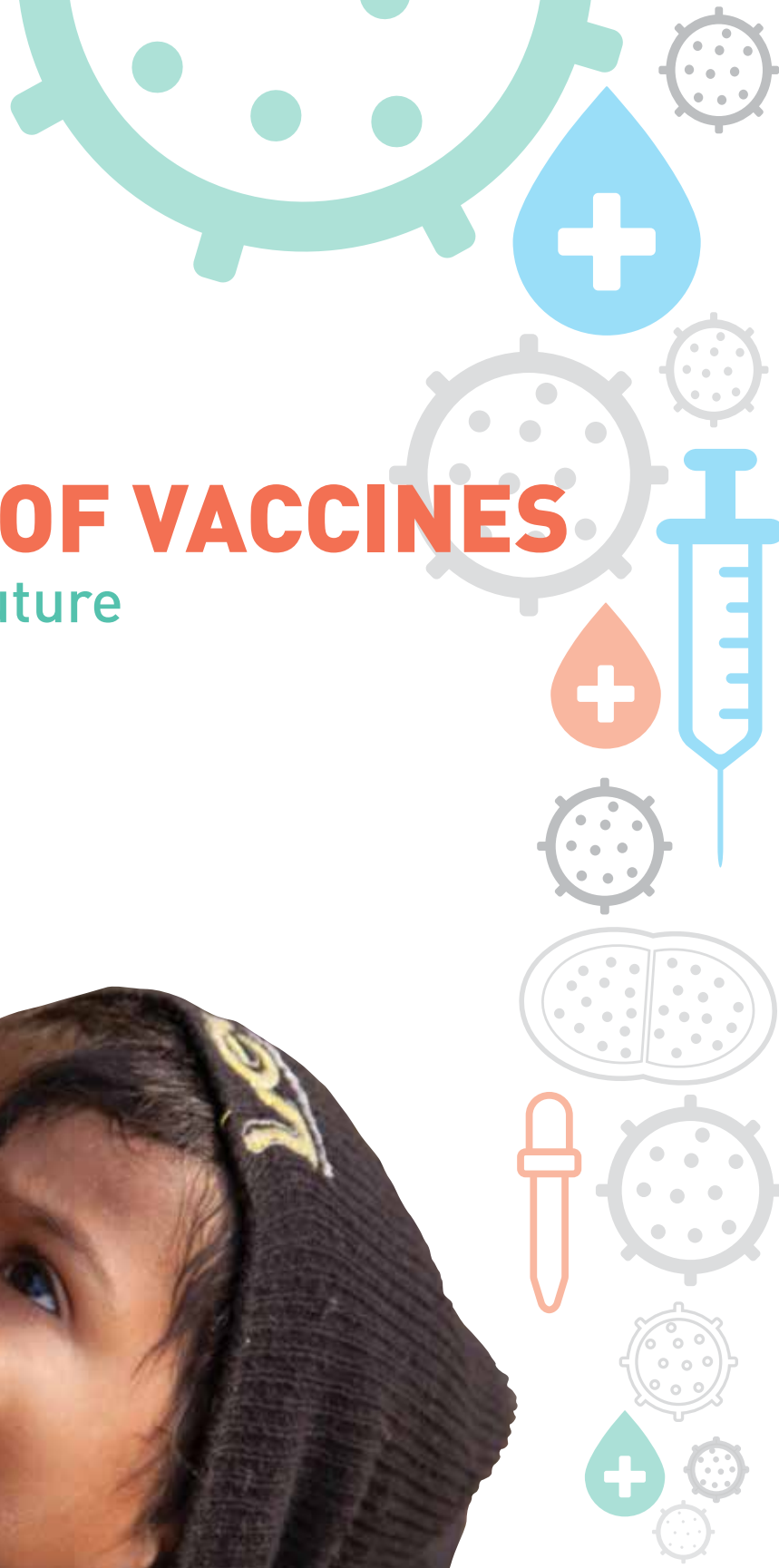


THE POWER OF VACCINES

Protecting India's Future



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Developed and published by

Immunization Technical Support Unit (ITSU)

About ITSU

ITSU was established by the Public Health Foundation of India (PHFI) in March 2012, under the auspices of the Ministry of Health and Family Welfare (MoHFW) to support the Universal Immunisation Programme (UIP). The overall vision of ITSU is to catalyse national improvements in routine immunisation by providing the technical and management expertise required to design, create, implement, and institutionalise a stronger immunisation programme fully led by the Immunisation division of MoHFW, Government of India, and supported by Bill & Melinda Gates Foundation. ITSU works through six different pillars to accomplish this, including monitoring and evaluation (M&E); vaccine logistics and cold chain management; strategic communication; AEFI management and vaccine quality and safety; strategic planning and system design; and evidence to policy.

ITSU serves to harmonise various initiatives being piloted or implemented in different states by all immunisation partners and provide a single platform for discussions, development of strategies, and coordination with partners for scaling up successful models.

THE POWER OF VACCINES

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1 EXECUTIVE SUMMARY

The unique role of vaccines

Vaccines have played a pivotal role in improving child health and survival in India and around the world. They are considered one of the most cost-effective solutions in the history of health and development. Vaccines are unique in that they help people stay healthy by preventing infection at the very outset, in turn avoiding recurring sickness, death and unnecessary social and economic costs to society. Immunisation not only helps protect health and provide medical savings, but also yields indirect economic benefits, including improvements in cognitive development, educational attainment and labour productivity. Many vaccines also provide “herd immunity,” offering protection even to unimmunised individuals.

Vaccines work in India

India has made significant progress towards reducing child deaths as it aims to achieve multiple child health targets. The country’s child mortality rates have declined by over 58% since 1990.^[1] This has been possible due to the many steps taken by the Government of India (GoI) to accelerate child survival in the country, including strengthening the country’s routine immunisation (RI) programme.

Vaccines have successfully eliminated smallpox and polio from India; brought measles to an all-time low; and reduced tetanus by an estimated 95% over the past three decades, with at least 18 states since 2003 validated as having eliminated maternal and neonatal tetanus as of December 2013.^[2, 3] Over the years, India has also seen progress expanding immunisation coverage, with

nationwide coverage of the third dose of the diphtheria-tetanus-pertussis (DTP) vaccine increasing to an estimated 72% in 2012 from 60% in 2000.^[3]

Several states have shown marked improvement in recent years. Bihar, for example, has increased DTP3 coverage from 54% in 2007-2008 (per District Level Health Survey-3) to over 80% in 2012-2013 (per Annual Health Survey).

Childhood diseases in India

Despite making important progress in reducing the burden of vaccine preventable diseases and achieving overall reductions in child mortality, serious challenges remain. An estimated 1.3 million Indian children under five continue to die each year, with more child deaths in India than in any other country in the world. India alone accounts for roughly one-fifth of the world’s total under-five deaths.^[1, 4]

Diarrhoea and pneumonia – the leading causes of death and suffering in children under five

Diarrhoea and pneumonia together account for the largest share (23%) of total under-five deaths in India. In 2013, diarrhoea claimed the lives of more than 130,000 Indian children under five. In the same year, pneumonia caused nearly 175,000 deaths of Indian children under five.^[1, 4] Even in cases of survival, the severe burden of illness that diarrhoea and pneumonia cause could adversely impact child growth and development. These diseases also place a significant economic burden on families, communities and the healthcare system.



