

Mini Review

Enhancing Capacity of Professionals and Academics for Vaccines and Immunization in Africa: The 3rd Regional Vaccinology Course for Francophone Countries, Mbour, Senegal, 12th-19th September 2015

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Abstract

The Regional Office for Africa of the World Health Organization organized the third Regional Vaccinology Course for Francophone Countries from 12-19 September 2015, in Mbour, Senegal. The course covered basic immunology and epidemiology, vaccine development, clinical trials, manufacture and quality control, norms and standards, licensure, WHO prequalification, vaccine logistics, introduction of vaccines, vaccine pharmacovigilance and vaccines against Ebola Virus disease, malaria and tuberculosis. Modules were taught by experts from WHO, UNICEF, Stellenbosch University, and the Network for Education and Support in Immunization (NESI) of the University of Antwerp. Each module concluded with an assignment conducted by small groups of participants, based on key elements of the course, to qualitatively evaluate the participant performance in groups and to ensure that the course objectives were met. A summary, highlighting discussions and relevance to enhancing the capacity of professionals for vaccines and immunization in Africa is presented. Participants recommended continued WHO and partner technical and financial support, dissemination of the revised pre-service prototype curriculum for the Expanded Programme of Immunization, and support for implementation research.

Background and rationale for course

The Global Vaccine Action Plan (GVAP) 2011-2020 is a framework for strengthening immunization systems, which emphasizes country ownership, shared responsibility, equity, integration, sustainability and innovation [1]. The GVAP also sets immunization coverage targets for all countries and recommends,

among others that health professionals should introduce vaccine educational courses in health training institutions as well as continuing education for all healthcare providers, to build capacity for immunization and to contribute to meeting these targets. In the World Health Organization African Region the Member States have endorsed the “**Regional Immunization Strategic Plan for the African Region 2015-2020**” which

derives from the GVAP and outlines the strategies for the national immunization programmers to attain the targets defined in the GVAP. Following her appointment in February 2015, the new WHO Regional Director for the African Region, Dr. Matshidiso Moeti, has launched the “The Transformation Agenda of the WHO Secretariat in the African Region” with the objective of ensuring that the WHO African Regional Office (AFRO) evolves into a leader in health development and a reliable and effective protector of Africa’s health stock. To achieve the goal of the GVAP, attain the objectives of the Regional Immunization Strategic Plan for the African Region and ensure that WHO evolves into a leader in health, the African region requires strong national immunization programmes, in addition to other services, to expand coverage with interventions including vaccines, to reduce disease burden and to exploit innovations.

So far, the countries of the region have made significant progress in introducing new vaccines. In the past five years, several countries have introduced vaccines against rotavirus diarrhoeal disease, meningococcal A meningitis, pneumococcal pneumonia, and cervical cancer [2]. The region is on the verge of eradication of poliomyelitis [3], introduction through mass vaccination campaigns of the monovalent meningococcal conjugate vaccine, MenAfriVac, to the 1-29 year-old has controlled sero group A meningococcal epidemics [4] and substantial progress has been made towards the elimination of maternal and neonatal tetanus [5,6]. Capacity building in Vaccinology is an integral part of the immunization strategy, essential to sustain the gains and to exploit new technologies and innovations. To this end, it is important to link capacity building for professionals and academics with the realities of service delivery by health institutions and to harmonize and reinforce pre-service and in-service training in Vaccinology. It is within this context that the 3rd Regional Vaccinology course for French-speaking countries was conducted at Mbour, Senegal from 12-19 September 2015.

Profiles of participants and course objectives

The 58 participants comprised of managers of national immunization programmers, staff of WHO and UNICEF responsible for immunization and vaccines, lecturers of medical and nursing schools, and members of National Immunization Technical Advisory Groups (NITAGs), drawn from Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Comoros, Cote d’Ivoire, Democratic Republic of Congo (DRC), Central African Republic, Gabon, Guinea, Madagascar, Mauritania, Niger, Senegal, and Togo. The facilitators were from WHO (Regional Office for Africa and Headquarters), UNICEF, NESI (University of Antwerp, Belgium) and Stellenbosch University, South Africa.

