Protecting People from Vaccine Preventable Diseases
Childhood immunization remains the most cost-effective health intervention to improve health and reduce child mortality due to vaccine-preventable diseases. Strengthening routine immunization is a cornerstone for countries to achieve the United Nations Millennium Development Goal 4 (MDG 4) which aims to reduce under-five mortality by two thirds and MDG 5 improving maternal health compared to 1990 estimates by 2015.

The WHO South-East Asia Region is home to 1.7 billion people of whom 38% are children under 15 years including 12% who are less than 5 years (204 million). Globally, vaccine-preventable diseases (VPDs) are responsible for nearly 20% of the 8.8 million deaths occurring annually among children under five years of age; this includes approximately 650000 in countries of the Region.

In the decades since the introduction of the universal immunization programme with traditional six antigens, significant progress has been made in reducing childhood mortality due to tuberculosis, diphtheria, pertusis, tetanus, polio and measles. Routine immunization coverage in the Region as measured by DTP3 coverage increased from 66% in 2000 to 73% in 2009. It is heartening that seven countries of the Region have achieved the global requirement of 90% coverage nationally and four have achieved 80% coverage at the district level. In addition, a few countries have introduced additional antigens in the schedule of immunization, notably Hepatitis and *Haemophilus influenzae* type b (Hib) vaccine, thus protecting children against eight vaccine preventable diseases.

With the expansion of immunization services and introduction of new vaccines, there has been added awareness regarding adverse events following immunization. Occasionally, such events have led to the temporary cessation of immunization services. However, it has also helped in strengthening and institutionalizing the role of national regulatory authorities and national committees for immunization practices to oversee and assess the events thus building confidence in the system.

The impact of immunization in reducing the burden of VPDs is well documented for polio and measles which are global priorities for eradication and elimination respectively. They are supported by a high quality disease surveillance system which includes accredited national and sub-national laboratories. Disease surveillance has to be strengthened for all vaccine-preventable diseases to assess the impact of the intervention. In addition a cost-benefit analysis will support national governments in making informed decisions to increase investment in immunization and health care.

Despite the progress made several challenges remain. The South-East Asia Region accounts for one fourth of the world population and with its diverse groups and high birth cohort, the Region has a large proportion of un-immunized children. Concerted efforts are required to accelerate routine immunization coverage particularly in hard-to-reach remote areas and to cover socially marginalized groups which will go a long way to achieve/sustain recommended universal immunization coverage of 90% nationally and 80% in the provinces.

Covering the last mile of ensuring universal immunization services is no easy task, given the competing priorities for resources. Declaring 2012 as the year of immunization is the first step in the right direction to contemplate, assess and accelerate routine immunization services which will ultimately lay the foundation for better health for our population and in reaching the MDG 4 and 5 targets.
Immunization & MDGs
- Immunization can significantly contribute to achieving the United Nations Millennium Development Goals Four and Five; Reduce childhood and maternal mortality which aims to reduce under-five mortality by two thirds by 2015.
- Globally, vaccine-preventable diseases are responsible for nearly 20% of the 8.8 million deaths which occurred in 2008 among children under five years of age.
- Improving services to deliver traditional vaccines will reduce the number of vaccine-preventable deaths. In addition, introducing new vaccines will help in preventing more child deaths and accelerating progress towards the MDG targets.

Progress
- The DTP3 coverage in the Region has increased from 66% in 2000 to 73% in 2009. Seven countries have achieved 90% DTP3 coverage at national level. Out of the six countries, 4 countries have achieved above 80% coverage in all districts.
- Four countries have introduced *Haemophilus Influenzae* type B vaccine and one country has introduced HPV vaccine.
- Four countries (India, Nepal, Sri Lanka and Thailand) have introduced Japanese Encephalitis vaccine in high-risk areas.
- India has started expanding the Hepatitis B vaccine introduction into other states beyond the original 10 states and it is expected to be completed by 2011.
- Ten out of 11 countries have National Committees of Immunization Practices functioning at different levels.
- A regional immunization policy is being developed and is in an advanced stage of preparation.
- A regional review meeting was conducted in July 2005 and increasing immunization coverage was identified as the most important priority and a regional framework for increasing immunization coverage has been developed.
- Countries interested in new and under-utilized vaccines introduction have been identified and advocacy meetings at the national level are being conducted in order to facilitate the decision-making process.
- Expanding the surveillance networks to identify the burden of rotavirus infections and Invasive Bacterial Diseases (IBD) will facilitate evidence-based decision-making for new vaccines introduction.
- The success made by several states of India in increasing routine immunization coverage through implementing the immunization and child health component of the National Rural Health Mission needs to be replicated in states/districts with low and moderate immunization coverage.
- The national regulatory authorities, expert committees for adverse events following immunization and national committees for immunization practices are being strengthened in Member States in order to provide better sustainable immunization services.

