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Conference on the Global Supply of New Vaccines

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Executive Summary

The objective of the meeting was to find common ground between the public and private sectors in efforts to ensure access to new vaccines for priority diseases, wherever they are needed. The participants included representatives from international organizations, public and private sector vaccine manufacturers, developers of biotechnology, and licensors of intellectual property, as well as academia and private sector consultants in related fields. The meeting consensus evolved through a series of presentations and wide-ranging discussions.

Five major themes were covered:

- the increased options, new technology, and market complexity in the field of vaccines
- strategies to address the use of existing but severely underused vaccines, such as Hib, hepatitis B, and yellow fever vaccines
- issues involved in the development of vaccines, including dealing with intellectual property rights (IPRs)
- the role of “local” production (defined as production for domestic use, usually in a developing country setting) in overall vaccine supply strategies
- the research and development pipeline for vaccines against priority diseases, which currently have less attractive commercial markets.
The participants agreed on the following conclusions:

The high cost-effectiveness of immunization and its unparalleled contribution to the reduction of infant and child mortality in the world needs greater recognition. The opportunity now exists to prevent at least an additional one to two million child deaths each year, and potentially millions more in the next decade. Existing but severely understated vaccines (such as those against hepatitis B, Haemophilus influenzae type b, rubella, and yellow fever) must be moved into appropriate use wherever needed. Other vaccines (e.g. rotavirus, pneumococcal and meningococcal conjugate vaccines) against major killers of children may rapidly become available. A new ‘golden era’ in vaccine development is at hand and other innovative new technologies will soon offer further advances. The establishment of a commercially viable vaccine market in developing countries is recognized as a long term goal for which approaches should be actively sought. For the supply of vaccines to the poorest countries, UNICEF’s procurement function will play a critical role for the foreseeable future.

Because of the different economics surrounding new vaccines, actually attaining the reductions in childhood death, disability and suffering they make possible will entail different approaches, including:

- Full implementation of the UNICEF/WHO strategy for targeting supply assistance for new vaccines to only those countries in greatest need. Tiering of prices for vaccines offered by manufacturers — an implicit part of the strategy, made possible by economies of scale and production experience — at the earliest feasible opportunity will accelerate worldwide control of infectious diseases and its affordability, and thus has broad benefits. Broad communication to achieve acceptance of this strategy is essential;
- Protection of, and respect for, intellectual property, which in turn serves as a stimulus for further innovation, in line with the WTO TRIPS agreement;
- Involvement in global supply of various types of producers to meet vaccine needs, all of which, to ensure their viability, will need to secure access to new technologies, whether through negotiated strategic alliances, licensing agreements, or research and development;
- Acceptance that vaccine quality cannot be compromised, if safety, effectiveness and public confidence are to be maintained, and assurance of this quality must be independently overseen by well-functioning national control authorities;
- Earlier forecasts of demand for new vaccines, based inter alia on epidemiological criteria;
- Pro-active management to ensure that vaccines will be developed to prevent diseases in developing countries for which there is no adequate commercially attractive market;
- Advocacy to raise awareness among decision makers and populations, in both industrialized and developing countries, donor and international agencies of the high value of vaccines, in terms of both health and economic benefits;
• Mobilization of substantially greater resources for vaccine introduction, supply and utilization, especially in developing countries; and

• Unprecedented levels of collaboration among the diverse contributors to vaccine development, supply, quality and delivery – in particular between the public and private sectors in achieving their shared goal of providing the best vaccines possible to improve the health of the world's population.

These efforts will necessarily be complex and interrelated. Consensus, coordination and recognition of complementary objectives among potential contributors will be required for effective implementation. A new active relationship is urgently needed. Therefore, the CVI Secretariat should:

1. Design new structures or mechanisms whereby all potential contributors can be involved in achieving the above objectives. These structures must create a sense of commitment and shared goals among all potential participants.

2. Create a strategic plan which can move forward the above-mentioned efforts.

3. Through discussions with those having the authority to commit institutional resources, seek the involvement of all potential contributors and stakeholders in achieving these aims.

