

October 25, 2000

UNICEF, through its Supply Division in Copenhagen, Denmark, has been entrusted with the challenge of procuring new and under-used vaccines on behalf of the Global Alliance for Vaccines and Immunization (GAVI), financed by the Global Fund for Children's Vaccines (GFCV). GAVI, which encompasses a wide array of organizations, both public and private, including the Pharmaceutical Industry which manufactures vaccines, is a broad partnership dedicated to increasing the availability and use of all vaccines in developing countries. The current emphasis is on hepatitis B and haemophilus influenza B, as well as yellow fever in endemic countries.

The Pharmaceutical Industry has committed itself to supporting the increased availability of vaccines, as well as contributing to GAVI non-vaccine components that lie within its competence. This commitment of Industry has been expressed through a series of proposals in response to a Request formally issued by UNICEF under its procurement procedures. This Request has been innovative in the sense that it asked Industry to respond to addressing the needs of immunizing children, rather than a search simply for specific products. UNICEF, at the same time, has committed itself to greater reliability and predictability in the procurement of specific vaccines, once country requirements are fully known.

The offer of Industry is broadly contained within the present document, both the variety of presentations available as well as a summary of the non-vaccine contributions. This information, together with a series of guides on the introduction of these vaccines, will facilitate the review by each country eligible for support from GAVI in determining the options each chooses to pursue in order to rapidly make these vaccines available to children and prevent further suffering from disease.

UNICEF, and in particular the Supply Division, has received invaluable support in establishing a meaningful procurement process from the GAVI Secretariat, WHO, the GAVI Financing Task Force co-chaired by the World Bank and USAID, and the Children's Vaccine Programme at PATH.

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Global Alliance for Vaccines and Immunization (GAVI¹)
and the
Global Fund for Children's Vaccines (The Fund)

Guidelines on Country Proposals for
Support to Immunization Services and
New and Under-used Vaccines

1. **Executive summary**

- The Global Alliance for Vaccines and Immunization (GAVI) is hereby inviting proposals from countries for support from the Global Fund for Children's Vaccines (the Fund).
- National governments of countries with GNP/capita equal to or below US\$1,000 are eligible for support from the Fund, according to the non-competitive terms outlined in this document.
- Current Fund resources have been budgeted to reach the objective of providing all eligible countries with five years of funding support from the start of funding of the country proposal. The Partners of the Alliance recognise the need for sustained support and will work with countries to find additional resources to improve immunization services that contribute to better overall health systems. In addition, GAVI Partners are taking steps to extend the Fund beyond five years to enable new vaccines that are currently under development, to be introduced.
- **GAVI will invite country proposals for support from the Fund in successive rounds for the next two years. Closing dates for country proposals for the next rounds will be 15 October 2000, 15 January 2001 and 1 April 2001. Further rounds will follow.**
- The three basic conditions for support are: a functioning Inter-agency Co-ordination Committee (ICC) or equivalent collaboration mechanism; an assessment of immunization services during the three last years; and a multi-year plan for immunization. Efforts to improve the safety of immunization and to plan for sustainable financing of immunization also need to be documented. It is anticipated that the role of national ICCs will grow to provide support to governments in their immunization planning and monitoring efforts.
- Currently the Fund provides support from two sub-accounts: for immunization services and for new and under-used vaccines.

¹ Otherwise referred to as "the Alliance"

- Countries with DTP3* coverage below 80% will be considered for funding from the sub-account for immunization services. A strict and transparent system of performance monitoring with output indicators at district level will be applied.
- Countries with DTP3 coverage above 50% will be considered for support from the sub-account for new and under-used vaccines. In this initial phase, vaccines for hepatitis B (hepB), *Haemophilus influenzae* type b (Hib), and yellow fever will be available from the Fund, together with related safe injection equipment.
- Countries with current DTP3 coverage below 50% that wish to introduce the new vaccines are encouraged to initially focus on improving their systems for delivering vaccines by seeking support from their country Partners, and from the sub-account for immunization services.
- Country proposals should be developed in close consultation with technical and financial Partners committed to health and immunization programs, following the guidelines in this document and be forwarded to the GAVI Secretariat on the enclosed form, with selected documentation attached.

2. The Global Fund for Children's Vaccines

In January 2000, a new multi-million dollar Global Fund for Children's Vaccines (the Fund) was launched by the GAVI Partners. The Fund is an important element in GAVI's mission to "save children's lives and protect people's health through the widespread use of safe vaccines". Three million lives could be saved by better use of available vaccines. The vision of the Fund is to promote awareness and commitment to immunization as key ingredients of a well-functioning health system. The GAVI Partners aim to identify new strategies for building sustained improvements to immunization services, with the ultimate goal of achieving improvements in overall health systems. The Fund has been specifically designed not to replace current funding or pre-empt new sources of funding

The Fund has received an initial commitment of US\$ 750 million (US\$ 150 per year over five years) from the Bill and Melinda Gates Foundation, and several governments have also committed themselves to support the Fund. Current resources have been budgeted to reach the objective of providing all eligible countries with five years of funding support.

GAVI Partners recognise the need for sustained support and will work with countries to find additional resources to improve immunization programs that contribute to better overall health systems. In addition, the Alliance is taking steps to extend the Fund beyond five years.

It is anticipated that the Fund will ultimately provide three sub-accounts of support for:

- development of immunization services as part of the health system;
- introduction of new and under-used vaccines and associated safe injection equipment;
- research and development of vaccines for diseases that are prevalent in developing countries, such as HIV/AIDS, tuberculosis, malaria, pneumonia, and diarrhoea.

* Represents full three-dose series of diphtheria, tetanus and pertussis vaccine by 12 months of age.

The Fund relies on the technical recommendations provided by the GAVI Board and its Partners. The first review of country proposals in July of this year resulted in the approval of proposals from 13 countries. It is planned that all eligible countries that so request should be provided with support within the next two years.

The sub-account for immunization services will provide support to governments in countries with national DTP3 coverage of less than 80% to strengthen their health systems to improve immunization services. The sub-account for new and under-used vaccines will initially be used to purchase vaccines against hepatitis B (hepB), Haemophilus influenzae type b (Hib) and yellow fever, and associated safe injection materials for countries with national DTP3 coverage of more than 50%. It is the intention of the Fund to support the introduction of additional new vaccines as they become available.

A comprehensive country proposal including needs for expansion of immunization services as well as needs for support to the new and under-used vaccines is hereby invited. The eligibility criteria, forms of support and procedure are outlined below.

Development of country proposals should be undertaken by governments in consultation with an Inter-agency Co-ordinating Committee (ICC) or equivalent collaboration mechanism. National ICC's are expected to assume new and larger roles in supporting governments in their effort to improve and expand national immunization programs. ICC members' signatures on the country proposals are considered to represent their agreement with the information and plans provided in the proposal as well as a sign of their support for the implementation of the plans.

Proposals should include current commitments by government and Partners, i.e., multilateral, bilateral agencies and NGOs, and unmet needs. As well as being the basis for GAVI for considering support from the Fund, the process will also provide an opportunity for Partners at the country level to commit themselves for additional support. The Alliance will also seek increases in global commitments to address unmet needs.

The Alliance attaches great importance to the successful finalisation of polio eradication. Support from the Fund should be used to complement the final polio eradication efforts; in no case should activities financed by the Fund be allowed to interfere with polio eradication. Countries are therefore requested to clarify their plans and confirm their commitment to polio eradication.

One of the overriding concerns of the GAVI Partners is to help countries formulate and implement strategies to sustain improved performance over time. Recognising that the lowest income countries will require continued external support for their immunization programs, support from the Fund has not been envisioned to continue indefinitely but to form a foundation for governments to expand support from other sources. Governments are urged to submit proposals that reflect an effort to secure additional funding for vaccines and immunization services in coming years.

Proposals will be reviewed by an independent panel of experts, with recommendations forwarded to the Alliance for decision in accordance with the time-table below. Incomplete proposals will be returned to countries for resubmission. Country proposals received by 15 October will be considered during the second review this year. The closing date for the third round will be 15 January 2001 and for the fourth round 1 April 2001. Further rounds will follow.

3. Conditions for Support from the Fund

Overall eligibility	
<p>Only national governments can apply Countries with equal to or less than US\$ 1,000 GNP/capita Special arrangements are foreseen for China, India and Indonesia</p>	
General assessment criteria	
<ol style="list-style-type: none"> 1. Existence of fully functioning Inter-agency Co-ordination Committee (ICC) or equivalent (see 4.1 below) 2. Implementation of a satisfactory immunization assessment within last three years (see 4.2 below) 3. Existence of a multi-year plan for immunization (see 4.3 below) 	
Specific assessment criteria	
Sub-account: Immunization services	Sub-account: New and under-used vaccines
<ul style="list-style-type: none"> ✓ National DTP3 coverage < 80% ✓ Annual targets for increasing number of children to receive DTP3 ✓ Action plans as part of the multi-year plan to achieve: <ul style="list-style-type: none"> - safe injections and safe management of sharps waste - a reduction of vaccine wastage and immunization drop-out rates. - sustained financing of immunization services 	<ul style="list-style-type: none"> ✓ National DTP3 coverage >50% ✓ Plan for the introduction of new vaccines (see 4.4 below) ✓ Action plans as part of the multi-year plan to achieve: <ul style="list-style-type: none"> - safe injections and safe management of sharps waste - a reduction of vaccine wastage and immunization drop-out rates. - sustained financing of immunization services
Monitoring	
<ol style="list-style-type: none"> 1. Performance verification at district level 2. Satisfactory annual progress reports 3. Mid-term review before end of second year; final review before end of fifth year. 	

4. Assessment criteria

4.1 A fully functioning Inter-agency Co-ordinating Committee (ICC) or equivalent.

The review will seek to understand the current role, responsibility and functions of the ICC (or equivalent collaborating mechanism) in relation to overall health sector planning. The following factors will be taken into consideration:

- Terms of reference that incorporate all aspects of immunization services;
- Frequency of meetings;
- Minutes of the meetings and how they are circulated to members;
- The level of the ICC chairman within the Ministry of Health;
- The list of members;
- Plans and budget requirements for strengthening the ICC if necessary.

