ations in prescribing decisions, including the proportion of broad- and narrow-spectrum antibiotics used; ethnographic approaches will describe prescribers perceptions on their experience; in-game analytics will report engagement with the game and elicit any dose-effect relations (i.e., increased game time greatly improving prescribing decisions). The influence of prompts by different professionals (doctors, nurses, pharmacists or hospital managers) on prescriber's decisions will be explored.

Conclusion: The sustainability of optimal prescribing behaviours remains a challenge for antimicrobial stewardship initiatives worldwide. Serious games may be an affordable and feasible solution to address behavioural and social influences on prescribing.

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Novel surveillance system demonstrates burden of enteric fever in India

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Background: Indian Academy of Pediatrics(IAP) in collaboration with its Kutch branch has started web based Infectious Disease Surveillance and AEFI (Adverse Event Following Immunization) reporting system. The Objectives of the project are to develop an early warning system for pediatric infectious diseases in India, to generate data on burden of infectious diseases in India and to generate data on serious AEFI. IDsurv relies on registered member pediatricians to contribute case reports for 10 communicable diseases, including enteric fever.

Methods & Materials: At present only registered paediatricians can report cases on IDsurv.org. IDsurv is a voluntary project and passive spontaneous reporting occurs. Once a user registers on website, his identity is verified and then activated by admin. Standard definitions for various diseases are provided on the website. A user can report cases using the web platform, mobile website, IVR reporting system or Text/SMS (short messaging service). All cases reported through various methods are updated in real time to a central database, which can be viewed on the website in tabular format, on a map and as a chart on the website. The data is periodically analyzed by a group of experts from IAP.

Results: A total of 2281 cases of enteric fever were recorded from February 2011 – November 2013, including 41 paratyphi infections and 2240 typhi infections. 74.62% (1702/2281) of reported cases were laboratory confirmed by antibody detection or specimen culture. The age distribution ranged from 3 months – 18 years, with the highest burden among 5-9 year olds (38.14%), followed by 2-5 year olds (28.71%). 34.23% (781/2281) of case reports were female. No fatalities were reported, although 20% (457/2281) of cases were hospitalized. Reports were received from 17 states, 37.1% of which were from Uttar Pradesh, followed by Madhya Pradesh (30%).

Conclusion: The case reports recorded by IDsurv.org demonstrate a high burden of enteric fever in the 17 states contributing data. IDsurv.org is a useful, accessible, and innovative platform for the timely reporting of infectious diseases in India and can be used to form public health policy and to monitor the progress of ongoing interventions for disease prevention and control.

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ESBL-producing Enterobacteriaceae colonization among pregnant women in community in Madagascar

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Background: The worldwide spread of expended-spectrum beta-lactamase-producing *Enterobacteriaceae* (ESBL-PE) is a major public health issue in developing countries where the burden of bacterial diseases is high. Severe neonatal bacterial infections are of particular concern. Given the potential for mother-to-child transmission of these bacteria in community, the aim of the study was to investigate the ESBL-PE colonization among pregnant women in Madagascar and to determine factors associated with this colonization.

Methods & Materials: Women included in the pilot phase of Children's Antibiotic Resistance infections in Low Income countries project (http://www.charliproject.org) living in rural or urban areas in Madagascar and having given birth between June and September 2013 where enrolled in the study. Stool samples were collected during delivery and screened for ESBL production. Women's sociodemographic characteristics and living conditions, past medical and pregnancy history and detailed antibiotic consumption during the previous year were recorded to assess possible factors associated with ESBL-PE colonization in multivariate analysis.

Results: Among the 139 women interviewed, 11.5% (95% CI 6.1-16.9) were colonized with ESBL-PE, with no significant difference between urban and rural areas. Most ESBL-PE were identified as *Escherichia coli*. Previous antibiotic use within the last year was reported for 32% of the women. In univariate analysis, factors associated with colonization included graduate or post-graduate education (Odds Ratio (OR) 3.1; 95% CI 1-9.5), private access to tap drinking water (OR 8.9, 95% CI 2.2-33.8), toilet use restricted to family (OR 3.2; 95% CI 1.2-9.4), delivery with a doctor (OR 5.8; 95% CI 1.6-20.2) and antibiotics use in the last 3 months (OR 2.7; 95% CI 0.8-8.7). In multivariate analysis, only private access to tap drinking water was found significant (OR 7.3; 95% CI 1.7-30.7).

