



Greater Milwaukee Global Health Landscape Study



This study was published in April 2020. The base year for the analysis was 2019.

Photo credit: Engineers Without Borders, University of Wisconsin-Milwaukee, <http://www.ewbatum.blogspot.com>

LETTER FROM THE MILWAUKEE GLOBAL HEALTH CONSORTIUM PRESIDENT

April 13, 2020

Dear Milwaukee Global Health Consortium and community members:

I am excited to share with you our recently completed “Global Health Landscape” study, which the Milwaukee Global Health Consortium (MGHC) Board commissioned in the fall of 2019. This historic and groundbreaking study is the first of its kind for greater Milwaukee, and, in a limited way, for the State of Wisconsin.

Today, we see, more than ever, that proactive investment in global health can help prevent disease and make our communities and neighborhoods safer and healthier. Additionally, global health-related activities contribute significantly to the local economy through employment and commerce. We are also acutely aware that the inability to predict, prevent, and effectively control a pandemic has significant health, social, and economic ripple effects. No one is unaffected. The world is a patchwork of interconnected neighborhoods, and we need to do more to protect our global population’s collective health and safety.

This study is a starting point for informed discussions about greater Milwaukee’s future global health strategy and investments. It provides a solid foundation from which to monitor and analyze greater Milwaukee’s global health landscape and improve the sector’s performance over the next three to five years. Although it is recognized that this report underestimates the totality of global health activity occurring across the state, it is an important first step in capturing and measuring the scope of global health–related activities across academic institutions, companies, nonprofit, and other civil service organizations.

Many Wisconsin organizations are committed to making greater Milwaukee a destination for global health research, education, clinical care, and technology development activities. We recognize that a consortium’s value is a function of the strengths and diversity of its membership and its use as a vehicle to connect and respond to challenges.

Collectively, we are committed to developing our future health professionals, engineers, scientists, and leaders who are needed to address health inequities; serve diverse populations; and make Wisconsin communities, and all communities around the globe, healthier and safer.

I want to thank all the participants who took time to discuss their global health activities and help with data collection, RTI International for the team’s professional conduct of this study, and the MGHC Board of Directors for their support of this important and inaugural study.

A handwritten signature in black ink, appearing to read 'Stephen W. Hargarten', written in a cursive style.

Stephen W. Hargarten, MD, MPH
President

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GREATER MILWAUKEE GLOBAL HEALTH LANDSCAPE STUDY

BACKGROUND AND PURPOSE

For the past three decades, the greater Milwaukee metropolitan area has been an advocate for and leader in global health research, education, training, and technology commercialization. Companies, universities, nonprofits, civil society organizations, and government agencies have worked together to strengthen health and safety locally and globally, with the goal of reducing disparities and inequities, for the world's diverse populations.

To measure the breadth and depth of greater Milwaukee's global health activities and to communicate the sector's impacts on the regional economy, the Milwaukee Global Health Consortium (MGHC) commissioned this study. MGHC members include Advocate Aurora Health, Carroll University, Children's Wisconsin, the City of Milwaukee Health Department, Concordia University, Froedtert Hospital, the International Institute of Wisconsin, Marquette University, the Medical College of Wisconsin, Milwaukee County Government, the Rotary Club of Milwaukee, Sixteenth Street Community Health Center, and the University of Wisconsin-Milwaukee.



RESEARCH METHODS

This study represents the first known global health landscape analysis and estimation of economic impact undertaken for the greater Milwaukee metropolitan area. A major emphasis of the study was to develop the framework for organizing and presenting greater Milwaukee's global health landscape and to work with stakeholders to develop the data collection process.

The study draws on economic, educational, and other data provided by MGHC members and a few of Milwaukee's largest, global biohealth companies. RTI International collected economic data on employment, operating expenditures, exports, and research activity that are related to global health. The study team also collected data and perspectives on the type of global health experiences offered by Wisconsin institutions of higher education and medical residency programs and the impact of these experiences on the quality, preparedness, and career focus of graduates. In total, RTI interviewed over 35 individuals representing Wisconsin organizations to understand the role they play in the global health ecosystem of the greater Milwaukee metro area, and, to a limited extent, the state of Wisconsin.

Because of the scope and time constraints of this study, there are limitations. For example, RTI and MGHC were not able to capture all the local faith-based and other community-based efforts focused on addressing local and global health disparities. We were also not able to include all the greater Milwaukee biohealth companies and companies in other industry sectors that are involved in global health



It's never happened in history that every region in the world could affect every other region simultaneously... The sense that Americans want to withdraw from the world, the attitude that 'most of the world must take care of itself' is one that has recurred in U.S. history, but is fraught with peril."¹

- Henry Kissinger, Former U.S. Secretary of State and National Security Advisor

activities. Two examples of non-biohealth companies that are engaged in global health activities are A.O. Smith, a manufacturer of water heaters and boilers which also supplies water filtration technology overseas, and SC Johnson, which is engaged in philanthropic technology commercialization activities with international partners to reduce the impact of mosquito-borne diseases.

RTI and the MGHC took a conservative approach to estimating the direct economic impact of global health activities by focusing on those research, education, and industrial activities that involved a bilateral, mutually beneficial linkage with another country or engagement with local, diverse populations representative of the global community. Many greater Milwaukee organizations that engage in global health activities are also actively engaged in

public health, international health, planetary health, and life sciences research and technology commercialization activities. The unifying thread across these varied companies and organizations is the ambition to improve health and reduce disparities for all people, from the neighborhoods of greater Milwaukee to those in other countries.

RTI used the IMPLAN economic impact modeling platform to estimate the indirect and induced impacts of the direct employment and expenditures by greater Milwaukee global health organizations in 2019.² IMPLAN draws on U.S. government, state, and local economic data to estimate how economic activity in one industry sector reverberates across other industry sectors in a regional economy through business establishment and personal spending.

LIFE EXPECTANCY AT BIRTH (LEB) BY ZIP CODES



6.3 years
largest gap in LEB
between two U.S. States



71.3 vs. 83.2 years
LEB for two zip codes
within Milwaukee County



67%
variation attributable to combined
income and education index

LeCounte, Erica and Geoffrey Swain (2017). "Life Expectancy at Birth in Milwaukee County: A Zip Code-Level Analysis," Journal of Patient-Centered Research and Reviews, 4:213-20.

