Overall Themes—
Granularity
- Tension between the value of granular, readily available, routine data sources with more precise measures that come from more specialized data collection/analysis/modeling that is available by pooling data across sites for national level assessments.
- What are the thresholds for sample size and prevalence that can be set up to make recommendations about when we expect to be able to have site level granularity for these measures? And then what guidance do we have to pool data across sites?
- Raises the question of what level of granularity will donors and decision makers be satisfied with when evaluating programmes given the constraints of sample size and the consequent need to pool samples across multiple sites which may have very different intervention histories.

Comparisons between styles of data collection (Models vs. Special study/survey vs. Routine data)
- There are potential tradeoffs of cost, feasibility, granularity, and precision of data depending on the style of data collection for a given measure (e.g. incidence)
- Most measures for global reporting and assessing the health care cascade are actually composites of data from multiple types of methods (e.g. model generated denominators and routine facility based numerators).
- Some participants advocated for more creative use of routine data and modeling to obtain national or aggregated level measures of the health care cascade. This builds on a model from prevalence measures of using high resource survey methods (DHS, AIS) periodically to validate lower cost facility based survey data (ANC HSS).
- In the past, we have seen periodic specialized data collection as the gold standard, but now there is a shift toward specific local data, locally owned, locally used. This approach has implications for capacity building.
- In NHBS (US) discussion and PHAI discussion, speakers mentioned use of programme data to validate survey representativeness. Raises the interesting point of what is the gold standard.

Differences in perspective
- When you are in the Alps the spectrum of services looks like a cascade to slide down, when you are in the shadow of Kilimanjaro or Everest, the spectrum of services is a pyramid to climb
- Very diverse group of participants. Some people are looking for a global way forward; some are looking for the kernels to bring back and adopt in their country
- What is perceived to be needed globally may conflict with what is perceived to be locally and in specific regions/countries. How do countries balance global needs with national needs.

Cost issues
- How do we make cost-related decisions for choosing between methods and components to maintain in HIV surveillance systems to get the key measures that are important for country context?
- Lack of standards for cost efficiency in surveillance – One way to phrase the question is how much is the data worth? Another way to phrase the question is how much should it cost?
- When a country gets to 90-90-90 will we be able to rely on case reporting systems? i.e. will there be a point where surveillance can be scaled back when programmes are performing well and effort is sustained. This implies that the data systems needed when a country is in maintenance phase (i.e. they have a good programme and just need to sustain their gains) looks different than when the country is still trying to get up to the 90-90-90 level.
**Ethical Issues**

- There has been a big shift in ethical norms in surveillance related to returning HIV and other test results, largely due to the greater availability and earlier initiation of treatment and lower cost rapid diagnostic tests (RDTs). The return of results has large implications for the HIV testing strategy and testing algorithm. There is still some concern for providing alternatives for individuals to opt out of receiving their test results from the survey without disqualifying them from participation. (Note: This issue is included in the upcoming population based survey guideline)

- A related shift has occurred in the sensitivity of asking survey respondents to reveal their HIV status if they have been tested. This question is necessary for measuring % of infected who have been diagnosed and to engage in further questions related to ART status. This information is particularly important for survey populations where incidence assays are used and must be combined with a recent infection testing algorithm (RITA). – (It may be useful to put together a small document to promote the addition of these questions to IBBS/key pop surveys but with appropriate cautions about beefing up confidentiality measures and training for survey teams)

- The push to include adolescent/young key populations in surveys also requires more consideration and guidance for ethical issues for protecting minors as a particularly vulnerable and important segment of the key population.

**Diagnostics/Laboratory**

- The surveillance community is keen to understand the availability of lower-cost rapid diagnostic tests that can be used with specific specimen types (DBS, saliva, etc.). There are a number of important developments in the last five years.

- The challenge lies in selecting testing algorithms which are appropriate for the dual purpose of surveillance and returning results to individuals (diagnostic). A common problem is that manufacturers have not validated the use of DBS with their test kits and this type of off-label use has serious implications for the false positivity rates and is not recommended for studies which return test results to participants.

- Surveillance-related demand for new types of diagnostics are dwarfed by service-related demand (incidence assay example) so it is difficult for the surveillance agenda to move manufacturers to act. An important strategy is for surveillance people to see where their interests are aligned with larger clinical service interests.

**Capacity Building/Sustainability**

- A common theme for the national surveillance systems featured was that the countries were upper or upper middle income and had infrastructure that allowed decentralized systems.

- When we talk about capacity building and decentralized systems, we are often talking about public sector facilities and institutions. What is the role of civil society, research institutes, and other forms of surveillance capacity, especially the kind that is more routine and locally owned?

- There is a tension between building long-term sustainable systems for HIV surveillance and responding to the urgency of a fast-trak response to HIV to reach the 90-90-90 targets

- Investments in HIV surveillance and strategic information have been much larger than any other disease condition. This is a critical transition period for surveillance due to a decreasing resource envelope from international development partners to fund large scale probability surveys (e.g. IBBS), except in a smaller number of highest priority countries. How will countries outside that priority designation shift their systems

**Data Use**

- The need to increase data use has multiple dimensions: encouraging local level implementers to have more immediate use of their data to strengthen programme, to have countries do more in
depth analysis and triangulation of the data to evaluate national programmes, for 3rd party researchers to develop methodological tools/improvements to enable more precise and validated surveillance data.

- Use is dependent on availability and dissemination of information. Countries still need to be supported/encouraged to publish publicly accessible reports, and in some cases for datasets to be more routinely available to enable researchers to improve methods.

