ABIDJAN DECLARATION FOR OPEN HEART SURGERY DEVELOPMENT IN SUB-SAHARAN AFRICA: Accessibility, Financing and Sustainability

Declaration written, issued and formally adopted on Friday May 10th 2019 at Radisson Blu, Abidjan, Cote d'Ivoire, by:

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- Professor Yves Tanauh, MD, Head, Department of Thoracic Surgery, Abidjan Heart Institute, and Felix Houphouet-Boigny University of Abidjan, Abidjan, Cote d'Ivoire
- Professor Mouhamadou Ndiaye, MD,Head, Department of Thoracic and Cardio-Vascular Surgery , FAAN University Teaching Hospital of Dakar, and University of Dakar, Dakar, Senegal
- Associate Professor Khaled Ould Boye, MD, Head,Department of Cardio-Vascular Surgery, National Center of Cardiology of Nouakchott ,and University of Nouakchott, Nouakchott, Mauritania
- Dr. Atipo –Galloye Reddy, MD, Head, Department of Cardio-Vascular Surgery, University Teaching Hospital of Brazzaville, and Marien Ngouabi University, Brazzaville, Congo
- Dr.Adama Sawadogo, MD, Consultant, Department of Thoracic and Cardio-Vascular Surgery, University Teaching Hospital of Tingandogo, and University of Ouagadougou, Ouagadougou, Burkina-Faso
- Dr. Wilfried Gandji, MD,Head , Department of Thoracic and Cardio-Vascular Surgery, University Teaching Hospital of Cotonou, Cotonou and University of Abomey-Calavi, Abomey-Calavi, Benin
- Professor Yena Sadio , MD, Head, Department of Cardio-Vascular and Thoracic Surgery , University Teaching Hospital of Mali ,and University of Bamako, Bamako, Mali
- Professor Gilbert Bonkoungou, MD, Head, Department of Thoracic and Cardio-Vascular Surgery, University Teaching Hospital of Tingandogo, and University of Ouagadougou, Ouagadougou, Burkina-Faso
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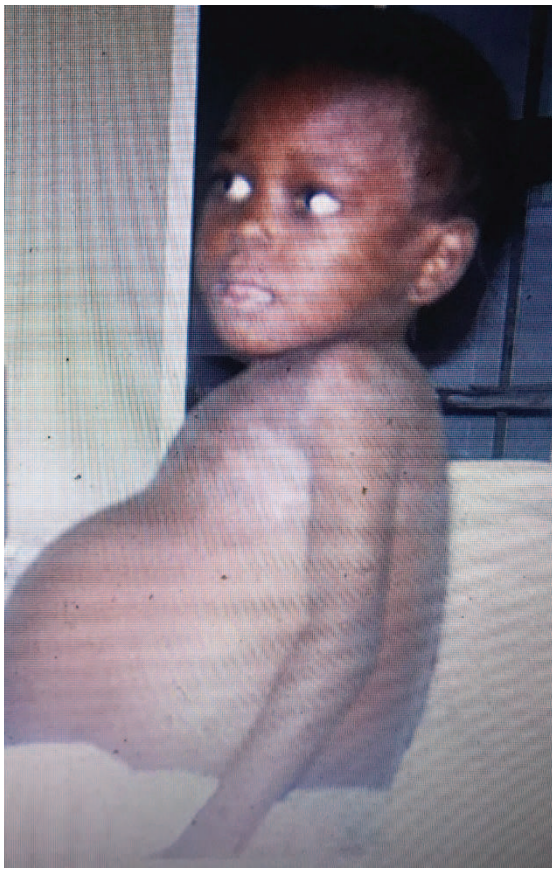


Photograph 1

Photograph 2

Typical illustrations being shown above testifying the late presentation in children in African setting with rheumatic heart diseases (RHD) (photograph1) and Tetralogy of Fallot, the most common form of cyanotic congenital heart diseases(CHD)(photo2) .They are usually in severe hemodynamic deterioration with advanced congestive heart failure symptoms(Photo1),underdeveloped, stunted, underweight, underweight and small for their age. More than one hundred thousand of those children born with CHD and or with RHD yearly will die within the first month of birth or in early ages because of no accessibility to open heart surgery (OHS) in Sub-Saharan Africa (SSA).

