



BRIEFING PAPER

# The Western Pacific Regional Child Survival Strategy: Progress and challenges in implementation



**PREPARED BY**

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Compass: The Women's and Children's Health Knowledge Hub  
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Please contact the lead author with any queries or feedback.

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*This review represents the views of its author/s and does not represent any official position of AusAID or the Australian government.*

### **Abstract**

The Regional Child Survival Strategy (RCSS) was launched by the World Health Organization and UNICEF in 2006. This involved the six highest mortality burden countries in the region. This paper aims to describe the experiences of countries in the Region in adopting and implementing the RCSS, and to identify factors that promote and impede progress. We also aimed to review the literature on the effectiveness of child survival strategies. Child mortality has fallen substantially since 1990, and the Region as a whole is on track to achieve the Millennium Development Goal targets. The RCSS has been incorporated into several countries' health programs. Some countries have made slower progress and are struggling. There is an urgent need to support countries that have, until now, not been included in the Regional Child Survival Strategy, particularly smaller Pacific Island nations, and to provide greater support to the poorest countries if MDG-4 targets for the Region are to be achieved.

## Introduction

The concept of a strategic approach to child survival followed a trend that moved the focus of UNICEF and WHO from temporary relief to sustainable development. The 1980s saw UNICEF begin a “Child Survival revolution” which included the introduction of the ‘GOBI’ Initiative (Growth monitoring, Oral rehydration solution, Breastfeeding and Immunisation). This initiative was estimated to save over 12 million lives during the 1980s.<sup>1</sup>

In September 1990 the historic United Nations World Summit for Children was held in New York, and called for a reduction of under-five child mortality rates by one third, or to a rate of 70 per 1,000 live births, whichever is the greater reduction, by the year 2000.<sup>2</sup> Most industrialised countries exceeded these targets. Countries in the Organization for Economic Cooperation and Development (OECD) reduced their under-five mortality rate (U5MR) to 4-5 per 1000. However, much of Sub Saharan Africa and many countries in Asia, North Africa, and the Pacific regions were unable to come close to their targets.<sup>3</sup>

In light of this, in November 2000 the United Nations met again in New York to develop the Millennium Declaration and the Millennium Development Goals (MDG). Similar to the targets created at the World Summit for Children ten years earlier, the fourth Millennium Development Goal (MDG 4) aims that by 2015 there should be a two-third reduction in under-5 mortality rates from the rate in 1990.<sup>4</sup> The other 7 MDGs are closely interlinked with child health, particularly MDG 5 - the aim to reduce maternal mortality and improve access to maternal and reproductive health care. While progress has been made towards reaching these targets, in many developing countries, there is still a long way to go.<sup>5</sup>

In 2005 WHO and UNICEF, together with representatives from seven countries in the Western Pacific Region, developed the Regional Child Survival Strategy (RCSS) to accelerate progress towards MDG 4.

Based on improving the delivery of simple, low cost and evidence-based interventions in an integrated way, the RCSS was designed to place child health higher on the political, economic and health agendas, and reinvigorate efforts to reduce child mortality. The strategy was endorsed in September 2005 at the fifty-sixth session of WHO's Western Pacific Regional Committee, and was launched in Vientiane in 2006. The strategy involved and has been promoted in Cambodia, Lao People's Democratic Republic, Mongolia, Philippines, Papua New Guinea, Vietnam and China.

The RCSS focuses on the importance of integrated service delivery and continuum of care, scaling up and quality improvement at all levels of the health system and universal access to child survival interventions, the “essential package” (Textbox 1). In some countries, the package also includes HIV prevention and antiretroviral treatment, scaling-up TB prevention and treatment, and promoting family planning.

### Textbox 1

- One effective high level coordination mechanism (e.g. a Child Health Committee)
- One integrated national plan for child survival
- One national monitoring and evaluation system measuring core child survival indicators
- Advocacy strategy for political and community engagement
- Mobilisation of sufficient resources

Three years after the launch of the RCSS and five years from the deadline of the Millennium Development Goals the state of progress is generally positive, although mixed. Some countries in Asia and the Pacific such as China, Philippines and Mongolia have either achieved or are approaching their MDG 4 targets. The Inter-agency group for Child Mortality Estimation reports an average of 3.6% per annum reduction in under-5 mortality rates in UNICEF's East Asia and Pacific Region. The estimated number of annual deaths in the region has fallen from 2.2 million to 800,000 between 1990 and 2008.<sup>9</sup> However some countries in the region have made slower progress, and in all there are the problems of inequity.<sup>10</sup>

We aimed to understand the approaches of countries in the Asia Pacific in adopting and implementing the RCSS, and to identify factors that promote and impede progress. We also aimed to review the effectiveness of child survival strategies, using a systematic review of published and grey literature.

### Methods

A systematic literature search was conducted in OVID-Medline (1950-July week 1 2009) and Embase (1980 to 2009 Week 27) using the search strategy outlined in Table 1. Web of Science, CINAHL and the Cochrane data-base were further searched using various combinations of MeSH terms and key words (Table 2). There were no pre-set limits. Inclusion and exclusion criteria (Table 3) were designed to identify literature that addresses the following:

- A description of the process leading to the development and planning for the RCSS • Recent approaches for child survival adopted in the Western Pacific high mortality burden countries - Vietnam, Papua New Guinea, Lao PDR, Cambodia, Philippines, China, Mongolia, and the experiences with the RCSS in these countries
- Examples of implementation of child survival strategies, drawing from evaluated national programs from any developing country, to identify their components, strategies for implementation, effectiveness and gaps in knowledge

All results were assessed for relevance by the authors, and the abstracts of potentially relevant articles were reviewed. The full text of those articles which fulfilled the inclusion criteria was then obtained. Reference lists from the short-listed articles were used to widen the search.

The grey literature was selectively searched using combinations of the search strategy MeSH terms and keywords, entered in the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) search engines. Retrieved publications and reports from these databases were further used to identify other relevant sources of data.

Results from the published and grey literature were reviewed by the authors, and relevant data were extracted and summarized in a data-base that recorded: publication type and study methods (published/unpublished, reviews, randomized controlled trials, observational studies, reports), setting (global/multi-country reviews, national reviews, primary research at a national, health facility or community level), focus (health system/program planning, implementation, evaluation), topic (health system planning and policy, implementation, evaluation) and main findings.

### Results

The search results for the OVID-Medline and Embase searches are outlined in Table 4. Additional studies were identified by searching CINAHL, Web of Science and Cochrane databases and by using the reference lists of relevant studies.

