EXPLORING PERSPECTIVES ON GENOMICS AND SICKLE CELL PUBLIC HEALTH INTERVENTIONS

PI: A Wonkam
Co-PI/ Collaborators: J Makani, K Ohene-Frempong, G Tangwa, M Treadwell, S McCurdy, J de Vries
Global Burden of SCD: The situation in Africa

Global burden of SCD
312,307 births a year

Burden of SCD in Africa
237,253 births a year (76%)

Piel, 2012
Background: Epidemiologic transition
Sickle Consortium of Healthcare, Advocacy, Research and Training in Africa
SICKLE CHARTA & REDAC

Managing Sickle Cell in Africa

Sickle Cell Symposium 2012: Friday 1st & Saturday 2nd June at Kuducchi Beach Hotel
Sickle Cell Awareness Saturday 2nd June

4ème Symposium international du REDAC à Yaoundé, Cameroon
4th International REDAC Symposium in Yaoundé, Cameroon
13 - 15 juin / June 2013

Sous le haut patronage du Ministre de la Santé Publique
Under the patronage of Minister of Public Health
Réseau d’Etudes de la Drépanocytose en Afrique Centrale

Thème / theme
Drépanocytose chez l’enfant
Sickle cell disease in childhood

Appel à communications jusqu’au 15 mai 2013
Call for papers deadline may 15th 2013
Hôtel Mont Felbe

Contact:

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E-mail: chopwe.maire@yahoo.fr

Fonds d’exploitation (Absorption)

Theme / Under themes:
- Dépistage régional
- Typage génétique
- Génétique
- Hydactyly
- Hypersensibilité
- Transfusion
- Infectious
- Thalassaemias
- Thalassaemia
- Thalassaemia major
- Thalassaemia minor
- Thalassaemia intermedia
- Thalassaemia intermedia major
- Thalassaemia intermedia minor

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CAMEROON: the birth place, 2009
• **Unprecedented opportunity to study genomics & SCD in Africa**

• **H3 Africa draws increased attention to longstanding and emerging issues:**
  - informed consent and community engagement,
  - privacy and confidentiality,
  - reciprocity/benefit sharing, and ownership
  - return of research results and incidental findings (e.g. GWAS)
  - the inclusion of children in genomic research.

• **There is a dearth of published research on the views/perspectives of Africans regarding several genomic and ELSI issues.**

• **Little empirical data are available about the perceptions, utility, and impact of genomic research and SCD-related public health strategies in Africa.**
Genetics in prevention & Care of SCD

Primary „prevention“
- Prenatal Diagnosis

Secondary prevention
- Guidance with Genetic modifiers (Hb F)

Therapy
- Transplantation: stem cells / bone marrow
- Gene therapy: reactivation of HbF
Acceptability of Prenatal Diagnosis by a Sample of Parents of Sickle Cell Anemia Patients in Cameroon (Sub-Saharan Africa)

Ambroise Wonkam, Alfred K. Njamshi, Dora Mbanya, Jeanne Ngogang, Caryl Zameyo, Fru F. Angwafo III

RESEARCH LETTER

Initiation of prenatal genetic diagnosis of sickle cell anaemia in Cameroon (sub-Saharan Africa)

Ambroise Wonkam, Cedrik Ngongeng Tekendo, Huguette Zambo and Michael A. Morris

European Journal of Medical Genetics
GENETICS PND OF SCD INITIATE THE PRACTICE OF MEDICAL GENETICS IN CAMEROON

Severe phenotypes

- Median age at diagnosis: 24 months
- Stroke prevalence of 7% in Cameroonian SCD
- 16.5% and 22.7% had moderate and severe deficit

Ruffieux, Njamshi *Wonkam* et al., *Child Neuropsychol.* 2013
In general how difficult is to coping with your affected disease child?

Voluntary abortion is a criminal offense but medical abortion is allowed:

“…if it is done by an authorized professional and justified by the need to save the mother from grave health jeopardy”

(Act 339; exception 1; the Cameroonian Penal Code).
Differential attitudes to SCD’s medical abortion

Wonkam et al. *Prenat Diagn*, 2006; 26: 760-1
Wonkam et al. *J med Ethics*, 2013
10 June 2013 23:24
Dear Editor and Co-Authors,

Please can you remove my name from the list of authors as I do not agree with what it's said on the prenatal diagnosis and the tendency of predilection of termination of pregnancy. I debate on this theme with all the team and I asked to be removed from the list of authors.

Thank you for the comprehension.

Best regards,
Ghana

Heroes and great ideas column: crossing borders: Dr. Kwaku Ohene-Frempong.
Rouse CM.

