HIV Research in East Africa

Building, Growing and Sustaining a HIV Research Enterprise in East Africa

The case of AMPATH

Presented at the 5th INTEREST workshop – 10 – 13 May 2010, Dar-es-Salaam, Tanzania
Outline

• The past 20 years of HIV research in Africa
  – Literary works
  – Funding
  – Research Agenda
• HIV research models
  – Academic Research Partnerships
    • Building, expanding and sustaining a research enterprise
    • Challenges and threats
    • Addressing the challenges and moving forwards
• Conclusion

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Last 20 years

• HIV literary works from Africa
  – Disproportionately low for the burden of disease
    • Jan 1990 – Jan 2010
      – 208,884 HIV-related publications
        » 2,981 (1.4%) from Africa
          • 93% from biomedical sciences
      – 25,942 publications in clinical area (RCT/CS)
        » 271 (1%) from Africa
  – Very few African authors
    • Issue raised at CROI 2011
Last 20 years

- HIV Research funding sources
  - 99% External
    - National Institutes of Health
    - European Union
    - Foundations
    - Pharma
  - 1% Domestic
    - 0.3% from Government of Kenya
Last 20 years

• Research agenda
  – Dictated by the funding agencies
    • RFA/FOA/CFA
  – Influenced by personal interests
  – ?Need
Research Models

• Academic Research Partnerships

• Government Research Institutions

• Industry – Pharma

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Academic Research Partnerships

The Academic Model Providing Access to Healthcare Partnership (AMPATH)

Collaborating Institutions

1. Moi University School of Medicine (MUSoM)
2. Moi Teaching and Referral Hospital (MTRH)
3. AMPATH Consortium
4. Government of Kenya (MoMS and MoPHS)
5. USAID and PEPFAR
AMPATH

• Founded in 2001
  – Built on a 10yrs foundation of collaboration between Moi University and Indiana University Schools of Medicine

• Tripartite mission:
  – Care
  – Teaching
  – Research
Research and Training Grants Awarded to the AMPATH Research Program 1998-2009

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## Research and Training Grants and Contracts Awarded to the AMPATH Research Program 1998 – 1999

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PI(s)</th>
<th>INSTITUTION</th>
<th>DIRECT COSTS</th>
<th>SOURCE OF FUNDS</th>
<th>DATES</th>
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<tbody>
<tr>
<td>Regenstrief-Moi Medical Informatics Fellowship Program</td>
<td>William Tierney</td>
<td>Indiana University</td>
<td>$617,383</td>
<td>Fogarty International Center, NIH</td>
<td>9/30/98-5/31/05</td>
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<td>Indiana University – Moi University Exchange Faculty Development Program</td>
<td>Robert Einterz</td>
<td>Indiana University</td>
<td>$138,424</td>
<td>ECFMG</td>
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<td>IUSM-MUFHS Exchange Faculty Development Program</td>
<td>Robert Einterz</td>
<td>Indiana University</td>
<td>$10,000</td>
<td>Indiana University International Development Fund</td>
<td>9/01/99-7/1/06</td>
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<tr>
<td>Causes of Infection Requiring Hospitalization in Patients with HIV/AIDS in Western Kenya</td>
<td>Ken Fife and Lameck Diero</td>
<td>Indiana University and Moi University</td>
<td>$10,000</td>
<td>NIH (ACTG)</td>
<td>6/1/02-5/30/04</td>
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</tbody>
</table>
Basic Research Infrastructure

- Research Office
  - Research Director and Research Manager
- Research Sponsored Programs Office (RSPO)
  - Administrator and Accountant
- Institutional Research and Ethics Committee (IREC) certified by NIH
  - Committee and an Administrator
- Improve and enhance laboratory capabilities
- Develop the AMPATH Medical Records System (AMRS)
Research and Training Grants Awarded to the AMPATH Research Program
1998-2009

Year Awarded

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Research and Training Grants Awarded to the AMPATH Research Program 1998-2009

