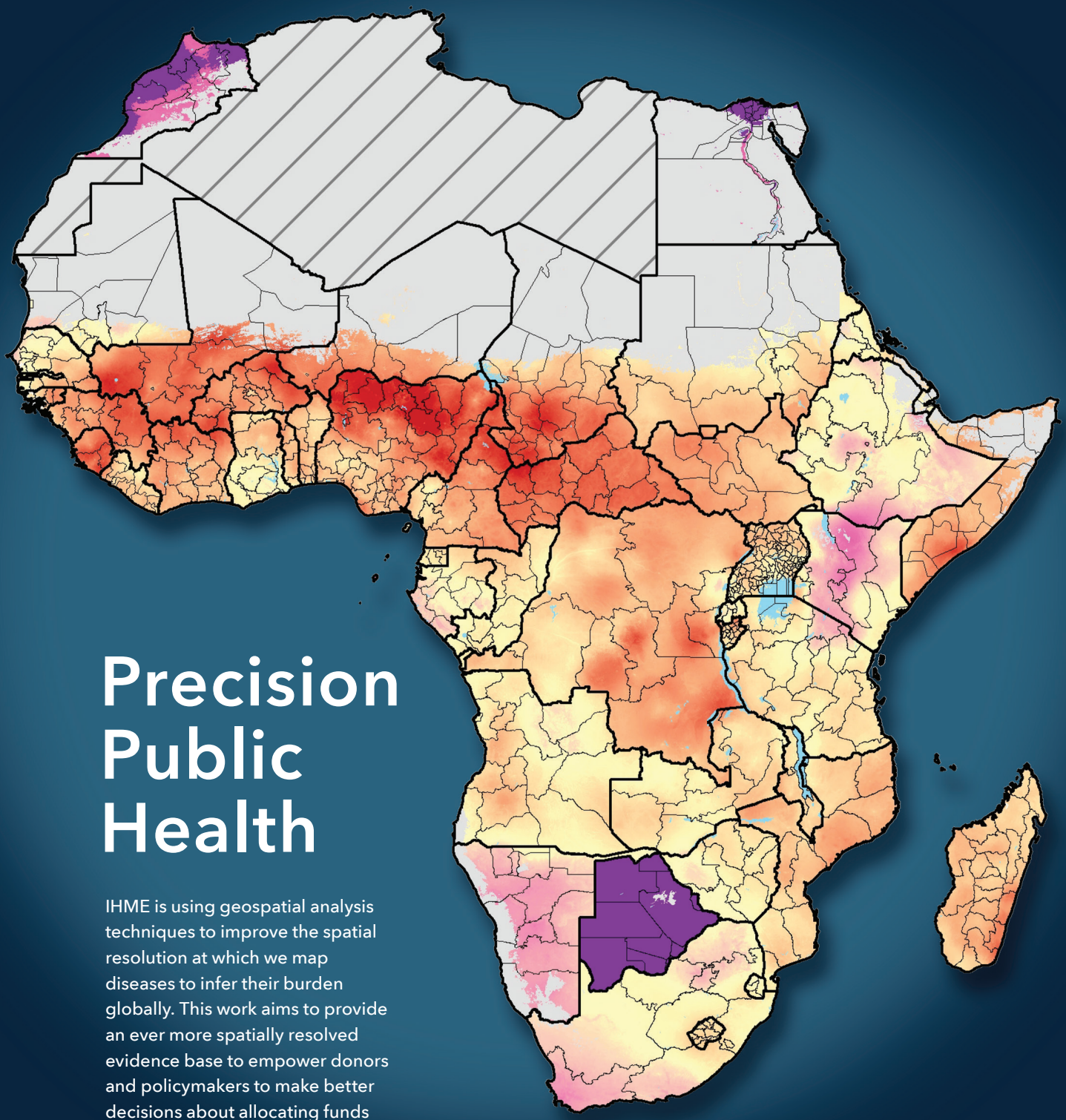
GLOBAL BURDEN OF DISEASE

20

CELEBRATING 20 YEARS

OF COLLABORATION AND INNOVATION



Precision Public Health

IHME is using geospatial analysis techniques to improve the spatial resolution at which we map diseases to infer their burden globally. This work aims to provide an ever more spatially resolved evidence base to empower donors and policymakers to make better decisions about allocating funds and prioritizing interventions.

Under-5 mortality rate per 1,000 live births

≤25 50 <200

www.healthdata.org/geospatial-analysis

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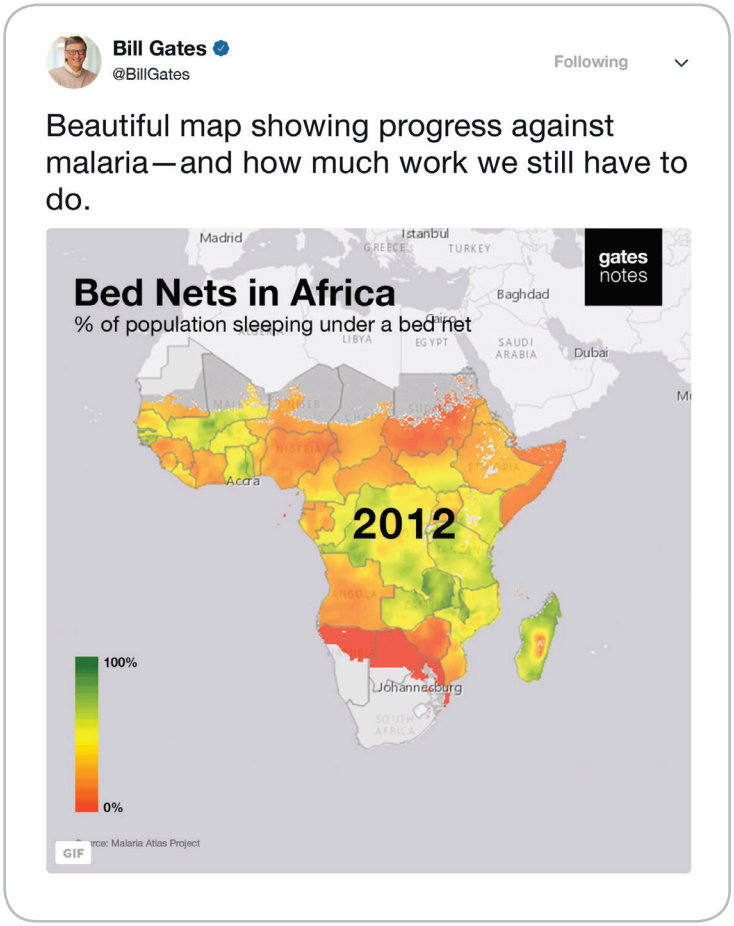
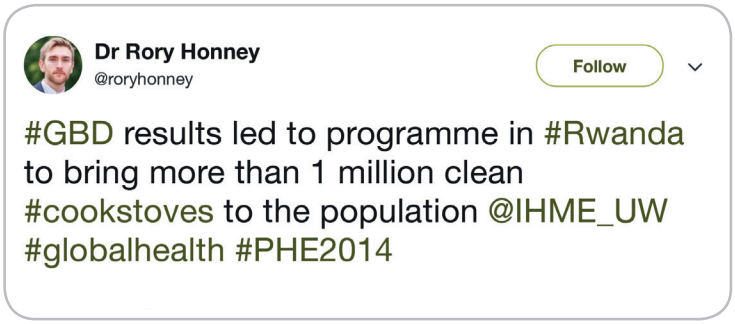
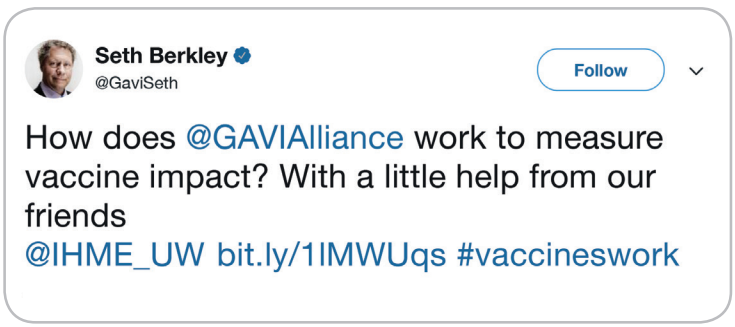
The cover photo was taken at the April 2017 GBD Technical Training event in Greece. This year's training included nearly 70 participants traveling from 29 countries and six continents. Trainees represented a diverse array of organizations and entities, including universities, ministries of health, NGOs, and nonprofit organizations.

