Global Burden of Disease for Older Persons in Mexico and USA, 1990-2013

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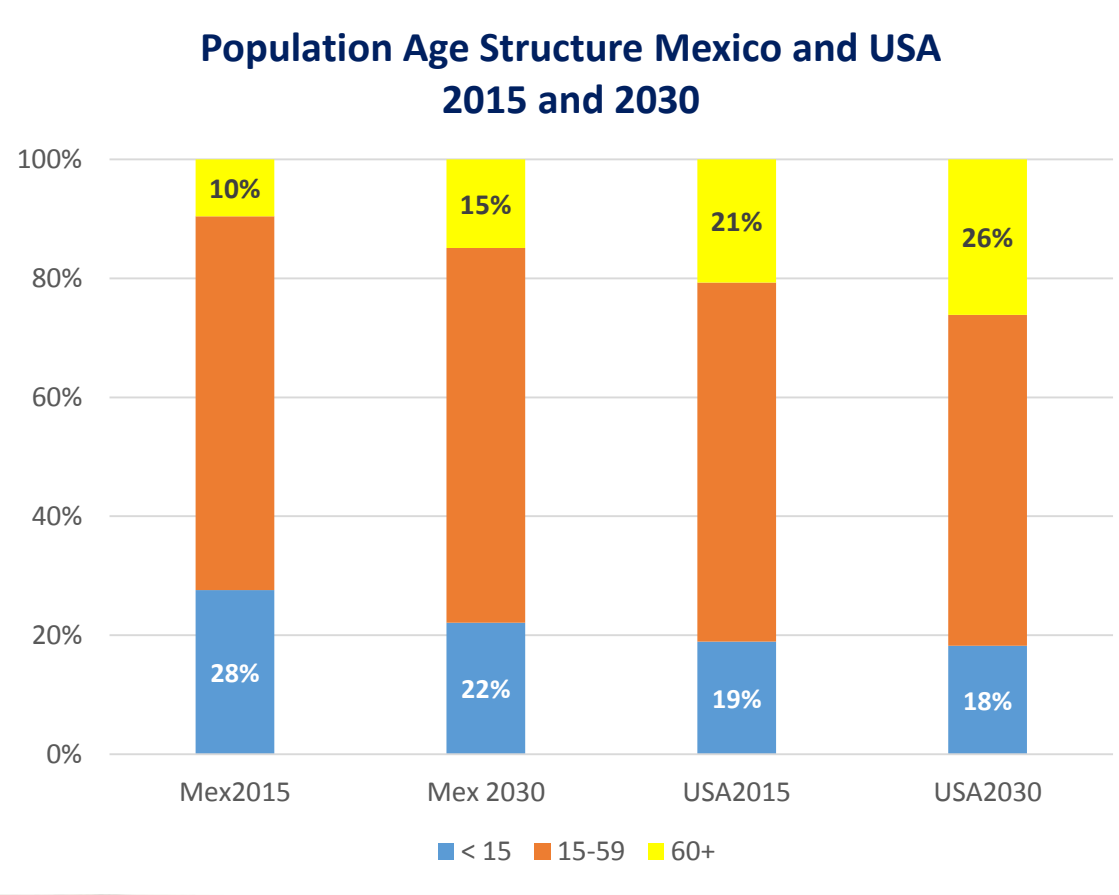
International Workshop on
Formal and Informal Systems of Support for Older Persons
in Mexico and the United States,
in the Context of Health and Welfare Reform

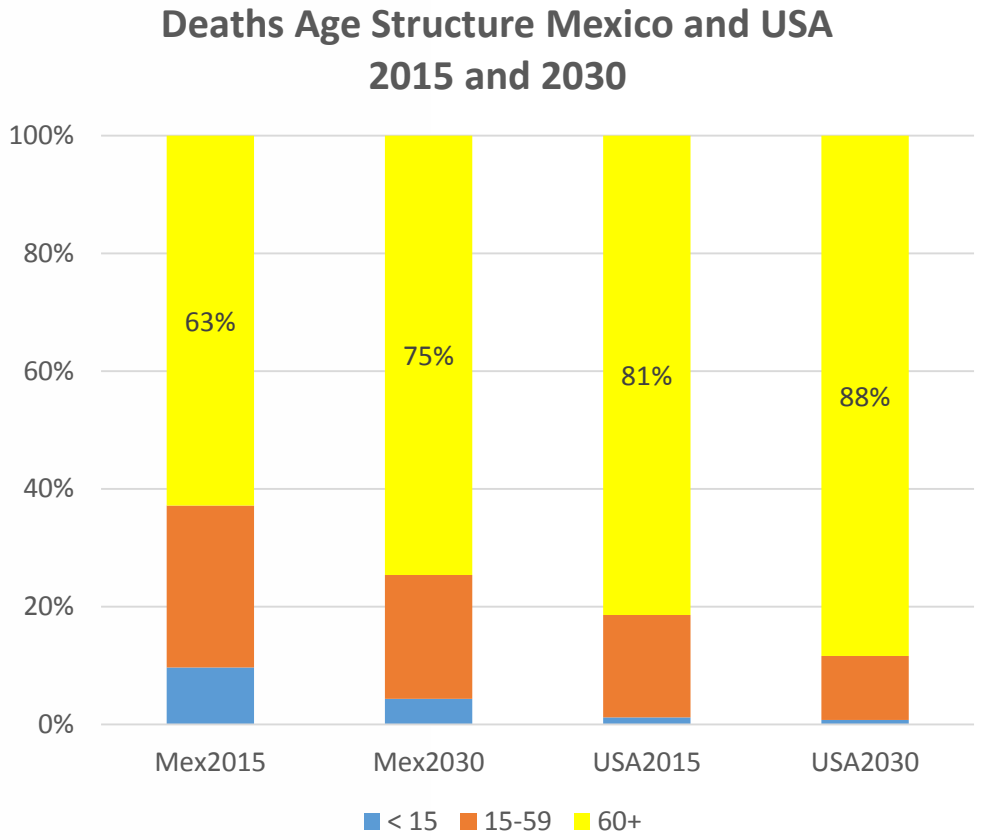
September 17-18, 2015
Mexico City

Outline

- Demographic and Epidemiological Transition
- GBD 2013
  - Better methods + more data = Sound results
- The BoD in older persons
- Implication for Health Systems

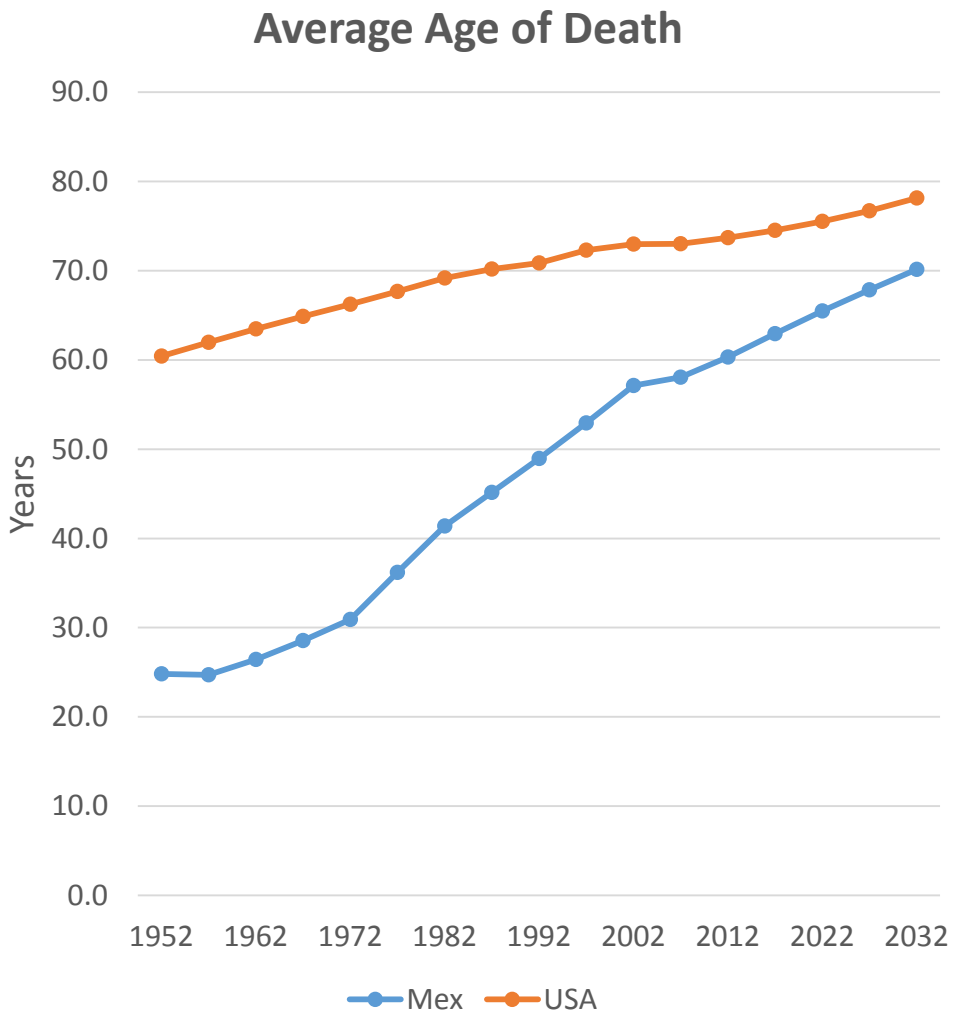
Demographic Changes





Source: UN. World Population Prospects: The 2015 Revision.