DAY 1

Session 1. Meeting Objectives/Challenge

UNAIDS and WHO challenge

- Surveillance data as part of the data needed for service improvement. The task is to define the “role of HIV surveillance in ending the AIDS epidemic as a public health threat.”
- Which implies greater emphasis of measures of incidence and mortality
- Surveillance data are needed at finer levels of granularity especially for prevalence (by geography and sub-population)
- As global community sees the next 5-years as a critical window for fast tracking the response, the surveillance agenda for the next 5 years must be oriented toward this goal.

Session 2. What we need to know

P. Ghys & D. Low-Beer

- Overlay the time points when surveillance data are collected against the course of infection of an individual
- Review progress from 2004 to 2009 to 2015: Many guidance documents have come out as a measure of technical developments in surveillance
- Consolidated Strategic Information Guidelines, released today, represent critical measures of HIV at global and national program level, harmonized across WHO, UNAIDS, Global Fund, and PEPFAR.
- Measures highlight the care cascade and data useful for impact reviews. And increasingly linking service data to impact measures.

PEPFAR perspective: I. Zaidi

- PEPFAR 3.0 sets the goal as achieving epidemic control with the current global budget by using the right interventions in the right places, right now.
- Granularity for PEPFAR = district level

Global Fund perspective: J. Zhao

- As a user of surveillance data, GFs is interested in data that substantiates eligibility of countries for funding, quantifies need and appropriate award amounts, and supports programme monitoring in real time.
- Data gaps GF sees are in terms of the large fluctuation in denominators, lack of data on service cascade, especially for key linkages, and limited direct incidence and mortality data
- GFs commitment in closing these gaps has come is at the level of 5-6% invested in M&E systems, includes 2-3% in surveillance systems + special initiatives to address specific gaps in specific countries.
Session 3: HIV surveillance: Country perspectives on sustainable measurements

Thailand’s surveillance system: T. Pilapat

- Four elements of early success: Strong infrastructure already in place— a) Division of epidemiology with local systems already in place; b) Surveillance unit in every province; c) strong network of communicable disease surveillance; and d) Field Epidemiology training Program (started in 1980)
- Current system is decentralized system (BOE provides technical support, provincial health department is in control of implementation).
- Financing of surveillance system – initial reliance on national AIDS plan – funding was limited; then transfer to National Health Plan – resulting in more comprehensive support; since 2010 additional support comes from development partners and GFATM.
- “Integrated surveillance system” to use data for multiple purposes is a sustainable approach
- In addition to investing in systems, it is critical to invest in the workforce. (Chinese proverb: one year of prosperity, grow grain; 10 years of prosperity, grow trees, 100 years of prosperity, grow people)

Integration and sustainability of surveillance system in Brazil: A. Pascom

- 5 pillars of HIV surveillance system: AIDS and HIV case notification; death reporting; CD4 and VL; ARV, and special studies
- Case reporting system is the only data on exposure/risk factors. Name based reporting allows linkages across care and treatment cascade. These systems are unlinked and represents a big missed opportunity to track achievements for key pops.
- Funding for the data system is tied to funding for treatment services, e.g. lab data is in an administrative data system that enables payment and supply chain management, so data is more complete.

The integrated HIV/STI surveillance System (SIVES) of Catalonia: a regional experience: J. Casabona

- The system in Spain is decentralized. There are minimum standards imposed centrally, but local jurisdictions can add additional components as it chooses.
- Four pillars of the surveillance system – morbidity and mortality, risk and determinants, diagnosis, and treatment
- Regional level control is important to use data and work with NGOs, e.g. to use the data to develop education and awareness material. For prevention activities (for MSM)
- Gave examples of correlating risk behavior and service delivery (needle sharing vs. N/S distribution, increasing testing, etc.
- Cost of system: 1.5 million euros (with 30% reduction due to financial crisis) for 16 staff with 2 administrators at Catalonia level.
- One main challenge is the lack of integration of informatics system at health facility level. Data protection law also creates barriers to use data (linkages AIDS and mortality) – requires collaboration and creativity to surmount.

Surveillance systems in India: progress, challenges and vision for sustainability: P. Kumar

- 7 components: BSS, STI surv, incidence, HSS, AIDS case reporting, Mortality, Drug resistance. But talk focuses on comparing HSS to IBBS.
• Implementation structure of the HSS – national to state to district which captures the technical resources and support of the country – i.e. 6 regional institute
• HSS data shows the spread at local level over time; is the basis of the impact assessment. Cost $6-7 per sample collected. – 36% to technical capacity, 40% to implementation cost, 13% to laboratory.
• IBBS 258 domains (FSW, MMS< IDU, TG, Migrants, Currently married women) Cost $60-65 per respondent. 80% is paid with domestic funds.
• Key question is how should IBBS be scaled down in complexity or scope or frequency to be cost effective and sustainable.

HIV surveillance systems in US: Progress and challenges: G. Paz-Bailey
• USD 9 million budget for 20 sites (metropolitan statistical areas comprise 60% of PLHIV in the US) (initiated in 2003) - $900 per interview – MSM, IDU, and Heterosexual at increased risk. Team of 25 at central level plus local teams in each site.
• Detailed analysis presented showing trends in prevalence and risk behavior are done at aggregate level rather than at site level. [Is this a power issue?]
• Recent outbreak of HIV among PWID in Indiana underscores the importance of finding methods for monitoring what is happening in rural areas. How to balance large investments in big data, yet remain nimble to detecting epidemic pockets.

