risk scores were selected. They illustrate the findings from the panel level analysis. Figure 10 on the following page displays a longitudinal summary of the major services delivered for the selected patients. The figure displays the differences in cardiac testing and physician services discussed above, showing the patient detail available for analysis. This detail is representative of a provider's practice pattern and manifest in patient histories. The figure is not meant to evaluate a particular procedure on a particular patient.

Figure 10: Patient Level Summary of Major Service Delivery



	Patient 1 – Provider A	**Patient 2 – Provider B**
Patient Characteristics	65 year old female Risk Score – 3.04 Diagnoses include: angina, congestive heart failure, rheumatoid arthritis, hypothyroidism, chronic kidney disease	71 year old female Risk Score – 3.07 Diagnoses include: Atrial fibrillation, COPD, Rheumatoid Arthritis
Initial Cardiologist Visit	Dr. A 8/6/2003	Dr. B 8/7/2003
Cardiologists Seen during period	3 - Dr. A and 2 others	2 - Dr. B and 1 other cardiologist
Cardiologist E&M Visits		
Cardiac Testing	7 – performed by 5 different cardiologists (2 ECHO, 2 ECG, 1 Cath, 1 Stress test, 1 Perfusion study)	3 – performed by Dr. B and 1 other cardiologist (1 ECHO, 1 Stress test, 1 Perfusion)
PCP Visits	11 visits to same PCP	2 visits to same PCP
Other Physician E&M Visits	2 Nephrologists – 7 visits 1 Rheumatologist – 3 visits 2 Surgeons – 8 visits	1 Rheumatologist – 2 visits 1 Ophthalmologist – 2 visit 1 Pulmonologist – 1 visit
Hospitalizations	2 times – 19 days total	

A sample patient chronology report is included for Patient 1 in Appendix 8. This report details in chronological order all the services provided to the patient during a selected time period. This report integrates inpatient, outpatient, DME and pharmacy claims detail into a single report that can be reviewed and analyzed. This report can provide the basis for auditing performance scores and engaging providers in process and practice improvement initiatives.

Summary

The pilot project shows the MQF warehouse is capable of providing users with analytic resources to meet many goals. Specifically, MQF can utilize the content of the database to support data-driven initiatives around provider performance and profiling with detailed analysis at the patient level. The results in summary are:

- The MQF warehouse can be used to identify, demonstrate and report differences in practice performance across many dimensions
- Information generate from the MQF warehouse can be shared with the public, provider and payer communities in Maine and these communities can be engaged to improve the quality of the all-payer claims database
- The MQF warehouse can support a robust set of measures across the dimensions of effective and efficient care and by extension, preference sensitive care
- Performance differences can be stratified by a number of classifications including geographic, patient characteristics (age, gender, risk level, location, payer), care setting (outpatient, inpatient) and provider characteristics (individual, group, specialty)
- Performance differences across the dimension of care can identify opportunities for improvement
- Differences in patterns of care at the patient level can be described, analyzed, and displayed.

7. Future Directions

The completion of this project suggests further actions that can initiate introduction of data-driven improvement initiatives throughout Maine. The next steps are to:

- Address the data issues detailed in the MQF Warehouse Build and Assessment section of this report
- Broaden the provider measurement to all providers in the MQF warehouse for all measures
- Engage providers with information for confidential information to them, receive feedback, make adjustments based on provider feedback, and repeat.
- Provide physicians with lists of attributed patients and their patients' measures
- Develop mechanisms for 'automate' feedback
- Consider using predictive modeling to identify provider panels which are at high risk for chronic condition care gaps, preference sensitive surgery, or high future medical cost.

The pilot project demonstrates it is possible to attribute patients to PCPs and specialists, and then measure providers on a broad range of effective care, preference sensitive and supply sensitive (efficiency) measures using HDAS' modeling techniques. A current limitation of all such efforts nationwide has been the availability of comprehensive measure sets for specialists. In 2007 HDAS will have completed an agreement with RAND and implemented an additional 120 effective care measures developed by Beth McGlynn at RAND. These additional measures are perhaps the broadest set of research based and validated measures available and will enable measurement on a number of specialties for which there currently are no, or very few, measures.

Engaging providers to participate in the validation and future development of the performance metrics is a critical part of moving forward. This needs to be done in all parts of an evaluation system from patient attribution to measurement of effective care and efficiency. Efforts are unlikely to succeed without their participation.

Health Dialog Analytic Solutions uses several predictive models to assess a population's clinical need. These models are designed to predict risk of supply sensitive utilization, preference sensitive surgery, and adverse events due to gaps in clinical quality measures. This effectively covers the 3 areas of unwarranted variation. Each model is risk adjusted based on demographics and clinical comorbidities. The supply sensitive model assigns risk scores based on supply factors (i.e., number of specialists, PCPs, laboratory and radiology services, facility utilization, etc.), the individual's use of services, and member factors (e.g., demographics, disease burden) to estimate future resource utilization. The preference sensitive models assign risk for surgical decisions that have alternative, equally effective treatment options. These models include risk for lumbar back surgery, hip replacement, knee replacement, hysterectomy for benign uterine conditions, prostatectomy for benign prostatic hyperplasia, cardiac revascularization, and weight loss surgery. The clinical gap model

generates risk scores based on the identification of clinical care gaps such as the use of asthma controllers for members with asthma, or lipid testing for members with diabetes. High gap scores indicate an increased likelihood of adverse clinical event due to chronic conditions.

Taken together, these models provide an indication of the opportunities to impact a provider's panel. By aggregating the risk within a provider's panel, the proportion of the panel is at-risk for these conditions can be estimated. Providers with a higher risk profile provide opportunities to direct impact quality and cost of care.

In summary, this project has demonstrated the value and utility of the MQF warehouse as a tool for MQF to further its mission of providing Maine's healthcare stakeholders with objective, comprehensive and actionable information on which to base decisions. The State of Maine possesses a valuable asset that is unique in the nation – a data warehouse that links citizens' healthcare experience across payers, over time and contains all payers (Medicare and MaineCare to come).

The value of this asset has relevance to all stakeholders in Maine:

- Consumers are empowered to make informed decisions when significant healthcare tradeoffs exist and are activated to collaborate with their healthcare providers to receive warranted care.
- Providers gain access to comprehensive patient care information for process improvement – no other providers have access to a database that is as complete.
- Policymakers have access to comprehensive, objective information from which to base policy choices and to support regulatory mandates
- Payers have access to information that eliminates sampling bias and increases credibility and stability of analyses.

Appendix 1: Paid Month vs. Incurred Month Matrix

	Incurred Date											
Paid Date	**Jan 2003**	**Feb 2003**	**Mar 2003**	**Apr 2003**	**May 2003**	**Jun 2003**	**Jul 2003**	**Aug 2003**	**Sep 2003**	**Oct 2003**	**Nov 2003**	**Dec 2003**
Jan 2003	28,025,088											
Feb 2003	50,597,256	23,938,287										
Mar 2003	20,186,907	48,505,428	28,365,427									
Apr 2003	9,321,877	18,280,499	56,986,924	30,386,953								
May 2003	5,059,093	6,753,957	17,668,961	52,940,366	29,004,539							
Jun 2003	3,164,571	4,076,406	7,315,397	19,663,714	54,725,720	28,917,101						
Jul 2003	2,584,254	2,490,728	4,326,948	8,207,064	18,821,198	53,459,344	30,256,873					
Aug 2003	1,350,937	1,409,194	2,521,535	3,600,174	7,153,185	17,802,199	52,637,822	27,126,221				
Sep 2003	1,531,946	2,164,694	2,079,932	3,065,249	4,380,622	7,195,049	18,435,310	51,031,047	29,302,048			
Oct 2003	1,031,471	1,317,555	1,541,523	2,635,252	4,200,523	3,757,847	6,527,323	16,291,737	54,995,001	32,430,328		
Nov 2003	1,501,470	519,003	904,442	1,308,956	1,740,644	2,051,213	3,283,097	6,881,177	14,477,328	52,204,934	23,009,852	
Dec 2003	974,685	658,251	1,218,359	820,333	1,688,840	1,959,957	2,565,550	3,863,503	8,080,303	20,960,216	51,185,123	32,782,211
Jan 2004	409,055	384,901	542,257	563,826	1,246,662	1,694,921	2,167,029	2,850,953	3,959,932	8,198,554	17,331,909	51,287,666
Feb 2004	534,171	356,163	618,890	448,641	474,570	1,094,367	1,946,280	2,000,404	3,344,157	4,749,546	7,334,332	17,549,234
Mar 2004	470,438	366,543	345,577	652,738	1,082,846	783,232	1,307,333	1,612,605	3,155,605	4,498,464	3,922,002	7,920,158
Apr 2004	291,154	508,931	250,187	350,655	442,766	571,183	1,190,980	867,856	1,520,392	2,707,538	2,861,927	4,648,261
May 2004	169,383	209,695	181,356	305,058	319,517	356,986	929,788	616,629	884,130	2,068,530	2,935,860	2,223,721
Jun 2004	178,716	70,740	136,230	258,002	364,864	284,592	577,342	440,783	607,196	1,569,037	1,767,994	2,438,049
Jul 2004	99,243	86,228	178,483	147,739	321,491	380,358	412,086	327,086	612,728	651,684	1,191,155	1,614,905
Aug 2004	93,460	136,666	134,034	325,836	106,953	160,234	355,069	291,153	680,137	621,218	1,017,105	1,315,631
Sep 2004	52,708	129,378	144,242	92,928	164,507	274,172	148,969	207,493	237,603	496,318	605,816	1,010,821
Oct 2004	89,132	48,459	70,454	380,420	39,320	151,899	144,656	155,077	419,406	233,938	313,113	410,078
Nov 2004	29,575	56,599	54,180	21,842	51,093	77,961	252,675	90,571	200,382	331,959	321,133	412,008

Appendix 1 (cont.)
Paid Month vs. Incurred Month Matrix

	Incurred Date											
Paid Date	**Jan 2003**	**Feb 2003**	**Mar 2003**	**Apr 2003**	**May 2003**	**Jun 2003**	**Jul 2003**	**Aug 2003**	**Sep 2003**	**Oct 2003**	**Nov 2003**	**Dec 2003**
Dec 2004	16,905	13,716	29,164	108,392	88,257	53,190	96,828	94,945	186,275	186,540	133,837	263,966
Jan 2005	27,080	16,841	15,780	50,749	42,745	40,290	33,226	104,059	37,431	86,772	100,670	228,735
Feb 2005	116,494	5,048	24,263	11,478	46,817	49,261	85,448	72,790	103,161	83,582	122,667	194,317
Mar 2005	14,242	8,222	16,770	58,058	56,765	42,077	155,995	32,631	224,457	102,161	109,495	204,083
Apr 2005	80,238	19,486	14,743	16,721	10,230	49,108	18,672	61,611	86,697	106,232	202,837	108,730
May 2005	92,874	146,101	114,858	24,964	36,621	19,074	35,930	79,571	148,291	564,971	109,675	367,646
Jun 2005	31,802	4,964	21,255	24,208	22,092	33,472	33,752	99,985	54,265	92,146	72,333	82,676
Jul 2005	3,232	2,347	12,424	12,624	13,840	25,435	35,685	35,536	85,774	90,266	51,108	53,432
Aug 2005	25,031	5,459	4,488	38,785	18,899	18,919	82,372	18,345	54,310	57,670	132,513	118,771
Sep 2005	(1,739)	34,844	9,824	13,874	30,091	19,339	55,142	17,164	13,591	51,026	55,687	134,613
Total	128,152,747	112,726,970	125,850,470	126,538,831	126,699,375	121,325,172	123,774,440	115,273,057	123,476,007	133,152,994	114,899,333	125,381,073

Appendix 1 (cont.)
Paid Month vs. Incurred Month Matrix

	Incurred Date											
Paid Date	**Jan 2004**	**Feb 2004**	**Mar 2004**	**Apr 2004**	**May 2004**	**Jun 2004**	**Jul 2004**	**Aug 2004**	**Sep 2004**	**Oct 2004**	**Nov 2004**	**Dec 2004**
Jan 2004	28,139,961											
Feb 2004	49,785,160	25,367,311										
Mar 2004	21,279,122	53,566,788	36,448,968									
Apr 2004	8,681,835	16,045,116	58,154,564	32,022,780								
May 2004	4,667,099	6,539,868	16,613,894	53,629,970	29,421,433							
Jun 2004	4,181,050	4,553,341	8,198,892	21,826,402	54,370,819	34,566,826						
Jul 2004	2,336,547	3,060,701	4,128,839	7,143,641	17,747,751	56,520,307	33,140,540					
Aug 2004	1,718,621	1,994,398	2,322,446	4,258,964	6,659,069	17,556,391	51,920,924	35,093,482				
Sep 2004	1,670,119	1,359,634	2,499,796	2,387,651	3,699,397	6,181,907	15,305,695	51,781,410	33,801,605			
Oct 2004	875,360	794,411	1,311,469	1,238,881	3,024,493	3,669,427	6,400,462	16,904,977	53,583,045	34,181,035		
Nov 2004	760,809	701,654	1,497,815	1,649,062	2,289,103	3,448,155	4,372,993	6,174,390	17,384,365	56,406,191	34,985,311	
Dec 2004	398,357	338,507	649,560	684,361	1,421,348	1,288,026	2,582,236	4,927,978	6,771,644	18,016,699	60,552,778	38,983,019
Jan 2005	314,290	431,633	944,956	902,579	1,854,259	1,745,026	2,362,910	2,543,388	4,140,591	7,261,659	15,591,136	53,098,822
Feb 2005	251,231	313,530	505,713	390,310	493,665	952,490	1,063,633	1,592,045	2,594,361	4,383,816	6,571,633	17,173,634
Mar 2005	571,757	282,208	391,826	531,431	612,986	940,328	1,947,457	1,536,902	2,383,276	2,887,091	5,405,035	8,326,568
Apr 2005	147,975	174,864	216,395	374,643	406,595	513,519	478,402	913,047	1,008,998	1,621,628	3,314,303	4,129,203
May 2005	222,034	171,954	336,792	227,509	1,156,111	274,941	1,171,317	1,165,361	1,342,194	1,630,342	1,470,730	2,309,261
Jun 2005	79,976	216,234	138,328	168,221	1,120,510	617,330	290,827	500,545	970,483	729,983	813,883	1,736,853
Jul 2005	42,430	56,577	138,008	113,334	145,602	236,331	223,084	707,280	762,043	1,198,916	890,949	1,418,690
Aug 2005	104,200	130,727	324,085	380,651	204,038	256,847	391,057	347,110	370,942	559,430	834,633	1,032,987
Sep 2005	41,123	302,765	86,858	139,543	120,014	172,548	145,051	251,176	471,767	877,038	616,477	873,767
Total	126,269,073	116,404,368	134,910,547	128,071,664	124,748,503	128,944,004	121,797,153	124,441,464	125,586,034	129,758,571	131,058,788	129,092,164

Appendix 1 (cont.)
Paid Month vs. Incurred Month Matrix

	Incurred Date											
Paid Date	**Jan 2005**	**Feb 2005**	**Mar 2005**	**Apr 2005**	**May 2005**	**Jun 2005**	**Jul 2005**	**Aug 2005**	**Sep 2005**			
Jan 2005	31,879,645											
Feb 2005	53,869,117	29,882,088										
Mar 2005	23,771,988	56,989,586	43,868,667									
Apr 2005	7,316,136	14,003,845	61,764,572	37,794,703								
May 2005	3,888,977	4,537,053	15,413,399	58,538,789	41,388,243							
Jun 2005	2,475,248	3,114,945	6,144,865	14,430,650	60,973,790	42,519,800						
Jul 2005	1,851,859	1,948,726	3,388,048	5,610,641	13,661,584	57,786,006	35,688,056					
Aug 2005	1,405,287	1,305,679	2,178,529	3,263,857	7,467,387	18,186,665	59,601,609	44,378,594				
Sep 2005	1,077,054	1,269,747	1,498,598	2,260,943	3,366,887	7,450,958	14,410,002	60,791,215	39,971,298			
Total	127,535,311	113,051,669	134,256,677	121,899,582	126,857,891	125,943,430	109,699,667	105,169,531	39,971,356			

Appendix 2: HEDIS Effective Care Measures

HEDIS Measure: Summary of All Measures

Measurement Period: July 2004 - June 2005

Measure	Numerator	Denominator	Administrative Rate (%)	NCQA National HMO/POS Rate	95 CI Lower (%)	95 CI Upper (%)
Beta Blocker Following Heart Attack	584	916	63.8	97.0	60.6	66.9
Breast Cancer Screening	43,190	58,047	74.4	73.4	74.1	74.8
Cervical Cancer Screening	104,794	150,044	69.8	80.9	69.6	70.1
Colorectal Cancer Screening*	51,653	132,051	39.1	49.0	38.9	39.4
Diabetes Eye Exam Performed	8,369	20,050	41.7	50.3	41.1	42.4
Diabetes Hemoglobin A1c Tested	14,257	20,050	71.1	86.5	70.5	71.7
Diabetes Nephropathy Monitored	8,437	20,050	42.1	52.0	41.4	42.8
Diabetes LDL-C Screening	14,948	20,050	74.6	91.8	74.0	75.2
Use of Imaging for Low Back Pain	8,731	10,828	80.6	74.9	79.9	81.4
Appropriate Medication For Asthma: All Ages Group Combined	3,843	4,697	81.8	72.9	80.7	82.9

*This measure looks for colonoscopies in the prior 9 years in history. The current database includes only 18 months of claims. As additional data is added to the warehouse, this rate is expected to rise.

Appendix 2(cont.)
HEDIS Effective Care Measures
HEDIS Measure by Hospital Service Area: Beta Blocker Following Heart Attack
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	41	54	75.9	64.5	87.3
BANGOR	68	94	72.3	63.3	81.4
BAR HARBOR	7	10	70.0	41.6	98.4
BELFAST	10	16	62.5	38.8	86.2
BIDDEFORD	33	54	61.1	48.1	74.1
BLUE HILL	5	7	71.4	38.0	100.0
BOOTHBAY HARBOR	6	8	75.0	45.0	100.0
BRIDGTON	9	11	81.8	59.0	100.0
BRUNSWICK	32	53	60.4	47.2	73.5
CALAIS	8	15	53.3	28.1	78.6
CARIBOU	11	24	45.8	25.9	65.8
DAMARISCOTTA	6	9	66.7	35.9	97.5
DOVER-FOXCROFT	13	16	81.3	62.1	100.0
ELLSWORTH	15	25	60.0	40.8	79.2
FARMINGTON	10	19	52.6	30.2	75.1
FORT KENT	8	13	61.5	35.1	88.0
GREENVILLE	2	2	100.0	100.0	100.0
HOULTON	9	17	52.9	29.2	76.7
LEWISTON	37	64	57.8	45.7	69.9
LINCOLN	9	10	90.0	71.4	100.0
MACHIAS	5	7	71.4	38.0	100.0
MILLINOCKET	2	5	40.0	0.0	82.9
NORWAY	20	25	80.0	64.3	95.7
PITTSFIELD	3	6	50.0	10.0	90.0
PORTLAND	103	156	66.0	58.6	73.5
PRESQUE ISLE	11	22	50.0	29.1	70.9
ROCKLAND	21	32	65.6	49.2	82.1
RUMFORD	4	7	57.1	20.5	93.8
SANFORD	9	21	42.9	21.7	64.0
SKOWHEGAN	17	32	53.1	35.8	70.4
WATERVILLE	26	43	60.5	45.9	75.1
YORK	23	38	60.5	45.0	76.1
TOTAL	584	916	63.8	60.6	66.9

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS Measure by Hospital Service Area: Breast Cancer Screening

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	2,660	3,387	78.5	77.2	79.9
BANGOR	4,311	5,640	76.4	75.3	77.5
BAR HARBOR	339	514	66.0	61.9	70.0
BELFAST	701	945	74.2	71.4	77.0
BIDDEFORD	2,404	3,228	74.5	73.0	76.0
BLUE HILL	474	625	75.8	72.5	79.2
BOOTHBAY HARBOR	295	421	70.1	65.7	74.4
BRIDGTON	602	850	70.8	67.8	73.9
BRUNSWICK	2,536	3,317	76.5	75.0	77.9
CALAIS	307	418	73.4	69.2	77.7
CARIBOU	414	519	79.8	76.3	83.2
DAMARISCOTTA	599	791	75.7	72.7	78.7
DOVER-FOXCROFT	604	808	74.8	71.8	77.7
ELLSWORTH	728	1,042	69.9	67.1	72.7
FARMINGTON	1,100	1,414	77.8	75.6	80.0
FORT KENT	369	482	76.6	72.8	80.3
GREENVILLE	75	104	72.1	63.5	80.7
HOULTON	514	677	75.9	72.7	79.1
LEWISTON	3,680	5,034	73.1	71.9	74.3
LINCOLN	348	462	75.3	71.4	79.3
MACHIAS	475	614	77.4	74.1	80.7
MILLINOCKET	298	392	76.0	71.8	80.2
NORWAY	820	1,071	76.6	74.0	79.1
PITTSFIELD	347	475	73.1	69.1	77.0
PORTLAND	9,275	12,755	72.7	71.9	73.5
PRESQUE ISLE	745	911	81.8	79.3	84.3
ROCKLAND	1,800	2,510	71.7	70.0	73.5
RUMFORD	293	415	70.6	66.2	75.0
SANFORD	980	1,350	72.6	70.2	75.0
SKOWHEGAN	939	1,176	79.8	77.6	82.1
WATERVILLE	2,326	3,032	76.7	75.2	78.2
YORK	1,793	2,599	69.0	67.2	70.8
TOTAL	43,190	58,047	74.4	74.1	74.8

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Cervical Cancer Screening

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	6,332	8,763	72.3	71.3	73.2
BANGOR	10,512	15,227	69.0	68.3	69.8
BAR HARBOR	765	1,089	70.2	67.5	73.0
BELFAST	1,441	2,088	69.0	67.0	71.0
BIDDEFORD	6,028	8,692	69.4	68.4	70.3
BLUE HILL	743	1,110	66.9	64.2	69.7
BOOTHBAY HARBOR	571	788	72.5	69.3	75.6
BRIDGTON	1,303	1,952	66.8	64.7	68.8
BRUNSWICK	6,030	8,348	72.2	71.3	73.2
CALAIS	608	960	63.3	60.3	66.4
CARIBOU	955	1,259	75.9	73.5	78.2
DAMARISCOTTA	1,115	1,554	71.8	69.5	74.0
DOVER-FOXCROFT	1,200	1,889	63.5	61.4	65.7
ELLSWORTH	1,481	2,183	67.8	65.9	69.8
FARMINGTON	2,284	3,378	67.6	66.0	69.2
FORT KENT	678	1,041	65.1	62.2	68.0
GREENVILLE	129	201	64.2	57.6	70.8
HOULTON	1,037	1,585	65.4	63.1	67.8
LEWISTON	9,837	14,657	67.1	66.4	67.9
LINCOLN	746	1,149	64.9	62.2	67.7
MACHIAS	946	1,374	68.9	66.4	71.3
MILLINOCKET	410	637	64.4	60.6	68.1
NORWAY	1,954	2,788	70.1	68.4	71.8
PITTSFIELD	812	1,264	64.2	61.6	66.9
PORTLAND	26,408	36,772	71.8	71.4	72.3
PRESQUE ISLE	1,558	2,049	76.0	74.2	77.9
ROCKLAND	3,961	5,489	72.2	71.0	73.3
RUMFORD	766	1,134	67.5	64.8	70.3
SANFORD	2,435	3,681	66.2	64.6	67.7
SKOWHEGAN	2,102	3,126	67.2	65.6	68.9
WATERVILLE	5,964	8,242	72.4	71.4	73.3
YORK	3,582	5,379	66.6	65.3	67.9
TOTAL	104,794	150,044	69.8	69.6	70.1

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Colorectal Cancer Screening

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	2,920	7,244	40.3	39.2	41.4
BANGOR	5,029	13,010	38.7	37.8	39.5
BAR HARBOR	377	1,139	33.1	30.4	35.8
BELFAST	713	2,048	34.8	32.8	36.9
BIDDEFORD	3,118	7,283	42.8	41.7	43.9
BLUE HILL	417	1,339	31.1	28.7	33.6
BOOTHBAY HARBOR	334	934	35.8	32.7	38.8
BRIDGTON	635	1,966	32.3	30.2	34.4
BRUNSWICK	2,981	7,594	39.3	38.2	40.4
CALAIS	364	975	37.3	34.3	40.4
CARIBOU	439	1,202	36.5	33.8	39.2
DAMARISCOTTA	641	1,742	36.8	34.5	39.1
DOVER-FOXCROFT	654	1,827	35.8	33.6	38.0
ELLSWORTH	901	2,355	38.3	36.3	40.2
FARMINGTON	1,178	3,188	37.0	35.3	38.6
FORT KENT	412	1,080	38.1	35.3	41.0
GREENVILLE	76	268	28.4	23.0	33.8
HOULTON	472	1,499	31.5	29.1	33.8
LEWISTON	4,557	11,541	39.5	38.6	40.4
LINCOLN	388	1,084	35.8	32.9	38.6
MACHIAS	513	1,350	38.0	35.4	40.6
MILLINOCKET	459	1,305	35.2	32.6	37.8
NORWAY	1,040	2,405	43.2	41.3	45.2
PITTSFIELD	346	1,087	31.8	29.1	34.6
PORTLAND	12,002	28,852	41.6	41.0	42.2
PRESQUE ISLE	925	2,098	44.1	42.0	46.2
ROCKLAND	2,144	5,639	38.0	36.8	39.3
RUMFORD	263	919	28.6	25.7	31.5
SANFORD	1,291	3,316	38.9	37.3	40.6
SKOWHEGAN	1,122	2,646	42.4	40.5	44.3
WATERVILLE	2,724	6,929	39.3	38.2	40.5
YORK	2,174	6,038	36.0	34.8	37.2
TOTAL	51,653	132,051	39.1	38.9	39.4

