



**Forum for  
Collaborative HIV Research**

# **CONTROLLING THE EPIDEMIC: THE PROMISE OF ARV BASED PREVENTION**

**Veronica Miller PhD  
Forum for Collaborative HIV Research**



## ACKNOWLEDGMENTS

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- Laure Sonnier\*\*\* (EATG)
- Kevin Fisher (AVAC)
- David Haerry (EATG)
- Victor De Gruttola (FCHR –EC)
  - Proposal presented at the 2007 Forum Exec Comm Meeting
- Funding from the EUROPRISE network
  - pan-European biomedical HIV-prevention network
  - sponsored by the European Commission, coordinated by Robin Shattock



## SYMPOSIUM OUTLINE

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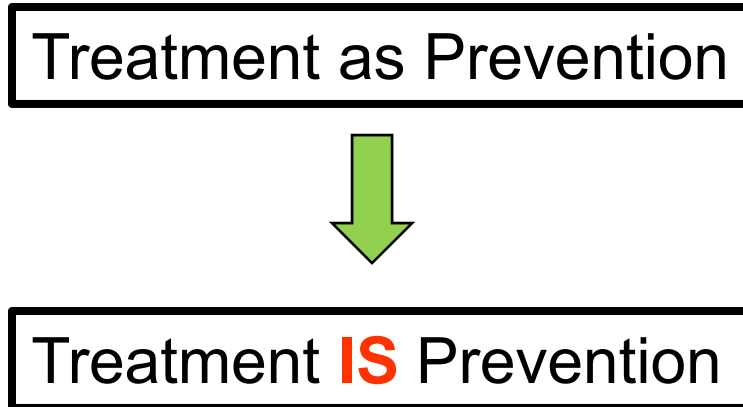
- Overview
  - Miller
- Multiple perspectives
  - De Gruttola; McCormack; Hallet; Cairns
- Issues in developing community based research
  - McCormack; Egger; Vernazza
- Roundtable Panel Discussion



