



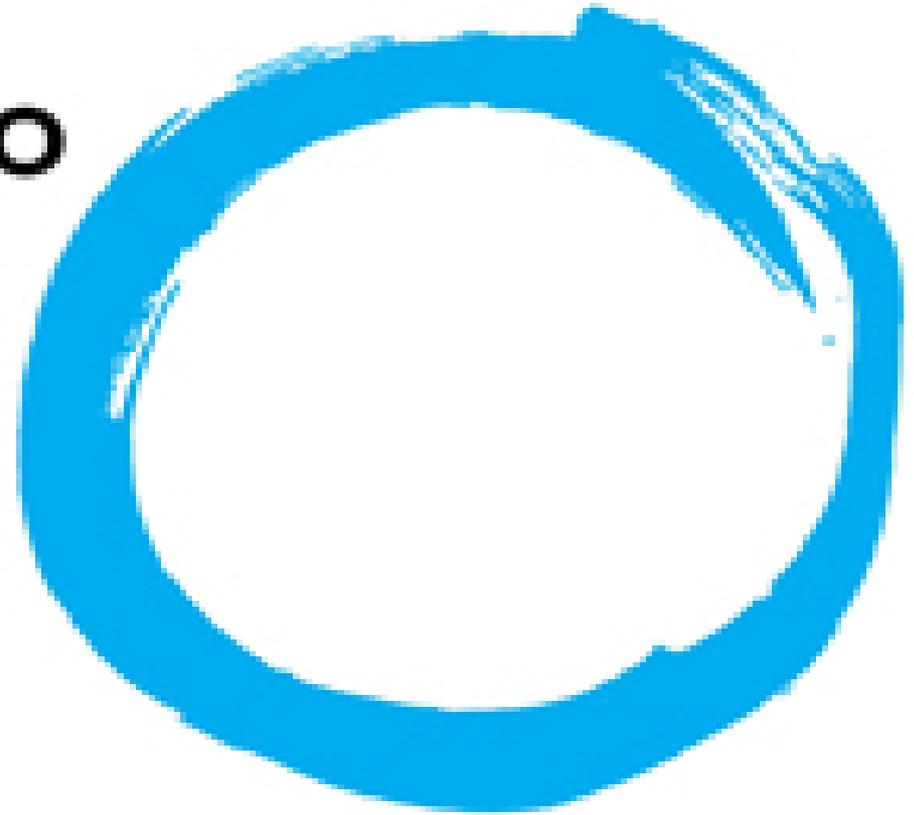
Global Program Science Initiatives

2012 National STD Prevention Conference
Minneapolis, Minnesota

March 12, 2012

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University of Manitoba

GETTING TO ZERO



- “Zero new infections” By 2015
 - 50% reduction in HIV incidence through sexual transmission
 - Elimination of vertical transmission

HIV Prevention: Opportunities and Challenges

- **New technological approaches**
 - “Treatment for prevention”
 - Circumcision
- **Increasing focus on prevention, globally and at the country level**
 - What drives the epidemics in different countries, and at the local level?
 - What is the right mix of interventions?
- **Declining financial resources:**
 - Resource allocation must be strategic to achieve impact efficiently



Program Science: an initiative to improve the planning, implementation and evaluation of HIV/sexually transmitted infection prevention programmes

James F Blanchard and Sevgi O Aral

Sex Transm Infect 2011 87: 2-3 originally published online December 1, 2010
doi: 10.1136/sti.2010.047555

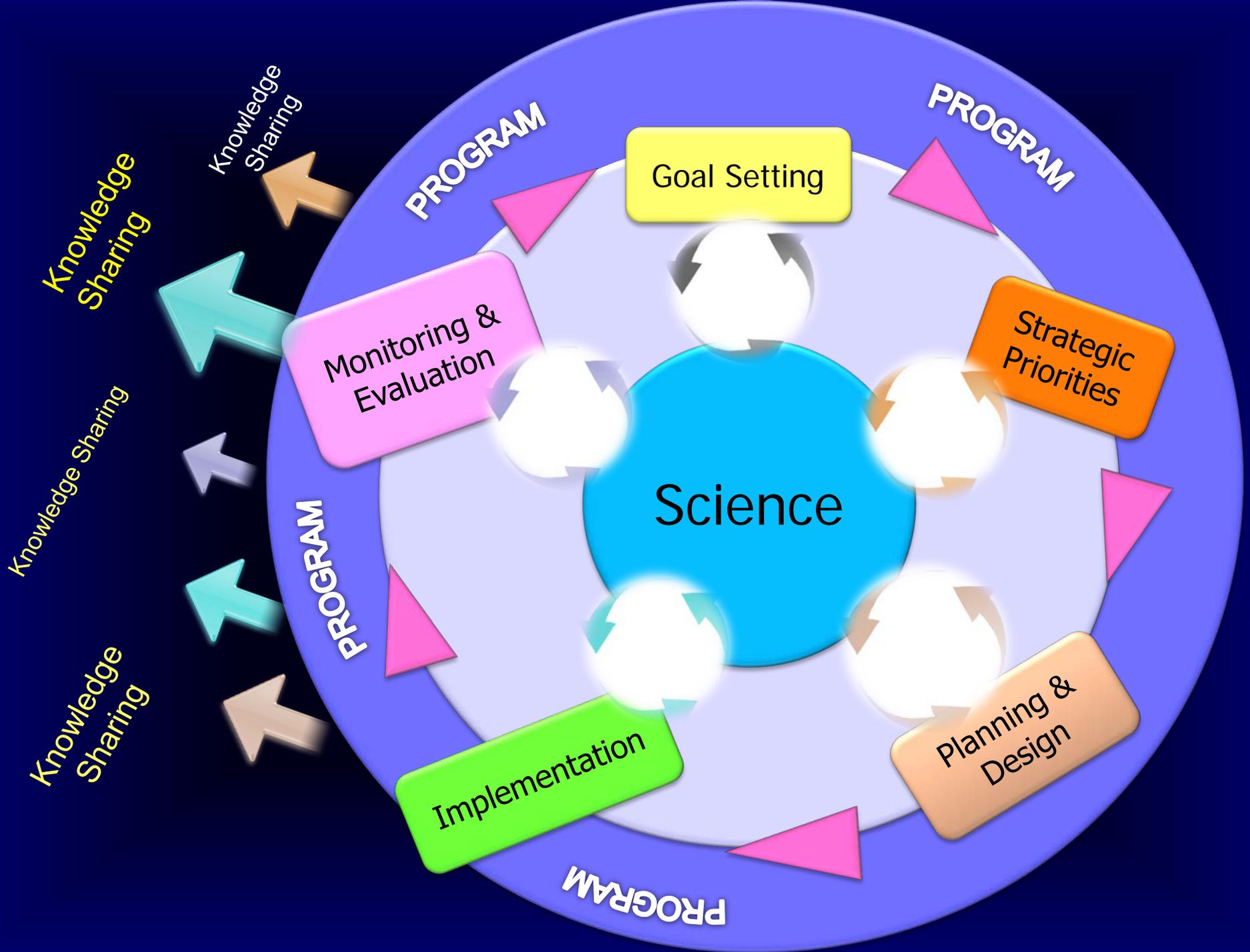
“...the systematic application of theoretical and empirical scientific knowledge to improve the design, implementation and evaluation of public health programmes.”

HIV Prevention – “What’s Science got to do with it?”

- Discover new technologies and biomedical interventions
- Assessing the efficacy and effectiveness of interventions, and combinations of interventions
- Building knowledge about what creates and sustains epidemics, and where to focus prevention efforts
- Optimizing the implementation and efficiency of programs through operations research
- Evaluating the impact and cost-effectiveness of interventions and programs

What is a public health “Program”?

- A set of interrelated activities and services addressing a defined public health issue
- Defined leadership, budget, authority and responsibilities
- Defined goals, objectives and strategies



