Human Heredity and Health in Africa (H3Africa)

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Program Director, H3Africa

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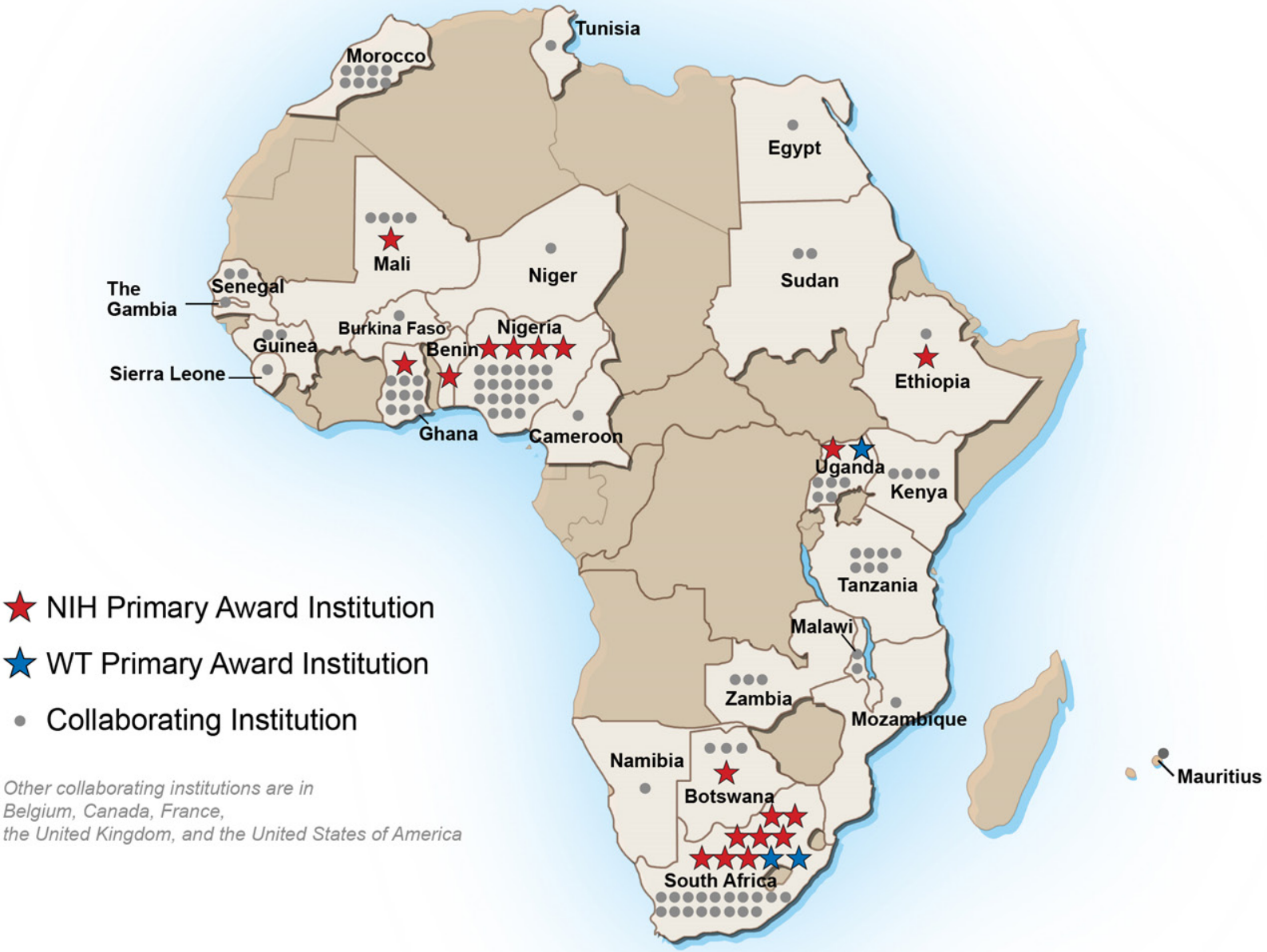
NIH
Common Fund & ICs

Genomics/Genetics (AfSHG)

Key Aspects of all H3Africa Components

- Awards made directly to African institutions & PIs
- Must deposit data in public repository
- Must deposit biospecimens in an H3Africa Biorepository
- Can collaborate with H3Africa Bioinformatics Network (H3ABioNet)
- Must include training component

