

Puliyel <puliyel@gmail.com> 2/15/11

Dear Dr Ajay Khera

Thank you for sending this draft policy for comments to NTAGI members before 15/2/11.

My comments are below.

Some suggestions have been made in the 'track changes mode' in the attachment.

Please acknowledge receipt of the email and let me know if you have difficulty in opening the attachments

Sincerely

Jacob Puliyel

### **Response to the Draft Vaccine Policy of Dr. Ganguly**

A 'Policy' is a "Statement of Intent" or a "Commitment". Policy is the principle(s) that guide(s) decision and actions that are most likely to achieve a desired outcome. Policy guides all subsequent decisions that are made. Policies are adopted by the governance body within an organisation. This must not be confused with manuals of procedures and protocols. Procedures and protocols are developed and adopted by senior executive officers based on the policy. Organizations can be held accountable for its 'Policy'. Executives are held responsible if they deviate from policy in their protocols.

### **The compromised process (of drafting a policy)**

NTAGI at its last meeting had resolved that Dr Jacob Puliyel with Dr NK Ganguly shall facilitate the drafting of the policy document. The Health Secretary who chaired the meeting will bear witness to it and it is mentioned in the first draft-minutes circulated for approval to the members. (Subsequent changes to the minutes can only be approved at the next full NTAGI meeting). I wish to state categorically that I had no role in preparing this draft policy, as I was not consulted for this purpose at all. It needs to be established at whose behest the collective decision of the NTAGI was overruled in the letter of the Ministry of Health and Family Welfare (MoH&FW) dated 23rd September 2010.

## **The compromised product (Draft Policy)**

Regardless of my role, I would have welcomed a policy document of unmistakable clarity of purpose and unquestionable focus on principles. However, this "draft policy" is a good example of a compromised product that emerges out of a compromised process and therefore I am constrained to denounce it. The present document cannot be construed as a 'Policy document' by any stretch of imagination. It does not even read like a manual of procedures or protocols. Instead it appears merely to be recommendations by the author in favor of some vaccines like the Pneumococcal vaccine, rotaviral vaccine and some combination vaccines, without stating rationale and without any cost benefit analysis (despite the lip service paid to such criteria elsewhere in the 'policy'). It makes a passionate plea to allow international agencies to influence the immunization agenda of the country, and seeks abundant funding for 'foreign trips' of 'would-be experts'. It also suggests numerous steps to make private vaccine manufacturers feel secure and insulated from the rough and tumble of market forces, while being lackadaisical about the role of the public sector. I have highlighted a few specific instances that illustrate my general comments above, after the following paragraphs.

The section on 'Adverse Events follows Immunization' looks like a policy statement, but it is seriously misguided policy. It states that *'establishing / dissociating a causal link between the event and immunization should be established based on laboratory findings and baseline demography data from the region'*. By analogy, using these criteria, deaths due to Penicillin-reactions have never occurred anywhere in the world, because the vials have not been shown to be contaminated and the death of that one person has not altered the baseline demographics of the region! This flies straight in the face of the recommendations of the Brighton Collaboration – to which the document makes a passing reference. This is policy that cannot be allowed to pass

Regarding the National Technical Advisory Group on Immunization (NTAGI) the author has said that there must be epidemiologists and public health persons etc on the committee but has not suggested how they are to be selected. It does not suggest advertising vacancies like in the USA. Further it says the term of the member must be 2 years but in the same sentence says they can be reappointed indefinitely, defeating the very purpose of having a fixed term.

### **The way forward**

The policy needs to be redrafted. I am willing to participate in the process as desired by the NTAGI. The draft policy must take into account all available policy literature, relevant developments and government documents. It must then be open to other experts, intellectuals, think tanks, civil society organizations and even corporations and lobbyists for their inputs. The draft policy can then be finalized for approval after considering all their inputs. Public Health policy is the domain of the public and their participation is crucial for its successful passage through the parliament and subsequent implementation.

### **Specific comments illustrating some of the points made above**

1. The moot policy question is not whether a vaccine works, but whether that vaccine is necessary for all in India, and how many cases/deaths can be prevented by vaccinating how many people and at what cost. This basic logic is missing throughout this policy document. Is this deliberate? (See section 4.3)

A hundred years ago George Bernard Shaw had written

*'Suppose it were ascertained that every child in the*

*world could be rendered absolutely immune from all disease during its entire life by taking half an ounce of radium to every pint of its milk. The world would be none the healthier, because not even a Crown Prince – no, not even the son of a Chicago Meat King – could afford the treatment. Yet it is doubtful whether doctors would refrain from prescribing it on that ground. The recklessness with which they now recommend wintering in Egypt or at Davos to people who cannot afford to go to Cornwall, and the orders given for champagne jelly and old port in households where such luxuries must obviously be acquired at the cost of stinting necessities, often make one wonder whether it is possible for a man to go through a medical training and retain a spark of common sense’*

*Shaw GB. The Doctors Dilemma.*

*Penguin Books, London, UK, 33 (1957)*

*(First published 1911).*

2. Executive summary (Page 7 first para): It is fraudulent to project pneumococcal and rotaviral vaccines (that too covering only few strains) as vaccines against pneumonia and diarrhea, as these diseases are caused by many more etiological agents and there are no vaccines against all causes of these two diseases. This is a common and deliberate mischief played by people who push some vaccines. The policy should have specified how to avoid such mischief in public interest. Instead, it plays into the hands of such mischief mongers.

3. Product development (Page 8 first para): Why should product development be only in PPP mode? Why should a policy limit its options to one such mode? Why can't government learn from the dubious PPP deals in the vaccine park, and the MOUs between PII and Green Signal Biopharma and Vatsan Biopharma?

4. (Page 8, last para): The opening line "Vaccine Policy is a guiding document for maximizing the use of vaccines available globally" is a patently wrong and objectionable objective. The policy should encourage development, production, adoption and administration of NECESSARY vaccines, rather than maximize the use of all vaccines available globally. One wonders if this is a Freudian slip where the author of this policy has revealed his true intentions in making this document.

5. (Section 4.1.) The policy mentions how vaccine decisions should be guided by disease burden, surveillance, data etc..., but contradicts itself elsewhere by recommending specific vaccines without any such qualifying data.

6. (Section 4.2: page 10, line 8): Collaboration is a means, and not an end in itself. The document does not specify the purpose of such collaborations. The superbug (NDM1) story has amply demonstrated how collaborations can be used by foreigners to damage Indian interests globally, and how Indian partners of such collaborations are ready to sign on anything for a trip abroad.

7. (Section 4.4: centre of page 11): The statement about combination vaccines is misleading. Industry is using combinations to add newer vaccines and multiply prices, virtually always pushing non-UIP vaccines piggyback with UIP vaccines. For more information, please read the Current Science article on combination vaccines by Madhavi in 2006. The attempt of this "policy document" seems to be, to push specific, dubious, combination vaccines without justifying their public health need based on disease burden, safety, efficacy, affordability etc. These recommendations completely contradict the next section on surveillance, cost-benefit and risk-benefit evaluation criteria. This document is thus a bundle of such contradictions. The document says that combination vaccines reduce program costs and adverse effects. Unfortunately there is abundant evidence that contradicts this.

8. (Section 4.7: Page 12 end) All the money needed for UIP must be found indigenously. Please refer to the Oxfam-MSF report 2010 titled "Giving developing countries the best shot: an overview of vaccine access and R&D" that clearly states: "Even the poorest countries are generally able to purchase the six basic EPI vaccines from their own health budgets, but many would not be able to afford the newer vaccines without external assistance. GAVI was created in 2000 to accelerate the adoption of new and underused vaccines in poor countries. ... GAVI has helped most of these countries introduce Hep B and Hib vaccines, and it is poised to finance the introduction of rotavirus and pneumococcal vaccines"..... "A simple example of pull funding is the existence of an organisation like GAVI, which, by obtaining (advance market) commitments of several billion dollars from donors, served to signal to industry that the poorest countries could be a viable market." Clearly, GAVI's primary role has been to open up new markets for manufacturers of new and combination vaccines, towards which most MNCs and aspiring MNCs are shifting, leaving the more basic vaccines to a handful of developing country firms and public sector firms. Even UNICEF lamented on this trend ([http://www.unicef.org/supply/index\\_vaccine\\_security.html](http://www.unicef.org/supply/index_vaccine_security.html)).

## **Concluding remarks**

I have also put some comments in the 'track-changes mode' in the attached document. This is not being done so as to produce a comprehensive list of corrections. The document is so manifestly and fundamentally flawed and needs to be re-written, that it is not worth trying to improve.

There are a number of good documents about policy from which help can be got. The Delhi High court seeking a clear policy on vaccine introduction, in its interim observations, refers to the policy paper that evolved out of an ICMR-NISTADS workshop and was published in the May 2010 issue of IJMR.

Even the draft 'Comprehensive Multi Year Strategic Plan (CMYSP) for Universal Immunization Program in India (2010-17)' presented to the NTAGI on 26 August 2010 had elements of a good policy document, especially 'Strategic Area 5' on 'Accelerated Introduction Of Licensed New And Underutilized Vaccines Against Diseases With Significant Mortality And Morbidity In The Country' (Page 57). The draft CMYSP document was rejected by the NTAGI only because it suggested (on the next page 58) that development partners like the WHO, NPSP, USAID etc with 'some' members of NTAGI must decide policy on introducing vaccines (like HPV vaccine). The present policy document appears like an attempt to fulfill that agenda of page 58, on a grander scale!!

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**(DRAFT) NATIONAL VACCINE POLICY**

Developed under guidance of

**Prof. N.K. Ganguly**  
**Former Director General ICMR**  
**President JIPMER**  
**Distinguished Biotechnology Research Professor,NIH**  
**Advisor, Translational Health Science and Technology Institute**  
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### **Foreword**

This draft of the National Vaccine Policy was commissioned by the Ministry of Health And Family Welfare (MoH&FW) vide their letter dated 23rd September 2010 and permission was granted by Department of Biotechnology to engage in creation of this document. An attempt has been made to address broad issues of strengthening the institutional framework, processes, evidence base and framework required for decision making for new vaccine introduction, vaccine-security, program management, regulatory guidelines, vaccine research & development and product development. In addition, a structure has been proposed for a National Immunization Authority (Annexure 5).