### **The Regional Child Survival Strategy: summary of the literature**

There are five reports published by the WHO Regional Office for the Western Pacific, which date from the drafting stages of the Western Pacific Regional Strategy in 2005<sup>11</sup>, the launch in 2006<sup>7</sup>, the identification of progress indicators in 2007<sup>12</sup> and “short program reviews” evaluating progress in Mongolia (2007)<sup>13</sup> and Cambodia (2008)<sup>14</sup>

Drafting of the RCSS took place in Manila in 2005 at the ‘Technical Consultation on the Child Survival Strategy’: a meeting of experts from a variety of fields and organisations.<sup>11</sup> Pre-existing child survival interventions, such as the Integrated Management of Childhood Illness (IMCI) and population-based nutrition programs, were reviewed and existing challenges to progress in child survival were identified. The components of the RCSS were discussed, with emphasis placed on the “essential package” of technical interventions (see textbox 1), indicators for monitoring, the importance of equity in implementation, and the role of the community. Approaches to scaling up child survival strategies were a key focus: important mechanisms for doing so were identified, including developing a single child health plan, single coordination mechanism and consistent monitoring and evaluation systems.

In 2006 in Vientiane, the strategy was officially launched. Implementation issues and a plan for a common monitoring framework to track progress were also discussed.<sup>7</sup> The seven ‘high priority’ countries present (Cambodia, China, the Lao People's Democratic Republic, Mongolia, Papua New Guinea, the Philippines and Vietnam) were shown to be carrying out many aspects of the essential package with varying degrees of coverage and quality. Representatives from each of these countries gave accounts of what has worked well in the past, and what difficulties they foresaw. Topics such as financing, strategic management, delivery and obstacles beyond the health sector were discussed at length.

### **Defining indicators of progress**

In 2007, in Cambodia, representatives from the priority countries met to discuss the standard indicators of child survival, the methods of data collection and means of ensuring the quality of retrieved data.<sup>12</sup>

The 10 key indicators mentioned in the RCSS (Table 5) which measure coverage of the interventions in the essential package were endorsed, and a target of universal coverage for all core indicators by 2015 was agreed upon. The recommendations that came from this meeting included:

- That all countries would develop a national child health plan, ideally including:
  - o a strategic plan outlining interventions to be included and how they will be delivered
  - o an implementation plan outlining activities and tasks that will be done in the next year
  - o a costing component based on all proposed activities and tasks
  - o review and reporting of key indicators
- Newer policies and interventions that were felt to be lacking in many countries included:
  - o Zinc for the management of diarrhoea
  - o IMCI should be updated to include management of the sick newborn and management of children with HIV

- o newborn care standards and training that included neonatal resuscitation and essential newborn care
- o essential drugs list to contain all key IMCI drugs, and all drugs required at a district hospital
- o community-based management of pneumonia
- o free or subsidized services and medications for children, ensuring access to health care irrespective of the parents' capacity to pay

### **Evaluating progress in child survival in countries implementing the Regional Child Survival Strategy**

Evaluation of progress was carried out as “short programme reviews” in Mongolia<sup>13</sup> and Cambodia<sup>14</sup> in 2007 and 2008 respectively. In October 2009, a Regional Meeting on Child Survival in Xi'an China brought together key people from the seven countries with the highest child mortality burdens (China, Cambodia, Lao PDR, Mongolia, PNG, Philippines, Vietnam), to review progress. The section that follows is a summary of the major findings, points of discussion, and recommendations from this meeting, incorporating the findings of the preceding “short-programme reviews”.

#### **Gains in child survival**

In the seven Western Pacific Region countries substantial gains have been made in child survival. WHO officials report that since 1990, in the highest priority Western Pacific countries' annual deaths in children under the age of 5 years had fallen from over 1.5 million to 567,000. In the UNICEF Region of East Asia and the Pacific, which includes Indonesia and Timor Leste, countries which are not included in WHO's Western Pacific Region, the number of deaths has fallen from 2.2 million to 800,000 annually.

Progress has not been even between or within countries, but all countries, even those with the lowest GDP (Lao PDR, PNG and Cambodia) have made progress in reducing child mortality. This is demonstrated by comparing gains in child survival in Mongolia (which began with a moderate baseline mortality rate), and Cambodia. In Mongolia, under-5 mortality improved from 41 to 23.2 per 1000 live births between 2000 and 2007. Cambodia's under-5 mortality rate was 123 per 1000 live births in 1996-2000, and has decreased to 83 per 1000 live births between 2001-2005.<sup>13;14</sup> These national trends however mask marked variation between sub-populations of differing ethnicities, socio-economic standing, educational levels and access to services.

#### **National plans and policies**

Since 2005 all seven Western Pacific high mortality burden countries have developed national plans for child survival. Some (Lao PDR, Cambodia) have combined national plans for maternal, newborn and child health while others (China, Vietnam) have several plans covering various aspects of child survival, health, protection and development.

All countries have made policy reforms and most have established coordinating committees; however gaps still exist in policies in almost all countries. Both seemingly minor – such as the lack of policy on zinc in some countries – and major challenges exist, such as how to make decentralized health systems work in favour of child and maternal health. The lack of costing of national plans has also been a criticism; however the tools for costing have only recently been developed and have significant limitations.<sup>15</sup> A lack of government policy on “financial protection for women and children” (i.e. free

health care) is a genuine deficiency in some countries, although this is being addressed or proposed in all countries.

### **Spending on child health**

Data on total health expenditures for child health (or for sub-categories such as newborn health) are not readily available in any of the countries, despite this being a reporting obligation under the Convention of the Rights of the Child. One of the difficulties in estimating total expenditure on Maternal & Child Health is the decentralized nature of health systems in most countries. Much of the budgeting and spending on service delivery and training occurs at a provincial or district level, and the proportions spent on MCH vary widely. Furthermore, much of child and maternal health services are shared health systems costs.

New tools are available for reviewing impact of child health interventions and tracking expenditures, but these have limitations, and no country with decentralised systems has yet provided data on expenditure that includes all service levels.<sup>16</sup>

### **Coverage of interventions in the “essential package”**

In all countries the most available and reliable data on coverage was from routinely conducted population surveys, such as the Demographic & Health Surveys (DHS), census or Multiple Indicator Cluster Survey (MICS). Their methodologies are validated, and the surveys are usually funded by donor agencies, so they do not drain national health or government budgets. The results are generally representative of the entire population and the information provided has broader health sector relevance than just maternal and child health, and can be used to leverage political support from other parts of the health service and government.

Few countries have functioning vital registration systems, and in low income countries they under-represent the poor, which does not help to reduce health inequity. Few have been able to institute “occasional surveys”, such as “household surveys”, to track progress on the 10 core indicators suggested by WHO in 2007 (Table 5).<sup>12</sup> Table 5 describes the commonly available data sets to measure the 10 RCSS “core indicators” of child survival. Some of the problems in the interpretation of other data – such as National Health Information Systems (NHIS) data are also described.

### **Interventions for which coverage is high or increasing**

Strategies that had improved coverage since 1990 in almost all countries were the “scheduled interventions” (delivered at discrete times, often in population campaigns), particularly immunization. High percentage coverage gains were also made in all countries for those interventions that had very low baseline coverage in the 1990s, particularly vitamin A supplementation and insecticide-treated bed-nets.

