OPEN HEART SURGERY IN NIGERIA; EXPERIENCE AND OUTCOMES

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Outline

- Introduction
- Requirements for Open Heart Surgery
- Open Heart Surgery in Sub-sahara Africa
- Challenges in Africa
- Experience in Nigeria
- Challenges mitigating against successful Nigerian programs
- Solutions? Viable Models?
Introduction

- Nigeria is yet to have any viable Open Heart Surgery (OHS) program, despite the high prevalence of surgically correctable cardiac disease.

- Attempts have been made to set up programs but these have not been sustained.
Definition of Open Heart Surgery

- Surgical repair of the Heart during which the blood circulation is maintained mechanically
- Usually requires the use of Cardiopulmonary bypass
Common Open Heart Procedures

- Coronary Artery Bypass Grafting
- Heart Valve repair or replacement
- Aortic surgery
- Correction of various congenital heart lesions
Requirements for Open Heart Surgery

- **Trained Team;**
  - Surgeon, Cardiologist, Anaesthetist, Perfusionist, Cardiac Physiologist, Theatre Nurses, ICU Nurses

- **Diagnostic Services**
  - Radiology, Echocardiogram, ECG, Stress tests, Cardiac Catheterization

- **Laboratory services**
  - Blood bank (with products), Biochemistry, Haematology, Arterial Blood gases, ACT measurement
- **Dedicated Infrastructure**
  - Operating theatre, Intensive care unit, Ward beds.

- **Dedicated Hardware**

- **Consummables**
  - Perfusion
  - Theatre
  - ICU

- **Drugs**
  - Anaesthesia, ICU
• Dedicated power supply (+ back up!)

• Staff remuneration

• Funds to pay for all the above items!
CARDIAC SURGERY

The African Challenge
Problems

- Demographics
- Urbanization
- Changes in the Way of Life
- Persistence of Infectious diseases
- Tobacco Use
- Dyslipidemia
- HTA
- Obesity
# The Pattern of Diseases

<table>
<thead>
<tr>
<th>Disease Type</th>
<th>Africa</th>
<th>Developed Countries</th>
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<tbody>
<tr>
<td>Age</td>
<td>Young</td>
<td>Elderly</td>
</tr>
<tr>
<td>Coronary Diseases</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Aortic Diseases</td>
<td>AR +++</td>
<td>AS +++</td>
</tr>
<tr>
<td>Mitral Diseases</td>
<td>MR</td>
<td>MS</td>
</tr>
<tr>
<td>Aneurysm</td>
<td></td>
<td>Identical</td>
</tr>
<tr>
<td>Pericardial Diseases</td>
<td></td>
<td>Identical</td>
</tr>
<tr>
<td>Rhythm Disorders</td>
<td></td>
<td>Unknown</td>
</tr>
<tr>
<td>Congenital</td>
<td>+++</td>
<td>Rare</td>
</tr>
<tr>
<td></td>
<td>(ASD, VSD, PDA, Fallot)</td>
<td>(VSD, ASD, PDA, VU)</td>
</tr>
</tbody>
</table>

Different Strategies
Incidence of Congenital Heart Disease
Functional Units

Yellow dots indicate functional cardiac surgical units outside of South Africa, some of which operate on some children.

Hewitson J
Cardiac Operations Worldwide

GLOBAL SITUATION...

7% HAVE 90%

WHY?
MONEY

CARDIAC OPERATIONS PER MILLION POPULATION

North America: 1222
Australia: 786
Europe: 569
Mean: 169
South America: 147
Russia: 37
Asia: 25
Africa: 18
Paediatric cardiac surgery for a continent – The experience of the Walter Sisulu Paediatric Cardiac Centre for Africa

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Email

ABSTRACT

Very few African countries have the resources to provide optimum paediatric cardiac services to their largely indigent populations. In the current era, in countries with access to modern paediatric cardiac care, mortality for congenital heart disease occurs more often in adulthood than in childhood. This level of care is largely unavailable in Africa. The Walter Sisulu Paediatric Cardiac Centre for Africa was set up in 2003 as a public-private collaborative initiative to extend modern paediatric cardiac care to the continent. Three core functions form the basis of our operations: service delivery, training, and research.