A core team of officials, experts and researchers that was created to review, give inputs and share their experience in evolving this policy document are as follows:

1. Prof. N.K. Ganguly, Ex. DG Indian Council of Medical Research (Chairman)
2. Prof. N.K Arora, Director, INCEN
3. Dr. Ajay Khera, (DC, Child Health & Immunization, MoHFW)
4. Dr. T.S Rao, Advisor, Department of Biotechnology
5. Dr. Paul Francis, NPO, WHO India
6. Dr. Ambujam Nair Kapoor, DDG, Indian Council of Medical Research
7. Dr. Satish Gupta, Health Specialist (Immunization) UNICEF
8. Dr. Ajay Kukrety, DCGI's office
9. Dr. Sanjukta Sen Gupta, Scientist, National Institute of Immunology

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### **Acknowledgement**

I thank the Ministry of Health and Family Welfare for giving me this opportunity to articulate a draft of the National Vaccine Policy and the Department of Biotechnology for granting permission and funding the unit project under which it was created.

There were several organizations, industries and resource people including the working group, who contributed to preparation of this document. I wish to acknowledge and thank them for their support.

N.K. Ganguly

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**ABBREVIATIONS:**

ACIP Advisory Committee on Immunization Practices  
AD Auto Disable  
AEFI Adverse Effect Following Immunization  
ANM Auxillary nurse-midwife  
CDC Centers for Disease Control and Prevention  
CDSCO Central Drugs and Standards Control Organisation  
CLAA Central License Approving Authority  
DPCO Drug Price Control Order  
DPT Diptheria Tetanus and Pertussis  
ECDC European Center for Disease prevention and Control  
EPI Expanded Program for Immunization  
FSP Financial sustainability Plan  
GAVI Global Alliance for Vaccines and Immunization  
GFR General Financial rules  
GIS Geographical Information System  
GNI Gross National Income  
GOI Government of India

GRADE The Grades of Recommendation Assessment, Development and Evaluation  
HIMS Health Management Information System  
ICB International competitive Bidding  
ID Infectious disease  
JE Japanese Encephalitis  
MoHFW Ministry Of Health and Family Welfare  
NABL National Accreditation Board for Testing and Calibration Laboratories  
NDMA National Disaster Management Board  
NIB National Institute of Biologicals  
NIHFW National Institute of Health And Family welfare  
NIP National Immunization Program  
NRHM National Rural Health Mission  
NTAGI National Technical Advisory Group on immunization  
OPV Oral Polio Vaccine  
PAHO Pan American Health Organization  
ProMIS Procurement Management Information System  
PSU Public Sector Unit  
RCH-2 Reproductive and Child Health Phase II  
SAGE Strategic Advisory Group of Experts  
SAIF Sophisticated and Analytical Instrument Facilities  
UIP Universal Immunization Program  
UNICEF United Nations International Children's Educational Fund  
VGCP Vaccine Grand Challenge Program  
VPD Vaccine preventable disease  
WHO World Health Organization

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**1. Executive summary:**

Vaccines are one of the most successful health interventions that bring about significant reductions in congenital malformations, untimely deaths in children and adults and improve quality of life in the elderly. Over the years vaccines have provided highly cost effective improvements to human health by reducing avoidable human suffering, costs of care and treatment, economic consequences of work i.e. lower productivity and loss of work. As more and more diseases are becoming vaccine preventable, including those for prominent killers like pneumonia and diarrhea, the technology used is evolving rapidly. Since vaccines are administered to healthy people, especially children, it is pivotal to ascertain they are safe. Consequently vaccine development has become time and resource intensive, with more stringent regulatory pathways to ensure safety and efficacy of vaccines. In a situation where there is abundance of new and expensive vaccines on one hand and limitations of resources on the other, it becomes imperative that use of vaccines through induction in the Universal Immunization Program (UIP) as well as in the free market is done through a framework of decision-making that confers positive health economic benefits to the society.

The UIP in India targets 2.7 crores infants and 3.0 crores pregnant women every year and is one of the largest programs in the world. The country also has a vaccine industry that caters to 43% of the EPI vaccines and well as some of the new vaccines purchased by Global Alliance for Vaccines and Immunization (GAVI). Thirty five percent of the India's population buys the vaccines through the private market. Most of the new vaccines are used by this population, which can afford them, while the most vulnerable population, which is serviced through the UIP misses out on this opportunity. There is a scope for improvement in the health system and the vaccine enterprise in the country to enable its

**Comment [I1]:** It is fraudulent to project pneumococcal and rotaviral vaccines (that too covering only few strains) as vaccines against pneumonia and diarrhea, as these diseases are caused by many more etiological agents and there are no vaccines against all causes of these two diseases. This is a common and deliberate mischief played by people who push some vaccines. The policy should have specified how to avoid such mischief in public interest. Instead, it plays into the hands of such mischief.

optimal functioning and bring about coordination between the various inter-dependent steps and involved stakeholders. This policy document deals with these issues to strengthen vaccine enterprise on the whole to ensure long-term supply of affordable vaccines to the people who need it the most under the following headings:

**New Vaccine Introduction:** This section discusses processes, matrix and evidence base in decision-making, doses, schedules and antigen combinations and identifies barriers that are confronted.

**Vaccines Security:** This section deals with vaccine production and supply issues as well as vaccine financing and sustainability, effective vaccine management, stock-piles in emergency situation and strengthening the human resource.

**Program Monitoring:** This section deals with Vaccine Preventable Disease (VPD), surveillance, Adverse Effects Following Immunizations (AEFI: Surveillance and Resolution), advocacy and communication in vaccines, coverage, ethics and equity issues.

**Regulatory Framework:** This section discusses the existing framework and suggests scope for improvement in regulatory framework, clinical trials, IPR and technology transfer.

**Vaccine Research and Development:** This discusses the challenges in vaccines research, mapping of capacity for vaccine research in the country, research networks and creation of bio-repositories retrospective use.

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**Product Development:** This discusses product development in a public-private partnership mode, innovative funding mechanisms and product development for emergency.

#### **2. Preamble:**

Expanded Program for Immunization was launched in India in 1978. The ambit of this program was increased with inclusion of measles vaccine (and discontinuation of typhoid vaccine) in 1985 and the program was renamed as Universal Immunization Program. The aim was to cover all districts of the country by 1990 in a phased manner and target all infants with the primary immunization and all pregnant women with TT immunization. Since 2006, only two new vaccines Hepatitis B and Japanese Encephalitis (JE) vaccine has been introduced in selected districts and states, although safe and efficacious vaccines are available for major killers like pneumonia and diarrhea, which have been used other parts of the world.

According to statistics released by World Health Organization (WHO) in May 2010, India has infant mortality rate of 52 compared to a global average of 45 and that in the European region and the region of Americas being merely 12 and 15. Despite being an economy growing at a very fast pace (GNP being 2980 as of 2008), we have 41.6 % of our population living below < \$ 1 per day. It is important that the National Government takes ownership of ensuring vaccine security and equity by creating fiscal and legislative provisions, with appropriate support from external partners like Global Alliance for Vaccines and Immunization (GAVI), WHO, UNICEF, and others. The risk of totally depending on external sources of funding like GAVI has increased, as such funding depends heavily upon donor countries and has yet to recoup from impact of recent global financial crisis. It is important that India creates and strengthens its own mechanisms and systems for long-term sustenance of programs for vaccine preventable diseases.

#### **3. Policy Framework:**

While the cost of new vaccines could be a bottleneck in their access, lacunae in the health system are responsible for the low coverage of cheaper EPI vaccines. A National Vaccine Policy with specific relevance to local vaccine needs is required to guide decision-making and develop a long-term plan to strengthen the whole vaccine enterprise and not just a component. This is essentially guided by the burden of disease in the country or as a

requirement of international health regulations and involves a cycle of interdependent processes and stakeholders working towards a common goal of disease prevention.

**National Vaccine Policy is a guiding document for maximizing the use of vaccines available globally as a public health tool for improving health of the population.**

This document addresses the broad issues of strengthening the institutional framework, processes, evidence base and framework required for decision making for new vaccine introduction, vaccine-security, program management, regulatory guidelines, vaccine R&D and product development. In addition, a structure has been proposed for a National Immunization Authority (**Annexure 6**).

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#### **4. New Vaccine introduction:**

Disease prevention with vaccines that are safe and efficacious vaccines is the ultimate aim of any vaccination program. Identifying various strategies and process that help these objectives to be achieved and sustained are of paramount importance. A critical initial step in the cascade of activities necessary for any new vaccine to be introduced is the creation of an informed policy decision-making process that is based on the best available information and addresses, operational and financial sustainability issues at the country level. This ensures that once the vaccine is introduced in the routine immunization program, the vaccine supply is secured to protect the most vulnerable populations. Processes established for new vaccine introduction could also cover study of adverse effects, regulations and Research and Development associated with the new vaccine. This decision making process should also be used to create a debate on introduction of new therapeutic vaccines for cancers like HPV; for HIV and for use of vaccine for malaria (when available) during pregnancy.

In our country 35% of the population access vaccines from private (free) market where new vaccine entry follows marketing strategy of the manufacturers based on their experience from introduction in developed countries. This population should be studied as it can provide a good post marketing surveillance (Phase -IV analysis) data. Profile of the people accessing the vaccines as well as the service providers could be useful for future planning.

##### **4.1. Vaccines for local relevance:**

Ideally, the decision to develop a new vaccine should be guided by the extent of disease burden estimated through surveillance or modeling of data from countries with either geographical proximity or similar demography but often it is the market forces that drive it. As a result, most of the vaccines cater to the developed country needs where the vaccines fetch enormous profits.

- R&D and Manufacturing of vaccines for diseases that are prevalent in India and other developing countries, should be given a priority in the country. These include vaccines for major killers like pneumonia and diarrhea, diseases with potential to cause outbreaks like JE, Dengue, Cholera and Typhoid and diseases like Leishmania.

The processes, funding, networks, repositories etc. that make this possible are detailed in the subsequent sections.

##### **4.2. Institutional framework: Technical Advisory Group on Immunization:**

A group of experts from various fields related to development and introduction of vaccines as a public health tool, like the National Technical Advisory Group on Immunization (NTAGI), guide the government regarding technical issues around vaccine and immunization. WHO-SAGE, GAVI etc. publish periodic guidelines for a particular vaccine after assessment and analysis of global evidence in the form of "position papers". The time from availability of a vaccine for a disease to its use in the country should be reduced. Following are the steps suggested to achieve this:

**Comment [I2]:** This is a wrong and objectionable objective. The policy should guide development, production, adoption and administration of NECESSARY and affordable vaccines, rather than maximize the use of all vaccines available globally. The authors of this policy have revealed their true intentions in making this document, which is to legitimize what has already been happening without a declared policy.

**Comment [I3]:** Since when did HPV vaccine become therapeutic? If so, why is it being used on poor adolescent tribal girls in AP and Gujarat before their first sexual contact?

