SUPPLEMENTAL MATERIAL

Supplemental Methods

Objectives of the Global Burden of Disease 2010 Study[1, 2]

The Global Burden of Diseases, Injuries, and Risk Factors (GBD) enterprise is a systematic, scientific effort to quantify the comparative magnitude of health loss due to diseases, injuries, and risk factors by age, sex, and geography for specific points in time. The GBD construct of the burden of disease is health loss, not income or productivity loss. For decision makers, health-sector leaders, researchers, and informed citizens, the GBD approach provides an opportunity to see the big picture, to compare diseases, injuries, and risk factors, and to understand in a given place, time, and age-sex group what are the most important contributors to health loss.

Measuring disease and injury burden in populations requires a composite metric that captures both premature mortality and the prevalence and severity of ill-health. The 1990 Global Burden of Disease study proposed disability-adjusted life years (DALYs) to measure disease burden. No comprehensive update of disease burden worldwide incorporating a systematic reassessment of disease and injury-specific epidemiology has been done since the 1990 study. We aimed to calculate disease burden worldwide and for 21 regions for 1990 and 2010 with methods to enable meaningful comparisons over time.

Glossary: Disability-adjusted life years and Global Burden of Disease definitions[1, 2]

- Disability-adjusted life years (DALYs) are a summary metric of population health. DALYs represent a health gap; they measure the state of a population's health compared to a normative goal. The goal is for individuals to live the standard life expectancy in full health.
- DALYs are the sum of two components: years of life lost due to premature mortality (YLLs) and years lived with disability (YLDs).
- YLLs are computed by multiplying the number of deaths at each age x by a standard life expectancy at age x. The standard selected represents the normative goal for survival and has been computed based on the lowest recorded death rates across countries in 2010.
- YLDs are computed as the prevalence of different disease-sequelae and injury-sequelae multiplied by the disability weight for that sequela. Disability weights are selected on the basis of surveys of the general population about the loss of health associated with the health state related to the disease sequela.
- DALYs are an absolute measure of health loss; they count how many years of healthy life are lost due to death and non-fatal illness or impairment. They reflect the number of individuals who are ill or die in each age-sex group and location. Population size and composition influences the number of DALYs in a population.
- The GBD 2010 disease-and-injury-cause list is a hierarchical list of 291 diseases and injuries. At the first level of disaggregation causes are divided into three broad groups: communicable, maternal, neonatal, and nutritional disorders; non-communicable diseases; and injuries. At

each level in the hierarchy, the cause list provides a set of mutually exclusive and collectively exhaustive categories.

- Sequelae—in total, we have identified 1160 sequelae of the 291 diseases and injuries. For example, diabetic neuropathy is a sequela of diabetes mellitus. To avoid double counting, a sequela can only appear in the cause-sequela list once even if the same outcome might be claimed by more than one disease.
- Health states—across the 1160 sequelae, 220 unique health states were identified. For example, both malaria and hookworm have mild anaemia as a sequela. Mild anaemia is a unique health state. The list of unique health states serves two purposes: (a) to allow assessment of the total burden of some health states such as anaemia across various causes; and (b) to simplify the task of measuring disability weights for sequelae.
- DALYs presented in this study are not age-weighted and are not discounted for time preference. Base case tabulations for the GBD 1990 and GBD 2000 studies used age-weighting and a 3% discount rate.

Description of Disease Model, Meta-Regression (DisMod-MR)

Bayesian Meta-Regression for Epidemiological Estimation in the GBD Study 2010

A. Introduction

While the density of data and types vary tremendously across diseases and their sequelae, there are a number of common challenges in the estimation of the prevalence of non-fatal outcomes. First, to a varying degree there is data sparsity in many regions for most outcomes. Sparse data mean that predictions of prevalence need to take advantage of relationships to covariates in the meta-regression or default to the average of a region, super-region, or the world. Second, in regions or countries with multiple measurements, the results are often highly heterogeneous. The degree of heterogeneity is far beyond what is expected on the basis of sampling error and indicates considerable non-sampling variance. The sources of non-sampling variance include sample design, implementation issues in data collection, case definitions, and diagnostic technologies. Third, published studies often use non-standard age-groups like 18-35 or 15 and above. For the GBD Study 2010, we need to use data from many different non-standard age-groups to generate coherent estimates for the 20 age-groups for the study. Given that prevalence for most sequelae are strongly related to age, this issue is particularly important. Fourth, data for conditions are collected for many different outcomes such as incidence, prevalence, remission, excess mortality, or cause-specific mortality. The mix of data varies across diseases and across regions for a disease. All of these sources provide some relevant information for estimating prevalence but more often than not are not strictly comparable due to variations in case definition or other methodological differences. Fifth, within regions or countries, the true prevalence for a sequela can vary enormously. The high level of hepatitis C in Egypt is an example in the North Africa and Middle East region. Such within-region heterogeneity in the true rates must be accommodated in a meta-regression framework. Sixth, based on biology we may have strong priors on the age pattern of incidence or prevalence for a condition; for example, we expect the incidence of many cancers to increase with age due to cumulative exposure to carcinogens at least until some adult age. Another example is no bipolar disorder at very

young ages. Seventh, for many conditions, the available studies use different case definitions. The review of diabetes prevalence studies identified 18 different case definitions in use. For angina pectoris, cases were defined using the Rose questionnaire or self-reported diagnosis. For AMI, incidence was expected to vary based on use or non-use of troponin biomarker measurement. If all non-reference definition data are excluded, predictions can be based on an extremely limited number of studies only. An alternative is to empirically adjust ("cross-walk") between different definitions using the overlap in available studies.

To address these common estimation challenges, we have developed a Bayesian meta-regression tool specifically for the GBD 2010, DisMod-MR. This tool estimates a generalised negative binomial model for all the epidemiological data with various types of fixed and random effects. These include age fixed effects, fixed effects for covariates that predict country variation in the quantity of interest, fixed effects that predict variation across studies due to attributes of the study protocol, and super-region, region, and country random intercepts. We divide this section of the appendix into several sections to explain the different uses of DisMod-MR: 1) the basic DisMod-MR estimation equation for prevalence; 2) how DisMod-MR uses data from different age intervals; 3) use of expert priors; 4) use of data on multiple epidemiological parameters simultaneously; 5) posterior estimation by region; and 6) predictions from 1990, 2005, and 2010.

B. Prevalence Estimation Equation

DisMod-MR can be used to estimate age-sex-country specific prevalence from heterogeneous and often sparse data sets. The estimation equation for the generalised negative binomial with random and fixed effects has the form:

$$\mathbf{p}(p_i \mid \pi_i, \delta_i, n_i) \propto \frac{\Gamma(\lfloor p_i n_i \rfloor + \delta_i)}{\Gamma(\delta_i)} \left(\frac{\delta_i}{\pi_i + \delta_i}\right)^{\delta_i} \left(\frac{\pi_i}{\pi_i + \delta_i}\right)^{\lfloor p_i n_i \rfloor}$$

$$\pi_i = \int_{a=a_{s_i}}^{a_{e_i}} \boldsymbol{\pi}(a) e^{\alpha U_i + \beta X_i + \beta' X_i'} \mathbf{d}w_i(a)$$

$$\alpha_j \sim \text{Normal}\left(0, \sigma^2_{l(j)}\right)$$

$$\delta_i = e^{\eta + \zeta Z_i}$$

Where p_i is the prevalence of observation i; π_i is the expected value of this prevalence, δ_i is the dispersion, and n_i is the effective sample size of the observation. Γ denotes the gamma function, $\boldsymbol{\pi}(a)$ is the age-specific piecewise linear spline (defined below), α is a vector of random effects, β and β' are vectors of fixed effects, U_i is a row of the random effect design matrix, X_i and X_i' are rows from the fixed effect country-prediction and cross-walk design matrices, and $w_i(a)$ is the age-specific population weight structure. σ_l is the standard deviation for random effects at level l of the spatial hierarchy, and $l(j)$ is the level of random effect j. η is the log of the negative binomial dispersion parameter at the reference level, ζ is the generalised negative binomial fixed effect vector and Z_i is a row from the corresponding design matrix.

The age-specific piecewise linear spline $\boldsymbol{\pi}(a)$ has a set of model-specific knots $\{a_1, \ldots, a_K\}$ and is defined by the equation:

$$\boldsymbol{\pi}(a) = \gamma_0 + \sum_{k=1}^{K} \gamma_k a \mathbf{1}[a \geq a_k],$$

where $$\mathbf{1}[a \geq a_k] = \begin{cases} 1, & \text{if } a \geq a_k; \\ 0, & \text{otherwise;} \end{cases}$$

and γ_k are the age fixed effect parameters.

There are two types of **fixed effects** from covariates included in this model. X_i are covariates that explain variation across populations in the prevalence rate for the condition being analyzed (Country Level fixed effects covariates). These covariates are selected by the analyst as in any traditional regression. In addition, covariates X_i' can be included, which are variables that characterize determinants of the observed rate in a study that are not related to the underlying rate in the community but characteristics of the study design, instrument or implementation (Study Level fixed effects covariates). For example, X_i' variables may be dummy variables for alternative case definitions used in different studies. When using X_i' variables in DisMod-MR, predictions for true prevalence are based on setting these variables to a reference value.

