between departments was required to facilitate the investigation, screening, and PEP process.

Results: 294 HCWs were identified as having physical contact with the organ recipients. 272 HCWs were considered low risk not requiring PEP. 12 were lost to follow-up due to resignation. 10 HCWs received PEP: 3 due to a high risk procedure, 2 with an unreported splash exposure, and 5 due to an unsure exposure risk. 5 HCWs indicated inappropriate personal protective equipment use. No HCW developed RVD.

Conclusion: The investigation identified areas for improvement; poor compliance with infection control practices, underreporting of exposures, and organ donations from high risk countries to include screening for RVD if cause of death is associated with non-specific encephalitis.

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Real time antimicrobial resistance surveillance in critical care: Identifying outbreaks of carbapenem resistant gram negative bacteria from routinely collected data

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Background: Statistically significant variation in antimicrobial resistance (AMR) occurs between hospitals, within hospitals, and over time. Whilst case mix and antimicrobial use contribute, the impact of cross-transmission on these fluctuations is not well understood. We investigated the utility of applying a statistical algorithm to identify outbreaks of carbapenem-resistant infections across three critical care units in a multi-centre teaching hospital network serving a population of 2 million in London, UK.

Methods & Materials: We applied a negative binomial regression model which accounts for seasonality and linear trends, as described by Noufaily *et al.*, to routinely collected microbiology data (fiscal years 2009-2015 for two units, 2012-2015 for the third) for carbapenem-resistant *Pseudomonas* spp. and Enterobacteriaceae (CRE). The first two years of data for each unit was used to train the algorithm. Exceedances (i.e. weeks with possible outbreaks) were validated by antibiogram comparison (as a proxy-indicator of strain similarity), against hospital infection control reports, and where available through genotypic typing.

Results: Across the three units, 154 CRE (from 3640 Enterobacteriaceae) were identified. The algorithm identified 17 exceedance weeks, in 11 multi-week clusters. In four of these clusters (three *K. pneumoniae*, one *E. coli*) organisms shared identical antibiograms; typing was available for one *K. pneumoniae* cluster, indicating clonal NDM cross-transmission, and this was the only outbreak (of the 11 clusters) identified in hospital infection control reports. Among 786 carbapenem-resistant *Pseudomonas* spp. (from 2378 isolated), 27 exceedance weeks were detected, in 15 multi-week clusters. Organisms in eight clusters shared identical antibiograms. No typ-

ing was available and none of the clusters had been identified in hospital infection control reports. No additional outbreaks of CRE or carbapenem-resistant *Pseudomonas* spp. were identified through routine surveillance or in hospital infection control reports.

Conclusion: The rise of carbapenem resistant organisms necessitates low-cost, easy-to-use surveillance mechanisms to aid early identification of outbreaks, particularly in critical care. Our data suggests such outbreaks may be more common than previously thought, and may be going undetected by current surveillance systems. Application of the Noufaily algorithm to routinely collected microbiology data provides a valid mechanism to better target limited hospital epidemiology, infection control, and diagnostics resources.

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Relationships between flavivirus serological laboratory test results from dengue endemic areas of India: Limitations and challenges

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Background: Cross-sectional, population-based seroprevalence studies provide data on exposure to pathogens, susceptibility and disease transmission dynamics, and are useful in public health and vaccination planning. Cross-reactivity between flavivirus IgG antibody assays is an important consideration where multiple flaviviruses co-circulate.

Methods & Materials: An age-stratified dengue and Japanese encephalitis virus (JEV) IgG seroprevalence study was conducted in 8 sites across India, enrolling 2,591 subjects aged 5 – 10 years. Sera were tested using commercial ELISA kits; those dengue positive were subjected to plaque reduction neutralization test (PRNT) for serotype-specific neutralizing antibodies (DEN-1, 2, 3 and 4). A threshold of ≥ 10 (1/dil) was considered detectable; an algorithm was applied to interpret profiles as "naïve", "monotypic" or "multitypic". This secondary analysis explored a hypothesis that JEV IgG status was associated with cross-reactive dengue antibodies. JEV IgG results were analyzed by: a) dengue IgG status; b) naïve/monotypic/multitypic PRNT profile; c) the number of serotypes with detectable neutralizing antibodies; and d) geometric mean neutralizing antibody titer (GMT). Associations were tested by Pearson's chi squared test.