- We, African Thoracic and Cardio-Vascular Surgeons declare: "**In Sub-Saharan Africa, at least 1.3 million children per year with surgical heart disease cannot have access to Open-Heart Surgery (OHS) and consequently their physical conditions will worsen steadily up to untimely death".**

- Based on this evidence, We, participants in the first International Congress of the Ivoirian Society of Thoracic and Cardio-Vascular Surgeons (ISTCVS) agree to the following general principles and call to actions and express recommendations to promote and achieve OHS development in Sub-Saharan Africa.

A. General Principles

1. The first International Congress of the Ivoirian Society of Thoracic and Cardio-Vascular Surgeons (ISTCVS) was organized from May 8th to 10th, 2019, in Abidjan, with a group of team lead surgeons from West and Central Africa.
2. The topic of this first International Congress was: "Thoracic and Cardio-Vascular Surgery in Côte d'Ivoire from 1977 to 2018: Progress and Outcomes". The main aim of this congress was to share the forty-year Côte d'Ivoire experience on open heart and thoracic surgery with african thoracic and cardio-vascular surgeons and leaders of surgical teams in their respective country; to look for innovative avenues for delivering better thoracic and open-heart surgery services in Sub-Saharan Africa; and strengthen a South-to-South cooperation among African thoracic and cardio-vascular surgeons.

A roundtable was organized on the theme**: "Open Heart Surgery in Sub-Saharan Africa: current situation and challenges in our respective countries, solutions and recommendations".**

View of participants

The objective of this roundtable was to highlight some recommendations to governments, international institutions or agencies or communities, health policy-makers worldwide and within Africa and social or humanitarian or scientific and medical associations or societies for more and significant access to open-heart surgery care in Sub-Saharan Africa, and to ensure a sustainable development for open-heart surgery delivery in Sub-Saharan Africa.
Thus, successively,

Associate Professor Khaled Ould Boye, Mauritania, Thoracic and Cardio-Vascular Surgeon, Vice-president of the Mauritanian Society of Cardiology, Head of the Department of Cardio-Vascular Surgery at the *National Center of Cardiology* in **Nouakchott, Mauritania,**

made a presentation on the past, and the present of heart surgery, and results achieved between 2012 and 2019 in Mauritania.

He mentioned difficulties encountered:
- Tough access of patients to OHS because of lack of universal health care insurance;
- High cost of OHS which makes that care unaffordable to an important group of patients;
- Constraints related to essential consumables supply services.

Professor Mouhamadou Ndiaye from Senegal, Thoracic and Cardio-Vascular Surgeon, Head of Thoracic and Cardio-Vascular Unit at FAAN Hospital, Dakar, Senegal,

pointed out the following difficulties:

- Lack of qualified staff, and infrastructures;
- Purchase of consumables and excessive cost of open-heart surgery in Dakar;

Nevertheless, Professor Ndiaye mentioned great achievements in his country in terms of infrastructures including: an adult cardiac surgery unit, a cardio-pediatric center and a research and training unit with a veterinary laboratory for experimental surgery.

He focused on the importance of financial support from our governments to ensure OHS sustainability. He also mentioned that they receive subsidies from Senegalese government.

As for solutions, his suggestions are as follows:

- Possibility to acquire kits for Open Heart Surgery;
- Organization of collective procurement markets for consumables for open heart surgery by annual identification of each country's needs in SSA;
- Necessity to set flat rates for Open Heart Surgery in SSA.

Dr. Reddy Atipo-Galloye from Congo-Brazzaville, Thoracic and Cardio-Vascular Surgeon, Head of the Department of Cardio-Vascular Surgery at the University Hospital of Brazzaville, **Brazzaville, Congo,**
underlined challenges related to:

- Training of qualified staff, such as surgeons, perfusionists, technicians, anesthetists, intensivists, physiotherapists and inalhotherapists;
- Difficulties to get consumables;

To end up, he recommended the creation of an “African Union group for Open-Heart Surgery” and south-south cooperation.

