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This article is an early release of information from Inform'ACTION No. 32, which will be published very soon.

Susceptibility to anti-TB drugs of *M. tuberculosis* strains isolated in Kiribati 2008–2009

Background

In late 2005, the World Health Organization (WHO) warned about the ever-rising level of tuberculosis (TB) in Kiribati, which had the highest incidence in the entire Western Pacific region. Few data were available about strains' susceptibility to TB drugs. Out of the 61 strains that could be cultured, the Institute of Medical and Veterinary Sciences (IMVS) of Adelaide isolated only three mono-resistant strains in 2006 (one resistant to rifampicin, one to streptomycin and one to isoniazid).

At the same time that a directly observed treatment (DOT) programme was implemented, the Secretariat of the Pacific Community (SPC) initiated a project to determine the strains' susceptibility and to identify any possible resistance mechanisms, work that would then be followed by a molecular epidemiology study.

Material and methods

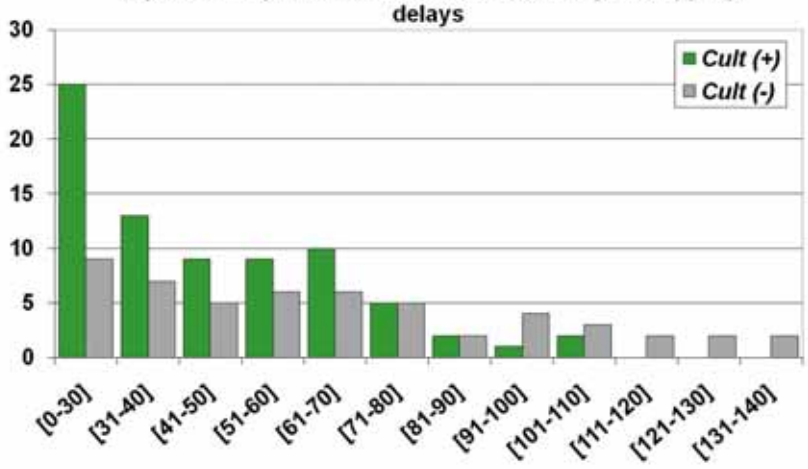
Samples were collected in Kiribati from February 2008 to late October 2009. The sputum samples collected from selected patients by national TB staff in charge of the study were kept 'refrigerated' without any preservatives and then sent periodically by airplane in batches to the Pasteur Institute of New Caledonia (IPNC). However, there was no objective guarantee that the cold chain would not be broken due to the multiple steps and intermediaries involved.

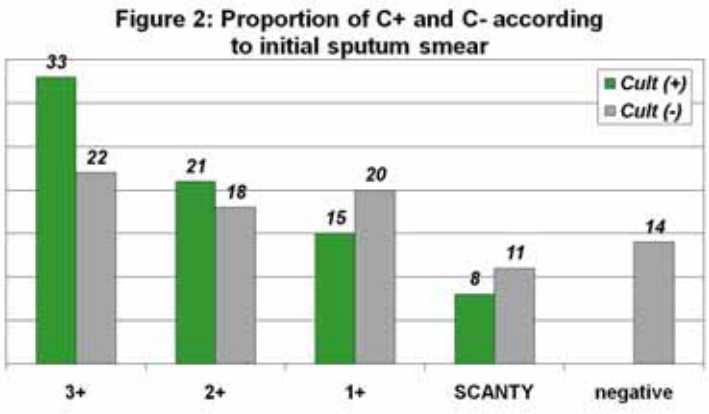
Upon arrival at IPNC, sputum smear results were rechecked using light microscopy (auramine stain and Ziehl-Neelsen), and the specimens were cultured (2 LJ and Coletsos tubes). Colonies of *Mycobacteria* appearing within 3 months were identified (hybridisation probe), and then the Mycobacterium tuberculosis strains were shipped to the Laboratoire Cerba in Paris for drug susceptibility testing (MGIT Bactec). A DNA extract (Instagène-matrix Bio-Rad) was packed in dry ice and sent to the Burnet Institute in Melbourne, Australia for Mycobacterium tuberculosis genotyping.

Results

We received a total of 167 sputum samples from different patients, including 15 negative sputum microscopy tests (culture negative) and 21 scanty positive microscopy tests (9 positive cultures, including one that was a nontuberculous mycobacteria). The time period between sampling and reception varied from 10 to 135 days (median: 49 days). This delay in shipping probably influenced the success of cultures, as figure 1 shows. The samples' bacillus load seems to be less clearly involved, as shown in figure 2.

Figure 1: Proportion of C+ and C- according to shipping delays





Only 48% (80) of the sputum sample cultures were positive and 77 cultures were identified as *M. tuberculosis*.

Of the Mycobacterium tuberculosis strains isolated, 14 appeared after more than 28 days of incubation (11 during the 2nd month and 3 before the 3rd month). Due to the date the study was scheduled to end, three strains could not be included in the DNA shipment or tested for sensitivity.

All of the 74 strains tested were sensitive to isoniazid, ethambutol and rifampicin, and 3 strains showed decreased sensitivity to streptomycin (two intermediate, one resistant).

Conclusion

The study confirms that the strains currently being transmitted have good sensitivity levels to first-line anti-TB drugs, which leads us to think that strict adherence to the directly observed treatment policy has made it possible to avoid the emergence of TB drug resistance, and that it will allow incidence rates to be brought down closer to those found in the rest of the region.

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