Telehealth Primer:
The Right Care at the Right Place at the Right Time

Miles Ellenby, MD
Professor, Ped Critical Care Medicine. Medical Director, Telehealth Services

Anthony Cheng, MD
Assistant Professor, Family Medicine. Medical Director, COVID Connected Care Center

Amber Hoffman, MSN, RN
Clinical Educator, Telehealth

Gianou Knox, MPH
Program Manager
All ordinary meetings of classes, research groups, and seminars should be cancelled or replaced with discussions with colleagues about anti-Black bias in the world and in academia.
What has brought us here today?

The Power of Video and Connectivity

• in the delivery of healthcare
• during the global response to COVID-19
• to shine a light on racial disparities in policing
• to facilitate a global discussion about racism
Equity in Telehealth

Telehealth is about increasing access to care, regardless of geography & time constraints

The Digital Divide:

- any uneven distribution in the access to, use of, or impact of Information and Communication Technologies between any number of distinct groups… based on social, geographical, or geopolitical criteria, or otherwise
- term coined by Larry Irving as head of National Telecommunications and Information Administration in 1990s

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Home Internet (wired or wireless)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>81</td>
</tr>
<tr>
<td>Asian</td>
<td>83</td>
</tr>
<tr>
<td>Hispanic</td>
<td>70</td>
</tr>
<tr>
<td>Black</td>
<td>68</td>
</tr>
<tr>
<td>Native Americans</td>
<td>72</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islanders</td>
<td>68</td>
</tr>
</tbody>
</table>

“Differences in income across race and ethnicity do not explain the entirety of this digital divide”

www.freepress.net
OR Broadband Map
OR Broadband Map
OR Broadband Map
OR Broadband Adoption

- broadband adoption
- computer ownership
- service availability
- Internet use
- barriers to adoption
- perceptions of cost
- user satisfaction
Digital Inclusion – 5 elements

1) affordable, robust broadband internet service
2) internet-enabled devices that meet the needs of the user
3) access to digital literacy training
4) quality technical support
5) applications and online content designed to enable and encourage self-sufficiency, participation and collaboration

National Digital Inclusion Alliance - 2015
What is TeleHealth?

Not a New Idea

“Diagnosis By Radio”
Science and Invention
February 1925
Technology Adoption Lifecycle - Everett Rogers (1962) - *Diffusion of Innovations*
- Geoffrey Moore (1991) - *Crossing the Chasm*
Hype Cycle - Gartner (1995)
Telehealth Primer

Why?
Institute for Healthcare Improvement
The Triple Quadruple Aim of Healthcare Reform
- Improving access
- Improving outcomes while:
  - Keeping patients as close to home as safely possible
  - Reducing cost
- Improving provider experience (and efficiency?)
What is Telehealth?

- Interactive healthcare over distance using telecommunication technology
  - Store & Forward (Imaging, EEGs, ECHOs)
  - Face-to-Face interactive
  - Remote Pt Monitoring

- Applications for different clinical scenarios
  - Inpatient/Outpatient
  - Asynchronous/Synchronous
Telehealth Across the Care Continuum

- Remote Monitoring
- Ambulatory Care
- Emergent/Urgent Care
- Transitional Care
- In Hospital Care

The Patient
Recognizing Limitations OR
“It can’t be as good.”

**In-person** care is the gold standard…
when possible, when necessary.

Telemedicine’s intent:
• increase access for those who are unable to obtain
in-person care (geography, time, etc)
On the spectrum of how care can be delivered

No Care due to access limitations

Asynchronous (Store & Forward)
Email, Text, Web Portal

Audio (aka TelePhone)

Video (aka TeleMedicine)

In Person
Motivation – The Desire & Reality of Access to Care

Desire

Specialty services everywhere & at all times

Realities

Children – 27% of all ER visits

Only 6% of US ER’s have all necessary pediatric supplies

*Emergency Care for Children: Growing Pains*
*Institute of Medicine 2006 Report*

Regionalization of services improves Quality of Care and Outcomes

*Consensus report from the Pediatric Section of SCCM*
*Task Force on Regionalization of Pediatric Critical Care*

*Crit Care Med 2000; 28: 236-239*
Oregon & Pediatric Intensive Care

Limited Access due to Geography:

- Only 3 PICUs in region
- < 10 miles apart in Portland
- > 100,000 sq. mile catchment area
- > 800 neonates & infants transported/year to our center alone

Many transported unnecessarily, at great risk, & expense
Some inadequately resuscitated

Due to poor data exchange/communication
Triage Decisions

- Consult calls 24/7/365
- The Dilemma for ER MD, Pediatrician, & PICU
  
  *Whether to transport…*
  
  *Based on a verbal report & institutional, provider and parental comfort levels*

- Who is impacted by the Decision?
  