According to him, implementation of these recommendations would allow them to satisfy the entire current needs for Open-Heart Surgery in Congo-Brazzaville, and he added that six hundred patients are on the waiting list.

Dr. Adama Sawadogo from Burkina Faso, Thoracic and Cardio-Vascular Surgeon, came up on behalf of Professor Gilbert Bonkoungou, Head of the Department of Thoracic and Cardio-Vascular Surgery at the University Teaching Hospital of Tingandogo, Ouagadougo, Burkina-Faso

According to him, the government has made efforts for Open-Heart Surgery, and that has led to the first successful case operation in Ouagadougou two weeks ago. He informed the audience on the building of a new hospital that will shelter a department for Open-Heart Surgery. Beside the importance to train qualified staff, he also insisted on the financial support for Open-Heart Surgery and the necessity for cooperation between Africans and political support for open heart surgery implementation and development across Sub-Saharan Africa.

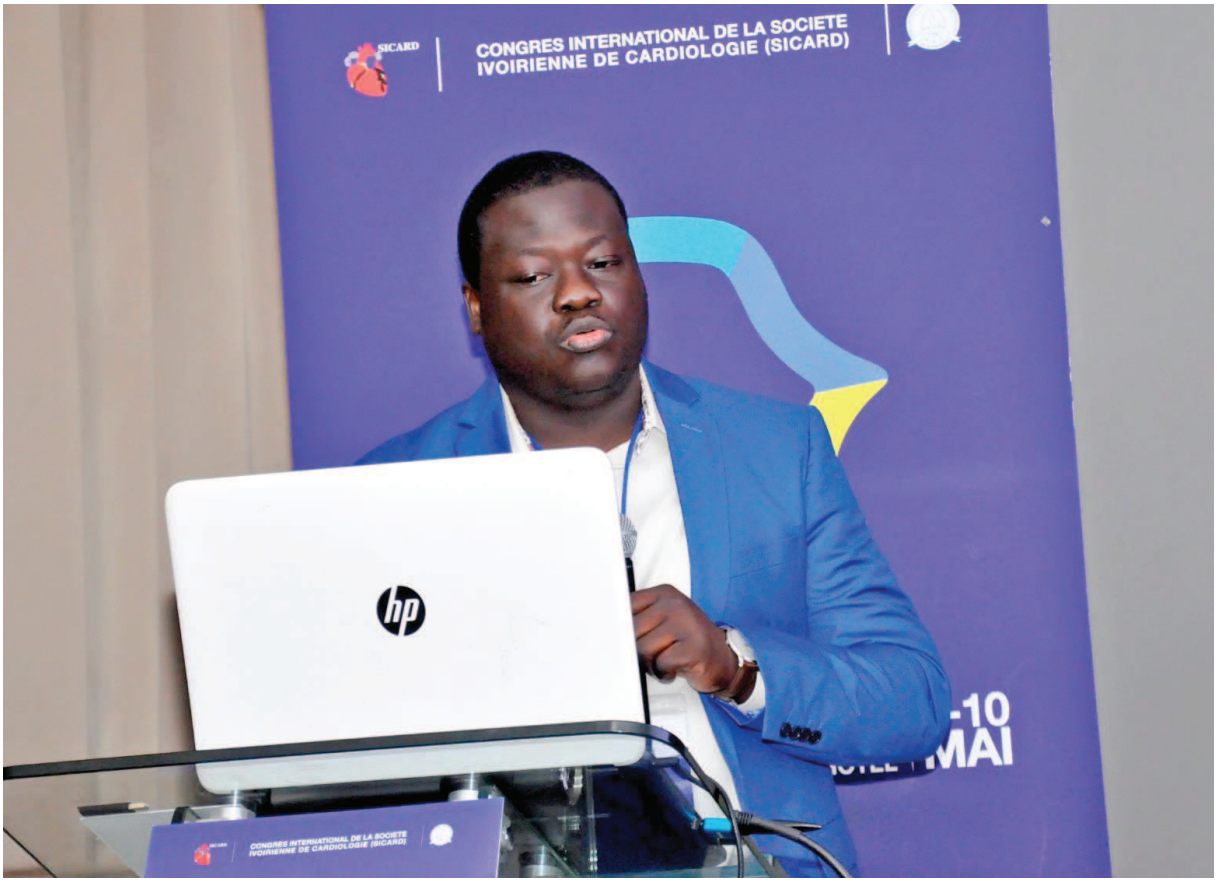
Professor Mohamed LY, Pediatric Heart Surgeon, (Franco-Mauritanian, President and Founder of the French Association of Heart for West Africa,)