Presented at the 5th INTEREST workshop – 10 – 13 May 2010, Dar-es-Salaam, Tanzania
<table>
<thead>
<tr>
<th>Project Description</th>
<th>Principal Investigator</th>
<th>Institution</th>
<th>Funding Source</th>
<th>Duration</th>
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<tbody>
<tr>
<td>The Economic Impacts of HIV/AIDS and Treatment</td>
<td>Markus Goldstein</td>
<td>World Bank</td>
<td>Economic and Social Research Council</td>
<td>2003-2004</td>
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<td>Directly Observed Therapy for TB/HIV in Western Kenya</td>
<td>Tim Flannigan</td>
<td>Brown University</td>
<td>NIH</td>
<td>9/1/03-8/30/07</td>
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<tr>
<td>Establishing HIV/AIDS Research in Western Kenya</td>
<td>Lameck Diero</td>
<td>Moi University</td>
<td>National Institute of Allergy and Infections Diseases, NIH</td>
<td>9/1/03-8/31/05</td>
</tr>
<tr>
<td>The Economic Impacts of Disease and Treatment on Household Welfare in Western Kenya</td>
<td>Markus Goldstein</td>
<td>World Bank</td>
<td>World Bank</td>
<td>2004-2006</td>
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<tr>
<td>Needs Assessment for Implementing the IU/Moi MOU in Research Ethics</td>
<td>Eric Meslin</td>
<td>Indiana University</td>
<td>Indiana University International Development Fund</td>
<td>4/1/04-3/31/05</td>
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<tr>
<td>AIDS Associated Assessment of TB Transmission</td>
<td>Jane Carter</td>
<td>Brown University</td>
<td>NIH</td>
<td>7/1/04-6/30/06</td>
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<tr>
<td>Tuberculosis Active Case Finding in Traditional and Non-traditional Sites in Western Kenya</td>
<td>Nathan Buziba and Jane Carter</td>
<td>Moi and Brown Universities</td>
<td>FIDELIS: The International Union Against TB and Lung Disease</td>
<td>7/1/04-6/30/05</td>
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<tr>
<td>Electronic Medical Records: A Critical Tool in the Battle Against HIV/AIDS in Africa</td>
<td>Joseph Mamlin and William Tiemey</td>
<td>Indiana University</td>
<td>Rockefeller Foundation</td>
<td>5/1/04-7/31/06</td>
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<tr>
<td>The Economic Impacts of Disease and Treatment on Household Welfare in North Rift Region of Kenya</td>
<td>Markus Goldstein</td>
<td>World Bank</td>
<td>USAID</td>
<td>2004-2005</td>
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Research and Training Grants Awarded to the AMPATH Research Program 1998-2009

Year Awarded

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<table>
<thead>
<tr>
<th>Study Title</th>
<th>Principal Investigator(s)</th>
<th>University(s)</th>
<th>Funding Agency(s)</th>
<th>Duration</th>
</tr>
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<tbody>
<tr>
<td>Partners in Prevention Study (Phase III Randomized Placebo-Controlled Trial of HSV-2 Suppression to Prevent HIV Transmission Among HIV-Discordant Partners)</td>
<td>Ken Fife</td>
<td>Indiana University</td>
<td>University of Washington (Bill and Melinda Gates Foundation)</td>
<td>2/1/05-4/30/08</td>
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<tr>
<td>ACTG: A5208 Clinical Trial</td>
<td>Mitchell Goldman and Abraham Siika</td>
<td>Indiana University and Moi University</td>
<td>National Institute for Allergy and Infectious Diseases (NIH)</td>
<td>1/1/05-completion</td>
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<tr>
<td>Supporting Collaboration of US and Kenyan Investigators</td>
<td>Constantin Yiannoutsos</td>
<td>Indiana University</td>
<td>Indiana University International Development Fund</td>
<td>6/1/05-5/31/06</td>
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<tr>
<td>Implementation of the AMPATH Medical Record System in East Africa</td>
<td>William Tiemey and Winstone Nyandiko</td>
<td>Moi University and Indiana University</td>
<td>Rockefeller Foundation, WHO, UN Development Program</td>
<td>10/1/05-9/30/08</td>
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<tr>
<td>The Impact of a Nutrition Program for AIDS Patients and its Role in their Coping Strategies</td>
<td>Mabel Nangami</td>
<td>Moi University</td>
<td>International Food Policy Research Institute</td>
<td>11/1/05-10/31/06</td>
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</table>
Acyclovir and Transmission of HIV-1 from Persons Infected with HIV-1 and HSV-2