Programme Science Components – Key Issues

Strategic Planning

- HIV transmission dynamics
- Local epidemic appraisal

Programme Implementation

- Selection of intervention mix
- Tailoring interventions to local settings

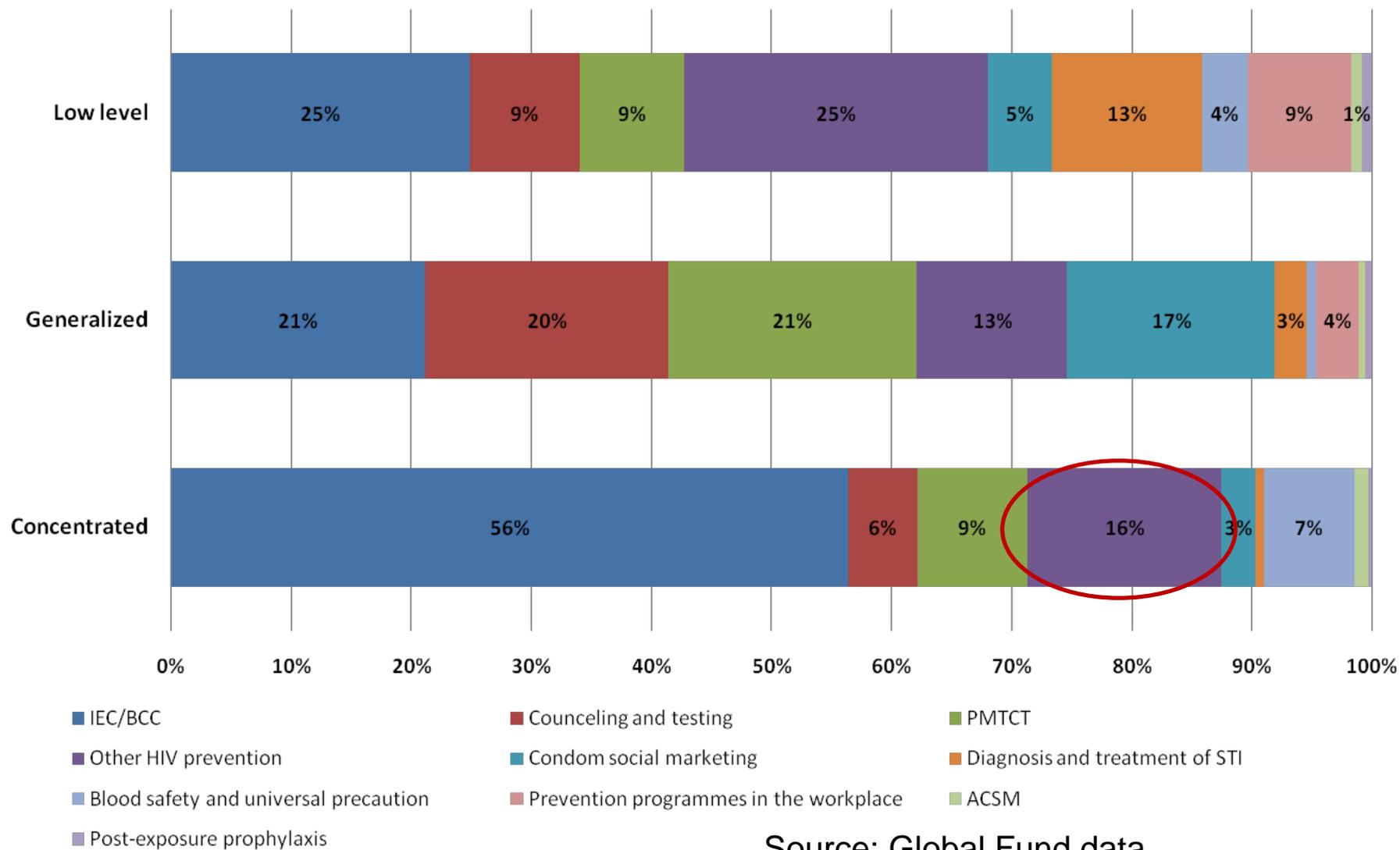
Programme Management

- System models for scaling up
- Monitoring and impact evaluation methods

Strategic Planning – the first Program Science challenge

- Getting the right “footprint” – matching resources to where the epidemic is most severe
- Matching prevention objectives and strategies to HIV transmission dynamics
- Covering the key populations

Global Fund Financing for HIV prevention by Types of Epidemics, 2010



Source: Global Fund data

Uganda “Modes of Transmission” Study

Mode of Transmission	Total number with risk behaviour	Percentage with risk behaviour	Incidence	% of incidence
Injecting Drug Use (IDU)	994	0.0%	258	0.28
Partners IDU	252	0.0%	10	0.01
Sex workers	32,652	0.3%	833	0.91
Clients	189,381	1.5%	7,172	7.83
Partners of Clients	108,676	0.8%	1,660	1.81
MSM	3,976	0.0%	559	0.61
Female partners of MSM	1,569	0.0%	92	0.10
Multiple partnership	1,808,919	13.9%	21,722	23.73
Partners MP	1,417,881	10.9%	19,925	21.76
Mutual monogamous heterosexual sex	6,022,317	46.1%	39,261	42.89
No recent risk	3,474,169	26.6%	0	0.00
Medical injections	13,060,787	100.0%	54	0.06
Blood transfusions	134,053	1.0%	0	0.00

Uganda “Know Your Epidemic, Know Your Response” Analysis

ii) Policies and guidelines for HIV counselling and testing, IEC/mass media, and behaviour change interventions should be reviewed and strengthened with a view to targeting the following population sub-groups:

- a. Persons in long-term marital or co-habiting partnerships
- b. Discordant couples
- c. Persons living with HIV and AIDS
- d. Most-at-risk populations (MARPs) including commercial sex workers, uniformed services, fishing communities, truck drivers, MSMs and IDUs

Discordant Couples in Uganda – Analysis from Rakai*

	% of Population
Not married / not in consensual relationship	39%
Currently married / in consensual relationship	61%
Concordant HIV negative couples	39%
Discordant couples	2%
Unknown partner status	20%

* Gray R, et al. AIDS 2011

Development of a Program Science Consortium

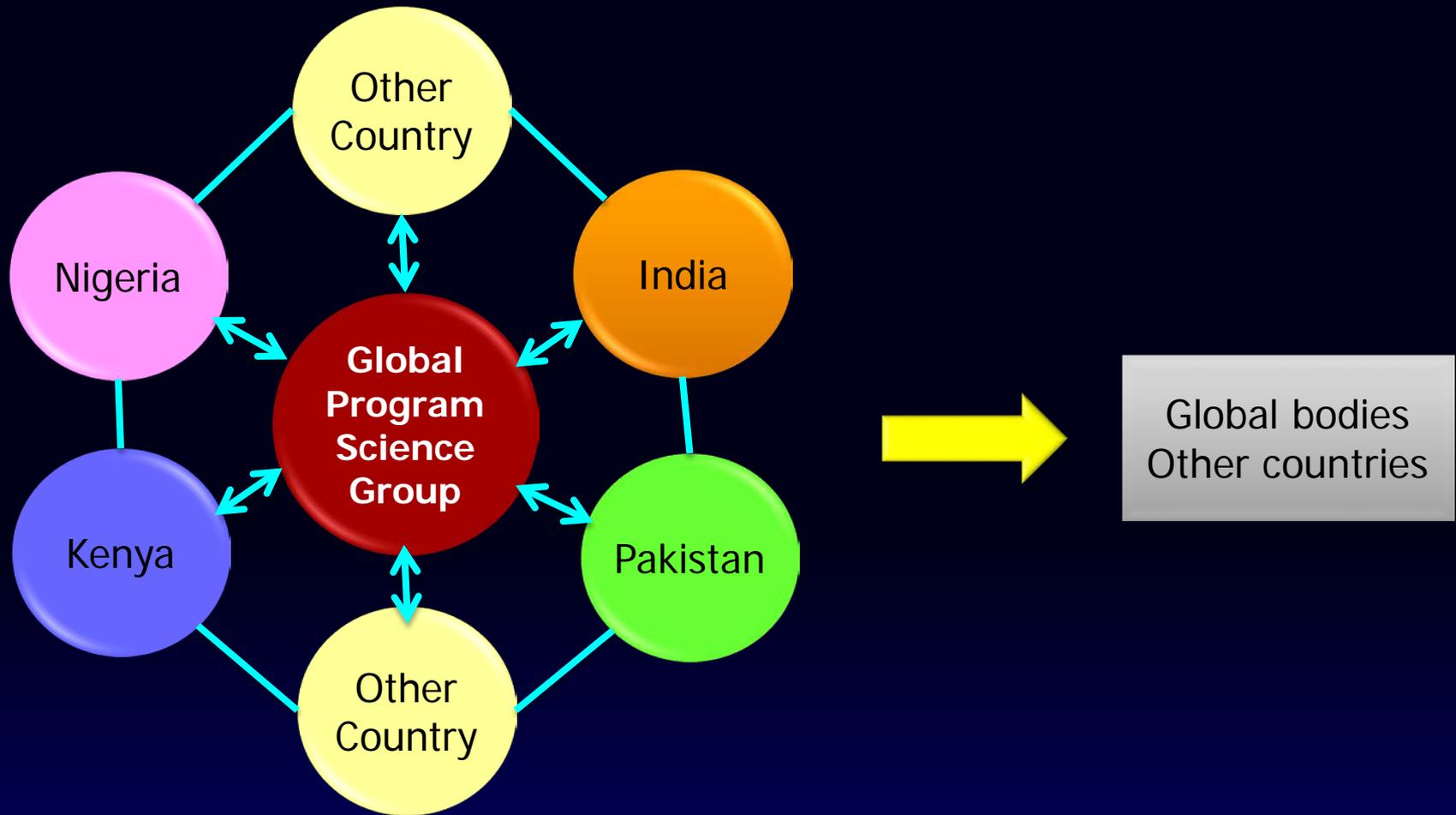
- 3 global meetings in 2010-11, funded by the NIH (OAR) and CIHR
- Participants:
 - **Science:** London School of HTM, University College (London), Imperial College, Johns Hopkins, U of Washington, Family Health International, U of Manitoba
 - **Program/policy leaders:** World Bank, Global Fund, UNAIDS, USAID/PEPFAR, Gates Foundation
 - **Country Program leaders:** India, Kenya, Nigeria, USA, Canada

“Global HIV Prevention Program Science Technical Support and Knowledge Management”*

- **Countries of focus:**
 - India, Kenya, Nigeria, Pakistan, +2 (TBD)
- **Epidemic appraisal**
 - Understanding epidemic typologies and drivers
- **Strategic planning**
 - Tailoring prevention objectives and resource allocation to maximize population-level impact
- **Implementation planning and support**
 - Improving effectiveness and efficiency

* **Supported by the Global HIV/AIDS Program of the World Bank**

Global Program Science Initiative – A Knowledge Translation Network



Key Methods for Knowledge Development and Translation

- “Program Science” platforms:
 - Working with HIV programs at the national and state levels
 - Focusing on iterative evidence-planning-implementation approaches
- “Learning Sites”:
 - Learning about what works
 - Building capacity for others
- Knowledge synthesis and dissemination
 - Country to country
 - Packaging lessons for global dissemination

