The Economic Impact of Office-Based Physicians in Rhode Island

State Report

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The American Medical Association

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January 2011

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Executive Summary

Office-based physicians in Rhode Island are a critical component of the healthcare system, fundamentally assuring the health of the community in which they practice. Office-based physicians include both doctors of medicine (MDs) and doctors of osteopathy (DOs) who are primarily engaged in the independent practice of medicine. These practitioners operate private or group practices in offices and clinics and are focused on providing care to their patients.

While physicians are primarily focused on providing care to their patients, they also play a vital role in the state and local economy by creating jobs, purchasing goods and services and supporting state and community public programs though the tax revenues they create.

In these times of rapid change in the health care industry it is important to understand how changes affect office-based physicians. This report will provide data which can be used by key policymakers, legislators and thought leaders in medicine. It shows how strong physician practices not only ensure the health and well being of communities but also critically support local economies and enable jobs, growth and prosperity.

This report estimates the economic impact of office-based physicians on Rhode Island's economy measured across four variables: output, jobs, wages and benefits, and tax revenue. Economic impact includes both a direct component and an indirect component. The *direct* impact is the value of output, jobs, wages and benefits, and taxes that are produced from patient care activities provided in physician offices. The *indirect* impact includes the output, jobs, wages and benefits, and taxes generated in the industries that are supported by physicians' offices.

The report drills down to examine the economic impact across eleven medical specialties and within the metropolitan statistical areas (MSAs) in Rhode Island. Finally, this report provides a snapshot of the economic impact of office-based physicians compared to other select industries in Rhode Island.

The economic impact of office-based physicians varies across states and depends on the number of physicians in each state as well as the characteristics of the state's economy. There were 638,661 office-based physicians practicing within the fifty states and the District of Columbia as of October 2010.[1] Of these, 2,672 physicians practiced in the State of Rhode Island.

- **Total Output**: In Rhode Island, office-based physicians created a total of $4.0 billion in direct and indirect economic output (i.e., sales revenues) in 2009.
- **Jobs**: Physician offices employ support staff and often work with non-physician providers, increasing the total number of employees in the industry to well above the count of physicians alone. In 2009, Rhode Island's office-based physicians supported

[1] This count is based on AMA Masterfile data, October 2010, for physicians in the 50 states and the District of Columbia. The Masterfile identifies 599,334 physicians as office-based and an additional 71,670 as having an unknown type of professional activity. To avoid undercounting the number of office-based physicians, we imputed the office-based status for physicians with an unknown professional activity. Through this methodology an additional 39,327 physicians were identified as office-based, yielding a total number of 638,661. For further detail on methods, see Appendix A.

15,322 jobs, the total of direct and indirect positions. On average each office-based physician supported 5.7 jobs, including his own.

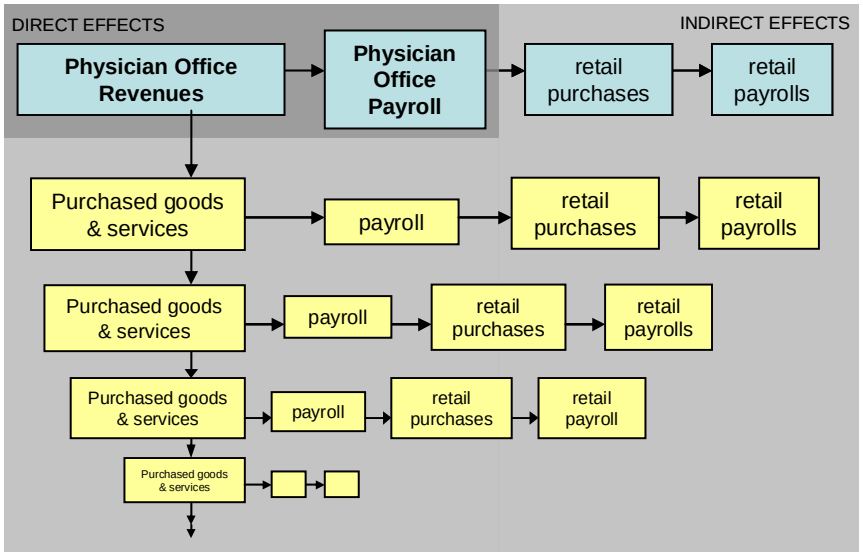
- **Wages and Benefits:** Office-based physicians significantly contribute to wages and other benefits in their communities. In Rhode Island, physician offices contributed $2.9 billion in direct and indirect wages and benefits for all employees in 2009; on average each physician supported $1,087,139 in total wages and benefits.
- **Tax Revenues**: The revenues and earnings generated by physicians' offices contribute to state and local taxes, which in turn support public works and community development. In Rhode Island, physician offices supported $185.6 million in local and state tax revenues in the year 2009.