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Vaccines – necessary part of an integrated strategy to address diarrhoea and pneumonia

World Health Organization (WHO) and United Nations Children’s Fund (UNICEF) recommend an integrated approach to protect against, prevent and treat childhood diarrhoea and pneumonia in the “Integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea” (GAPPD). They recommend the adoption of a comprehensive approach that includes vaccines as one of the most critical tools to prevent child deaths and suffering.

Vaccines protect against the leading causes of diarrhoea and pneumonia

The leading cause of moderate-to-severe diarrhoea – rotavirus – and the two leading causes of bacterial pneumonia – *Haemophilus influenzae* type b (Hib) and *Streptococcus pneumoniae* (pneumococcus) – are all vaccine preventable in children. Vaccines that protect against these causes are widely used around the world and have proven to be very effective in preventing and reducing cases of diarrhoea and pneumonia. As of January 2015 the Hib vaccine has been introduced into India’s Universal Immunisation Programme (UIP) in 15 states and union territories in the form of the pentavalent (DTP-HepB-Hib) vaccine, with plans for a nation wide scale-up. India has also developed and licensed its first indigenous rotavirus vaccine, manufactured by Bharat Biotech in collaboration with the Department of Biotechnology (DBT) and All India Institute of Medical Sciences (AIIMS).

Recommended by national and international experts

The aforementioned diarrhoea and pneumonia vaccines are:

- Recommended by the WHO for use in national immunisation programmes worldwide.
- Recommended by the Indian Academy of Pediatrics (IAP) for all Indian children.
- Listed as a necessary component of WHO and UNICEF’s GAPPD.
- Key elements of the WHO Global Vaccine Action Plan, which is endorsed by 194 member states, including India.

Equal access for all

Delivering vaccines to children safely and effectively requires a strong immunisation system. In India, the Pulse Polio Program, as well as the Japanese encephalitis and measles catch-up campaigns, have amply demonstrated the capacity of a well-developed immunisation system to deliver oral and injectable vaccines to millions of children safely and effectively. Several children across India rely solely on the national public health system to access childhood vaccines. Given that pneumonia and diarrhoea are the leading causes of death for children under-five, vaccines that protect against these diseases must be included in India’s routine immunisation program.

Equitable access to these life-saving vaccines is an essential step in India’s effort to successfully accelerate progress towards achieving national and international child health and development targets.

More children die each year in India than in any other country

2 CHILDHOOD DEATHS AND DISEASE IN INDIA

In 2013, there were an estimated 1.3 million deaths among Indian children under-five. Many of these deaths were from largely preventable causes.^[4, 1] While the country has made significant progress in reducing child deaths, current efforts, especially for pneumonia and diarrhoea, must be enhanced and accelerated to achieve national and global goals.

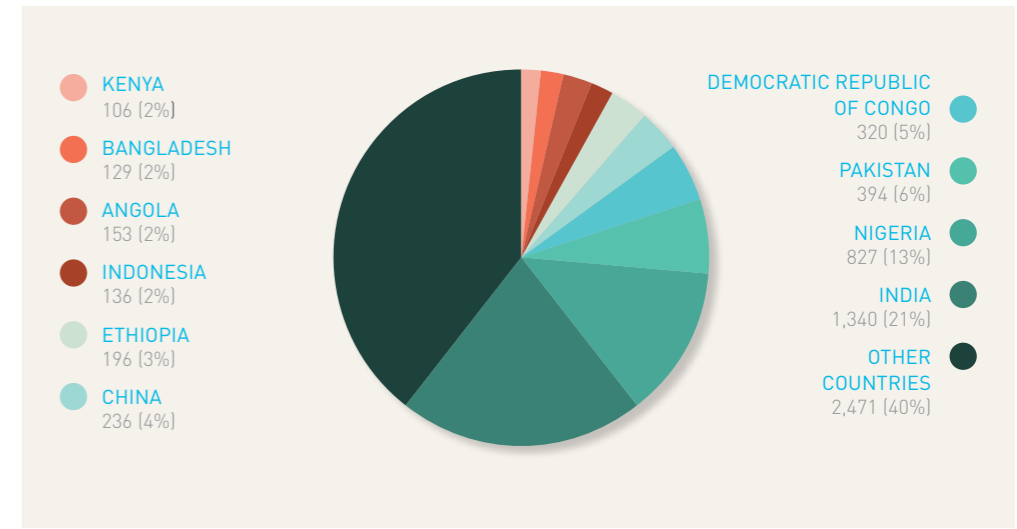
In the years to come, India will also need to continue its efforts towards reducing child deaths in line with the Post-2015 Development Agenda.^[5]

INDIA'S SHARE OF GLOBAL CHILD MORTALITY

The incidence of global deaths among children under-five has reduced by more than half, from an estimated 12.6 million deaths in 1990 to 6.3 million deaths in 2013.^[1]

However, more than 17,000 children continue to die globally each day. India witnesses more child deaths each year than any other country, accounting for 21% of global deaths among children under five.^[1]

FIGURE 1
India's Share of Global Child Mortality 2013 (figures in thousands)



Reference: Committing to Child survival - a Promise renewed. Progress report 2014. UNICEF, 2014.

After the first month of life, vaccine preventable diseases are the biggest threats to children

LEADING CAUSES OF UNDER-FIVE CHILD DEATHS

Pneumonia, diarrhoea, and newborn complications account for the majority of under-five deaths in India. Figure 2 illustrates the leading causes of deaths in children under-five, while also highlighting the diseases for which vaccines are available.*

- **Newborns (0-27 days):** More than half the total under-five deaths in India occur in the first 27 days of life, or the neonatal period.^[4] These deaths are primarily due to prematurity and low birth weight, birth trauma, asphyxia, and infections.^[1] While some newborn deaths can be prevented by vaccines, such as the maternal tetanus vaccine, many require prevention through dedicated antenatal and newborn care.^[1]
- **1-59 months:** After the first month of life, vaccine-preventable diseases are the biggest threats to child survival.^[4, 6] Diarrhoea and pneumonia are the two leading causes of death among children in this age group.^[4]

The GoI has taken many steps to reduce these preventable child deaths, some of which have been carried out under the National Rural Health Mission (NRHM), established in 2005 to improve access to and affordability of quality health care for all rural populations. The NRHM's Rashtriya Bal Swasthya Karyakram

