



IHME

Measuring what matters

GBD 2019

COST Action Burden EU Network Meeting

Theo Vos, MD, MSc, PhD

Professor of Health Metrics Sciences

Team Lead: Non-fatal and Risks Quality Enhancement Team

Institute for Health Metrics and Evaluation (IHME)

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W UNIVERSITY of WASHINGTON

Institute for Health Metrics and Evaluation

GBD 2019

- **GBD 2019 Study released on [October 15th, 2020](#)**
 - 369 diseases and injuries
 - 87 risk factors (512 risk-outcome pairings)
 - Estimates for 204 countries and territories
([22 countries](#) with subnational estimates: [six in Europe](#))
 - 23 age groups: five-year age bands
- **All GBD outcomes** estimated annually (1990-2019)
 - Mortality, fertility and population analyzed from 1950-2019
 - Cause-specific mortality analyzed from 1980-2019

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The Global Burden of Disease Study 2019



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****Every cycle re-estimates the entire time series to ensure internal consistency and comparability, and to allow for analysis of trends.***

What's new in GBD 2019 for Europe?

- Subnational analyses for Italy and Poland
- New causes: 9 (childhood) cancer sites, OA hand and 'other joints', pulmonary arterial hypertension
- New risks: high and low temperature
- More systematic approach to 'crosswalking' based on overlapping data for reference and alternate case definitions rather than relying on DisMod-MR finding an 'ecological' adjustment factor
- Wider priors passed down geographical cascade in DisMod-MR has led to wider uncertainty of prevalence estimates ...but better coverage with input data
- Dose-response curves of RR analysed in Bayesian metaregression tool (MR-BRT) rather than assuming log-linear relationship
- Closer collaboration with WHO

Two-page Cause and Risk Summaries in GBD 2019

- Purpose:** provide a concise overview of all causes, impairments, and risk factors on a global level.

Key components:

- Disease/impairment/risk definition
- Brief listing of modeling updates
- Summary of estimates on deaths, YLLs, YLDs, DALYs, incidence and prevalence
- Age-standardized DALY rates by location, age and sex.

Diabetes and kidney diseases—Level 2 cause

Summary This aggregate disease category resulted in 113 million (95% UI 99.3–128) global DALYs in 2019 and was responsible for 4.4% (4.2–4.7) of total global DALYs. Diabetes contributed 62.9% and chronic kidney disease (CKD) contributed 37.1% of total DALYs in this category.

Definition This aggregate category consists of types 1 and 2 diabetes and of CKD due to these causes: by hypertension, glomerulonephritis, and unspecified causes, type 1 diabetes, and type 2 diabetes. Both types of diabetes are important aetiologies of CKD.

Total	2019
Incidence	1271
Prevalence	2203
Remission	0
Causes of death	357
Other	523

What is new in GBD 2019?

- Updated the regression used to portion out deaths due to unspecified diabetes into type 2 versus type 1. We used data from 753 country-years that had more than 50% of diabetes that was type-specific and more than 30% of the type-specific deaths were type 2.
- Changes to the redistribution of unspecified diabetes resulted in a 41.2% increase in the number of deaths from type 2 and a 68.1% decrease in deaths from type 1 compared to GBD 2017.
- Excess mortality data (EMR) were modeled in MR-BRT by age and sex as a function of HAQ index.