National Institutes of Health - Wellcome Trust H3Africa Research Network



H3ABioNet

Administrative hub at UCT

34 partner institutions, 32 in 15 African countries, 2 in USA

Roles of H3A Bionet in H3Africa

- Data submission
- Data storage, backup and transfer
- Data access and visualization (public and new)
- Training
- Support for analysis:
  - General questions
  - Access to computing resources
  - Technical computing support
- Large-scale data analysis for:
  - Genotyping by arrays
  - Next generation sequencing
  - GWAS


Roles of H3A Bionet in H3Africa, cont'd

- Data storage, backup and transfer
- Data access and visualization (public and new)
- Training—several workshops per year
- Support for analysis:
  - General questions
  - Access to computing resources (eBiokit)
  - Technical computing support
- Large-scale data analysis for:
  - Genotyping by arrays
  - Next generation sequencing
  - GWAS
- Site of new Coordinating Center


H3Africa Biorepositories

- Two-phase approach
  - Pilot phase (UH2) two years. Four pilots started
  - Scale-up one to three
  - Scale-up decision will be made on the basis of an administrative review. March 2014. First scaled-up biorepository in Summer 2014

- Pilots have been working well collaboratively
  - Common SOPs
  - Common policies
  - Pricing for shipping
  - Working together on a small demonstration project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H3Africa Collaborative Centers

PI	Country	Title (topic)
Clement Adebamawo	Nigeria	African Collaborative Center for Microbiome and Genomics Research (role of HPV, vaginal microbiome, and host genetics in the persistence of HPV.
Dwomoa Adu	Ghana	H3Africa Kidney Disease Research Network (Chronic and hereditary kidney disease)
Gabriel Anabwani	Botswana	Collaborative African Genomics Network (host factors in progression of HIV and HIV-TB infection in African children)
Mayowa Owalabi	Nigeria	Stroke Investigative Research & Educational Network (SIREN) (genetic & environment risk factors for stroke)
Michele Ramsay	South Africa	Genomic & environmental risk factors for cardiometabolic disease (focus on obesity)
Dan Stein	*South Africa*	*Genomics of Schizophrenia in RSA Xhosa (genes for schizophrenia in one South African population -- NIMH grant*
Bongoni Mayosi	South Africa	RHDGen: The genetics of rheumatic heart disease network
Enock Matovu	Uganda	TrypanoGEN: an integrated approach to the identification of genetic determinants of susceptibility to trypanosomes
Ayesha Motala	South Africa	Burden, Spectrum, and aetiology of type 2 diabetes in sub-Saharan Africa



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H3Africa Research Projects

PI	Country	Title
Dissou Affolabi	Benin	Contribution of genetic variation to PK variability and toxicity in patients undergoing TB treatment
Gobena Ameni	Ethiopia	Systems Biology for Molecular Analysis of Tuberculosis in Ethiopia
Christian Happi	Nigeria	Host and Microbial Genetic Determinants of Febrile Illness in West Africa
Guida Landoure	Mali	Clinical and genetic studies of hereditary neurological disorders in Mali
Mark Nicol	South Africa	The nasopharyngeal microbiome and respiratory disease in African children
Hugh Patterton	South Africa	Reprogramming of the T. brucei epigenome during human infection: opportunities for new rx
Ambrose Wonkam	South Africa	Exploring Perspectives on Genomics and Sickle Cell Public Health Interventions


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Collaborative Centers & Individual Projects in Year 1

- Several of the H3Africa research sites have received ethics committee approval of protocols and consents
- Several projects are now in the process of submitting material to the ethics review boards at their secondary sites in order for them to consider approval
- As of the end of December:
  - 8 sites are actively recruiting and samples are being stored on site.