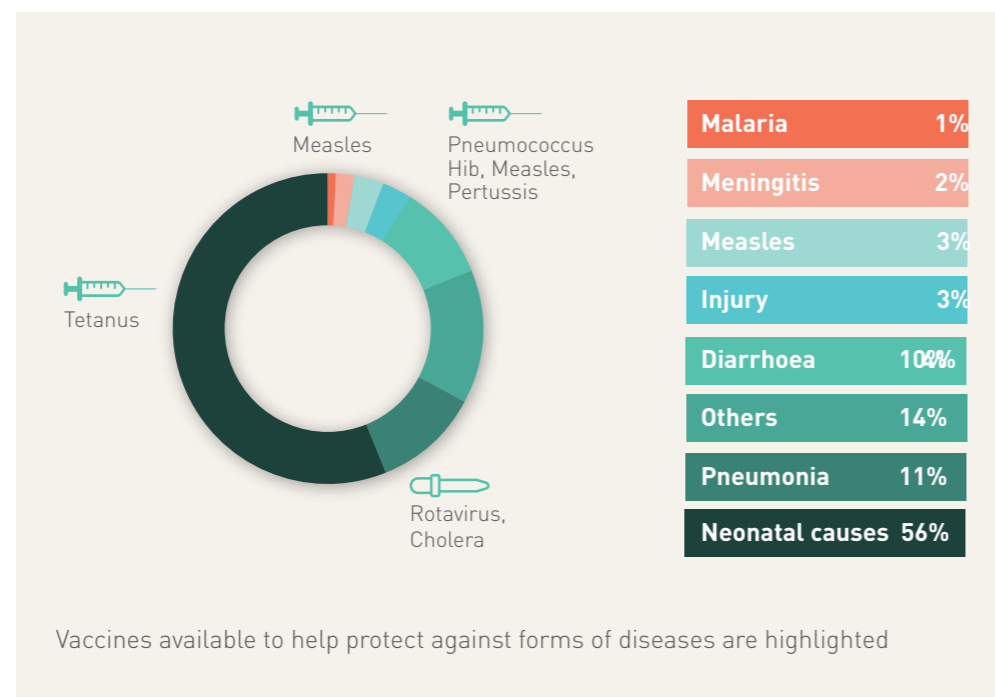
(RBSK) or National Child Health Programme is one such initiative that was launched to provide services for the screening of childhood diseases. Similarly, schemes like the Janani-Shishu Suraksha Karyakram (JSSK) have been introduced to provide financial and medical assistance to childbearing mothers and newborns on a national scale. More recently, under the National Health Mission (NHM), the GoI has initiated the National Urban Health Mission (NUHM) to meet the healthcare needs of those living in urban centres. These comprehensive and far-reaching schemes are part of the GoI's "cohesive approach" to reproductive, maternal, newborn, child, and adolescent health (RMNCH+A), which seek to address major causes of sickness and death among women and children, as well as the problems they face in accessing and utilising healthcare services.^[7]

Despite these efforts, under-five deaths from several preventable causes remain high. This is, in large part, due to the high incidence of illness caused by diarrhoea and pneumonia, which resulted in more than 300,000 deaths in 2013.^[11] Even when not fatal, the severe burden of illness that diarrhoea and pneumonia cause can adversely impact a child's growth and development, while also economically burdening families, communities, the government, and the healthcare system.

*Not all vaccines are available in India's national immunisation programme.

FIGURE 2

Causes of Under-Five Child Deaths in India, 2013



Reference: Committing to Child survival - a Promise renewed. Progress report 2014. UNICEF, 2014.

3 VALUE OF PREVENTION

Vaccines are considered to be one of the most effective interventions among the many public health efforts and development initiatives that have contributed to the laudable reduction in global child deaths.

Vaccines prevent deaths and put a halt to the vicious cycle of recurring illness, hospitalisations, and unnecessary social and economic costs to families and society. Today, more than 30 common infectious diseases are preventable with vaccines.^[8]

VACCINES: A PUBLIC HEALTH 'BEST BUY'

Vaccines are also considered to be one of the most cost-effective solutions in the history of health and development.^[9] In 2012, some of the world's leading health economists ranked childhood immunisation among the top three most cost-effective solutions to advance human welfare.^[10] Vaccines prevent illness and death, while also offering long-term benefits for economic growth and national development.^[11]

MORE THAN JUST SAVING LIVES

Vaccines don't just save lives. They also prevent illness, hospitalisation, disability, and unnecessary human suffering. They also provide indirect benefits to individuals and society, including improvements in cognitive development, educational attainment, and labour productivity.

"HERD IMMUNITY" AND OTHER INDIRECT EFFECTS

Many vaccines protect more than only those who have been immunised. They also protect unimmunised individuals by reducing disease transmission between people – a phenomenon known as "herd immunity" or "indirect protection."^[8, 12] This type of protection helps safeguard communities, including the most vulnerable members of society, such as persons whose immunity has been compromised, the elderly, or infants who are too young to receive immunisations. For example, immunising children with pneumococcal conjugate vaccines is known to significantly reduce the number of elderly patients hospitalised for pneumonia.^[13]

ROLE OF VACCINES IN REDUCING DEATH AND DISEASE IN INDIA

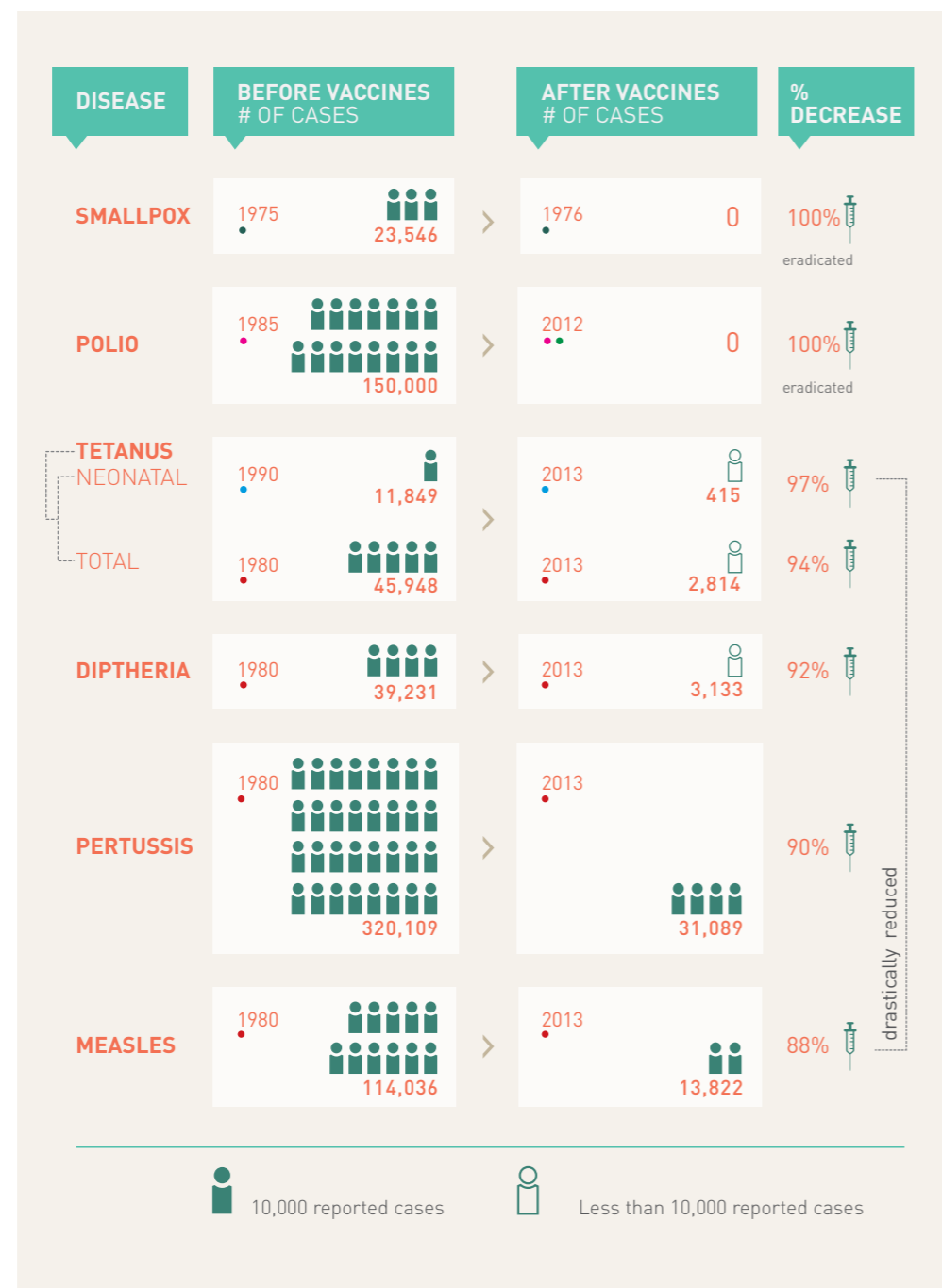
- Smallpox elimination was achieved in India, contributing to global eradication of the disease in 1980.[3]
- India was declared polio free in 2014, after no cases had been reported in India for three consecutive years; a feat once widely regarded as impossible.[3]
- Tetanus cases have reduced by over 95% over the past three decades, with at least 18 states