Increasing the Age of death



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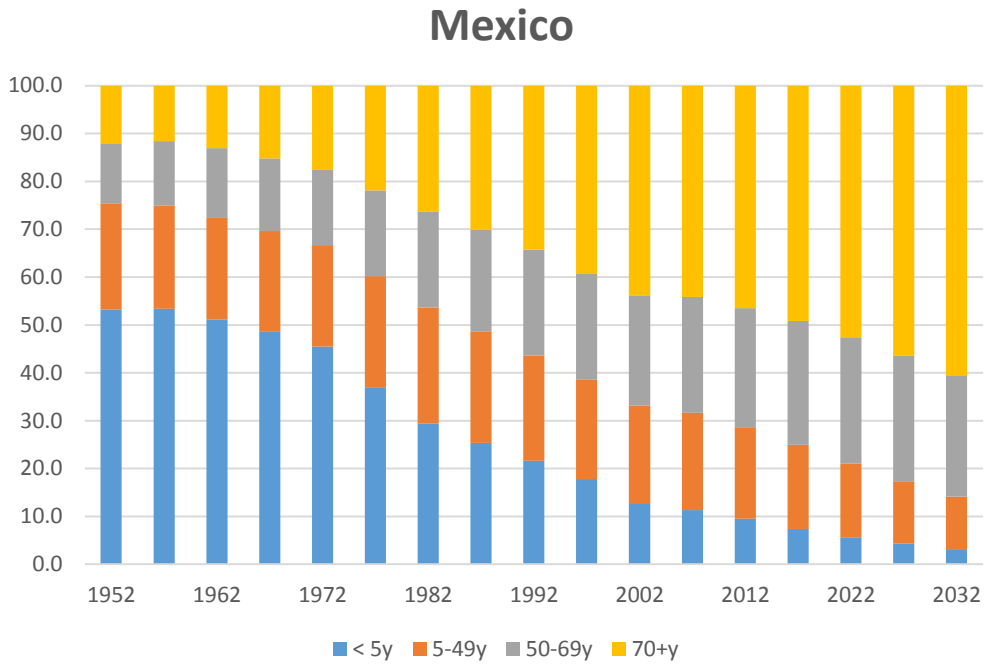
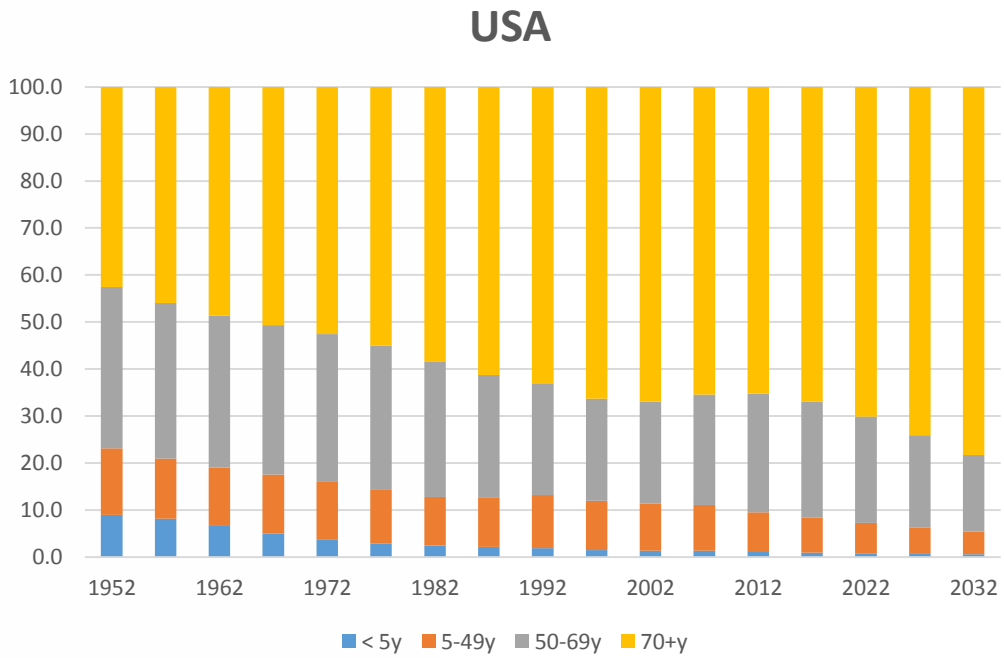
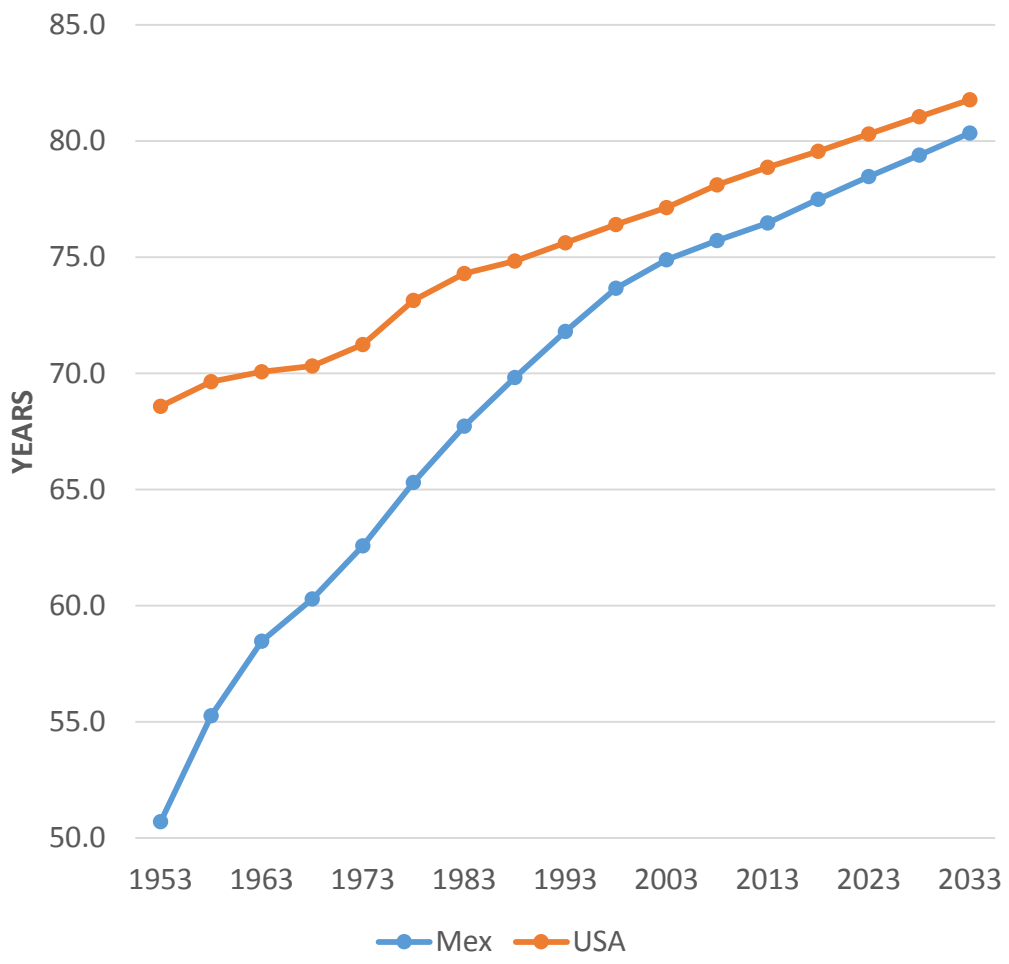




Important Progress in Health



Source: UN. World Population Prospects: The 2015 Revision.

The Lancet Commissions

GLOBAL HEALTH 2035

THE LANCET

Global health 2035: a world converging within a generation

Dean T Jamison*, Lawrence H Summers*, George Alleyne, Kenneth J Arrow, Seth Berkley, Agnes Binagwaho, Flavia Bustreo, David Evans, Richard G A Feachem, Julio Frenk, Gargee Ghosh, Sue J Goldie, Yan Guo, Sanjeev Gupta, Richard Horton, Margaret E Kruk, Adel Mahmoud, Linah K Mohohlo, Mthuli Ncube, Ariel Pablos-Mendez, K Srinath Reddy, Helen Saxenian, Agnes Soucat, Karen H Ulltveit-Moe, Gavin Yamey

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See Comment pages 1859, 1863, e33, e34, e36, and e38

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See Online for video infographic

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Executive summary

Prompted by the 20th anniversary of the 1993 World Development Report, a *Lancet* Commission revisited the case for investment in health and developed a new investment framework to achieve dramatic health gains by 2035. Our report has four key messages, each accompanied by opportunities for action by national governments of low-income and middle-income countries and by the international community.

There is an enormous payoff from investing in health

The returns on investing in health are impressive. Reductions in mortality account for about 11% of recent economic growth in low-income and middle-income countries as measured in their national income accounts.

However, although these accounts capture the benefits that result from improved economic productivity, they fail to capture the value of better health in and of itself. This intrinsic value, the value of additional life-years (VLYs), can be inferred from people's willingness to trade off income, pleasure, or convenience for an increase in their life expectancy. A more complete picture of the value of health investments over a time period is given by the growth in a country's "full income"—the income growth measured in national income accounts plus the VLYs gained in that period. Between 2000 and 2011, about 24% of the growth in full income in low-income and middle-income countries resulted from VLYs gained.

This more comprehensive understanding of the economic value of health improvements provides a strong rationale for improved resource allocation across sectors.

Opportunities:

- If planning ministries used full income approaches (assessing VLYs) in guiding their investments, they could increase overall returns by increasing their domestic financing of high-priority health and health-related investments.
- Assessment of VLYs strengthens the case for allocating a higher proportion of official development assistance to development assistance for health.

A "grand convergence" in health is achievable within our lifetimes

A unique characteristic of our generation is that collectively we have the financial and the ever-improving technical capacity to reduce infectious, child, and maternal mortality rates to low levels universally by 2035, to achieve a "grand convergence" in health. With enhanced investments to scale up health technologies and systems, these rates in most low-income and middle-income countries would fall to those presently seen in the best-performing middle-income countries. Achievement of convergence would prevent about 10 million deaths in 2035 across low-income and lower-middle-income countries relative to a scenario of stagnant investments and no improvements in technology. With use of VLYs to estimate the economic benefits, over the period 2015–35 these benefits would exceed costs by a factor of about 9–20, making the investment highly attractive.

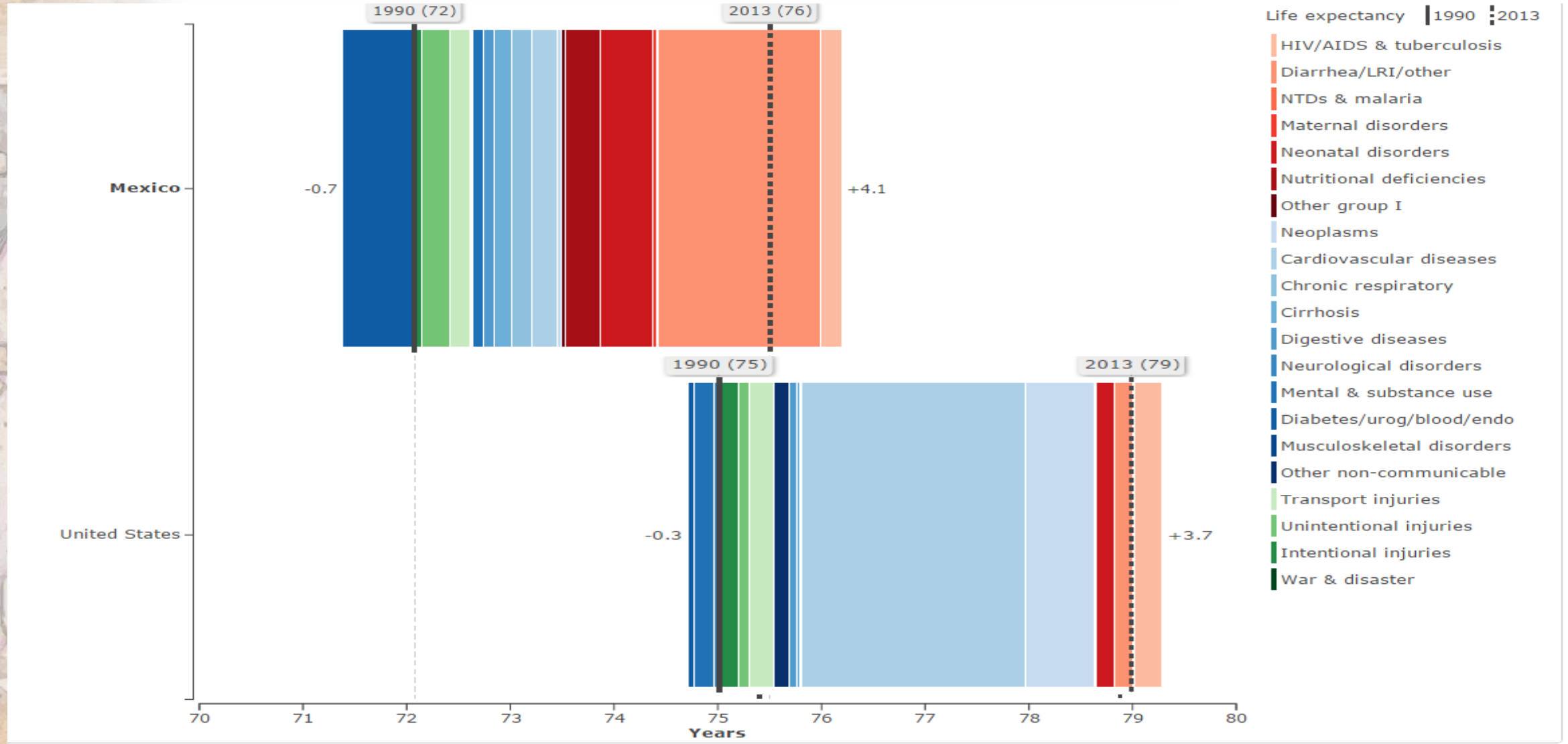
Opportunities:

- The expected economic growth of low-income and middle-income countries means that most of the incremental costs of achieving convergence could be covered from domestic sources, although some countries will continue to need external assistance.
- The international community can best support convergence by funding the development and delivery of new health technologies and curbing antibiotic resistance. International funding for health research and development targeted at diseases that disproportionately affect low-income and middle-income countries should be doubled from current amounts (US$3 billion/year) to $6 billion per year by 2020. The core functions of global health, especially the provision of global public goods and management of externalities, have been neglected in the last 20 years and should regain prominence.