Progress in measles mortality reduction
- Between 2000 and 2008, the estimated number of measles deaths in the Region was reduced by 46%, from 234,000 to 126,000.
Ten out of eleven Member States, have achieved or exceeded the 90% mortality reduction target. Several of these countries are pursuing measles elimination strategies.

In November 2010, India began measles catch-up campaigns to vaccinate 134 million children in 14 states and introduced 2nd dose of measles vaccine in the remaining 21 states.

Successful implementation of these supplementary activities while sustaining and improving routine immunization coverage will contribute to reaching the 90% mortality reduction goal by 2013.

Challenges in SEAR

- One fourth of the world population is in SEAR.
- India and Indonesia are very large countries with diverse population groups.
- India alone has 26 million birth cohort to be vaccinated every year.
- 87% of the 9.8 million un-immunized children accumulated in each year in SEAR are in India.

The acceleration of routine immunization coverage needs to compete with other disease control priorities for resources.

Specific challenges for routine immunization

- Inadequate access to immunization services by large populations in hard-to-reach rural areas and socially marginalized groups in urban areas; vulnerable populations are unaware of the need for immunization and due to socio-cultural barriers, do not perceive it as important for child survival.
- Inadequate capacity at the district level for using data for action.
- Insufficient efforts to capitalize on the opportunities and resources available through accelerated disease control initiatives such as polio, measles, and of new vaccine introduction to improve routine immunization services.
- Inadequate managerial capacity for monitoring and supervising immunization programmes and lack of proactive communication planning to address fear of Adverse Events Following Immunization (AEFI).
The added value of IVD

Reaching disease control targets, such as polio eradication and measles/rubella control requires three related strategies:

- Sensitive surveillance and timely outbreak response.
- Comprehensive routine immunization.
- Targeted supplementary immunization activities.

Surveillance data and disease burden studies are critical for determining programme priorities and monitoring the impact of immunization.

Immunization and vaccine development (IVD) ensures a systematic collection, analysis, interpretation and dissemination of data of vaccine-preventable diseases. This provides the basis for planning, implementing and evaluating disease prevention and control activities including immunization in Member States.

IVD provides support to Member states for vaccine preventable disease (VPD) surveillance that includes polio (AFP), measles, rubella, encephalitis, neonatal tetanus, diphtheria, pertussis, Hib, rotavirus and influenza. VPD surveillance is supported by an extensive regional and national laboratory network.

IVD provides technical assistance and monitors AEFI surveillance to ensure the safety and quality of vaccine manufactured and used in the Region.

Uniqueness of the IVD supported surveillance network

- Simplicity:
  - The ease of operation of the system.
- Sensitivity:
  - Ability to quickly detect positive cases, epidemics and changes in disease patterns.
- Timeliness:
  - The availability of data in time for appropriate action.
- Acceptability:
  - The participation of Member States and Organizations.
- Representativeness:
  - The capacity to accurately portray the incidence (time, place and person) of the disease in a population.
- Flexibility:
  - The ability to adapt to changes in operating conditions or information needs.

Sources of data

- Data comes from the Ministries of Health and EPI programmes in Member States through the following mechanisms:
  - Routine HMIS or VPD surveillance networks
  - Annual WHO/UNICEF Joint Reporting Form (JRF – national data) and SEARO Annual EPI Report Form (AERF – sub-national data).
  - Coverage surveys conducted by the Ministry of Health (MoH).
  - Laboratory network data that is linked with surveillance data
- Programme performance:
  - Data quality assessments and validation
  - Lot Quality Assessments (LQA)
Protecting People from Vaccine Preventable Diseases