This communication reviews our experience with this effort over an eight-year period. We have performed 2 023 procedures on 1 738 patients including a large proportion of neonates and infants with an overall mortality of 7.1%. Our charity arm sponsored 21.5% of these patients. We have encountered problems peculiar to the African context which we discuss. We also describe innovative techniques in
Children’s heart disease in sub-Saharan Africa: Challenging the burden of disease

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INTRODUCTION

"Where you live should not determine whether you live." – Bone

ABSTRACT

Children with heart disease in Africa have little or no access to treatment of any kind, and cardiac surgical services are virtually absent outside a handful of centres in a few of the wealthier nations. There is little reliable data concerning the prevalence of congenital or acquired heart disease in African children, but there is sufficient information to indicate that the burden of cardiac disease is vast. This major non-communicable disease is largely hidden, overshadowed by the incidence of communicable diseases. There is as yet little evidence of the hoped-for epidemiological transition toward non-communicable diseases amongst children in Africa. The burden of congenital heart disease is only part of the problem, with rheumatic heart disease (RHD) remaining the commonest cardiac problem, related to poor socioeconomic conditions. RHD is the most preventable form of cardiac disease, yet there is little preventive work being done. The many obstacles to developing paediatric cardiac care are discussed, and some possible ways forward are
Open-Heart Surgery in Nigeria
Indications and Challenges

From the early 1940s through the 1950s, it was a popular belief throughout the world that cardiac diseases were rare among Nigerians. However, the establishment of the cardiac registry in 1964 in Ibadan revealed all types of cardiac diseases, including those requiring surgical intervention. Virtually all who
Enugu - CHD

Cases of mitral valve disease, at 40 (39.2%) in number, topped the list of the pathological processes. These included mitral stenosis, mitral regurgitation, and combined lesions. The high incidence of mitral valve disease has been attributed to the aftereffects of rheumatic heart disease in the region. Mitral valve disease was followed in frequency of observation by 16 (15.7%) cases of ventricular septal defect (VSD), 13 of tetralogy of Fallot (12.7%), and 12 of atrial septal defect (11.8%). There were 7 cases of ascending aorta–aortic arch aneurysm. Other lesions included ventricular aneurysm and total anomalous pulmonary venous connection. These 102 patients are of course far fewer than the World Health Organization’s estimated figure for Nigeria, with its population of 126 million.

Our center at Enugu was for a long while the only center in Nigeria that was doing open-heart surgery. The patients treated were the young, those who could afford the fees, and those whose cases could be handled by our center. The average age of our
Cardiovascular Topics

Cardiac surgical experience in northern Nigeria

J NWILOH, S EDAIGBINI, S DANBAUCHI, I BABANIYI, M AMINU, Y ADAMU, A OYATI

Abstract

A pilot study was undertaken to determine the feasibility of establishing a heart surgery programme in northern Nigeria. During three medical missions by a visiting US team, in partnership with local physicians, 18 patients with heart diseases underwent surgery at two referral hospitals in the region. Sixteen (88.9%) patients underwent the planned operative procedure with an observed 30-day mortality of 12.5% (2/16) and 0% morbidity. Late complications were anticoagulant related in mechanical heart valve patients and included a first-trimester abortion one year postoperatively, and a death at two years from haemorrhage during pregnancy. This has prompted us to now consider bioprosthetics as the valve of choice in women of childbearing age in this patient population. This preliminary result has further stimulated the interest of the local population in seeking medical care abroad.