For **IHD** sequelae, the following fixed effects were modeled:

<u>Angina pectoris</u>

- Study level
  - Sex
  - Study used Rose questionnaire versus a physician's diagnosis of angina
  - For physician-diagnosis studies, whether reported by the patient or the diagnosing physician
  - Data were from the World Health Survey (WHS) versus all other surveys (WHS prevalence appeared systematically higher)
  - For WHS data, whether from sub-Saharan Africa regions or other regions
- Country level
  - IHD age-standardized mortality rate

<u>Acute myocardial infarction</u>

- Study level
  - Sex
  - Troponin biomarker measured and in the outcome definition
  - Study reported on first-ever AMI versus first ever or repeat AMI
  - Study reported only on nonfatal or nonfatal AMI, not the two combined
- Country level
  - IHD age-standardized mortality rate

<u>Heart failure</u>

- Study level
  - Sex
  - Self-reported diagnosis versus diagnosis directly by physician based on data and symptoms
  - Diagnostic definition (Framingham criteria, New York State Heart Association Class)
  - Severity range (number of New York State classes included in the outcome definition)
  - Hospital discharge rate
- Country level
  - Mean BMI
  - Health system access
  - Cardiomyopathy age-standardized mortality rate

DisMod-MR includes nested random intercepts for $\boldsymbol{\pi}$ in the generalised negative binomial in a hierarchy across super-region, region, and country. The user can choose to require that the sum of the country random effects within a region is zero and similarly for regions within super regions. The random effects estimate systematic variation in the data across countries, regions and super-regions.

Because DisMod-MR is a variant of the generalised negative binomial model, the variance of the gamma distribution used in the negative binomial can be parameterised to be a function of the Z_i study parameters if the analyst so chooses. In other words, if studies of varying quality or method are expected to be more heterogeneous, the variance of the gamma distribution can be estimated as a function of covariates.

C. Data with Different Age Intervals

Published and unpublished studies report using a set of widely discrepant age-groups. DisMod-MR has been designed to use data reported for any age interval and to yield an age pattern of prevalence. This is accomplished by generalising the observation that the prevalence for a population of age a_0 to a_2 is equal to the average prevalence of the subpopulation aged a_0 to a_1 and aged a_1 to a_2, provided that the average is weighted by relative population size. Repeating this subdivision ad infinitum yields the weighted integral above. By integrating over the age range for any given observation, the log likelihood for each observation can be computed.

D. Expert Priors

DisMod-MR is a Bayesian meta-regression tool which allows users to specify different types of expert priors. We explain the main types of expert priors that can be used for the estimation of prevalence and how they are implemented in the estimation of the likelihood above.

For **IHD**, the expert priors were as follows. It was assumed there was no remission from IHD back to non-IHD. The age range was set as 0-100 (though IHD almost exclusively affects adults) with knots at 0, 10, 20 or 25, 30 or 35, 40, 50, 60, 70, 80, and 100. Prevalence was assumed to increase with age. Incidence and prevalence set to zero at age less than one year old.

Smoothness

Based on knowledge of the general biological, environmental, or social determinants of disease patterns by age, we may expect that there should not be dramatic changes in prevalence as a function of age. Users can establish a prior that prevalence should change smoothly as a function of age, which effectively puts a prior view on the posterior difference in prevalence between age-groups. This is implemented as a prior on the root mean square variation of the derivative of the log of the age pattern spline model:

$$\left(\int_{a=a_1}^{a_K} \left\| \frac{d \log \boldsymbol{\pi}(a)}{da} \right\|^2 dw(a) \right)^{1/2} \sim N(0, \sigma^2).$$

Age Patterns

Based on biological, clinical, or other sources, disease experts may have a view that for example cancer incidence rises with age up until some peak age group. This may be grounded in a model of cumulative mutation due to various exposures driving the development of cancer. These prior views

can be implemented in DisMod-MR by informative priors on the age pattern spline model. Simply setting the prior probability to zero for age patterns which violate such a constraint achieves the goal theoretically, but for computational efficiency, it is better to implement the constraint with a strong penalty. For example, a prior that an age pattern is a non-decreasing function of age is implemented as:

$$\text{clip}(\log \pi(a+1) - \log \pi(a), 0, 1) \sim \text{Normal}(0, \epsilon^2),$$

where clip(x, a, b) = min(max(x,a), b), and ε is a small constant like 10^{-6}.

Heterogeneity

The dispersion term in the gamma distribution of the generalised negative binomial is specified as $\delta_i = \exp(\eta + \zeta Z_i)$. Based on the nature of the data available on a disease, users may have a prior view on how much variation across studies represents true variation in the rates versus how much it represents variation in the way in which prevalence is measured that is not fully captured by study level covariates. If there is a lot of non-sampling variation across studies, the user can set the level of global heterogeneity to be high. This is implemented as a weakly informative prior on η, specifying $\eta \sim$ Uniform[a,b], where the lower-bound of the uniform distribution sets a maximum level of over-dispersion allowed for the data.

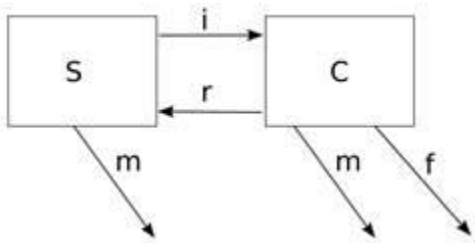
E. Borrowing Strength across Different Types of Epidemiological Data

The equations and approach described for prevalence can be used for any epidemiological parameter encompassed in DisMod-MR, such as incidence, remission, or excess mortality. But for many diseases, data are sparse and often available across studies for a mixture of incidence, prevalence, remission, and excess mortality. In addition, information on cause-specific mortality is very often available from vital registration or verbal autopsy data. In fact, the GBD work on causes of death has generated cause-specific mortality estimates for 235 causes. Estimates of the prevalence of angina pectoris should logically be informed by cross-country differences in the death rate from ischemic heart disease. Likewise, where data suggest incidence is higher than ceteris paribus, we may expect prevalence to be higher.

To borrow strength across data for different epidemiological parameters in the estimation of prevalence requires some assumptions on the relationship between different epidemiological parameters. If rates have been constant over time, there is equilibrium in that relationship that can be captured in the simple two-box model shown in Web Figure 1. This is a simplification of the four-box model that was the basis of the internal consistency tool developed for the GBD 1990, DisMod, and its successor, DisMod 2, used for the GBD 2000 revisions. The equilibrium assumption that rates have been constant over time is not appropriate for conditions where incidence, remission, or excess mortality is rapidly changing, such as HIV, but for many conditions is a reasonable assumption and one that is preferable to ignoring all the available data on incidence, remission, excess mortality, and cause-specific mortality and focusing exclusively on the limited prevalence data that is available.

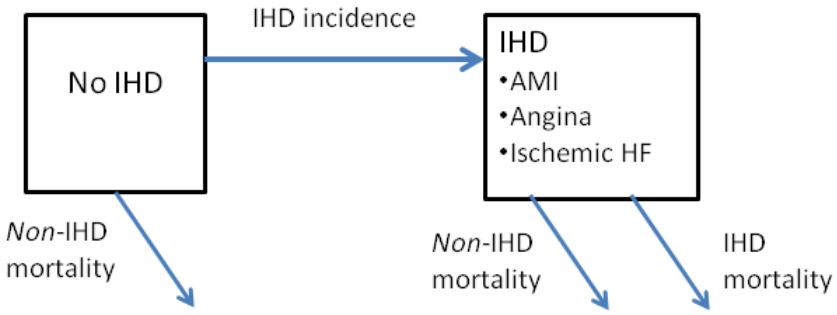
Supplementary Methods Figure 1: The two-compartment model of process for disease in a population. Compartment S contains the population susceptible to the disease and compartment C contains the population with the condition. Individuals move from S to C with incidence rate i, and from C to S with remission rate r. The susceptible population flows out of the system with without-condition mortality rate m, and the with-condition population flows out of the system with with-

condition mortality rate m+f , where f is the excess mortality rate, representing quantitatively the increase in mortality for individuals with the condition.



The meta-regression component of DisMod-MR can be estimated simultaneously using data on all the epidemiological parameters in Web Figure 1. If the user chooses to estimate consistent parameter values, DisMod-MR estimates the likelihood function for incidence, remission, and excess mortality using observations on prevalence, incidence, excess mortality, and cause-specific mortality. These additional epidemiological rates are generally estimated using the same model as for the prevalence data described above. In the case of relative mortality risk data and standardised mortality rate data, the negative binomial likelihood is replaced by a log-normal model, and in the case of duration data, a model with a normal likelihood is used.

For **IHD**, the disease model differed from the general model in **Supplementary Methods Figure 1** above because of the assumption of no remission, as shown **below.** Data availability for the epidemiologic parameters (incidence, prevalence, mortality, excess mortality) differed according to IHD sequela. For angina pectoris, almost all the studies measured prevalence. For AMI, we reviewed survey studies of prevalent prior MI and found that the results of these studies suffered from imperfect accuracy of the measurement methods (usually self-report and resting ECG changes) are likely unreliable across populations. We therefore relied exclusively on studies of AMI incidence and case fatality. Heart failure data were a mixture of incidence, prevalence, and event rate (first ever or repeat events, gathered from hospital data).