# MAXIMIZING TREATMENT & PREVENTION

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# THE PROBLEM

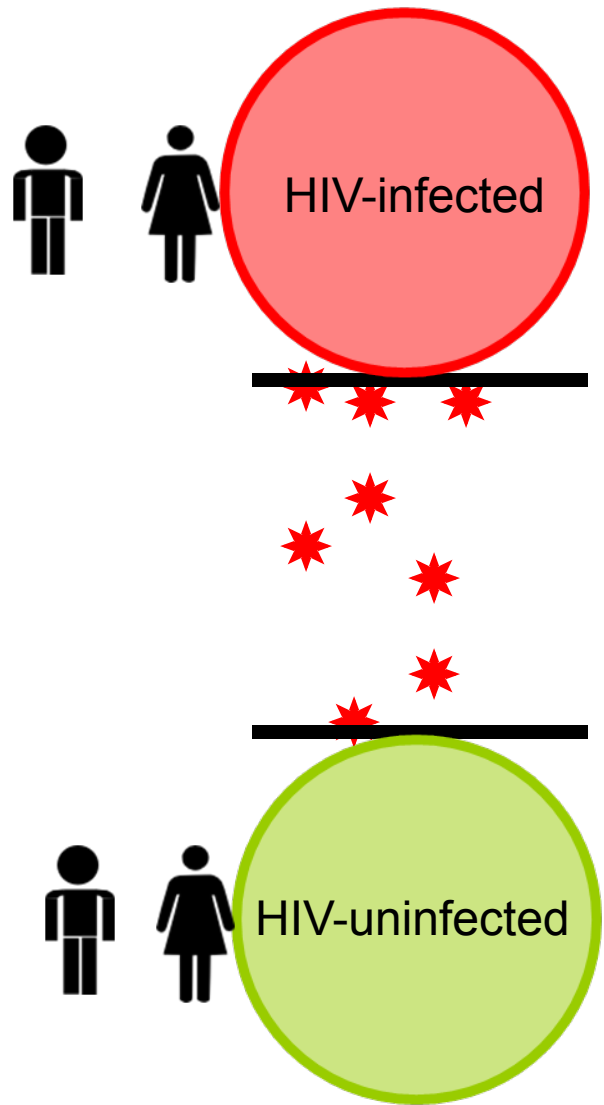
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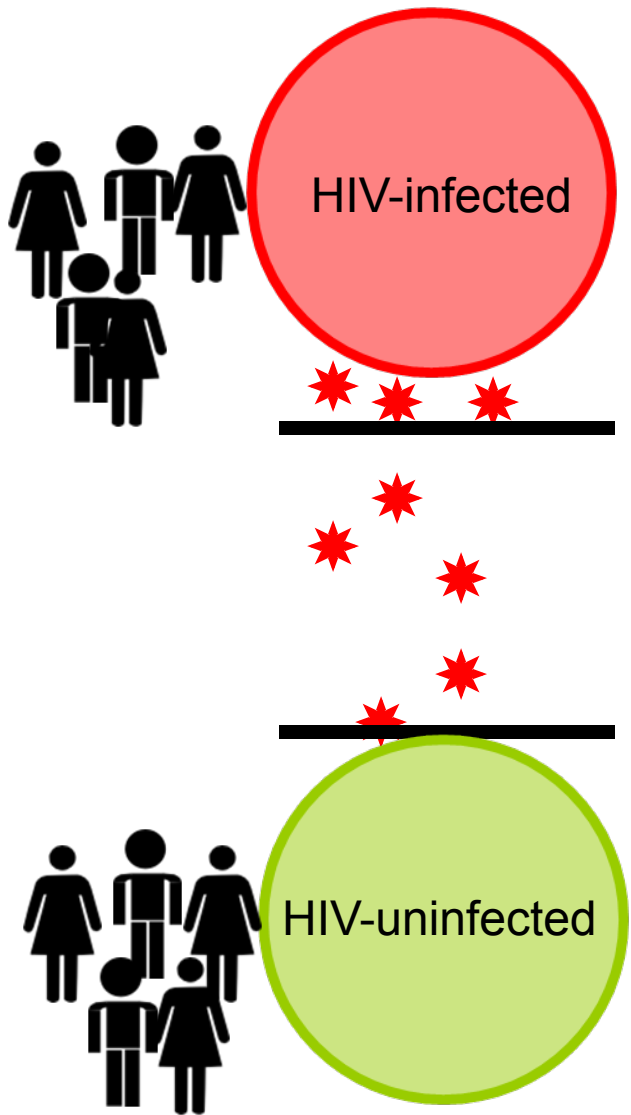
## •Decreasing infectiousness/transmission

### •**Knowledge of serostatus**

- Link/engage in care
- Psycho-social support
- Physical barriers
  - Condoms
- Biomedical
  - ART
  - Treat STIs
- Structural/policy
  - Availability of clean needles
  - Availability of family planning
  - Availability of treatment for addiction

## •Decreasing susceptibility

- Genetic
  - e.g.  $\Delta 32$
- Biological/biomedical
  - Male circumcision
  - pMTCT
  - PEP/PrEP/microbicide
- Behavioral
  - Reducing # of sex partners
  - Condom
  - Clean needles
- Socio-cultural
  - Age of sexual debut



## •Reducing transmission at the population level

- Societal/Structural
  - reduce stigma
  - policies (e.g. against discrimination)
  - social norms (e.g. age of sexual debut)
- Routine testing and linkage to care services
- Programs
  - wide spread antiretroviral treatment
    - reducing community viral load
  - male circumcision scale up
  - universal pMTCT
  - partner tracing/contact
  - drug addiction treatment programs



# EPIDEMICS AT THE LOCAL LEVEL

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## **RISK FACTORS DRIVING THE EMERGENCE OF A GENERALIZED HETEROSEXUAL HIV EPIDEMIC IN WASHINGTON, DC NETWORKS AT RISK**

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- Geospatial selection: high HIV incidence and high level of poverty
- 750 individuals interviewed
  - 93% AA
  - 60% annual income < 10,000
- 5.2 HIV-infected
  - 6.3% women; 5.2 % men
- 50% history of incarceration
- 75% <3 sex partners in last year
  - 46% of women had only 1
- “Normal” heterosexual relationships within a high prevalence network



# THE PROBLEM OF EARLY INFECTION

Myron S. Cohen, M.D., George M. Shaw, M.D., Ph.D.,  
Andrew J. McMichael, M.B., B.Ch., Ph.D., and Barton F. Haynes, M.D.

