



## Partnership between the Ministry of Health of the Kingdom of Saudi Arabia and IHME for the creation of a world-class integrated surveillance and burden of disease monitoring system in the Kingdom

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The Ministry of Health (MOH) of the Kingdom of Saudi Arabia (KSA) has an opportunity to develop an integrated surveillance and burden of disease monitoring system that is unique in the region and can be a model for other countries.

To accomplish this, the MOH has partnered with the Institute for Health Metrics and Evaluation (IHME), which leads the Global Burden of Disease (GBD) study and has extensive experience creating national surveillance and disease burden monitoring systems.

IHME is an independent global health research center at the University of Washington that provides rigorous and comparable measurement of the world's most important health problems. IHME makes this information available so that policymakers have the evidence they need to make informed decisions about how to improve population health.

GBD measures levels and trends in all major diseases, injuries, and risk factors and reflects the work of over 1,000 researchers in more than 100 countries, with IHME as the coordinating center. IHME has collaborated with the governments of United Kingdom, China, and Mexico to produce subnational estimates of the burden of diseases and to highlight health disparities and set regional and national health priorities.

IHME's lead representatives in the MOH/IHME partnership are the Director of IHME, Prof. Christopher Murray, and the Director of Middle Eastern Initiatives, Prof. Ali Mokdad. The project is funded by a \$9.7 million grant and began in April 2012. We would welcome the opportunity to discuss how we can expand the collaboration, build upon current successes, and continue to achieve ambitious goals in the future.

### Key achievements to date:

- IHME has developed a health census survey for KSA, which aims to collect subnational data on socio-demographic characteristics, tobacco use, diet, physical activity, functional health, maternal and child health, chronic and infectious diseases, mortality and health, and health facility access and satisfaction. This study aims to provide the MOH with a better

understanding of local health disparities. The goal is to interview and collect data from every household in the Kingdom.

IHME and the MOH have piloted the Saudi Health Interview Census twice. IHME trained over 200 MOH staff members from all regions of the Kingdom on the questionnaire, protocols, software usage, enumeration, and proper data collection techniques using IHME-created manuals. As part of the first pilot, IHME staff accompanied surveyors in visiting and interviewing households in a small community in Riyadh. The second pilot is being conducted nationwide, and data collection is scheduled to be complete by the end of June 2015.

- IHME designed and implemented a baseline household survey called the Saudi Health Interview Survey (SHIS) to gather data related to select burden of disease and risk factors at the national level. SHIS is a national, multistage survey of individuals aged 15 or older. Eleven thousand households participated in the study, which was conducted in all regions using probability proportionate to size for selection of households. A roster of household members was compiled, and an adult aged 15 or older was randomly selected to be surveyed. Weight, height, and blood pressure were measured at each household. The survey included questions on socio-demographic characteristics, tobacco consumption, diet, physical activity, health care utilization, different health-related behaviors, and self-reported non-communicable diseases. Respondents who completed the questionnaire were invited to local primary health care clinics to provide a blood sample for laboratory analysis. All blood samples were analyzed in a central lab at the King Fahd Medical City in Riyadh. The survey was conducted using computer-assisted personal interviewing and rigorous data monitoring as performed by IHME. IHME trained interviewers and supervisors on how to conduct the survey and use the computer software (DatStat) for interviewing respondents.
  - IHME monitored the data collection process, and cleaned and analyzed the data.
  - IHME produced a detailed report about the results of the study and short reports consisting of two- to four-page summaries of the prevalence of certain diseases, such as diabetes, in the Kingdom.
  - IHME released the findings in a press conference at the MOH. Dr. Mokdad presented the findings to media and health professionals in KSA. Leading media outlets in the Gulf region have written about IHME studies, which increases visibility for the partnership.
  - IHME debriefed members of Al-Shoura at the MOH on SHIS findings and next steps.
- IHME developed a burden of disease visualization tool to allow users to easily identify deaths and disability caused by distinct diseases and risk factors in KSA. This was the first country-specific visualization created by IHME (previous visualizations captured global-level trends only). More recently, IHME developed a new and improved version of the visualization tool that highlights the share of deaths caused by three categories of burden: communicable diseases, non-communicable diseases, and injuries. The tool visualizes the percentage of deaths attributable to each of the three categories by age, sex, and KSA region between 1999 and 2012.
- IHME conducted a review of all scientific publications and health information sources related to the burden of disease (including injuries) in KSA and extracted all relevant data from publicly available datasets. IHME also identified all existing data sources related to mortality, injuries, and risk factors to compile a robust data landscape. IHME incorporated these datasets into the