Fiscal policies are a powerful and underused lever for curbing of non-communicable diseases and injuries

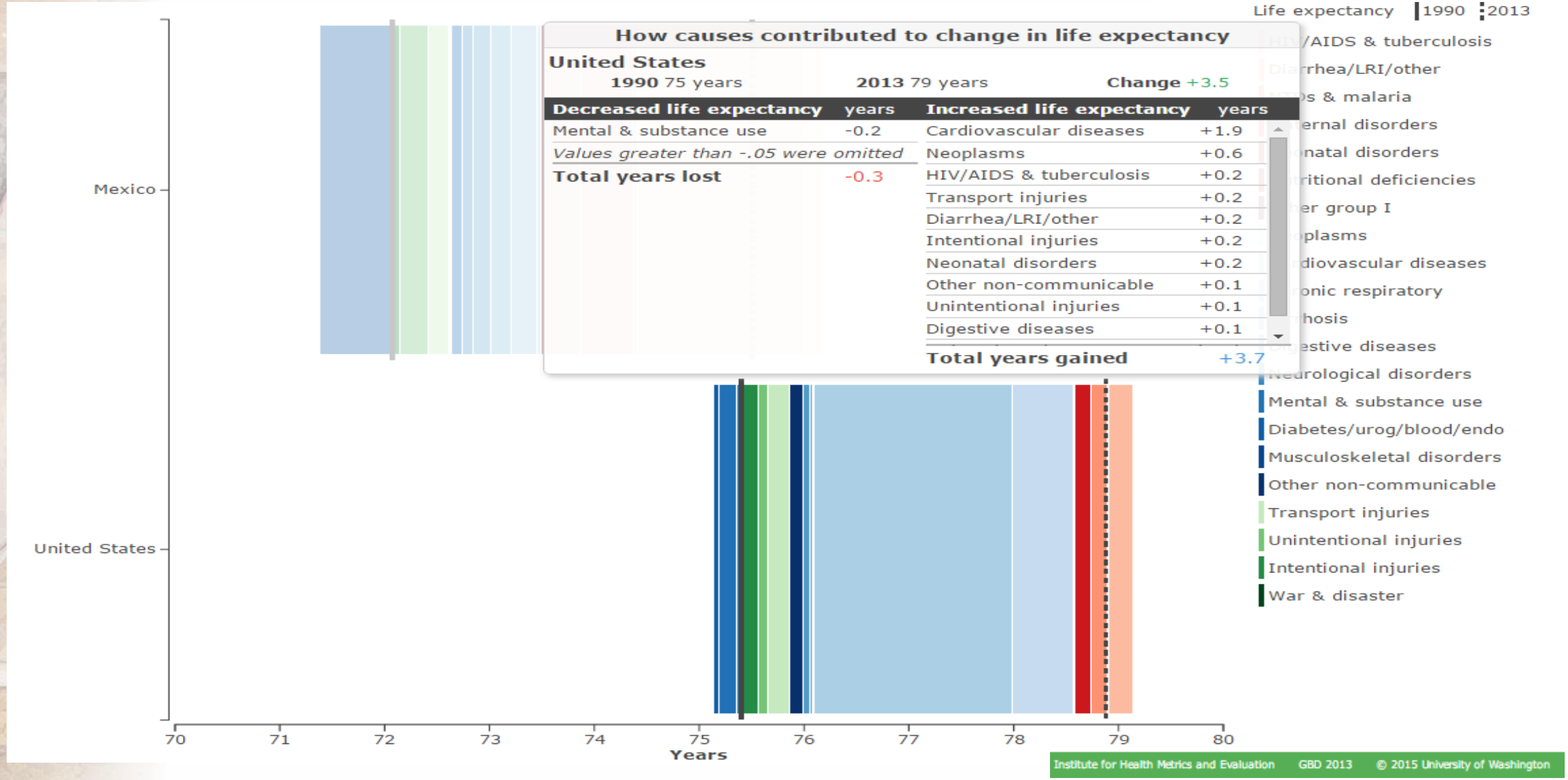
The burden of deaths from non-communicable diseases (NCDs) and injuries in low-income and middle-income

Life expectancy decomposition by causes Mexico and USA 1990-2003

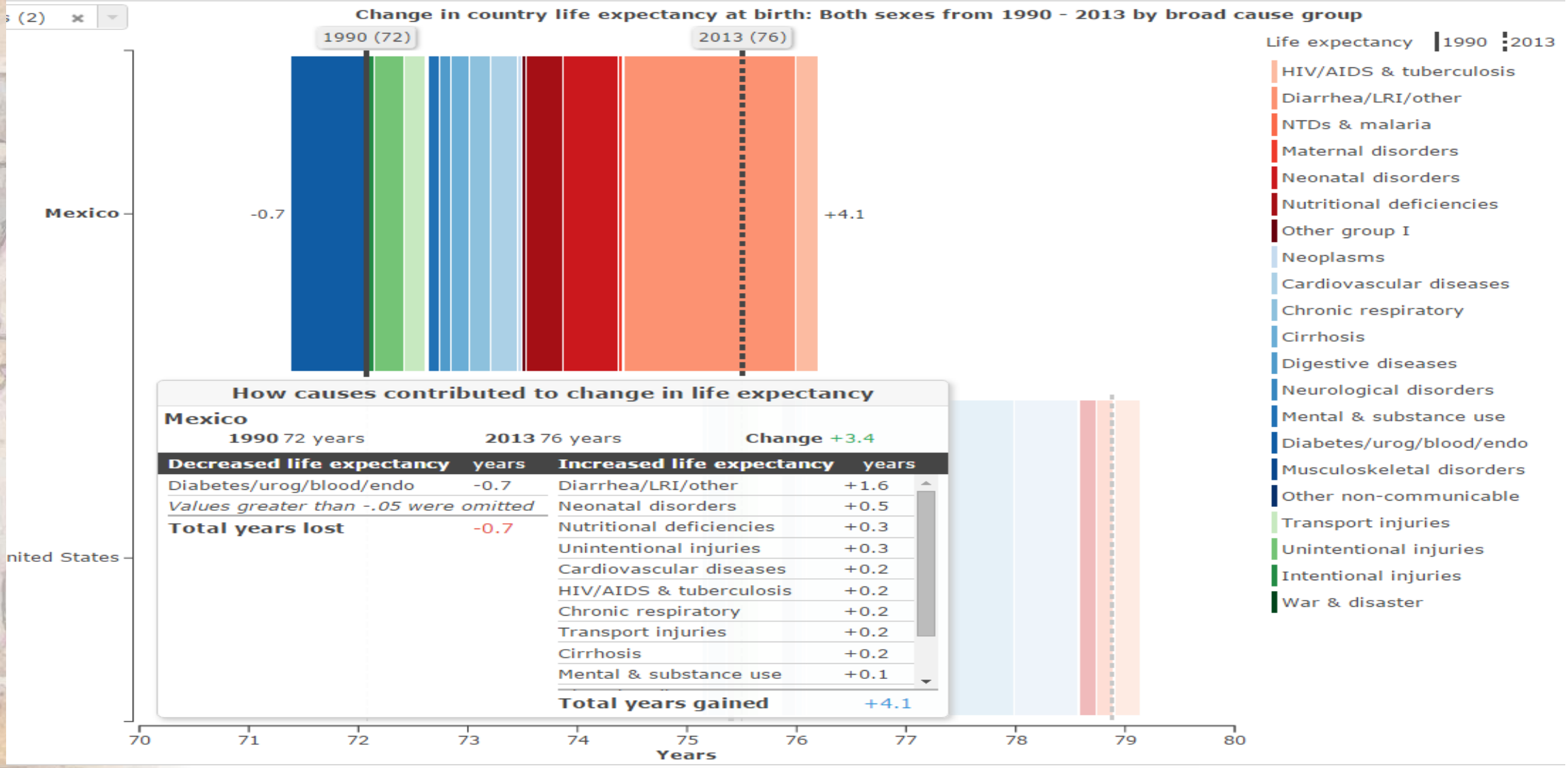


GBD 2013, released 12/2014

Life expectancy decomposition by causes USA 1990-2013



Life expectancy decomposition by causes Mexico, 1990-2013



Outline

- Demographic and Epidemiological Transition
- GBD 2013
  - Better methods + more data = Sound results
- Implications for older persons
- Implication for Health Systems

GBD 2013

First revision GBD 2013 to be released during 2014 and 2015.

GBD 2013 will incorporate critical feedback on the GBD 2010 estimates and many new datasets proposed by disease, injury and country experts.

GBD 2013 will include subnational assessments for the UK, China and Mexico

Comment

GBD 2.0: a continuously updated global resource

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The Global Burden of Disease Study 2010 (GBD 2010) provides a comprehensive and coherent assessment of the state of the world's health from 1990 to 2010.[1,2] With consistent definitions, standardised approaches to data quality, and consistent modelling strategies, GBD 2010 assesses mortality, premature mortality, and disability caused by a detailed list of diseases, injuries, and risk factors. The analysis is undertaken in great detail, covering 187 countries, two decades, both sexes, and 20 age groups. The findings point to rapid changes in patterns of health outside sub-Saharan Africa, with large shifts in many regions towards non-communicable diseases, chronic disability, and risk factors related to behaviours. In sub-Saharan Africa, mortality of children younger than 5 years decreased substantially and maternal mortality also fell; since 2005, major progress has been made for HIV, and for malaria since 2004. Despite this progress, GBD 2010 also shines a spotlight on the challenges that many of the poorest countries continue to face, where several infectious diseases, such as diarrhoea, pneumonia, and neonatal conditions, continue to dominate as major causes of premature child death. Substantial investments by developing countries and US$28·1 billion in 2012 in development assistance for health, focusing on the Millennium Development Goals, are contributing to accelerated transitions.[3] Countries are experiencing a complex set of changes in health problems and their underlying causes, which need more and more contextualised policy responses.

For several reasons, national, regional, and global actors need to have access to the best available evidence for patterns of health and how they are changing. Although it is an enormous resource, GBD 2010 needs to be regularly and systematically revised and improved to reflect new evidence and new methods as they accumulate for at least five reasons. First, new data sources for a country—eg, a Demographic and Health Survey, a census, a local survey, or national vital registration data—can substantially change understanding of health trends. Demographic and Health Surveys in several sub-Saharan African countries have shown accelerated decreases in child mortality in the past decade.[25] Trends in mortality can change abruptly: from 2008 to 2010, adult male mortality in Ukraine dropped about 22%; and scale-up of antiretroviral therapy (ART) has radically reduced adult mortality since 2005 in several countries (eg, Botswana).

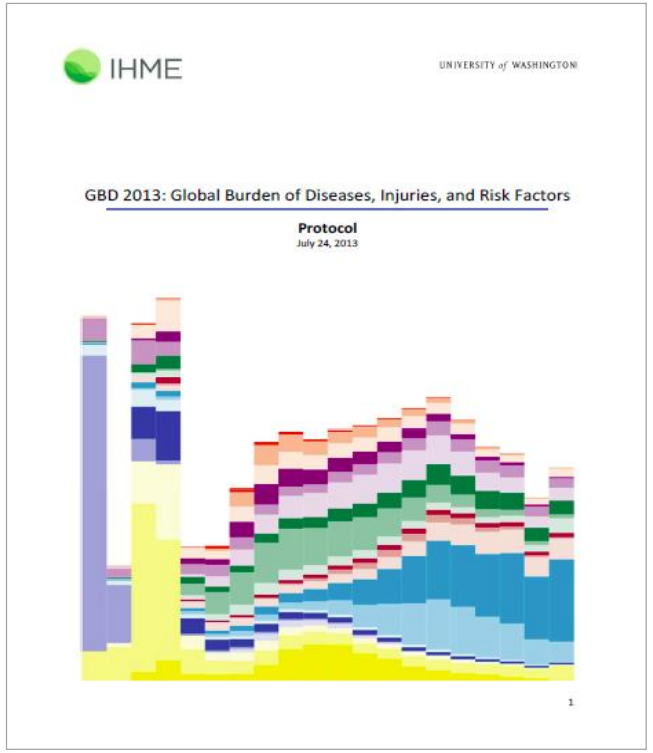
Second, multicentre studies, such as the Global Enterics Multi-Center Study[26] or Pneumonia Etiology Research for Child Health Study,[11] will provide much-needed high-quality information about the aetiology of diarrhoea and pneumonia. Additionally, proposed studies of the risks of death associated with malaria parasitaemia in adults would potentially change understanding of malaria mortality when completed. Multicentre investigations will probably change detailed understanding of disease patterns. Burden estimates should be quickly revised to reflect this type of new knowledge. New studies will also affect understanding of the hazards associated with different risk factors.