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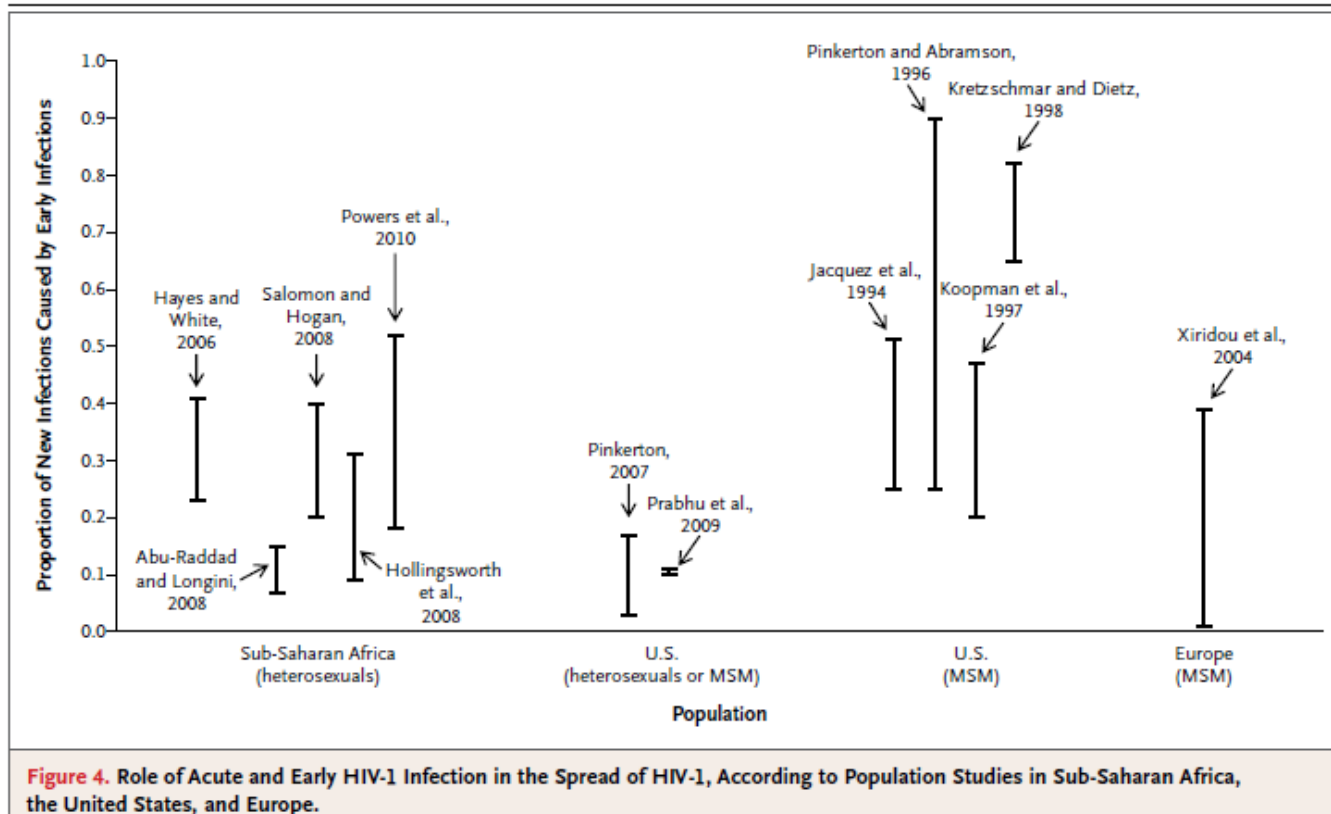


Figure 4. Role of Acute and Early HIV-1 Infection in the Spread of HIV-1, According to Population Studies in Sub-Saharan Africa, the United States, and Europe.

