

The Economic and Societal Impact of the Mayo Clinic and Mayo Health System

PREPARED BY:
Battelle
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PREPARED FOR:
Mayo Clinic

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ABOUT BATTELLE

Battelle is the world's largest non-profit independent research and development institution, and the Battelle Technology Partnership Practice is the leading national provider of advanced impact analysis and economic development consulting services for state governments, regional economic development organizations and major research institutions.

EXECUTIVE SUMMARY

Introduction

As one of the largest not-for-profit health care organizations in the United States, Mayo Clinic is an international leader in clinical care, medical research and medical/health education. From its beginnings as a small town medical practice in southeast Minnesota, Mayo Clinic has become perhaps the most recognized brand in health care. Each year, it is a destination for more than half a million patients from all 50 states and nearly every country in the world. Mayo Clinic today provides highly specialized clinical services from major locations in Arizona, Florida and Minnesota, and Mayo Health System provides primary and secondary health care services in about 70 communities in southern Minnesota, northern Iowa and western Wisconsin. Additional diversified initiatives include clinical laboratory reference services, health publishing enterprises and other operations.

Scope of the Study

While Mayo Clinic's core focus is the provision of the highest standard of patient care, the clinic also provides many additional societal benefits. In the states in which it operates, Mayo is a major employer — providing nearly 57,000 jobs across a broad range of scientific, clinical and educational disciplines. In addition, Mayo's diversified activities make substantial economic contributions to surrounding communities and states.

In the fall of 2009, Mayo Clinic commissioned the Battelle Memorial Institute to quantify the economic impact of the entire Mayo Clinic enterprise on the U.S. and regional economies. Using 2008 data, Battelle's analysis measures:

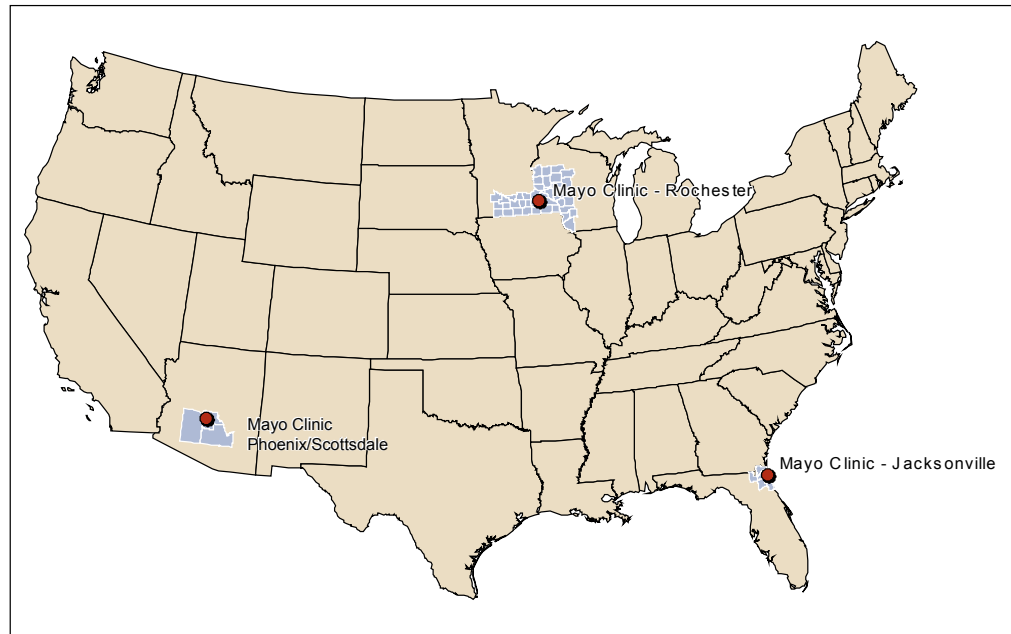
- The total economic impact of Mayo's \$7.2 billion operations in Arizona, Florida, Minnesota and Wisconsin, including jobs; purchase of goods, services and labor; and funds flowing into and circulating within communities because of Mayo Clinic's presence.
- An assessment of the social impacts generated by Mayo Clinic's research, innovation, commercialization and higher education services.
- Quantification of societal benefits generated by charitable giving and community service.