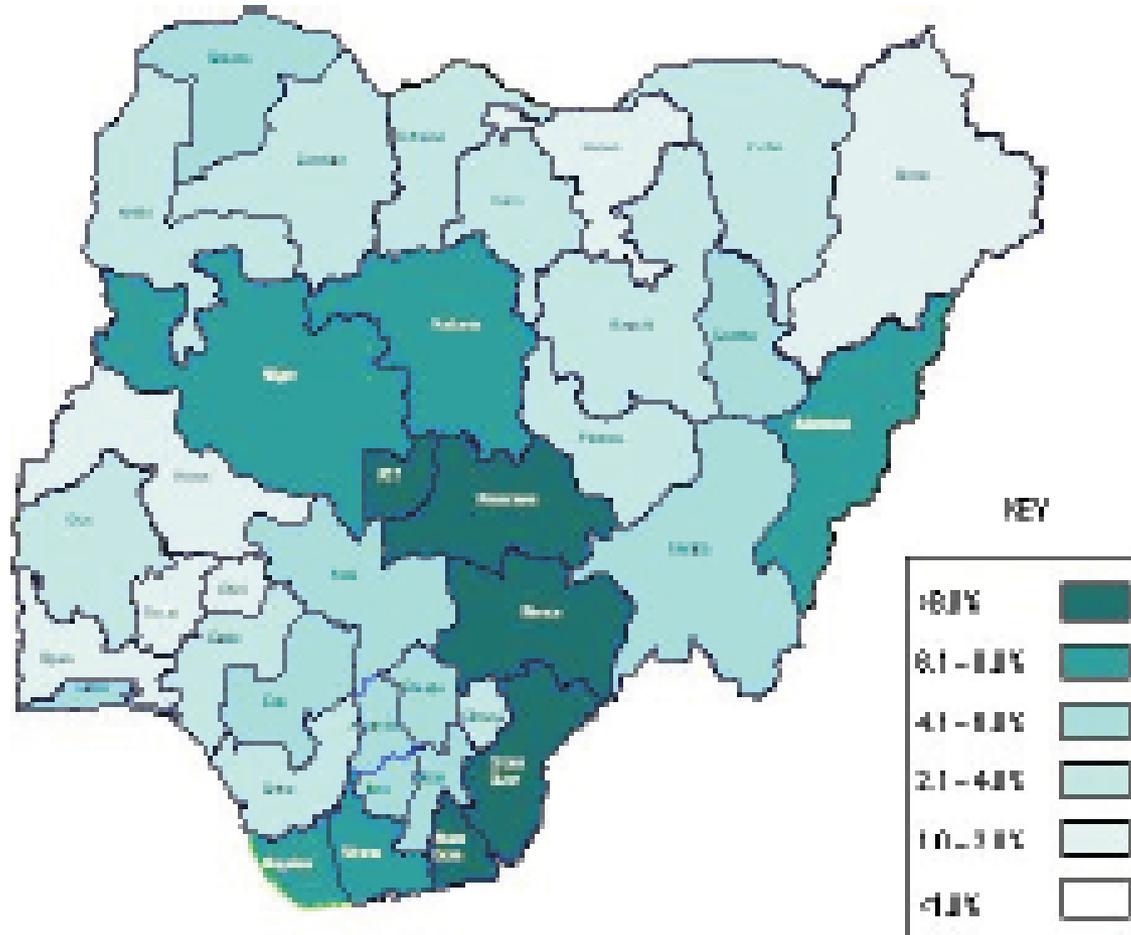
Nigeria – HIV Prevention Context

- Contributes second highest number of new HIV infections globally
- Very large investments for HIV (US Govt, GFATM, World Bank, DfID)
- Most investments have been for:
 - HIV counseling and testing
 - Treatment, care and support
 - PMTCT
- Concerted national effort for HIV prevention underway

Nigeria HIV Prevention Policy

- **Minimum Prevention Package Interventions (MPPI) Approach**
 - “Combination Prevention”
 - Differentiated by population group
- **Challenges:**
 - Epidemic heterogeneity
 - Diversity in socio-cultural characteristics and sexual structure
- **Program Science questions**
 - How best to allocate resources within a state?
 - Optimizing coverage levels to the right populations
 - Selecting the right intervention-population mix

HIV Prevalence in Nigeria – by State

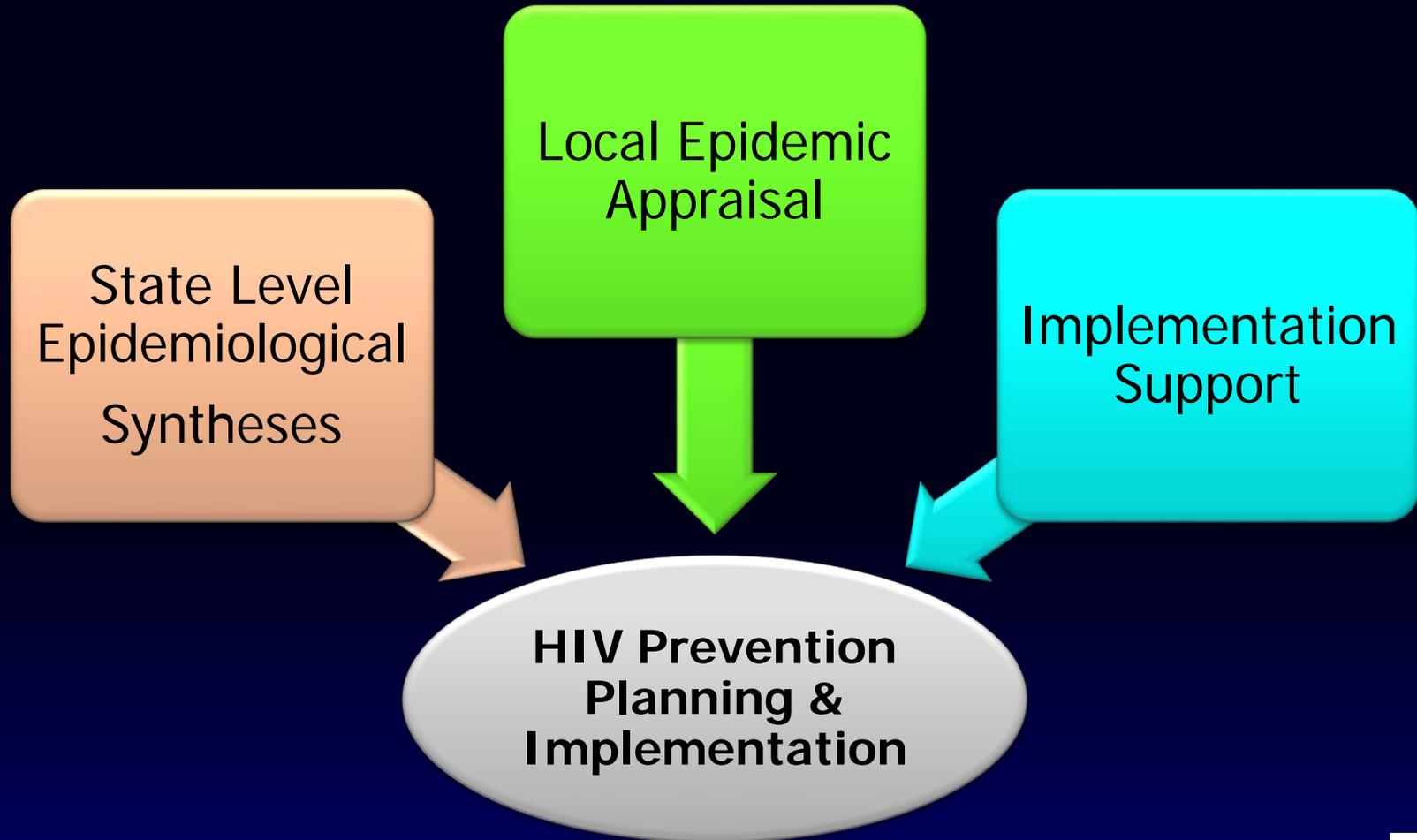


Source: FMOH (2008) National HIV sero-prevalence sentinel survey, Nigeria

Epidemic Typology – Prevention Priority Objectives (from Wilson and Halperin*)

Epidemic Type		
Concentrated	Generalized	Mixed
Saturation coverage of most at risk key populations with high quality targeted interventions	<p>Programming and policies to change behavioural norms at the population level</p> <p>Reduce multiple partnerships and concurrency</p> <p>High coverage of PMTCT programs</p>	<p>High coverage targeted interventions for MARPs, focusing on populations and locations where there is substantial overlapping with general population networks</p> <p>Programming and policies to change key behavioural norms in focused areas with specific populations</p>