GBD database and used these data to generate burden of disease estimates for Saudi Arabia. IHME produced a report with these results for the MOH, covering life expectancy, mortality rates, leading risk factors, and causes of death in KSA.

- IHME also produced a mortality report using IHME methods to enhance comparability of cause of death data. In this report, we used cause of death data from 1997 to 2011 to build on these approaches and to recommend improvements in the quality of cause of death data and the death registration system in KSA. The IHME methodology accounted for underreporting of deaths in KSA and for ill-defined causes of death reported by MOH.
- IHME provided the MOH with a report comparing different methodologies used by IHME and the World Health Organization (WHO) to calculate maternal mortality and infant mortality in KSA. Dr. Mokdad of IHME traveled to Riyadh to attend a WHO meeting that explored maternal mortality in the Kingdom. The MOH was provided with a report and PowerPoint presentation about the topic to be used for the meeting. The report responded to Dr. Al Rabeeah's inquiry regarding whether WHO maternal mortality numbers overestimated rates in the Kingdom. As a result of the meetings, WHO decided to adopt IHME numbers in its future reports on KSA.
- Upon request from WHO, IHME provided the MOH with a detailed health status report using all available and generated data for KSA. The report covered estimates ranging from anemia among women to tobacco use among adolescents in the Kingdom. This has bridged the gap between MOH estimates and the indicators reported by the WHO.
- Upon request from WHO, IHME provided a detailed report to the MOH on chronic disease prevalence in KSA. The report included measured and self-reported results from SHIS.
- IHME produced a report covering estimates of the expenditure allocated to treating diabetes that examined direct and indirect costs associated with disease. IHME used data provided by the MOH. The results of this analysis were presented to the MOH.
- IHME produced a report covering estimates of the expenditure allocated to treating hypertension that examined direct and indirect costs associated with disease. IHME used data provided by the MOH.
- IHME showcased the experience, challenges, and opportunities of the Kingdom in a number of publications in peer-reviewed journals, including the following:
  - Burden of Disease, Injuries, and Risk Factors in the Kingdom of Saudi Arabia 1990-2010. *Preventing Chronic Disease*. 2014 Oct 2; 11:E169. doi: 10.5888/pcd11.140176.
  - Obesity and associated factors — Kingdom of Saudi Arabia, 2013. *Preventing Chronic Disease*. 2014 Oct 9; 11:E174. doi: 10.5888/pcd11.140236.
  - Hypertension and its associated risk factors in the Kingdom of Saudi Arabia, 2013: a national survey. *International Journal of Hypertension*. 2014: 564679. doi: 10.1155/2014/564679. Epub 2014 Aug 6.