Data collection process at IVD

- AFP surveillance data from all countries:
  - All countries submit weekly data or zero reports.
- AFP Cases Crossing International Borders:
  - Notification and monitoring of all AFP and polio cases crossing borders; case investigation forms, stool results, and follow-up data.
- Vaccine-Preventable Disease (VPD) data (measles, rubella, neonatal tetanus, pertussis, diphtheria, Japanese Encephalitis, and adverse events following immunization):
  - Monthly case-based or aggregate format.
  - Annual aggregate data from WHO/UNICEF JRF and SEARO AERF.
- Laboratory Data:
  - Polio lab data received weekly in Epi6 through Polio Lab Information For Action (PLIFA).
  - Measles/Rubella, AES/JE lab results aggregate received monthly.
- Annual immunization coverage data:
  - National coverage data through WHO/UNICEF JRF.
- Immunization systems data (vaccine supply, financing, safety, etc.).
- Sub-national (usually district level) coverage data through AERF.
- Coverage surveys as available.

Background Data:

- Sub-national population and other demographic data submitted with AERF annually.
- GIS boundary files for Member States collected as needed.

Data management at IVD

Data is received in different formats depending on country capacity and type of information compiled for analysis. Epi6 Access:

- Data Analysis Tools:
  - VPDIFA ACCESS-based program created by IVD for processing reports and maps.
  - Arc view 9.3 or Epi Info (Epi Map) for ad hoc mapping.
- During data processing and mapping, countries are notified immediately and issues resolved when data problems are identified.
- Data is sent to WHO HQ on a weekly, monthly and quarterly basis depending on the type of data processed.
Information dissemination

- Vaccine-Preventable Disease Surveillance Bulletin published on a weekly and monthly basis.
- Measles Surveillance Bulletin published on a quarterly basis.
- Regional and country-specific SEAR EPI Fact Sheet published annually.

Surveillance for polio eradication

Number of AFP Cases Reported in SEAR, 1997-2010

1997 Total AFP Cases = 4550

2010 Total AFP Cases = 60539

Enhanced surveillance initiated
Progress in surveillance for measles elimination

<table>
<thead>
<tr>
<th>Country</th>
<th>From health facilities</th>
<th>Outbreak investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data collection</td>
<td>Serology of cases</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Case-based</td>
<td>69%</td>
</tr>
<tr>
<td>Bhutan</td>
<td>Case-based</td>
<td>100%</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>Case-based</td>
<td>Data Missing</td>
</tr>
<tr>
<td>India</td>
<td>Aggregate</td>
<td>NA</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case-based</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Aggregate for all suspected cases</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td>Case-based</td>
<td>100%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>Case-based</td>
<td>93%</td>
</tr>
<tr>
<td>Nepal</td>
<td>Case-based</td>
<td>79%</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Case-based</td>
<td>54%</td>
</tr>
<tr>
<td>Thailand</td>
<td>Aggregate</td>
<td>4.30%</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>Case-based</td>
<td>0%</td>
</tr>
</tbody>
</table>

Progress in MNTE validation

Neonatal Tetanus Elimination Status, 2010*

*Source: WHO/UNICEF JRF and GEAR Member Countries Update as of 15 Nov 2010
Surveillance reviews conducted by SEAR

Maintain a high level of immunity against polio through high quality routine immunization and supplementary immunization activities with a focus on border areas with India, migrant/refugee populations and densely populated urban areas.

Trainings and meetings conducted or supported
- Global
- Regional
- National
- Sub-national

In the pipeline
- Surveillance of diseases preventable by New Vaccines.
- Integrated Disease Surveillance – VPD with other communicable diseases.
- Case-based measles surveillance to be started in India and expanded in other countries.
The final push

Interrupting all remaining chains of polio virus transmission remains the highest priority. After interruption, all countries will need to maintain certification standards for at least three years until regional and global certification are achieved. Bangladesh, India, Indonesia, Myanmar and Nepal have established infrastructures for AFP surveillance with technical and financial support from WHO. In recent years, the AFP surveillance network has been expanded to include surveillance for other vaccine-preventable diseases (measles, rubella, Japanese encephalitis and neonatal tetanus) and monitoring of routine immunization activities. The polio programme has enhanced the Region’s ability to conduct mass immunization activities by improving micro-planning, developing monitoring/evaluation tools and improving logistic capacity that has contributed to the measles mortality reduction goal and neonatal tetanus validation programme.

