REMOTE PATIENT MONITORING - ENGAGING PATIENTS AND IMPROVING COMPLIANCE

Presented by:
Larry Steinberg
EVP/Co-founder
Cloud DX
LARRY STEINBERG

- RPM for 8 years
- Former Dir. Biz Dev/Trapollo
- Involved in some of the largest RPM deployments in USA
- Have deployed 1,000's of kits to 10's of thousands of patients
- Co-founder Cloud DX 2014

Cloud DX

- Top Tier Vendor in RPM - Full Stack FDA Cleared RPM Solution
- Winner Qualcomm Tricorder XPrize - Bold Epic Innovator Award
- Endorsed by Canadian Medical Association
- Showcased at Microsoft Center of Excellence/Boston
- Seen on Smithsonian Channel/Building Star Trek 50 years later
- Seen on Discovery Channel/Daily Planet
- Canadian Innovation Exchange Top 20
- AARP Top 50 Innovation Leader
- Seen on TedX Toronto
CLINICAL VALIDATION

Quality Management System
Fully staffed Compliance Department

Regulatory Clearance

ISO 13485
Cloud DX Inc. Quality Management System is certified to meet ISO 13485 Standards for medical device manufacturers

Health Canada
Cloud DX Inc. is licensed by Health Canada as a Medical Device Manufacturer. MDML 70264

FDA Clearance
Pulsewave® has been cleared by the FDA as an automated blood pressure & pulse rate monitor with computer controls. 510(k) K122443
ABOUT CLOUD DX

CLOUD DX AWARDS

WINNER

BOLD EPIC INNOVATOR AWARD

QUALCOMM TRICORDER XPRIZE

CANADA’S TOP 20 INNOVATIVE COMPANIES

WT INNOVATION WORLD CUP

VOTED BY AARP READERS

STARTUP CANADA GROUP AWARDS

BNN BUSINESS NEWS NETWORKS

CONVERGENCE AWARD

INTERFACE CHALLENGE

2015 - Winner 2nd Place
2016 - Finalist

2015 - Winner Startup of the Year

BIGGEST UPSIDE POTENTIAL AWARD

50+ INNOVATION LEADERS

CLOUD DX

clouddx.com
THE INDUSTRY

Healthcare at Home is expected to be the fastest growing industry through 2024.

Remote patient monitoring industry is poised to triple in value over the next 3 years.

CMS Unbundles CPT Code 99091 for RPM CPT 99490 for CCM.
THE CONNECTED HEALTH KIT

THE CLINICAL MONITORING DASHBOARD
Physician dashboard can track up to 1,000 patients simultaneously.

View at pulsewavedx.com
- User name: DoctorDemo
- Password: DoctorDemo

Consumer dashboard delivers 6 vital signs including our unique Cardiac Anomaly Detector.

View at pulsewavedx.com
- User name: Demo1
- Password: Demo1
How to Design a Successful Remote Patient Monitoring Program
DETAILS AND WORKFLOW

- Financial ROI Reporting
- Lost Equipment
- EMR Integration
- Device Infestation

- FDA Device Recalls
- Inventory Control
- Data Analytics
- Clinical Work Flow

- Shipping Logistics
- Vendor Management
- Patient Education
- Management of FDA Regulated Devices

- Cellular, WIFI, POTS, Bluetooth
- Patient Support
- Legal & Compliance
- Patient Adherence

- Device Sanitize and Repackaging
- Device Deployment Models
- Device Recovery Models
- HIPAA Compliant Clouds Apps.

- Device Quarantine and RMA Management
- Lease vs. Buy vs. Rent
- Monitoring Model
- Technical Support

- Vendor Financial Stability
- Patient Selection Criteria
- Enrollment Sources & Processes
- Reimbursement

- Device Logistics
- Conditions To Be Monitored
- Monitoring Model
- Technology Selection
A SUCCESSFUL RPM PROGRAM

WHAT ELEMENTS ARE ESSENTIAL?

