

## 09.004

**Managing health and infections in refugees: Turkey's experience**

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Continuing conflicts near the borders led to massive population flows, Turkey has followed an open door policy and accepted them as “guest”. Turkey is currently hosting the largest number of Syrian refugees in the World.

According to the official numbers 2,726,980 (Aug 2016) Syrians are staying at Turkey but it is difficult to give the exact numbers (1). Nearly half of them are children, and 152,000 Syrian refugees were born in Turkey (Feb 2016). A limited number of refugees (269,672; Sep 2016) are sheltered in 26 camps located around the border cities, and others are living throughout Turkey (2). Camps are coordinated by Prime Ministry Disaster and Emergency Management Authority of the Republic of Turkey which provide accommodation, health, food, education, and other services. Local hospitals have been enlarged and equipped to cover the most acute needs.

A lot of legal, administrative and institutional arrangements have been made, some are underway. Currently, each registered Syrian refugee has free access to healthcare services under the Ministry of Health like as Turkish citizen. Emergency healthcare is provided free to unregistered Syrians and to all migrants. Recently, 85 Migrant Health Units have been organized in 16 provinces. In general, preventive health services to refugees are delivered by Public Health Directorates.

Active surveillance for cutaneous leishmaniasis and malaria is initiated. According to the data of Ministry of Health; 825 cases of cutaneous leishmaniasis were detected in 2015. Totally 1022 cases of tuberculosis were diagnosed and treated between 2012–2015 years. Tuberculosis prevalence rate was found as 18.7/100000, similar to Turkish population. Any malaria case was not detected. Syndromic surveillance for food- and waterborne diseases is being conducted at the camps. Syrian children were also affected recent measles outbreak due to interruption of vaccination on civil war condition. Considering the polio cases in Syria, measles and polio vaccination campaign were launched promptly. All the Syrian children are included into the national childhood immunization programme of Turkey.

Nevertheless there are still some problems to access to health care services resulting from communication barriers and cultural differences. Educational activities for healthcare workers and Syrians are in progress.

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## 10.001

**Intense human-animal interaction and limited capacity for the surveillance of zoonoses as drivers for Hepatitis E virus infections among animals and humans in Lao PDR**M. Pauly<sup>a</sup>, C.P. Muller<sup>a</sup>, A.P. Black<sup>b</sup>, C.J. Snoeck<sup>a,\*</sup>

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**Purpose:** In Lao People's Democratic Republic (PDR), overlapping habitats of the population and livestock create a propitious environment for zoonoses. Insufficient hygienic measures in slaughterhouses and in rural settings further increase the risk for

zoonotic transmission. Limited laboratory capacity as well as lack of background knowledge prevent timely control of disease outbreaks. Here, we assess the occurrence and transmission of Hepatitis E virus (HEV), as well as public awareness of zoonoses.

**Methods & Materials:** In 2015 and 2016, samples were collected from ruminants in rural areas (n=211), as well as from slaughterhouse workers (n=129) and slaughter pigs (n=290) in Lao PDR. Using commercial ELISAs, presence of antibodies (IgG, IgM and IgA) against HEV was assessed. Fecal shedding of HEV by animals was investigated using a generic real-time PCR. Detected viruses were characterized by Sanger sequencing if feasible. Using a standardized questionnaire, data on risk factors for zoonotic pathogen transmission and awareness on zoonoses were captured. Much emphasis was placed on collaborating with local actors and on strengthening laboratory capacities.

**Results:** Anti-HEV antibodies were detected in 13% of ruminants in rural settings and in 46% of slaughter pigs. 7% of the ruminants and 2% of the pigs shed HEV that were thus far not characterizable. While anti-HEV antibody seroprevalence was of 33% in people exposed to pigs, only 15% of the non-exposed control group were seropositive (p=0.001). Awareness of zoonoses among farmers and slaughterhouse workers was low. Wearing protective equipment was associated with a decrease in anti-HEV antibody detection (p=0.024). Limiting the consumption and use of groundwater and cooking of meat further reduced the risk for HEV infection in a domestic context.

**Conclusion:** We could show that people who are exposed to livestock and pigs are at higher risk for contracting HEV than the general population. Although shedding rates were relatively low, animals may represent an infection source that can be controlled by applying personal protective equipment. Building the capacity for the detection and prevention of infectious diseases and increasing awareness about zoonoses in developing countries is a prerequisite for combating infectious disease outbreaks in future.

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## 10.002

**The Vietnam Initiative on Zoonotic Infections (VIZIONS): An interim analysis of the epidemiology and aetiology of central nervous system infections**H.E. Brindle<sup>a,\*</sup>, M. Choisy<sup>b</sup>, M.P. Tran<sup>c</sup>, R.van Doorn<sup>d</sup>, B. Nadjm<sup>d</sup>, R. Christley<sup>a</sup>, M. Griffiths<sup>a</sup>, H.D.T. Nghia<sup>e</sup>, G. Thwaites<sup>f</sup>, S. Baker<sup>c</sup>

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**Purpose:** The Vietnam Initiative on Zoonotic Infections (VIZIONS) is a nationwide multi-centre study of which aims to assess the aetiology and epidemiology of patients hospitalised with one of four syndromes.

**Methods & Materials:** An interim analysis of seven hundred and seventy-eight cases of central nervous system infection admitted to six hospitals from December 2012 until March

2016 was performed. Patients aged one month and over with a suspected CNS infection were recruited according to clinical criteria.