F. Posterior Estimation by Region

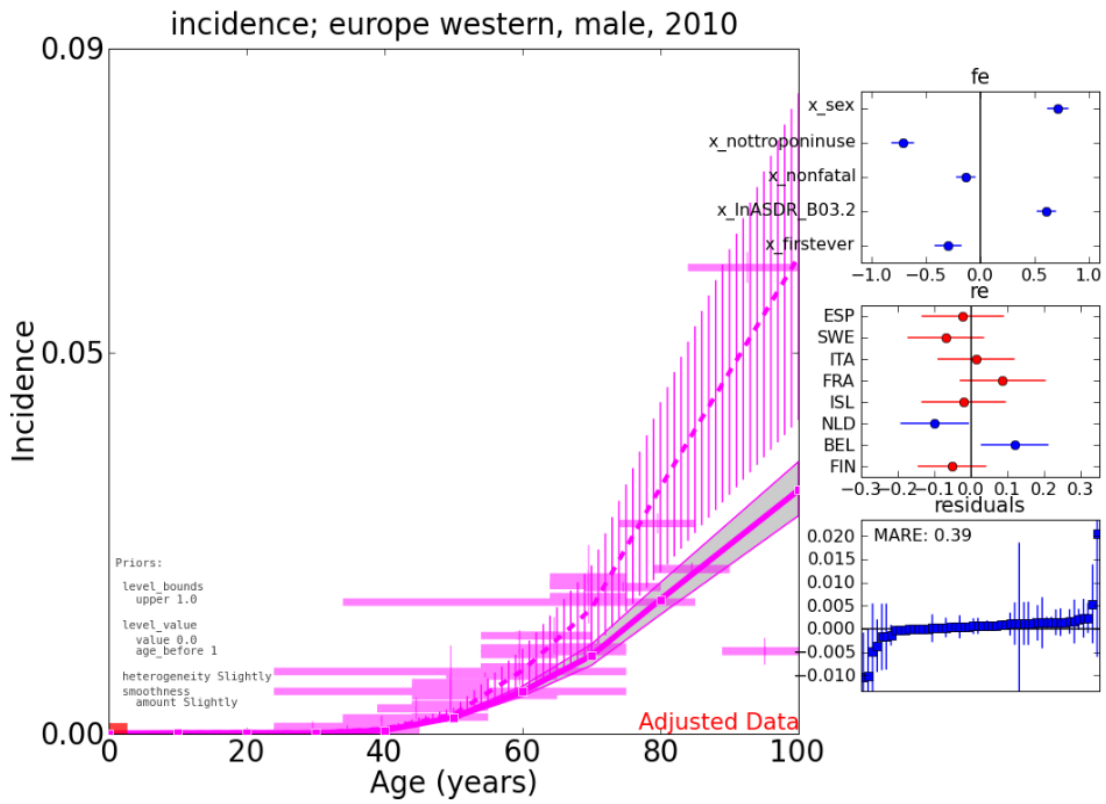
DisMod-MR estimates the global meta-regression for each epidemiological parameter independently or all together, assuming consistency for the global means, if the user so chooses. In consistent estimation, consistency is always enforced for the reference levels of the covariates (i.e. without random effects, with the average of country-level effects, and with the selected reference values for cross-walk effects). In either case, however, the age fixed effects are held constant across all countries and regions and across males and females. Where there are sufficient data, however, by region, DisMod-MR can also be used to allow for regional variation in the age-sex pattern.

Regional variation in the age-sex pattern of results is captured through the empirical Bayes approach to hierarchical modeling, where the global estimates are used to produce empirical priors for the estimation of region-sex posteriors. The global meta-regression results are used as a prior in Bayes theorem along with the data in the region to generate a posterior estimation for the region. This is implemented by taking the fixed effects and random effects to be constant at their mean values during posterior estimation, and using the regional predicted age pattern from the global fit to produce a mean and standard deviation for the regional age pattern. For example, the age-sex pattern for pancreatitis is markedly different for females and males. In women, pancreatitis tends to steadily rise with age where in males there are much higher rates than women at younger ages due to alcoholic pancreatitis. Assuming a fixed age-sex pattern makes the initial global meta-regression results inconsistent with the observed data in either sex. By estimating the posterior values for each region-sex group separately, where the data are strong, regional age-sex patterns that differ from the global pattern can be estimated.

An important component of the posterior stage of the estimation is to determine how heterogeneous the data are in a region due to non-sampling error as opposed to variation in the true rates across countries within a region. The user can set the level of local heterogeneity due to non-sampling error by setting a weakly informative prior on η, the log of the reference-level over-dispersion parameter. For the purposes of model development, three ranges of uniform distribution were generally used, corresponding to restricting delta to overlapping ranges [1,9], [3,27], and [9,81].

The lowest level of the spatial hierarchy in DisMod-MR is the country level, reflected both in the country-level random effects and country-level fixed effect covariates (when applicable). After fitting a model at the regional level with all relevant data, the resulting posterior distribution is used to make country-level predictions. These predictions have the same age-sex pattern for all countries within a GBD region, but shifted levels based on fixed effect and random effects. Regional predictions that take country-level variation into account are then produced by taking the population-weighted average of the country-level predictions.

Acute Myocardial Infarction Incidence, Western Europe, 2010: Empirical prior and posterior estimates for AMI incidene in Western Europe, males, 2010. Dashed line with horizontal bars shows the mean and standard deviation of the empirical priors. Solid line with grey shaded region shows the mean and 95% UI of the posterior distribution. The empirical Bayes approach to hierarchical modeling permits estimation of differing age patterns in the face of differing data.



AMI Incidence Model Covariates:

X_sex: Gender
X_nottroponinuse: 1 if the diagnostic test in the study was **not** troponin
X_nonfatal: 1 if the study reported non-fatal MI;
X_lnASDR_B03.2: IHD age standardized death rate
X_firstever: 1 if the study reported first-ever MI
**Adjusted data indicated that the level of data has been adjusted (to be comparable with the case definition) based on effect of covariates. The horizontal lines represent data that have been adjusted based on study-level covariates (i.e., the case definition). The vertical lines show the confidence intervals associated with each data point. The curved thick solid blue line is the final estimate with confidence intervals shown in the area shaded in grey. The curved dotted line is the empirical prior calculated by country-level covariates in addition to sex, age, and year, as well as country, region, and super-region random effects. The small plots on the right side of the figure show the effect of covariates, the country random effect, and the residuals.

G. Predictions for Different Study Years

Because the study has multiple time periods but the data available for many conditions are sparse, we have estimated posterior values for two time windows at the region-sex level. To produce estimates for 1990, we include all data with start year 1997 or earlier in the posterior estimation. To produce estimates for 2005 and 2010, we include all data with end year 1997 or later. Country-level covariates that vary with year additionally inform the difference between 2005 and 2010 posterior estimates.

H. Estimation of 95% credible intervals

One thousand draws were taken of the posterior distributions of model covariate effects (beta coefficients). Ninety-five percent Bayesian credible intervals reported in the paper are data within the 2.5 and 97.5 percentiles of these posterior distributions. These covariate values were entered into 1,000 iterations of the estimation models. Generation of credible intervals for IHD mortality estimates is described in the companion IHD mortality paper. For estimation of non-fatal IHD outcomes (acute MI, angina, ischemic heart failure), the covariates were age-standardized IHD mortality rate and study-level data from the systematic review. In this manner, uncertainty surrounding covariate effects was propagated forward into estimates of years lived with disability (YLD) and disability-adjusted life years (DALYs).

I. Estimation of disability in co-morbid conditions

Few epidemiologic surveys obtain information on disability and presence of multiple conditions. Simulated cohorts were created using microsimulation in order to estimate the probability that particular combinations of co-morbid conditions would be present in an individual. Age and sex specific disease prevalence was used as the probability of having a condition. The probability of having any specific combination of co-morbid conditions was calculated by assuming that the probability of each component condition was independent of the other conditions. The example below shows a microsimulation of 10 individuals and two possible conditions [Condition 1 with disability weight (DW) of 0.5 and Condition 2 with DW of 0.4]. In this simulation, 20% of the cohort have one morbid condition and 10% have the two combinations together (co-morbidity). The far right column shows how the DW was calculated for co-morbidity, as $[1-(1-DW_1)*(1-DW_2)]$. That is, we assumed independence and a multiplicative effect.

Example: Results of a co-morbidity microsimulation using 10 simulants and 2 diseases:

Simulant	Condition 1	Condition 2	Combined DW
1	0	0	0
2	1	0	0.5
3	0	1	0.4
4	0	0	0
5	1	1	0.7
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0

10	0	0	0

To test the validity of the assumptions of independence and multiplicative effect of multiple comorbitities, the same microsimulations were performed for U.S. Medical Expenditure Panel Survey (MEPS) data, using GBD 2010 disability weights and combinations of ICD-coded diagnoses to model co-morbitiies. The resulting distribution of simulated disability weights among combinations of co-morbid conditions matched well with the MEPS distribution of SF-12 (Short Form 12, a general quality of life instrument): the correlation coefficient for the two approaches was 0.999.