• Goal Setting and Developing a Sustainable Model
• Patient Selection Criteria
• Enrollment Sources & Processes
• Deployment Model
• Monitoring Model
  – Adherence
  – Clinical
• Technology Selection
• Technical and Customer Support
• Device Recovery and Recycling
• On-going Measurement and Reporting:
  – Data Collection:
    • Clinical
    • Operational
• Project & Program Management Reporting
A WELL DEVELOPED PROCESS

WHAT STEPS TO TAKE?

**Design**
- Program Design Services
  - Develop Requirements
  - Process Flows
  - Procedures
  - Documentation
  - Patient Selection & Enrollment
  - Patient Orientation Tools
  - Monitoring Model
  - Technology Selection
  - Legal

**Test & Learn**
- Program Process Validation Services
  - Setup
  - Setup Data Transfer Interface
  - Develop Project Reporting
  - Develop Kit Configuration
  - “GO LIVE”
  - Use selected technology
  - Patient on-boarding
  - Installation & De-Install
  - Monitor, Report, Analyze

**Implement**
- Full Support Services
  - Project Management
  - Warehousing
  - Kitting & Spare Management
  - Logistics
  - Installation & De-Install
  - Recondition, Clean, Calibrate
  - Customer & Technical Support
  - RMA Management
  - Leasing & Consolidated Billing
ALL THE MOVING PIECES
ARE YOU PREPARED?

PATIENT ENROLLMENT CHALLENGES
• On average as high as 30% of patients who initially agree to the program, will decide not to participate prior to installation of the equipment.
• Over 24 months of 10,900 patients enrolled in nationwide RPM programs, 3,400 requested to cancel after their initial consent.

CALL VOLUME CHALLENGES
• A total of 122,119 non-clinical calls were made in support of 10,986 patients over a 12 month period.
• That's an average of 11 non-clinical calls per patient throughout their time on monitoring.
• A recent program required 7,714 calls non-clinical calls to support 434 patients in 1 year alone.

PATIENT SUPPORT CHALLENGES
• 530 patients generated 1,150 support tickets in one month.
• 398 support tickets were device or software related.
• 752 were related to contact information requests, scheduling issues, information requests, and other program related questions.

*Details above provided by Trapollo
CLINICAL WORKFLOW

Clinicians identify patients
Clinicians enroll patients
Patient receives equipment
Patient gets training & first uses the devices
Patients take readings:
- Blood pressure
- Heart rate
- Weight
- Oxygen
- Glucose
- Temperature
- Respiration*

Clinicians then evaluate outcomes
Clinicians monitor compliance to instructions
Clinicians react to notifications:
- Text to patients
- Schedule a video call
- Send a nurse to the home
Notifications will flag any changes in patient condition
Clinicians check the dashboard daily

*in beta testing - final validation 2018
RPM FAILURES - NOT ANY MORE

**Device kits are too expensive**

Standard remote monitoring kits are based on off-the-shelf medical devices and old-fashioned internet gateways. These kits can cost up to $1,500 per patient.

**Cloud DX Connected Health Solutions** for Remote Monitoring are priced 60% to 80% lower than the competition.

**Devices are intimidating**

Medical devices are no fun to use. Arm cuffs are uncomfortable. Interfaces are monochromatic, and very technical. The implications are discouraging.

**Cloud DX Connected Health devices & software** are futuristic, bright, colorful and easy to use. They speak to an optimistic outcome.

**Vital Sign Data is not integrated**

Typically vital signs are gathered one at a time, written down & (often but not always) typed into the patient record. Errors are all too common.

**Cloud DX vital signs** are generated in the cloud and are available via secure API. We integrate with major EMRs and care coordination solutions.

**Data Provenance Issues**

Across the care continuum, devices are not calibrated against each other. Patient-generated data is rarely trusted by doctors.