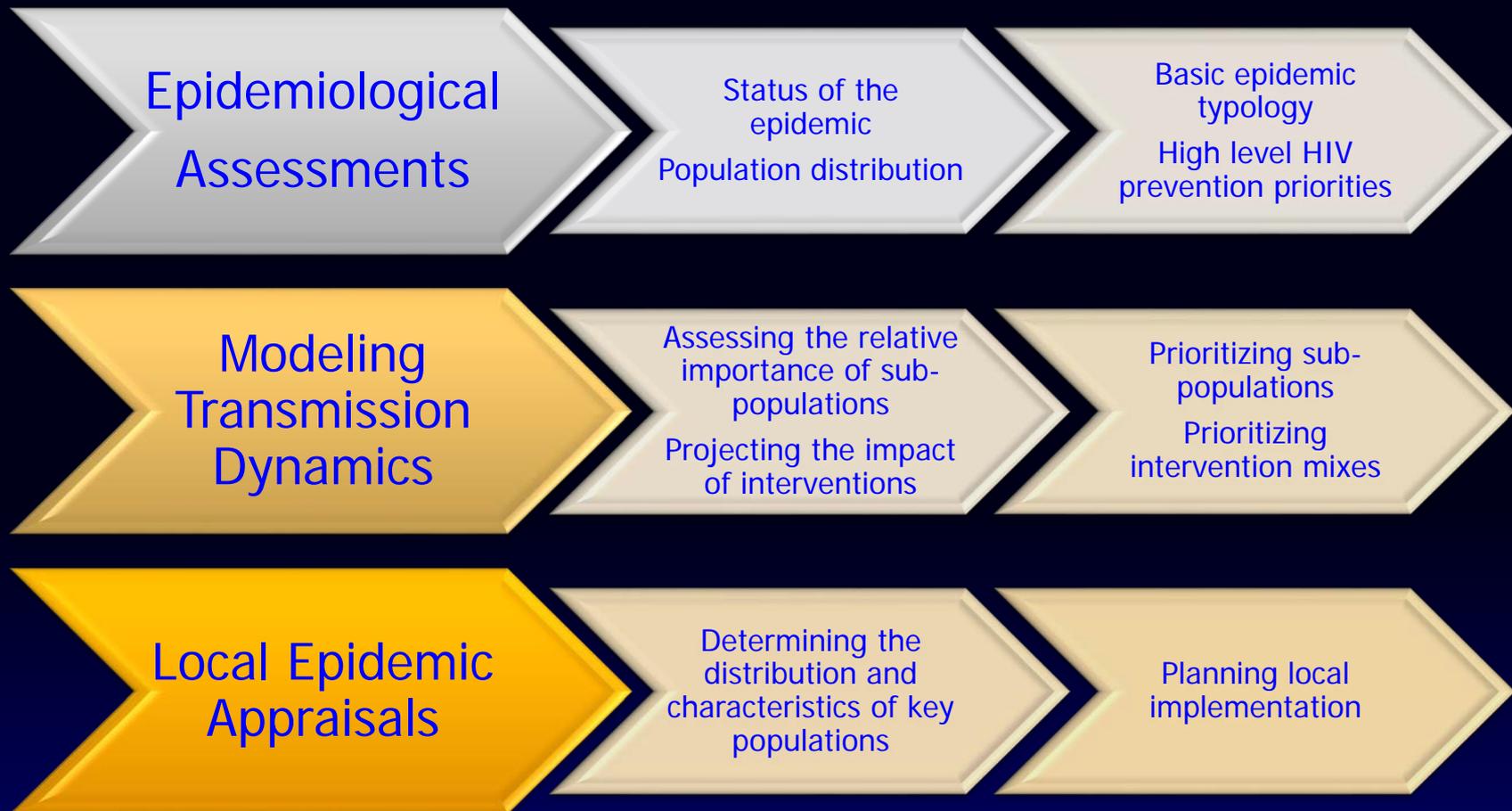
Nigeria – Program Science Initiative



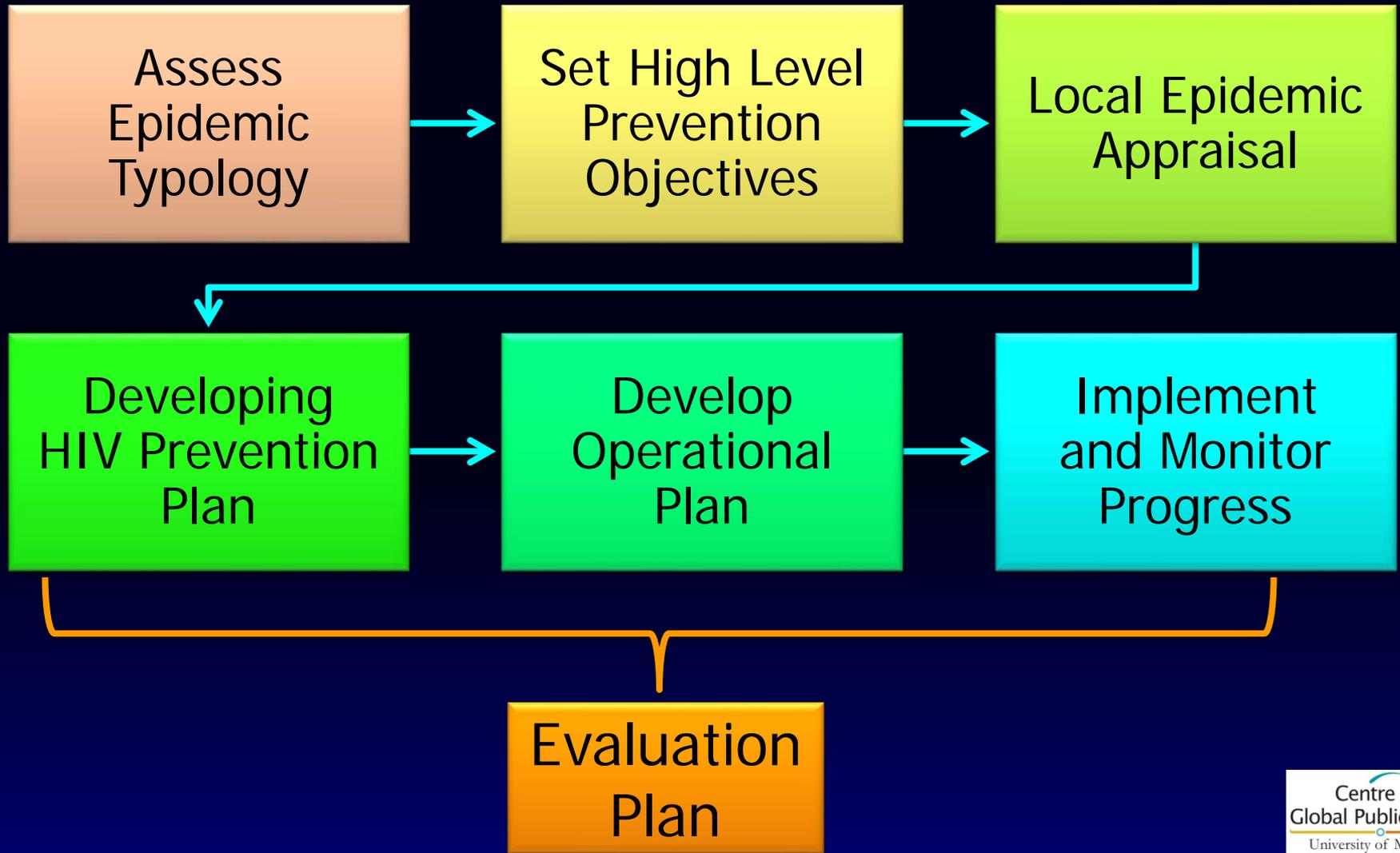
Basic Data – 3 States of Nigeria

	Nasarawa	Kaduna	Ondo
HIV prevalence - general	6.8%	6.3%	0.9%
HIV prevalence - ANC - most recent	10.0%	7.0%	2.4%
Highest most recent local prevalence if avail	19.5%	17.7%	4.0%
Multiple partners - men	11.4%	19.1%	18.8%
Multiple partners - women	1.4%	4.9%	0.2%
Non-marital partner - men	44.3%	9.2%	47.7%
Non-marital partner - women	12.2%	0.9%	20.8%
Know where HIV test - men	55.3%	54.4%	61.0%
Know where HIV test - women	22.3%	70.9%	62.0%
HIV test ever - men	19.9%	9.0%	7.0%
HIV test ever - women	7.8%	15.4%	17.0%
Paid for sex - men	3.4%	0.6%	0.3%
# lifetime partners - men	4.6	4.1	5.3
# lifetime partners - women	1.3	1.1	1.7
Condom use - non-marital - men	40.4%	15.7%	62.0%
Condom use - non-marital - women	10.5%	24.3%	38.0%

Components and Purposes of Epidemic Appraisals



Developing State Level HIV Prevention Prioritization and Implementation Plans



Three Approaches to Epidemic Rapid Appraisals – 9 States

- Mapping MARPs
- Assess other high risk networks:
 - Identify locations where people meet new sexual partners:
 - Identify other methods that people meet new sexual partners
 - Assess what high risk behaviours are prevalent and what groups are involved
 - Gain understanding of the social dynamics in different groups who have higher levels of risk behaviours
- Assess key behavioural patterns in the “general” population

Some key research questions for epidemic appraisals

- What is the size and contribution of defined key populations to the overall epidemic?
 - Female sex workers
 - MSM, IDU
- What are the operational typologies for sex work and transactional sex, and how does this translate to intervention strategies?
- What is the extent, nature and context for intersections between MARPs and other high risk sexual networks?
- What are the key aspects of the sexual structure in the general population driving HIV transmission, particularly in rural areas?