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Diabetes Eye Exam Performed

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	562	1,199	46.9	44.0	49.7
BANGOR	998	2,187	45.6	43.5	47.7
BAR HARBOR	52	116	44.8	35.8	53.9
BELFAST	123	303	40.6	35.1	46.1
BIDDEFORD	431	1,152	37.4	34.6	40.2
BLUE HILL	74	140	52.9	44.6	61.1
BOOTHBAY HARBOR	45	126	35.7	27.3	44.1
BRIDGTON	109	302	36.1	30.7	41.5
BRUNSWICK	392	1,073	36.5	33.7	39.4
CALAIS	73	172	42.4	35.1	49.8
CARIBOU	99	205	48.3	41.5	55.1
DAMARISCOTTA	86	183	47.0	39.8	54.2
DOVER-FOXCROFT	121	293	41.3	35.7	46.9
ELLSWORTH	175	375	46.7	41.6	51.7
FARMINGTON	192	457	42.0	37.5	46.5
FORT KENT	67	148	45.3	37.3	53.3
GREENVILLE	19	40	47.5	32.0	63.0
HOULTON	98	250	39.2	33.1	45.3
LEWISTON	834	1,986	42.0	39.8	44.2
LINCOLN	87	230	37.8	31.6	44.1
MACHIAS	82	207	39.6	33.0	46.3
MILLINOCKET	78	183	42.6	35.5	49.8
NORWAY	182	385	47.3	42.3	52.3
PITTSFIELD	77	200	38.5	31.8	45.2
PORTLAND	1,595	3,841	41.5	40.0	43.1
PRESQUE ISLE	226	407	55.5	50.7	60.4
ROCKLAND	279	709	39.4	35.8	42.9
RUMFORD	68	182	37.4	30.3	44.4
SANFORD	238	639	37.2	33.5	41.0
SKOWHEGAN	165	462	35.7	31.3	40.1
WATERVILLE	467	1,138	41.0	38.2	43.9
YORK	269	745	36.1	32.7	39.6
TOTAL	8,369	20,050	41.7	41.1	42.4

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Diabetes Hemoglobin A1c Tested

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	886	1,199	73.9	71.4	76.4
BANGOR	1,512	2,187	69.1	67.2	71.1
BAR HARBOR	83	116	71.6	63.3	79.8
BELFAST	189	303	62.4	56.9	67.8
BIDDEFORD	889	1,152	77.2	74.7	79.6
BLUE HILL	96	140	68.6	60.9	76.3
BOOTHBAY HARBOR	81	126	64.3	55.9	72.7
BRIDGTON	199	302	65.9	60.5	71.2
BRUNSWICK	754	1,073	70.3	67.5	73.0
CALAIS	114	172	66.3	59.2	73.3
CARIBOU	154	205	75.1	69.2	81.0
DAMARISCOTTA	120	183	65.6	58.7	72.5
DOVER-FOXCROFT	209	293	71.3	66.2	76.5
ELLSWORTH	268	375	71.5	66.9	76.0
FARMINGTON	304	457	66.5	62.2	70.8
FORT KENT	111	148	75.0	68.0	82.0
GREENVILLE	29	40	72.5	58.7	86.3
HOULTON	169	250	67.6	61.8	73.4
LEWISTON	1,307	1,986	65.8	63.7	67.9
LINCOLN	154	230	67.0	60.9	73.0
MACHIAS	161	207	77.8	72.1	83.4
MILLINOCKET	77	183	42.1	34.9	49.2
NORWAY	278	385	72.2	67.7	76.7
PITTSFIELD	118	200	59.0	52.2	65.8
PORTLAND	3,084	3,841	80.3	79.0	81.5
PRESQUE ISLE	326	407	80.1	76.2	84.0
ROCKLAND	452	709	63.8	60.2	67.3
RUMFORD	129	182	70.9	64.3	77.5
SANFORD	451	639	70.6	67.0	74.1
SKOWHEGAN	310	462	67.1	62.8	71.4
WATERVILLE	742	1,138	65.2	62.4	68.0
YORK	494	745	66.3	62.9	69.7
TOTAL	14,257	20,050	71.1	70.5	71.7

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Diabetes Nephropathy Monitored

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	516	1,199	43.0	40.2	45.8
BANGOR	936	2,187	42.8	40.7	44.9
BAR HARBOR	56	116	48.3	39.2	57.4
BELFAST	113	303	37.3	31.8	42.7
BIDDEFORD	491	1,152	42.6	39.8	45.5
BLUE HILL	43	140	30.7	23.1	38.4
BOOTHBAY HARBOR	44	126	34.9	26.6	43.2
BRIDGTON	115	302	38.1	32.6	43.6
BRUNSWICK	473	1,073	44.1	41.1	47.1
CALAIS	69	172	40.1	32.8	47.4
CARIBOU	84	205	41.0	34.2	47.7
DAMARISCOTTA	69	183	37.7	30.7	44.7
DOVER-FOXCROFT	127	293	43.3	37.7	49.0
ELLSWORTH	173	375	46.1	41.1	51.2
FARMINGTON	191	457	41.8	37.3	46.3
FORT KENT	90	148	60.8	52.9	68.7
GREENVILLE	8	40	20.0	7.6	32.4
HOULTON	73	250	29.2	23.6	34.8
LEWISTON	782	1,986	39.4	37.2	41.5
LINCOLN	86	230	37.4	31.1	43.6
MACHIAS	86	207	41.5	34.8	48.3
MILLINOCKET	46	183	25.1	18.9	31.4
NORWAY	172	385	44.7	39.7	49.6
PITTSFIELD	74	200	37.0	30.3	43.7
PORTLAND	2,019	3,841	52.6	51.0	54.1
PRESQUE ISLE	109	407	26.8	22.5	31.1
ROCKLAND	250	709	35.3	31.7	38.8
RUMFORD	77	182	42.3	35.1	49.5
SANFORD	253	639	39.6	35.8	43.4
SKOWHEGAN	157	462	34.0	29.7	38.3
WATERVILLE	401	1,138	35.2	32.5	38.0
YORK	251	745	33.7	30.3	37.1
TOTAL	8,437	20,050	42.1	41.4	42.8

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Diabetes LDL-C Screening

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	940	1,199	78.4	76.1	80.7
BANGOR	1,625	2,187	74.3	72.5	76.1
BAR HARBOR	89	116	76.7	69.0	84.4
BELFAST	173	303	57.1	51.5	62.7
BIDDEFORD	966	1,152	83.9	81.7	86.0
BLUE HILL	113	140	80.7	74.2	87.2
BOOTHBAY HARBOR	86	126	68.3	60.1	76.4
BRIDGTON	217	302	71.9	66.8	76.9
BRUNSWICK	762	1,073	71.0	68.3	73.7
CALAIS	126	172	73.3	66.6	79.9
CARIBOU	167	205	81.5	76.1	86.8
DAMARISCOTTA	125	183	68.3	61.6	75.0
DOVER-FOXCROFT	208	293	71.0	65.8	76.2
ELLSWORTH	274	375	73.1	68.6	77.6
FARMINGTON	313	457	68.5	64.2	72.7
FORT KENT	117	148	79.1	72.5	85.6
GREENVILLE	29	40	72.5	58.7	86.3
HOULTON	176	250	70.4	64.7	76.1
LEWISTON	1,397	1,986	70.3	68.3	72.4
LINCOLN	169	230	73.5	67.8	79.2
MACHIAS	173	207	83.6	78.5	88.6
MILLINOCKET	89	183	48.6	41.4	55.9
NORWAY	285	385	74.0	69.6	78.4
PITTSFIELD	130	200	65.0	58.4	71.6
PORTLAND	3,205	3,841	83.4	82.3	84.6
PRESQUE ISLE	325	407	79.9	76.0	83.7
ROCKLAND	470	709	66.3	62.8	69.8
RUMFORD	133	182	73.1	66.6	79.5
SANFORD	482	639	75.4	72.1	78.8
SKOWHEGAN	297	462	64.3	59.9	68.7
WATERVILLE	770	1,138	67.7	64.9	70.4
YORK	508	745	68.2	64.8	71.5
TOTAL	14,948	20,050	74.6	74.0	75.2

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Use of Imaging for Low Back Pain

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	460	600	76.7	73.3	80.1
BANGOR	746	979	76.2	73.5	78.9
BAR HARBOR	62	75	82.7	74.1	91.2
BELFAST	116	142	81.7	75.3	88.1
BIDDEFORD	502	648	77.5	74.3	80.7
BLUE HILL	27	35	77.1	63.2	91.1
BOOTHBAY HARBOR	42	45	93.3	86.0	100.0
BRIDGTON	96	119	80.7	73.6	87.8
BRUNSWICK	425	514	82.7	79.4	86.0
CALAIS	39	46	84.8	74.4	95.2
CARIBOU	56	82	68.3	58.2	78.4
DAMARISCOTTA	79	101	78.2	70.2	86.3
DOVER-FOXCROFT	89	108	82.4	75.2	89.6
ELLSWORTH	118	159	74.2	67.4	81.0
FARMINGTON	209	263	79.5	74.6	84.3
FORT KENT	53	72	73.6	63.4	83.8
GREENVILLE	11	14	78.6	57.1	100.0
HOULTON	77	95	81.1	73.2	88.9
LEWISTON	874	1,067	81.9	79.6	84.2
LINCOLN	56	77	72.7	62.8	82.7
MACHIAS	113	130	86.9	81.1	92.7
MILLINOCKET	25	33	75.8	61.1	90.4
NORWAY	163	203	80.3	74.8	85.8
PITTSFIELD	112	125	89.6	84.2	95.0
PORTLAND	2,431	2,934	82.9	81.5	84.2
PRESQUE ISLE	139	171	81.3	75.4	87.1
ROCKLAND	291	343	84.8	81.0	88.6
RUMFORD	49	60	81.7	71.9	91.5
SANFORD	244	314	77.7	73.1	82.3
SKOWHEGAN	176	208	84.6	79.7	89.5
WATERVILLE	502	602	83.4	80.4	86.4
YORK	343	456	75.2	71.3	79.2
TOTAL	8,731	10,828	80.6	79.9	81.4

Appendix 2 (cont.)
HEDIS Effective Care Measures
HEDIS rates by Hospital Service Areas: Appropriate Medication for Asthma: All Age Groups

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Numerator	Denominator	Administrative Rate (%)	95 CI Lower (%)	95 CI Upper (%)
AUGUSTA	232	279	83.2	78.8	87.5
BANGOR	497	640	77.7	74.4	80.9
BAR HARBOR	28	30	93.3	84.4	100.0
BELFAST	47	56	83.9	74.3	93.5
BIDDEFORD	240	289	83.0	78.7	87.4
BLUE HILL	17	24	70.8	52.6	89.0
BOOTHBAY HARBOR	19	20	95.0	85.4	100.0
BRIDGTON	36	44	81.8	70.4	93.2
BRUNSWICK	191	233	82.0	77.0	86.9
CALAIS	17	21	81.0	64.2	97.7
CARIBOU	39	50	78.0	66.5	89.5
DAMARISCOTTA	29	40	72.5	58.7	86.3
DOVER-FOXCROFT	37	52	71.2	58.8	83.5
ELLSWORTH	68	84	81.0	72.6	89.3
FARMINGTON	76	96	79.2	71.0	87.3
FORT KENT	26	29	89.7	78.6	100.0
GREENVILLE	6	10	60.0	29.6	90.4
HOULTON	31	42	73.8	60.5	87.1
LEWISTON	342	421	81.2	77.5	85.0
LINCOLN	33	41	80.5	68.4	92.6
MACHIAS	20	31	64.5	47.7	81.4
MILLINOCKET	18	22	81.8	65.7	97.9
NORWAY	52	65	80.0	70.3	89.7
PITTSFIELD	44	51	86.3	76.8	95.7
PORTLAND	1,028	1,202	85.5	83.5	87.5
PRESQUE ISLE	73	88	83.0	75.1	90.8
ROCKLAND	105	128	82.0	75.4	88.7
RUMFORD	27	35	77.1	63.2	91.1
SANFORD	77	93	82.8	75.1	90.5
SKOWHEGAN	86	107	80.4	72.8	87.9
WATERVILLE	202	255	79.2	74.2	84.2
YORK	99	116	85.3	78.9	91.8
TOTAL	3,843	4,697	81.8	80.7	82.9

Appendix 3: Preference Sensitive Measures

Preference Sensitive Care - Measure Descriptions

Preference Sensitive Measure	Description
Hip Surgery	Rate of hip surgeries for patients age 18 and over.
Knee Surgery	Rate of knee surgeries for patients age 18 and over.
Lumbar Back Surgery	Rate of lumbar back surgeries for patients age 25 and over.
Cardiac Revascularization Surgery	Rate of cardiac revascularization surgeries for patients age 40 and over.
Hysterectomy for BUC Surgery	Rate of hysterectomy surgeries for female patients age 18 – 69, except those diagnosed with ovarian/uterine cancer.
Benign Prostatic Hyperplasia Surgery	Rate of prostate surgeries for male patients age 40 and over, except those diagnosed with prostate cancer

Preference Sensitive Measures:
Summary of All Measures
Measurement Period: July 2004 - June 2005

Preference Sensitive Surgery	Number Observed Surgeries	Number Population at Risk	Crude Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate	MQF Rate[3] 1999-2003	Comment
Hip Surgery	1,287	468,771	2.7	2.6	2.9	0.82	MQF rate excluded fractures
Knee Surgery	1,700	468,771	3.6	3.5	3.8	1.6	MQF rate excluded knee replacement
Lumbar Back Surgery	1,062	420,711	2.5	2.4	2.7	2.8	Combined MQF rate for Fusion and Disc Surgery no Fusion
Cardiac Revascularization Surgery	1,713	327,352	5.2	5.0	5.5	--------	----------
Hysterectomy for BUC Surgery	1,290	216,655	6.0	5.6	6.3	4.5	
Benign Prostatic Hyperplasia Surgery	317	146,242	2.2	1.9	2.4	--------	----------

[1] LCL Lower Confidence Limit
[2] UCL Upper Confidence Limit
[3] MQF rate is the rate shown on the MQF website based on inpatient discharge database 1999-2003.

Appendix 3 (cont.)
Preference Sensitive Measures

Preference Sensitive Measures:
Hip Surgery Rate for Patients Age 18 and Over
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	64	71	25,254	2.5	2.5	1.9	3.1
BANGOR	127	118	44,510	2.9	2.9	2.4	3.4
BAR HARBOR	14	13	3,843	3.6	3.0	1.3	4.7
BELFAST	14	19	6,293	2.2	2.0	0.9	3.1
BIDDEFORD	57	68	26,671	2.1	2.3	1.7	2.9
BLUE HILL	19	14	3,838	5.0	3.6	1.7	5.5
BOOTHBAY HARBOR	11	10	2,617	4.2	3.1	1.0	5.2
BRIDGTON	15	19	6,649	2.3	2.2	1.1	3.3
BRUNSWICK	55	72	25,900	2.1	2.1	1.5	2.6
CALAIS	15	13	3,309	4.5	3.3	1.3	5.2
CARIBOU	21	13	4,000	5.3	4.4	2.4	6.5
DAMARISCOTTA	13	18	5,066	2.6	2.0	0.8	3.3
DOVER-FOXCROFT	23	20	6,035	3.8	3.1	1.7	4.5
ELLSWORTH	38	26	7,946	4.8	4.0	2.6	5.4
FARMINGTON	35	31	10,402	3.4	3.1	2.0	4.1
FORT KENT	17	16	3,773	4.5	3.0	1.2	4.7
GREENVILLE	3	3	771	3.9	2.6	0.0	6.1
HOULTON	25	17	5,036	5.0	3.9	2.2	5.7
LEWISTON	105	108	46,544	2.3	2.7	2.2	3.1
LINCOLN	19	15	4,320	4.4	3.5	1.8	5.3
MACHIAS	22	15	4,342	5.1	4.0	2.1	5.9
MILLINOCKET	12	17	3,122	3.8	1.9	0.4	3.5
NORWAY	27	25	8,755	3.1	3.0	1.8	4.1
PITTSFIELD	12	11	4,236	2.8	3.0	1.4	4.7
PORTLAND	218	263	110,067	2.0	2.3	2.0	2.6
PRESQUE ISLE	48	22	6,519	7.4	6.0	4.1	7.8
ROCKLAND	84	56	17,503	4.8	4.1	3.2	5.1
RUMFORD	10	15	4,009	2.5	1.9	0.5	3.2
SANFORD	34	32	12,508	2.7	2.9	1.9	3.8
SKOWHEGAN	27	26	9,328	2.9	2.9	1.8	4.0
WATERVILLE	56	67	24,732	2.3	2.3	1.7	2.9
YORK	45	54	20,739	2.2	2.3	1.6	3.0
TOTAL[3]	1,287	1,287	468,771	2.7	2.7	2.6	2.9

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment.; Only patients with at least 11 months of medical eligibility are included.

Appendix 3 (cont.)

Preference Sensitive Measures:
Knee Surgery Rate for Patients Age 18 and Over
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	70	94	25,254	2.8	2.7	2.1	3.3
BANGOR	216	156	44,510	4.9	5.0	4.4	5.7
BAR HARBOR	28	17	3,843	7.3	6.0	3.6	8.4
BELFAST	27	25	6,293	4.3	3.9	2.3	5.4
BIDDEFORD	57	90	26,671	2.1	2.3	1.7	2.9
BLUE HILL	19	19	3,838	5.0	3.6	1.7	5.5
BOOTHBAY HARBOR	4	13	2,617	1.5	1.1	0.0	2.4
BRIDGTON	23	25	6,649	3.5	3.3	1.9	4.7
BRUNSWICK	69	96	25,900	2.7	2.6	2.0	3.2
CALAIS	12	17	3,309	3.6	2.6	0.9	4.4
CARIBOU	17	17	4,000	4.3	3.6	1.7	5.4
DAMARISCOTTA	24	23	5,066	4.7	3.7	2.0	5.4
DOVER-FOXCROFT	38	27	6,035	6.3	5.1	3.3	6.9
ELLSWORTH	28	35	7,946	3.5	2.9	1.7	4.1
FARMINGTON	43	42	10,402	4.1	3.7	2.6	4.9
FORT KENT	26	21	3,773	6.9	4.6	2.4	6.7
GREENVILLE	11	4	771	14.3	9.3	2.5	16.0
HOULTON	27	23	5,036	5.4	4.2	2.4	6.0
LEWISTON	161	142	46,544	3.5	4.1	3.5	4.7
LINCOLN	22	20	4,320	5.1	4.1	2.2	6.0
MACHIAS	16	20	4,342	3.7	2.9	1.3	4.5
MILLINOCKET	23	23	3,122	7.4	3.7	1.6	5.8
NORWAY	25	33	8,755	2.9	2.7	1.6	3.8
PITTSFIELD	28	14	4,236	6.6	7.1	4.6	9.6
PORTLAND	289	345	110,067	2.6	3.0	2.7	3.4
PRESQUE ISLE	43	29	6,519	6.6	5.3	3.6	7.1
ROCKLAND	130	74	17,503	7.4	6.4	5.2	7.6
RUMFORD	17	19	4,009	4.2	3.2	1.4	4.9
SANFORD	39	43	12,508	3.1	3.3	2.3	4.3
SKOWHEGAN	35	34	9,328	3.8	3.7	2.5	5.0
WATERVILLE	69	88	24,732	2.8	2.8	2.2	3.5
YORK	64	71	20,739	3.1	3.3	2.5	4.0
TOTAL[3]	1,700	1,700	468,771	3.6	3.6	3.5	3.8

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment.; Only patients with at least 11 months of medical eligibility are included.

Appendix 3 (cont.)

Preference Sensitive Measures:
Lumbar Back Surgery Rate for Patients Age 25 and Over
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	63	58	22,701	2.8	2.8	2.1	3.4
BANGOR	76	100	40,192	1.9	1.9	1.5	2.3
BAR HARBOR	10	9	3,509	2.8	2.7	1.0	4.4
BELFAST	18	15	5,721	3.1	3.0	1.6	4.5
BIDDEFORD	59	60	24,125	2.4	2.5	1.9	3.1
BLUE HILL	8	10	3,517	2.3	2.0	0.6	3.5
BOOTHBAY HARBOR	9	7	2,369	3.8	3.4	1.1	5.8
BRIDGTON	14	15	6,006	2.3	2.3	1.1	3.5
BRUNSWICK	65	59	23,130	2.8	2.8	2.1	3.5
CALAIS	7	8	3,041	2.3	2.1	0.5	3.7
CARIBOU	8	10	3,666	2.2	2.1	0.6	3.6
DAMARISCOTTA	15	13	4,626	3.2	3.0	1.4	4.6
DOVER-FOXCROFT	7	15	5,494	1.3	1.2	0.3	2.1
ELLSWORTH	18	19	7,303	2.5	2.3	1.2	3.4
FARMINGTON	31	24	9,305	3.3	3.2	2.1	4.4
FORT KENT	13	10	3,443	3.8	3.3	1.4	5.3
GREENVILLE	2	2	702	2.8	2.5	0.0	6.1
HOULTON	12	12	4,578	2.6	2.5	1.0	3.9
LEWISTON	91	98	40,217	2.3	2.3	1.9	2.8
LINCOLN	14	11	3,944	3.5	3.3	1.5	5.1
MACHIAS	4	11	3,971	1.0	0.9	0.0	1.9
MILLINOCKET	12	9	2,902	4.1	3.4	1.3	5.5
NORWAY	24	20	7,900	3.0	3.0	1.8	4.2
PITTSFIELD	7	9	3,803	1.8	1.9	0.5	3.2
PORTLAND	273	239	98,542	2.8	2.9	2.6	3.2
PRESQUE ISLE	8	16	5,889	1.4	1.3	0.4	2.2
ROCKLAND	35	42	15,870	2.2	2.1	1.4	2.8
RUMFORD	9	10	3,639	2.5	2.3	0.7	3.9
SANFORD	30	28	11,213	2.7	2.7	1.8	3.7
SKOWHEGAN	22	21	8,437	2.6	2.6	1.5	3.7
WATERVILLE	59	55	22,083	2.7	2.7	2.0	3.4
YORK	38	47	18,747	2.0	2.0	1.4	2.7
TOTAL[3]	1,062	1,062	420,711	2.5	2.5	2.4	2.7

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment.; Only patients with at least 11 months of medical eligibility are included.

Appendix 3 (cont.)

Preference Sensitive Measures:
Cardiac Revascularization Surgery Rate for Patients Age 40 and Over
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	76	93	17,865	4.3	4.3	3.3	5.2
BANGOR	190	158	30,980	6.1	6.3	5.4	7.2
BAR HARBOR	23	16	2,929	7.9	7.3	4.3	10.4
BELFAST	17	25	4,756	3.6	3.5	1.8	5.2
BIDDEFORD	89	93	18,413	4.8	5.0	4.0	6.0
BLUE HILL	25	19	3,067	8.2	7.0	4.0	9.9
BOOTHBAY HARBOR	14	13	2,071	6.8	5.8	2.5	9.1
BRIDGTON	23	26	4,822	4.8	4.7	2.8	6.6
BRUNSWICK	75	98	18,489	4.1	4.0	3.1	4.9
CALAIS	22	15	2,521	8.7	7.5	4.1	10.8
CARIBOU	22	17	2,944	7.5	6.8	3.8	9.8
DAMARISCOTTA	17	23	3,889	4.4	3.9	1.9	5.9
DOVER-FOXCROFT	31	26	4,540	6.8	6.3	4.0	8.6
ELLSWORTH	40	34	5,976	6.7	6.1	4.1	8.1
FARMINGTON	41	41	7,571	5.4	5.2	3.6	6.8
FORT KENT	30	19	2,889	10.4	8.4	5.0	11.7
GREENVILLE	4	4	630	6.3	5.1	0.0	10.6
HOULTON	34	22	3,802	8.9	8.2	5.3	11.1
LEWISTON	130	149	30,004	4.3	4.6	3.8	5.3
LINCOLN	31	19	3,206	9.7	8.7	5.5	11.9
MACHIAS	22	19	3,288	6.7	6.0	3.4	8.6
MILLINOCKET	24	19	2,537	9.5	6.8	3.6	10.0
NORWAY	34	33	6,219	5.5	5.4	3.6	7.2
PITTSFIELD	7	15	2,907	2.4	2.4	0.6	4.2
PORTLAND	318	358	72,936	4.4	4.6	4.2	5.1
PRESQUE ISLE	36	28	4,781	7.5	6.7	4.4	9.0
ROCKLAND	73	73	13,104	5.6	5.3	4.0	6.5
RUMFORD	9	18	2,933	3.1	2.7	0.8	4.6
SANFORD	42	43	8,511	4.9	5.1	3.6	6.6
SKOWHEGAN	41	34	6,609	6.2	6.2	4.3	8.1
WATERVILLE	97	89	17,248	5.6	5.7	4.6	6.9
YORK	75	75	14,811	5.1	5.2	4.1	6.4
TOTAL[3]	1,713	1,713	327,352	5.2	5.2	5.0	5.5

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment.; Only patients with at least 11 months of medical eligibility are included.