Methodology

Battelle assessed both the "backward linkage" (expenditure-based direct, indirect and induced economic impacts) and "forward linkage" or functional impacts of Mayo Clinic and Mayo Health System operations. In each examination, specific attention was paid to fully assessing the impacts of Mayo Clinic's unique operational structure that includes three distinct but interrelated functions: health care services, research and education.

The impact of Mayo expenditures (backward linkage impacts) are quantified using regionally-specific IMPLAN input-output models. IMPLAN is one of the most widely used and respected models in the nation. Operational data (full-time equivalent employment, wage and benefit figures, and revenue and expense figures) were obtained from the Mayo Clinic for five operational groups. Battelle then developed regional IMPLAN models to measure direct, indirect, and induced impacts in terms of employment, personal income, output and tax revenue measures for these operational groups. The forward linkage impacts (also known as functional impacts) were developed using data provided by the Mayo Clinic, as well as a variety of third-party data sources.

Major Findings:



Mayo Clinic practice sites in Minnesota, Florida, Arizona, Wisconsin and Iowa

Impact on and Contributions to the U.S. Economy

- **Mayo Clinic's total annual economic impact on the United States economy is \$22 billion.**
- Every dollar spent by the Mayo Clinic on operations, supplies and personnel generates an additional \$2.05 for the overall national economy.
- **Mayo Clinic directly and indirectly supports 144,468 jobs throughout the United States.**
- Mayo generates nearly \$1.9 billion in federal tax revenue and more than \$1 billion in state and local tax revenue through direct and indirect sources.
- In 2008, Mayo Clinic provided nearly \$70 million in charitable care for patients. In addition, unpaid portions of Medicaid and other indigent care programs totaled approximately \$140 million.
- Mayo Clinic invested \$391 million of its own funds into research and education activities in 2008.

Total Economic Impact

In 2008, Mayo Clinic's impact on the nation's economy totaled more than \$22 billion. This comprises the direct, indirect and induced impacts of Mayo Clinic's spending, including:

- Goods and services vendors in wholesale, retail, service, hospitality and manufacturing sectors
- Capital expenditures that Mayo made with contractors and suppliers
- Payroll and benefits
- Dollars spent by hospital patients, patients' visitors, medical residents and their visitors
- Plus a "multiplier" or indirect effect from expenditures re-circulating through additional spending.

Mayo's presence causes local and state economies to grow because its operations attract dollars from diversified revenue sources, including:

- Payments for hospitality services provided to national and international patients
- Spending by professionals attending Mayo-sponsored conferences and seminars
- Research funding received by the institution from the National Institutes of Health and private industry
- Endowments, contributions and gifts from grateful patients.

In addition to purely financial effects, Mayo Clinic produces many social benefits associated with its mission of patient care, biomedical research and higher education. (See Figure 1.)

