

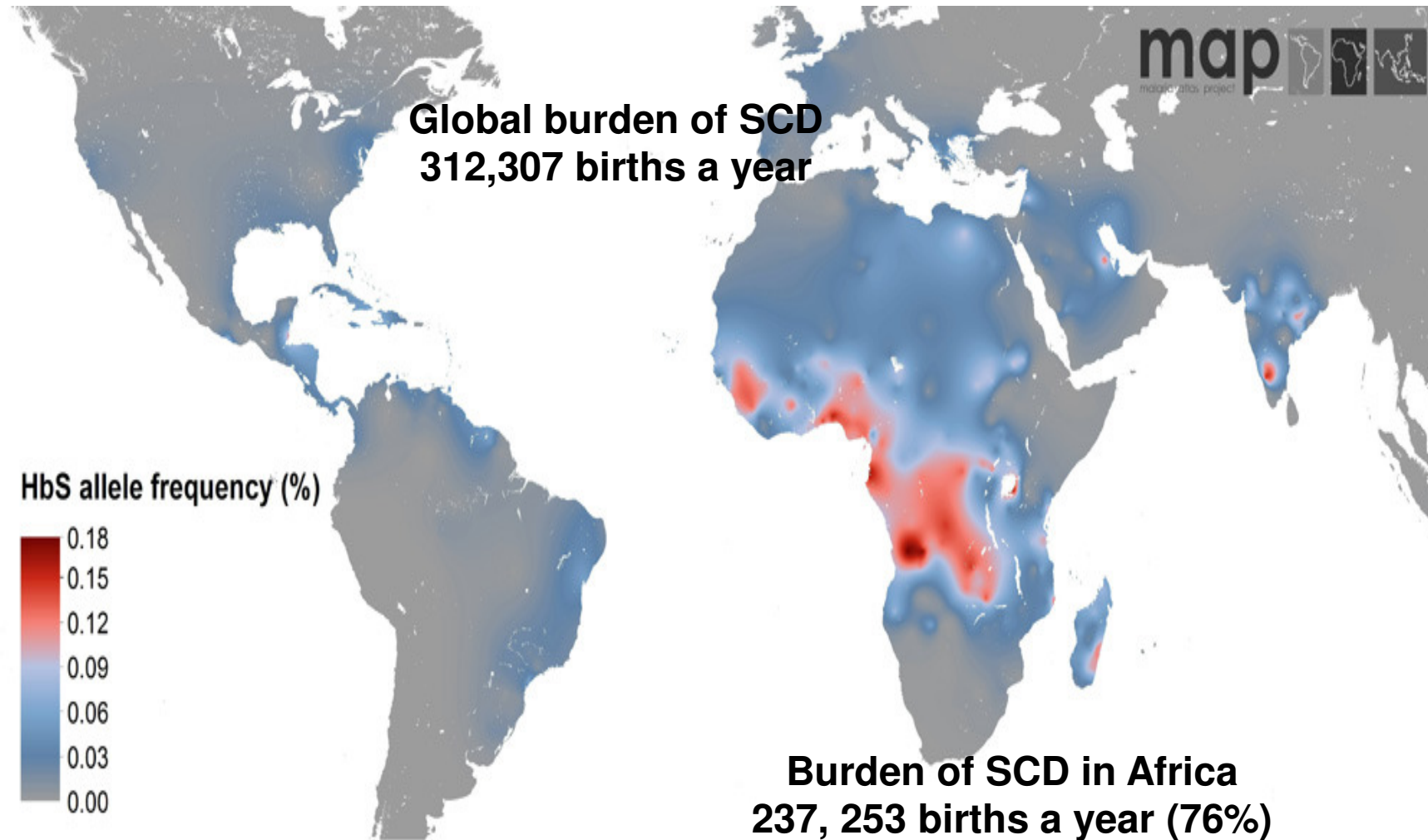
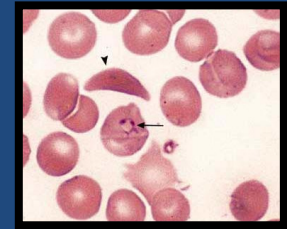


# **EXPLORING PERSPECTIVES ON GENOMICS AND SICKLE CELL PUBLIC HEALTH INTERVENTIONS**

**PI: A Wonkam**

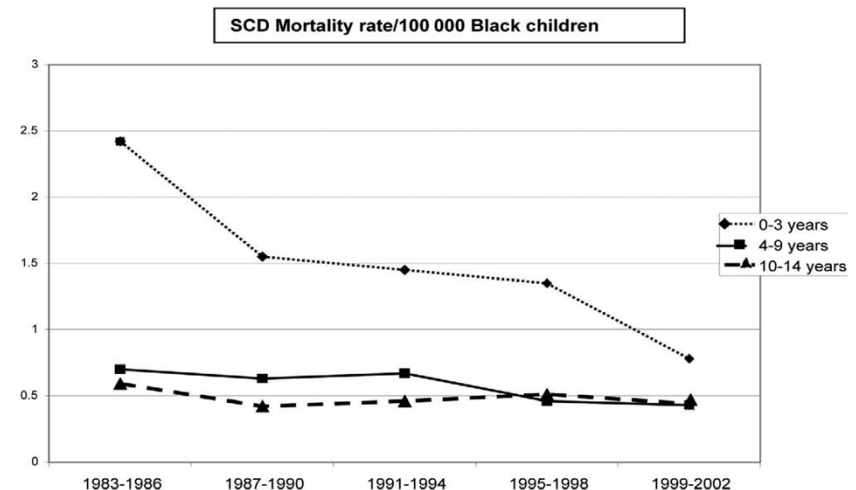
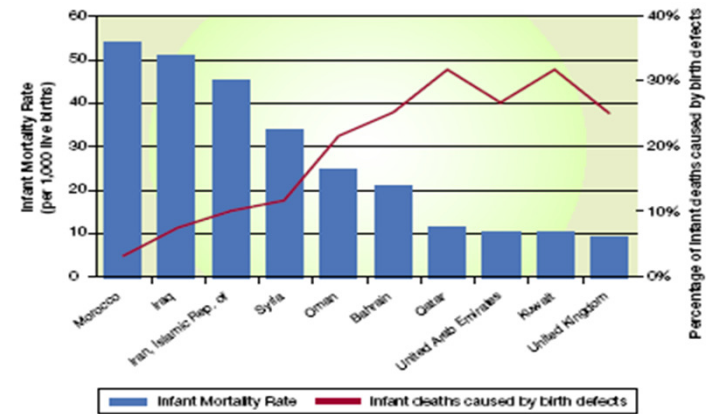
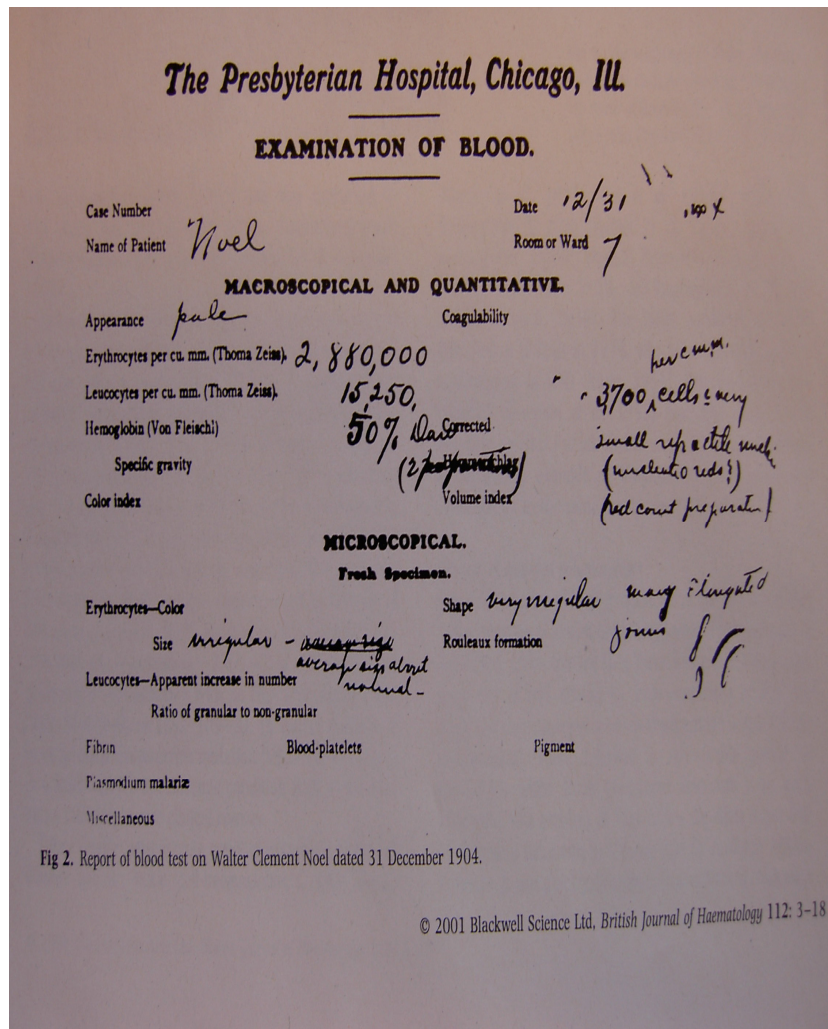
**Co-PI/ Collaborators: J Makani, K Ohene-Frempong,  
G Tangwa, M Treadwell, S McCurdy , J de Vries**