Supplemental Table 1: **Disability weights and lay descriptions and severity distributions for the three nonfatal sequelae of ischemic heart disease: nonfatal myocardial infarction, angina pectoris, and ischemic heart failure**

IHD state	Disability Weight (95% confidence interval)	Sequelae	Lay Description	Severity distribution (proportions)
Myocardial infarction	0.422 (0.284-0.566)	Acute myocardial infarction, days 1-2	The person has severe chest pain that becomes worse with any physical activity. The person feels nauseous, short of breath, and very anxious.	Not applicable
	0.056 (0.035-0.082)	Acute myocardial infarction, days 3-28	The person gets short of breath after heavy physical activity, and tires easily, but has no problems when at rest. The person has to take medication every day and has some anxiety.	Not applicable
Angina pectoris	0.037 (0.022-0.058)	Angina pectoris, mild	The person has chest pain that occurs with strenuous physical activity, such as running or lifting heavy objects. After a brief rest, the pain	0.27

			goes away.	
	0.066 (0.043-0.095)	Angina pectoris, moderate	The person has chest pain that occurs with moderate physical activity, such as walking uphill or more than half a kilometer (around a quarter-mile) on level ground. After a brief rest, the pain goes away.	0.19
	0.167 (0.109-0.234)	Angina pectoris, severe	The person has chest pain that occurs with minimal physical activity, such as walking only a short distance. After a brief rest, the pain goes away. The person avoids most physical activities because of the pain.	0.54
Ischemic Heart failure	0.037 (0.021-0.058)	Heart failure, mild*	The person has shortness of breath and easily tires with moderate physical activity, such as walking uphill or more than a quarter-mile on level ground. The person feels comfortable at rest or during activities requiring less effort	0.23
	0.070 (0.044-0.102)	Heart failure, moderate*	The person has shortness of breath and easily tires with minimal physical activity, such as walking only a short distance. The person feels comfortable at rest but avoids moderate	0.22

			activity	
	0.186 (0.128-0.261)	Heart failure, severe†	The person has shortness of breath and feels tired when at rest. The person avoids any physical activity, for fear of worsening the breathing problems.	0.55

*New York Heart Association (NYHA) Class II
†New York Heart Association (NYHA) Class III and IV

Supplemental Table 2: AMI incidence per 100,000 (95% CI), all ages, age-standardized, by male/female and by region for 1990, 2005, 2010

Acute myocardial infarction	1990	2005	2010
Region	Males		
Asia Pacific, High Income	128.81 (117.16-140.92)	106.89 (97.62-117.15)	106.84 (97.52-117.37)
Asia, Central	329.28 (278.17-386.11)	347.47 (293.10-411.87)	341.10 (289.06-398.56)
Asia, East	132.63 (125.48-140.70)	133.27 (126.84-139.70)	132.62 (126.55-139.25)
Asia, South	254.13 (237.80-270.46)	244.60 (229.54-261.06)	245.43 (230.81-261.47)
Asia, Southeast	187.88 (159.19-223.89)	167.45 (139.57-202.30)	166.51 (137.45-198.86)
Australasia	281.88 (255.49-305.97)	192.49 (175.95-209.94)	185.21 (168.44-202.66)
Caribbean	239.47 (191.23-297.42)	212.29 (169.56-260.02)	209.57 (167.36-258.39)
Europe, Central	351.66 (319.82-387.02)	265.17 (238.98-294.99)	264.51 (237.53-296.98)
Europe, Eastern	348.35 (308.45-398.45)	404.95 (360.53-456.64)	410.16 (364.29-470.15)
Europe, Western	298.34 (280.79-317.13)	198.56 (186.57-211.74)	191.04 (178.31-204.29)

Latin America, Andean	178.05 (140.46-226.00)	153.17 (119.57-193.17)	149.13 (115.54-192.13)
Latin America, Central	215.02 (173.57-264.23)	195.31 (156.50-239.91)	198.41 (161.53-245.19)
Latin America, Southern	239.29 (219.79-263.53)	196.56 (179.49-216.49)	194.47 (176.83-214.98)
Latin America, Tropical	243.08 (230.97-254.52)	205.40 (195.71-215.73)	205.21 (194.77-216.68)
North Africa / Middle East	290.06 (253.55-335.60)	252.81 (222.98-291.45)	257.46 (226.64-294.29)
North America, High Income	278.54 (257.75-298.74)	195.07 (180.08-211.92)	191.28 (176.66-206.30)
Oceania	235.38 (187.67-299.25)	218.60 (172.44-270.10)	212.44 (167.83-265.77)
Sub-Saharan Africa, Central	226.39 (180.66-286.06)	220.85 (173.89-278.26)	223.28 (172.81-296.72)
Sub-Saharan Africa, East	191.58 (165.40-221.75)	173.60 (150.52-199.03)	172.95 (151.37-198.69)
Sub-Saharan Africa, Southern	210.21 (148.68-287.26)	175.65 (128.65-235.14)	174.78 (131.11-230.31)
Sub-Saharan Africa, West	168.84 (138.04-206.67)	182.94 (149.23-221.20)	181.14 (151.21-219.41)
		Females	

Asia Pacific, High Income	70.09 (63.57-76.82)	51.32 (46.64-56.36)	50.77 (46.26-56.13)
Asia, Central	196.62 (166.08-235.62)	191.72 (163.85-226.02)	189.46 (159.04-226.01)
Asia, East	86.25 (81.55-91.13)	80.75 (76.91-84.55)	78.54 (74.70-82.54)
Asia, South	169.13 (158.34-180.78)	156.68 (146.71-168.14)	155.03 (145.25-165.38)
Asia, Southeast	124.98 (105.19-147.70)	104.71 (88.34-123.64)	101.26 (84.78-118.87)
Australasia	140.07 (127.63-154.59)	93.51 (85.32-102.34)	93.61 (85.41-102.49)
Caribbean	159.93 (127.72-198.38)	142.87 (113.96-178.99)	139.92 (112.01-173.21)
Europe, Central	180.06 (162.00-200.12)	140.11 (125.39-156.46)	138.41 (123.67-154.57)
Europe, Eastern	181.90 (160.48-208.08)	201.80 (178.21-230.29)	199.17 (176.37-228.13)
Europe, Western	134.38 (125.83-143.62)	90.66 (85.14-96.70)	88.24 (82.97-94.40)
Latin America, Andean	127.61 (99.22-163.43)	102.73 (79.25-132.11)	101.61 (78.92-127.85)
Latin America, Central	139.27 (113.79-170.25)	124.56 (100.54-155.73)	124.28 (98.42-151.98)

Latin America, Southern	117.84 (106.80-129.90)	95.57 (87.39-104.15)	95.15 (87.24-104.67)
Latin America, Tropical	147.19 (140.24-154.30)	119.08 (113.30-125.23)	118.76 (112.85-124.36)
North Africa / Middle East	178.12 (154.83-204.89)	153.64 (133.97-175.96)	152.60 (132.67-174.95)
North America, High Income	134.11 (124.93-145.12)	99.93 (92.45-107.80)	98.91 (91.81-107.39)
Oceania	120.75 (92.51-154.38)	132.58 (101.78-173.95)	130.19 (100.55-171.18)
Sub-Saharan Africa, Central	162.85 (124.58-210.86)	163.51 (124.23-217.63)	165.09 (122.94-221.50)
Sub-Saharan Africa, East	149.20 (131.01-168.60)	138.32 (120.13-157.65)	138.95 (122.01-159.43)
Sub-Saharan Africa, Southern	131.27 (97.17-179.75)	120.72 (87.28-162.79)	118.15 (87.38-160.53)
Sub-Saharan Africa, West	147.00 (121.32-179.87)	149.22 (125.53-183.38)	147.38 (120.80-180.30)

Angina pectoris	**1990**	**2005**	**2010**
Region		**Males**	
Asia Pacific, High Income	20.89 (10.20-39.26)	17.35 (8.74-31.53)	17.25 (8.51-30.90)
Europe, Western	25.11	20.51	19.32

	(19.86-33.62)	(15.69-27.35)	(14.96-25.81)
Latin America, Andean	16.90 (11.02-26.76)	15.69 (9.86-24.57)	15.44 (9.85-24.80)
Latin America, Central	18.84 (11.88-30.11)	18.01 (11.31-28.51)	18.00 (11.21-28.61)
Latin America, Southern	22.28 (12.14-39.61)	18.69 (10.42-33.68)	18.11 (9.80-30.78)
Latin America, Tropical	27.35 (23.21-32.13)	25.95 (22.02-30.53)	25.75 (22.08-30.15)
North Africa / Middle East	25.29 (20.77-31.55)	23.83 (19.47-30.01)	23.20 (18.86-29.39)
North America, High Income	24.07 (21.87-27.02)	17.65 (16.07-20.12)	16.86 (15.23-19.13)
Oceania	23.45 (13.99-38.40)	23.53 (14.50-38.38)	23.12 (13.17-38.93)
Sub-Saharan Africa, Central	18.54 (11.10-31.29)	17.37 (10.29-28.21)	18.14 (10.63-29.98)
Sub-Saharan Africa, East	21.28 (16.31-27.81)	19.99 (15.24-26.42)	20.12 (15.24-27.09)
Asia, Central	34.46 (26.85-45.72)	35.51 (26.50-48.14)	35.18 (26.05-47.15)
Sub-Saharan Africa, Southern	17.89 (14.89-21.60)	18.05 (15.17-21.69)	17.85 (14.67-21.35)

