FIGHTING CHILDHOOD PNEUMONIA: STARTING WITH UGANDA

A5 CONSULTING
AGENDA

Vaccination Challenges

Underlying Causes

Areas of Improvement

Solution

Risk Evaluation

Impact Forecast
CHALLENGES

AWARENESS
CULTURE
FUNDING
DISTRIBUTION
RESOURCES
underlying determinants

key areas of improvement

POLICY
SOCIAL SUPPORT
ACCESS
ECONOMIC STABILITY
EDUCATION

UGANDA M.O.H. CONTROL
DISEASE PERCEPTION + HOUSEHOLD NORMS
DRUGS TO CLINICS
VACCINE COST
PATIENT + PROVIDER UNDERSTANDING
MEDICAL INTERVENTION

- Vaccinations
- Diagnosis
- Treatment

DIAGONAL APPROACH

- Clinic supply coordination
- Educating population
- Training workers

HEALTH SYSTEM STRENGTHENING

solution criteria
Public/Private Partnership

- GAVI Advance Market Commitment for Vaccines
- Create Clinic Network
- Provide network with vaccines and antibiotics

SUPPLY SIDE

DEMAND SIDE

Community Approach

- Expand VHT program
- Improve data collection
- Increase patient referrals
- Implement educational component

Partnership Development $1M 5-Year Program Cost $11M

Medic Mobile $890,000 Cost of VHT Workers $17M

TOTAL = $29.89M
community approach implementation timeline

- VHT TRAINING (6 MO)
- PERFORMANCE EVALUATION (6 MO)
- BEGIN TIERED SALARY SYSTEM (1 YEAR)
- EVALUATE WORKER TEAMS
- CONTINUE TIERED SALARY SYSTEM (2.75 YEARS)
- PROGRAM EVALUATION
RISK EVALUATION

PUBLIC-PRIVATE PARTNERSHIP

ASSUME INDEFINITE SUBSIDIZED VACCINATIONS
CLINIC NON-PARTICIPATION
LACK OF DATA FROM CLINICS

COMMUNITY HEALTH WORKERS

FUNDING DECLINE
“BRAIN DRAIN”
UNDER-QUALIFIED
UNCERTAIN IMPACT
forecasted impact

Program Reach: **474,862** children in rural Uganda

Demand driven supply of medication

Increase in pneumonia awareness & diagnosis

Increased healthcare accessibility

10% reported decrease in supply shortages in 1 year

10% mortality rate decrease in 5 years

Rate of children seen by healthcare providers up to 90% in 5 years
# APPENDIX

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<th>Effectiveness of Community HWT &amp; Pneumonia</th>
<th>Strengths &amp; Weaknesses of Current Efforts</th>
<th>Detailed Financials</th>
<th>Availability of PCV &amp; Amoxicillin</th>
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<td>Looking Forward</td>
<td>Other Clinical Benefits of Health System Strengthening</td>
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<td>Medic Mobile Tool</td>
<td>Referral System to Clinics &amp; High Level Facilities</td>
<td>Forecasted Impact</td>
<td>Detailed Implementation Timeline</td>
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</table>
Effectiveness of Community Health Workers Treating Pneumonia

“To ensure that every child with severe pneumonia has rapid access to treatment with an effective antibiotic, treatment in the community by workers with limited training is necessary in many developing country situations and is essential in ensuring equity in access to treatment. Community management programmes can be scaled up effectively.” - World Health Organization

“Community-based management of pneumonia doubled the total number of cases treated compared with districts with facility-based treatment only.”

- Dawson, 20 years of community based management of childhood pneumonia in Nepal
### SWOT

#### Village Health Teams

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Structure already established</td>
<td>- brain drain (if not paid)</td>
</tr>
<tr>
<td>- Managed by MOH</td>
<td>- expensive ($18 million/year for the country) without paying workers</td>
</tr>
<tr>
<td>- Relationships with intl NGOs</td>
<td>- impact not clear</td>
</tr>
<tr>
<td>- Community trust</td>
<td>- lower level health workers</td>
</tr>
<tr>
<td></td>
<td>- lack of health system integration</td>
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</tbody>
</table>