Methods

Between October 2006 and April 2008, patients referred with heart diseases to the Cardiology Division of the National Hospital, Abuja and Ahmadu Bello University Teaching Hospital, Zaria, were screened and potential surgical candidates were shortlisted. After further evaluation, patients testing positive for the presence of cardiac valve disease were selected for surgical intervention.
Open heart surgery in Nigeria; a work in progress

Bode Falase, Michael Sanusi, Adetinuwe Majekodunmi, Barakat Animasahun, Ifeoluwa Abose, Ariyo Idowu and Adewale Oke

Abstract

Background: There has been limited success in establishing Open Heart Surgery programmes in Nigeria despite the high prevalence of structural heart disease and the large number of Nigerian patients that travel abroad for Open Heart Surgery. The challenges and constraints to the development of Open Heart Surgery in Nigeria need to be identified and overcome. The aim of this study is to review the experience with Open Heart Surgery at the Lagos State University Teaching Hospital and highlight the challenges encountered in developing this programme.
Research

The cost of open heart surgery in Nigeria

Bode Falase1, Michael Samesi1, Adetimowe Majekodunmi1, Ifeolua Ajobe2, Aiye Idowa1, David Oke3

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Key words: Open Heart Surgery, direct costs, Lagos, Nigeria

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Abstract

Introduction: Open Heart Surgery (OHS) is not commonly practiced in Nigeria and most patients who require OHS are referred abroad. There has recently been a resurgence of interest in establishing OHS services in Nigeria but the cost is unknown. The aim of this study was to determine the direct cost of OHS procedures in Nigeria. Methods: The study was performed prospectively from November to December 2011. Three concurrent operations were selected as being representative of the scope of surgery offered at our institution. These procedures were Atrial Septal Defect (ASD) Repair, Off Pump Coronary Artery Bypass Grafting (OPCAB) and Mitral Valve Replacement (MVR). Cost categories contributing to direct costs of OHS (Investigations, Drugs, Perfusion, Theatre, Intensive Care, Honorarium and Hospital Stay) were tracked to determine the total direct cost for the 3 selected OHS procedures. Results: ASD repair cost $6,230 (Drugs $600, Intensive Care $410, Investigations $955, Perfusion $1,080, Theatre $1,360, Honorarium $925, Hospital Stay $900). OPCAB cost $8,490 (Drugs $740, Intensive Care $625, Investigations $3,020, Perfusion $1,200, Theatre $1,360, Honorarium $925, Hospital Stay $900). MVR cost $8,950 (Drugs $740, Intensive Care $625, Investigations $3,020, Perfusion $1,200, Theatre $1,360, Honorarium $925, Hospital Stay $900).
Factors affecting treatment of CHD in developing countries

- Chronic under-investment in public health sectors
- Poor standards of basic health care
- Prohibitive cost of pediatric cardiac care
- Competing priorities in budget allocations
- Shortage of trained pediatric specialists
- Migration of healthcare workers to developed countries
- Few facilities for pediatric cardiac care
- Inability to access even these facilities
GNP/Capita
The too little for too many paradox !!

Capability to deal with almost all problems
- Facilities for newborn heart surgery
- Facilities for infant heart surgery
- Operative facilities for older children
- Basic cath lab facility
- Diagnostic capability
- Nothing

Proportion of the world's population that have access
- $1500 or Lesser
- 4000 million

$1500 - 20,000
75-100 million

> $20,000
1500-1750 million

Courtesy Dr. Krishna Kumar
Personnel

CTS Net = 21,000 Surgeons

North America 42%

Europe 32%

Asia 18%

Latin America 7%

Africa 1%

Remuneration

![Graph showing remuneration across different regions](image-url)
History of Open Heart Surgery in LASUTH

- **2004-2006**
  - Cardiac Missions sponsored by LASG. Dr Nwiloh team from Atlanta (Global Eagle Foundation)

- **2007-2008**
  - Gradual acquisition of equipment to start local program

- **2009-2011**
  - Development of Local cardiac program with support of visiting foreign teams

- **Dec 2011**
  - Program suspended due to severe challenges with support systems making continued surgery untenable
Materials and Methods

- Prospectively maintained Microsoft Access Database
- Retrospective analysis of all operations between January 2004 and December 2011
- Data analysis with Microsoft Excel. Summary data expressed as numbers, mean ± SD or percentages, as appropriate.
Includes risk stratification

