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

Overview and pipeline of MPTs relevant to the prevention of STIs

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Healthy timing & spacing of intended pregnancies

Unmet family planning need

Maternal Morality Ratio, 2010

The annual unmet need of 225 million women in low-resource settings results in:
- 74 million unintended pregnancies
- 36 million abortions

Protection against HIV and other STIs

Number of women living with HIV, 2013

Number of STIs

- Each year, 1.8 million women die of AIDS
- And 2.7 million more become infected with HIV.
- More than 1 million people acquire an STI/day.
- The majority of STIs are asymptomatic
- Complications include MTCT, increased risk of HIV, chronic disease and cancers

Multipurpose Prevention Technologies

MPTs combine protection against:
- Unintended pregnancy
- HIV
- Other STIs

MPTs: Historical Precedents

- H2O + fluoride
- The pill + iron
- Grains + folic acid

Who should MPTs target

- Populations at risk for unintended pregnancies, HIV and STIs
  - Young women/adolescents
  - Sex workers
  - Sexually active women
- Populations at risk for HIV and other STIs
  - MSM
  - Couples intending to conceive
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**Available MPTs:**
- Male and female condoms
- SILCS diaphragm

**MPTs: Many Possibilities**
- **Conditions:** Pregnancy, HSV, HPV, HIV, BV, Chlamydia, Gonorrhea, Syphilis, Candida, Trich
- **Delivery Methods:** Topical daily, Topical pericoital, Systemic sustained, Topical sustained, Oral daily, Oral pericoital
- **Actions:** HC, Non-HC, Barrier, Probiotic, Antimicrobial, Antifungal, Antiviral
- **Product Types:** Vaginal film, Vaginal tablet, Oral tablet, Vaginal ring, Non-IVR device, Vaginal gel, Injectable, Implantable

**Regional Providers’ Priorities**

**What is needed for MPTs to work**
- Device needs to be initiated by women rather than men
- Device needs to be acceptable to end users
  - Appearance,
  - Ease of use/administration,
  - Side effects
- Different populations may have different needs

**Potential MPT Delivery Methods**
- Drug combinations
- Drug/device combinations
- Multipurpose vaccines
- Bacterial therapeutics
- Nanoparticles
MPTs in the Pipeline

- Longer acting vaginal rings
- Fast dissolving films and tablets
- Innovative and effective gels
- Injectables that combine contraception and infection prevention
- Nanofiber delivery systems

MPTs in Clinical Trials

HIV + Other STIs
- 1% Tenofovir Vaginal Gel Phase III
- MAP210 (MAL) Vaginal Film Phase I
- HIV-1SD + Zinc acetate + Carageenan Vaginal Gel Phase I
- Tenofovir + Acyclovir Intravaginal Ring Phase I
- Tenofovir Disoproxil Fumarate Intravaginal Ring Phase I
- Tenofovir Vaginal Ring Phase I
- Tenofovir Intravaginal Tablets Phase I
- TFV/FTC Vaginal Tablets Phase I

Pregnancy, HIV & Other STIs
- Origami Female Condom Phase III
- Tenofovir + Levonorgestrel Intravaginal Ring Phase I

Priority Products in Preclinical Development for:
- HIV + Pregnancy
- HIV + Other STIs
- Pregnancy, HIV & Other STIs
- Pregnancy + Non-HIV STIs

Sustained Release Devices:
Combination Intravaginal Rings

- 30-day MZL Combo (Pop Council)
- 60-day Dapivirine + LNG (IPM)
- 90-day TFV + LNG (CONRAD)

- MIV - 150 + Zinc Acetate + LNG
- Demonstrated single-API success
- Pregnancy, HIV, HSV2
- DFV + LNG • Testing underway, clinical studies 2013
- TPV + LNG • Testing underway, clinical studies 2013
- Pregnancy, HIV

Long Acting Injectables:

- TMC278LA (rilpivirine; PATH; HPTN)
- GSK 744 (II; ViiV)

- Injectable nano-suspension of approved NNRTI
- Long acting: 2-3 mos (R)
- Multiple trials:
  - P1 dose ranging PK; SD/MD PK/PD
  - P2 planning

Priorities for 1st Generation MPTs

- On demand
- Sustained release

- Used around time of intercourse
- For women who have intermittent sex or want more direct control over their protection
- User-initiated, does not require daily action
- Should increase adherence and effectiveness

Single & Multipurpose Vaccines

- Today: Single purpose vaccines (HPV & HBV)
- 20 years: Multivalent vaccines (HSV, HIV, Gonorrhea, Chlamydia, Trichomonas, other STIs)
- Contraceptive vaccines are not likely
The Initiative for MPTs

What else is happening in MPT Research & Development?

http://mpt101.org/mpt-database