WHY GREATER MILWAUKEE CARES ABOUT GLOBAL HEALTH

What is global health? This study defines global health as collaborative research, education, training, and technology commercialization that strengthen health and safety, locally and globally, by reducing disparities and inequities for the world's diverse populations.

An important aspect of global health is awareness of how culture and language shape our understanding of "health" and "disease," as well as our response. A global health perspective recognizes that socioeconomic, environmental, and cultural factors play a role in the very different health outcomes experienced by populations within the same cities and same countries, as well as across countries.

Consider a Milwaukee County statistic that makes this point: Life expectancy at birth varies by 12 years for two zip codes within Milwaukee County: 71.3 years versus 83.2 years.³ Similar statistics that highlight health disparities can be found across U.S. states and across countries.

As Dr. Stephen Hargarten noted in his letter, "Today we see that when we proactively invest in global health, we can prevent disease and make our communities and neighborhoods safer and healthier. Additionally, our global health-related activities support local employment and commerce. We are also acutely aware that the inability to prevent or effectively control a pandemic has significant health, social, and economic ripple effects. No one is unaffected."

Greater Milwaukee's 30 years of leadership in global health aims to prepare future health professional leaders to serve Wisconsin residents; partner across local and global institutions to solve important global health problems; and leverage its global health expertise to generate more research, innovation, and economic activity for the state of Wisconsin that contribute to good health and well-being.



I am very pleased that we continue to demonstrate a true spirit of cooperation with academic partners around the world. Collaboration and the exchange of ideas and brainpower with institutions on a global scale will have a positive and lasting impact on the health of our respective communities."

— John R. Raymond, Sr., MD, President and CEO, Medical College of Wisconsin

ECONOMIC IMPACT RESULTS

In 2019, greater Milwaukee's global health sector generated direct employment of 6,132 people and \$2.901 billion of economic activity. When the secondary and tertiary impacts of spending by greater Milwaukee global health organizations and employees are included, the greater Milwaukee global health sector supported 16,961 total jobs, \$1.308 billion in labor income, \$4.671 billion in economic output, and \$143.8 million in state and local taxes for the state of Wisconsin.⁴ For comparison, the Milwaukee-Waukesha-West Allis metropolitan statistical area gross domestic product is \$103.7 billion.⁵

ECONOMIC IMPACT



16,961
Total Jobs



\$4.7B
in Economic Output



\$143.8M
in State and Local taxes

Source: RTI International



Not all medical schools and residencies provide global health experiences for trainees, and even fewer provide formal curriculum or tracks. What we offer helps to attract students and faculty who are interested in incorporating global health into their careers.”

Caitlin Kaeppler, MD, Director, Pediatric Residency Global and Community Health Track, Medical College of Wisconsin

A VIBRANT GLOBAL HEALTH ECOSYSTEM

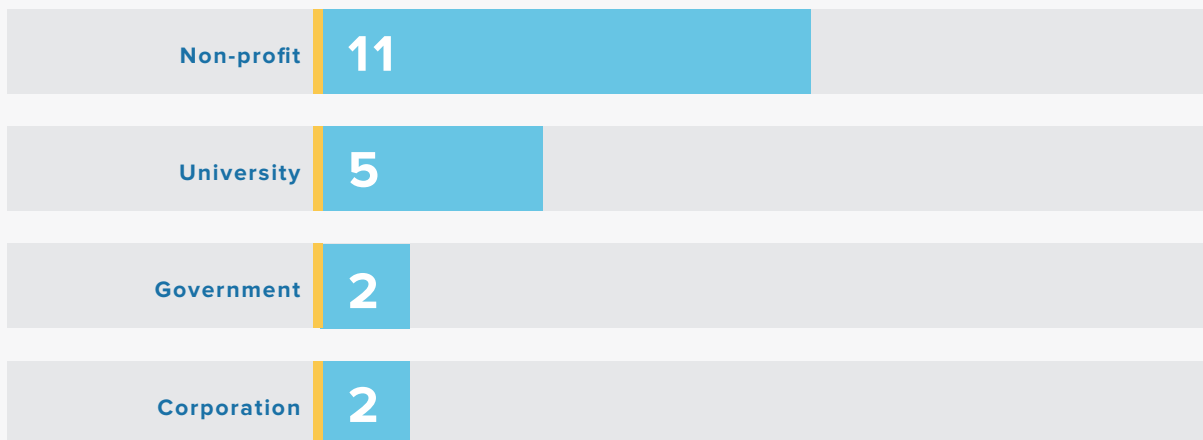
Nationally, the MGHC is one of five regional global health alliances playing a leadership role in global health education, research, and technology commercialization activity. The others are the Washington Global Health Alliance (anchored by Seattle), the Bay Area Global Health Alliance of California (anchored by San Francisco), the Georgia Global Health Alliance (anchored by Atlanta), and the Triangle Global Health Consortium of North Carolina (anchored by Raleigh-Durham-Chapel Hill).⁶

Greater Milwaukee’s global health ecosystem comprises institutions of higher education, hospitals and community health centers, global biohealth companies, nonprofit research institutes, philanthropic and civic organizations, and local government agencies (see Figure 1).

Representatives of greater Milwaukee global health organizations are engaged in several global health disciplines or focus areas. Figure 2 ranks these global health disciplines by the number of organizations that identified working in that discipline. “Infectious diseases” (55%) and “chronic diseases” (50%) were the top two disciplines, followed by “maternal, child, and newborn health” (40%) and “injury and violence” (30%). Work in the areas of “injury and violence;” “mental and behavioral health;” and “water, food, and planetary health and sustainability” highlights Milwaukee’s understanding of how social, environmental, and health issues are interrelated.