4.2 Implementation of a satisfactory immunization assessment within last three years.

A complete assessment of immunization services includes the following areas of inquiry, at national, sub-national and service delivery levels:

- External environment;
- Health system context;
- Immunization operations:
 - immunization service delivery
 - disease surveillance and MIS monitoring
 - immunization safety
 - cold chain, logistics and transport
 - vaccine supply, utilisation, quality and stock-control
 - advocacy and communications (including telecommunications)
 - financing.

Note: WHO is now finalising a new protocol for conducting an immunization assessment for use by countries. Copies will be available through WHO.

4.3 A multi-year strategic plan for immunization.

The plan should include immunization targets and strategies for achieving disease control priorities, especially polio eradication and associated surveillance system. The plan should also tackle problems of the quality of immunization services which were identified by the national immunization assessment. The plan will be reviewed with particular emphasis on the following four issues:

- Management of immunization operations:
Plans of action are required which will achieve the immunization coverage targets while also utilising vaccine in the most economic way. Specific strategies, such as those to progressively reduce drop-out rates and vaccine wastage and social mobilisation strategies will be critical to optimise the management of immunization operations.
- Capacity building:
In outlining the actions needed to address the deficiencies in key technical areas identified in the immunization assessment, the multi-year plan should identify the technical support (expert consultants, training curricula, managerial tools (such as an updated immunization guide or a survey instrument), which will be required for implementation.
- Safety of injections:
Plans of action are required which will ensure that appropriate injection equipment is provided in sufficient quantity, distributed to the right place at the right time, used safely and disposed safely and effectively. If specific strategies for the final disposal of injection equipment cannot be stated at this time, intent to tackle the problem of disposal is the minimum required.

- Sustainable financing of immunization services.
budget forecast is required for government and Partner contributions, including estimated support from the Fund, for the period of the plan and detailing the following sources and cost categories:
 - Sources: Central and Local Government, Community financing, health insurance systems, external loans and/or grants from named sources.
 - Costs: Vaccines (itemised), Immunization specific equipment and supplies, advocacy, social mobilisation and shared recurrent costs including surveillance, training, management and maintenance of equipment and transport.

A long term strategy for sustainability is requested that includes targets for the percentage of financing for immunization from government, compared to financing from all sources. Other financial sustainability targets may be included, such as the proportion of debt relief proceeds which can be devoted to immunization or the proportion of the total financing of immunizations which can be mobilised at the district or community level.

The Alliance highly recommends that the Ministry of Finance should approve the financial sustainability plan.

The plans of action in these four areas, considered critical by the Alliance, should also indicate objectives and tasks for which Partner technical support and collaboration will be welcomed by the Government. Where possible, the preferred Partner and the timing of their technical contribution should be indicated.

4.4 New and under-used vaccines

The plan for the introduction of new and under-used vaccines, as part of the national immunization services plan, will be reviewed using the following information as a guide:

- An assessment, or planned assessment, of the national disease burden, or a justification for adding the new vaccines, based on existing local, national or regional data;
- A forecast of the quantities and specifications (including single versus multidose vials) of vaccines needed by year, over the next five years;
- The proportion of total vaccine needs to be requested from the Fund each year;
- Statement of existing vaccine wastage rates and anticipated rate for additional vaccine(s);
- Plans for modifying cold chain, logistics and routine monitoring systems to accommodate new vaccines and retain immunization safety;
- Proposed immunization schedule;
- Long-term plan for resource mobilisation including a gradual increase of government contributions (as a proportion of total financing, including bilateral support and multilateral development bank contributions) to vaccine procurement.

5. Fund allocation mechanisms

The available resources from the Fund will be allocated, in the initial phase, to the sub-accounts for immunization services and for new and under-used vaccines.

5.1 The immunization services sub-account

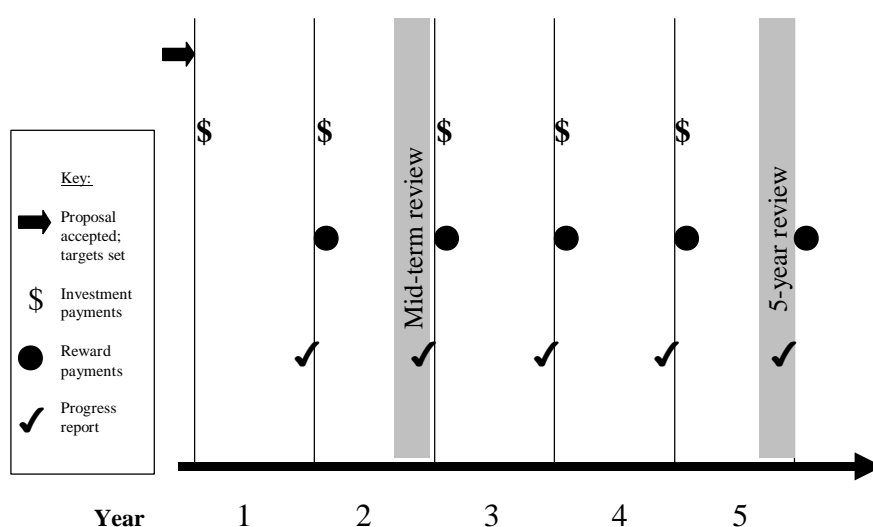
The immunization services sub-account is a distinct departure from traditional funding systems that impose strict guidelines on the use of resources. Instead, this system imposes strict requirements for performance, relying upon governments and ICCs (or equivalent) to set goals and monitor progress, without prescribing conditions for the use of funds.

Countries with current DTP3 coverage of less than 80% will initially be eligible for support from the immunization services sub-account. Increases in the number of children immunized with DTP3 by age 12 months will be used as a surrogate measure for immunization service performance. Therefore, the number of children who currently receive the full three-dose series of DTP before age 12 months, based on district aggregated data, is required as a 1999 baseline. If these data are not available or not sufficiently reliable, a national coverage survey will be required. Countries, which achieve and exceed 80% coverage during the funding period, will continue to be supported for the whole period of five years.

For the purpose of calculating Fund contributions to immunization services, the concept of “shares” has been developed. Each share conceptually represents the Fund’s contribution toward immunizing one child. The share value will be calculated on the basis of available resources and reviewed annually; in the initial phase the share value has been set at US\$ 20. In order to ensure a measure of stability in financing as well as to reward good performance in achieving coverage, share values will be divided into two parts and disbursed in accordance with two distinct principles:

- *Up-front* investment in plans to reach additional children with immunization services;
- *Retrospective* reward for additional children having been immunized.

Timeline for support from sub-account for immunization services



The investment will be calculated based on the number of additional children – over and above those covered in 1999 – the government plans to reach in the future, with targets agreed to by the ICC and endorsed by GAVI during the proposal review process.

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Considering that countries may require more than one year to achieve an initial increase in immunization, the first investment will be based on a two-year target, paid in two instalments - at the start of the first year, and upon receipt of a satisfactory annual progress report at the start of the second year (see page 11 for explanation of report).

The reward will be calculated at the end of each year based on the number of additional children actually immunized with DTP3 by age 12 months during the preceding year. The first year reward for 2001 will be based on the number of additional children actually immunized with DTP3 by age 12 months in comparison to the number in 1999.

If after two years, recipient countries do not show any increases in numbers of children immunized, support from the immunization services sub-account will be suspended until satisfactory progress is shown.

Example A: Calculation of share grants for hypothetical country that meets targets

COUNTRY A	Baseline 1999	2001	2002	2003	2004	2005
# children receiving DTP3	100,000	120,000	125,000	135,000	145,000	150,000
Actual increase in last year		10,000**	5,000	10,000	10,000	5,000
Reward		\$100,000	\$50,000	\$100,000	\$100,000	\$50,000
Planned increase in next year	20,000*	5,000	10,000	10,000	5,000	
Investment	\$200,000	\$50,000	\$100,000	\$100,000	\$50,000	
Total Funding	\$200,000	\$150,000	\$150,000	\$200,000	\$150,000	\$50,000

*First investment is for planned increases in 2001 relative to the 1999 baseline

** First reward for increase relative to 1999 baseline

Example B: Calculation of share grants for hypothetical country that does not meet targets

COUNTRY B	Acceptance of proposal	End year 1	End year 2	End year 3	End year 4	End year 5
# children receiving DTP3 in last year	100,000	100,000	100,000	100,000	110,000	115,000
Actual increase in last year		0	0	0	10,000	5,000
Reward		\$0	\$0	\$0	\$100,000	\$50,000
Planned increase in next year	20,000*	10,000	0	0	5,000	
Investment	\$200,000*	\$100,000	\$0	\$0	\$50,000	
Total Funding	\$200,000	\$100,000	\$0	\$0	\$150,000	\$50,000

* First investment is for planned increases in 2001 relative to the 1999 baseline

Proposals from countries seeking support from the immunization services sub-account must identify an appropriate system for transfer of funds, agreed to by the ICC. Funds can be provided to the country through three main mechanisms: directly to the government, through a Partner agency, or through an independent third party. The preferred mechanism should be included in the proposal, together with an explanation of how the proposed mechanism addresses transparency, standards of accounting, long-term sustainability and empowerment of the government.

5.2 The new and under-used vaccines sub-account

Countries with DTP3 coverage above 50% will be considered for support from the sub-account for new and under-used vaccines. Countries with current DTP3 coverage below 50% that wish to introduce the new vaccines must improve their systems for delivering immunization prior to receiving new vaccines from the Fund. These countries are encouraged to commit more of their own resources to health services, as well as to seek support from their Partners, and from the sub-account for immunization services, in order to meet eligibility requirements.

The amount of support the Fund can offer is equivalent to 100% approved country support for five years. However, in order to avoid an abrupt termination of the Fund support, it will start to be phased out after the first three years, extending the period of support up to seven or eight years. Therefore, governments are required to develop plans to transfer the cost of these vaccines and related injection equipment, progressively to the government budget, or to external assistance from other sources before the end of the funding period. The Alliance will require that these plans are included in the documentation for the mid-term review.