# Global Burden of SCD: The situation in Africa

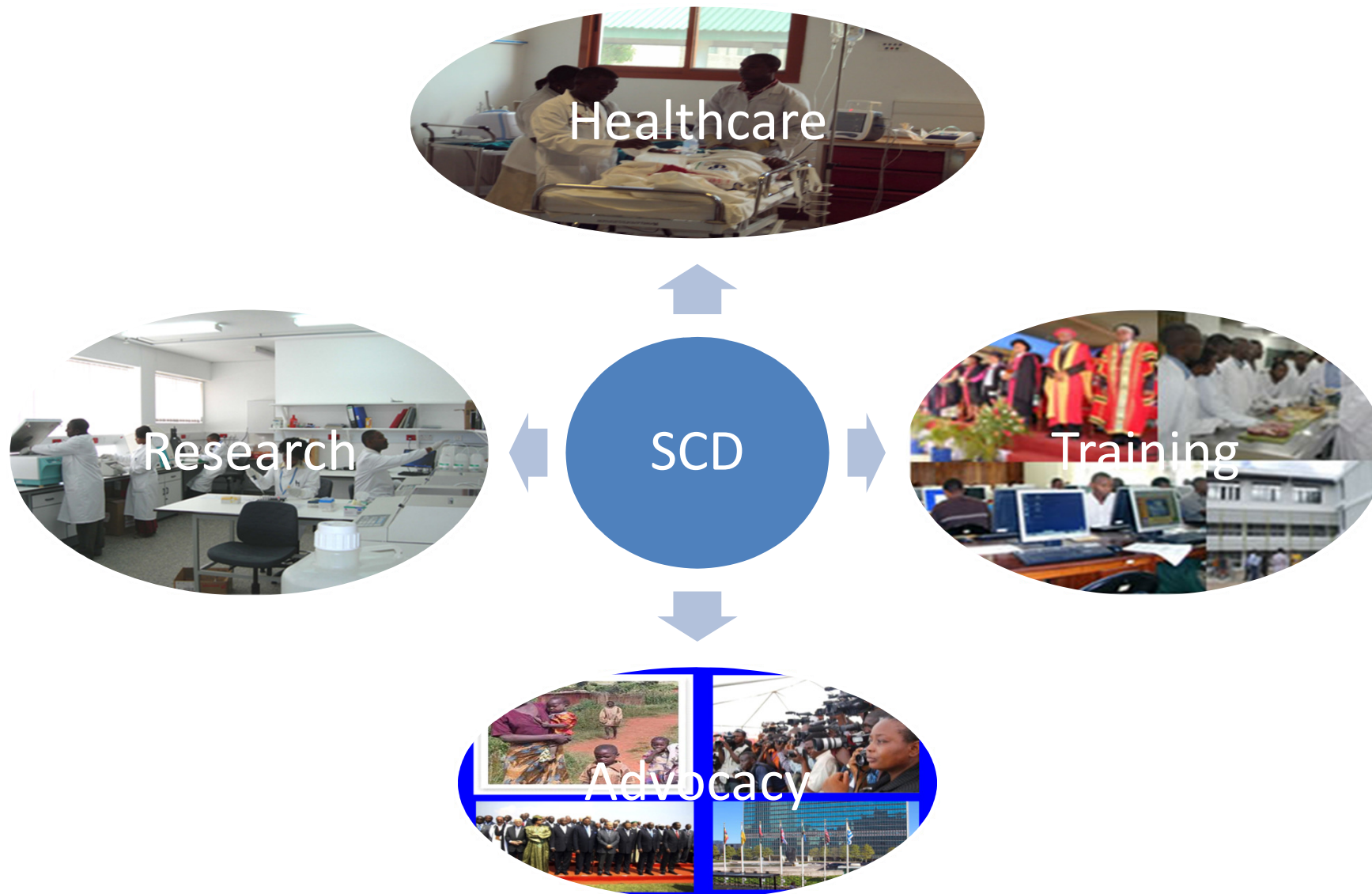


Piel, 2012

# Background: Epidemiologic transition

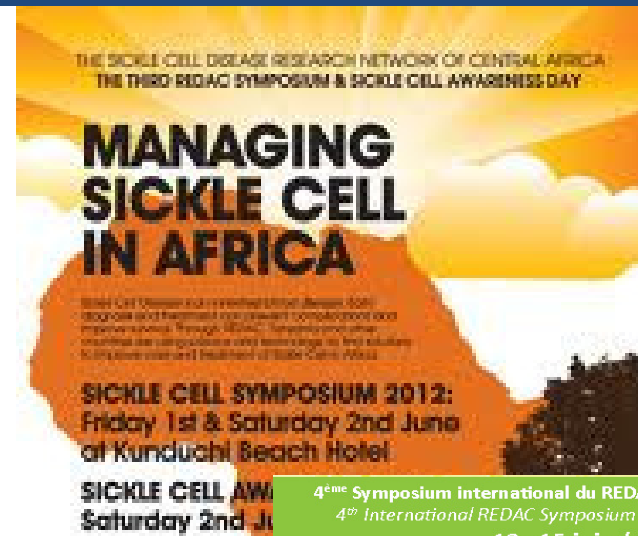
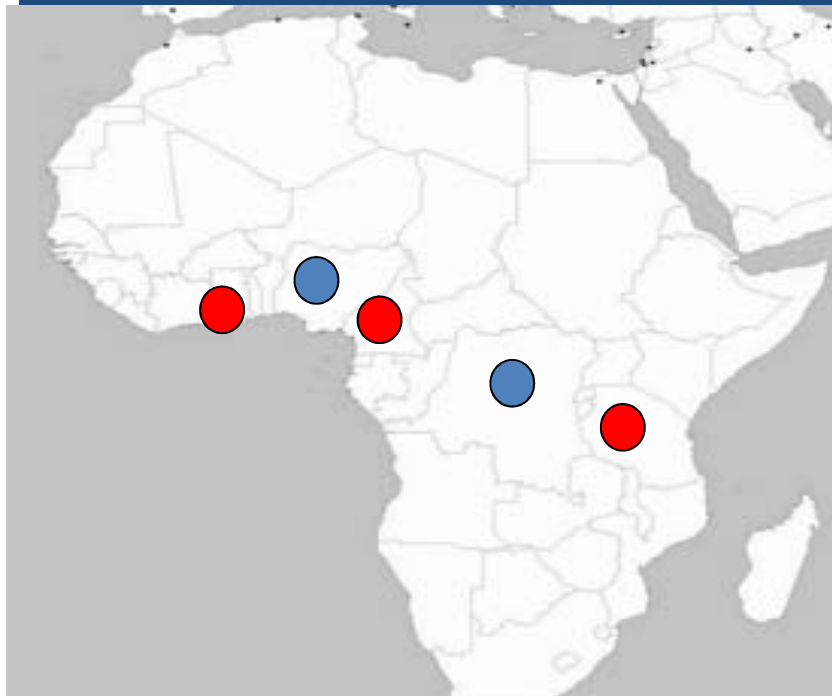