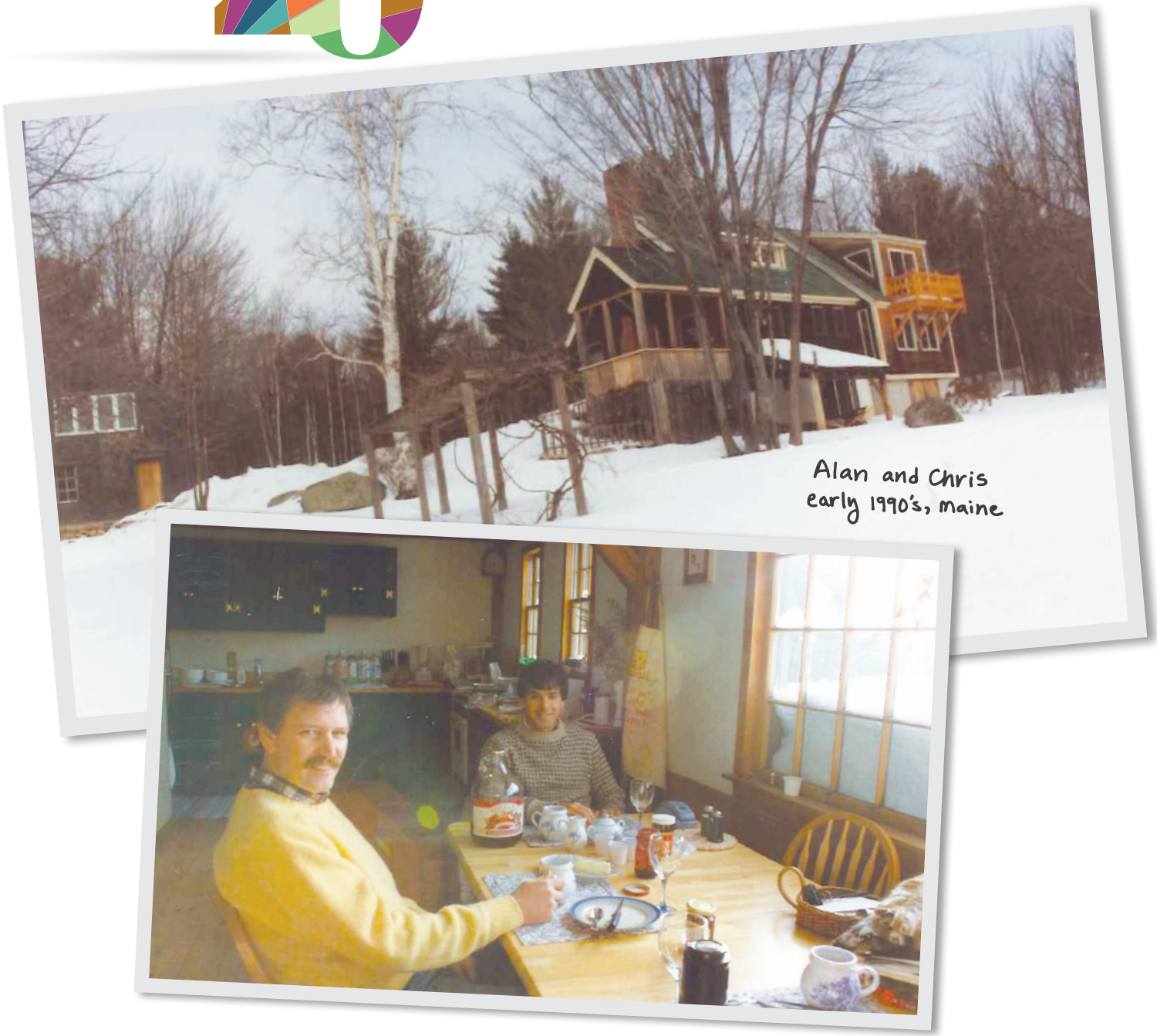
SOCIAL MEDIA



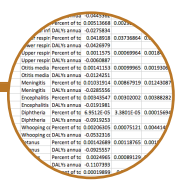




GBD 20



History of the GBD



1991: Work begins on the Global Burden of Disease (GBD) study. The endeavor consists of a small number of analysts using methods such as calculations done in spreadsheets.

1991

When we started working on what would become the Global Burden of Disease study, we faced a vexing problem: different organizations, governments, and researchers produced widely varying death estimates. Little was known about the impact of conditions that cause illness but not death. In short, there were no comprehensive and comparable assessments of human health.

We made it our mission to tally up all the deaths the world over, map them to causes, and quantify the amount of disability people experienced from nonfatal conditions. We started with the premise that everyone, all over the world, should have the chance to live a long life in good health. And for that to be possible, decision-makers needed to be able to make evidence-based decisions. The publication of the first series of Global Burden of Disease papers in *The Lancet* in 1997 gave the work the validation that it needed to become a reliable tool for planning and priority setting.

Working initially with just a small group of analysts, we could not have imagined that we would someday have more than 2,500 people helping with this project around the world.

Over the past two decades we have increased the granularity of estimates: we've gone from tracking 107 diseases and injuries and 10 risk factors for eight world regions for GBD 1990, to 333 diseases and injuries and 84 risk factors for 774 locations for the 20th anniversary edition of the GBD.

Over the past 20 years, the disability-adjusted life year – a once unknown metric – has become part of the global health infrastructure, used by researchers, ministries of health, non-governmental organizations, and many others.

In addition, we've brought the data to life through interactive visualizations, advanced our analytical methods, and provided greater transparency by making data and code available, in compliance with the Guidelines for Accurate and Transparent Health Estimate Reporting (GATHER). GBD findings are now used by the private sector to develop targeted therapies, and at the highest levels of government to prioritize spending and policy interventions.

While the GBD study has evolved considerably, there is still room for improvement. With the help of our highly diverse network of collaborators, we look forward to continuing to improve health worldwide as we further advance this essential public good.

Thank you for your interest and your dedication to this effort.

> “We started with the premise that everyone, all over the world, should have the chance to live a long life in good health.

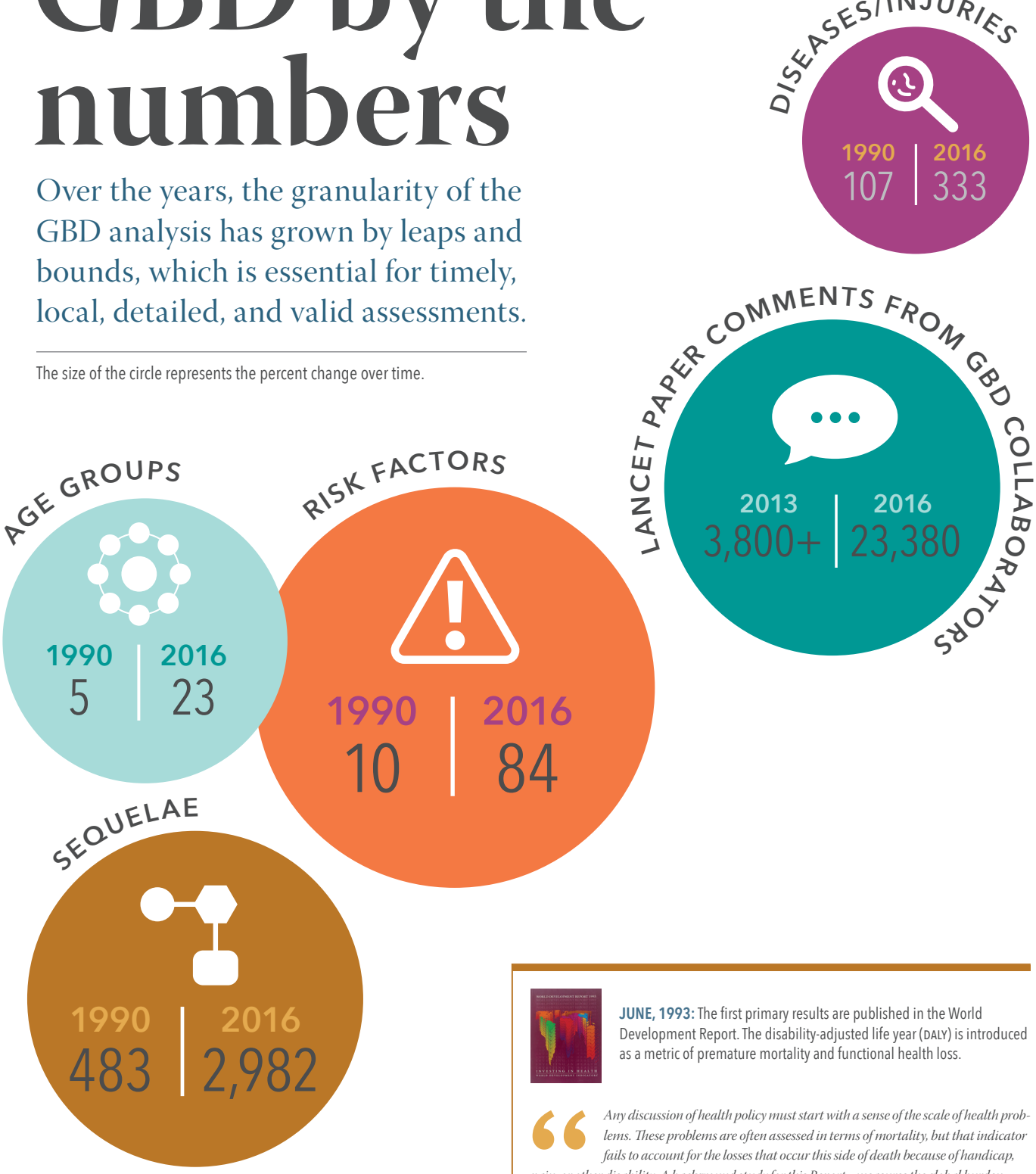
Dr. Alan Lopez
Professor of Medical Statistics and Population Health
Head, School of Population Health
The University of Queensland