Currently, vaccines for hepatitis B (hepB), Haemophilus influenzae type b (Hib), and yellow fever, together with related safe injection equipment, will be made available and financed by the new and under-used vaccines sub-account. Based on current knowledge, the GAVI Board considers that hepB is appropriate for use globally, Hib is appropriate for use in Africa, the Americas, and the Middle East, as well as countries in other regions if supported by epidemiological data, and yellow fever is appropriate for use in Africa and the Americas according to regional recommendations.

The Alliance strongly advocates the use of combination vaccines as soon as available. The current list of vaccines that may be provided by the Fund includes:

Vaccines	Currently available vial sizes	UN Pre-qualification Status*
Monovalent vaccines		
• hepB	Single and ten	Pre-qualified
• Hib	Single and ten	Pre-qualified
• Yellow fever	Ten and twenty	Pre-qualified
Combination vaccines		
• DTP-hepB	Single and ten	Pre-qualified
• DTP-hepB-Hib	Single	Pre-qualified
• DTP-Hib	Single and ten	Pending
• hepB-Hib	Single and ten	Pending

*For the current list of UN pre-qualified vaccines see:
<http://www.who.int/vaccines-access/>

Current global capacity for the production of combination vaccines with Hepatitis B and/or Hib may not be sufficient to fulfil all requirements, particularly in 2001. If the requested combination is unavailable, countries should therefore indicate if they would prefer an early introduction of monovalent or bivalent vaccines, or a delayed introduction of the combination vaccine.

When the vaccine tenders have been received from vaccine suppliers in October, the availability of the combinations will be known. Countries will then be informed of how their requests for combination vaccines can be met. Monovalent or bivalent substitutions for combination vaccines may be offered to countries for their acceptance; some may decide to delay introduction until their choice of combination vaccine is available. Once countries have introduced combination vaccines all efforts will be made to assure them of a sustained supply.

A GAVI policy is currently being drafted that will outline procedures for allocating vaccines that are in limited supply. This policy will be reviewed with the Partners and recipient countries, endorsed by the board and used to guide decisions on which countries will receive limited supply vaccines.

The following issues will be considered when making decisions regarding the provision of new vaccines:

- hepB vaccine will only be considered for routine infant vaccination, not for catch-up vaccination of older children and adults;
- A four-dose schedule of hepB is acceptable in countries where a birth dose of hepB is given, followed by three doses of DTP-hepB or DTP-hepB-Hib;
- Pentavalent DTP-hepB-Hib will be considered for countries where this combination is appropriate. Affordable presentations of this vaccine currently require reconstitution of lyophilised Hib with liquid DTP-hepB at the time of injection, and additional syringes. Training and additional disposal capacity will therefore be needed.

Auto-disable syringes and safety boxes, sufficient to administer the above vaccine to the target population, will be purchased and 'bundled' with vaccines shipped to the countries. GAVI Partners are working to make vaccines available in single-dose, pre-filled auto-disable devices within the five-year period.

The Fund will not provide auto-disable syringes and safety boxes for vaccines funded by other sources; GAVI will encourage agencies that provide vaccines to bundle this equipment with the vaccines in accordance with established WHO/UNICEF/UNFPA policy.

UNICEF will, on behalf of GAVI, negotiate special, low prices for the purchase of vaccines and injection equipment to be supplied under the Fund. A country that already procures vaccines and wishes to continue should indicate this in its proposal. Consideration of such a proposal will depend on the existence of a fully functional National Regulatory Authority and compliance with WHO recommended procedures for vaccine procurement. These countries may receive reimbursement, after purchase, equivalent to the value of UNICEF's price. However, if their negotiated prices are higher than UNICEF's, governments must pay the difference in order to purchase enough vaccine to reach the target population.

As a matter of policy the Alliance has decided that the Fund will not replace existing providers of vaccines. However, on a case by case basis, GAVI will provide vaccines to countries that are currently using a vaccine if the government and the Partners can demonstrate that this investment will increase the total resources dedicated to immunization.

In no case will the Fund replace government funds. Special incentives will be considered for countries with >80% DTP3 coverage and 100% government vaccine financing.

III. Calculation of the required number of doses of new vaccine should be based upon:

- realistic targets corresponding to DTP3 coverage targets when combination vaccine is used. For yellow fever vaccine targets should correspond to measles coverage targets.
- A phasing in plan for the new vaccine in relation to DTP.
- A buffer stock requirement of normally 25% for the first year in which the vaccine is introduced into any given geographic area.
- Maximum wastage rates of 25% for the first year and a plan to gradually reduce this to 15% by the third year. No maximum limits have been set for yellow fever vaccine in multi-dose vials. For vaccine in single dose vials the maximum wastage allowance is 5%.

6. Monitoring

Disbursements from the Fund will be subject to strict performance monitoring. The government will be held accountable through a requirement for district level performance monitoring through health management information systems. Monitoring will be scheduled as indicated below:

6.1 Mid-term and 5-year review

Before the end of the second year and at the end of the fifth year, the government through the ICC will organise a major in-depth review with the participation of external experts agreed with GAVI Partners. The review report is expected to document country performance against planned targets and will include the status of the following recommended performance indicators:

- The number of children reported, by district monthly reports and externally verified, to have received DTP3, and new and under-used vaccines where applicable, by age 12 months.
- A financial plan to ensure the sustainability of the immunization services including government expenditure on immunization
- Three quality indicators and a plan for monitoring them to be defined by the government and the ICC prior to the mid-term review, based on country needs:
 - management performance (e.g., drop-out rate of DTP1 to DTP3)
 - disease surveillance (e.g., AFP surveillance rate)
 - immunization/injection safety (e.g., utilisation of AD syringes and disposal boxes)

These indicators will be used for the specific purpose of allocating Fund resources following the review; this list should not be interpreted as comprehensive, and should not preclude the adoption of internationally-accepted indicators for the measurement of immunization service and health system performance. The Alliance will develop additional mechanisms to reward performance, which may be based on indicators such as those described above.

In addition, attached to the mid-term review report, a multi-year financial plan for sustainable procurement of all vaccines and AD syringes, indicating annual proportion of the increased financial commitment from government and bilateral donors, and of the phasing-out support from the Fund for these items, must be submitted for review.

6.2 Annual progress report

The government is required to report its progress toward achieving performance goals annually and present strategies to improve performance of immunization in the following year. The report must contain records of the number of children reported to have received DTP3 by age 12 months, based on district monthly reports reviewed by the ICC (required by GAVI Partners for reward calculation). A copy of the progress report, endorsed by the ICC, will be sent to GAVI Secretariat at the end of each year of funding. The receipt of a satisfactory annual progress report is a condition for Fund support beyond the first year.

The intention of this reporting system is for the Alliance to get the basis for calculating support for coming years as indicated above and to establish that further support will help to meet the GAVI milestones. The focus is on performance, not on activity monitoring.

6.3 External verification of DTP3 reported data

The Alliance will normally require that the numbers of children reported to be immunized with DTP3 is externally verified at the time of annual disbursement of the reward portion of shares. In agreement with the government, the number of children who are reported to have received DTP3 by age 12 months will be independently verified by teams that will review district and health facility reports in a sample of districts according to a standard WHO procedure which is now under development. Surveys may also be arranged as required. The calculation of the number of shares will be adjusted according to the findings of this verification.

7. Procedure

The development of the country proposal should be made in close collaboration with the ICC (or equivalent) and the country representatives of the GAVI Partners. The process should provide an opportunity for Partners at the country level to commit themselves for additional support as well as being the basis for GAVI for considering support from the Fund.

For country proposals to be considered, governments of eligible countries should submit complete proposals for funding to the GAVI Secretariat, based upon these guidelines by the closing dates stated above for each review. Decisions will be taken rapidly, however clarifications and/or additional information may be sought before implementation. Countries not fulfilling the required criteria will receive approvals conditional upon meeting these and subject to later review. All efforts will be made to provide countries with appropriate advise and support in case immediate approval of their proposals cannot be granted.

These guidelines and the accompanying proposal form which have been slightly modified compared to those used for the first review are being made available to eligible countries and should be used forthwith. Application forms and attachments will be received in English or French; data may be used for aggregated analysis and disseminated, unless notified to the contrary.

Brief and succinct documentation is encouraged.

GAVI BOARD POLICY ON VACCINES OF LIMITED SUPPLY

The GAVI Board will authorize the procurement of yellow fever (YF), hepatitis B (Hep B) and *Haemophilus influenzae* type B (Hib) vaccines for countries through the New and Underutilized Vaccine sub-account of the Global Fund for Children's Vaccines (the Global Fund).

Early country demand for vaccines through the Global Fund has been enormous. In the short-term (until 2003), the supply of certain combination vaccines will not meet expected demand. This document outlines the allocation process for vaccines in limited supply.

Current Vaccine Supply Situation

At this time, the GAVI Board recognizes the following vaccine supply situation:

Yellow Fever Vaccine: There may be shortages of some presentations of YF vaccine in the short-term.

Monovalent Hep B and Hib: There are sufficient monovalent hepatitis B and Hib vaccines to meet current demand.

Combinations with Hep B and/or Hib: The supply of combination vaccines with hepatitis B and/or Hib offered to UNICEF for the Global Fund will not be sufficient to meet anticipated demand through 2003.

GAVI Policies on Allocation of Vaccines in Limited Supply

The following considerations will govern the allocation of vaccines among countries. These considerations will be applied in a manner consistent with previously established GAVI and Fund policies.

A. Yellow Fever Vaccine

- In the event that there is a shortage of some presentations of yellow fever vaccine, priority for introduction will be established according to risk level as specified in Table 1.

Table 1: Priority Countries for Yellow Fever Vaccine

Group	Risk Level	Characteristics	Countries (in order of priority)*
Group One	Highest Risk	Recent large epidemics; high number of reported cases; densely populated; many epidemics.	Nigeria, Cameroon, Kenya, Liberia, Mali, Burkina Faso, Senegal, Benin, Ghana, Guinea, Cote d'Ivoire, Niger, Sierra Leone, Togo
Group Two	Medium Risk	Epidemic and or reported cases in past, includes countries that have already included yellow fever into routine EPI and good measles coverage (in order of priority)	Angola, Gabon, Mauritania, CAR, Chad, Congo, Equatorial Guinea, Ethiopia
Group Three	Lower Risk	No reported epidemics or not at least in last 20 years	Sudan, DR Congo, Eritrea, Rwanda, Burundi, Gambia, Guinea, Bissau, Tanzania, Uganda, Cape Verde, Sao Tome, Somalia

* Additional countries will be added based on input from the Pan American Health Organization.