# Sickle Consortium of Healthcare, Advocacy, Research and Training in Africa





# SICKLE CHARTA & REDAC



4<sup>ème</sup> Symposium international du REDAC à Yaoundé, Cameroun  
4<sup>th</sup> International REDAC Symposium in Yaounde, 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'Etude de la Drépanocytose en Afrique Centrale



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

### Sous thèmes / Under themes

- Dépistage neonatal  
Neonatal screening
- Hydroxycarbamide  
Hydroxycarbamide
- Génétique  
Genetics
- Infections  
Infections
- Transfusion sanguine et complications  
Blood transfusion and complications
- Doppler transcranien  
Transcranial doppler
- Transition enfant-adulte  
Child-adult transition

Appel à communications jusqu'au 15 mai 2013  
Call for papers: deadline may 15<sup>th</sup> 2013

Lieu / Venue  
Hôtel Mont Febe

### PAF:

Médecins / Doctors  
2500 FCFA (50 USD)  
Infirmières et étudiants  
Nurses and students  
1500 FCFA (30 USD)

### Comité scientifique / Scientific committee

Président / chairman: Léon Talliole  
Vice-président / vice-chairman: Lucie Koko  
Membres / Members: Baron Ngaso, Guillaume Wamba, Rago-pai Nkomo, Jean Paul Gnanou, Guya Loko, Jean Koko, Julie Ndiani, Suzanne Belinga, Ambrose Wankam, Constant Moudouhe, Simon Ategbro

### Comité d'organisation / Organizing committee

Président / chairman: Guillaume Wamba  
Vice-président / vice-chairman: Lucie Koko  
Secrétaire / secretary: Suzanne Belinga and Baron Ngaso  
Membres / Members: Ambrose Wankam, Ambrose Wankam, Rachel Kamganga, Guy Aimé Dong, Lydia Ze Meka, Odette Guilo, Angèle Pondy, Issa Ngaso Tetonye

Contact:  
redac@yaounde2013@yahoo.fr • barongaso@gmail.com



# CAMEROON: the birth place, 2009





# Background: H3Africa

- **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)

June 2008 • Vol. 18 • No. 6

article

Ambroise Wonkam • Alfred K. Njamnshi •  
Dora Mbanya • Jeanne Ngogang • Caryl Zameyo •  
Fru F. Angwafo III

**PRENATAL DIAGNOSIS**  
*Prenat Diagn* 2011; **31**: 1210–1212.  
Published online 26 October 2011 in Wiley Online  
(wileyonlinelibrary.com) DOI: 10.1002/pd.2896

## Knowledge and attitudes concerning medical genetics amongst physicians and medical students in Cameroon (sub-Saharan Africa)

Ambroise Wonkam, MD, Alfred K. Njamnshi, MD, and Fru F. Angwafo III, MD

### RESEARCH LETTER

## Initiation of prenatal genetic diagnosis of sickle cell anaemia in Cameroon (sub-Saharan Africa)<sup>†</sup>

Ambroise Wonkam<sup>1,2\*</sup>, Cedrik Ngongang Tekendo<sup>1</sup>, Huguette Zambo<sup>1</sup> and Michael A. Morris<sup>3</sup>



ELSEVIER

European Journal of Medical Genetics

journal homepage: <http://www.elsevier.com/locate/ejmg>



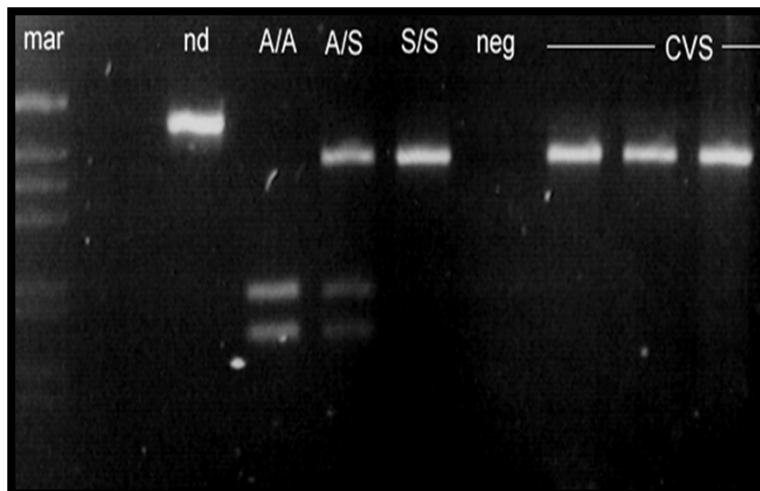
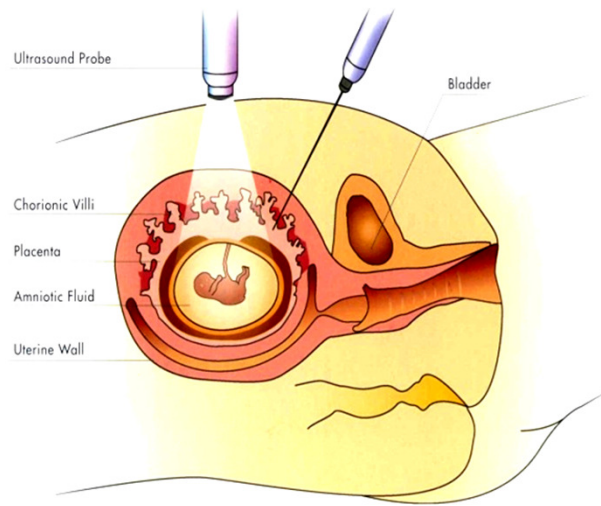
Original article

Initiation of a medical genetics service in sub-Saharan Africa:  
Experience of prenatal diagnosis in Cameroon

Ambroise Wonkam<sup>a,b,\*</sup>, Cedrik Ngongang Tekendo<sup>a</sup>, Dohbit Julius Sama<sup>a</sup>, Huguette Zambo<sup>a</sup>,  
Sophie Dahoun<sup>c</sup>, Frédérique Béna<sup>c</sup>, Michael A. Morris<sup>c</sup>

# GENETICS PND OF SCD INITIATE THE PRACTICE OF MEDICAL GENETICS IN CAMEROON

Transabdominal Chorionic Villus Sampling (CVS)



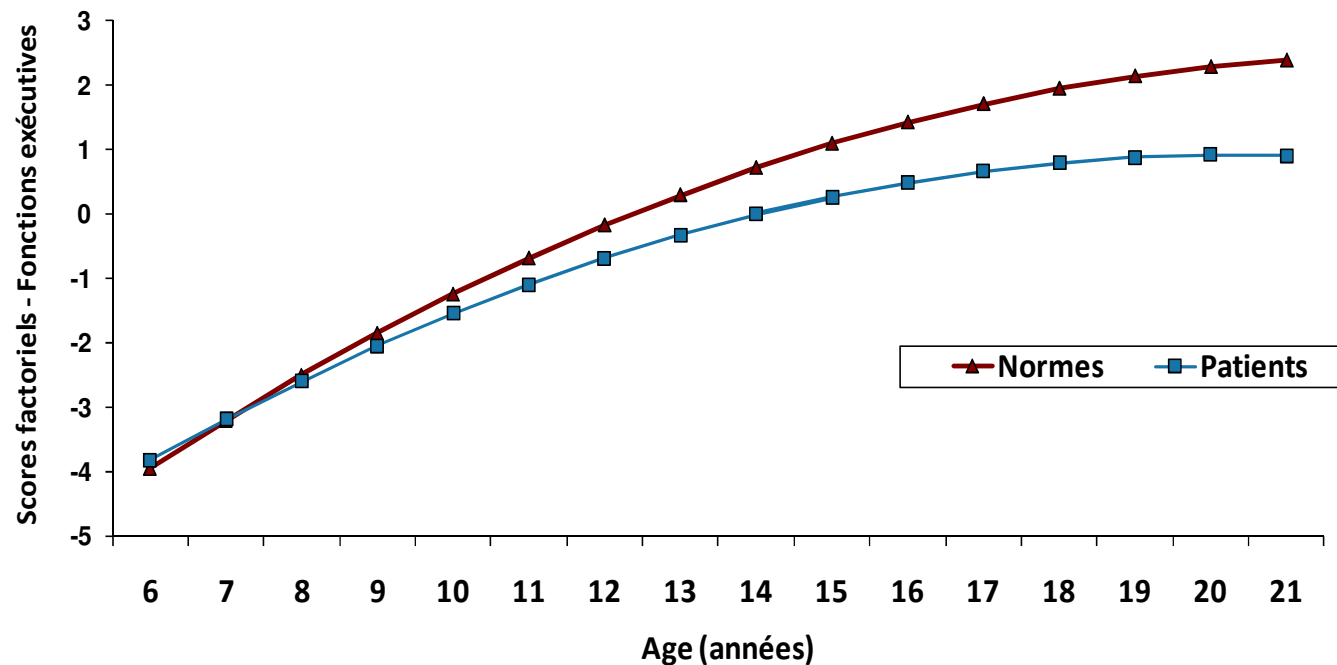
**Wonkam A** et al. Prenat Diagn. 2011;31(12):1210-2.