- Hypercholesterolemia and its associated risk factors — Kingdom of Saudi Arabia, 2013. *Annals of Epidemiology*. 2014 Aug 20; pii: S1047-2797(14)00375-5. doi: 10.1016/j.annepidem.2014.08.001.
  - Status of the diabetes epidemic in the Kingdom of Saudi Arabia, 2013. *International Journal of Public Health*. 2014 Oct 8. [Epub ahead of print]
  - Reported stroke symptoms and their associated risk factors in the Kingdom of Saudi Arabia, 2013. *Journal of Hypertension*. 3:177. doi: 10.4172/2167-1095.1000177.
  - Get a license, buckle up, and slow down: risky driving patterns among Saudis. *Traffic Injury Prevention*. 2015;16(6):587-92. doi: 10.1080/15389588.2014.990090. Epub 2014 Dec 31. PubMed PMID: 25551701.
  - Breast cancer screening in Saudi Arabia: free but almost no takers. *PLoS One*. 2015 Mar 16;10(3):e0119051. doi: 10.1371/journal.pone.0119051.
  - Fruit and vegetable consumption among adults in Saudi Arabia. *Nutrition and Dietary Supplements*. 2015 Feb 20;2015(7). doi: 10.2147/NDS.S77460.
  - Low uptake of periodic health examinations in the Kingdom of Saudi Arabia, 2013. *Journal of Family Medicine and Primary Care*. In press.
  - Self-rated health among Saudi adults: findings from a national survey, 2013. *The Journal of Community Health*. 2015 Mar 21. doi 10.1007/s10900-015-0014-4.
  - Access and barriers to health care in the Kingdom of Saudi Arabia, 2013: Findings from a National Multistage Survey. *BMJ Open*. 2015 Jun 12;5(6):e007801. doi: 10.1136/bmjopen-2015-007801.
  - Tobacco consumption in the Kingdom of Saudi Arabia, 2013: findings from a national survey. *BMC Public Health*. 2015 Jul 5;15:611. doi: 10.1186/s12889-015-1902-3.
  - Low uptake of periodic health examinations in the Kingdom of Saudi Arabia, 2013. *Journal of Family Medicine and Primary Care*. 2015 July 23; 4(3):342-6. doi: 10.4103/2249-4863.161313
  - On your mark, get set, go levels of physical activity in the Kingdom of Saudi Arabia, 2013. *Journal of Physical Activity and Health*. In press.
  - Cost of Diabetes in the Kingdom of Saudi Arabia, 2014. *Journal of Diabetes & Metabolism*. In press.
  - Prevalence of asthma in Saudi adults: findings from a national household survey, 2013. *BMC Pulmonary Medicine*. In press.
- IHME has submitted several manuscripts to peer-reviewed journals, which are currently undergoing the review process. These manuscripts include the following:
- The Health Status of Saudi Women Findings from a National Survey

- The health of Saudi youth: Current challenges and future opportunities
- Use of dental clinics and Practices of oral hygiene in the Kingdom of Saudi Arabia, 2013
- Deficiencies under plenty of sun: vitamin D status among adults in the Kingdom of Saudi Arabia, 2013
- Medication use for chronic conditions among adults in Saudi Arabia; findings from a national household survey

### **Goals for the project's next phase:**

- Implement the health census and collect data from every household in the Kingdom (approximately 5 million households). Analyze the data collected to give policymakers and the MOH the ability to monitor long-term and real-time burden of disease on a national and subnational level.
- Pilot a health facility survey during IHME's next visit to KSA. All necessary manuals have already been developed. The survey focuses on health system capacity, service delivery, efficiency, and the costs of care per patient.
- Create a burden of disease unit in the Kingdom. IHME will support the MOH by assigning specialized IHME personnel to assist in establishing and developing the unit.
- Conduct a GBD Technical Training Workshop in Riyadh, led by IHME, providing hands-on experience using GBD methods, tools, data, and visualizations, as well as a forum for discussing the implications of results and future work on the GBD study. IHME will focus on training MOH participants on accurate cause of death coding and the rationale behind garbage coding.
- Establish a training program at IHME that will host select Saudi health professionals to be trained on GBD, epidemiology, and statistics. IHME will also focus on conceptualizing and implementing an integrated surveillance system in KSA, which will link data collected from the health census and health facility survey to existing MOH data on mortality and annual facility reports.
- Use subnational analysis and methodology to produce estimates for the burden of disease in each region in the Kingdom using existing data sources and data to be collected.
- Produce projections of the burden of disease in the Kingdom as a whole and in each region up to the year 2030.
- Collaborate on using the currently available data in KSA, the newly collected data, GBD data, and other related metrics for health systems planning, financing, and transformation programs.