An assessment of and vision for D-tree International

Prepared for the Board of Directors

October, 10, 2013
Imagine a World

Where every person has the information they need to keep themselves and their family healthy no matter who they are or where they live.

That’s IMPOSSIBLE

Where every health worker has the tools she needs to provide consistent and excellent care.

Where the health system supports continuity of care through better information, logistics and management.
Mission

Provide health workers who live in rural areas with the tools they need to effectively diagnose and treat their patients.

Focus-specific projects

Developing countries

Medical areas:
- Emergency triage
- Maternal health
- Family planning
- HIV/AIDS care
- Malnutrition care
- Intestinal worms
D-Tree modus operandi

Acquire clinical protocols

Customize and prepare protocols for mobile platforms

Train and equip healthcare workers with electronic protocols

Does the child have a cough?
- yes
- no

Is there chest indrawing?
- yes
- no

This child should be referred to PHCC/hospital for treatment IMMEDIATELY

Acknowledge
**Business Model**

- **Donor- and foundation-funded**
  - ~$1.2M annual budget (2012)*
  - Not-for-profit

- **Organizational model**
  - Work with existing programs
    - Government health services
    - NGO and for-profit partners
  - Country-level director and team

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• **Improve healthcare delivery** by making appropriate **clinical protocols** accessible to **health workers** in **rural settings**

• Leverage the expanding wireless and mobile phone infrastructure in rural areas to enable the **delivery of protocols** to **healthcare workers**

• Create **electronic patient records** for **integrated and continuous healthcare management**
Value Chain

System
- Real-time Data Access / PHR
- Vital Statistics Reporting
- Disease Surveillance
- Logistics monitoring and tracking
- Financing (Banking, Insurance)
- Electronic Medical Records

Provider
- Decision Support Systems
- Point-of-care Diagnostics
- Telemicine
- Workflow Management Systems
- On-Demand Training / Assessment
- Remote Monitoring
- Client reporting of quality / performance

Client
- Enhanced Counseling
- SMS Reminders/ Alerts
- Appointment Scheduling
- Client Education
- On-demand Information / Helplines

Improved Information about individuals, populations, providers, facilities, outcomes,

Availability of Commodities, Health Workers, Equipment

Provider Competence, Accountability, Effectiveness

Client Knowledge and Self-Efficacy

Improved Efficiency + Coverage

Improved Quality of Care

Improved Health Behaviors

Improved HEALTH Outcomes

mHealth: Revolutionizing Health care Worldwide
• Improved patient outcome through integration of technology and healthcare

Company very responsive to new trends and innovation
## Adherence to protocols

<table>
<thead>
<tr>
<th>Symptom or observation</th>
<th>paper IMCI</th>
<th>electronic IMCI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairrhea</td>
<td>87.6%</td>
<td>99.8%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vomiting</td>
<td>77.2%</td>
<td>95.6%</td>
<td>0.033</td>
</tr>
<tr>
<td>Fever</td>
<td>97.8%</td>
<td>99.6%</td>
<td>0.022</td>
</tr>
<tr>
<td>Cough</td>
<td>89.7%</td>
<td>99.6%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ear Problem</td>
<td>60.8%</td>
<td>99.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ability to drink</td>
<td>70.3%</td>
<td>95.8%</td>
<td>0.002</td>
</tr>
<tr>
<td>Convulsion</td>
<td>77.7%</td>
<td>99.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Visibly awake</td>
<td>80.6%</td>
<td>96.2%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ability to breastfeed</td>
<td>83.3%</td>
<td>97.8%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ability to eat foods</td>
<td>64.1%</td>
<td>92.4%</td>
<td>&lt;0.001</td>
</tr>
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</table>
### Correct Diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Paper</th>
<th>eIMCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>90.6 %</td>
<td>93.3 %</td>
</tr>
<tr>
<td>Malaria</td>
<td>93.4 %</td>
<td>97.5 %</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>98.5 %</td>
<td>99.8 %</td>
</tr>
<tr>
<td>Dehydration</td>
<td>98.8 %</td>
<td>100 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Paper</th>
<th>eIMCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Pneumonia</td>
<td>22 %</td>
<td>64 %</td>
</tr>
<tr>
<td>(2/9)</td>
<td></td>
<td>(7/11)</td>
</tr>
<tr>
<td>Severe Malaria</td>
<td>100 %</td>
<td>91 %</td>
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<tr>
<td>(16/16)</td>
<td></td>
<td>(10/11)</td>
</tr>
<tr>
<td>Severe Diarrhea</td>
<td>67 %</td>
<td>91 %</td>
</tr>
<tr>
<td>(10/15)</td>
<td></td>
<td>(10/11)</td>
</tr>
<tr>
<td>Severe Dehydration</td>
<td>50 %</td>
<td>100 %</td>
</tr>
<tr>
<td>(1/2)</td>
<td></td>
<td>(2/2)</td>
</tr>
</tbody>
</table>

**Improvement in Integrated Management of Childhood Illness (IMCI)**

Implementation through use of Mobile Technology: Evidence from a Pilot Study in Tanzania Authors: Marc Mitchell, Bethany Hedt, Daniel Msellemu, Oscar Mukasa, Melania Mkaka, Neal Lesh
**Strengths**

- Extendable platform
- Robust paperless system
- Leverage carriers’ infrastructure

**Weaknesses**

- Vulnerable business model
- Patient care in hands of health workers, not in D-Tree control

**Opportunities**

- Expand to more countries
- Add protocols / disease states
- Expand to other fields (manufacturing / quality control / services)

**Threats**

- SANA (@ MIT)
- SMS-for-Life & similar platforms
Challenges

Short-term challenges

- Vulnerable business / revenue model

Long-term challenges

- Finding and training healthcare workers gets harder at scale

Priority

1. Sustainability
   - Deterioration of patient care quality due to lack of expertise/training of healthcare workers

2. Service quality
   - Ensure model adoption at the local level (how to measure?)

3. Scalability
   - Balance between growth and D-tree’s capacity / capability
Proposed Solutions

Potential solutions

• Use tangible results to obtain funding from MOHs
• Bring income from insurance companies/private sector
• Transfer business to Governments at the end of the program
• Maintain innovation

• Implement training/certification process for healthcare workers to ensure high-quality providers
• Implement feedback loops between healthcare workers and GPs/specialists
• Set KPIs on patient outcomes vs. protocol usage

Opportunities

• Collaborate with external bodies, insurance companies

• Leverage electronic patient records for more connected care model

• Expand to new regions (India & China)
• Expand into other medical areas

Priority

1. Sustainability

- Gather more data for strategic decisions
- Incentives for healthcare workers
- Establish relationships with new MOHs

2. Service quality

- Use tangible results to obtain funding from MOHs
- Bring income from insurance companies/private sector
- Transfer business to Governments at the end of the program
- Maintain innovation

3. Scalability

- Implement training/certification process for healthcare workers to ensure high-quality providers
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