In terms of specific activities, greater Milwaukee global health organizations are participating in a di-

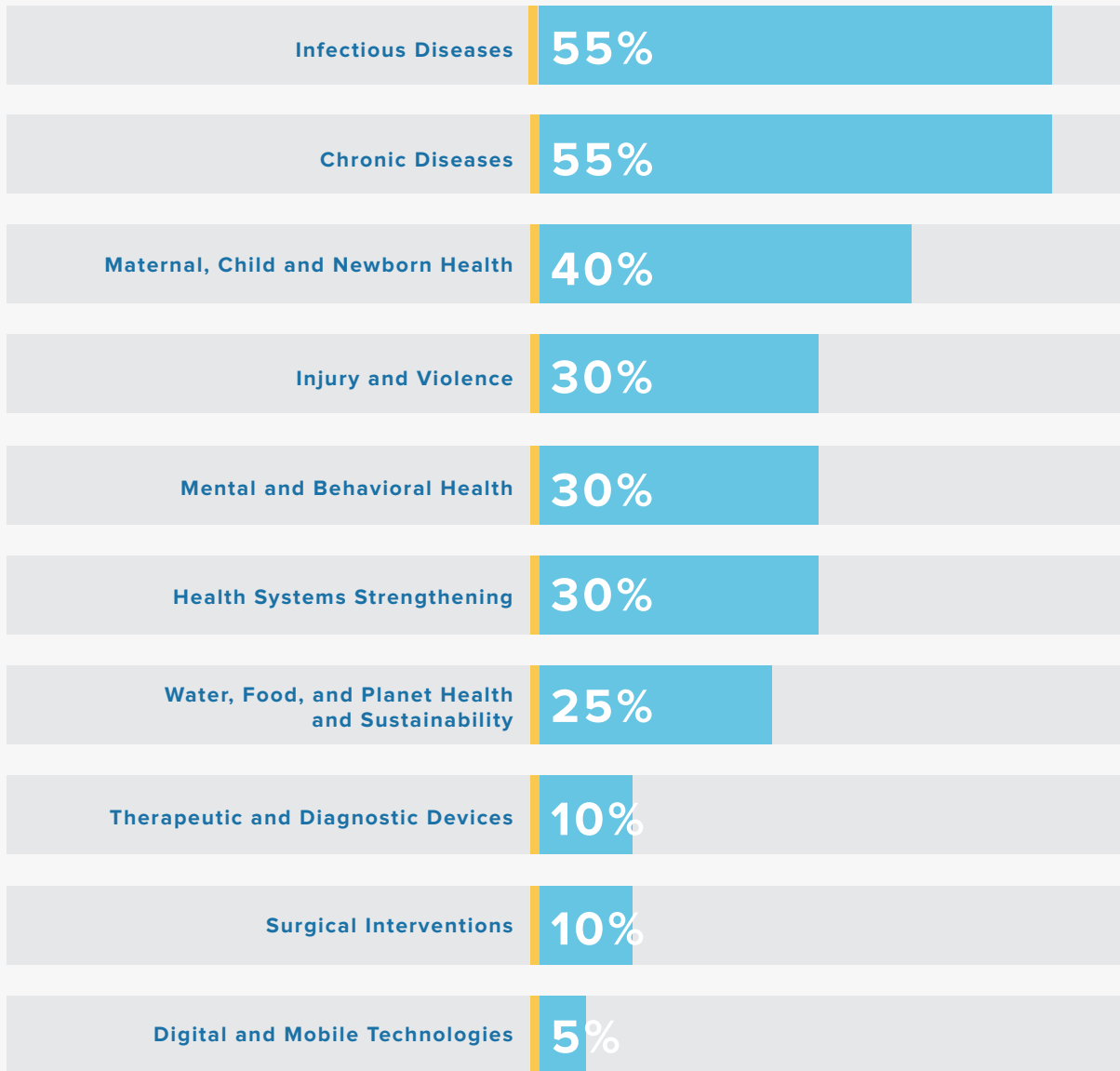
Figure 1. Breakdown of Greater Milwaukee Global Health Organizations by Type of Organization, 2019



Note: “Non-profits” are Internal Revenue Service-approved 501(c)(3) organizations that include community health centers, hospitals, foundations, etc. Many public and private universities are also non-profits, but RTI used the “university” category to distinguish these higher education institutions from other non-profits.

Source: RTI International

Figure 2. Global Health Disciplines Represented by Greater Milwaukee Global Health Organizations, 2019



Note: Global health organizations could select more than one global health discipline in which they are active.
Source: RTI International

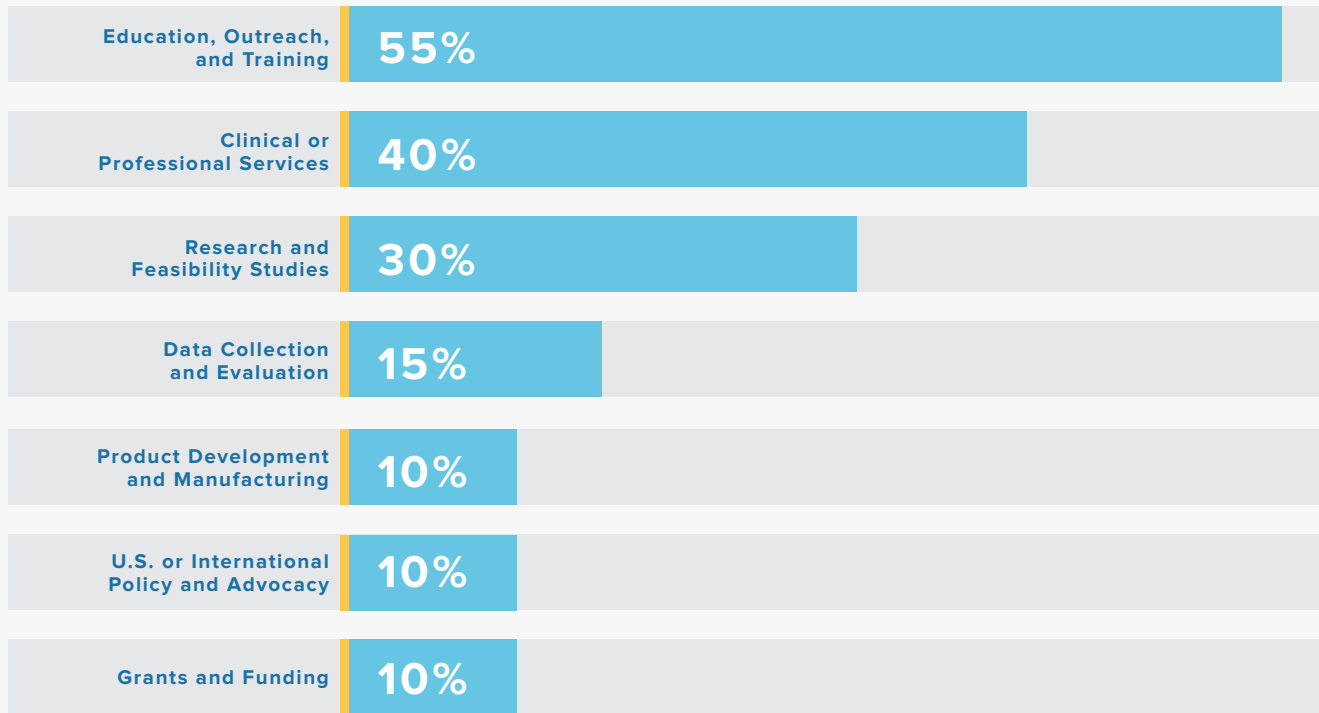


“

Global health curriculum helps our pediatric residents see that the world is much smaller, and people are more similar than they realize. It helps them appreciate that the physician’s role is to serve, not to help. The nuance is important.”

