WHO/DHHS Joint Workshop on Enhancing the Global Workforce for Vaccine Manufacturing

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Meeting Report

Executive Summary

Highly trained personnel are essential to establishing or strengthening vaccine production capacity in developing countries, therefore, international support should include appropriate efforts to train and retain a skilled local workforce. A skilled workforce will support long-term sustainability and viability of the operations of developing country vaccine manufacturers (DCVMs).

The Workshop on Enhancing the Global Workforce for Vaccine Manufacturing (WEGWVM) brought together key stakeholders to identify essential needs and current gaps in the vaccine manufacturing workforce in developing countries; discuss the development of a coordinated and sustainable approach to address these needs and gaps; generate ideas for leveraging existing resources; and delineate potential policy issues and options for the short, medium, and long-term. The workshop plenary and poster sessions provided a forum for highlighting successful models and best practices to invigorate vaccine manufacturing workforce development.

More than 100 delegates from 30 countries participated in the workshop, including representatives from government agencies and ministries (health, science and technology, labour and education), developing and developed country vaccine manufacturers, small research-driven biotech companies, international donor organizations, academic institutions, and non-governmental organizations.

Outputs from the WEGWVM are intended and expected to influence the implementation of the WHO Global Pandemic Influenza Action Plan to Increase Vaccine Supply (GAP). The GAP was reviewed and refined in 2011 as part of the formulation of a GAP-2 which will span the next 5 years.

The WEGWVM served as a catalyst for stakeholders to form new partnerships and reinforce existing ones. These relationships, and the dialogue that was initiated during the workshop, are small but important steps toward the establishment of trans-national and/or regional synergies in vaccine production capacity building. Continued dialogue on a shared platform may spark innovative collaborations to address the vaccine production workforce development challenges faced by nations and regions with existing or planned vaccine production activities.

The main messages derived from discussions on the opportunities and challenges to ensuring availability of skilled workforce are summarized in Table 1.

Table 1. Points for consideration from the WEGWVM

1. Availability of high quality, appropriate, effective and easily accessible training developed collaboratively by experts, regulators and manufacturers.
    a. Develop a **harmonized curricula** with key core competencies, including specialized training for highly technical tasks (maintenance, cleaning etc.) and hands-on training opportunities.
    b. Establish systems to **monitor and evaluate the quality and consistency of the training programs.**
    c. Institute a **national stakeholder advisory group** composed of government representatives (including regulators), educators, trainers and industry, that meets regularly to establish education and training priorities and discuss curricula standards.
    d. Create regional centres of excellence for workforce training. Identify **regional location** for course provider(s) and **language adaptation** to the needs of the trainees.
    e. Develop three levels of **certification**: a) curriculum/facilities, b) Quality of trainers, and c) Quality of trainees
    f. Explore potential role for electronic media, e-learning and online training
    g. **explore the possibility of an international recognition** of training courses and qualifications.
2. Develop strong **business planning skills** within vaccine manufacturing companies so investments in workforce are integrated in human resource and manufacturers strategic plans.
3. **Encourage mobility of technical and scientific expertise** between manufacturing institutions and regulatory bodies.
4. Introduce **forms of support** to vaccine manufacturing companies and institutions through government grants, soft loans, tax breaks and other incentives to help **offset training costs.**
5. Collect and analyze quantitative data derived from workforce mapping surveys and recruitment and retention studies to support increased flow of resources towards workforce capacity enhancement efforts.

Introduction

Creating regionally-based, independent and sustainable vaccine production capacity in developing and emerging economy countries is an important means of enhancing global public health preparedness. The World Health Organization (WHO), the U.S. Department of Health, and Human Services (DHHS) and other organizations and governments are committed to assisting in these efforts through capacity building and technology transfer.

In January 2010 WHO and DHHS convened the Sustainable Influenza Vaccine Production Capacity Stakeholders' Workshop in Washington D.C. in order to initiate a coordinated discussion among international partners regarding this shared goal. An important point for consideration that arose from the workshop was that international support for establishing or strengthening vaccine production capacity in developing and emerging economy countries must also include appropriate efforts to recruit, train and retain a skilled local workforce. A highly skilled workforce will support long term sustainability and viability of the operations of developing country vaccine manufacturers (DCVM).