**Comment [I4]:** A policy document declares what a government "shall do" or "will do". There is no place for "should" in a govt policy document, because the govt can't tell itself what it should do, nor can it answer the question "then why the hell don't you do it"? from outsiders.

**Comment [I5]:** Again the fraudulent reference to vaccines against pneumonia and diarrhea, which don't exist, nor are anywhere in the horizon.

**Comment [I6]:** So it is all about vaccine availability and vaccine use, with all the urgency in between. Vaccine must be used regardless of (whether there is a proven) need for such a vaccine in the country/region.

• The guidelines of bodies like WHO-SAGE should be seen in context of the capacity that exists in the Indian vaccine enterprise to absorb a particular vaccine in the program.

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• The members of the technical advisory group should have sufficient interaction and representation in these international bodies to be able to incorporate country perspective in decision-making at that level.

• Country specific “situational analysis” should be created by a technical group of experts for individual vaccines.

• The inputs from translational research in the country to support such introduction should be improved. Capacity and infrastructure building in this area is being created / revamped. More interdisciplinary collaborations within the nation and at global level need to be initiated and established.

• The NTAGI should be supported by subgroups that look into specific areas such as vaccine security, ethics, equity, financial sustainability of the immunization program and improvements in health system.

• Membership of NTAGI should include experts in the areas of Public health, Pediatrics, Epidemiology, Infectious Disease (ID), Clinicians other than ID, Immunologists, Medical Microbiologists, Cold chain experts / logisticians, Statistic modelers, Social scientists, Scientific research, Drug regulators. It is also important to have experts in ethics, health economics, and nursing/pharmacy from the field, immunization programs managers and representatives of the civil society who can bring the public perception about vaccines and immunization programs to the decision –makers, which can help communication and advocacy initiatives. Other members should be ex-officio members from the Ministry of Health, Ministry of Education, Ministry of Women and Child Development and Ministry of Rural development. There should be representation from the State Departments of Health and Education as well.

• The group should meet on quarterly basis or meet at least 2-3 times every year, with a pre-decided agenda.

• It must be mandatory for the members to declare conflicts of interest to ensure an unbiased decision making process. The members should be allowed a term of a minimum of 2yrs (which could be extended).

• Terms of references for NTAGI members should have formal legislative and administrative mandates. (for details see Annexure 1)

#### 4.3. Matrix for Evidence based introduction of new vaccines:

The linear decision-making criteria used in the country for introduction of vaccines should be replaced by a matrix-based system to ensure ethically defensible yet rapid and efficient process for introduction of vaccines into EPI. The Grades of Recommendation Assessment, Development and Evaluation (GRADE) system is one such system followed, which allows a systematic and transparent grading of evidence with deliberate separation of quality of evidence and strength of recommendation.

The system grades the evidence from High to Very low based on limitations of detailed design and execution (risk of bias criteria), inconsistency (or heterogeneity), indirectness (PICO i.e. Participants, Interventions, Comparisons and Outcome and applicability), imprecisions (number of events and confidence intervals) and publication bias to grade evidence for decision-making. (See Annexure 2 for details)

#### 4.4. Vaccine formulations and immunization schedules:

In India, achieving higher coverage rates is often a challenge and is hampered by factors like social and religious issues, lack of proper advocacy and communication, coupled

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with weakness in the health system especially in certain states of the country.

**Comment [I7]:** Will we take a vaccine into a program depending on the disease burden and public health factors, or just because WHO-SAGE guidelines push it and just because Indian capacity exists to import/repackage/manufacture?

**Comment [I8]:** International bodies like WHO must work only through the ministry of Health to obtain country perspectives. The ministry CAN in turn obtain the inputs for its position from NTAGI as well as from the civil society. NTAGI's members' direct access to WHO does not guarantee India's ability to influence international bodies, but the reverse will certainly get institutionalized. In other words, our representatives enamoured with international bodies will influence NTAGI's decisions.

**Comment [I9]:** It is not clear if this model takes disease burden into account. The moot policy question is not whether the vaccine works, but whether the vaccine is necessary for all in India, and how many cases/deaths can be prevented by vaccinating how many people. This basic logic is missing throughout this policy document, just as it was missed in most of the NTAGI proceedings. Is this deliberate?

Evidence based (EBM) recommendations evaluate and specify the grade of recommendation. In itself such grading of evidence does little to improve the evidence itself. The author suggests that EBM is some form of a mantra which when invoked will allow “rapid and efficient ...introduction of vaccines” This is a misunderstanding of the EBM

**Comment [I10]:**

Introduction of new vaccines in the Indian EPI schedule has not taken place for many decades now. Changes in existing immunization schedule are required to accommodate new vaccines, for broader utilization some vaccines or for changing the number of doses based on experience elsewhere.

- Technical consultations should be carried out to examine the possibility of any alteration in vaccine formulation (eg. vaccines with or without preservative, with or without adjuvant, liquid or lyophilized etc.) that could enable the use of a vaccine in the existing schedule. Such a consultative process should include scientists, program managers, cold chain managers and representative manufacturers.
- Combinations containing the UIP antigens have shown to improve coverage, reduce program and non-program costs, and adverse effects following immunizations, especially in countries with similar issues. Introduction of such combinations should be attempted in the country for similar gains.
- The implementation of combination Measles-Rubella, targeted use of inactivated polio vaccine, future expansion of UIP with use of penta and hexavalent combinations and potential introduction of pneumococcal and rotavirus vaccine should be considered while making the changes.

#### 4.5. Barriers:

- Given the size of the country in terms of geographical spread and the population that needs to be serviced, there is **shortage of trained manpower** to manage the UIP at the center as well as state, for innovation in vaccines, for disease surveillance and for procurement and effective vaccine management.
  - Is a particular disease a health problem? This is the most difficult question to answer if the total number of cases of illness, disability, and death caused by the pathogen is limited. **Lack of data on disease burden** can lead to a perception that the disease is not important, especially when the pathogen causes a clinical condition (e.g., pneumonia) also caused by others; etiology and complications of the disease; occasional serious consequences of the disease are ignored. There is shortage of people who can carry out mathematical modeling of disease burden based on data from other neighboring countries. Even this requires some baseline data.
  - **Lack of diagnostic tools for certain vaccine preventable diseases** that could be used without sophisticated instruments or specialized training.
  - **Lack of baseline surveillance data** also is a bottleneck in monitoring the impact of vaccination. It also hampers measure of indirect effects like herd immunity. Developing routine reporting and surveillance systems will not only help overall management of health services, but also identify the major disease priorities, and help with decisions on new vaccine.
  - **Economic evaluations** to show cost effectiveness of vaccines over other interventions should be carried out to support decision-making.
  - **Lack of a financial sustainability plan for introduction of new vaccines** in the UIP also effects decision making in this area.
- Subsequent sections deal with how to address these barriers.

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#### 5. Vaccine security:

##### 4.6. Vaccine production and supply:

India is a major producer and exporter of vaccines: around 43% of global vaccine supply (> 70% in case of single vaccine) comes from India, mainly from private sector units. Till recently, both public and private sector vaccine producers were supplying vaccines to UIP. However, following withdrawal of production license from public sector units by DCG(I) in January 2008 due to deficiencies in GMP compliance, majority of vaccines for

**Comment [I11]:** This statement is misleading and mischievous. Ample published evidence indicates that the benefits of individual components of combination vaccines don't add up as much as the risks do. Moreover, industry is using combinations to add vaccines and multiply prices, virtually always pushing non-UIP vaccines piggyback with UIP vaccines. For more info, read the current science article on combination vaccines in 2006.

**Comment [I12]:** Since when has this been known and what was done about it? Is this a policy statement or mock self-criticism? Who is criticizing whom?

**Comment [I13]:** Absence of evidence of disease need not mean that the disease is absent. It may only be a reflection of poor data collection. This must be an impetus to collect and present better data. However absence of evidence of disease cannot be presented as evidence that vaccination is needed. Mathematical modelling in the absence of hard data is unreliable and must not be trusted. In a situation where hard data is available models are redundant.

UIP is being procured from private sector manufacturers. GoI is under process of reviving vaccine production in the three major public sector units and to make them GMP compliant.

Assessment of the National Regulatory Authority (NRA) in April 2009 by WHO and independent consultants has declared the regulatory system as fully functional. Till such time that the public sector units are functional, concerns about short-term supply of UIP vaccine has been resolved through negotiations with private sector manufacturers.

- A number of departments within the MoH&FW are involved with procurement and stock management, the two key components of vaccine security in India. A single entity to deal with procurement of vaccines and stock management should be created. The procedure for procurement of vaccines has to be streamlined to match the realities of the production timelines.
- An effective, functional and inclusive platform needs to be created so that all the stakeholders have the same understanding of the issues and work towards a common goal to ensure sustainable and uninterrupted production & supply of good quality, safe and effective vaccines at the most competitive price.
- Local manufacturers must be encouraged to play a key role in ensuring sufficient vaccine supply that meet global standards. They should be assured with accurate demand estimates, followed by purchases of all ordered vaccines in order to make manufacturers feel confident to invest in the enterprise and offer the government an opportunity to negotiate a much affordable prices of vaccines.
- Upgradation of the public sector units should be done with long-term goals in view.

For example, the role of these production units when the combination vaccines are used in the UIP, have to be planned ahead of time and with adequate provision for expansion and re-adjustments. The public sector units should be lead by a person with strong scientific background and should have forward-looking corporate -like governing system.

#### **4.7. Vaccine financing and sustainability:**

The ideal situation for any National Government is to assume ownership of their national immunization programs to the fullest possible extent and accordingly create fiscal and legislative space. Meeting benchmarks and enacting protective legislation are both essential conditions for sustainability.

- Creating a financial sustainability plan (FSP) is must. The sustainability plan should include the breakdown of vaccine and non-vaccine expenditures (system costs) in immunization and plan for scale up in the coming years. It should also factor in the changes to be brought about by introduction of new vaccines, expansion in cold chain capacities and program management.

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- The non-vaccine expenditure should also include expansion and sustenance of trained of human resource with appropriate career path. This should clearly state the expenditures to be met by the central and state government.
- An accurate estimate of vaccine demand, including vaccine wastage and cold chain capacity is important for accurate assessment of fund allocation for immunization program.
- New investors should be engaged to meet the sustainability problem. New investors can be domestic- from the public or private sector- or international. Enlarging the donor pool will help protect national budgets from potential funding shifts in the current donor base.
- Creation of a **Corpus fund for India** (Vaccine fund) through innovative financing mechanism should be considered. An interagency task force should be created to attract



talent within and outside the government to start a discussion on this. This group should also assess the legal and administrative barriers to make such a fund operational. This fund could also be used for introduction of new vaccines and for development of vaccine for emergency.