having not reported a single case of maternal and neonatal tetanus as of December 2013.[2]

- Following the introduction of a second dose of the measles vaccine and intensive vaccination campaigns, measles is at an all-time low.[3]
- Since 1980, diphtheria cases have declined by 94%, with only around 2,500 cases reported in 2012.[3]
- Pertussis vaccination has helped reduce the burden of disease by 86% between 1980 and 2012.[3]

FIGURE 3

The Vaccine Story in India



Reference:

- Rabindra Nath Basu, R.N., Jezek, Z & Ward, N.A. "The Eradication of Smallpox from India." World Health Organization, South-East Asia Regional Office, 1979.
- India Polio Learning Exchange. Polio IndiaFact Sheet. UNICEF, 2012. <http://www.iple.in/document/media-fact-sheet-on-polio-in-india>
- Polio refers to all polio cases (indigenous or imported), including polio cases caused by vaccine derived polio viruses (VDPV) it does not include cases of vaccine-associated paralytic polio (VAPP) and cases of non polio acute flaccid paralysis (AFP)
- Verma, Ramesh & Khanna, Pardeep. "Tetanus toxoid vaccine: Elimination of neonatal tetanus in selected states of India." Human Vaccines & Immunotherapeutics 8:10, 1439-1442; October 2012.
- WHO VPD Monitoring System: Global Summary. Last Updated 15 July 2014. http://apps.who.int/immunization_monitoring/globalsummary/countries?countrycriteria%5Bcountry%5D%5B%5D=IND&commit=OK

The government has taken concrete steps to strengthen routine immunisation in recent years

Pentavalent vaccines are currently being used in 15 states: Kerala, Tamil Nadu, Haryana, Jammu & Kashmir, Gujarat, Karnataka, Goa, Puducherry, Delhi, Rajasthan, Madhya Pradesh, Chhattisgarh, Punjab, Bihar and West Bengal.

ROUTINE IMMUNISATION IN INDIA: A SYSTEM BUILT TO DELIVER

Reductions of vaccine-preventable diseases would not have been possible without the many steps taken by the Gol to accelerate child survival in the country, including the strengthening of the country's routine immunisation (RI) programme.

According to the 2009 UNICEF Coverage Evaluation Survey All India Report, national coverage of three doses of the DTP vaccine is an estimated 72%, compared to, for example, 43% for oral rehydration therapy among children with diarrhoea, and 33% for breast feeding within one hour of birth.[14]

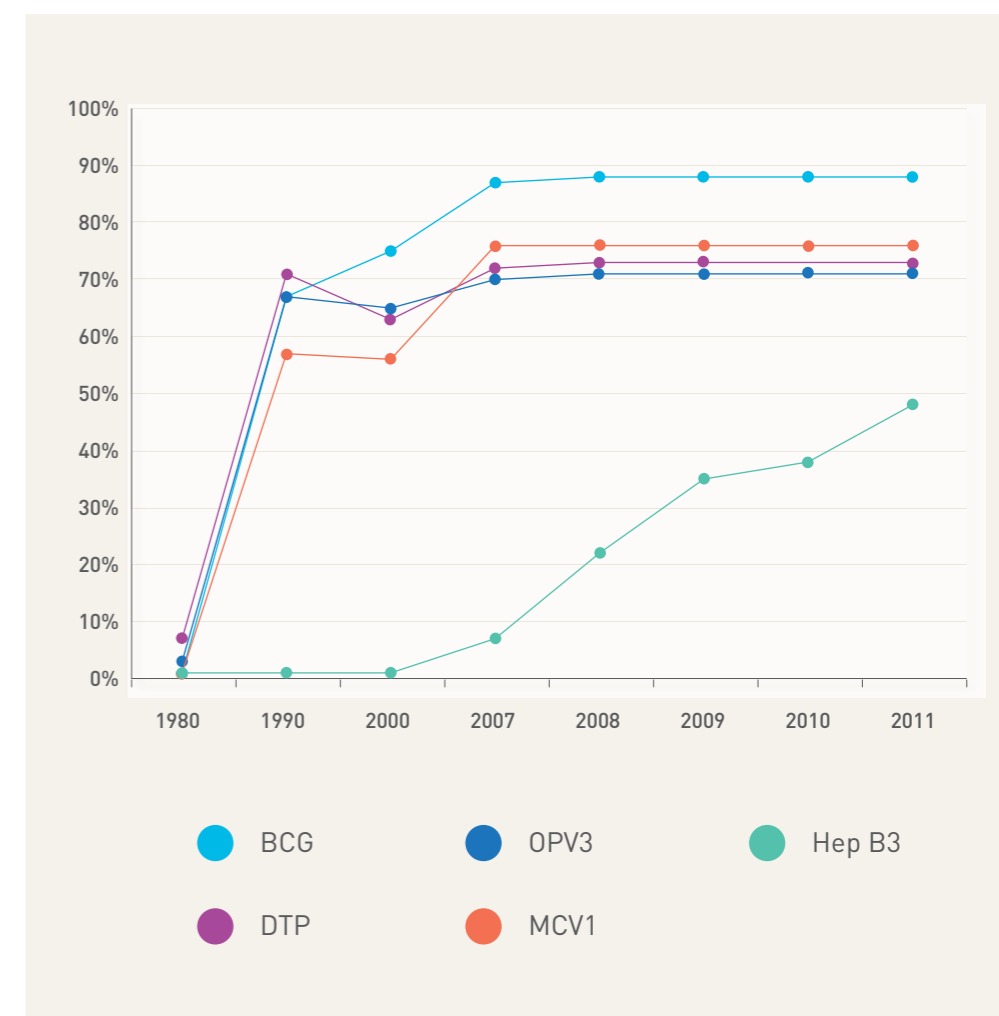
Several states are showing strong progress. Bihar, for example, has increased