### **Interventions for which coverage is low or has declined**

In most countries case management interventions, such as antibiotics for pneumonia and Oral Rehydration Solution (ORS) for diarrhoea, had lower increases in coverage. In some countries (including Cambodia and Philippines) the proportion of children receiving ORS for diarrhoea had fallen.

There are many potential reasons proposed for reduced ORS coverage. To be optimally effective, case management interventions must be available 24 hours a day and require functioning and accessible health systems, and these are deficient in many of the poorer countries in the Region. In

the 1980s, the GOBI strategy was effective in delivering simple messages on diarrhoea treatment. Now with IMCI algorithm having increased complexity and the public education campaigns and health worker training not as strong, such awareness is not as common. In China and Philippines, pressure from consumers and health professionals has meant that many families equate quality management of diarrhoea (and other conditions) with intravenous therapy, and there are financial incentives on doctors to prescribe antibiotics. Mongolia has solved some of these issues by providing free public health care and access to medicines, removing any financial incentive for doctors to over-prescribe.

### Breastfeeding

Levels of exclusive breastfeeding to 6 months remain low in many countries. Cambodia reported major increases in early and exclusive initiation of breastfeeding between 2000 and 2008 (exclusive breastfeeding for 6 months from 11% in 2000 to 66% in 2008).<sup>17;18</sup> through a multi-faceted strategy of endorsing the *International Code of Marketing of Breast Milk substitutes*, and health promotion activities.<sup>19</sup> This involved a major mass media campaign, education to new mothers through health centres, endorsement and enforcement of the Code, and reinvigoration of the Baby Friendly Hospital Initiative.<sup>20</sup>

High rates of complementary feeding at 6 months may be because many infants are fed solids long before it is safe to do so. In Lao, 20% of infants and in PNG at least 10% of infants are given complementary feeds in the first few weeks of life.<sup>21;22</sup> In Vietnam, the most common early complementary foods were water/sugar water and milk.<sup>23</sup> There is a need to define standards of complementary feeding, especially fortified complementary feeds, as the quality of feeding from 6 months of age is even more important than the time it is introduced.

Some of the obstacles to improving rates of exclusive breastfeeding include aggressive marketing of breast milk substitutes, cultural barriers (discarding of colostrum in some countries), inadequate support from health professionals (often influenced by formula manufacturers) and lack of human resources for breastfeeding counseling. The Baby Friendly Hospital Initiative (BFHI) is important in promoting better breastfeeding practices, but has received inadequate support in recent years.<sup>20</sup>

Some countries and UNICEF reported plans to relaunch the initiative, to make the BFHI status a pre-requisite for hospitals where maternal services are accredited.

### Malnutrition

Overall rates of malnutrition have decreased, but in many countries, stunting (signifying chronic under-nutrition) and anaemia continue to be high. Stunting is a major problem in all 7 countries (prevalence rates varied from 15% in China to 40% in Lao PDR).<sup>24;25</sup> Poor breastfeeding practices, inadequate complementary feeding, low maternal nutrition, childhood illnesses, particularly anaemia and worm infestation, all are causative.<sup>26;27</sup> In the Western Pacific Region more than 35% of diseases causing child death are associated with inadequate nutrition.<sup>28</sup>

China and Philippines are starting preventative supplementation with weekly iron and folic acid in schools which has been shown to reduce low birth weight and have beneficial effects on later maternal health. There is a need to gather more information on the effectiveness of such nutritional interventions.

Anaemia (defined as Hb<110 g/l) is still a problem in most countries, with prevalence rates from 20% in China to 63% in Cambodia in children under the age of 5 years.<sup>25;29</sup> There is a need to clarify recommendations on fortified complementary feeding for young children and pre-schoolers, including the roles of industry fortification, and point of use fortification with micronutrients - "sprinkles". UNICEF and WHO are working on developing standards for what can validly be marketed as complementary feeds and a policy on micronutrient supplementation.

There are variations in nutrition levels between sub-populations, regions and by education level, which tracks other trends in inequity, particularly mortality risk.

Human resources to address nutrition have not been adequately addressed. Few countries in the Western Pacific have sufficient nutritionist training courses. Even in Philippines where such courses exist, recruitment is difficult. Other countries (PNG, Lao, Cambodia and Solomon Islands) do not have courses in nutrition, and capacity for implementation of nutritional interventions is even weaker than in Philippines. There is also a need to review curricula for doctors, nurses and midwives to ensure it contains current recommendations on nutrition.

### **Maternal and newborn care**

Rates of hospital deliveries increased markedly in China and Mongolia since 2000 to above 90%, and were associated with falls in maternal mortality. Relatively fewer women delivered in hospitals in remote western provinces (Personal communication, MOH; Mongolia 2008). Improvements have been achieved by policies for free hospital delivery and improving the quality of care. Pre-eclampsia / eclampsia and maternal anaemia are important causes of maternal morbidity and mortality in Mongolia, highlighting the need to improve the quality of care in antenatal visits.<sup>13</sup> In Lao PDR, less than 20%, and in PNG around 50%, of deliveries are in a health facility with a skilled birth attendant (SBA).<sup>21;22</sup> In Vietnam rates of SBA deliveries have declined: 77% in 1997, 85% in 2000, 64% in 2006, but this may be due to changes in definitions between 2000 and 2006.<sup>30;31</sup>

The proportion of newborns protected against neonatal tetanus shows improvement in most countries, although PNG, Lao and Cambodia have not reached the goal of tetanus elimination.

In remote Vietnam, a trial of training of local village women as "ethnic midwives" in a truncated 6-month skilled birth attendant course is being conducted. This does not train to the level of a midwife, but aims to provide more competency than a traditional birth attendant (TBA).

### **Neonatal mortality**

While rates of neonatal mortality have fallen slightly in many countries, the reduction has been less than that for post-neonatal mortality, and now a higher proportion of overall child mortality occurs in the first 28 days of life in all countries than in 1990. The proportion of child deaths in the neonatal period varies from 59% in China to 31% in Laos.<sup>21;32</sup>

Reliable data on cause-specific neonatal deaths are lacking, as are data on how newborns are cared for in health facilities and in homes. The Philippines has recently done a detailed study of the practices in the first hour of life in over 50 hospitals, which showed much scope for improving essential newborn care, especially early breast feeding, skin to skin warming, and resuscitation when needed. Mongolia and China have addressed neonatal mortality with approaches that include training

in essential newborn care and neonatal resuscitation, referral level neonatal care and post-natal visits. Vietnam has a major focus on neonatal mortality reduction, with similar programs being put in place.

Some additional avenues that were proposed to improving neonatal care included establishment of financial incentives for skilled birth attendants, support for institutions of training of midwives or other skilled birth attendants (such as community health workers), and requisite workforce planning to ensure adequate human resourcing .