Implementation Process and Progress

Science team work intensively with NACA and SACAs from 9 states

- Review existing epidemiological data
- Develop initial HIV prevention prioritization and implementation policy briefs
- Design protocols for state-level epidemiological appraisals, based on initial assessment of epidemic typology
- Train NACA, SACAs and national technical working groups in epidemic appraisals
- Train and support state teams for implementing epidemic appraisals

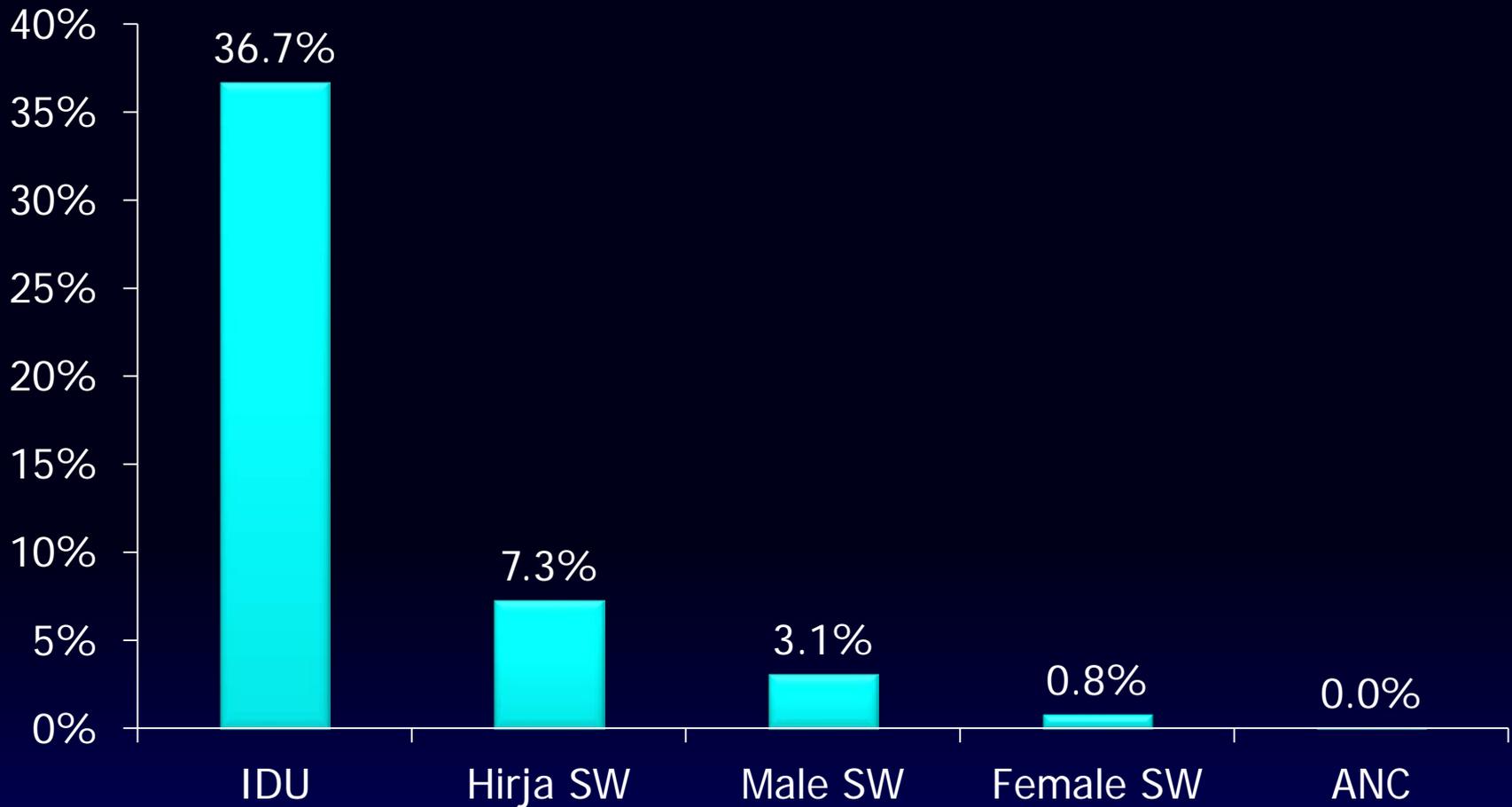
Next Steps

- Summarize results of epidemic appraisals and translate them into detailed implementation plans:
 - Geographic and sub-population focus
 - Intervention mix and implementation modalities
- **Implementation support:**
 - Capacity building for implementers
 - Intervention standards, guides and tools
 - “Learning Sites” – learn by doing (operations research), training others

Pakistan – HIV Prevention Context

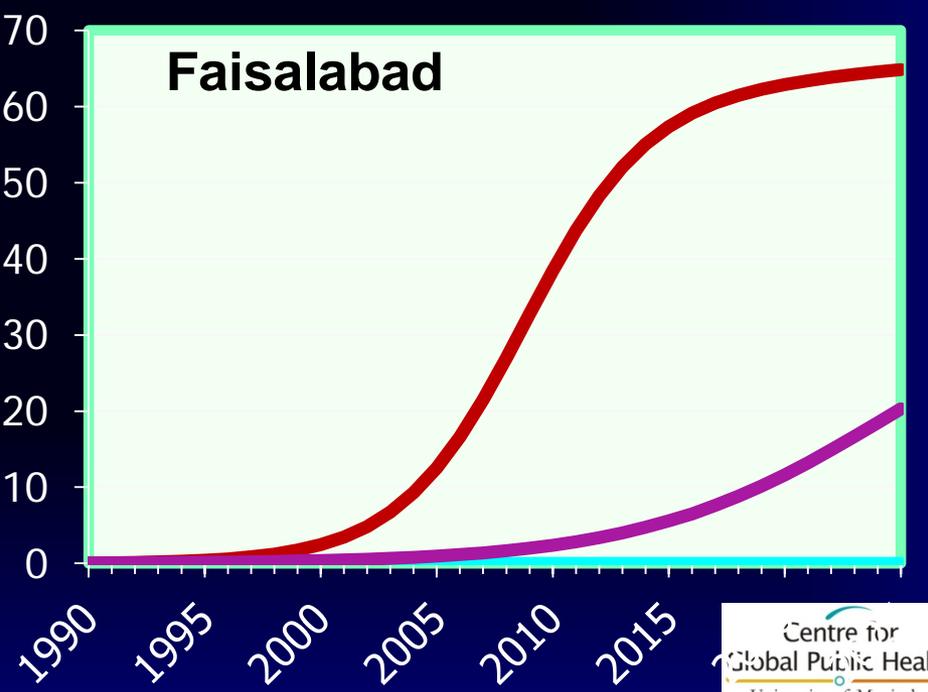
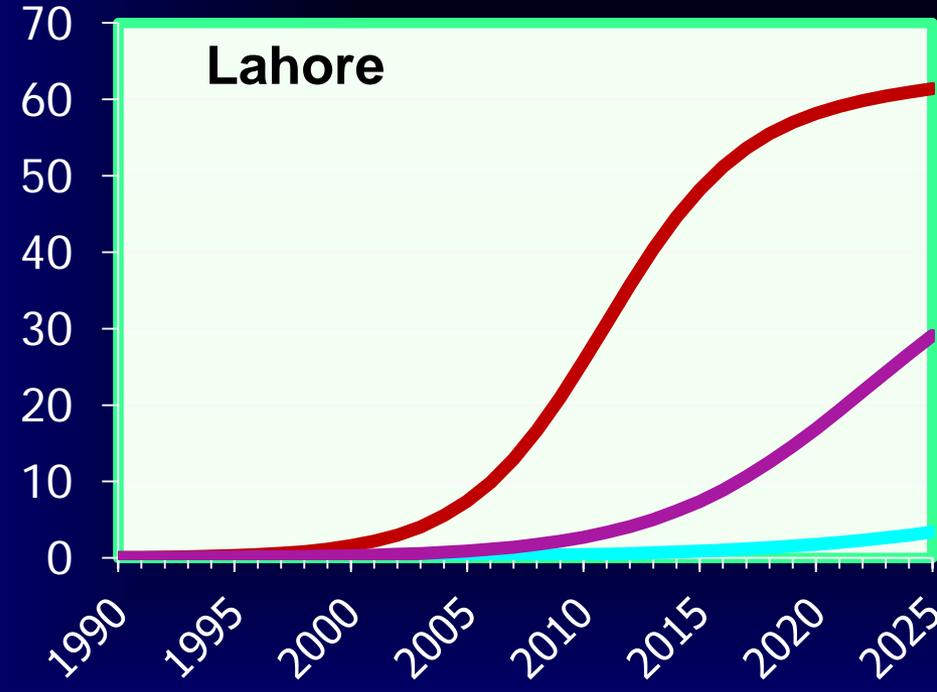
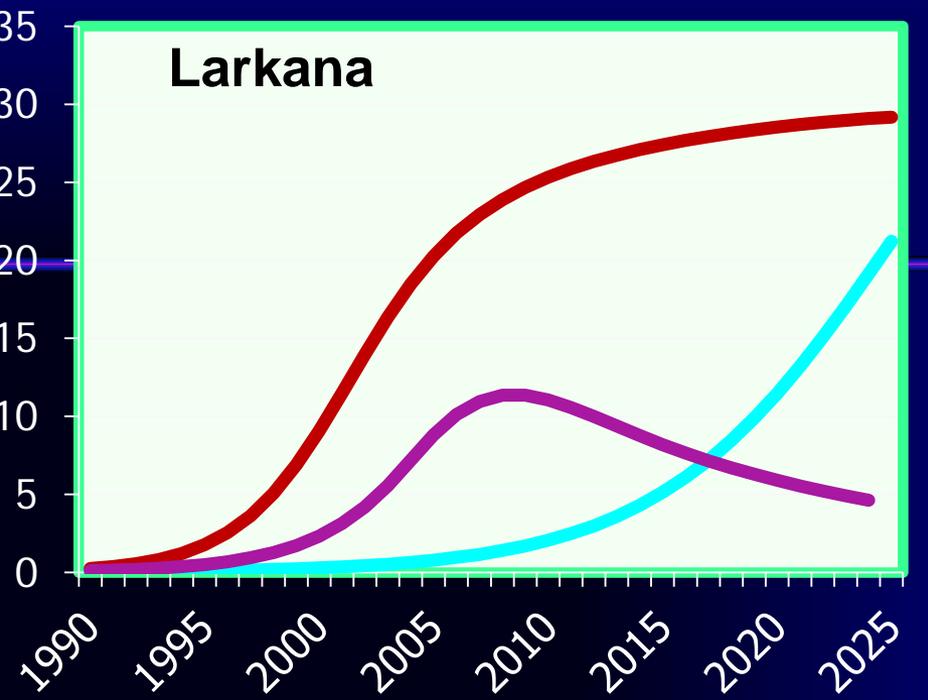
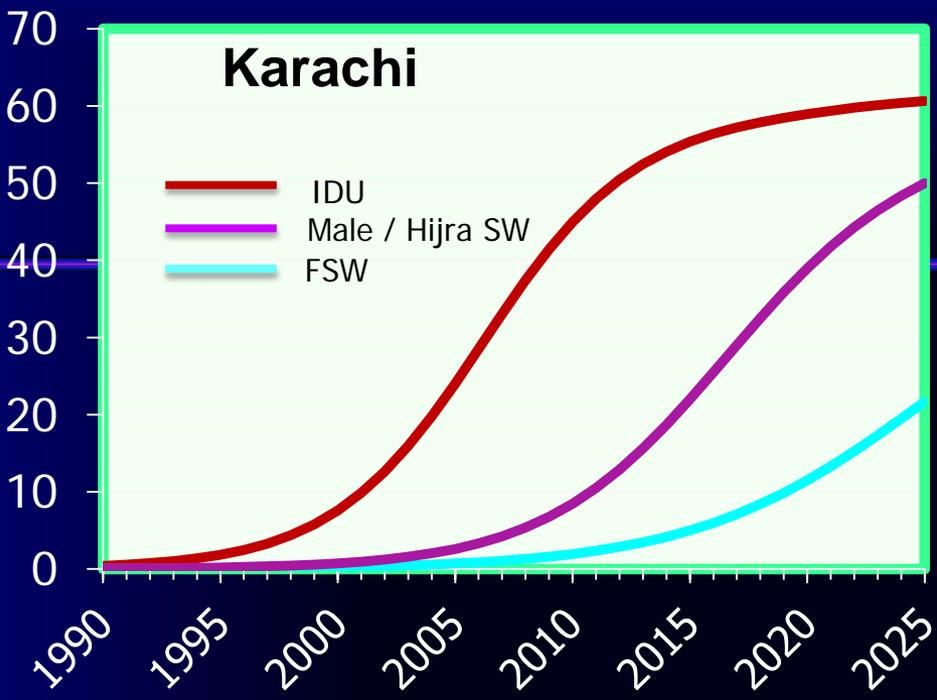
- National HIV prevention planning focused on targeted interventions for most at risk populations (MARPs).
 - Heavy emphasis on IDU
 - Highly decentralized response
- Declining resources for HIV prevention
- Uneven capacity for implementation