DTP3 coverage from 54% in 2007-2008 to 81.6% in 2012-13.[15,16]

The Gol has taken concrete steps to strengthen RI in recent years, including introducing a National Vaccine Policy in 2011 and declaring 2012 as the year of "Intensification of Routine Immunisation," with concentrated efforts on improving coverage in low-performing states.[17] During this time, special immunisation weeks were initiated to boost immunisation coverage. The Gol has also made vaccine-specific efforts, including introducing a second dose of the measles vaccine. Catch-up campaigns for a second dose of the measles vaccine in low-coverage states were completed by 2013.[3] In January 2014, the Gol approved a Comprehensive Multi-Year Strategic Plan for Universal Immunisation Programme in India (2012-2017).[18]

FIGURE 4

Routine Immunisation Coverage Trend in India by Antigen: 1980-2011*



Reference: WHO-UNICEF coverage estimates Routine Immunisation Coverage Trend in India by Antigen 1980-2011

Diarrhoea and pneumonia take a toll on children's bodies, leaving them more vulnerable to subsequent infections, malnutrition, stunting, wasting, and poor physical and cognitive development, ultimately leaving them more likely to die from other causes too

Currently, India's Universal Immunisation Programme includes vaccines against the following diseases: tuberculosis (BCG), polio, diphtheria, pertussis, tetanus, measles, and hepatitis B. Some states also include Haemophilus influenzae type b (Hib, as pentavalent vaccine) and tetanus toxoid (TT) vaccines. In some endemic areas, the Japanese encephalitis (JE) vaccine is also used.

In July 2014, the Office of the Prime Minister of India announced that four new vaccines, an indigenously developed rotavirus vaccine, the inactivated polio vaccine, the rubella vaccine and the vaccine against Japanese encephalitis, would be provided to all children in India.

SUCCESS IN ELIMINATING SMALLPOX

Smallpox, one of the deadliest diseases in human history, was eradicated from the globe more than 30 years ago. Global eradication efforts came into full force in 1966, with the launch of WHO's Intensified Smallpox Eradication Programme, which envisaged the goal of universal vaccination.

One of five remaining smallpox-endemic countries at the time, India reported more than 60,000 smallpox cases in the first few months of 1974.^[19] The country acted quickly to address the most troublesome areas, namely delivering smallpox vaccines to remote populations in Bihar and West Bengal,

where more than two-thirds of the cases had occurred. In 1975, India witnessed its last case of smallpox and by 1980 WHO declared that smallpox had been eradicated worldwide, a feat that would have been impossible without vaccines.

SUCCESS IN ELIMINATING POLIO

India marked three years without a case of polio on 13 January 2014, a landmark achievement for global public health and the worldwide effort to eradicate polio. India's remarkable success proves that polio can be eliminated under the most challenging of circumstances. Once considered by experts as the most technically difficult place to end polio, India had at least 150,000 cases of polio in 1985.^[20] The country launched an intensive campaign to end polio, which was supported by numerous international partners and technical experts. A surveillance network of more than 33,000 reporting sites was established and more than 2.3 million vaccinators were deployed. Strategies to reach every child ensured the delivery of several million doses of oral polio vaccine each year.^[21]

On achieving three years as polio-free, India and WHO's South-East Asia Region were officially certified as polio-free in March 2014. India's success with polio demonstrates that it can successfully deliver critical life-saving vaccines to all children, even in the hardest to reach places. Today, the strategies and infrastructure built to tackle polio are being used to address other vaccine preventable diseases, such as measles.

4

DIARRHOEA AND PNEUMONIA IN INDIA



A study found that children with one episode of moderate-to-severe diarrhoea had an 8.5-fold increased risk of dying two months later from any cause compared to children who did not have an episode^[25]

FIGURE 5

IN INDIA, DURING 2013

134,000 CHILDREN
LESS THAN FIVE YEARS

DIED FROM
DIARRHOEA

174,200 CHILDREN
LESS THAN FIVE YEARS

DIED FROM
PNEUMONIA

THIS
EQUALS

ONE FIFTH OF ALL
GLOBAL **DIARRHOEA** AND
PNEUMONIA DEATHS

ROTAVIRUS: LEADING CAUSE OF SEVERE DIARRHOEA

Diarrhoea in children is caused by infections from a broad range of viruses, bacteria, or parasites, which infect the intestinal tract and disrupt the normal functioning of the intestines. If left untreated, diarrhoea can lead to cases of severe dehydration that may require hospitalisation or even cause death.

Rotavirus is the leading cause of moderate-to-severe diarrhoea among children in India, accounting for approximately 40% of all reported diarrhoea cases according to numerous studies.^[22, 23, 24] Recent studies have estimated that rotavirus led to more than 78,000 deaths in India in 2011 and over 11 million episodes among children under-

five. In the same year, the virus accounted for more than 872,000 hospitalizations and over 3 million outpatient visits.^[26]

HIB AND PNEUMOCOCCUS: LEADING CAUSES OF SEVERE PNEUMONIA

Most cases of pneumonia are caused by bacteria or viruses. The Hib and pneumococcus bacteria are two leading causes of pneumonia in children in India and also cause meningitis, an infection of the membranes surrounding the brain and spinal cord.

Pneumococcus and Hib are the leading causes of severe bacterial pneumonia in children, together accounting for approximately 60% of pneumonia deaths in children under the age of 5 years. In India,

INTEGRATED GLOBAL ACTION PLAN FOR THE PREVENTION AND CONTROL OF PNEUMONIA AND DIARRHOEA (GAPPD)

Reduce Pneumonia & Diarrhoea Morbidity and Mortality



PROTECT

Children by establishing good health practices from birth

- Exclusive breast feeding for 6 months
- Adequate complementary feeding
- Vitamin A supplementation



PREVENT

Children from becoming ill from pneumonia and diarrhoea

- Vaccines: pertussis, measles, Hib, PCV and rotavirus
- Handwashing with soap
- Safe drinking water and sanitation
- Reduce household air pollution
- HIV prevention
- Cotrimoxazole prophylaxis for HIV infected and exposed children



TREAT

Children who are ill from pneumonia and diarrhoea with appropriate treatment

- Improved care seeking and referral
- Case management at the health facility and community level
- Supplies: Low-osmolarity ORS, zinc, antibiotics and oxygen
- Continued feeding (including breast feeding)

Reference: WHO and UNICEF The Integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD), 2013.

*Unpublished estimates based on published disease-specific estimates and updated child mortality estimates for 2013.[1, 27, 28]

Pneumococcal disease is the number one vaccine-preventable cause of death in children under five, globally and in India.[4]

it is estimated that in 2013 pneumococcus caused more than 60,000 pneumonia deaths and Hib caused more than 35,000 pneumonia deaths.* In addition to this high mortality burden, these two bacteria are responsible for millions of cases of pneumonia and tens of thousands of cases of debilitating meningitis in children each year.[1, 27, 28]

Even where treatment can save lives, cases of meningitis caused by pneumococcus and Hib often have negative life-long health effects, such as deafness, seizures, motor impairment, and mental disabilities.