B. Combination Vaccines

Preliminary indications from the first round of procurement and evolving country data indicate that demand for selected combination vaccines, and in particular DTP-Hep B, will outstrip supply until 2003.

The GAVI Board has determined that all combination vaccines in limited supply will be allocated as follows:

- Countries with DTP3 coverage of 50% will have first priority for combination vaccines, should such vaccines be requested by the government in collaboration with the major partners on the Inter-Agency Coordinating Committee (ICC).
- Countries with DTP3 coverage of 51% would have second priority, those with DTP 3 coverage of 52% would have third priority, and so on (See Table 2).
- Coverage will be based upon DTP3 as reported on the 1999 WHO-UNICEF Joint Reporting Form.
- For the 13 countries which received approval for proposals in July, 2000, DTP3 coverage data will be taken from their proposal documents, reflecting the signed endorsement of the data by the governments and ICC partners at country level.

In providing combination vaccines to those countries with weaker immunization systems, (as defined by the DTP3 coverage rate), the GAVI Board recognizes that those countries with weak immunization systems are also those that have the greatest programmatic and safety considerations to overcome and the least flexibility in introducing new vaccines. The burden of introduction of new vaccines and programmatic challenges, including training, additional cold chain and logistics requirements, are minimized through the use of combination vaccines. Furthermore, vaccines given in combination necessitate fewer injections per child, thereby minimizing the risk of adverse injection events and enhancing safety.

In adopting this policy of allocation of all vaccines in limited supply, the GAVI Board affirms the following:

- A specific vaccine formulation or presentation will only be introduced where there will be sufficient quantity to meet the country's total projected needs. This commitment includes those countries that decide to introduce new vaccine in a phased program.
- Countries with large birth cohorts (those that will require on the order of 50% of the available doses), will be strongly encouraged to introduce monovalent vaccine. The Fund will not provide these countries combination vaccines at this time (e.g. based on the available supplies of DTP-Hep B the Global Fund will not be able to provide this vaccine to Pakistan and Bangladesh at this time).
- Given that the introduction of monovalent vaccines will pose additional challenges for immunization delivery systems, countries that introduce monovalent vaccines will receive priority for GAVI partner supported training and technical assistance.
- The supply of combination vaccine is expected to increase substantially from 2004. Additional supply will be allocated according to GAVI policy outlined above. Countries that have recently become eligible for support for vaccines from the Global Fund by increasing their national coverage rate for DTP3 to at least 50% will be included in the allocation of new supplies. The GAVI Board will also review the vaccine allocation policy and guidelines for countries with large birth cohorts, at this time.

Timeframe of Introduction: If a country is likely to substantially delay introduction of a combined vaccine, beyond the end of 2001 or to a point in time when available combined vaccines would not be used efficiently, the GAVI Board directs UNICEF Supply Division to reallocate vaccines to countries requesting them sooner, thereby ensuring the available supplies are fully utilized.

TABLE 2. Priority for Combination Vaccines

In accordance with GAVI Board Policy, countries with 50% DTP3 coverage in 1999 and a birth cohort that will not require on the order of 50% of the available doses for 2001,2002, or 2003, have initial priority for combination vaccines, with availability to countries with higher coverage as supplies permit.

	Country	1999 % DTP3 Cov.
1	Uganda	54
2	Papua New Guinea	56
3	Lao PDR	56
4	Eritrea	56
5	Cote d'Ivoire	56
6	Rwanda *	57
7	Madagascar	57
8	Pakistan**	59
9	Senegal	60
10	Haiti	61
11	Guinea-Bissau	63
12	Burundi	63
13	Lesotho	64
14	Kenya	64
15	Cambodia	65
16	Bangladesh **	69
17	Yemen	72
18	Sao Tome	73
19	Mozambique	73
20	Ghana	73
21	Myanmar	75
22	Comoros	75
23	Tanzania, United Republic Of	76
24	Nepal	76
25	Georgia	80
26	Zimbabwe	81

	Country	1999 % DTP3 Cov.
27	Guyana	83
28	Malawi	83
29	Solomon Islands	86
30	Bolivia	87
31	Gambia, The	87
32	Korea, DPR	87
33	Armenia	88
34	Bhutan	88
35	Sudan	88
36	Nicaragua	90
37	Bosnia & Herzegovina	90
38	Mongolia	90
39	Benin	90
40	Zambia	92
41	Azerbaijan	93
42	Viet Nam	93
43	Cuba	94
44	Tajikistan (1999 DTP3=1998)	94
45	Honduras	95
46	Moldova, Republic of	97
47	Albania	97
48	Turkmenistan	99
49	Kyrgyzstan	99
50	Sri Lanka	99
51	Ukraine	99
52	Uzbekistan	99

* May not apply until 2002

** Birth cohort that will require on the order of 50% of the available doses and is not eligible for combination vaccines in limited supply

TABLE 3. Countries Not Currently Eligible for New and Underutilised Vaccine Sub-Account of the Fund - September, 2000

	Country	1999 % DTP3 Cov.
	Congo, Democratic Republic of	15
	Somalia	18
	Mauritania	19
	Niger	21
	Nigeria (1999 DTP=1998)	21
	Ethiopia	21
	Sierra Leone	22
	Liberia	23
	Djibouti	23
	Central African Republic	28
	Congo, Republic of	29
	Angola	29
	Chad	33
	Afghanistan	37
	Burkina Faso	37
	Guinea	46
	Togo	48
	Cameroon	48
	Mali	48

Product Menu

The product menu overleaf defines the range of products, presentations, quantities and prices, available under the Unicef Procurement Process for GAVI funded vaccines.

The product menu is intended to be used as a guideline for the countries eligible for support from the Global Fund for Children's Vaccines in order to select their preferred products and presentations.

You are kindly requested to use the enclosed response form (to be found at the back of this brochure) when completing the product preference list for your country. The response form should be returned within 2 weeks to:

UNICEF SUPPLY DIVISION – IMMUNIZATION GROUP
Attn.: Mr. Steve Jarrett / Ms. Shanelle Hall, Fax no.: +45 35 26 9421

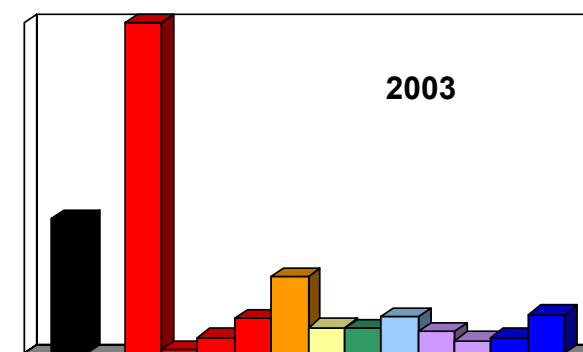
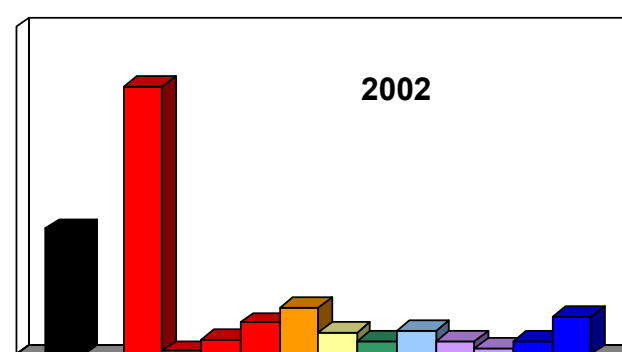
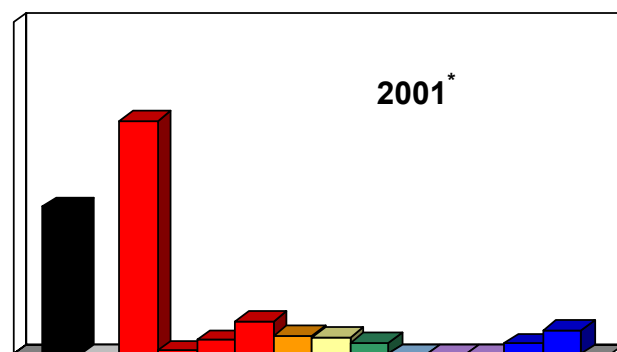
A copy should also be submitted to the UNICEF country office.