N Engl J Med 2011;364:1943-54.



# THE PROBLEM OF EARLY INFECTION

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The role of acute and early HIV infection in the spread of HIV and implications for transmission prevention strategies in Lilongwe, Malawi: a modelling study

*Kimberly A Powers, Azra C Ghani, William C Miller, Irving F Hoffman, Audrey E Pettifor, Gift Kamanga, Francis E A Martinson, Myron S Cohen*



Published Online  
June 18, 2011  
DOI:10.1016/S0140-6736(11)60842-8

38.4% (18.6-52.3) of transmissions attributable to early infection

95-99% coverage of chronic infection needed for elimination of HIV



# APPROACHING SOLUTIONS

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# HPTN 052: TREATMENT OF HIV INFECTION REDUCES HIV TRANSMISSION

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- 96% reduction in HIV transmission
- 1783 sero-discordant couples
  - Start ART @ 350-550 CD4: 1 transmission
  - Start ART @  $\leq$  200 CD4: 27 transmissions

○ 11 unlinked/potential unlinked transmissions

# Partners PrEP Study



PARTNERS PrEP STUDY

**4758 HIV discordant couples**  
(HIV+ partner not yet medically eligible for ART)



**Randomize HIV- partners**  
(normal liver, renal, hematologic function)



TDF once daily



FTC/TDF once daily



Placebo once daily

All receiving HIV ↓ prevention services

Follow couples for 24-36 months

**1° endpoint: HIV infection in HIV-negative partner**  
**Co- 1° endpoint: Safety**



**EMBARGOED UNTIL RELEASE**

Wednesday July 13, 2011, 2:00 a.m. Pacific Daylight Time

**PIVOTAL STUDY FINDS THAT HIV MEDICATIONS ARE HIGHLY EFFECTIVE AS  
PROPHYLAXIS AGAINST HIV INFECTION IN MEN AND WOMEN IN AFRICA**

	<b>Placebo</b>	<b>TDF</b>	<b>FTC/TDF</b>
New Infections	47	18	13
% ↓ transmission		62% (34-78)	73% (49-85)
		P=0.0003	P<0.0001

Intensive safe-sex counseling  
HIV testing  
Free condoms  
STI dx, Rx  
Monitoring/care of HIV disease

## Press Release

For immediate release: July 13, 2011

Media Contact: NCHHSTP - News Media Line, +1-404-639-8895, NCHHSTPMediaTeam@cdc.gov

## CDC Trial and Another Major Study Find PrEP Can Reduce Risk of HIV Infection among Heterosexuals

### CDC Assessing Data from All Heterosexual Trials to Develop Interim Guidance for Use

	Placebo	FTC/TDF
New Infections	24	9
% ↓ transmission		63%

Intensive safe-sex counseling  
HIV testing  
Free condoms  
STI dx, Rx  
Monitoring/care of HIV disease