Appendix 3 (cont.)

Preference Sensitive Measures:
Hysterectomy Rate for Female Patients Age 18-69 Excluding Ovarian/Uterine Cancer
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	83	71	11,959	6.9	7.0	5.5	8.5
BANGOR	107	126	20,983	5.1	5.0	4.1	6.0
BAR HARBOR	5	10	1,704	2.9	3.0	0.4	5.6
BELFAST	29	18	2,974	9.8	9.7	6.2	13.3
BIDDEFORD	77	75	12,529	6.1	6.1	4.8	7.5
BLUE HILL	9	9	1,648	5.5	5.8	2.1	9.4
BOOTHBAY HARBOR	6	7	1,177	5.1	5.4	1.2	9.5
BRIDGTON	21	18	3,060	6.9	6.8	3.9	9.7
BRUNSWICK	65	70	11,752	5.5	5.5	4.2	6.9
CALAIS	10	9	1,463	6.8	6.9	2.6	11.1
CARIBOU	11	10	1,740	6.3	6.6	2.8	10.4
DAMARISCOTTA	12	13	2,300	5.2	5.5	2.5	8.5
DOVER-FOXCROFT	14	16	2,669	5.2	5.2	2.5	7.9
ELLSWORTH	23	21	3,646	6.3	6.4	3.8	9.0
FARMINGTON	20	28	4,766	4.2	4.2	2.4	6.1
FORT KENT	16	9	1,542	10.4	10.9	5.7	16.1
GREENVILLE	4	2	315	12.7	13.2	0.6	25.8
HOULTON	18	13	2,283	7.9	8.0	4.4	11.7
LEWISTON	107	127	21,651	4.9	5.0	4.1	5.9
LINCOLN	18	11	1,889	9.5	9.5	5.1	13.9
MACHIAS	12	12	2,014	6.0	6.0	2.6	9.4
MILLINOCKET	5	6	1,095	4.6	4.8	0.7	9.0
NORWAY	25	24	4,029	6.2	6.2	3.8	8.6
PITTSFIELD	8	11	1,929	4.1	4.2	1.3	7.0
PORTLAND	284	311	51,898	5.5	5.4	4.8	6.1
PRESQUE ISLE	17	16	2,815	6.0	6.3	3.3	9.2
ROCKLAND	51	46	7,891	6.5	6.5	4.8	8.3
RUMFORD	12	10	1,703	7.0	6.9	3.0	10.9
SANFORD	43	34	5,671	7.6	7.5	5.3	9.8
SKOWHEGAN	34	26	4,294	7.9	7.9	5.3	10.6
WATERVILLE	98	69	11,404	8.6	8.4	6.8	10.1
YORK	46	60	9,802	4.7	4.6	3.2	5.9
TOTAL[3]	1,290	1,290	216,655	6.0	6.0	5.6	6.3

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment.; Only patients with at least 11 months of medical eligibility are included.

Appendix 3 (cont.)

Preference Sensitive Measures:
Prostate Surgery Rate for Male Patients Age 40 and Over Excluding Prostate Cancer
Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Observed Surgeries	Number of Expected Surgeries	Number of Population at Risk	Crude Rate (Per 1,000)	Adjusted Rate (Per 1,000)	95% LCL[1] for Adjusted Rate	95% UCL[2] for Adjusted Rate
AUGUSTA	14	17	7,684	1.8	1.8	0.9	2.7
BANGOR	47	29	13,691	3.4	3.5	2.5	4.5
BAR HARBOR	2	3	1,317	1.5	1.4	0.0	3.4
BELFAST	2	5	2,052	1.0	0.9	0.0	2.2
BIDDEFORD	18	16	8,294	2.2	2.4	1.3	3.4
BLUE HILL	2	4	1,362	1.5	1.1	0.0	2.9
BOOTHBAY HARBOR	2	3	903	2.2	1.7	0.0	4.4
BRIDGTON	5	5	2,200	2.3	2.2	0.2	4.2
BRUNSWICK	12	18	8,402	1.4	1.4	0.6	2.3
CALAIS	5	3	1,079	4.6	3.4	0.0	6.9
CARIBOU	4	3	1,319	3.0	2.7	0.0	5.5
DAMARISCOTTA	1	4	1,681	0.6	0.5	0.0	1.5
DOVER-FOXCROFT	5	5	1,961	2.5	2.2	0.1	4.2
ELLSWORTH	5	7	2,608	1.9	1.6	0.1	3.1
FARMINGTON	6	8	3,312	1.8	1.7	0.3	3.1
FORT KENT	6	4	1,245	4.8	3.3	0.1	6.5
GREENVILLE	0	1	286	0.0	0.0	0.0	0.0
HOULTON	24	4	1,631	14.7	12.1	6.8	17.4
LEWISTON	30	26	13,790	2.2	2.5	1.7	3.3
LINCOLN	5	4	1,455	3.4	2.8	0.1	5.4
MACHIAS	2	4	1,403	1.4	1.1	0.0	2.9
MILLINOCKET	11	4	1,050	10.5	5.6	1.1	10.2
NORWAY	4	6	2,774	1.4	1.4	0.0	2.8
PITTSFIELD	5	3	1,357	3.7	4.0	0.6	7.4
PORTLAND	31	64	32,857	0.9	1.1	0.7	1.4
PRESQUE ISLE	9	6	2,144	4.2	3.5	1.0	6.0
ROCKLAND	14	14	5,772	2.4	2.2	1.0	3.4
RUMFORD	5	4	1,235	4.0	3.1	0.0	6.2
SANFORD	5	8	3,922	1.3	1.4	0.2	2.5
SKOWHEGAN	8	6	2,985	2.7	2.7	0.9	4.6
WATERVILLE	18	16	7,679	2.3	2.4	1.3	3.5
YORK	10	14	6,747	1.5	1.6	0.6	2.5
TOTAL[3]	317	317	146,242	2.2	2.2	1.9	2.4

[1] LCL Lower Confidence Limit; [2] UCL Upper Confidence Limit; [3] Total includes patients with no HSA assignment. Only patients with at least 11 months of medical eligibility are included.

Appendix 4: Cost Measures

Cost Measures: Summary of All Measures

Measurement Period: July 2004 - June 2005

Measures	Number of Eligible Patients	Number of Patients with Costs >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Costs	95% CI Lower	95% CI Upper	Predicted Per Capita Costs
Inpatient Facility Costs for Member Being Admitted [a]	583,638	30,313	5.2	$4,142	$3,760	$4,571	$215
Annualized Outpatient Facility Costs [a]	583,638	313,714	53.8	$671	$642	$701	$361
Annualized Professional Office Visit Costs [a]	583,638	417,667	71.6	$252	$247	$258	$180
Annualized Professional Costs Excluding Professional Office Visit [a]	583,638	403,988	69.2	$261	$252	$272	$181
Annualized Pharmaceutical Costs[b]	430,302	298,796	69.4	$639	$609	$672	$444

a. Patients must be eligible for at least 11 months of medical coverage.
b. Patients must be eligible for at least 11 months of both medical and pharmacy coverage.

Appendix 4 (cont.)
Cost Measures: Inpatient Facility Costs for Members Being Admitted

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Eligible Patients [a]	Number of Patients with Cost >0	Number of Expected Patients with Cost >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Cost	95% CI Lower	95% CI Upper	Predicted Per Capita Cost
AUGUSTA	31,084	1,729	1,746	5.1	$4,567	$4,337	$4,809	$235
BANGOR	55,376	3,030	2,861	5.5	$4,183	$4,023	$4,350	$230
BAR HARBOR	4,650	293	252	6.0	$4,317	$3,808	$4,894	$260
BELFAST	7,452	440	422	5.4	$4,318	$3,898	$4,784	$234
BIDDEFORD	33,912	1,544	1,657	4.8	$3,818	$3,615	$4,033	$185
BLUE HILL	4,495	282	268	5.5	$4,783	$4,209	$5,436	$262
BOOTHBAY HARBOR	3,064	186	186	5.2	$3,825	$3,268	$4,477	$198
BRIDGTON	8,224	418	427	5.1	$4,073	$3,667	$4,523	$207
BRUNSWICK	32,389	1,565	1,672	4.9	$3,936	$3,728	$4,156	$191
CALAIS	3,917	269	267	5.2	$4,100	$3,597	$4,673	$214
CARIBOU	4,853	311	314	5.1	$4,232	$3,747	$4,780	$217
DAMARISCOTTA	6,143	361	359	5.2	$4,787	$4,275	$5,359	$250
DOVER-FOXCROFT	7,164	366	413	4.6	$4,215	$3,767	$4,715	$194
ELLSWORTH	9,405	592	549	5.6	$4,515	$4,133	$4,931	$253
FARMINGTON	12,705	688	690	5.2	$4,708	$4,338	$5,110	$244
FORT KENT	4,355	387	304	6.6	$3,460	$3,102	$3,859	$229
GREENVILLE	867	56	56	5.2	$3,233	$2,427	$4,307	$168
HOULTON	5,951	371	348	5.5	$4,216	$3,771	$4,713	$234
LEWISTON	58,305	2,673	2,808	4.9	$4,095	$3,928	$4,268	$202
LINCOLN	5,235	328	298	5.7	$3,795	$3,371	$4,273	$217
MACHIAS	5,094	307	307	5.2	$4,291	$3,797	$4,851	$223
MILLINOCKET	3,554	291	309	4.9	$3,464	$3,054	$3,929	$170
NORWAY	10,820	626	572	5.7	$4,514	$4,143	$4,919	$257
PITTSFIELD	5,297	300	281	5.6	$3,804	$3,361	$4,306	$211
PORTLAND	140,595	6,459	6,481	5.2	$3,844	$3,742	$3,948	$199
PRESQUE ISLE	7,866	478	492	5.0	$4,666	$4,229	$5,147	$235
ROCKLAND	21,188	1,231	1,201	5.3	$4,354	$4,096	$4,629	$232
RUMFORD	4,889	328	322	5.3	$3,663	$3,253	$4,124	$194
SANFORD	15,871	737	826	4.6	$3,579	$3,307	$3,874	$166
SKOWHEGAN	11,485	677	641	5.5	$5,006	$4,610	$5,437	$275
WATERVILLE	30,863	1,663	1,686	5.1	$4,371	$4,147	$4,608	$224
YORK	26,570	1,327	1,299	5.3	$3,806	$3,588	$4,037	$202
TOTAL	583,638	30,313	30,313	5.2	$4,142	$3,760	$4,571	$215

Appendix 4 (cont.)
Cost Measures: Annualized Outpatient Facility Costs

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Eligible Patients [a]	Number of Patients with Cost >0	Number of Expected Patients with Cost >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Cost	95% CI Lower	95% CI Upper	Predicted Per Capita Cost
AUGUSTA	31,084	19,045	17,059	60.0	$545	$534	$556	$327
BANGOR	55,376	32,156	29,794	58.0	$675	$665	$686	$392
BAR HARBOR	4,650	2,760	2,579	57.5	$797	$756	$841	$458
BELFAST	7,452	4,546	4,197	58.2	$652	$625	$680	$380
BIDDEFORD	33,912	16,573	17,992	49.5	$455	$445	$465	$225
BLUE HILL	4,495	2,841	2,580	59.2	$735	$697	$775	$435
BOOTHBAY HARBOR	3,064	1,861	1,772	56.4	$844	$791	$901	$477
BRIDGTON	8,224	4,681	4,465	56.4	$587	$564	$612	$331
BRUNSWICK	32,389	17,854	17,446	55.0	$525	$514	$536	$289
CALAIS	3,917	2,328	2,260	55.4	$794	$749	$841	$439
CARIBOU	4,853	3,368	2,729	66.3	$877	$835	$920	$582
DAMARISCOTTA	6,143	3,748	3,461	58.2	$726	$693	$760	$422
DOVER-FOXCROFT	7,164	4,378	4,029	58.4	$658	$631	$686	$384
ELLSWORTH	9,405	5,942	5,312	60.1	$755	$728	$783	$454
FARMINGTON	12,705	7,702	6,940	59.7	$548	$531	$566	$327
FORT KENT	4,355	2,924	2,531	62.1	$731	$694	$771	$454
GREENVILLE	867	546	514	57.1	$874	$775	$986	$499
HOULTON	5,951	3,748	3,360	60.0	$725	$692	$759	$435
LEWISTON	58,305	32,946	30,463	58.1	$486	$478	$493	$282
LINCOLN	5,235	3,117	2,904	57.7	$723	$687	$760	$417
MACHIAS	5,094	2,895	2,902	53.6	$806	$765	$850	$432
MILLINOCKET	3,554	2,482	2,169	61.5	$827	$781	$875	$508
NORWAY	10,820	6,788	5,877	62.1	$654	$632	$677	$406
PITTSFIELD	5,297	3,207	2,844	60.6	$710	$675	$746	$430
PORTLAND	140,595	56,328	73,071	41.4	$503	$497	$509	$208
PRESQUE ISLE	7,866	5,230	4,431	63.4	$730	$702	$759	$463
ROCKLAND	21,188	12,447	11,797	56.7	$593	$578	$608	$336
RUMFORD	4,889	2,987	2,723	59.0	$571	$543	$602	$337
SANFORD	15,871	7,722	8,420	49.3	$492	$476	$508	$242
SKOWHEGAN	11,485	7,505	6,251	64.5	$737	$714	$762	$476
WATERVILLE	30,863	19,155	16,676	61.7	$541	$531	$553	$334
YORK	26,570	13,904	14,161	52.8	$595	$581	$609	$314
TOTAL	583,638	313,714	313,709	53.8	$671	$642	$701	$361

Appendix 4 (cont.)
Cost Measures: Annualized Professional Office Visit Costs

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Eligible Patients [a]	Number of Patients with Cost >0	Number of Expected Patients with Cost >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Cost	95% CI Lower	95% CI Upper	Predicted Per Capita Cost
AUGUSTA	31,084	22,751	22,440	72.6	$295	$292	$298	$214
BANGOR	55,376	36,604	39,610	66.1	$290	$288	$293	$192
BAR HARBOR	4,650	3,319	3,373	70.4	$239	$232	$246	$168
BELFAST	7,452	4,885	5,418	64.5	$249	$243	$255	$161
BIDDEFORD	33,912	24,742	24,161	73.3	$310	$306	$313	$227
BLUE HILL	4,495	3,199	3,306	69.2	$238	$231	$245	$165
BOOTHBAY HARBOR	3,064	2,316	2,263	73.2	$255	$247	$265	$187
BRIDGTON	8,224	6,003	5,905	72.7	$251	$245	$256	$182
BRUNSWICK	32,389	25,056	23,224	77.2	$282	$279	$285	$218
CALAIS	3,917	2,955	2,897	73.0	$245	$237	$252	$179
CARIBOU	4,853	3,691	3,544	74.5	$247	$241	$254	$184
DAMARISCOTTA	6,143	4,792	4,494	76.3	$279	$273	$286	$213
DOVER-FOXCROFT	7,164	4,796	5,222	65.7	$219	$214	$224	$144
ELLSWORTH	9,405	6,416	6,863	66.9	$260	$254	$265	$174
FARMINGTON	12,705	9,155	9,141	71.7	$233	$228	$237	$167
FORT KENT	4,355	3,270	3,227	72.5	$222	$215	$229	$161
GREENVILLE	867	623	647	69.0	$195	$182	$209	$135
HOULTON	5,951	4,238	4,347	69.8	$194	$189	$199	$136
LEWISTON	58,305	40,913	41,144	71.2	$261	$259	$263	$186
LINCOLN	5,235	3,702	3,802	69.7	$218	$212	$224	$152
MACHIAS	5,094	3,831	3,737	73.4	$277	$269	$284	$203
MILLINOCKET	3,554	2,602	2,712	68.7	$193	$187	$200	$133
NORWAY	10,820	7,827	7,779	72.0	$248	$243	$253	$179
PITTSFIELD	5,297	3,774	3,786	71.3	$278	$271	$286	$199
PORTLAND	140,595	103,190	99,229	74.4	$298	$296	$300	$222
PRESQUE ISLE	7,866	6,025	5,753	74.9	$249	$244	$254	$187
ROCKLAND	21,188	14,929	15,385	69.4	$264	$261	$268	$184
RUMFORD	4,889	3,517	3,564	70.6	$215	$209	$221	$152
SANFORD	15,871	10,913	11,300	69.1	$270	$266	$274	$187
SKOWHEGAN	11,485	8,050	8,254	69.8	$250	$246	$255	$175
WATERVILLE	30,863	21,113	22,139	68.2	$260	$257	$263	$178
YORK	26,570	18,470	19,001	69.6	$283	$279	$286	$197
TOTAL	583,638	417,667	417,667	71.6	$252	$247	$258	$180

Appendix 4 (cont.)
Cost Measures: Annualized Professional Costs Excluding Professional Office Visit

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Eligible Patients [a]	Number of Patients with Cost >0	Number of Expected Patients with Cost >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Cost	95% CI Lower	95% CI Upper	Predicted Per Capita Cost
AUGUSTA	31,084	22,338	21,764	71.0	$282	$276	$287	$200
BANGOR	55,376	35,617	38,330	64.3	$302	$298	$307	$194
BAR HARBOR	4,650	3,214	3,287	67.7	$289	$275	$305	$196
BELFAST	7,452	4,784	5,292	62.6	$258	$247	$269	$161
BIDDEFORD	33,912	24,244	23,300	72.0	$307	$301	$313	$221
BLUE HILL	4,495	3,126	3,237	66.8	$261	$247	$275	$174
BOOTHBAY HARBOR	3,064	2,194	2,218	68.5	$278	$261	$296	$190
BRIDGTON	8,224	5,591	5,729	67.6	$278	$267	$289	$188
BRUNSWICK	32,389	23,733	22,463	73.1	$290	$284	$295	$212
CALAIS	3,917	2,892	2,831	70.7	$243	$230	$257	$172
CARIBOU	4,853	3,607	3,443	72.5	$230	$219	$242	$167
DAMARISCOTTA	6,143	4,603	4,378	72.8	$273	$261	$285	$199
DOVER-FOXCROFT	7,164	4,762	5,097	64.7	$221	$212	$231	$143
ELLSWORTH	9,405	6,118	6,703	63.2	$272	$262	$283	$172
FARMINGTON	12,705	9,061	8,878	70.6	$227	$220	$234	$160
FORT KENT	4,355	3,207	3,161	70.2	$239	$227	$252	$168
GREENVILLE	867	607	637	66.0	$206	$183	$232	$136
HOULTON	5,951	4,151	4,244	67.7	$247	$236	$259	$167
LEWISTON	58,305	38,570	39,657	67.3	$278	$274	$282	$187
LINCOLN	5,235	3,585	3,698	67.1	$215	$205	$226	$144
MACHIAS	5,094	3,650	3,651	69.2	$265	$253	$279	$184
MILLINOCKET	3,554	2,634	2,667	68.4	$234	$221	$248	$160
NORWAY	10,820	7,606	7,536	69.9	$235	$227	$243	$164
PITTSFIELD	5,297	3,501	3,655	66.3	$248	$235	$260	$164
PORTLAND	140,595	100,652	95,472	73.0	$361	$358	$365	$264
PRESQUE ISLE	7,866	5,832	5,595	72.2	$258	$248	$268	$186
ROCKLAND	21,188	14,212	14,977	65.7	$292	$285	$299	$192
RUMFORD	4,889	3,375	3,464	67.4	$245	$233	$258	$165
SANFORD	15,871	10,470	10,902	66.5	$262	$254	$270	$174
SKOWHEGAN	11,485	7,787	7,996	67.4	$244	$236	$253	$165
WATERVILLE	30,863	20,581	21,415	66.5	$261	$255	$266	$174
YORK	26,570	17,684	18,308	66.9	$267	$261	$273	$178
TOTAL	583,638	403,988	403,988	69.2	$261	$252	$272	$181

Appendix 4 (cont.)
Cost Measures: Annualized Pharmaceutical Costs

Measurement Period: July 2004 - June 2005

Hospital Service Area (HSA)	Number of Eligible Patients [a]	Number of Patients with Cost >0	Number of Expected Patients with Cost >0	Risk Adjusted Rate >0 (%)	Risk Adjusted Median Cost	95% CI Lower	95% CI Upper	Predicted Per Capita Cost
AUGUSTA	25,847	18,755	18,306	71.1	$631	$618	$645	$449
BANGOR	42,285	30,425	29,532	71.5	$798	$784	$812	$571
BAR HARBOR	2,987	2,133	2,107	70.3	$630	$590	$673	$443
BELFAST	5,467	3,779	3,891	67.4	$580	$552	$609	$391
BIDDEFORD	23,725	16,791	16,371	71.2	$708	$691	$724	$504
BLUE HILL	2,726	1,940	1,966	68.5	$623	$582	$668	$427
BOOTHBAY HARBOR	2,164	1,636	1,561	72.8	$719	$667	$775	$523
BRIDGTON	6,042	4,156	4,193	68.8	$652	$622	$684	$449
BRUNSWICK	25,572	17,992	17,709	70.5	$604	$590	$617	$426
CALAIS	2,398	1,715	1,728	68.9	$630	$586	$678	$434
CARIBOU	3,834	2,914	2,729	74.1	$735	$695	$777	$545
DAMARISCOTTA	4,395	3,259	3,102	73.0	$638	$605	$673	$466
DOVER-FOXCROFT	4,527	3,276	3,226	70.5	$625	$593	$659	$441
ELLSWORTH	6,917	4,896	4,943	68.8	$684	$655	$714	$470
FARMINGTON	9,356	6,439	6,550	68.3	$512	$493	$531	$349
FORT KENT	3,126	2,195	2,225	68.5	$645	$605	$688	$442
GREENVILLE	554	422	405	72.4	$651	$561	$754	$471
HOULTON	4,185	2,902	3,009	67.0	$660	$624	$698	$442
LEWISTON	44,885	29,442	30,797	66.4	$630	$619	$641	$418
LINCOLN	3,949	2,645	2,760	66.5	$539	$509	$572	$359
MACHIAS	3,631	2,641	2,626	69.8	$703	$663	$746	$491
MILLINOCKET	1,787	1,287	1,266	70.6	$783	$720	$852	$553
NORWAY	8,237	5,581	5,714	67.8	$546	$524	$568	$370
PITTSFIELD	4,006	2,781	2,769	69.8	$608	$574	$644	$424
PORTLAND	104,501	71,598	71,363	69.7	$695	$688	$703	$485
PRESQUE ISLE	6,271	4,750	4,455	74.0	$689	$660	$720	$510
ROCKLAND	15,022	9,840	10,609	64.4	$596	$578	$615	$384
RUMFORD	3,478	2,359	2,422	67.6	$538	$506	$573	$364
SANFORD	10,431	6,987	7,167	67.7	$605	$583	$627	$409
SKOWHEGAN	8,976	6,186	6,256	68.7	$559	$538	$581	$384
WATERVILLE	22,754	15,819	15,781	69.6	$584	$570	$599	$407
YORK	16,267	11,255	11,260	69.4	$652	$633	$671	$452
TOTAL	430,302	298,796	298,796	69.4	$639	$609	$672	$444

Appendix 5: Geographic Variation Analysis of Advanced Imaging Services

An Analysis of Population Based Utilization of Advanced Imaging (CT and MRI)
MQF Warehouse, January 2003 – June 2005

Prepared by the Center for Outcomes Research and Evaluation
Maine Medical Center
In cooperation with Health Dialog Analytic Solutions

Health Dialog Analytic Solutions created a data warehouse of commercial payer enrollment and utilization claims data for January 2003 – August 2005 from files provided by the Maine Quality Forum (MQF). A unique patient identifier, independent of payer, was created to link across membership, facility claims and professional claims files. From this warehouse, multiple files were created for the Center for Outcomes Research and Evaluation (CORE) to calculate population based utilization rates of advanced imaging in Maine and describe advanced imaging testing practices within cohorts of members with specific diagnoses.

Methods

Population Based Rates

Population based rates are used to describe how health care is used by defined populations rather than the physical location of health services. In this case, the population of interest included all persons with medical benefits provided by commercial payers (not Medicaid or Medicare) in Maine over the period from January 2003 through June 2005. This constituted our at risk population for advanced imaging and included many persons who had no specific indications for testing. (A secondary analysis limited the at risk population to the cohort of members with specific diagnoses of abdominal/pelvic or lumbar pain and followed them forward in time to see if they received advanced imaging testing and is described later.)