This statement provides a basis for implementing an action agenda through a renewed Children's Vaccine Initiative (CVI), providing for the full participation and collaboration of public and private sector partners throughout the vaccine development and utilization continuum. This meeting served as a first step towards this shared aim. The list of participants and agenda are attached as Annexes 1 and 2 respectively. Copies of presentations (listed in Annex 3) are available on request from the CVI Secretariat.
Session I: Background

The meeting was opened by Dr J.W. Lee, Executive Secretary, CVI. Drs Seth Berkley and Roy Widdus, representing the Rockefeller Foundation and the CVI Secretariat, respectively, outlined the aim of the meeting, urging participants towards expanded efforts in global immunization. Dr Berkley noted that the public sector must share some of the blame for the sub-optimal way vaccines have been supplied in the past. Today, following efforts to build on the achievement of Universal Child Immunization (UCI), he believed we were now on the threshold of the “Golden Age of Vaccines”. However, with the world vaccine market expected to increase from US$ 3 billion to US$ 5 billion or more over the next five years, the challenge will be to ensure that new vaccines — especially those against diseases of importance in developing countries — are available wherever needed. Dr Widdus challenged the group to review recent developments in the area of vaccine supply, to question if the directions now being taken were fundamentally sound, to look at ways of speeding up implementation of the strategies already agreed, and to develop a new form of public-private collaboration for the future.

Economic framework for considering global vaccine supply

The economic framework for consideration of global supply issues was outlined by Mr Piers Whitehead of Mercer Management Consulting, UK. Mr Whitehead pointed out that since vaccine production is largely a fixed cost business both an increase in the scale of production and increased experience in production of a specific vaccine (the “learning curve”) can drive production costs down. Thus, additional production volume has a value by lowering costs, even if the revenues per dose resulting from this marginal volume are low. However, revenue per dose has a more important bearing on profitability. New vaccines are generally higher priced and larger sources of revenue than established vaccines. Most manufacturers, if forced to choose, would opt for higher prices at low volume. However, Mr Whitehead maintained that, in the long term, manufacturers would benefit more from serving all segments of demand at “appropriate price points”. The concept of tiered pricing, involving different prices to individual market segments, is key to the implementation of this production supply strategy.

Intellectual Property Rights (IPRs)

Mr Walter Vandersmissen, of SmithKline Beecham Biologicals, Belgium, looked at the role of Intellectual Property Rights in the research-based pharmaceutical industry. He noted that, while patents are important, and must be respected, they are nevertheless assets, which can be traded like any other asset. Therefore, access to technology is not an insurmountable problem but can be addressed by agreements
between interested parties. The major impediments to access to new technologies are not IPRs, but rather limited production capability, the potential for a threat to more profitable markets, and the unattractiveness of some markets due to trade barriers and low price levels.

Offering a public sector perspective, Dr Phil Russell, of John Hopkins University, USA, said the role of the public sector should be to move a vaccine down the continuum from disease surveillance and basic research, through production and regulation, to introduction. An ideal system would be responsive to public health needs and would implement purchasing policies beneficial to the entire world. However, the current system is not always meeting these goals. In particular, it is failing to keep up with the increasing availability of combinations and new vaccines now available, and to speed up the introduction of vaccines in the poorer developing countries — both measures which would have a major impact on the global burden of disease. Meanwhile, more work is needed in cost-benefit analysis to demonstrate the value of vaccines. And there is a need for better coordination of research activities which are now fragmented due to multiple patents and licensing arrangements.

Mr Adrian Otten, head of the Intellectual Property and Investment Division of the World Trade Organization (WTO), pointed out that intellectual property laws exist for three main reasons: as an incentive for investment in research and development, for encouraging disclosure of scientific information, and for equity. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) provides international rules so that minimum standards for protection of intellectual property will exist. Mr Otten maintained, however, that the impact of the TRIPS agreement may have been overestimated, as there are many other factors which have an impact on vaccine economics.

Round table: vaccine supply and IPRs

During a round table discussion, representatives of the various players in global vaccine supply presented their individual viewpoints. In general, intellectual property protection was viewed positively as a way of promoting the development of discoveries (in universities, government or private institutions) into products that benefit and protect public health. The biotechnology industry, similarly defended IPRs as a mechanism crucial to its development of new technologies. Intellectual property protection attracts investment because it reduces risks and increases the likelihood of reward on the investment. From the perspective of the large commercial manufacturer, IPRs were considered useful in reducing the risks inherent in moving a technology forward. Therefore, restrictions on IPR protection would not increase vaccine supply and might shift investment elsewhere.