Conclusion: The prevalence of colonization with ESBL-PE among pregnant women in the Madagascar community is high. In

this overall underprivileged population, factors found to be associated with colonization were mostly indicative of a somewhat higher socioeconomic status, potentially linked to a better access to healthcare services (and opportunities for ESBL-PE transmission or antibiotics prescription). While not found to be a significant factor in multivariate analysis, antibiotics use deserves to be further explored.

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Identifying "Trojan horse" positions within tetM to neutralize tetracycline resistance

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Background: Tetracyclines are broad spectrum, once popular antibiotics for the treatment of urinary tract, intestinal infections, and other infections including those due to Chlamydia. Their widespread use led to the emergence of resistance, a phenomenon that outruns discovery of new antimicrobials. *tetM* is one of the genes encoding a protein protecting against tetracycline resistance in Gram positive and Gram negative organisms.

Using linker-insertion mutagenesis, we are identifying potential positions within *tetM* that can be targeted to disarm the protective TetM and restore tetracycline susceptibility.

Methods & Materials: Guided by the cryo-EM structural model of *tetM*, we used standard cloning techniques to insert a sequence of 21 nucleotides at 13 different positions within the gene. The resulting mutants were then screened for tetracycline susceptibility in *E. coli*.

Results: We identified at least threepositions(R282, E340, R622) within TetM that represent potential targets for different neutralization strategies ofTetM function.

Conclusion: Designing antimicrobial approaches based on the current findings would hopefully help decrease the burden of tetracycline resistance thus resuscitating tetracyclines whose clinical usefulness has been hampered by resistance development.

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Incidence and determinants of health care associated blood stream infections at a neonatal intensive care unit in Ujjain, India: Results of a prospective cohort study

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Background: Little is known about epidemiology of healthcare-associated infections (HAIs) in neonatal intensive care units (NICUs) in resource-limited settings including India. The aim of this study was to determine the prevalence, onset, risk factors and causative agents of HAI in an 8 bedded, level-2 NICU.

Methods & Materials: Neonates with suspected HAI (gestational age more than 28 weeks and age up-to 28 days) were enrolled prospectively from June 2010 to January 2012. The diagnosis of HAI was established using the CDC criteria. A questionnaire including risk factors for HAI was filled, septic screen and culture was performed, on all neonates developing clinical features of sepsis after admission.

Results: A total of 150 neonates (95 male and 55 female) with suspected HAI were enrolled. Out of them 65(43%) were preterms. The incidence of microbiologically confirmed HAI was 31% (95% confidence interval CI 23-38). The independent risk factors for confirmed HAI were: "prematurity" (Odds Ratio OR 3.05, 95% CI 1.94-9.88; $P = 0.042$), "malpresentation" (OR 8.39, 95% CI 1.02-68.55; $P = 0.047$), "meconium aspiration syndrome" (OR 13.75, 95% CI 2.36-80.06; $P = 0.004$), "premature rupture of membranes in mother" (OR 7.55, 95% CI 1.54-36.98; $P = 0.013$), "umbilical catheterization in the neonate" (OR 15.11, 95% CI 3.40-67.01; $P < 0.001$), "mechanical ventilation" (OR 8.94, 95% CI 1.32-60.31; $P = 0.024$) and "duration of stay in NICU for more than 10 days" (OR 4.09, 95% CI 1.05-16.70; $P = 0.047$). Neonates started on "minimal enteral nutrition" were protected from HAI (OR 0.09, 95% CI 0.009-0.95; $P = 0.046$). The predominant causative organisms for HAI (n = 46) were Gram-negative pathogens (n = 28, 61%) ie. *Klebsiella* spp. (22%), *Proteus* spp. (11%), *E. coli* (9%), *Enterobacter* (9%), *Pseudomonas* spp. (7%) and *Citrobacter* (2%). *S. aureus* (22%) and *coagulase-negative staphylococcus* (17%) were main Gram positive pathogens (n = 18, 39%). Among *Klebsiella* spp. and *E. coli* isolates, 88 and 67%, respectively were identified as extended-spectrum beta-lactamase (ESBL) producers.

Conclusion: The study provides evidence that HAI is quite common in resource-limited set-ups. HAI surveillance can be strengthened by incorporating the factors associated with HAI identified in the present study.

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