Dr. Christopher J.L. Murray
Institute Director and Professor of Global Health
University of Washington

GBD by the numbers

Over the years, the granularity of the GBD analysis has grown by leaps and bounds, which is essential for timely, local, detailed, and valid assessments.

The size of the circle represents the percent change over time.



JUNE, 1993: The first primary results are published in the World Development Report. The disability-adjusted life year (DALY) is introduced as a metric of premature mortality and functional health loss.

"Any discussion of health policy must start with a sense of the scale of health problems. These problems are often assessed in terms of mortality, but that indicator fails to account for the losses that occur this side of death because of handicap, pain, or other disability. A background study for this Report...measures the global burden of disease (GBD) by combining (a) losses from premature death...and (b) loss of healthy life resulting from disability. The GBD is measured in units of disability-adjusted life years (DALYS).

1993

GEOGRAPHIES

1990 | 2016

8 | 774

In the news...

“

Analyzing some 1,800 data sets from around the world, researchers found that excess weight played a role in four million deaths in 2015, from heart disease, diabetes, kidney disease and other factors.

-New York Times

“

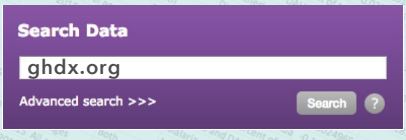
The rate of maternal deaths has declined while actual number seems higher reflecting higher population growth, limited [government] interventions and increase in skilled care and facilitated births in many provinces,” said Professor Zulfiqar Bhutta, founding Director of Centre of Excellence in Women and Child Health at The Aga Khan University.

-Express Tribune (Pakistan)

Want more numbers?

The Global Health Data Exchange (GHDx) is the world’s largest catalog of health data. Join the more than half a million users who have visited the GHDx since 2013 and harness its power for your research.

- 28,000 scientific studies
- 10,000 vital registration datasets
- 7,000 surveys
- 5,000 disease registries
- 1,200 censuses
- And more

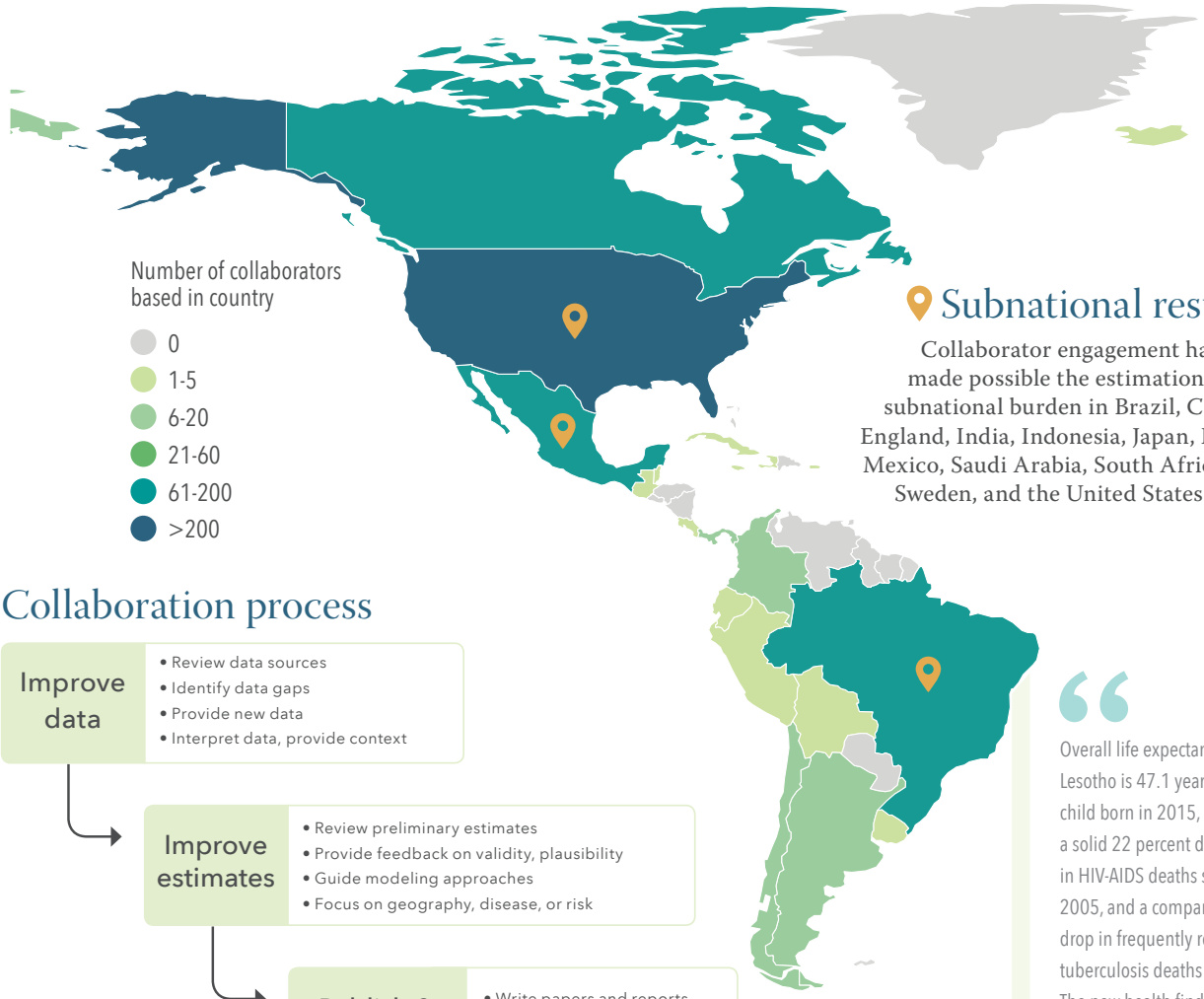


1996: GBD 1990 is published in a two-volume set. The study covers over 100 diseases and injuries, and eight regions of the world.

1996

Collaborator Network expansion and impact

The network consists of over 2,500 members from more than 135 countries.



Subnational results

Collaborator engagement has made possible the estimation of subnational burden in Brazil, China, England, India, Indonesia, Japan, Kenya, Mexico, Saudi Arabia, South Africa, Sweden, and the United States.

