

Project Final Report (261375 optimunise)

Title: Optimising the impact and cost-effectiveness of child health intervention programmes of vaccines and micronutrients in low-income countries

Acronym: OPTIMUNISE

Contract/Grant agreement number: FP7-HEALTH-F3-2011-261375

Executive summary (max 1 page)

With OPTIMUNISE we have demonstrated that in low- and middle income countries, health and demographic surveillance systems (HDSS) sites can play a major role in the continuous monitoring and evaluation of health interventions. We have developed a publicly available free tool for data collection and data analysis. We have trained a number of young researchers in Guinea-Bissau, Ghana and Burkina Faso in using these tools to evaluate the overall real-life health impact of health interventions. We are also in the process of establishing other markers of a good health than mortality, which can be used as outcomes in the continued evaluation of health interventions in the future.

Building on this platform, we have corroborated many of our previous observations of non-specific effects of BCG, measles vaccine (MV), diphtheria-tetanus-pertussis (DTP) and vitamin A supplementation (VAS), helped also by the fact that WHO carried out a review, which supported many of the conclusions. We have discovered that several other interventions have NSEs, confirming the patterns we had already established: the live oral polio vaccine (OPV) has beneficial NSEs, whereas the non-live penta and the new RTS,S malaria vaccine have negative NSEs for females. Sex-differential effects were far more common than usually assumed and we confirmed the predefined hypotheses about DTP having a negative effect for female survival. Vaccines and micronutrients interacted and combination and sequence of vaccinations were very important for the effect on survival.

The potential effects of campaigns on child survival has not been assessed before but we have shown that the beneficial NSEs of OPV and the many campaigns with OPV during the last 15 years go a long way in explaining why mortality has decreased so incredibly in Africa. Similarly, we have shown that general MV campaigns also have major beneficial NSEs. There have been far more OPV campaigns than MV campaigns, so OPV campaigns may have been a major driver in explaining why two of the three HDSS sites have reached the Millennium Development Goal 4 (MDG4).

We have furthermore discovered that vaccination in the presence of pre-existing immunity, from the mother or from previous vaccinations, confers additional beneficial NSEs, thus adding to the evidence for the importance of the OPV and MV campaigns for the decline in mortality.

We did not, in a randomised controlled trial (RCT), confirm the finding from previous studies of a particularly beneficial effect of providing an early MV at 4-6 months of age. This could be due to the low power of the studies because the mortality rate was much lower than expected but we find it more likely that it could be due to the many OPV campaigns carried out during the trial, which tended to blur any effect of early MV. The RCT revealed that children in both Burkina Faso and Guinea-Bissau are susceptible to measles infection much earlier than hitherto anticipated, and an early MV could establish protective immunity and be an effective tool in the eradication of measles infection.

We are in the process of documenting how taking into account both the NSEs and the overall real-life effect of health interventions, rather than their assumed effects, can refine the cost-effectiveness analyses and lead to completely different conclusions about which interventions to prioritise. The first analyses have shown that MV campaigns are highly cost-effective and that the restrictive vial policy to reduce wastage of vaccines in multi-dose vial (BCG, MV) is not cost-effective if the effect of these vaccines on overall child survival is taken into consideration.