### **Expanded Program for Immunization (EPI)**

The region overall has sustained high vaccine coverage rates, and there have been >90% reduction in diphtheria and pertussis, and >60% decline in tetanus since 1990. Further increases will only occur by reaching poorer or remote communities.<sup>33</sup>

Supplemental immunization activities (SIA) have been highly successful in many countries. In the Philippines, there were 351 deaths from measles in 2004, and this was reduced to 4 deaths following SIA in 2004-2006. In PNG, SIA were introduced in response to a deadly outbreak of measles, with tens of thousands of cases reported and hundreds of documented deaths between 1998 and 2002. SIA were conducted in 2002-4 and in 2007-8. The number of measles cases has dropped dramatically, almost certainly averting a measles epidemic in the interval years.

The regional goal to control hepatitis B is to achieve 70% coverage with the birth dose of hepatitis B vaccine and >85% coverage with the 3 doses of the vaccine. PNG and Lao have not achieved either coverage goal, while Cambodia, Philippines and Vietnam have not achieved the 70% target for the birth dose, but have achieved >80% coverage with the 3 doses. Coverage of the birth dose of the vaccine is linked to the proportion of deliveries taking place in a health facility.

EPI coverage rates are not even across any given country, and all countries have low performing districts. WHO has been promoting the *Reaching Every District* (RED) strategy, which focuses on district micro-planning, monitoring, supervision and using practical tools to measure coverage at service delivery level.

### **Integrated Management of Childhood Illness (IMCI)**

For many low-income countries, IMCI represented the first integrated and standardized case management strategy that could be taught to nurses and community health workers. Some countries have also adopted the other two broad components of IMCI; better health facility functioning, and better home and community practices. Most countries reported improvements in health worker performance in the diagnosis and management of key childhood presentations with implementation of IMCI.<sup>34-37</sup> In Tanzania there were reductions in under-5 mortality temporally associated with implementation of IMCI (13%), although many other factors are likely to explain this.<sup>36</sup> In Bangladesh, a randomized controlled trial of IMCI showed that overall reductions (-23%-30%) outweighed the isolated impact on mortality attributed to IMCI (-13%).<sup>37</sup> The reasons for such improvements in child survival were associated with national government programs that saw improvements in maternal education, housing, water supplies, access to electricity, vitamin A supplementation and immunization. However, home case management and "Oral Rehydration Therapy Corners" in health facilities are seen as avenues for improvement.

Few countries could demonstrate a significant change in family preventative or health seeking practices. The lack of technical guidelines on delivering community IMCI, and more significantly,

the lack of an adequate and established cadre of health workers at a community level were barriers to progress in many countries in community-based IMCI. Further challenges to IMCI included difficulties in integrating it within local health systems and training institutions.

These problems can be traced to waning global support for IMCI in recent years. In the 1990s, the introduction of IMCI was initially strongly funded by external donors, with a focus on in-service training for health workers in IMCI case management. Within 10 years, global donor support for IMCI had waned, leaving health departments with a commitment to often complex IMCI programs bolted onto their MCH programs, often incompletely integrated and now inadequately funded. In many countries little effort went into incorporating IMCI training in schools and colleges of nursing, supervision, and follow-up of staff after training. As a result, many countries found it difficult to move beyond the introductory stage of IMCI due to lack of technical guidelines and poor integration with local health systems and training institutions.<sup>38</sup> For IMCI to evolve into a sustainable part of the health culture, program simplification, and more support for incorporation into health training colleges and existing Maternal and Child Health (MCH) systems must occur.

### **Zinc**

Since 2000 there has been compelling evidence from multiple randomised clinical trials that zinc sulphate is effective in reducing the duration and severity of acute and persistent diarrhoea,<sup>39;40</sup>

reducing mortality from severe malnutrition, and reducing morbidity in low birth weight babies.<sup>41;42</sup>

Zinc supplementation is also effective in preventing diarrhoea, and pneumonia in some communities.<sup>43</sup>

However, no country in the Western Pacific Region has successfully introduced zinc. The reasons are multi-factorial: lack of inclusion into therapeutic guidelines or the national essential medicines list; delayed endorsement of zinc as a new therapeutic agent by health departments; lack of policy outlining its use; and difficulties in finding suppliers. The need for modelling by respected senior clinicians was also raised, but is a more downstream issue. Representatives from some countries said that when global agencies, particularly WHO and UNICEF, first promoted zinc they were led to believe that these agencies would supply it, as had been the case in many countries with vitamin A originally.

### **Financial protection**

The approaches to financial protection vary. In Mongolia free services are provided, and the Philippines is aiming for 100% insurance coverage. Cambodia has implemented 'Health Equity Funds': government and non-government organization (NGO) funds managed at a district level that pay the costs of access of the poor to health facilities, including medical fees, transport and food costs. Evaluation has shown this approach to be sustainable and effective.<sup>44</sup> In both Laos and Cambodia, there are conditional cash transfers to mothers. Other examples given included a program in India, called Chirongevi in Gujarat, whereby the Government pays fees for the private sector to provide services for poorest 20% of the population. Women receive vouchers to access private healthcare, which are then redeemed by the hospitals for government payments.

### **Integration / single point of delivery / mass campaigns**

National Health Days (or Week) are an increasing global trend, where immunization, insecticide treated bed-nets, vitamin A supplementation and deworming, plus messages on key behaviours, including breastfeeding and sanitation are given. No countries in the Western Pacific have fully

adopted this practice. Several countries, in conducting successful SIA, have added vitamin A administration during these campaigns.

### **Audit, monitoring and evaluation for improving child survival**

Current data from most countries in the region is derived from population surveys such as the DHS and census. Information of births and deaths is retrospective, and little information is available about cause of death, mostly relying on the mother's recall. Audits of mortality have generally been limited to isolated studies, with few national programs. Half of the countries in Africa and Southeast Asia do not record any causes of death.<sup>45</sup>

In PNG, audits of the aetiology of childhood admissions (2003)<sup>46</sup> and mortality (2002)<sup>47</sup> have been important in prioritising immunization, acute respiratory infection control, measles, and neonatal care. These audits were followed by implementation of SIA (2002), a program for improving oxygen therapy for the management of acute respiratory infections (2004) and instigation of national standards for neonatal care.

Currently in PNG, a program is being nationally implemented that collects cause-specific data on childhood illnesses and frequency of important co-morbidities, including malnutrition, anaemia and HIV. It also enables a more specific understanding of the causes of neonatal deaths across the country and of pneumonia case fatality rates according to disease severity. (Lagani et al, unpublished)

In the Solomon Islands, a system for auditing all child deaths across the country is being implemented. Standardized forms, completed by the nurses/doctors at all health facilities, including clinics and provincial hospitals, are sent to the paediatric committee at the Ministry of Health. Data on cause of death, co-morbidities, and preventable factors (including pre-referral care, referral and health-facility care) will be analysed, summarized in an annual report and fed back to all health facilities around the country.