Sub-Saharan Africa, West	18.11 (12.68-27.06)	19.55 (13.89-29.98)	20.19 (14.08-30.27)
Asia, East	18.86 (17.21-20.71)	18.96 (17.23-20.66)	18.58 (16.94-20.32)
Asia, South	13.68 (11.86-15.71)	16.31 (14.14-18.76)	16.27 (14.04-18.60)
Asia, Southeast	17.28 (13.12-24.75)	16.71 (12.68-23.30)	16.56 (12.74-22.46)
Australasia	28.20 (13.26-53.68)	20.42 (9.43-38.45)	19.36 (9.70-36.01)
Caribbean	20.55 (13.56-30.72)	17.91 (12.17-27.07)	17.93 (12.40-26.58)
Europe, Central	25.70 (19.12-35.93)	24.23 (17.80-33.84)	23.08 (17.24-31.31)
Europe, Eastern	33.02 (28.53-38.30)	35.64 (30.94-40.83)	33.20 (28.68-38.50)
		Females	
Asia Pacific, High Income	16.42 (8.73-31.10)	10.11 (4.93-19.64)	13.68 (7.17-24.68)
Europe, Western	18.34 (14.24-24.02)	15.05 (11.72-19.90)	14.48 (11.15-19.26)
Latin America, Andean	14.50 (9.18-22.52)	13.47 (8.41-22.07)	12.70 (8.10-20.13)

Latin America, Central	15.00 (9.70-23.46)	13.93 (9.09-21.38)	14.11 (8.82-22.26)
Latin America, Southern	15.32 (8.67-26.77)	12.99 (7.27-22.15)	12.72 (6.72-21.99)
Latin America, Tropical	22.38 (18.84-26.25)	20.56 (17.45-24.01)	20.31 (17.31-23.74)
North Africa / Middle East	20.45 (16.57-25.68)	18.80 (15.18-23.89)	18.08 (14.49-23.17)
North America, High Income	16.95 (15.29-19.16)	12.91 (11.77-14.40)	12.71 (11.58-14.22)
Oceania	15.78 (8.83-27.39)	15.54 (8.79-26.83)	15.16 (8.74-26.11)
Sub-Saharan Africa, Central	14.06 (7.96-23.60)	13.46 (7.59-23.02)	13.13 (7.56-21.98)
Sub-Saharan Africa, East	17.85 (13.69-23.91)	16.52 (12.70-21.66)	16.44 (12.49-21.65)
Asia, Central	26.11 (20.61-34.44)	26.23 (20.04-34.89)	25.21 (18.73-35.14)
Sub-Saharan Africa, Southern	14.73 (12.22-17.58)	14.41 (12.09-17.21)	13.79 (11.47-16.51)
Sub-Saharan Africa, West	17.29 (11.89-25.45)	17.30 (12.08-27.86)	17.38 (12.17-25.65)
Asia, East	15.95 (14.57-17.47)	15.13 (13.82-16.58)	15.01 (13.64-16.53)

Asia, South	12.29 (10.57-14.09)	12.85 (10.99-14.85)	12.54 (10.87-14.46)
Asia, Southeast	12.89 (9.94-17.55)	13.18 (10.12-18.00)	12.89 (9.96-17.28)
Australasia	20.67 (9.86-39.22)	16.02 (7.70-29.88)	14.98 (7.72-27.86)
Caribbean	16.40 (11.10-24.33)	14.11 (9.76-21.28)	14.30 (10.06-20.63)
Europe, Central	18.85 (14.23-26.25)	17.67 (13.20-24.01)	16.95 (12.54-23.72)
Europe, Eastern	25.65 (22.08-29.61)	25.28 (21.56-29.08)	23.78 (20.32-27.79)

Supplemental Table 4: Ischemic heart failure prevalence per 1,000 (95% CI), all ages, age-standardized, by male/female and by region for 1990, 2005, 2010

Ischemic Heart Failure	1990	2005	2010
Region		Males	
Asia Pacific, High Income	1.67 (1.04-2.51)	1.41 (0.88-2.28)	1.43 (0.90-2.21)
Europe, Western	3.10 (2.64-3.63)	4.02 (3.43-4.77)	4.15 (3.54-4.90)
Latin America, Andean	1.00 (0.72-1.40)	1.14 (0.79-1.58)	1.17 (0.86-1.65)

Latin America, Central	1.39 (1.08-1.81)	1.53 (1.15-2.00)	1.68 (1.27-2.24)
Latin America, Southern	3.39 (2.20-5.07)	3.66 (2.46-5.58)	3.86 (2.53-5.65)
Latin America, Tropical	1.78 (1.08-2.91)	1.87 (1.10-2.92)	2.05 (1.19-3.21)
North Africa / Middle East	2.76 (2.05-3.77)	2.79 (2.15-3.65)	2.98 (2.28-3.91)
North America, High Income	4.90 (3.81-6.13)	5.58 (4.28-7.14)	5.87 (4.63-7.41)
Oceania	2.95 (2.19-3.98)	4.61 (3.33-6.44)	5.22 (3.84-7.08)
Sub-Saharan Africa, Central	1.04 (0.73-1.48)	1.06 (0.74-1.47)	1.18 (0.84-1.64)
Sub-Saharan Africa, East	1.34 (1.07-1.66)	1.33 (1.07-1.63)	1.43 (1.15-1.75)
Asia, Central	2.41 (1.77-3.39)	3.38 (2.53-4.52)	3.41 (2.59-4.48)
Sub-Saharan Africa, Southern	1.34 (0.90-1.96)	1.73 (1.17-2.53)	1.90 (1.25-2.89)
Sub-Saharan Africa, West	0.64 (0.49-0.85)	0.69 (0.53-0.89)	0.74 (0.58-0.98)
Asia, East	1.45 (0.87-2.23)	1.22 (0.73-1.96)	1.19 (0.71-1.92)

Asia, South	1.41 (0.90-2.17)	1.79 (1.18-2.70)	1.87 (1.20-2.83)
Asia, Southeast	2.48 (1.88-3.24)	1.67 (1.30-2.17)	1.71 (1.31-2.19)
Australasia	3.08 (2.00-4.71)	2.95 (1.88-4.43)	3.21 (2.01-4.84)
Caribbean	1.71 (1.28-2.25)	2.04 (1.54-2.68)	2.19 (1.66-2.93)
Europe, Central	2.29 (1.83-2.82)	2.93 (2.38-3.59)	3.07 (2.50-3.74)
Europe, Eastern	4.17 (2.89-5.97)	6.05 (4.05-8.76)	5.54 (3.67-7.82)
		Females	
Asia Pacific, High Income	1.16 (0.72-1.77)	0.87 (0.56-1.33)	0.88 (0.57-1.32)
Europe, Western	2.00 (1.68-2.37)	2.34 (1.98-2.74)	2.31 (1.99-2.73)
Latin America, Andean	0.94 (0.67-1.30)	1.12 (0.78-1.56)	1.13 (0.79-1.63)
Latin America, Central	1.10 (0.82-1.47)	1.26 (0.91-1.69)	1.35 (1.02-1.79)
Latin America, Southern	1.92 (1.25-2.84)	2.38 (1.61-3.50)	2.59 (1.71-3.86)

Latin America, Tropical	1.78 (1.04-2.79)	1.67 (0.98-2.76)	1.67 (0.98-2.65)
North Africa / Middle East	3.20 (2.39-4.33)	3.11 (2.36-4.08)	3.22 (2.43-4.29)
North America, High Income	3.22 (2.47-4.01)	3.73 (2.89-4.79)	3.94 (3.08-5.02)
Oceania	2.96 (2.06-4.18)	4.25 (2.96-5.94)	4.53 (3.19-6.29)
Sub-Saharan Africa, Central	0.73 (0.49-1.05)	0.73 (0.49-1.03)	0.78 (0.56-1.11)
Sub-Saharan Africa, East	0.79 (0.64-0.98)	0.77 (0.62-0.96)	0.80 (0.65-1.00)
Asia, Central	1.45 (1.14-1.82)	1.81 (1.44-2.31)	1.89 (1.51-2.39)
Sub-Saharan Africa, Southern	1.44 (0.93-2.15)	1.63 (1.03-2.46)	1.76 (1.16-2.65)
Sub-Saharan Africa, West	0.58 (0.44-0.78)	0.55 (0.41-0.73)	0.57 (0.44-0.76)
Asia, East	1.11 (0.68-1.75)	0.84 (0.49-1.29)	0.83 (0.50-1.36)
Asia, South	1.24 (0.81-1.84)	1.32 (0.87-1.96)	1.32 (0.86-1.97)
Asia, Southeast	2.27 (1.74-2.95)	1.46 (1.08-1.90)	1.44 (1.10-1.91)

Australasia	1.53 (0.92-2.33)	1.53 (0.96-2.30)	1.68 (1.07-2.62)
Caribbean	1.46 (1.12-1.88)	1.74 (1.35-2.26)	1.87 (1.42-2.45)
Europe, Central	2.07 (1.70-2.59)	2.19 (1.79-2.69)	2.19 (1.79-2.70)
Europe, Eastern	2.31 (1.58-3.30)	2.78 (1.92-3.95)	2.69 (1.84-3.88)

Supplemental Table 5. Mean age at acute myocardial infarction and angina incidence and average duration of angina, by world region, the Global Burden of Disease 2010 Study.