**Wonkam A**, et al. Morris MA. Eur J Med Genet. 2011;54(4):e399-404.

**Wonkam A**, et a. Public Health Genomics. 2010;13(7-8):492-4

# 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



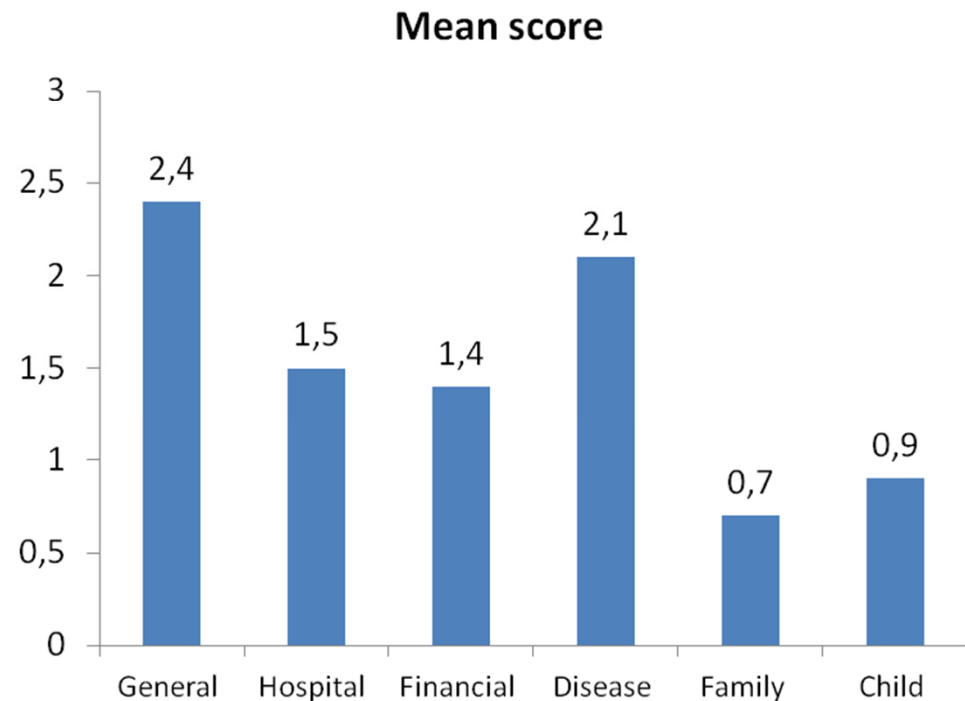
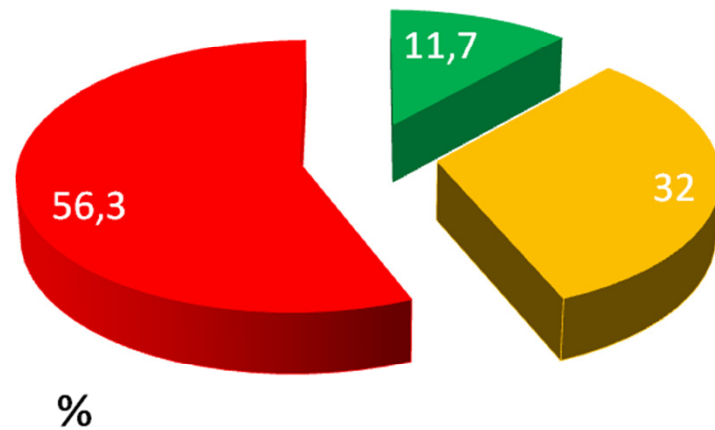
Njamnshi, AK; **Wonkam, A et al**, *J Neurol Sci.* **2009**; **285** : S161-S161.