Michael Gutzeit, MD, Chief Medical Officer, Children’s Wisconsin

Figure 3. Global Health Activities Engaged in by Greater Milwaukee Global Health Organizations, 2019



Note: Global health organizations could select more than one global health activity in which they are engaged.”
Source: RTI International

verse set of global health activities, as shown in Table 3. The greatest share (55%) of greater Milwaukee global health organizations are engaged in “education, outreach, and training” for students, healthcare workers, and refugees and recent immigrants. “Clinical or professional services” is second (40%), followed by “research and feasibility studies” (30%), and “data collection and evaluation” (15%).

Engagement in global health is also local. Milwaukee is home to the largest population of Rohingya refu-

gees (from Burma) in the U.S. Other refugees resettled in Milwaukee include Hmong (from Laos), Congolese, Liberians, Russians, Iraqis, Somalis, Sudanese, Eritreans, Ethiopians, and Afghans, among many others.⁷ Milwaukee global health organizations provide a variety of services, education, health screenings, and clinical care for newly arrived immigrants. Collaborative partnerships that support refugee health and assimilation span the State of Wisconsin Department of Children and Families, the Milwaukee Area Refugee Consortium, the African and Asian Refugee Consortium, academic institutions, nonprofit organizations, and health clinics. Since 2015, the “Our City of Nations” conference, has been hosted by three MGHC academic members (Concordia University, UW-Milwaukee, MCW) to promote refugee health and wellness. The Our City of Nations conference brings together these diverse partnerships to discuss best practices in refugee resettlement and ensure that greater Milwaukee is a more welcoming community to these newcomers.⁸



My month in Vietnam will have a drastic impact on my care of patients here at MCW. I feel more competent, more independent, more confident, and more creative when thinking about how to care for patients.”

Shola Vaughn, MD, Medical College of Wisconsin Dermatology Resident, Vietnam

IMPACT ON WORKFORCE

Global health programs (e.g., global health tracks, certificates, and degrees) offered by Wisconsin institutions of higher education aim to provide undergraduate and graduate students and medical residents with the knowledge, skills, and hands-on experiences to treat diverse patient populations and to engage communities in prevention and care. Figure 4 provides a sample of topics covered by Children’s Wisconsin and the Medical College of Wisconsin Department of Pediatrics’ Global Health Noon Conference Series for pediatric residents.

Studies of the impact of a global health curriculum and field experiences on medical students have identified the following changes in students’ knowledge, attitudes, and skills⁹:

- Changes in worldviews
- Increased cultural sensitivity
- Enhanced community, social, and public health awareness
- Enhanced clinical and communication skills
- More appropriate resource utilization
- Change in career plans (e.g., more likely to practice primary care, strong preference to work with underserved populations and engage in community service activities)
- A greater understanding of the challenges of working in areas with scarce resources



Our students gain a real recognition of health care disparities in underserved areas, and they learn the “grit” skills that are important to providing good healthcare.”

Chris Olsen, Director, Graduate/Professional and Capstone Certificates in Global Health, Global Health Institute, University of Wisconsin-Madison

Figure 4. Global Health Disciplines









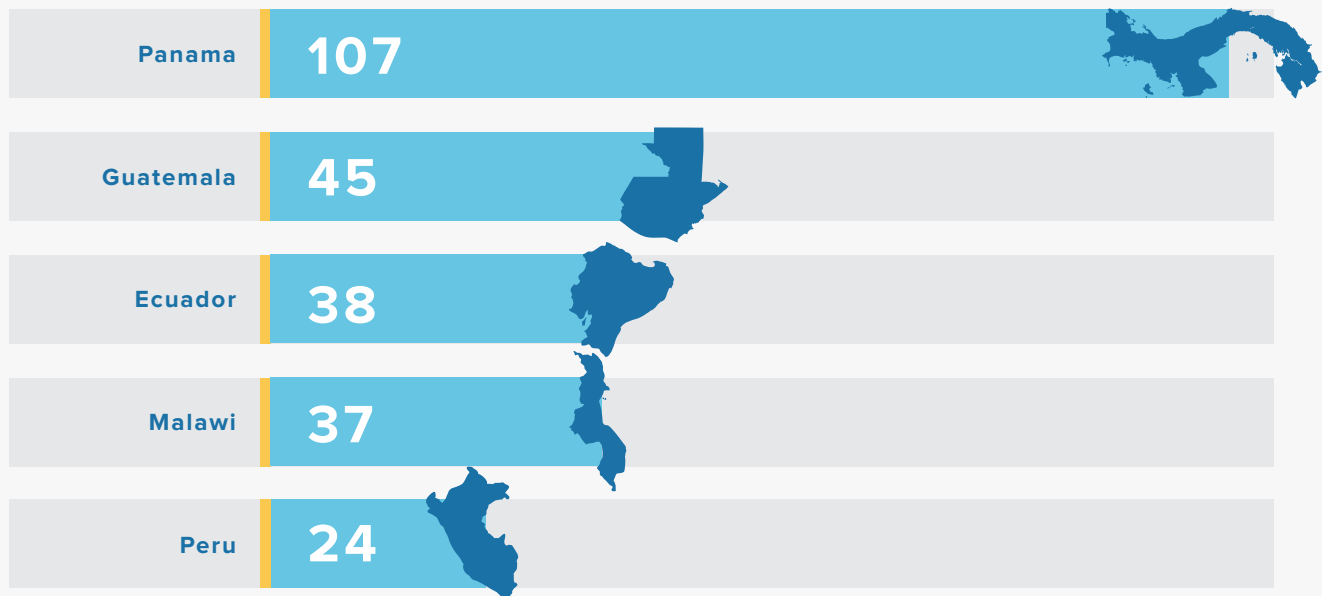
 <p>Infectious Disease</p>	 <p>Maternal, Child, and Newborn Health</p>	 <p>Injury and Violence</p>
 <p>Chronic Disease</p>	 <p>Mental and Behavioral Health</p>	 <p>Health Systems Strengthening</p>
 <p>Water, Food, and Planetary Health</p>	 <p>Therapeutic and Diagnostic Devices</p>	 <p>Surgical Interventions</p>

Figure 5. Top Five Countries Where Greater Milwaukee University Students and Medical Residents Studied by Number of Students, FY2019



Source: RTI International

These are positive workforce impacts for the state of Wisconsin, especially in those parts of the state that need more primary care physicians or more health-care professionals interested in working with diverse or underserved communities.