### **Human resources**

Limited human resources for child health remain a major impediment to progress. The countries in the Western Pacific where child mortality rates have remained high (Cambodia, Lao PDR, PNG and Solomon Islands) have among the lowest health worker numbers per capita in the world. On the other hand, China, Mongolia and Philippines, and increasingly Vietnam have strong institutions of training for midwives, doctors and child health nurses. Mongolia has among the highest health worker densities in the world, with a hierarchical system of primary, secondary and tertiary care, with feldchers, doctors and nurses working at a primary level, and paediatricians and obstetricians at secondary and tertiary levels.

Training, retention, deployment and support of child health nurses and midwives should be among the highest priorities for child survival, for governments, donors and the health and education sectors.

Health training schools are run by many different agencies, often independent of ministries of health. Mechanisms for better communication would assist the implementation and dissemination of national child health policies. The IMCI program for example was largely introduced using in-service training courses for health workers already under the national health departments, rather than being incorporated into schools and colleges of training. This situation continues to hinder IMCI implementation.

Distribution equity and quality of health professionals is also vital. If health departments map the number and distribution of midwives, child health nurses, paediatricians and community health workers in the country this may provide ministries of health with a better understanding of where human resource gaps are. Currently in no country was such information readily available.

### **Improving education for girls**

There is a direct relationship between maternal education and under-5 mortality rates. An example from PNG is demonstrated in Table 6. Lao, Vietnam and Mongolia reported similar findings from the DHS. In PNG, this dramatic impact of maternal education on child survival is partly due to the following factors: vaccine coverage is higher in infants of educated mothers; educated mothers are more likely to deliver a baby in hospital, and have skilled birth attendant (doctor, nurse, midwife); educated mothers are more likely to send their children to school; the duration of breastfeeding is longer among primary school educated mothers than mothers with no education; and educated mothers are more likely to take their infant to a health facility if they have symptoms of ill health than mothers with no education.

### **Inequity**

Despite major reductions in child deaths throughout the Western Pacific Region, inequity still exists, closely related to combinations of poverty, geographical isolation, and in many countries, ethnic minority inequity. In Vietnam, despite very substantial progress in reducing child mortality, people in poor rural mountainous regions and indigenous populations have neonatal and under-5 mortality rates 3 times higher than in major cities.<sup>31</sup> In China, provinces in the west have 3 times higher mortality than those in the east.<sup>32</sup> In PNG highlands mortality is 40% greater than in the low-lands regions, however recent gains in child survival, greater in highlands than other regions, has reduced this inequity.<sup>22</sup>

Several factors have accentuated such in-country inequity in recent times including the move towards decentralization of governance.

In the mid-1980s, Vietnam legalised private health services and user fees for health services were introduced. Health service delivery and outcomes improved for those who could afford the many costs (mostly unregulated) of consultations, medical investigations and drugs. However, with a profit-driven health sector, these reforms have particularly disadvantaged ethnic minorities, who are more likely to be geographically isolated and poor.<sup>48</sup>

Similarly, Cambodia, having emerged from 30 years of conflict and civil wars, embarked on a process of decentralization and economic liberalization. As is Vietnam, this resulted in marked economic growth and reductions in under-5 and neonatal mortality rates. However, in 2005, under-5 mortality rate was almost 3 times greater amidst the poorest-quintile than the richest quintile (127 vs 43 per 1000 live births), and 2.5 times greater amidst the least/non-educated mothers (135.7 vs 53 per 1000 live births). Inequity of health service access was greatest for those services provided at health facilities as compared to those delivered at the community level highlighting that money and distance from health facilities significantly impede access.<sup>49</sup>

In Mongolia, access and availability of health services remains limited particularly for poor, rural and migrating, unregistered communities. Proposed solutions to improve equity included developing

incentives and policies to encourage the private sector to serve poor populations, and the provision of free essential drugs for children under-5 years.<sup>13</sup>

### Child survival strategies from other regions

While much of what is published is specific to the demographics, health priorities and political and economic situation of the respective countries in the Western Pacific Region, many general lessons can be learned from experiences in other countries.

What follows are brief summaries of the published examples of critical evaluation of effectiveness of child survival strategies. The majority of studies assess effect on mortality by examining temporal associations between implementation and changes in child health indicators, retrospectively. Three countries have systematically described improvements in child survival in the last 20 years: Tanzania, Mexico and Chile.

#### *Tanzania*

The under-five mortality rate per 1000 live births (U5MR) in Tanzania reduced from 141.5 in 1990 to 83.2 in 2004.<sup>50</sup> A dramatic 24% improvement from 2000 to 2004 was attributed to IMCI and scaling up of other cost effective interventions. The latter resulted in increased rates of:

- Vitamin A coverage: 14% to 85%,
- Use of insecticide treated bed nets for children: 10% to 29%
- Use of oral rehydration therapy for children: 57% to 70%
- Exclusive breastfeeding for children under two months: 32% to 41%

Reforms and economic growth between 1999 and 2004 saw total government health expenditure rise from US\$4.70 to US\$11.70 per person. During this time, decentralization of governance and the introduction of a grant system providing districts with resources to carry out locally relevant interventions, gave districts more control and autonomy over health budgets and greater access to a central pool of donor funding.

#### *Mexico*

The decline in U5MR from 64 to 23 from 1980 to 2005 places Mexico on track to achieving MDG4.<sup>51;52</sup>

Public health interventions have played a key role, including:

- National Health Weeks; enhancing community based management and prevention of diarrhoea including improved ORS, micronutrient and deworming coverage rates.
- Clean Water Program; introduction of water chlorination, construction of latrines in rural areas, advocating adequate disposal of waste water and banning the use of sewage for crop irrigation.

Maternal and child health initiatives have also improved the under-5 mortality rate with “*Arrangue Pareio en la Vida*” or “An equal start in life” (APV) being introduced in 2001. This included:

- Increased training of midwives,
- Improved folic acid supplementation for women
- Introduction of neonatal screening, including newborn hearing testing

- Development of 50 shelters to provide care prior to and after delivery for women living long distances from health facilities.

Financial support for child health among impoverished Mexicans was pivotal. Introduced in the 1990's, *'Progresa'* was a system where cash transfers were used as incentives for the poorest families to invest in their children's health and education including schooling, provision of nutritional supplements and attendance at clinics. In 2004 health insurance *'Seguro Popular'* expanded, and now provides funding for over 250 interventions, including all care delivered at primary health clinics and district hospitals.

### *Chile*

From 1952 to 2000 the under-5 mortality rate in Chile reduced from 136.2 to 8.9.<sup>53-55</sup>

There are many contributing factors to such a dramatic decline. For example, some public health interventions include improved water and sanitation, immunization programs, and enhancing delivery and access of primary health visits, including free visits. Chile also focused on neonatal mortality with services provided free of charge. These included improved management of acute respiratory infections, enhanced neonatal intensive care services, surgical correction of congenital heart defects, increased EPI coverage and the introduction of the Haemophilus Influenzae type b vaccine. Funding was a key player with increased spending on maternal and child health which incorporated basic education of young mothers.