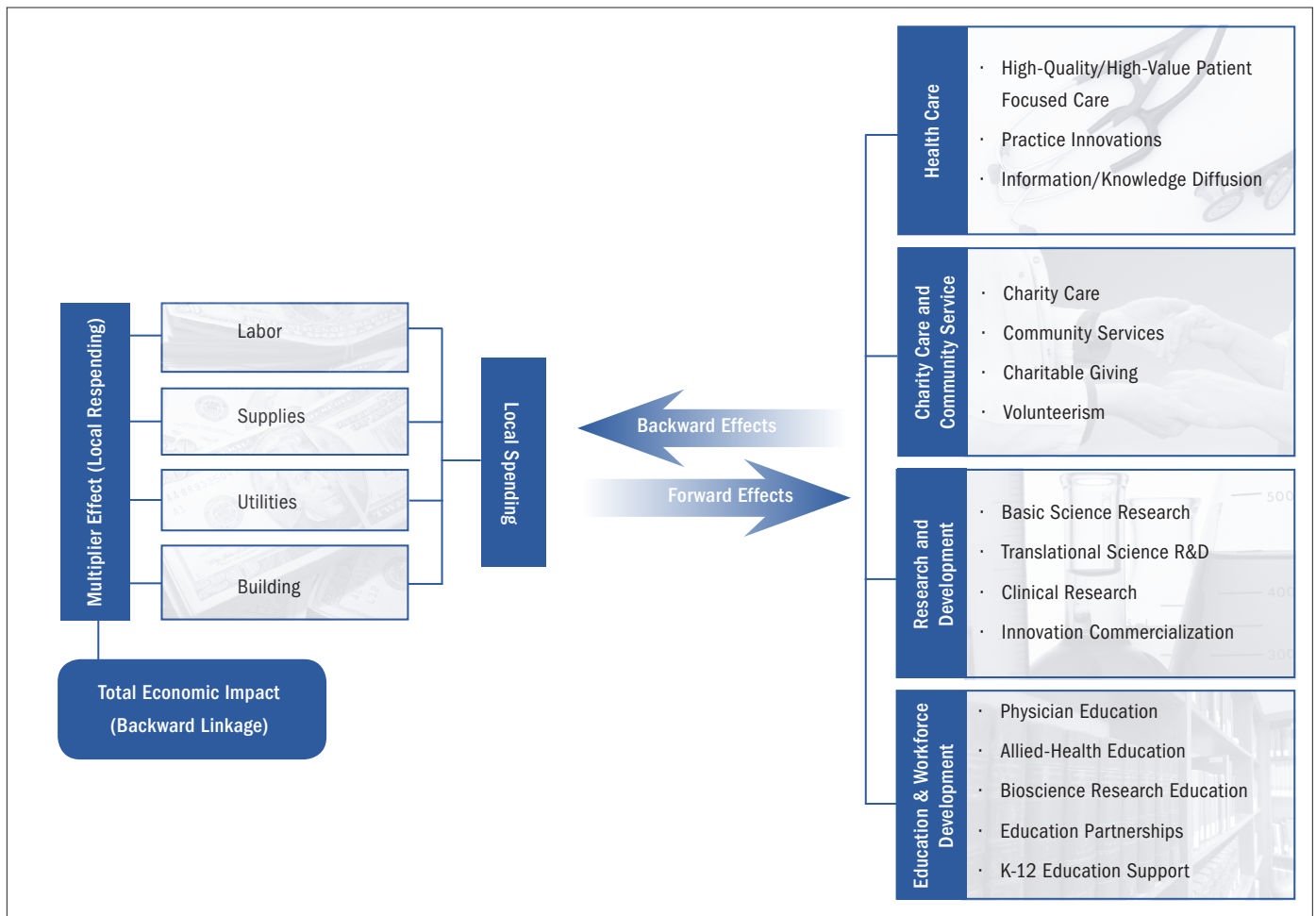
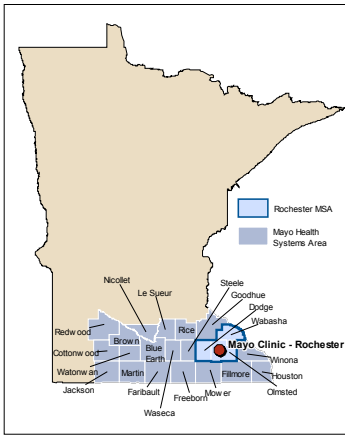


Figure 1. Characterization of Mayo Clinic's Economic and Social Impacts



Impact of Mayo Clinic on Minnesota's Economy

Total impact = \$9.6 billion

Total jobs = 70,777

Total taxes = \$1.9 billion

To put this into context, Mayo Clinic's impact on Minnesota's economy is larger than that of the hotel and lodging industry (\$1.8 billion), motor vehicle manufacturing (\$3.9 billion) or professional sports (\$717 million).