Economic Impact Analyses

Economic impact analyses (EIAs) track the reach of revenues generated by an activity as they flow through the local economy, tracking jobs created, spending that supports local business, and new tax revenues. EIA's include both direct and indirect benefits. ***Direct*** benefits, in the context of the office-based physician "industry" take the form of: 1) revenues generated in the course of the practice of medicine (i.e., the value of output); 2) the wages and benefits that go to physicians and practice employees who are hired to support the delivery of care; 3) the number of jobs created in the office-based physician industry; and 4) the taxes that are paid by physician offices and their owners and employees.

Economic activities and businesses that are supported by the physician's practice outside of their own industry represent the ***indirect*** benefits of the physician office. These *business-to-business* effects include the supplies and equipment purchased by the physician, practice administrative services, cleaning and property maintenance services and clinical and laboratory services that support physician operations.

Figure 1: Economic Multipliers



Additional indirect benefits (sometimes called induced effects)[2] arise when the employees of physician practices and employees of vendors, in turn, spend their earnings to support local businesses, which pay their employees and pay taxes, and so on (see Figure 1). With each cycle of spending there is some "leakage", i.e., some spending goes outside the community and, as a result, generates no additional local value.

The indirect and direct effects make up the "multiplier" that drives an economic impact analysis. Simply put, the total impact in a community is a *multiple* of the economic benefit that is generated directly from the practice of medicine. In the current context, the multiplier reflects the number of times that each dollar generated in the practice of medicine circulates through the local economy, supporting local jobs and spending.

An output multiplier is the number of dollars of total economic activity that are created by one dollar of new business revenue in a community.

There is a separate multiplier for three types of direct benefits mentioned above: output, jobs, and wages and benefits. An output multiplier is used to compute the total value (i.e., direct and indirect) of output created by an industry. This value indicates the total economic output generated in an economy for every $1 million in direct output. A job multiplier computes the total number of full-time equivalent jobs supported for every $1 million in direct output created by an industry. The multiplier for wages and benefits is based on direct wages and benefits. For every $1 million in direct employee compensation the multiplier indicates the total value of supported wages and benefits.

Multipliers are specific to geographic areas and to particular industries and their values can vary widely. A multiplier of 1.0 would indicate that the total economic value of the industry is the same as the direct economic value, i.e. a dollar of revenue in the industry immediately leaves the community so that there is no cycling through the community for additional economic benefit. A multiplier will take on a value *greater* than 1.0 when a dollar earned by a business, e.g., a physician practice, is spent in the community, supporting jobs and other local businesses, which in turn pay their employees who, in turn buy more goods and services in the local community.

Multipliers are lower when business revenues are spent (leak) outside the community or are spent on goods or services that support fewer local jobs. Multipliers for small community areas will be smaller than for larger areas or a state because establishments in smaller areas often must look outside of their immediate communities to find inputs. It is often said that "health care is local". Indeed health care multipliers tend to be higher than those for many other industries precisely because physicians and their office staff tend to live in the community and their services support the local community.

Data Sources

Three primary data sources were used to evaluate the economic impact of physician offices: the AMA Masterfile, MGMA Cost Survey, and IMPLAN. IMPLAN's economic impact multipliers were combined with MGMA's per-physician revenue and costs data and the Masterfile's number

[2] Induced effects are included as a portion of "indirect" effects in this report for ease of reading.

of physicians to estimate values for the direct, indirect and total economic impact of the office-based physician industry. For specific methods used, see Appendix A.

Economic Impact for Rhode Island

This report estimates the direct, indirect and total impact of office-based physicians on the following four measures of economic activity: output (i.e., total sales revenues), jobs, wages and benefits (i.e., employee compensation), and tax revenues generated on the local and state levels. The direct and indirect economic benefits for each measure sum to the total benefit.

Table 1: Total Output, Jobs, and Wages & Benefits Supported by the Office-based Physician Industry in Rhode Island, 2009

Economic Measure	State Aggregate
Number of Physicians	2,672
Output ($ in billions)	4.0
Jobs	15,322
Wages & Benefits ($ in billions)	2.9

Output

The direct output of an industry is defined as the total sales revenue produced by that industry in any given year. For office-based physicians such "output" can be thought of as the total value of care (e.g., patient visits) provided plus the value of any other services provided by the physicians office (e.g., revenue from renting additional office space, parking fees). This value includes both medical and non-medical revenues generated by office-based physician practices.

The output multiplier for office-based physicians in Rhode Island is 1.87, meaning an additional $0.87 of indirect output is generated in the State over and above each dollar of direct output created in the practice of medicine. Indirect output captures the value of revenues generated by other businesses as a result of the office-based physician industry, e.g., the sale of equipment to the offices or the sale of laboratory services related to a physician visit.

The "total output" of office-based physicians sums the direct and indirect output generated by the industry. In Rhode Island, office-based physicians generated $4.0 billion in total output. Total output is presented by physician specialty in Appendix B.