Session 4: HIV incidence surveillance

EPP/Spectrum: Kim Marsh
• Estimation of HIV incidence is important to monitor global goals for reducing HIV
• Overview of Spectrum approach: AEM, EPP, and fit models to programmatic data
  ○ AEM: high income countries - external models to produce incidence curves
  ○ EPP: pop-based surveys, ANC surveillance used to estimate HIV prev and incidence; dependent on mortality.
  ○ Fit models to programmatic data: use case reporting and mortality data
• Challenges and Next Steps:
  ○ Expanding case reporting and mortality data → back calculation for estimating HIV incidence; supplemented by additional parameter data
  ○ Assay-based testing algorithms → need to consider survey N etc to determine estimates in smaller geographic levels
  ○ Move towards granular view of epidemic changes over time

Cohort Studies: Frits vanGriensven
• Overview of study designs: limitations and strengths
• Moment of seroconversion needs to be defined → limited by available biological assays and given sensitivity and specificity of test
• Distribution of infection depends on the type of epidemic occurring → this is important for appropriately classifying the recency of infection
• Various examples of different studies using observational cohort design among MSM population’s HIV incidence estimation
**Assay-based Estimation**: Pete Dailey
- Cross-sectional assessment
- Assays of today based on avidity measurements (lower avidity = recent infection) → variability in assay results based on cut-off
- Important considerations: MDRI (average time spent as ‘recent’) and FRR (false positive)
- Assay performance: No single assay accurately measures TPP in populations with ART-treated individuals
  - Algorithms using multiple assays are recommended
- Impact of N: determination of N to test difference over time depends on many factors
  - Challenges in determining trends in incidence between 2 surveys
  - Consideration of Deft → also leads to inflation of N
- Technical issues/gaps: RITAs; FRR and subtype D; consideration of N; requirement of FRR- how to do that?

**Triangulation**: Andrea Kim
- Use of 4 methods to estimate HIV incidence in Kenya 2012
- Method 1: Assay-derived incidence using 3 RITA methods → use of RITA results in reduction of FRR
- Method 2: Spectrum → evidence of declining incidence
- Method 3: Synthetic cohort
- Method 4: use of prevalence in youth (15-24 yrs vs. 15-19 yrs)
- General conclusion: sames estimates for all methods, considering CIs

**Summary**: T. Mastro

*Normative guidelines- standardization of assays; guidance required*

*What’s the purpose of conducting incidence estimation? How to interpret incidence estimation? Complex issue that requires further assessment and consideration across collaborators*

**Session V: Mortality surveillance**

**Modelling AIDS mortality in Spectrum**: Kelsey Case
- Tracking New Adult Infections - death parameters are specific for those on ART as well as absence of ART
  - Parameter values have been validated by surveys as well as other sources
    - Modeling results in changing progression of cohort of new infections
    - Other considerations for mortality on ART: CD4, duration, region, age, sex, etc
- Child mortality- can also be modeled based, however, limited data availability and sensitivity to numerous assumptions dependent on adult characteristics
  - similar parameters for death as those in adults (CD4, duration, ..., etc) → IeDEA Consortium
  - Long-term goal: Survival outcomes for children as adults
Summary: all mortality estimates are model dependent

Mortality among people on ART in community settings: data from longitudinal surveillance (ALPHA):
Basia Zaba

- ALPHA- ten sites in EAstern and Southern Africa (not a multi-site study, but independent sites)
  - Community-based studies using a longitudinal, open cohort design
  - Overview provided of strengths and limitations of ALPHA study
- Surveillance results show decline in mortality among population since start of ART
  - Attributable LE gains: mostly strong gains, with exception of deficits among women (due to higher prevalence among women)
  - Distribution of deaths on treatment continuum of ART initiation and use: overall decline in each of groups, but still a large number of deaths among undiagnosed
  - Avoidable deaths: largest among those that are undiagnosed
- Note: Important consider for ALPHA conceptual framework: treatment is not a cascade, but rather a pyramid; nevertheless the ALPHA studies provide information for this how ART is related to mortality

Assessing the impact of HIV from health registration data: Rob Dorrington

- Although several approaches have been used to estimate mortality, completeness of data is questionable, as it categorization of AIDS deaths
- Study extended Groenewald et al approach and had significantly improved completeness of data
- Corrected vs. reported AIDS death- can provide additional information for assessing mortality in older ages
- Comparison with other models- some variability across methods, but generally similar trends
  - Much higher mortality in children under 1 with study method
- Key conclusion: Mortality estimates among HIV infected individual are necessary for incidence estimation

The strengths and weakness of verbal autopsy for HIV-associated mortality: Clara Calvert

- Verbal autopsy can provide additional information on the excess mortality among those that are HIV positive
- Data collection methods- 2012 WHO released qre has helped to standardize data collection
- Data interpretation methods- use of automated methods using Bayesian approaches are becoming more popular
  - Assignment of causes of death differs between two VA automated interpretation → given lack of specificity in VA, how big of a problem is this?
- Can use VA to compare cause of death among HIV+ vs. HIV-
  - Nevertheless, there are some misclassification limitations with automated VA interpretation (~25% HIV - individuals are assigned cause of death of HIV)
- In general - limited precision when estimating HIV-related mortality → perhaps best used as a stepping stone among areas that do not have a good VR system
Summary: Each method has limitations (cost, precision, ability for data collection); and considerations should be made to determine best approach for context of country/region and also research/programmatic questions

