POLICY FORUM: PUBLIC HEALTH

Proliferation of National Institutes of Health

Harold Varmus

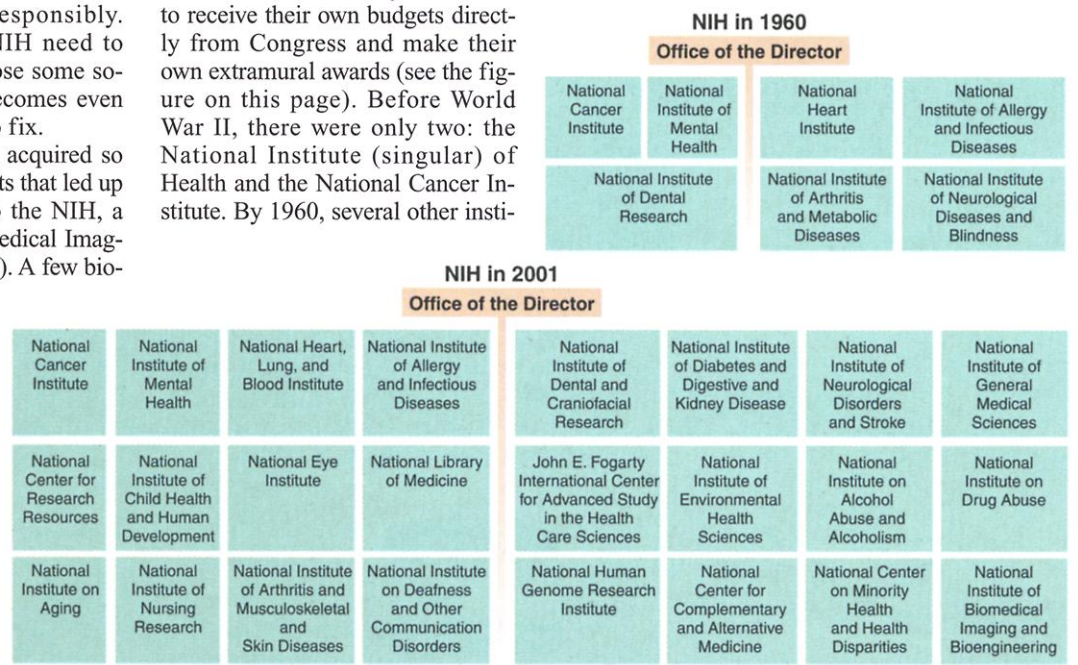
Many people with influence in Washington view the National Institutes of Health as "the jewel in the crown of the federal government." Such praise has helped to enhance the value—the number of carats—in this jewel, especially over the past few years. But considerably less attention has been given to its shape than its price. New facets are being added without much thought to overall design, providing a superficial sparkle that may be pleasing to the few, but threatening to the functional integrity of the entire gem. With too many surfaces of different sizes, the organization may soon become less able to take advantage of its extraordinary budget increases and more difficult to manage responsibly. Those who care about the NIH need to think about its form and propose some solutions before the structure becomes even more fragmented and harder to fix.

But first, how has the NIH acquired so many facets? Consider the events that led up to the most recent addition to the NIH, a new National Institute of Biomedical Imaging and Bioengineering (NIBIB). A few bioengineers and radiologists have been lobbying intensively but unsuccessfully for several years for institutes—and, of course, funds—devoted specifically to their own disciplines. Last year a proposal for a new, combined institute (H.R.1795) was passed by the House, but was not expected to be acted upon by the Senate. In the final moments of the last session of the Senate, however, it was introduced on a point of order that received unanimous consent. The measure was then signed into law by President Clinton on 29 December without appreciable objection or fanfare. At no point were congressional hearings or public debates held to consider the possible effects of the new institute: How will the creation of NIBIB affect the many bioengineeering and imaging programs now conducted through the disease-specific divisions of existing institutes? How will support for NIBIB affect the budgets of other federal science agencies that fund work in these areas but have fared less well than the NIH in recent years? Will the founding of the NIBIB promote or reduce the fruitful interactions among bioengineers, clinical investigators, and laboratory scientists that have been growing stronger in recent years?