### **Discussion**

Significant reductions in under-5 and infant mortality have been seen in many countries since 1990, including in all countries in the Western Pacific Region. To varying extents, the seven high-mortality burden countries have incorporated the components of the RCSS into their government sector programs for health. Each country has developed plans for child health that reflect the technical ingredients of the RCSS, but adapted to local needs and priorities. Most countries have a multi-disciplinary review body for child health that meets regularly and is functional, within limits of support. Each country has put in place new surveillance and monitoring activities, or strengthened existing ones, that have further developed countries' capacity to monitor progress in child health. However the RCSS has not involved smaller Pacific Island nations, including Solomon Islands, Kiribati, Fiji, Vanuatu and Samoa. While these countries have a much lower total burden of mortality than the "high priority countries", rates of mortality are still high, and they require support.

The experience of countries both within and outside the Western Pacific region that have successfully reduced child mortality is that the focus on a defined set of effective, low-cost interventions saw marked reductions in mortality from diarrhoea, vaccine preventable diseases, improvements in childhood nutrition, and improvements in survival by as much as 64% over 25 years.<sup>52</sup> Public health activities to improve immunization coverage, micro-nutrient supplementation and de-worming, and community-based interventions to improve use of ORS and antenatal care attendance were important initiatives. Improving access to clean water and sanitation, reducing poverty, and improving coverage of education are crucial. The common national experience was that child health interventions need to be supported by political commitment, eliminating financial barriers to access, improved human resources, quality of service delivery, and ongoing monitoring of progress.

A significant barrier to implementation continues to be equity of access to health services. Sub-populations at most risk from this are the poor, minority groups (including ethnic minorities) and those

geographically isolated. Factors limiting access include the costs of medical consultations, investigations and treatments (particularly in privatized health systems) and distance from health facilities.<sup>48,49</sup>

The lack of social safety nets in many countries where the poor and disadvantaged cannot afford out of pocket payments is a significant gap that needs to be addressed. There are examples where this has been addressed: health insurance coverage (Philippines and Mexico), government and NGO funding for the poor to access health services (Cambodia) and mobilizing the private sector to serve the poor (Gujarat, India). Such programs, in combination with free community-based and outreach programs (eg. free primary health visits in Chile) have the potential to bridge the gaps in access.

Most countries in the Western Pacific Region have undergone decentralization since the early 1990s. Optimally this results in more local autonomy, health service responsiveness to local needs, and community participation, as described in Tanzania. Positive outcomes from decentralization result when there are motivated and educated district managers and senior clinicians and when genuine support and attention to the morale of lower level health staff is provided. However in many areas, decentralization is the biggest structural challenge facing the implementation of national goals and global strategies. In centralized health systems, national government political support and strong national leadership at an administrative, public health or clinical level can result in widespread uniform adoption of national approaches. Decentralization has limited this effect in many countries. For global, regional and national strategies to be widely implemented, both priority setting and technical, and management capacity must exist within districts and provinces. However, unlike staff at a national level, district or provincial staff responsible for program implementation are often far removed from processes that allow sharing of knowledge and building capacity (eg. regional meetings).

In decentralized systems, such as in Philippines and PNG, funding distribution to districts is untied, and district managers are free to set their own priorities and disperse funding as they see fit. Although in theory this should be ultimately regulated by democratic processes, in reality local level political fallout from poor maternal and child health outcomes is rare. This is especially the case in communities where the literacy level of mothers is low, and compounded in strongly patriarchal societies, where empowerment of women to make healthy choices for their children is often constrained. Moreover, provinces / districts are often delegated the task of planning and implementing child health programs, but rely on central funds, which are often insufficient and difficult to obtain. A limitation of funding across all sectors often means that funds are diverted from child and maternal health programs to support other perceived higher priorities. There is evidence that this can be addressed by central and NGO support: pooled government and NGO funding at a district level increased health spending, district autonomy and resulted in more effective implementation of programs in Tanzania.<sup>50</sup>

Mechanisms need to be in place to ensure investment in child and maternal health, even when there is little political impetus to do so at the provincial and district level.

The triad of decentralisation, lack of human resources and low educational levels for women and girls are closely intertwined. District-level technical and management capacity that is needed to enable decisions and action in favour of child health and education is more limited in remote and poorer areas. Political support and accountability for health and education are often less in poorer districts. It is hard to attract health staff to work in remote districts, with lack of appropriate housing and schools for their children are often given as reasons. Few countries have introduced effective incentives for remote or rural service, despite much lip service paid to this issue as a solution. Remote areas are

more likely to rely on less trained health staff, or even volunteers. While this can be a pragmatic and understandable response, it impacts on equity. Children from middle-class families in cities see a properly trained doctor or nurse, while poor children in remote areas are taken to a traditional healer or village volunteer.

The result of this triad is a cycle of low performing districts, poor outcomes, low health worker morale, and limited district-level data to identify these problems. The EPI programs have begun to address this, through the "Reaching Every District" strategy and district micro-planning and such models are relevant to efforts to increase access to other child survival interventions.

Until vital registration is feasible and has equitable coverage in developing countries, health departments will rely largely on DHS, MICS and census data for population-based data. The content of these surveys should be reviewed to include the 10 core indicators. Other proximal determinants of child and maternal survival, particularly literacy and education levels for girls, also available from DHS surveys, should be included among the WHO core indicators. The public release of DHS results should not be delayed beyond that required for careful analysis, and there should be more efforts to communicate results in plain language that is understandable by policy makers, administrators and health workers.

Routinely collected health program and health facility data should be strengthened and used to track progress in other areas. In particular it would be important to know the numbers and distribution of nurses, midwives, child health nurses and doctors by combining training institution records and human resource data. Health facility data should be standardised and improved to monitor case fatality rates for common diseases, as measures of local disease burdens, and health system quality. Audits of mortality can be valuable in guiding policy and clinical teaching for nurses, doctors and other health workers.<sup>46;47;56</sup> Surveillance for vaccine-preventable disease outbreaks and other common disease trends should also be strengthened. Integration of surveillance systems would avoid duplication of effort and confusion.

Today's world context is more complex than 30 years ago, when child survival was first promoted. Unequal economic advancements and HIV epidemics are among many of the more recent issues affecting child survival. And despite calls for integration, increasing vertical funding streams challenge the ability to make creative use of these funding sources to build strong health systems.<sup>57</sup> Prior to the current global economic crisis, there were one billion people living in the least developed countries that have not benefited from the economic growth of the past 20 years.<sup>58</sup> Child health, more than ever, is hampered by the adverse effects of globalisation, urbanisation, overpopulation, global warming and other unfavourable environmental conditions.<sup>59</sup> In this context, much more support is needed if the progress that has occurred since 1990 is to be maintained in the poorest countries.

Textbox 2 is a summary of the lessons learned so far from implementing the RCSS in select countries in the Region. Listed are health system and non-health sector factors that need to be addressed in order to achieve equity in coverage of interventions, and survival gains.

