Revision of TB estimates of incidence, prevalence and mortality: key issues, current priorities, and next steps

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Plan of work Task Force: Area 1

To review the different methodologies used to measure TB burden, trends and the epidemiological impact of control.

To review the existing data and methods by country, and to update the estimates of TB incidence, prevalence and deaths, and their trends as appropriate.
Background

- Since 1997 estimates of key indicators of the epidemiological burden of TB - incidence, prevalence and mortality – developed by WHO
- The original estimates followed a thorough review of the available evidence and methods, and a series of workshops/country consultations held in each WHO region.*
- Thereafter, yearly updates of estimates, using essentially the same methods but making use of the latest surveillance data reported to WHO by countries each year as well as new data.
- Update to the data and methods as a whole was made in 2003, following a thorough review of the relationship between TB and HIV.#
- In recent years, the WHO estimates have been adopted by the Global Burden of Disease project.

# Corbett et al, Arch Intern Med v163, p1009
Why is a revision of the estimates needed?

- The existing estimates of TB incidence, prevalence and mortality are based on data and methods that have known limitations.
- The base of existing estimates is 10 years old.
- New data are available.
- New Global Burden of Disease (GBD) project.
Current methods for making TB incidence estimates

- Notifications (with assumption about proportion of cases detected), 176 countries
- Prevalence survey results (with assumptions about duration), 13 countries
- Mortality data (with assumption about case fatality rate), 3 countries
- Tuberculin survey results (to calculate ARTI, then use "Styblo ratio"), 18 countries
Global Burden of Disease (GBD) project

- Original GBD 1990 Study was commissioned by the World Bank in 1991 to provide a comprehensive assessment of the burden of 107 diseases and injuries and ten selected risk factors for the world and eight major regions in 1990.*

New GBD project

- First major effort since the original GBD 1990 Study
- Complete systematic assessment of the data on all diseases and injuries
- Produce comprehensive and comparable estimates of the burden of
  - 175 diseases, injuries
  - 43 risk factors
  - For two time periods, 1990 and 2005
  - For both sexes
  - For several age groups
  - For 21 regions of the world
GBD study organizational structure

External Advisory Board

Core Team

- Cause of Death Sub-team: Alan Lopez & Chris Murray
- Comparative Risk Assessment Sub-team: Majid Ezzati
- Disability Weights Sub-team: Joshua Salomon & Colin Mathers
- Mortality Estimation Sub-team: Kenneth Hill & Kenji Shibuya

Cluster A: Cancers, Cardiovascular, and Chronic Respiratory Diseases: Majid Ezzati
Cluster B: Child and Maternal Health: Bob Black
Cluster C: Injuries and Mental Health: Theo Vos
Cluster D: Communicable Diseases: Neff Walker
Cluster E: Other Non-communicable Diseases: Catherine Michaud

Tools & Curricula Development Sub-team

Years Lived with Disability (YLD) Sub-team
Methods

- Establishment of core group with WHO staff and KNCV Tuberculosis Foundation staff
- Workshop with core group and external experts
- Monitoring progress of activities by telephone conferences
- Workshop to develop revised estimates
- Evaluation and endorsement of new estimates to be submitted to the GBD project by Task Force
- Continuation of revision of estimates (Phase II)

N.B. Interested Task Force members are kept informed about all activities
Output

- Updated set of estimates of TB incidence, prevalence and mortality for
  - The period 1990–2006
  - The two sexes
  - Large number of age groups
  - All countries
First workshop, June 2008, The Hague

Objectives:

- Review and discuss the existing methods used to produce estimates of TB incidence, prevalence and mortality;
- Review and discuss alternative methods;
- Define a clear work-plan for the subgroup
Assumptions in current methods

- Constant Incidence Rate Ratio (IRR)
  the ratio of the incidence of TB in HIV-positive people to the incidence of TB in HIV-negative people
  IRR=30 for high-income countries
  IRR=6 for all other countries

- Proportion of all cases which are smear positive
  HIV-: 45% of TB cases SS+
  HIV+: 35% of TB cases SS+
Assumptions in current methods

- Case-fatality rate:
  HIV-: from follow-up studies of patients (cohort data include non TB deaths and don’t include untreated cases)
  HIV+: assumptions made about proportion of death which are due to TB

- Duration of disease

- Styblo rule
Workplan

- Rewrite Excel program into more sophisticated software
- Collect lay definitions and health state checklists from 2 TB experts in each WHO region
- Do systematic reviews
- Collect additional information
  - Distribution of SS+ cases by age
  - Proportion of SS+ TB vs. SS-
- 4 country visits
- Develop revised estimates
- Discuss revised estimates with Task Force
Reviews

- Duration of disease
- IRR
- TB incidence in HIV infected being on ARV and not being on ARV
- Case fatality rates
Systematic review

- Specify main research question and potential sub question
- Define criteria for considering studies for inclusion in systematic review
  - Types of studies
  - Type of participants
  - Type of outcome measures
- Search methods for identification of studies
  - Specify electronic database sources
  - Specify terms which will be used in the search strategy
  - Specify manual searches
- Methods of the review
  - Selection of studies
  - Data extraction
  - Assessment of methodological quality of included studies
- Data analysis
Lay definitions

**Tuberculosis disease in HIV negative**
Typically characterized by 2 or 3 of the following symptoms: persistent cough with thick and sometimes bloody mucus from the lungs; fatigue and weakness; fever, chills, and night sweats; loss of appetite and unexplained weight loss; and shortness of breath and chest pain.

**Tuberculosis disease in HIV positive**
Typically characterized by all of the following symptoms: fatigue and weakness; fever, chills, and night sweats; loss of appetite and unexplained weight loss; and shortness of breath and chest pain; and sometimes cough.
Health state checklists
Workplan

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Acknowledgements

- Catherine Watt WHO for slides
- GBD documents
- Core group documents
  - Project plan
  - Minutes
  - Work plan