Highlights of 3rd ESCMID Conference on Vaccines

The 3rd ESCMID Conference on Vaccines, which was primarily devoted to the topic Vaccines for Mutual Protection, took place from 6 – 8 March 2015 in Lisbon, Portugal. Top vaccine experts from all parts of the world (36 speakers from 17 countries), presented findings to better understand and control a number of vaccine-preventable infectious diseases. More than 220 participants from 52 countries around the world exchanged ideas on new therapeutic approaches, recommendations and latest clinical data.

Mutual protection – key to disease prevention

During the opening symposium key exponents from international organizations outlined the role mutual protection plays in disease prevention. Liz Miller, a UK epidemiologist at the Health Protection Agency in London, who also acts as consultant to the WHO, presented the concept of herd immunity and explained the role mathematical models play in vaccine policy. Miller showed how herd immunity may protect the older generation against influenza and pneumococcal disease. Miller also highlighted the importance of being prepared for resurgences so that confidence in the overall benefit of vaccination programmes would not be undermined.

Robb Butler from the WHO outlined the challenges of translating a global vaccine plan into a regional context to achieve a mutual response to shared threats in the European region. He presented the European Vaccine Action Plan (EVAP), which aims to address immunity gaps due insufficient access as well as vaccine hesitancy and refusals. Butler explained that the challenge is to make sure that the programme is integrated with other health interventions and changes in health systems. With regard to infections, the EVAP goals are to sustain polio-free status, to eliminate measles and rubella and to control hepatitis B.

Pier Luigi Lopalco, Head of the Scientific Assessment Section at the ECDC, explained the role of surveillance in assuring mutual protection. Lopalco explained the processes involved from data to action. Starting with the data needed to guarantee herd immunity, he outlined how data is collected and how outbreaks of vaccine preventable diseases are detected and investigated. Lopalco also urged to improve monitoring of diseases and vaccines. This not only means to follow up vaccine effectiveness during the post-marketing phase, but also to monitor public confidence in immunization programmes, he explained.

Acceptance of vaccines – safety

Trust, confidence and acceptance were also the buzz words in the session dedicated to safety issues in vaccines and their potential risk for mutual protection. Litjen Tan, Chief Strategy Officer at the Immunization Action Coalition and co-chair of the United States Adult and Influenza Immunization Summit, outlined how vaccine confidence evolved in the US. He explained that the way the general public perceives the risks associated with childhood diseases has changed because vaccination successfully eliminated many of them. He recommends actively involving parents in vaccination decisions and better supporting the majority of parents who vaccinate their children so they may act as powerful advocates in their communities.

Pauline Paterson and Heidi Larson from the London School of Hygiene and Tropical Medicine demonstrated how vaccine confidence in Europe will influence community protection. Paterson warned that it is important to understand the reasons behind vaccine hesitancy, concerns that have persisted
over two centuries. She concluded that strong confidence in vaccines can help sustain vaccination coverage and – if above herd immunity threshold – can also help protect the community, while low confidence may have a detrimental impact on public health.

Frederic Boudier from Maastricht University showed how the unvaccinated population impacts the community they live in as even the shadow of a doubt may be enough to undermine trust. Therefore providers have to understand and adapt risk communication to the perceived risks of the population and society’s worries, Boudier concluded.

**Human papillomavirus control**

Hesitancy also affects the control of the human papillomavirus (HPV). In the session on how to control HPV in Europe, Paolo Bonanni from the Department of Health Sciences at the University of Florence, Italy, explained why the public remains reluctant to embrace vaccination. Bonanni pointed out that because of the universal application of vaccines, herd immunity can only be achieved if the public is confident that the vaccines are safe. He suggests using personal narratives and social media in support of immunization to build trust within the population.

Xavier Castellsagué from the L'Hospitalet de Llobregat in Spain in his talk concluded that current screening and vaccination strategies will have a slow and long-term impact on HPV-related diseases. Castellsagué suggested that these strategies can be improved and implemented more efficiently if they are combined, simplified, and extended to adult women. He said extended vaccine catch-up strategies combined with HPV-based cervical cancer screening not only provide protection for a greater number of individuals, they will also reduce HPV-related cancer and diseases.

Elmar Joura, a gynaecologist at the Medical University of Vienna, Austria, presented evidence on how HPV vaccination effectively prevents HPV infections and the development of HPV-related lesions in both genders. Joura, first author of a paper published in February 2015 in NEJM, described in detail a pivotal randomized, international, double-blind, phase 2b–3 study of a recently US FDA-approved 9-valent HPV vaccine performed in 14,215 women. Despite convincing clinical efficacy data and recently introduced vaccination programmes across Europe the coverage rates remain suboptimal in Europe, Joura stated. According to the ECDC, only Portugal, the United Kingdom and Denmark have vaccine coverage rates of around 80%, while other countries like Germany and France have substantially lower coverage.

**Pertussis Protection throughout life**

Even for vaccines where there is a sufficient coverage, problems may arise at a later stage. Top vaccine specialist Stanley Plotkin from the US outlined how pertussis is resurgent in many countries because of waning protection despite vaccination. Pertussis is increasing in children vaccinated three to five years previously and it is common in older children, adolescents and adults, resulting in serious infections in infants, Plotkin stated. The incidence of pertussis increased after the whole-cell vaccine had been replaced by an acellular vaccine, which may cause post-vaccination antibodies to wane faster, Plotkin said, adding that other reasons may include strain change decreasing effectiveness and transmission in childhood leading to less natural boosting and more susceptibility in older persons. He concluded that a new vaccine is needed to protect against the disease.