OVERVIEW

Because of its size and sphere of influence, Mayo Clinic operations in Minnesota are a major economic force for the state's economy. Mayo Clinic's Minnesota activities generated a \$9.6 billion total impact on the Minnesota economy in 2008.

JOB

Mayo Clinic in Minnesota provides more than 10 percent of the state's privately operated health care employment. Mayo directly and indirectly supported jobs for more than 70,777 Minnesotans in 2008. This includes:

- 34,245 full-time jobs, making Mayo the largest private employer in the state.
- More than 36,000 additional jobs needed to support Mayo's business volume. For example, local and regional companies increase their number of employees to provide goods and services to Mayo. In turn, companies that provide goods and services to Mayo suppliers must increase their number of employees.

Examples of Minnesota Businesses Commercializing Mayo Clinic Innovations and Research Discoveries

EnteroMedics (St. Paul) – Founded in 2002, this 50-employee company is developing devices using neuroblocking technology to treat obesity and other gastrointestinal disorders.

Torax Medical, Inc. (Shoreview) – Started in 2003, Torax is creating treatments for gastroesophageal reflux disease based on a new technology called magnetic sphincter augmentation.

NeoChord, Inc. (Minnetonka) is developing new, minimally invasive surgical devices for the treatment of degenerative heart valve regurgitation.

Muve, Inc. (Minneapolis) is commercializing Mayo Clinic research to deliver activity-based weight management solutions to tackle obesity.

Medspira, Inc. (Minneapolis) is commercializing multiple technologies and medical devices invented at Mayo Clinic.

Mayos MRI is a product line created directly by Mayo Clinic in collaboration with IBM's Engineering and Technology Services Group. The key product is an MRI imaging device for the hand and forearm.

mRemedy is a start-up venture formed by Mayo and smartphone application developer DoApp (of Minneapolis and Rochester, Minn.). The venture produces Mayo-branded software applications for medical and healthy living advice.

In addition, several Minnesota companies have licensed Mayo Clinic innovations, including Conventus Orthopaedics, Inc., Hutchinson Technology and R&D Systems, Inc.

RESEARCH

Recognizing the importance of bioscience research and innovation to national, state and regional economic development, Mayo Clinic has initiated novel partnerships to leverage intellectual and infrastructural assets — creating partnerships intended to be greater than the sum of their parts. A key example is The Minnesota Partnership for Biotechnology and Medical Genomics.

Established in 2004, the Minnesota Partnership describes itself as “an economic engine that saves lives.” It has launched more than 39 collaborative research teams to initiate projects to find disease solutions that can be commercialized. The Partnership also efficiently grows Minnesota’s research infrastructure and helps recruit new scientists to the state, while attracting more than \$40 million in federal and industry funding to Minnesota.

EDUCATION

The University of Minnesota and Mayo Clinic have signed a Memorandum of Understanding (MOU) for Education that promotes academic collaboration in educational initiatives, research and business development.

The importance of the Mayo Clinic to Minnesota and the regional economy is reflected in the ongoing development of bachelor’s and graduate degree programs at the University of Minnesota Rochester (UMR) — programs in which Mayo Clinic staff participate in advisory, adjunct teaching, and field and lab work facilitation. Currently UMR offers more than 30 doctorate, master’s and bachelor’s degrees, as well as certificate and licensure programs with key biomedical and health-science programs.

ADDITIONAL IMPACTS

Figure 2 summarizes various impacts of Mayo Clinic’s Minnesota operations on the state in the areas of employment, income, economic output and taxes.