Some within the public sector contended that the public sector has been naïve in its treatment of IPRs. One public sector producer emphasized the critical role of export for its survival, pointing out that, without an export market for its vaccines, it would not be able to serve its home market. It was noted that central procurement agencies such as UNICEF have a key role to play in assuring access to new vaccines. Measures that UNICEF can take to make developing country markets more attractive include: aggregating demand to reduce transaction costs, promoting uptake of new products, and promoting market segmentation. Through tiered pricing,
UNICEF will be able to increase immunization coverage with new vaccines. Several participants emphasized the need to prioritize new vaccines for use within the public health sector.

A representative from the vaccine industry emphasized the role which manufacturers with increasing export potential play in the global supply of vaccines. While agreeing that IPRs should be respected, he maintained that some patents are both obstructive and too far-reaching. While there is a need to maintain high quality in production of new vaccines, local production may be needed to make a sufficient supply of these vaccines available to developing countries. The Latin American experience in local vaccine production was also discussed, and two major challenges for local producers were noted: government ownership may conflict with appropriate management and budgeting for these facilities, and there is a need to develop local capacity for research and development. Partnerships with the major commercial companies may be a viable way of meeting these challenges.

General discussion focused on two key areas: Intellectual Property Rights (IPRs) and the economics of vaccine supply. Participants agreed that IPRs are important and should be respected. However, it was noted that there is inevitably a tendency towards infringement of IPRs when a desired technology is, or is perceived to be, inaccessible. There is a relationship between access to vaccine and the likelihood of infringement, and this relationship needs to be well managed to optimize the availability of new technologies and decrease the tendency towards infringement. Technology holders are often under pressure to license it to the first bidder. However, better assessment of the future value of the technology might lead to licensing decisions which would assure wider access for key product patents.

On vaccine supply issues, it was agreed that market segmentation and tiered pricing might be commercially attractive options for manufacturers that would also meet public health needs. However, decision makers in industrialized countries might resist the notion of paying prices in their home markets higher than those offered to poorer countries even though these prices would be the same or higher if only the home market existed. Efforts are needed to explain the rationale behind price tiering and ensure it is recognized both as a sound commercial proposition and as a way of improving global disease control. More work is also needed to increase the level of resources available in developing countries to buy vaccines. By creating demand for products of public health importance, these markets may become more attractive.
Session II:
Evolution of the vaccine industry

Vaccine sources and markets

Dr Julie Milstien, of the Vaccine Supply and Quality Unit, in WHO’s Global Programme for Vaccines and Immunization (WHO/GPV), pointed out that the major source of supply for the traditional EPI vaccines, particularly in Asia, is through local production. However a different trend is developing for the newer vaccines. At the outset, new vaccine technology is concentrated in research-based commercial manufacturers, but these vaccines are subsequently being made available by “diffusing” manufacturers, who have adapted technology, despite IPR protection, and introduced more competition into the industry. Thus, for hepatitis B vaccines, manufacturers who used to serve an exclusively local market, are now entering the global market.

Dr Archana Asthana, of Frost and Sullivan, used a forecasting model to predict future trends in the vaccine market. She predicted a widening gap between developed and developing country markets, with the former having access to new vaccines such as DTaP and combination vaccines, and the latter only slowly accessing these advances.

Mr Walter Vandermissen, of SmithKline Beecham Biologicals, Belgium, outlined future trends for developing world markets, predicting that economic growth and burgeoning private markets in some developing countries would have an important influence on the overall global market.

Dr Stanley Cryz, of the Swiss Serum Vaccine Institute, highlighted the increasing impact of technological innovations such as live recombinant vaccines and nucleic acid vaccines. He pointed out that some new products, such as Hib and DTaP, will have an impact on the use of existing vaccines in areas such as primary immunization schedules, booster doses, and the use of combinations. Highlighting his own company’s experience in the development of a Hib-DTP liquid combination vaccine, he noted that the ability to lower the antigen content of the vaccine, as indicated by clinical trial data, would effectively multiply the yield of bulk product while reducing the cost. The potential for filling and finishing this bulk in developing country facilities could decrease overall production costs, and thus price.
Role of local production

The second part of session II focused on the barriers to viable local vaccine production, using Brazil as an example. Dr Otavio Oliva, of BioManguinhos, explained that in Brazil, those barriers are high production costs arising from an inflexible management structure, a high percentage of fixed costs, and the need to produce for low profit markets. Faced with this situation, local producers are currently applying to the Government for a change of status to allow them greater financial and managerial independence. He noted that access to new vaccine technologies for developing country manufacturers which lack research and development expertise will depend on partnerships for technology transfer, joint ventures, or licensing of technology.