In the past year, approximately 413 greater Milwaukee university students and residents studied or participated in global health experiences in 30 countries. The top five countries represented were Panama (107 students), Guatemala (45 students), Ecuador (38 students), Malawi (37 students), and Peru (23 students), as shown in Figure 5.

Greater Milwaukee’s and the state of Wisconsin’s leadership in creating global health tracks, certificates, and degrees has enhanced the attractiveness of Wisconsin’s undergraduate and graduate degree programs in engineering, medicine, nursing, allied health professions, peacebuilding, and public health nationally and internationally.

IMPACT ON INDUSTRY

Wisconsin is home to 367 biohealth companies spanning drugs and pharmaceuticals; medical devices and diagnostics; and molecules, cells, and tissue. These companies are engaged in global health research, manufacturing, and export activities that generate significant economic activity and employment for the state of Wisconsin. In 2019, Wisconsin biohealth companies exported \$2.9 billion of Wisconsin-manufactured products to clinics, hospitals, and academic medical centers worldwide.¹⁰

Greater Milwaukee is home to major biohealth companies, such as GE Healthcare (imaging technology) and Alkami (contract development and manufacturing organization in the pharmaceutical industry), as well as global companies in other industry sectors that are engaged in global health, such as A.O. Smith (water filtration) and SC Johnson (philanthropic work to reduce mosquito-borne disease).

Did you know?

- The University of Wisconsin-Milwaukee was the first university in Wisconsin to offer a global health bachelor's degree and certificate. It was the first higher education institution in the country to offer a Master's in Sustainable Peacebuilding, which prepares students with the interdisciplinary skills and systems-based approach to solve complex global problems.¹⁴
- The Medical College of Wisconsin offers a Global Health Pathway for medical students and global health tracks for residents and fellows. The Medical College of Wisconsin's Global Health Track for Pediatric Residents at Children's Wisconsin is one of the most popular tracks with 35 out of a total of 101 residents (35%) participating in FY19. Residents can choose from five track options. The Medical College of Wisconsin will offer the state's first Master's of Science in Global Health Equity beginning in fall 2020.
- The University of Wisconsin-Madison elevated its Center for Global Health to a university-wide institute, the Global Health Institute, in 2011. UW-Madison offers undergraduate, graduate, and professional certificates in global health through the School of Medicine and Public Health, School of Nursing, School of Pharmacy, School of Veterinary Medicine, and College of Agriculture and Life Sciences. The University of Wisconsin-Madison will offer a Bachelor's degree in Global Health beginning in fall 2020.
- To strengthen intra-institutional educational connections, MGHC initiated the Milwaukee Global Health Scholars program in 2019. Scholars are comprised of undergraduate, graduate, and medical graduate students from UW-Milwaukee, Marquette University, Concordia University Wisconsin, Carroll University, and the Medical College of Wisconsin, who convene around a shared interest in topics of local and global health equity. Student applicants are formally accepted and intentionally connected to a cohort of other global health-minded students from the fields of medicine, nursing, public health, and sustainable peacebuilding.

Outside of Milwaukee, and concentrated around the Madison area, are companies such as Exact Sciences, Promega, Covance, Catalent Pharma Solutions, Thermo Fisher Scientific (Madison and Milwaukee locations), Illumina, Epic Systems, Gilson, and MilliporeSigma (Madison, Milwaukee, and Sheboygan Falls locations).¹¹

In 2019 alone, greater Milwaukee companies, institutions of higher education, and other global health organizations worked in, partnered with, and studied in 62 countries (out of a total of the world's 195 countries), as shown in Figure 6.

Greater Milwaukee global health companies and organizations worked in 37 countries. The top countries represented in 2019 were China, Japan, India, Nepal, Belize, Peru, and Uganda. Figure 7 presents the list of top countries where greater Milwaukee companies have major operations and greater Milwaukee hospitals and MCW have partnerships for medical residents. This is a distinct count from the 30 countries in which Milwaukee institutions of higher education offered global health experiences for students. In total, greater Milwaukee global health organizations worked, partners, and studied in 62 unique countries (Figure 6).



SC Johnson is committed to improving the lives and health of the people at the Base of the Pyramid—those who earn less than a few U.S. dollars per day. We work with global health partners, including Ministries of Health, to protect people living in vulnerable, difficult-to-reach communities from mosquito-borne diseases.”

Thomas Putzer, Director, Base of the Pyramid Group, Office of the Chairman and CEO, SC Johnson

Figure 6. Sixty-two Countries Where Greater Milwaukee Global Health Organizations Worked, Partnered, and Studied, 2019