Jobs

Employment is a second means of evaluating an industry's economic value. A total of 2,672 office-based physicians (MDs and DOs) were practicing in Rhode Island as of October 2010. The number of jobs directly created by physician offices in the State was 13,583 employees, including self-employed positions.[3] This is the direct employment impact of the office-based physician industry.

[3] The direct employment figure includes physicians as well as non-physician staff, including administrative and non-physician provider personnel.

Physician offices employ support staff and often work with non-physician providers, increasing the total number of employees in the industry to well above the count of physicians alone. The employment multiplier in Rhode Island is 1.81, meaning that each million dollars of office-based physician output generated an additional 0.81 full time jobs in the economy outside the office-based physician industry. In other words, 0.81 additional jobs, above and beyond the clinical and administrative personnel that work inside the physician practices, were supported for each one million dollars of revenue generated by a physician office business.

The total number of jobs supported by the office-based physician industry in Rhode Island was 15,322; the average office-based physician supported 5.7 jobs in the economy, including his own. For detail by specialty, see Appendix B.

Wages and Benefits

Employee compensation, i.e., the wages and benefits[4] that are paid to local residents, is also an important measure of an industry's value to the local economy. The value of direct wages and benefits in Rhode Island includes compensation and benefits paid to physicians, non-physician staff, practice owners, and any other staff on payroll. This direct amount of wages and benefits totaled to $1.9 billion in the State in 2009.

The payroll multiplier in Rhode Island is 1.51, meaning that an additional $0.51 in wages and benefits was generated for every dollar of direct employee compensation within the industry. Including the indirect wages and benefits supported by the industry, the total amount of wages and benefits in Rhode Island was $2.9 billion, an average of $1,087,139 per physician. For detail by specialty see Appendix B.

Taxes

Physicians' offices also generate tax revenues at the local and state levels.[5] The total tax contribution is computed by summing taxation on employee income, proprietor income, indirect business interactions, households, and corporations. Tax revenues are included from physician offices (direct) and from other affected industries (indirect); i.e., these are the "total" tax revenues supported by the industry.

The state and local taxes incorporated in this study include:

- Social Security taxes: the state portions of Social Security taxes, both the employee and employer paid portions;
- Personal taxes: state and local income taxes, gift and estate taxes, motor vehicles taxes/fees, fishing/hunting and other license fees, property taxes, personal property taxes, and other fines/fees or donations;
- Business taxes: corporate profits and dividends taxes; and

[4] For ease of reading, "wages and benefits" is used to mean salaries and wages plus other forms of compensation paid to employees, e.g., benefits, for the remainder of this report. Values include wages and benefits to all support staff, non-physician practitioners and physicians.

[5] The industry also generates federal tax revenue, but the federal level is beyond the scope of this report.

- Indirect business taxes: property taxes, sales taxes, motor vehicle licensing, severance taxes, non-tax payments (e.g., rents and royalties, special assessments, fines, settlements and donations), and other taxes (including business licenses, documentary and stamp taxes).[6]

In the State of Rhode Island, the aggregate local and state taxes generated by office-based physician offices in 2009 totaled $185.6 million.

Impacts by Metropolitan Statistical Area[7]

Economic impact analyses can also be performed for smaller areas and economic regions, such as a metropolitan statistical area (MSA). MSAs are defined as cities and their adjoining counties, where the population of the city exceeds 50,000 or the population of the area exceeds 100,000. These urban areas are important as economic centers. Table 2 presents the total output, jobs, wages & benefits, and tax revenue for all MSAs within Rhode Island, including any MSAs that cross borders of neighboring states.

Table 2: Total Output, Jobs, Wages & Benefits, and Tax Revenue Supported by the Office-based Physician Industry in Rhode Island, by MSA, 2009

MSA Name	Number of Physicians	Output ($ in millions)	Jobs	Wages & Benefits ($ in millions)	State & Local Tax Revenue ($ in millions)
Providence-New Bedford-Fall River, RI-M	3,498	$5,016	20,038	$3,734	$238

[6] Olsen DC. Using Social Accounts to Estimate Tax Impacts. MIG, Inc. Available through IMPLAN.com. (Paper originally given at the Mid-Continent Regional Science Association Meetings in Minneapolis, MN; June 11, 1999.)

[7] MSA names are based on OMB definition for fiscal year 2007.

Appendix A: Methodological Overview

Three primary data sources were used to evaluate the economic impact of physician offices: the AMA Masterfile, MGMA Cost Survey, and IMPLAN.

- The AMA Masterfile provided data by geographic area regarding the number of patient-care, office-based physicians practicing within each geographic area. Office-based physicians were further classified into 3 broad specialty groupings (primary care, surgical specialists and non-surgical specialists); and into 11 narrow specialty groups.
- MGMA's Cost Survey report provided data on the financial characteristics of physician practices; specifically, total medical revenue and total payroll costs per full-time physician across 11 medical specialties, and 3 larger medical practice groupings. Revenues and costs are based on 2009 calendar year data.
- IMPLAN, the input-output modeling system developed by the Minnesota Implan Group, estimates output, labor compensation (wages and benefits), and employment multipliers for each industry by selected geographic area using a social accounting system. IMPLAN also provides data on tax revenues generated by individual industries by geographic area.