Table 1: Total causes used in GBD 2019 estimation

	Prevalence		Incidence		Deaths		YLLs		YLDs		DALYs	
	Cases (millions)	Rate (per 100 000)	Cases (millions)	Rate (per 100 000)	Deaths (millions)	Rate (per 100 000)	YLLs (millions)	Rate (per 100 000)	YLDs (millions)	Rate (per 100 000)	DALYs (millions)	Rate (per 100 000)
2019												
Both sexes	994 (947 to 1040)	11232.4 (11552.7 to 10912.4)	41.0 (44.2 to 37.8)	530.6 (528.3 to 532.9)	2.90 (2.77 to 3.03)	37.9 (35.0 to 40.4)	67.3 (62.9 to 71.7)	8267 (7732 to 8804)	45.4 (43.1 to 47.7)	551.0 (524.2 to 577.8)	113 (104 to 120)	1377 (1242 to 1506.7)
Females	527 (483 to 547)	12205.9 (12619.5 to 11772.9)	21.5 (23.4 to 19.6)	296.8 (293.5 to 300.1)	1.49 (1.40 to 1.58)	34.1 (30.8 to 36.8)	31.6 (28.8 to 34.1)	7782 (7219 to 8345)	23.5 (22.0 to 25.0)	526.6 (499.2 to 554.0)	54.1 (49.3 to 58.9)	1264.1 (1182.1 to 1346.9)
Males	475 (463 to 499)	12124.4 (11493.3 to 12751.2)	20.5 (19.4 to 21.0)	534.7 (534.8 to 534.3)	1.40 (1.40 to 1.40)	42.7 (42.4 to 43.0)	35.7 (34.1 to 37.4)	5085 (4842 to 5329)	21.9 (21.0 to 22.8)	524.4 (495.2 to 553.8)	58.9 (54.7 to 63.1)	1102.8 (1060.0 to 1145.8)
Percentage change 2010–19												
Both sexes	28.2% (24.5 to 29.4)	5.0% (4.5 to 5.6)	31.2% (29.4 to 32.9)	7.6% (7.0 to 8.2)	30.8% (28.8 to 32.8)	0.4% (0.4 to 0.4)	24.1% (22.7 to 25.5)	-0.3% (0.5 to -0.7)	32.9% (31.8 to 34.0)	9.3% (8.0 to 10.6)	28.6% (24.9 to 32.3)	3.3% (3.2 to 3.4)
Females	22.0% (20.9 to 22.9)	4.7% (4.3 to 5.1)	30.2% (28.6 to 31.8)	6.6% (6.2 to 7.0)	32.9% (31.0 to 34.8)	0.6% (0.6 to 0.6)	24.8% (23.4 to 26.2)	-4.4% (0.5 to -9.5)	34.6% (33.5 to 35.7)	8.4% (7.4 to 9.4)	28.4% (24.9 to 31.9)	3.1% (3.0 to 3.2)
Males	29.2% (27.7 to 30.8)	6.3% (5.7 to 6.9)	32.3% (30.9 to 33.7)	8.6% (8.2 to 9.0)	27.6% (26.8 to 28.5)	0.7% (0.7 to 0.7)	19.2% (18.4 to 20.0)	1.6% (1.6 to 1.6)	27.3% (26.8 to 27.8)	9.9% (9.5 to 10.3)	28.7% (27.2 to 30.2)	3.2% (3.1 to 3.3)

Numbers in parentheses are 95% uncertainty intervals.

Table 2: Global prevalence, incidence, deaths, YLLs, YLDs, and DALYs in counts and age-standardized rates for both sexes combined, females, and males, 2019, with percentage change between 2010 and 2019

	Deaths	YLLs	YLDs	DALYs
1990	30k	15k	12k	18k
2010	7k	15k	8k	13k
2019	5k	8k	6k	8k

Table 3: Rank among Level 2 causes for global deaths, YLLs, YLDs, and DALYs in 1990, 2010, and 2019, for both sexes combined



Figure 1: Composition of DALYs by constituent level 2 causes for both sexes combined, 2019

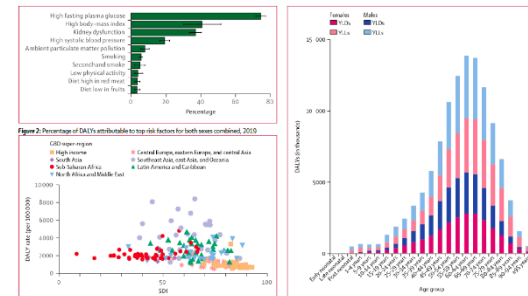


Figure 2: Percentage of DALYs attributable to top risk factors for both sexes combined, 2019

Figure 3: Age-standardized DALY rates for each location by sex for both sexes combined, 2019