Similarly, even if children survive, each episode of diarrhoea and pneumonia takes a toll on their bodies, leaving them more vulnerable to subsequent infections, malnutrition, stunting, wasting, and poor physical and cognitive development, ultimately leaving them more likely to die from any cause.

NEED FOR A COMPREHENSIVE APPROACH

Diarrhoea and pneumonia are preventable and treatable diseases. WHO and UNICEF recommend an integrated approach to protect against, prevent and treat childhood diarrhoea and pneumonia in the "Integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea"(GAPPD).[29] The GAPPD strategy emphasises a range of proven interventions, including breast feeding, vitamin supplements, hand washing with soap, treatments such as oral rehydration salts (ORS) and antibiotics, improved sanitation, and immunisation, among many other strategies. A key element of the GAPPD strategy is the use of vaccines to prevent disease, as the leading causes of diseases such as diarrhoea and pneumonia are vaccine preventable.[29]

Rotavirus is the leading cause of moderate-to-severe diarrhea in India, accounting for approximately 40% of all diarrhea cases requiring treatment.[22, 23, 24]

Hib disease has been virtually eliminated from industrialised countries, where Hib vaccines have been in widespread use for over 20 years.^[30]



5 VACCINES FOR DIARRHOEA AND PNEUMONIA

There are several safe and effective vaccines that protect against rotavirus, Hib, and pneumococcal disease. These vaccines are widely used all over the world:

- Rotavirus can be prevented with the help of vaccines. In India, two effective rotavirus vaccines are currently available in the private market, and the country has developed and licensed its first indigenous vaccine. In July 2014, the Prime Minister's Office announced it would introduce rotavirus vaccines into the country's UIP. As of September 2014, rotavirus vaccines have been introduced in more than 70 countries.^[30]
- Hib disease can be prevented by Hib vaccines, such as the five-in-one pentavalent vaccine or the stand-alone Hib vaccine. Hib vaccines have been introduced in over 185 countries as of September 2014. The pentavalent (DTP-HepB-Hib) vaccine, which is used in over 100 countries, is part of India's national immunisation programme in selective states.^[30]
- Pneumococcal disease can be prevented through vaccination with a pneumococcal conjugate vaccine (PCV). Two PCVs are currently available in India only in the private market, while an indigenous PCV candidate is in the early stages of development. As of September 2014, PCV has been introduced in over 110 countries.^[30]

GLOBAL IMPACT

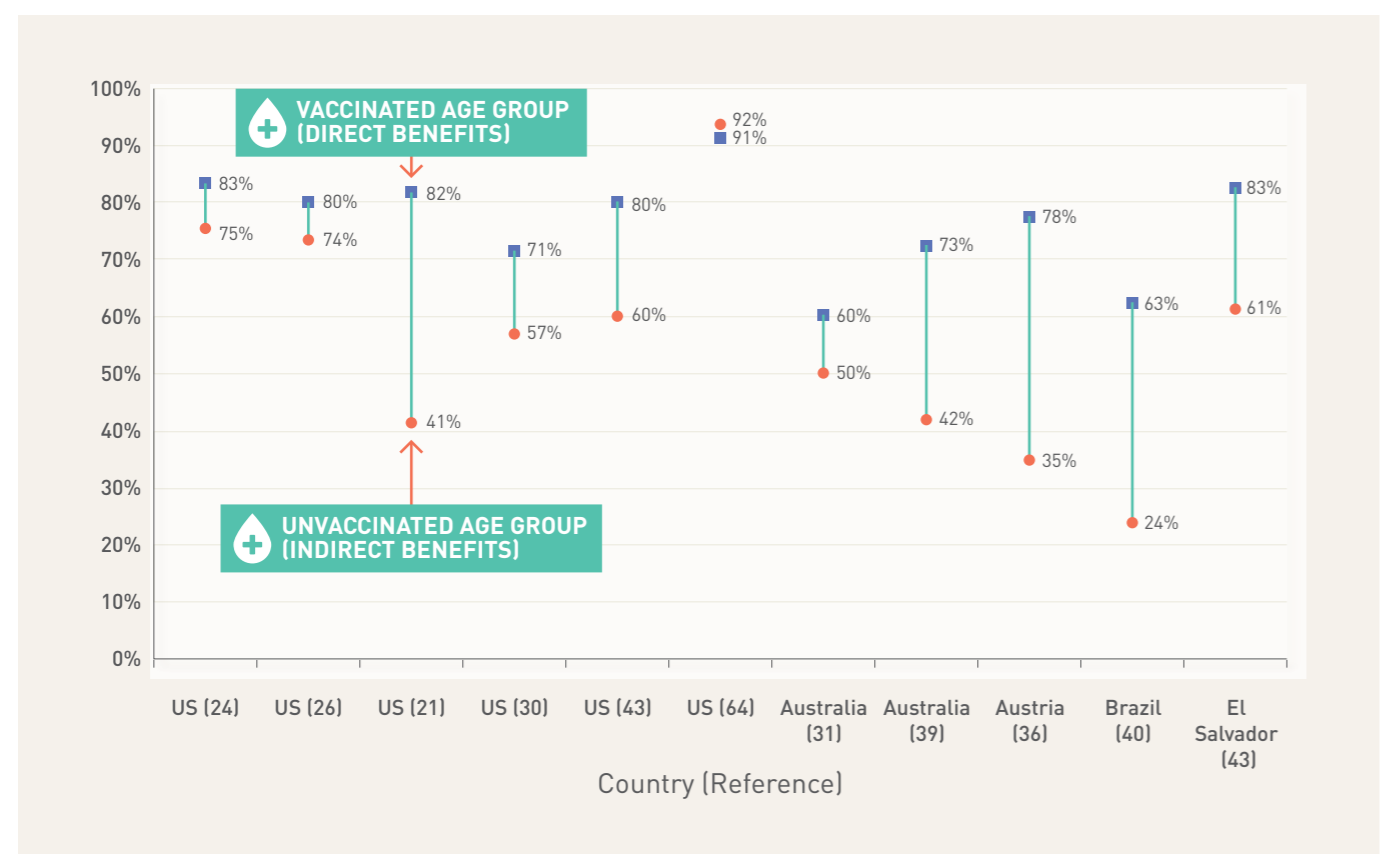
Hib disease has been virtually eliminated from industrialised countries, where Hib vaccines have been in widespread use for more than 20 years. In developing countries that introduced Hib vaccines into their national immunisation programmes, cases of Hib pneumonia and meningitis have been drastically reduced.^[31] In countries that introduced pneumococcal vaccines, the disease has almost been eliminated, including reductions in affected cases of unvaccinated children and adults.^[32, 33, 34, 35, 36]

Hospitalisations from pneumonia have also shown dramatic reductions, following the introduction of the vaccine.^[37]

Swift and significant declines in hospitalizations and deaths due to rotavirus diarrhea and all-cause diarrhea have been observed in many countries that have introduced rotavirus vaccines, including low- to-middle-income countries, such as Mexico (See Figure 6).^[38, 39] Since the introduction of the rotavirus vaccine, one of the most interesting and unanticipated findings was its indirect