Collaboration process

Improve data
- Review data sources
- Identify data gaps
- Provide new data
- Interpret data, provide context

Improve estimates
- Review preliminary estimates
- Provide feedback on validity, plausibility
- Guide modeling approaches
- Focus on geography, disease, or risk

Publish & engage
- Write papers and reports
- Reach out to media
- Inform policy

MAY 1997: The first of four articles revising the GBD 1990 study is published in *The Lancet*.

"Overall life expectancy in Lesotho is 47.1 years for a child born in 2015, despite a solid 22 percent drop in HIV-AIDS deaths since 2005, and a comparable drop in frequently related tuberculosis deaths… The new health findings published in *The Lancet* draw their assessments from more than 80,000 different data sources and the work of more than 1,800 collaborators across the globe."

– Africa Times

1997

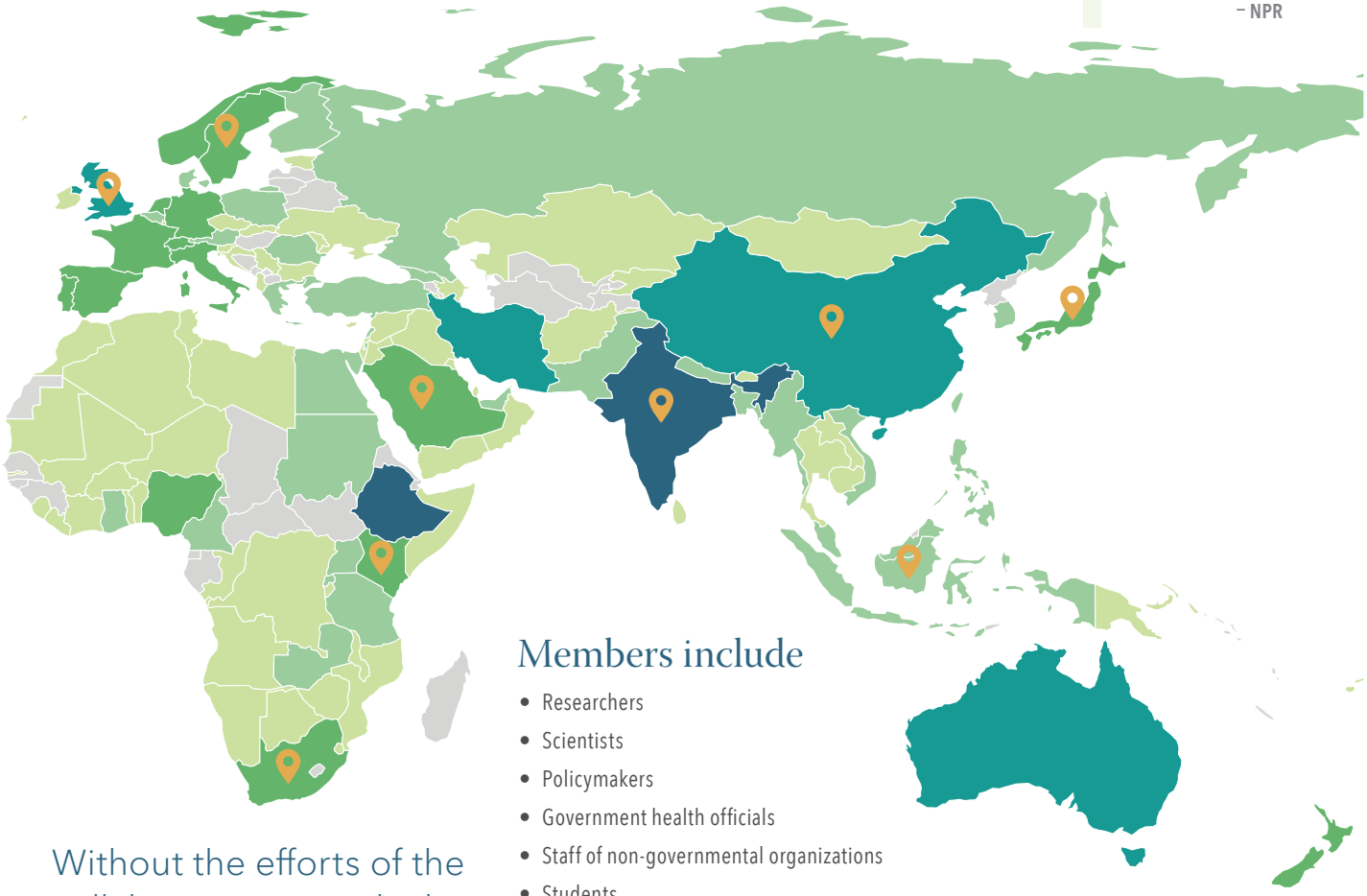
The GBD Collaborator Network plays a crucial role in the study production, analysis, and improvement. Collaborators participate in the GBD study in diverse ways, including

- Strengthening data inputs and suggesting new data sources
- Critiquing results and providing quality review
- Offering feedback on covariates and modeling approaches
- Serving as publication co-authors
- Assisting in outreach efforts and local dissemination
- Formulating policy recommendations
- Enabling subnational burden estimation

3 PER DAY

Since 2012, the network has grown by nearly 100% annually, with new collaborators now joining at a rate of almost three per day.

> Data covering 184 countries was collected and analyzed by the Global Burden of Disease Health Financing Collaborator Network…the spending is quite literally all over the map. And the amount of spending doesn't necessarily translate into better health care.
>
> – **NPR**



Members include

- Researchers
- Scientists
- Policymakers
- Government health officials
- Staff of non-governmental organizations
- Students

Without the efforts of the collaborator network, the GBD study would not be possible. They are owed tremendous thanks for their countless contributions.

2001, 2002, 2003: Estimates of mortality, incidence, prevalence, YLLs, YLDs, and DALYs by sex, cause, and WHO region for 2000–2002 are reported in the World Health Reports 2001, 2002, and 2003.

2001

Walter Mendoza, MD

United Nations Population Fund

GBD is turning 20. What were you doing when you were 20 years old?

I was studying in my first years at medical school.

What inspired you to go into the field of public health?

The complexity of health as a result of more than medical services, the need to understand the implications of the broader context which explains the lack of opportunities to fulfill the expectations of health as a basic human right. The possibility to deliver the right intervention at the right moment.

What do you think is the biggest challenge to improving population health today?

The need to link information and research results as a basis for health policy, while recognizing the limits of evidence when decisions are made based on various interests. And the need to translate research into policy briefings/messages in a friendly format as a basis for advocacy to foster health rights.

How have you used GBD in your work?

To advocate before health authorities on the burden of disease trends, particularly those more related with my regular work, such as the implications of population change for health systems, maternal health and mortality, and adolescent and youth health.

What do you consider your greatest professional achievement to date?

To be able to "design" my career as a public health practitioner, by combining commitment, policy-making, and advocacy based on the best available information, and find the right institution that allows me to do so.

Kairat Davletov, MPH, PhD, MD

Republican Institute of Cardiology and Internal Diseases

What do you consider your greatest professional achievement to date?

I am proud to contribute to NCD epidemiology development in my country; joining the GBD network is my greatest achievement as I am learning from you every day/week/month.

Which scientist, living or dead, do you most admire and why?

I admire Professors Salim Yusuf, who involved me in the PURE and other projects, and Martin McKee, who was my co-author on a couple of papers. They aren't afraid to have non-mainstream ideas.

Who is your favorite musician or musical group?

Many – mostly rock groups – Deep Purple, Queen, Led Zeppelin, Dire Straits, etc.

2007: The Institute for Health Metrics and Evaluation (IHME) – the coordinating center for the international network of GBD contributors – launches with the goal of providing an impartial, evidence-based picture of global health trends to inform the work of policymakers, researchers, and funders.

2007

Aunty Kerrie Doyle
BA, MA, MS, PhD

RMIT University

> Entering university – first in my family, first in my community, first in my people.

GBD is turning 20. What were you doing when you were 20 years old?

I had just moved to Sydney, Australia – and was still learning to drive on roads with more than one lane!

What inspired you to go into the field of public health?

The determinants of health require a public health approach – being Aboriginal and seeing the health of indigenous people requires a big-picture approach only available through a public health lens.

What do you think is the biggest challenge to improving population health today?

The biggest challenge in any country is the social gradient – health and health care should be a human right to all people, not just those best able to afford it.

How have you used GBD in your work?

I use it in public health lectures, and to inform research projects.

What profession other than your own would you like to attempt?