Camille Locht shared his assessment of such a new pertussis vaccine, a novel intranasal vaccine he is helping to develop at the Institut Pasteur in Lille, France. The first-in-human trial showed that the live attenuated bacterial vaccine BPZE1 is safe, able to colonize the nasopharynx and induce an antibody response in all colonized subjects. Before the novel vaccine can be used in the target population, the
newborns, it will first have to be tested again in adolescents and children of both sexes using higher doses, said Locht who is also working on the development of a freeze-dried formulation, and recombinant BPZE1 derivatives for multivalent vaccines.

Susanna Esposito from the Pediatric Highly Intensive Care Unit at the University of Milan, Italy, showed that adults are an important source of infection for infants, particularly family members. To control the spread of disease and protect infants who are too young to be immunized, Esposito recommends antepartum and cocooning programmes, where adolescents and adults potentially in contact with infants are targeted for Tdap immunization. She also called for improved surveillance systems and educational intervention to raise awareness on Tdap vaccination and the role adolescents and adults play in this major public health problem.

Prevention of viral gastroenteritis in all ages
Timo Vesikari from the Vaccine Research Center at the University of Tampere in Finland found that rotaviruses continue to circulate even at a high level of vaccine coverage and will sooner or later “pick-up” unvaccinated older children and adolescents. He expects current viral-like particle norovirus vaccines to protect against disease but not against infection. Vesikari proposes a trivalent (RV VP6 + NoV GII-4 + NoV GI-3) combination vaccine in children, although RV VP6 + NoV VLP will not have much effect on herd protection, Vesikari concluded.

Umesh Parashar from the US Centers for Disease Control and Prevention in Atlanta outlined safety issues and concerns that may affect an uptake of rotavirus vaccines. He mentioned the risk of intussusception, concerns about vaccine-derived reassortant rotavirus strains and porcine circovirus contamination. The vaccine would also need to be administered early before 15 weeks of age, an age where there is an increased risk of the vaccine virus shedding in nurseries.

Hugues Bogaerts, a vaccine specialist consulting to Takeda Pharmaceutical Co., described the most advanced norovirus vaccine candidate, which is being developed at his company. Takeda’s candidate VLP norovirus vaccine, which is proceeding into Phase III in adults, is generally well-tolerated. It induces an immune response after one dose, a functional HGBA-blocking antibody response, a cross-blocking sero-response, and may reduce viral shedding, Bogaerts stated.

Poliovirus – did we open the Pandora box?
In the session on recent threats of poliovirus Jacob Moran-Gilad from the Ministry of Health and Ben-Gurion University of the Negev in Beersheba, Israel, described the public health response to a silent introduction of wild-type poliovirus 1 into Israel. The poliovirus poses a risk even in highly IPV vaccinated countries and may exhaust national response capacity, he warned. Not only is it difficult to establish transmission dynamics, it is even more difficult to assess the risk and communicate clearly and transparently, Moran-Gilad concluded.

Paloma Carrillo-Santisteve from the ECDC’s Vaccine Preventable Disease Programme outlined what is done to protect the population in Europe against polio. She estimates that about 2.4 million people were cumulative poliovirus susceptible from 2003-2013 in the EU. Poliovirus seroprevalence is high in younger cohorts and immunity low in people born in the 1960s and 1970s. She concluded that there is no immediate risk, given the generally high levels of sanitation and hygiene in the EU.

David Salisbury, a vaccination specialist at the UK Department of Health and the WHO, concluded the session with a talk on the strategy on polio eradication and endgame, including a rationale and
timetable for switching from tOPV to bOPV and strategies for containment. To minimize the risk of any type 2 cVDPV re-emergence or outbreaks from the use of tOPV, the switch would need to take place everywhere within a two-week period. Eventually, after eradication of wild type poliovirus and cessation of OPV, laboratories would be the only potential source of poliovirus introduction into an increasingly naïve population.

Lively debates
The sessions on how to effectively fight pertussis, viral gastroenteritis, HPV or varicella zoster virus in Europe – to name just a few – generated a great deal of interest. But the conference also featured discussions on pandemic vaccination, on how to prevent transmission of influenza, on seasonal vaccines including a discourse on a universal flu vaccine as well as a session on how to achieve meningococcal control in Europe.

The most extensive discussions ensued in the two popular pro-con-debates. In the session on indirect effects of pneumococcal conjugate vaccine, Marc Bonten from the University Medical Centre in Utrecht defended the point of view that it is useful to vaccinate adults. He argued that the vaccine is not only effective and safe; vaccination would also be highly cost effective, particularly if you target individuals in medium and high-risk groups. Meanwhile, Ron Dagan from the Pediatric Infectious Disease Unit at the Soroka University Medical Center in Beer-Sheva, Israel, on the other hand, argued that there is a little benefit in countries with high rates of childhood vaccination in consideration of the relatively extensive indirect protection to adults from vaccinated children.

A similar discussion also took place on a universal varicella zoster virus (VZV) vaccination, which sparked a lively discussion in the closing session. Adam Finn from the Bristol Childrens Vaccine Centre argued in favour of a varicella vaccine for all children because hospitalization and mortality data clearly shows that the vaccine works and because most complications – excluding deaths – occur in otherwise healthy children. Finn concluded that because varicella has been potentially preventable for more than 30 years, it is time to start preventing it. Hanna Nohynek from the National Institute of Health and Welfare in Finland, however, made a case for why the varicella vaccine should not be universally introduced from the perspective of public health. Nohynek concluded that universal VZV vaccination may not be appropriate because despite the safety of the individual vaccines, there remains uncertainty about its public health benefits, cost effectiveness and its potential to boost herpes zoster incidence.