Denominator

The population based denominator defining the at risk population was built from the all commercial payer membership file. The membership file included the unique patient identifier, patient date of birth, gender, town and state of residence, payer identifier and the months the member was eligible for medical benefits over the period from January 2003 to August 2005. Residency and payer did not vary over time and represented the most recent status of the member. (A study of the membership file by Health Dialog Analytic Solutions revealed that few members changed residence during the study period.)

Several exclusions were applied to the raw dataset. We excluded members whose identifier could not be uniquely defined, members with missing or invalid gender codes, and members with a date of birth prior to 1900. We excluded data from July and August of 2005 because we suspected incomplete claims submission which would result in artificially low utilization. From this membership file, the total number of months in which members had medical coverage and were therefore "at risk" for receiving an advanced imaging procedure was calculated.

We were concerned that persons aged 65 years or older were likely to have had their advanced imaging testing paid for by Medicare, claims for which do not appear in this dataset of commercial payers, resulting in under ascertainment of utilization. A study by Health Dialog Analytic Solutions, however, revealed that claims for members over age 65 had lower average paid amounts than those for younger people, indicating that these were probably claims paid primarily by Medicare but that the private plans paid secondary claims to cover co-payment amounts or deductibles. In addition, overall rates were substantially higher in the aged population than in younger people. Therefore, we expect that under ascertainment in the aged is probably, at most, a small problem.

Finally, we limited to only those members who resided in Maine Health Service Areas (HSAs). The Maine Health Data Organization defined HSAs based upon town code of residence. There are 32 HSAs in Maine. The cross walk from town code to HSA was provided by MQF to Health Dialog, which performed the assignment of beneficiaries to HSAs for our analysis...

Numerator

Next numerators were created for calculating population based rates of advanced imaging. The numerator was built by combining facility claims (submitted by hospitals, clinics or labs) and professional claims (submitted by physicians) for advanced imaging tests. We used Current Procedural Terminology (CPT) codes to identify tests of interest as defined by MQF in the request for proposals. We considered supplementing with tests identified by International Classification of Diseases , version 9 (ICD-9), procedure codes to ensure that we captured tests performed in the inpatient setting, but ultimately decided that these codes were too non-specific to warrant inclusion. Exploratory analyses suggest that 2800 total events were identified using the much less specific ICD-9 procedure codes and that 62% of them were also ascertained by CPT codes. Thus we may have an undercount of total advanced imaging, especially for inpatient procedures, although the lack of specificity in the ICD coding system may mean that some of the procedures we identified using them may be different procedures than those of interest in this analysis and there may be no undercount.

There are four tests of interest; abdominal/pelvic CT, abdominal/pelvic MRI, lumbar CT, and lumbar MRI. The following codes, as specified by MQF, were used to select claims:

CPT Codes--Advanced Imaging (ABDOMEN/PELVIS)			
CT Scans		**MRI**	
Code	**Description**	**Code**	**Description**
72191	CT PELVIS W/O&W/CONTRAST&OTH	72195	MR IMAG PELV; W/O CONTRST MATE
72192	CT PELVIS; W/O CONTRAST MATERI	72196	MR IMAGING PELV; W/CONTRST MAT
72193	CT PELVIS; W/CONTRAST MATERIAL	72197	MRI PELVIS; W/O&W/CONTRST&FURT
72194	CT PELVIS; W/O & W/CONTRST&OTH S	74181	MR IMAG ABD; W/O CONTRST MATER
74150	CMPT TOMOGRPH ABD; W/O CONTRST	74182	MR IMAGING ABD; W/CONTRST MATE
74160	CMPT TOMOGRPH ABD; W/CONTRST M	74183	MRI ABD W/O & W/CONTRST & OTH
74170	CT ABD; W/O & W/CONTRST&OTH SE		
74175	CTA ABD W/O & W/CONTRST & OTH		

CPT Codes--Advanced Imaging (LUMBAR SPINE)			
CT Scans		**MRI**	
Code	**Description**	**Code**	**Description**
72131	CT LUMBAR SPINE; W/O CONTRST M	72148	MRI SPINAL CANAL LUMB; NO CONT
72132	CT LUMBAR SPINE; W/CONTRST MAT	72149	MRI SPINAL CANAL LUMBAR; W/CON
72133	CT LUMB SP; W/O&W/CONTRST&OTH	72156	MRI SPINAL NO THEN W/CONTRAST
		72157	MRI SPINAL NO THEN W/CONTRST
		72158	MRI SPINAL NO THEN W/CONTRAST

Each CPT code of interest was associated with the patient identifier, date of service, the claim number and any ICD-9 diagnosis codes (DX) present on the claim. The raw file was structured so that any relevant CPT was associated with every DX code (e.g., a person with 2 CPTs for a lumbar MRI and 3 diagnoses on that claim (for any reason), would have 6 records in the dataset). The first step was to identify unique events from the claims data and to flag those events in which a lumbar or abdominal diagnosis of interest was present. Because more than one CPT could be used to identify a particular test, and because a single test could be ascertained from both the facility claims and professional claims data (if both the facility and physician billed for it), we defined unique events by patient identifier and service date. Multiple claims or multiple procedure codes for a particular test of interest occurring on the same day to the same person were considered a single event. This does mean that in the rare instance when someone has two tests of the same type, e.g. 2 lumbar MRIs in a single day, we would count only one event. However tests of a different type, e.g. lumbar CT and lumbar MRI, occurring on the same day to the same person, would be counted separately. Similarly, more than one DX code can identify a diagnosis of interest and every DX is associated with all CPT codes. All DXs for a particular diagnosis were combined at the event level, and a lumbar diagnosis, for example, would be associated with both a lumbar CT and lumbar MRI if both occurred on the same day. We created event level files separately for the facility claims and professional claims and then combined them.

Next we merged the numerator events to the membership file in order to obtain patient demographic information (age, gender, HSA) and to ensure patient eligibility. This latter criterion was used to prevent over-ascertainment by including only those events occurring among the "at risk" population (denominator), that is during a month in which we had counted the person in the denominator. Using these procedures, 1.5% of events were excluded because they did not link to the at risk population of Maine beneficiaries with non-missing patient identifier, age and gender. An additional 1.4% of events were excluded because the event itself didn't occur during a month in which the member had eligibility.

Descriptive Analysis

There were 9 events of interest; any advanced imaging, any CT imaging, any MRI imaging, any advanced imaging of the abdomen/pelvis, any advanced imaging of the lumbar spine, and the 4

individual tests (abdominal/pelvic CT, abdominal/pelvic MRI, lumbar CT and lumbar MRI). For each of these tests we determined the number of events that occurred each year, overall and within strata of age, gender, payer, and health service area.

Age was calculated using date of birth and categorized for ease in presentation and for utilization rate standardization. For the event numerator, age was calculated as of the date of the event. For the person-years denominator, age was calculated as of the midpoint of each person-month of eligibility. Age was categorized into 7 groups (<35, 35-44, 45-54, 55-64, 65-74, 75+); we specifically selected 65 years of age, the time when most Americans become Medicare eligible, as one of the cutpoints. Payer was also categorized to explore whether utilization differed by payer, a possible source of variation in this multi-payer dataset. Although the data included members from approximately 85 different payers, just 7 accounted for almost 75% of all members ever eligible over the study period, with 1 payer accounting for roughly 48% of members. For this reason, we categorized the 7 largest payers individually and combined all remaining payers (who individually account for <2% of total members) into a "low volume" category.

We also determined the number of people ever eligible during the time period and the total amount of person time each contributed. Person time is defined as the total number of months of eligibility contributed by each member during the time period. For ease of interpretation, the number of person months was divided by 12 to indicate person years of contribution to the denominator, such that a single person eligible for an entire year contributes 1 person year. Although a count of persons has intuitive appeal, it actually overestimates the at risk population since not all persons are eligible for the entire time period. This is especially evident for the 2005 time period in which only half a year's worth of data were available; the number of persons ever eligible is just slightly under that seen in 2003 and 2004, which contribute an entire year, whereas the person time is roughly half of earlier years reflecting the half year of observation. Person years was then used as the denominator to calculate crude overall and strata specific rates.

Finally, we calculated the proportion of persons who had either an abdominal CT or MRI that had an abdominal pain diagnosis and the proportion of persons with a lumbar CT or MRI who had a lumbar diagnosis. For a test to be categorized as having a diagnosis, the relevant ICD-9 diagnosis code had to appear on the same claim as the test. Proportions were examined overall, by year, and within strata for age, sex, payer and HSA.

Population Based Rates

Crude population based rates were calculated as simply the number of events divided by the number of person years. In order to account for differences in the distribution of demographic characteristics between HSAs and over time, we calculated adjusted rates. Adjusted rates were calculated using the indirect method of standardization, adjusting for age and gender. We calculated annual rates, where 2005 covered just the first 6 months, and region specific rates. We used the 2003 denominator as the standard population. The indirect method of adjustment applies age and gender specific rates from the standard population to the age and gender specific distribution of each study population (defined by year or HSA), to calculate the number of events in the study population that would be expected if the standard rate applied. From this calculation, a ratio of observed to expected events is calculated and then multiplied by the overall crude rate in the standard population to obtain an adjusted rate.

We displayed population based rates by HSA in maps. These maps chart the ratio of the HSA specific rate to the state rate. MQF provided a crosswalk between ZIP code and HSA, which we

used for mapping purposes only. A small number of ZIP codes mapped to more than one HSA; when this occurred, we assigned the ZIP to one HSA at random.

Statistical Testing

We recommend that readers interpret with extreme caution any rates based on fewer than 20 expected events as these rates are statistically unstable. (This situation actually occurred only for lumbar CT, which had very low rates.) For more formal statistical testing, Z-scores were calculated to evaluate the statistical significance of differences in rates between HSAs and the state rate. Thus, for each test, we calculated 32 Z-scores, one for each HSA, comparing the HSA rate with the state rate. The Z-score is a ratio of the difference between the rates of interest (in this case, the state rate expressed as a proportion and the adjusted HSA rate) to the standard error of the HSA rate ($Z = p_{HSA} - p_{state}/SE\ p_{HSA}$, where p is the rate and $SE\ p_{HSA} = sqrt(p_{state}*q_{state/}N_{HSA})$.

For all but the most unusual test categories, the numbers of events and the denominators are very large, resulting in statistically significant Z-scores for very small differences. For this reason, we recommend that readers evaluate the magnitude of the differences as well as their statistical significance. In addition, we have defined as statistically significant rates that are more than three standard errors above or below the state rate (corresponding to a p value of ~ 0.001) rather than the approximately two standard error difference that is usually used to indicate statistical significance (corresponding to a p value of 0.05). This conservative interpretation of statistical significance will also help ameliorate the problem of multiple comparisons, that is, for each of 9 test categories evaluated, we are actually performing 32 statistical tests. The p value of 0.001 associated with a Z score with an absolute value of 3 results in a significance level equivalent to that which would be obtained from a Bonferroni correction for 32 comparisons (0.05/32), resulting in an overall level of statistical significance of 0.05 for each of the imaging tests evaluated.

Cohort Analysis

Cohorts

The first step in the cohort analysis was to create cohorts defined by the presence of a condition of interest. We used ICD-9 diagnosis codes to identify two conditions: lumbar pain and abdominal/pelvic pain. The following codes, as selected by MQF and briefly reviewed by Health Dialog Analytic Solutions, were used to select claims (we excluded records with an ICD-9 diagnosis code of 722.11 although originally specified (<0.5%) since it is a thoracic rather than lumbar spine code):

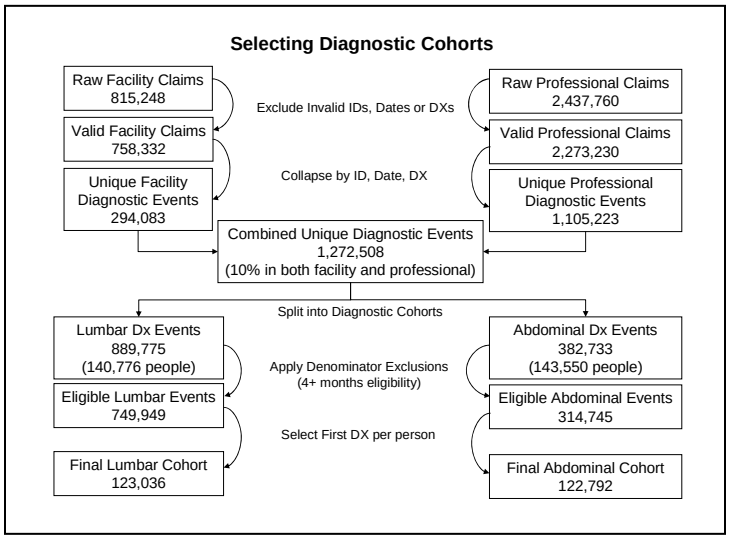
Lumbar Disorder		Abdominal Disorder	
Description	**Code**	**Description**	**Code**
Lumbosacral spondylosis w/o myelopathy	721.3	Abdominal Pain	789.0-9
Lumbosacral spondylosis w myelopathy	721.42	Pelvic Pain	625.9
Displacement L disc w/o myelopathy	722.1	Nausea with vomiting	787.01
Displacement unspecified	722.2	Nausea	787.02
Degeneration of Lumbar disc	722.52	Vomiting	787.03
Degeneration of disc unspecified	722.6		
Intervertebral lumbar disc with myelopathy	722.73		
Post laminectomy syndrome, unspecified	722.8		
Post laminectomy syndrome lumbar	722.83		
Unspecified disc disorder, unspecified site	722.9		
Unspecified disc disorder, lumbar	722.93		
Spinal stenosis, lumbar	724.02		
Lumbago	724.2		
Sciatica, neuralgia of the sciatic nerve	724.3		
Unspecified backache	724.5		
Sprain and strain of lumbosacral joint	846		
Lumbar sprain and strain	847.2		

The cohorts were built by combining facility claims (submitted by hospitals, clinics or labs) and professional claims (submitted by physicians) that included a relevant ICD-9 diagnosis code. Each ICD-9 diagnosis code (DX) of interest was associated with the patient identifier, date of service, the claim number and any ICD-9 or CPT based procedure codes present on the claim. The raw file was structured such that any relevant DX was associated with every procedure code such that a person with 2 DXs for lumbar pain and 3 CPTs (for any procedure), would have 6 records in the dataset. (Because this dataset only includes CPT codes for claims with a diagnosis of interest, it could not be used to capture numerator events for the calculation of population based utilization rates – some tests occurred without a concomitant diagnosis.)

As previously, we excluded members whose identification number could not be uniquely defined (<1%), and records with service dates occurring in July and August of 2005 (6%). We then collapsed across records to obtain records unique on patient identifier, date of service and diagnosis type (lumbar versus abdominal). We then combined facility and professional claims by identifier and date, creating separate datasets for lumbar diagnoses and abdominal diagnoses.

These 'diagnosis event level' datasets were then merged with the patient level membership file, which was limited to those patients residing in Maine HSAs and with valid age and gender, and

which summarized medical benefit eligibility across the 30 months of the study. Patients who could not be matched (1%), who were ineligible in the month of diagnosis (1%), and who did not have 3 or more months of eligibility after the first occurrence of the diagnosis (15%) were excluded. Finally, we selected the temporally first diagnosis meeting the above criteria, resulting in a lumbar diagnosis cohort with 123,036 members and an abdominal diagnosis cohort with 122,792 members. Results of cohort selection are charted below:



Events

Events were selected from the same file used to identify numerator events for calculation of population based rates. Recall, events are defined by CPT codes found in the facility and professional files, are unique by patient identifier and date, and are limited to members residing in Maine HSAs and with non-missing values for age and gender. The event datasets were merged with the cohort datasets, limiting to just those events occurring among cohort members (90% of lumbar events, 74% of abdominal events). For each event, the time between the index diagnosis (first occurrence of the diagnosis of interest during the study period) and the test date was calculated and then each test was flagged as to whether it occurred before diagnosis, within 90 days of diagnosis, or sometime after 90 days. Events were then collapsed to the person level, with indicator variables to flag whether a CT or MRI occurred for the cohort member within the timeframe of interest. Our outcome of interest was the occurrence of a test within 90 days of the index diagnosis. We calculated simple proportions of cohort members who received CTs, MRIs, or either within 90 days of the index diagnosis among lumbar and abdominal diagnosis cohorts. Proportions were calculated overall and within strata defined by age, gender, payer, and HSA.

Results

We identified 102,777 advanced imaging tests for insured enrollees contributing 1,791,851 person years of observation over the 2.5 year study period, yielding a crude rate of overall population based advanced imaging (combining abdominal/pelvic and lumbar CT and MRI) 5.74 tests per 100 person years (PY) (Table 1). Rates increased with increasing age: beneficiaries less than 35 years of age were tested at a rate of 1.9 tests per 100 PY, while those older than 75 experienced 15.5 tests per PY. Rates among women were higher than those among men, 6.1 versus 5.3 tests per PY. Rates varied by payer, from 2.3 to 7.1 tests per PY. However, these are crude rates and the age distributions are

quite different by payer: the payer with the highest rate also has a high proportion of elderly enrollees (Table 2). Crude rates by HSA varied by a factor of 1.8 from 4.7 tests per PY in Sanford to 8.5 in Presque Isle. The proportion of tests with an appropriate diagnosis on the same claim varied as well (Table 3). Lumbar tests were more likely than abdominal tests to have a relevant DX code on the claim. The proportion of abdominal/pelvic tests with an associated DX code decreased with age and was smaller among men tested than among women. There was substantial payer and geographic variability as well. Variability in the proportion of tests carrying an associated DX code was less for lumbar tests.

During the study period, age and gender adjusted CT rates were more than twice as high as MRI rates (Figure 1a). Abdominal CT was the most common of the studied procedures; abdominal/pelvic MRI and lumbar CT were quite rare (Figure 1b). Rates of advanced imaging increased over the study period after adjustment for changes in age and gender distribution over time. Overall advanced imaging rates increased from 5.4 per 100 PY to 6.0. Both CT and MRI rates have increased over the study period.

Geographic Variation

Figures 2a-i display advanced imaging rates by HSA graphically. These data combined data from the entire study period and were adjusted for difference across regions in age and gender. The maps show by color shading the ratio of the rate in the HSA to the state rate. Tables 4a-i display similar data in tabular form and include the HSA rate and the results of statistical testing for differences between the HSA rate and the state rate. Information from the figure and the table must be interpreted together—the map shows descriptively how different the HSA rate is from the state rate. We have used a ratio to express the relationship between the HSA rate and the state rate; where the ratio is 1.0 the rates are the same. The maps color code the ratios, with the extremes of color indicating outliers. The tables give the number of events on which the rate was based (observed), the number expected if the standard population distribution applied, the magnitude of the rate and the results of statistical testing in the Z score column. Because our sample size was very large and there were a large number of events per HSA for most tests, even very small differences were statistically significant, so it is important to look at the ratio (the measure of how different the rate is from the state rate) and the Z score (the measure of whether the two rates are statistically different) together. In addition, the value of the adjusted rate is also important as a measure of how frequently the population is exposed to the test. In the following discussion, we use the term ‘substantially lower’ than the state rate to refer to rates that are more than 25 percent lower than the state rate; the term ‘substantially higher’ refers to rates that are 30 percent higher or more than the state rate. We use the term statistically significant to mean a Z score of 3 or greater.

Overall Advanced Imaging

Privately insured Maine enrollees received 5.74 advanced imaging tests per 100 PY (Figure 2a, Table 4a). Rates varied by HSA, from a low of 4.79 in Belfast to a high of 7.60 in Presque Isle; these rates correspond to ratios of 0.84 and 1.32, indicating that Belfast’s rate was 16% below the state rate while Presque Isle’s rate was 32% higher than the state rate. There were no areas with ratios <0.75 (that is, at least 25% lower than the state rate, which we term substantially lower), 5 areas with ratios between 0.75 and 0.90 (somewhat lower than the state rate), 21 areas with ratios between 0.90 and 1.10 (very similar to the state rate), 5 areas with ratios between 1.10 and 1.30 (somewhat higher than the state rate), and one area with ratio of > 1.30 (at least 30% higher than the state rate, which we term substantially higher). Note that, for instance, Portland’s ratio to the state

rate was 0.94, well within the range that we interpret as being similar to the state rate; its absolute testing rate was 5.41 per 100 PY, not very different from the state rate of 5.74; however, it had a highly significant Z score. This is because Portland is the largest area and has the most events even though its rate is relatively low. On the other hand, the Presque Isle rate is in the 'much higher' category (rate of 7.60, ratio of 1.32) and its Z score is also highly significant. We recommend that the reader evaluate the rate difference and rate ratio and, only when an area appears to be an outlier, check the Z score for statistical significance, using a Z score of 3 or higher (in absolute value) to define statistical significance; this means that areas with both the rate ratio column and the Z score column identified in red in Tables 4a-i would be considered outliers, with rates both substantially and significantly different from the state rate. In the case of combined advanced imaging, there was only one true outlier, Presque Isle, as indicated by its rate ratio and its Z score taken together.

Imaging by Modality

Rates of CT were much higher than rates of MRI, 4.08 and 1.67 per PY, respectively (Figures 2b and c, Tables 4b and c). CT rates varied from 3.13 per 100 PY in Belfast to 5.21 in Presque Isle. No areas had rates substantially (ratio of < 0.75) and significantly (using our criterion of a Z score absolute value of 3 or greater) lower than the state rate, and no areas had rates substantially (rate ratio of 1.30 or higher) and significantly higher than the state rate. MRI rates varied from 1.32 in Bar Harbor to 2.52 in Caribou. No areas had rates substantially and significantly lower than the state rate. While four areas had rates substantially higher than the state rate, only three of these rates were significantly higher, those of Presque Isle, Fort Kent, and Caribou.

Imaging by Body Region

Abdominal/pelvic tests were more frequent than lumbar tests, 4.15 versus 1.62 tests per 100 PY (Figures 2 d and e, Tables 4 d and e). The lowest rate of abdominal/pelvic imaging occurred in Belfast, a rate of 3.33 per 100 PY, while the highest rate occurred in Presque Isle, 5.76 per 100 PY. No areas had rates substantially lower than the state rate; only Presque Isle had a rate substantially and significantly higher than the state rate. Lumbar imaging rates were lowest in York, 1.41 per 100 PY, and highest in Greenville and Caribou at 2.15 per 100 PY. No areas had rates substantially lower than the state rate while 2 areas had rates substantially higher than the state rate, although only the Machias rate was significantly higher.

Imaging by Individual Test

Rates by body region and modality are given in Figures 2 f-i and Tables 4 f-i. Advanced imaging of the abdomen/pelvis was 18 times more likely to be performed using CT than MRI, while lumbar imaging was 10 times more likely to be performed using MRI than CT.

Rates for abdominal/pelvic CT varied from a low of 3.03 per 100 PY in Belfast to a high of 5.06 per 100 PY in Presque Isle (Table 4f). There were no areas with rates either substantially lower or substantially higher than the state rate. Rates for abdominal/pelvic MRI varied much more than rates of abdominal/pelvic CT (Table 4g). Rates varied by a factor of 7; the lowest rate of 0.11 per 100 PY was observed in Dover-Foxcroft, while the highest rate of 0.78 per 100 PY occurred in Fort Kent. Three HSAs had rates substantially and significantly lower than the state rate, Dover-Foxcroft, Biddeford, and Lewiston. Six HSAs had rates substantially and significantly higher than the state rate, Belfast, Caribou, Fort Kent, Houlton, Presque Isle and Skowhegan.

Rates for lumbar CT were very low and highly variable (although this variability is in many cases based on few events), varying from 0.08 per 100 PY in Bridgeton, Brunswick, and Damariscotta to

0.48 per 100 PY in Machias (Table 4h). Brunswick and Waterville had rates substantially and significantly lower than the state rate while rates were substantially and significantly higher than the state rate in Bar Harbor, Calais and Machias. Rates for lumbar MRI were higher and less variable (Table 4i). Rates ranged from 1.18 per 100 PY in Bar Harbor to 2.00 per 100 PY in Greenville. No areas had rates substantially lower than the state rate. Only Caribou had a rate substantially and significantly higher than the state rate.

Summary

The largest amount of variability in the tests we evaluated occurred with lumbar CT and abdominal/pelvic MRI. For several tests, there were no areas with rates substantially and significantly lower than the state rate, while there was at least one area with rates above the state rate for each test category except overall CT testing. While there were, for various tests evaluated, HSAs with rates substantially and significantly below the state rate, there was no clear pattern associated with these lower utilization rates. However, there was a clear pattern for higher utilization rates. The Presque Isle and Caribou HSAs had rates substantially and significantly higher for several of the test categories examined. (It should be noted that the test categories are not independent of each other; that is, they are just different ways to cut the same data. For example, the overall rate is a simple addition of the CT and MRI rates.)

Cohort Analysis

The cohort analysis was based on identifying two cohorts of patients, one with an abdominal/pelvic diagnosis at some time during the study period and one with a lumbar diagnosis. This analysis is entirely descriptive; no statistical testing was performed.