There are several limitations to the literature on child survival. Publication bias means that only countries that can demonstrate positive results publish these experiences, and it is often difficult to identify and explore the challenges and factors leading to less successful implementation. Published experiences tend to represent those countries in which detailed current and historical data exist, but this is not the case in many lower-income countries. We have attempted to minimize this bias by

reporting on the results of regional meetings, in which positive and negative results are presented and discussed. There continues to be a scarcity of literature on the process and effectiveness of implementation of national programs for child health, particularly in the Western Pacific Region. With the call of the RCSS to improve the collection and use of local data, there needs to be increased support for such research, especially where it relies on routinely collected data.

### Textbox 2

#### **What is required to further implement the RCSS and lower child mortality in the Western Pacific Region?**

##### *Access and equity*

- Free maternal care - including hospital delivery - and free health care for children, as seen in Mongolia, or programs to improve access for the poor (eg. dedicated government funds, incentives for services by the private sector)
- A “pro-poor” approach; a focus on areas where services are poorest, barriers to access (geographical, social or cultural) exist and child mortality rates highest.
- Increased education for girls. Literacy rates for women should be an indicator of non-health sector commitment to child health and survival.

##### *Health system structuring*

- Increasing financial and technical support to provincial/district program managers implementing child health programs. Some of the requirements include pooled government and donor funds that are easily accessible by provinces and districts, paediatricians providing technical advice to district and provincial health officials on child health policy and practice, and supporting local collection and use of child health data.

##### *Child health interventions*

- Appropriate systems for management of pneumonia, diarrhoea and neonatal problems at a community level.
- A focus on quality neonatal services at all levels, from community essential newborn and post-natal care to primary, referral and tertiary level care.
- Improvements in quality of referral level (district and provincial) hospital care for children through the implementation of the WHO *Pocketbook of Hospital Care for Children*, improving essential medicines for children, appropriate technology, particularly oxygen concentrators and pulse oximeters, staff training and clinical audit.
- Consideration of the role of National Health Weeks, where immunization, distribution of Insecticide Treated Nets, vitamin A supplementation and de-worming, plus health education messages are given, ideally in low performing districts to support a pro-poor approach.

##### *Nutrition and breast feeding*

- Improvements in early and exclusive breastfeeding, by multifaceted approaches, such as has been successful in Cambodia
- Strengthening of the adoption and regulation of the *International Code of Marketing of Breast Milk substitutes* in each country.
- Increasing the involvement of the agricultural and food manufacturing sectors in addressing food security and quality food production.

### *Human resources and training*

- Increased human resources for maternal and child health. This requires much increased donor and government support for local institutions of training, including schools of nursing, midwifery, paediatric and child health nursing, community health workers, nutritionists, paediatricians and obstetricians. Increased output, especially for well trained nurses and community health workers is vital, as is workforce planning to ensure more health workers are available at a district level
- Development of a national training framework. It would help integrate the health and education sectors, NGOs, churches, international agencies. This would also promote standardization of curricula for all cadres of health workers, and alignment with government policy and clinical guidelines. It would avoid agencies insisting on using their own training programs.
- Introduce incentives for health workers to work in rural and remote areas, where health worker density is lowest.
- Improve training programs for nutritionists and establish a minimal standard of nutritionists per population.

### *Monitoring and evaluation*

- Improvements in quality and use of maternal and child health data.
- Improve routine data sources to derive disease- and age-specific case fatality-rate data, and better communicate the results of DHS and other population-based surveys in plain language.
- Map the number and distribution of midwives, child health nurses, paediatricians and community health workers in the country, to identify gaps and inequities.

### *Scope*

- Actively involve smaller island nations, including Solomon Islands, Kiribati, Fiji, Vanuatu, Samoa and Timor Leste with the RCSS.

### **Conclusions**

The Regional Child Survival Strategy has been an important initiative for countries in the Western Pacific Region. It has raised the profile of persistently high child mortality, put a focus on countries with large numbers of child deaths, and provided them with a framework for strengthening programs for child health and survival. However the strategy and processes that have arisen from the RCSS are fragile. Without ongoing support and funding there is a risk that these will be discarded as yet another global strategy that failed to sustain political interest for sufficient time to have a measurable outcome. The experience in these countries demonstrates that the RCSS best helps countries when it is considered as a framework for strengthening their existing child health services. Until now, smaller Pacific island nations have not had the benefit of involvement in the RCSS, and this needs to be urgently addressed.

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## Annexes

**Table 1. Search strategy for OVID-Medline and Embase**

((\*morbidity/ or \*incidence/ or \*prevalence/ or (\*health planning/ or \*health care rationing/ or \*health plan implementation/ or \*health planning guidelines/ or \*health priorities/ or \*health resources/ or exp \*health services research/) or (\*health planning/ or \*regional health planning/ or \*community health planning/ or exp \*health facility planning/ or \*health systems plans/) or exp \*Health Policy/ or \*Primary Health Care/ or (\*immunization/ or exp \*immunization, passive/ or \*immunization schedule/ or \*immunization, secondary/ or \*mass immunization/) or \*Cause of Death"/ or exp \*Malaria/pc, mo, ep or exp \*Diarrhea/pc, ep, mo or exp \*Respiratory Tract Infections/pc, ep, mo or \*Tuberculosis/pc, ep, mo or exp \*hiv/ or \*Referral and Consultation"/) and (\*international cooperation/ or \*developing countries/ or (\*melanesia/ or \*fiji/ or \*papua new guinea/) or (\*cambodia/ or \*east timor/ or \*indonesia/ or \*laos/ or \*philippines/ or \*vietnam/ or \*mongolia/)) OR (\*Child Welfare/ or (\*child mortality/ or \*hospital mortality/ or \*infant mortality/ or \*maternal mortality/ or \*perinatal mortality/) or (exp \*child nutritional physiology phenomena/ or exp \*maternal nutritional physiological phenomena/) or \*Maternal Welfare/ or (\*community health services/ or exp \*child health services/ or \*community health nursing/ or \*family planning services/ or exp \*home care services/ or exp \*maternal health services/ or exp \*preventive health services/) or (\*ambulatory care/ or \*perinatal care/ or \*postnatal care/ or \*prenatal care/) or (\*adolescent health services/ or exp \*child care/) or (\*imci/) or (\*child health/ and \*determinant\$/) or (\*Mothers/ and exp \*Educational Status/) or (\*minority groups/ or exp \*social class/ or exp \*social environment/ or exp \*social isolation/) or (exp \*Breastfeeding/ and exp \*Program Development/) or \*Poverty/ or \*Health Services Accessibility/))

AND

(\*Asia, Central/ or exp Asia/ or Asia, Western/ or exp Asia, Southeastern/ or \*melanesia/ or \*fiji/ or \*papua new guinea/) or \*laos/ or \*vietnam or Solomon Islands/))

OR

(Child survival AND National)