#### **4.8. Vaccine pricing:**

The middle and high income groups in this country purchase a sizable fraction of the total vaccine consumption from the private practitioners (purchase both UIP and non-UIP vaccines) while the lower income group is covered under the National Program for Immunization. Vaccines were taken out of the ambit of the DPCO in 1995. Unlike the UIP vaccines where the R&D costs are minimal, manufacture of the non-UIP vaccines involve technology licensing, R&D, infrastructure, production under cGMP and operational costs. In addition, the stringent regulatory requirements for the newer vaccines to be licensed, also adds up to the cost of these vaccines.

- There should be rationalization of cost of vaccines that covers the investment of the manufacturers unless risk of the manufacturers is reduced by financing mechanisms and by creating an enabling procurement system in sync with the timelines of vaccine manufacturing.
- Vaccine prices have been shown to be dependent on volumes purchased to the extent that no new infrastructure has to be created. "Pooled purchase" as is done with the PAHO revolving fund has been shown to reduce vaccine prices.
- The vaccine manufacturers often push the non-UIP vaccines through the private practitioners by offering them huge discounts. In order to discourage such practices, the pricing of the new vaccines, should be carried out by an independent assessment system like that for drugs, wherein the R&D, manufacture and operational costs are factored into and yet there remains a "price control" for the vaccines supplied to the private market.
- The vaccines procured through the government should be appropriately labeled in order to prevent their sale in the open market.

#### **4.9. Procurement and forecasting:**

All basic UIP vaccines are purchased at the central level for distribution to the states. Theoretically, seventy-five percent of the estimated requirement is scheduled for purchase at the beginning of a fiscal year and twenty-five percent is purchased later in the year after annual stock balances have been compiled. However, since the closure of PSUs most of the vaccine procured in UIP is sourced from private producers in the country. There are currently no standard procurement guidelines for GOI procurement other than broad

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overarching rules in the General Financial Rules (GFR). Vaccine is purchased using Annual Rate Contracts (as per General Financial Rules) against which Supply Orders must be issued. Parallel contracts are awarded for most vaccines because no single domestic manufacturer has enough available production capacity to cover the entire annual requirement. All 28 States and 7 Union Territories (UT) in India receive free, basic EPI vaccines from centrally placed contracts. Private sector physicians can obtain the same basic EPI vaccine from district level stores at no cost and charge a small fee to administer it. While basic EPI vaccines are purchased by the central government from indigenous sources, OPV for mass immunization campaigns as well as some Hepatitis B (Hep B) and Japanese Encephalitis (JE) vaccine is procured through UNICEF and other donor-driven programs.

- The current dependence on a limited number of domestic vaccine producers leaves the EPI program vulnerable to price increases and shortages. Market changes and upgrading of Indian GMP requirements to international standards will affect domestic producers.

**Comment [I14]:** Is it a bad thing that vaccine are sold at a lower price? What is the need to discourage the practice? Surely manufacturers will not be selling at a loss. If anything the effort must be to lower the MRP to the discounted price which must be the real and uninflated price of the drug.

- Transparent evaluation criteria and effective contract monitoring systems need to be instituted along with establishment of an independent evaluation committee(s) with binding outcomes to oversee procurement.
- Procurement timing has been out of step with the realities of vaccine supply. EPI vaccines have long production time, short shelf life and a supply imperative that must respond to the continuous birth of babies with a specific schedule of needs. Three year cycle of procurement should be tried and contractual lead time increased to better match vaccine production cycles.
- Aligning delivery schedules with production outputs to ensure that a base level of supply is always maintained in all states.
- The current number of personnel attending to EPI procurement and distribution is not adequate for the magnitude of the task. Mechanisms to augment this have to be identified.
- The difference between reported and evaluated coverage mentioned in the recent EPI evaluation. An in-depth study of the distribution system – including lower levels, should be undertaken to re- evaluate factors used for forecasting and determining supply requirements.
- AD syringes and vaccines should be bundled – that is, procured together. At the least, quantities and delivery schedules for procurement of AD syringes must match vaccine quantity and delivery schedules. RCH-2 funds used to purchase AD syringes, require strict International Competitive Bidding (ICB) to be followed, which are significantly different from Gol procurement procedures used to procure vaccines.
- Closer management of delivery schedules to ensure that over-stocking and understocking in different states needs to be instituted.
- A proposal for a Centralized Procurement Initiative is currently under consultation to address issue related to streamlining procurement of vaccines and related supplies.

#### **4.10. Effective vaccine management:**

Effective management of vaccine supply chain entails estimation of requirements, calculation of wastage and cold chain supply capacity management at different levels from central store depot to the PHC. Cold chain capacity assessment is important for delivery of right quality and quantity of vaccines to every child immunized and along

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with assessment of wastage goes a long way for development of financial sustainability plans (FSP) too.

#### **Cold chain:**

- The UNICEF assessment revealed that there shortage of cold chain equipment, shortage of space allocation and lack of preventive /corrective measures for breakdown of installed cold chain equipment facilities in immunization centers and storage facilities. Considerable capital investment is needed for up-gradation of GMSD facilities to enable a supply of buffer stocks of vaccines to be held by these facilities.
- The shortage of appropriately trained manpower to manage the cold chain logistics and equipments should be addressed on priority. On job training of manpower for management cold chain supply and maintenance should be urgently addressed.
- A system to dispose outdated CFC equipments that needs to be phased out according to Montreal protocol by 2010 also needs to be geared to create space for new cold chain equipments.
- There should be mechanisms and systems in place for independent auditing of cold chain capacity and compliance from time to time to ensure its proper use in the supply of vaccines including a communication system for feedback to concerned authority

for timely corrective measures.

**Vaccine wastage:**

- Assessment of vaccine wastage in India conducted in 2009 revealed that wastage rates depended on type of vaccine (lyophilized or liquid formulation), single or multidose and was inversely proportional to session size. Both cold chain and wastage is expected to increase several fold with the newer vaccines compared to the UIP vaccines. Smaller dose vial is recommended for vaccines that have only one dose in the UIP schedule (eg. Single dose for birth dose of HepB) and 2- 5 dose vials for the newer and more expensive vaccines.
- There is a need to optimize the size of the sessions and logistics management to reduce vaccine wastage. Adopting WHO multidose vial policy at session sites should be considered (**see Annexure 4 for details**). In addition, open vial policy, followed in some of the countries could be looked into. However, the processes and injection safety measures should be firmly in place and a strict quality assurance and supervision should be in place, as sometimes improper usage has led to septic shock and other complications.
- Documentation of the wastage at all levels and needs improvement.
- Any change in the vaccine vial size should be complimented with revised microplans and training of the frontline workers.

**4.11. Vaccine stockpile in disaster and outbreak situation:**

Stockpile of vaccines against certain diseases with potential to cause outbreaks such as cholera, JE and influenza need to be created. These vaccines are required for an affected target population and the quantity of vaccine needed for creation of this stockpile should

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be assessed accordingly together with the National Disaster Management Agency (NDMA).

- The manufacturers of these vaccines have to be communicated of the decision ahead of time for planning production and when the stock expires or is utilized.
- Adequate budgetary provision for such stockpiles should be created and adequate cold chain equipment earmarked for storage.
- The NDMA also needs to be intimated about the locations of these stockpiles and effective communication maintained with the agency for delivery of these vaccines during an emergency situation.

**4.12. Human resource:**

The Universal Immunization Program in India is among the largest immunization programs in the world targeting 2.7 crore infants and 30 crore pregnant women. The program is administered by the Immunization Division of the MoH&FW. The non-UIP vaccines on the other hand, are dealt-with by the Directorate of Health Services. Several assessments have revealed the shortage of appropriately trained human resource at all levels in the vaccine enterprise in the country. The present size of immunization division is extremely small, given the size of the country and number of beneficiaries to be serviced. Capacity building needs to be supported on a sustainable basis and should be adequately stressed in the National budget.

- Immunization is a centrally driven vertical program. The major problem with the system is that there is also no ownership at the facility level. There is a need to specify job responsibility of every person engaged in service delivery at all levels. Knowledge, skills and attitude needed for the various functions should be reviewed, gaps identified and long-term projection for human resource needs developed.
- The institutional framework for immunization and capacity should be built for program managers with a public health background and good leadership skills to drive

immunization program needs to be established.

- The existing system should be equipped to handle the new vaccine introductions. The gap between policy and scale-up of human resource needs to be addressed. There should be uniformity in recruitment at the center as well as the state level with flexibility of lateral movement. There should also be incentives for the state level officer to be moved to a position at the central level depending on his performance.
- The central immunization division needs to be much larger and expansion needs to be looked into in terms of functional categories: Data analysis and policy, management for vertical programs, cold chain, research and communication etc. Expansion of public health cadre at the central level to enable induction of more officers from the cadre as immunizations managers both at the Immunization Division at the Centre and at the State level is much needed.
- A cadre also needs to be built for monitoring and supervision of immunization program, which is currently lacking.
- The existing Institutional framework at the State level needs to be looked into in the context of service delivery. States need to be encouraged to frame and institute a HR policy
- The Tamil Nadu example, where there is an Independent Public Health Department with clear lines of supervision, needs to be studied for scale-up.

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- In order to improve vaccine coverage and service delivery all human resource initiatives should be in the framework of NHRM.
- Various interventions under NRHM, like provision of second ANMs, support for alternate vaccine delivery etc. and should be taken into consideration for planning for HR activities.
- Available technical resources at the National level: NIHFV and other national Institutes etc. also could be utilized for public health training /orientation for immunization managers and administration.
- Capacity for data management in order to improve the Health Management Information System (HMIS) and the mother and child tracking system is a needed. In order to reduce the gap between reported and evaluated coverage, facility based reporting should be strengthened.
- Wherever feasible possibility of outsourcing need has to be looked into.
- Maintenance of cold chain is important for quality of vaccines delivered. Training of cold chain officers and technicians is ongoing. Feasibility of outsourcing cold chain maintenance, as is the practice in a few states needs to be looked into.
- Few areas in which a cadre with special training is required are:
  - ! Epidemiology and mathematical modeling,
  - ! Regulatory requirements specific to vaccines,
  - ! Vaccine procurement and supply management
  - ! Causality assessment, investigation and management of AEFI
  - ! Communication and advocacy.