After exclusion criteria were applied, there were 122,792 enrollees who received an abdominal/pelvic diagnosis during the study period (Table 5a). Of these, 20.6% received some kind of advanced abdominal/pelvic imaging in the 90 days following the first appearance of the diagnosis, 20,2% with CT and 0.9% with MRI (a very small number of enrollees received both tests). Younger patients were less likely to be tested than older ones and women were less likely to be tested than men. There was variation by plan in the proportion tested, with total testing rates ranging from 16.7% to 22.1%. Geographic variation was larger, ranging from 16.1% in Sanford to 23.6% in Presque Isle.

During the study period, 123,036 enrollees received a lumbar diagnosis (Table 5b). Of these 11.3% received advanced lumbar imaging, 0.9% with CT and 10.7% with MRI. Testing was more probable with increasing age. Men were more likely to receive a test than women. Rates by payer varied from 9.7% to 11.7%. Rates were quite variable by HSA, varying from 9.3% in Rockland to 21.2% in Greenville.

Table 1. Distribution of Events and Crude Population Based Rates By Patient Characteristics, Insurer, and Hospital Service Area: Total Advanced Imaging, Maine, January 2003 – June 2005

		Events	Person Years	Crude Rate Per 100 PY
Total		102,777	1,791,850.6	5.7
Age	<35	13,913	728,349.8	1.9
	35-44	15,594	298,944.1	5.2
	45-54	22,660	335,898.7	6.7
	55-64	21,243	230,541.1	9.2
	65-74	13,103	9,2978.8	14.1
	75+	16,264	105,138.1	15.5
Gender	Female	57,300	940,642.3	6.1
	Male	45,477	851,208.2	5.3
Payer	C0065A	62,230	881,919.1	7.1
	C0125A	8,808	175,370.5	5.0
	T0007	5,698	113,217.5	5.0
	C0423	4,196	68,585.7	6.1
	C0108	2,778	56,298.4	4.9
	C0254	2,545	50,006.3	5.1
	C0266	610	26,510.3	2.3
	Low Volume	15,912	419,942.8	3.8

Table 1. (Continued) Distribution of Events and Crude Population Based Rates By Patient Characteristics, Insurer, and Hospital Service Area: Total Advanced Imaging, Maine, January 2003 – June 2005

		Events	Person Years	Crude Rate Per 100 PY
HSA	Augusta	6,118	91,401.9	6.7
	Bangor	10,503	170,738.0	6.2
	Bar Harbor	989	14,760.2	6.7
	Belfast	1,259	24,382.7	5.2
	Biddeford	5,616	105,647.5	5.3
	Blue Hill	891	13,369.7	6.7
	Boothbay Harbor	583	9,008.3	6.5
	Bridgton	1,562	24,927.5	6.3
	Brunswick	5,302	100,019.5	5.3
	Calais	890	13,155.3	6.8
	Caribou	1,212	15,942.2	7.6
	Damariscotta	1,076	17,885.8	6.0
	Dover-Foxcroft	1,418	21,823.5	6.5
	Ellsworth	1,940	27,715.1	7.0
	Farmington	2,124	38,336.2	5.5
	Fort Kent	1,093	13,272.7	8.2
	Greenville	209	2,828.6	7.4
	Houlton	1,166	17,234.7	6.8
	Lewiston	9,136	173,263.7	5.3
	Lincoln	956	15,992.6	6.0
	Machias	1,070	15,113.5	7.1
	Millinocket	910	11,159.3	8.2
	Norway	2,036	33,110.8	6.1
	Pittsfield	996	17,404.0	5.7
	Portland	21,881	428,027.2	5.1
	Presque Isle	2,146	25,367.6	8.5
	Rockland	3,871	64,622.1	6.0
	Rumford	1,076	14,780.7	7.3
	Sanford	2,525	53,840.6	4.7
	Skowhegan	2,343	34,672.5	6.8
	Waterville	5,575	95,193.4	5.9
	York	4,305	86,853.6	5.0

Table 2. Age and Gender Distribution (%) of Enrollees by Plan, Maine, January 2003 – June 2005

Plan	N	Age < 35	Age 65+	Female
C0065A	881,919	36.1%	16.2%	53.7%
C0125A	175,370	46.6%	3.0%	48.8%
T0007	113,217	45.5%	1.3%	52.6%
C0423	68,586	36.1%	22.9%	51.6%
C0108	56,298	46.5%	1.2%	50.5%
C0254	50,006	52.3%	1.1%	54.8%
C0266	26,510	33.3%	0.2%	47.3%
Low volume	419,943	45.4%	7.5%	52.0%

Table 3. Proportion of Advanced Imaging Procedures with an Appropriate Concurrent Diagnosis, Maine, January 2003 – June 2005

		Abdominal/ pelvic test		Lumbar spine test	
		CT	MRI	CT	MRI
Overall		48.0%	30.1%	76.2%	82.1%
Age	<35	63.4%	37.3%	67.6%	79.0%
	35-44	57.6%	31.0%	73.8%	83.1%
	45-54	49.1%	31.8%	76.9%	81.3%
	55-64	40.9%	26.7%	78.6%	82.0%
	65-74	39.1%	28.3%	79.6%	84.2%
	75+	41.7%	27.3%	77.9%	84.0%
Gender	Female	53.5%	34.0%	75.7%	81.3%
	Male	41.2%	22.8%	76.7%	83.2%
Payer	Low Volume	47.5%	34.1%	76.1%	79.4%
	C0065A	48.0%	29.8%	78.2%	82.8%
	C0125A	49.1%	29.0%	73.8%	83.3%
	T0007	52.8%	32.7%	68.7%	81.4%
	C0423	40.7%	20.3%	69.5%	79.8%
	C0108	48.9%	28.6%	70.2%	82.4%
	C0254	49.3%	29.4%	70.5%	85.3%
	C0666	38.6%	27.3%	50.0%	73.4%
HSA	Augusta	65.8%	28.2%	79.6%	85.9%
	Bangor	50.6%	38.5%	81.2%	65.1%
	Bar Harbor	43.9%	25.9%	91.8%	85.9%
	Belfast	46.0%	42.0%	76.7%	86.1%
	Biddeford	44.3%	20.8%	68.8%	85.1%
	Blue Hill	46.3%	36.0%	76.2%	81.0%
	Boothbay Harbor	42.8%	26.3%	85.7%	87.9%
	Bridgeton	43.6%	31.4%	50.0%	87.2%
	Brunswick	46.3%	26.2%	78.8%	85.3%
	Calais	48.2%	38.5%	78.9%	73.6%
	Caribou	50.3%	35.5%	78.8%	79.0%
	Damariscotta	46.4%	27.1%	83.3%	90.5%
	Dover-Foxcroft	45.9%	40.7%	87.8%	79.9%
	Ellsworth	49.1%	28.2%	76.9%	79.3%
	Farmington	48.6%	30.0%	81.0%	91.0%
	Fort Kent	45.3%	30.5%	73.3%	82.8%
	Greenville	48.8%	17.6%	83.3%	67.1%
	Houlton	47.5%	39.1%	67.7%	78.3%
	Lewiston	53.1%	27.7%	68.8%	85.8%
	Lincoln	51.1%	40.9%	86.1%	71.7%
	Machias	42.0%	29.7%	68.6%	78.6%
	Millinocket	39.5%	35.7%	83.3%	83.0%
	Norway	47.7%	27.1%	56.8%	86.3%
	Pittsfield	48.5%	45.5%	82.6%	84.0%
	Portland	40.2%	18.1%	73.0%	84.7%
	Presque Isle	51.6%	55.4%	59.6%	74.2%
	Rockland	51.9%	33.3%	72.0%	84.3%
	Rumford	51.9%	34.8%	82.9%	80.8%
	Sanford	44.2%	38.5%	79.3%	83.5%
	Skowhegan	47.3%	34.6%	85.7%	87.3%
	Waterville	51.9%	38.5%	79.8%	85.1%

	York	49.2%	24.1%	84.1%	82.9%

Table 4a. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Any Advance Imaging: Overall State Rate 5.74 per 100 PY

HSA	Observed	Expected	Adjusted * Rate	Ratio to State Rate**	Z score***
Augusta	6,118	5,074.8	6.46	1.13	9.37
Bangor	10,503	9,093.1	6.19	1.08	8.00
Bar Harbor	989	885.0	5.99	1.04	1.30
Belfast	1,259	1,406.3	4.79	0.84	-6.32
Biddeford	5,616	5,522.2	5.45	0.95	-4.04
Blue Hill	891	887.1	5.38	0.94	-1.77
Boothbay Harbor	583	598.0	5.22	0.91	-2.10
Bridgton	1,562	1,402.4	5.97	1.04	1.56
Brunswick	5,302	5,442.6	5.22	0.91	-7.05
Calais	890	826.9	5.76	1.00	0.14
Caribou	1,212	932.9	6.96	1.21	6.63
Damariscotta	1,076	1,117.6	5.16	0.90	-3.33
Dover-Foxcroft	1,418	1,336.9	5.68	0.99	-0.35
Ellsworth	1,940	1,694.7	6.13	1.07	2.83
Farmington	2,124	2,204.9	5.16	0.90	-4.86
Fort Kent	1,093	888.8	6.59	1.15	4.21
Greenville	209	196.9	5.68	0.99	-0.12
Houlton	1,166	1,084.9	5.76	1.00	0.11
Lewiston	9,136	8,784.4	5.57	0.97	-2.97
Lincoln	956	959.9	5.33	0.93	-2.18
Machias	1,070	948.5	6.04	1.05	1.62
Millinocket	910	845.9	5.76	1.00	0.12
Norway	2,036	1,834.4	5.94	1.04	1.63
Pittsfield	996	912.2	5.85	1.02	0.63
Portland	21,881	21,657.9	5.41	0.94	-9.14
Presque Isle	2,146	1,512.5	7.60	1.32	12.76
Rockland	3,871	3,803.5	5.45	0.95	-3.12
Rumford	1,076	900.4	6.40	1.12	3.47
Sanford	2,525	2,733.7	4.95	0.86	-7.87
Skowhegan	2,343	1,912.1	6.56	1.14	6.62
Waterville	5,575	5,086.6	5.87	1.02	1.78
York	4,305	4,535.0	5.08	0.89	-8.26

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4b. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Any CT: Overall State Rate 4.08 per 100 PY

HSA	Observed	Expected	Adjusted * Rate	Ratio to State Rate**	Z score***
Augusta	4,395	3,602.8	4.63	1.14	8.51
Bangor	7,410	6,441.2	4.37	1.07	6.11
Bar Harbor	778	631.9	4.68	1.15	3.68
Belfast	823	999.2	3.13	0.77	-7.49
Biddeford	3,967	3,901.6	3.86	0.95	-3.53
Blue Hill	663	637.6	3.95	0.97	-0.74
Boothbay Harbor	395	430.1	3.49	0.86	-2.82
Bridgton	1,114	995.3	4.25	1.04	1.39
Brunswick	3,771	3,863.9	3.71	0.91	-5.92
Calais	643	594.0	4.11	1.01	0.20
Caribou	784	664.9	4.48	1.10	2.57
Damariscotta	715	801.1	3.39	0.83	-4.65
Dover-Foxcroft	1,076	956.7	4.27	1.05	1.46
Ellsworth	1,417	1,211.1	4.44	1.09	3.09
Farmington	1,549	1,570.7	3.75	0.92	-3.28
Fort Kent	701	641.9	4.15	1.02	0.42
Greenville	132	142.1	3.53	0.87	-1.47
Houlton	811	777.8	3.96	0.97	-0.77
Lewiston	6,588	6,209.3	4.03	0.99	-0.99
Lincoln	648	687.4	3.58	0.88	-3.18
Machias	764	680.2	4.27	1.05	1.18
Millinocket	638	619.2	3.91	0.96	-0.87
Norway	1,457	1,303.8	4.24	1.04	1.54
Pittsfield	730	645.2	4.30	1.05	1.47
Portland	15,374	15,291.1	3.82	0.94	-8.54
Presque Isle	1,483	1,081.0	5.21	1.28	9.13
Rockland	2,797	2,713.2	3.91	0.96	-2.07
Rumford	827	648.7	4.84	1.19	4.70
Sanford	1,757	1,931.9	3.45	0.85	-7.30
Skowhegan	1,729	1,356.9	4.84	1.19	7.18
Waterville	4,066	3,608.1	4.28	1.05	3.17
York	3,038	3,199.5	3.61	0.88	-7.01

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4c. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Any MRI: Overall State Rate 1.67 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	1,730	1,480.1	1.83	1.10	3.79
Bangor	3,115	2,666.5	1.83	1.10	5.15
Bar Harbor	214	254.5	1.32	0.79	-3.35
Belfast	439	409.4	1.68	1.01	0.12
Biddeford	1,659	1,629.6	1.59	0.95	-1.92
Blue Hill	233	250.9	1.45	0.87	-1.95
Boothbay Harbor	194	168.9	1.80	1.08	0.95
Bridgton	453	409.4	1.73	1.04	0.78
Brunswick	1,537	1,587.5	1.52	0.91	-3.79
Calais	251	234.2	1.68	1.01	0.08
Caribou	433	269.6	2.52	1.51	8.34
Damariscotta	364	318.3	1.79	1.07	1.26
Dover-Foxcroft	343	382.4	1.41	0.84	-3.06
Ellsworth	530	486.3	1.71	1.02	0.48
Farmington	578	637.8	1.42	0.85	-3.83
Fort Kent	393	248.3	2.48	1.48	7.27
Greenville	78	55.2	2.22	1.33	2.26
Houlton	356	308.8	1.81	1.08	1.39
Lewiston	2,566	2,589.3	1.55	0.93	-3.83
Lincoln	310	273.9	1.77	1.06	1.01
Machias	306	269.8	1.78	1.06	1.02
Millinocket	275	227.9	1.89	1.13	1.81
Norway	580	533.5	1.70	1.02	0.46
Pittsfield	266	268.5	1.55	0.93	-1.22
Portland	6,544	6,401.8	1.60	0.96	-3.52
Presque Isle	667	433.9	2.41	1.44	9.17
Rockland	1,081	1,096.5	1.54	0.92	-2.50
Rumford	253	253.0	1.57	0.94	-0.99
Sanford	771	806.2	1.50	0.90	-3.12
Skowhegan	619	558.4	1.74	1.04	0.96
Waterville	1,519	1,486.6	1.60	0.96	-1.68
York	1,276	1,342.8	1.49	0.89	-4.18

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4d. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Any Abdominal/Pelvic Imaging: Overall State Rate 4.15 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	4,423	3,652.0	4.66	1.12	7.83
Bangor	7,415	6,530.3	4.37	1.05	4.67
Bar Harbor	755	640.0	4.54	1.10	2.41
Belfast	875	1,012.7	3.33	0.80	-6.42
Biddeford	3,993	3,955.6	3.89	0.94	-4.24
Blue Hill	668	645.3	3.98	0.96	-0.93
Boothbay Harbor	416	435.4	3.68	0.89	-2.23
Bridgton	1,145	1,008.8	4.37	1.05	1.77
Brunswick	3,883	3,915.4	3.82	0.92	-5.21
Calais	612	601.5	3.92	0.94	-1.32
Caribou	860	673.6	4.91	1.19	4.87
Damariscotta	747	811.1	3.55	0.86	-4.03
Dover-Foxcroft	1,062	968.7	4.22	1.02	0.55
Ellsworth	1,437	1,226.8	4.51	1.09	3.03
Farmington	1,527	1,591.1	3.69	0.89	-4.43
Fort Kent	801	649.5	4.75	1.15	3.48
Greenville	143	143.8	3.83	0.92	-0.85
Houlton	849	787.8	4.15	1.00	0.02
Lewiston	6,598	6,293.5	4.04	0.97	-2.30
Lincoln	635	696.3	3.51	0.85	-4.03
Machias	716	689.0	4.00	0.96	-0.90
Millinocket	657	625.9	4.04	0.97	-0.56
Norway	1,484	1,321.2	4.32	1.04	1.63
Pittsfield	742	654.0	4.37	1.05	1.47
Portland	15,715	15,503.3	3.90	0.94	-8.00
Presque Isle	1,639	1,095.2	5.76	1.39	12.91
Rockland	2,858	2,748.3	4.00	0.97	-1.82
Rumford	834	656.4	4.89	1.18	4.54
Sanford	1,757	1,958.8	3.45	0.83	-8.06
Skowhegan	1,783	1,375.0	4.99	1.20	7.90
Waterville	4,136	3,656.3	4.35	1.05	3.23
York	3,115	3,244.9	3.70	0.89	-6.66

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4e. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Any Lumbar Imaging: Overall State Rate 1.62 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	1,718	1,447.5	1.82	1.12	4.80
Bangor	3,140	2,607.1	1.85	1.14	7.44
Bar Harbor	240	249.4	1.48	0.91	-1.38
Belfast	396	400.4	1.52	0.94	-1.27
Biddeford	1,646	1,593.6	1.58	0.98	-0.92
Blue Hill	231	246.1	1.44	0.89	-1.65
Boothbay Harbor	168	165.6	1.56	0.96	-0.48
Bridgton	426	400.4	1.63	1.01	0.15
Brunswick	1,439	1,553.8	1.42	0.88	-4.99
Calais	283	229.5	1.89	1.17	2.47
Caribou	371	263.9	2.15	1.33	5.36
Damariscotta	333	312.0	1.64	1.01	0.18
Dover-Foxcroft	360	374.7	1.47	0.91	-1.71
Ellsworth	515	476.2	1.66	1.02	0.51
Farmington	604	624.6	1.48	0.92	-2.12
Fort Kent	303	243.7	1.91	1.18	2.62
Greenville	76	54.1	2.15	1.33	2.26
Houlton	331	302.4	1.68	1.04	0.61
Lewiston	2,595	2,533.9	1.57	0.97	-1.62
Lincoln	324	268.3	1.85	1.14	2.33
Machias	357	264.1	2.07	1.28	4.41
Millinocket	259	224.3	1.77	1.09	1.27
Norway	553	522.1	1.62	1.00	0.06
Pittsfield	260	262.7	1.52	0.94	-1.07
Portland	6,231	6,260.4	1.53	0.94	-4.84
Presque Isle	534	424.7	1.93	1.19	3.89
Rockland	1,045	1,073.7	1.49	0.92	-2.56
Rumford	248	248.4	1.53	0.95	-0.85
Sanford	777	788.3	1.51	0.93	-1.99
Skowhegan	574	546.4	1.61	0.99	-0.13
Waterville	1,459	1,455.2	1.54	0.95	-2.01
York	1,209	1,312.1	1.41	0.87	-4.82

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance at with Bonferroni correction

Table 4f. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Abdominal/Pelvic CT: Overall State Rate 3.94 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	4,246	3,478.0	4.48	1.14	8.32
Bangor	7,136	6,218.9	4.21	1.07	5.67
Bar Harbor	731	609.9	4.39	1.12	2.84
Belfast	796	964.6	3.03	0.77	-7.34
Biddeford	3,866	3,767.0	3.76	0.95	-2.97
Blue Hill	646	615.3	3.85	0.98	-0.54
Boothbay Harbor	381	415.0	3.37	0.85	-2.80
Bridgton	1,094	960.9	4.17	1.06	1.90
Brunswick	3,698	3,730.3	3.63	0.92	-4.97
Calais	589	573.3	3.77	0.96	-1.02
Caribou	752	641.8	4.30	1.09	2.31
Damariscotta	699	773.2	3.31	0.84	-4.30
Dover-Foxcroft	1,036	923.3	4.11	1.04	1.32
Ellsworth	1,370	1,168.9	4.30	1.09	3.05
Farmington	1,468	1,516.1	3.55	0.90	-3.93
Fort Kent	674	619.3	3.99	1.01	0.30
Greenville	127	137.1	3.40	0.86	-1.49
Houlton	785	750.6	3.83	0.97	-0.72
Lewiston	6,356	5,995.4	3.89	0.99	-1.14
Lincoln	613	663.5	3.39	0.86	-3.59
Machias	679	656.5	3.79	0.96	-0.94
Millinocket	617	597.2	3.79	0.96	-0.83
Norway	1,414	1,258.6	4.12	1.05	1.67
Pittsfield	709	623.0	4.17	1.06	1.58
Portland	14,948	14,764.5	3.71	0.94	-7.68
Presque Isle	1,439	1,043.4	5.06	1.28	9.14
Rockland	2,702	2,618.9	3.78	0.96	-2.06
Rumford	788	625.9	4.62	1.17	4.22
Sanford	1,668	1,865.4	3.28	0.83	-7.89
Skowhegan	1,679	1,309.9	4.70	1.19	7.27
Waterville	3,991	3,483.2	4.20	1.07	4.13
York	2,904	3,089.4	3.45	0.87	-7.48

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4g. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Abdominal/Pelvic MRI: Overall State Rate 0.21 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	181	177.2	0.19	0.91	-1.27
Bangor	286	317.3	0.17	0.80	-3.75
Bar Harbor	27	30.6	0.16	0.78	-1.20
Belfast	81	49.0	0.31	1.47	3.37
Biddeford	130	192.2	0.13	0.60	-5.93
Blue Hill	25	30.6	0.15	0.73	-1.44
Boothbay Harbor	38	20.7	0.34	1.63	2.75
Bridgton	51	48.8	0.19	0.93	-0.51
Brunswick	187	188.6	0.18	0.88	-1.71
Calais	26	28.7	0.17	0.81	-1.02
Caribou	110	32.4	0.63	3.02	11.67
Damariscotta	48	38.6	0.23	1.11	0.65
Dover-Foxcroft	27	46.3	0.11	0.52	-3.26
Ellsworth	71	58.9	0.22	1.07	0.55
Farmington	60	76.4	0.15	0.70	-2.70
Fort Kent	128	30.7	0.78	3.71	14.29
Greenville	17	6.8	0.46	2.21	2.96
Houlton	64	37.9	0.31	1.50	3.03
Lewiston	249	303.8	0.15	0.73	-5.17
Lincoln	22	33.4	0.12	0.59	-2.40
Machias	37	33.1	0.21	0.99	-0.03
Millinocket	42	29.1	0.27	1.28	1.36
Norway	70	63.7	0.20	0.98	-0.19
Pittsfield	33	31.6	0.19	0.93	-0.43
Portland	778	752.9	0.19	0.92	-2.42
Presque Isle	202	52.7	0.71	3.41	17.59
Rockland	159	131.9	0.22	1.07	0.85
Rumford	46	31.1	0.28	1.32	1.76
Sanford	91	95.1	0.18	0.85	-1.58
Skowhegan	107	66.4	0.30	1.43	3.70
Waterville	148	176.3	0.16	0.75	-3.58
York	212	158.4	0.25	1.19	2.57

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4h. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Lumbar CT: Overall State Rate 0.14 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	157	133.0	0.17	1.14	1.62
Bangor	293	237.0	0.17	1.19	3.06
Bar Harbor	49	23.5	0.29	2.02	4.71
Belfast	30	36.8	0.11	0.79	-1.27
Biddeford	112	143.5	0.11	0.75	-3.05
Blue Hill	21	23.7	0.12	0.86	-0.64
Boothbay Harbor	14	16.0	0.12	0.85	-0.56
Bridgton	20	36.6	0.08	0.53	-2.84
Brunswick	80	142.5	0.08	0.54	-5.51
Calais	57	22.1	0.36	2.49	6.52
Caribou	33	24.6	0.19	1.29	1.42
Damariscotta	18	29.8	0.08	0.58	-2.12
Dover-Foxcroft	41	35.6	0.16	1.11	0.64
Ellsworth	52	44.9	0.16	1.12	0.76
Farmington	84	58.2	0.20	1.40	2.95
Fort Kent	30	24.1	0.17	1.20	0.89
Greenville	6	5.3	0.16	1.10	0.20
Houlton	31	29.0	0.15	1.03	0.17
Lewiston	247	228.3	0.15	1.05	0.72
Lincoln	36	25.5	0.20	1.36	1.75
Machias	86	25.3	0.48	3.29	10.73
Millinocket	24	23.6	0.14	0.98	-0.06
Norway	44	48.1	0.13	0.88	-0.81
Pittsfield	23	23.7	0.14	0.94	-0.31
Portland	444	561.8	0.11	0.76	-5.90
Presque Isle	47	40.1	0.16	1.13	0.81
Rockland	107	100.4	0.15	1.03	0.28
Rumford	41	24.4	0.24	1.62	2.88
Sanford	92	71.0	0.18	1.25	2.23
Skowhegan	56	50.1	0.16	1.08	0.56
Waterville	84	133.2	0.09	0.61	-4.60
York	138	117.1	0.16	1.14	1.55

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 4i. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Hospital Service Area, January 2003 – June 2005, Maine