Session 6: Household-based general population surveys

KIAS: history, evolution, key outcomes, lessons learned: Andrea Kim

- Evolution of KAIS driven by changes in ART use and need for new data on programs
  - New additions to survey in both 2007 and in 2012
- General increases in testing and awareness of HIV status; as well as MC interventions
  - However, gains in programs targeting HIV test uptake still needed
- Design allowed for assessment of progress towards 2014 ART Guidelines and 90-90-90 → benchmark for treatment cascade
- Recommendation for target surveys among key populations

HIV Impact Assessments: Rationale, goals, outcomes, methods: Drew Voetsch

- Expansion of HIA model (such as KAIS) into other PEPFAR countries
  - Considering Impact (of treatment) and Sustainability
  - At the population level, impact data are unavailable
- Why pop-based survey? Routine data collection miss important individuals in the denominator, which are key for modeling and trend assessments
- Goals: define epidemic and build capacity
- Outcomes: both biomarker measures of HIV infection and data-based outcomes HIV uptake services
- Methods: inclusion of triangulation of data with programmatic information; expansion of methods to include blood from kids; return to HH for other surveys; consent process; etc.
  - Biomarker logistics- treatment vs. referral
    - NCDs? Hep B, Syphilis

Capacity building in KIAS: successes and challenges from the technical advisor partner and country perspective: Sandy Schwarcz and Joyce Wamicwe

- Capacity building- essential in PEPFAR and key objective of PEPFAR 3.0
- TA Partner perspective:
  - CB approach used subcommittees to lead each survey phase; headed by local staff and TA organization
  - Overarching theme: how can CB be measured in a meaningful way?
- Country perspective: through the lens of comparison between 2007 and 2012 KAIS
  - Change in leadership between surveys
  - Recommendation to include CB early, including methods of CB and evaluation
Capacity strengthening, country ownership, and models for sustainability: the experience of the DHS Program: Joy Fishel

- Human capacity: Country ownership
  - Leadership role within all phases of the survey
- Capacity Strengthening:
  - Context: changes over time in staff, skills, survey measurements/implementation
  - Strategies: collaboration model, workshops, fellows program, online tools
  - Formalization: assessment and documentation of CS effectiveness to evaluate CS
- Experiment: Continuous Surveys (Peru and Senegal)

Summary: HH surveys are evolving as the HIV epidemic and the response to it has changed overtime. Of the many changes to surveys include measurement of HIV incidence and ART use, which greatly influence sample size elements of design. A key consideration among surveys is to strengthen the capacity of implementing organizations and reduce the role of TA providers. This consideration is limited by funding availability and survey deadlines for rollout.

DAY 2.

Session 7. Key population – surveys

Overview of key pop surveys and their main challenges: W. Hladik

- Main technical challenges are obtaining close to probability samples of key pops given their characteristics of mobility, being marginalized, and hidden. Of particular concern is the replicability, representativeness, accuracy of estimators, and precision (due to large design effects) when these surveys are used to measure trends ultimately used to evaluate programmes and assess impact.
- There is an important missed opportunity related to improving access to survey data to 3rd party researchers to enable more exploration about what the sampling methods give us and how they can be improved.

Advances in Key Population Link-Tracing Network Surveys: I. Beaudry

- 2 new variations on RDS to improve representativeness of sampling: based on the better understanding of linked-ego networks in which those recruited give information about general network, not just about the people who are recruited. (2 papers)
- Follow up questions to assess whether the assumptions for the estimators are met. (Diagnostics for respondent driven sampling – Giles, Johnston, and Salganik)
- Network Sampling with Memory – Participant lists the contacts they have, then sample with replacement to recruit others. Then sample from both those identified by first participant and subsequent participants without biasing the early nodes? Search mode – favors those who act as bridges between different parts of the network. (How do you know who are the bridges? What is the operational definition? Requires people to be contacted again and to track them)
- These approaches haven’t been fully validated/formally assessed in terms of converging to SRS as proposed.
- There has been some work on conducting Web-based RDS that has some promise (no discussion on methodological details in the presentation)
**Stigma and discrimination metrics:** S. Baral

- Research suggests that stigma and discrimination have direct, and indirect impact on risk taking as well as service utilization behavior among key populations and PLHIV.
- This work describes the development scales or validated measures of stigma to add to survey questionnaires – 4 domains for MSM experience of stigma, experience Health care stigma, stigma from family and friends, perception of stigma in health care settings.
- Next steps include, identification of which measures ones are core, how to measure timeframe, and responses.

**Potential uses of biomarker measurements in key pop surveys:** C. Archibald

- Now it is the standard, but the inclusion of biomarkers raises questions of feasibility, cost, and ethnical issues affect specimen type, diagnostic chosen.
- Some caution about VL measurements on DBS, which are comparable but higher than those measured in venous blood. (see later lab discussions)

**What we need to know about MSM and Transgender people:** F. van Griensven

- Need to understand sexuality (but not necessarily through key pop surveys)
- Use of erectile dysfunction drugs and stimulants have important implications for risk.
- Internet as a virtual habitat that influences behaviors and interactions socially.
- Evolving meanings of HIV to the MSM and transgender community will impact risk behavior and interest in prevention services and testing behaviors.
- Take home message - Recognize the importance of localized understanding of MSM in interpreting the data from the survey. And how to use it to influence programming.