Ruffieux, Njamshi **Wonkam** et al., *. Child Neuropsychol.* 2013

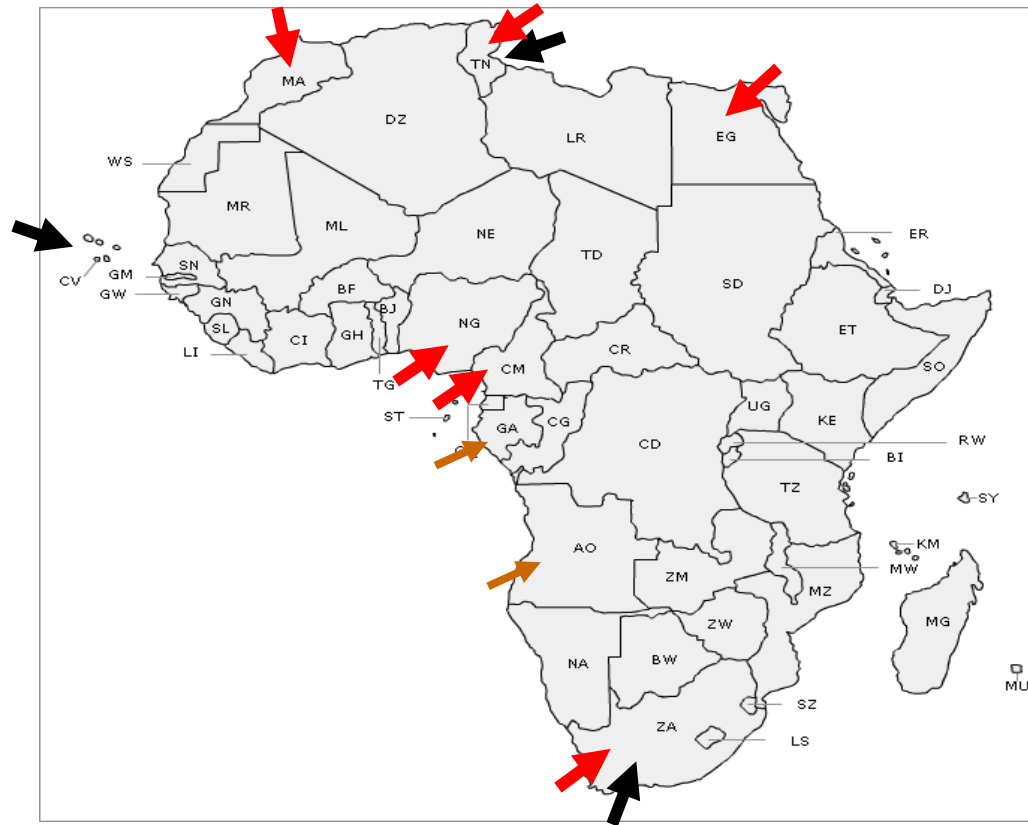


# In general how difficult is to coping with your affected disease child?

- mild difficulty
- moderate difficulty
- severe difficulty



# Africa & Restrictive abortion laws

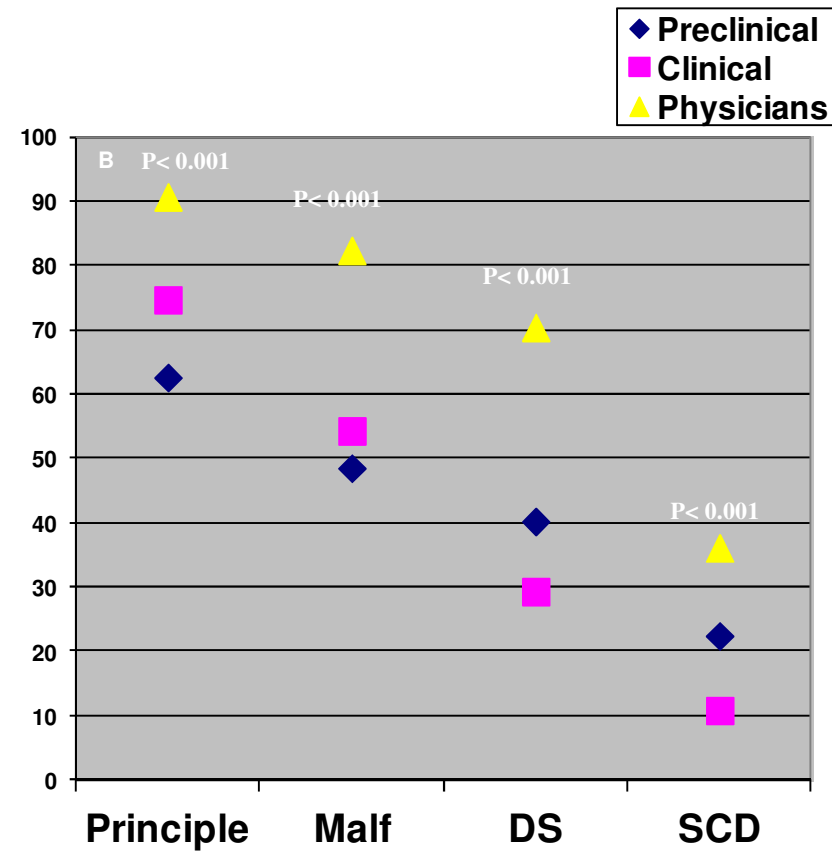
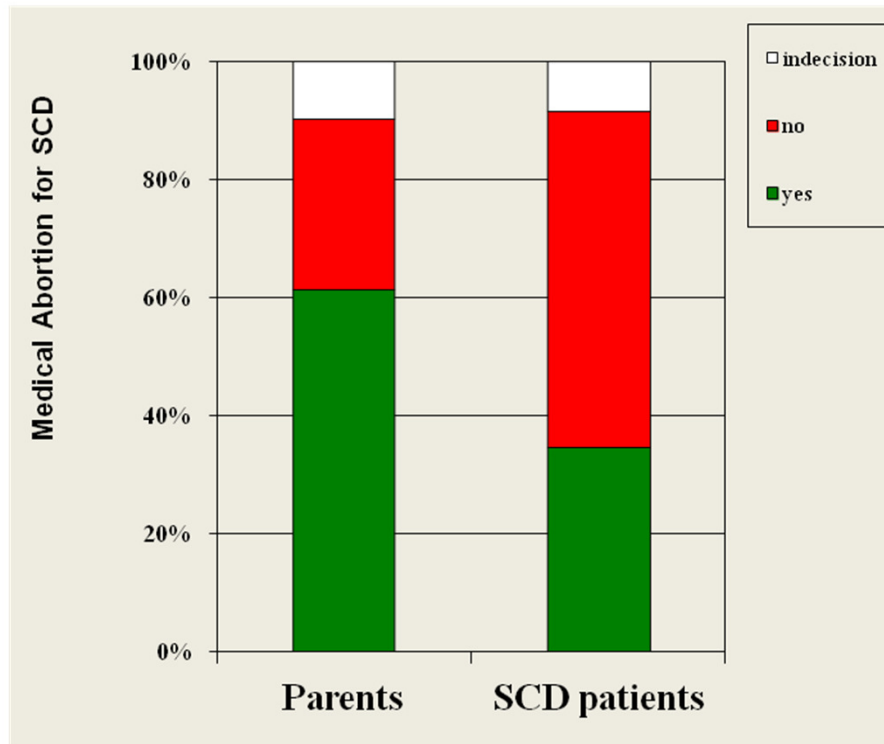


Voluntary abortion is a criminal offense but medical abortion is allowed:

*“...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 A, et al. *J Genet Couns.* 2011 Oct;20(5):476-85

Wonkam & Hurst. *The Lancet*, 2007, june 16; **369**: 1999

Wonkam et al. *Genet Med*, 2006, june; **8**:331-8

Wonkam et al. *Prenat diagn*, 2006; **26**: 760-1

Wonkam et al. *J med Ethics*, 2013



# Differential attitudes to SCD's medical abortion

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

[J Health Care Poor Underserved.](#) 2007 Feb;18(1):1-5.

**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

OPEN ACCESS Freely available online

PLoS one

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

Julie Makani<sup>1,2\*</sup>, S RED CELLS, IRON, AND ERYTHROPOIESIS

Brief report

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

\*Julia Makani,<sup>1,2</sup> \*Stephan Menzel,<sup>2</sup> Blana Nkya,<sup>1</sup> Sharon E. Cox,<sup>1,4</sup> Emma Dresser,<sup>2,5</sup> Deogratius Soka,<sup>1</sup> Albert N. Kombo Josephina Mgaya,<sup>1</sup> Helen Rooks,<sup>2</sup> Nisha Vasavda,<sup>2</sup> Gregory Fagan,<sup>2,6</sup> Charles R. Newton,<sup>1,4,7</sup> Martin Farrall,<sup>8</sup> and Ewee Lay Thain<sup>2,8</sup>

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

Sharon E. Cox,<sup>1,2</sup> Julie Makani,<sup>2,3</sup> Cl

A global network for investigating the genomic epidemiology of malaria

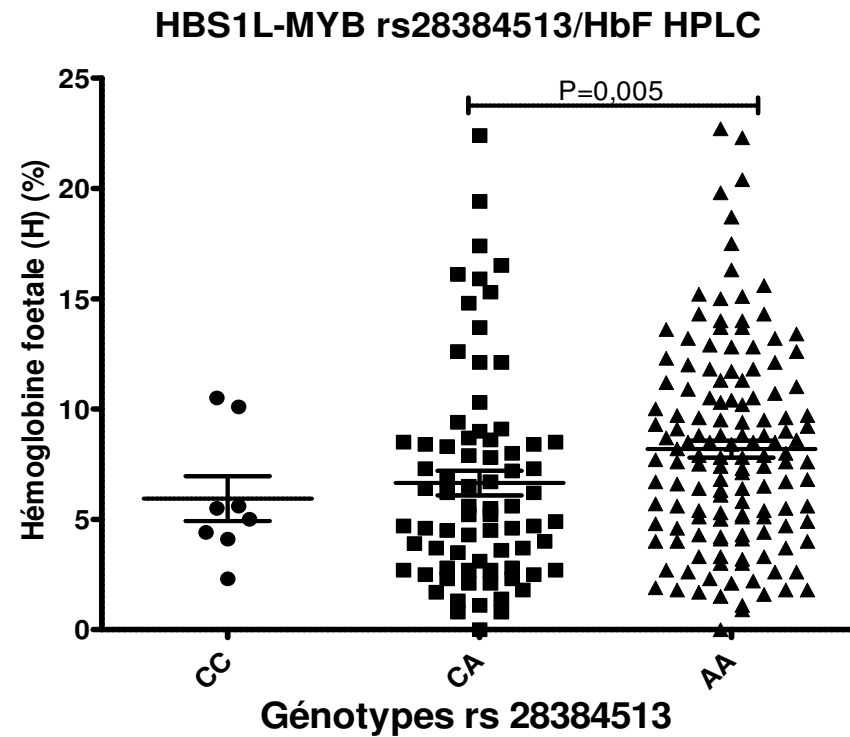
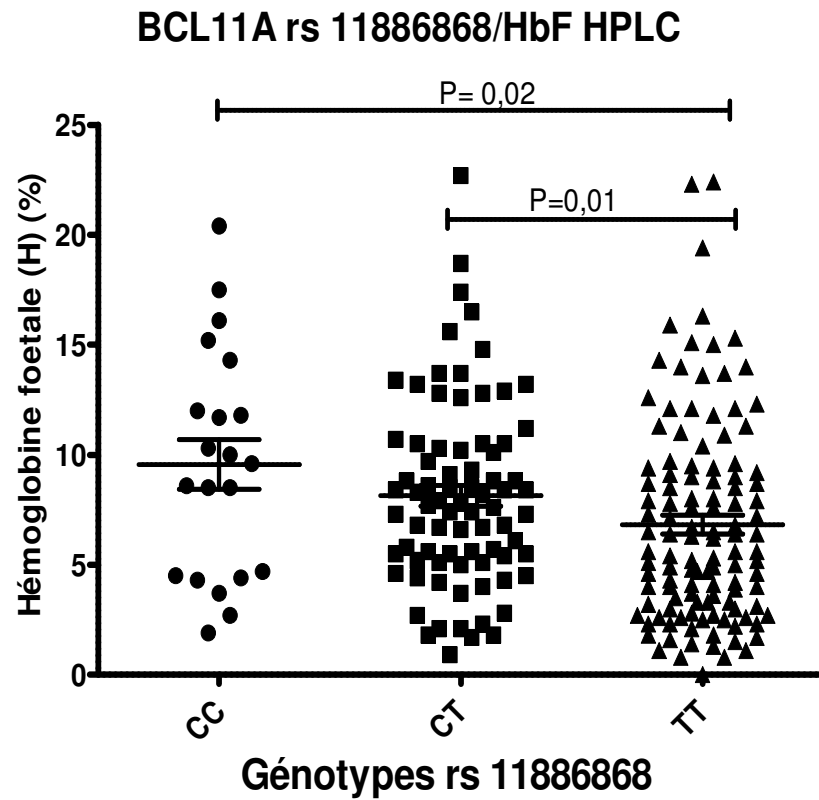
The Malaria Genomic Epidemiology Network\*