**Cloud DX Connected Health Kits** are designed to work together in the clinic and at home; raw signals are analyzed and compared in the cloud ensuring result accuracy.

**Primitive Devices and Data**

Current systems integrate basic data from primitive devices that provide little insight.

**Cloud DX** procures raw data from sensors on our platform that can be mined to produce a number of insights, both diagnostic and predictive, on individual health.
BENEFITS FROM RPM

Improves Outcomes
- Better Patient Adherence
- Early Complication Warning
- Patient Ownership

Saves Money
- Admission and Re-Admission Reduction
- Reduces Transportation Cost
- Creates Staff Efficiency

Generate Revenues
- Frees up Hospital Bed Space by Reducing Length of Stay
- Increase the Number of Patients that can be Managed

Delivers ROI When Used Effectively
- ROI’s of over 200% achieved
- Scales Quickly
- Clinical Adoption
WHY TELEHEALTH WITH REMOTE MONITORING?

Cloud DX technology enables connection between patient and care team. Patients say that using Cloud DX Connected Health makes them feel more in control of their health, learning how to cope better with chronic illness and gaining peace of mind. These benefits have increased patient engagement up to 90% and user satisfaction to 100% in recent studies.

Patient Engagement & Education

Clinicians & patients receive early warning that a condition has deteriorated, even if the patient doesn’t feel any symptoms. Intelligent Cloud DX software looks for patterns in vital sign data that indicate a real change, not a false alarm. Patients learn to recognize “normal” and become adept at tracking health changes, freeing up clinician resources.

Early Warning of Changes to Vitals

Once notified, the care team can intervene quickly eg: with a homecare nurse visit, an urgent care center appointment or a telehealth video consult. Delivering care early means fewer ER visits, fewer hospital admissions, shorter hospital stays and dramatic cost savings. Studies show that patients also get better faster, and die less often.

Lowest-cost Interventions eg: Homecare

Cloud DX evidence of better outcomes continues to grow: a patient’s need for supplemental oxygen was uncovered; another patient avoided major organ failure due to early warning by Cloud DX; yet another patient’s crippling edema was brought completely under control with remote monitoring and timely intervention. There are many additional examples.

Better Outcomes
CASE STUDIES
**OUR RESULTS**

### Improved Outcomes

- **Reduced Average BP in a 40 Patient Cohort in Ontario Canada**

![Graph showing average BP reduction](image)

- Average 4% reduction

- **Detected Accurate Percentage of Hypertensive Users in Large Population Health Study**

![Pie chart showing percentage of hypertensive users](image)

- **38.74%**
- Systolic Over 145 mmHg = Hypertension
- **121/74 mmHg**
- Avg Blood Pressure in Ontario in 2015

### Testimonials

- **“Pulsewave® detected an irregular heart beat, quickly and non-invasively revealing a serious heart condition!”**
  - Anil Gupta, MD
  - Cardiologist, Toronto, ON

- **“I am using Pulsewave® remote monitoring in my practice and I have been impressed by the results.”**
  - Sandy Sharma, MD
  - Obstetrician, Oakville ON

### Academic Studies

- **Qualitative Assessment of a Non-Invasive Vital Sign Monitor with Secure Home-Based Video Conferencing Patient Engagement Platform:**
  - The e-Clinic Pilot Study - 2015

- **Medication detection via bio-signal analysis – An initial study conducted at UNB with caffeine administration**
  - 2016

- **Assessment of the Non-Invasive Pulsewave Health Monitor for Blood Pressure Determination in a Clinical Setting of Cardiovascular Catheterization**
  - 2015
## Recent Results

### Ontario Health Region

<table>
<thead>
<tr>
<th>CHF &amp; COPD Deployment</th>
<th>n=38</th>
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<tbody>
<tr>
<td>Duration</td>
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<td>67%</td>
<td>91%</td>
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| Estimated ER visits avoided | 2 |
| Estimated admissions avoided | 6 |
| Patient satisfaction        | >90% |

“My CHF patients are now better able to manage their condition. They know what to look for and they know what to do if their vital sign readings indicate a deterioration in their health.”