ABSTRACT

BACKGROUND
Most persons who are infected with human immunodeficiency virus type 1 (HIV-1) are also infected with herpes simplex virus type 2 (HSV-2), which is frequently reactivated and is associated with increased plasma and genital levels of HIV-1. Therapy to suppress HSV-2 reduces the frequency of reactivation of HSV-2 as well as HIV-1 levels, suggesting that suppression of HSV-2 may reduce the risk of transmission of HIV-1.

The authors' full names, degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Celum at the Department of Global Health, University of Washington, Harborview Medical Center, 325 Ninth Ave., Box 359927, Seattle, WA 98104.

Presented at the 5th INTEREST workshop – 10 – 13 May 2010, Dar-es-Salaam, Tanzania
Research and Training Grants Awarded to the AMPATH Research Program 1998-2009

Year Awarded

$0

$2,000,000

$4,000,000

$6,000,000

$8,000,000

$10,000,000

$12,000,000

$14,000,000

$16,000,000

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<tr>
<th>Project Description</th>
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<th>Institution</th>
<th>Amount</th>
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<tr>
<td>AMPATH Evaluation Program</td>
<td>John Sidle and Thomas Inui</td>
<td>Indiana University</td>
<td>$500,000</td>
<td>PVF Foundation</td>
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<td>Extending HIV Care Beyond the Rural Health Center</td>
<td>Kara Wool-Kaloustian</td>
<td>Indiana University</td>
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<td>Doris Duke Charitable Foundation</td>
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<td>East Africa IeDEA Consortium</td>
<td>Constantin Yiannoutsos and Kara Wool-Kaloustian</td>
<td>Indiana University</td>
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<td>NIAID</td>
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<td>Enhancing Infant Feeding Among HIV-infected Mothers</td>
<td>Kara Wool-Kaloustian</td>
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<td>Indiana University Center for AIDS Research</td>
<td>4/1/06-3/31/07</td>
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<td>DOTS Expansion: Lab to Community Mobilization in North Rift Valley, Western Kenya</td>
<td>Nathan Buziba and Jane Carter</td>
<td>Moi and Brown Universities</td>
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<td>Kenya Cancer Project</td>
<td>Patrick Loehrer</td>
<td>Indiana University</td>
<td>$50,000</td>
<td>Eli Lilly Company</td>
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<td>Increasing Animal Source Foods in Diets of HIV-Infected Kenyan Women and Their Children</td>
<td>Judy Ernst</td>
<td>Indiana University</td>
<td>$749,996</td>
<td>Global Livestock Collaborative Research Support Program (GL-CRSP) funded by USAID</td>
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<td>Monitoring and evaluation, patient surveillance, and loss to follow-up</td>
<td>Constantin Yiannoutsos</td>
<td>Indiana University</td>
<td>$92,412</td>
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<td>Use of Rapid TB Culture Technology: Impact on the Diagnosis of Smear Negative Tuberculosis in the Developing World</td>
<td>Haroun Mengech and Fabian Esamai</td>
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<td>$250,000</td>
<td>FIND Diagnostics</td>
<td>10/1/06-9/30/08</td>
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<td>HIV-1 Geontypic Diversity and Drug Resistance in Western Kenya</td>
<td>Rami Kantor</td>
<td>Brown University</td>
<td>$40,000</td>
<td>Brown University Center For AIDS Research</td>
<td>01/01/06-12/31/06</td>
</tr>
</tbody>
</table>
POPOPULATIONS AT RISK