Ms Amie Batson, of the Vaccine Supply and Quality Unit, WHO/GPV, told participants that WHO has developed criteria to assess the potential viability of local vaccine producers. These criteria include indicators in seven key areas: production efficiency, Good Manufacturing Practice (GMP), access to new technologies, quality assurance, ability to meet demand, management, and legal status — all of which are designed to predict the ability of a public sector manufacturer to manage change and complexity. Three general groupings of manufacturers have been identified: those which are viable, those which are potentially viable, and those with a low probability of ever becoming viable. The viability rating is a tool to help governments and donors target inputs where they are likely to be most effective, and to have them re-evaluate the feasibility of continuing production when large amounts of investment and commitment are needed.

Mr Albert Saporta, of Pasteur Mérieux Connaught, outlined the criteria involved in a decision to enter into partnership with a local producer. They include: the public health benefit; access to otherwise closed markets; the possibility of a stronger marketing position in strategic countries; and the opportunity to take advantage of particular local conditions. He explained that for a large global vaccine manufacturer the key criterion is not the viability of the local producer, but the viability of the partnership. Other important considerations were quality — the existence of a national control authority is a key requirement; the economic rationale; and the management of the partnership. He noted that the work done by WHO was helpful in laying the groundwork for discussions with potential partners.

Dr Su Wannian, of the Beijing Vaccine and Serum Institute, China, described how China's massive demand for vaccine is met by seven national production institutes. The mechanisms used to develop new vaccines include collaboration between the national institutes, and transfer of technology both between the institutes and from abroad. Several new vaccines are now being produced in China, including two types of recombinant hepatitis B, typhoid, acellular pertussis, and Japanese encephalitis B vaccines. In discussions, it was noted that a key issue in the assurance of vaccine quality is the National Control Authority in China, which does not perform, as of the time of the meeting, all the functions considered essential by WHO to ensure product quality.
Discussion

The discussion focused on three major areas. First was the need for simplification of licensing process patents. It was suggested that broad cross-licensing packages would streamline acquisition of the non-exclusive enabling technology patents, so that developers could avoid extensive negotiations on an individual basis.

Second was the need to enlarge markets in developing countries. The potential market for new vaccines is enormous. The challenge will be to change this potential market into a real one. Awareness of the value of vaccines by the end user is key to the uptake of new vaccines, and may be even more important than price in the private market. It was suggested that once new vaccines enter the private market in developing countries, pressure increases to move them into the public sector. This could motivate manufacturers to develop vaccines targeted at developing country markets.

The third area of focus was the role of developing country vaccine producers in ensuring the wide availability of new vaccines. In the past, quality standards have not been met, partly due to the low prices paid by their governments to local producers. These two factors of quality and price have created a disincentive for transfer of technology. It was agreed that it is the responsibility of each country to oversee the quality of vaccines produced within its borders. It therefore follows that since a country’s ability to support a fully functioning national control authority depends on its size and wealth, this would normally discourage vaccine production in small poor countries.

WHO’s proposal to limit technical assistance to public sector producers to support only for meeting national needs was discussed in light of the reality that most developing country producers would probably have to export in order to be viable. Except in the case of very large countries, the home market cannot generally support a national producer; thus export and private sector markets become important factors. However, the prospects for export cannot be guaranteed as the producer would have to compete in the international market.
Session III: Meeting demand

Optimal methods to meet global demand

Mr Jacques-François Martin, of Chiron Vaccines, outlined what the public sector could do to help the vaccine industry meet global demand for vaccines: good planning for the short term; a commitment to a global recommendation on use of new vaccines for the middle term; and careful priority setting for the long term. Choices on desired combination vaccines would have to be made particularly carefully to offset loss in flexibility in their use. Because industry will not be able to develop all possible new vaccine candidates, the public sector must set priorities. Harmonization of regulatory requirements would lower development costs.

Mr Martin also underscored the importance of advocacy in making the public and policy makers aware of the cost-effectiveness of disease prevention instead of treatment. He emphasized that until existing vaccines such as hepatitis B and Hib vaccines were used in developing countries, there was little relevance in discussion of the alleged ‘failure’ of industry to develop vaccines for developing country needs.

