intensive support to fully establish. FSW engaged in self-help groups and supported each other by arranging child care, encouraging each other to go to get clinical care, establish savings and lending schemes and in some cases to return to educational or vocational training.

Conclusion Sex workers were empowered and able to make better life decisions. Priorities for the groups changed over time and as trust increased. Self-help groups can become autonomous of programme support over time. Microplanning allowed us to regularly reach women not previously engaged in the programme. We plan to test the cost effectiveness of this intervention in a cluster randomised trial.

Disclosure No significant relationships.

**S05.4** #SAVESEXY: A GAMIFIED APPROACH TO HARNESSING THE POWER OF COMMUNITY ACTIVISM FOR HIV TESTING PROMOTION

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As a response to the rising trend of new HIV infections among men who have sex with men (MSM), a group of volunteers in Manila, Philippines, formed a nonprofit organization called The Red Whistle (TRW). MSM in the Philippines suffer not just from HIV-related stigma but also from gender-based discrimination. In order to circumvent this environment, TRW devised ‘#SaveSexy’ a gamified approach to HIV awareness communication and HIV testing promotion that is not explicitly targeted to MSM but used visual imagery and messaging that would attract an MSM crowd. Using well-designed merchandise and branding, celebrity volunteers, and themed activities, ‘#SaveSexy’ encouraged its target audience to rethink the concept of ‘sexy’ as being confidently aware of their sexual health. The campaign takes its cue from market research done by TRW and partner ad agencies on what works for its target audience and applies this research to sexual health promotion. In this format, TRW partners with local government units and community-based organizations to organize ‘races’ where three teams of volunteers compete to encourage the most number of individuals to get tested in a single day. Elements of the strategy include teaming up with a celebrity volunteer and using social media to boost the reach and engagement of the information drive online. It also includes partnering with the local government’s health office who will provide volunteers and materials for HIV testing. Aside from being well received, the intervention is also cost-effective. Designed to cost at around Php 250,000 (USD 5,000) per event targeting 350 individuals tested, the average cost per is Php 715 (USD 14) per individual tested. In February 2019, it reached the most number of individuals tested in one day at 1,006, also for the lowest amount invested at Php 170,000 or USD 3,400. Average cost per individual tested was Php 169 (USD 3.38).

Disclosure No significant relationships.

**S06 – IMPROVED MODELS AND TOOLS FOR STI INFECTIONS**

**S06.1 USE OF CERVICAL EXPLANTS TO STUDY GONOCOCCAL PATHOGENESIS**

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Gonococcal infections remain a challenging public health issue due, in part, to a lack of a vaccine. A major obstacle in vaccine development and for understanding gonococcal infections in women is the lack of tractable models mimicking in vivo infection in the female reproductive tract. We used human tissue-explants and isogenic gonococci (GC) to examine by quantitative imaging analysis the impact of the heterogeneity of cervical and bacterial surfaces on infection. We found that GC preferentially colonize the ectocervix and squamocolumnar junction (transformation-zone, TZ) but only penetrate into TZ and endocervical epithelia. Colonization of any region required the expression of pili. GC expressing Opacity-associated proteins (Opas) that bind the host carcinoembryonic antigen-related cell adhesion molecule (CEACAMs) (OpaCEA) increase ecto/endocervical colonization and reduce endocervical penetration. GC expressing Opas that bind heparan sulfate proteoglycans (HSPGs) (OpaHSPG) did not promote colonization or tissue penetration in any region of the cervix. OpaCEA inhibited GC-induced disruption of epithelial-epithelial adhesions and epithelial exfoliation, enhancing GC colonization and reducing penetration, through engaging CEACAMs. We propose the following model to explain GC pathogenesis of the female reproductive tract (FRT). GC establish colonization through pili-mediated adhesion. OpaCEA expression promotes colonization, leading to asymptomatic local infections. Low expression of OpaCEA allows GC to effectively penetrate into the endocervical epithelium, causing symptomatic infection. Because GC with low levels of OpaCEA expression are rare, as most 11 Opa proteins are OpaCEA, this model provides an explanation as to why most infections of the FRT are asymptomatic and why invasive disease is rare.

Disclosure No significant relationships.

