Practical Integration of Telemedicine into the EPIC Electronic Health Record System
VISION

Deliver the best healthcare to children anytime, anywhere
Facilitate quality of response and preventative care

IOM outcome metrics: Effective, efficient, safe, timely, patient centered, equitable
CHOP Telemedicine 3 contexts

1) CHOP
   - CHOP (strengthen the foundation)
     - Build relationships between service lines
     - Rapid communication amongst consultants
     - Rapid dissemination of education / policies

2) REGIONAL NETWORK
   - REGIONAL NETWORK
     - Strengthen ties between CHOP and Affiliates
     - Rapid communication amongst consultants
     - Rapid dissemination of education / policies
   (Contractual agreements)

3) VIRTUAL NETWORK
   - VIRTUAL NETWORK (expand)
     - Cultivate relationships
     - Overcome current barriers to communication
     - Support clinical needs of remote/rural areas
     - Disseminate education
   (Personal relationships)
Program Overview

• Governance/Guiding Principles
  – Repeatable – Stay away from one offs where possible
  – Supportable – Use existing technologies where possible
  – Billable (when/if) – Be ready to bill when approved

• Oversight
  – Administrative
  – Clinical

• Work Groups
  – Clinical, Administrative and Info Systems
Patient Care Workflows

*Formal Consultation*
  (Physician to Patient consult)

*Remote patient support*
  (Patient to Physician mHealth)

*Remote Medical Advice*
  (Physician to Physician advice)
Types of Telehealth Communications

- **Virtual Encounters**
  - **Sync (Real time)**
    - Video conversation
  - **Async (store and forward)**
    - Remote continuous monitoring
    - cEEG, ICU

  - **Simple***
    - Virtual patient visits, Medical advice, Video chat consultations
  - **Low Complexity**
    - EPIC documentation, remote trainee
  - **High Complexity**
    - Connection to diagnostic devices
Technologies/Use Cases

• **Neurology**
  - SFTP – EEGs from remote hospitals
  - Long Term Monitoring from remote hospitals

• **ShareFile/LifeImage for Radiology system**
  - International Medicine
  - Radiology Second Opinion

• **Epic direct**
  - Push/Pull – Record review
    - Genetics
  - Real Time
    - CARE Clinic – more details later in presentation
“Improving Outcomes for Pediatric Patients with Complex Illnesses using Mobile Technology Driven Post Hospitalization Virtual Visits”

- **Verizon Grant – using Microsoft Lync**

  To date - 9 cases (4 Neonatology, 2 Ortho, 2 Home Care, 1 Plastic Surgery)

  2 cancellations (one readmitted before virtual visit)

  2 technical difficulties – convert to phone

We truly appreciated Dr. Wells proposing that our visit take place via the web since we live 62 miles from Virtua Hospital. Our virtual visit was very convenient and was a very positive experience.

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<table>
<thead>
<tr>
<th>Parent Survey Question</th>
<th>Patient 1</th>
<th>Patient 2</th>
<th>Patient 3</th>
<th>Patient 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Internet connection was reliable (no drop calls)</td>
<td>99</td>
<td>99</td>
<td>100</td>
<td>98</td>
</tr>
<tr>
<td>The quality of the image (focus, visual resolution, magnification) was</td>
<td>100</td>
<td>53</td>
<td>100</td>
<td>98</td>
</tr>
<tr>
<td>acceptable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You were able to show the clinician the affected areas</td>
<td>100</td>
<td>99</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>The appointment was not too long</td>
<td>99</td>
<td>97</td>
<td>100</td>
<td>98</td>
</tr>
<tr>
<td>You were comfortable speaking with the clinician</td>
<td>100</td>
<td>98</td>
<td>100</td>
<td>99</td>
</tr>
<tr>
<td>You would have preferred to be seen in person in the clinic or office</td>
<td>0</td>
<td>1</td>
<td>49</td>
<td>0</td>
</tr>
<tr>
<td>Overall, you were satisfied with your experience</td>
<td>100</td>
<td>96</td>
<td>100</td>
<td>99</td>
</tr>
</tbody>
</table>

This saved me a 9 hour round trip drive!

saved us about a 40 minute drive.
Planned Next Steps

• MyChart Video Visits
  o Full Client for Clinician
  o Flash on remote computers
  o Vidyo for Epic MyChart mobile

• EpicCare Link
Case Study

Piloting Telemedicine in a Child Abuse Clinic: lessons learned

• Technology Overview
  o Axis Cameras – IP Based
  o Epic Full Client required

• Challenges
  o Clinician Ease of Use
  o Cart/Equipment Stability
  o Cart Positioning
    o Patient and Clinician
  o Image Quality
  o Patient/Family Acceptance
  o Supportability
Clinical and Educational Application in Child Abuse Pediatrics

- Medical care due to child maltreatment
  - Inpatient consultations (Child Protection Team)
  - Outpatient sexual abuse clinic (CARE Clinic)
    - 400 evaluations/year
- Fellowship training program in Child Abuse Pediatrics
Project Background

• Child Abuse Pediatrics as an ABP subspecialty
• ACGME New Accreditation System
  o Medical care
  o Interpersonal and communication skills
• 40,000 children/year with substantiated investigation of sexual abuse
  o 1 out of 4 girls/ 1 out of 8 boys
Striving Towards the “Triple Aim”

- Improving health
- Reducing costs
- Improving care (quality/satisfaction)

• Address workforce shortage
• Demonstrate ACGME core competency
• Access high quality specialized care
Philadelphia Safety Collaborative

• Co-location of medical services
  o Hunting Park site- attending physician logistics
  o Senior fellows competent in bedside care, but would benefit from telemedicine (TM) training
  o 1/3 of eligible patients receive follow up medical eval

• State-wide needs
  o Expertise in Philadelphia
    o Resources limited with unmet needs in city
    o State of PA mostly rural with additional unmet needs
TM Project

- Provide TM capacity at co-located Hunting Park site for child sexual abuse evals
- Provide TM education opportunity in fellowship training
- Streamline care with technology replacement
  - Colposcope → Telemedicine Cart (TMC)
Monitor
- Bidirectional communication
- Visualization for examiner

Camera
- Interview/general exam
- “Colposcope”

Ethernet cable
- Enables use without remote provider
Initial TMC Testing in the Clinical Evaluation

TMC Testing - (as of 4/30/15) - 18 patients

• Pros
  o Integrated within Epic EMR
  o Direct download of imaging into patient record
  o Provides both pan and zoom function for general TM and colposcope
  o Diagnostic quality imaging
  o Simple to connect/capture image

• Cons
  o System specific to CHOP application
  o Cart stability for dual functionality challenging
  o Mobility of remote expert
    o Laptop requirement vs. tablet (Citrix)
Initial TMC Testing in the Clinical Evaluation

• Patient/Family Acceptance
  - Patients/ families engaged in use of technology
  - Parents see innovation as marker of expertise
  - Less obtrusive system than current colposcope
    - Greater distance between TMC and patient
    - Camera system less obvious, including image capture
Screen Shots of Functionality
a. Zoom In
b. Zoom Out
c. Camera Pause/Restart
d. Microphone On/Off
e. Speaker On/Off
f. Resize Screen
g. Choose Camera
Questions/Comments

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