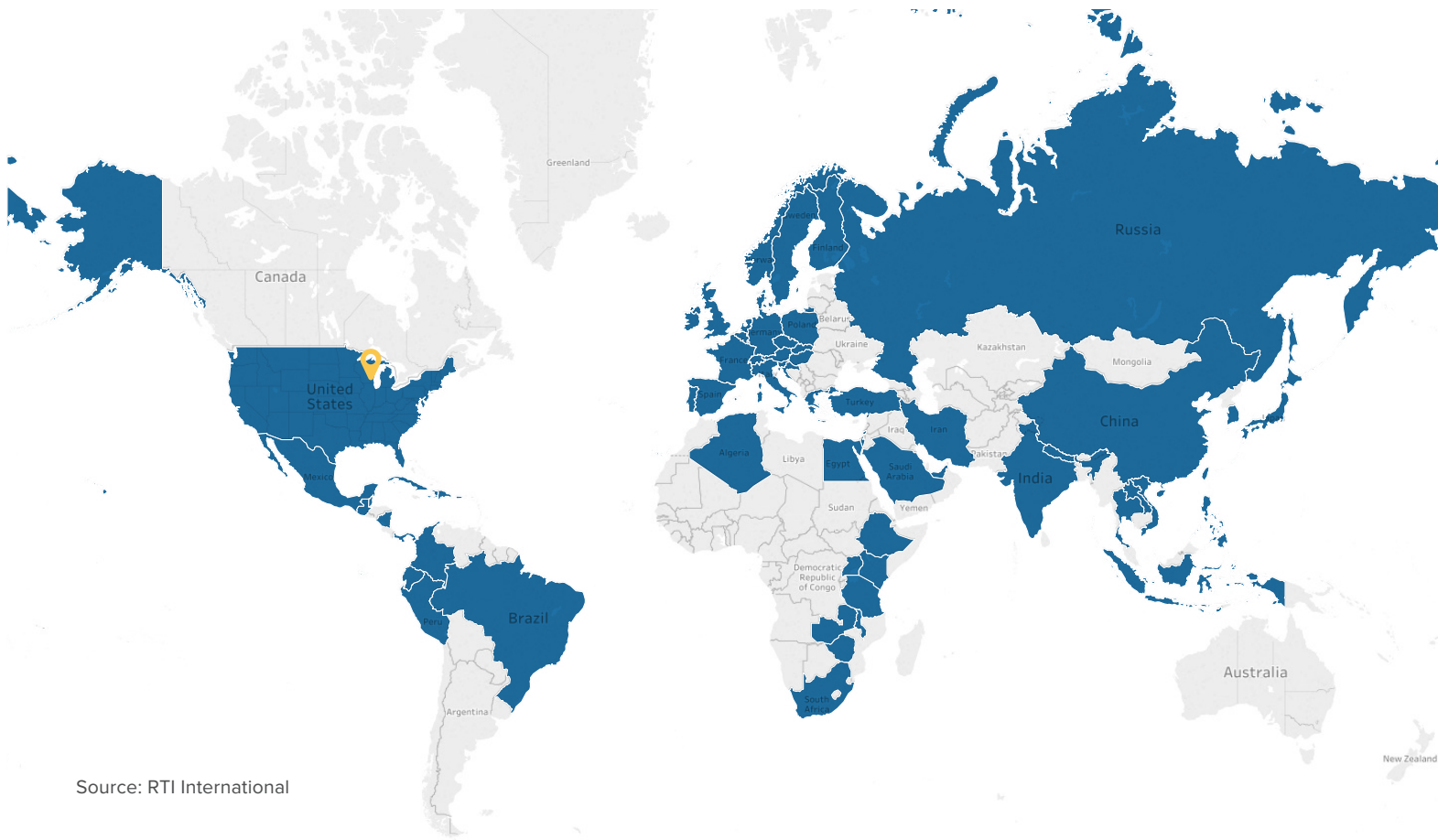
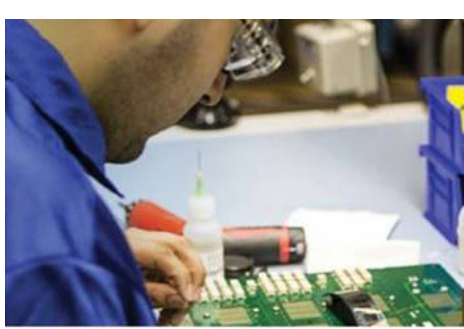


Figure 7. Countries Where Greater Milwaukee Global Health Organizations Worked in 2019





GE Healthcare: Local Commitment, Global Engagement

Question: How does GE Healthcare view its global health role?

“At GE Healthcare, we work to provide cutting-edge medical solutions that develop and strengthen healthcare systems and enhance the capabilities of our global medical community,” says Jay Hill, CTO and COO, Imaging at GE Healthcare and Board Chair at BioForward Wisconsin. “With more than four million GE Healthcare devices installed in more than 160 countries around the world, our company works closely with government agencies and hospital systems to train more than 10,000 global customers each year on ways to optimize equipment and improve patient care.”

“Improving global health is a three-part challenge: developing high-quality medical technologies and solutions; making these innovations as affordable as possible; and increasing access to these innovative solutions in every country, community and healthcare setting worldwide to empower clinicians and impact patients’ lives,” continues Hill. “GE Healthcare is tackling this three-part challenge head on. For example, GE Healthcare was the first medical device company to establish direct operations in Algeria. We train Algerian engineers and technicians to service and maintain medical equipment in country. This is critical, since when medical equipment isn’t working, patients can’t be screened, treatments can’t be developed, and healthcare facilities can’t operate efficiently. Our center in Algeria represents our commitment to developing human capital worldwide.”

Hill adds: “Our global impact starts with local commitment. Since we moved to Wisconsin in 1947, the state has become a global hub for biohealth research, innovation and commercial activity. At GE Healthcare, we’re proud to be a part of this community. Our partnerships with local universities and medical institutions have contributed to the development of numerous medical technologies and industry leading healthcare solutions that benefit patients throughout the world.”



At Marquette, global health is at the core of our mission. We care for those who need the most help throughout the world. We tend to the needs of the sick and the poor both through education and service.”

Lars Olson, PhD, Vice Chair of Academic Affairs, Biomedical Engineering, Marquette University