Lumbar MRI: Overall State Rate 1.48 per 100 PY

HSA	Observed	Expected	Adjusted* Rate	Ratio to State Rate**	Z score***
Augusta	1,562	1,316.0	1.65	1.12	4.48
Bangor	2,852	2,372.6	1.68	1.14	6.85
Bar Harbor	191	226.2	1.18	0.80	-3.01
Belfast	366	364.0	1.40	0.95	-0.96
Biddeford	1,534	1,451.7	1.47	1.00	-0.07
Blue Hill	211	222.7	1.32	0.90	-1.48
Boothbay Harbor	157	149.8	1.46	0.99	-0.11
Bridgton	406	364.2	1.55	1.05	1.02
Brunswick	1,359	1,412.9	1.34	0.91	-3.54
Calais	227	207.7	1.52	1.03	0.46
Caribou	338	239.5	1.97	1.33	5.14
Damariscotta	316	282.6	1.56	1.06	0.92
Dover-Foxcroft	319	339.5	1.31	0.89	-2.03
Ellsworth	463	431.8	1.49	1.01	0.26
Farmington	520	567.1	1.28	0.87	-3.21
Fort Kent	273	219.9	1.73	1.17	2.44
Greenville	70	48.8	2.00	1.35	2.30
Houlton	300	273.7	1.53	1.04	0.57
Lewiston	2,354	2,308.0	1.42	0.96	-1.87
Lincoln	290	243.0	1.66	1.13	1.97
Machias	271	239.1	1.58	1.07	1.06
Millinocket	235	201.0	1.63	1.10	1.35
Norway	510	474.5	1.50	1.02	0.34
Pittsfield	237	239.3	1.38	0.94	-1.04
Portland	5,795	5,704.5	1.42	0.96	-3.24
Presque Isle	488	385.1	1.77	1.20	3.84
Rockland	940	974.4	1.34	0.91	-2.76
Rumford	208	224.2	1.29	0.88	-1.84
Sanford	686	718.1	1.33	0.90	-2.77
Skowhegan	518	496.9	1.45	0.98	-0.35
Waterville	1,378	1,323.4	1.45	0.98	-0.62
York	1,073	1,196.3	1.25	0.85	-5.51

*Adjusted for age and gender
**Red color indicates a rate substantially higher or lower than the state rate
***Red color indicates statistical significance with Bonferroni correction

Table 5a. Proportion of Beneficiaries with a Diagnosis of Abdominal/Pelvic Pain Undergoing Advanced Imaging Within 90 Days of First Diagnosis, Maine, January 2003 – June 2005

		CT	MRI	Either	Denom	% CT	% MRI	% Either
Overall		24,774	1090	25,352	122,792	20.2%	0.9%	20.6%
Age	<35	4,502	127	4,585	40,147	11.2%	0.3%	11.4%
	35-44	4,029	179	4,129	21,519	18.7%	0.8%	19.2%
	45-54	5,351	299	5,518	23,469	22.8%	1.3%	23.5%
	55-64	4,588	206	4,686	16,945	27.1%	1.2%	27.7%
	65-74	2,707	133	2,771	8,455	32.0%	1.6%	32.8%
	75+	3,597	146	3,663	12,257	29.3%	1.2%	29.9%
	Female	14,289	768	14,720	81,207	17.6%	0.9%	18.1%
	Male	10,485	322	10,632	41,585	25.2%	0.8%	25.6%
Payer	Low Volume	3,977	188	4,078	20,697	19.2%	0.9%	19.7%
	C0065A	14,633	654	14,973	67,820	21.6%	1.0%	22.1%
	C0125A	2,281	101	2,336	12,503	18.2%	0.8%	18.7%
	T0007	1,420	52	1,447	8,641	16.4%	0.6%	16.7%
	C0423	990	42	1,018	4,704	21.0%	0.9%	21.6%
	C0108	712	23	724	4,055	17.6%	0.6%	17.9%
	C0254	611	27	623	3,550	17.2%	0.8%	17.5%
	C0666	150	3	153	822	18.2%	0.4%	18.6%

Table 5a. (Continued) Proportion of Beneficiaries with a Diagnosis of Abdominal/Pelvic Pain Undergoing Advanced Imaging Within 90 Days of First Diagnosis, Maine, January 2003 – June 2005

		CT	MRI	Either	Denom	% CT	% MRI	% Either
HSA	Augusta	1,721	55	1,741	7,438	23.1%	0.7%	23.4%
	Bangor	2,520	93	2,583	12,662	19.9%	0.7%	20.4%
	Bar Harbor	247	7	250	956	25.8%	0.7%	26.2%
	Belfast	285	22	298	1,766	16.1%	1.2%	16.9%
	Biddeford	1,377	40	1,395	7,152	19.3%	0.6%	19.5%
	Blue Hill	199	6	201	945	21.1%	0.6%	21.3%
	Boothbay Harbor	134	8	138	658	20.4%	1.2%	21.0%
	Bridgeton	393	12	398	1,653	23.8%	0.7%	24.1%
	Brunswick	1,307	48	1,338	6,835	19.1%	0.7%	19.6%
	Calais	194	9	196	1,046	18.5%	0.9%	18.7%
	Caribou	254	26	264	1,218	20.9%	2.1%	21.7%
	Damariscotta	267	11	273	1,333	20.0%	0.8%	20.5%
	Dover-Foxcroft	340	11	344	1,485	22.9%	0.7%	23.2%
	Ellsworth	462	18	473	2,099	22.0%	0.9%	22.5%
	Farmington	506	10	512	2,687	18.8%	0.4%	19.1%
	Fort Kent	224	32	240	1,086	20.6%	2.9%	22.1%
	Greenville	48	2	49	202	23.8%	1.0%	24.3%
	Houlton	244	16	254	1,203	20.3%	1.3%	21.1%
	Lewiston	2,446	74	2,480	11,401	21.5%	0.6%	21.8%
	Lincoln	218	6	221	1,143	19.1%	0.5%	19.3%
	Machias	192	9	198	1,141	16.8%	0.8%	17.4%
	Millinocket	175	14	181	849	20.6%	1.6%	21.3%
	Norway	537	23	547	2,367	22.7%	1.0%	23.1%
	Pittsfield	227	11	234	1,309	17.3%	0.8%	17.9%
	Portland	4,844	207	4,959	26,084	18.6%	0.8%	19.0%
	Presque Isle	493	76	540	2,057	24.0%	3.7%	26.3%
	Rockland	1,014	53	1,043	4,258	23.8%	1.2%	24.5%
	Rumford	286	9	288	1,163	24.6%	0.8%	24.8%
	Sanford	565	29	576	3,587	15.8%	0.8%	16.1%
	Skowhegan	560	38	583	2,528	22.2%	1.5%	23.1%
	Waterville	1,440	48	1,468	6,822	21.1%	0.7%	21.5%
	York	1,055	67	1,087	5,659	18.6%	1.2%	19.2%

Table 5b. Proportion of Beneficiaries with a Lumbar Diagnosis Undergoing Advanced Imaging Within 90 Days of First Diagnosis, Maine, January 2003 – June 2005

		CT	MRI	Either	Denom	% CT	% MRI	% Either
Overall		1,104	13,116	13,930	123,036	0.9%	10.7%	11.3%
Age	<35	156	1,703	1,815	26,686	0.6%	6.4%	6.8%
	35-44	137	2,507	2,609	24,317	0.6%	10.3%	10.7%
	45-54	202	3,228	3,376	29,205	0.7%	11.1%	11.6%
	55-64	214	2,681	2,830	20,709	1.0%	12.9%	13.7%
	65-74	162	1,452	1,575	9,892	1.6%	14.7%	15.9%
	75+	233	1,545	1,725	12,227	1.9%	12.6%	14.1%
	Female	578	7,262	7,671	72,440	0.8%	10.0%	10.6%
	Male	526	5,854	6,259	50,596	1.0%	11.6%	12.4%
Payer	Low Volume	180	2,093	2,231	19,143	0.9%	10.9%	11.7%
	C0065A	705	7,621	8,135	70,270	1.0%	10.8%	11.6%
	C0125A	67	1,200	1,253	12,061	0.6%	9.9%	10.4%
	T0007	51	800	841	8,521	0.6%	9.4%	9.9%
	C0423	48	524	556	4,646	1.0%	11.3%	12.0%
	C0108	28	430	451	4,041	0.7%	10.6%	11.2%
	C0254	18	379	389	3,589	0.5%	10.6%	10.8%
	C0666	7	69	74	765	0.9%	9.0%	9.7%

Table 5b. (Continued) Proportion of Beneficiaries with a Lumbar Diagnosis Undergoing Advanced Imaging Within 90 Days of First Diagnosis, Maine, January 2003 – June 2005

		CT	MRI	Either	Denom	% CT	% MRI	% Either
HSA	Augusta	63	776	821	6,939	0.9%	11.2%	11.8%
	Bangor	136	1,382	1,486	11,298	1.2%	12.2%	13.2%
	Bar Harbor	30	98	124	882	3.4%	11.1%	14.1%
	Belfast	14	204	213	1,785	0.8%	11.4%	11.9%
	Biddeford	49	798	838	7,260	0.7%	11.0%	11.5%
	Blue Hill	8	107	112	872	0.9%	12.3%	12.8%
	Boothbay Harbor	5	77	80	662	0.8%	11.6%	12.1%
	Bridgeton	6	220	225	1,651	0.4%	13.3%	13.6%
	Brunswick	26	687	709	7,007	0.4%	9.8%	10.1%
	Calais	20	98	117	1,062	1.9%	9.2%	11.0%
	Caribou	12	165	172	1,112	1.1%	14.8%	15.5%
	Damariscotta	6	157	160	1,357	0.4%	11.6%	11.8%
	Dover-Foxcroft	15	145	156	1,390	1.1%	10.4%	11.2%
	Ellsworth	24	222	241	1,901	1.3%	11.7%	12.7%
	Farmington	34	269	296	2,644	1.3%	10.2%	11.2%
	Fort Kent	14	153	160	1,169	1.2%	13.1%	13.7%
	Greenville	5	37	40	189	2.6%	19.6%	21.2%
	Houlton	12	131	141	1,403	0.9%	9.3%	10.0%
	Lewiston	87	1,143	1,192	11,543	0.8%	9.9%	10.3%
	Lincoln	22	138	149	977	2.3%	14.1%	15.3%
	Machias	34	107	134	1,145	3.0%	9.3%	11.7%
	Millinocket	14	117	127	703	2.0%	16.6%	18.1%
	Norway	18	266	279	2,342	0.8%	11.4%	11.9%
	Pittsfield	11	122	130	1,263	0.9%	9.7%	10.3%
	Portland	186	2,923	3,070	28,040	0.7%	10.4%	10.9%
	Presque Isle	20	244	256	1,638	1.2%	14.9%	15.6%
	Rockland	48	440	478	5,125	0.9%	8.6%	9.3%
	Rumford	19	102	116	1,095	1.7%	9.3%	10.6%
	Sanford	43	326	357	3,669	1.2%	8.9%	9.7%
	Skowhegan	25	251	268	2,416	1.0%	10.4%	11.1%
	Waterville	43	715	747	6,886	0.6%	10.4%	10.8%
	York	55	496	536	5,611	1.0%	8.8%	9.6%

Figure 1a. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Year and Modality, January 2003 – June 2005, Maine

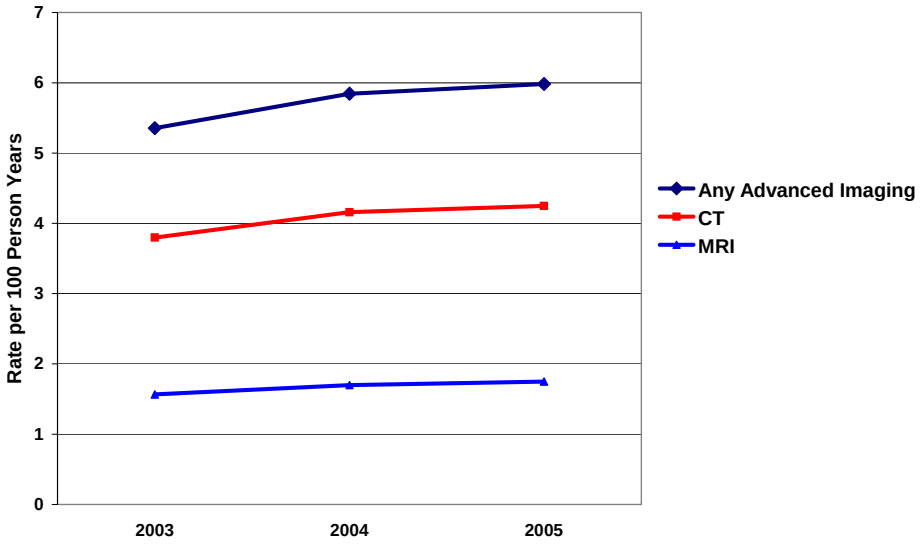
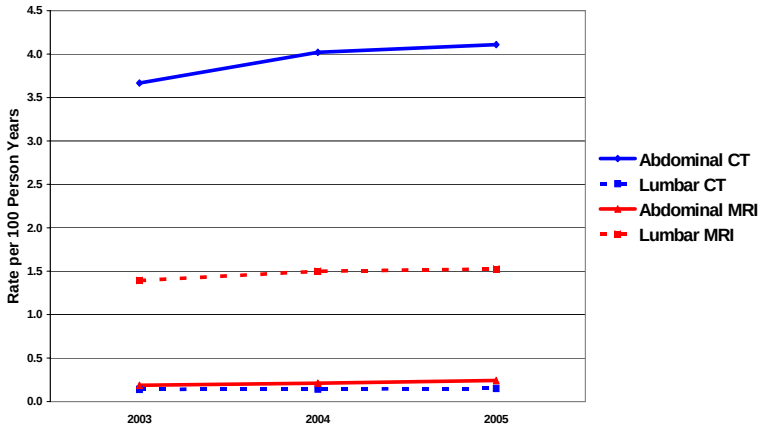


Figure 1b. Adjusted* Rates Per 100 Person Years of Advanced Imaging By Year, Modality and Body Site, January 2003 – June 2005, Maine



*Adjusted for age and gender

Figure 2a. Ratio of Overall Advanced Imaging Rate (CT and MRI Combined) to State Rate
Maine, January 2003- June 2005

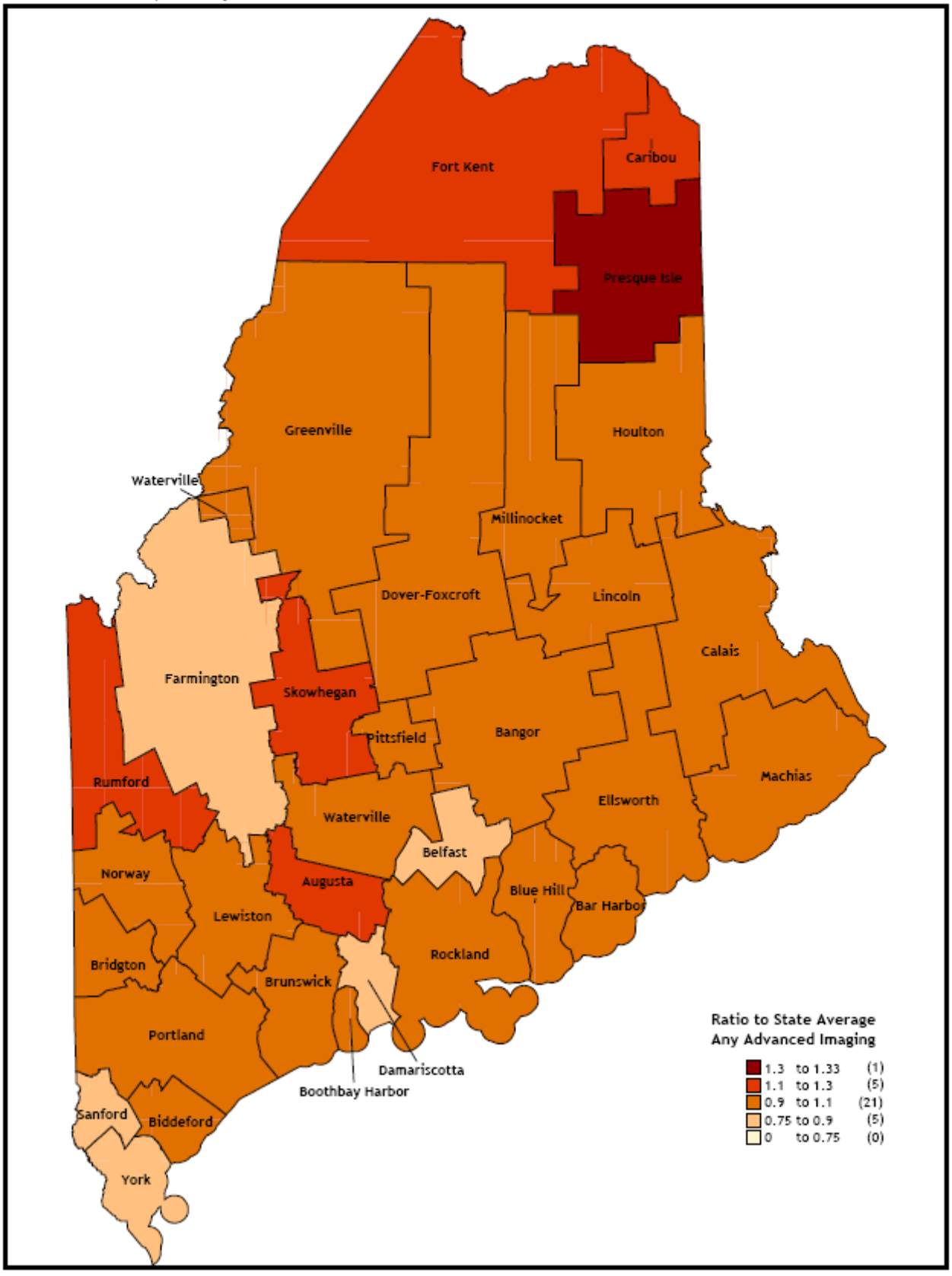


Figure 2b. Ratio of CT Rate to State Rate
Maine, January 2003 - June 2005

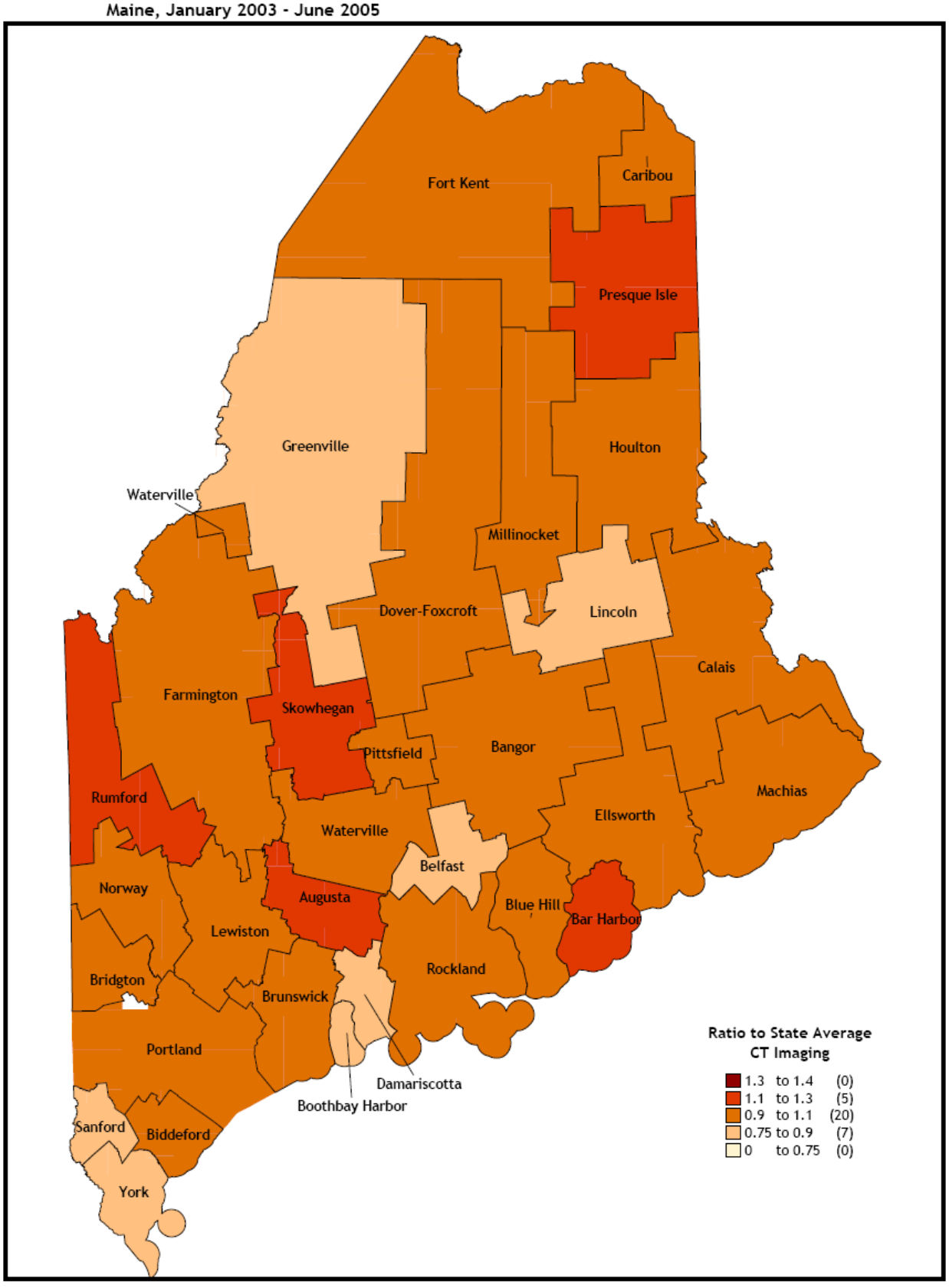


Figure 2c. Ratio of MRI Rate to State Rate
Maine, January 2003 - June 2005

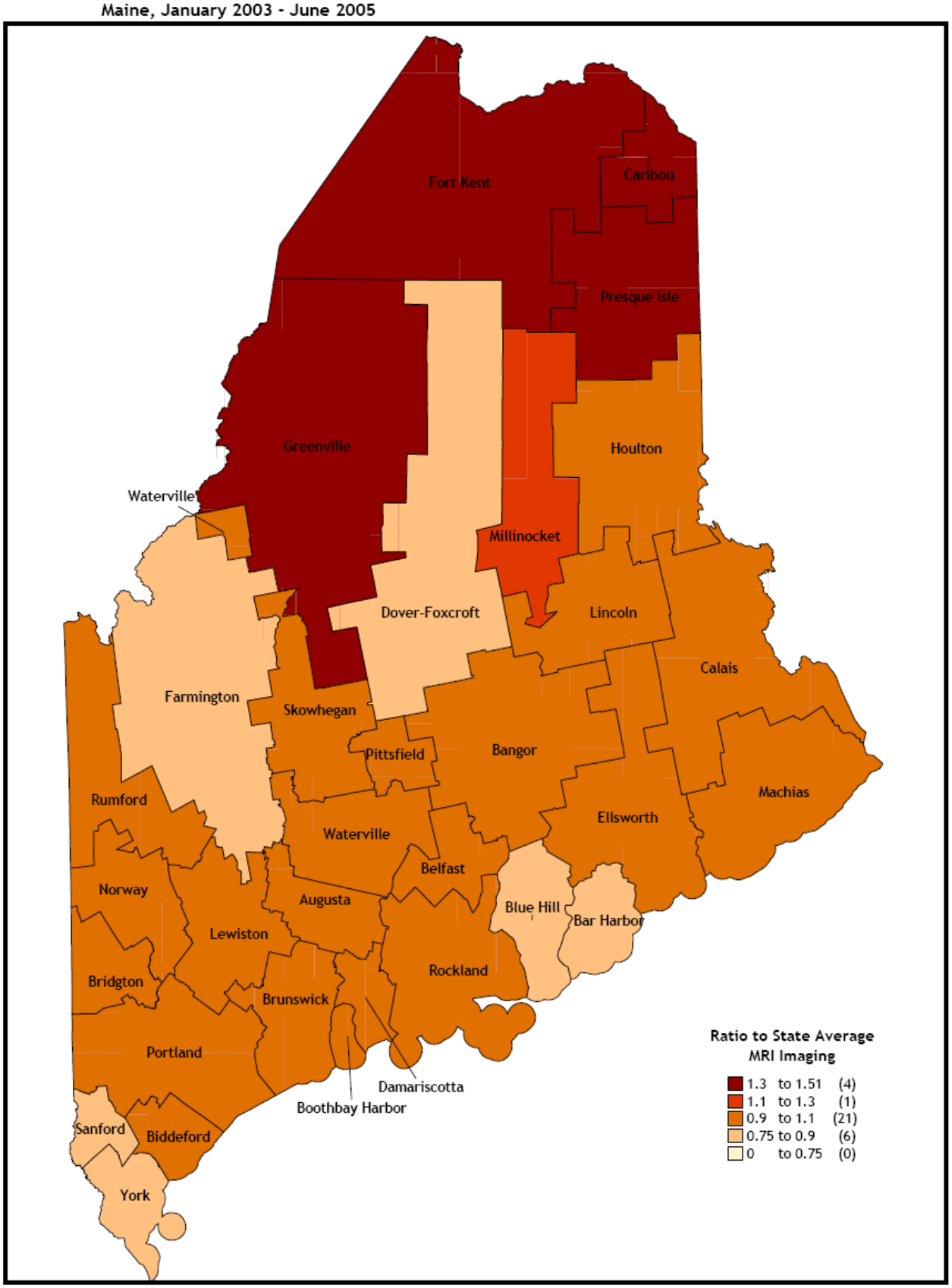


Figure 2d. Ratio of Abdominal / Pelvic Imaging (CT and MRI Combined) Rate to State Rate
Maine, January 2003 - June 2005

