

Plight of thousands of postdoctoral researchers in Boston

By Nancy C. Andrews, Neal F. Lane and Norman R. Augustine

A recent article in the *Boston Globe* described the plight of thousands of postdoctoral researchers in Boston and, by extension, across the country. The fact that talented young scientists are stalled in jobs that fall short of what their training has prepared them for is, indeed, a crisis in biomedical science.

However, an important aspect of this problem may have been understated. Federal funding for American research in biomedicine and in other scientific areas has decreased as a proportion of the nation's gross domestic product (GDP) over the past decade. Research and innovation are strong drivers of our nation's economy while improving our health, quality of life and the nation's global preeminence and security.

The research process also trains young people who will take the reins as tomorrow's science and technology leaders. In recognition of the importance of research and innovation, there has been an appropriate effort to increase the science, technology, engineering and math (STEM) career pipeline in recent years. But federal funding for research (a portion of which covers researchers' salaries) has failed to keep pace, and the careers of a generation of talented young people have fallen by the wayside. Like the postdocs mentioned in the *Globe* article, these "invisible people" are highly educated, yet are unable to secure the careers that they have long trained for. The talent surplus may be due in part to overfilling the pipeline, but it is also a consequence of the federal government's failure to assign a high priority to the research that made America a scientific leader in the 20th century. In the words of Nobel Laureate Randy Schekman, scientists who came to the United States for training are now "returning to their countries because those countries, unlike ours, see the promise of investment in basic science. It's actual damage that's occurring right now."

After World War II, America took the lead in science and technology because of the foresight that led to funding for the National Institutes of Health, the National Science Foundation and other agencies that support research and provide the wherewithal to turn discoveries into meaningful advances, e.g., in medical treatments and cures. We have seen the benefit in our own lives – our life expectancy is nearly twice that of our great-grandparents because devastating infectious diseases have been conquered and conditions like cancer and coronary artery disease are much less likely to be lethal. Our current fears of the Ebola virus are tempered by the knowledge that researchers are on the case and, in fact, have been since well before the current crisis.

But America can no longer claim preeminence in a number of areas we have taken for granted. As a country our ranking has fallen to 7th in the world in basic research investment and 10th in total R&D investment as a percentage of GDP. We are starting to fall behind other countries that are emulating what we used to do. China, for example, is growing its national R&D by an average of 8% every year, and is expected to surpass the United States in R&D about eight years from now. We risk losing the advantage America has long held as an engine of innovation that not only generates new knowledge, technologies and products, but new jobs and industries, as well as providing social benefits such as improved healthcare. Research is a critical investment, and there is a deficit between what our government *is* investing and what it *should be* investing to remain competitive in these key areas. A new report from the American Academy of Arts & Sciences, *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream*, sets sustainable goals for investments in research that are ambitious, but achievable.

Funding is not the only challenge. Reforms are needed in how federal agencies fund research as well as the kind of education and training provided by universities and medical schools and how those institutions respond to swings in federal budgets. The American Academy report also recommends aggressive policy reforms for repairing the research framework, including workforce challenges. This call to action should certainly be heeded.

It may appear self-serving for researchers to call for increased support at a time when America has a large debt and many political leaders are under pressure to reduce budget deficits. But even in tight times, the investments need to be made if America is to remain the country that makes the major scientific and medical breakthroughs, and if the American people are to reap the benefits. As Dr. Kirschner pointed out in the recent Globe article, the plight of the postdoc is, in many ways, the canary in the coal mine. The system is broken and must be fixed.

Norman R. Augustine and Neal F. Lane are co-chairs and Nancy C. Andrews is a member of the American Academy of Arts and Sciences study on “New Models for U.S. Science and Technology Policy.” Mr. Augustine is a Fellow of the American Academy, retired Chairman and Chief Executive Officer of Lockheed Martin Corporation, and a former Under Secretary of the Army. He was a member of the President’s Council of Advisors on Science and Technology for sixteen years and chaired the landmark National Academies study Rising Above the Gathering Storm. Dr. Lane is a Fellow of the American Academy, Senior Fellow in Science and Technology Policy at the Baker Institute, the Malcolm Gillis University Professor, and Professor in the Department of Physics and Astronomy at Rice University. He is a former Assistant to the President for Science and Technology and former Director of the White House Office of Science and Technology Policy (OSTP). He served as Director of the National Science Foundation from 1993 to 1998. Dr. Andrews is a Fellow of the American Academy, Dean of the Duke University School of Medicine and Vice Chancellor for Academic Affairs. She previously served as the Director of the Harvard-MIT M.D.-Ph.D. program from 1999 to 2003 and as Dean for Basic Sciences and Graduate Studies at Harvard Medical School from 2003 to 2007.