<table>
<thead>
<tr>
<th>Parsonnet Score</th>
<th>Additive Euroscore</th>
<th>Logistic Euroscore</th>
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</thead>
<tbody>
<tr>
<td>Sex 1</td>
<td>3</td>
<td>0.3304052</td>
</tr>
<tr>
<td>BMI 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Ejection Fraction 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Age 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Emergency 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Previous Surgery 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Renal Impairment 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>PCI 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Previous MI 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Respiratory Impairment 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Ventilated 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>IABP 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Neurological Dysfunction 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>PA Systolic Pressure 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Extracardiac arteriosclerosis 0</td>
<td>0</td>
<td>0.0000000</td>
</tr>
<tr>
<td>Other than CABG 2</td>
<td>0</td>
<td>0.0000000</td>
</tr>
</tbody>
</table>
Annual Surgical Activity

- 2004: 5
- 2005: 10
- 2006: 11
- 2009: 12
- 2010: 13
- 2011: 11
## PATIENT SUMMARY

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No.(%)</th>
<th>Age(years)</th>
<th>Euroscore</th>
<th>CPB Time(mins)</th>
<th>Xcclamp Time (mins)</th>
<th>Mortality(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>14(27.5)</td>
<td>28.9 ± 12.4</td>
<td>2.9 ± 0.9</td>
<td>86.5 ± 44.2</td>
<td>45.9 ± 29.8</td>
<td>1 (7.1)</td>
</tr>
<tr>
<td>VSD</td>
<td>8 (15.7)</td>
<td>15 ± 9.4</td>
<td>3.9 ± 1.2</td>
<td>159.1 ± 77.3</td>
<td>108.9 ± 64.7</td>
<td>2 (25)</td>
</tr>
<tr>
<td>MVR</td>
<td>15(29.4)</td>
<td>33.2 ± 11.4</td>
<td>3.9 ± 1.3</td>
<td>145.5 ± 41.1</td>
<td>96.3 ± 20.6</td>
<td>2 (12.5)</td>
</tr>
<tr>
<td>AVR</td>
<td>5 (9.8)</td>
<td>23.8 ± 3.1</td>
<td>4 ± 1.4</td>
<td>156.8 ± 10.8</td>
<td>103.5 ± 20</td>
<td>0</td>
</tr>
<tr>
<td>LA Myxoma</td>
<td>2 (3.9)</td>
<td>60 ± 14.1</td>
<td>7 ± 4.3</td>
<td>132 ± 11.3</td>
<td>98 ± 2.8</td>
<td>1(50)</td>
</tr>
<tr>
<td>CABG</td>
<td>2 (3.9)</td>
<td>64 ± 11.3</td>
<td>10 ± 5.7</td>
<td>160</td>
<td>70</td>
<td>1(50)</td>
</tr>
<tr>
<td>GLENN</td>
<td>2 (3.9)</td>
<td>13 ± 2.8</td>
<td>2.5 ± 0.7</td>
<td>97 ± 1.4</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>TOF</td>
<td>2 (3.9)</td>
<td>15.5 ± 13.4</td>
<td>2</td>
<td>267.5 ±19.1</td>
<td>127 ± 15.6</td>
<td>2 (100)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 (17.5)</td>
</tr>
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## Cardiac Missions

<table>
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<tr>
<th>Group</th>
<th>Date</th>
<th>Cases Done</th>
<th>No</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEF</td>
<td>Jan 2004</td>
<td>ASD-2, VSD – 1, AVR-1, MVR-1</td>
<td>5</td>
<td>MVR (1)</td>
</tr>
<tr>
<td>GEF</td>
<td>June 2005</td>
<td>ASD -2, VSD -1, AVR-3, MVR-3</td>
<td>9</td>
<td>VSD (1)</td>
</tr>
<tr>
<td>GEF</td>
<td>Mar 2006</td>
<td>ASD – 3, VSD -2, MVR -4, LA Myxoma - 1</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>GEF</td>
<td>Jan-Feb 2009</td>
<td>ASD -2, VSD -1, AVR -1, MVR-3</td>
<td>7</td>
<td>ASD, MVR (2)</td>
</tr>
<tr>
<td>ARI</td>
<td>April 2009</td>
<td>ASD -1, VSD -1, MVR -1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>GEF</td>
<td>Feb 2010</td>
<td>CABG -1</td>
<td>1</td>
<td>CABG (1)</td>
</tr>
<tr>
<td>RH</td>
<td>June 2011</td>
<td>ASD -1, VSD -2</td>
<td>3</td>
<td>VSD (1)</td>
</tr>
<tr>
<td>Fortis</td>
<td>Nov 2011</td>
<td>MVR -1, MV Repair-1, CABG-1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>42</td>
<td>6</td>
</tr>
</tbody>
</table>