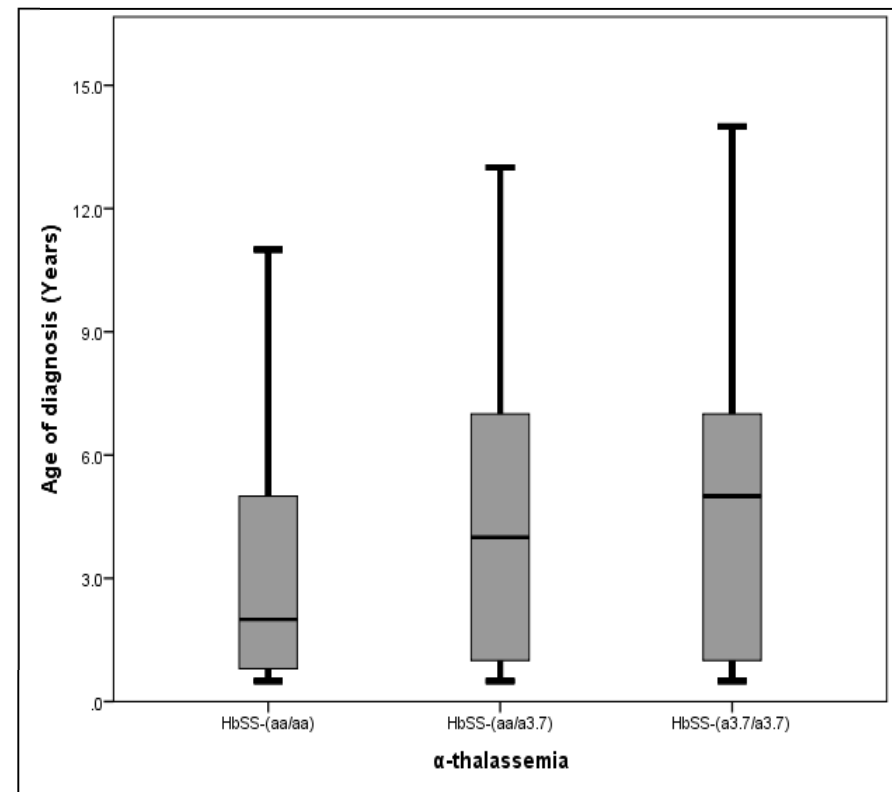
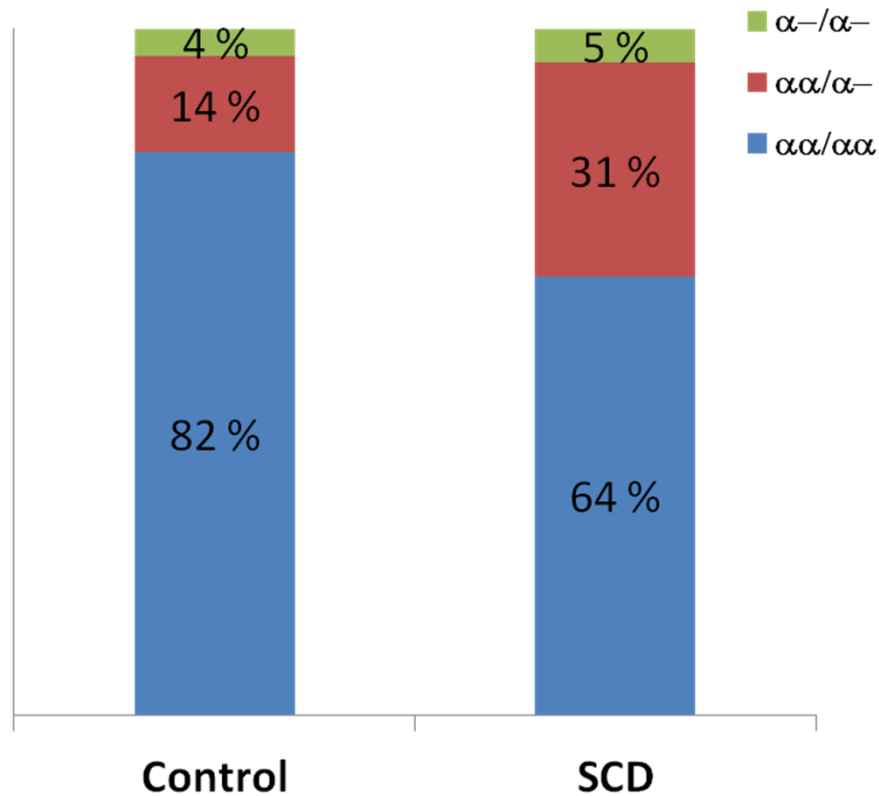
# SNPs & Hb F & SCD

				Cameroon				Tanzania				USA: CSSCD		
Locus	SNP	Position sur le chr*	Allèle changé	MAF	Effet	HWP	n	MAF	Effet	P	n	MAF	Effet	P
Chromosome 2														
BCL11A	rs11886868	60720246	T>C	0,28		0,00043	587	0,26	-0,406	3,00E-30	1000	0,31	0,524	4,00E-35
BCL11A	rs4671393	60720951	G>A	0,27		0,69229	594	0,30	-0,412	3,90E-28	845	0,27	0,598	2,00E-42
Chromosome 6														
HBS1L-MYB	rs28384513	135376209	A>C	0,2		0,31745	596	0,21	-0,146	1,90E-04	1021	0,2	-0,102	0,04
HBS1L-MYB	rs9376090	135411228	T>C	Homozygote		NA	580	0,01	0,471	1,60E-02	1021	NA	NA	NA
HBS1L-MYB	rs9399137	135419018	T>C	0,05		0,000002	555	0,01	0,668	8,30E-06	975	0,06	0,571	5,00E-11
HBS1L-MYB	rs9389269	135427159	T>C	0,18		1,08E-07	568	0,03	0,400	1,40E-05	1016	NA	NA	NA
HBS1L-MYB	rs9402686	135427817	G>A	0,03		0,64572	591	0,06	0,342	1,60E-04	1013	NA	NA	NA
HBS1L-MYB	rs9494142	135431640	T>C	0,12		0,19510	583	0,13	0,085	6,00E-02	1014	NA	NA	NA
Chromosome 11														
HGB2	rs7482144	5276169	G>A	0,006		0,89661	539	0,01	0,562	1,60E-04	991	0,7	0,407	4,00E-07
OR51B5/6	rs5006884	5373251	C>T	0,08		0,02484	592	0,05	0,164	2,40E-02	957	NA	NA	NA