**Results:** A pathogen was detected in 31.5% (95%CI 28.3–34.9%). Of the pathogens identified the most common included *Streptococcus suis* (35.1%; 29.2–41.5%) followed by Japanese encephalitis virus (JEV) (26.9%; 21.6–33.0%), *Streptococcus pneumoniae* (18.0%; 13.5–23.5%) and dengue virus (DENV) (7.8%; 4.9–12%). However, of those with *S. suis*, significantly more were adults (aged 16 years and over) compared to children (82.4%; 72.3–89.5% versus 17.6%; 10.5–27.8%  $p < 0.001$ ) and with JEV, significantly more children (75.8%; 63.4–85.1% versus 24.2%; 14.9–36.6%  $p < 0.001$ ). There was a significant difference between males and females with *S. suis* (80.2%; 70.0–87.7% versus 19.8%; 12.3–30.0%  $p < 0.001$ ), *S. pneumoniae* (70.5%; 54.6–82.8% versus 29.5%; 17.2–45.4%,  $p = 0.01$ ), JEV (65.2%; 52.3–76.2% versus 34.8%; 23.8–47.7%  $p = 0.02$ ) and where the aetiology was unknown (65.9%; 61.6–69.8% versus 34.1%; 30.2–38.4%,  $p < 0.001$ ). 41% (37.5–44.6%) of cases raised, kept or handled an animal at home and 40.8% (37.3–44.4%) had eaten, cooked or handled raw meat, viscera or blood within two weeks prior to symptoms onset. Of those with no pathogen detected, 61.0%; 56.7–65.1% had a form of animal contact.

**Conclusion:** The common pathogens seen in this study are in keeping with similar previous studies in Vietnam. However, further analysis of the results of this study will be undertaken to determine the spatial-temporal distribution of the known and unknown pathogens and association of environmental and demographic variables.

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#### 10.005

##### Differential effect of pandemic H1N1/2009 virus introduction in pigs in Europe compared to West and Central Africa

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**Purpose:** The emergence of pandemic H1N1/2009 shook up the epidemiology of influenza A virus in humans but also in other susceptible species, especially in pigs. At the heart of Europe, Luxembourg is a small agricultural country with strong interactions with neighbouring countries. Similarly to Luxembourg, influenza viruses circulating in swine in West and Central Africa are largely unknown, despite a growing porcine sector and their importance for public health.

**Methods & Materials:** Almost 1600 serum samples collected from pigs in Luxembourg (2009, 2012), Nigeria (2009, 2012) and Cameroon (2011) were tested by virus microneutralization against a panel of influenza strains including European, American swine and human influenza viruses for assessing the presence of influenza type-specific neutralizing antibodies. Nasal swabs were also collected in Nigeria (n=264, 2009; n=340, 2012) and Luxembourg (n=270, 2009; n=518, 2014–2015), screened by RT-PCR and the genome of the strains detected was sequenced.

**Results:** Our serological survey suggested that, before the 2009 pandemic, only rare swine and human H3N2 or human H1N1 infections occurred in Nigeria. However, in 2011–2012, 27.4% of pigs in Nigeria and 5.6% in Cameroon had antibodies against H1N1 viruses. Higher antibody titres against pandemic H1N1/2009 suggested that pigs were exposed to this or a similar virus, either by multiple introductions or sustained circulation, and that reactivity against American and European swine H1N1 viruses resulted from cross-reaction. In Luxembourg however, the antibody response was dominated by European H1N1 avian-like viruses in 2009 and 2012, while rare cases of exposure to pandemic H1N1/2009 were suspected in 2012. Our molecular survey found several types of influenza viruses in Luxembourg, including a case of seasonal human H3N2 and a new reassortant with internal genes from the pandemic H1N1 rarely reported elsewhere in Europe.

**Conclusion:** Taken altogether, our results suggest that the pandemic H1N1/2009 may have been successfully transmitted and spread more easily in countries where previous circulation of other swine influenza viruses was low, compared to countries with pre-existing endemic swine influenza virus circulation. The introduction of pandemic H1N1 also permitted the generation of new reassortants whose fitness and zoonotic potential are still unknown.

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#### 10.006

##### Monoclonal antibody-mediated clearance of rabies virus from the central nervous system: Implications for future approaches to rabies therapy

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**Purpose:** Current rabies post-exposure prophylaxis (PEP) currently includes the administration of equine or human rabies immunoglobulins (RIG). The replacement of these products with at least equally potent and safe products is strongly encouraged. Of note, PEP efficacy diminishes progressively when PEP administration is delayed, being ineffective when symptoms appear. We have recently identified a cocktail of two anti-rabies human monoclonal antibodies (RVC20/RVC58) with unprecedented potency and breadth, that can be combined with vaccination (PEP) or even administered alone as a late post-exposure treatment (late-PET).

**Methods & Materials:** Syrian hamsters were firstly challenged intramuscularly (IM) with CVS-11 (0.05 ml) and treated IM at day 0 with vaccine + mAbs (expPEP), or vaccine + HRIG (stPEP) or left untreated. Second, animals were PEP-treated without challenge, to assess whether the administration of RVC20/RVC58 may influence the hamster response to vaccination. Third, animals were challenged IM with a 100-fold higher dose of CVS-11, administered IM with a high dose of RVC20/RVC58 late post infection (d2 pi and d3 pi), with stPEP or left untreated. Animals were observed over 340 days. Mortality, clinical signs and CNS viral load were assessed.

**Results:** RVC20/RVC58-administered Syrian hamster successfully survived to the lethal CVS-11 challenge, in both exp-PEP and late-PET experiments. Interestingly, RVC20/RVC58 did not affect the endogenous post-vaccination antibody response. As for the