I. AMA Masterfile

The AMA Physician Masterfile was used to estimate the number of office-based physicians in each state and MSA, in aggregate and by specialty.

Each record within the Masterfile corresponds to one physician. Our dataset was current as of October 2010 and contained information on a total of 1.3 million physicians. Data analyses were conducted with SAS 9.1.

Office-based physicians

Before beginning our count, we first limited the Masterfile data to office-based physicians, the population of interest for this analysis. We found that 57.7% of physicians (599,334) had an office-based practice as their "major professional activity". However, an additional 6.9% (71,670) of the records did not have a major professional activity identified. The variable "major professional activity" had the distribution shown at right.

Masterfile: Major Professional Activity Distribution

57.7%	Office-based practice
18.8%	Hospital-based practice (e.g., residents, full-time staff)
4.3%	Other professional activity (e.g., research)
12.3%	Inactive (i.e., those who work < 20 hours a week)
6.9%	Not classified
100%	

Because presumably some portion of the 6.9% of unclassified physicians are in office-based practice, excluding them would underestimate the number in office-based practice and including all unclassified as office-based physicians would overestimate that number. To address this issue, we imputed whether each unclassified physician is office-based or not using a logit analysis; results from this exercise identified the probability that a physician is office-based versus not office-based. Explanatory variables for this model included age, sex, specialty, board certification, international medical graduate (IMG) status, and AMA membership.

Our results showed that, all else remaining constant, females were less likely to be office-based than males, AMA members were less likely to be office-based, and board certified physicians were more likely to be office-based. As a result of this imputation, an additional 39,327 physicians were classified as office-based, increasing the total number to 638,661 (62% of physicians in the Masterfile).

Location

Because we are classifying physicians by geographic area, we next clarified where a physician is located based on a set of three possible location variables: office address, home address, or preferred mailing address. As reflected in the Masterfile, a physician might have an office in one state but live in another. Although the preferred address variable has greater reliability due to AMA confirmations for mailing purposes, the office location variables was selected because the office is the location of economic activity.[8]

MSA categorization was more complicated than identifying a physician's state. For the MSA-level analysis, we had to resolve differences between two widely-used MSA configurations. The Masterfile's MSA variable represents the official configuration, as defined by the U.S. Office of Management and Budget (OMB). The Medicare program has modified this configuration for certain payment purposes, such as the hospital wage index. These configurations differ in two ways. First, OMB treats the largest metropolitan areas as MSAs, usually subdividing them into metropolitan divisions, whereas Medicare refers to these smaller units as "MSAs." For the Chicago area, for example, OMB delineates one MSA, which has 3 metropolitan divisions: Chicago-Joliet-Naperville, Gary, and Lake County-Kenosha. Medicare reports a different wage index for each of these divisions. The areas outside of metropolitan areas are designated by OMB as either micropolitan areas or rural areas. In contrast, Medicare combines all such areas outside of MSAs into the rural areas of each state.

This analysis uses the 2007 fiscal year OMB report to determine which counties fall into each MSA. While a 2009 OMB report is also available, it was not used because the most current Medicare GAF data available for this analysis is from 2008, and therefore does not incorporate OMB's 2009 edits to MSA designations. The result of using a 2007 OMB file is minimal in that most changes between 2007 and 2009 were in name changes, and the creation of three new MSAs which were previously considered rural counties. The three 2009 MSAs, which were not used in this analysis, are:

- 16020: Cape Girardeau-Jackson, MO-IL Metropolitan Statistical Area
- 31740: Manhattan, KS Metropolitan Statistical Area
- 31860: Mankato-North Mankato, MN Metropolitan Statistical Area

Each record was assigned by office location to a state and also to one of 363 MSAs or the rural area of a state (available for 48 states).

[8] A sensitivity analysis was performed using the preferred address compared to the office address. For each state and MSA, we calculated the absolute value of the difference in the counts between using the office versus using the preferred location. The national sum of these differences as a percentage of all office-based physicians (pre-imputation) was 1.3 percent in the case of states and 2.2 percent in the case of MSAs.

Masterfile specialty designation

The Masterfile's specialty variable has more than 200 values at its most granular level. There are over 34,000 observations with the specialty designated as "unspecified". The Masterfile specialties were grouped to match selected MGMA specialty categories, further defined under MGMA Specialties. Two different specialty variables were created. First, a variable was created to identify whether each observation was primary care, surgical specialty, or a non-surgical (i.e., medical) specialty. This division of the specialties was exhaustive; each doctor in the Masterfile was placed into one of these categories. Values were assigned by the Masterfile specialty code to one of the three categories based on conversations with the AMA.

