Eyeing the future of healthcare

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http://EyeNETRA.com
Problem

2.4 Billion People w/out Glasses who need them around the world

1.6 Billion

2.4 Billion

Billions of People with Uncorrected Refractive Error, by Region

Source: Essilor, Infomarket 2009, CPB Research, numbers may not add due to rounding
Why?

Patients:

“Eye care is inaccessible and costly”

Eye Care Providers/Vendors:

“There’s no easy way to inexpensively or effectively:

- Test patients
- Deliver eye care products and services”
Medical Diagnostic Devices
Phoropter

Reading Charts
What if we could create a new platform for eye care that:

• Is accessible **virtually anywhere by almost anyone**
• **Produces high quality** measurements for eyeglasses that patients can trust
• **Efficiently connects patients to products and services through the mobile network**

….all at a **low cost**?
Introducing EyeNetra

Digital ecosystem for eyecare to serve 1 Billion people

EyeNetra
Test2Connect Platform

Point-of-care diagnostics + cloud based infrastructure enables eye care businesses to remotely access patients with new products and services, faster and cheaper.
Introducing NETRA-G

Near Eye Tool for Refractive Assessment

“Mobile Phone + Software + Eyepiece”
Refraction Map using Wavefront Sensor

Wavefront aberrometer

Shack-Hartmann WS
User interactively creates the Spot Diagram

Spot Diagram on LCD

1. Displace 25 spots with smart UI

2. Displace spots till single dot perceived

NETRA = Inverse of Shack-Hartmann wavefront sensor

CellPhone

EyePiece

LCD
3 Major Innovations

- Breakthrough Science
- Off the Shelf Components
- Piggybacking on Mobile Phone Hardware
Software replaces moving parts
NETRA-G of the near future
<table>
<thead>
<tr>
<th>Feature</th>
<th>NETRA-G</th>
<th>Auto-refractor</th>
<th>Phoropter</th>
<th>Retinoscope</th>
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</thead>
<tbody>
<tr>
<td>Accurate</td>
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NETRA-G UX Testing Worldwide
<table>
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<tr>
<th>Markets: Current</th>
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<tr>
<td><strong>Ophthalmic Diagnostics</strong></td>
<td><strong>Eyeglasses</strong></td>
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<tr>
<td>Worldwide: $750 M</td>
<td>Worldwide: $75 B</td>
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<td><em>Device sales only</em></td>
<td><em>EyeNetra will significantly expand this market</em></td>
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<tr>
<td>India: $1 B</td>
<td>China: $5 B</td>
</tr>
</tbody>
</table>
Underserved Consumers in India and underdeveloped markets

Worldwide: 2.4 B people w/out glasses who need

India: > 300 M
China: > 400 M

Source: Essilor and Procter & Gamble
A small rise in income drives massive jump in demand for eyecare

Base of Pyramid
- Need but no demand
- Not affordable
- Little access

Emerging Middle Class
- Need and demand
- Affordable
- Need testing

Top of Pyramid
- Need and demand
- Affordable
- Access to testing

*Source: Essilor
Why India

• Big Need/Market: 300M+ without glasses who need them
• Underserved: 10K optometrists for > 1B people
• Demand: 100K Optical shops demand auto-refractors and quality/low cost glasses
• No Regulation on medical devices or prescribing/selling glasses
• Good infrastructure: Eyeglasses makers available in major cities
• Expertise of founders
• Great traction with partners
India Opticals Today Vs. Tomorrow

**Today:**
Entrepreneurs have to spend a lot of money to open up an optical shop:

- Autorefractor* - $5000. Large up front cost.
- Rely on patients coming to store
- Must have own linkages to fulfillment – difficult to negotiate good rates

*Many don’t have testing equipment because of price or lack of trained professional/optometrist.
India Opticals Today Vs. Tomorrow

Tomorrow:

- **FREE (or low cost) diagnostic**
- **High quality product fulfillment included**

- NETRA – G, free or low cost
- Access to new clients via 1-800-EYENETRA call center which funnels and relays testing requests
- Wireless connection to discounted brand-name lenses and frames
Disruptive opportunity #2

Point of care in USA and developed markets
Product Pipeline: Eyecare Medkit

mClinic
Refractive Error
Cataracts
Retinal Conditions

Tablet example
Hardware App Store
3d Printing + Maker Spaces

Workspace Snapshot

3d Printer for Prototyping
Cataract

Slit Lamp Exam
CATRA: Cataract Screening Tool

Vitor Pamplona     Erick Passos     Jan Zizka     Manuel M. Oliveira
Everett Lawson     Esteban Clua     Ramesh Raskar
CATRA: Radar for Cloud Cover
36 years old female with Posterior Sub-Capsular Cataract (10%) in Right Eye

Cataract Assessment result for the same eye with NETRA
Eye is mirror of health
Impacting lives of hundreds of millions

Disruptive technology | Disruptive business model | Global Social Impact
Symbiotes for Health
Diagnostic/monitoring data + AI Analytics Engines = Predictive Medicine
What’s the role of the doc?
Consumer health
Emerging markets
AI Analytics cloud
POC diagnostics
Democratization of Hardware
Tricorder XPrize