Virtual Doctor’s Office

Authors: Samantha Ranaweera, Suchitha Chetia, Amit Joshi, Vijay Talati, Purnima Varma, Sukh Lobana
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“The Affordable Care Act is creating a huge opportunity, We’re realizing that the majority of people’s appointments with doctors are for things that could be done online. We see telemedicine and online mental health services going mainstream in coming years.”

*John Sculley* former President & CEO of Pepsi-Cola & Apple, Inc.

"Facial expression, body language and reactions to different questions or subject matters are all available for an attentive virtual therapist.”

*Dr Phil’s Doctor-On-Demand*, backed by *Richard Branson* & Google Ventures.
Telemedicine - Existing Market and Growth Trends

**Market Analysis**

Telemedicine is 11.4% of overall mkt (280M$)

Telemedicine in North America projected to grow at a compound annual growth rate of 16.7 percent from 2012 to reach more than $600 million in 2017”.

Consumers showing increased interest and enthusiasm for using mobile devices to engage with healthcare providers.

Overall Remote Patient Monitoring (RPM) market expected to grow at an annual growth rate of 35% between 2013 and 2018, reach $26.5 billion by 2018. ([eWeek Report](http://example.com))
Telemedicine – Current Landscape

Early movers trying to capitalize on the projected demand.

Creating a niche and/or low cost alternative to insurance backed medical examinations/consultations.

Keen interest amongst employers to reduce their OPEX costs.

National insurers pitching tele-health & telemedicine to consumers.

*Anthem, UnitedHealthcare offer telemedicine coverage in Nevada*

December 8, 2014

**Walgreens Expands Telehealth Platform to Offer Virtual Doctor Visits Through MDLIVE via Walgreens Mobile App**
## Telemedicine - Stakeholder Segments

<table>
<thead>
<tr>
<th>Functions</th>
<th>Activities</th>
<th>Consumers</th>
</tr>
</thead>
</table>
| Consumer/Family Wellness and Prevention | • Measure weight, exercise and calories consumed  
• **Minor ailments**, measure vitals for triage | • Consumer/family  
• Caregiver (adult child or parent)  
• Employer/plan sponsor |
| Chronic Disease Management       | • Diabetes: monitor blood glucose  
• **CHF: track weight, General: medication adherence**  
• Hypertension: track blood pressure  
• COPD: measure strength of breath | • Health Plan  
• Employer/plan sponsor  
• Provider (pay-for-performance or bundled-for-condition) |
| Acute Care, Post Acute & Rehabilitation | • Prevent hospital readmission  
• **Monitor physical therapy at home** | • Medicare, under Accountable Care Act  
• Health Plan  
• Employer/plan sponsor |
| Aging at Home                    | • Medication optimization  
• **Remote monitoring of vital signs and activities of daily living, Assistive technologies (e.g., smart home, smart wheelchair)** | • Health Plan  
• Consumer/family |
| Rural Population                 | • Prevent distant travel under trying circumstances – **Tremendous market in developing world** | • Rural Consumer/family  
• Military deployments  
• Out posts (Antarctic/Arctic) |
| Infectious Disease Management    | • Manage isolated highly infectious patience | • CDC |
Current Players: Wellness and Prevention

- Zephyr
- GRANDCARE
- SENSIO TEC
- BioSign
- Preventice Care Platform

Remote Monitoring: $1.74B

Interactive: $280M

Psychiatric Monitoring: $430M
Spot Light – MDLIVE (Revenue Model)

- Lower cost of service
- Convenience
- Reduced healthcare costs
- Reduce absenteeism
- Improved productivity
- Increase consumer options
- Lower cost of ownership
- Decreased healthcare costs
- Reduced absenteeism
- Improved productivity
- Increased profits
- Increase consumer options

<table>
<thead>
<tr>
<th>Service</th>
<th>Time (min)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Room</td>
<td>1.5</td>
<td>$570</td>
</tr>
<tr>
<td>Urgent Care</td>
<td>1.2</td>
<td>$156</td>
</tr>
<tr>
<td>Office Visit</td>
<td>4</td>
<td>$120</td>
</tr>
<tr>
<td>MDLIVE Virtual Visit</td>
<td>12</td>
<td>$49</td>
</tr>
</tbody>
</table>

MDLIVE 

Premium Breaks

Walgreens

AT THE CORNER OF

HAPPY & HEALTHY

CIGNA

Doctor/Physician/
Psychiatrist

Foundations/
Insurers

Individuals/
Patients

Employers
Opportunity

Seamless Communication channel
• Audio-Video
• Integrated Help menu, Nurse, Dr guidance

Integrated Sensor kit
• FDA approved for home/OTC usage - No one has it!
• Combined Stethoscope, thermometer, pressure meter, ear scope, Pulse Ox meter – No one has it!
• Idiot proof 😊 - Simple to use!
• Bluetooth, wired connection to Phone/Laptop, controlled by App
• Low cost – Less than 100$ • Portable