	Mean Age of Incidence						Duration		
	Myocardial Infarction			Angina			Angina		
Region	1990	2005	2010	1990	2005	2010	1990	2005	2010
Asia Pacific, High Income	67.9 (67.5 - 68.3)	71.1 (70.7 - 71.5)	72.2 (71.8 - 72.6)	58.8 (57.6 - 60.0)	62.7 (61.6 - 63.8)	63.9 (62.7 - 65.0)	15.5 (14.0 - 17.1)	14.4 (13.0 - 15.8)	13.8 (12.4 - 15.3)
Asia, Central	66.9 (66.5 - 67.4)	66.9 (66.4 - 67.3)	66.6 (66.1 - 67.1)	56.4 (55.4 - 57.3)	56.4 (55.5 - 57.3)	56.0 (55.1 - 56.9)	15.1 (14.2 - 16.1)	14.7 (13.8 - 15.8)	14.9 (13.9 - 15.9)
Asia, East	66.2 (65.8 - 66.7)	67.1 (66.8 - 67.5)	67.5 (67.1 - 67.9)	55.9 (54.9 - 56.9)	56.8 (55.8 - 57.6)	57.5 (56.7 - 58.4)	15.5 (13.8 - 17.4)	15.9 (14.1 - 18.0)	15.4 (13.8 - 17.3)
Asia, South	62.5 (62.1 - 62.9)	63.5 (63.1 - 63.8)	63.8 (63.5 - 64.2)	53.8 (53.0 - 54.6)	54.3 (53.5 - 55.0)	54.7 (53.9 - 55.5)	15.8 (14.2 - 17.5)	16.3 (14.7 - 18.0)	16.0 (14.5 - 17.7)
Asia, Southeast	63.2 (62.8 - 63.7)	63.6 (63.2 - 64.2)	64.0 (63.5 - 64.5)	54.8 (53.9 - 55.7)	55.4 (54.6 - 56.3)	56.0 (55.1 - 56.8)	15.7 (14.6 - 16.7)	15.4 (14.2 - 16.5)	15.0 (13.9 - 16.1)
Australasia	70.6 (70.2 - 70.9)	71.4 (71.0 - 71.8)	71.6 (71.2 - 72.0)	60.3 (59.2 - 61.4)	61.2 (60.2 - 62.2)	61.7 (60.8 - 62.6)	14.4 (13.0 - 16.0)	15.1 (13.7 - 16.8)	14.8 (13.1 - 16.5)
Caribbean	67.9 (67.4 - 68.4)	68.1 (67.7 - 68.6)	68.4 (67.9 - 68.8)	57.6 (56.6 - 58.5)	57.8 (56.8 - 58.8)	58.3 (57.4 - 59.3)	14.8 (13.7 - 16.0)	14.9 (13.8 - 16.0)	14.6 (13.5 - 15.7)
Europe, Central	69.7 (69.4 - 70.0)	71.4 (71.1 - 71.7)	71.9 (71.5 - 72.3)	60.5 (59.7 - 61.4)	61.8 (60.9 - 62.6)	62.3 (61.4 - 63.1)	12.9 (12.1 - 13.7)	12.8 (12.0 - 13.6)	12.6 (11.9 - 13.4)
Europe, Eastern	69.7 (69.3 - 70.2)	69.9 (69.5 - 70.3)	69.9 (69.4 - 70.3)	60.7 (59.6 - 61.9)	61.7 (60.6 - 62.9)	61.6 (60.4 - 62.7)	12.5 (11.4 - 13.7)	11.6 (10.5 - 12.7)	11.6 (10.5 - 12.7)
Europe, Western	71.7 (71.4 - 72.0)	72.3 (72.0 - 72.7)	72.8 (72.5 - 73.2)	61.2 (60.5 - 61.9)	62.0 (61.4 - 62.6)	62.5 (61.8 - 63.1)	14.9 (14.2 - 15.8)	15.5 (14.7 - 16.4)	15.3 (14.5 - 16.1)

Latin America, Andean	64.8 (64.3 - 65.3)	65.4 (64.9 - 65.9)	66.1 (65.6 - 66.7)	54.8 (53.9 - 55.7)	56.0 (55.0 - 56.9)	56.5 (55.7 - 57.4)	16.6 (15.3 - 18.0)	16.9 (15.5 - 18.4)	16.6 (15.2 - 18.1)
Latin America, Central	65.1 (64.7 - 65.5)	66.4 (66.0 - 66.9)	66.8 (66.4 - 67.3)	55.1 (54.2 - 56.0)	56.1 (55.3 - 57.1)	56.7 (55.8 - 57.6)	16.6 (15.3 - 17.9)	16.5 (15.3 - 17.7)	16.1 (14.9 - 17.5)
Latin America, Southern	68.8 (68.4 - 69.2)	69.6 (69.2 - 70.0)	69.9 (69.4 - 70.2)	59.1 (58.2 - 60.0)	60.1 (59.2 - 61.0)	60.3 (59.3 - 61.3)	14.1 (12.9 - 15.5)	14.3 (13.0 - 15.7)	14.3 (12.9 - 15.7)
Latin America, Tropical	64.7 (64.4 - 65.1)	66.1 (65.8 - 66.5)	66.5 (66.2 - 66.9)	54.7 (53.7 - 55.5)	56.0 (55.2 - 56.9)	56.5 (55.7 - 57.4)	16.9 (15.0 - 18.9)	16.5 (14.7 - 18.7)	16.4 (14.5 - 18.4)
North Africa / Middle East	62.4 (62.1 - 62.8)	64.0 (63.6 - 64.3)	64.2 (63.9 - 64.6)	54.0 (53.2 - 54.8)	54.5 (53.7 - 55.4)	54.7 (53.9 - 55.5)	16.6 (15.6 - 17.7)	16.8 (15.8 - 17.9)	16.7 (15.7 - 17.8)
North America, High Income	70.9 (70.5 - 71.2)	70.6 (70.2 - 71.0)	70.5 (70.1 - 70.9)	61.7 (61.1 - 62.4)	62.3 (61.7 - 62.9)	62.6 (62.0 - 63.2)	12.4 (11.1 - 13.8)	12.6 (11.4 - 14.0)	12.4 (11.1 - 13.9)
Oceania	60.3 (59.7 - 61.0)	60.2 (59.7 - 60.8)	60.7 (60.1 - 61.3)	51.7 (50.7 - 52.7)	52.2 (51.1 - 53.1)	52.6 (51.6 - 53.6)	15.1 (14.0 - 16.4)	15.3 (14.0 - 16.6)	15.1 (13.8 - 16.4)
Sub-Saharan Africa, Central	62.5 (61.9 - 63.1)	62.0 (61.4 - 62.6)	62.0 (61.4 - 62.6)	53.3 (52.4 - 54.1)	52.8 (51.9 - 53.6)	52.6 (51.7 - 53.4)	15.0 (13.7 - 16.4)	15.1 (13.9 - 16.4)	15.1 (13.8 - 16.4)
Sub-Saharan Africa, East	61.0 (60.5 - 61.5)	60.5 (60.0 - 60.9)	60.6 (60.1 - 61.1)	52.3 (51.6 - 53.0)	52.3 (51.6 - 53.0)	52.3 (51.6 - 53.1)	16.1 (15.2 - 16.9)	16.3 (15.5 - 17.2)	16.4 (15.5 - 17.2)
Sub-Saharan Africa, Southern	63.0 (62.2 - 63.6)	62.4 (61.8 - 63.0)	63.2 (62.6 - 63.8)	52.3 (51.6 - 52.9)	53.3 (52.6 - 53.9)	53.8 (53.2 - 54.5)	16.5 (15.1 - 18.1)	15.0 (13.8 - 16.5)	14.9 (13.6 - 16.2)
Sub-Saharan Africa, West	61.6 (61.0 - 62.1)	61.2 (60.7 - 61.7)	61.4 (60.9 - 61.8)	52.6 (51.9 - 53.3)	52.3 (51.6 - 53.1)	52.3 (51.5 - 53.1)	17.1 (16.0 - 18.3)	17.1 (16.0 - 18.2)	17.1 (16.0 - 18.2)