Mr Piers Whitehead, of Mercer Management, emphasized that the most profitable way to meet global vaccine demand is to maximize production volume, serving all segments of demand at appropriate price points. Recognizing the need for a change in previous vaccine supply structures, Mr Whitehead examined two different approaches by vaccine manufacturers. One extreme is to focus exclusively on the ‘core’ (usually industrialized country) market, which implies – because of limited volume – high cost, high price, and heavy dependence on innovation for a flow of new products to revitalize revenues. This would probably result in limited attractiveness to biotech partners due to the restricted market. It would also run the risk of competition from manufacturers offering lower prices, since an unmet global demand would result in more local production. The other extreme was a global market orientation, with low cost and high revenues through market segmentation, limiting competition from local producers, but running a risk of threatening the domestic price structure through price tiering. Mr Whitehead maintained that the public sector would need to intervene to help shift the risk/return ratio toward the second approach being attractive to companies. He recommended the following measures:

- preserve “core market” pricing by securing acceptance of tiered pricing and limiting the risk of market cannibalization and parallel imports;
- protect marginal pricing as a critical means of access to new vaccines for the poorest countries by improving forecasting of demand early in the vaccine life cycle, and accelerating the recommendation process for vaccine introduction;
understand the key role of UNICEF (or other) consolidated procurement in respecting market segmentation, recognizing legitimate commercial concerns, and placing a value on the potential for future new vaccines.

Licensing strategies

Dr Tony Mills, of the British Technology Group, and Ms Elizabeth Fuller, of the CVI Secretariat, outlined possible options for new licensing strategies and market segmentation as a means to promote access to new vaccines. The presentation described innovative approaches to licensing technologies, such as field of use licenses or exclusive licenses within limited territories, which could maximize the chance for new vaccine development while encouraging availability. The same economic arguments which would convince vaccine manufacturers to provide marginal volume at the lowest tiered price might also encourage a licensee to make a product or technology protected by IPRs available on a global scale. One approach suggested was the concept of tiered royalties, which could strengthen the market segmentation approach. Also highlighted were the inherent flexibility in licensing agreements and the need for effective enforcement of IPRs. Dr Mills noted that developing countries need to develop their own innovation and IPR management, rather than depend solely on partnerships for access to new technologies.

Discussion

On the issue of new licensing strategies, it was suggested that outlicensing technology to several developers via 'field-of-use' licenses would miss the opportunity for synergy which might be possible if one licensee developed the technology. The difficulty of knowing, in advance, the potential value of the technology was seen as a possible problem in deciding whether or not to grant an exclusive license.

Some participants maintained that the concept of tiered royalties was an acceptable approach and one that was already in use. It was suggested that, in order to reach new audiences and increase the potential benefits, a briefing document on tiered pricing should be prepared to accompany the one proposed on the UNICEF procurement strategy. Other participants maintained that tiering of royalties could have a negative impact on biotechnology in the longer run, unless provisions were made for a longer period of time for the lower royalty stream. There was, however, a consensus on the need to maintain flexibility in approach. There was also agreement on the need for an increased understanding (particularly in developing countries) of IPR management — a major asset in negotiating technology transfer or partnership agreements.

There was some opposition to reliance on tiered pricing as an approach to expanding market access. To some, it was a monopoly building tool which would drive out local producers who could not meet economies of scale. In addition, there was concern that its impact could be destroyed if prices in different markets were not maintained at different levels, or if parallel markets were developed which brought in vaccine purchased at a lower price to a higher priced market. Finally, it was suggested that there was a need to 'manage' the life cycle of new vaccines, recognizing that tiered pricing would probably not come into effect until a few years after introduction, to allow maximum revenues on the initially limited production.
There was strong support for wider and better presentation of the concept of market segmentation and tiered pricing. A purely economic rationale was generally felt likely to be more effective with decision makers than simply a humanitarian argument. Ways must be found to convince vaccine consumers and government officials in industrialized countries of the reasons why market segmentation is beneficial.