insisted on necessity to set up centers of excellence for a better sharing of human and financial resources and for more efficient and rapid development of heart surgery in SSA.

Professor Remi Seka, Chief Executive Officer of Abidjan Heart Institute, Abidjan, Cote d'Ivoire,

mentioned that there is a need for setting up a global order among African cardiac surgeons to purchase consumables for OHS; by doing so, it would reduce heart surgery consumables cost in Sub-Saharan Africa.

Dr. Wilfried Gandji, Thoracic and Cardio-Vascular Surgeon from Benin, Head of the Department of Thoracic and Cardio-Vascular Surgery, University Hospital of Cotonou, **Benin**,



also focused on the necessity to guarantee access to Open Heart Surgery and sustainability through three major priorities:

- Training of qualified staff,
- Building appropriate infrastructures,
- Fundraising policy

As his predecessors, he amplified the call for African Intelligentsia to advocate for African solidarity around open heart surgery development in Sub-Saharan Africa.

Finally, **Professor Koffi Herve Yangni-Angate, Thoracic and Cardio-Vascular Surgeon, President of the Ivorian Thoracic and Cardio-Vascular Surgery Society, and of the African Association of Thoracic and Cardio-Vascular Surgeons ,Head of the Department of Cardio-Vascular and Thoracic Diseases, University Hospital of Bouake,**

highlighted similar difficulties and challenges encountered in open-heart surgery practice in SSA and urgency to make recommendations towards policy-makers in all SSA countries.

Cross-section of the invited panelists. From Right to Left: Wilfried Gandgi (Cotonou, Benin), Reddy Atipo-Galloye (Brazzaville, Congo), Khaled Ould Boye (Nouakchott, Mauritania), KH Yangni-Angate (Bouake, Cote d'Ivoire), Mouhamadou N'Diaye (Dakar,Senegal), Mohamed LY (Paris, France), Adama Sawadogo (Ouagadougou, Burkina-Faso)

Before recommendations, all participants pointed out remarkable facts related to cardio-vascular diseases in terms of epidemiological aspects, care system delivery, social and economic impacts in SSA:

- Cardiovascular Diseases (CVD) have a significant and an increasing surgical burden, particularly Rheumatic Heart Diseases and Congenital Heart diseases in African continent[1];
- CVD are the first cause of death in the world: each year more people die from cardiovascular diseases than any other cause[2,3];
- An estimated 17.7 million people die each year from cardio-vascular diseases, accounting for 31% of total global mortality[2,3];
- More than three deaths out of 4 due to cardiovascular diseases happen in low or middle income countries including Sub-Saharan Africa (SSA)[2];
- By the year 2030 worldwide, CVD annual number of deaths will reach 24.2 million, percentage of all deaths due to CVD will be 32.5% and CVD DALY's will rise to 187 million[4] .In the world, the highest rates of disability-adjusted life years (Daly's

per 100 000 population or CVD Burden) attributable to CVD are recorded in SSA ; CVD burden was estimated in 2011 between 3439 and 10 772[5] ;