PRODUCT MENU

Vaccine	Presentation	Quantity Ranges in Million Doses ⁽¹⁾			Indicative Price Ranges /Dose (USD) ⁽²⁾			Presentation	Vaccine		
		2001	2002	2003	2001	2002	2003				
MONOVALENT HIB									MONOVALENT HIB		
Hib (lyophilized)	1ds vial + diluent	-	up to 6	up to 8	-	2.65	2.65	1ds vial + diluent		Hib (lyophilized)	
Hib (liquid)	1ds vial	up to 9	up to 5	up to 5	2.70	2.85	3.01	1ds vial		Hib (liquid)	
Hib (liquid)	10ds vial	6 to 20	17 to 32	17 to 32	2.50 to 4.25	2.66 to 4.25	2.79 to 4.25	10ds vial		Hib (liquid)	
MONOVALENT HEPATITIS B									MONOVALENT HEPATITIS B		
Hep B (Recombinant)	1ds vial	18 to 40	18 to 46	18 to 57	0.62	0.61	0.60	1ds vial		Hep B (Recombinant)	
Hep B (Recombinant)	1ds vial + syringe	up to 13	up to 19	up to 28	0.64	0.61	0.58	1ds vial + syringe		Hep B (Recombinant)	
Hep B (Recombinant)	1ds vial in Uniject	3 to 16	20 to 39	30 to 63	0.64 to 1.31	0.60 to 1.31	0.57 to 1.44	1ds vial in Uniject		Hep B (Recombinant)	
Hep B (Recombinant)	2ds vial	up to 12	up to 13	up to 13	0.54	0.54	0.54	2ds vial		Hep B (Recombinant)	
Hep B (Recombinant)	6ds vial	up to 3	up to 3	up to 3	0.56	0.56	0.56	6ds vial		Hep B (Recombinant)	
Hep B (Recombinant)	10ds vial	117 to 182	140 to 223	164 to 273	0.26 to 0.43	0.25 to 0.43	0.23 to 0.43	10ds vial		Hep B (Recombinant)	
Hep B (Recombinant)	20ds vial	up to 65	up to 83	up to 97	0.28	0.28	0.28	20ds vial		Hep B (Recombinant)	
Hep B (Plasma)	10ds vial	up to 10	up to 20	-	0.35	0.35	-	10ds vial		Hep B (Plasma)	
COMBINATION VACCINES									COMBINATION VACCINES		
DTP-Hib, (lyophilized)	1ds vial + diluent	-	up to 6	up to 8	-	2.75	2.75	1ds vial + diluent		DTP-Hib, (lyophilized)	
DTP-Hib, (liquid)	1ds vial	-	up to 5	up to 10	-	3.00	3.15	1ds vial		DTP-Hib, (liquid)	
DTP-Hib, (liquid)	10ds vial	-	up to 5	up to 10	-	2.80	2.95	10ds vial		DTP-Hib, (liquid)	
DTP-Hep, (Recombinant)	10ds vial	up to 14	up to 19	up to 21	1.10	1.00	0.90	10ds vial		DTP-Hep, (Recombinant)	
DTP-Hep+Hib (liquid)	2ds vial	up to 10	up to 11	up to 20	3.50	3.25	3.10	2ds vial		DTP-Hep+Hib (liquid)	
COMBO-PACKED VACCINES									COMBO-PACKED VACCINES		
DTP+Hep (Recombinant)	10ds vial	-	up to 20	up to 30	0.48	0.45	0.40	10ds vial		DTP+Hep (Recombinant)	
SAFE INJECTION									SAFE INJECTION		
AD Syringe	0.5 ml	TBD	TBD	TBD	0.068	TBD	TBD	0.5 ml		AD Syringe	
Safety Box	5 liter	TBD	TBD	TBD	0.56	TBD	TBD	5 liter		Safety Box	

PICTORIAL OF HEP B DEMAND COMPARED WITH VARIOUS VACCINE PRESENTATIONS

- Estimated Demand HepB
- -
- Hep B (10 d)
- Hep B (6 d)
- Hep B (2 d)
- Hep B (1 d)
- Hep B (uniject)
- DTP-Hep B (10d)
- DTP-Hep B+HIB (2d)
- DTP+Hep B (10d)
- DTP-HIB (1 d)
- DTP-HIB (10 d)
- HIB (1 d)
- HIB (10 d)



- Estimated Demand HepB
- -
- Hep B (10 d)
- Hep B (6 d)
- Hep B (2 d)
- Hep B (1 d)
- Hep B (uniject)
- DTP-Hep B (10d)
- DTP-Hep B+HIB (2d)
- DTP+Hep B
- DTP-HIB (1 d)
- DTP-HIB (10 d)
- HIB (1 d)
- HIB (10 d)

* First year demand includes 25% buffer stock.

CONTRIBUTIONS

Industry has offered a limited number of proposals to provide presentational materials and/or videos to assist countries with immunization training, including introduction of Hepatitis B and HIB vaccines. Countries will be asked to indicate on their Response Form to Supply Division whether they are interested in receiving and/or participating in such. Details on the options will be provided after consolidation of country consultations.

Notes to Product Menu

- (1) The Quantity Range indicates the minimum and maximum quantities offered for each vaccine presentation. Exact quantities available for each presentation from a supplier are dependent on the quantities produced of a different presentation by the same supplier. The quantities and timing of availability also takes into account the timing of WHO pre-qualification for those suppliers that are in the process of being pre-qualified.
- (2) The Indicative Price represents the weighted average price offered for each vaccine presentation. When the difference between prices for each presentation exceeds 30%, the price range is given.

Choosing Auto-Disable Syringes or Prefilled Auto-Disable Devices For Delivering Liquid Vaccines

Factors For Consideration

Background

Countries selecting liquid vaccines from the Global Fund for Children's Vaccine (GFCV) may have an option to receive these vaccines in vials (multi- or single-dose) with auto-disable (AD) syringes or in single-dose, prefilled AD injection devices. The purpose of this document is to provide decision-makers with sufficient information to make an informed choice.

Description of the Technologies

AD Syringes and Vaccine Vials

AD syringes are designed to prevent reuse by means of an internal mechanism that locks the plunger after a single use. Some AD syringes have fixed needles and some have detachable needles that only fit the AD syringe with which they are supplied (i.e., they cannot be used with standard syringes). Some AD syringes are individually packaged in plastic 'blister packs' and others are boxed in bulk. All have plastic caps to keep the needle sterile and some also have caps on the plungers. There are currently 3 types of 0.5 ml AD syringes available from the GFCV.



Figure 1: Comparison of 5 Doses of Vaccine in:
a) 5 Prefilled AD Devices (left) and b) 1 Vial with 5 AD Syringes (right)

Pre-filled AD Injection Devices

Pre-filled AD devices consist of a small plastic pouch with a permanently fixed needle, each containing a single dose of vaccine. Each device is individually packaged in a sealed foil pouch. Like AD syringes, these devices are designed to prevent reuse and automatically become disabled after one use, due to the presence of an internal one-way valve.

The vaccine is contained in a sealed, bubble-like reservoir that prevents the vaccine from contacting the needle until the time of activation. The user prepares (activates) the device by

pushing the needle shield into the port, thereby opening the fluid path between the needle and vaccine reservoir. The needle shield is then removed, the needle inserted into the injection site, and the dose delivered by squeezing the reservoir until it collapses. At present, only hepatitis B vaccines are projected to be available in 0.5-ml dose prefilled AD devices through the GFCV.

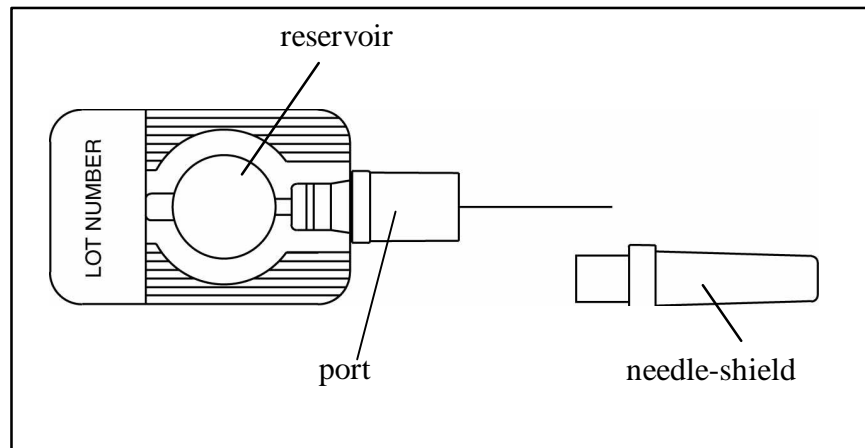


Figure 2: Prefilled AD Device

History of the Technologies

The first AD syringes were developed by the public sector in the late 1980s in an effort to improve injection safety. AD syringes have been commercially available through UNICEF since 1992 and prefilled AD device are scheduled to become commercially available starting from 2001. AD syringes are now used extensively throughout the world, with more than 100 million used by immunization programmes during 1999.

Successful studies with vaccines in prefilled AD devices have been conducted using:

- Tetanus Toxoid (TT) vaccine in Bolivia - Traditional birth attendants used prefilled AD devices to deliver TT to women in their homes (1995).
- Hepatitis B and TT vaccine in Indonesia - Midwives used prefilled AD devices to deliver TT to mothers and hepatitis B vaccine to newborns in their homes (1995-1996).
- Hepatitis A vaccine in the U.S. – Nurses used prefilled AD devices to deliver hepatitis A vaccine in an outpatient clinic (1999-2000).

Prefilled AD devices are currently being used for delivery of hepatitis B vaccine in Indonesia, and will be used for delivery of millions of doses of TT through UNICEF's global initiative against tetanus beginning in 2001.

Making a Choice

Table 1 outlines the major factors for consideration when choosing between AD syringes and vials or prefilled AD devices. Details regarding each factor follow the table.

Table 1: AD Syringes vs. Prefilled AD Devices - Factors for Consideration

Factors	AD Syringes and Vaccine Vials	Prefilled AD Devices
Single- vs. Multi-dose	AD syringes can be used with both single- and multi-dose vials.	Available in single dose only.
Safety	Cannot be reused. May have a fixed or detachable needle. Needles are more likely to become contaminated during filling process.	Cannot be reused. More likely to deliver an accurate dose and to give a sterile injection.
Ease of Preparation	Familiar to most health staff, but relies on health worker to draw an accurate dose and maintain sterility.	Easier to use since fewer steps required.
Cold Chain Storage Space (See Table 2)	No cold chain space needed for syringes; storage space requirement determined by vial sizes only.	Both vaccine and device kept in the cold chain; requires much more storage space than multi- or single-dose vials.
Logistics and Distribution	Syringes can be stored and shipped separately from vaccine.	Devices cannot be separated from doses of vaccine.
Sharps and Waste Management (See Table 3)	Large disposal volumes, especially for some AD syringe brands. Glass vials must also be disposed of. Most AD syringes emit toxic fumes during incineration.	Smaller disposal volumes: Prefilled AD devices contain only about 1/3 of the plastic of a standard syringe. Fewer toxic fumes emitted during incineration.
Burden of Introduction	Training and practice with syringes required (1-2 hours suggested).	Training and practice with device required (1-2 hours suggested).
Availability	AD syringe production independent of vaccine production. Supplies plentiful and can be used with all vaccines in any size vial. Available in 0.05ml and 0.5 ml capacities.	Must be integrated with vaccine production and prefilled by vaccine producer. Availability may initially be limited to a few vaccine types and brands.