Concerted Global Effort to Combat Sickle Cell Disease
The First Global Congress on Sickle Cell Disease
in Accra, Ghana

Isaac Odame, MB, ChB, MRCP, Roshni Kulkarni, MD, Kwaku Ohene-Frempong, MD
Genome-wide and fine-resolution association analysis of malaria in West Africa

Mortality in Sickle Cell Anemia in Africa: A Prospective Cohort Study in Tanzania

Julie Makani¹,²*, S

Brief report
Genetics of fetal hemoglobin in Tanzanian and British patients with sickle cell anemia

*Julie Makani,¹,² *Stephan Manzel,³ Blane Nkya,¹ Sharon E. Cox,¹ ⁴ Emma Dresser,³,⁴ Deogratius Boka,¹ Albert N. Komba Josephine Ngaya,¹ Helen Rooke,³ Nina Vasavada,³ Gregory Fagan,³,⁴ Charles R. Newton,¹ ⁴ ⁷ Martin Farrall,³ and Bwee Lay Thein³,⁴

Hematological and Genetic Predictors of Daytime Hemoglobin Saturation in Tanzanian Children with and without Sickle Cell Anemia

Sharon E. Cox,¹ ² Julie Makani,² ³

A global network for investigating the genomic epidemiology of malaria

The Malaria Genomic Epidemiology Network*
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<th>Locus</th>
<th>SNP</th>
<th>Position sur le chr*</th>
<th>Allèle changé</th>
<th>MAF</th>
<th>Effet</th>
<th>HWP</th>
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SNPs & HbF

BCL11A rs 11886868/HbF HPLC

- **Génotypes rs 11886868**
- **Hémoglobine foetale (H) (%)**

- **P = 0,02**
- **P = 0,01**

HBS1L-MYB rs28384513/HbF HPLC

- **Génotypes rs 28384513**
- **Hémoglobine foetale (H) (%)**

- **P = 0,005**
Alpha-Thalassemia & SCD

Bar chart showing:
- Control: 82% (green), 14% (red), 4% (blue)
- SCD: 64% (green), 31% (red), 5% (blue)

Box plot showing age of diagnosis for different conditions:
- HbSS (pallao)
- HbSS (ααo5.7)
- HbSS (α5.7α5.7)
Background: Sites’ Selection

**Cameroon**
Genomics, PND & psychosocial research

**USA**
U Texas
Children hospital
Oakland (CA)

**South Africa**
UCT

**Tanzania**
Genomics studies

**Ghana**
Newborn screening

Genomics, SCD, ELSI and policy
Aims

Aim 1:
To explore perspectives and attitudes regarding genomic research and its implementation and implications in Cameroon, Ghana and Tanzania.

Aim 2:
To assess perceptions about public health interventions to increase awareness, early detection, and prevention of SCD-related complications.
Recruitment and Data Collection

1- Perceptions / experience with SCD and SCT, Genomics and public health interventions
- Screening, PND, counseling, stigmatization etc...

36 Focus groups (urban and rural)
- SCD-affected families (patients, parents)
- Health professional and promoter

60 In-depth Interviews (urban and rural)
- Community leaders, policy influencing people (health, traditional, religious)

Pilot & training
- FGs & Interviews
- 15 Key Informants

1- Interview guide
2- Selections of rural settings

Identification of stakeholders & community leaders

1- Perspectives with SCD and SCT, Genomics and public health interventions
- Screening, PND, counseling, stigmatization etc...

2- Perspectives on genomic research
- Consent, community engagement, result return, benefit/data sharing etc...

GUIDE

THEMATIC CONTENT
Community Engagement: Advocacy Groups

Cameroon: Globule Rouge

Ghana
The Sickle Cell Foundation of Ghana

SCD
Training and Sustainability

1) Link and expertise of existing network
   - Bioinformatics Network and H3Africa community
   - Wellcome trust and ETHOX Centre, Duke University
   - H3Africa ELSI working group

2) Registration for formal PhD/MSc training and Co-supervision
   - Social Sciences/ELSI: Drs McCurdy, Treadwell, deVries, Royal, Tangwa
   - Genomic/SCD: Drs Ohene-Frempong, Makani, Wonkam

3) Additional funding for ELSI-Sickle scholarships
Importance of the Knowledge to be Gained

• There is a paucity of data on ELSI of genetic research on SCD on the African continent.

• An accurate evaluation of the relevant ELSI issues requires grounding in empirical data on the awareness, attitudes, and experiences of professionals, students, affected families, SCD patients, stakeholders and community leaders.

• Obtaining these information will allow the identification of specific practical, psychosocial and ethical challenges that are associated with genomics in general and genomics and SCD prevention and care in Sub-Saharan Africa.

• Findings from our study will help to guide recommendation for preventive and care policies that do not conflict with community perceptions, behaviors and culture.
## Timeline

| Year 1 | 1Q       | • Hire Research Assistants;  
|        |          | • Develop focus group guide;  
|        |          | • Prepare and submit protocol for ethics Committee approvals,  
|        |          | • Training of research assistants (Dr Treadwell, Dr McCurdy Dr DeVries);  
|        |          | • Commentary paper  
| 2Q     | • Recruit and schedule focus group participants  
|        |          | • Recruit and Schedule key informants for interviews  
| 3Q     | • Pilot instruments and make adjustments as needed.  
| 4Q     | • Conduct and transcribe focus group and in-depth interviews  
|        |          | • Cleaning the transcription  
|        |          | • Begin data analysis |
Overview of management plans

H3Africa Steering Committee

Advisory board
H3Africa ELSI working group

Senior management Board: PIs

- Weekly site/country co-PI supervision meetings
- Monthly PIs’ Skype meetings

Operational management
Research assistants and trainees

- On-site Weekly meeting
  - Monthly Report
Publications policies

- **Project publications**: at least 2 (FGs & in-dept interviews).

- **Countries’ Report**: at least 1 publications per countries

- **Authorship**: defined jointly by PIs according to the work involvement in the project and the manuscript preparations.
  
  - *H3Africa consortium* to be included as author in all the publications

- **Arbitrations**: H3Africa publications’ committee.
THANKS

FOA: RM12-005, 1 U01 HG007459-01