GEF – Global Eagle Foundation, Atlanta, ARI – Aberdeen Royal Infirmary, Scotland RH- Ruby Hall Clinic India, Fortis Hospital Bangalore India
## Local Team

<table>
<thead>
<tr>
<th>Period</th>
<th>Procedures</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2009</td>
<td>MVR – 1</td>
<td>0</td>
</tr>
<tr>
<td>Jan 2010</td>
<td>ASD – 1</td>
<td>0</td>
</tr>
<tr>
<td>May 2010</td>
<td>Glen – 1</td>
<td>0</td>
</tr>
<tr>
<td>October 2010</td>
<td>ASD – 1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Glenn – 1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>TOF Repair – 1</td>
<td>1</td>
</tr>
<tr>
<td>Dec 2010</td>
<td>TOF Repair – 1</td>
<td>1</td>
</tr>
<tr>
<td>May 2011</td>
<td>LA Myxoma - 1</td>
<td>1</td>
</tr>
<tr>
<td>December 2011</td>
<td>ASD -1</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>
Quick trip to LASUTH Theatre
Skills transfer
Mentorship
Skills transfer……
Mentorship.........
Skills transfer......
Skills transfer......
Mentorship.........
OPCAB done in LASUTH
Mitral Valve Repair
Repair of Atrial Septal Defect
## Mortalities

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Procedure</th>
<th>Timing</th>
<th>Euroscore</th>
<th>Cause of Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17</td>
<td>MVR</td>
<td>Elective</td>
<td>7</td>
<td>Severe Pulmonary Hypertension. Unable to wean off CPB.</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>VSD</td>
<td>Elective</td>
<td>3</td>
<td>PDA missed preop. Circulatory arrest required. Prolonged surgery. Failed to come off CPB</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>ASD</td>
<td>Elective</td>
<td>4</td>
<td>Post op SVT, sudden cardiac arrest.</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>MVR</td>
<td>Elective</td>
<td>5</td>
<td>Unable to achieve cardioplegic arrest. Myocardial Ischemia.</td>
</tr>
<tr>
<td>5</td>
<td>72</td>
<td>CABG</td>
<td>Urgent</td>
<td>14</td>
<td>Recent MI. RV aneurysm. Preop IABP. Progressive Post op RV failure</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>VSD</td>
<td>Elective</td>
<td>4</td>
<td>Progressive post op RV failure</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>TOF</td>
<td>Elective</td>
<td>2</td>
<td>Progressive post op RV failure</td>
</tr>
<tr>
<td>8</td>
<td>25</td>
<td>TOF</td>
<td>Elective</td>
<td>2</td>
<td>Severe pyrogenic blood transfusion reaction, Renal Failure. Unable to dialyse.</td>
</tr>
<tr>
<td>9</td>
<td>70</td>
<td>LA Myxoma</td>
<td>Urgent</td>
<td>10</td>
<td>Cardiogenic shock prior to surgery. Failed to come off CPB</td>
</tr>
</tbody>
</table>
Challenges

- Low volume of cases
- Unstable work environment
- Training and exposure
- Laboratory support facilities
- Case selection; risk stratification
- Moving away from the Cardiac Mission model
- Financial support
Govt Funding

![Bar chart showing government funding from 2004 to 2011. The chart indicates the percentage of fully funded, half-funded, and self-funded projects each year.]
Cost of Open Heart Surgery

