**Multipurpose Prevention Technologies (MPTs): Developing interventions to simultaneously prevent STIs, HIV and pregnancy**

**2015 World STI & HIV Congress & HIV/AIDS Conference**  
16 September 2015 – Brisbane, Australia

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**Who has anal sex?**

- Heterosexual couples
  - 1 in 5 heterosexual reported heterosexual anal intercourse ever (<1% most recent sex)
- Gay/Bisexual/Men who have sex with men:
  - 1 in three reports anal sex, 58% condom use
- Australian Study of Health and Relationships 2, 2014
  - Survey of 20,094 people, representative sample
  - 6.5% of men identified as gay, bisexual or MSM

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**Lifetime experience of anal intercourse**

![Graph showing lifetime experience of anal intercourse by age group and gender.](image)

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**What are multipurpose prevention technologies in the anal sex context?**

- Products that serve a dual purpose
  - Sexual lubricants with antiretroviral and/or other antimicrobial action (rectal microbicides);
  - Douche products that combine cleaning with antiretroviral and/or other antimicrobial action
- Products suitable for rectal and vaginal use
- Oral products or regimens that prevent STIs and HIV (pre-exposure prophylaxis for multiple infections)

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**Target viruses** adapted from José Fernández Romero

- Herpes simplex virus (HSV); and
- Human papillomavirus (HPV)
- Not curable
  - Associated with huge public health burden
  - Associated with increased susceptibility to HIV
  - HPV vaccination is not universally available
Oral regimens

- HIV PrEP (tenofovir and emtricitabine)
- Metronidazole plus (ceftriaxone or cefixime) plus (azithromycin or doxycycline) – antimicrobial regimen for chlamydia, gonorrhoea and trichomonas (sexual assault context)
- HIV PrEP plus doxycycline currently tested in France for HIV, chlamydia, gonorrhoea and syphilis

Tenofvir 1% gel

- Being tested as a rectal gel
- Rectal delivery of the gel results in higher vaginal concentrations than oral delivery
- “[Rectal delivery] delivers lower systemic exposure and higher vaginal exposure than do similar doses of oral delivery, with rectal tissue accumulation of TFVdp over time, likely due to the long intracellular half-life.”

Dual Compartment Topical Formulation Challenges  
José Fernández Romero

- Physiological and anatomical differences between vaginal and rectal compartment
  - Vagina has stratified squamous epithelium and rectum/lower gastrointestinal tract has simple columnar epithelium
  - Vaginal tract is a closed cavity while rectal compartment is longer/opened
  - Vaginal normal pH is acidic (4 - 4.5); rectum is neutral/slightly alkaline
Other products in development

- MIV-150 (an antiretroviral drug) - M
- Zinc acetate (an antiviral active against HIV and HSV-2) - Z
- Carrageenan (a seaweed derived product active against HPV) – C
- Griffithsin (an algae-derived protein active against HIV in the lab and against HSV and HPV in preclinical studies)

Research considerations for MPTs active against multiple viruses

- Difficult to test HIV, HPV efficacy in placebo-controlled trials (ethical reasons)
- Testing for efficacy against HSV will be a simpler task

Conclusion

- Great public health value in:
  - Products that prevent more than one non-curable STI
  - Products that can be used in the rectum and the vagina (or that cross from one compartment to the other)
- Promising products in the development pipeline
- [www.cami-health.org](http://www.cami-health.org) [www.mpts101.org](http://www.mpts101.org)
- An important area in STI control, requires funding and advocacy

Thanks

José Fernández Romero
Jim Pickett (IRMA)