**Session VIII. Key populations – Size estimation**

**Principles of programmatic mapping and use of data collected thru programmatic mapping:** F. Emmanuel

- Embed a surveillance method in a programmatic activity
- Programmatic mapping offers much more information than size estimates data

**Data from programme mapping and how it has been used:** S. Isac

- Cost of programmatic mapping 1 million population city ~ about $25,000
- Example of new work to explore key pops who meet partners in virtual venues, the team found 92% mobile phone based FSW also use other forms of solicitation. (Not clear about the sampling/validation of this figure) How do you sample mobile-phone based FSW (is there a method for mapping virtual key pops and assessing the overlap between

**Network scale up method: feasibility in resource constrained setting:** A. Aramarattana

- Done in 2010 and 2014, the timeframe asks about those who engage in a risk behavior in the past 2 years.
- Issues to expand this to provincial level to get finer levels of granularity.

**Size estimation based on RDS survey successive sampling method:** K. McLaughlin

- Makes use of prior data on PSE calculated by different methods, including expert opinion
- Done retroactively, doesn’t require special planning.
Data can be triangulated with other results – how do you assess the biases of the result – SS PSE gives the option of looking at a confidence interval for where the estimate lies between.

**Assessment of bias and collecting data to adjust the estimates based on the bias:** S. Weir

- Lens used: size estimation as a tool for increasing access of key populations to high quality prevention and treatment programs
- Who, where, when, what questions for fitting size estimates to a programmatic purpose
- Blind spots of bias – e.g. turnover among FSW, areas without services, sub-groups not identified, refusal rates underestimated
- Addressing the gaps: need tools to help local users to understand the difference between estimates. Use programme data to validate the size estimates data.

**Extrapolating from limited local level data to arrive at national estimates:** T. Saidel

- People are fixated on a Utopian number – one national number that can address all their needs
- Critical decision making for what to collect where requires a strategic framework – and a stratified approach for collecting the data.
- Different purposes need different numbers, it also depends on who we expect/want to reach: High risk – reachable, vs. high risk who are not reachable, vs low risk who are reachable, vs. low risk who are not reachable.

**Session 9: HIV Surveillance among Adolescents at higher risk of HIV**

**Youth perspective:** J. Acaba and Lisa Johnston

- Different considerations for approaching youth than for adult-focused RDS/TLS surveillance studies
- Participation of youth in dissemination of results
- Capacity building should be inclusive of YKPs → a critical component for scaling up prevention and interventions for YKPs

**Summary:** Specific groups of adolescents are at a higher risk of HIV infection, and are generally excluded from routine surveillance. As such, specific methods, such as RDS and TLS approaches, are appropriate tools for HIV surveillance used for understanding the HIV risk among this unique subgroup of youth key populations. Engagement of YKP throughout surveillance strengthens overall tools, data outputs, and policies and programs.

**Session 10: Strengthening routine case surveillance (1)**

**HIV case surveillance in generalized epidemics: the case of Kenya:** Joyce Wamicwe

- Advantage: Routine data collected; facility based data allows for lower-level representation of data (district and sub-district level)
- Implemented a pilot within select facilities in two counties: Kisumu and Siaya
  - MoH tools generated data, distinguishing between mandatory and supplemental data
- Use of unique identifiers are required, but need to be better considered for use in Kenya as there is limited acceptance a clinic level
- Recommendation: continued evaluation of case-based reporting required
**Case surveillance, unique IDs and programme data links:** Olga Varetska

- HIV epidemic in Ukraine among PWIDs
- SyrEx is a database that captures linkage to care on the local level through data from AIDS center and NGOs
  - Provides a program monitoring tool of treatment cascade
  - Lack access to full case history on the individual level

**Linking HIV case and care: the Ethiopian experience:** Wuleta Lemma

- EMR used to integrate HIV surveillance data with overall health facility surveillance
  - Specific HIV module within the EMR system → both data clerk and clinician entry possible
  - Monthly updates provided to ministers
- Flexible design to encourage use for a facility/clinician needs
- Future: use of EMR for data collection

**Uganda pediatric program data use:** C. Kiyaga

- Creation of 6 different tools (ie- 5 forms and 1 database) to collect and manage Early Infant Diagnosis clinic and program data → used for program M&E
- Dashboard used to disseminate data to stakeholders within the country
- System provides M&E for both the health facilities and lab

**Botswana a pediatric program data use:** C.Petlo

- IPMS
- Patient Information Management System (PIMS) II: covers only 5 districts of total 29 districts
- EID database: national coverage
  - Includes data at the health facility level, as well as in district labs and a reference lab (two in country); however, clinical data not captured
  - Data from 2007-2014
  - Limitation: no unique IDs for infants

**Value of routine CD4 and viral load laboratory data in the public health monitoring of the South African epidemic:** Valerie Delpech

- Triangulation of many data sources, include case reporting, to determine key indicators → UK
- Application of methods used in UK to scenario in SA to meet surveillance needs
  - Where there opportunities to use existing data?
- Vital Reg.; HH surveys (HSCR), and Lab testing to develop a treatment cascade.

**Summary:** Although case surveillance is a common tool for assessing the HIV epidemic in HICs, case surveillance has not traditionally been used in most LMICs. Nevertheless, successful examples of electronic case surveillance were presented from Kenya, Ukraine, Ethiopia, Uganda, Botswana, and South Africa. Such systems can be used to monitor generalized HIV epidemics or infections in key
populations (eg: PWID or infants), which can be integrated into larger EMR systems. For example, laboratory capture of biomarker results from routine data collection can be used to better understand the treatment cascade.

