NairoBEAT

Combating CVD in Kenya through mobile technologies

Triangle Global Health Case Competition
March 31, 2012

Lydia Stewart  Molly Hrudka  Emma Johnson  Shampa Panda  Erica O’Brien  Michael Wilson
Roadmap

- Rheumatic Heart Disease
- Pregnant Women
- Eastlands, Nairobi
- NairoBEAT
Rheumatic Heart Disease

“Acute rheumatic fever and rheumatic heart disease are the leading causes of cardiovascular death during the first five decades of life in developing countries.”

-American Heart Association Guidelines
Rheumatic Heart Disease

Strep Throat & Scarlet Fever

Rheumatic Fever

Rheumatic Heart Disease
Rheumatic Heart Disease

Normal mitral valve

Narrowing of mitral valve (mitral valve stenosis)

Diagram of the heart with labeled parts:
- Aorta
- Superior vena cava
- Pulmonary artery
- Left atrium
- Left pulmonary veins
- Mitral valve
- Tricuspid valve
- Right atrium
- Right pulmonary veins
- Inferior vena cava
- Right ventricle
- Left ventricle
At Risk:
Focus on the Pregnant Woman
Looking to Kenya
Focus in Nairobi
Program Overview

- Clinical Partnership
- Mobile Outreach Program: Eastlands
- Prevention, Detection, and Referral Process
- Beyond Eastlands
- Costs and Benefits
Partner Overview

Carolina for Kibera: Clinical Headquarters

Kenyan-Heart National Foundation: Workforce and Community Outreach

Nairobi Hospital: Institutional Support and Specialized Services
Partner: Carolina for Kibera Clinical Headquarters

- Tabitha Medical Center
  - Located in Kibera, 15 km from Eastlands slum
  - Full range of clinic services
  - Established workforce and medical infrastructure
  - Facilities for child care and community education
Mobile Clinic

- Three mobile health clinic vehicles
- Focus on screening pregnant women in the Eastlands
- While there for prenatal care, offer:
  - Echocardiograms
  - Blood pressure checks
  - HIV screenings
  - Education Materials

Detecting Rheumatic Hearth Disease

mild case
- Counseling
- Antibiotic regimen

moderate case
- Antibiotic regimen
- Referral to Specialist

severe case
- Percutaneous mitral balloon valvotomy – (valvuloplasty)
Partner: The Nairobi Hospital
Institutional Support and Specialized Service

- Has operating theaters to accommodate valvuloplasty
- Cost covered by National Hospital Insurance Fund
- 20 minutes from slums

Referral process
  - Staff case coordinators
  - Provide travel to and from Nairobi Hospital
Education at Mobile Clinic

- Required reading of educational materials about the risk factors for rheumatic heart disease
  - Incorporate pictures, visual information
  - Explain strep -> rheumatic fever -> rheumatic disease causative chain
- Rheumatic fever detection and treatment
  - Explain levels of severity and corresponding treatment
- Hygiene – prevent spread of viruses, infections
- Provide other tips for preventing CVD:
  - Nutrition
  - Exercise
Building Patient Relationship

- Incentive program
  - Community garden
    - Located near Tabitha Medical center
    - Staffed by locals
    - $\frac{1}{2}$ produce goes to market
    - $\frac{1}{2}$ goes to repeat patients who demonstrate comprehension of educational material
  - Creates incentive for continuous care, improves nutrition and health behaviors
Beyond Eastlands: Work-Site Visits

- Contract with employers
- Offer routine check-ups
- Perform preventative screenings
- Disseminate educational materials
- Important to reach other populations in Nairobi
Beyond Eastlands: Mass Information Kenyan-Heart

- Publicity
  - Encourage faith leaders to publicize

- Mass media campaign to increase awareness
  - Radio PSAs
  - SMS site-visit alerts and health tips
Role of the Health Worker

- Increased cardiovascular disease specific training for workers
- Train workers to use echocardiograms and interpret results
- Use workers in case management role
- Increase behavioral counseling role of health worker
- Encourage community participation—new health workers
Innovative Technology

- Use of portable echocardiograms
- Development of CVD training software for health worker
- Use of telemedicine in areas with supporting infrastructure
- SMS campaign for site visit alerts and health reminders
- Implementation of Care2000 ERP and EHR system
## Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security and Insurance of medical equipment</td>
<td>40000</td>
</tr>
<tr>
<td>Vehicle operating, insurance, maintenance and upkeep</td>
<td>100000</td>
</tr>
<tr>
<td>Staff salaries</td>
<td>60000</td>
</tr>
<tr>
<td>Private security costs for vehicle</td>
<td>100000</td>
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<tr>
<td>Partnership cost paid to partners to cover costs</td>
<td>70000</td>
</tr>
<tr>
<td>Operating costs including garden</td>
<td>50000</td>
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<tr>
<td><strong>Total per year</strong></td>
<td>420000</td>
</tr>
<tr>
<td><strong>Total per truck over three years</strong></td>
<td>1260000</td>
</tr>
<tr>
<td>Vehicle upfront</td>
<td>300000</td>
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<tr>
<td>Medical Equipment upfront including Echocardiogram</td>
<td>300000</td>
</tr>
<tr>
<td></td>
<td>10000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1870000</td>
</tr>
</tbody>
</table>
After year 1

- Assess areas of greatest disease density
- Assess community and cultural response
- Assess feasibility of work-site screenings
- Expand to neighboring low-income areas
- Assess feasibility of additional vehicle for rural clinics
Benefits

- Estimate of total patients seen: 6,7500
- Work site patient estimates: 9,4500
- Estimated cost per patient: 59.36507937
- Early detection
- Increased longevity
- Increased productivity
- Increased educational achievement
- Healthier pregnancies
Sources


- “Guide to Imaging.” Cardiology Today.


“National Hospital Insurance Fund.”


“Rheumatic Fever and Rheumatic Heart Disease.” n. pag. Print.

“Rheumatic Heart Disease.” World Heart Federation.


Sorrentino, Matthew, and Michael Foley. “Pregnancy in Women with Mitral Stenosis.” *UpToDate*.

“Tabitha Medical Clinic.” *eHealth-Kenya facilities*


*The Nairobi Eastlands Children’s Heart Education*. Print.

Contributions

- Molly researched the biology and health implications of rheumatic heart disease as relevant to Kenya.

- Emma performed a broad literature review and helped research methodology behind educational mass media campaign. Further, Emma researched previous intervention strategies in comparable countries.

- Erica did initial literature review on gender based and access issues associated with efficient healthcare solutions in Kenya.

- Shampa compiled sources, performed initial literature review, and focused on slum intervention strategies as applied to Kenya.

- Lydia worked to assess the health infrastructure, coordinate intervention strategies, and develop health worker training program.

- Michael estimated financial costs and impacts as well as providing feasible and grounded solutions.
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