Third, expanded use of the GBD 2010 results will probably lead local analysts to identify data sources that have not been used and could strengthen the analysis for a specific country. For example, collaborative work with the University of Zambia and the Ministry of Health of Zambia on district-level health outcomes was able to make use of many data sources not used in international assessments of child health.[27]

Fourth, careful reflection on the GBD 2010 results and future iterations of GBD will probably suggest alternative interpretations of the biases and necessary corrections in many data sources. This type of assessment is iterative and benefits from repeated assessments. The development of the UNAIDS

Key Aspects of GBD 2013

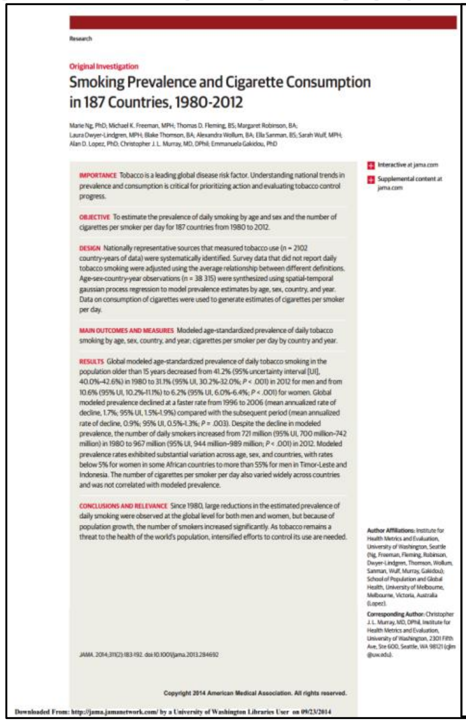
1) **Expanding the collaborative network** – in addition to strengthening expert input in key disease, injury and risk factor areas, major emphasis on developing collaborators in each country. Currently, more than 1000 local collaborators located in more than 105 countries.
2) **Re-engineering of the code for GBD 2010** –improved computational efficiency, standardization across all analyses, automated archiving, linkage of data to the GHDx, allowing for sub-national estimation within the overall framework.
3) **Improved estimation tools** – DisMod-MR 1.0 extensively used for GBD 2010. Version 2.0 is a major improvement – 100 times faster, more analyst control of modeling options, new visual interface, consistent posterior estimation for each country.



Key Aspects of GBD 2013 (2)

4) **Documenting sources used for GBD 2010** – many expert groups provided data input sheets with missing source documentation. Major effort to trace back sources and document them in the GHDx.
5) **Incorporating new studies and data** -- Extending systematic reviews to 2013, adding new survey data sources, incorporating sources provided by new collaborators, major addition of more recent cancer registry data.
6) Changes in estimation methods for diarrhea etiologies and pneumonia etiologies.
7) **Enhanced transparency of source data for each input** -- source metadata would be available for each outcome in GBD 2013 visualization tools consistent with data access policy.

GBD 2013 results published


Research

Original Investigation

Smoking Prevalence and Cigarette Consumption in 187 Countries, 1980-2012

Marie Ng, PhD; Michael K. Freeman, MPH; Thomas D. Fleming, BS; Margaret Robinson, BA; Laura Dwyer-Lindgren, MPH; Blake Thomson, BA; Alexandra Wollum, BA; Ella Sanman, BS; Sarah Wulf, MPH; Alan D. Lopez, PhD; Christopher J.L. Murray, MD, DPhil; Emmanuela Gakidou, PhD

IMPORTANCE Tobacco is a leading global disease risk factor. Understanding national trends in prevalence and consumption is critical for prioritizing action and evaluating tobacco control progress.

OBJECTIVE To estimate the prevalence of daily smoking by age and sex and the number of cigarettes per smoker per day for 187 countries from 1980 to 2012.

DESIGN Nationally representative sources that measured tobacco use (n = 2102 country-years of data) were systematically identified. Survey data that did not report daily tobacco smoking were adjusted using the average relationship between different definitions. Age-sex-country-year observations (n = 38 315) were synthesized using spatial-temporal gaussian process regression to model prevalence estimates by age, sex, country, and year. Data on consumption of cigarettes were used to generate estimates of cigarettes per smoker per day.

MAIN OUTCOMES AND MEASURES Modeled age-standardized prevalence of daily tobacco smoking by age, sex, country, and year; cigarettes per smoker per day by country and year.

RESULTS Global modeled age-standardized prevalence of daily tobacco smoking in the population older than 15 years decreased from 41.2% (95% uncertainty interval [UI], 40.0%-42.6%) in 1980 to 31.1% (95% UI, 30.2%-32.0%; $P < .001$) in 2012 for men and from 10.6% (95% UI, 10.2%-11.1%) to 6.2% (95% UI, 6.0%-6.4%; $P < .001$) for women. Global modeled prevalence declined at a faster rate from 1996 to 2006 (mean annualized rate of decline, 1.7%; 95% UI, 1.5%-1.9%) compared with the subsequent period (mean annualized rate of decline, 0.9%; 95% UI, 0.5%-1.3%; $P = .003$). Despite the decline in modeled prevalence, the number of daily smokers increased from 721 million (95% UI, 700 million-742 million) in 1980 to 967 million (95% UI, 944 million-989 million; $P < .001$) in 2012. Modeled prevalence rates exhibited substantial variation across age, sex, and countries, with rates below 5% for women in some African countries to more than 55% for men in Timor-Leste and Indonesia. The number of cigarettes per smoker per day also varied widely across countries and was not correlated with modeled prevalence.

CONCLUSIONS AND RELEVANCE Since 1980, large reductions in the estimated prevalence of daily smoking were observed at the global level for both men and women, but because of population growth, the number of smokers increased significantly. As tobacco remains a threat to the health of the world's population, intensified efforts to control its use are needed.

Interactive at jama.com

Supplemental content at jama.com

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JAMA. 2014;311(2):183-192. doi:10.1001/jama.2013.284692


Articles

Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013

Summary

Background In 2010, overweight and obesity were estimated to cause 3·4 million deaths, 3·9% of years of life lost, and 3·8% of disability-adjusted life-years (DALYs) worldwide. The rise in obesity has led to widespread calls for regular monitoring of changes in overweight and obesity prevalence in all populations. Comparable, up-to-date information about levels and trends is essential to quantify population health effects and to prompt decision makers to prioritise action. We estimate the global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013.

Methods We systematically identified surveys, reports, and published studies (n=1769) that included data for height and weight, both through physical measurements and self-reports. We used mixed effects linear regression to correct for bias in self-reports. We obtained data for prevalence of obesity and overweight by age, sex, country, and year (n=19 244) with a spatiotemporal Gaussian process regression model to estimate prevalence with 95% uncertainty intervals (UIs).

Findings Worldwide, the proportion of adults with a body-mass index (BMI) of 25 kg/m² or greater increased between 1980 and 2013 from 28·8% (95% UI 28·4–29·3) to 36·9% (36·3–37·4) in men, and from 29·8% (29·3–30·2) to 38·0% (37·5–38·5) in women. Prevalence has increased substantially in children and adolescents in developed countries; 23·8% (22·9–24·7) of boys and 22·6% (21·7–23·6) of girls were overweight or obese in 2013. The prevalence of overweight and obesity has also increased in children and adolescents in developing countries, from 8·1% (7·7–8·6) to 12·9% (12·3–13·5) in 2013 for boys and from 8·4% (8·1–8·8) to 13·4% (13·0–13·9) in girls. In adults, estimated prevalence of obesity exceeded 50% in men in Tonga and in women in Kuwait, Kiribati, Federated States of Micronesia, Libya, Qatar, Tonga, and Samoa. Since 2006, the increase in adult obesity in developed countries has slowed down.

Interpretation Because of the established health risks and substantial increases in prevalence, obesity has become a major global health challenge. Not only is obesity increasing, but no national success stories have been reported in the past 33 years. Urgent global action and leadership is needed to help countries to more effectively intervene.

Funding Bill & Melinda Gates Foundation.

Lancet 2014; 384: 766–81

Published Online May 29, 2014


Articles

Global, regional, and national levels of neonatal, infant, and under-5 mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

Summary

Background Remarkable financial and political efforts have been focused on the reduction of child mortality during the past few decades. Timely measurements of levels and trends in under-5 mortality are important to assess progress towards the Millennium Development Goal 4 (MDG 4) target of reduction of child mortality by two thirds from 1990 to 2015, and to identify models of success.

Methods We generated updated estimates of child mortality in early neonatal (age 0–6 days), late neonatal (7–28 days), postneonatal (29–364 days), childhood (1–4 years), and under-5 (0–4 years) age groups for 188 countries from 1970 to 2013, with more than 29 000 survey, census, vital registration, and sample registration datapoints. We used Gaussian process regression with adjustments for bias and non-sampling error to synthesise the data for under-5 mortality for each country, and a separate model to estimate mortality for more detailed age groups. We used explanatory mixed effects regression models to assess the association between under-5 mortality and income per person, maternal education, HIV child death rates, secular shifts, and other factors. To quantify the contribution of these different factors and birth numbers to the change in numbers of deaths in under-5 age groups from 1990 to 2013, we used Shapley decomposition. We used estimated rates of change between 2000 and 2013 to construct under-5 mortality rate scenarios out to 2030.

Findings We estimated that 6·3 million (95% UI 6·0–6·6) children under-5 died in 2013, a 64% reduction from 17·6 million (17·1–18·1) in 1970. In 2013, child mortality rates ranged from 152·5 per 1000 livebirths (130·6–177·4) in Guinea-Bissau to 2·3 (1·8–2·9) per 1000 in Singapore. The annualised rates of change from 1990 to 2013 ranged from –6·8% to 0·1%. 99 of 188 countries, including 43 of 48 countries in sub-Saharan Africa, had faster decreases in child mortality during 2000–13 than during 1990–2000. In 2013, neonatal deaths accounted for 41·6% of under-5 deaths compared with 37·4% in 1990. Compared with 1990, in 2013, rising numbers


Articles

Global, regional, and national levels and causes of maternal mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

Summary

Background The fifth Millennium Development Goal (MDG 5) established the goal of a 75% reduction in the maternal mortality ratio (MMR; number of maternal deaths per 100 000 livebirths) between 1990 and 2015. We aimed to measure levels and track trends in maternal mortality, the key causes contributing to maternal death, and timing of maternal death with respect to delivery.

Methods We used robust statistical methods including the Cause of Death Ensemble model (CODEm) to analyse a database of data for 7065 site-years and estimate the number of maternal deaths from all causes in 188 countries between 1990 and 2013. We estimated the number of pregnancy-related deaths caused by HIV on the basis of a systematic review of the relative risk of dying during pregnancy for HIV-positive women compared with HIV-negative


Clinical Review & Education

Special Communication

The Global Burden of Cancer 2013

Global Burden of Disease Cancer Collaboration

IMPORTANCE Cancer is among the leading causes of death worldwide. Current estimates of cancer burden in individual countries and regions are necessary to inform local cancer control strategies.