#### **6. Program monitoring:**

##### **4.13. Surveillance:**

Disease surveillance in a country like India should be strengthened in order to create an evidence base in order to enable planning and deployment effective interventions. Presently, efforts to collect data on childhood infectious diseases of public health importance is often fragmented. There is also a need for reliable and comparable data to establish baseline information, monitor trends of infectious diseases and monitoring of existing interventions. This will also provide data for evidence-based decision-making

important for framing policies and strategies in the future. Present surveillance systems do not provide all the actionable data required especially with regard to Vaccine Preventable Diseases (VPDs) and other childhood illnesses. There is a need for a sentinel surveillance system for program monitoring to provide information for VPD's like Diphtheria, Pertussis, Childhood Tuberculosis, and Japanese Encephalitis.

India has different surveillance models based on program needs. The major program is the IDSP, which is a case-based surveillance system for detection of early warning signals of outbreaks. Others are sentinel surveillance systems of vertical National Health programs for diseases targeted for control, elimination or eradication. Analysis of some of the existing surveillance systems and details of functioning of proposed surveillance system for VPDs is appended in **Annexure 5**. There is a need for horizontal linkage between these programs.

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- Surveillance models in other countries like Brazil and United States have a strong laboratory support. US have an overarching system under the Centres for Disease Control (US CDC) wherein each program division has an in-built surveillance system collecting relevant data for programmatic action. The model followed in Europe (EU – VACNET and TESSy) and the functioning of European Center for Disease prevention and Control (ECDC) should be studied especially with regard to integration and management of different surveillance networks in the country.
- Vaccine preventable disease surveillance has to be a long-term program in order to assess the impact of vaccination and therefore there has to have a strong component of training incorporated right from the planning stage. This will ensure that we have a pool of trained manpower to sustain the task for longer periods.
- There should be a provision to train and mentor young people at best of places in the world and this should be a budgeted expense for any program that is involved with surveillance. Well-planned training of staff at different levels, right from the principal investigators to the field staff, has to be in place. The laboratory staff at all these different levels should also be trained to use the best practices.
- Assistance should be sought from international agencies, which already have the resource and expertise in this area, especially for training, monitoring and independent evaluation of the system.
- Some incentives could also be given to investigators contributing to disease surveillance apart from their regular role in the hospitals.
- Networks need to be established for surveillance, the first node being at district level, then at regional level and finally should be monitored by a Central body. These networks should work with defined and unified protocol, preferably have common SOPs and also have a stringent and rigorous system of monitoring/auditing. These networks should also be equipped with the latest available systems for communication for timely dissemination of data to higher levels for action.
- Emergence of antibiotic resistance in organisms is another threat that the community has to deal with. Linkages with laboratory networks monitoring antibiotic resistance should be developed.
- Environmental surveillance using technology like the Geographical Imaging System (GIS) and Remote Sensing (RS) should also be used to support sentinel surveillance. This could provide important details about disease hotspots a helping prediction of epidemics and outbreaks well ahead in time.
- Epidemiology and Biostatistics should be an important component of our research agenda in all the government departments involved with health and education in the country.

- Innovations in diagnostics and tools for surveillance should be encouraged and facilitated. Tools for surveillance should be such that even the laboratories that are in the periphery at the primary health center can use it without much training of staff. Development of non-invasive tools for screening and surveillance, albeit properly validated will enable accurate estimation of burden of a disease.
- Surveys like the NHFS should be further strengthened with trained manpower to create data sets on baseline demography and linked to other international agencies engaged in similar activities in the country. Such baseline demographic data is of utmost importance in interpreting disease burden data, results of clinical trials or when an adverse events following any intervention has to be investigated and causal linkages established.

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**4.14. Adverse Events Following Immunization:**

Since vaccines are administered as preventive measures to healthy individuals particularly children, adverse effects following immunizations should be handled effectively in order to maintain/restore public faith in immunization programs. An assessment of the NRA in India has revealed that its AEFI monitoring function is deficient. Subsequently, efforts have been made to improve the AEFI guidelines by the MoH&FW in consultation with WHO.

- Proper reporting and notification as well as rapid evaluation of AEFI that occurs during vaccination is important. The reporting of an AEFI event should be encouraged and guidelines for reporting of an adverse event should be adhered to. Compliance to this can be improved, if instructions go with a message that this is being done to take corrective measures and prevention of any untoward incident rather than for blame allocation.
- A temporal association of a serious adverse effect or death with vaccine administration can lead to derailment of a vaccination program and further lowering of public confidence. Unsafe injection practices may occur because of heightened activity during immunization programs. This should be identified and corrected quickly and efficiently by staff trained in causality assessment.
- Establishing / dissociating a causal link between the event and immunization should be based on laboratory findings and baseline demography data for the region.
- Effective collaboration and effective communication between National Control Laboratory, the surveillance program and the National Immunization Program should be established and quick identification and resolution of a vaccine batch related problem. Clarity of responsibilities and good liaison system with the NIP is required.
- Basic investigation of an AEFI should be completed within 15-20 days to enable proper sampling during postmortem and preventing loss of vial /sample in question.
- Special training of staff dealing with AEFI is essential to prevent disinformation and rumors and to equip them to respond to the media.
- Resolution of AEFI should be simple in its functioning for effective handling of such situations in a delineated and well coordinated manner without any overlap of responsibilities that might lead to miscommunication to the community and media.
- The National Control Laboratory with in the NRA should be consulted for AEFI surveillance. The NCL at Kasauli, which is currently used for the purpose should be upgraded and NABL certified. If possible duplicate samples could be sent to an international laboratory of repute, identified for the purpose.
- In case the vaccine in question has been procured through a UN system such as UNICEF, an appropriately trained contact person identified within the UN system during procurement needs to utilize the UN mechanism to provide an independent assessment

of the situation.

- NIP and NRA should be provided with adequately trained human resource to manage and coordinate immunization safety initiatives. Both should have a joint plan of action and communication to the designated officer in Ministry of Health, the public and other stakeholders like the manufacturer, UNICEF and the procurement agency.

- **A strong AEFI surveillance system**, both for UIP as well as privately procured vaccines should be set up as a priority within the National Regulatory Authority. It should be well equipped for rapid notification and effective evaluation and dissemination

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of information to relevant authorities. Properly laid down guidelines for reportable events and case definitions, with proper training of staff and partnerships with appropriate academic institutions is must.

- **Waste management**, often a neglected component of planning of immunization programs should also be given stress and budgeted accordingly.

- **Post marketing surveillance of AEFI** is also important to generate new hypotheses about vaccine reactions that are specific to the population.

- **Links with the Brighton collaboration** and Global Advisory Committee on Vaccine Safety need to be established.

- A global consortium for analyzing vaccine safety infrastructure in developing countries is being created, launch of which is expected in 2011. This will enable determination of minimum capacity required by the country to ensure vaccine safety and have a strategic plan in place to achieve this goal. Linkages with this consortium can be looked into.

#### **4.15. Advocacy and communication:**

Advocacy and communication efforts are as important for community acceptance of the new vaccine as for maintaining their confidence in the existing vaccines. This is specially important for situations where a serious adverse effect of immunization has occurred. In the arena of vaccines there are always people who have concerns- either perceived or real. A system has to be in place to speedily deal with them in a scientific fashion in so that it does not affect the vaccination program in the community.

- Adequate research to gauge the perceptions of the target community about immunizations could help develop the communication and advocacy strategy better. Messages and methods used for their dissemination need to be tailored to the target audience. The messages should be simple, accurate and information relevant to and is understood by target audience.

- Promotion of the concept and importance of vaccination should involve people the mass can relate to eg. community and religious leaders, outreach workers, traditional birth attendants, and other community peers, sports icons, movie stars, should be used to spread the benefits of immunization keeping in mind the sensitivities of the target population.

- Such messages should be adequately pre-tested before sending out to the public.

- Special training of health care workers is needed to respond to the frequently asked questions (FAQs) by the parents and care givers so their confidence in the immunization program is maintained and if possible augmented.

#### **4.16. Coverage:**

The coverage of UIP vaccines in this country is >70% only in 11 states, 50-60% in 13 and below 53 % in the rest of the 8 states. The last group also happens to include the most populous states, which brings down the national average below 50%.

- While improving coverage of the UIP vaccines is much needed for which an assessment of existing bottlenecks that impede success of this objective should be carried

out by an independent agency.

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- A systematic registration and identification of pregnancies and births along with computerization of data for data-management will be useful to facilitate reaching the newborns for administration of the birth dose of
- As mentioned earlier linking the GIS system with the NIP network can also be used to track delivery of vaccines.
- The strengths and gains from National Rural Health Mission (NHRM) in improving coverage of vaccination in certain states should be consolidated. The ANMs should be adequately incentivized to contribute to increasing coverage.
- An in-depth assessment of the immunization systems in the states should be carried out to understand the better outcomes in some versus the abysmal performance in others. Similarly the neighboring country structures (eg, Sri Lanka, Bangladesh etc.) should also be studied to learn from them.

#### **4.17. Ethics and Equity:**

Ethical use and equitable access to prevention and care should be the basic mantra of any program meant for ameliorating disease burden in the country. The mortality and morbidity, especially in the impoverished populations is mainly due to diseases for which there are vaccines available now. The fact that many new vaccines are expensive and financial resources are limited, calls for rational prioritization of investment in getting these vaccines to the people who actually need them. While the rich and the middle class in this country access the vaccines from the open market and private practitioners, introduction in the UIP is one way of making vaccines accessible to the poor and needy.

- The vaccines to be introduced in the UIP should be safe and efficacious.
- Public health benefits of vaccines in the mass immunization programs should always outweigh the adverse effects. The economic burden and inconvenience to the parents/family should always be factored in when planning.
- Studies that compare the burden to benefits ratio of vaccination to other options available for prevention should be encouraged.
- Effective communication system should be in place to convey the benefits (and expected adverse effects) and well as disadvantages of not being immunized to the population to be immunized.
- There are several models world over for financing of vaccination for the impoverished other than government funds e.g. Typhoid vaccines in Pakistan where the rich kids pay a price for the vaccine that allows it to be subsidized to the poor kids. In Bangladesh the fishery industry finances the cholera vaccine for the poor. Such models need to be studied and similar ones developed for India at least for some vaccines like pneumonia and HPV.

#### **7. Regulatory Framework:**

##### **4.18. The existing vaccine regulatory system:**

The Central Drugs and Standards Control Organization (CDSCO) fills the role National Regulatory Authority (NRA) in India. CDSCO is headed by the Drugs Controller General (India) [DCG(I)]. It approves new vaccines that are introduced in the country,

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grant permission to conduct clinical trials, registers and controls the quality for imported vaccines as well as lays down standards for updating India Pharmacopoeia. It also approving licenses as the Central License Approving Authority (CLAA) for the manufacture of vaccines and coordinates the activities of the States and advises them on matters relating to uniform administration of the Act and Rules.