AMPATH: Living Proof that No One Has to Die from HIV

Thomas S. Inui, ScM, MD1,2, Winston M. Nyandiko, MD3, Sylvester N. Kimaiyo, MD3, Richard M. Frankel, PhD2,4, Tadeo Muriuki, BA5, Joseph J. Mamlin, MD2, Robert M. Einterz, MD2, and John E. Sidle, MD, MS2

1Regenstrief Institute, Indianapolis, IN, USA 2Indiana University School of Medicine, Indianapolis, IN, USA 3Moi University School of Medicine, Eldoret, Kenya 4Richard L. Roudebush VAMC, Indianapolis, IN, USA 5AMPATH, Eldoret, Kenya.

BACKGROUND AND OBJECTIVE: The HIV/AIDS epidemic in sub-Saharan Africa is decimating populations, deteriorating economies, deepening poverty, and destabilizing traditional social orders. The advent of the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) made significant supplemental resources available to sub-Saharan national programs for the prevention and treatment of HIV/AIDS, but few programs have demonstrated the capacity to use these resources to increase rapidly in size. In this context, AMPATH, a collaboration of Indiana University School of Medicine, the Moi University School of Medicine, and the Moi Teaching and Referral Hospital in Eldoret, Kenya, is a stunning exception. This report summarizes findings from an assessment of AMPATH staff.

Patients give and get hope
I live in the village that my clinic serves and know many of the people who come to the clinic. When they first come they are weak and often think they are in a hopeless situation. Watching them get first medicines, then get food for themselves and their families, gain strength, and become themselves again is inspiring and gives me hope that no one has to die of HIV. [Clinical Officer]

For the past decade, HIV/AIDS has been decimating populations in sub-Saharan Africa while virtually all attempts to control the pandemic have failed. With the advent of highly active antiretroviral therapy in the mid-1990s, the number of deaths from HIV in the United States began to fall.
Research and Training Grants Awarded
to the AMPATH Research Program
1998-2009

Year Awarded

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<table>
<thead>
<tr>
<th>Project Description</th>
<th>PI/Co-PIs</th>
<th>Institution/Partner(s)</th>
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<tr>
<td>ASANTE Cardiovascular and Pulmonary Diseases Center of Excellence</td>
<td>Sylvester Kimaiyo and Eric Velazquez</td>
<td>Moi University</td>
<td>NIH-NHLBI</td>
<td>7/1/09-</td>
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<tr>
<td>Orphaned &amp; Separated Children’s Assessment Related to their Health &amp; Well-Being</td>
<td>Paula Braitstein</td>
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<td>Moi University Clinical Research Site</td>
<td>Abraham Siika</td>
<td>Moi University</td>
<td>NIH-NHLBI</td>
<td>7/1/09-</td>
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<td>Computerized Counseling to Promote Positive Prevention and HIV Health in Kenya</td>
<td>Ann Kurth and Abraham Siika</td>
<td>New York University and Moi University</td>
<td>NIH-NIMH</td>
<td>5/1/09-4/30/13</td>
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<td>Emergency Obstetrical Training in Western Kenya</td>
<td>Elkanah Orango Omenge and Alan Bocking</td>
<td>MTRH and the University of Toronto</td>
<td>Development Partnerships in Higher Education (DelPHE), United Kingdom</td>
<td>9/1/09-8/31/12</td>
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<tr>
<td>An East African Center of Excellence in Health Informatics</td>
<td>William Tierney and Abraham Siika</td>
<td>Indiana University and Moi University</td>
<td>Fogarty International Center</td>
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<td>Improving Decision Support in AMPATH</td>
<td>Martin Were</td>
<td>Indiana University</td>
<td>Abbott Foundation</td>
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<td>Causes of early mortality in HIV-infected Africans on antiretroviral therapy</td>
<td>Abraham Siika</td>
<td>Moi University</td>
<td>NIH-NIAID</td>
<td>7/1/09-6/30/13</td>
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<td>Research Endowment to the IU Center for Global Health</td>
<td>Craig Brater</td>
<td>Indiana University</td>
<td>Lilly Endowment</td>
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**Total research and training funding as at Dec 2010:**

70 Grants: $40,420,596
Universities Participating in the AMPATH Research Program
AMPATH Publications
1989-2010

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How did we do it?