- In SSA, CVD burden is increasing; it will double by 2030[5,] ; when in SSA we're still facing lack of adequate functional cardiac surgery centres and no access to open heart surgery for a large majority of patients in LMIC's[6 ,7] where six billion people have no access to open heart surgery when necessary[1] ;
- The highest prevalence of rheumatic heart disease in the world is found in Sub-Saharan Africa in children aged 5 to 14 years at 5.7 per 1000; there are 2 million children with rheumatic heart disease worldwide, including 1 million in Sub-Saharan Africa[8,9,10,11,12,13];
- There are 200,000 to 470,000 new cases of rheumatic heart disease every year[8,10,14,15]. In children with heart disease in Sub-Saharan Africa, rheumatic heart disease is the leading cause of death during the first 10 years of life with a mortality rate of 12.5% to 20%[8,11,14]; among the deceased, more than fifty percent could have been saved if there were easy access to Open Heart Surgery; among the survivors, hundreds of thousands cannot access Open-Heart Surgery and will see their physical condition deteriorate until early death[16,17]; without any surgery ,more than 80% of them may have lost life[18];
- In Africa, of the 50 million live births annually, at least 335,000 will have a congenital heart disease(CHD)[19] .Up to date,SSA has the highest birth rates in the world of 25 to 44.2 births per 1000 population[20] , the highest fertility in the world with the top at 7.153 children per woman in Niger[21],making the global burden of CHD more heavy in SSA . According to Julien Hoffman[22] **:« In a country with a fertility rate of about eight per woman, the population has to support four times as many children with CHD as in a country with a fertility rate of two. Countries with high fertility rates have more children with congenital heart disease per wage earner »**. Unfortunately, less than 5% will have access to open heart surgery (OHS)[19]. **Because of no availability or no accessibility to OHS, one in three children born with CHD will die within the first month of birth" [19]. As a consequence of topping fertility and burden rates; and of no access to OHS, CHD will remain a social problem in African continent and SSA specially;**

- More than 1.5 million open-heart operations are performed every year in the world by more than 6000 surgeons[23]; whereas in Sub-Saharan Africa, only few patients have access to open-heart surgery[6,7,19], despite a large need for OHS, approximately 3000 to 5000 new surgical cases per year and country in SSA;
- **There are 1222 Open-Heart operations performed for 1 million of inhabitants in North America, versus 18 for 1 million of inhabitants in Africa[23]. On the other side, there is 1 center for 120,000 people in North America versus only 1 single center for 33 million of people in Africa[23];**
- Moreover,In LMIC's there is less than 1 adult cardiac surgeon per million population compared with 7.15 adult cardiac surgeon in high income countries[24] ;
- Obviously SSA and Africa at large face serious challenges in providing OHS services for all patients who need it [6,7,25];
- Most People affected by cardio-vascular diseases are poor and live in low or middle income countries income; for this reason, , most of them do not benefit from integrated program of primary care for early detection, and health cares for people at risk comparatively to high income countries[2];
- As well, in LMIC's and in SSA mainly, cardio-vascular diseases and other non-communicable diseases contribute to household poverty due to catastrophic health cost and the high level of direct payments faced by households[26,27,28];
- The total economic loss due to CVD in low- and middle-income countries such as those in Sub-Saharan Africa was estimated at US$3.7 trillion between 2011 and 2015, representing approximately half of the economic burden of non-communicable diseases and 2% of GDP in low- and middle-income countries[27];
- The national or regional economic loss due to CVD in sub-Saharan Africa is estimated at US$9 biillion versus$ 20bn in Brazil, India $2.4 trillion over 2012–2030 in India[27] ;
- **At macroeconomic level, CVDs have a negative impact on the economies of low- and middle-income countries. "They would reduce the gross domestic product (GDP) of these countries, which are experiencing rapid economic growth of 1 to 5% because many people die prematurely," says WHO in a checklist on cardio-vascular disease dated September 2011[29].**

3. After the aforementioned facts, the following Call to Actions and recommendations were made for OHS development in SSA.

B. CALL TO ACTIONS AND RECOMMENDATIONS TO GOVERNMENTS AND OTHER PARTNERS

I. *HUMAN RESOURCES*

- Encouraging the recruitment of at least 2 surgeons, 4 anesthesiologists, 4 intensive care physicians, 2 anesthesiologists, 2perfusionists, 1 physiotherapist, 1 respiratory therapist, per open heart surgery centre.