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>ASD (N)</th>
<th>ASD (USD)</th>
<th>MVR (N)</th>
<th>MVR (USD)</th>
<th>OPCAB (N)</th>
<th>OPCAB (USD)</th>
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</thead>
<tbody>
<tr>
<td>Drugs</td>
<td>98,020</td>
<td>605</td>
<td>195,760</td>
<td>1,208</td>
<td>118,530</td>
<td>732</td>
</tr>
<tr>
<td>Intensive Care</td>
<td>61,480</td>
<td>380</td>
<td>79,600</td>
<td>491</td>
<td>123,350</td>
<td>761</td>
</tr>
<tr>
<td>Investigations</td>
<td>154,500</td>
<td>954</td>
<td>492,500</td>
<td>3,040</td>
<td>489,500</td>
<td>3022</td>
</tr>
<tr>
<td>Perfusion</td>
<td>174,800</td>
<td>1,079</td>
<td>178,200</td>
<td>1,100</td>
<td>147,900</td>
<td>913</td>
</tr>
<tr>
<td>Theatre</td>
<td>238,700</td>
<td>1,473</td>
<td>572,600</td>
<td>3,535</td>
<td>211,650</td>
<td>1306</td>
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<tr>
<td>Honorarium</td>
<td>300,000</td>
<td>1,852</td>
<td>300,000</td>
<td>1,852</td>
<td>300,000</td>
<td>1852</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,027,500</td>
<td>6,343</td>
<td>1,818,660</td>
<td>11,226</td>
<td>1,390,930</td>
<td>8586</td>
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</tbody>
</table>
The Nigerian story?

- Enugu 102 Cardiac Operations 1974-2000

- Northern Nigeria (Abuja, Zaria) 15 OHS procedures 2006-2008. Mortality 12.5%

- South-western Nigeria (LASUTH) 51 OHS procedures 2004-2011. Mortality 17%
<table>
<thead>
<tr>
<th>Centre</th>
<th>CT Surg</th>
<th>Team</th>
<th>Infra</th>
<th>Hard</th>
<th>Cons</th>
<th>Ext Links</th>
<th>Activity (Current/Imminent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enugu</td>
<td>4</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>US/UK/India</td>
<td>Missions x 2 (2013)</td>
</tr>
<tr>
<td>Lasuth</td>
<td>2</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>UK/India</td>
<td>Public-Private 2013 Public-2013</td>
</tr>
<tr>
<td>Ibadan</td>
<td>2</td>
<td>+</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>US/Israel/India</td>
<td>?? Funds sought</td>
</tr>
<tr>
<td>Ife</td>
<td>2</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>Egypt/SA</td>
<td>Private 2013??Public</td>
</tr>
<tr>
<td>Ilorin</td>
<td>2</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>SA</td>
<td>? Jan 2014</td>
</tr>
<tr>
<td>Abuja</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>US</td>
<td>None. Mission 2006</td>
</tr>
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<td>Irrua</td>
<td>1</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Nnewi</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Asaba</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Umahia</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>P-Harc</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Kano</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>India</td>
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<tr>
<td>Sokoto</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>India</td>
<td>None</td>
</tr>
<tr>
<td>Zaria</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None. Missions 08.09</td>
</tr>
<tr>
<td>Benin</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>
Collaboration

- The most important is the collaboration between the Cardiac Surgeon and the Cardiologist!!
CLINICAL AND ANGIOGRAPHIC PROFILE OF CORONARY ARTERY DISEASE IN NIGERIANS

Bode Falase¹, Adeyemi Johnson², Kofo Ogunyankin², Ifeoluwa Ajose¹, Yemi Onobowale³

1. Cardiovascular Division, Department of Surgery, Lagos State University College of Medicine, Lagos State University Teaching Hospital, Lagos, Nigeria
2. First Cardiology Consultants, Ikoyi, Lagos, Nigeria
3. Reddington Multispecialist Hospital, Victoria Island, Lagos, Nigeria
## Indication for coronary angiogram and confirmation of coronary artery disease