OBJECTIVE To estimate mortality, incidence, years lived with disability (YLDs), years of life lost (YLLs), and disability-adjusted life-years (DALYs) for 28 cancers in 188 countries by sex from 1990 to 2013.

EVIDENCE REVIEW The general methodology of the Global Burden of Disease (GBD) 2013 study was used. Cancer registries were the source for cancer incidence data as well as mortality incidence (MI) ratios. Sources for cause of death data include vital registration system data, verbal autopsy studies, and other sources. The MI ratios were used to transform incidence data to mortality estimates and cause of death estimates to incidence estimates. Cancer prevalence was estimated using MI ratios as surrogates for survival data; YLDs were calculated by multiplying prevalence estimates with disability weights, which were derived from population-based surveys; YLLs were computed by multiplying the number of estimated cancer deaths at each age with a reference life expectancy; and DALYs were calculated as the sum of YLDs and YLLs.

FINDINGS In 2013 there were 14.9 million incident cancer cases, 8.2 million deaths, and 196.3 million DALYs. Prostate cancer was the leading cause for cancer incidence (1.4 million) for men and breast cancer for women (1.8 million). Tracheal, bronchus, and lung (TBL) cancer was the leading cause for cancer death in men and women, with 1.6 million deaths. For men, TBL cancer was the leading cause of DALYs (24.9 million). For women, breast cancer was the leading cause of DALYs (13.1 million). Age-standardized incidence rates (ASIRs) per 100 000 and age-standardized death rates (ASDRs) per 100 000 for both sexes in 2013 were higher in developing vs developed countries for stomach cancer (ASIR, 17 vs 14; ASDR, 15 vs 11), liver cancer (ASIR, 15 vs 7; ASDR, 16 vs 7), esophageal cancer (ASIR, 9 vs 4; ASDR, 9 vs 4), cervical cancer (ASIR, 8 vs 5; ASDR, 4 vs 2), lip and oral cavity cancer (ASIR, 7 vs 6; ASDR, 2 vs 2), and nasopharyngeal cancer (ASIR, 1.5 vs 0.4; ASDR, 1.2 vs 0.3). Between 1990 and 2013, ASIRs for all cancers combined (except nonmelanoma skin cancer and Kaposi sarcoma) increased by more than 10% in 113 countries and decreased by more than 10% in 12 of 188 countries.

CONCLUSIONS AND RELEVANCE Cancer poses a major threat to public health worldwide, and incidence rates have increased in most countries since 1990. The trend is a particular threat to developing nations with health systems that are ill-equipped to deal with complex and expensive cancer treatments. The annual update on the Global Burden of Cancer will provide all stakeholders with timely estimates to guide policy efforts in cancer prevention, screening, treatment, and palliation.

Editorial

Author Audio and Video Interviews at jamaoncology.com

Supplemental content at jamaoncology.com

The Authors/Members of the Global Burden of Disease Cancer Collaboration are listed at the end of this article.

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Articles

Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

Summary

Background The Millennium Declaration in 2000 brought special global attention to HIV, tuberculosis, and malaria through the formulation of Millennium Development Goal (MDG) 6. The Global Burden of Disease 2013 study provides a consistent and comprehensive approach to disease estimation for between 1990 and 2013, and an opportunity to assess whether accelerated progress has occured since the Millennium Declaration.

IHME

Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

GBD 2013 Mortality and Causes of Death Collaborators*

Lancet 2015; 385: 117-71

Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

Global Burden of Disease Study 2013 Collaborators*

June 8th , 2015

Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition

GBD 2013 DALYs and HALE Collaborators*

August 27, 2015

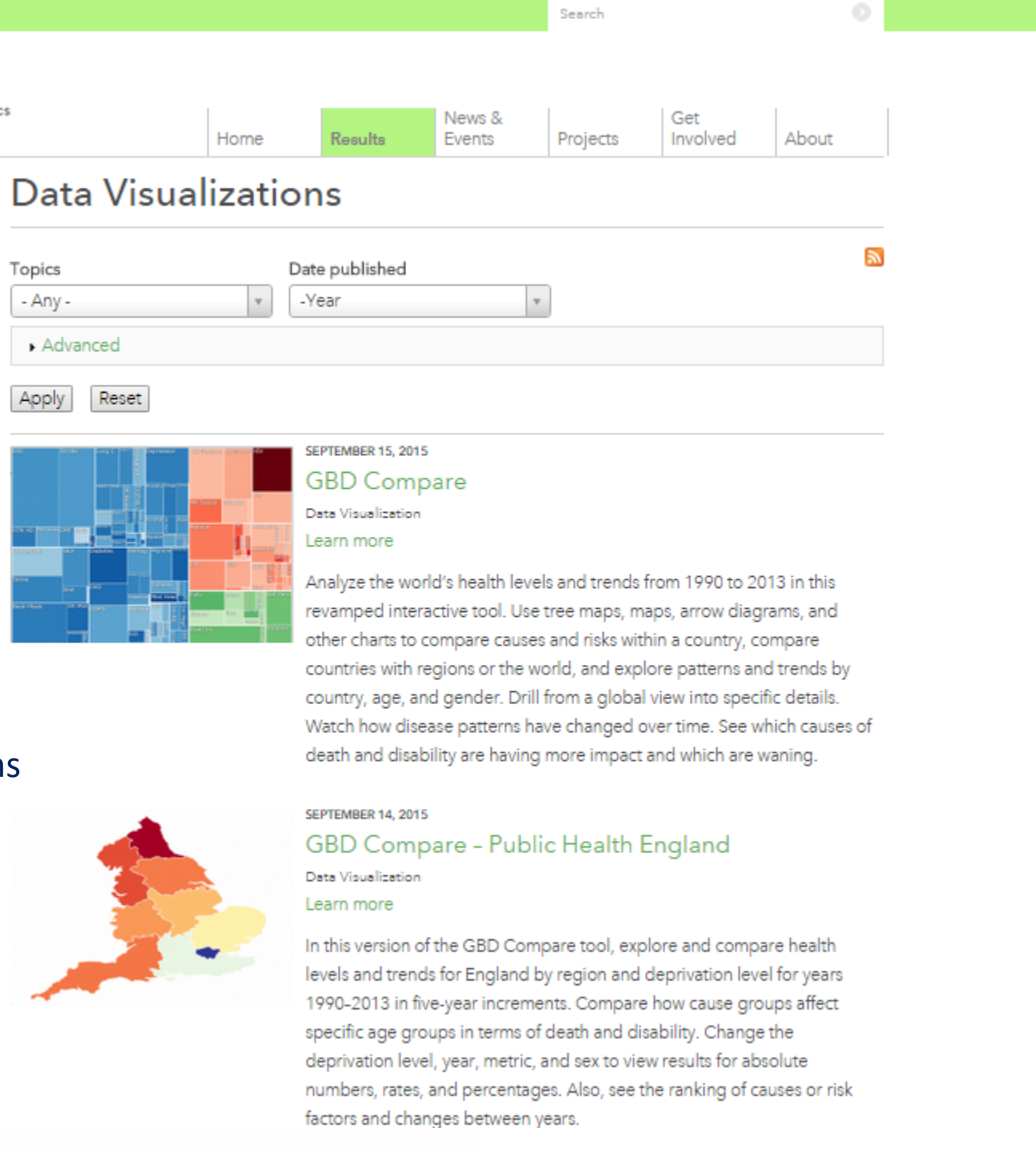
Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