Collecting Additional Sample Types & Phenotypes

- H3Africa projects expect to recruit 50,000 to 75,000 participants *in toto*
- Most projects will collect blood, send DNA to the biorepositories, and freeze plasma
  - The latter can be sent to biorepositories or stored locally, as funds permit
- Some are willing to consider partnering to collect additional samples of interest and/or additional phenotyping information
- NIDDK is considering an add-on program to collect urine samples from all projects willing to participate


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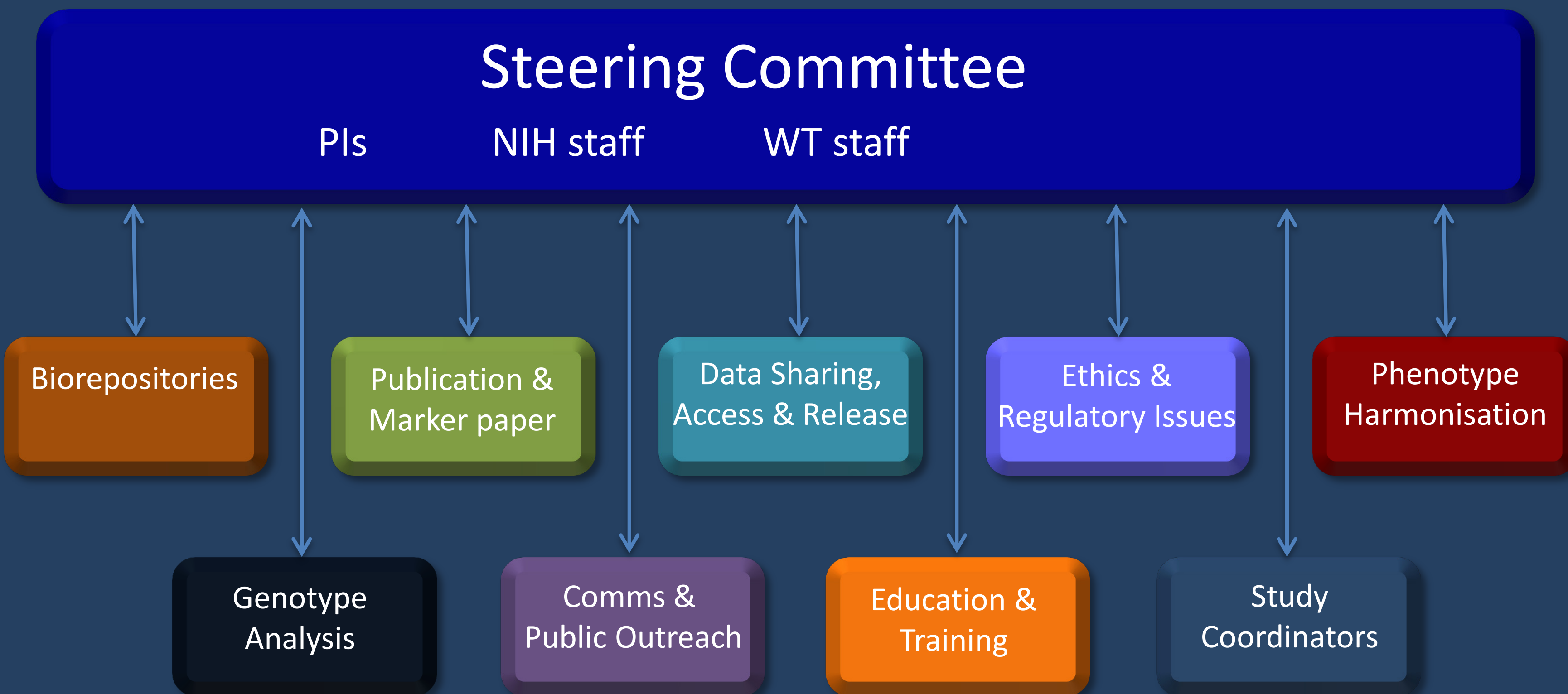
Other Year 1 Achievements

Established 9 working groups that meet 2X per month to collaborate in developing policies and developing common research interests



Other Year 1 Achievements

Working Groups

- **Biorepository WG** has developed a detailed set of SOPs
  - Developed a sample access policy currently being reviewed by the SC
- **Ethics & Regulatory Issues WG**
  - Developed a set of open informed consent guidelines
  - Published (on line) a white paper on Informed Consent
  - Organizing a workshop for Chairs of Ethics Committees from across H3Africa at the next Consortium meeting
- **Publications WG**
  - Developed a Publications Policy that has been accepted by the Steering Committee (SC)
  - Wrote an H3Africa 'Marker Paper' that has been submitted to *Science*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Other Year 1 Achievements

Working Groups

- **Data Sharing, Access, and Release WG**
  - Developed a data access policy currently being reviewed by the SC
- **Phenotype harmonization WG** has made recommendations for standard phenotypes to be collected at each site to facilitate cross-study analyses
- **Genome Analysis WG** is working with other groups on the development of an African genotyping chip(s)