Progress in India

- Significant progress has been made in polio eradication in 2010. There has been a 94% reduction in the number of cases over the past 12 months.
- Preliminary data from the recent sero-prevalence study of children 6-7 months of age in the high-risk blocks of UP and Bihar have confirmed that >95% of these young children are sero-positive for type 1.
- Starting in January 2010, intensified supplementary vaccination campaigns with bivalent OPV (bOPV) have allowed for immunization activities to simultaneously target type 1 and control type 3 polio virus.
- This is the lowest level of transmission in the history of the program.

Epidemiologic risks to polio eradication

There are two main risks for continued transmission of wild polio virus in India:

- The continued transmission of wild polio virus in migrant and mobile communities and the movement of the virus with these populations, potentially re-introducing wild polio virus into the highest risk areas of western Uttar Pradesh and central Bihar where it could have the chance of re-establishing circulation.
- The continued transmission in the endemic areas of western Uttar Pradesh and central Bihar despite the absence of detected virus. Although surveillance quality in both areas is very high, the history and genetic linkages of the current wild polio virus isolates warns us that there is a possibility that low level transmission could continue.

Addressing the epidemiologic risks

Stopping residual polo transmission:

- Mopping-up vaccination rounds are on-going in areas with active or recent polio transmission. There have been quality gaps in West Bengal and adjacent areas of Jharkhand, which the state governments have begun to address.

Emergency preparedness and response:

- The India Expert Advisory Group for polio eradication (IEAG) advised the government of India that the detection of any wild polio virus
from any source should now be considered a public health emergency and that central and state level plans should be put in place for emergency preparedness and rapid response. Guidance has been provided for rapid large scale and high quality mop-up activities.

Covering migrant populations:
- Adequate vaccination coverage of migrant populations in UP and Bihar as well as non-endemic states that host a large number of migrants. These mobile groups are being listed and mapped to ensure coverage by special vaccination teams.
- UP and Bihar have established vaccination posts at border crossing points with Nepal to vaccinate migrant children returning to India.

Ensuring high polio immunity levels in UP and Bihar:
- Monthly large scale sub-national immunization days have been conducted in Uttar Pradesh and Bihar from January to June and again in September, November and December with the epidemiologic appropriate oral polio vaccine.
- High quality supplementary immunization activities are being maintained in the 107 high-risk blocks of Uttar Pradesh and Bihar with an incremental implementation of the other components of the plan to reduce diarrhea rate through improved access to clean water, hygienic practices, and prevention/control measures.

Six type 1 polio virus cases were detected this year in two districts of Nepal that share a border with Bihar, India.
- Two of these cases were genetically linked to wild polio virus cases in Bihar, India and represent two separate importations. The other four cases indicate local circulation of these imported strains.
- Nepal conducted eight supplementary immunization activities (SIAs) in response to these cases, in addition to conducting refresher trainings and deploying national and international consultants to help with micro-planning, monitoring and evaluation.

Other countries in the region
- The remaining 9 countries in the Region are polio-free.
- The challenges in these countries is to:
  - Maintain a high level of immunity against polio through high quality routine immunization and supplementary immunization activities with a focus on border areas with India, migrant/refugee populations and densely populated urban areas.
  - Sustain uniform high quality AFP surveillance in all districts through regular sub-national analysis of the standard AFP surveillance indicators.
  - Conduct regular risk assessment and make available up-dated plans for timely and adequate response to importations to prevent local circulation.

Polio situation in the rest of the region

Nepal
- Besides India, Nepal is the only other country in the region with circulation wild polio virus.
The impact of funding on the children of South-East Asia

The IVD team supports eleven countries that make up the WHO South-East Region (SEAR). With an estimated 26% of the world's population, the region is home to 1.7 billion people of whom 38% are children under 15 years old (646 million), including 12% under 5 years old (204 million).

Every year 2.5 million deaths are averted because people are immunized against vaccine-preventable diseases (VPD) globally, approximately 650,000 in SEAR.

In the last 5 years IVD’s budget to support countries has increased by 75% from US$ 28.4 million in the year 2000 to US$ 49.8 million in 2010.