GBD 2013 Risk Factors Collaborators*

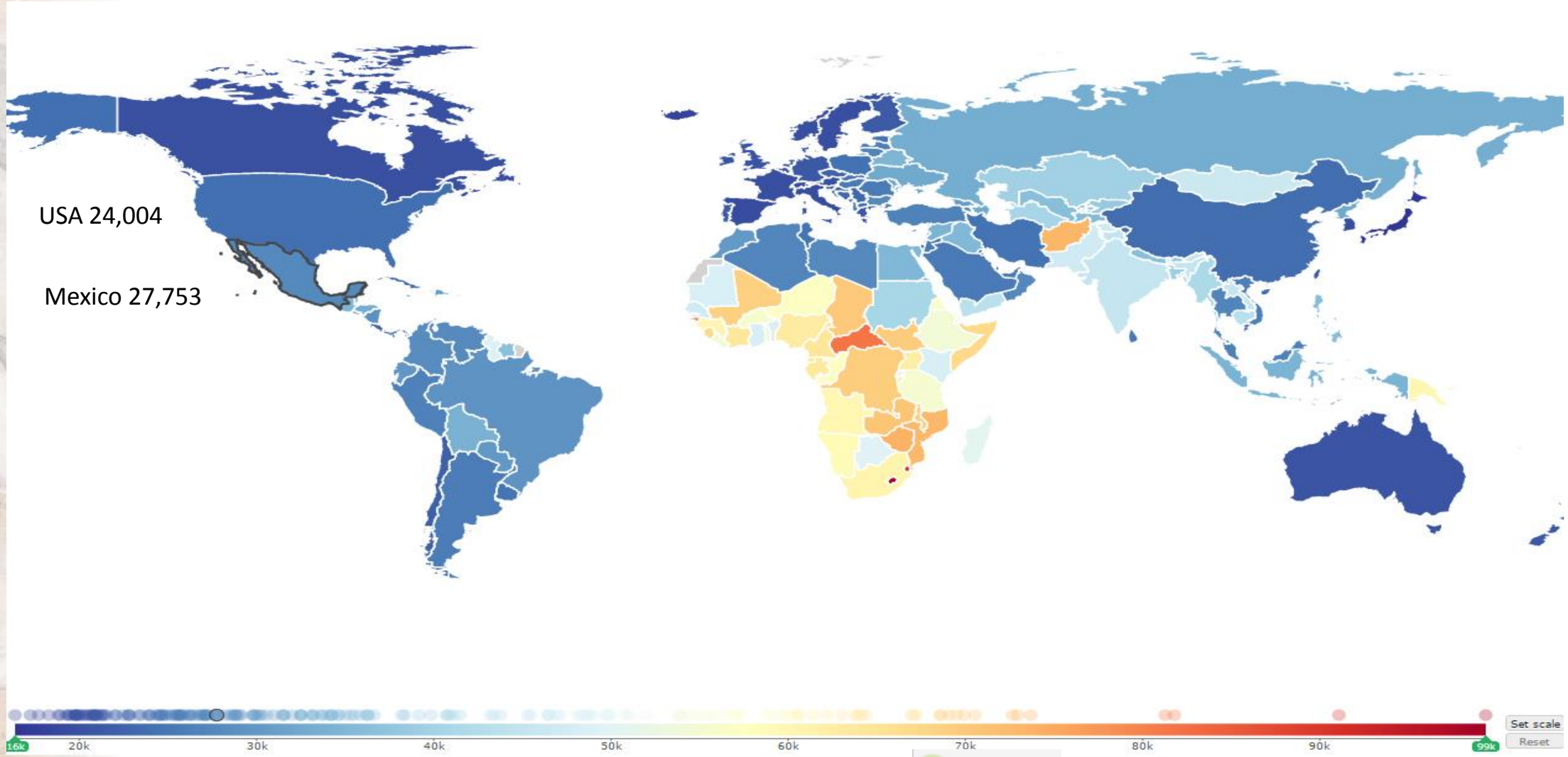
September 11th , 2015

Released in September 14th 2015

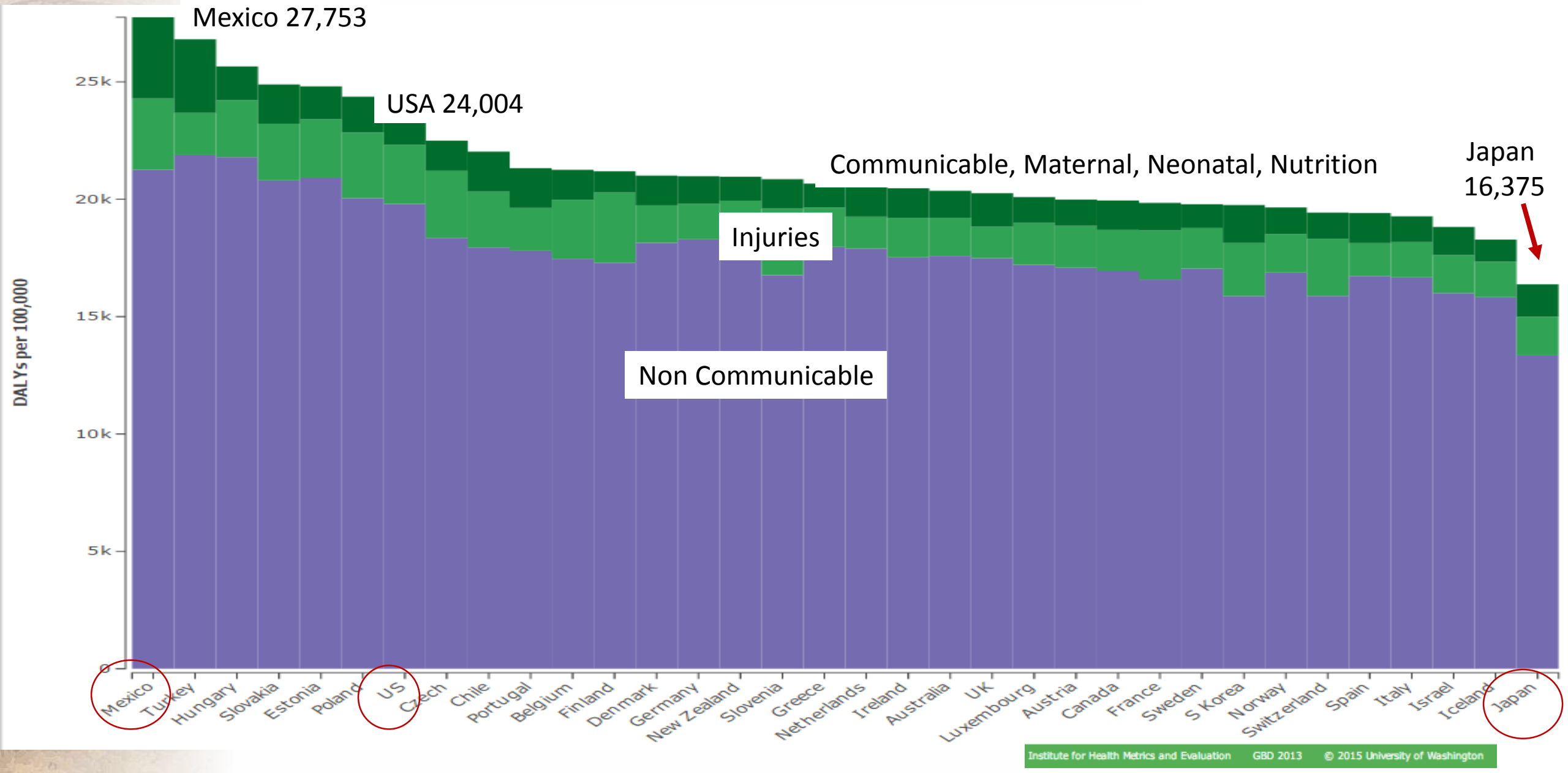
http://www.healthdata.org/results/data-visualizations



Rate of DALYs lost, both sexes, (age std) 2013



Rate of DALYs lost, both sexes, (age std), OCDE countries 2013



Leading Causes of Health lost, both sexes (age adj), Mexico 2013

Deaths	YLL	YLD	DALYs
1 Ischemic heart disease	1 Ischemic heart disease	1 Low back & neck pain	1 Diabetes
2 Diabetes	2 Chronic kidney disease	2 Depressive disorders	2 Ischemic heart disease
3 Chronic kidney disease	3 Diabetes	3 Sense organ diseases	3 Chronic kidney disease
4 Cerebrovascular disease	4 Road injuries	4 Diabetes	4 Low back & neck pain
5 COPD	5 Interpersonal violence	5 Skin diseases	5 Depressive disorders
6 Alzheimer disease	6 Congenital anomalies	6 Other musculoskeletal	6 Road injuries
7 Lower respiratory infect	7 Cerebrovascular disease	7 Anxiety disorders	7 Congenital anomalies
8 Road injuries	8 Lower respiratory infect	8 Iron-deficiency anemia	8 Sense organ diseases
9 Cirrhosis alcohol	9 COPD	9 COPD	9 COPD
10 Interpersonal violence	10 Cirrhosis alcohol	10 Oral disorders	10 Interpersonal violence
11 Cirrhosis hepatitis C	11 Neonatal preterm birth	11 Migraine	11 Cerebrovascular disease
12 Protein-energy malnutrition	12 Cirrhosis hepatitis C	12 Osteoarthritis	12 Lower respiratory infect
13 Lung cancer	13 Alzheimer disease	13 Asthma	13 Other musculoskeletal
14 Congenital anomalies	14 Self-harm	14 Schizophrenia	14 Skin diseases
15 Hypertensive heart disease	15 Neonatal sepsis	15 Chronic kidney disease	15 Neonatal preterm birth

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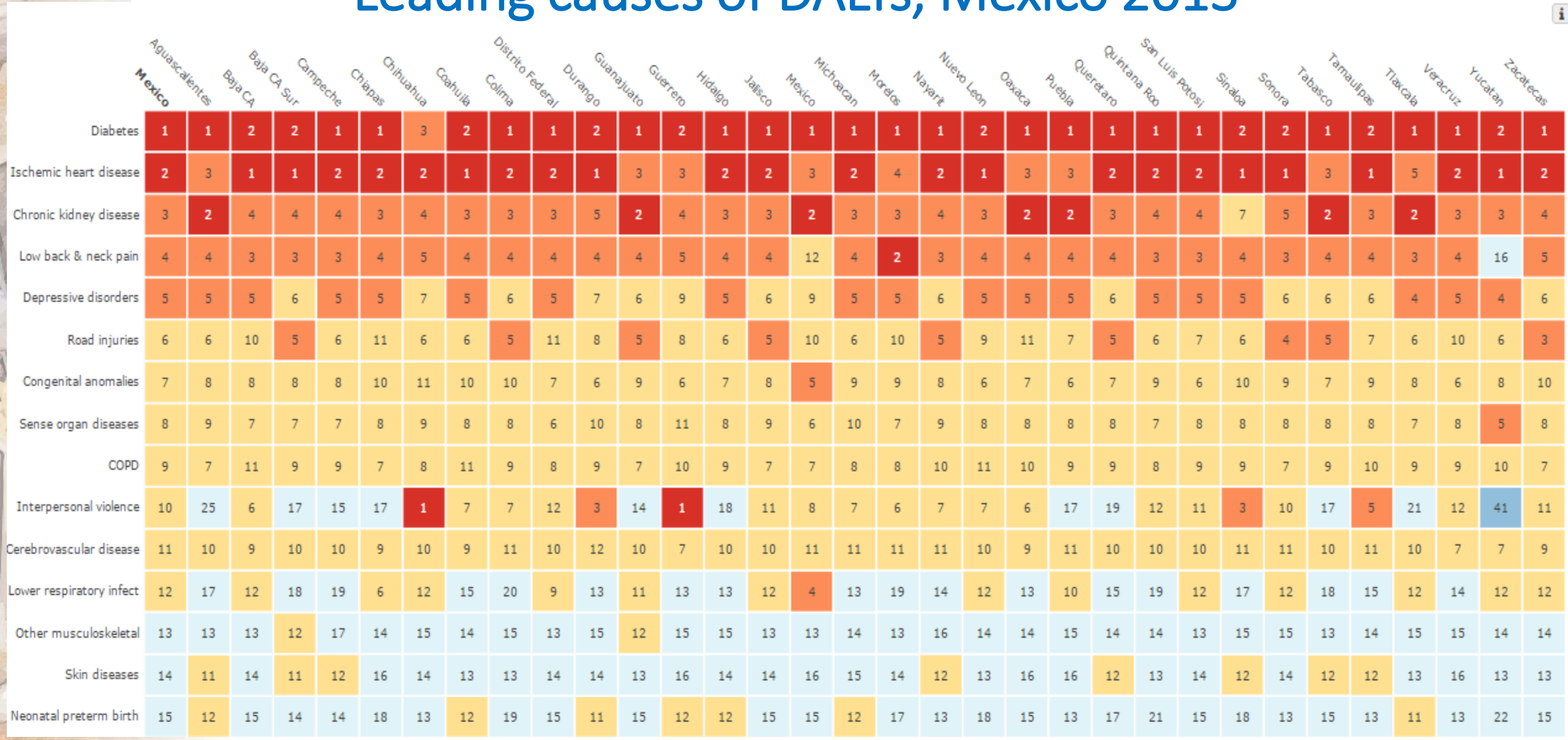
Leading Causes of Health lost, both sexes (age adj), USA 2013

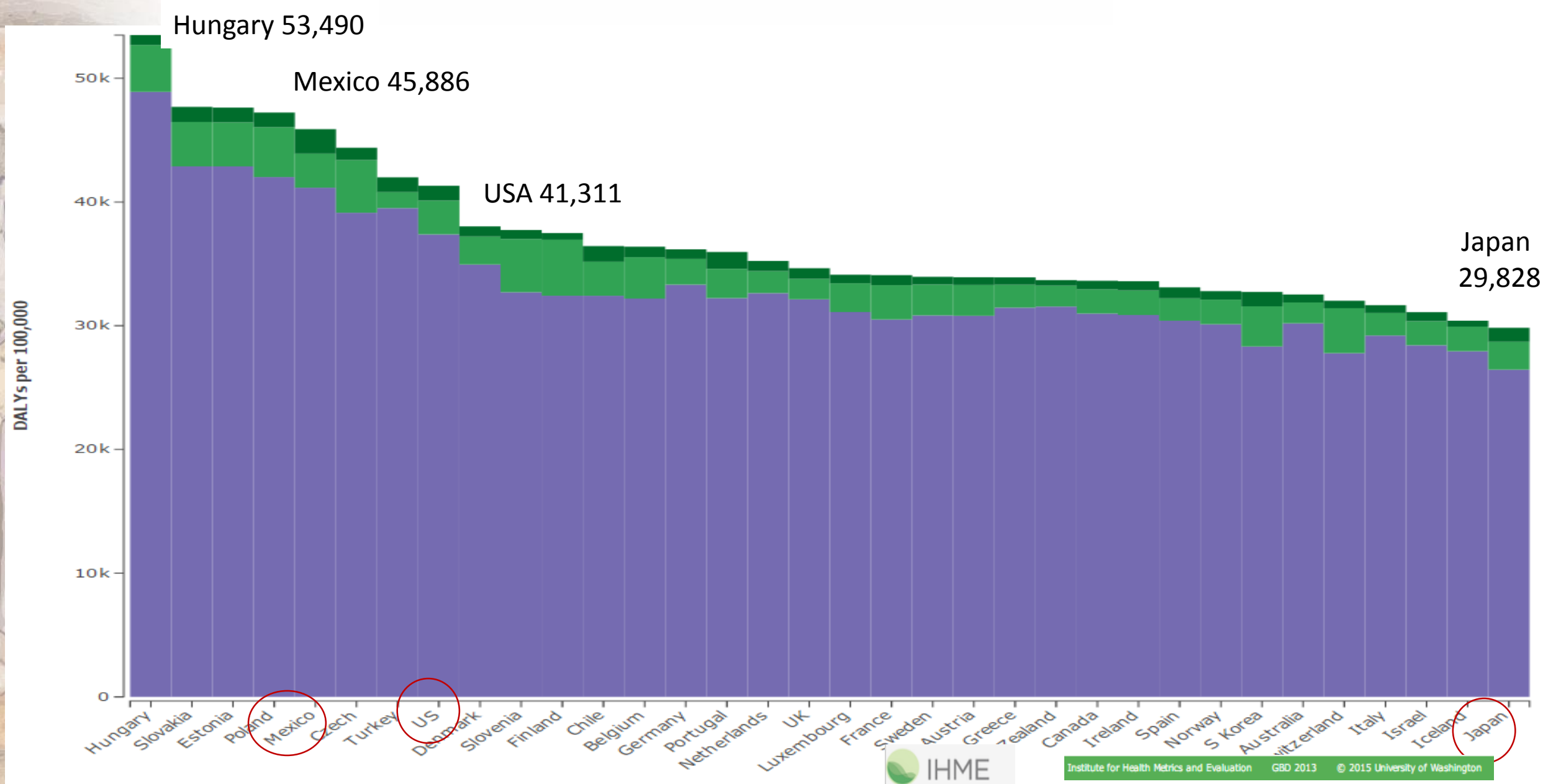
Deaths	YLL	YLD	DALYs
1 Ischemic heart disease	1 Ischemic heart disease	1 Low back & neck pain	1 Ischemic heart disease
2 Alzheimer disease	2 Lung cancer	2 Depressive disorders	2 Low back & neck pain
3 Lung cancer	3 Road injuries	3 Other musculoskeletal	3 Depressive disorders
4 Cerebrovascular disease	4 Self-harm	4 Anxiety disorders	4 COPD
5 COPD	5 COPD	5 Skin diseases	5 Lung cancer
6 Lower respiratory infect	6 Cerebrovascular disease	6 Sense organ diseases	6 Diabetes
7 Diabetes	7 Alzheimer disease	7 COPD	7 Other musculoskeletal
8 Colorectal cancer	8 Drug use disorders	8 Diabetes	8 Road injuries
9 Chronic kidney disease	9 Diabetes	9 Iron-deficiency anemia	9 Cerebrovascular disease
10 Road injuries	10 Congenital anomalies	10 Asthma	10 Anxiety disorders
11 Self-harm	11 Interpersonal violence	11 Migraine	11 Skin diseases
12 Breast cancer	12 Colorectal cancer	12 Oral disorders	12 Alzheimer disease
13 Pancreatic cancer	13 Lower respiratory infect	13 Falls	13 Drug use disorders
14 Other cardiovascular	14 Neonatal preterm birth	14 Schizophrenia	14 Sense organ diseases
15 Prostate cancer	15 Breast cancer	15 Drug use disorders	15 Self-harm