Something that would allow me to work in the snow – we don't see it much in Australia.

What do you consider your greatest professional achievement to date?

Entering university – first in my family, first in my community, first in my people.

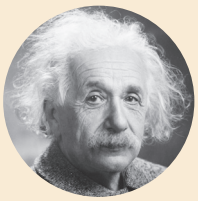
A PROFESSION YOU'D CHOOSE, OTHER THAN YOUR OWN

of collaborators surveyed

14% said "artist"

14% said "pilot or astronaut"

A SCIENTIST, LIVING OR DEAD, YOU MOST ADMIRE



17% of collaborators surveyed said "Albert Einstein"

LANGUAGES SPOKEN

22% of collaborators surveyed speak 5 or more languages

44 languages spoken among surveyed collaborators

Abadhi
Aboriginal Australian
Afrikaans
Amharic
Arabic
Bahasa Malay
Bashkir
Bengali
Bhojpuri
Bulgarian
Chinese
Dutch
English
Estonian
Finnish
French
German
Greek
Hebrew
Hindi
Italian
Kannada
Kazakh
Kirundi
Korean
Luxembourgish
Maithali
Maori
Nepali
Polish
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Punjabi
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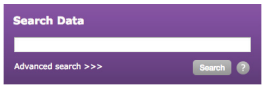
Sindhi
Spanish
Swahili
Swedish
Tamil
Tatar
Telugu
Tigrigna
Turkish
Ukrainian
Urdu



MARCH 2011: The Global Health Data Exchange (GHDx) is launched. The database provides a searchable online catalog of all sources used in GBD.

2011

Yun Jin Kim, PhD, MD

Xiamen University Malaysia Campus School of Medicine

GBD is turning 20. What were you doing when you were 20 years old?

I was a medical college student.

What do you think is the biggest challenge to improving population health today?

Mental health.

How have you used GBD in your work?

In seminars for my students.

If you could go anywhere in the world, where would you go and why?

Korea. It is my home country, because I stay in Malaysia.

What profession other than your own would you like to attempt?

Pianist.

Associate Professor Deena Al Asfoor MSc

Expert, Public Health, Ministry of Health

What inspired you to go into the field of public health?

Helping people; I always loved medicine and the idea of taking care of people. Having the opportunity to change thousands of lives is inspiring.

What do you think is the biggest challenge to improving population health today?

Dysfunctional health systems; having physicians who are not qualified in public and population health as the main decision-makers in medicine and health.

How have you used GBD in your work?

I have presented results from GBD in my presentations in the MoH. Also, I used the results to justify research in specific areas in my research proposals.

Which scientist, living or dead, do you most admire and why?

Dr. Ed Frongillo from the US, for his high ethics and devotion to public health, and for his kindness and support during the years I worked with him as a student and as a colleague in the Multi-Center-growth reference study.

> “Helping people; I always loved medicine and the idea of taking care of people.

What do you consider your greatest professional achievement to date?

Establishing the program Reduction of PEM in Oman, and showing achievements. Control of NTDs in Oman; reduction of micronutrient deficiencies in Oman; being the focal point in the WHO Multi-center growth reference study in Oman; and more to come...

DECEMBER 2012: GBD 2010 is published in *The Lancet*. The study covers 187 countries, 20 age groups, 21 regions, 291 diseases and injuries, and 67 risk factors. Online dynamic data visualizations are introduced.

2012

Nkurunziza Lambert, MD

Ministry of Public Health and Fight Against AIDS

What inspired you to go into the field of public health?

I worked in a medical center as a physician. At the end of the month, I was doing the activity report of the center; it was at this time that I became aware of the problem between patient care, the reported data (quantity and quality), and the health information that guides evidence-based decision-making.

What do you think is the biggest challenge to improving population health today?

Financing the health sector so that it can carry out appropriate research on disease control, and on the other hand, having health infrastructures with qualified medical staff in sufficient quantity and quality.

What do you consider your greatest professional achievement to date?

The Demographic and Health Survey of Burundi, 2016–2017.

Amador Goodridge, BS, MS, PhD

Instituto de Investigaciones Científicas y Servicios de Alta Tecnología (INDICASAT-AIP)

GBD is turning 20. What were you doing when you were 20 years old?

I was working on my undergraduate degree studying human papillomavirus.

What inspired you to go into the field of public health?

The experience within my undergraduate dissertation thesis, which allowed me to see how people are affected by several factors and they just don´t know. Also, the need for people to prevent and defeat infectious disease with evidence-based medicine.

What do you consider your greatest professional achievement to date?

Supporting tuberculosis control in Panama, especially in Colón, where it is most needed in our country.

Katarzyna Kissimova-Skarbek MS, PhD

Jagiellonian University Medical College

What do you think is the biggest challenge to improving population health today?

Getting the population to adopt healthier lifestyles by reducing their NCD-related risk behavior.

What do you consider your greatest professional achievement to date?

Probably helping the Polish Government to implement a Health Insurance system in 1996–2000: it created payment methods for health providers and trained managers. Another example may be explaining to health professionals the essence of DALYs allowing to express in one number the years lost due to both deaths and disability.

2013: The 35-member GBD Scientific Council is established. The Council governs the endeavor, assists with determining new methodology, and resolves scientific disputes.

GBD gives decision-makers the reliable evidence they need

Dr. John Q. Wong

The Global Burden of Disease grew out of a real-world need for more reliable, comparable, and consistent evidence for policy and planning in global development. The work of GBD isn't done for analysis alone. Instead, turning evidence into action to improve population health is the cornerstone of the GBD enterprise. Examples of how GBD has been used to set priorities and to decide where to invest in order to change lives abound. Here are a few of the most recent.

Prioritizing national health resources in the Philippines

The Philippine Health Insurance Corporation (PhilHealth) used GBD evidence to expand its health care coverage to more low-income families and to address what was causing the most health loss. PhilHealth was created to provide health care for a country of nearly 100 million people, and it was struggling in the early 2010s to meet that mandate.

> "With the burden of disease findings, we were able to show the areas that deserved the most attention.

In 2016, Dr. John Q. Wong from Ateneo de Manila University used GBD data to advise PhilHealth on how it could provide coverage for the areas that would have the biggest health impact.

"Until recently, simple mortality statistics and lobbying by stakeholders determined which benefit packages were chosen for government coverage," Dr. Wong said. "With the burden of disease findings, we were able to show the areas that deserved the most attention."

Dr. Wong developed a new, evidence-driven process to help PhilHealth select services to include in the country's universal health plan with a goal of maximizing impact and minimizing costs. Dr. Wong and his team used GBD to discover that just 48 causes of illness and injury were contributing to 80% of all health problems in the Philippines.

They then paired this list with interventions that would be the most cost-effective to implement. Dr. Wong found many new interventions could – and should – be added inexpensively to the national health plan. His recommendations not only became the core of the new prioritization process, but also inspired a new comprehensive benefit package called the Guaranteed Health Benefit Package (GHBP). The GHBP will be rolled out to the 92% of Filipinos covered under PhilHealth once all components of the benefit package are approved. The GHBP will

> The Global Burden of Disease study, which shows the key drivers of ill health, disability, and death in individual countries, found that by 2015, the world population had gained more than a decade of life expectancy since 1980 – rising to 69.0 years in men and 74.8 years in women.
>
> **– Reuters**

2014: The GBD 2013 study is published in *The Lancet*.

2014

Midwife Jesusa Calanoc Sari provides pregnant patient Ronalyn Repuya with a routine physical examination at a rural health clinic

greatly reduce out-of-pocket costs and cover 15 million Filipinos who are most in need.

"Now, the services included in the new guaranteed health benefits package will reflect what causes the most health loss of Filipinos," Dr. Wong said. "The world can look at what the Philippines has done, because it used burden of disease data to set priorities and lead to more efficient use of its resources."

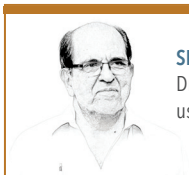
Stemming the tide of diabetes in Kenya

The Kenyan Ministry of Health is framing its strategy for tackling diabetes using IHME's GBD 2015 report *Health Transitions in Africa: Evaluating the Rise of Diabetes and Cardiovascular Disease*. Diabetes is now a substantial contributor to premature death and poor health in many countries in sub-Saharan Africa, and this burden is frequently higher than expected given levels of socioeconomic development.