The Central Drugs Laboratory (CDL) in Kasauli performs lot release for all imported vaccines as well as locally produced vaccines. CDL is under the Directorate of Health Services, GOI.

#### **4.19. Scope for Improvements in the quality assessments**

Indian vaccine industry has occupied an important niche in the manufacture of EPI vaccines and in the last decade. However, except measles vaccine which is from a domestic pre-qualified producer, none of the EPI vaccines supplied for the national immunization program are from non pre-qualified source despite the fact that India is one of the major suppliers to UN agencies of pre-qualified DTP, DT, TT, Measles, BCG and Hep B vaccines.

The Indian vaccine industry has taken up new challenges of manufacturing more complex vaccines like the meningococcal conjugate vaccine, pneumococcal conjugate vaccine and combination vaccines. Recognizing this emerging strength of the Indian manufacturers, the NRA should be appropriately strengthened with trained manpower and an accredited laboratory which can serve as the National Control Laboratory setup.

- The current regulatory guidelines followed for vaccines by the National Regulatory Authority is dated and essentially designed for drugs. There is an urgent need to develop guidelines that is specific for vaccines.

- Laboratory testing for vaccine consistency is a critical component of vaccine quality. Consistency of three to five lots of final product characteristics is essential for licensure.

A system of accreditation of laboratories through a set of internationally accepted parameters should be in place. Institutions like the **National Institute of Biologicals (NIB)**, which have this mandate need to be adequately strengthened especially to take on the laboratory testing of new generation of vaccines and the novel platforms.

- India should have its own set of prequalification standards in consonance with the international standards. Single window system should be in place to prevent any unnecessary delays in regulatory clearances. There is a need for training and capacity building in vaccine regulation.

- Most of the EPI vaccines procured for use in India comes from manufacturers that are not WHO prequalified and have different risk taking ability. Adhering to the WHO prequalification standards will enable more domestic manufacturers to cater to international markets. Coupled with a more efficient procurement system that factors the timelines of the vaccine manufacturing process, the risk of the vaccine manufacturers will be significantly reduced.

- There is a need to set up systems for fast-track clearance of vaccines needed for emergencies. One of the ways to achieve this is that the Indian NRA should recognize NRA of other countries as is done by countries procuring vaccines through the UNICEF.

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In situations where time is essence, having provisions like this will go long way to save several lives during emergencies.

- In order to set up new premises that meet the cGMP standards, there should be a panel of accredited vendors and consultants, which can be utilized in situations where there is emergency.

#### **4.20. Clinical trials:**

- Often drug and vaccine trials are conducted by limited number of Principal Investigators in the country and thus the number of trials each one handles is more than optimal for proper conduct of a trial. There is a need to create a pool of trained investigators to design and oversee clinical trials for vaccines. The Clinical Development and Services Agency, which has been recently established by the Department of Biotechnology and its partners, which have this mandate should be supported

appropriately.

- Clinical trials are very crucial for go-no-go decisions in vaccine development. They should be planned and executed according to the good clinical practices and maintain highest standards possible. Good Clinical Practice (GCP) training courses should be mandatory for all PIs leading clinical trials and they in turn could act as trainers the subordinate staff.
- Capacity building for data management and biostatistics to analyze and interpret the results of a clinical trial is essential.
- A training program for the support staff participating in each trial may be different and therefore be budgeted in the trial.
- There should also be provision to engage trained auditors from time to time for independent assessment of vaccine trials conducted in the country.

#### **4.21. IPR and technology transfer:**

After the latest amendments made in the Indian Patent Act in 2005 product patents have been allowed in India which significantly effects that cost of health care products in India in general. The vaccine manufacturers as well as research institutions are now strengthening capacity to deal with the situation. Improving the institutional capacity for intellectual property (IP) management and technology transfer will help investigators involved in research to understand the claims of the patents and will enable them to make sound judgments during product development. Failure to understand IP context might cause infringement and potential liabilities for damage, withdrawal of products from the market or to accept licensing agreement at unfavorable terms. On the other hand, trying to circumvent the claims could also lead to delay in product line expansion and missing opportunities for developing new products. Vaccine manufacturers have been using the technologies that have been off patent or publicly available albeit not the best available technologies.

- Strengthening the Indian patent office, reducing the time too examine and grant a patent and creation of more comprehensive IP databases in India will facilitate better analysis of freedom to operate.

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- Encouraging of technology transfer from multinational companies is one of the fastest ways of developing products and gain access to technologies and know how, albeit with limited market. Most of the Indian manufacturers resort to this type of arrangement to gain access to cell lines and for financial sustainability till it has its own innovative products. Facilitating such arrangements will improve access to the domestic market, will create additional manufacturing facilities and will also strengthen the quality control and regulatory pathway in the country.
- Indian patent law should have provisions to permit compulsory licensing especially in case of an emergency (like the HINI pandemic) or situations where some technology/intermediate is needed for vaccine development for such a situation.
- The country should develop/use expertise to study the flexibilities enshrined in the TRIPS agreement to reduce the negative impact of the patents. One such flexibility is “**Bolar provision**” which specifically permits the manufacturers of generic pharmaceuticals to begin product development, while the patent is in force. This could be particularly helpful in reducing the lead-time to obtain regulatory clearances during vaccine development.
- Collective management of IPR and open access agreements should be resorted to improve innovation and access. Innovations in ways too deal with IPR of new vaccines need to emerge through innovative funding of R&D. A good example is the SIBRI model.
- It is suggested that an externally funded body that could acquire and hold IPR for

technologies beneficial for use in public health, be created. This body could then license the technology to emerging manufacturers on acceptable terms for development of vaccines and related products. It could be initially funded by World Bank /Gates foundation and after covering the cost of running it and licensing of technologies, it could use the surplus money to finance Indian manufacturers to undertake development on soft repayment terms in order to cushion the risks.

#### **8. Vaccine R&D:**

##### **4.22. Grand challenges in vaccine research:**

Research and development of vaccines is being undertaken in the academia as well as the industry. Vaccine development is a long, multi stage process where critical actions must be taken in synergy and not sequentially. As articulated by the DBT, The Grand challenges in Vaccine is a program that will primarily function through effective linkages with all institutions in India where the vaccine related projects are implemented by DBT including institutions of ICMR, DST, CSIR, small and medium vaccine industries, medical and engineering schools in addition to DBT supported autonomous institutions. The services available under this program will be accessible to all agencies. Several types of linkages will be established (i) Academia – Academia (ii) Academia-Industry (iii) International linkages such as NIH/NIAID, GAVI, PATH etc. and a strong international cooperation program under bilateral collaborations or with international agencies pursuing similar vaccine development projects especially with NIH, NIAID, WHO, Gates Foundation, PATH, ICGEB and other international institutes will be developed. Given

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India's manufacturing prowess in the vaccine sector and a rapidly rising global demand, vaccine R&D is also a tremendous economic opportunity.

- A fund for grand challenges in vaccine R&D needs to be created.
- The vaccine grand challenge mechanism will ensure that all varied type of infrastructures and services, approved by FDA, and DCGI are available, accessible and affordable to investigators and SME's involved in vaccine research and development.
- Workable mechanisms need to be developed to sustain vaccine development teams, for a decade or more for continuity and focus, and new skills incorporated to fulfill evolving requirements.
- Flexible governance and granting systems should be in place to ensure that additional science funding, cooperate granting system (where funding agency, project managers and investigators work as a team for collective decision making) and subcontracting mechanisms are in place.
- Enabling processes for rapid decision-making to allow building alliances and partnerships, both national and global, and for support to agencies for diffusion of the technologies into the social systems, should be in place.

##### **4.23. Mapping of capacity and research in the country:**

Periodic mapping of research and development activities in the country is important to assess the strengths and gaps and to avoid duplication of efforts. This exercise also helps identify candidates that have potential and should be taken forward and quickly abort/correct programs that have lacunae. Mapping exercises are very important in case of vaccines where the pipeline of candidates has to be large and the development resource-intensive.

- Participation of national government institutions, private institutions and industries that have resources and manpower in the area of health research should be given a platform to share ideas and intellectual property and encouraged to collaborate.
- These groups when identified to have common goals, should be encouraged facilitated to write joint grants and thus utilize the infrastructure and manpower to the optimum

capacity.

- The results of mapping exercise should be made available to researchers in the country and to other funding agencies investing in similar programs.

#### **4.24. Research networks:**

The above-mentioned mapping exercise could result in disease or intervention (drug/ vaccine/ delivery systems/adjuvants) specific networks that could synergize the efforts and enable concentration of resources, both monetary and human, towards fight against a specific disease or a group of diseases (for example a network of neglected tropical diseases).

- These networks could then collaborate within themselves, share intellectual property, expertise, biological material and also collaborate with international groups working on similar projects.
- Creation of Sophisticated and Analytical Instrument Facilities (SAIF) within a region/state will encourage sharing of expensive instruments and enable participation

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of investigators from various universities and institutions. This will also enable periodic up gradation of the facilities.

#### **4.25. Creation of Biorepositories:**

Banking of biological samples both sera and organisms that are collected during diseases surveillance, epidemics or clinical trials can be excellent source of materials for retrospective use in identifying biomarkers, genetic makeup or studying changes in pathogenic organisms in India in case of reemergence of a disease. Administration, management, custodianship and security of bio-banks can be major issues. Without proper guidelines and policies about benefit-sharing, data-sharing, privacy, access both for depositing of samples and retrieval, policies to handle bio-piracy etc. a well intended effort could go haywire.

- The existing guidelines that govern the functioning of a National Biorepository in India and the best practices followed in other countries should be examined and an India specific Standard Operating Procedure and Guidelines needs to be drafted with appropriate linkages with different programs.
- The biorepositories need to be equipped with fingerprinting, sequencing for analysis of the genetic makeup of the organism and freeze-drying facility for longterm storage.
- The repositories should be accredited and linked with International Repository System and to other discovery research units in the country.
- There is an urgent need to establish a repository for pathogenic organisms. All the data sets generated should be strongly linked with other national programs.

### **9. Product development:**

#### **4.26. Public Private Partnerships:**

The concept public private partnership for product-development is 10 years old, but has bridged the gap between academia, industry and funding agencies effectively. It unifies the commitment of the public sector to develop products to improve health of the population with the private sectors discipline and culture in business development and marketing and has resulted in non-profit enterprise that has effectively led to development of several products in the past decade. The PPPs have also evolved innovative methods for intellectual property and portfolio management and has unique structures and methods for governance.