Leading causes of DALYs, Mexico 2013



	Mexico	Aguascalientes	Baja CA	Baja CA Sur	Campeche	Chiapas	Chihuahua	Coahuila	Colima	Distrito Federal	Durango	Guanajuato	Guerrero	Hidalgo	Jalisco	Mexico	Michoacan	Morelos	Nayarit	Nuevo Leon	Oaxaca	Puebla	Queretaro	Quintana Roo	San Luis Potosi	Sinaloa	Sonora	Tabasco	Tamaulipas	Tlaxcala	Veracruz	Yucatan	Zacatecas
Diabetes	1	1	2	2	1	1	3	2	1	1	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	2	2	1	2	1	1	2	1
Ischemic heart disease	2	3	1	1	2	2	2	1	2	2	1	3	3	2	2	3	2	4	2	1	3	3	2	2	2	1	1	3	1	5	2	1	2
Chronic kidney disease	3	2	4	4	4	3	4	3	3	3	5	2	4	3	3	2	3	3	4	3	2	2	3	4	4	7	5	2	3	2	3	3	4
Low back & neck pain	4	4	3	3	3	4	5	4	4	4	4	4	5	4	4	12	4	2	3	4	4	4	4	3	3	4	3	4	4	3	4	16	5
Depressive disorders	5	5	5	6	5	5	7	5	6	5	7	6	9	5	6	9	5	5	6	5	5	5	6	5	5	5	6	6	6	4	5	4	6
Road injuries	6	6	10	5	6	11	6	6	5	11	8	5	8	6	5	10	6	10	5	9	11	7	5	6	7	6	4	5	7	6	10	6	3
Congenital anomalies	7	8	8	8	8	10	11	10	10	7	6	9	6	7	8	5	9	9	8	6	7	6	7	9	6	10	9	7	9	8	6	8	10
Sense organ diseases	8	9	7	7	7	8	9	8	8	6	10	8	11	8	9	6	10	7	9	8	8	8	8	7	8	8	8	8	8	7	8	5	8
COPD	9	7	11	9	9	7	8	11	9	8	9	7	10	9	7	7	8	8	10	11	10	9	9	8	9	9	7	9	10	9	9	10	7
Interpersonal violence	10	25	6	17	15	17	1	7	7	12	3	14	1	18	11	8	7	6	7	7	6	17	19	12	11	3	10	17	5	21	12	41	11
Cerebrovascular disease	11	10	9	10	10	9	10	9	11	10	12	10	7	10	10	11	11	11	11	10	9	11	10	10	10	11	11	10	11	10	7	7	9
Lower respiratory infect	12	17	12	18	19	6	12	15	20	9	13	11	13	13	12	4	13	19	14	12	13	10	15	19	12	17	12	18	15	12	14	12	12
Other musculoskeletal	13	13	13	12	17	14	15	14	15	13	15	12	15	15	13	13	14	13	16	14	14	15	14	14	13	15	15	13	14	15	15	14	14
Skin diseases	14	11	14	11	12	16	14	13	13	14	14	13	16	14	14	16	15	14	12	13	16	16	12	13	14	12	14	12	12	13	16	13	13
Neonatal preterm birth	15	12	15	14	14	18	13	12	19	15	11	15	12	12	15	15	12	17	13	18	15	13	17	21	15	18	13	15	13	11	13	22	15

Rate of DALYs lost, both sexes, 50-69 years OCDE countries 2013



Leading Causes of DALYS, both sexes 50-69 years old Mexico and USA 2013

MEXICO

1 Diabetes
2 Chronic kidney disease
3 Ischemic heart disease
4 Low back & neck pain
5 Cerebrovascular disease
6 Sense organ diseases
7 COPD
8 Cirrhosis alcohol
9 Other musculoskeletal
10 Depressive disorders
11 Cirrhosis hepatitis C
12 Road injuries
13 Osteoarthritis
14 Oral disorders
15 Lower respiratory infect

USA

1 Ischemic heart disease
2 Low back & neck pain
3 Lung cancer
4 COPD
5 Diabetes
6 Other musculoskeletal
7 Cerebrovascular disease
8 Depressive disorders
9 Sense organ diseases
10 Chronic kidney disease
11 Colorectal cancer
12 Breast cancer
13 Anxiety disorders
14 Road injuries
15 Pancreatic cancer

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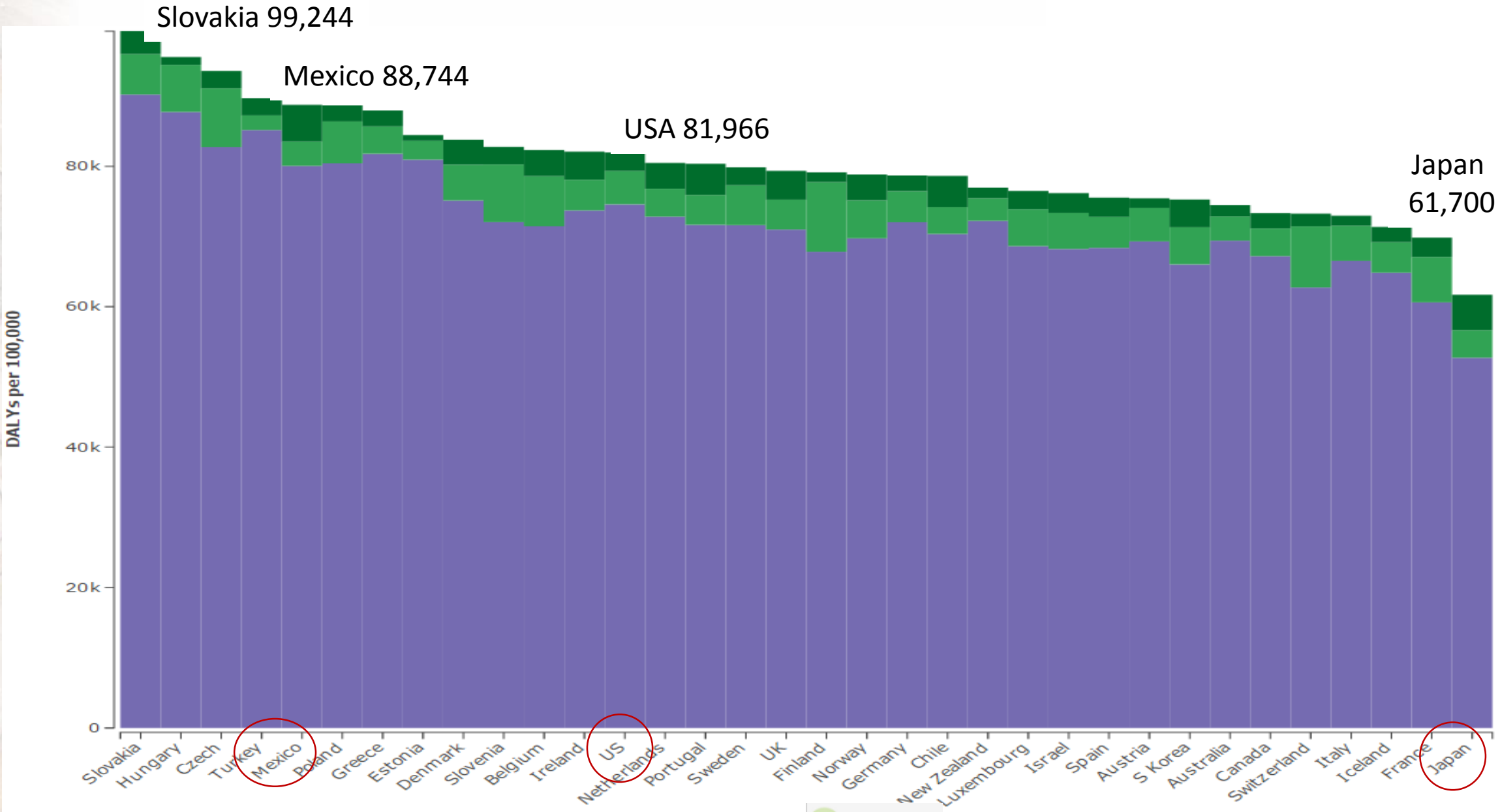
Rate of DALYs lost, both sexes, 70+ years OCDE countries 2013



Leading Causes of DALYS, both sexes 70+ years old Mexico and USA 2013

MEXICO	USA
1 Ischemic heart disease	1 Ischemic heart disease
2 Diabetes	2 Alzheimer disease
3 Chronic kidney disease	3 COPD
4 COPD	4 Cerebrovascular disease
5 Alzheimer disease	5 Sense organ diseases
6 Sense organ diseases	6 Lung cancer
7 Cerebrovascular disease	7 Diabetes
8 Low back & neck pain	8 Low back & neck pain
9 Lower respiratory infect	9 Falls
10 Osteoarthritis	10 Chronic kidney disease
11 Other musculoskeletal	11 Lower respiratory infect
12 Protein-energy malnutrition	12 Other musculoskeletal
13 Prostate cancer	13 Colorectal cancer
14 Cirrhosis alcohol	14 Prostate cancer
15 Hypertensive heart disease	15 Other cardiovascular