#### Sustainable Drug Seller Initiative

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- intervenes in the hierarchy of resort</td>
<td>- Incentive to oversell for profit</td>
</tr>
<tr>
<td>- Already a cultural norm</td>
<td>- study showed ineffectiveness</td>
</tr>
<tr>
<td></td>
<td>- gives credibility to self-treatment</td>
</tr>
<tr>
<td></td>
<td>- Ugandan government unable to fund</td>
</tr>
<tr>
<td></td>
<td>- $4 million annual cost for all of Uganda</td>
</tr>
<tr>
<td></td>
<td>- undermines pharmacists</td>
</tr>
<tr>
<td></td>
<td>- requires constant government monitoring</td>
</tr>
</tbody>
</table>
### Patient Awareness Campaigns

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 880,000 for 3 months in 34 poorest districts (30% of population)</td>
<td>- isn’t a direct fix</td>
</tr>
<tr>
<td>- supplements other approaches</td>
<td>- no direct impact results (other than listening rate)</td>
</tr>
<tr>
<td>- can teach multiple topics without incurring more cost/easily adaptable</td>
<td></td>
</tr>
<tr>
<td>- addresses EDUCATION</td>
<td></td>
</tr>
<tr>
<td>- target audience on fleek</td>
<td></td>
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</tbody>
</table>

### Healthcare Provider Training

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- increase accuracy of diagnosis</td>
<td>- Pulse oximeters at $500/clinic/year</td>
</tr>
<tr>
<td>- training program is relatively cost effective ($3.4M/year)</td>
<td>- Timers not available in most clinics</td>
</tr>
<tr>
<td>- healthcare providers are trustworthy investment</td>
<td>- logistics of replacing the oximeters each year</td>
</tr>
<tr>
<td>- impact numbers likely high</td>
<td>- Too vertical</td>
</tr>
</tbody>
</table>
## Program Cost

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Inflation rate (2012-2014)</strong></td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>Program cost 2012 (10% of pop)</strong></td>
<td>$1,800,000.00</td>
</tr>
<tr>
<td><strong>Program cost in 2014 (10% of pop) w/ inflation</strong></td>
<td>$1,855,800.00</td>
</tr>
</tbody>
</table>

## Cost of VHT Worker

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Cost per worker in 2012</strong></td>
<td>$1,000.00</td>
</tr>
<tr>
<td><strong>Cost per worker in 2014</strong></td>
<td>$1,031.00</td>
</tr>
<tr>
<td><strong>Half cost per worker</strong></td>
<td>$515.50</td>
</tr>
</tbody>
</table>

## Paid workers/VHT

<table>
<thead>
<tr>
<th>Year</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>TOTAL (ending Year 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0.5</td>
<td>0.5</td>
<td>1.5</td>
<td>1.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>VHTs needed per household</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
</tr>
<tr>
<td>Paid Workers per Household</td>
<td>0</td>
<td>0.002</td>
<td>0.002</td>
<td>0.005</td>
<td>0.006</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Uganda population 2014</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
<td>37,800,000.00</td>
</tr>
<tr>
<td>13.4% population</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
<td>5,065,200.00</td>
</tr>
<tr>
<td>People per Household</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Number of Households</td>
<td>633,150.00</td>
<td>633,150.00</td>
<td>633,150.00</td>
<td>633,150.00</td>
<td>633,150.00</td>
<td>633,150.00</td>
<td>633,150.00</td>
</tr>
<tr>
<td>Total Workers Needed</td>
<td>-</td>
<td>1,266.30</td>
<td>1,266.30</td>
<td>3,798.90</td>
<td>3,798.90</td>
<td>6,331.50</td>
<td>6,331.50</td>
</tr>
<tr>
<td>Worker Cost</td>
<td>-</td>
<td>1,305,555.30</td>
<td>1,305,555.30</td>
<td>3,916,665.90</td>
<td>3,916,665.90</td>
<td>6,527,776.50</td>
<td>16,972,218.90</td>
</tr>
<tr>
<td>Total Worker and Program Cost</td>
<td>$1,855,800.00</td>
<td>$3,161,355.30</td>
<td>$3,161,355.30</td>
<td>$5,772,465.90</td>
<td>$5,772,465.90</td>
<td>$8,383,576.50</td>
<td>$28,107,018.90</td>
</tr>
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## Medic Mobile