Manufacturers said it was possible that, as a result of competing priorities, it was unlikely that they would develop products to prevent diseases that only occur in developing countries and for which no significant commercial market exists. The success of efforts by the public sector to maximize uptake of existing but underused vaccines against globally important diseases would be an indication to manufacturers of the value of investing in products with a smaller commercial market. Activities are needed to increase awareness among consumers, including governments, parents, and health care providers, that, despite their higher prices, new vaccines are highly beneficial. These activities could have the effect of increasing the total market for vaccines. Modeling of the economic impact of developing vaccines for these markets would be useful, and there is also a need to expand the funding base, through increasing the amounts paid by governments and donors for these particular products. Meanwhile the acceptability of offering different products to developing country markets needs further exploration to define the degree of flexibility acceptable, given that these alternative vaccines would be controlled by competent regulatory authorities and of demonstrated quality.
Summary of discussions

There is increased market complexity in the field of vaccines

The global vaccine market has changed from a commercially unattractive market for traditional vaccines to a high technology-driven one that is more commercially attractive. This in turn will lead to changes in the way pharmaceutical companies view their vaccine divisions, and in the way they manage their product portfolio. The number of potential products in the pipeline is increasing, together with rapid advances in vaccine technology. As a result, vaccine manufacturers must make choices as to which products to develop.

Market needs are increasingly diverse. Not only are there different types of vaccines for different markets, but the presentations (single dose or multi-dose, for example) and formulations may differ. Due to the cumulative impact of lower vaccine prices for more mature products, the increasing range of options for combination products, non-harmonization of regulatory requirements, and increasing research and development costs, the vaccine industry is consolidating. This is likely to lead to a smaller number of producers in both industrialized and developing countries to meet these diverse global needs.

Faced with this change in the vaccine production industry, the public sector must find ways of managing the increased choices and restrictions in ways that benefit public health. These include: advocacy to promote vaccines as the most cost-effective health expenditure; better forecasting of vaccine demand, particularly for new vaccines; joint planning with manufacturers on ways to meet this demand; and development of a priority setting process which will help in making choices from among the portfolio of different vaccines and varying presentations.

Strategies must be designed to address the use of existing but severely underused vaccines, such as Hib, hepatitis B, and yellow fever vaccines

Millions of vaccine-preventable deaths occur every year through failure to provide existing vaccines in the countries which need them most. Until these vaccines are employed, discussions with vaccine producers on the development of vaccines with no commercial markets will have less credibility. Public sector interventions to facilitate the introduction of these underused vaccines should be directed first to countries in greatest need. This will require strategies to increase the pool of funds available for their purchase; to create awareness of the cost-benefit of vaccines, among government decision makers, parents, health care providers, and donor agencies; and to exploit the power of UNICEF (and other) consolidated procurement by employing strategies, such as tiering of prices over different segments of the market, to maximize public sector access to these vaccines.
Although it was agreed that tiered pricing is an effective mechanism to provide volume for suppliers and wider access to products, there are several issues which must be addressed to make it acceptable, particularly in the wealthier countries. The economic basis of the strategy needs to be effectively packaged so that wealthier consumers, both governments and users, understand that tiered pricing provides a stable pricing structure for the vaccines they buy. The potential for erosion of prices across different market segments and the threat of parallel imports - which would have the same result - need to be anticipated and managed.

New issues to be considered in developing vaccines include dealing with intellectual property rights (IPRs)

While all agreed on the need for IPRs to stimulate research and development, and to ensure disclosure and equity, there is a risk that product patents may limit access in developing countries to new technologies — a situation which would encourage patent infringement. There are several possible ways of preventing this. The first is the encouragement of IPR protection and management in all countries, thus fostering innovation. While some new technologies will be accessed by partnerships and licensing agreements, vaccine research and development leading to licensable technologies should be pursued in developing as well as industrialized countries.

A second method of promoting wide product availability is to approach licensing of technologies in ways that will both increase returns on investment and improve access. One suggestion is to make non-exclusive process patents more readily available, by packaging them together to simplify their acquisition. Another is to improve the ability to predict the utility of a new technology so that exclusive product patents for products likely to be key to development of a specific new vaccine can be avoided. A third possibility is to use tiering of royalties as a means of leveraging access to technology. Each of these ideas has implications in both the short and the long term which need careful consideration. A continuing public-private sector dialogue is essential to achieve the goal of making new vaccines available at affordable prices as soon as possible.

There is a new role of “local” production (defined as production for domestic use, usually in a developing country setting) in vaccine supply strategies

From a global supply perspective, local production is not an end in itself. There are many local producers today for whom future options will be restricted by their limited ability to manage change. Imposition of efficient management practices and adherence to global quality standards will be necessary. Viability assessment can be helpful to ‘local’ producers in clarifying the options and their implications. While there will continue to be producers in developing countries, their numbers are expected to decrease, and the majority of those that remain will probably enter the global market.