Single- versus Multi-dose Presentations

Single-dose presentations may offer advantages in situations where:

- *Wastage of vaccine in opened, multi-dose vials is high,*
- *Coverage rates are low due to reluctance of health workers to open a multi-dose vial for only a few children, and/or*
- *There are potential problems with dose accuracy or with vial contamination when multi-dose vials are used.*

For the single-dose format, a further choice can be made between using AD syringes or prefilled AD devices.

Safety

Both AD syringes and prefilled AD devices are designed to prevent reuse, but neither provide any protection against needle-stick injury. Needles on prefilled AD devices are less likely to be contaminated before use, since the filling steps are not carried out by the health worker. Prefilled AD devices are also more likely to deliver an accurate dose.

Ease of Preparation

Preparing a dose of vaccine with an AD syringe is similar to preparing a dose with a standard disposable or reusable syringe. If the needle is not fixed, it will have to be attached. The dose must then be drawn from the vial and injected. Prefilled AD devices eliminate these steps, and only have to be activated before the dose is injected.

Cold Chain Storage Space

With prefilled AD devices, the vaccine cannot be separated from the injection device and thus, both must occupy cold chain space. Vaccines in prefilled AD devices occupy significantly more storage volume per dose than either multi- or single-dose vials. Example volumes for hepatitis B vaccine are shown in Table 2.

In order to calculate vaccine requirements using multi-dose vials, wastage must always be taken into account. However, for single-dose vials and pre-filled devices there will be very little or no wastage, since all vaccine in the vial or device is used, and it is assumed that the child receives the full 0.5ml dose with each injection. Remember that for all presentations in both multi- and single-dose vials and in pre-filled devices, adequate buffer stocks must always be provided.

**Table 2: Cold Chain Storage Volume Examples for Hepatitis B Vaccine
(these figures do not include wastage as described in WHO/EPI/LHIS/97.01)**

Format	Packed Storage Volume / Dose (cm³)
Multi-dose vials (10-dose)	3.0
Multi-dose vials (3-dose)	6.3
Single dose vials	9.7 to 15.0
Prefilled AD devices	24.7

Before making a final decision to use a particular format, it must be confirmed that adequate cold chain capacity exists. This must include analysis of cold chain capacity at each level of storage and transport taking into account needs during peak demand periods such as national campaigns. If a cold chain storage or transport capacity constraint is identified, remedies such as adding more capacity or altering the distribution pattern to smaller and more frequent shipments might be considered. Both alternatives will have cost implications, which may alter the overall feasibility of adopting a single-dose or prefilled AD device format. Taking heat-stable vaccines (such as hepatitis B) out of the cold chain for brief periods of time might also be considered as an option for easing cold chain capacity constraints. The risks and benefits of this option would require some study beforehand, and ongoing monitoring will be needed to ensure that heat abuse does not occur. Vaccine Vial Monitors (VVMs) will be attached to all vaccines provided through the GFCV and can provide information on whether or not individual vials or prefilled devices have been exposed to excessive heat.

Logistics and Distribution

With prefilled AD devices, the needle cannot be separated from the vaccine and thus only one item needs to be ordered. This prevents possible diversion of the syringe/needle to other uses. In contrast, AD syringes can easily be used for delivery of other non-immunization injections, and may then not be available for their intended purpose.

Sharps and Waste Management

The relative volumes of vials and syringes requiring disposal should be compared as part of the decision-making process. Consideration should be given to the quantity of sharps containers required, the transport needs for distribution and collection of waste, and the ultimate method of destruction/disposal. AD syringes range in volume from approximately 30 to 50 cm³ each, and the accompanying glass vials must also be disposed of. By comparison, a prefilled device occupies only 10 cm³ on average. In addition, prefilled AD devices do not contain rubber stoppers and therefore generate less toxic fumes when incinerated.

**Table 3: Disposal Volume Examples
For Hepatitis B Vaccine**

Format	Sharps Volume (cm³)	Vial Volume / Dose (cm³)
Multi-dose vial (10-dose) with AD syringe	30 to 50	2.0
Multi-dose vial (3-dose) with AD syringe	30 to 50	5.0
Single dose vial with AD syringe	30 to 50	12.0
Prefilled AD device	10.0	0

Burden of Introduction

Training sessions (1 to 2 hours) are suggested for health workers using either AD syringes or prefilled AD devices for the first time. Since many types of AD syringes are available, countries may need to provide training updates to health workers each time a new type is received. At present, only one type of prefilled AD device is available. It is important to have extra syringes and devices available for training purposes, so that health workers can practice before using them on a patient. Changes in technique will be needed when using the new types of syringe or injection device. For example, air cannot be pumped into a vial with some types of AD syringe, since this will lock the plunger so that it cannot withdraw the dose of vaccine.

Special Program Considerations

Studies with prefilled AD devices have shown that they are particularly well suited for programmes focused on the following goals:

- *Expansion of services* – Prefilled AD devices can be used in novel ways to increase access to immunizations. They can facilitate outreach to homes and remote areas since they are single-dose and ready-to-use. They can also be used by health workers who do not normally give immunizations if a minimal amount of training is provided.
- *Home administration of birth doses of hepatitis B vaccine* – Prefilled AD devices are a good option for administration of birth doses of hepatitis B vaccine in regions where perinatal transmission of hepatitis B is high and a substantial percentage of child birth takes place in homes. Prefilled AD devices are currently being successfully used in Indonesia in this manner by midwives who previously did not give injections. The midwives keep the hepatitis B vaccine-filled AD devices in their possession so that they can take them directly to home deliveries. Vaccine Vial Monitors (VVMs) will be used on all devices and this will enable the vaccine to be kept out of the cold chain while in a midwife's possession.

Technical Assistance

Technical assistance is available on these issues either before or after selection of product preferences. Please contact the local WHO representative, the WHO Regional Office, the Department of Vaccines and Biologicals at WHO HQ (vaccines@who.int) or the PATH Immunization Technology Introduction Team (cnelson@path.org) for further information on the impact and use of AD syringes or prefilled AD devices and/or to request assistance with introduction.

World Health Organization

AIDE-MEMOIRE

Introducing hepatitis B vaccine into national immunization programmes

Hepatitis B Immunization

Background

Hepatitis B (HepB) is a major public health problem worldwide. Approximately 30% of the world's population, or about 2 billion persons, have serologic evidence of hepatitis B virus (HBV) infection. Of these, an estimated 350 million have chronic HBV infection and at least one million chronically infected persons die each year from liver cancer and cirrhosis. HBV is second only to tobacco as a known human carcinogen.

A safe and effective vaccine against HepB has been available for nearly 20 years. HepB vaccine is effective in preventing HBV infections when it is given either before exposure or shortly after exposure. At least 85%-90% of HBV-associated deaths are vaccine-preventable.

WHO recommends that HepB vaccine be included in routine infant immunization programmes in all countries. This document provides an outline of information needed to implement a national decision to introduce HepB vaccine, with a particular focus on issues relevant to countries applying for support for the introduction of HepB vaccine from the Global Fund for Children's Vaccines (GFCV).

Objectives

The primary objective of routine infant HepB immunization is to prevent the early childhood infections which result in chronic liver disease later in life. By preventing chronic HBV infection, this strategy also serves to reduce the major reservoir for transmission of new infections.

Immunization Strategies

Routine Infant Immunization. Immunization of all infants as an integral part of the national immunization programme is the highest priority in all countries. Additional immunization strategies that should be considered depending on the epidemiology of HBV transmission in a particular country are:

- **Prevention of perinatal HBV transmission.** In order to prevent HBV transmission from mother to infant, the first dose of HepB vaccine needs to be given as soon as possible after birth (preferably within 24 hours). In countries where a high proportion of chronic infections are acquired perinatally (e.g., SE Asia), a birth dose should be given to infants when feasible. It is usually most feasible to give HepB vaccine at birth when infants are born in hospitals. Efforts should also be made in these countries to give HepB vaccine as soon as possible after delivery to infants delivered at home. In countries where a lower proportion of chronic infections is acquired perinatally (e.g., Africa), the highest priority is to achieve high DTP3 and HepB3 vaccine coverage among infants. In these countries, use of a birth dose may also be considered after disease burden, cost-effectiveness, and feasibility are evaluated.
- **Catch-up vaccination of older persons.** (Note: The GFCV does not provide vaccine for catch-up vaccination). In countries with a high endemicity of HBV infection (hepatitis B surface antigen [HBsAg] prevalence $\geq 8\%$), catch-up immunization is not usually recommended because most chronic infections are acquired among children <5 years of age, and thus, routine infant vaccination will rapidly reduce HBV transmission. In countries with lower HBV endemicity, a higher proportion of chronic infections may be acquired among older children, adolescents and adults; catch-up immunization for these groups may be considered.

Vaccine Formulations

HepB vaccine is available in monovalent formulations that protect only against HepB and also in combination formulations that protect against HepB and other diseases.

Monovalent HepB vaccines:

- can be used for any dose in the HepB vaccine schedule;
- *must be used* for vaccination at birth.

Combination vaccines that include HepB vaccine:

- can be used *any time all of the antigens in the combination vaccine are indicated* by the schedule;
- *cannot be used before 6 weeks of age* (because DTP and Hib immunogenicity are reduced if given before this age); thus, combination vaccines *cannot be used* to administer the birth dose of HepB vaccine.

Schedule

HepB vaccine schedules are very flexible; thus, there are multiple options for adding the vaccine to existing national immunization schedules without requiring additional visits for vaccination.

Options for Adding Hepatitis B Vaccine to Immunization Schedules

Age	EPI Visit	Other Antigens	Hepatitis B Vaccine Options		
			No Birth Dose	With Birth Dose	
			I	II	III
Birth	0	BCG OPV0		HepB†	HepB‡
6 weeks	1	OPV1 DTP1	HepB*	HepB†	HepB‡
10 weeks	2	OPV2 DTP2	HepB*		HepB‡
14 weeks	3	OPV3 DTP3	HepB*	HepB†	HepB‡
9-12 months	4	Measles			

* monovalent or combination vaccine

† monovalent vaccine

‡ combination vaccine

Programmatically, it is easiest if the 3 doses HepB vaccine are given at the same time as the 3 doses of DTP (Option 1). This schedule will prevent infections acquired during early childhood, which account for most of the HBV-related disease burden in high endemic countries, and also will prevent infections acquired later in life. However, this schedule will not prevent perinatal HBV infections because it does not include a dose of HepB vaccine at birth. Two schedule options can be used to prevent perinatal HBV infections: a 3-dose schedule of monovalent HepB vaccine, with the 1st dose given at birth and the 2nd and 3rd doses given at the same time as the 1st and 3rd doses of DTP vaccine (Option 2); and a 4-dose schedule in which a birth dose of monovalent HepB vaccine is followed by 3 doses of a combination vaccine (e.g., DTP-HepB) (Option 3). The 3-dose schedule (Option 2) is less expensive, but is more complicated to administer, because infants receive different vaccines at the 2nd EPI visit than at the 1st and 3rd visits. The 4-dose schedule (Option 3) is easier to administer programmatically, but is more costly, and vaccine supply issues may make it unfeasible.