Supplemental Table 6: Total IHD YLD by region, 1990,1995,2000,2005,2010

GBD 2010 Super-Region GBD 2010 Region	1990	1995	2000	2005	2010
High Income					
Asia Pacific, High Income	273,452	268,436	275,079	293,701	362,719
Europe, Western	907,014	913,675	942,163	994,052	1,039,865
Australasia	42,779	42,955	44,590	47,825	52,070
North America, High Income	598,267	618,385	645,242	679,444	749,883
Latin America, Southern	69,135	72,042	77,101	84,703	93,332
Eastern Europe/Central Asia					
Europe, Central	240,082	244,608	255,985	275,102	283,663
Europe, Eastern	592,657	613,146	645,571	691,325	670,110
Asia, Central	102,985	106,912	115,480	129,939	142,357
Latin America/Caribbean					
Latin America, Tropical	176,729	202,210	232,628	268,932	312,325
Latin America, Central	118,502	133,396	155,221	186,444	223,364
Latin America, Andean	25,237	28,214	32,352	38,015	42,810
Caribbean	35,765	37,572	40,593	45,006	50,356
East Asia/Pacific					
Asia, Southeast	338,494	375,984	425,492	490,289	562,187
Asia, East	1,196,986	1,333,503	1,495,430	1,685,716	1,892,354

Oceania	4,627	5,384	6,430	7,883	9,273
North Africa / Middle East					
North Africa / Middle East	285,207	323,529	374,598	442,725	517,548
South Asia					
Asia, South	635,633	756,386	905,685	1,091,216	1,255,119
Sub-Saharan Africa					
Sub-Saharan Africa, Southern	32,179	37,060	43,013	50,310	55,536
Sub-Saharan Africa, East	130,467	142,956	161,324	187,477	220,078
Sub-Saharan Africa, Central	27,982	30,372	34,097	39,595	46,680
Sub-Saharan Africa, West	118,184	132,382	152,730	181,391	213,100
Global	5,954,352	6,421,100	7,062,803	7,913,092	8,796,739

Supplemental Table 7: Total IHD DALYs by region, 1990,1995,2000,2005, and 2010

GBD 2010 Super-Region GBD 2010 Region	1990	1995	2000	2005	2010
High Income					
Asia Pacific, High Income	2,071,598	2,005,535	2,037,122	2,106,338	2,283,171
Europe, Western	13,767,702	12,549,854	11,294,708	9,801,685	9,467,882
Australasia	658,294	585,787	506,212	453,723	471,627
North America, High Income	10,367,870	9,903,803	9,310,384	8,739,451	8,575,498
Latin America, Southern	1,022,111	990,573	1,042,687	1,018,018	1,038,983
Eastern Europe/Central Asia					
Europe, Central	5,837,451	5,968,753	5,562,416	5,364,880	5,119,210
Europe, Eastern	13,956,080	19,693,942	20,336,788	22,086,428	18,341,635
Asia, Central	2,537,426	3,233,599	3,256,205	3,487,986	3,486,359
Latin America/Caribbean					
Latin America, Tropical	2,518,537	2,744,450	2,901,654	3,048,468	3,328,057
Latin America, Central	1,880,912	2,158,823	2,343,841	2,552,973	3,050,921
Latin America, Andean	337,366	356,230	418,368	464,985	480,595
Caribbean	730,074	779,162	778,101	804,505	890,347
East Asia/Pacific					
Asia, Southeast	5,157,427	6,096,028	6,578,999	7,195,092	8,327,566
Asia, East	10,646,247	13,238,508	16,435,517	17,179,128	18,687,953

Oceania	76,350	90,546	100,218	115,233	131,610
North Africa / Middle East					
North Africa / Middle East	6,807,062	7,661,699	7,987,775	8,438,501	9,340,315
South Asia					
Asia, South	17,936,053	22,507,135	26,222,427	28,719,802	31,015,021
Sub-Saharan Africa					
Sub-Saharan Africa, Southern	472,161	539,039	568,801	581,786	570,359
Sub-Saharan Africa, East	1,545,067	1,694,094	1,715,858	1,816,021	2,001,389
Sub-Saharan Africa, Central	536,400	591,135	631,165	705,879	851,842
Sub-Saharan Africa, West	1,610,907	1,855,459	2,010,868	2,071,410	2,359,557
Global	100,475,084	115,246,150	122,042,114	126,754,296	129,821,908

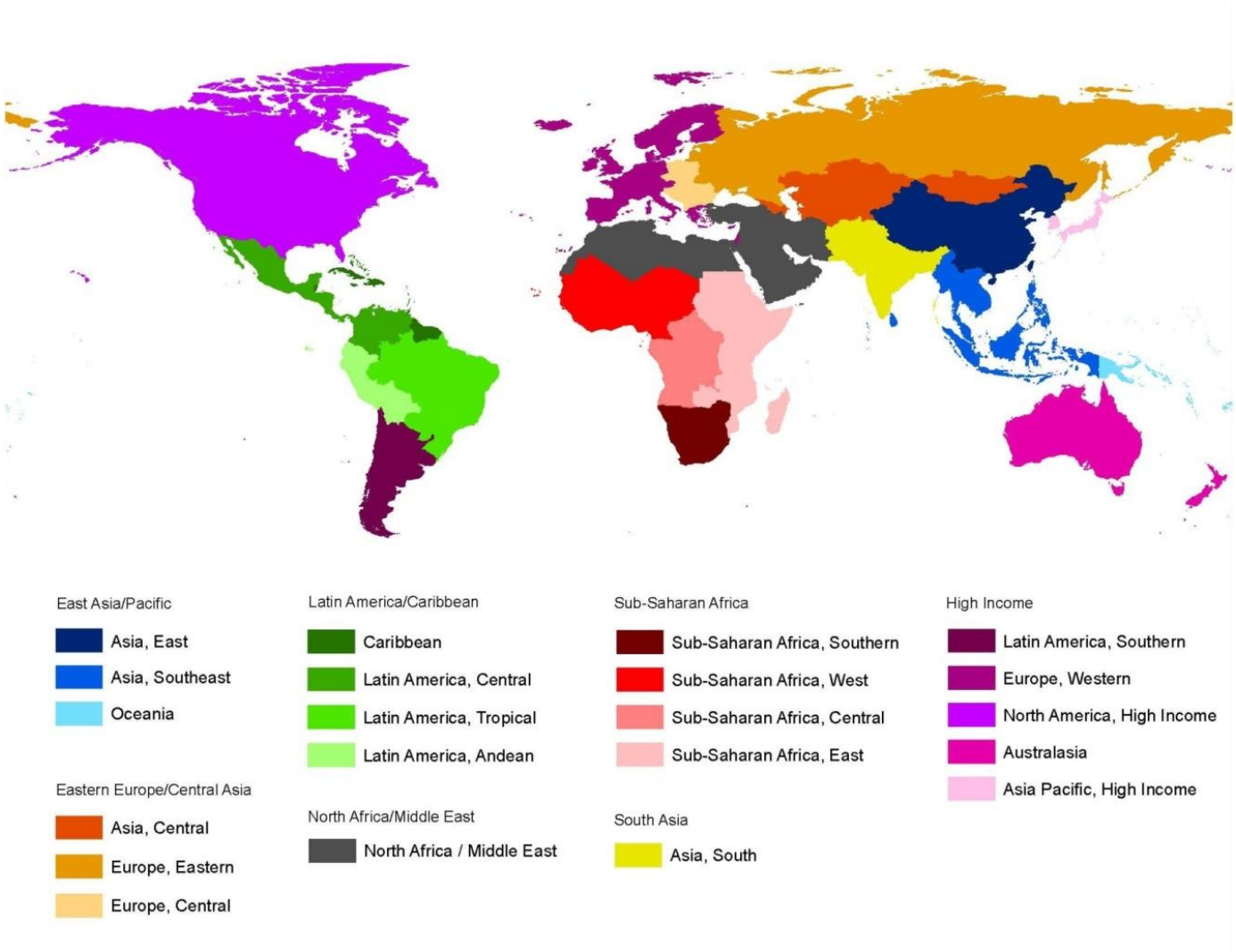
Supplemental Table 8: Contributions of population growth, population aging, and per capita burden of disease (fatal and non-fatal IHD rates) to changes in the global burden of ischemic heart disease, 1990 and 2010

	DALYs							
Region	1990 actual	population growth	population aging	2010 actual	% growth	% aging	% rates	% actual
Asia Pacific, High Income	2,070,560	2,197,908	3,819,837	2,283,016	6.2%	78.3%	-74.2%	10.3%
Asia, Central	2,537,025	2,878,044	3,464,166	3,485,717	13.4%	23.1%	0.8%	37.4%
Asia, East	10,641,002	12,452,356	17,462,772	18,678,868	17.0%	47.1%	11.4%	75.5%
Asia, South	17,933,644	25,781,583	30,975,420	31,010,195	43.8%	29.0%	0.2%	72.9%
Asia, Southeast	5,155,728	6,866,189	9,155,319	8,324,856	33.2%	44.4%	-16.1%	61.5%
Australasia	658,281	835,616	1,096,191	471,550	26.9%	39.6%	-94.9%	-28.4%
Caribbean	729,897	754,659	995,882	890,535	3.4%	33.0%	-14.4%	22.0%
Europe, Central	5,836,498	5,675,565	7,540,018	5,117,751	-2.8%	31.9%	-41.5%	-12.3%
Europe, Eastern	13,954,439	13,017,813	16,201,113	18,339,747	-6.7%	22.8%	15.3%	31.4%
Europe, Western	13,765,518	14,918,216	18,698,029	9,467,910	8.4%	27.5%	-67.1%	-31.2%
Latin America, Andean	337,225	469,897	619,538	480,388	39.3%	44.4%	-41.3%	42.5%
Latin America, Central	1,880,455	2,628,312	3,637,848	3,050,035	39.8%	53.7%	-31.3%	62.2%
Latin America, Southern	1,021,936	1,254,165	1,542,166	1,038,876	22.7%	28.2%	-49.2%	1.7%
Latin America, Tropical	2,518,023	3,295,107	4,800,207	3,327,212	30.9%	59.8%	-58.5%	32.1%
North Africa / Middle East	6,807,871	9,897,025	12,552,400	9,341,585	45.4%	39.0%	-47.2%	37.2%

