Systematic Reviews of Epidemiologic Data: the Global Burden of Cardiovascular Disease

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Systematic reviews in epidemiology

Summarize analytic research
- e.g. efficacy of an intervention

Summarize descriptive information
- e.g. incidence or prevalence of conditions in populations

Global Burden of Disease Study - GBD

Goal – to systematically assess global disease data for 1990 and 2005

Provide estimates for 175 diseases and injuries and 43 risk factors

45 Scientific Expert Groups for specific conditions to conduct systematic reviews of incidence and prevalence
Lead Institutions in GBD Study

Harvard Initiative for Global Health

Institute for Health Metrics & Evaluation at University of Washington

Johns Hopkins University

The University of Queensland

World Health Organization

GBD Innovations

Summary measure of population health, *Disability-Adjusted Life Years*, to reflect both premature mortality and non-fatal health outcomes.

Internal consistency analysis combine data sources on mortality, incidence, prevalence, duration and remission.

International Classification of Disease underlying cause of death to assign each death to a single cause.

Each disease and injury receives equal attention – burden estimation decoupled from strength of advocacy.
The GBD Study is divided into seven major activities:

- Disease, injury and risk factor epidemiological systematic reviews
- Mortality estimation
- Cause of death estimation using population data sources
- Disability weight measurement and co-morbidity corrections
- Comparative risk assessment
- Harmonize GBD estimates
- Creation of curricula and tools and dissemination of results and products

## Stroke Systematic Review

### Review Protocols Developed

- Specified case definitions & sequelae. Developed disease model.

### Stroke Literature Search & Screening Results

- Comprehensive literature search and screening results for 1980 – 2007 including all languages

### Study Coding for Key Epidemiologic Parameters

- ACCESS data coding form and study coder training

## Stroke Disease Model

![Stroke Disease Model Diagram](image)

- $I$: Incidence of first-ever stroke
- $F_{28d}$: 28 day case fatality
- $F_s$: Survivor case fatality
- $P$: Prevalence of stroke survivors
- $R$: No remission
- $M_{28d}$: 28 day deaths
- $M_d$: Deaths from stroke as underlying cause
- $M_a$: Attritable stroke mortality
- $M_{2a}$: Deaths from stroke-related causes
- $M_{2a}$: Deaths from all other causes

5/21/2009
Global Burden of Stroke

Literature review

Search of databases:
(unduplicated titles & abstracts)
Medline (6,295) Embase (4,322) LILACS (124) IMEMR/EMRO (26) AFRO (18)
Total = 10,785

Initial Screening: Abstract Review
Application of inclusion/exclusion criteria:
- publication date 1980 through 2007
- epidemiologic measure of interest
- population-based

9,482 = titles and abstracts did not meet initial inclusion criteria 92%

Data Analysis & Synthesis Stage

Produce Estimates: incidence, prevalence, case fatality, stroke related mortality

Study Coding Stage
Single abstraction of papers with 10% sample dual abstracted for consistency checks.

GBD Region                % World Pop | Screen 1 | % Studies | Screen 2
1 Asia Pacific High Income 3%        | 139      | 11%       | *
2 Asia Central              1%        | 3        | <1%       | 2
3 Asia Southeast            9%        | 14       | 1%        | 7
4 Asia East                 21%       | 98       | 8%        | 51
5 Asia South                23%       | 37       | 3%        | 11
6 Australasia               <1.0%     | 70       | 5%        | *
7 Caribbean                 <1.0%     | 11       | 1%        | 3
8 Europe Central            2%        | 64       | 5%        | *
9 Europe Eastern            3%        | 47       | 4%        | *
10 Europe Western           6%        | 435      | 34%       | *
11 Latin America Andean     All Latin Am | 7       | All Latin Am | 8
12 Latin America Central    All Latin Am | 4       | 7%        | 17
13 Latin America Southern   8%        | 19       | 1%        | 18
14 Latin America Tropical   19       | 19       | 1%        | 18
15 North Africa & Middle East 6%       | 36       | <1%       | 2
16 North America High Income 5%       | 242      | 19%       | *
17 Oceania                  <1.0%     | 2        | <1%       | 2
18 Sub Saharan Africa Central All SS Africa | 8       | All SS Africa | 2
19 Sub Saharan Africa East   All SS Africa | 8       | 3%        | 3
20 Sub Saharan Africa Southern 12%     | 15       | 3%        | 3
21 Sub Saharan Africa West  19
Global literature for epidemiologic measures of stroke is not evenly distributed.

Gaps in evidence in middle- and low-income countries with large populations.

Challenge will be to use the best available evidence using published and grey literature.

Systematic reviews of observational studies

Methodological considerations:
- Study quality - STROBE statement
- Selection bias - publication bias, incomplete ascertainment of studies
- Information bias - selective reporting of outcomes
- Analysis – heterogeneity among studies, sensitivity analyses

Strengthening Reporting of Observational Studies in Epidemiology (STROBE)
**In conclusion - GBD Benefits**

A common metric to *assessment of the magnitude of health problems* – the disability-adjusted life years (DALYs).

Final GBD estimates will be released in 2010.

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**In conclusion – GBD benefits**

*Systematic and objective analysis*  
separating epidemiological assessment from advocacy.

Providing evidence-based information on health patterns to inform health policy and research.
Thank you!

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