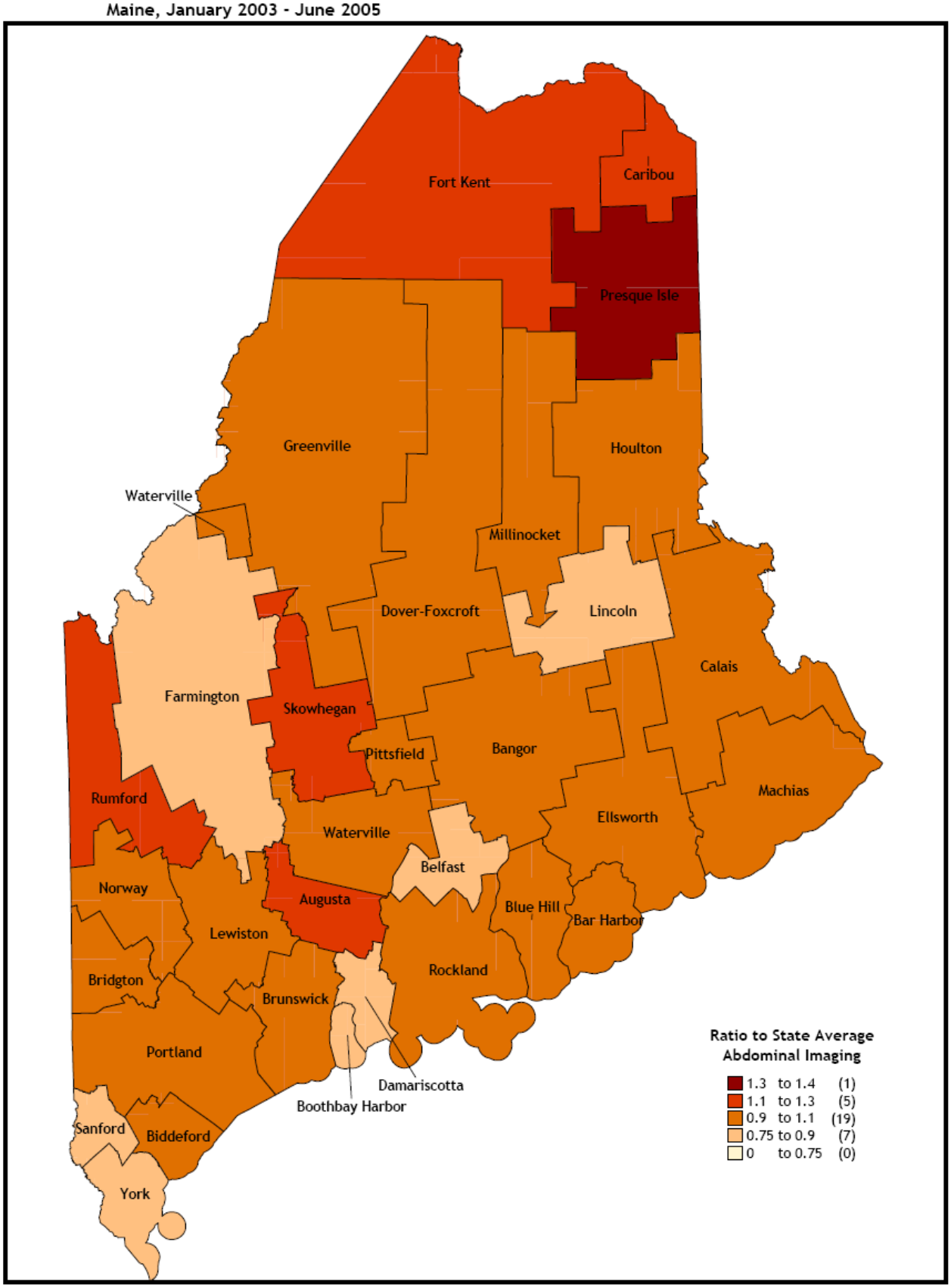


Figure 2e. Ratio of Lumbar Imaging (CT and MRI Combined) Rate to State Rate
Maine, January 2003 - June 2005

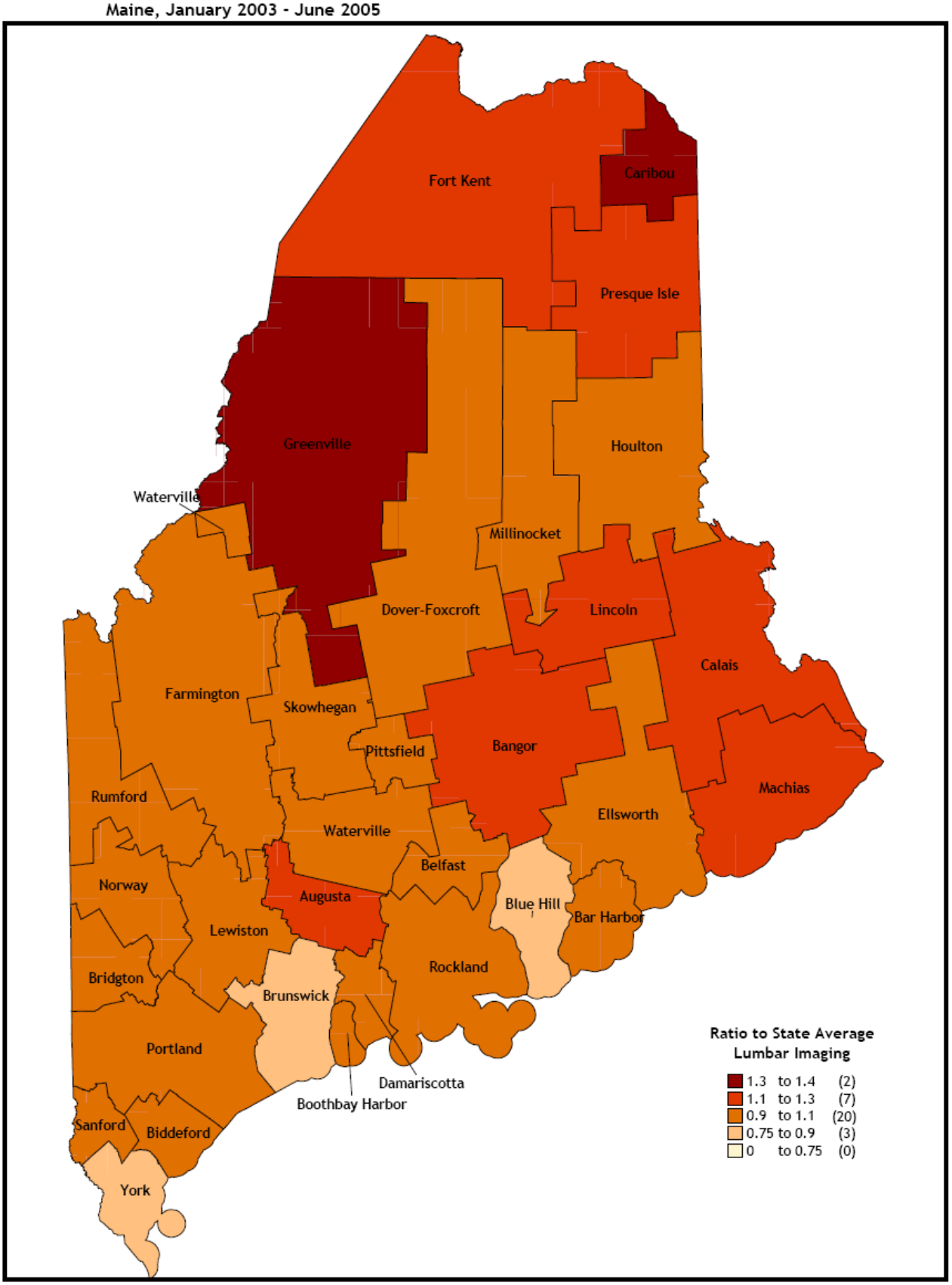


Figure 2f. Ratio of Abdominal / Pelvic CT Rate to State Rate
Maine, January 2003 - June 2005

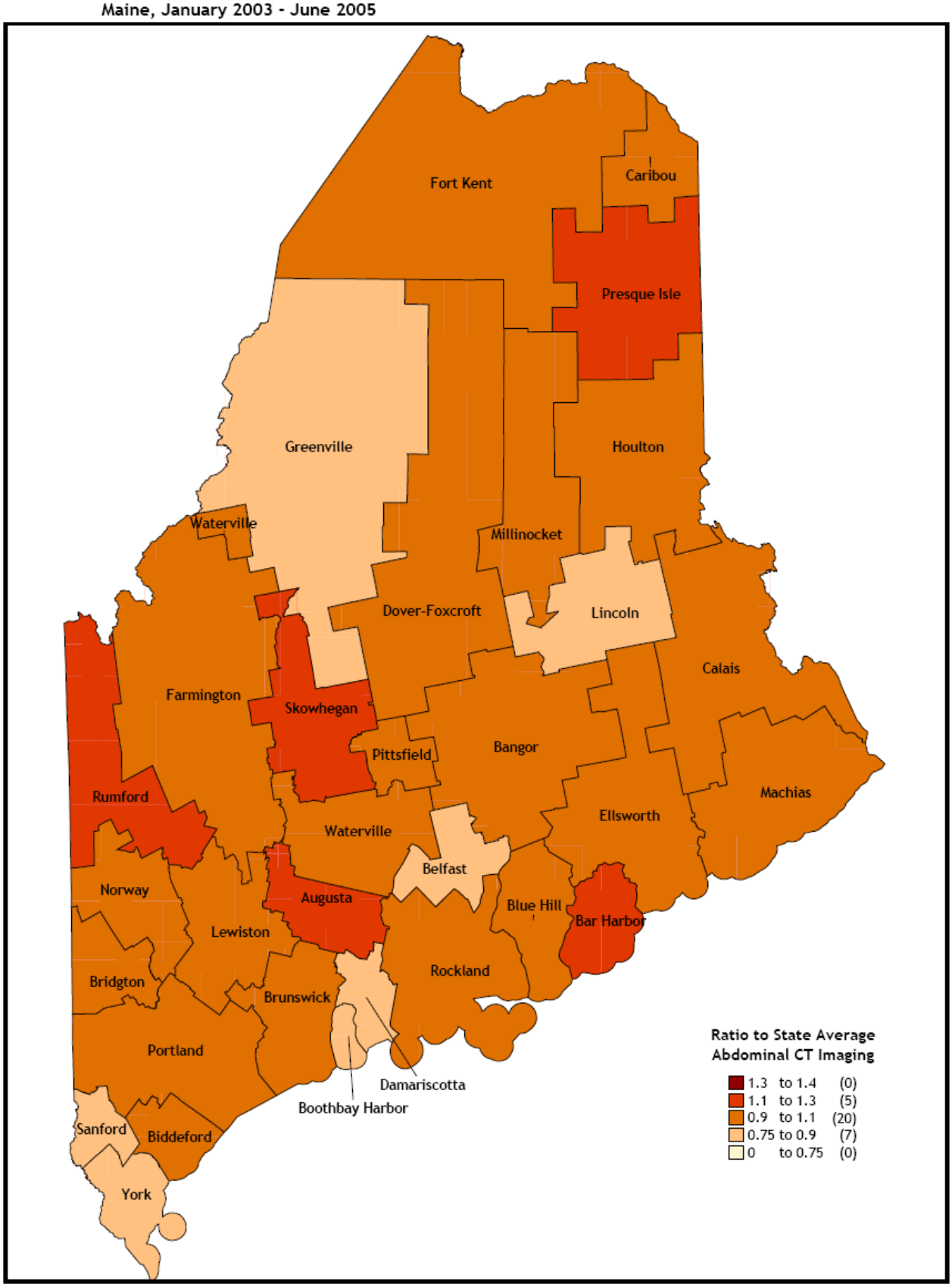


Figure 2g. Ratio of Abdominal /Pelvic MRI Rate to State Rate
Maine, January 2003 - June 2005

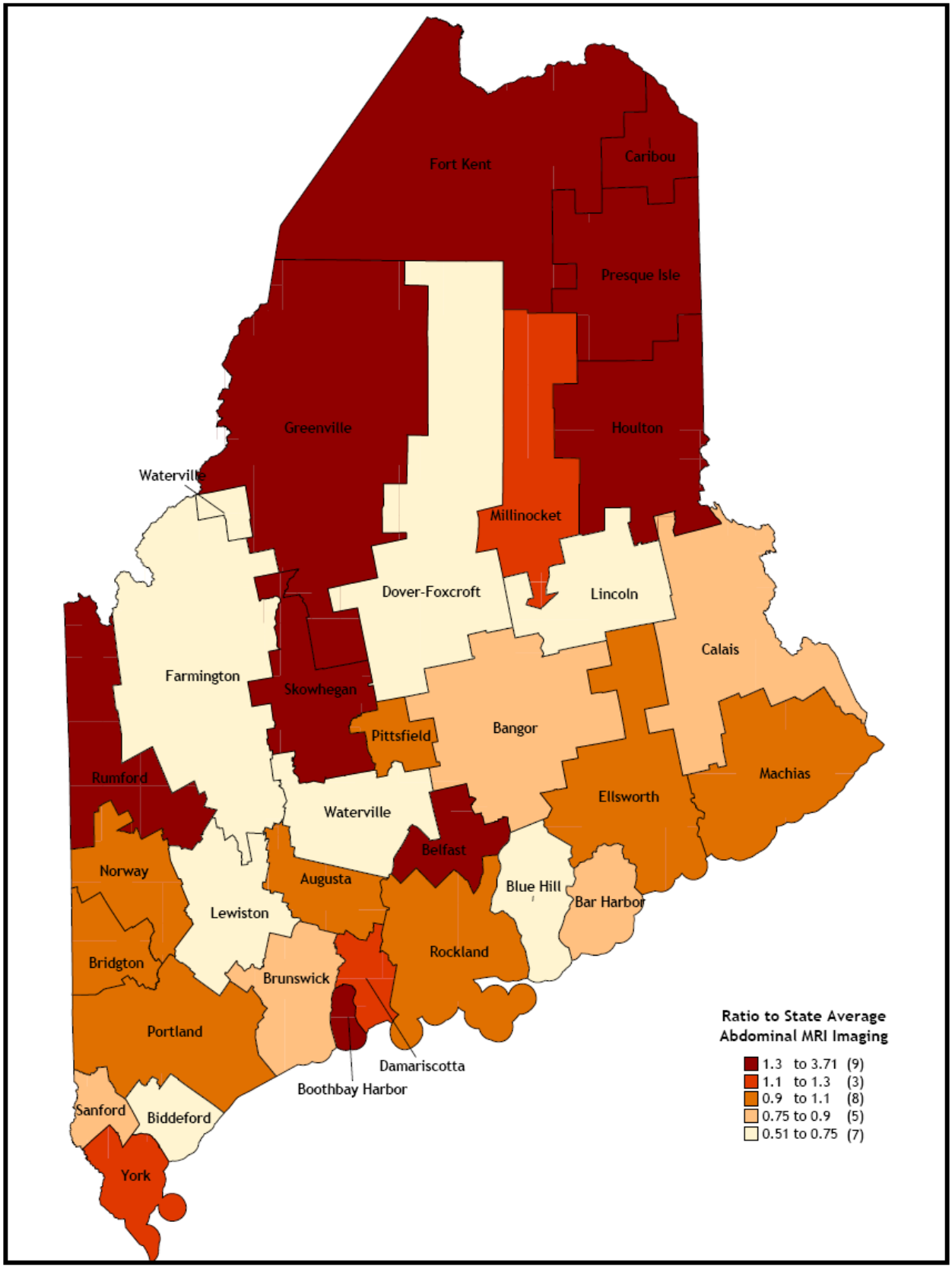


Figure 2h. Ratio of Lumbar CT Rate to State Rate
Maine, January 2003 - June 2005

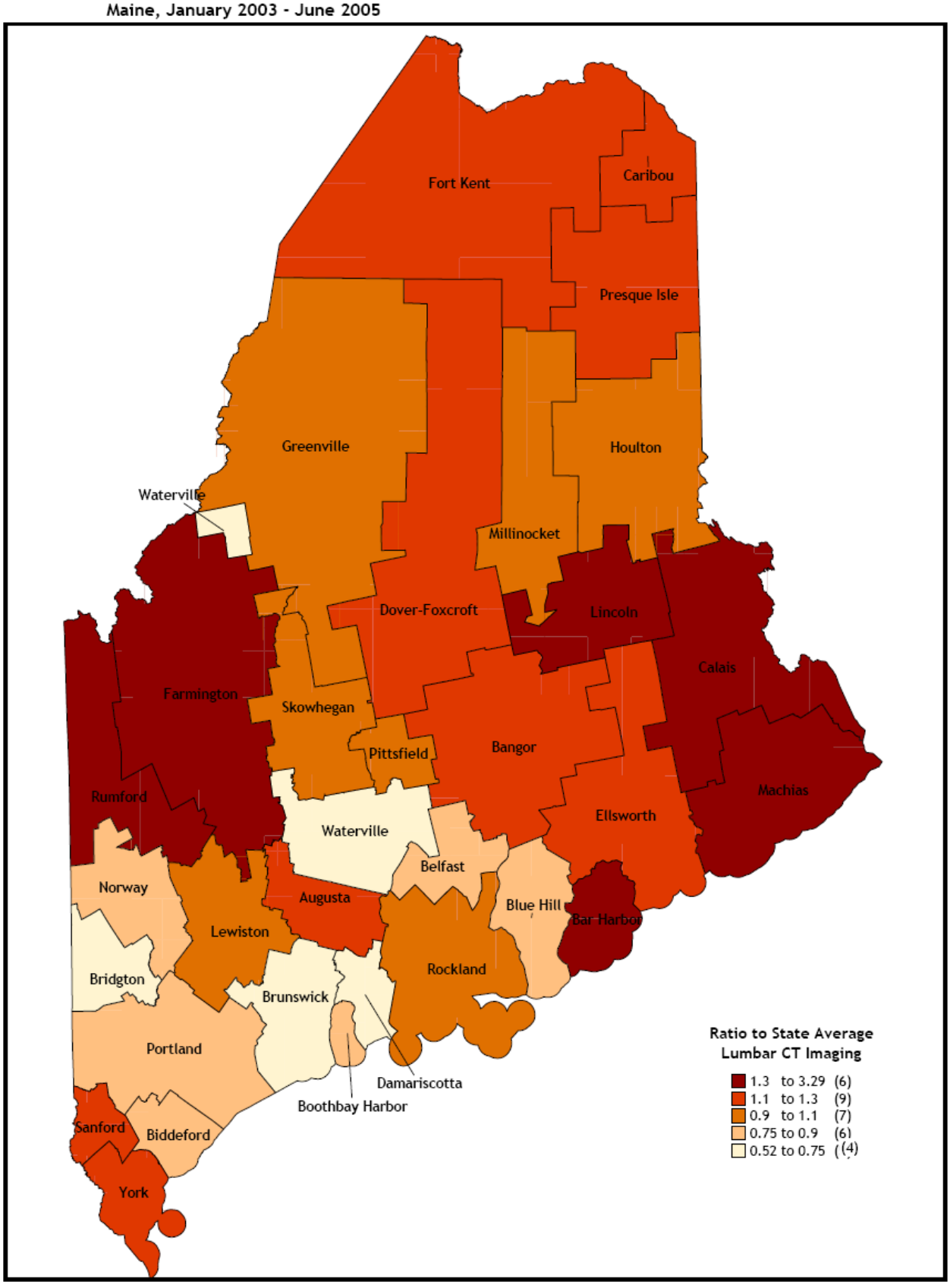
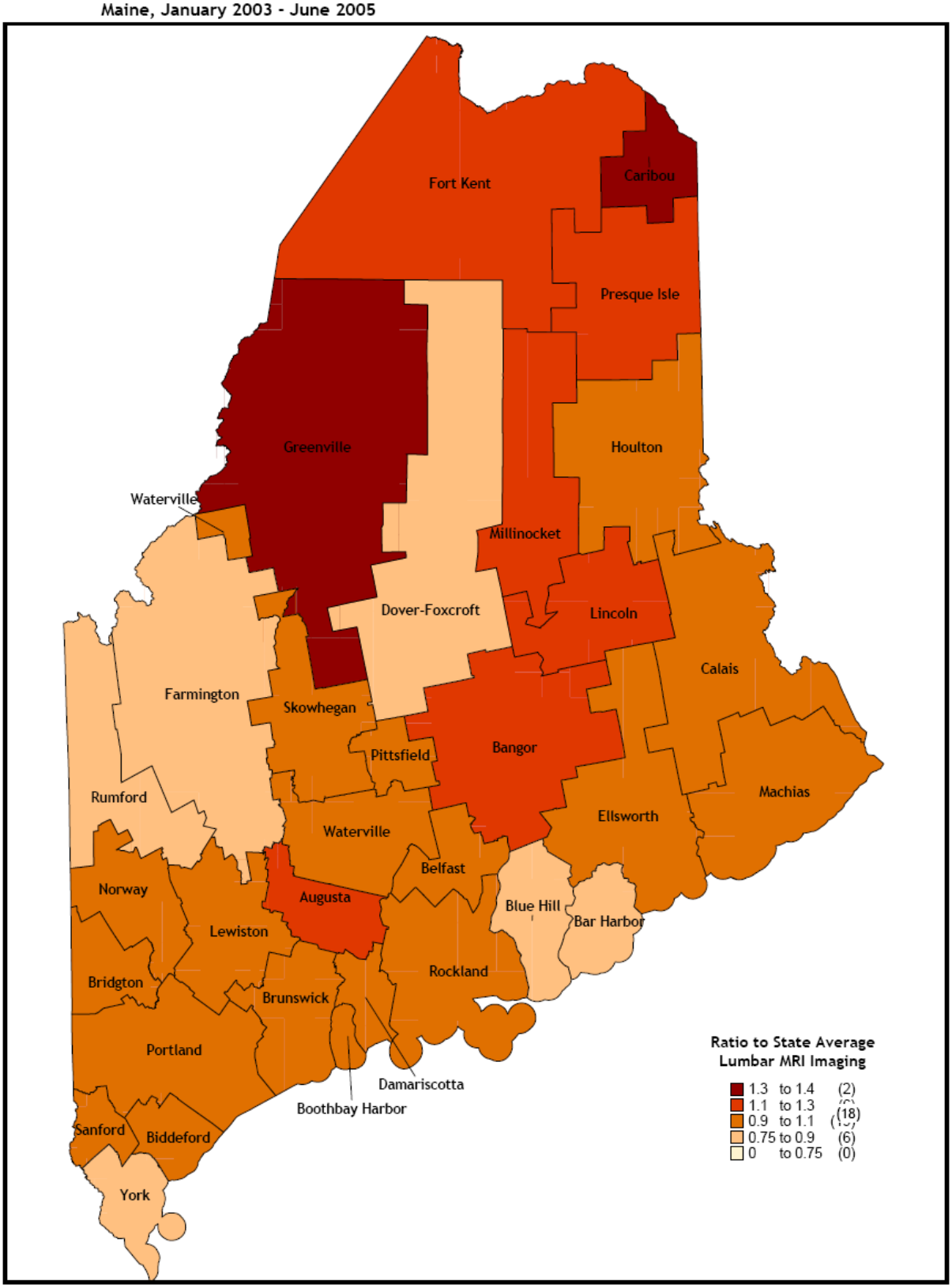


Figure 2i. Ratio of Lumbar MRI Rate to State Rate
Maine, January 2003 - June 2005



Appendix 6: Provider Profiling Pilot Project Measure Descriptions

Supply Sensitive Measures

Measure	Description	Primary Care Physicians	Cardiologists
Total Cost	The total medical costs (plan and patient contribution) including inpatient, outpatient professional fees and facility costs. Pharmacy costs are not included.	X	X
Total Supply Sensitive Costs	The total of all Supply Sensitive professional and outpatient facility costs.	X	X
Outpatient Provider Contact Costs	The cost per patient of all Outpatient physician contact costs.	X	X
Total Imaging Costs	The cost per patient for the professional component of imaging service costs.	X	X
Total Cardiac Costs	The cost per patient for the professional component of cardiac testing service costs.	X	X

Appendix 6 Provider Profiling Pilot Project
Measure Descriptions (cont.)