Because records with an "unspecified" specialty could not be placed into one of the three exhaustive categories, we prorated those records at the state level. That is, the physicians with "unspecified" specialty in each state were allocated to the three broad specialties in proportion to the number of physicians known to be in that specialty in that state. Put differently, the number of physicians in each of the three categories was increased by the same percentage.

For the second specialty variable, observations were identified as being in one of a select eleven specialties by Masterfile specialty code and per AMA discussions. This assignment was not exhaustive; only 403,674 physicians were placed into one of these sub-specialty categories. Specialty divisions were made consistent with the specialty configuration used by MGMA in order to match the data by specialty.

II. MGMA Cost Survey

The MGMA data was used to estimate per-physician employment, payroll and revenue for 2009, by specialty. All MGMA data were on the national level. To adjust payroll and revenue to specific geographic areas, we adjusted by the wage index and Medicare Geographic Adjustment Factor, respectively.

MGMA specialties

Because physician specialty was used to link MGMA data with AMA data, specialty categories were cross-walked across the two datasets. While the Masterfile data offers flexibility in the creation of aggregate specialties from its 200+ specialty categories, MGMA data software offers limited options with set definitions. MGMA specialties, therefore, were the limiting factor in our specialty-to-specialty match-up across files.

We defined two levels of specialty categories for this analysis. The first is a high-level categorization of three broad specialty categories: primary care; surgical specialties and non-surgical specialties (i.e., medical specialties). This is a classification scheme defined by MGMA, and it allows the assignment of all AMA physicians. (See AMA Specialties for a description of allocation of Masterfile records with an "unspecified" specialty.) Table A-1 presents the full allocation of AMA specialties to the three MGMA high-level bins.

The second categorization of specialties is a selection of specific MGMA categories that align with AMA categories of interest. There are some limitations to this level of analysis, particularly differing groupings of specialties into AMA versus MGMA categories. In addition, MGMA

specialty-specific data are limited in scope by the number of respondents providing revenue and cost information for their medical practice; data points are suppressed where fewer than ten practices respond to a survey question.

Eleven AMA specialties of interest align with available MGMA categories:

1. Anesthesiology,
2. Cardiology,
3. Family practice,
4. General surgery,
5. Internal medicine,
6. Obstetrics/gynecology,
7. Ophthalmology,
8. Orthopedic surgery,
9. Otolaryngology,
10. Pediatrics, and
11. Urology.

Table A-1: Masterfile sub-specialties categorized as primary care

Primary Care	
Adolescent Medicine (Family Medicine)	Internal Medicine (Preventive Medicine)
Adolescent Medicine (Internal Medicine)	Internal Medicine/Dermatology
Adolescent Medicine (Pediatrics)	Internal Medicine/Family Medicine
Child Abuse Pediatrics	Internal Medicine/Medical Genetics
Emergency Medicine/Family Medicine	Internal Medicine/Nuclear Medicine
Family Medicine	Internal Medicine/Pediatrics
Family Medicine	Internal Medicine/Physical Medicine and Rehabilitation
Family Medicine/Psychiatry	Internal Medicine/Psychiatry
General Practice	Pediatrics
Geriatric Medicine (Family Medicine)	Sports Medicine (Family Medicine)
Geriatric Medicine (Internal Medicine)	Sports Medicine (Internal Medicine)
Internal Medicine	Sports Medicine (Pediatrics)
Internal Medicine & Neurology	Urgent Care Medicine
Internal Medicine (Emergency Medicine)	

Table A-2: Masterfile sub-specialties categorized as surgical specialties

Surgical Specialties	
Abdominal Surgery	Osteopathic Manipulative Medicine
Adult Cardiothoracic Anesthesiology	Otolaryngology
Adult Reconstructive Orthopedics	Otology/Neurotology
Anesthesiology	Pain Management
Colon & Rectal Surgery	Pain Management (Anesthesiology)
Congenital Cardiac Surgery (Thoracic Surgery)	Pediatric Anesthesiology (Anesthesiology)
Cosmetic Surgery	Pediatric Cardiothoracic Surgery
Craniofacial Surgery	Pediatric Ophthalmology
Critical Care Medicine (Anesthesiology)	Pediatric Orthopedics
Critical Care Medicine (Obstetrics & Gynecology)	Pediatric Otolaryngology
Dermatologic Surgery	Pediatric Surgery (Neurology)
Endovascular Surgical Neuroradiology	Pediatric Surgery (Surgery)
Facial Plastic Surgery	Pediatric Urology
Foot and Ankle, Orthopedics	Plastic Surgery
General Surgery	Plastic Surgery - Integrated
Gynecological Oncology	Plastic Surgery within the Head & Neck
Gynecology	Plastic Surgery within the Head & Neck (Otolaryngology)
Hand Surgery	Plastic Surgery within the Head & Neck (Plastic Surgery)
Hand Surgery (Orthopedic Surgery)	Proctology
Hand Surgery (Surgery)	Sports Medicine (Orthopedic Surgery)
Head & Neck Surgery	Surgery of the Hand, Plastic Surgery
Maternal & Fetal Medicine	Surgical Critical Care (Surgery)
Musculoskeletal Oncology	Surgical Oncology
Neurological Surgery	Thoracic Surgery
Obstetrics	Thoracic Surgery - Integrated
Obstetrics & Gynecology	Transplant Surgery
Ophthalmology	Trauma Surgery
Oral & Maxillofacial Surgery	Urology
Orthopedic Surgery	Vascular Surgery
Orthopedic Surgery of the Spine	Vascular Surgery-Integrated
Orthopedic Trauma	