Pakistan – A highly concentrated epidemic

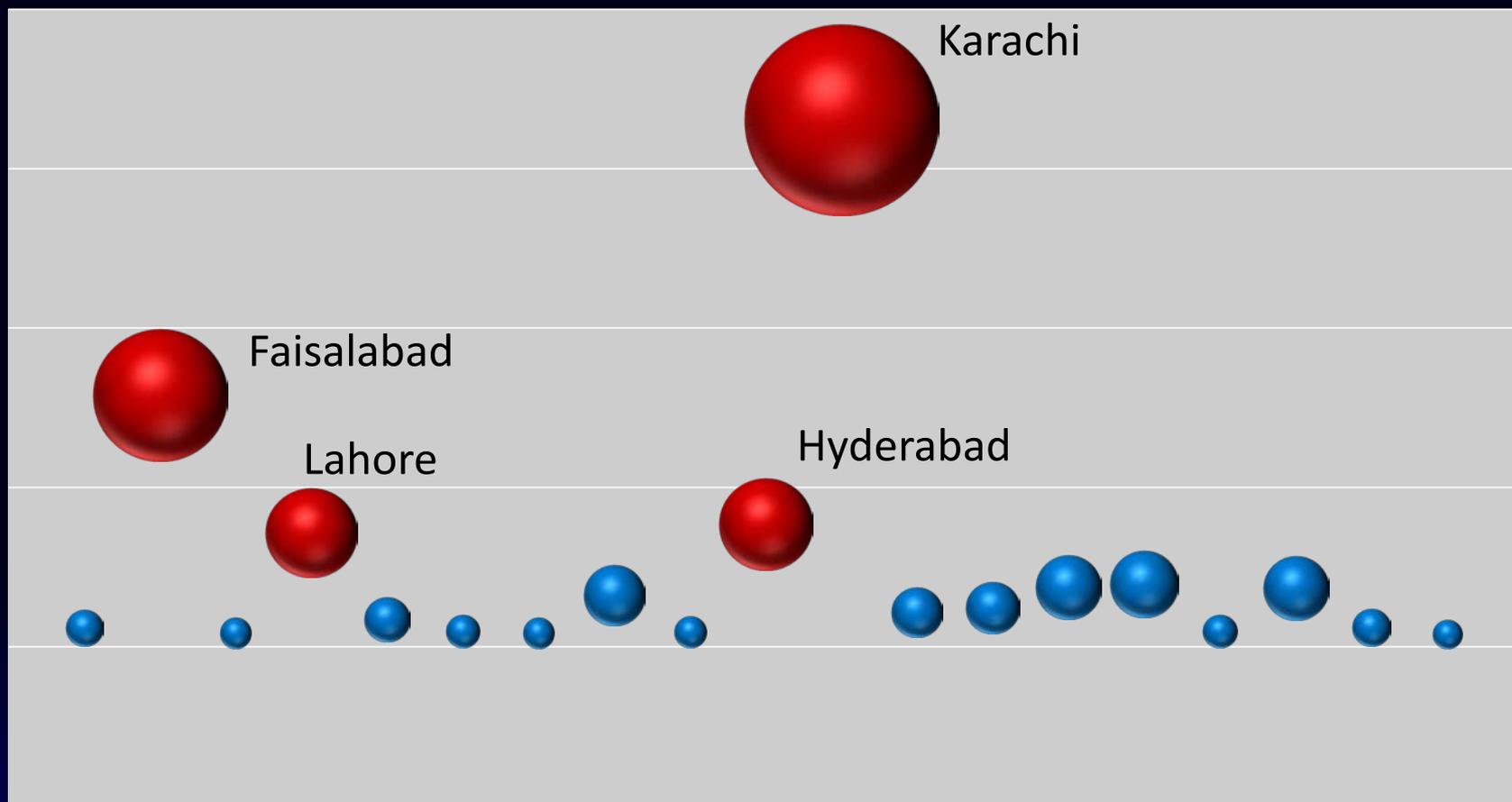


Pakistan Epidemic Typology

- **A mix of three sub-epidemics**
 - IDU – oldest and most severe
 - MSW / HSW – expanding in many cities
 - FSW – emerging in cities with older and more advanced epidemics
- **Heterogeneous**
 - Severity and distribution of sub-epidemics differs by city