FIGURE 6

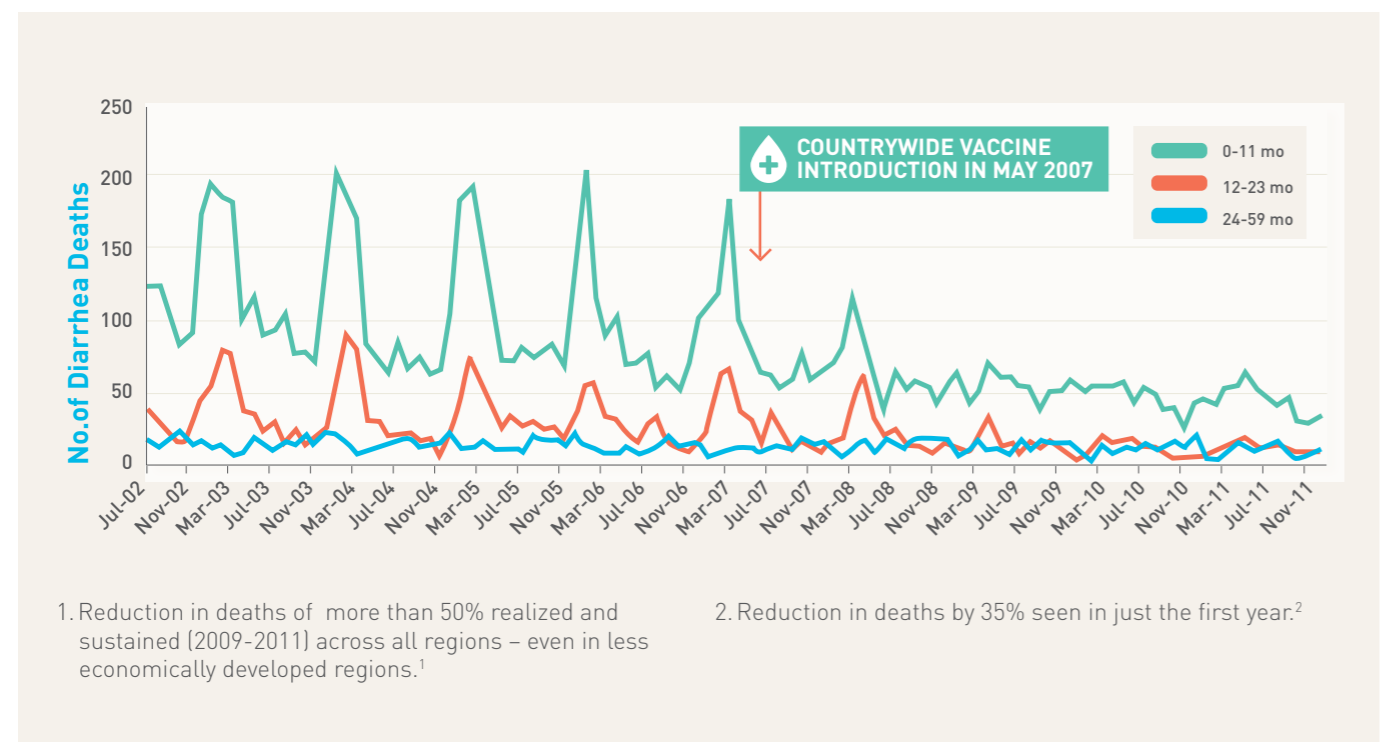
Reductions in Rotavirus Hospitalisations for Vaccinated and Unvaccinated Age Cohorts



Based on, Patel et al. Lancet ID 2012;12:561-570

FIGURE 7

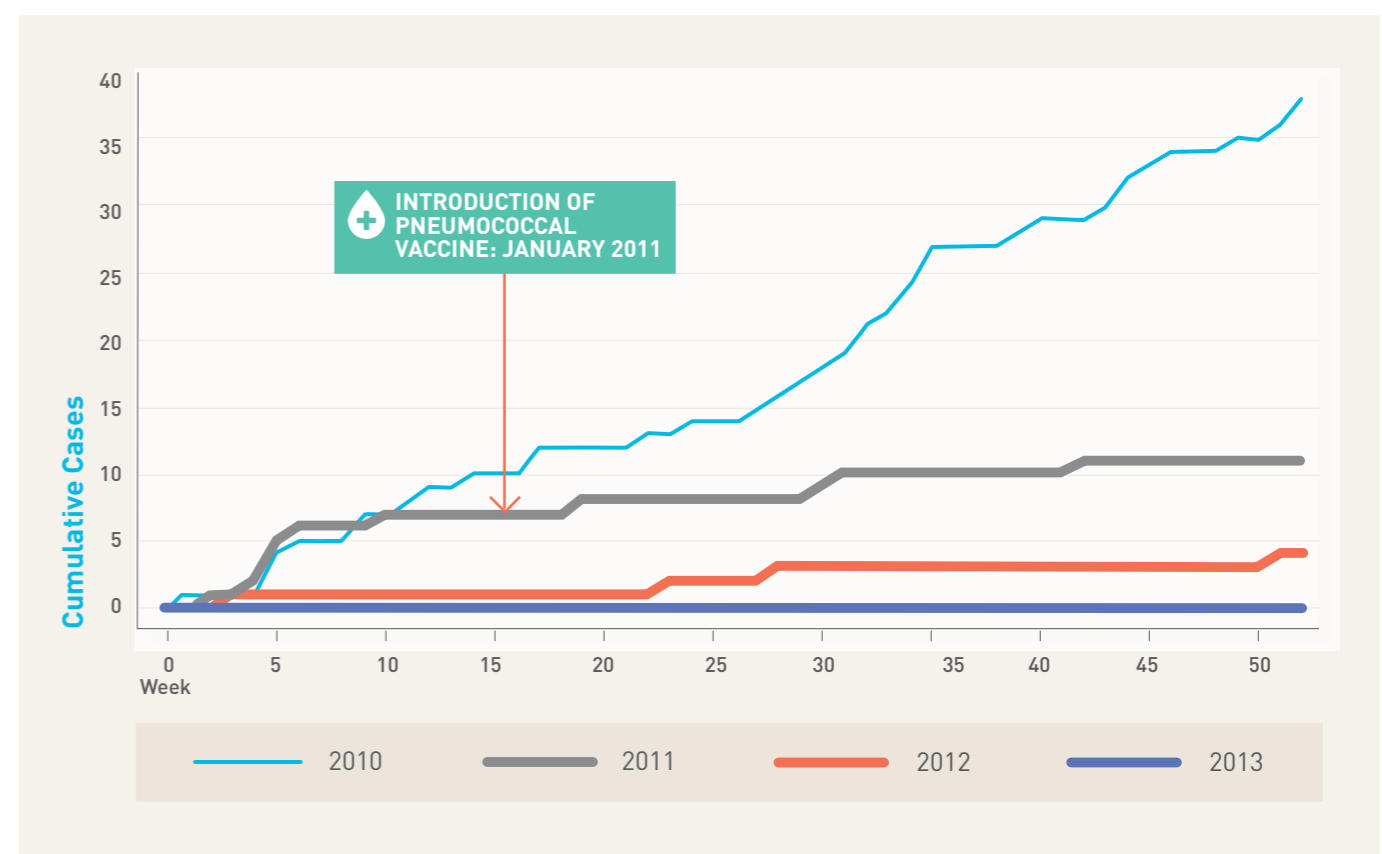
MEXICO: Decline in Diarrhoeal Deaths in Children Under 5 Following Rotavirus Vaccine Introduction