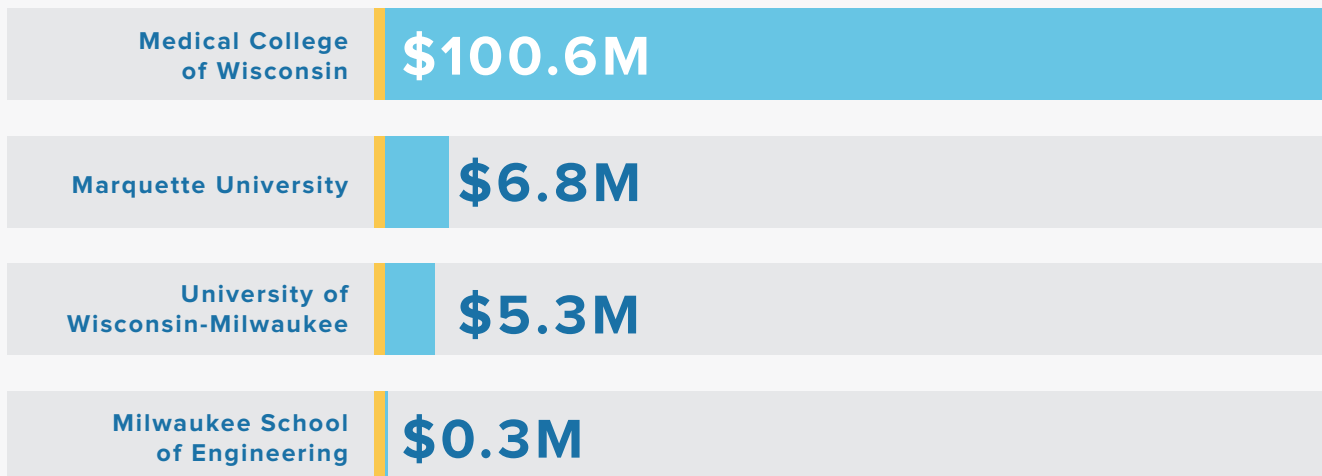


ENABLING RESEARCH ACTIVITY

What constitutes global health research is difficult to define and developing a framework that enables companies and research institutions to measure this activity remains a longer-term goal of the MGHC.¹² What is clear is that biohealth research and federal funding of this research is important to greater Milwaukee institutions of higher education. Biohealth research—specifically, research supported by the U.S. Department of Health & Human Services (HHS)¹³, which includes the National Institutes of Health—represented \$113 million (or 76.7%) of the total research and development (R&D) expenditures (\$147.2 million) by greater Milwaukee institutions of higher education in FY18, the most recent year for which data were available. Figure 8 shows total HHS-supported biohealth R&D expenditures by Wisconsin’s major universities.

Wisconsin foundations and civic organizations are also important funders of global health research activity and global health educational experiences. The J.M. Kohler Foundation Sustainability and Peacebuilding Fund provides a scholarship to support six 8-week immersive fieldwork experiences for students pursuing a UW-Milwaukee Masters in Sustainable Peacebuilding. The William Collins Kohler Foundation supports the Dr. Elaine Kohler Summer Academy of Global Health Research at the Medical College of Wisconsin, which provides medical students with a stipend for a 10-week, hands-on research experience mentored by a faculty member and global partner to address global health disparities in Milwaukee and overseas (see Figure 9).

Figure 8. Health & Human Services-Supported R&D Expenditures at Greater Milwaukee Universities, FY18



Note: The U.S. Department of Health & Human Services includes 11 operating divisions, of which the National Institutes of Health is the largest. Source: National Center for Science and Engineering Statistics, National Science Foundation (2019). Higher Education Research and Development Survey, FY 2018.

Figure 9. Dr. Elaine Kohler Summer Academy of Global Health Research: Country Collaborators, 2011-2019



Source: Medical College of Wisconsin
Office of Global Health

The Rotary Club of Milwaukee is another important funder of global health projects. Rotary’s motto is “service over self,” and the Rotary Club of Milwaukee and the Southeast District Rotary have funded a variety of health and disease prevention projects over the years. Each year, Rotary supports community water system and bridges projects in Guatemala conducted by Engineers Without Borders and engineering students at UW-Milwaukee and Marquette University (see photos on next page). As Mike Paddock, Engineering Service Corp Deputy Director at Engineers Without Borders, stated, “How do you ensure health without access to clean water and access to healthcare clinics during the rainy season? Engineers are key to prevention when it comes to health.”

LOOKING FORWARD

For the past three decades, greater Milwaukee has been a leader in global health research, education, training, and technology commercialization. The work of Milwaukee global health organizations spans many different disciplines and type of activities. The unifying aim is to prepare future health professional leaders; partner locally and globally to solve important global health problems; and leverage Milwaukee’s collective global health expertise to support more research, training, and economic activity for the state of Wisconsin that contribute to good health and well-being.

MGHC recognizes the limitations and gaps of this first landscape study but looks forward to the interest and discussion that it will generate among stakeholders. The next study will improve upon this initial effort to describe and measure Milwaukee’s global health sector activity and impact. MGHC hopes this study speaks to the value and vision of greater Milwaukee’s global health sector work today and its potential in the years to come.

“

Each year, we welcome hundreds of newcomers to our community: refugees, asylum seekers, immigrants, and others. Access to healthcare and services is a unifying need that crosses all nationalities. The International Institute of Wisconsin and its partners continually try to bridge the chasm of culture and language that often separate people from health care and services.”

Alexander Durtka, Jr., President and CEO, International Institute of Wisconsin

“

There’s a lot we can learn from other countries when we travel. There’s a tendency to assume we have the best healthcare in the world having never experienced other systems. Our students learn that healthcare can be delivered without all the bells and whistles. They see good quality healthcare being delivered in low-income countries, like Malawi and Thailand.”

Anne Dressel, PhD, Director, Center for Global Health Equity, University of Wisconsin-Milwaukee

“

The greater Milwaukee metropolitan area is a hub for global activity that strengthens the economy, advances research to tackle complex global health concerns, and enriches the culture of Southeastern Wisconsin. It is an honor to be part of MGHC's global landscape study."

Thomas Pahnke, MS, PT, ATC, Dean, College of Health Sciences, Carroll University



Photo credit: Engineers Without Borders, University of Wisconsin-Milwaukee, <http://www.ewbatum.blogspot.com>

APPENDIX 1: ECONOMIC IMPACT ANALYSIS

RTI and the MGHC took a conservative approach to estimating the direct economic impact of global health activities focusing on those research, education, and industrial activities that involved a bilateral, mutually beneficial linkage with another country or engagement with local, diverse populations representative of the global community.

RTI collected economic data on employment, operating expenditures, exports, and research activity from 18 Milwaukee global health organizations spanning nonprofit organizations (e.g., research institutes, philanthropic organizations, civil service organizations, community health centers, and hospitals), institutions of higher education, and companies. The base year for the analysis was 2019.

RTI used the IMPLAN Wisconsin model to estimate the indirect and induced impacts of Milwaukee global health organizations' direct global health-related employment and other operating expenditures in 2019. IMPLAN is an economic input-output modeling software used to estimate how economic activity in one industry sector reverberates across other industry sectors in a regional economy through establishment and personal spending.

Estimates generated by RTI's economic impact analysis are presented in Table A-1. In 2019, Milwaukee's global health sector directly employed 6,132 people and generated \$2.901 billion of economic output, or activity, through the sector's operations and exports. When the secondary and tertiary impacts of spending by Milwaukee global health organizations and employees are included, the greater Milwaukee global health sector supported 16,961 total jobs, \$1.308 billion in labor income, \$4.671 billion in economic output, and \$143.8 million in state and local taxes for the state of Wisconsin.