In response to these findings, Dr. Joseph Kibachio, head of the Division of Non-Communicable Diseases at the Kenyan Ministry of Health, is using GBD results to raise awareness of diabetes and its major risk factors. Noting that many are not even aware that they have the condition, he encouraged Kenyans to go for early testing to ensure timely diagnosis and reduce the risk of developing serious complications such as blindness or limb loss. He also urged people to commit to positive lifestyle changes such as healthy eating, increased exercise, and cutting back on smoking and alcohol consumption.

The report has led to concrete changes in the Kenyan health system. Dr. Kibachio inaugurated a specialized diabetes center at Nakuru Provincial Hospital. The Ministry

> "Now, the services included in the new guaranteed health benefits package will reflect what causes the most health loss of Filipinos.



SEPTEMBER 2014: The first Roux Prize is awarded to Dr. Rodrigo Guerrero, mayor of Cali, Colombia. Dr. Guerrero used data in addressing violence as a public health crisis.

of Health is now looking to roll out more facilities like this, particularly given the increasing burden of diabetes demonstrated in the report. Legislative measures for tackling diabetes are next on the agenda.

Dr. Shaukat Sadikot, President of the International Diabetes Federation, said, "Diabetes is not a silent epidemic; what we are facing is a tsunami of diabetes. A few years ago the major cause of blindness was vitamin A deficiency in children. We are now talking about diabetes in adults. We have to look back and rethink our strategies in order to help our people." Kenyan policymakers are using the findings from IHME's report to do just that, continuing to demonstrate how timely, rigorous evidence can help governments understand and respond to new health challenges.

Using GBD data to maximize the NIH's funding impact

With its 2016–2020 strategic plan, the National Institutes of Health (NIH) will use US burden of disease data – which allow decision-makers to directly compare the impact of diseases that kill, such as cancer, and conditions that disable, such as depression – in determining how to best direct public resources. The strategic plan's release followed the passage of the bipartisan 21st Century Cures Act, which awarded the NIH an additional 3% real increase in funding per year for three years, with an additional $2 billion for an NIH Innovation Fund.

"This strategic plan will guide our efforts to turn scientific discoveries into better health, while upholding our responsibility to be wise stewards of the resources provided by the American people," said NIH Director Dr. Francis S. Collins when the plan was released in December 2015. The use of burden of disease data will harmonize decision-making across the NIH's nearly 30 institutes and centers. By working with its partners, the NIH will collect and integrate burden of disease data into its priority-setting processes.

The NIH's analysis of US burden of disease data revealed the massive burden of non-communicable diseases, but it also showed that funding levels for some diseases were relatively high compared to their burden. Faced with competing priorities, the NIH's strategic plan noted that burden of disease data "will serve as a crucial, but not the only, consideration in aligning NIH's research priorities with public health needs." The agency says it will continue to engage in a comprehensive process that draws in scientific experts and thought leaders. In doing so, the NIH will chart a path toward better health for all.

Photo by Derrick Coetzee, Flikr Creative Commons. USA, 2012

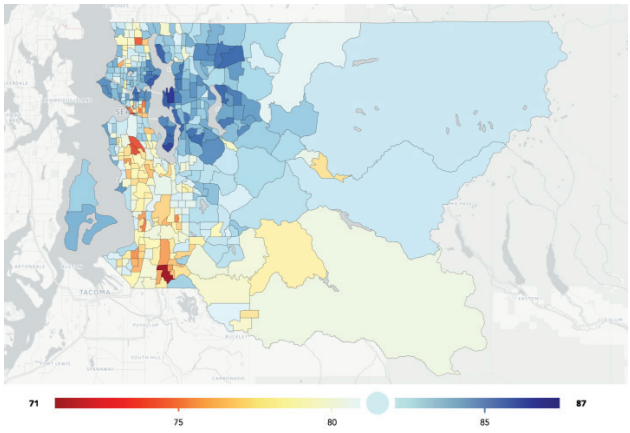
> "The use of burden of disease data will harmonize decision-making across the NIH's nearly 30 institutes and centers.

2015: Beginning in 2015, the GBD study is updated annually.

2015

Comparing disease burden to health spending in the US

The US spends more on health care annually than any other country, yet ranks only 43rd in the world for life expectancy. There is huge variation across the country, with some people living among the longest and healthiest lives in the world and others with health outcomes akin to developing countries with far weaker economies and far less education. A recently published study of neighborhoods in King County, Washington, showed a variance of up to 18 years in life expectancy within just a few miles.



King County, Washington life expectancy map

While there is increasing knowledge about how health outcomes vary across the US, there is far less information about how and why health care spending varies. The Institute for Health Metrics and Evaluation (IHME) believes local decision-makers need comprehensive information on health outcomes and risk factors, coupled with health expenditure data, to identify opportunities to improve health and allocate resources effectively. The Disease Expenditure (DEX) project at IHME has begun to address this information gap, building on the GBD evidence base. Findings from the DEX project offer spending trends at the national level, but the opportunity exists to explore critical geographic variation.

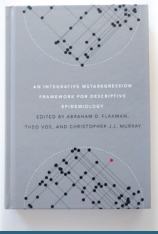
Our vision is to provide the evidence that will help decision-makers align health resources and eliminate health gaps in the US. We're focused on being able to show in great detail at the very local level – down to the neighborhood where possible – two things: 1) what is causing the most health loss, both in terms of people dying too young and in terms of people getting sick from conditions that should be preventable or treatable, and 2) how every dollar is spent on those same diseases, risks, and injuries to uncover where that spending is having an impact and where it is not.

IHME published in *JAMA* an analysis of health care spending nationally divided into diseases and by age and sex groups. In addition, IHME's most recent estimates of life expectancies for all 3,142 US counties revealed a gap of more than 20 years between the highest- and lowest-performing counties. The study, published in *JAMA Internal Medicine*, highlighted massive and growing inequality in American health. IHME also collaborated with Public Heath – Seattle & King County (PHSKC) in Washington, to analyze differences in life expectancy by geographic disparities at the census tract level. Results were published in *The Lancet Public Health*.

Building on these studies and GBD, IHME proposes to create a new generation of analyses that would track health expenditures by age, sex, cause, and payer and then link expenditures to health outcomes. This work would provide comparisons among the impacts and costs of conditions such as Alzheimer's disease, diabetes, and heart disease – and more than 150 conditions IHME examines as part of its US county-level analysis – and strengthen our understanding of how to improve health, reduce disparities, and control costs.

This project could have a transformative effect on health care in the US by giving policymakers a way to bring better health care to more people while making sure that money is being spent wisely. We already have seen how the US National Institutes of Health is using GBD to decide how to allocate more than $30 billion in research funding. Think about what could happen if we could better direct more than $2 trillion in spending on health care in the US.

To find out more about how to support this work, contact Senior Director of Philanthropy, **Karen Donahue Robinson** at **+1-206-897-2881** or **karendr@uw.edu**.



OCTOBER 2015: *An Integrative Metaregression Framework for Descriptive Epidemiology* is published. The book details the methods underlying the morbidity estimation in the GBD study.

How one of the world's foremost research universities is using GBD

AN INTEGRAL COMPONENT OF THE UW'S POPULATION HEALTH INITIATIVE

By Ana Mari Cauce and Ali Mokdad

Ana Mari Cauce, PhD

President of the University of Washington and chair of the UW's Population Health Initiative

Ali Mokdad, PhD

Professor of Global Health at the Institute for Health Metrics and Evaluation and vice chair of the UW's Population Health Initiative

Among the 7.5 billion human beings who share this planet, there are vast disparities in health. At the University of Washington, we believe that when you see a disparity, you must ask: why? And what can be done to make a difference?

The answers to the first question may be simple: poverty, access to sanitation and health care, for example. The answers to the second question rarely are.

When the University of Washington launched its multi-decade Population Health Initiative last year, we did so with a vision of creating a world where all people can live healthier and more fulfilling lives. The initiative strengthens our commitment to reducing the diseases and injuries that contribute to the health disparities experienced by far too many people. Through it, we will also work to meet the challenge of environmental resilience as we grapple with the effects of climate change, access to clean water, air, and land. And we will strive to address the social and economic inequities that limit opportunities for communities and individuals.