Utilization Measures

Measure	Description	Primary Care Physicians	Cardiologists
PCP Visits	The number of patient visits on distinct service days to a Primary Care provider	X	X
Specialist Visits	The number of patient visits on distinct service days to a non Primary Care Specialty provider	X	X

GAPS in Effective Care Measures

Measure	Description	Primary Care Physicians	Cardiologists
GAP in CAD Care	Lipid Testing, Lipid Rx, Beta-Blocker Rx		X
GAP in CHF Care	Lipid Testing, Beta-Blocker Rx, LVEF Test		X
Total Effective Care GAP Score	Cardiac, Asthma, and Diabetic Care		X

Appendix 6 Provider Profiling Pilot Project (cont.)
Measure Descriptions

HEDIS measures

Measure	Description	Primary Care Physicians	Cardiologists
Breast Cancer Screening	The percentage of women 50-69 years of age who had a mammogram during the measurement year or year prior to the measurement year.	X	
Cervical Cancer Screening	The percentage of women 18-64 years of age who received one or more Pap tests during the measurement year or the two years prior to the measurement year.	X	
Colorectal Cancer Screening	The percentage of adults 50-80 years of age who had appropriate screening for colorectal cancer. The screening tests include a fecal occult blood test, flexible sigmoidoscopy, double contrast barium enema, and/or colonoscopies.	X	
Diabetes: Retinal Eye Exam Performed	The percentage of members 18-75 years of age with Type I or Type II diabetes who had retinal eye exam performed in the measurement year.	X	
Diabetes: Hemoglobin A1c Tested	The percentage of members 18-75 years of age with Type I or Type II diabetes who had a Hemoglobin A1c test during the measurement year.	X	
Diabetes: Nephropathy Monitored	The percentage of members 18-75 years of age with Type I or Type II diabetes who had monitoring for kidney disease during the measurement year.	X	
Diabetes Care: LDL-C Screening	The percentage of members 18-75 years of age with Type I or Type II diabetes who had a test for LDL Cholesterol during the measurement year.	X	
Imaging Studies For Low Back Pain	This measure assesses where imaging studies (plan, X-Ray, MRI, and CT scan) are overused in evaluating patients with acute low back pain. This measure is reported as an inverted rate {1 minus (numerator/denominator)}. A higher score indicates appropriate treatment of low back pain (i.e. proportion for whom imaging studies did not occur).	X	

Appendix 7: Provider Profiling Pilot Project Summary of Provider Evaluations

PCP Evaluations (regional)

Statistic	No. of Physicians	Total (PPPY)	Total SS (PPPY)	Outpatient Contact (PPPY)	Imaging (PPPY)	Cardiac Testing (PPPY)	PCP Visits (PPPY)	Specialist Visits (PPPY)
Minimum	600	218	80	28.2	3.8	1.4	0.8	0.2
25th Percentile	600	652	302	144.0	5.7	2.1	2.2	0.7
Mean	600	787	380	180.4	7.0	2.7	2.6	0.8
Median	600	778	368	178.4	6.5	2.5	2.5	0.8
75th Percentile	600	898	444	210.8	7.8	2.9	2.8	0.9
Maximum	600	1,958	980	447.3	52.2	18.6	7.3	1.9

Cardiology Evaluations (statewide)

Statistic	No. of Cardiologists	Total (PPPY)	Total SS (PPPY)	Outpatient Contact (PPPY)	Imaging (PPPY)	Cardiac Testing (PPPY)	PCP Visits (PPPY)	Specialist Visits (PPPY)
Minimum	86	1,871	622	181.4	2.0	20.4	0.4	0.6
25th Percentile	86	3,302	1,154	342.2	2.5	30.8	0.6	4.1
Mean	86	4,083	1,274	379.3	2.8	42.2	0.7	4.6
Median	86	3,938	1,318	389.3	2.7	41.7	0.7	4.6
75th Percentile	86	4,713	1,435	421.9	3.0	52.1	0.8	5.1
Maximum	86	7,725	1,826	550.3	4.3	110.7	1.3	7.7

Appendix 7 Provider Profiling Pilot Project
Summary of Provider Evaluations (cont.)

PCP HEDIS evaluations (regional)

Measure	No. of Physicians	Median Adjusted Evaluation	Minimum Adjusted Evaluation	25th Percentile Adjusted Evaluation	75th Percentile Adjusted Evaluation	Maximum Adjusted Evaluation	No .Stat. Significant Lower
Breast Cancer Screening	414	0.84	0.64	0.81	0.89	0.95	76
Cervical Cancer Screening	510	0.81	0.61	0.77	0.84	0.92	76
Colorectal Cancer Screening	478	0.48	0.17	0.40	0.55	0.84	71
Diabetes Eye Exam	314	0.41	0.30	0.38	0.44	0.54	9
Diabetes Hemoglobin A1c	314	0.77	0.37	0.71	0.85	0.93	62
Diabetes Nephropathy Monitored	314	0.44	0.12	0.31	0.57	0.81	61
Diabetes LDL-C Screening	314	0.81	0.29	0.76	0.88	0.95	61
Use Of Imaging For Low Back Pain	182	0.81	0.88	0.84	0.79	0.62	1

Cardiology HDAS Effective Care (GAP) evaluations (statewide)

Measure	No. of Cardiologists	Median Risk Adjusted Evaluations	Minimum Risk Adjusted Evaluations	25th Percentile Risk Adjusted Evaluations	75th Percentile Risk Adjusted Evaluations	Maximum Risk Adjusted Evaluations	No. Stat. Significant Upper 10%
CHF GAP In Care	10	2.84	2.43	2.46	3.17	3.40	1
CAD GAP In Care	76	2.84	1.75	2.49	3.28	4.27	11
Total Effective Care GAP	82	3.05	2.23	2.61	3.39	5.22	11

Appendix 8: Example Patient Chronology

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
8/6/2003	Cardiologist 5	Cardiology	99244	OFFICE CONSLTJ 60 MIN	4139	ANGINA PECTORIS OT/UNSPEC	$192
	Clinical Laboratory 1	Clinical Laboratory	80048	BASIC METAB PANEL	78650	UNSPECIFIED CHEST PAIN	$12
		Clinical Laboratory	85027	BLD# COMPL AUTO HHRWP	78650	UNSPECIFIED CHEST PAIN	$9
	Cardiologist 5	Cardiology	99000	HANDLG&/OR CONVEY OF SPEC FOR	4139	ANGINA PECTORIS OT/UNSPEC	$7
8/13/2003	Hospital 2		3722	LEFT HEART CARDIAC CATH	4139	ANGINA PECTORIS OT/UNSPEC	$0
					41401	ATHEROSCLER NATIVE COR ART	$3,856
					4439	PERIPH VASCULAR DIS UNSPEC	$0
			760	Unknown			$519
			93510	L HRT CATHJ RTRGR F/BRACH ART			$1,813
			93543	INJECTION, CARDIAC CATHETERIZA			$226
			93545	INJECTION, CARDIAC CATHETERIZA			$344
			93555	I SI&R F/NJX PX DURING C-CATHJ			$381
			93556	I SI&R F/NJX PX DURING C-CATHJ			$574
	Cardiologist 2	Cardiology	93510	L HRT CATHJ RTRGR F/BRACH ART	4139	ANGINA PECTORIS OT/UNSPEC	$289
		Cardiology	93543	INJECTION, CARDIAC CATHETERIZA	4139	ANGINA PECTORIS OT/UNSPEC	$19
		Cardiology	93545	INJECTION, CARDIAC CATHETERIZA	4139	ANGINA PECTORIS OT/UNSPEC	$26
		Cardiology	93555	I SI&R F/NJX PX DURING C-CATHJ	4139	ANGINA PECTORIS OT/UNSPEC	$54
		Cardiology	93556	I SI&R F/NJX PX DURING C-CATHJ	4139	ANGINA PECTORIS OT/UNSPEC	$55
8/20/2003	Pharmacy		59104060	LISINOPRIL			$7
8/22/2003	Pharmacy		17306970	ADVAIR DISKUS			$151
8/26/2003	Pharmacy		45620200	LEXAPRO			$32
	Pharmacy		9306380	TRAZODONE HCL			$0
8/27/2003	Pharmacy		78115061	ATENOLOL			$0
	Pharmacy		7466241	SYNTHROID			$0
9/4/2003	Pharmacy		59700300	MOBIC			$56
	Pharmacy		6365311710	PLAVIX			$78
9/8/2003	Internal Medicine MD 2	Internal Medicine	99213	OFFICE OUTPT EST15 MIN	4011	BENIGN HYPERTENSION	$0
		Internal Medicine			4439	PERIPH VASCULAR DIS UNSPEC	$0
9/11/2003	Pharmacy		9300580	TRAMADOL HCL			$4

Service Date	Provider Name	Specialty	Service Code and Description	Diagnosis Code and Description	Pd Amt

9/19/2003	Pharmacy		59104060	LISINOPRIL			$7
9/25/2003	Pharmacy		7466241	SYNTHROID			$0
	Pharmacy		45620200	LEXAPRO			$32
	Pharmacy		9306380	TRAZODONE HCL			$0
	Pharmacy		78115061	ATENOLOL			$0
9/29/2003	Internal Medicine MD 1	Internal Medicine	99000	HANDLG&/OR CONVEY OF SPEC FOR	2449	HYPOTHYROIDISM UNSPEC	$0
		Internal Medicine			4019	HYPERTENSION UNSPEC	$0
		Internal Medicine			4439	PERIPH VASCULAR DIS UNSPEC	$0
		Internal Medicine	99213	OFFICE OUTPT EST15 MIN	2449	HYPOTHYROIDISM UNSPEC	$0
		Internal Medicine			4019	HYPERTENSION UNSPEC	$0
		Internal Medicine			4439	PERIPH VASCULAR DIS UNSPEC	$0
	Clinical Laboratory 2	Clinical Laboratory	84443	THYR STIMULATING HORM	2449	HYPOTHYROIDISM UNSPEC	$24
9/30/2003	Pharmacy		5260451250	LEVOXYL			$0
10/1/2003	Thoracic Surgeon 1	Thoracic Surgery	93923	N-INVAS PHYSIOLOGIC STD UPR/LX	44032	ATHRSCL NONAUTO GFT EXTR	$166
		Thoracic Surgery	99214	OFFICE OUTPT EST 25 MIN	44032	ATHRSCL NONAUTO GFT EXTR	$85
10/6/2003	Pharmacy		6365311710	PLAVIX			$78
10/7/2003	Thoracic Surgeon 1	Thoracic Surgery	99214	OFFICE OUTPT EST 25 MIN	44032	ATHRSCL NONAUTO GFT EXTR	$85
10/11/2003	Pharmacy		59104070	LISINOPRIL			$8
10/14/2003	Internal Medicine MD 1	Internal Medicine	99000	HANDLG&/OR CONVEY OF SPEC FOR	4011	BENIGN HYPERTENSION	$0
		Internal Medicine	99211	OFFICE O/P EST 5 MIN	4011	BENIGN HYPERTENSION	$0
	Clinical Laboratory 2	Clinical Laboratory	80048	BASIC METAB PANEL	4011	BENIGN HYPERTENSION	$12
10/22/2003	Hospital 2	Hospital	93010	ECG ROUTINE ECG W/LEAST 12 LDS	311	DEPRESSIVE DISORDER OT	$0
		Hospital			4280	CONGESTIVE HEART FAILURE UNS	$0
		Hospital			44030	ATHRSCL UNSP GRAFT EXTR	$11
		Hospital			7140	RHEUMATOID ARTHRITIS	$0
	Diagnostic Radiologist 6	Diagnostic Radiology	71020	RADEX CH 2 VIEWS FRNT&LAT	4280	CONGESTIVE HEART FAILURE UNS	$0
		Diagnostic Radiology			5119	PLEURAL EFFUSION UNSPEC	$0
		Diagnostic Radiology			V7282	PREOP RESPIRATORY EXAM	$14
10/23/2003	Podiatry 1	Podiatry	99213	OFFICE OUTPT EST15 MIN	44020	ATHEROSCLER EXTREMTY UNSPEC	$0

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
		Podiatry			71947	JOINT PAIN ANKLE	$49
10/24/2003	Pharmacy		9306380	TRAZODONE HCL			$0

	Pharmacy		45620200	LEXAPRO			$32
10/26/2003	Pharmacy		78115061	ATENOLOL			$0
10/27/2003	Thoracic Surgeon 1	Thoracic Surgery	35661	BYP OTH/THN VEIN FEM-FEM	44032	ATHRSCL NONAUTO GFT EXTR	$1,312
	Hospital 2	Hospital	1270	ANES INVG ART UPR LEG W/BYP GR	311	DEPRESSIVE DISORDER OT	$0
		Hospital			4280	CONGESTIVE HEART FAILURE UNS	$0
		Hospital			44030	ATHRSCL UNSP GRAFT EXTR	$374
		Hospital			7140	RHEUMATOID ARTHRITIS	$0
	Anesthesiologist 1	Anesthesiology	1270	ANES INVG ART UPR LEG W/BYP GR	4599	CIRCULATORY DISEASE UNSPEC	$742
	Hospital 2		3929	VASC SHUNT & BYPASS NEC	311	DEPRESSIVE DISORDER OT	$0
					4280	CONGESTIVE HEART FAILURE UNS	$0
					44030	ATHRSCL UNSP GRAFT EXTR	$6,274
					7140	RHEUMATOID ARTHRITIS	$0
					7391	NONALLO LESION CERVIC REG	$0
					7392	NONALLO LESION THORAC REG	$0
					7396	NONALLO LESION LOWER EXTR	$0
					7398	NONALLO LESION RIB CAGE	$0
					7399	NONALLOPATHIC LESION OT	$0
					311	DEPRESSIVE DISORDER OT	$0
					4280	CONGESTIVE HEART FAILURE UNS	$0
					44030	ATHRSCL UNSP GRAFT EXTR	$6,274
					7140	RHEUMATOID ARTHRITIS	$0
					7391	NONALLO LESION CERVIC REG	$0
					7392	NONALLO LESION THORAC REG	$0
					7396	NONALLO LESION LOWER EXTR	$0
					7398	NONALLO LESION RIB CAGE	$0
					7399	NONALLOPATHIC LESION OT	$0
			120	Room and Board Charges			$1,723
			250	Pharmacy			$411

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
			258	Pharmacy			$85
			270	Unknown			$467

			272	Unknown			$853
			278	Unknown			$889
			301	Laboratory			$196
			302	Laboratory			$250
			305	Laboratory			$134
			320	Radiology			$182
			360	Unknown			$689
			370	Unknown			$104
			710	Unknown			$209
			730	Unknown			$82
10/28/2003	Osteopathic Therapy 1	Osteopathic Therapy	98927	OSTEOPATHIC MANIPULATIVE TREAT	7392	NONALLO LESION THORAC REG	$0
		Osteopathic Therapy			7393	NONALLO LESION LUMBAR REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0
		Osteopathic Therapy	99252	1ST INPT CONSLTJ 40 MIN	7392	NONALLO LESION THORAC REG	$88
		Osteopathic Therapy			7393	NONALLO LESION LUMBAR REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0
10/29/2003	Osteopathic Therapy 1	Osteopathic Therapy	98927	OSTEOPATHIC MANIPULATIVE TREAT	7391	NONALLO LESION CERVIC REG	$0
		Osteopathic Therapy			7392	NONALLO LESION THORAC REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0
		Osteopathic Therapy	99232	SBSQ HOSP CARE PR D 25 MIN	7391	NONALLO LESION CERVIC REG	$67
		Osteopathic Therapy			7392	NONALLO LESION THORAC REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0
10/30/2003	Osteopathic Therapy 1	Osteopathic Therapy	98927	OSTEOPATHIC MANIPULATIVE TREAT	7391	NONALLO LESION CERVIC REG	$0
		Osteopathic Therapy			7392	NONALLO LESION THORAC REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0
		Osteopathic Therapy	99232	SBSQ HOSP CARE PR D 25 MIN	7391	NONALLO LESION CERVIC REG	$67
		Osteopathic Therapy			7392	NONALLO LESION THORAC REG	$0
		Osteopathic Therapy			7394	NONALLO LESION SACRAL REG	$0

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
	Diagnostic Radiologist 6	Diagnostic Radiology	71020	RADEX CH 2 VIEWS FRNT&LAT	4280	CONGESTIVE HEART FAILURE UNS	$14
		Diagnostic Radiology			5119	PLEURAL EFFUSION UNSPEC	$0

		Diagnostic Radiology			V7282	PREOP RESPIRATORY EXAM	$0
10/31/2003	Pharmacy		40605520	OXYCODONE HCL			$4
11/4/2003	Pharmacy		9300580	TRAMADOL HCL			$2
	Pharmacy		5260451250	LEVOXYL			$0
11/7/2003	Pharmacy		59700300	MOBIC			$65
11/9/2003	Pharmacy		6365311710	PLAVIX			$78
11/13/2003	Pharmacy		2915272	BACTROBAN			$65
11/14/2003	Clinical Laboratory 2	Clinical Laboratory	84443	THYR STIMULATING HORM	2449	HYPOTHYROIDISM UNSPEC	$24
	Internal Medicine MD 1	Internal Medicine	99000	HANDLG&/OR CONVEY OF SPEC FOR	2449	HYPOTHYROIDISM UNSPEC	$0
11/16/2003	Pharmacy		59104070	LISINOPRIL			$8
11/21/2003	Pharmacy		5260451500	LEVOXYL			$0
11/28/2003	Pharmacy		45620200	LEXAPRO			$32
	Pharmacy		9306380	TRAZODONE HCL			$0
12/2/2003	Pharmacy		78115061	ATENOLOL			$0
12/11/2003	Pharmacy		17306970	ADVAIR DISKUS			$151
12/12/2003	Pharmacy		6365311710	PLAVIX			$78
12/16/2003	Pharmacy		9300580	TRAMADOL HCL			$2
	Pharmacy		59104070	LISINOPRIL			$5
12/29/2003	Pharmacy		5260451500	LEVOXYL			$0
	Pharmacy		45620200	LEXAPRO			$32
	Pharmacy		9306380	TRAZODONE HCL			$0
1/2/2004	Pharmacy		78115061	ATENOLOL			$0
	Internal Medicine MD 1	Internal Medicine	99213	OFFICE OUTPT EST15 MIN	311	DEPRESSIVE DISORDER OT	$0
		Internal Medicine			4928	EMPHYSEMA OT	$0
	Internal Medicine MD 1	Internal Medicine	90471	IMADM PRQ ID SUBQ/IM NJXS 1 VA			$13
		Internal Medicine	90658	INF VIRUS SPLT 3 YR+ IM			$10
1/3/2004	Pharmacy		5993016470	ALBUTEROL SULFATE			$1
1/6/2004	Clinical Laboratory 2	Clinical Laboratory	84443	THYR STIMULATING HORM	2449	HYPOTHYROIDISM UNSPEC	$24

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
	Internal Medicine MD 1	Internal Medicine	99000	HANDLG&/OR CONVEY OF SPEC FOR	2449	HYPOTHYROIDISM UNSPEC	$0
1/12/2004	Pharmacy		6365311710	PLAVIX			$78
1/14/2004	Pharmacy		5260451750	LEVOXYL			$0

1/16/2004	Internal Medicine MD 1	Internal Medicine	99214	OFFICE OUTPT EST 25 MIN	2449	HYPOTHYROIDISM UNSPEC	$0
		Internal Medicine			78609	RESPIRATORY ABNORMALITY OT	$0
		Internal Medicine			78650	UNSPECIFIED CHEST PAIN	$0
	Internal Medicine MD 1	Internal Medicine	93000	ECG ROUTINE ECG W/LEAST 12 LDS	2449	HYPOTHYROIDISM UNSPEC	$0
		Internal Medicine			78609	RESPIRATORY ABNORMALITY OT	$0
		Internal Medicine			78650	UNSPECIFIED CHEST PAIN	$33
	Internal Medicine MD 1	Internal Medicine	99000	HANDLG&/OR CONVEY OF SPEC FOR	2449	HYPOTHYROIDISM UNSPEC	$0
		Internal Medicine			78609	RESPIRATORY ABNORMALITY OT	$0
		Internal Medicine			78650	UNSPECIFIED CHEST PAIN	$0
	Pharmacy		6930607	ZITHROMAX Z-PAK			$13
	Pharmacy		17264074	IPRATROPIUM BROMIDE			$55
	Clinical Laboratory 2	Clinical Laboratory	80048	BASIC METAB PANEL	78650	UNSPECIFIED CHEST PAIN	$12
1/19/2004	Pharmacy		59104070	LISINOPRIL			$5
	Pharmacy		59700300	MOBIC			$65
1/20/2004	Pharmacy		17306970	ADVAIR DISKUS			$151
1/28/2004	Pharmacy		9306380	TRAZODONE HCL			$0
	Pharmacy		45620200	LEXAPRO			$63
1/29/2004	Cardiologist 6	Cardiology	93015	CARDIOVASCULAR STRESS TEST W/E	4240	MITRAL VALVE DISORDER	$0
		Cardiology			4254	PRIMARY CARDIOMYOPATHY OT	$0
		Cardiology			78609	RESPIRATORY ABNORMALITY OT	$130
		Cardiology	93321	DOP ECHO P-W&/OR CONT W/SPECTR	4240	MITRAL VALVE DISORDER	$0
		Cardiology			4254	PRIMARY CARDIOMYOPATHY OT	$0

Service Date	Provider Name	Specialty	Service Code and Description		Diagnosis Code and Description		Pd Amt
		Cardiology			78609	RESPIRATORY ABNORMALITY OT	$64
		Cardiology	93325	DOP ECHO COLOR FLO VEL MAPG	4240	MITRAL VALVE DISORDER	$0
		Cardiology			4254	PRIMARY CARDIOMYOPATHY	$0

						OT	
		Cardiology			78609	RESPIRATORY ABNORMALITY OT	$146
		Cardiology	93350	ECHOCARDIOGRAPHY, TRANSTHORACI	4240	MITRAL VALVE DISORDER	$0
		Cardiology			4254	PRIMARY CARDIOMYOPATHY OT	$0
		Cardiology			78609	RESPIRATORY ABNORMALITY OT	$181
		Cardiology	J1250		4240	MITRAL VALVE DISORDER	$0
		Cardiology			4254	PRIMARY CARDIOMYOPATHY OT	$0
		Cardiology			78609	RESPIRATORY ABNORMALITY OT	$5
2/3/2004	Diagnostic Radiologist 7	Diagnostic Radiology	71260	CT SCAN, THORAX; W/CONTRAST MA	4239	PERICARDIAL DISEASE UNSPEC	$0
		Diagnostic Radiology			4293	CARDIOMEGALY	$0
		Diagnostic Radiology			4928	EMPHYSEMA OT	$0
		Diagnostic Radiology			5119	PLEURAL EFFUSION UNSPEC	$78
	Diagnostic Radiologist 5	Diagnostic Radiology	71020	RADEX CH 2 VIEWS FRNT&LAT	5119	PLEURAL EFFUSION UNSPEC	$14
	Hospital 1		3491	THORACENTESIS	4254	PRIMARY CARDIOMYOPATHY OT	$0
					4280	CONGESTIVE HEART FAILURE UNS	$0
					42823	AC/CH SYSTOLIC HEART FAILURE	$14,716
					496	CHR AIRWAY OBSTRUCT OT	$0
					5118	PLEURAL EFFUS OT EX TB	$0
					51889	OT LUNG DISEASE OT	$0
					5849	ACUTE RENAL FAILURE UNSPEC	$0
					5990	URIN TRACT INFECTION UNSPEC	$0
					7140	RHEUMATOID ARTHRITIS	$0
					4254	PRIMARY CARDIOMYOPATHY OT	$0

Service Date	Provider Name	Specialty	Service Code and Description	Diagnosis Code and Description		Pd Amt
				4280	CONGESTIVE HEART FAILURE UNS	$0
				42823	AC/CH SYSTOLIC HEART FAILURE	$14,716

					496	CHR AIRWAY OBSTRUCT OT	$0
					5118	PLEURAL EFFUS OT EX TB	$0
					51889	OT LUNG DISEASE OT	$0
					5849	ACUTE RENAL FAILURE UNSPEC	$0
					5990	URIN TRACT INFECTION UNSPEC	$0
					7140	RHEUMATOID ARTHRITIS	$0
			120	Room and Board Charges			$5,659
			250	Pharmacy			$851
			270	Unknown			$359
			300	Laboratory			$5,318
			324	Radiology			$413
			352	Unknown			$889
			730	Unknown			$227
			732	Unknown			$999
	Ambulance Service Provider 1	Ambulance Service Provider	A0422		4280	CONGESTIVE HEART FAILURE UNS	$28
		Ambulance Service Provider	A0425		4280	CONGESTIVE HEART FAILURE UNS	$8
		Ambulance Service Provider	A0428		4280	CONGESTIVE HEART FAILURE UNS	$131
	Cardiologist 5	Cardiology	99223	1ST HOSP CARE PR D 70 MIN	4280	CONGESTIVE HEART FAILURE UNS	$190
2/4/2004	Pathologist 1	Pathology	88180	FLOW CYTOMETRY; EACH CELL SURF	20280	LYMPHOMA OT UNSPEC	$487
	Diagnostic Radiologist 5	Diagnostic Radiology	71020	RADEX CH 2 VIEWS FRNT&LAT	5119	PLEURAL EFFUSION UNSPEC	$14
	Pathologist 3	Pathology	88104	CYTOPATHOLOGY EXCEPT CERVICAL/	5119	PLEURAL EFFUSION UNSPEC	$38
		Pathology	88305	LEVEL IV - SURGICAL PATHOLOGY,	5119	PLEURAL EFFUSION UNSPEC	$51
	PVD MD 1	PVD	32000	THORACENTESIS, PUNCTURE, PLEUR	5119	PLEURAL EFFUSION UNSPEC	$97