The unfortunate process by which the NIBIB was established is not unprecedented or even unusual. New components of the NIH have been proliferating for over 50 years, and now there are nearly 30 of them, most of which are fully authorized to receive their own budgets directly from Congress and make their own extramural awards (see the figure on this page). Before World War II, there were only two: the National Institute (singular) of Health and the National Cancer Institute. By 1960, several other institutes had been established, all based on the diseases they addressed (Mental Health, Heart, Allergy and Infectious Diseases, Dental, Arthritis and Metabolic Diseases, and Neurological Diseases and Blindness). But in the intervening years, other organizing principles have come into play, such as life stages (Aging and Child Health and Human Development) and disciplines (Nursing, Human Genome Research, and Complementary and Alternative Medicine).

Two underlying mechanisms have been responsible for most of these new units: fusion and fission. The many activities to be fused under the single roof of NIBIB and the banner of technology are now spread—appropriately, many would say—across the other institutes, where they are part of the research programs on many different diseases. In contrast, some of the several institutes in the field of neuroscience, such as the National Eye Institute or the National Institute of Deafness and Communication Disorders, were spun off as fission products from a larger neurology institute.

Further proposals for fission or fusion are always waiting in the wings. The National Institute of Diabetes, Digestive, and Kidney Diseases contains the seeds of four potential institutes (each favored at times by some advocates for research on diabetes, gastroenterology, nephrology, and urology). The new NIBIB seems itself to be fissionable, if the bioengineers or the radiologists come to think that they would be more prosperous on their own.



Changes in the organization of the NIH over 40 years. (**Top**) NIH in 1960. (**Bottom**) NIH in 2001. Only those components that receive an independent appropriation are shown. Source (*1*).

The fusion reaction that established the new National Center on Minority Health and Health Disparities may inspire parallel efforts for women's health research and other activities that are currently embedded in the portfolios of several institutes. The establishment in 1992 of the Office of AIDS Research (OAR), with its special responsibilities for program and budget coordination, but without grant-making authorities, represents a compromise to

The author is a former director of the NIH and is president of the Memorial Sloan-Kettering Cancer Center, New York, NY 10021, USA.

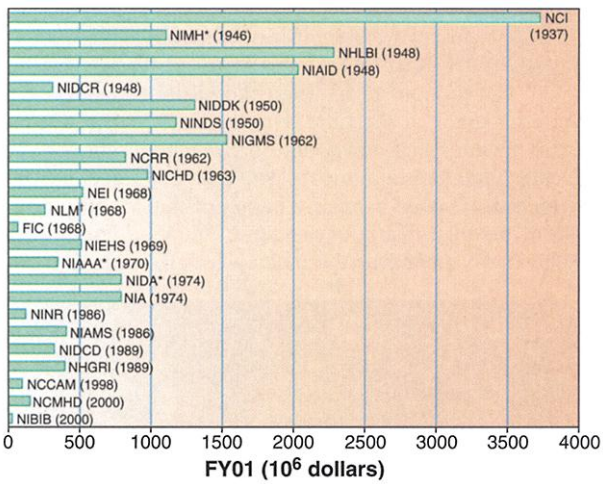
avoid an especially contentious fusion of AIDS programs into a full-fledged institute. The OAR and a number of centers and other offices without independent budgets or grant-making authority—for Sleep Disorders, Medical Rehabilitation, Dietary Supplements, Rare Diseases, or Behavior and Social Sciences—can be viewed as prospective institutes, waiting to be born.

It would be wrong to argue that there are no benefits to the NIH and its constituencies from the establishment of the newly independent components. The NIH thrives politically and financially from the enthusiasm of its supporters. This enthusiasm is enhanced when a new institute or center is founded in law, especially when the legislator-founders are prominent, the Administration gets credit for its role, and the advocacy groups feel a loyalty to the NIH through "their" unit. The current litany of institutes and centers is a forceful reminder of the many things the NIH is responsible for, and this cannot hurt during the budget process, when the leaders of each institute and the several centers with independent budgets appear before the House and Senate appropriations subcommittees.

