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REFERENCE

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Childhood immunization in Papua New Guinea – re: A survey of age at first immunization in the Aiyura Valley

The letter from Dr Weir (1) raises a number of issues related to childhood immunization in Papua New Guinea. Much of Prof. Shann's presentation to the Medical Society of Papua New Guinea to which Dr Weir refers is to be found in his excellent article in the *Papua New Guinea Medical Journal* (2). In this article Prof. Shann writes "recent evidence suggests that measles and BCG vaccines dramatically reduce child mortality through nonspecific effects – that is, they reduce mortality from many causes, not just measles and tuberculosis. The combination of BCG at birth and measles vaccine at 6 months probably reduces total mortality to about one-third of its previous level. This means that immunization must now have the highest priority." He does not advocate measles vaccination at 3 months, though he speculates that a second dose of BCG at 3 months and an extra dose of measles vaccine at 18 months may be beneficial.

The evidence to which Prof. Shann refers is the data from a remarkable study carried out by Peter Aaby and Ines Kristensen and colleagues under very difficult circumstances in one of the poorest countries of the world – Guinea-Bissau (3). This group had previously reported that immunization with standard measles vaccine was associated with improved childhood survival in countries with high infant mortality (4). Their latest longitudinal study followed 20 clusters of 100 women of fertile age in the 5 most populous rural regions of Guinea-Bissau. Children born to the women were followed up to the age of 5 years, or to the age at which they migrated out or died if before 5 years of age. Vaccination status was assessed at each of at least 2 visits of a mobile team (at intervals of 5-7 months where possible) and mortality was analyzed according to vaccination status at the first visit, made when the children were 0-6

months of age. The vaccination program recommended in Guinea-Bissau is BCG and polio at birth, diphtheria, tetanus and pertussis (triple antigen or DTP) and polio at 6, 10 and 14 weeks, and measles at 9 months of age.

Mortality was assessed at the second visit or at 6 months after the first visit if the visit interval was more than 6 months. Correction for confounding variables enabled estimates of the effects on mortality of vaccination with BCG and DTP and polio vaccines. Subsequent visits at similar time intervals enabled estimates of the effects of measles vaccine on mortality.

Not surprisingly, mortality was lower in the group who received any vaccine compared with unvaccinated children (mortality ratio 0.74). What was a completely new finding was that vaccination with BCG was associated with a significantly lower mortality (0.55). Even more dramatic was the effect of measles vaccination on mortality (0.48). When deaths from measles were excluded measles vaccination was still associated with a mortality ratio of 0.51. It is suggested that the nonspecific effects of BCG and measles vaccination on reducing 'all causes mortality' are the result of their beneficial stimulatory effects on immunological responses.

The study did not contain only good news. There was some evidence that a single dose of DTP vaccine may undermine some of the nonspecific beneficial effects of BCG vaccine, possibly due to the effects of the aluminium adjuvant. This of course is not an argument for stopping DTP vaccination – which would, inevitably, result in a massive increase in mortality from whooping cough. It does, however, indicate that we need to know much more about the effects of vaccinations.

The study from Guinea-Bissau is not without its critics (5). However, it is now generally accepted that both BCG and measles vaccine do indeed have previously unpredicted and highly significant nonspecific beneficial effects (6).

Dr. Weir indicates that in the area covered by the Summer Institute of Linguistics (SIL) health services, 78% of children have received vaccination before 3 months. This figure needs to be interpreted with caution, since it refers to those who are seen by the clinic and its outreach program and is not based on a community survey. It is, nevertheless, an impressive figure. In comparison the national immunization coverage (no more than 50%) can only be described as disastrous. Papua New Guinea is currently in a major measles epidemic, which has resulted in the deaths of large numbers of children and will result in further deaths as it spreads through the country. The country has now experienced several devastating measles epidemics over the last 16 years, and PNG has the highest incidence of subacute sclerosing panencephalitis in the world (7), yet we – the health sector – do not seem to have learned anything from the experiences. Unless we change our whole approach to immunization we shall watch the next measles epidemic in a few years time wreak similar devastation on PNG's children.

We do not need to change our vaccination schedule. The current schedule –with 2 doses of measles vaccine at 6 and 9 months – takes into account the unusual and complicated epidemiology of measles in Papua New Guinea. No one is able to advise us of any better schedule, since we do not know the current schedule's effectiveness, having never achieved high coverage rates. It is our attitude to immunization that we must change. We need to aim for universal immunization and we need to achieve the highest vaccination coverage possible. Achieving high coverage through routine vaccination should be our aim and priority. Realistically, supplementary immunization activities (SIA) will also be required at 3-4 year intervals. Such 'combined' approaches have been highly successful in other countries. This will entail considerable effort. Significant progress has been made in

improving the cold chain, but we need secure and regular vaccine procurement and distribution. Most importantly we need financial and political support for outreach programs that will ensure high coverage. Should we fail to achieve a major improvement in our immunization figures we will be guilty of failing to prevent deaths in the most vulnerable section of our community. Should we succeed, as we must, in putting immunization as a priority, then, with our current vaccines, we will not only reduce deaths from the vaccine-preventable diseases, but we may well also see a spectacular fall in infant and child mortality. Prof. Shann speculates that under 5 mortality may well drop from 120 to 52/1000 – which would be a remarkable achievement. Further reduction in mortality would be likely with the introduction of new vaccines (*Haemophilus influenzae* type b and pneumococcal vaccines) in the future. However, the introduction of new vaccines is only feasible if our current program is working at high efficiency. Quite clearly immunization is a matter of the highest national importance.

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