Reference: 1. Gastañaduy, Pediatrics, 2013. 2. Richardson, NEJM, 2010

FIGURE 8

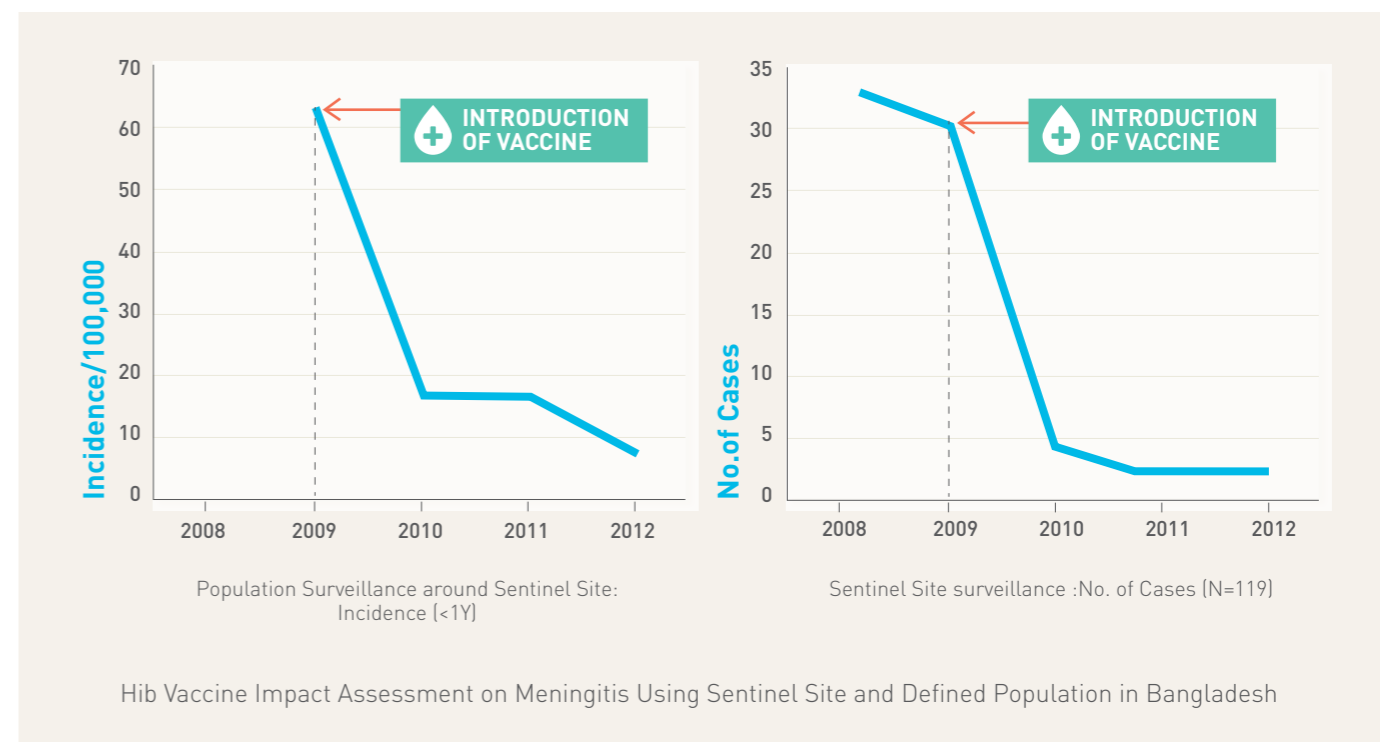
KENYA: Decline in Cumulative Admissions of Children Under Five for Invasive Pneumococcal Disease in Kilifi District Hospital



Reference: KEMRI-Wellcome Trust, ongoing data as of 16 September 2013

FIGURE 9

BANGLADESH: Decline in Hib Meningitis After Hib Vaccine Introduction



Reference: Unpublished data from Samir Saha Chile Health Research Foundation, Bangladesh

Hib Vaccine Impact Assessment on Meningitis Using Sentinel Site and Defined Population in Bangladesh

effect of significantly reducing rotavirus disease among older children who were not vaccine-eligible. The data in Figure 6 is from multiple settings (the US, Australia, Austria, Brazil, and El Salvador) showing declines in hospitalisations not only in vaccinated age groups (in blue) but also age groups who were unvaccinated (in red)— the result of “herd immunity”.

STATUS OF INTRODUCTION

Among these new vaccines, only the Hib vaccine is included in India’s UIP in the form of the five-in-one pentavalent vaccine.^[31, 40] As of January 2015, pentavalent vaccines have been introduced in 15 states and union territories. The National Technical Advisory Group on Immunisation (NTAGI) has recommended that the pentavalent vaccine be scaled up nationally so that all children in India are protected. In July 2014, the Prime Minister’s Office (PMO) announced the inclusion of rotavirus vaccines in India’s UIP. PCV is currently not included in India’s UIP. However, India’s first indigenous PCV vaccine is currently in early stages of development.

Since the affordability of vaccines impacts decisions regarding their inclusion in the national immunisation system, many manufacturers have decided to offer these vaccines at lower prices. For example, the manufacturer of the recently licensed domestic rotavirus vaccine has pledged to make the current formulation of the vaccine available at US\$1 per dose for governments and UN procurement agencies.^[41, 42]

Making vaccines more widely available and accessible through the UIP would have a significant impact on reducing childhood deaths and disease in India. All three vaccines — Hib, PCV and rotavirus— are widely recommended and endorsed by numerous Indian and international stakeholders, including WHO and the IAP. They are listed as a necessary component of WHO and UNICEF’s GAPPD and are a key element of the WHO’s Global Vaccine Action Plan (GVAP), which is endorsed by 194 member states, including India.

POTENTIAL IMPACT

Rotavirus vaccine: According to one study, introduction of a rotavirus vaccine in the national immunization program would prevent over 25,000 deaths, nearly 300,000 hospitalisations, and more than 600,000 outpatient visits each year in India.^[43]

Pentavalent (Hib) vaccines: A study conducted in the Vellore district of Tamil Nadu found a significant reduction in Hib meningitis hospitalisations once the vaccine became available in the private market, while hospitalisations for other diseases remained stable.^[44] As pentavalent vaccine is introduced in additional states, experts anticipate a more substantial impact from the vaccine than that found in the Vellore study.

Pneumococcal conjugate vaccines (PCV): In clinical trials conducted in several countries, PCV showed an average efficacy of 80% and prevented 36% of severe pneumonia cases (caused by any pathogen) in children.^[45] Both the PCVs available in India protect against more than 70% of the disease-causing strains of pneumococcus in the country that could result in a significant reduction of the disease.^[46]



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