

Highlights from ESCAIDE 2018

The European Scientific Conference on Applied Infectious Disease Epidemiology was held in Malta, Nov 21–23. Phoebe Hall reports.



Whole-genome sequencing in epidemiology

A recurrent topic at the conference was the use of whole-genome sequencing (WGS) for epidemiological analyses of infectious diseases. Although the European Centre for Disease Prevention and Control advocate its use for this purpose, not everyone agrees. In the opening plenary session, Christian Drosten (Institute of Virology, Charité—Universitätsmedizin Berlin, Germany) asserted that early detection of viruses requires not genomics but serology and good in-country capacity for surveillance. Many studies presented at the conference used next-generation sequencing technologies for outbreak investigation, although most were retrospective in design. Such technologies are rarely used during an outbreak, for several reasons: the technology is too expensive in many of the most affected countries; samples must be shipped elsewhere for sequencing, limiting timely response efforts based on the data; and standard bioinformatic pipelines and platforms for sharing data are lacking. However, Nick J Loman (Birmingham University, UK), speaking in the second plenary session, argued that most of these barriers have been, or will soon be, overcome. For instance, the development of small, portable sequencing devices has allowed sequencing in the field at reasonably low cost. ARTIC network is developing an inexpensive, mobile, virus-sequencing laboratory based on the MinION sequencer that can be positioned at the site of an outbreak for real-time molecular epidemiology. Earlier prototypes of this laboratory were successfully used for real-time genomic surveillance of Ebola virus in Guinea and Zika virus in Brazil.

Recombinant human anti-diphtheria toxin antibody

In a session on vaccine-preventable diseases, Esther Wenzel (Technische Universität Braunschweig, Germany) described a recombinant human monoclonal antibody targeting the diphtheria toxin. She explained the limitations of traditional methods for producing diphtheria antitoxin (in which antibodies are raised by immunising horses), including serum sickness and stability, problems with batch quality and variation, and ethical issues. Wenzel and colleagues used phage-display technology to produce the antibody, and ELISAs and in-vitro neutralisation tests to show that the antibody interacted with the receptor-binding domain of the toxin and has a neutralising potency of about 200 IU/mg (about ten times higher than the equine serum). Wenzel hopes that the non-reliance on animals will allow large stockpiles of the recombinant human antibody to be maintained in Europe and elsewhere.

Hepatitis B revaccination

About 5–15% of healthy adults do not respond after hepatitis B vaccination and require revaccination. However, the most effective revaccination schedule is unclear. Stijn Raven (Regional Public Health Service, West Brabant, Netherlands) presented the results of an open-label randomised controlled trial to investigate the effectiveness of three revaccination series (Fendrix 20 µg, Twinrix 20 µg, or HBVaxPro 40 µg) versus standard revaccination series (HBVaxPro 10 µg or Engerix-B 20 µg) in 480 healthy non-responders from 16 centres in the Netherlands. In a multivariable logistic regression analysis, revaccination with Fendrix or HBVaxPro 40 µg induced a higher response than did the standard

revaccination schedules ($p < 0.01$) after controlling for baseline anti-HBs titre. At present, Fendrix is licensed for use only in patients receiving dialysis in the Netherlands, which Raven said might be reconsidered on the basis of these results.

Invasive meningococcal serogroup W

Cases of invasive meningococcal disease (IMD) caused by *Neisseria meningitidis* serogroup W have been increasing in the Netherlands since 2015. In 2018, the Ministry of Health introduced the tetravalent MenACWY vaccine. However, whether cases of IMD caused by serogroup W differ from those caused by the other serogroups included in the vaccine in terms of incidence, clinical manifestations, and case fatality rates is unknown. Anna D Loenenbach (Centre for Infectious Disease Control, Netherlands) described how her group used national surveillance system data to compare characteristics of serogroup W and non-serogroup W isolates sent to the Netherlands Reference Laboratory for Bacterial Meningitis between 2015 and 2017. They found that the incidence of IMD caused by serogroup W increased significantly in that time, and that it affected older patients, was more often associated with sepsis or pneumonia (and less often with meningitis), and had a significantly higher case fatality rate than IMD caused by non-serogroup W isolates. At present, MenACWY vaccination is offered free of charge in the Netherlands to infants aged 14 months and children aged 13–14 years; however, these findings suggest that MenACWY could also be beneficial in older age groups.

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