# SUMMARY OF OTHER PREVENTION TRIALS FINDINGS

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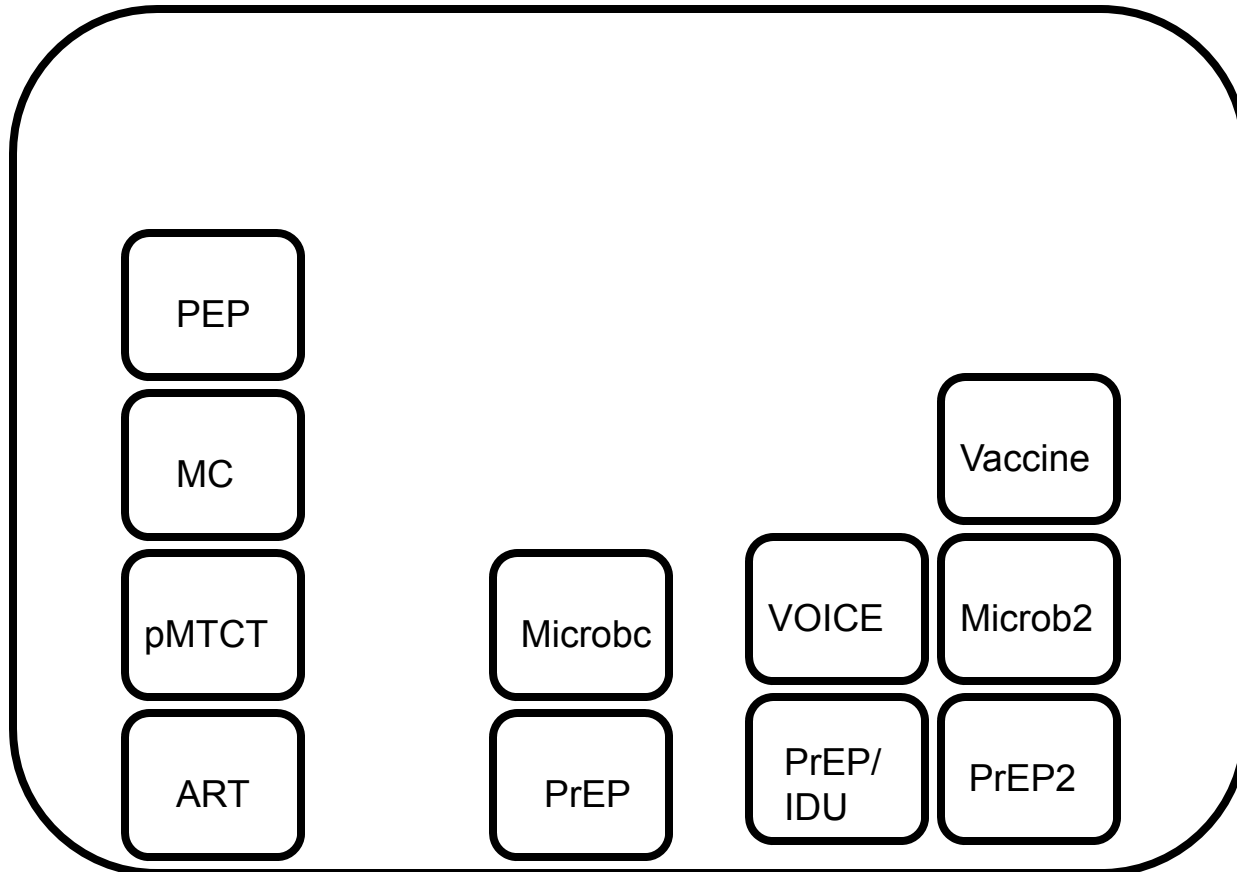
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Study	% ↓ Transmission	High adherence
FEM-PREP	NA (Closed for fertility)	
IPrEX	44%	73%
Caprisa 004	39%	54%
Adult Male Circumcision	60%	