An extensive literature review conducted in March 2011 yielded no significant data. In response to the dearth of published data, WHO surveyed vaccine manufacturers worldwide to address this knowledge gap. The phased survey, which was implemented April-May 2011 and October –November 2011, yielded data that helped map the global influenza vaccine manufacturing workforce, shed light on vaccine manufacturers' approaches to recruitment and retention of a skilled local workforce, described the type of trainings available to the workforce, and provided a first look at vacancy and turnover rates in the industry.

In order to undertake an in-depth examination of this multi-faceted issue, WHO and DHHS convened the Workshop on Enhancing the Global Workforce for Vaccine Manufacturing (WEGWVM) in Cape Town, South Africa 30 November – 2 December 2011. Information derived from the surveying vaccine manufacturers worldwide provided content and context for the WEGWVM.

More than 100 delegates from 30 countries participated in the workshop, including representatives from government agencies and ministries (health, science and technology, labour and education), developing and developed country vaccine manufacturers, small research-driven biotech companies, international donor organizations, academic institutions, and non-governmental organizations.

The agenda and list of participants were developed by WHO and DHHS together with a multidisciplinary organizing committee.

WEGWVM set a precedent by convening a multisectoral group of stakeholders to discuss issues specifically related to enhancing the global vaccine manufacturing workforce. The workshop participants set out to

- identify essential needs and current gaps in the vaccine manufacturing workforce in developing countries;
- discuss the development of a coordinated and sustainable approach to address these needs and gaps;
- generate ideas for leveraging existing resources; and
- delineate potential policy issues and options for the short, medium, and long-term.

Given the lack of standards, guidelines and best practices in human resources management in the vaccine manufacturing field, this workshop was primarily driven by panel discussions and audience participation: this report aims to capture the results of these discussions.

Obstacles to workforce capacity enhancement

Although stakeholders identify human resources capacity as a critical need of sustainable vaccine manufacturing, drivers and obstacles to achieving this goal are not well understood. The most commonly cited obstacles, which the workshop explored, included: brain drain; lack of harmonized curricula and training programs; high cost of training; long periods of training and lack of consistent or coordinated communication among stakeholders.

Key elements in creating an environment conducive to workforce capacity enhancement

Coordination and Synergy

Case studies presented during the workshop indicated that there is often a disconnect between industry needs, education, and funding programs. There is a clear need for coordination and synergy. A coordinated multisectoral approach, in which all stakeholders derive benefit from the establishment and/or development of vaccine manufacturing capacity, is needed in order to facilitate the goal of enhancing the global vaccine manufacturing workforce. Such an approach can help assure buy-in from stakeholders and sustainability over time.

Adequate and regular flow of international and national resources

The high cost of training was a recurring theme throughout the workshop, as was the fact that few international institutions offer training courses dedicated to innovation and vaccine production. Manufacturers must often bear the expense of sending their staff to another continent for training (training programs are concentrated in Europe and the United States), the cost of the training itself and personnel hours lost during this period. An adequate and regular flow of international and national resources for capacity building in human resources would enable developing countries to establish or improve the necessary infrastructure and processes to build a skilled local vaccine manufacturing workforce. However, since there is no immediate return on enhancing vaccine manufacturing capacity, funding these efforts proves to be a challenge for governments and other donors.

The results of WHO's survey of vaccine manufacturers, compiled with quantitative data derived from additional workforce mapping surveys and recruitment and retention studies can increase awareness of the current capacity and needs and build the case for investment in workforce capacity enhancement efforts.

Strong government commitment and support

A range of government models for the enhancement of the global vaccine manufacturing workforce were presented during the workshop. These approaches ranged from actively establishing and promoting training programs to allowing market forces to dictate training development, with some facilitation. Coordination of efforts at the government level (inter-ministerial dialogues) is key for skill development policies to anticipate and meet the future needs of the local industry. Governments can contribute to these efforts through strong commitment, political support and strategic vision, as well as support to vaccine manufacturing companies and institutions through grants, soft loans, tax breaks and other incentives to help offset training costs.

Governments can also play a role in creating an enabling environment for innovation and technology transfer by encouraging the development of networks and public-private-partnerships, particularly between the education/research and industrial sectors.

Sustained government investment in a strong basic education system is also critical. Government has a role in ensuring education quality (and consistency thereof), but it cannot be the sole driver; the educational needs must be solicited from industry.