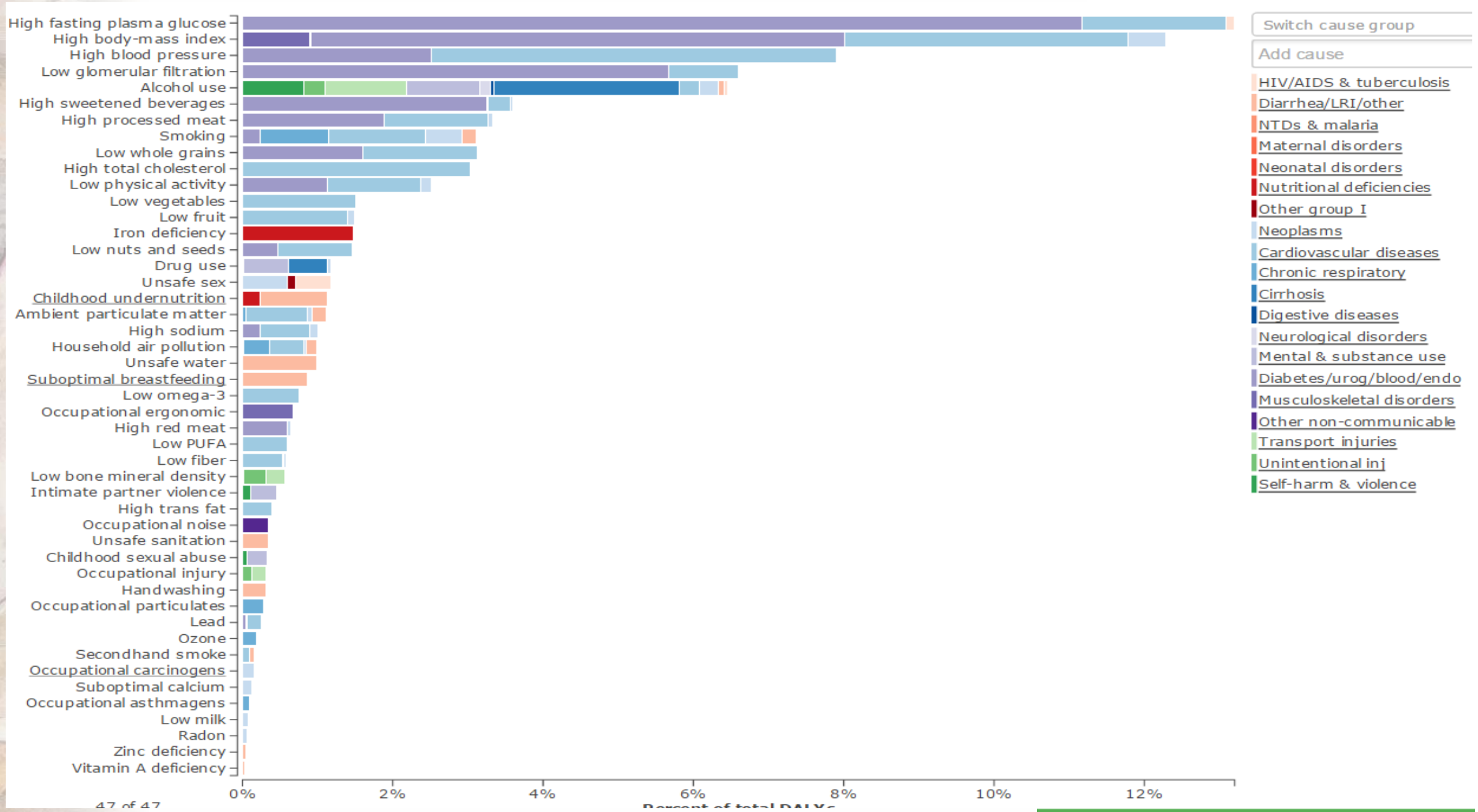
Leading Causes of YLDs, both sexes 50-69 years old Mexico and USA 2013

MEXICO	USA
1 Diabetes	1 Low back pain
2 Low back pain	2 Other musculoskeletal
3 Other musculoskeletal	3 Diabetes
4 Major depression	4 COPD
5 Other hearing loss	5 Major depression
6 COPD	6 Neck pain
7 Osteoarthritis	7 Other hearing loss
8 Neck pain	8 Anxiety disorders
9 Anxiety disorders	9 Falls
10 Ischemic heart disease	10 Osteoarthritis
11 Edentulism	11 Ischemic heart disease
12 Refraction & accomodation	12 Ischemic stroke
13 Migraine	13 Edentulism
14 Schizophrenia	14 Schizophrenia
15 Rheumatoid arthritis	15 Migraine

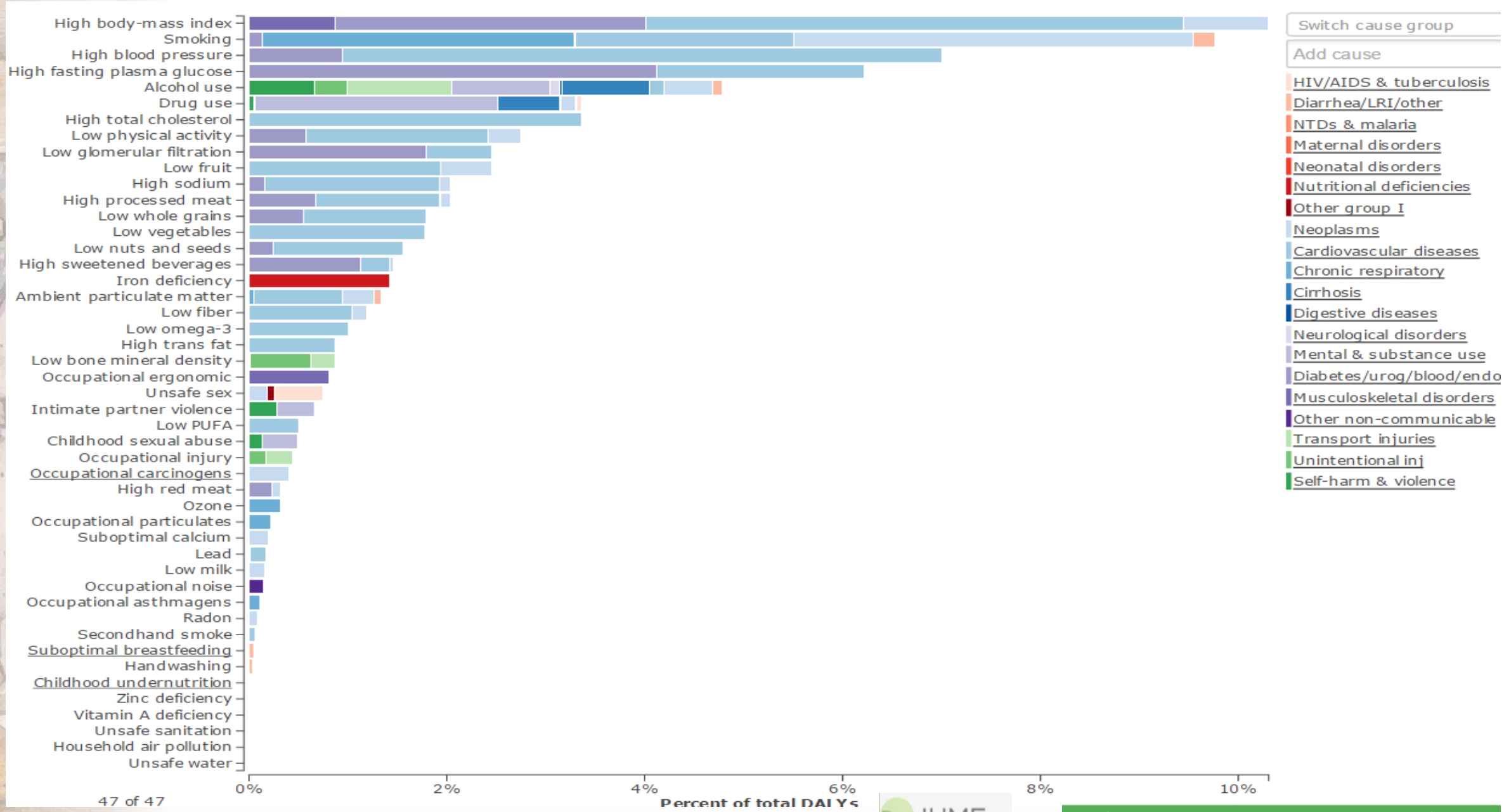
Leading Causes of YLDs, both sexes 70+ years old Mexico and USA 2013

MEXICO	USA
1 Other hearing loss	1 Alzheimer disease
2 Low back pain	2 Other hearing loss
3 Alzheimer disease	3 Low back pain
4 Osteoarthritis	4 COPD
5 Diabetes	5 Falls
6 Other musculoskeletal	6 Diabetes
7 COPD	7 Other musculoskeletal
8 Major depression	8 Ischemic heart disease
9 Edentulism	9 Ischemic stroke
10 Refraction & accomodation	10 Osteoarthritis
11 Ischemic heart disease	11 Edentulism
12 Cataract	12 Major depression
13 Falls	13 Neck pain
14 Rheumatoid arthritis	14 Other cardiovascular
15 Neck pain	15 Other unintentional

Risk Factors Attributable to DALYs, both sexes Mexico 2013



Risk Factors Attributable to DALYs, both sexes USA 2013



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Risk Factors Attributable to DALYs, USA and Mexico 2013

1 Smoking
2 High body-mass index
3 High systolic blood pressure
4 High fasting plasma glucose
5 High total cholesterol
6 Alcohol use
7 Low physical activity
8 Diet low in fruits
9 Diet high in processed meat
10 Diet high in sodium

1 High fasting plasma glucose
2 High body-mass index
3 High systolic blood pressure
4 Low glomerular filtration rate
5 Alcohol use
6 Diet high in sugar-sweetened beverages
7 Diet high in processed meat
8 Diet low in whole grains
9 Smoking
10 High total cholesterol

50-69 years old

USA

1 Smoking
2 High systolic blood pressure
3 High body-mass index
4 High fasting plasma glucose
5 Low glomerular filtration rate
6 Low physical activity
7 High total cholesterol
8 Diet high in sodium
9 Diet low in fruits
10 Diet low in vegetables

MEXICO

1 High fasting plasma glucose
2 High systolic blood pressure
3 High body-mass index
4 Low glomerular filtration rate
5 Smoking
6 High total cholesterol
7 Low physical activity
8 Diet low in whole grains
9 Alcohol use
10 Diet high in processed meat

70+ years old

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Healthy Life Expectancy (HALE) by Sex
USA and Mexico, 1990 and 2013

Sex	year	United States	Mexico	Diff Years
male	1990	62.7	60.8	1.9
male	2013	65.8	63.8	2.0
male	**change**	**3.1**	**3.0**	
Female	1990	67.0	65.2	**1.8**
Female	2013	68.6	67.8	**0.8**
Female	**change**	**1.6**	**2.6**	
Both	1990	64.8	63.0	**1.8**
Both	2013	67.2	65.8	**1.4**
Both	**change**	**2.4**	**2.8**	

Are the Health Needs aligned with the Organized Social Response?

- Health Needs

1. **Demographic transition** is shifting burden from children to adults.
2. **Disease transition** is leading to a larger fraction of burden from non-communicable diseases.
3. **Disability transition** is shifting the burden of disease to conditions that cause disability but not substantial decrease of premature mortality.
4. **Risk transition** is shifting the major risk factors from those of poverty to lifestyle risks.

- Health System

1. Organized to address crisis or acute episodes (infections and injuries)
2. Successful in infectious diseases but not for long term conditions or chronic treatments
3. Not organized to retain people
4. There is no incentive to follow up patients in the public sector
5. The dominant practice is to cure diagnostics; not management long duration treatments and diseases

Source: GBD 2013

Rethinking the Organization of Health Care Systems

- Good performance in infections diseases and decreasing premature mortality
- Still invisible for the public health system several health conditions, such as: mental health, musculoskeletal disorders, Sense organs diseases, oral disorders, etc.
- “Victims of Success”

- It is imperative to incorporate three notions in our vision of the Health System (The triple “C”)
  - Chronicity: on diseases, treatments and exposure
  - Comorbidity
  - Continuity: Relationship, Information, and organization

- Benchmarking of good HS performance to measure the burden that could be reduce without more investments
- To put more attention in the managerial and incentives strategies to deal with chronic diseases and long term treatments

"... When someone tells me you are too old to do something, I try to do it right away ..."

Pablo Picasso 1881-1973

Acknowledgements

- The study of the Global Burden of Disease was developed by the Institute of Metrics and Evaluation Health of the University of Washington http://www.healthdata.org/

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