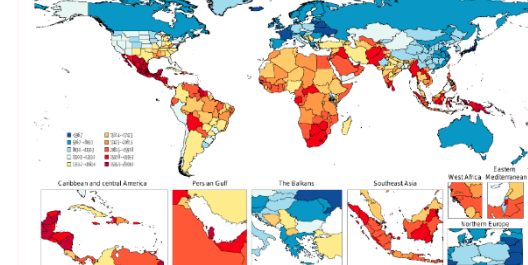


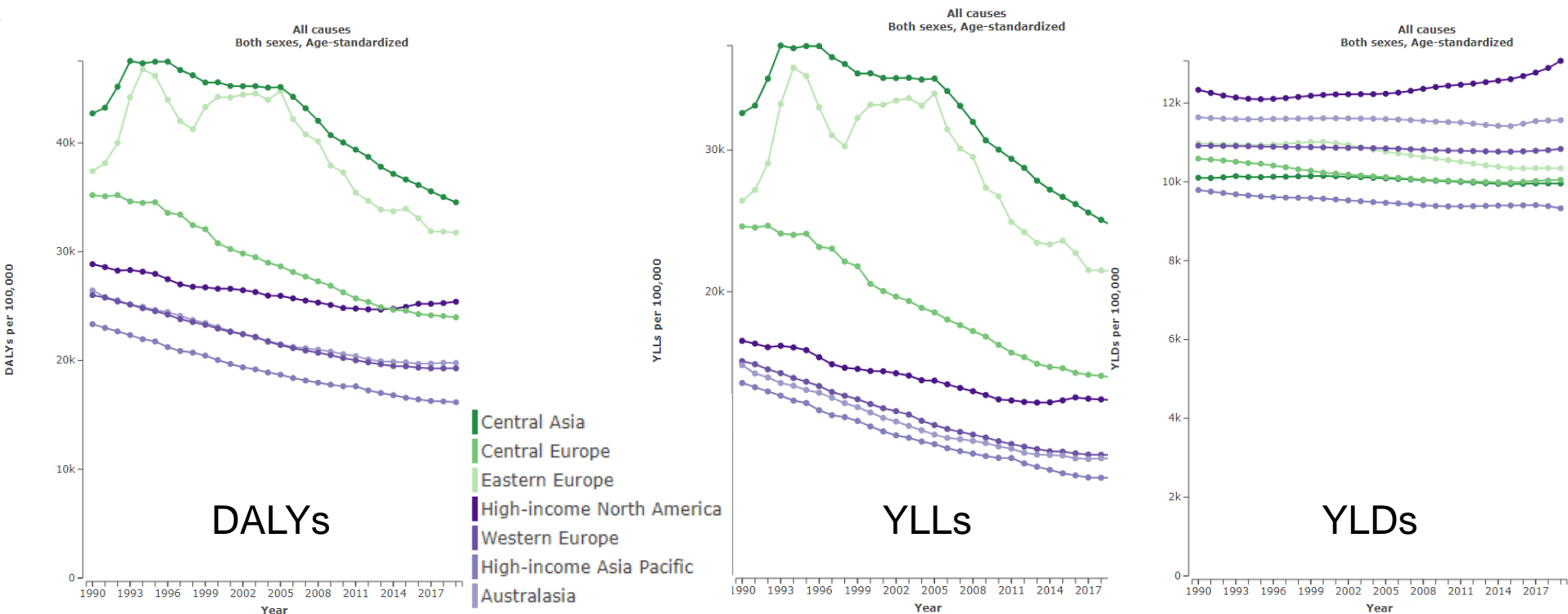
Figure 4: Composition of DALYs by YLLs and YLDs, age group, and sex, 2019

Figure 5: Age-standardized DALY rates (per 100 000) by location, both sexes combined, 2019

Diabetes and Kidney Disease 2-pager:
http://www.healthdata.org/results/gbd_summaries/2019

