Immunisation and Nutrition: an integrated approach for saving lives

Despite a dramatic decline in child mortality over the past two decades, approximately seven million children die every year, mainly from preventable causes.[i] Globally, infectious diseases and malnutrition are the leading causes of these deaths.[ii] However, using existing proven interventions and platforms, such as immunisation and the related national delivery system, in a more integrated manner, will enable us to curb the heavy toll of unnecessary suffering and preventable child deaths.

Breaking the cycle

Children who are malnourished are nine times more likely to die from infectious diseases such as pneumonia, diarrhoea, malaria and measles.[iii] A child coping with such diseases will find it difficult to retain essential nutrients, thus putting that child at risk of falling into a dangerous state of malnutrition. For example, repeated bouts of diarrhoea can disrupt the intestinal absorptive and barrier functions of the gut – the cause of up to 43% of stunted growth affecting one-fifth of children worldwide and one third of children in developing countries.[iv]

> *"Children who are poor, hungry and living in remote areas are most likely to be visited by "forgotten killers" pneumonia and diarrhoea."*
>
> *The integrated Global Action Plan for Pneumonia and Diarrhoea 2013*

Figure 1: Undernourished children are at a higher risk of dying due to pneumonia or diarrhoea [v]

Odds ratio of dying due to pneumonia and diarrhoea among undernourished children relative to well nourished children

	Level of undernutrition[a]			
	Severe	Moderate	Mild	None
Underweight[b]				
Diarrhoea	**9.5**	3.4	2.1	1.0
Pneumonia	6.4	1.3	1.2	1.0
Stunting[c]				
Diarrhoea	4.6	1.6	1.2	1.0
Pneumonia	3.2	1.3	1.0	1.0
Wasting[d]				
Diarrhoea	6.3	2.9	1.2	1.0
Pneumonia	8.7	4.2	1.6	1.0

A child who is severely underweight is 9.5 times more likely to die of diarrhoea than a child who is not underweight.

Note: Values are based on data for Bangladesh, Ghana, Guinea-Bissau, India, Nepal, Pakistan, the Philippines and Senegal.
a Severe refers to a level of undernutrition more than three standard deviations below the median WHO Child Growth Standard, moderate refers to a level of undernutirition two to three standard deviations below the median standard and mild refers to a level of undernutrition that is one to two standard deviations below the median standard.
b Measured as weight-for-age.
c Measured as height-for-age.
d Measured as weight-for-height.
Source: Black and others 2008.

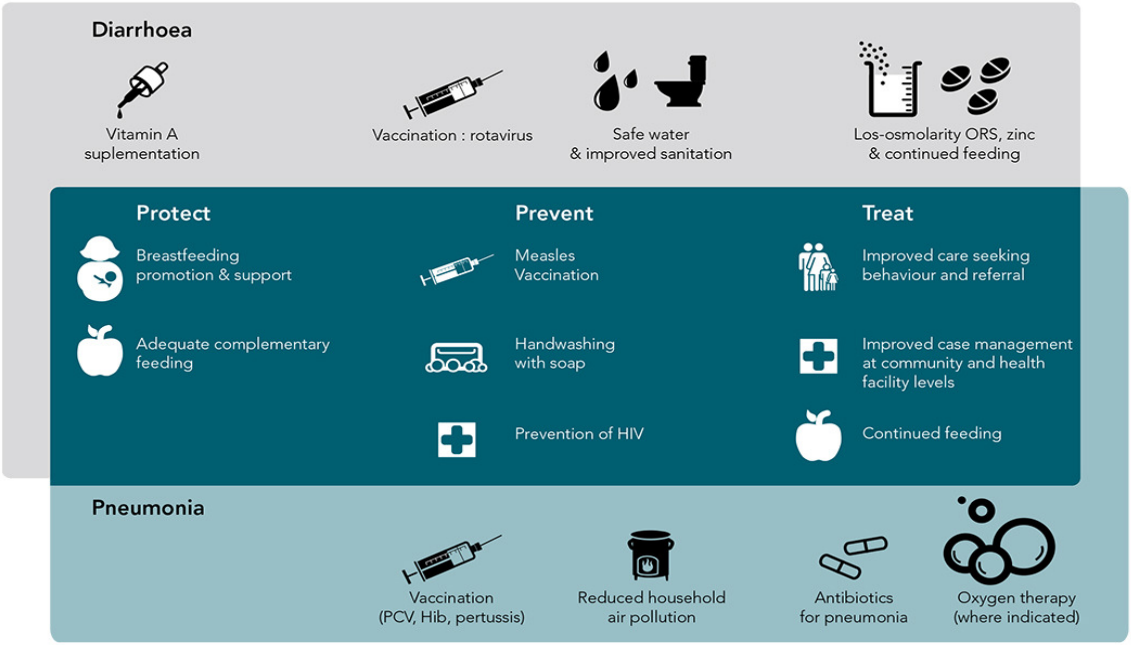
Under-nutrition is also a consequence of repeated bouts of illness. Recent findings in Brazil, for instance, demonstrate a bi-directional relationship between nutritional status and the duration of diarrhoeal illness, where a loss of zinc through diarrhoea can leave a child prone to further infection, prolonging the diarrhoea and further reducing nutritional intake.[vi]