**Table 2. MeSH terms and key words**

<b>Topic</b>	<b>MeSH terms and Keywords</b>
<b>Child survival</b>	Child survival (keyword) National (keyword)
<b>Health indicators</b>	Morbidity Incidence Prevalence Causes of death Child mortality Hospital mortality Infant mortality Maternal mortality Perinatal mortality/
<b>Health policy and planning</b>	Health planning Regional health planning Community health planning Health facility planning Health systems plans Health policy Health care rationing Health plan implementation Health planning guidelines Health priorities Health resources Health services research Program Development
<b>Primary healthcare</b>	Primary healthcare
<b>EPI</b>	Immunization Immunization, passive Immunization schedule Immunization secondary Mass immunization
<b>Major childhood diseases and interventions</b>	Malaria Diarrhea Respiratory Tract Infections Tuberculosis HIV Breastfeeding IMCI

<b>Asia Pacific</b>	Asia Asia, Central Asia, Western Asia, Southeastern Pacific islands Melanesia Fiji Papua New Guinea Cambodia East timor Indonesia Laos Philippines Vietnam Mongolia International cooperation Developing countries Solomon Islands
<b>Health services</b>	Community health services Child health services Community health nursing Family planning services Home care services Maternal health services Preventive health services Ambulatory care Perinatal care Postnatal care Prenatal care Adolescent health services Child care Health Services Accessibility
<b>Wider determinants of child health</b>	Child Welfare Child nutritional physiology phenomena Maternal nutritional physiological phenomena Maternal Welfare Child health and determinants Mothers Educational Status Minority groups Social class Social environment Social isolation Poverty
<b>Child health strategies/plans</b>	Regional child survival strategy Survival strategy Child Health strategy Child health plan

**Table 3. Inclusion and exclusion criteria**

**Inclusion criteria**

Published literature was included if it addressed:

- Examples of national strategies for child survival, their content, implementation and evaluation from any developing country
- Aspects of planning, implementation or evaluation related to the RCSS
- Details of the child health system in high priority countries in the Western Pacific Region
- Aspects of the state of child health or outline widely implemented program areas for child health in the high priority countries in the Western Pacific Region
- The wider determinants of health, including poverty, maternal education and sanitation / hygiene, environmental health in the high priority countries in the Western Pacific Region
- Models of implementation of child health interventions, including community neonatal care or home-based case-management in the high priority countries in the Western Pacific Region
- Major global reviews relevant to child survival

**Exclusion criteria**

The following published literature was excluded:

- Articles specific to other countries *AND* the findings had no direct relevance to countries or the Asia Pacific Region
- Primary research or reviews that deal with the *efficacy* of health interventions but provide no data on their implementation or impact on global child survival or child survival in the high-priority countries or the Asia Pacific Region
- Global reviews or estimates of health indicators before the year 1990
- Studies from the developed regions
- Letters, news pieces and comments



**Table 4. Ovid-Medline and Embase Results**

		Pubmed	Embase
1	(((*morbidity/ or *incidence/ or *prevalence/ or (*health planning/ or *health care rationing/ or *health plan implementation/ or *health planning guidelines/ or *health priorities/ or *health resources/ or exp *health services research/) or (*health planning/ or *regional health planning/ or *community health planning/ or exp *health facility planning/ or *health systems plans/) or exp *Health Policy/ or *Primary Health Care/ or (*immunization/ or exp *immunization, passive/ or *immunization schedule/ or *immunization, secondary/ or *mass immunization/) or *"Cause of Death"/ or exp *Malaria/pc, mo, ep or exp *Diarrhea/pc, ep, mo or exp *Respiratory Tract Infections/pc, ep, mo or *Tuberculosis/pc, ep, mo or exp *hiv/ or *"Referral and Consultation"/) and (*international cooperation/ or *developing countries/ or (*melanesia/ or *fiji/ or *papua new guinea/) or (*cambodia/ or *east timor/ or *indonesia/ or *laos/ or *philippines/ or *vietnam/ or *mongolia/)) or (*Child Welfare/ or (*child mortality/ or *hospital mortality/ or *infant mortality/ or *maternal mortality/ or *perinatal mortality/) or (exp *child nutritional physiology phenomena/ or exp *maternal nutritional physiological phenomena/) or *Maternal Welfare/ or (*community health services/ or exp *child health services/ or *community health nursing/ or *family planning services/ or exp *home care services/ or exp *maternal health services/ or exp *preventive health services/) or (*ambulatory care/ or *perinatal care/ or *postnatal care/ or *prenatal care/) or (*adolescent health services/ or exp *child care/) or *imci/ or (*child health/ and *determinant\$/) or (*Mothers/ and exp *Educational Status/) or (*minority groups/ or exp *social class/ or exp *social environment/ or exp *social isolation/) or (exp *Breastfeeding/ and exp *Program Development/) or *Poverty/ or *Health Services Accessibility/)	380037	378813
2	1 AND (Asia OR Melanesia)	4284	866
3	1 AND Vietnam	629	266
4	1 AND Papua New Guinea	243	109
5	1 AND Laos	119	33
6	1 AND 'Solomon Islands'	15	22
7	(child survival) AND (national OR developing countries)	549	126

Table 5. Core indicators for child survival

Indicators	Generally available sources of the data	Problems with these data if derived from other sources
Proportion of births assisted by skilled personnel	DHS, MICS, census	NHIS data inappropriate because deliveries outside health facilities will not be included
Proportion of infants less than 12 months of age with breastfeeding initiated within one hour of birth	National nutrition surveys, DHS, however recall likely to be poor	NHIS give no indication of practices of breastfeeding for babies born at home Data difficult to record in a health facility where midwives are busy with many tasks
Proportion of infants less than 6 months of age exclusively breastfed	DHS, National nutrition surveys	
Proportion of infants 6-9 months of age receiving breast milk and complementary food	DHS, National nutrition surveys	Statistic, even from well conducted population-based studies does not capture inappropriately early complementary feeding, or quality of complementary feeding
Proportion of children 6-59 months old who have received vitamin A in the past 6 months	DHS National nutrition surveys EPI program data	If EPI data is used, may not take account of multiple doses of vitamin A given to the one child, so may overestimate coverage
Proportion of one-year-old children immunized against measles	DHS EPI program data	Often problems with the denominator in EPI program data
Proportion of one-year-old children protected against neonatal tetanus through immunization of their mothers	DHS EPI program data	Often problems with the denominator in EPI
Proportion of children 0-59 months of age who had diarrhoea in the past 2 weeks and were treated with ORT	DHS	Trends between DHS may not be accurate if there have been recent outbreaks of viral infection
Proportion of children 0-59 months of age who had suspected pneumonia in the past 2 weeks and were taken to an appropriate health care provider	DHS	Trends between DHS may not be accurate if there have been recent outbreaks of viral infection
Proportion of children 0-59 months of age who slept under an insecticide-treated net the previous night	DHS, malaria program surveys	

**Table 6. Female education and mortality in children under 5 years old in PNG**<sup>.22</sup>

<b>Educational standard</b>	<b>Under-5 deaths / 1000 live births</b>
No education	95
Grade 1-5	79
Grade 6	63
Grade 7+	45

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