II. *CONSUMABLES, DRUGS AND MEDICAL EQUIPMENTS*

- Allowing grants for "Kits" for Open-Heart Surgery;
- Enabling supply of consumables and medical drugs by purchasing groups or specialized industries;
- Encouraging group to purchase for all consumables and medicines expressed by centers for Open-Heart Surgery in Sub-Saharan Africa;
- Granting tax relief on all consumables, drugs, medical imaging and biomedical equipment in countries where it does not exist.

III. *INFRASTRUCTURES*

- Building at least 1 Open-Heart Surgery center per country in SSA which should include:
- An outpatient unit;
- A Cardiology unit with at least 30 beds;
- A medical and surgical intensive care unit (ICU) of at least 10 beds;
- A 15-bed surgical hospital unit;
- A medical imaging unit with a complete cardiac hemodynamics room, and two echocardiography-doppler rooms;
- A biology Unit and a Pharmacy Unit;

- A surgical block with at least two surgical theaters and two artificial "Heart-Lung" machines.

IV. TRAINING PROGRAM

Development of fellowship program and continuous education in thoracic and cardio-vascular surgery;

Extenxion of the harmonized curriculum for fellowship in cardio-vascular and thoracic surgery within West Africa to other countries n SSA;

Creation of sub- specialties training program including perfusionist and physiotherapy training program in SSA.

V. FUNDING

- Ensuring universal health coverage for all patients who need open heart surgery, with priority given to children aged 0 to 15 years;
- Benefiting from 2% of social funds of companies and industries established in our countries;
- Allocating 0.1% of the national budget to enhance Open-Heart Surgery practice and accessibility in each SSA country;
- Budgeting for at least 200 open heart surgery cases per center, per country annually from national government in SSA;
- Developing bills and laws and decrees to facilitate open heart surgery practice in SSA.

C- ACTIONS FROM AFRICAN THORACIC AND CARDIO-VASCULAR SURGEONS

We, thoracic and cardio-vascular surgeons, have come together and decide to:

- Share our skills and expertise;
- Setting up fellowship training programs in thoracic and cardio-vascular surgery and a cardiovascular perfusion master's degree program;
- Setting up a simulation unit in cardiovascular and thoracic surgical training per center and country;
- Setting up a unit for Research in "Cardiovascular Health" per center and country;

- Developing and strengthening south-to-south cooperation through the African Association of Thoracic and Cardiovascular Surgeons;
- Setting up an intelligentsia of thoracic and cardio-vascular surgeons in every country;
- Holding regular annual meetings for scientific exchanges and sharings;
- Setting up a common database for our surgical patients ;
- Setting up a committee for monitoring the development of open-heart surgery in our countries.

We, thoracic and cardiovascular surgeons, encourage:

- African Development Banks, chambers of commerce and industry within Sub-Saharan Africa, pharmaceutical and biomedical industries, or medical imaging equipments, donors, local or international Foundations, Humanitarian Organizations or any other individual or collective initiative to enhance Open Heart Surgery development in SSA;
- More fundraising campaigns to support Open Heart Surgery delivery and research in cardiovascular and thoracic surgery;
- Setting up Centers of excellence for Open-Heart Surgery.

We, thoracic surgeons, assert hereby that through open heart surgery performance enhancement, we will have an important social impact and contribute towards the:

- Achievement of the third Goal of African Union Agenda 2063 and United Nation Sustainable Development Goals:
    a. decrease of at least 25% of the perinatal and infant mortality before 5 years;
    b. improvement of at least 30% of rural and urban populations access to Open-Heart Surgery.

We, thoracic and cardiovascular surgeons, our additional social contribution will be to work towards the achievement of goals as follows:

- Decrease of at least by one-quarter the heavy financial burden of several medical evacuations for Open-Heart Surgery outside SSA, in Europe or USA which roughly cost 20,000 to 40,000 Euros per patient;
- Reduction of at least 75% of travels abroad for open heart surgery because of excellent local heart care centers in SSA.