Results: Overall, 1,525/2,558 (59.6%) of available samples were dengue IgG positive, and 345/2,544 (13.6%) were positive for JEV IgG. Of JEV positive samples, 327 (94.8%) were also dengue IgG positive. Similarly, 96.5% of the 405 "inconclusive" JEV samples were dengue positive. Of the 1,794 JEV IgG negative samples, 801 (44.6%) were dengue IgG positive (p<0.0001). Examining PRNT profiles, 0.62%, 25.3% and 74.1% of JEV positive samples were naïve, monotypic and multitypic, compared to 4.5%, 38.6% and 56.9% of JEV

negative subjects (p<0.0001). 97.8% of the JEV positive and 92.5% of inconclusive samples had detectable titres against all four dengue serotypes, compared with 71.0% of the JEV negative samples. For every monotypic dengue serotype, the GMT was highest in JEV positive subjects, followed by those with an inconclusive JEV result, and lowest in the JEV negative group.

Conclusion: While limited by a lack of PRNT data from dengue IgG negative subjects, these results suggest that JEV IgG ELISA test results in dengue-endemic areas should be viewed with caution. More specific laboratory methods, such as JEV PRNT, should be employed where available.

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DPT vaccination rate in children ages 1 to 5 years old and associated factors in K'bang District, Gia Lai Province, Viet Nam in 2015

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Background: From October 2013 to July 2014, 108 suspected diphtheria cases were reported in 13 out of 14 communes in the K'bang district of Gia Lai province. Seven out of sixteen cases were confirmed positive with diphtheria, including two deaths. The current investigation found that 87% cases had not vaccinated with DPT while the expected coverage of DPT vaccination was 94%. The study aimed to estimate the DPT immunization coverage rate of children 1 to 5 years old and identify associated factors in this district in 2015.

Methods & Materials: Using a cross-sectional study design, seven out of fourteen communes were randomly selected. In each commune information regarding vaccination status for 50 children, aged 1 to 5 years old, was collected. This data was used to estimate the overall district vaccination rate using a weighted cluster analysis. Multivariable logistic regression models were applied to identify factors associated with the immunization status of children.

Results: 79% of the children surveyed received 3 DPT shots. Based on this study the estimated district vaccination coverage is 81%, 61% were from the Ba Na ethnic group, 87.4% were care for by the communal health center, and 68.7% were vaccinated in that communal health center, 92.3% of the mother or father received the vaccination information from commune health workers. Characteristics associated children receiving full vaccination were their ethnic group (OR = 0.45, 95% CI = 0.22, 0.89); their registration with the communal health center (OR = 0.02, 95% CI =

0.01, 0.06); the education level of mother (OR = 1.62, 95% CI = 1.19, 2.23); their economic status (OR = 1.91, 95% CI = 1.11, 3.29); the parents' understanding of vaccination (OR = 0.40, 95% CI = 0.24, 0.68).

Conclusion: This study shows that a significant gap exists between the observed vaccination coverage (81%) and the goal immunization coverage rate (98%). Groups that need specific attention ethnic minorities and those who are not registered at communal health centers. This study suggests that many parents do not get their children vaccinated because of a lack of understanding and educations campaigns should be introduced to improve vaccination uptake.

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Drug-resistant tuberculosis in children less than 5 years old with culture positive mycobacterium tuberculosis

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Background: Diagnosis of paediatric tuberculosis remains a challenge due to the difficulty in obtaining samples from children and the low sensitivity of culture confirmation. Drug resistance in TB continues to be a significant challenge in South Africa. Microbiologic confirmation of tuberculosis in children is necessary to exclude drug-resistant tuberculosis in face of the high multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) rates reported in the adult population.

We describe the rates of drug-resistant TB in children less than 5 years old from KwaZulu Natal – a province in South Africa with the highest burden of both TB and HIV disease.

Methods & Materials: A retrospective descriptive analysis was done of specimens from children less than 5 years old submitted to TB reference laboratory in KwaZulu-Natal, South Africa. Data was collected from 2012 to 2014. Specimens cultured included respiratory samples, lymph node aspirates, pleural and peritoneal fluid, cerebrospinal fluid, bone and tissue samples.

Cultures were performed using the automated Mycobacterial Growth Indicator Tube 960 system (Becton Dickinson) and identification and susceptibility was confirmed with the line probe MTBDR plus assay (Hain-Life Science). From 2012 the Xpert MTB/RIF was introduced into the diagnostic algorithm for MTB detection and Rifampicin resistance.

Results: 903 children were found to have culture-confirmed TB during this 3 year period. Drug susceptibility testing showed susceptible MTB ranging from 71-82% in the various age groups. Overall the resistance to isoniazid and rifampicin (MDR) rates ranged from 11-16% with the highest rates found in 2 year old age group. Extensively drug-resistant TB (0-2.1%) was present in all age groups. INH mono-resistance was 3,4% and Rifampicin mono-resistance was 2.8%.