

US slipping as global leader in medical research

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Once the undisputed center of global innovation in medicine, the U.S. is steadily losing ground to Asia and Europe and will, if trends continue, relinquish its leadership in the coming decade. That is the conclusion of an analysis appearing today in the *Journal of the American Medical Association*.

"U.S. [medical research](#) remains the primary global source of new discoveries, drugs, [medical devices](#), and clinical procedures," said University of Rochester neurologist Ray Dorsey, M.D., M.B.A., a co-author of the study. "However, a decade of unprecedented growth in research activity has been followed by a decade of steady decline which now leaves open the possibility that other nations could assume global

leadership given their increasing investment in biomedical research."

The study tracked medical research activity from 1994 to 2014 in the U.S., Europe, Asia, Canada, and Australia, compiling data on funding by public and private sources, the creation of intellectual property, and the size of the medical and scientific workforce.

U.S. spending on medical research grew at an average annual rate of 6 percent between 1994 and 2004. This pace fell sharply in the following decade, where the annual rate of growth decreased to 0.6 percent, falling behind the pace of inflation. With the exception of the temporary increases brought about by federal stimulus spending in 2009 and 2010, the last five years have seen a decrease in research funding when adjusted for inflation. Overall, medical R&D funding has declined in real terms by 13 percent since 2004.

Research funding, particularly by the private sector, has also shifted to later stages development and away from basic science. Guided primarily by the desire to realize short-term economic benefits, the share of spending by pharmaceutical, biotechnology, and medical device companies on phase 3 clinical trials – large studies in people that often represent the final step before regulatory approval – grew by 36 percent between 2004 and 2012. Industry spending is also now the largest component of U.S. medical R&D, increasing from 46 percent in 2004 to 58 percent in 2012.

The move away from investing in early stage research has significant long-term implications, according to the authors. They point out that new knowledge often takes from 15 to 25 years to move from the discovery made in the lab to its clinical application in people. With the private sector moving more resources to late-stage research, this leaves the shrinking resources provide by the federal government and often very small companies as the primary sources of funding for early-stage, high-

risk research.

The authors also found that the allocation of research resources does not reflect the burden of disease on society. Diseases that represent more than 80 percent of all U.S. deaths receive less than half of the funding from the National Institutes of Health. The portion of total funding for cancer and HIV/AIDS research in particular are well above the levels that these diseases inflict in terms of death and disability. The amount of money spent by the pharmaceutical industry on finding treatments for rare diseases is also high, driven primarily by the lower barriers to market set forth in the Orphan Drug Act of 1983.

Medical research has become an increasingly global endeavor and investments by other countries, particularly in Asia, are eroding U.S. leadership. In 2004, U.S. medical R&D spending represented 57 percent of the global total. By 2014, the U.S. share had fallen to 44 percent with Asia – led by China, Japan, South Korea, India, and Singapore – rapidly making up ground and increasing investment by 9.4 percent per year. If current trends continue, the U.S. will be overtaken by China as the global leader in medical R&D in the next ten years. China has already surpassed the U.S. in terms of the size of its science and technology workforce and global share of patents for medical technologies, and is closing the gap in published [biomedical research](#) articles.

The authors point to the low levels of [research funding](#) in the field of [health services](#) as area in particular need of remedy. Health services – which study topics such as access to care, cost, quality of care, and efforts to promote well-being – represent only 0.3 percent of U.S. research expenditures.

"The low levels of investment in health services research represent a missed opportunity to improve many aspects of health, especially the burden of chronic illness, aging populations, and the need for more

effective ways to deliver care," said Dorsey.

The trends are reversible, the authors note. However, given the political environment in Washington and the pressures by shareholders on industry for short-term returns, new sources of revenue will need to be identified. They recommend several possible options, including providing tax incentives that will allow medical and pharmaceutical companies to reinvest profits held overseas in research in the U.S., a commitment by insurance companies and the health care sector to invest more money in health services research, and government-backed research bonds and trusts similar to those employed in the United Kingdom, Australia, and Canada.

"Clearly the pace of scientific discovery has outstripped the capacity of current financial and organizational models to support the opportunities afforded," said University of Rochester neurology resident Benjamin George, M.D., M.P.H., a co-author of the study. "This analysis underscores the need for the U.S. to find new sources to support biomedical and health services research if we wish to remain the world's leader in medical innovation."

Provided by University of Rochester Medical Center

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