The first objective of the course was, for the participants to master basic immunology and the scientific basis of immunization, the development of vaccines, vaccines under development, introduction of new vaccines and the opportunities and challenges of the use of current vaccines in African immunization programmes. The second objective was for participants to acquire knowledge and competencies, to enable them advice, train and coordinate capacity building activities in vaccines and immunization in their respective countries. The workshop was supported by WHO with funds from NESI and the Gavi Alliance.

Content and Highlights

The course modules include basic immunology, scientific basis of Vaccinology, vaccine development, vaccines in national immunization programmes and strategies for their implementation, production, prequalification, licensure and surveillance, cost-effectiveness and safety, vaccine introduction and pre-service training. Each session was followed by group work, to evaluate participant understanding.

Firstly, the design of vaccines has changed significantly in recent years, with vaccines based on vectors, such as the Chimpanzee Adenovirus Type-3 Zaire Ebola Virus and the recombinant vesicular stomatitis virus-ZEBOV in clinical trials in the region. Secondly, clinical trial designs have shifted from the traditional randomized placebo-controlled trials to designs such as the step-wedge or ring vaccination in use in clinical trials of candidate vaccines against Ebola Virus Disease (EVD) [7]. New clinical trials of candidate vaccines against tuberculosis will target adolescents and use adaptive designs. These became important points for discussion in the course, as they affect ethics reviews and regulatory approvals. The course also entailed discussions of adolescents as a special group when it comes to immunization and the need for special attention to be paid to them, in the light of their emergence as an additional target group for immunization.

The new malaria vaccine, RTS, S/AS01, which was recently given a positive scientific opinion by the European Medicine Agency (EMA), through the European Union’s Article 58 legal provision, was discussed. The Article 58 procedure is used for products developed in an EU Member State but are intended for exclusive use outside the EU. The WHO policy recommendation on RTS,S/AS01 is now waited. Discussions were also held on the vectored candidate vaccines against EVD, which are currently in clinical trials in the countries of the region, how to reach adolescents, as a special group with vaccines against human papillomavirus (HPV) and tetanus toxoid, and to minimize and manage immunization anxiety-related reactions, commonly associated with this age category. It was important to explain the regulatory pathways for licensure and the WHO prequalification of new vaccines, and how these are linked to the EMA article 58 procedure. Suggestions were made on how to improve vaccine knowledge and to use it to enhance immunization coverage towards disease prevention, elimination and eradication.

The introduction of vaccines into national immunization programmes in the region has risen sharply in the last five years [2]. Currently 35 of the 47 countries of the WHO African Region have introduced conjugate pneumococcal vaccines and 4 more hope to do so by the end of 2015. Twenty-seven countries have introduced vaccines against rotavirus, with two additional countries preparing to do so this year. Five countries have introduced a vaccine against HPV nationwide while 15 others are piloting the vaccines in demonstration projects. By the end of 2015, two additional countries would have introduced HPV vaccine nationwide and seven more countries would have initiated demonstration projects. The unique target of girls aged 9 to 13 years old for this vaccine was a subject of much discussions, particularly how to ensure compliance, high coverage and to institute robust surveillance for adverse events following immunization. In 2016, the countries of the region will replace

trivalent oral polio vaccine (tOPV) with the bivalent vaccine and introduce at least one dose of inactivated polio vaccine.

Vaccine safety and pharmacovigilance was discussed in the context of the WHO Global Vaccine Safety Blueprint, a framework, developed by the Global Vaccine Safety Initiative, which defines the minimum capacity required by countries and the means to adequately monitor adverse events following immunization. Emphasis was placed on fostering collaboration among manufacturers, the NRA, EPI and disease surveillance programmes to effectively monitor the performance of all the new vaccines being introduced. On the last day, eleven countries presented their pre-service training experiences in Vaccinology. Some new developments were discussed and the need to update the curricula of training institutions in line with these new developments was stressed. Participants strongly recommended that WHO and partners should continue to provide technical and financial support, disseminate the revised EPI prototype curricula and support operational/implementation research.

Evaluation of course participants

The level of attainment of the objectives of training is an

important component of every capacity building effort and should always be measured. Measurement of outcomes requires pre-defined pre and/or post-tests to evaluate participant acquisition of knowledge and skills and possible impact of the training provided [8-10]. Pre-test and post-test evaluations can be quantitative [10], where statistically significant differences between individual pre-test and post-test scores of participants or student become the basis for improved knowledge of participants and hence attainment of course objectives. In some cases evaluation may also be qualitative or for groups of participants [11].