	Employment	Personal Income	Economic Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	34,245	\$3,157,952,192	\$4,775,114,944	\$764,284,852	\$168,363,500
Indirect Impacts	10,969	\$550,899,144	\$1,647,216,896	\$222,616,162	\$95,229,512
Induced Impacts	25,563	\$985,468,920	\$3,187,691,136	\$469,393,233	\$228,300,954
Total Impact	70,777	\$4,694,320,256	\$9,610,022,976	\$1,456,294,247	\$491,893,966

Figure 2



Impact of Mayo Clinic on Arizona's Economy

Total impact = \$1.5 billion

Total jobs = 10,600

Total taxes = \$208 million

OVERVIEW

Mayo Clinic in Arizona (Scottsdale/Phoenix) generates more than \$747 million in direct economic output for the state of Arizona. This spending leads to more than \$700 million in additional economic output for a total impact of nearly \$1.5 billion on the state.

JOBS

Mayo Clinic in Arizona provides 4,651 full-time jobs and supports an additional 5,964 jobs in the state of Arizona, yielding employment for a total of more than 10,600 people.

EDUCATION AND RESEARCH

Mayo Clinic Arizona partners with Arizona institutions in advancing biomedical research within the state. Mayo and Arizona State University recently formed the ASU/Mayo Center for Metabolic and Vascular Biology, a new joint research venture targeting metabolic syndrome – a group of high-risk medical factors that can lead to heart disease, stroke and diabetes.

“Our connection with ASU is a very broad and deep one. We’ve tried to build a web of connections between us. We have connections at the research level, at the medical school level, at the business school level, and at the nursing level.”

Victor Trastek, M.D.

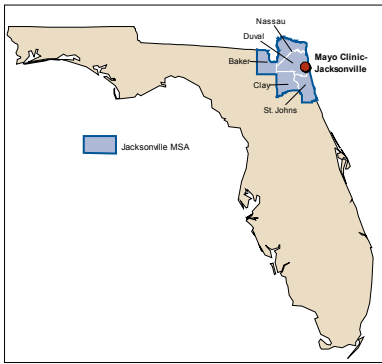
CEO, Mayo Clinic Arizona

Within Arizona, Mayo also has a productive relationship with the Translational Genomics Research Institute (TGen). Mayo and TGen formed a 2003 agreement to enhance joint research programs between the two institutions. The Mayo Collaborative Research Building in Scottsdale houses TGen’s Cancer Drug Development Laboratory and TGen’s Drug Development Services. The relationship was further solidified in 2008 when leaders from both Mayo Clinic’s NCI-designated Comprehensive Cancer Center and TGen formalized a strategic alliance that will promote further collaborations in cancer research.

ADDITIONAL IMPACTS

Figure 3 summarizes various impacts of Mayo Clinic’s Arizona operations on the state in the areas of employment, income, economic output and taxes.

	Employment	Personal Income	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	4,651	\$486,108,000	\$747,078,016	\$11,751,371	\$91,606,662
Indirect Impacts	1,921	\$82,245,624	\$246,283,920	\$14,491,733	\$19,184,056
Induced Impacts	4,043	\$151,862,000	\$489,116,640	\$34,753,883	\$37,043,859
Total Impact	10,615	\$720,215,616	\$1,482,478,592	\$60,996,987	\$147,834,577



Impact of Mayo Clinic on Florida's Economy

Total impact = \$1.6 billion

Total jobs = 11,300

Total taxes = \$198 million

OVERVIEW

Mayo Clinic in Florida (Jacksonville) generates nearly \$750 million in direct economic output for the state of Florida. This spending leads to about \$850 million in additional economic output for a total impact of almost \$1.6 billion on the state of Florida.

JOBS

Mayo Clinic in Florida's 4,487 full-time jobs generate more than 6,800 additional jobs for the state of Florida, yielding employment for a total of more than 11,300 workers.

ADDITIONAL IMPACTS

Figure 4 summarizes various impacts of Mayo Clinic in Florida's operations on the state in the areas of employment, income, economic output and taxes.