Integrated With Health care providers and Insurance Companies backend
• Savings for both Consumer and Insurance Companies – Win-Win!
• Health care providers can focus on acute cases Vs trivial conditions

Triage
Resolve

Body Temp
Pulse/Blood pressure/Stethoscope
Ear/Throat camera
Pulse Ox
Why will we win – We Create a new market

<table>
<thead>
<tr>
<th>Feature</th>
<th>Target</th>
<th>CellScope</th>
<th>ZyphyrLife</th>
<th>Preventice</th>
<th>UPMC AnywhereCare</th>
<th>MDLIVE</th>
<th>DrOnDemand</th>
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</thead>
<tbody>
<tr>
<td>OTC/Home usage</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Triage patients</td>
<td>✔</td>
<td>✔ (Ear only)</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated Sensors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Temperature</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>ECG</td>
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<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Respirator Rate</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Blood Pressure</td>
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<td>✔</td>
<td>✔</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Pulse OX</td>
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<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Otoscope (Ear/Throat Cam)</td>
<td>✔</td>
<td>✔ (Ear only)</td>
<td>✔</td>
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<td></td>
<td>✔</td>
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</tr>
<tr>
<td>Accelerometer</td>
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<td>✔</td>
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<td>✔</td>
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<tr>
<td>Bluetooth</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated App with HSP</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated App with Insurance</td>
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<tr>
<td>Integrated Help</td>
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<td>✔</td>
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<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Backup

Backup

Backup
Barriers To Adoption Of Telemedicine

- Regulatory Challenges
- Insurances
- Physicians Workflow Challenges
- Patient/Consumer Engagement
- Hospital Ambivalence
Technology: The Ecosystem

PATIENT
- Better health engagement
- Ensure continuity of care
- Improve outcomes

CAREGIVER/COMMUNITY
- Increase peace of mind
- Reduce stress

Telehealth as a Service™
- Wellness/Prevention
- Chronic Disease Management
- Acute Care
- Post-Acute Care/Rehabilitation
- Aging in Place

PAYER/PLAN SPONSOR
- Improve quality
- Reduce cost

PROVIDER
- Integrate with workflow
- Enhance patient outcomes
- Organize for new payment models

Source: The Connected Patient, By Jane Sarasohn-Khan, Prepared for California Healthcare Foundation
Technology - Sensors & Wearables

- Sensors and wearable's allow continuous physiological monitoring with reduced manual intervention and at low cost.

Wearable Sensor Exposure
**Mobile Doctors Office – Business model canvas**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Unique Value Proposition</th>
<th>Unfair Advantage</th>
<th>Customer Segments</th>
<th>Key Metrics</th>
<th>Channels</th>
<th>Revenue Streams</th>
<th>Cost Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inability to triage health conditions without visiting a doctors office/ER/Urgent Care</td>
<td>Mobile app that connects patients with Health Care Providers (HCP) using video conferencing, supplemented with hardware, to take all vital-signs (temperature, pressure, heart / respiratory rate, stethoscope capabilities, look inside ear, throat, Pulse-Ox), all for less than 100$</td>
<td>Anytime, Anywhere</td>
<td>Market Creator (no existing comprehensive solution)</td>
<td>General Population, Chronic patients requiring constant monitoring, HCPs, Product Differentiation - Holographic remote presence, Emergency Response Management</td>
<td>• App sales/downloads • Supported instruments • Integrated HCPs • HW unit sales</td>
<td>• Peripheral HW providers • HCPs • FDMs</td>
<td>• Free App to paid version conversions • Peripheral HW sales • HCP licensing • HCP routing preferential fees when patient does not know who to call • Insurance company purchases for covered patients</td>
<td>• App development, Web hosting, Support Center • Peripheral HW development/integration (Thermometer, stethoscope, Otoscopic extender, Pulse Oximeter) • Regulatory compliance • HCP integration</td>
</tr>
</tbody>
</table>
References

Growth and Innovation in the Health Care Industry – Trends, Opportunities, and Challenges – By Frost & Sullivan

The Baby Boomers’ Massive Impact on Health Care – By Christina Orlovsky, senior writer

Wireless-Enabled Remote Patient Monitoring Solutions – By Rajeev D. Rajan, Senior Director of Product Management, Qualcomm Life
http://www.mdtmag.com/articles/2013/05/wireless-enabled-remote-patient-monitoring-solutions

The Connected Patient: Charting the Vital Signs of Remote Health Monitoring
Prepared for – California HealthCare Foundation
By – Jane Sarasohn-Kahn
http://www.chcf.org/publications/2011/02/the-connected-patient

ZyphyrLife - http://zephyranwhere.com/healthcare/zephyrlife-home/
Doctor On Demand - http://www.doctorondemand.com/
MDLive - https://www.mdlive.com/