Table A-3: Masterfile sub-specialties categorized as non-surgical specialties

Non-surgical specialties	
Abdominal Radiology	Neurodevelopmental Disabilities (Psychiatry & Neurology)
Addiction Medicine	Neurology
Addiction Psychiatry	Neurology/DiagnosticRadiology/Neuroradiology
Aerospace Medicine	Neurology/Physical Medicine and Rehabilitation
Allergy	Neuromuscular Medicine
Allergy & Immunology	Neuromuscular Medicine (Physical Medicine & Rehabilitation)
Anatomic Pathology	Neuropathology
Anatomic/Clinical Pathology	Neuropsychiatry
Blood Banking/Transfusion Medicine	Neuroradiology
Cardiothoracic Radiology	Nuclear Cardiology
Cardiovascular Disease	Nuclear Medicine
Chemical Pathology	Nuclear Radiology
Child and Adolescent Psychiatry	Nutrition
Child Neurology	Occupational Medicine
Clinical Laboratory Immunology (Allergy & Immunology)	Other (i.e., a specialty other than those appearing above)
Clinical and Laboratory Dermatological Immunology	Pain Management (Physical Medicine & Rehabilitation)
Clinical and Laboratory Immunology (Internal Medicine)	Pain Medicine (Neurology)
Clinical and Laboratory Immunology (Pediatrics)	Pain Medicine (Psychiatry)
Clinical Biochemical Genetics	Palliative Medicine
Clinical Cardiac Electrophysiology	Pediatric Allergy
Clinical Cytogenetics	Pediatric Cardiology
Clinical Genetics	Pediatric Critical Care Medicine
Clinical Molecular Genetics	Pediatric Dermatology
Clinical Neurophysiology	Pediatric Emergency Medicine (Emergency Medicine)
Clinical Pathology	Pediatric Emergency Medicine (Pediatrics)
Clinical Pharmacology	Pediatric Endocrinology
Critical Care Medicine (Internal Medicine)	Pediatric Gastroenterology
Cytopathology	Pediatric Hematology/Oncology
Dermatology	Pediatric Infectious Disease
Dermatopathology	Pediatric Nephrology
Developmental-Behavioral Pediatrics	Pediatric Pathology
Diabetes	Pediatric Pulmonology
Diagnostic Radiology	Pediatric Radiology
Emergency Medicine	Pediatric Rehabilitation Medicine
Endocrinology, Diabetes and Metabolism	Pediatric Rheumatology
Epidemiology	Pediatric/Child Psychiatry
Forensic Pathology	Pediatrics/Dermatology
Forensic Psychiatry	Pediatrics/Emergency Medicine
Gastroenterology	Pediatrics/Medical Genetics
General Preventive Medicine	Pediatrics/Physical Medicine & Rehabilitation
Geriatric Psychiatry	Pharmaceutical Medicine
Hematology (Internal Medicine)	Phlebology
Hematology (Pathology)	Physical Medicine & Rehabilitation
Hematology/Oncology	Procedural Dermatology
Hepatology	Psychiatry
Hospice & Palliative Medicine	Psychiatry/Neurology
Hospice & Palliative Medicine (Family Medicine)	Psychoanalysis
Hospice & Palliative Medicine (Internal Medicine)	Psychosomatic Medicine
Hospice & Palliative Medicine (Obstetrics & Gynecology)	Public Health and General Preventive Medicine
Hospice & Palliative Medicine (Psychiatry & Neurology)	Pulmonary Critical Care Medicine
Hospice & Palliative Medicine (Radiology)	Pulmonary Disease
Hospice and Palliative Medicine (Emergency Medicine)	Radiation Oncology
Hospitalist	Radiological Physics
Immunology	Radiology
Infectious Disease	Reproductive Endocrinology and Infertility
Internal Medicine/Emergency Medicine/Critical Care Medicine	Rheumatology
Interventional Cardiology	Selective Pathology
Legal Medicine	Sleep Medicine
Medical Biochemical Genetics	Sleep Medicine (Internal Medicine)
Medical Genetics	Sleep Medicine (Pediatrics)
Medical Management	Sleep Medicine (Psychiatry & Neurology)
Medical Microbiology	Spinal Cord Injury Medicine
Medical Oncology	Sports Medicine (Emergency Medicine)
Medical Toxicology (Emergency Medicine)	Sports Medicine (Physical Medicine & Rehabilitation)
Medical Toxicology (Pediatrics)	Sports Medicine (Physical Medicine & Rehabilitation)
Medical Toxicology (Preventive Medicine)	Transplant Hepatology (Internal medicine)
Molecular Genetic Pathology (Medical Genetics)	Undersea & Hyperbaric Medicine (Emergency Medicine)
Molecular Genetic Pathology (Pathology)	Undersea & Hyperbaric Medicine (Preventive Medicine)
Musculoskeletal Radiology	Vascular and Interventional Radiology
Neonatal-Perinatal Medicine	Vascular Medicine
Nephrology	Vascular Neurology
Neurodevelopmental Disabilities (Pediatrics)	