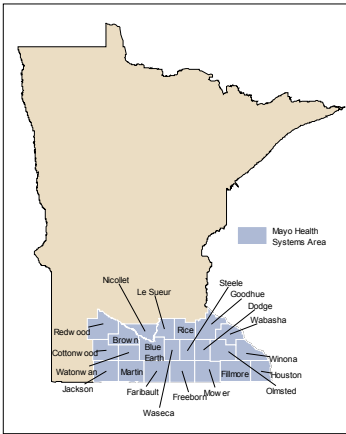
	Employment	Personal Income	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	4,487	\$431,456,992	\$749,060,992	\$2,725,464	\$82,277,932
Indirect Impacts	2,326	\$97,769,480	\$298,508,320	\$15,086,459	\$22,271,294
Induced Impacts	4,511	\$174,580,144	\$549,312,256	\$34,927,499	\$41,015,807
Total Impact	11,324	\$703,806,592	\$1,596,881,536	\$52,739,422	\$145,565,033

Figure 4

EDUCATION AND RESEARCH

In 2008 Mayo Clinic in Florida entered into a partnership agreement with Florida State University (FSU). The agreement calls for interaction and collaboration between researchers at FSU and Mayo Clinic, the establishment of joint research programs and the exchange of scientific and educational literature and research.

In addition, Florida-based companies Anthrex, Inc. and MAKO Surgical Corporation licensed several Mayo Clinic innovations.



Impact of Mayo Health System on the Economy of Minnesota

OVERVIEW

Mayo Health System (MHS) is a family of clinics, hospitals and health care facilities serving 70 communities in Minnesota, Iowa and Wisconsin. Mayo Health System links the expertise of Mayo Clinic with health care providers in local communities to offer patients a full spectrum of health care options. Patients receive quality health care at their local clinic or hospital, and, when needed, can receive highly specialized care at Mayo Clinic.

MHS’s southern Minnesota operations serve additional patients and generate more economic impacts for the state. Within this 22-county region, MHS makes a \$1.3 billion total contribution to Minnesota’s economy.

JOBS

MHS Minnesota practices employ more than 5,344 people and create nearly 5,000 additional jobs, providing a total of more than 10,300 jobs in southern Minnesota.

ADDITIONAL IMPACTS

Figure 5 summarizes various impacts of Mayo Health System’s operations on the state of Minnesota in the areas of employment, income, economic output and taxes.

	Employment	Personal Income	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	5,344	\$424,099,008	\$693,366,976	\$23,659,302	\$76,130,952
Indirect Impacts	1,540	\$77,337,032	\$229,647,360	\$13,616,569	\$17,932,787
Induced Impacts	3,456	\$133,237,112	\$430,982,016	\$30,866,775	\$32,596,128
Total Impact	10,340	\$634,673,152	\$1,353,996,288	\$68,142,646	\$126,659,867

Figure 5



Impact of Mayo Health System on the Economy of Wisconsin

OVERVIEW

Mayo Health System operations in Wisconsin provide benefits to the state beyond patient care services. Including their downstream impacts, these practices generate a total impact of \$1.7 billion for the state of Wisconsin.

JOBS

As a result of the activities of MHS’s 7,017 Wisconsin full-time jobs, 7,000 additional jobs come to the state. MHS’s Wisconsin practices support a total of 14,042 jobs for workers in Wisconsin.

ADDITIONAL IMPACTS

Figure 6 summarizes various impacts of Mayo Health System’s Wisconsin operations on the state in the areas of employment, income, economic output and taxes.