**Session 1: Strengthening routine case surveillance (2)**

The challenges to replace ANC surveillance for using PMTCT data: Jacob Dee (Txema)
- Limitation of ANCs do not provide estimates that cover the general population, especially given changes in epidemic structure within the last two decades
- New 2015 WHO Guidelines for pregnant women attending ANC
  - ANC derived data should be triangulated with other data sources
  - Programmatic approach: census vs. sentinel sites
    - Encouragement to HMIS and EMR system to include a census approach

Using facility-level PMTCT data for an improved geographic understanding of HIV burden across 3 countries: Ian Wanyeki
- Use of spatial analysis techniques to improve HIV surveillance
  - E.g. interpolation
- Inclusion of PMTCT sites in addition to ANC to better understand epidemic at a more “granular” level
- Facility-based mgt information systems are available and relatively cheap (e.g. DHIS 2.0)

Use of different sources of program data to track HIV infection: Masami Fujita
- A case-study of an outbreak in Cambodia
- Data sources included interviews, HH surveys, VCT near hospitals, etc.
  - Case/control study to determine mode of transmission with frequency matching
- Outbreak led to questioning of whether there are similar situations occurring elsewhere.
  - Use of routine data from health centers can provide some information to help answer this type of questions → small spikes = potential hotspots

Routine patient and case reporting: Isabel Bergeri
- Revised guidelines for patient monitoring in 2012 → 2015 Strategic Information Guidelines
- To cover each element of cascade, data should come from various sources
  - information provided for individual-level, as well as at the health facility level

Summary: Strengthening of HIV surveillance spans a range of systems, from outbreak investigation to PMTCT programs. This session provided examples of surveillance data on the individual, community, and facility level to assist governments in better understanding the HIV epidemic.

Day 3.

Session 12. Biological and laboratory markers: HIV and links to STI and hepatitis
Drug resistance monitoring and toxicity: L-V. Le
- Related to both ART and PrEP and PEP use, impacts second 2 90-90 targets.
- Changes in sampling/objectives of surveillance strategy
- Routine programme data should include EWI - evaluation of programmes vs. clinics
- Toxicity surveillance is that it is part of a prioritized, forward looking surveillance agenda.
- Drug resistance strategy update

Moving towards surveillance as HIV diagnosis: A.Sands
- Strategy – general testing sequence of testing; vs. algorithm – specific combination and sequence of specific products; strategy is stable; algorithms may change over time
- In unlinked testing, results are for surveillance purpose and strategy may be less stringent
- HIV testing services consolidated guidelines (2015) – looking for testing strategy for a PPV as the primary criteria, accept those that are 95% and above,
- Stringent diagnostic strategies are necessary in the era of test and treat; Inconclusive specimens are recommended for retesting after 2 weeks.
- In the process of selecting products for an algorithm need to be aware of which tests are rebranded and those that have the shared false reactivity.
- Multiple Rapid diagnostic tests (RDT) HIV and syphilis, HIV and HCV, and HIV/HBV, and HIV/HBV/HCV
- Cautions around false negatives for those on ART;
- Manufacturers instructions that indicate what assays have been validated on what specimen types. Cannot be used for diagnostic testing in a surveillance setting.
- Importance of collaboration between surveillance and laboratory teams to make appropriate decisions on the use of diagnostics/tests.

Diagnostic considerations for inclusion of STI in HIV surveillance: L. Newman
- In the context of sentinel surveillance and IBBS, acute, treatable STIs as a proxy for recent sexual risk behavior
- HIV/ treponemal syphilis tests RDTs – promising – DBS; Dual tep/non-trep test
- There are a number of target product profiles identified by WHO working group for accelerated development.
- Potential tools building on TB diagnostic tools by Genexpert that have been purchased in many countries. These makers have developed cartridges for different STIs and HIV that can be processed by these machines. Current costs are still $20 per cartridge/patient. The key is to increase demand to get the costs down per cartridge
- There is a new PAHO guidance on syphilis testing strategies and considerations for different populations

Session 13. Data use and modeling: sharing and dissemination

Data use: Use and implications for evaluation: R. Komatsu
- Two processes – strategic planning and programme management, uses different kinds of data
- GF is encouraging programmes to move from “adequacy design” to “plausibility deign,” (eventually, to move toward “probability design”) in evaluation.
- There is an Internal document which provides staff of key agencies with guidance on impact plausibility assessment with Global Fund TERG, UNAIDS MERG, and WHO.
• Summarized by the 5 Ps: Partner, Periodic, Plausibility design, country Platform, Practical for grants

New, and Improved AEM: W. Peerapatanapokin-
• AEM is a modeling tool which includes includes test and treat scenario; include automatic fitting and uncertainty and direct integration with spectrum, instead of EPP
• There are three components that work together: AEM Baseline, AEM Intervention, AEM Impact analysis that allows comparison of scenarios as described by policy inputs. These tools have been used to construct investment framework case studies for a number of countries.
• AEM designed as a collaborative process for collating, reviewing, and understanding data used.
• From a capacity building perspective AEM experience in countries demonstrates the use of models as a way to build local capacity for understanding data and understanding the dynamics of the epidemic.
• AEM used in Thailand, Cambodia, Myanmar, Philippines, Indonesia, Vietnam, Peru, Ukraine. (Bangladesh, Malaysia, Nepal in process)

Back calculation modeling to estimate HIV incidence based on first CD4 count: C. Landman
• Data from the national SISCEL (i.e. CD4 and Viral load) lab system. Used method described by Lodi et al., 2011 CD4 depletion mode, by sex and age.
• Data are standardized to account for private sector testing, weighting SIESCEL data to demographics by geography.
• Can predict the future year new infections, and can also look at the time between infection and first CD4 count.
• Applied 2 correction factors, younger (<15 years old), those who died before diagnosis.
• Results correlate well with results obtained from SPECTRUM modeling for data from the same time period.