– Shannon, RN

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CHF & COPD Deployment

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**Recent Results**

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<td>Duration</td>
<td>90 days</td>
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<tr>
<td>Age distribution</td>
<td>55-75 years</td>
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<tr>
<td>Multiple co-morbidities: arthritis, cancer, asthma, lung disease, diabetes</td>
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<tr>
<td>Before pilot:</td>
<td></td>
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<tr>
<td>“Technology makes me nervous/uncomfortable”</td>
<td>36%</td>
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<tr>
<td>After pilot:</td>
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<td>“I want to keep using Cloud DX technology; I am confident”</td>
<td>100%</td>
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“Patients reported an increased awareness of their condition and felt more comfortable managing their care at home, with the added security of remote monitoring; we were pleased to report a 100% satisfaction rating with all participants expressing a desire to keep the equipment in their home after the pilot ended”

– Sarah Rhoads, PhD, DNP, APRN
PATIENT’S HOSPITALIZATIONS

ANTICIPATED VS. REALIZED

✓ Fifteen month period
✓ Reviewed 122 patients

Saved more than $7.4 million in healthcare charges

“The Cloud DX Connected Health Kit was instrumental in saving my life; I had no obvious symptoms, I just didn’t feel well. The oximeter identified a pulse rate of 197/beats per minute. I went to the hospital immediately where I was diagnosed with ventricular tachycardia, a side effect from a new medication.”

– William L, 66, Cambridge ON
“I felt very secure, and very, very comfortable knowing someone was looking out for me. I knew I would get a call if I had a problem. I also noticed that hospital visits were much more efficient, I was seen faster and I was taken more seriously because I had this information with me. The thought of not having the equipment now actually makes me incredibly anxious”

- Jeannine O, 75, Cambridge ON
“Pulsewave Dx is a truly amazing product, easy to use and accessible online. It was a lifesaver for me! During my first obstetrician visit, Dr Sharma provided me with the Pulsewave blood pressure monitoring kit as part of my prenatal care. Within minutes I was set up to have my blood pressure routinely monitored from home. It was simple to use and each result was recorded and stored for easy retrieval as well as sent directly to my doctor. Throughout my pregnancy I had peace of mind, knowing that my blood pressure was being monitored and within the normal range. On the day of my preop visit, my blood pressure was high. Subsequently, Pulsewave Dx allowed me to monitor from home and seek medical intervention immediately. Because of the prompt dx of hypertension, our son was born by emergency c/s that day resulting in a safe delivery. Thanks Pulsewave Dx!”

– Sandra P., 32, Oakville ON
CASE STUDIES

**CHF, Male, 70**
Nurse said, “this is a success story!” and shared that 6 months ago when he was brought into the program he “couldn’t walk 5 steps” without great difficulty due to extreme swelling in almost his entire body, from his feet/legs to his face. Last week she went to discharge him from the pilot and he was outside hammering in fence posts—he now has no swelling, lungs are clear and has been stable for 2 months.

**CHF, Female, 81**
Had two CHF exacerbations (couldn’t breathe, full of fluid) and treated at home instead of calling 911 and in hospital. Caught early (due to weight trending and O₂). Prior to this, she didn’t have home oxygen and the Nurse was able to convince the Doctor (who was initially resistant) to have her assessed for home-O₂. She qualified and now has home O₂.

**CHF, Female, 85**
Low O₂ alerted nurse that patient required oxygen. Was able to be treated at home and avoided a hospital visit.

**CHF, Female, 83**
Client went to ER due to bradycardia and general weakness; heart rate was 30/bpm. Admitted with hyperkalemia and AKI (acute kidney injury). This patient was experiencing symptoms, so she may have gone to the hospital anyway, unlike some of our other patient stories but her low heart rate was detected and she was able to receive the care she required.
THANK YOU

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