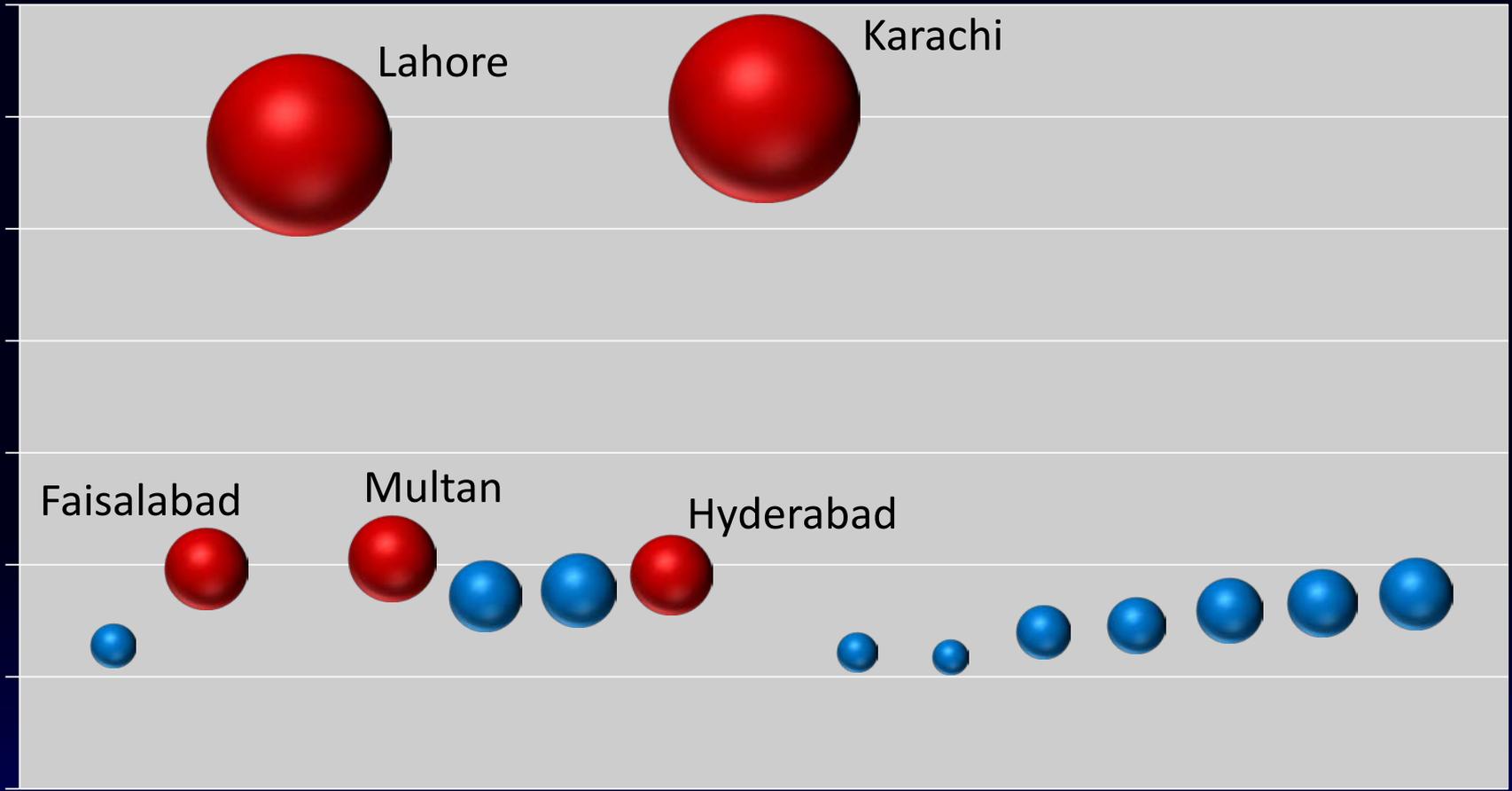


Relative Size of IDU Populations in Cities of Pakistan



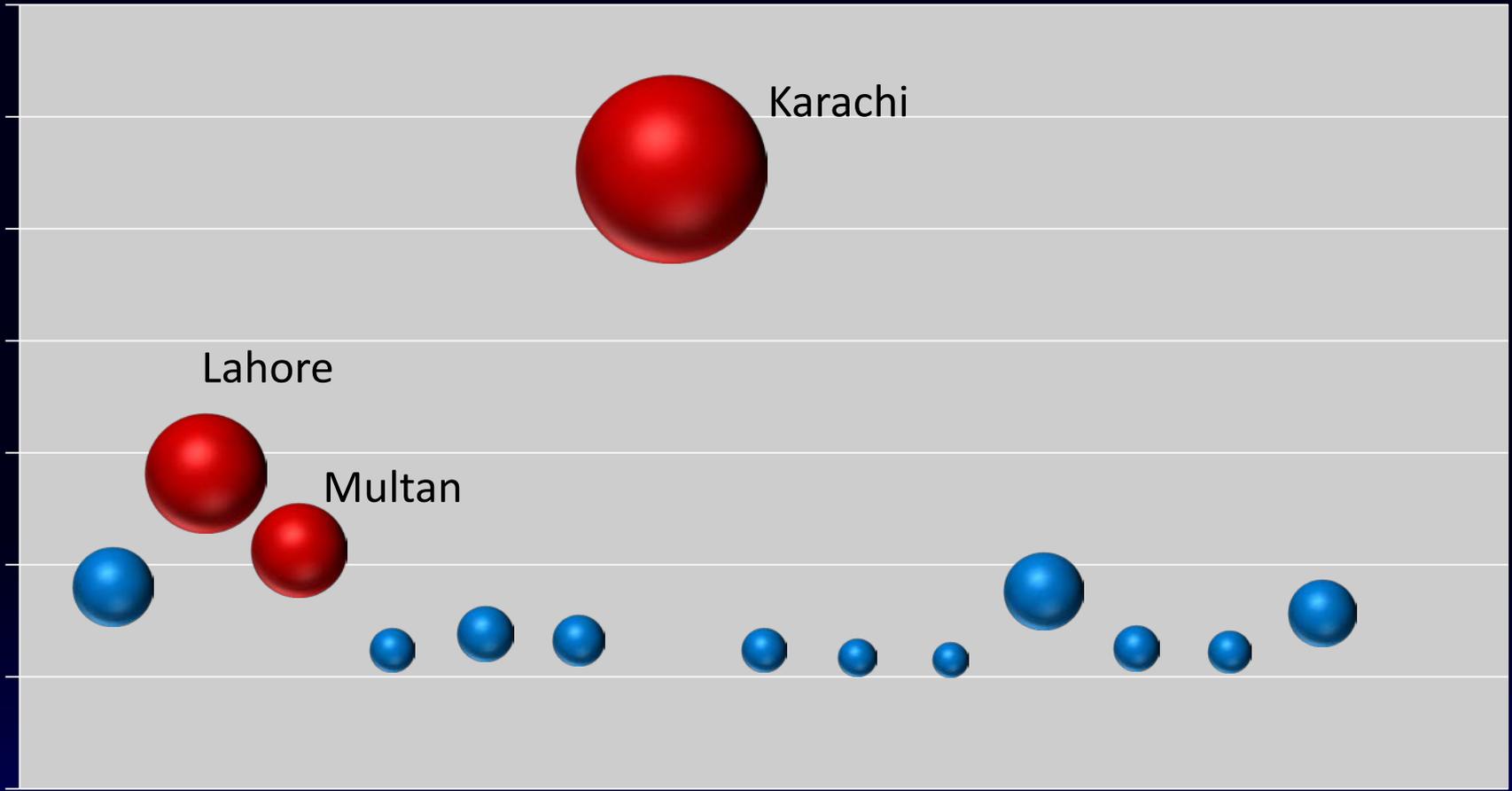
69% of IDUs

Relative Size of FSW Populations in Cities of Pakistan



72% of FSWs

Relative Size of *Hijra* (transgender) SW Populations in Cities of Pakistan



64% of HSW

Implications for HIV prevention priorities

- Focus on scaling up HIV prevention programs for key populations at higher risk:
 - IDUs, HSW, MSW and FSW
- Allocate resources according to the size of key populations in different cities, and prioritize cities with more advanced IDU and MSW / HSW epidemics

Program Science issues

- Getting the right footprint for allocating prevention resources
- “Micro-planning” interventions within cities
- Implementation support

Implementation Process and Progress

- Establish “Program Science” working groups at state and provincial levels
- Analyze and review HIV second generation surveillance data → develop high level plans to guide resource allocation
- Develop implementation standards and tools
- Establish implementation “Learning Sites”
 - Develop effective intervention models
 - “Getting research out of practice” to better understand implementation context and refine models
 - Monitor and evaluate

Reflections on Program Science initiatives, so far

- Substantial interest in this approach from national and state programs
 - Improvement on extant technical support models
 - Opportunity for sustained engagement between programs and science
- Importance of coherence and collaboration between key funders and actors within a country
- Substantial capacity building needs and opportunities:
 - For public health trainees
 - For public health leaders

Implications for Canada and USA?

Initial thoughts

- Find ways to bring STD / HIV prevention programs and public health science closer
- Define “program science” platforms to more systematically learn scientific approaches to program development and implementation
- Build leadership and expand training opportunities

Thank You

India's HIV Epidemic – Does it matter which intervention we use?

To control the epidemic

Effective prevention for female sex workers vs. “treatment for prevention”

HIV elimination without antiretroviral therapy (ART) in Southern India: Modelling and projected costs

Mike Pickles

Peter Vickerman

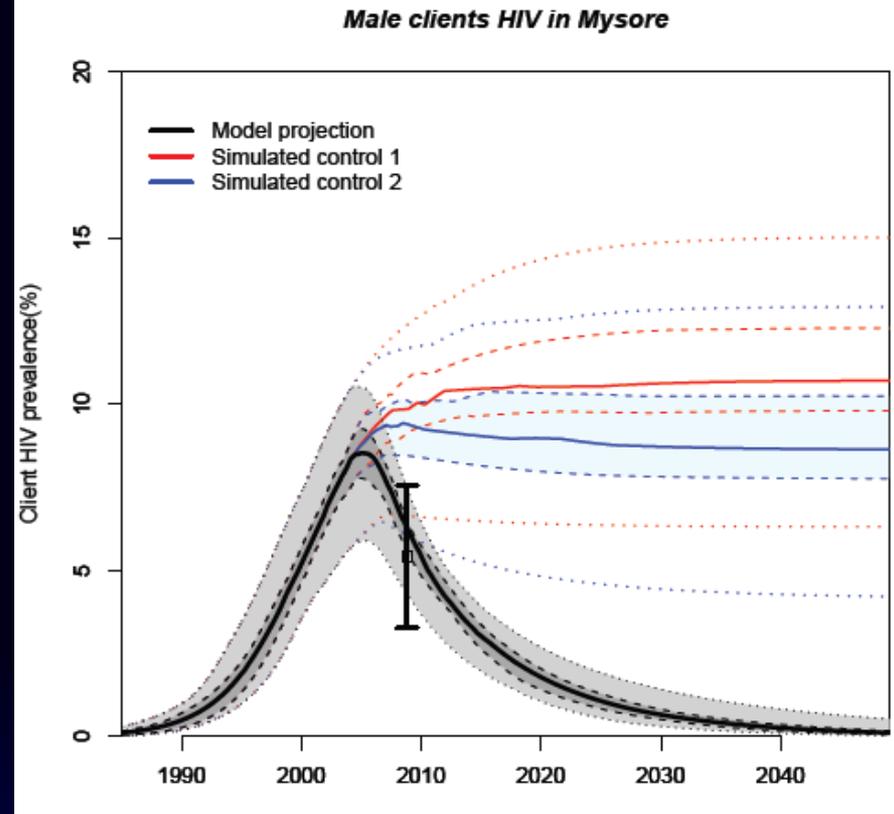
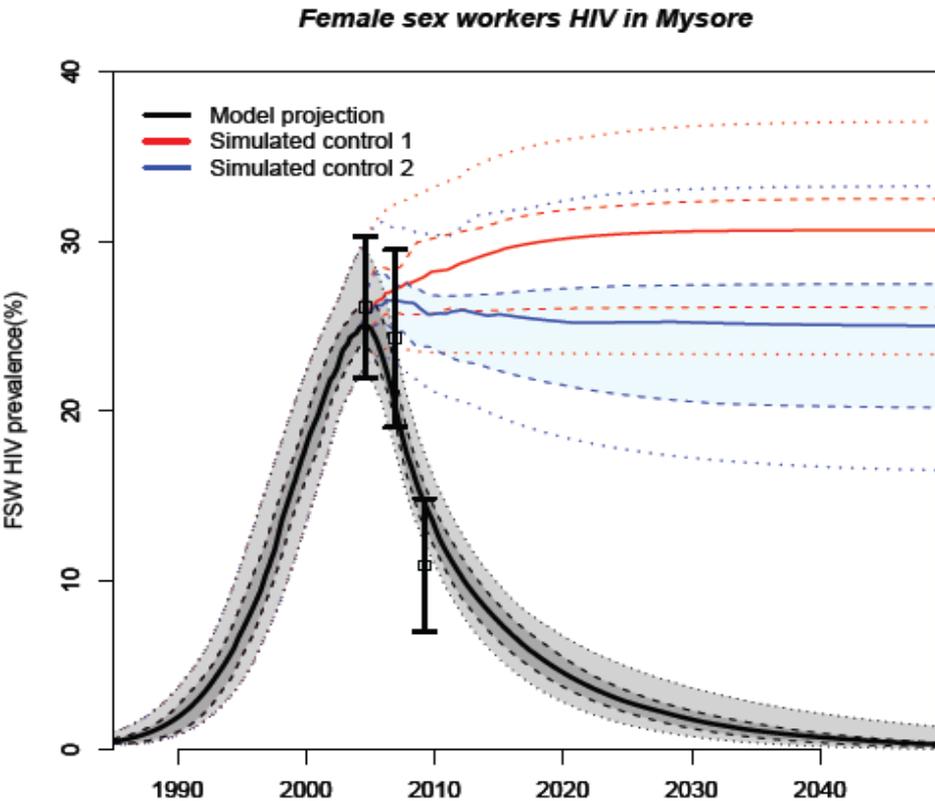
Marie-Claude Boily