For these surviving public sector producers, access to new technologies will be critical. This trend is already being seen and has resulted in the diffusion of newer vaccines to a wider market. Access to new technologies can be achieved by developing strong research and development capacity, bulk-filling arrangements, licensing technology, negotiating partnerships for specific products, or entering into joint ven-
ture agreements with a research-based manufacturer. For commercial manufacturers, there may be advantages in developing such partnerships; for example, as a means of accessing certain markets more quickly or to develop a regional manufacturing capacity. In deciding whether to go into partnership, the viability of the alliance, rather than of the potential partner, will be the determining factor.

There is a need to include in the research and development pipeline vaccines against diseases specific to developing countries

Vaccine manufacturers are faced with a range of possible vaccines to develop. So it is understandable that development of vaccines with no commercial market will be a lower priority — especially since the public sector has been slow to introduce existing, reasonably priced new vaccines that could be of great benefit to public health. In future there could be not only a large global burden of disease which remains unaddressed, but also a large gap between the products available in the poorest countries and those needed in the industrialized world. Already there is a difference both in vaccine products and their presentation. For example, in industrialized countries, single dose presentations are common, rather than multi-dose presentations which are generally more cost-effective for large public sector immunization programmes. Wealthier consumers can choose from a range of combination vaccines which include new vaccines already on the market. Yet none of these are yet available for the countries in greatest need. The introduction of acellular pertussis vaccines is a case in point. Is it acceptable that a product which will have fewer side effects but costs more is not available to all children?

To increase the probability of the development of new vaccines, it is essential to ensure optimum uptake of existing priority vaccines. The public sector could also help by prioritizing and coordinating research and development activities for new vaccines.

A global recommendation on the need for new vaccines and increased discussion on their priority could make commercial investment more attractive, as would firmer establishment of epidemiologic need, surveillance, and cost-effectiveness studies. But the key approach ultimately will be the development of commercial markets for these vaccines. This implies increasing the funds available for their purchase, and increasing the number of potential purchasers.

Based on these discussions and the points of agreement reached, participants agreed on the statement of conclusions included in the Executive Summary and the need for a strong coordinating mechanism by which to implement it. The CVI Secretariat will take on this role, define a strategic plan which can be used as a basis for action, and seek ways of involving all groups represented among the participants in implementing this plan.
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Annex 2: Agenda

Monday, February 3, 1997

6:45  Cocktails.
7:30  Opening Night Dinner.

Remarks from hosts: Dr Seth Berkley, Dr Roy Widdus.

Purpose of meeting - to find common ground between the public and private sectors with the goal of ensuring supply for new vaccines.

Tuesday, February 4, 1997

Session I: Background

8:00 - 9:00  Breakfast

9:00 - 9:30 Welcome: Dr J.W. Lee, Executive Secretary, CVI.

Introductions: Dr Seth Berkley, Dr Roy Widdus.

9:30 - 10:00 Economic framework for considering global vaccine supply (Mercer Management).

10:00 -10:45 IPR definitions and presentation of current environment

Commentary:
  a. Economics drive the right outcomes, i.e. the current system provides the proper motivations and that it works (Mr W. Vandersmissen).
  b. Public health needs are not always met under the current system (Dr P. Russell).

Purpose of Meeting Redux - Are these two perspectives necessarily mutually exclusive?

10:45 - 11:00  Coffee
Tuesday, February 4, (cont.)

11:00 - 11:30  Protection of IPRs: Why, How and for Whose Benefit?  
(Mr A. Otten - WTO).

11:30 - 12:30  Perspectives and Motivations of the various players in vaccine sup-
ply: Round Table  
a. Academia (Ms L. Nelsen),  
b. NIH/OTT (Dr R. Benson),  
c. Biotech (Dr T. Dunn),  
d. Large Commercial Manufacturers (Mr T. Kostyk),  
e. Public Sector Producers - Staten Serum Institute (Mr L. Pallesen),  
f. Central procurement agencies - UNICEF (Dr D. Broun),  
g. Producers with increasing export potential (Dr J.H. Han),  
h. Developing country local producers (Dr O. Oliva).

3-5 page paper to be submitted in advance by a representative of each category CVI to compile for points of agreement and dis-
agreement.

12:30 - 2:00  Lunch

2:00 - 2:30  Follow up discussion on Round Table.