• Leadership
  – Remaining focused on the partnership’s mission of care, training and research
  – Committed, open and honest
  – Advocates for improved earnings for Kenyan Faculty
How did we do it?

• Care leads the way
  – Genuine desire to improve patient care
  – Moral basis for conducting research
  – Focus/prioritize HIV research to address our patient’s needs
How did we do it?

• Strength of partnerships
  – Mutual benefit
  – Training and mentorship
  – Resources
    • Expertise
    • Funding
How did we do it?

• An electronic medical record (AMRS)
  – An implementation of OpenMRS
    • Web-based system with MySQL backend
  – 130,000 HIV-infected patients registered
    • 3 million encounters
    • 80 million observations
  – Responsive to patient care and research
Challenges

• Drowning in success
  – Research and care grants ~ US$40M and US$100M respectively
    • Management and other personnel
    • Space and other basic resources
    • IREC
Challenges

• Drowning in success
• Training
  – Research faculty
  – Research staff
    • RAs
    • Data managers and analysts
    • HIT developers
Challenges

• Drowning in success
• Training
• Tightening relationships between clinical care, service, and research
Challenges

• Drowning in success
• Training
• Tightening relationships between clinical care, service, and research
• Developing and managing partnerships
  – New investigators at AMPATH schools
  – New universities wanting to participate
  – Non-academic entities wanting to participate
Challenges

- Drowning in success
- Training
- Tightening relationships between clinical care, service, and research
- Developing and managing partnerships
- Establishing a research tradition at Moi
Challenges

• Drowning in success
• Training
• Tightening relationships between clinical care, service, and research
• Developing and managing partnerships
• Establishing a research tradition at Moi
• Establishing health services research
Challenges

- Drowning in success
- Training
- Tightening relationships between clinical care, service, and research
- Developing and managing partnerships
- Establishing a research tradition at Moi
- Establishing health services research
- Establishing a successful community-based public health research program
Threats

- Brain drain
- Dependence
- Digital divide
- Cultural differences
  - Work ethic
  - Misunderstandings
- Funding opportunities
  - Limited
  - Skewed in favor of partners
- Clash in priorities
- In country corruption
- Plagiarism
- Turf wars
How do we continue building?

• Increase manpower
  – New Faculty with research interests
  – Introduce research courses early
    • Make research a career choice
  – Mentorship
    • Partners and current Kenyan researchers are essential
      – Canadian/Kenyan Electric Companies Partnership
        » “No need to retire”
How do we continue building?

• Build infrastructure

• Academic Centers of Excellence
How do we continue building

• Lobby for increase in domestic funding

• National Research Agenda
  – Defines priorities for research
  – Directs effort
Conclusion
Essential National Health Research*

*John R Evans. Essential national health research: a key to equity in development; NEJM; 1990

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## Acknowledgements

### Organizations
- MOH-USAID-AMPATH Partnership
- AMPATH Consortium
- INTEREST
- CDC
- Rockefeller
- MoH, GoK
- Bill and Mellinda Gates Foundation
- WHO
- NIH
- WFP
- PEPFAR
- EU
- MRC
- Others

### Individuals
- William Tierney
- Sylvester Kimaiyo
- Joseph Mamlin
- Robert Einterz
- Winston Nyandiko
- Kara Wools Kaloustian
- Paul Ayuo
- Haroun Mengech
- Barasa Otsyula
- Fabian Esamai
- Constantin Yiannoutsos
- Charles Kwoba
- Douglas Shaffer
- Lameck Diero
- Tom Inui
- Wilfred Emonyi
- Chip Schooley
- Constance Benson
- Joep Lange
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- Bev Musick
- Others
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