HIV prevalence trends in ANC attendees v. Gen pop during ART scale up: S. Gregson
• To explore the observation in which gen pop prevalence rates are declining, but ANC surveillance pop declining faster.
• This is likely due to under-representation of ageing of the HIV epidemic in ANC surveillance data. (especially as ART scales up and longer survival of PLHIV)
• This phenomenon was also observed when HIV prevalence is compared in gen pop samples of recently pregnant women to ANC women. This indicates that the women who go to ANC sites are a biased sample of recently pregnant women.
• Based on this type of situation, EPP Spectrum will offer an option to correct for an ageing infected population. But requires age structured ANC sentinel surveillance data

Triangulating survey and program data to develop national estimates: J. Hargreaves
• MESH Consortium – structure to using data
• Program data (29,000 women making 70,000 visits) partnered with RDS in 14 sites (N=200) - 57.5 % mean prevalence across 14 sites.
• 50% People already know their HIV + status at first visit.
• Only 43% come back > 1 time – what’s the value of the RDS data?

Using HIV surveillance data for network agent-based simulation projection: K. Dombrowski
Iterative process of using models to interpret surveillance data and to use surveillance data to test model assumptions
Random Mixing Assumptions – in fact network connections create structure that inhibit transmission as expected in a random mix assumption
What data is available from what people are already doing to collect data that can inform the epidemic modeling of PWID to account for firewalls. E.g. RDS structure data can be used for this purpose. The additional data needed is relationship dynamics, how long does a sharing relationship exist.

Session 14: What next: Building sustainable capacity

Priorities for strengthening HIV surveillance systems in central and eastern Europe: Ivana Bozicevic
- Training: surveys for Key Pop; M&E surveillance; needs assessment for training courses for HIV surveillance
- Need to strengthen pt. monitoring systems and treatment cascade
- Consideration of groups not covered by surveillance systems (ie- refugees, migrants, PWID, MSM, FSW and clients)
- Declining funding and need for sustainability of surveillance programs needed

The impact of Kerman knowledge hub on the generated evidences about HIV in Iran and in EMRO: Ali Haghdoot
- Capacity building: Consultation, generating evidence (through publications), and training
- Policy making

Individual country experience: Ukraine: Tonya Salyuk
- CB activities → supported by donors in Ukraine
  - Mostly trainings, some in research
- Education system has little focus on epidemiology and surveillance
  - Medical school, PH school -mgt-
  - All epi programs are short (a few months)
- METIDA Project → different focus on the national, regional, and local levels to meet surveillance needs
- Call for more support in advocacy and sustainability of surveillance

Strategies & Institutional mechanisms to build sustainable capacity for surveillance & data use - India Experience: Yujwal Raj
- Systems do not consider a holistic approach → “piecemeal”
  - Not designed for case tracking individuals
- Institutional collaboration - CB through “academics” to meet program needs; consortia created
- Mentoring model by encouraging junior scientists to enter HIV field
- Engagement of program managers to enhance data use
- Link CB to long-term surveillance deliverables
- Strengthen program data systems → individual level data
Sustainability of sentinel surveillance for HIV and STI in Central America: lessons learned from the VICITS strategy: Sanny Chen Northbrook

- VICITS: Sentinel Surveillance of STIs and HIV → main source of epi and program data in the region
- Within the MoH system → clinics funded by MoH (but not staff salaries)
- Mentoring by implementing partners
- Peer-to-peer trainings → in-service trainings
- Clinics not linked across countries- limited de-duplication of data

Summary: *Cases studies from different approaches to strengthening the local capacity of HIV surveillance systems.*
Cost effectiveness? How is that evaluated? Feedback CB into program to increase effectiveness CB should not be limited to trainings; and the correct individuals should be invited to attend the trainings (particularly considering high turnover of staff)

**Session 15. STI & Hepatitis: Opportunities for Integration with existing HIV surveillance**

**Essentials of STI surveillance within second generation HIV surveillance:** L. Newman

- Recommend to keep it to basics – see recommendations of the guide.
- Doing triangulation to build the richness of the story told by STI surveillance data.
- Mapping and sharing STI surveillance data through reports is important for building demand and seeing the value of the data collection.
- Assessment tool for STI surveillance systems is available to help plan to address weaknesses

**Assessment of STI surveillance in India and a Roadmap for Action:** TLN Prasad

- Conducted in Feb-March 2015
- Designated STI clinics as a set of sentinel sites used to monitor trends.
- Detailed review of the extensive system of STI surveillance in India.

**DAY 4.**

**Session 15. (cont) Hepatitis**

**Building on HIV surveillance to fill gaps in viral Hepatitis surveillance:** I. Bergeri

- Focus on Hepatits B and C. – 2 distinct viruses, but both can result in cancer.
- Greatest number of co-infected (HIV and viral Hepatitis) persons live in Africa, due to the prevalence of HIV.
- Rapid diagnostic tests for serology are available for both HBsAg and anti-HCV Ab (cannot distinguish new or re-infection) – not yet available as validated use on DBS
- Surveillance for Hepatitis can benefit from other systems (immunization programmes, blood safety, injection safety, HR services, ANC, and HIV
In an HIV surveillance system this could include adding Hep screening to ANC and PMTCT, adding sentinel sites specific to Hepatitis (e.g. among health workers), other enhancements for including Hepatitis in IBBS.