Other Year 1 Achievements

- The H3Africa Consortium has rapidly gotten up and running

Addis Ababa, Ethiopia October 2012

Accra, Ghana May 2013

Johannesburg RSA October 2013

Kampala, Uganda
May 2014

Associated meetings:

- **Cardiovascular research in Africa**
- **Development of African-specific genotyping chips**
- **Ethics committee chairs**

Challenges to date

- Electronic receipt of applications - 40% failure rate
- Grants management in African institutions
  - Challenges in making the awards
  - Challenges in gaining access to funds
- IRBs are concerned about the secondary use of data and samples
- WG teleconferences/communications

Future Challenges

- Establishing full-scale biorepositories
  - Shipping across and outside of Africa
- Promoting regular data release from research sites in accordance with Consortium policies
- Effecting sample release, including
  - Promoting regular sample deposition according to Consortium policies sample shipment to biorepository
  - Development of an acceptable and successful system for making H3Africa samples available to others
- Effect (positive) on 'brain drain' – will we see a 'brain gain'?
- Extension of H3Africa for a second five years
- Long-term sustainability

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Successes

- Empowering African Scientists
  - African scientists determine and then manage the science
  - African scientists play the major role in determining the course of the Consortium
  - African scientists are appreciating what can be done as a group
  - Meeting and collaborating with scientists outside of the home institution
- Funded high quality applications that meet the standards of NIH peer review
- First steps toward building more infrastructure
- High degree of interest from others

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NHGRI H3Africa Team

- Mark Guyer, Project Coordinator
- Jennifer Troyer, Program Director
- Jeff Struewing, Program Director (Centers)
- Ebony Madden, Program Director (ELSI)
- Chris Darby, Grants Management
- Diane Patterson, Grants Management
- Quynh Nguyen, Program Analyst
- Sue Penno, JHU, Biorepository Expert


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H3Africa Executive Committee

- **NIAID:** Maria Giovanni, Karen Lacourciere, Robin Mason, Patricia Strickler-Dinglasan, Gray Handley, Julia Puzak
- **OAR:** Stacy Carrington-Lawrence
- **NINDS:** Salina Waddy, Stacey chambers
- **NIMH:** Thomas Lehner, Geetha Senthil, Pamela Collins
- **NICHD:** Regina James
- **NEI:** Louise Wideroff
- **NIDDK:** Rebekah Rasooly, Paul Kimmel, Marva Moxey-Mims
- **NIEHS:** Kim McAllister
- **NCI:** Damali Martin
- **Common Funds:** Leslie Derr


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Questions?

www.h3africa.org

Follow us on

The Origins of the H3Africa Initiative

Press Release, 2010

Working Group Meeting, 2010

Cape Town Meeting, 2011

H3 DEPARTMENT OF HEALTH & HUMAN SERVICES USA NATIONAL INSTITUTES OF HEALTH wellcome trust

The Goals of H3Africa

- Increase the number of African scientists trained in genomics and population-based research
- Increase international competitiveness of Africa genomic scientists
- Increase collaborations among African investigators
- Create/expand infrastructure for genomics research

H3ABionet -- Highlights from Year 1

- Surveyed the Consortium members about their anticipated bioinformatics needs
- Developed a recommended set of hardware options for the full nodes
- Developed options for the other nodes tailored to their individual needs.
- Negotiated better prices for high-end servers for the nodes with Dell
- Systems administrators and software developers were trained on how to install and maintain the hardware, how to set up clusters, cloud computing, etc.
- All H3ABionet groups are connected by an active mailing list which is used to help each other with queries.
- 9 collaborations among the sites are ongoing!