An integrated response

Child malnutrition is widespread and is limiting the future success of millions of children and their countries.[vii] The global fight against malnutrition needs to be complemented with a fight against infectious diseases. We know, for example, that vitamin A is essential for a healthy, functioning immune system and that children aged under two years are less likely to die from measles when given vitamin A supplements.[viii]

Together with critical nutrition interventions such as promoting optimal breastfeeding practices, encouraging micronutrient supplementation (such as zinc and vitamin A) and better access to safe water and sanitation services, improving access to vaccines against infectious diseases such as pneumonia, diarrhoea, and measles will significantly advance child survival and development.[ix]

Figure 2: Vaccines – a core component of integrated approach to pneumonia and diarrhoea[x]



There is also evidence to show that vaccines can help prevent some of the chronic consequences of undernourishment. A study, published in 2012, suggests that children in India with up-to-date vaccines against tuberculosis, diphtheria, tetanus, pertussis, measles and polio were less likely to show signs of stunting.[xi] Similarly, vaccinating pregnant women against influenza has been found to reduce fetal growth retardation.[xii] Another paper, examining the relationship between diarrhoea and stunting, suggests that we should consider water, sanitation, micronutrients and vaccines as preventing not just diarrhoea, but also malnutrition and its developmental consequences.[xiii]

The extent to which malnutrition affects vaccine efficacy is less clear, but thus far the evidence suggests that in most cases there is surprisingly little or no effect on the response or efficacy of vaccines.[xiv] However for some oral vaccines, such as rotavirus, malnutrition has been implicated in the lower efficacy of the vaccine in low-income countries.[xv]

Immunisation as a platform

Immunisation is an integral part of a primary healthcare platform reaching children multiple times in their first years of life, thus providing the opportunity to reach children with other critical health interventions. For populations living in rural areas, immunisation services are often the first point of contact with the national health system.

> *"Immunisation service delivery should continue to serve as a platform for providing other priority public health interventions."*
>
> *Global Vaccine Action Plan 2011-2020*

Routine immunisation programmes are one of the most successful public health services, reaching over 83% of the world's children.[xvi] Other health concerns such as malnutrition often lack effective or established delivery mechanisms.[xvii]

By integrating essential services, including efforts to address malnutrition and vitamin deficiencies, with national immunisation delivery systems, more mothers and children will receive comprehensive healthcare.[xviii] In Tanzania, Zambia, Madagascar and Zimbabwe, for example, growth monitoring, supplementary feeding, health education, vitamin supplementation and immunisation were all provided together. As a result nutritional status improved in the children involved and other health gains were achieved. [xix]

However the successful integration of services is dependent on a well-functioning health system, including adequate planning, availability of trained health workers and a functioning supply chain. With proper preparation, integration can improve coverage, combine costs and create synergies.[xx]

The GAVI Alliance

The GAVI Alliance was established in 2000 with a mission to contribute to saving children lives and protecting people's health by increasing access to immunisation in poor countries. Since its inception, GAVI and its Alliance members have already helped to immunise an additional 370 million children and prevent approximately 6 million early deaths.

In partnership with implementing countries, GAVI is supporting the introduction of new vaccines against pneumonia and diarrhoea, key contributions to the prevention of malnutrition. These vaccines are being rapidly introduced into routine immunisation programmes.

> *"A child who is borderline nourished will tip into malnutrition if he or she contracts an infectious disease such as measles. As part of an integrated health approach, immunisation plays a critical role in curbing the devastating impact of malnutrition."*
>
> *Dr Seth Berkley, GAVI Alliance*

GAVI also supports health system strengthening to enable implementing countries to strengthen the

capacity of integrated health systems to deliver immunisation and to tackle institutional barriers to advancing child health. A strong health system is a central component to a sustainable response to malnutrition.

A window of opportunity

In order to deliver on the promise of Millennium Development Goal 4 and dramatically reduce child mortality by 2015 we must ensure that every child has access to life-changing vaccines that not only provide protection against the leading causes of death in children under five, but also contribute to decreasing vulnerability to malnutrition.

Looking forward, GAVI is proposing that ”the fully immunised child” be one of the indicators in the post 2015 development agenda.[xxi] As we shape the next chapter in international development, harnessing synergies and ensuring an integrated approach to health will be critical if we are to ensure that every child is given the best possible start in life.

This information note will be updated as new evidence becomes available. Feedback and advice are welcome and can be sent to GAVIadvocacypublicpolicy@gavialliance.org

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