So why worry about the proliferation of institutes, especially when such concerns could antagonize those responsible for the budgetary success of the entire agency? Because having more institutes also means less flexibility, less managerial capacity, less coordination, and more administrative burden. There are many reasons for why this is so. Part of the answer can be found in the appropriations history of the institutes (see the figure on this page). The strong correlation between the age of an institute and the size of its budget reflects a poorly known feature of the NIH. Appropriated budgets for all institutes tend to increase in virtual lockstep, with more or less the same percentage increment for each, in part because these highly visible numbers are viewed inappropriately as value-based rankings. In contrast, budgets within institutes can be managed much more dynamically, and even large shifts can be more easily justified. For this reason, the creation of new institutes and centers, perhaps paradoxically, can limit the flexibility of the NIH as a whole.

The dramatic differences (up to 100-fold) among the budget numbers are also shown in the second figure. This is important because an institute's budget determines not simply how many grants it can support. It also reflects its capacity to undertake large-scale projects, such as clinical trials and other expensive and logistically demanding activities; to attract highly talented people to run its extramural and intramural programs; to transfer funds between programs; and to initiate major projects that exploit new scientific developments or respond to public health crises. It is highly unlikely that any major industrial firm would ever chose to be organized and managed in this way.

It is important to sound a warning note about the proliferation of NIH's components now, before the problems become more profound and less correctable. If history is any guide, we can expect to see about five new institutes or independent centers each decade. This would bring the number of significant units to about 40 by 2020 and about 50 by 2040, making the administrative complexities and defects in program coordination only more severe.



Correlation between the age of an NIH component and the size of its budget. *NIMH, NIAAA, and NIDA joined NIH in 1992. †The NLM joined NIH in 1968. Source (*1*).

Is it possible to imagine a reasonable alternative to the current pattern? Here is one proposal for a simpler and arguably better NIH. All of its current activities would be redistributed into six units of approximately equal sizes and budgets. Five of these would be categorical institutes, committed mainly to groups of diseases: the National Cancer Institute, the National Brain Institute, the National Institute for Internal Medicine Research, the National Institute for Human Development, and the National Institute for Microbial and Environmental Medicine. Each of these would contain several major divisions for extramural research and an intramural research program. Each would also house offices to coordinate research training, international science, minority and women's health, and other activities, both within and among the five institutes. The sixth unit, NIH Central, would be led by the NIH director, to whom the directors of five institutes would report. NIH Central would have responsibility for policies across NIH (e.g., on intellectual property, personnel management, or training programs), the peer-review process, scientific infrastructure (e.g., information technology, buildings and facilities, including the intramural Clinical Research Center), and thematic coordination (through links to the offices in each of the five institutes). In addition, NIH Central would participate in the development of highly innovative or emergency scientific programs, through use of discretionary funds to initiate work that would be transferred to the five institutes for long-term management.

Of course, this is only one of many schemes that might provide long-term coherence for the NIH. Fundamental changes in an organization as complex and successful as the NIH should be undertaken only slowly. They entail serious political risks, and so must be debated at length in a bipartisan fashion and installed at an appropriate pace. Furthermore, it is neither sensible nor politically realistic to re-evaluate each institute and center, one by one. (Eliminating an element of the NIH once it has been formed is like trying to stuff the large springs back into a novelty shop's "peanut brittle" can after someone has been induced to open it.) Instead, we need to establish some general principles by which the NIH should be organized and attempt to use those principles to decide how it can, in practice, be reorganized, even if the reorganization occurs in slow stages.

Happily, the Labor–Health and Human Services–Education Appropriations Bill for 2001 includes report language that directs the NIH to fund just the kind of study of its organization that is so badly needed. The report of this study, to be conducted by the National Academy of Sciences, is due one year after the appointment of a new director of the NIH. (Would it be too much to suggest a moratorium on new components until this study is done?) Thanks to bipartisan actions by NIH's appropriators, the federal government's "jewel in the crown" has a rare opportunity to reconsider its design in hopes of retaining its luster for many more decades.

References

1. www.nih.gov/icd/