The University's vision for population health is inspired by the tremendous interdisciplinary work taking place across our three campuses and in collaboration with many local and global partners. At the forefront of these interdisciplinary collaborations is the Global Burden of Disease (GBD) study, which supports our faculty, students, and staff in identifying and quantifying health loss from hundreds of diseases, injuries, and risk factors, so that health systems can be improved and disparities can be eliminated.

> **"We believe that when you see a disparity, you must ask: why? And what can be done to make a difference?"**

With more than 2,500 researchers worldwide, GBD is the largest publishing collaboration in science. The study quantifies, on an annual basis, the magnitude of health loss at global, national, and regional levels, and does so by age, sex, and population. It examines trends looking back more than a quarter century – and forecasts decades into the future.

2016: The expected burden of disease based on a population's level of socioeconomic development – as measured by the Socio-demographic Index (SDI) – is introduced with GBD 2015. The 2015 study is also compliant with recommendations set forth by Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) (**http://gather-statement.org/**).

From the impact of malaria in sub-Saharan Africa to diabetes trends in Europe to the opioid epidemic in the US, GBD studies are providing clarity and specificity about not just the prevalence of particular diseases, but the relative harm they cause.

GBD's convening organization, the Institute for Health Metrics and Evaluation (IHME), is one of the University's centers of excellence. Located within the UW School of Medicine, IHME serves as a campus-wide colleague, able to work easily and collaboratively alongside other departments and units that support the Population Health Initiative.

IHME's status as a global leader in health data and analysis was reinforced earlier this year when the Bill & Melinda Gates Foundation announced a new 10-year grant for the Institute's work. The $279 million investment continues a long tradition of partnership between the Gates Foundation and the UW on work that contributes to a better world.

Foundation co-chair Melinda Gates said of the grant, "We are proud to support IHME and the University of Washington. We feel lucky that our local university is also on the leading edge of innovation globally, and we are grateful that it has chosen to innovate to help the poorest people in the world."

The UW's Population Health Initiative seeks to capitalize on this innovation mindset to bring together the knowledge and resources of the University and the Puget Sound region, and to channel them toward improving health and well-being locally and around the world.

> **"With more than 2,500 researchers worldwide, GBD is the largest publishing collaboration in science."**

Our hope and ambition over the coming decades is to answer the questions of why health disparities exist and what we can do about them using data, wisdom, and insight. In fact, we hope those questions can be answered so thoroughly that they need never be asked again.

Want to know

- What are the world's major health problems?
- How well are countries addressing these problems?
- How do we best dedicate resources to help people live longer, healthier lives?

Interested in getting involved?

- **Sign up for IHME updates**
  http://www.healthdata.org/news-events
- **Support our work**
  http://www.healthdata.org/get-involved/support-our-work
- **Explore our interactive data visualizations**
  http://vizhub.healthdata.org
- **Join our team**
  http://www.healthdata.org/get-involved/careers
- **Sign up to become a GBD collaborator**
  http://www.healthdata.org/gbd/call-for-collaborators

OCTOBER 2016: The GBD 2015 study is published in *The Lancet*. Data visualizations for the 2015 study include 24 billion results.

The influence of the GBD technical training

WORKSHOP STATISTICS 2012–2017

337
Total participants

103
Scholarships

71
Countries

Since 1994, over 20 GBD technical training workshops have offered an interactive learning experience where participants receive hands-on training from study creators on how to apply GBD methods, tools, data, and visualizations.

The workshops are a unique hands-on opportunity for the global community of researchers, academic leaders, policymakers, and public health professionals to not only gain an in-depth understanding of the technical and scientific methods used in the GBD study, but also cultivate networks with a global community of experts. This network furthers the scientific excellence of the study and increases the impact and applications of the study in health programs around the world.

We are excited now to enter a new phase in the program by adding an online learning component. Beginning this fall, individuals will be able to enroll in web-based training sessions that will explore broad GBD concepts. This new delivery channel will increase the reach of GBD technical knowledge and make the training accessible to more learners worldwide. In-person workshops covering more focused topics will continue to be offered annually. The next session will be held in April 2018. For more program information, please contact **gbdtraining@healthdata.org.**

2017: More than 16,000 peer-reviewed publications and reports have been generated from the GBD study. References to the studies have been cited over 700,000 times.

2017

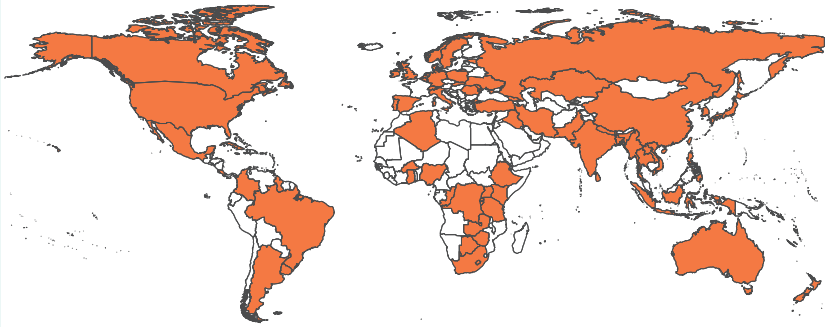
“As professionals working on Portuguese health data we felt that this IHME workshop was a great professional and personal investment and opportunity. The techniques used by the training team strengthened our knowledge of the GBD methodology, and the contacts made with professionals from different countries and areas of knowledge added even more interest to this experience. Our goal for the future is to produce estimates of the burden of diseases, injuries, and risk factors at the regional and sub-regional levels in Portugal, and this was an important step to reach it.”

–Vasco Machado
Northern Health Region Administration of Portugal, Public Health Department, Portugal