# SNPs & HbF

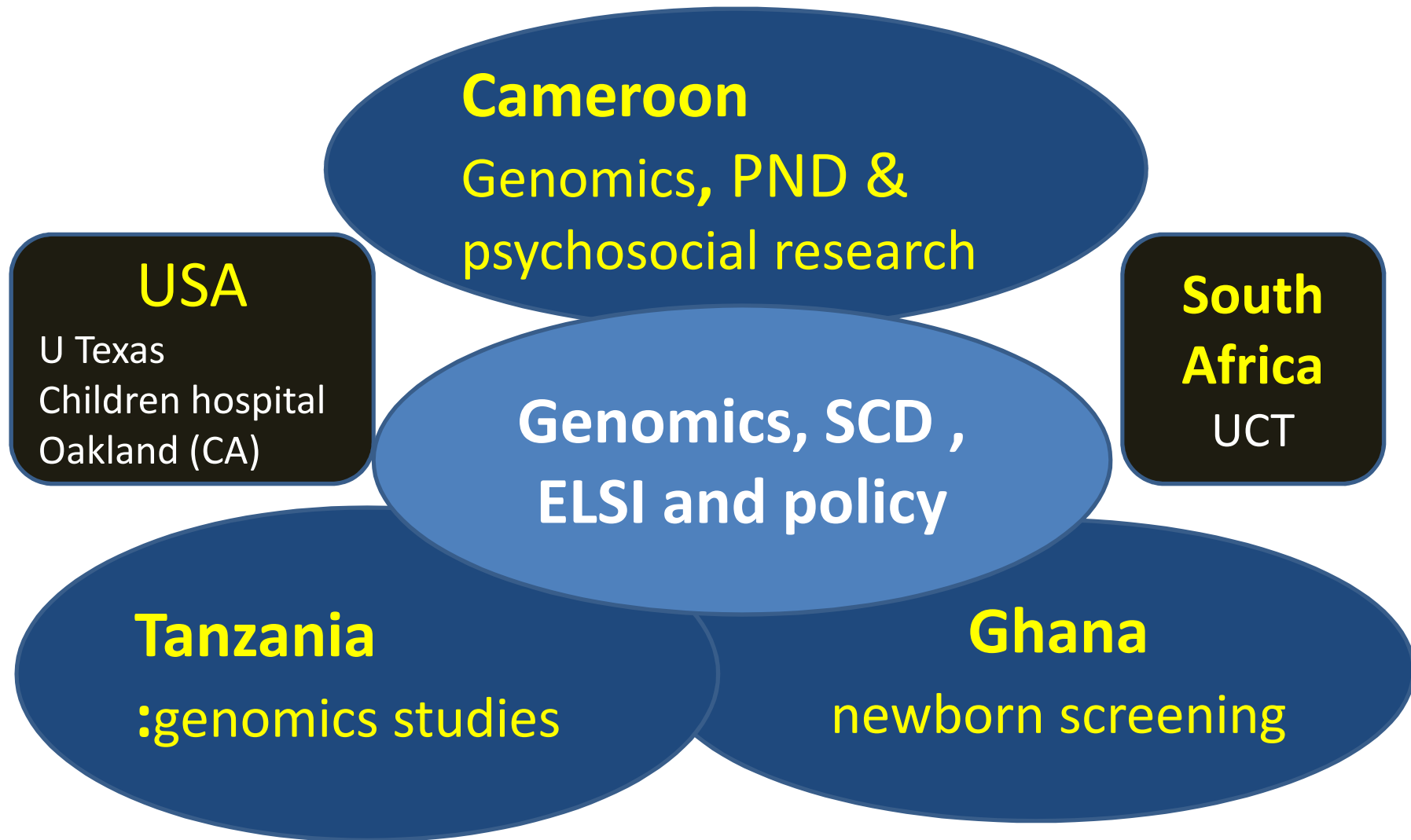


# Alpha-Thalassemia & SCD





# Background: Sites' Selection



# AIMS

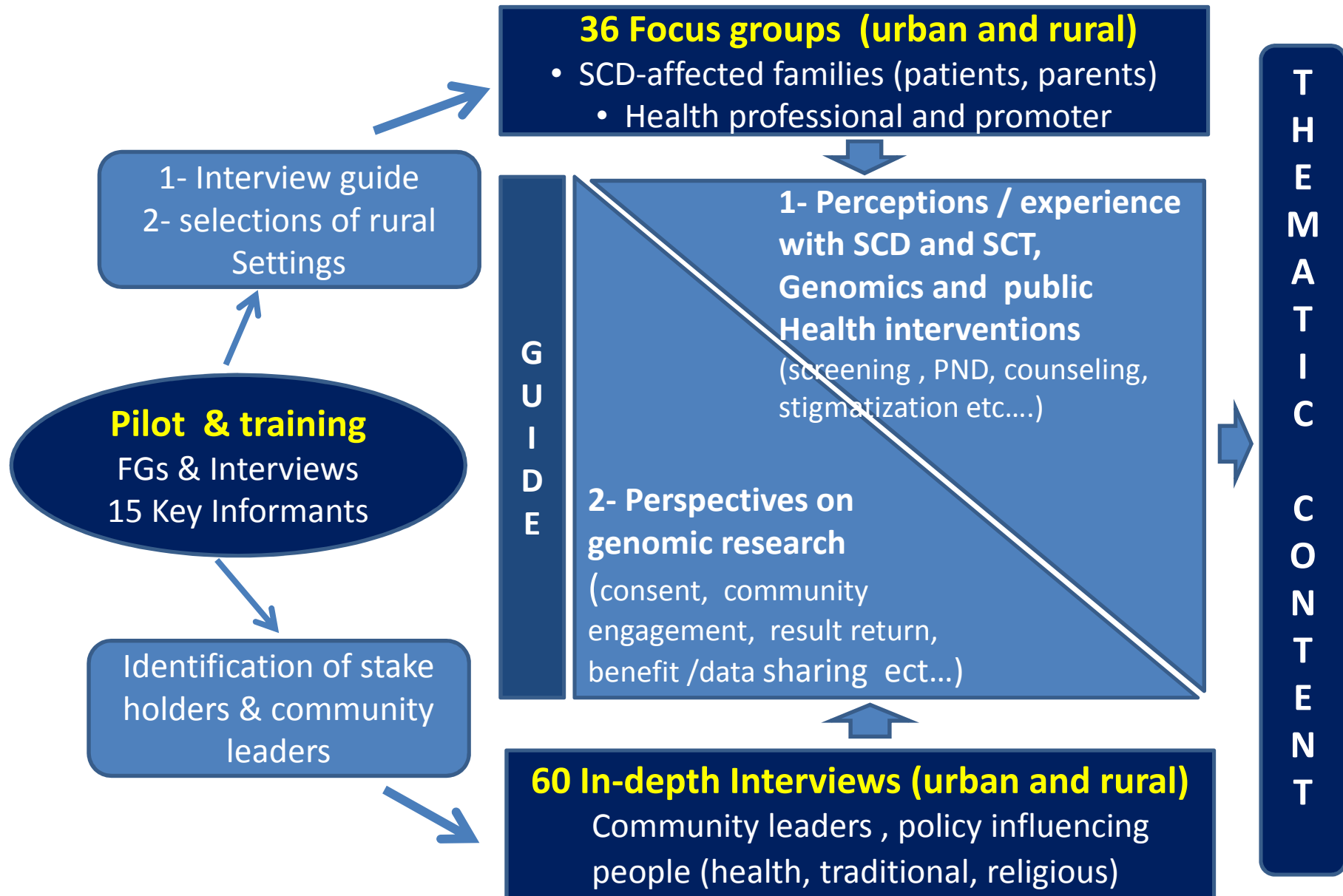
## Aim 1:

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

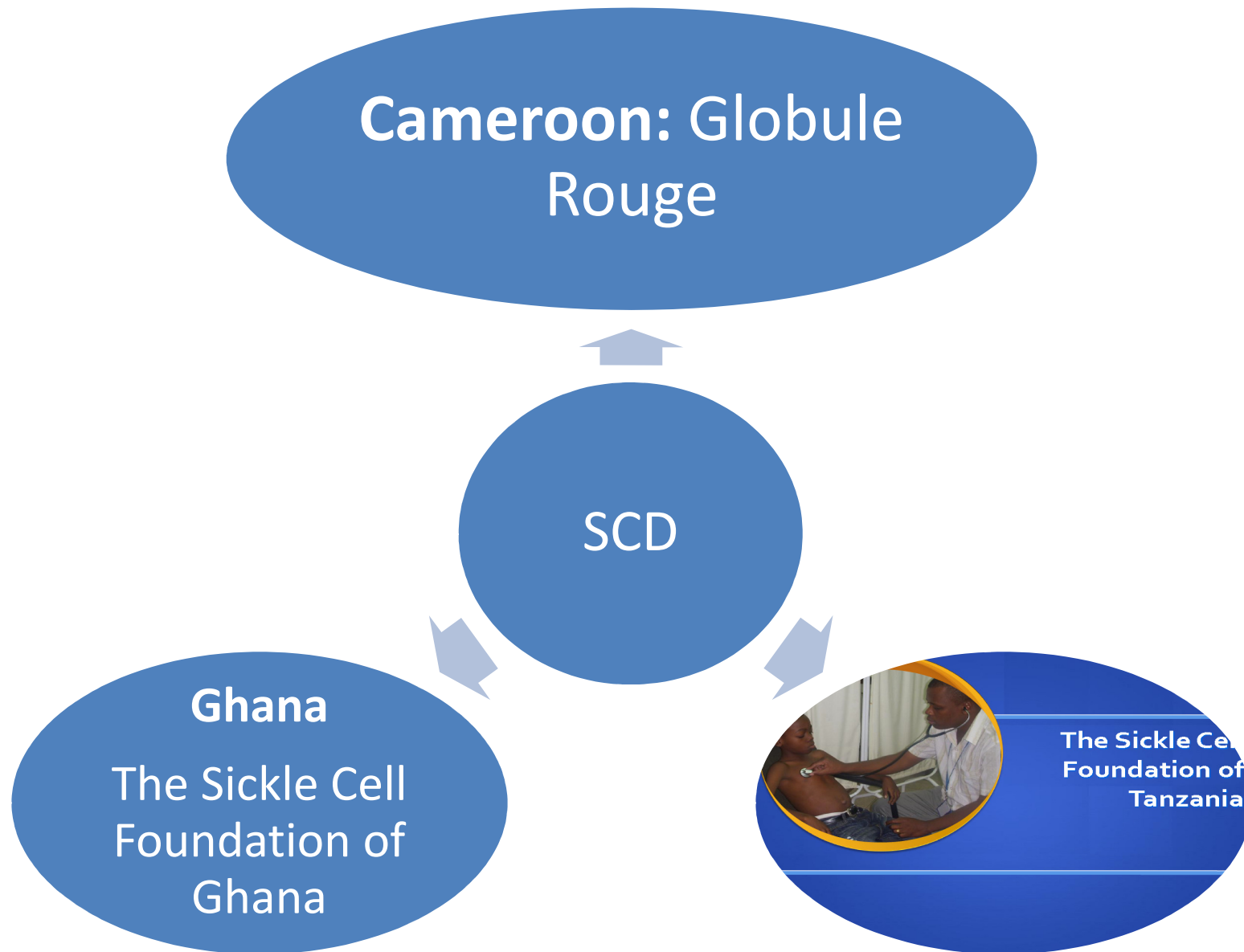
## Aim 2:

To assess perceptions about public health interventions to increase awareness, early detection, and prevention of SCD-related complications.

# Recruitment and Data Collection



# Community Engagement: Advocacy Groups



# 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**



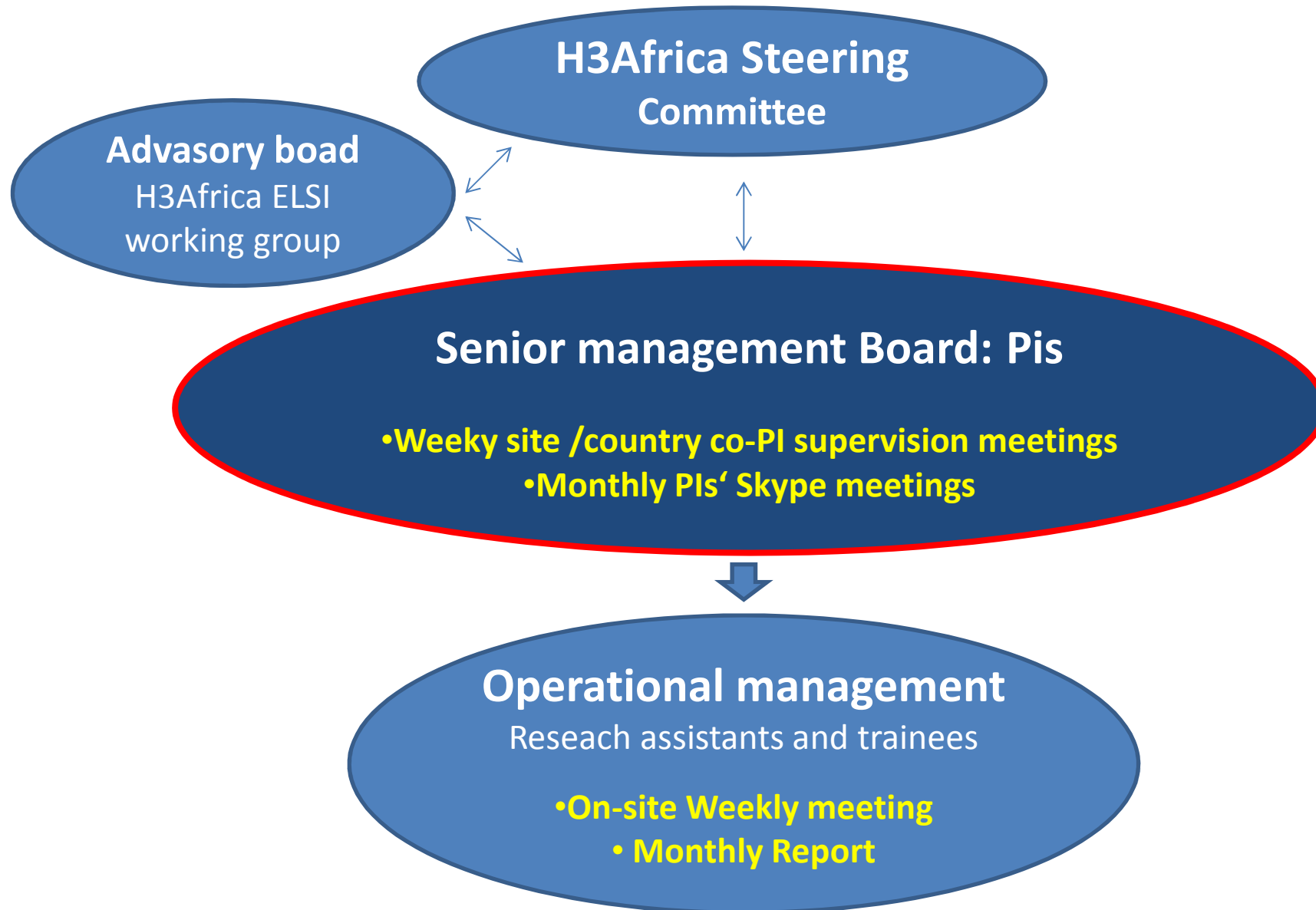
# Importance of the Knowledge to be Gained

- 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

<b>Year 1</b>	<b>1Q</b>	<ul style="list-style-type: none"><li>• Hire Research Assistants;</li><li>• Develop focus group guide;</li><li>• Prepare and submit protocol for ethics Committee approvals,</li><li>• Training of research assistants (Dr Treadwell, Dr McCurdy Dr DeVries);</li><li>• Commentary paper</li></ul>
	<b>2Q</b>	<ul style="list-style-type: none"><li>• <b>Recruit and schedule focus group participants</b></li><li>• <b>Recruit and Schedule key informants for interviews</b></li></ul>
	<b>3Q</b>	<ul style="list-style-type: none"><li>• <b>Pilot instruments and make adjustments as needed.</b></li></ul>
	<b>4Q</b>	<ul style="list-style-type: none"><li>• <b>Conduct and transcribe focus group and in-depth interviews</b></li><li>• <b>Cleaning the transcription</b></li><li>• <b>Begin data analysis</b></li></ul>

# Overview of management plans



# 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.



FOA: RM12-005, 1 U01 HG007459-01



**wellcome**trust

THANKS