Tremendous strides in some of the areas of work that IVD prioritizes shows the investments made by donors globally and regionally have had a meaningful impact on the health of children in the region. Some clear examples of progress towards reducing child mortality (MDG 4) are highlighted below.

Polio

◆ A 2010 study estimated the global net benefits of polio eradication between 1988 and 2035 will be between $45 - $50 billion dollars if transmission is interrupted within the next five years.

◆ The same study highlighted the effects investments in polio eradication have made on building laboratory capacity for other diseases and that of vitamin supplements in helping reduce child mortality.

◆ Innovative financing mechanisms with secured funding from committed donors have provided market stability for procuring vaccines globally.

◆ Since 1988, donors have invested US$ 9 billion in polio eradication, but a critical funding gap at a time when transmission is planned to be interrupted (2011-2012) remains at US$ 720 million.

Measles

◆ During 2000-2008, global mortality attributed to measles declined by 78%, from an estimated 733,000 deaths in 2000 to 164,000 in 2008. This achievement was made through increased funding for large-scale immunization campaigns and increased immunization coverage.

◆ Increased funding between 2000 and 2009 supported building up the capacity of the laboratory network to a total of 679 national and sub-national labs in 183 countries.

◆ During 2007-2009 funding to support the Measles Initiative decreased from US$ 150 million annually to US$ 50 million, causing concerns about the future mortality reductions and countries’ ability to sustain surveillance and operational costs.

◆ The global measles funding gap for 2010-2011 was US$ 215 million out of which US$ 1.7 million was for the South-East Asia Region.

◆ Unless funding is sustained, experts estimate 1.7 million measles-related deaths will occur globally between 2010 and 2013.
Funding the future of healthy children

Guided by the Strategic Plan (2010-2013), IVD focuses on supporting SEAR countries to:

- Increase immunization coverage.
- Eradicating polio and eliminating measles from the region.
- Strengthening vaccine-preventable disease (VPD) surveillance and laboratory capacity.
- Developing research capacity in the prevention and control of VPDs.
- Increasing access to vaccines with assured quality and safety.

In order to carry out its objectives and contribute to reduce child mortality targets by 2/3, IVD needs to sustain funding from donors to continue supporting all countries in the region, while focusing on five priority countries (Bangladesh, India, Indonesia, Myanmar and Nepal).

Polio eradication is at a critical juncture as the target for interrupting transmission globally is 2011. While donors are under increased pressure to cut on budget expenditures due to the economic crisis, protecting the investments made are being repeatedly highlighted by committed advocates and partners as well as donors. After investing a total of US$ 7.94 billion, now is not the time to shortchange the efforts of donors and partners as well as affected countries.

IVD will also need to continue supporting countries to improve their immunization programmes by providing policy, evidence-based data and recommendations to build capacity and strengthen immunization systems and coverage across the SEAR region. In order to do this, a fully-funded and functioning programme must accompany the plans. Below are tables showing cost categories for the estimated funding requirements for the region in 2011.

### Biennium 2010-2011

<table>
<thead>
<tr>
<th>IVD’s Priority areas of work to support countries</th>
<th>Required funding</th>
<th>Funding mobilized</th>
<th>Funding gap*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increase immunization coverage</td>
<td>4,621</td>
<td>1,815</td>
<td>2,806</td>
</tr>
<tr>
<td>2. Eradicating polio and eliminating measles from the region</td>
<td>19,782</td>
<td>11,346</td>
<td>8,436</td>
</tr>
<tr>
<td>3. Strengthening vaccine-preventable diseases (VPD) surveillance and laboratory capacity</td>
<td>35,122</td>
<td>14,320</td>
<td>20,802</td>
</tr>
<tr>
<td>4. Developing research capacity in the prevention and control of VPDs</td>
<td>400</td>
<td>197</td>
<td>203</td>
</tr>
<tr>
<td>5. Increasing access to vaccines with assured quality and safety</td>
<td>1,124</td>
<td>551</td>
<td>573</td>
</tr>
<tr>
<td><strong>Total (in thousand US$)</strong></td>
<td><strong>61,048</strong></td>
<td><strong>28,229</strong></td>
<td><strong>32,819</strong></td>
</tr>
</tbody>
</table>

*As of 31 December 2010
Immunization and Vaccine Development
South-East Asia Region

World Health Organization
Regional Office for South-East Asia