Administration

HepB vaccine is given by intramuscular injection in the anterolateral aspect of the thigh (infants) or deltoid muscle (older children). It can safely be given at the same time as other vaccines, such as DTP, Hib, measles, OPV, BCG, and yellow fever vaccines. If more than one injection is given at the same time, separate injection sites should be used.

World Health Organization

Injection Equipment

The injection equipment for HepB vaccine is the same type as that for DTP or Hib:

- 0.5 ml (if AD), 1.0 ml or 2.0 ml syringe
- 25 mm, 22 or 23 gauge needle

Sterile autodisable (AD) injection devices are recommended.

Dosage

The standard pediatric dose is 0.5 ml.

Vaccine Procurement

In most countries, GFCV-funded HepB vaccine will be supplied through the UNICEF procurement mechanism. The number of HepB vaccine doses required is estimated using the size of the birth cohort, the coverage rate for DTP and the number of doses in the immunization schedule. These calculations should also include wastage and the size of the reserve stock.

Presentation

HepB vaccines are generally available as a liquid in single-dose and multi-dose glass vials. Multi-dose vials of monovalent HepB vaccines generally contain 2, 6, or 10 doses. Multi-dose vials of DTP-HepB vaccine contain 2 doses.

Storage and Shipping Volume

The total storage volume for other EPI vaccines (BCG, DTP, measles, OPV, TT) is about 11.0 cm³ per dose. Storage volumes (vial plus packet containing vial plus other packaging) for HepB vaccines supplied through UNICEF are:

Vaccine	Packed volume per dose cm ³			
	1 dose vials	2 dose vials	6 dose vials	10 dose vials
HepB monovalent	9.7	4.8	3.2	3.0
HepB + DTP (packaged together)	---	41.2	---	8.2
DTP-HepB (combined)	---	---	---	3.0
DTP-HepB-Hib	---	9.7	---	---

Cold Chain Issues

The storage temperature for HepB vaccine is the same as for DTP vaccine, from 2 °C to 8 °C. *HepB vaccine should never be frozen.* If frozen, HepB vaccine loses its potency.

Adding HepB vaccine to the national immunization programme will require cold chain assessments at all administrative levels:

- to assure adequate storage capacity is available, and
- to assure policies and procedures are in place to prevent freezing of HepB vaccine.

Reducing Vaccine Wastage

Reducing vaccine wastage becomes increasingly important as the costs of vaccines rise. An important strategy to reduce wastage is to monitor wastage rates. Monitoring increases ordering accuracy and reduces wastage by providing reliable data for estimating the number and size of vials to be ordered. It also serves as a tool for improving the practices of health centres when wastage rates are found to be unacceptably high.

Other strategies to reduce vaccine wastage include:

- careful planning of vaccine ordering and distribution;
- implementation of WHO's multi-dose vial policy. (Vaccine vial monitors will be provided on all HepB vaccines supplied through UNICEF, which will facilitate implementing this policy);
- appropriate use of single-dose and multi-dose vials;
- careful maintenance of the cold chain;
- attention to vaccine security; and
- reducing missed opportunities for vaccination.

Injection Safety

HepB vaccine procured through the GFCV will be supplied together with autodisable (AD) syringes and safety boxes. Managers at each level are responsible for ensuring that adequate supplies are available at all times so that each injection is given with a sterile injection device. Attention should also be given to proper use and disposal of safety boxes to collect these materials.

Revision of EPI Forms and Materials

An important element of integrating HepB vaccine into national immunization programmes is to revise training and informational materials, forms used to monitor and evaluate the programme, and vaccination cards.

Information, Education, and Communication Needs

When introducing HepB vaccine into national immunization programmes, information, education and communication (IEC) efforts are important in order to generate support and commitment for the new vaccine and to assure that the vaccine is appropriately handled and administered. The primary target audiences for IEC efforts are decision makers/opinion leaders, health care staff, and the general public (including parents).

What information is needed to assess HepB disease burden?

Adequate seroprevalence data needed to assess HepB disease burden are generally available in all countries, or from adjacent countries with similar HBV endemicity. Thus, additional seroprevalence studies are usually not needed.

How should HepB vaccine be phased into the existing infant immunization programme?

A strategy in which HepB vaccine is given to infants who have not yet completed the DTP vaccine series at the time HepB vaccine is introduced is generally the most feasible to implement.

Which type of HepB vaccine is most suitable?

The following issues should be considered when planning for the procurement of HepB vaccine: the existing immunization schedule and planned HepB vaccine schedule, including whether a birth dose is recommended; impact on cold chain capacity; the proper mix of single/multi-dose vials; the number of injections per visit; vaccine security; impact on local vaccine production; and cost. Use of combination vaccines (e.g., DTP-HepB vaccine) may offer certain programmatic advantages. These include:

- a decrease in the number of injections required per visit (and thus decrease the number of AD needles and syringes required); and
- a decrease in the amount of space required for cold chain storage and transport.

How can the addition of HepB vaccine be used to strengthen the national immunization programme?

The introduction of HepB vaccine should be used as an opportunity to strengthen the existing national immunization programme. Programme elements that need particular attention include stock management, reducing vaccine wastage, and injection safety.

Budgeting for HepB vaccine introduction

Capital and recurrent costs related to the introduction of HepB vaccine should be estimated and included in the annual EPI budget. Additional capital costs might include investment in cold chain equipment and information campaigns targeted to the general public. Additional recurrent costs include vaccines, AD syringes, training, cold chain maintenance, safe disposal of waste, and evaluation of program impact.

Background

The bacterium, *Haemophilus influenzae* type B (Hib), is an important cause of infections in infants and young children; severe disease in adults due to Hib is uncommon. Where it has been studied carefully, Hib is typically the leading cause of acute bacterial meningitis in infants and children less than five years old, accounting for one-third to one-half of all cases of bacterial meningitis in this age group. Bacterial meningitis is fatal unless treated immediately with antibiotics. Even with proper treatment 3-25% of affected children may die. Permanent disability with sequelae that include deafness, learning disabilities, and difficulties in movement is not uncommon among those who survive infection. Studies have also shown that Hib accounts for up to one-quarter of the severe pneumonia cases in young children. WHO estimates that without vaccination 400,000 children die each year of Hib disease.

Safe and effective vaccines against Hib infections exist. These vaccines have been routinely used to vaccinate infants in many countries for over 10 years. The experience with these vaccines has shown that they are very safe and highly effective for preventing severe Hib disease, including meningitis and pneumonia. Studies have shown that vaccination reduces the risk of invasive Hib disease in young children by >90%, and in some cases, has even led to protection of unimmunized populations by 'herd immunity'.

Since 1998, WHO has recommended that Hib conjugate vaccine be included in routine infant immunization programmes in all countries where the resources permit its use and the burden of disease is established. This document provides an outline of information needed to implement a national decision to introduce Hib vaccine, with a particular focus on issues relevant to countries applying for support for the introduction of Hib vaccine from the GAVI Global Fund for Children's Vaccines (GFCV).

Objectives

The primary objective of Hib immunization strategies should be to prevent severe Hib disease in infants and young children because nearly all severe Hib disease occurs in children less than five years of age, and the majority of the deaths occur among infants.

Immunization Strategies

Universal infant immunization. Immunization of all infants through routine services is the highest priority for all countries. This strategy has been proven effective in many areas.

Catch-up vaccination of older children. (Note: GAVI does not provide funding to purchase vaccine for catch-up vaccination.) Children aged greater than 12 months can be protected with just a single dose of Hib conjugate vaccine. At the time of introduction, some countries have chosen to conduct one-time national campaigns to vaccinate all children 1 to 5 years of age with a single dose of Hib conjugate vaccine. This approach may provide some protection to older children but should be undertaken only if it does not draw resources away from infant immunization. Because the risk of Hib disease falls sharply after age 5 years, vaccination of persons older than age 5 years should not be undertaken.

Vaccine Formulations

Hib conjugate vaccines are available in several different formulations. They can be obtained as a liquid or freeze-dried powder (lyophilized), in single or multi-dose vials, and as

monovalent vaccines (Hib conjugate vaccine only) or in combination with other routine vaccines (e.g., DTP, DTP-hepatitis B).

The currently available pentavalent vaccine requires the reconstitution of lyophilized Hib conjugate vaccine with liquid DTP-hepatitis B vaccine. In this instance, *the Hib vaccine should be reconstituted only with the DTP-hepatitis B vaccine produced by the same manufacturer.* Similarly, there is at least one DTP-Hib combination that requires the reconstitution of the lyophilized Hib conjugate vaccine with liquid DTP vaccine, and *the Hib vaccine should be reconstituted only with the DTP vaccine produced by the same manufacturer.*

Combination vaccines that contain Hib conjugate vaccine:

- can be used *anytime all of the antigens in the vaccine are indicated* by the schedule;
- *cannot be used before 6 weeks of age* (e.g., for the birth dose of hepatitis B vaccine) because the immunogenicity of the DTP and Hib components will be reduced if given before this age.

Schedule

Immunization of infants with Hib conjugate vaccine is usually accomplished by giving the vaccine at the same ages as DTP vaccine, either as a separate injection or in combination. In general, infants should receive a primary dose schedule of 3 doses of Hib conjugate vaccine in the first year of life. Doses of Hib conjugate vaccine should be administered at least 4 weeks apart. Children older than one year of age require only a single dose of Hib conjugate vaccine. Booster doses of Hib conjugate vaccine may be given to children in the second year of life, but successful control of Hib disease does not require a booster dose.