Key findings for the European Region

1. Slowing down of improvements in W Europe (similar to Nth America and Australasia)

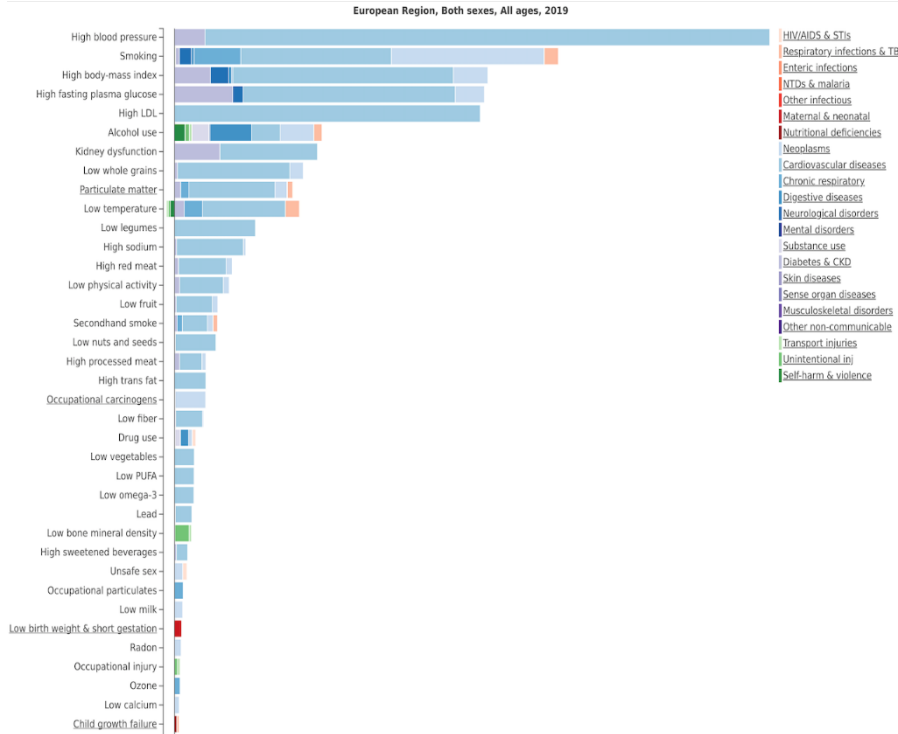


Key findings for the European Region

2. Shrinking populations

- Italy, Spain, Portugal and Greece have already peaked in 2017; other W European countries will follow in next decade apart from Scandinavian countries, Luxemburg and Belgium
- Most E and C European countries have already peaked or are about to do so
- In Central Asian countries, Armenia and Georgia follow E European pattern; others will peak much later
- This will have profound implications on distribution of burden of diseases (towards diseased of ageing) ...and on health services, in particular finding the workforce to care for the elderly

Risk Factors

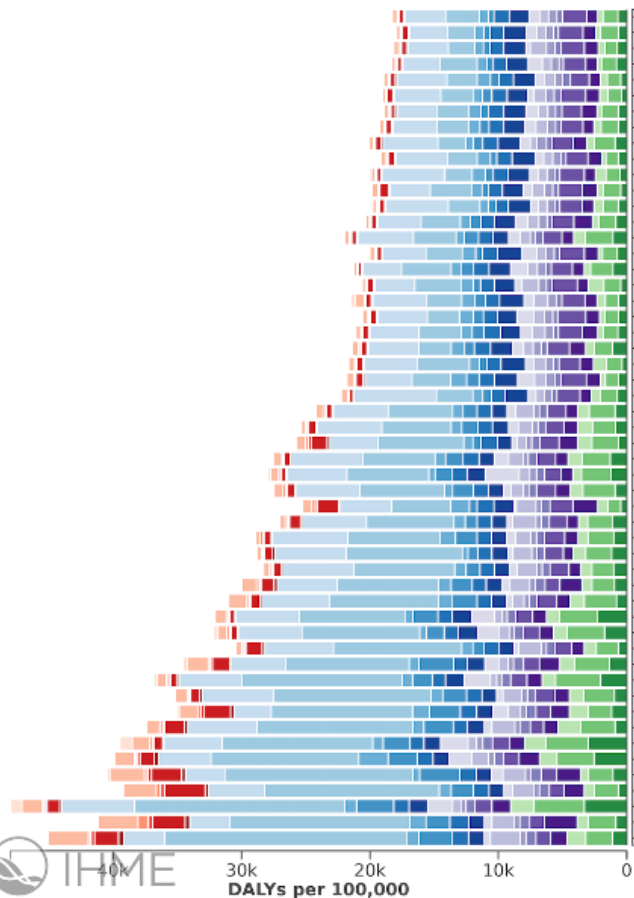


Top 10 risk factors attributable to deaths in the WHO European Region:

