into scale-up of the program and are building the informatics tools that will ultimately allow our microbial risk scores to be made available to clinicians via a smart-phone enabled app. The primary objective of this work is to enable the precision management of infections using isolate-specific virulence data. This PIM approach will inform clinical decision-making and infection management practices in point-of-care settings resulting in, (1) a reduction in the number of people who develop life-threatening infections, (2) a reduction in the number of side effects that result from over-treating benign infections, and (3), an extended service-life for our existing antibiotics by dramatically reducing the over-use of these drugs. We introduce a new Precision Infection Management (PIM) strategy for titrating clinical care according to the risks posed by each individual infection.

Disclosure No significant relationships.

S15.4 COMBATTING HIV WITH NANOMATERIALS

Kim A Woodrow*. *University of Washington, Bioengineering, Seattle, USA*

10.1136/sextrans-2019-sti.72

The delivery of drug combinations is a paradigm for treatment of cancer, HIV/AIDS and drug resistant bacterial infections. My laboratory is interested in the application of engineered biomaterials to control the spatial and temporal delivery of a combination of agents (small molecules, biologics, conjugates). Strategies to combine chemically incompatible agents may facilitate the discovery of unique drug-drug activities, particularly unexplored combination drug synergy. In this presentation, I will summarize our efforts to develop polymeric delivery systems for the combination delivery of antiretroviral (ARV) drugs in HIV prevention, treatment and cure. We have developed polymeric particulate and fiber carrier systems for delivering ARV drug combinations. The flexibility to design the nanoarchitecture of these polymeric carriers, combined with the versatility of drugs that can be encapsulated for controlled release, motivate the use of these systems for topical, injectable or oral delivery of combination agents.

S16.1 – ANATOMICAL SITES OF INFECTION: BIOMEDICAL, MODELING, BEHAVIORAL, AND PROGRAMMATIC CONSIDERATIONS FOR STI PREVENTION

Wednesday, July 17, 2019
10:45 AM – 12:15 PM

S16.1 ANATOMICAL SITES OF INFECTION – BIOMEDICAL CONSIDERATIONS FOR STI PREVENTION

Jane Hocking*. *University of Melbourne, Melbourne School of Population and Global Health, Carlton, Australia*

10.1136/sextrans-2019-sti.73

Extragenital (anorectal and oropharyngeal) sexually transmitted infections (STIs), particularly chlamydia and gonorrhoea, are highly prevalent among men who have sex with men (MSM), but are now an increasing concern among heterosexual men and women with calls for anorectal testing in women. Further, there is ongoing debate about the role of oropharyngeal STIs driving transmission, particularly among MSM and about anorectal chlamydia in women causing urogenital infection via auto-inoculation. These issues highlight that site of infection is an important issue. Treatment efficacy can vary considerably by site of infection – for example, treatment efficacy is lower for oropharyngeal gonorrhoea and anorectal chlamydia with some treatments. Factors related to the pharmacokinetic properties of the drug can affect its efficacy at different anatomic sites including its tissue distribution, protein binding and half-life. Factors related to the individual including the pH of the local tissue environment, immune response, drug side-effects and sexual practices can affect treatment efficacy. Finally, factors related to the microorganism itself such as organism load and antimicrobial resistance can also impact on treatment efficacy. These factors should play a role in guiding treatment guidelines as it is possible that treatment regimens need to vary by site of infection. The use of mouthwash and doxycycline prophylaxis have been raised as potential biomedical interventions to reduce STI transmission, although ongoing concern about antimicrobial stewardship threatens the widespread use of doxycycline. We also need to understand the natural history of extra-genital STIs, particularly in women where the importance of anorectal infections and whether they play an important role in inoculating and causing persistent urogenital infection is not well understood. This presentation will discuss the importance of the site of infection particularly when considering treatment options and the possible role of biomedical interventions to prevent infection.

Disclosure No significant relationships.

S16.2 MODELING CONSIDERATIONS RELATED TO MULTI-SITE INFECTION

Ian Spicknall*. *Centers for Disease Control and Prevention, Atlanta, USA*

10.1136/sextrans-2019-sti.74

Background Gonorrhea may infect the urethra, rectum, and oropharynx in men. It may only be acquired when there is contact between infected and uninfected anatomical sites. Seven plausible routes of MSM transmission have been proposed: urethra-to-rectum, rectum-to-urethra, urethra-to-oropharynx, rectum-to-oropharynx, oropharynx-to-urethra, oropharynx-to-rectum, and oropharynx-to-oropharynx. We characterize the uncertainty and potential importance of transmission from each anatomical site using a deterministic compartmental mathematical model.

Methods We developed a model of site-specific gonococcal infection, where individuals are infected at zero, one, two, or all three sites. Sexual behavior and infection duration parameters were fixed similar to recent analyses. Markov Chain Monte Carlo methods were used to sample the posterior distribution of transmission probabilities that were consistent with site-specific prevalence in American MSM populations under specific scenarios. Scenarios were defined by whether transmission routes may or may not transmit by constraining specific transmission probabilities to zero rather than fitting them.