Variable selection and manipulation

MGMA variables compiled for each of the high-level and 11 specific specialty categories included data on employment (e.g., the sum of physician FTEs, nonphysician provider FTEs, support staff FTEs); total medical and non-medical revenue ; and payroll (e.g., total support staff cost per physician, total provider cost per physician).

From these data points, we calculated for each specialty category:

1. Total employment per physician (sum of physician, nonphysician provider and support staff FTEs);
2. Total payroll per physician (sum of support staff cost per physician and total provider cost per physician); and
3. Revenue per physician (total medical revenue plus non-medical revenue divided by physician FTEs).

MGMA data limitations

Problems with the MGMA data include that the data are 1) likely biased towards larger practices that are MGMA members; 2) not identified by the type of office (i.e., whether office-based); and 3) not geographically representative.

We cannot adjust for the possible data bias toward larger practices, but we attempted to compensate for the other data limitations, as described below.

No office-based variable

MGMA data do not separate physicians by office type, i.e., whether a physician is office or hospital-based. The closest MGMA variable defines legal ownership of a practice, i.e., whether a practice's majority owner is a hospital or integrated delivery system (IDS) or not. We examined whether the measures we are interested in varied depending on whether the practice was hospital owned or not; we considered the comparisons both at the high-level specialty groupings and the specific specialties of interest. While some trends were mostly consistent across most specialties (e.g., higher revenue in non-hospital owned practices), we are not able to make assumptions about the relationship between office-based and hospital-owned physician offices. Therefore we did not divide the MGMA data by ownership. The result of this may be some bias because staffing patterns at hospital-based practices, for example, may be different than office-based practices.

Geographic adjustment

Physician practice revenues and payroll vary according to geographic variation in price levels and costs of services. The MGMA cost survey, however, only has sufficient sample size to make estimates at the state level for a few of the larger states. In lieu of using the MGMA data to make state-level estimates, we therefore calculated specialty-specific estimates at the national level and adjusted revenue and dollar-denominated measures using local medical wage and price indices obtained from other sources. We made adjustments in two ways:

- Payroll spending was adjusted by Medicare's FY 2010 Wage Index; and

- Practice revenues were adjusted by the Medicare's CY 2010 Geographic Adjustment Factor (GAF).

Medicare uses its geographic wage index to adjust payments to inpatient hospital facilities and other institutional providers. The index is defined for each MSA and rural area of states.

Medicare also uses its three geographic practice cost indices (GPCIs) to adjust payments to physicians. For analytic purposes, these three GPCIs are summarized into the Geographic Adjustment Factor (GAF), which is the sum of the physician work GPCI weighted at about 52 percent, the practice expense GPCI weighted at about 44 percent, and the malpractice GPCI weighted at about four percent. Medicare constructs GAFs for 89 payment localities, which (unlike MSAs) are not defined based on a consistent set of principles. Localities are states and sub-state regions. In 2010, GAFs ranged from 0.88 to 1.29, reflecting significant variation in price levels across the US. The highest GAF value of 1.29 (Alaska) was trimmed to 3 standard deviations above the mean; only this one state was affected by this trim.

To recognize that payroll spending varies by local wage levels, the mean per-physician payroll in a state or MSA was calculated as the national mean for payroll (by specialty) multiplied by the local (state or MSA) Medicare geographic wage index. To recognize that practice revenues vary by local cost factors, the mean practice medical revenue in a state or MSA was calculated as the national mean for revenue (by specialty) times the local (state or MSA) Medicare Geographic Adjustment Factor.

Because our analyses are at the state and MSA levels, we need value of the wage index and GAF at those levels. To construct state- and MSA-level files, we downloaded a county-level CBSA crosswalk file from CMS and a county-level file with 2009 population from U.S. Census Bureau. The population variable was merged on the county-level CBSA crosswalk file. The wage index was merged on by MSA variable. A locality-county crosswalk was created; GAF values were entered by hand.

These steps resulted in a county-level file containing: CBSA code; county FIPS code; CBSA name; population; wage index used in 2010; and GAF used in 2010. We weighted each wage index at the county level by its population and calculated a weighted average for the MSA and state. We did the same for the GAF.