Table A-1. Economic Impact of Greater Milwaukee Global Health Sector, 2019

Impact Type	Employment	Labor Income	Total Value Added	Output	State and Local Tax Revenue	Federal Tax Revenue
Direct Effect	6,132	\$722,043,457	\$1,325,595,134	\$2,900,896,577	\$46,390,811	\$180,210,425
Indirect Effect	4,693	\$307,426,048	\$480,317,686	\$910,345,326	\$46,784,820	\$68,421,448
Induced Effect	6,136	\$278,886,797	\$489,884,155	\$859,901,798	\$50,596,545	\$66,091,373
Total Effect	16,961	\$1,308,356,302	\$2,295,796,975	\$4,671,143,700	\$143,772,176	\$314,723,246

Source: RTI analysis using IMPLAN Wisconsin model.

APPENDIX 2: LIST OF INDIVIDUALS INTERVIEWED

ALPHABETIZED BY ORGANIZATION

Kurt Waldhuetter, MS, Vice President of Research, Development, and Business Services, Aurora Research Institute, Advocate Aurora Health

Carolyn McCarthy, NP, Aurora Walker's Point Community Clinic

Michael Harrison, MD, PhD, Business Development Manager, SE Wisconsin, BioForward Wisconsin

Mike Gutzeit, MD, Chief Medical Officer and Chief Safety Officer, Children's Wisconsin

Sanjib Bhattacharyya, PhD, Laboratory Director and Special Deputy Health Commissioner, City of Milwaukee Health Department

Lilliann Paine, MPH, Chief of Staff, City of Milwaukee Health Department

Griselle Torres, MPH, Deputy Commissioner of Policy, Innovation and Engagement, City of Milwaukee Health Department

William Cario, PhD, Provost/Chief Academic Officer, Concordia University Wisconsin

Mike Paddock, PE, Chief Engineer and Engineering Service Corp Deputy Director, Engineers Without Borders

Marissa Jablonski, PhD, Mentor and Advisor, Engineers Without Borders, University of Wisconsin-Milwaukee

Cathy Buck, MSN, RN, President, Froedtert Hospital

Balaji Narayanan, MS IE, Process Improvement Specialist, Froedtert Hospital

Manuela Govin, Account Executive, GE Healthcare

Orrin Marcella, Head of U.S. Government Affairs, GE Healthcare

Annamarie Carlson, Special Programs Coordinator, International Institute of Wisconsin

Alexander Durtka, Jr., President and CEO, International Institute of Wisconsin

Jean Dole, Chief of Staff, Office of the Senior Vice President and Chief Operating Officer, Marquette University

Jay Kutka, Senior University Budget Director, Office of Finance, Marquette University

Mary McCormick, Executive Director, Rotary Club of Wisconsin

Jerry Stepaniak, Chair, Rotary Club of Wisconsin

Tiffany Frazer, MPH, Manager, Office of Global Health, Medical College of Wisconsin

Caitlin Kaeppler, MD, Director, Global and Community Health Track for Pediatric Residents, Medical College of Wisconsin

Stephen Hargarten, MD, Associate Dean, Office for Global Health, Medical College of Wisconsin; President, Milwaukee Global Health Consortium

Laura Mesenbrink, FNP, Medical Director, Ascension Family Health Center/Medical College of Wisconsin

Dave Eland, Senior Director, Research, Development and Engineering, SC Johnson

Thomas Putzer, Director, Base of the Pyramid Group, Office of the Chairman and CEO, SC Johnson

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ENDNOTES

- 1 Page, Susan (2014). "Kissinger: What U.S. must do to battle Islamic state," USA Today, 8 September 2014.
- 2 See IMPLAN: Economic Impact Analysis for Planning, <http://www.implan.com>
- 3 LeCounte, E., Swain G. (2017). "Life Expectancy at Birth in Milwaukee County: A Zip Code-Level Analysis," *Journal of Patient-Centered Research and Reviews*, 4: 213-20.
- 4 See the appendix for a table with direct, indirect, and induced economic impact estimates.
- 5 U.S. Bureau of Economic Analysis (2020). *Gross Domestic Product by County and Metropolitan Area*. The Milwaukee metropolitan statistical area includes Milwaukee, Waukesha, Washington, and Ozaukee Counties.
- 6 Nationally, the Global Health Council is the member organization serving to raise awareness of and catalyze action on important global health issues.
- 7 Wisconsin Department of Children and Families (2020). "15-Year Refugee Arrivals in Wisconsin by Destination County, 2001-2015," *Statistics, Population and Census Data*.
- 8 Sanders, J., Chavez, H., Cohen, S. M., Enright, M., Flynn, M., Frazer, T., Hoormann, K., Rader, B., Ssempijja, S., & Wilson, S. L. (2017). Consensus statement on best practices for refugee care in Wisconsin. *BMC Proceedings*, 11(Suppl 5), 5. <https://doi.org/10.1186/s12919-017-0072-y>
- 9 Ramsey, A.H., Haq, C., Gjerde, C.L., Rothenberg, D. (2004). "Career Influence of an International Health Experience During Medical School," *Family Medicine*, 36(6): 412-6. Jeffrey, J., Dumont, R. A., Kim, G. Y., & Kuo, T. (2011). "Effects of international health electives on medical student learning and career choice: results of a systematic literature review," *Family Medicine*, 43(1): 21-8.
- 10 Baker Tilly, LLP. (2019). *Wisconsin's Biohealth Industry: 2018 Economic Impact Report*. Prepared for BioForward Wisconsin.
- 11 Wisconsin Economic Development Corporation. (2019). *Breakthroughs in Biohealth Convergence in Wisconsin*.
- 12 To be conservative, RTI and MGHC only included in this study those R&D expenditures that involved at least one international partner.
- 13 The other HHS divisions which fund extramural R&D include the Administration for Children & Families (ACF), the Administration for Community Living (ACL), the Agency for Healthcare Research Quality (AHRQ), the Centers for Disease Control & Prevention (CDC), the Centers for Medicare & Medicaid Services (CMS), the Food & Drug Administration (FDA), the Health Resources & Services Administration (HRSA), the Indian Health Service (IHS), and the Substance Abuse and Mental Health Services Administration (SAMHSA).
- 14 For example, the Master of Sustainable Peacebuilding health focus area offers classes in global food security (nursing), program planning and implementation (public health), epidemiology (nursing), public health policy analysis (public health), community wellness programming (Silver Spring Wellness Center), and international peace initiatives (food security in Meru, Kenya).