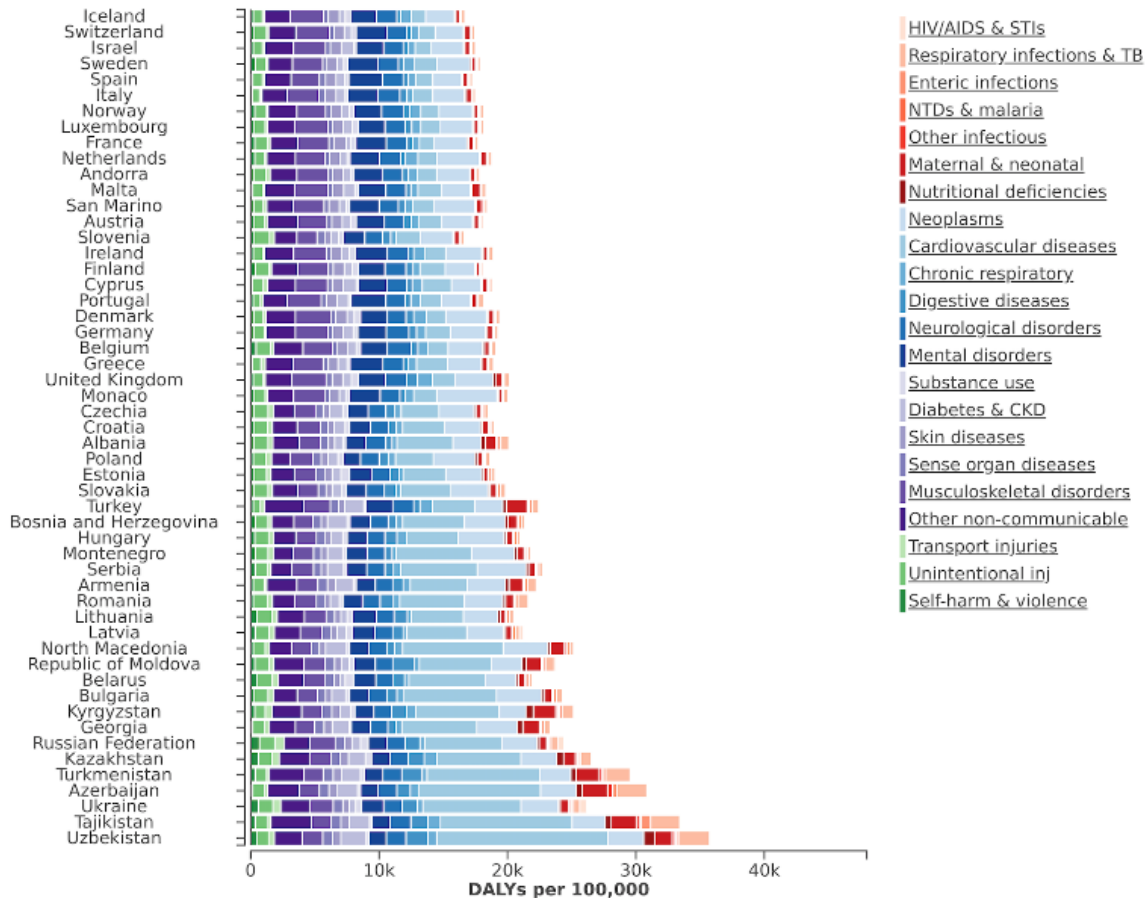
1. High blood pressure
2. Smoking
3. High body mass index
4. High fasting plasma glucose
5. High LDL
6. Alcohol use
7. Kidney dysfunction
8. Low whole grains
9. Particulate matter pollution
10. Low temperature