and

–Graca Lima
ARS Norte/ULS Matosinhos, Portugal

Since 2012, participants have traveled from 71 countries to attend the trainings

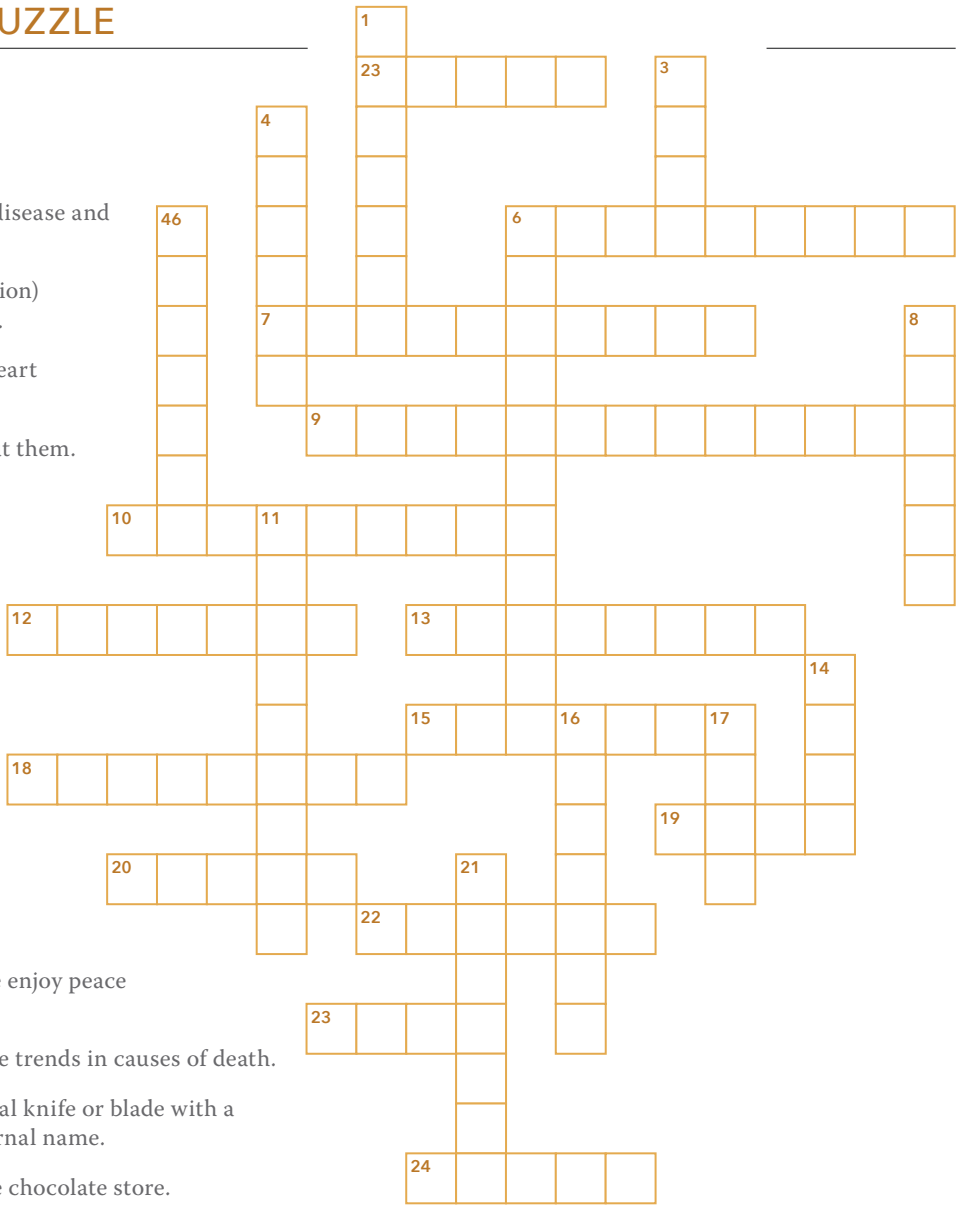


SEPTEMBER 2017: The GBD 2016 study has the participation of 2,518 collaborators from 133 countries and three territories. The study includes 333 diseases and injuries, 84 risk factors, 23 age groups, estimated for a total of 774 locations.

GBD CROSSWORD PUZZLE

Across

2. Potentially modifiable causes of disease and injury.
6. The smallest country (by population) estimated in the GBD 2015 study.
7. Hearing or vision loss, anemia, heart failure, and the like.
9. GBD wouldn't be possible without them.
10. A variable that is possibly predictive of the outcome under study.
12. One of the "hottest" ways to visualize GBD data.
13. Another term for cancer.
15. State of having a body mass index (BMI) of 30 or greater.
18. The cause, set of causes, or manner of causation of a disease or condition.
19. Universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity.
20. Analytical tool that explores large trends in causes of death.
22. A small, broad, two-edged surgical knife or blade with a sharp point, or a well-known journal name.
23. GBD author and a famous Seattle chocolate store.
24. YLLs + YLDs.



Down

1. A visualization that gets to the "roots" of GBD results.
3. GBD measure or a homophone for a meteorological phenomenon.
4. A class of drugs that include heroin, fentanyl, oxycodone, and hydrocodone.
5. Fourth-leading (level 2) global risk factor in GBD 2015.
6. What a bad programmer produces (2 words).
8. Software tool used in GBD to quantify deaths from each cause by age, sex, country, and year.
11. Also known as "Dr. Death" (2 words).
14. Years of life lost due to premature mortality.
16. Latin for "thread," or the consequence of a disease or injury.
17. Years of life lived with any short-term or long-term health loss.
21. By GBD 2015 estimates, the country with the highest life expectancy.

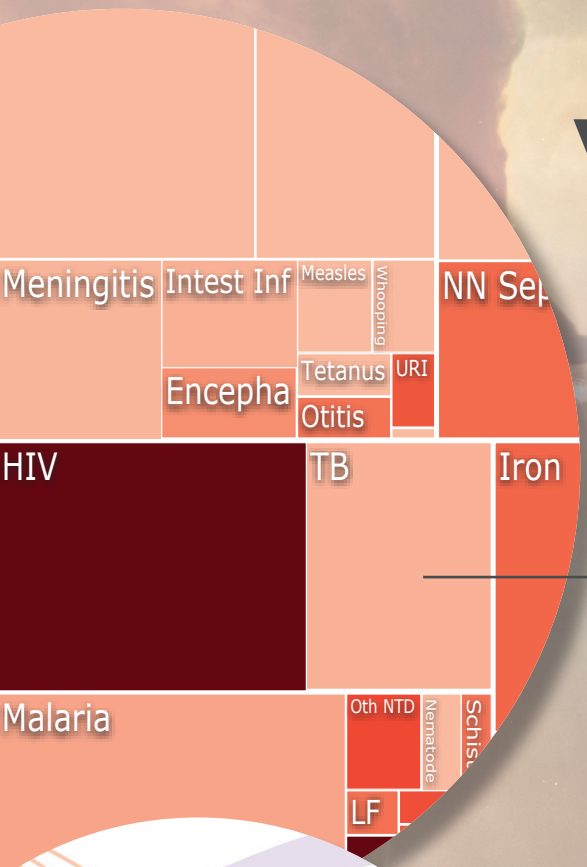
Join the GBD Collaborative Network

With more than 2,500 collaborators around the world (and counting), we are always working to expand the GBD collaborative network. Through scientific publications, policy reports, and online data visualizations, GBD allows decision-makers to compare the effects of different health conditions.

We continue to build and sustain an even larger and more diverse network of collaborators with expertise in mortality, specific diseases, injuries, risk factors, impairments, and the health profiles of individual countries. Collaborators bring new data into the enterprise, advance the analytical methods behind the work, co-author GBD publications, and help drive the use of disease burden estimates in decision-making around the world.

Enrollment is now open for the next round of GBD. We invite you to apply to be a GBD collaborator if you are interested in participating in the next iteration.

www.healthdata.org/gbd/call-for-collaborators
or send an email to the **GBD Secretariat at gbdsec@uw.edu.**



VISUALIZATIONS

Bringing the data to life

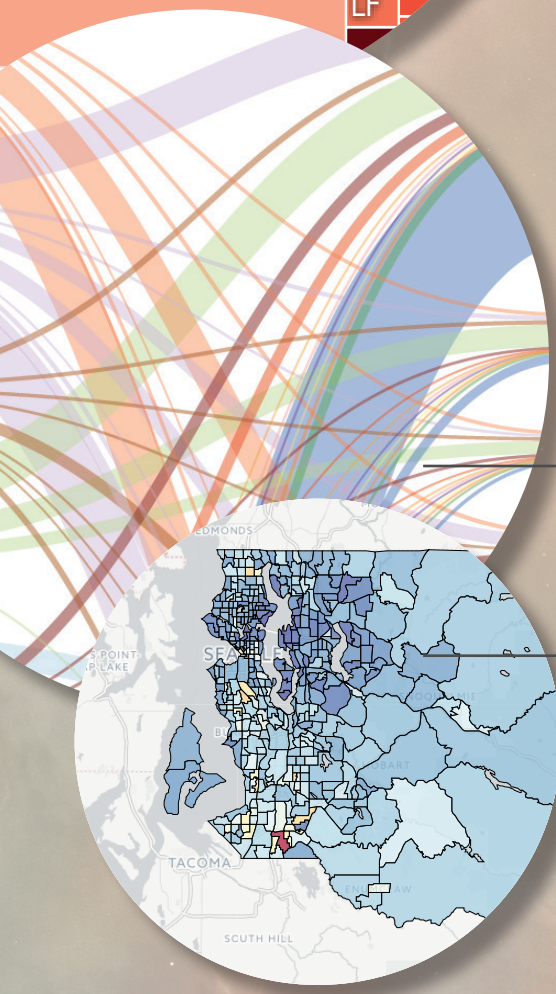
Billions of data points – how do I make sense of it?

GBD Compare allows users to uncover trends and find the stories that can turn findings into actionable policies and initiatives.

https://vizhub.healthdata.org/gbd-compare/

Developed by IHME for non-commercial use, GBD Compare can be used to create visuals for reports and presentations, to download custom datasets, and to introduce students to tools that can unleash the power of in-depth research in an accessible way.

Use maps and treemaps, arrow diagrams, and many other charts to compare results within a country, compare countries with regions or the world, and view patterns and trends by country, age, sex, and year. From the global perspective, drill down into specific details. Contrast expected and observed trends. Witness how disease patterns have evolved over time. Learn which causes of death and disability are having increasing impact and which are waning.



More data visualizations

Tracking personal health care spending in the US
http://vizhub.healthdata.org/dex
Observe US health care spending trends for 155 conditions since 1996.

King County Census Tracts Visualization
https://vizhub.healthdata.org/subnational/usa/wa/king-county
Track life expectancy and rates of mortality and premature mortality across the 397 census tracts of King County, WA, since 1990.

Photo by NASA on Unsplash