There are several examples where product development have taken the public private partnership route and have resulted in shortening of the time frame for vaccine development as in case of Meningococcal Meningitis Vaccine Initiative (MMVI) the

product is produced in India with multiple partners, meets international standards in quality, is exported to and used in Africa. The model has been instrumental in indigenously developed 116 E rotavirus vaccine being developed with effective collaboration between Indian and US academia and Indian industry in partnership with PATH. Malaria vaccine initiative (MVI) has led to development of several

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vaccines each for a different stage of malaria and includes India academic institutes and industry along with PATH.

Another good example is the development of influenza H1N1 vaccine with support of 10 crores each to three Indian vaccine manufacturers under the BIPP (Biotechnology Industry Partnership Programme of the Department of Biotechnology, Government of India). A indigenous new generation Oral Cholera Vaccine has also been brought to the market under such model, the partners being IVI Korea, NICED Kolkata and Shantha Biotechnics, Hyderabad.

- Flexible governing and funding mechanisms should be evolved to support product development in the public private partnership mode.
- Flexibility of contracting experts, both from national and global pool for a defined period should be built in these partnerships.

#### **4.27. Novel funding mechanisms:**

In order to fund the long and multistage pathway of vaccine development where the various components have to work in synergy rather than sequentially, novel funding mechanisms for various stages need to be in place with the flexibility required to fund various partners in an enterprise model. Some of these are already available like the BIPP and SBIRI mechanisms of Department of Biotechnology available for industrial development of lead candidates.

- More flexible granting mechanisms, unlike the milestone based, short-term, project-specific funding currently followed, both from government and external agencies, are needed for research and development in academia and industry.
- Innovative Funding mechanisms lasting for 5-8 yrs should be instituted for young investigators interested in vaccine development including flexible mechanisms for training in related areas like Good Laboratory/Clinical/Manufacturing practices ethics (Including IPR) and hands on skill development in certain technology platforms.

#### **4.28. Product development for emergency:**

- There is a need to develop mechanisms where speedy regulatory clearances are possible including flexibilities in the import of biological materials needed for such development.
- Risk of the manufacturers is cushioned by appropriate assistance from the Government.
- It should be mandatory for the Government to support such developments with Advance Market Commitments and honor the commitments.

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- Innovative Financing Mechanisms To Advance Global Health Past, Present and Future Investments IAVI POLICY BRIEF: 21 JUNE 2009

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**Annexure 1:*****The Terms of Reference (TOR) for the National Technical Advisory Group for Immunization:***

The terms of reference for NTAGI should be inclusive of the following:

- ! Identify the reasons of the low immunization coverage and, identify bottlenecks and suggest a strategy to improve the immunization system.
- ! Conduct policy analysis and determine immunization policies and strategies that are optimum for the nation for control of vaccine preventable diseases.
- ! Advise the government on the periodic evaluation of immunization programs in order to measure and quantify its impact.
- ! Provide the government with specific guidance in setting up standards and criteria to support new vaccine introduction in the UIP.
- ! Inform government of public health needs in vaccine preventable diseases and use of sophisticated tools available to estimate demand for vaccines.
- ! Suggest innovative ways of introducing demand generation strategies in the program.
- ! Promote national vaccine security.
- ! Help the government identify mechanisms of financing immunization activities and suggest strategies for sustaining the program.
- ! Help the government improve the human resource and develop training in area of vaccines and immunization.
- ! Suggest mechanisms and modalities to improve vaccine safety and quality through the strengthening of National Regulatory Authority.
- ! Advise the government in investigating adverse events with the help of expertise available globally.
- ! Help in assessment of the current disease surveillance system and appropriately strengthening the Integrated Disease Surveillance Program for long-term surveillance of vaccine preventable diseases.
- ! Firm up guidance for epidemic/outbreak control measures of vaccine preventable disease.
- ! Help government agencies and organizations to determine strategies, policies and plans for long-term research agenda in the area of vaccines and immunization including estimation of disease burden, cost effective analysis and operation research.

Reference: *Vaccine* vol.28 April 19, 2010 supplement

SIVAC initiative website: <http://www.sivacinitiative.org/>

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## **Annexure 2:**

**GRADE:** *The Grades of Recommendation Assessment, Development and Evaluation system.*

This is a systematic and transparent grading of evidence with deliberate separation of quality of evidence and strength of recommendation.

### **Levels of quality of a body of evidence in the GRADE approach:**

#### **Underlying methodology Quality rating**

Randomized trials; or double-upgraded observational studies. High  
Downgraded randomized trials; or upgraded observational studies. Moderate  
Double-downgraded randomized trials; or observational studies. Low  
Triple-downgraded randomized trials; or downgraded observational studies; or case series/case reports.

Very low

#### **Factors that may decrease the quality level of a body of evidence:**

#### **Factors that may increase the quality level of a body of evidence:**

Source: Chapter 12 : <http://www.cochrane-handbook.org/>

1. Limitations in the design and implementation of available studies suggesting high likelihood of bias.
2. Indirectness of evidence (indirect population, intervention, control, outcomes).
3. Unexplained heterogeneity or inconsistency of results (including problems with subgroup analyses).
4. Imprecision of results (wide confidence intervals).
5. High probability of publication bias.

1. Large magnitude of effect.

2. All plausible confounding would reduce a demonstrated effect or suggest a spurious effect when results show no effect.

3. Dose-response gradient.

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## **Annexure 3**

### ***New vaccine introductions planned:***

### ***Domestic production/ development of the new vaccines:***

### **Vaccine Companies Presentation Installed capacity in**

### **Lakh doses\* / not**

### **under production yet**

**Hep B** SII, Pune 1000

Panacea Biotech, New Delhi Multidose 540

Panacea Biotech, New Delhi Single dose 120

BBIL,Hyderabad 1000

HBI Udhagamandalam 200

Shanta Biotechnic Pvt Ltd 2000

**Hib** Bio-Med Pvt. limited

Ghaziabad

Monovalent 15

Panacea Biotech, New delhi 1000

**S.**

**No.**

### **Vaccine 2009 2010 2011 2012 2013 2014 2015**

1. **HepB** 10 States Entire country

2. **Hib** 5 -10 states Entire country

3. **PCV** One State ??? 10 States?



4. JE 80

districts

All 104 endemic districts?

5. Rotavirus ???

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Shanta Biotechnic Pvt Limited,

Hyderabad

Panacea Biotech, New Delhi Tetravalent (DPT

-Hib)

4500

Shanta Biotechnic Pvt Limited,

Hyderabad

3000

Panacea Biotech, New Delhi

Shanta Biotechnic Pvt Limited,

Hyderabad

Pentavalent (

DPT-HepB-Hib

1000

PCV SII, Pune

Pancea Biotech, New Delhi

8-11 valent Preclinical

development

Shanta Biotechnic Pvt Limited

R&D

JE Shanta Biotechnic Pvt Limited

2000

Biological E Expected launch in

2012

Indian Immunologicals,

Hyderabad

R&D

Rotavirus BBIL Hyderabad

Shanta Biotechnic Pvt. Limited

SII, Pune

\* as submitted to CDSCO for 2008-2009

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**Annexure 4.**

**Summary of vaccine wastage rates:**

**Source: Assessment of Vaccine wastage in India, 2010**

**Wastage Rates By Storage sites:**

BCG 0.005% 0.345% 0.857% 60.99%

DPT 0.426% - 0.053% 26.80%

TT 0.002% - - 33.71%

HepB - - 0.080% 33.15%

OPV - - - 47.47%

Measles 3.463% - - 35.09%

**State wise vaccine wastage rates for each vaccine:**

: The average wastage rate was observed to be 61%. The maximum wastage rate was observed in the state of Assam (68%) and minimum in Maharashtra (54%).

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**Wastage rates with different vial sizes:**

The vaccine is available in various sizes, starting from single dose vials up to 20 doses per vial. Table below shows the vial sizes typically available for each type of vaccine in the UIP schedule.

Doses per vial

**Vaccine Doses per vial Used in**

**India**

**1 2 5 10 20**

**BCG " " " 10**

**Measles " " " 5**

**DPT " " 10**

**TT " " 10**

**HepB " " " " 10**

**OPV " " " " 20**

The vaccine wastage rates as observed in the assessment are based on the vial size used in India. The vaccination coverage data from the assessment (number of doses immunized per session) is used below with different vial sizes to arrive at projected wastage of vaccine. It is shown that the wastage is least with a vial size of 5 doses .. But the cost of saving wastage by introducing smaller size vials should be complimented with no incremental need of cold chain storage space.

**Cost impact of vaccine wastage:**

The vaccine is procured in India based on a coverage assumption of 100% of the target population and a wastage factor of 1.33 for all vaccines except for BCG. For BCG, the requirements are based on session planning. Adding the cost of vaccine (per dose) is to the derived wastage rates from this assessment, the total amount spent to procure vaccines about 61% is the base cost of immunizing every fully immunized child (FIC) and 39% is to cover the vaccine wasted.

Graph below shows the breakup of base cost per FIC and additional cost incurred as a result of wastage for each vaccine in immunization schedule.

Figure 11: Cost per FIC Figure2: Cost per FIC by type of vaccine

**Baseline assumptions**

FIC- Fully Immunized Child

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The baseline cost of each vaccine assumed for use in this assessment.

**Vaccine Type Number**

**of doses**

**per FIC**

**Number**

**of doses**

**per vial**

**Mode of**

**administration**

**Storage**

volume  
per dose  
(cm<sup>3</sup>)  
Cost per  
dose  
In INR

BCG Lyophilized 1 10 Injectable 1.2 1.92  
Measles Lyophilized 1 5 Injectable 5.0 9.09  
DPT Liquid 5 10 Injectable 3 1.68  
TT Liquid 3.5 10 Injectable 3 1.25  
HepB Liquid 3 10 Injectable 3.8 4.95  
OPV Liquid 4 20 Oral 1 3.6

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#### **Annexure 5:**

##### ***Analysis of surveillance systems functioning in the country:***

**Source:** Concept note for developing a framework for strengthening surveillance for childhood infectious diseases (mainly vaccine preventable diseases) prepared by WHO India and MoHFW

##### **! Integrated Disease Surveillance Project:**

This is a World Bank assisted project covering the entire country (3 phases) started in November 2004 with the objective to detect and respond to early warning signals of disease outbreaks. It is a decentralized reporting of diseases right from the periphery to the district/state and national level. It reports Syndromic cases (symptomatics only in 'S' format filled by ANMs) from sub-centres; Probable cases (Presumptive/ clinical diagnosis in 'P' format filled by Medical officers) from PHC/CHC/District Hospital/any hospital); and Confirmed cases (laboratory confirmed in 'L' format filled by Microbiologists) from district/state labs. The system gathers reports on diseases of public health importance especially of outbreak potential (number of cases only and description of outbreak events). IDSP receives weekly surveillance data from 458 out of 613 districts. It has a well-developed structure with a web portal for data access and transmission, 24x7 call centre through toll free number 1075 for community reporting of outbreaks. It has a well-established IT network for data entry, training, video conferencing and outbreak discussion.