	Employment	Personal Income	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	7,017	\$557,628,992	\$931,091,968	\$19,511,291	\$94,664,870
Indirect Impacts	2,184	\$89,053,760	\$265,132,736	\$15,846,132	\$18,694,504
Induced Impacts	4,841	\$171,871,616	\$542,350,080	\$39,198,640	\$37,523,540
Total Impact	14,042	\$818,554,368	\$1,738,574,848	\$74,556,063	\$150,882,914

Figure 6

Other Impacts

- In 2008 Mayo's combined Colleges of Medicine received \$184 million in NIH funding, placing Mayo within the top 20 institutions for NIH funding. During that same year, Mayo Clinic also used \$210.8 million of its institutional revenues to fund research. In total, Mayo's research expenditures for 2008 equaled \$538.2 million.
- From 2004 to 2008, Mayo Clinic clinicians and researchers published 15,960 manuscripts, adding to the base of scientific knowledge across multiple life science and health care disciplines.
- Mayo Clinic won a five-year, \$72.5 million grant from the NIH for its Center for Translational Science Activities (CTSA), which accelerates the movement of laboratory discoveries and innovations into clinical practice and practical products designed to improve clinical care of patients.
- In 2008, Mayo Clinic Cancer Center received an additional five years of National Cancer Institute (NCI) funding and re-designation as a comprehensive cancer center for 2009-2013, a nod to the institution's scientific excellence and focus on cancer prevention, diagnosis and treatment. The award will provide more than \$28 million for infrastructure and administrative support for the center's 450 scientists and physicians. Mayo has the only NCI-designated comprehensive cancer center conducting research at three distinct locations across the United States: Scottsdale/Phoenix, Ariz.; Jacksonville, Fla.; and Rochester, Minn.
- Mayo Clinic's Office of Intellectual Property has filed more than 3,150 patent applications, and received more than 1,000 issued patents and 550 active license agreements for Mayo intellectual property since 1986.
- In 2008 Mayo Clinic launched the Mayo Medical Ventures Fund II, a \$10 million fund for making joint investments with other venture capital funds in companies commercializing Mayo innovations and research discoveries. The fund, which can provide up to \$2.5 million per company, has already funded five companies, while its predecessor fund (MMV Fund I), launched in 1998, and has invested in 26 companies.
- Mayo Clinic's medical education programs strengthen the future earning power of medical professionals, which eventually boosts tax revenues and stimulates local economies. Mayo Clinic operates as a de facto biomedical and health sciences university system with locations in Minnesota, Arizona and Florida and five principle education divisions:
 - Mayo Medical School (200 enrolled students)
 - Mayo School of Graduate Medical Education (1,500 resident physicians and fellows annually)
 - Mayo Graduate School (270 Pre-doctoral and other students)
 - Mayo School of Health Sciences (1,500 allied-health students)
 - Mayo School of Continuous Professional Development
 - 270 educational activities annually
 - 77,100 annual physician participants
 - 42,900 annual non-physician participants

Conclusion

Mayo Clinic represents an exceptional asset for the nation and for the individual states and regions that are home to major Mayo operations. Mayo Clinic's expenditure impacts are significant, generating over 144,000 jobs nationwide and \$22 billion in output impact on the U.S. economy. The individual states and regions of the country where Mayo Clinic concentrates its operations benefit not only from widespread Mayo Clinic and Mayo Health System expenditure impacts, but also from a broad variety of functional impacts generated through Mayo Clinic's health care, research and education missions.

By independent measures, Mayo Clinic is a leader in the provision of state-of-the-art and high-value clinical health care services. Furthermore, independently produced metrics show Mayo Clinic to be a highly productive and influential biomedical and health sciences research and development institution, responsible for above-average impact in science and health care research and the generation of a substantial volume of technology and intellectual property.

Mayo Clinic is also empowering the next generation of research scientists, clinicians and health care personnel through a major commitment to higher education, all the way from certificate-level programs through to doctorate and medical professional degrees.

Battelle further concludes that, among academic medical centers, Mayo Clinic is particularly well positioned for continued leadership in the science and technology driven 21st century economy, and that the nation and Mayo Clinic home states and regions are likely to see significant further impacts and benefits from Mayo Clinic in the future.