# CURRENT FIELD OF BIOMEDICAL PREVENTION INTERVENTIONS

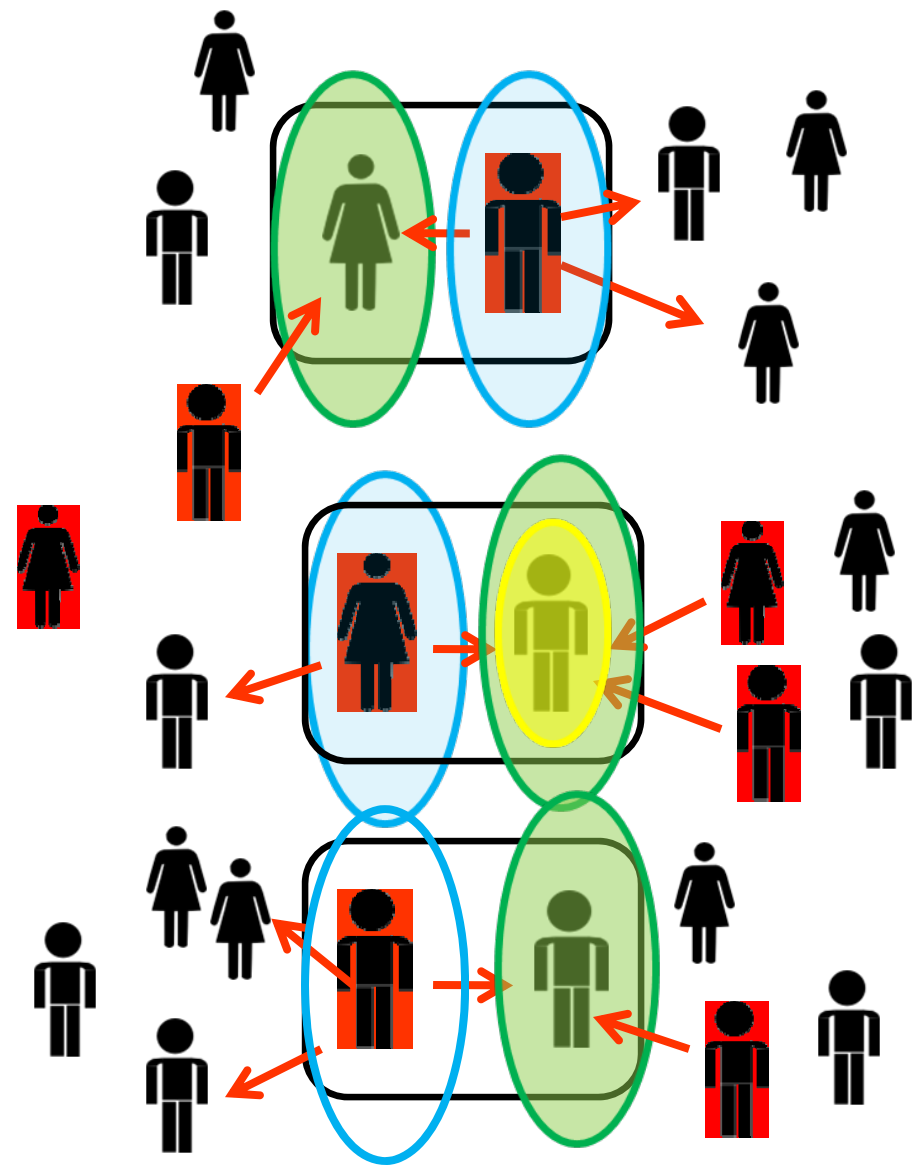
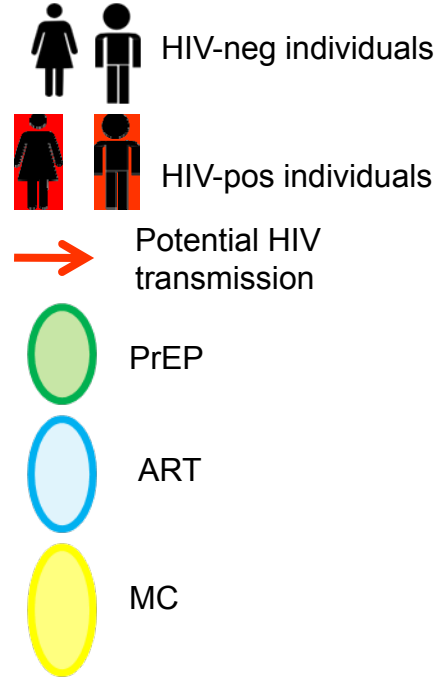
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In Programs