The IDSP also has strengthened surveillance by contractual employment of additional staff like epidemiologists, microbiologists, entomologists, data managers, data entry operators and others through NRHM.

**Limitations:** The IDSP is not designed to collect case based data (age, sex, immunization status etc.) or mortality data. The lab confirmation of outbreaks is also less than 30% and needs to improve. This requires strengthening of district and state level labs which have been delayed. Collection of OPD data especially from large hospitals has been difficult. The outbreaks are reported by First Information Reports/early warning reports (FIR/EWR) but subsequent detailed outbreak investigation reports are not being received regularly. The case based data received also has not been properly analyzed at various levels.

##### **AFP surveillance:**

This is a high intensity surveillance started in end 1997 for eradication of poliomyelitis by the Govt-National Polio Surveillance Project (NPSP). It has a network of over 300 dedicated Surveillance Medical Officers (SMOs) supported by WHO (each covering 1-5 districts) with dense concentration in UP and Bihar to assist the State/District immunization officers (SIO/DIO) in surveillance. They receive reports about cases of

Acute Flaccid Paralysis from around 31,000 reporting sites (11,000 reporting units and 20,000 informers) and these are verified by a network of 8 accredited national labs and one reference lab. The program reimburses incidental costs for verification of cases, sample collection, etc.

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**Limitations:** The surveillance is resource intensive for a single disease (under eradication) and the data needs to be better mainstreamed into the govt. system.

**Measles surveillance:**

Measles surveillance is functional in seven states (presently this system is operational in the states of Andhra Pradesh, Gujarat, Karnataka, Kerala, Tamil Nadu, West Bengal and Rajasthan) and is built on the existing AFP surveillance in coordination with IDSP and verifies outbreaks of measles. Whenever measles outbreaks occur the and carries out detailed investigations and 5 blood samples are sent to the state laboratory (one in each state) to confirm measles. If the cases are negative then it is further tested for Rubella to rule out a Rubella outbreak. The system provides for age-wise incidence and vaccination status. This is being considered for expansion to further states.

**Limitations:** The and presently limited to a few states only.

**AES surveillance:**

This sentinel surveillance for AES (including Japanese encephalitis) functions from 4 sentinel sites- Dibrugarh, Bardhaman, Bellary and Madurai and is built on the existing AES surveillance of NVBDCP which also covers Gorakhpur. Blood and CSF of admitted cases are tested at labs for JE situated in the microbiology labs of the sentinel site itself. Additional surveillance sites could be added to increase the geographical coverage of JE.

**Limitations:** The sentinel surveillance is resource intensive and limited to 4-5 sentinel sites only.

In addition to the above systems, periodic surveys are also being conducted to validate elimination status for childhood diseases like Neonatal tetanus etc.

**Approaches:**

Maintaining program specific data needs is crucial for quality delivery of services. Hence the need is to explore for workable, sustainable surveillance model for VPDs, under the framework of the IDSP to strengthen and build the capacity of the existing system. At the same time there are potential areas for synergy and functional integration where feasible. For example in training, lab services, supervision and dissemination of surveillance data.

**Suggested surveillance model:**

The model suggested is to identify and establish around 1-3 sentinel sites in each of the 35 states and UTs (50-60 sentinel sites totally) of the country. These sites should preferably be the HQ district of the state/UT and one another district. The selected site should preferably be a government Medical College Hospital or a Childrens Hospital which is attached to the Govt. Medical College. A mix of public and private institutions could be considered. The sentinel sites, already part of the AFP surveillance could be considered. The out-patients and in-patients of the Medicine and Pediatric Departments of these colleges would provide the information on the specific childhood diseases, which would be collected and collated by the Community Medicine (PSM) depts. Clinical samples of the patients would be sent to the Microbiology departments of the institutions for lab confirmation of sample of cases. The sentinel surveillance sites would be nurtured

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by the Immunization Division of the Ministry and the data flow would to the state and centre through the existing IDSP IT network.

Figure 1. Proposed Sentinel surveillance for childhood.

**Epidemiology Units:**

For maximum and sustained benefit from such collaboration there is need for institutional capacity building. One approach is establishing functional Epidemiology Units composed of components of various surveillance programs and could be housed at the Regional Office of H&FW or PSM Dept. of the respective institutions. It could be both at state and/or district levels. The main TOR for these units to provide technical assistance to the sentinel sites and the respective state/ districts for case/outbreak investigation, coordination of surveillance components, data analysis and monitoring the sentinel sites and institutions for strengthening the surveillance system. They will also assist in forming effective liaison with IDSP and other surveillance systems.

**Children /Medical College  
Hospital (Sentinel Site)**

OPD &amp; IPD

**PSM****Dept.****District****Epidemiology****Unit**

Microbiology

Dept/PH Lab

***Proposed Sentinel Surveillance for Childhood******Diseases*****Data flow through IDSP**

Medicine/Pediatrics

Depts.

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**Epidemiology Unit: Coordination****Need to strengthen IDSP:**

For additional information on childhood diseases there is also a need to strengthen the case based surveillance of IDSP. The following amendments are suggested:

! The earlier IDSP 'P' formats had information of under-fives' and over fives' for the listed diseases which needs to be reintroduced.

! Strengthening the lab network for confirmatory diagnosis and collecting further information about these lab confirmed cases

! Also inclusion of line list for all death cases.

**Need to strengthen HMIS of NRHM:**

The HMIS under the NRHM is collecting and collating monthly data from the various health units for the following childhood illnesses:

! Diarrhea

! Measles

! Diphtheria

! Pertussis

! Tetanus

! Malaria

The quality of data received from these institutions needs to be validated by the states. HMIS data could be used effectively for data triangulation at the central level.

**Institutional arrangements:**

The following institutional arrangements need to addressed for the proposed Sentinel site surveillance of Childhood illness:

DSO + Epidemiologist

and DSU team

NVBDCP

RNTCP

NACO

AFP/Measles

Immunization

SIO/DIO

Ro H&FW Sentinal Unit

(PSM Depts.)

### **Sentinel Sites Epidemiology Unit IDSP**

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#### **Center:**

! Establish a surveillance cell within MOH, Immunization Division with appropriate staff, communication, data analysis and mobility support.

! Development of Guidelines/tools/feedback mechanism

**State:** Analysis, monitoring and training

**District:** Link to programs

**Facility sentinel site:** Data collection, collation, transfer

Designation of the role of partners: (WHO, UNICEF, USAID, CDC, others) – to be discussed.

Technical assistance in:

! Development of concept plan and Project implementation plan (PIP)

! Organizing national and regional workshops to finalize the plan

! Training

! Laboratory support

! Data analysis, interpretation of aggregate surveillance data

! Monitoring and evaluation of the surveillance system

#### **List of diseases to be considered for inclusion:**

In addition to IDSP and VBD list of diseases the following childhood diseases need to be considered:

Measles

Diphtheria

Pertusis

Neonatal Tetanus

AES (Japanese encephalitis)

Primary and Post-primary Tuberculosis

Measles & Rubella

HiB and Pneumococcal pneumonia

Invasive Hib and Pneumococcal diseases

Hepatitis A, B, C, D, E

Influenza like illness (ILI) in OPDs

Severe Acute Respiratory Infections (SARI) in in-patients

ADD

Cholera; Enteric fever; Rota virus

Dengue

Malaria

Meningococcal disease

Leptospirosis

HIV/AIDS

Outbreaks

Others: AEFI surveillance.

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### Annexure 6:

#### **Proposed Structure of the National Immunization Authority:**

##### **The current structure:**

Universal immunization Program in our country is a centrally driven vertical program administered by the Ministry of Health and Family Welfare. In order to make it operational, there are several functions required which is currently carried out under supervision of one Deputy Commissioner of the child health and immunization division. This division is responsible for Policy formulation, establishing priorities, strategic planning, inter agency and inter departmental coordination, donor coordination, legal Matters within the UIP, Assessment of HR needs and financial administration. In addition the division also looks after training, procurement, surveillance, monitoring and evaluation and addresses quality issues

In addition the vaccine manufacturing units of the government, the procurement division, the Non UIP division under the DGHS, the DCGI and the IEG division support the enterprise of vaccine delivery in the country.

##### **The proposed structure:**

**At the Center**, this division needs to be supported by several cells (functions described below) responsible for different functions, each headed by an Asst. commissioner who is also responsible for coordination with 8-10 states. The support staff for each cell should include statisticians and data management, staff amongst others.

- **Program Management** (separate units for UIP and Non-UIP vaccines),
- **Disease Control** (VPD surveillance, Measles control, polio eradication),
- **New Vaccine introduction** (R&D in Vaccine, Industry coordination, communication with NRA & vaccine testing units and cold chain)
- **Program monitoring and evaluation** (AEFI, Immunization safety, communication with NRA and Vaccine testing units)

The following areas should have a Director level person to carry out the following functions:

- **Vaccine Logistics Management** (forecasting, cold chain management, procurement and supply)
- **Administration and finance** (Legal Matters, budgeting, personnel)

In addition assistance should be sought from UNICEF for communication strategies, NHFIW for training, ICMR for research and development in vaccines.

**At the State level**, the current structure of a single state EPI/RCH officer needs to be supported with Program managers each responsible for overseeing immunization in at least 10 districts in addition to the state vaccine and logistic manager and cold chain officer. Each state should also have data management and analysis team including statisticians for timely analysis of data collected at the state level and for its proper dissemination to higher levels of reporting.

Cold chain officer in the state should also have enough cold chain handlers along with helpers and a refrigeration mechanic.

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**At the district level**, the district immunization officer should have a cold chain and logistic manager with appropriate numbers of mechanic and helpers and an additional district immunization officer who will look after data collected at the district level, analysis and management of this data and its timely communication to state level for action.

**At the sub district level and at the PHC**, there should be enough staff who can be made responsible for a certain number of facilities each. These staff should under go periodic

training in reporting and providing feed back to the higher levels. The flexibilities of staffing under NRHM with adequate modification of incentives should be utilized at this level.

**Proposed structure of National Immunization Authority**