The Vaccinology course had specific objectives as outlined and is part of a series of courses provided since 2007. The course utilized authentic adult learning principles and peer-learning. Peer learning improves confidence of the participants, elicits innovation and skills, promotes teamwork and collaboration and develops critical thinking and skills [12]. All of these are desirable characteristics for any immunization programme managers and related health professionals. Additionally, achievement of the objectives of the GVAP requires innovation, teamwork, collaboration and critical thinking skills by immunization staff

Table 1: Summary of participant evaluations through daily group exercises. The key elements of the group exercises, the target diseases used as case studies and qualitative group evaluation outcomes are presented. Facilitators were present in each group to ensure that there was full participation by all and at the end all the groups passed the evaluations through their presentations in plenary.

Days	One	Two	Three	Four
Topics	Principles of basic epidemiology and disease burden estimation	Basic concepts and design of clinical trials in Africa.	Estimation of susceptible population for a community based on vaccine efficacy, vaccination coverage, age at immunization and other considerations.	Principles and practicalities of vaccine introduction into immunization programmes.
Key elements of Group Exercise	<ul style="list-style-type: none"> Disease description Definition of disease burden Options available for treatment and prevention Considerations for introduction of a vaccine Innovative financing mechanisms for disease prevention and control through vaccination. 	<ul style="list-style-type: none"> Phases of clinical trials and definition of objectives Target populations and sample sizes Trial Designs Ethics and regulatory approvals Endpoints etc. 	<ul style="list-style-type: none"> threshold of vaccine efficacy Annual accumulation of susceptible children. Calculation of birth cohort Estimation of susceptible children Limitations of the calculations Factors to consider- Inaccurate denominators, population movement, immunity due to natural infections, susceptibility of older age groups etc. 	<ul style="list-style-type: none"> Disease burden Vaccine type and availability Target population Logistics and cold chain Communication and social mobilization Micro-planning Training etc.
Target Diseases	Group 1 - Meningococcal meningitis Group 2- Cervical cancer Group 3 - Rotavirus diarrhoea Group 4 - Malaria	Group 1 - Meningococcal meningitis Group 2- Cervical cancer Group 3 - Rotavirus diarrhoea Group 4 - Malaria	Measles*	Group 1 -Meningococcal meningitis Group 2- Cervical cancer Group 3 - Rotavirus diarrhoea Group 4 - Malaria
Group Evaluations Outcomes	√	√	√	√

*Target disease for Group exercise for all groups on Day 3 was measles.

√ - Satisfactory or met facilitator's requirements.

in the implementation of programmes and activities [1]. In the light of this and since the present course focused on adults, who are also professionals in their own right, we chose to avoid pre-testing with quantitative scores and to focus on post-test based on group exercises with qualitative evaluations for groups rather than individuals. This departure from the standard methodology, although fraught with its limitations, avoids openly revealing the weaknesses of individual participants which can adversely affect group dynamics, while promoting, exchange of ideas, collaboration and team building among the participants and has worked well in previous Vaccinology courses. The methodology also allowed facilitators to incorporate any difficulties identified after each exercise into subsequent sessions of the course, to reinforce learning.

Table 1 summarizes the evaluation of the course participants through a series of daily group exercises, highlighting the topics covered, key learning elements, target diseases used as case studies and the qualitative evaluation of each group. The facilitators were present in each group to ensure that there was full participation by all. At the end of the group exercises, there were presentations in plenary by each group. These group presentations were assessed by the facilitators. A few issues which were unclear were further discussed at the end of each day by facilitators and some were repeated the following day to further reinforce learning. Based on the assessments of the participants in the group exercises by the facilitators, the course objectives were considered met. It is however important to stress that these evaluations are very limited in effectively ascertaining long term impact of the training on skills and knowledge acquisition by the course participants, as is the case for other pre-test and post-evaluations. Repeated evaluations and longer term monitoring of performance in the field is essential for determining the actual impact of training such as this.

CONCLUSION

In closing the course, the WHO Resident representative for Senegal, who spoke on behalf of the Regional Director, Dr. Matshidiso Moeti reiterated the commitment of WHO and partners to strengthen the capacity of immunization programmes and health systems in general to ensure universal access to vaccines and other interventions and the attainment of global health goals.

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