TABLE 21

Advantages and disadvantages of various epidemiological measurements for TB control

Text in blue refers to attributes of the indicator; regular text refers to attributes of the measurement technique.

MEASURE	ADVANTAGES	DISADVANTAGES
Prevalence of infection	**Risk of infection changes relatively quickly in response to control (but prevalence, from which risk is calculated, changes slowly).**	**Measures infection, not disease burden; not an MDG indicator.**
From tuberculin surveys	Relatively cheap and logistically straightforward.	Results often hard to interpret where infection rates are low and where BCG coverage is high or where exposure to environmental mycobacteria is high; measures average risk of infection over past 5–10 years; Stýblo 1:50 rule for indirectly estimating disease incidence may not be applicable under chemotherapy, or where HIV infection rates are high.
Prevalence of disease	**Component due to duration of illness changes relatively quickly in response to control; MDG indicator.**	**Component due to incidence changes slowly in response to control.**
From population-based surveys	Accurate measure of bacteriologically confirmed disease; should change quickly in response to control; surveys useful where routine surveillance data are poor, and are a platform for related investigations e.g. of interactions between patients and health system.	Costly; logistically complex (especially with radiography), therefore cannot be measured annually; does not easily lead to an estimate of TB incidence (denominator of WHO case detection rate), because duration is hard to assess.
Incidence of disease	**Direct measure of denominator of WHO case detection rate; MDG indicator.**	**Changes slowly following reductions in transmission.**
From case notifications	Direct measure of incidence; absolute incidence can be assessed from routine case reports where case detection judged to be high; trends can be judged from series of routine case reports, if measured consistently; every country now has a surveillance system, reporting annually or sub-annually.	Case detection mostly low in high-burden countries (underestimates incidence), and may vary through time (inaccurate trends).
From consecutive prevalence surveys	Direct measure of incidence.	Costly; logistically complex; requires ≥2 surveys with carefully judged survey interval and follow-up of individual patients.
TB mortality	**Direct measure of TB burden accounting for a high proportion of DALYs; case fatality falls quickly in a new control programme; MDG indicator.**	**Component due to incidence changes slowly in response to control; hard to reduce case fatality further in low-burden countries.**
From observations on patient cohorts	Direct observation of number of patients dying.	Deaths observed are those in cohort only, not in the population at large, and not beyond the period of cohort follow-up; deaths among defaulters and transfers usually unknown; TB not always the cause of death for patients on TB treatment.
From product of incidence and case-fatality rate	Simple and widely applicable.	Relies on accurate measures of incidence (above) and case fatality; case fatality measurable in observed DOTS cohorts, but not among patients treated elsewhere or untreated. Approximate at best.
From vital (death) registrations (VR)	Direct measure of TB deaths and trends; can be reported annually or sub-annually.	VR does not yet exist in many high-burden countries (notably in Africa and Asia); typically underestimates TB deaths; sensitivity and specificity untested.
From verbal autopsy (VA)	Review of registered deaths can improve accuracy of cause of death statistics.	Sensitivity and specificity of VA not fully evaluated; where no death registration system exists, laborious to compile deaths from a rare disease, and requires large sample sizes.

Besides the staff shortages, many laboratories participating in DOTS programmes have insufficient equipment and supplies, and limited procedures for quality assurance. All these essential elements need to be in place before laboratories take on the larger tasks of culturing *M. tuberculosis* and testing for drug sensitivity, as will be required to integrate DOTS-Plus projects within DOTS programmes. To help improve capacity in HBCs, the DEWG has established a subgroup concerned with laboratory strengthening.

In addition to the deficiencies in laboratories, the lack of national policies on MDR-TB management, the widespread availability of drugs of uncertain quality and the large numbers of MDR-TB patients treated outside the NTP together suggest that the treatment of drug-resistant TB is often inadequate. The high propor-