

The Health Innovation Gap Ranking Project, as part of the partnership between Milken Institute's FasterCures and the US Department of Health and Human Services (HHS), focuses on creating a framework to systematically identify priority areas among diseases and conditions that would benefit from research and development (R&D) investment.

However, in the absence of a formalized process to merge information from multiple sources using different classifications of diseases, it is difficult to assess the comprehensive cost and benefit of R&D investment in a particular disease or condition. Furthermore, debate continues as to whether to prioritize highly costly or deadly conditions that remain relatively rare or assign priority to less burdensome but far more prevalent conditions.

In "[How to Identify Health Innovation Gaps?](#)" we contribute to this discussion by providing a novel framework. We use text mining to facilitate merging data from diverse sources and machine learning to group disease categories based on their economic costs, prevalence, and mortality rates. The prioritization of the diseases and conditions would reflect their impact on public health, their cost to the health-care system, and the absence of recent related biomedical innovations.

### WHAT DO WE FIND?

We identify the 32 disease categories out of 262 that report relatively high medical costs, number of patients, or death rates. Mapping these categories to R&D investment data from the National Institutes of Health (NIH) highlights three points:

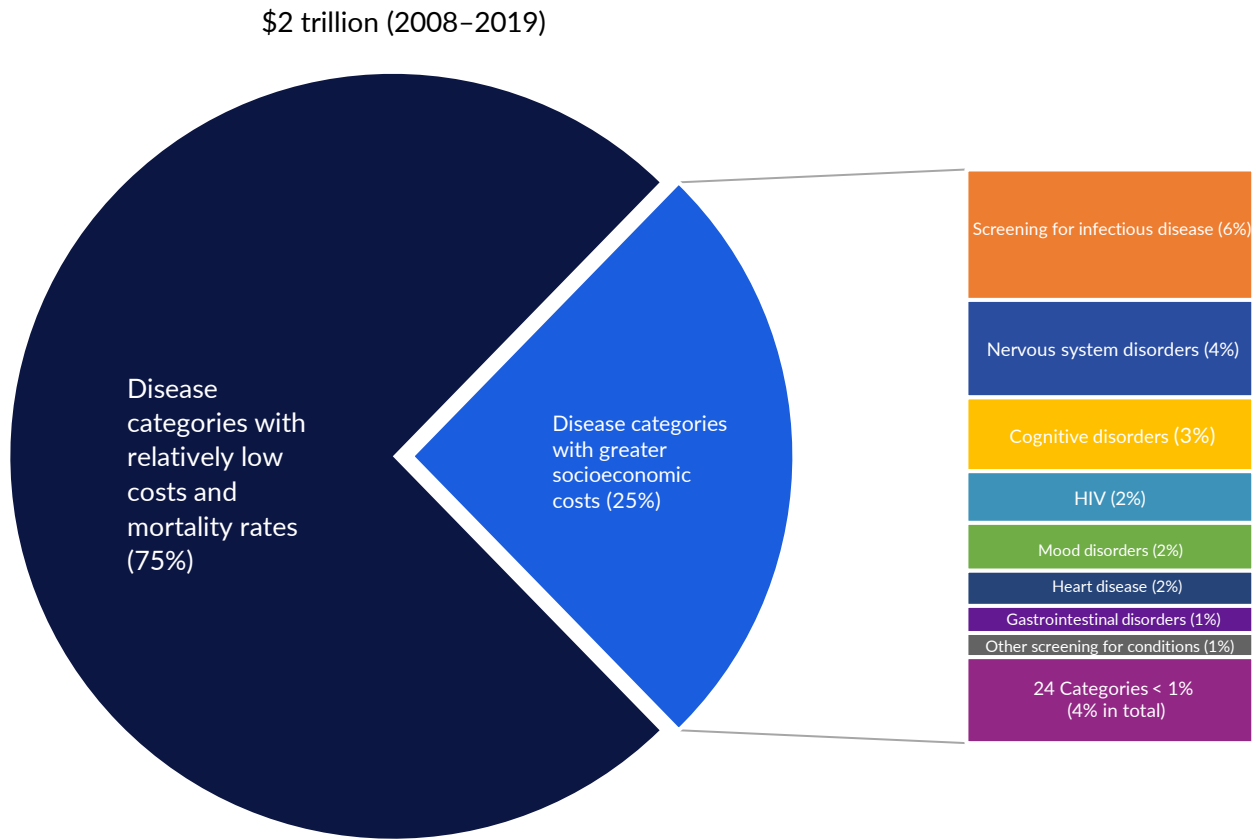
1. Only 25 percent of the NIH funding over the past 12 years (\$2 trillion in total) covered the 32 categories with greater social and economic impact. Furthermore, there is no correlation between diseases' social and economic impact and the R&D investment.
2. Rare diseases, despite their high cost and mortality burdens, are underfunded. Each of the 14 disease categories in the rare disease group collected 0.3 percent of the NIH funding on average.
3. Conclusions differ depending on which aspect of a disease's burden is prioritized. Some diseases (e.g., lung cancer) cause more deaths but lower medical expenses while another (e.g., cystic fibrosis) incurs the costliest medical expenses per patient but is rare.

### POLICY IMPLICATIONS

Our analysis shows the necessity of a **systematic tracking of the NIH funding or R&D investment allocation**. Providing an aggregated assessment of the funding landscape would help identify the funding gaps and allow a reallocation when necessary. We recommend the following to achieve this goal:

1. **Set priority criteria that are measurable.** These criteria are a necessary base as they clarify the goals to achieve, such as minimizing the social and economic cost of a disease. They provide meaning and order on how to aggregate the information to create an informative R&D funding landscape. Finally, they allow funding allocation based on societal goals.
2. **Create a standardized relational database.** It is necessary to reconcile the information across databases' disease and condition categories to leverage existing data. This allows standardized assessment of the cost, funding, and other dimensions of the disease or condition.

**Figure 1. Proportion of NIH Funding toward Disease Categories**



*Note: The disease names are based on 262 Clinical Classification Software disease categories. The 32 disease categories incurring higher economic or social costs received 25 percent of NIH funding over 12 years. Twenty-four categories among 32 received less than 1 percent of the funding. The 24 categories include Diabetes mellitus, Upper respiratory disease, Lower respiratory disease, Chronic kidney disease, Connective tissue diseases, Rectal/Anal cancer, Brain cancer, Lung cancer, Non-traumatic joint disorders, Hypertension, Lymphoma, Labor & fetal complications, Respiratory distress syndrome, Chronic obstructive pulmonary disease, Sepsis, Pancreatic cancer, Leukemia, Multiple Sclerosis, Liver cancer, Cystic fibrosis, Sickle cell anemia, Skin disorders, Osteoarthritis, and Spondylosis & back problems.*

Source: Milken Institute (2022)



For questions or comments, please email us at [research@milkeninstitute.org](mailto:research@milkeninstitute.org).

To view the full report, visit <https://milkeninstitute.org/report/how-identify-health-innovation-gaps>.