Anna Vassall

Imperial College & London School of Hygiene and
Tropical Medicine

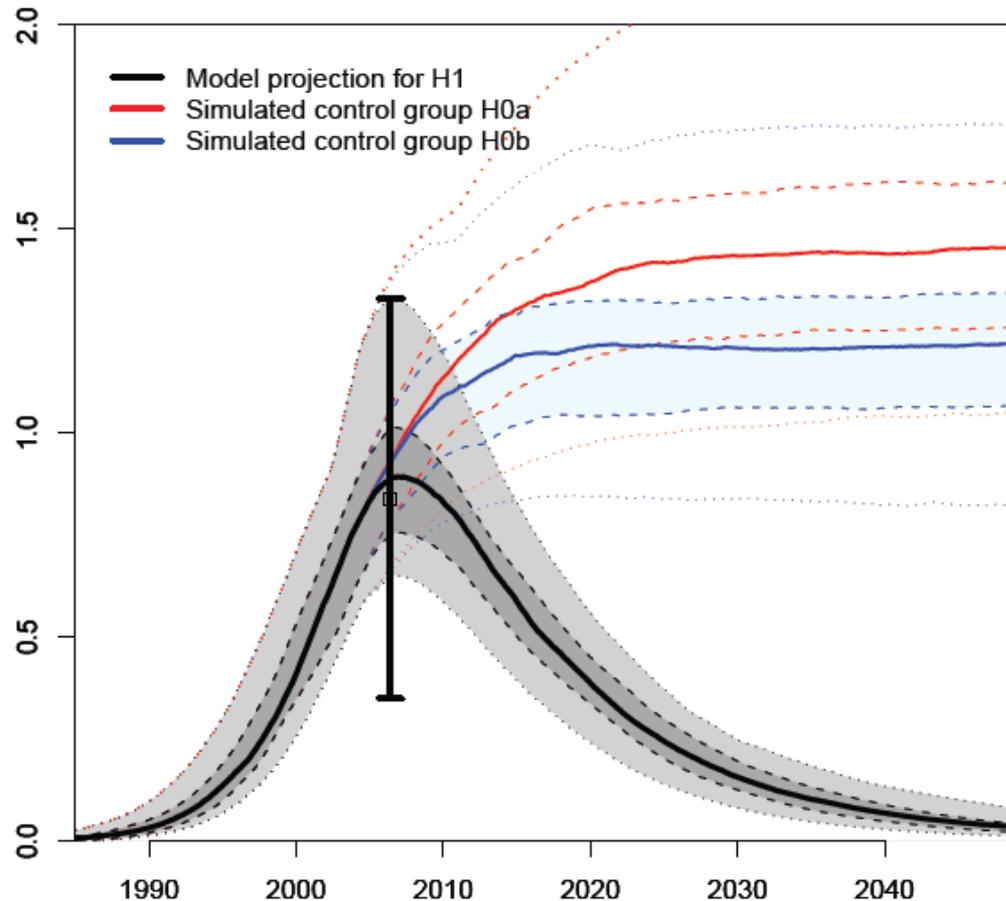
On behalf of the CHARME-India team

HIV prevalence in sex workers and clients (Mysore) – predicted program impact and measured prevalence



From left to right: Model projections of HIV prevalence in FSWs, clients and MSM, fitted to prevalence data. Grey shaded area show 95% CrI of model projections

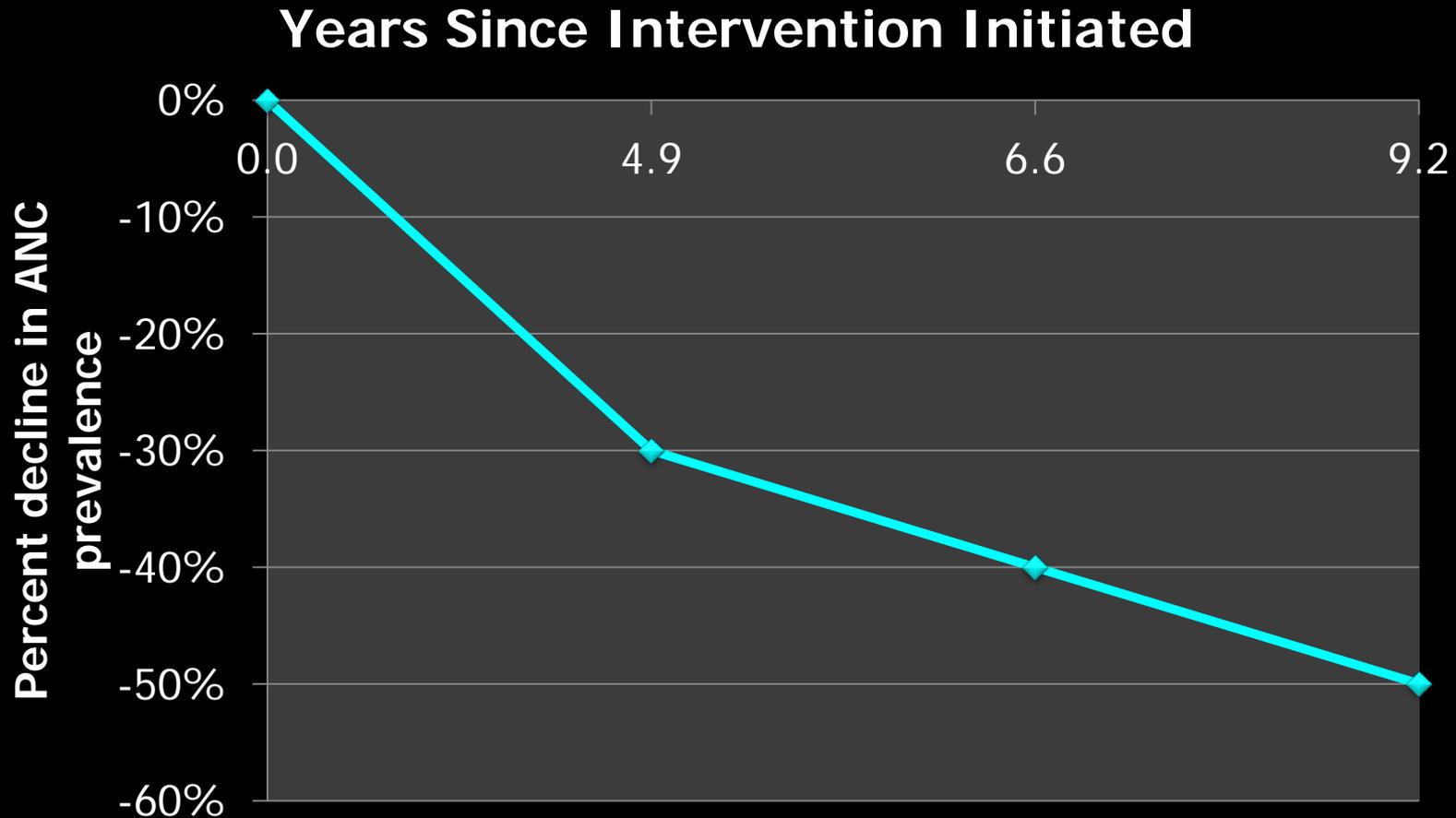
Elimination in the general population



In the 3 districts modelled so far >90% of runs reach the elimination criteria in the total male and female population by 2015.

HIV prevalence in low-risk women. Red and blue lines show simulated control groups of epidemic in absence of Avahan. Also shown: results from general population survey in urban Mysore (*model runs not fitted to data*)

Predicted impact of a targeted intervention on PMTCT in a concentrated epidemic: (80% condom use in FSW in Karnataka)*



*Boily MC et al. AIDS 2008.

Cost comparisons

	Mysore	Belgaum	Bellary	Guntur
Size of general population	480,000	460,000	490,000	620,000
Size of FSW population	2300	2000	4300	6400
% gen pop HIV positive	0.94%	0.63%	1.36%	1.9%
Cost of testing general population every 5 years (US\$)	960,000	920,000	980,000	1,240,000
Estimate of annual test-and-treat costs	4,600,000	3,200,000	6,300,000	10,600,000
Annual cost of core group intervention	470,000	400,000	570,000	1,200,000

Using cost estimates from Dodd et al (US\$10 per test; US\$800 cost of ART per year) and assuming a strategy of testing every 5 years