<table>
<thead>
<tr>
<th>Indication</th>
<th>N</th>
<th>CAD confirmed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unstable Angina/NSTEMI</strong></td>
<td>22</td>
<td>20 (91)</td>
</tr>
<tr>
<td><strong>Chronic Stable Angina</strong></td>
<td>39</td>
<td>20 (51.3)</td>
</tr>
<tr>
<td><strong>STEMI</strong></td>
<td>37</td>
<td>32 (86.5)</td>
</tr>
<tr>
<td><strong>Congestive Cardiac Failure</strong></td>
<td>17</td>
<td>6 (35.3)</td>
</tr>
<tr>
<td><strong>Non-specific chest pain</strong></td>
<td>28</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>Preoperative Workup</strong></td>
<td>9</td>
<td>1 (11.1)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>152</td>
<td>79 (52)</td>
</tr>
</tbody>
</table>
Clinical risk profile of patients with confirmed coronary artery disease

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>27 (34.2)</td>
</tr>
<tr>
<td>Smoking</td>
<td>13 (16.5)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>54 (68.4)</td>
</tr>
<tr>
<td>Extracardiac Arteriopathy</td>
<td>6 (7.6)</td>
</tr>
<tr>
<td>Hypercholesterolaemia</td>
<td>49 (62)</td>
</tr>
<tr>
<td>Overweight (BMI &gt;25)</td>
<td>72 (91)</td>
</tr>
<tr>
<td>Obese (BMI &gt;30)</td>
<td>30 (38)</td>
</tr>
</tbody>
</table>
# Distribution of 192 lesions in diseased coronary vessels

<table>
<thead>
<tr>
<th>Diseased Vessel</th>
<th>Location</th>
<th>N</th>
<th>TOTAL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMS</td>
<td></td>
<td>9</td>
<td>9 (4.5)</td>
</tr>
<tr>
<td>LAD</td>
<td>LAD Proximal</td>
<td>44</td>
<td>79 (39.3)</td>
</tr>
<tr>
<td></td>
<td>LAD Mid</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LAD Distal</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagonal 1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Cx</td>
<td>Proximal Cx</td>
<td>24</td>
<td>60 (29.9)</td>
</tr>
<tr>
<td></td>
<td>Mid Cx</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distal Cx</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OM1</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OM2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RCA</td>
<td>Proximal RCA</td>
<td>26</td>
<td>53 (26.4)</td>
</tr>
<tr>
<td></td>
<td>Mid RCA</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distal RCA</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RCA-PDA</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
• STAND-ALONE PERCUTANEOUS CORONARY INTERVENTION IN A NIGERIAN CARDIAC CATHETERIZATION FACILITY

• Adeyemi Johnson¹, Bode Falase², Kofo Ogunyankin¹, Yemi Onabowale³

1. First Cardiology Consultants, Ikoyi, Lagos, Nigeria
2. Cardiothoracic Division, Department of Surgery, Lagos State University College of Medicine, Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria
3. Reddington Multispecialist Hospital, Victoria Island, Lagos, Nigeria
## Distribution of significant coronary stenosis and PCI rates

<table>
<thead>
<tr>
<th>Vessel</th>
<th>LM</th>
<th>LAD Prox</th>
<th>LAD Mid</th>
<th>LAD Dist</th>
<th>DI</th>
<th>Cx PRox</th>
<th>Cx Mid</th>
<th>Cx Dist</th>
<th>OM1</th>
<th>OM2</th>
<th>Int</th>
<th>RCA Prox</th>
<th>RCA Mid</th>
<th>RCA Dist</th>
<th>RCA PDA</th>
<th>RCA LV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stenoses</td>
<td>9</td>
<td>44</td>
<td>24</td>
<td>3</td>
<td>8</td>
<td>24</td>
<td>11</td>
<td>6</td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>26</td>
<td>14</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>PTCA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMS</td>
<td>12</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td></td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DES</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total PCI</td>
<td>3</td>
<td>20</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% PCI</td>
<td>33.3</td>
<td>45.5</td>
<td>50</td>
<td>0</td>
<td>12.5</td>
<td>16.7</td>
<td>54.5</td>
<td>50</td>
<td>8.3</td>
<td>0</td>
<td>25</td>
<td>30.8</td>
<td>57.1</td>
<td>42.9</td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>
Lessons from India....