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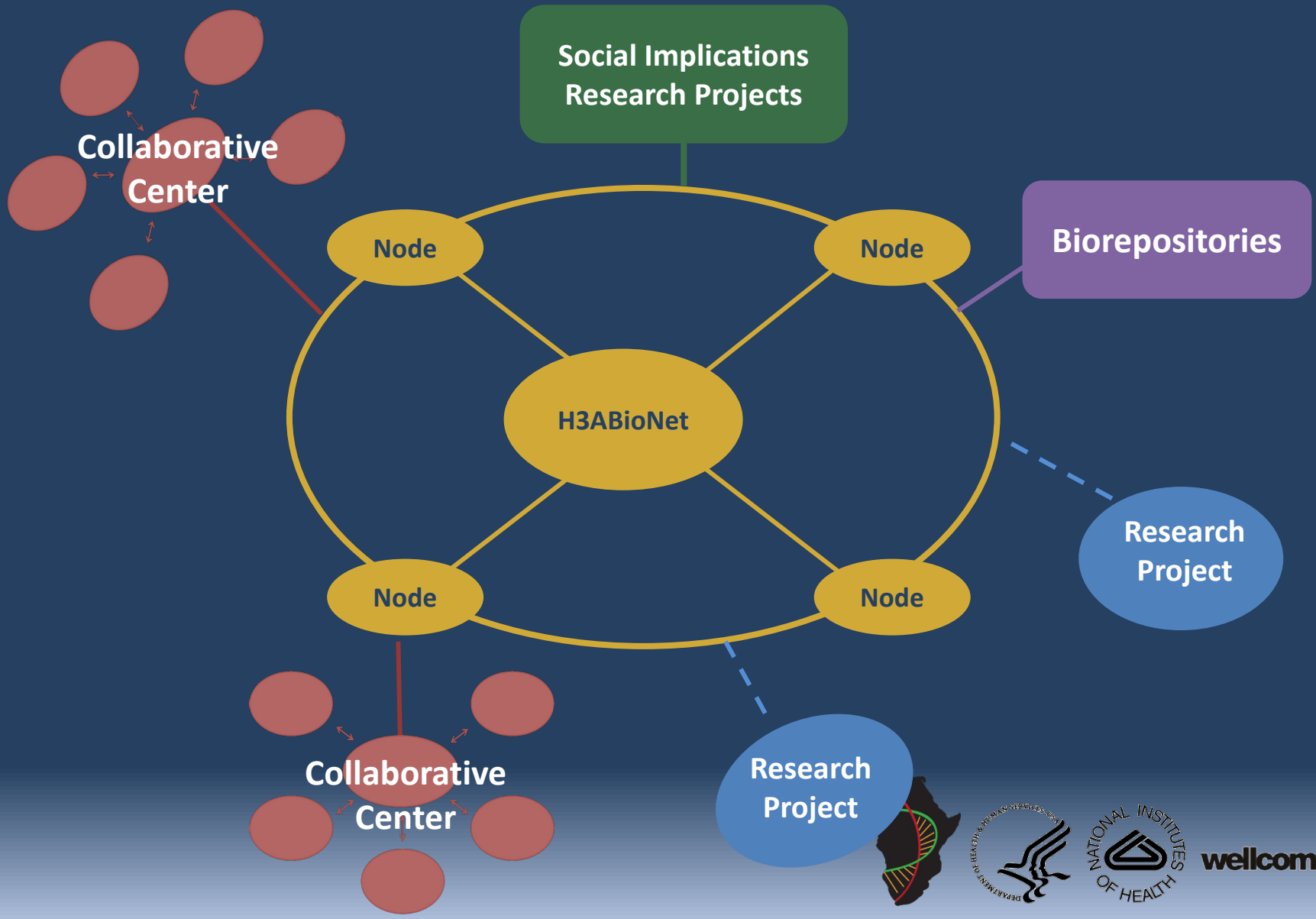
A Conceptual Representation of the H3Africa Consortium



H3ABionet – More Highlights from Year 1

- At the Hub (UCT)
  - Started a database for African data
  - Started development of new software tools
  - Set up coordinating center
  - Set up Consortium web site
  - Held multiple training workshops
- At the Nodes
  - have ordered hardware and eBiokits (open source software),
  - recruited students and post-docs,

H3ABionet – continuing challenges

- Collaborations with genomics groups in the “north” to perform genome analysis has slowed the uptake of H3ABioNet genome analysis training.
- Establishing better capabilities to address the identified need to keeping the data in Africa (or at least a copy of the data)
- Continuing to increase the skills of nodes and contributing to the establishment of bioinformatics and computational biology as a strength of African genomic science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Collecting Additional Sample Types & Phenotypes

- IC Directors were notified that there is a window of opportunity to support collection of additional sample types and/or to expand the analysis of existing samples to address the interests of those ICs
- Because sample collection has started, initiating an effort in the next six months would be optimal