Session II: Evolution of the vaccine industry

2:30 - 3:00  Sources of Supply - overview and emerging trends (Dr J. Milstien).

3:00 - 3:30  The future markets for vaccines (Dr A. Asthana).

3:30 - 4:00  Coffee

4:00 - 4:30  How markets are changing in the developing world given emerg-
ing affluence (Mr W. Vandersmissen and/or Mr J.F Martin).

4:30 - 5:00  Emerging trends in IPR (Ms L. Fuller).

5:00 - 5:30  The future of vaccines: possible advances in science and technol-
egy. Technological innovations (e.g. DNA vaccines or technology critical to combinations) that could potentially revolutionize the vaccine market and therefore, affect global supply (Dr S. Cryz).

7:00  Cocktails

7:30  Dinner
Wednesday, February 5, 1997

8:00 - 9:00  Breakfast

9:00 - 9:30  Trends and motivations among local producers who do not export (Dr O. Oliva, Bio Manguinho, Brasil).

9:30 - 10:30 Viability of local production: Assessment of its potential role in future supply (Ms A. Batson).

10:30 - 11:00 Coffee

11:00 - 11:45 Large commercial producer approach towards local producers (Mr A. Saporta).

11:45 - 12:30 Approaches to ensuring supply in large developing countries - China (Dr Su Wannian).

12:30 - 2:00 Lunch

Session III: Meeting demand

2:00 - 3:00  Perspective on optimal methods by which to meet global demand (Mr J.F. Martin).

3:00 - 3:30 Coffee

3:30 - 4:30  Perspective on optimal methods by which to meet global demand (Mr P. Whitehead).

4:30 - 5:00 Discussion: including export and tiered pricing as essential components in global supply.

7:00 Cocktails

7:30 Dinner
Thursday, February 6, 1997

8:00 - 9:00 Breakfast

9:00 - 10:00 Possibilities for new licensing strategies and market segmentation: Consequences for public health, revenues and market share (Dr T. Mills, BTG and Ms L. Fuller, CVI).

10:00 - 10:30 Tiered royalties - A benefit, albeit small, for everyone? (Ms L. Fuller).

10:30 - 11:00 Coffee

11:00 - 12:15 Discussion of forgoing presentations (using hypothetical situations to avoid any trade secret/confidentiality problems).

12:15 - 12:30 Summary of conclusions.

12:30 - 2:00 Lunch

2:00 - 2:30 Criteria for partnerships: Harmonization of perspectives (Consensus reports on traditional vaccines - DTP, Polio).

2:30 - 3:15 How to apply partnerships to new vaccines.

3:15 - 4:00 Discussion - Tie together export, tiered pricing, advocacy partnerships and new licensing strategies - the need to arrive at practical alternatives which acknowledge and begin to address the needs/concerns of all parties, and agree who should do what.

4:00 - 4:30 Coffee

4:30 - 5:00 Summary, Adjournment

7:00 Cocktails

7:30 Closing dinner
Annex 3: Presentations

Opening Remarks
J.W. Lee

Introduction
Roy Widdus, Seth Berkley

Economic Framework for Considering Vaccine Supply
Piers Whitehead

Presentation of Current Environment
Walter Vandersmissen, Phil Russell

Protection of IPRs
Adrian Otten

Round Table:
- Academia
- NIH/OTT
- Biotech
- Large Commercial Manufacturers
- Public Sector Producers
- Central Procurement Agencies
- Producers with Increasing Export Potential
- Developing Country Local Producers

Lita Nelsen
Bob Benson
Tracy Dunn
Tom Kostyk
Lars Pallesen
UNICEF
Jee H. Han
Ottavio Oliva

Sources of Supply - Overview and Emerging Trends
Julie Milstien

The Future Market for New Vaccines
Archana Asthana

How Markets are Changing in the Developing World
Walter Vandersmissen

The Future Vaccines - Possible Advances in Technology
Stan Cryz

Trends and Motivations among Local Producers Which Do Not Export
Ottavio Oliva

Viability of Local Production
Amie Batson
Large Commercial Producer Approach Towards Local Producers

Approaches to ensuring Supply in Large Developing Countries

Perspectives on Optimal Methods by Which to Meet Global Demand

Perspectives on Optimal Methods by Which to Meet Global Demand

Possibilities for New Licensing Strategies and Market Segmentation

Albert Saporta

Su Wannian

Jacques-François Martin

Piers Whitehead

Tony Mills, E. Fuller