Model 1: Free non-governmental care

Sathya Sai Institute, Puttaparthi, South India

2500 cardiac cases / yr
> 800 children
Totally free for patients
Funded by donations from devotees !!
Model 2: Micro Insurance

Narayana Hrudyalaya, Bangalore, South India

> 5000 surgeries / yr
> 1500 children / yr

Yashasvani Project – Public - Private Partnership
- Govt. supported health insurance for farmers
Pay $ 5 per month for free health care including cardiac surgery in any hospital!
Model 3: State funded insurance

Aarogyaasri reaches yet another milestone towards Aarogyaadhr Pradesh

Aarogyaasri Health Care trust

Rajiv Aarogyaasri Health Insurance Scheme

Rural population of state, majority of whom are farmers, are not having access to advanced medical treatments and are silent sufferers of ill health. This is more true in case of diseases related to heart, kidney, brain, cancer and injuries due to accidental accidents and burns. While the Government is in the process of adequately...
Model 4: affordable private care

Fortis-Escorts Heart Institute, New Delhi

300 - bedded heart care corporate hospital
3500 cardiac surgeries / yr, > 1100 children

Pediatric program piggy-backed on adult program at the start
The Mantra?

- Availability
- Affordability
- Cost Containment
- Viability
Cost Containment Strategies

Micro level
- Appropriate case selection and pre-op screening
- Focus on correctable lesions, avoid HLHS
- Maintain balanced case mix
- Accurate surgery confirmed by echo, avoid reops
- Cost-effective ICU strategies – avoid NO, ECLS
- Stringent protocols to prevent infection
- Constantly look for cheaper but safe alternatives
Cost Containment Strategies

- **Macro level**
  - Comprehensive care through dedicated programs
  - Generate high volumes
  - Efficient manpower management
  - Improve awareness and streamline referral pathways
  - Push for tax breaks on imported consumables
  - Encourage local manufacture of equipment, consumables and drugs
Prerequisites for Nigerian success

- Stable work environment
- Network Building
- Appropriate Equipment

- Lab Equipment and support (+ Cardiac Cath lab)
- Blood Transfusion Security

- Equipment at Affordable Costs
- Equipment maintenance (Biomedical Depts)

**FUNDING**
- Reduce cost of Surgery

- Skilled Human Resources And Training Programs
- Development of a Plan & Strategies for at least 20 yrs
- Involved Teams Committed to Change and Excellence
OPTIONS TO PRIORITISE:

- By likely outcome
- By academic or surgical interest
- By urgency or time waiting
- Random
- First-come, first served

Suggestion by Prof Hewitson...
My proposal:

“... in resource-limited settings: Let us start with the ASDs”

and VSDs, PDAs, Tetralogy, Coarctation, AVSD, etc.

Cost-effective, successful program with excellent outcomes ...

... then build ...

Castaneda example
May need to create your own systems

- The system you need may not exist.....

- Create your own systems!
Satisfactory Parameters obtained. Basic heart rate was changed to 70 bpm from 60 bpm because intrinsic heart rate seems to be competing with the pacemaker's heart rate.
The way forward

- Adequate planning
  - Trained staff, Infrastructure, Equipment, Supporting facilities, consummables
- Funding Models
  - Government subsidy, Insurance, Private centres, NGOs?
- Collaboration
  - Pool our resources together
- Research, Data, honesty
  - What have we been doing, what do we need to do better?
- HELP required! Role of ANPA? Funding, exposure, grants, personal contributions?
The efforts of the Lagos State Government.....

- A new standalone Cardio-Renal Centre
- Completed, due to open in next few months
- Special thanks to the Governor of Lagos State
- The Commissioner for Health (Dr Jide Idris)
« It is not the strongest nor the fittest who will survive, it is the most responsive to change »

Charles Darwin, 1859
The future will not just happen because one wishes hard enough.

It requires decision. Now.

It imposes risk. Now.

It demands allocation of resources and above all, human resources. Now.

It needs work. Now.

Peter F Drucker
THANK YOU!!!