**S06.2 T. PALLIDUM IN VITRO GROWTH**

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For over a century, investigation of Treponema pallidum subsp. pallidum, the spiral-shaped bacterium that causes syphilis, was hindered by an inability to culture the organism in vitro. Recently, we reported long-term cultivation of this enigmatic
organism using modifications of previously described mamma-
lian cell co-culture. In vitro cultures of T. pallidum have now
been maintained continuously for over 500 days, with full
retention of multiplication rate, motility, structural integrity,
and infectivity in a rabbit model. Genome sequencing of long-
term in vitro cultured T. pallidum has revealed remarkable
genetic stability, in that organisms from long-term in vitro cul-
ture had identical genome sequences and the same intrastrain
heterogeneity observed in the original organisms used for
inoculation. We have verified that replacement of Eagle’s
MEM with CMRL 1066 as the basal medium was key to
achieving long-term growth. Surprisingly, the reducing agent
dithiothreitol (DTT) was not required for long-term multipli-
cation in the tissue culture system. We have also examined
the effects of the scale of culture, medium composition, and
axenic vs. mammalian cell co-culture. Finally, we have utilized
limiting dilution to generate clonal isolates of T. pallidum, an
important first step in developing a system to genetically
manipulate the bacterium. Further development of the T. pal-
didum in vitro culture system is likely to have far-reaching
effects on many aspects of T. pallidum research, including
studies of physiology, structure, genetics, gene regulation, anti-
microbial susceptibility, pathogenesis, immune reactivity, and
epidemiology.

Disclosure No significant relationships.

**506.3 PIGTAILED MACAQUE MODEL OF STIS**

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The Public Health Problem: Sexually transmitted infections
(STIs) and their sequelae disproportionately affect young
women, with cervical infections frequently ascending to the
upper genital tract, leading to reproductive, pregnancy-related
and newborn morbidity. Attributes of this Nonhuman Primate
(NHP) as a Model: The pigtailed macaque (Macaca nemestrina) has several advantages over small animals for evaluating
STIs, treatment and prevention. This nonhuman primate
undergoes a regular menstrual cycle of 28–30 days and shows
hormonal and genital tract changes similar to human females.
Her microflora and reproductive tract tissues are similar in
constituents and function to those of women. Use of the
Model: The female pigtailed macaque model was initially
developed in the early 1980’s to simulate human Chlamydia
trachomatis infection (cervicitis, salpingitis, pelvic inflammatory
disease), pathogenesis and disease outcome, which has been
key to our understanding of human chlamydial pathogenesis
and treatment. The immune responses and histopathological
characteristics of infection in this model closely resemble those
seen in humans. This NHP model has been expanded to
include lower genital tract infections with Trichomonas vagi-
alis, Mycoplasma genitalium and simian/human immunodefi-
ciency virus (SHIV). Consequently, this model lends itself to
coinfection studies using multiple STIs. Summary and Future
Direction: M. nemestrina is naturally susceptible to multiple
human sexually transmitted infections including C. trachoma-
tis, T. vaginalis and M. genitalium. Pretreatment with exoge-
 nous hormones are not required to initiate or sustain these
infections. Current model refinement efforts focus on model-
ing Neisseria gonorrhoeae infection. These STI pathogens are
unique in that the majority of infections in women are asym-
tomatic, vaccines are currently unavailable, and concerns about
antimicrobial resistance are on the rise. Supported by NIH and
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Disclosure No significant relationships.

**S06.4 CHLAMYDIA, TRICHOMONAS AND SYPHILIS INFECTIONS IN MACAQUES: EFFECTS ON SIMIAN HIV ACQUISITION**

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Epidemiologic studies have linked sexually transmitted infections
(STIs) to an increased risk of HIV acquisition. Although the
precise mechanism of this association is unclear, it is likely to
be a combination of STI-induced local inflammation, disruption
of mucosal surfaces, and recruitment of HIV target cells. Given
that some experiments are logistically difficult or impossible to
conduct in humans, nonhuman primates (NHP) as STI models
of enhanced HIV susceptibility are invaluable in understanding
mechanisms, magnitude of risk, and evaluating effectiveness of
biomedical interventions. Advantages of using NHPs over other
animal models include their relatedness to humans and available-
ability of better immunological reagents. We have successfully
developed NHP models of both vaginal and rectal STIs, and
studied them in the context of simian HIV (SHIV) acquisition
and coinfection, and pre-exposure prophylaxis (PrEP) efficacy.
We demonstrated that vaginal Chlamydia trachomatis (CT) and
Trichomonas vaginalis (TV) infections increase SHIV acquisition
risk while rectal CT infections do not. Also, to study efficacy of
Truvada® (the only anti-HIV medication FDA-approved for
PrEP), we used a validated STI-NHP model of repeated SHIV
exposures to mimic populations at high risk for HIV infection,
and demonstrated that oral Truvada® maintained efficacy
despite CT-TV infections, albeit with a modest loss of PrEP
activity. We showed that another promising anti-HIV Injectable,
long-acting cabotegravir, maintained complete efficacy against
vaginal SHIV acquisition in NHPs infected with CT and TV.
However, these are non-ulcerative infections, which led us to
develop the first NHP models for rectally and vaginally
acquired syphilis, an ulcerative STI. More NHP studies are
ongoing to assess risk of vaginal SHIV acquisition and PrEP
efficacy in macaques coinfected with syphilis, CT, and TV.
These STI-NHP models are also powerful tools to study inter-
actions between STIs, concomitant alterations in clinical mani-
festations and host responses, and to evaluate specific STI-
related interventions, including vaccines.

Disclosure No significant relationships.