Research → Policy

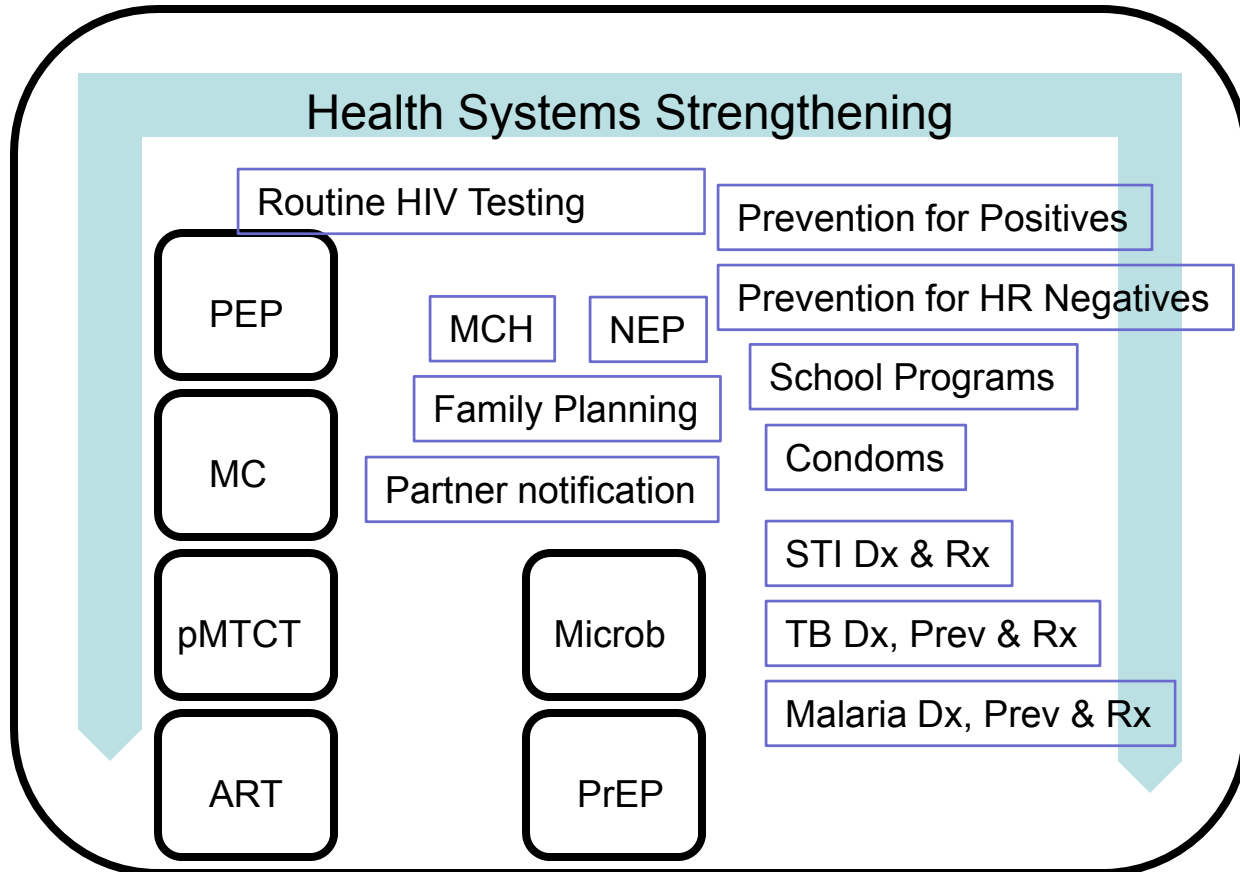
Research





# FINDING THE SYNERGIES

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# RESEARCH CHALLENGES

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- Clinical/efficacy research
  - New drugs, new dosing, new formulations
  - Expeditious use of PK/PD and NHP models
  - Smart use of clinical trial sites



## RESEARCH CHALLENGES

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- Moving from clinical/efficacy research to implementation and cost-effectiveness research
  - What are some of the untapped data sources?
  - Who are the local players?
  - Where are untapped collaborations?
  - Where are the synergies?
  - What are the most effective roll-out strategies?