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Clinics</td>
<td>2500</td>
</tr>
<tr>
<td>Hardware Cost per Clinic</td>
<td>$100.00</td>
</tr>
<tr>
<td>Number of VHT teams</td>
<td>1890</td>
</tr>
<tr>
<td>Hardware Cost per VHT Teams</td>
<td>$50.00</td>
</tr>
<tr>
<td>5 year Maintenance Cost</td>
<td>$344,000.00</td>
</tr>
<tr>
<td>Initial Implementation Cost</td>
<td>$200,000.00</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$888,500.00</td>
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## Public Private Partnership Development

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<tbody>
<tr>
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<td>$1,004,481.10</td>
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</table>
PCV and Amoxicillin

PCV13 (pneumococcal conjugate vaccines) - via Advance Market Commitment Initiative

GSK will start supplying 24 million doses annually (Annual Supply Commitment) from 2015 for a period of 10 years

Pfizer will start supplying 26 million doses annually (Annual Supply Commitment) from 2016 for a period of 10 years

....provides a sustainable supply for vaccines until the demand goes down due to high vaccination rates

Amoxicillin

patent expired over 10 years ago

stiff price competition and low profit margins

dosage cost: $.4 per regime
Sustainable Financial Models

- Slow implementation when paying community health workers.

- Measured Success of Community Case Management should alleviate donor fatigue, allowing for increased payment and better retention.

- Begin funding Community Health Workers through Co-Ops and grass roots funding mechanisms
Looking Forward

1 Million dedicated to stimulating local innovation

Public & Private Partnerships to empower the MOH
Other Clinical Benefits of Health System Strengthening

Improves treatment for both influenza and RSV - both key contributors to Pneumonia.

CCM can also help improve HIV treatment, reducing immunocompromised adults and preventing vertical transmission.

Vaccination for Pneumonia also prevents meningitis
Target Populations

Children under 5: highest mortality rate during childhood

Soon-to-be-mothers: maternal vaccination can result in offspring immunity

*Rural population density estimated at sub-county level from the 2002 Uganda national housing and population and census (UBOS 2002).*

*Small area estimates of poverty incidence in 1992 at county-level. Adapted from Emwanu et al. (2003).*
Referral System to Clinics and High Level Facilities

Each clinic should maintain a working vehicle to transport patients to and from facility, reducing barriers to access.

Viral Pneumonia should receive supportive care at a level 3 or 4 facility with oxygen, rest, antipyretics, analgesics, nutrition, and close observation.
Forecasted Impact

Reach: our VHT program reaches 13.5% of the population:

37,500,000 million * .135 = 5,500,000 people in the program area
5,500,000/ 8 = 687,500 households
632,581 households *.75 (on the assumption that rural households average 6 children and 2 parents) = 474,863

10% reported decrease in supply shortages in 1 year
2,500 clinics into network
immediate data collection in 500/year, distribution system
50% of clinics have reported supply shortages: those 250 clinics will be better stocked based on data collection system
goal: 90% of clinics stocked with AMOX after 1 year

10% mortality rate decrease in 5 years
currently 15% of under 5 years are due to pneumonia. impact: conservative estimate to decrease 10% by targeting 13.5% of the population via CHWs (which can reduce mortality up to 60%) and up to 100% of clinics stocked with vaccines.

Rate of children seen by healthcare providers up to 90% in 5 years
currently at 75% - community health worker program will refer all suspected cases, pushing rate seen up to 90%
Medic Mobile Tool

Impact logic
Better screening, faster case detection, and active follow-up lead to an increase in the number of people successfully treated.
Implementation Timeline

- **Public-Private Partnership**
  - Q1 to Q5: 1 year
  - Q6 to Q10: 1 year
  - Q11 to Q20: 5 year period

- **PCV13 Vaccine Subsidy**
  - Q1 to Q10: 5 year period

- **Amoxicillin Subsidy**
  - Q1 to Q10: 5 year period

- **Start Clinic Network**
  - Q1 to Q5: 1 year

- **MOH Demand Tracking**
  - Q1 to Q4: 4 years

- **Program Evaluation**

- **Clinic Network Expansion**
  - Q1 to Q7: 2.75 years

- **CHW Program**
  - Q1: 6 m.

- **VHT Training**
  - Q1: 6 m.

- **Performance Evaluation**

- **Begin Tiered Salary System**
  - Q1: 15 mo

- **Evaluate CHW Teams**

- **Continue Tiered Salary System**
  - Q1 to Q7: 2.75 years

- **Program Evaluation**