III. IMPLAN

IMPLAN data contains industry-based employment, revenue, payroll, multipliers, and tax data by MSA and by state. Multipliers are specific to geographic areas and to a particular industry, although the office-based physician industry cannot be divided by specialty for this purpose. Multipliers for "offices of physicians, dentists, and other health practitioners" link to Masterfile data by geographic area; specialties do not vary by geographic area.

Multipliers

IMPLAN multipliers can be customized by county or by groups of counties. Multipliers were calculated by MSA and by state, constructed by their respective counties. Upon creation of each model's geographies, the software calculates multipliers for employment and output (both based on millions of dollars of output) and payroll (based on millions of dollars of payroll).

The multipliers for Rhode Island are as follows:

- Output multiplier: 1.87
- Employment multiplier: 1.81
- Payroll multiplier: 1.51

Tax Analyses

IMPLAN software also estimates the impact of economic activity on state and local tax revenues, including income, sales, and property taxes. Tax impacts in each model (i.e., geographic area) have a linear relationship with industry output. Tax calculations were based on 2010 IMPLAN modeling and in 2010 dollars.

IV. Data Aggregation

Combining data across the three source datasets allowed the calculation of the following measures by geographic area:

1. Direct impacts of physician office-based practices (medical and non-medical revenues, total employment and total payroll per physician from the MGMA file multiplied by counts from the Masterfile);
2. Indirect impacts of physician office-based practices (IMPLAN multipliers x respective MGMA direct impacts x counts from the Masterfile);
3. Total impacts of physician office-based practices (direct and indirect impacts summed for revenue, employment and payroll);
4. Tax benefits from physician office-based practices.

Direct, indirect and total impacts were calculated in aggregate at the state and at the MSA level. These values were also calculated by specialty at the state level. Tax revenues were calculated at the state and MSA level.

Appendix B:
Total Economic Impact by Specialty Category and Specific Specialties

Table B-1: Total Economic Impact of Office-Based Physician Industry in Rhode Island, by Specialty Category

Broad Specialty	Number of Physicians	Output ($ in millions)	Jobs	Wages & Benefits ($ in millions)
Primary Care	982	$1,047	5,498	$792
Surgical Specialties	1,021	$1,719	5,283	$1,347
Non-Surgical Specialties	669	$1,241	4,541	$766
Total	2,672	$4,008	15,322	$2,905

Table B-2: Total Economic Impact of Office-Based Physician Industry in Rhode Island for Select Specialties

Specialty	Number of Physicians	Output ($ in millions)	Jobs	Wages & Benefits ($ in millions)
Anesthesiology	103	$148	306	$134
Cardiology	96	$214	763	$136
Family practice	196	$201	1,244	$155
General surgery	91	$98	430	$92
Internal medicine	549	$455	2,564	$384
Obstetrics/gynecology	159	$227	1,144	$166
Ophthalmology	61	$148	663	$91
Orthopedic surgery	89	$195	798	$133
Otolaryngology	31	$50	221	$33
Pediatrics	269	$364	1,600	$212
Urology	36	$67	259	$41

Appendix C:
Comparison Industry Analysis

The economic impact of the office-based physician industry can also be viewed in comparison to other industries both within and outside the health care industry. This report compares the economic impact of office-based physicians to the following industries:

1. Higher education (junior college, university, and professional schools),
2. Nursing home and residential care facilities,
3. Inpatient hospitals,
4. Legal services, and
5. Home health.

Table C-1: Comparison Industry Total Output, Jobs, and Wages & Benefits in Rhode Island, 2009

Industry	Output ($ in millions)	Jobs	Wages & Benefits ($ in millions)
Office-based physicians	$4,008	15,322	$2,905
Colleges / universities*	$2,253	14,924	$960
Nursing home and residential care facilities	$1,520	17,707	$806
Hospitals	$5,204	25,734	$2,172
Legal	$1,567	7,465	$457
Home health	$481	4,693	$192

*Also includes junior colleges and professional schools

Output

The office-based physician industry is largely made up of small physician groups or solo practitioners, but in aggregate they are comparable to the hospital industry across all fifty states. With few exceptions, states' office-based physician industries generated greater economic impact than the education, home health, legal, and nursing home industry in 2009. The most notable exception to this is the legal industry in the District of Columbia, with a total economic impact more than five times greater than that of the office-based physicians industry.

Jobs

Including support staff and non-physician providers, the national number of employees in the office-based physician industry (direct jobs) was approximately 3.3 million in 2009. Compared to the employment impact of the five comparator industries, with few exceptions across some states, the office-based physician industry employed more people than the legal, education, or home health industries, but fewer people than the hospital industry. The office-based physician industry's employment was comparable to that in the nursing homes industry across all fifty states, with the nursing home industry employing a total of approximately 3 million full-time employees.

Wages and Benefits

The office-based physician industry supports higher total wages and benefits than nearly all comparator industries across the states, with the most notable exception again being the legal industry in the District of Columbia. This is important because it indicates that the office-based physician industry compensates its employees well, so that they are in turn more able to purchase services from other industries in the state, and therefore stimulate their state economy.