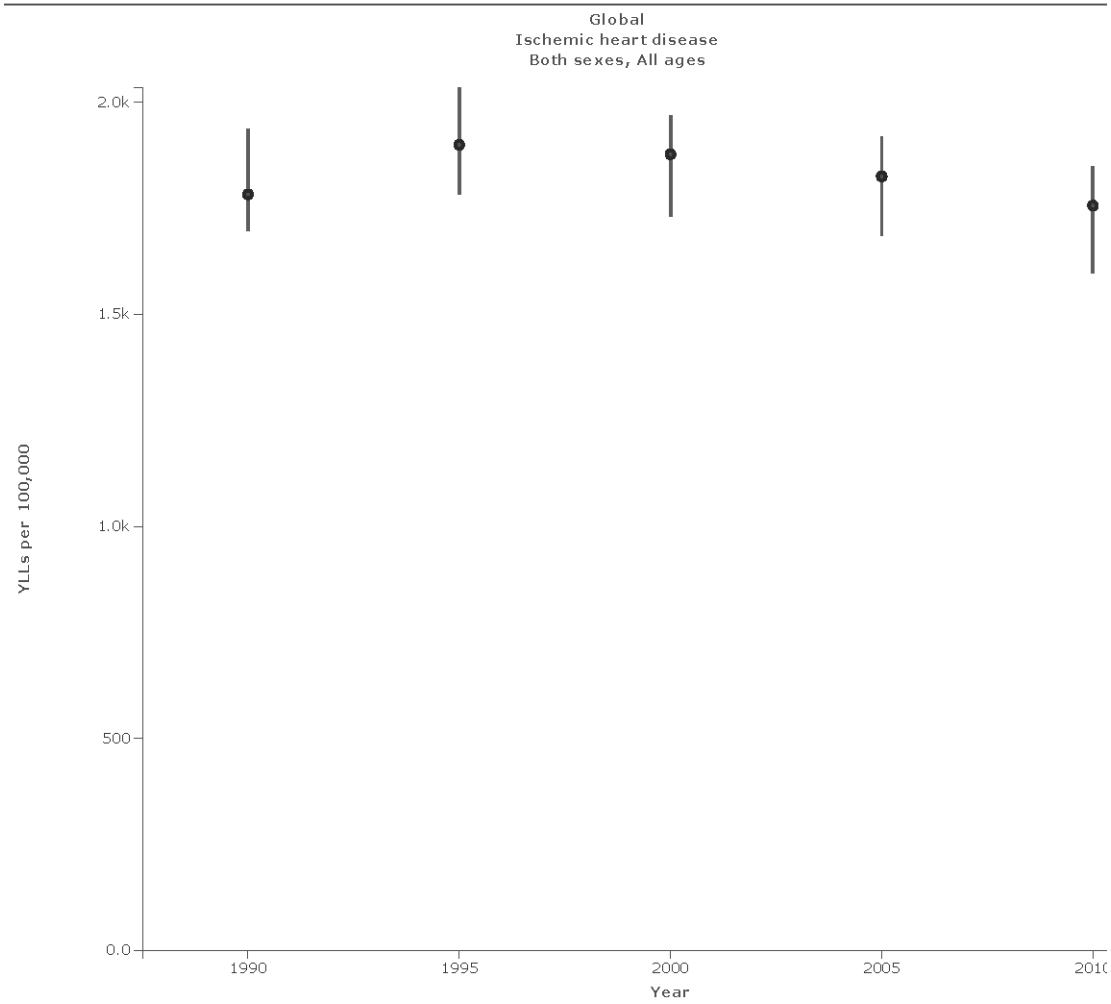
North America, High Income	10,367,323	12,700,634	15,311,055	8,575,282	22.5%	25.2%	-65.0%	-17.3%
Oceania	76,328	100,411	123,219	131,543	31.6%	29.9%	10.9%	72.3%
Sub-Saharan Africa, Central	536,331	955,836	907,715	851,649	78.2%	-9.0%	-10.5%	58.8%
Sub-Saharan Africa, East	1,544,382	2,604,863	2,725,399	2,000,247	68.7%	7.8%	-47.0%	29.5%
Sub-Saharan Africa, Southern	472,028	640,268	840,852	570,174	35.6%	42.5%	-57.3%	20.8%
Sub-Saharan Africa, West	1,610,321	2,691,797	2,696,587	2,358,329	67.2%	0.3%	-21.0%	46.5%
Developing	53,802,195	73,270,510	92,499,489	85,540,208	36.2%	35.7%	-12.9%	59.0%
Developed	46,652,620	49,345,752	62,666,241	44,255,255	5.8%	28.6%	-39.5%	-5.1%
Global	100,454,814	122,616,262	155,165,730	129,795,464	22.1%	32.4%	-25.3%	29.2%

Supplemental Figures:

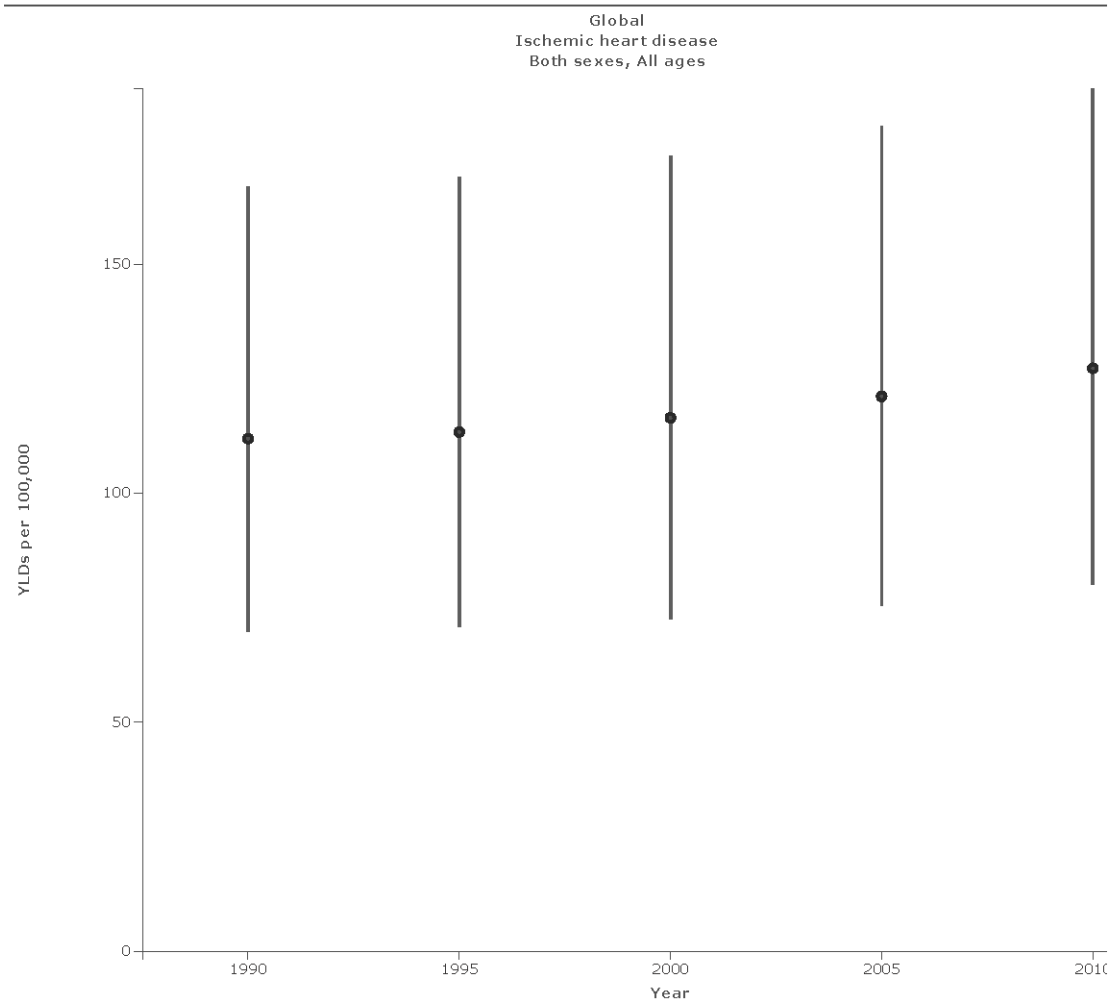
Supplemental Figure 1: GBD 2010 Study Region Map



Supplemental Figure 2a: Global years of life lost (YLL) due to IHD over time, main estimates with 95% credible intervals, the Global Burden of Disease 2010 Study.



Supplemental Figure 2b: Global years of life lived with disability (YLD) due to IHD over time, main estimates with 95% credible intervals, the Global Burden of Disease 2010 Study.



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