Administration

Hib conjugate vaccine is administered by intramuscular or subcutaneous injection in the anterolateral aspect of the thigh (infants) or the deltoid muscle (older children). It can be given safely at the same time as other vaccines such as DTP, polio, hepatitis B, measles, BCG, and yellow fever vaccines.

Injection Equipment

The injection equipment for Hib conjugate vaccine is the same type as that for DTP or hepatitis B:

- 0.5 ml (AD), 1.0 ml or 2.0 ml syringe
- 25 mm, 22 or 23 gauge needle

Sterile autodisable (AD) injection devices are recommended.

Dosage

The standard pediatric dose is 0.5 ml.

Vaccine Procurement

In most countries, GFCV funded Hib conjugate vaccine will be supplied through the UNICEF procurement mechanism.

The number of Hib conjugate vaccine doses required is estimated using the size of the birth cohort, the coverage rate for DTP and the number of doses in the immunization schedule. These calculations should also include wastage and the size of the reserve stock.

World Health Organization

Presentation

Hib conjugate vaccines are generally available in single-dose and multi-dose (10 dose) vials, and in liquid and lyophilized formulations.

Storage and Shipping Volume

Storage volumes (vial plus packet containing the vial plus any other packaging) for some available vaccines are:

- 32.3 cm³ per dose for liquid Hib in single-dose vials,
- 9.7 cm³ for per dose for lyophilized Hib in single-dose vials, (Diluent for freeze-dried vaccines doubles the necessary storage space at the health center level.)
- 13.8 cm³ per dose for liquid Hib or DTP-Hib vaccine in 10 dose vials,
- 9.7 cm³ per dose for DTP-HepB-Hib vaccine in 2 dose vials.

For comparison, the WHO standard storage volumes for DTP vaccine is 2.5 cm³ per dose in 20 dose vials and 3.0 cm³ per dose in 10 dose vials.

Cold Chain Issues

The storage temperature for Hib conjugate vaccines is the same as for DTP and hepatitis B vaccines, from 2°C to 8 °C. *Hib conjugate vaccine should never be frozen.* Freezing Hib conjugate vaccine causes the vaccine to lose its potency.

Adding Hib conjugate vaccine to the national immunization programme will require:

- an assessment of cold chain storage capacity and cold chain procedures at all administrative levels; and,
- development and implementation of plans to modify cold chain storage capacity and cold chain procedures, if needed.

Monitoring and Reducing Vaccine Wastage

Monitoring vaccine wastage becomes increasingly important as the costs of the vaccine rise. Monitoring increases ordering accuracy and reduces wastage by providing reliable data for estimating the number and size of vials to be ordered. It also serves as a tool for improving the practices of health centres when wastage rates are found to be unacceptably high.

Strategies to reduce vaccine wastage include the following:

- careful planning of vaccine ordering and distribution;
- use of both single-dose and multi-dose vials ;
- careful maintenance of the cold chain;
- implementation of WHO's multi-dose vial policy, when appropriate.

Injection Safety

Hib conjugate vaccine procured through the GFCV will be supplied with autodisable (AD) syringes and safety boxes. Additional disposable syringes will be needed for lyophilized vaccines that require reconstitution. Managers at each level are responsible for ensuring that adequate supplies are available at all times. Attention should also be given to the proper use and disposal of the safety boxes used to collect these materials.

Revision of EPI Forms and Materials

An important element of integrating Hib vaccination into national immunization programmes is to revise training and informational materials, forms used to monitor and evaluate the programme, and vaccination cards.

Information, Education, and Communication Needs

When introducing Hib conjugate vaccine into national immunization programmes, information, education and communication (IEC) efforts are important from the beginning in order to generate support and commitment for the new vaccine and to assure that the vaccine is appropriately handled and administered. The primary target audiences for IEC efforts are

decision makers/opinion leaders, health care staff, and the general public (including parents).

What information is needed to assess Hib disease burden?

Various tools are available from the WHO regional office which use existing local and regional data to estimate the burden of Hib disease. As a result, disease burden studies will not be needed in most countries.

How should Hib conjugate vaccine be phased into the existing infant immunization programme?

The easiest way to introduce Hib conjugate vaccine is to simply begin vaccinating each infant that comes for routine DTP vaccination. Some countries may wish to consider one-time catch-up vaccination of older children (<2 years or <5 years of age). This will lead to a more immediate reduction in Hib cases but will be more expensive and somewhat more complicated to achieve.

Which type of Hib conjugate vaccine is most suitable?

The following issues should be considered when planning for the procurement of Hib conjugate vaccine:

- the existing immunization schedule and planned Hib conjugate vaccine schedule;
- the proper mix of monovalent/combo vaccines in single/multi-dose vials;
- formulation (lyophilized vs. liquid);
- total number of injections per visit;
- impact on local vaccine production; and
- cost.

Use of combination vaccines may offer certain programmatic advantages. These include:

- a decrease in the number of injections required per visit (and thus decrease the number of AD needles and syringes required); and
- a decrease in the amount of space required for cold chain storage and transport.

How can the addition of Hib conjugate vaccine be used to strengthen the national immunization programme?

The introduction of Hib conjugate vaccine into the routine programme should be used as an opportunity to strengthen the existing programme. Programme elements that need particular attention for the introduction of Hib conjugate include stock management, reducing vaccine wastage, and injection safety. Also, the introduction of this new vaccine against serious childhood illness represents an opportunity to renew community interest in all routine vaccinations.

Budgeting for Hib conjugate vaccine introduction

Capital and recurrent costs related to the introduction of Hib conjugate vaccine should be estimated and included in the annual EPI budget. Additional capital costs might include: investment in means of transport, cold chain equipment and sterilization equipment. Investment in an information campaign targeted at the general public should also be included. Additional recurrent costs include: vaccines, AD injection devices, salaries, transportation (petrol & maintenance), training, cold chain maintenance, safe disposal of waste, disease surveillance and other supplies, such as media and stationery.

Information on Vaccine Vial Monitors (VVMs)

What is a VVM?

A VVM is a small circle that is printed on a vial label or placed on another location on a vaccine container. The inner square of the VVM darkens irreversibly with exposure to heat over time. By comparing the color of the inner square to the color of the surrounding reference circle, a health worker can determine the extent to which the vaccine has been exposed to heat.

Why are VVMs important? VVMs can:

- prevent delivery of heat-damaged vaccine
- reduce vaccine wastage
- indicate cold chain problems
- serve as a tool to manage vaccine stocks
- facilitate immunization outreach

Timing and availability

VVMs have been available on all OPV purchased by UNICEF since 1996. VVMs will be introduced on UNICEF-supplied vaccines, including hepatitis B, yellow fever, Hib, and multivalent vaccines purchased through the Global Fund for Children's Vaccine (GFCV). As VVMs are introduced on all vaccines, there will be a period of time when programs will have a mix of vaccines with and without VVMs. Programs and health workers must be prepared for this situation. Vials with VVMs should not be used as proxy indicators of heat exposure for vials without VVMs. The VVM shows the heat exposure only for the vial to which it is attached. Vials without VVMs should be handled as they always were.

Location of VVMs on freeze-dried vaccines

In contrast to the situation for liquid vaccines where the VVM is on the label, WHO specifications require that VVMs be placed on the caps of freeze-dried vaccines (measles, yellow fever, BCG and some formulations of Hib) since the heat stability of these vaccines decreases rapidly once reconstituted. The health worker will then be forced to discard the VVM when opening the vial of freeze-dried vaccine, thereby preventing confusion about whether or not the VVM is still relevant to the reconstituted vaccine. **For freeze-dried vaccines, the VVM will show the heat exposure prior to reconstitution. Reconstituted vaccines need to be used within 6 hours of reconstitution and must be discarded if not used within that time.**



The Vaccine Vial Monitor says...

if the expiry date is not passed,



USE the vaccine



USE the vaccine
FIRST



DO NOT USE
the vaccine



DO NOT USE
the vaccine

Training -

- All staff members who handle vaccines (including supervisors, stock managers, workers who transport vaccines, health workers, and National Immunization Day volunteers) must be trained on VVM interpretation and use. Ideally, training will occur prior to January 2001.
- Policy guidelines, reference materials, training guides, and on-the-job aids, such as stickers and posters, can be distributed.
- Supervision and training updates will be needed to ensure that new and existing staff understand VVMs and continue to properly handle vaccines.

Wastage monitoring – All users of vaccines with VVMs should monitor vaccine wastage. Quantities of vaccine discarded due to a VVM indication of excessive heat exposure should be specifically noted on inventory forms and reported to supervisors. Supervisors should review vaccine wastage statistics and strengthen the cold chain, supervise vaccine administration, or change vaccine orders as appropriate.

Sources of information on VVMs

The following documents are available from the World Health Organization:

- Quality of the cold chain: WHO-UNICEF policy statement on the use of vaccine vial monitors in immunization services (*Ordering code: WHO/V&B/99.18*). Also available in French.
- The vaccine vial monitor - training guidelines (*WHO/EPI/LHIS/96.04(1079)*).
- **Making use of the Vaccine Vial Monitor (WHO/V&B/00.14)**. Also available in French.
- **WHO Policy Statement (WHO/V&B/00.09): The use of opened multi-dose vials of vaccine in subsequent immunization sessions**. Also available in French and Spanish.
- Vaccine vial monitor poster. This poster shows different color changes recorded by the VVM and how to interpret them. (CCPS/20 (4027)). Also available in French.
- Vaccine vial monitor sticker. A rectangular sticker showing four different stages of color change registered by the VVM (CCST/05 (3013)). Size 10.5 x 11 cm. Also available in French, Russian and Spanish.
- Specifications for vaccine vial monitors (E6/IN5).

Technical assistance

For assistance with VVM introduction, please contact the local WHO representative, the WHO Regional Office, the Department of Vaccines and Biologicals at WHO HQ (vaccines@who.int) or the PATH Immunization Technology Introduction Team (dkriste@path.org).

VVMs are valuable tools to improve immunization program quality and decrease vaccine wastage.

However, these benefits cannot be realized without training.