Sound strategic planning

Manufacturers ultimately benefit from allocation of sufficient time and budget for training to ensure the workforce develops and maintains skills, and is up to date with technology advancement. Additional benefits can be derived by allocating more resources to retain talent. Comprehensive strategies to make brain drain manageable should include a variety of financial and non-financial incentives such as those outlined in Table 2.

Table 2. Incentives for retaining vaccine manufacturing personnel

Financial recognition	Non-financial recognition
• Good financial package • Monetary incentives/rewards for performance • Reward for return to home country	• Supportive work environment • Good employer-employee relationship that contributes to improved communication • Opportunities for development through training, promotion, recognition • Opportunities for innovation/to make a difference

Training and mentorship opportunities for executives are an important part of enhancing the global workforce for vaccine manufacturing, it is therefore important to build an executive training component into any program or initiative. It is essential to integrate sustainability from the start; leaders of vaccine manufacturing companies and institutions require strong business planning skills to successfully plan for the initiation or expansion of vaccine manufacturing capacity, including investments in workforce.

Harmonized curricula and training programs

Harmonized curricula and training programs are essential for the training of a global workforce. A up-to-date, comprehensive and technically sound core curriculum for vaccine manufacturing workforce will ideally lead to international recognition of training courses and qualifications. In order to define a core curriculum, several aspects should be taken into consideration:

- Defined set of key core competencies
- Training of very specialized personnel groups including maintenance staff and cleaners
- A realistic environment for the trainees to help them in practical industrial problem solving
- Regional location for course provider(s) and language adaptation to the needs of the trainees
- Three levels of certification: a) curriculum/facilities, b) quality of trainers, and c) quality of trainees
- Certification given by an industry organization, e.g. DCVMN, IFPMA, ISV, ISPE
- Possible role for electronic media and e-learning and online training, at least in part for provision of specific modules or a course involving a range of modalities
- Initially focus of trainings should be on front level supervisors.

The introduction of national stakeholder advisory groups and national training meetings and networks would be highly beneficial as a means of encouraging a coordinated discussion among manufacturers, regulators and experts to seek agreement on the content of education and training programs.

Quality of training must be a high priority in order to ensure programs turn out a competent workforce able to consistently produce high quality products. Follow-up evaluations of training effectiveness can provide a method for continuous improvement of the course materials and curriculum content.

Leveraging resources

Lessons learned through the implementation of the Global Action Plan to Increase Supply of Pandemic Influenza Vaccines (GAP) can be applied to other vaccines. For example, sustainability of pandemic influenza production capacity is dependent on two factors (1) the ability to produce a pandemic influenza vaccine and (2) manufacturing a product that keeps the facility running. Thus, training staff on influenza vaccine production is not sufficient – they must also have know-how and expertise on alternative marketable products.

One of the ideas explored during the workshop was establishing or developing regional centers for excellence as a means of maximizing available resources. In order to avoid duplicating efforts, stakeholders should consider leveraging well established hands-on training programs, e.g. the International Vaccine Institute, Netherlands National Institute of Public Health and the Environment (RIVM), North Carolina State University BTEC, and Utah State University CIB..

Another important point with respect to existing resources is that the vaccine industry can also be supported by trained staff from other related industries, for example, from the veterinary vaccine, Bio-therapeutics, pharmaceutical (fill-finish, aseptic processing, sterile injectable) and fermentation industries.

The way forward

In July 2011 the WHO Global Pandemic Influenza Action Plan to Increase Vaccine Supply (GAP) was reviewed and refined in 2011 as part of the formulation of a GAP-2 which will span the next 5 years. The new implementation plan aligns a timeline to stakeholder roles and responsibilities in the creation of sustainable influenza vaccine production capacity worldwide. Outputs from the WEGWVM are intended and expected to influence the implementation of the GAP-2; the WEGWVM points for consideration have been transmitted to the influenza vaccine stakeholders and GAP Advisory Group for their consideration (March 2012).

The WEGWVM served as a catalyst for stakeholders to form new partnerships and reinforce existing ones. These relationships, and the dialogue that was initiated during the workshop, are small but important steps toward the establishment of trans-national and/or regional synergies in vaccine production capacity building. Continued dialogue on a shared platform has sparked innovative collaborations to address the vaccine production workforce development challenges faced by nations and regions with existing or planned vaccine production activities.

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