Sponsors

SIGNATORIES

For International Institutions, Universities or Colleges, University Teaching Hospitals (In alphabetical order)

Emmanuel Abara, FWACS MSc.CH RHUPPI visit our website at http://www.richmondhillurology.com.
Professor Alexandre Kokoua, Chair of African Society of Morphology, Chair of Ivorian section/International College of Surgeons;
Professor Frederick Kwaku Addai (Ghana) President West Africa College of Morphologists;
Professor Bob Lane, President, the International Federation of Surgical Colleges;
Professor David Levien, MD, MBA, FACS American College of Healthcare Trustees President and CEO;
Professor Mohamed LY Pediatric, Heart Surgeon;
President and Founder of the French Association of Heart for West Africa
Professor John Meara - PGSSC
Pr Remi Seka CEO Heart Institute of Abidjan-
Mr Sylvain Villiard CEO Brazzaville Teaching Hospital; Congo-Brazzaville
Dr Ibrahim Wada, Founder Chairman Chief Executive of Garki Hospital Abuja, Nigeria
Professor Koffi Herve Yangni-Angate,Project Manager Pascab-CI

For Commerces and Industries Organizations

Prince Adetokunbo Kayode, CON, SAN ,Abuja Chamber of Commerce and Industry(ACCI) President

For Humanitarian organizations and Heart Foundations

Adam L. Kushner, MD, MPH, FACS Founder & Director, Surgeons OverSeas (SOS)
Professor Joseph Mucumbitsi the President of the Rwanda Heart Foundation
Achieng Otieno Communication and digital Advocacy Kenya Tobacco Control Alliance (KETCA),Ivorian Heart Foundation

For Cardiac Societies

Professor Martin Houenassi President de la Societe beninoise de cardiologie
Professor Abdoul Kane, Président, de la Société sénégalaise de cardiologie
Samuel KINGUE Président Société Camerounaise de Cardiologie
Lilian Mbau CEO, Kenya Cardiac Society-
Professor Khaleb Ould Boye, Société Mauritanieene de Cardiologie
Professor Toure Niger Cardiac Society
Association Africaine des chirurgiens thoraciques et cardiovasculaires
Société Ivoirienne des chirurgiens thoraciques et cardiovasculaires
Société de chirurgie thoracique et cardiovasculaire du Mali
Professor Koffi Herve Yangni-Angate, President, Ivorian Heart Foundation, Cote d'Ivoire

For Experts

Professor Anicet Adoubi (Bouaké, Cote d'Ivoire)
Professor Mac Aghaji (Nigeria)
Dr Moussa Bazongo (Ouagadougou,Burkina-Faso)
Professor Gabriel Ciss (Dakar, Sénégal)
Dr Diarra Ibrahim Diarra, (Bamako, Mali)
Professor Anastase Dzudie (Yaoundé, Cameroon)
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Dr Cheick Ahmed Sékou Touré, (Bamako, Mali)

Dr Michel F. Mitsomoy, (Congo,Brazzaville)
Dr Sylvain Monangangounda, (Congo -Brazzaville)
Professor Mireiile Yavo-Tre , (Abidjan Cote d'Ivoire)

For Academic Journals

African Annals of thoracic and cardiovascular surgeons
African Journal of Morphology
Journal Africain du thorax et des vaisseaux

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Post-scriptum:

Cooperation with partners for OHS developpement in SSA has commenced:

ACCI President, Prince Adetokunbo Kayode, CON, SAN (in blue necktie) today February 24,2020 received Prof. Prof. Koffi Herve Yangni-Angate, President ISTCVS and AACTCVS (in red necktie) on a partnership building visit.

Partnership building visit to Mr Sylvain Villiard CEO, Brazzavlle Teaching Hospital ;Pr Gisele KIMBALLY Chief Medical Director and Drs Michel MITSOMOY and Sylvain MONIANGANGOUNDA,cardiovascular surgeons