**Country experience with hepatitis surveillance in Vietnam:** N. Tuan (given by Amitabha)
- Backbone is hepatitis case reporting, part of the notifiable diseases.
- Reanalysis of banked IBBS specimens to include Hepatitis B/C – preliminary results of 2010 samples suggests that 16% of HIV positive were co-infected with Hepatitis B, and majority co-infected with Hepatitis C among PWID. Data from FSW reinforces the understanding that FSW and PWID networks are linked, due to high coinfection with Hepatitis C.
- Additional cost to IBBS was ~7% of total cost to add Hepatitis testing.
- Pros: good domestic capacity for serological testing; but challenges are that procurement of test kits can be problematic, testing is expensive, and there is an issue with confirmation through PCR.
- Remaining questions: what frequency and populations is cost-effective/informative; how to improve case reporting

**Discussion comments:**
- GF is still in the process of developing a policy for addressing Hepatitis B/C
- In India, 7 generic manufacturers are starting to produce 3 week treatment for Hep C, prices vary from $155-400 for a full course of treatment.

**Session 17. Ethics Discussion**

**Ethics of Public Health Surveillance: Vulnerability and Security:** C. Ho
- Developing a framework for ethics applicable to all public health surveillance. To be available by early 2016.
- Ethical Guiding Principles: HIV surveillance (developed in collaboration with Columbia University) – Informed Consent and Transparency – respect for persons as underlying rationale.
- Incorporating these principles requires effective engagement in planning, communicate results of surveillance to stakeholders. Advocacy for persons participating in surveillance should have services available to them, especially if related to information on diagnosis or prognosis.
- Special consideration/responsibility to protect vulnerable population requires deeper consideration of vulnerability and recognizing layers of vulnerability

**Measuring stigma and discrimination in the context of UNAIDS fast-track targets to ending AIDS:** B. Harrison
- Stigma and discrimination/ violation of human rights as a primary reason some groups have not accessed services as per their need.
- Highlights existing models for how stigma and discrimination inhibits the response to the epidemic.
- Triangulation of general population attitudes, experiences of PLHIV and key populations, and attitudes of healthcare workers and other segments of the population to understand the situation and progress toward addressing stigma and discrimination.
- Other systems for collecting data on stigma includes helping community log and document experiences of stigma, discrimination, and violence.
Human rights, intercultural and ethics in HIV surveillance: The Peruvian experience: M. Pun

- Highlights different types of sentinel surveillance as an area that has developed human rights protections for conducting testing. E.g. moving from anonymous to linked testing with returning results and including informed consent; reviewing protocol by an ethnical committee, etc. (ANC< MSM, and prison settings)
- Special example – Working with Indigenous Amazonian Populations, requires a translator to communicate, a participatory process, individual and collective informed consent, sharing results with communities.

Conducting surveillance among adolescents and young key populations: L. Johnston

- UN obligations to protect minors, but ensure the best possible care/services for this group
- Policy change: Lower ages for consent to HIV testing have been seen globally (~ 14-15 years old); using the language/rationale for these policy changes can help make the case for doing surveillance activities that include younger age groups
- Gives examples of arguments that can be used to further justify consent by minor adolescents.
- Strategies for providing informed consent for minors include the use of parental proxies, special efforts to ensure informed consent is understood by minors.

Session 18. Wrap Up discussion:

- Proposed Meeting Report structure
  - Rationale for importance of HIV surveillance,
  - identified priority areas,
  - a workplan for addressing the priorities (describing the methods, status of implementing these, where guidelines exist, and additional methodological development that is needed.
  - [Insert matrix]
  - Vision of the way forward
- Discussion has been about building systems that have a much longer timeframe than the 5 year timeframe that we’ve talked about as the critical window. In the interim it seems we also need a ‘fast-trak’ strategy to get good enough, rather than perfect data for making decisions and improving programmes
- Act on the data we have now and continue to improve as we move forward;
- Is there a shift away for surveillance (for the sake of surveillance) and more toward data that is useful for local programmes. (WB perspective)
- Data use is a critical issue – how is this going to be strengthened (country perspective)
- We are at a stage where we need to really take a hard look at what systems are necessary and useful to sustain in the response, vs. which can be eliminated. And this requires programme and evaluation data. (WB perspective)
- How do we evaluate the value of data that is being gathered and analyzed? This is a relevant question because international support for surveillance data will be focused in 12 countries. Local resources and national resources will be increasingly the source of these surveillance budgets. Greater focus will be on the use of local data for programme use. A stronger case needs to be made to justify surveillance activities. (Economic value of information) In this context, how can HIV surveillance systems serve as a platform for supporting other disease conditions which are important (e.g. STI, or Hepatits, etc.)
- In the context of using data, how can we make the existing data more accessible, especially IBBS data. UNAIDS, WHO and USG are very supportive of this idea. There have been efforts in the
past to make this happen (e.g. FHI360 making their IBBS datasets available) – statement to include in the report to support the idea of making data available with appropriate safe guards.

Practical next steps, to have funders of the survey require public access to the datasets. (Country perspective: a lot of these data are messy and it is non trivial to prepare them for use by a group who is not familiar with the caveats of the way the data were collected.). The different types of dataset may be broad – this includes routine data, survey data, and potentially intervention study data. Is there a tension between developing country ownership of the data vs. making datasets available to the universe. An intermediate and more comfortable step may be resourcing the publish and disseminate the data by countries.

- The concept of longitudinal data should be added to our programmatic data priority list. Cascade snapshots are not enough. TB programme is an example of this approach. What can we learn from this experience? There are some important differences, but this is still an important example.