Leading causes of DALYs in the WHO European Region, age-standardized, 2019

Males, Age-standardized, 2019




Females, Age-standardized, 2019



- HIV/AIDS & STIs
- Respiratory infections & TB
- Enteric infections
- NTDs & malaria
- Other infectious
- Maternal & neonatal
- Nutritional deficiencies
- Neoplasms
- Cardiovascular diseases
- Chronic respiratory
- Digestive diseases
- Neurological disorders
- Mental disorders
- Substance use
- Diabetes & CKD
- Skin diseases
- Sense organ diseases
- Musculoskeletal disorders
- Other non-communicable
- Transport injuries
- Unintentional inj
- Self-harm & violence

GBD 2019 Resources

- **Major GBD Capstones (available in *The Lancet*):** <https://www.thelancet.com/gbd>
- **Five Key Insights from GBD 2019:** <http://www.healthdata.org/node/7846>
- **Global Burden of Disease Study 2019 Data Sources:** <http://ghdx.healthdata.org/gbd-2019>
- **GBD Results Tool:** <http://ghdx.healthdata.org/gbd-results-tool>
- **Country Profiles:** <http://www.healthdata.org/node/5300>
- **Two-page Summaries:** http://www.healthdata.org/results/gbd_summaries/2019
- **Data visualizations:**
 - GBD Compare: <https://vizhub.healthdata.org/gbd-compare/>
 - CoD Viz: <https://vizhub.healthdata.org/cod/>
 - Epi Viz: <https://vizhub.healthdata.org/epi/>
 - Mortality Viz: <http://www.healthdata.org/node/1618>



Global Burden of
Disease 2019

Questions on COVID

- How to calculate BoD of Covid
- COVID-19 impact on chronic diseases; diabetes & COVID-19
- Impact of COVID-19 on mortality
- challenges in considering impact of covid pandemic on GBD for the year 2020, given that most countries will not have data available to share, not even VR, before the closure of the cycle.
- What sort of data will be used to infer cause of death and impact on use of health services in GBD2020?
- Does the GBD method offer any advantages over other methods for COVID-19 disease burden calculation?
- probably to talk about anti-covid vaccine efficacy
- would the lockdowns quantify as a risk factor?

Questions on DWs

- Calculation of Disability weight
- Robustness of disability weights for certain conditions
- Where are the details of disability weights and severity distributions available?
- The disability weights are quite complicated for some diseases such as diabetes. How have these DWs been applied in GBD or how they should be applied in other studies to different types of data not including all the details described in connection to the DWs? For diseases with DWs for three or four severity levels and published severity distributions the case is somewhat less challenging.

Questions on comorbidity

- Methods to assess the overlap of risk factors and comorbidities?
- Co-morbidity adjustment

Questions on risks

- attributable burden of disease
- would like to have elucidations on how overlap between different risk factors is managed when computing the attributable burden
- not only the overlap on the concomitant occurrence, but also the chain: high BMI, high blood pressure, high LDL, high fasting plasma glucose, are metabolic risk factors, but are also the consequence of behavioural risk factors: malnutrition, dietary risks, alcohol use, low physical activity. how can we consider both? what measures have been taken not to consider these twice? have metabolic risks been “cleaned” by the effect on them of behavioural risks?
- Effect of smoking, alcohol and other behaviors and risk factors

Questions on sparse data

- As mentioned in the article “GBD 2019 includes subnational analyses for Italy, Nigeria, Pakistan, the Philippines, and Poland”, my question is how do you take into account the quality of data despite there is no reliable health information system existing, for example Pakistan and Nigeria? and how these estimates could reflect the real-time situation (extent of uncertainty)?
- how work around the missing data
- discussion about GBD in low-middle income countries

Questions on other topics

- How to improve collaboration between national efforts and IHME
- how to use properly the results of this study in order to inform health policy and how reliable are this data, considering that we have some articles comparing real and estimated data
- Mental disorders, in particular how YLL is counted, currently not adequate in GBD
- Publicly available resources on 2019 reference life table use
- priorities, projections
- What are the top 3 priority diseases (risk factors) at global and regional based on GBD 2019 study estimates for the future?
- Sharing data and code templates
- Main differences from previous rounds - both methods and results
- How do they perform data integration