  Child
  
  Parents
  
  Transport Team

Financial Impacts to Healthcare System, Family, & Local Economy

- PANDA to Eugene (ground ambulance) $9,000
- PANDA to Klamath Falls (fixed wing) $24,000
Telemedicine

Telephone Call: 
Picture: 
Live Interactive Video: 
Helpful 
A Thousand Words 
Priceless 
Replaces the Anonymity of a Phone Call 
with the Intimacy of Live Interactive Video
OHSU Acute Care Telemedicine Network

2007 – PICU pilot with Sacred Heart, Eugene
Goals: improve triage (reduce unnecessary transports), support resuscitation

2010 - Network
- PICU
- Stroke
- Newborn Resuscitation
- TeleICU

2019 - Virtual ICU
Acute Care Telemedicine

Over 3,000 consults since inception
16 hospitals in Oregon & SW Washington

- $15M estimated in avoided transport costs
- Many pts able to remain in local community
- Varies by service line & community hospital
Tele – Newborn Resuscitation

- Small Oregon Community Hospital
  - baby not tolerating labor ➔ “Crash” C-Section
  - Family Medicine doctor on call from home
- 5:32 AM – C-Section
- 5:41 AM – Baby born ➔ bradycardic, cyanotic ➔ CPR
- 5:43 AM – OHSU NICU ‘arrives’ to support local team
Tele – Newborn Resuscitation

- Video not available for distribution
Ambulatory TeleHealth

- Delivering Value to Patients, Providers, Payers
  - Appropriate follow-up care
  - Improves compliance & outcomes
  - Cost containment

- Multiple applications
  - Home or clinic setting
  - Post-op checks
  - Primary Care
  - Chronic Disease Mgmt
  - Less mobile populations
Virtual Visits—Primary, Specialty, & Urgent

July 2018-April 2020 Digital Health Volumes
Data includes OHSU and Hillsboro Medical Center

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Visits</td>
<td>254</td>
<td>235</td>
<td>301</td>
<td>344</td>
<td>300</td>
<td>3,752</td>
<td>18,410</td>
<td>21,251</td>
<td>45,592</td>
<td></td>
</tr>
<tr>
<td>eVisits</td>
<td>69</td>
<td>69</td>
<td>76</td>
<td>94</td>
<td>78</td>
<td>187</td>
<td>242</td>
<td>252</td>
<td>1,275</td>
<td></td>
</tr>
<tr>
<td>eConsults</td>
<td>226</td>
<td>297</td>
<td>279</td>
<td>406</td>
<td>456</td>
<td>319</td>
<td>275</td>
<td>344</td>
<td>3,255</td>
<td></td>
</tr>
<tr>
<td>Telemed Outreach</td>
<td>121</td>
<td>104</td>
<td>143</td>
<td>108</td>
<td>116</td>
<td>142</td>
<td>159</td>
<td>134</td>
<td>1,348</td>
<td></td>
</tr>
<tr>
<td>Telephone*</td>
<td>1,500</td>
<td>1,278</td>
<td>1,415</td>
<td>1,521</td>
<td>1,628</td>
<td>10,692</td>
<td>24,490</td>
<td>20,612</td>
<td>63,634</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2,170</td>
<td>1,983</td>
<td>2,214</td>
<td>2,473</td>
<td>2,578</td>
<td>15,092</td>
<td>43,576</td>
<td>42,593</td>
<td>115,104</td>
<td></td>
</tr>
<tr>
<td>FY 20 Goal</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>1,333</td>
<td>16,000</td>
<td></td>
</tr>
</tbody>
</table>

*Telephone encounters include Perioperative clinic encounters

Digital Health Volume by Modality

2025 Goal: 20,300 visits per month
Jumping into the Telehealth Deep End – Sinking or Swimming?

7 Steps for Success

1. Prepare Yourself
2. Prepare Patients, see the Digital Divide
3. Acquire Tools & Technology
4. Prepare Your Team
5. Have a Good Visit
6. Assess Outcomes and Adapt
7. Advocate for Payment Reform
1. Prepare Yourself

- Identify barriers and address them

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of Poor Quality Care</td>
<td>Data</td>
</tr>
<tr>
<td>Doubt ability to build rapport with a patient telephonically</td>
<td>Study up!</td>
</tr>
<tr>
<td>Frustration with the process</td>
<td>Identify tools, technology or staff support</td>
</tr>
<tr>
<td>Health equity</td>
<td>Data, tools, technology, remove barriers, staff support, and advocacy</td>
</tr>
</tbody>
</table>
## 2. Prepare Patients

<table>
<thead>
<tr>
<th>Category</th>
<th>Home Broadband</th>
<th>Smartphone</th>
<th>Desktop / Laptop</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Americans</td>
<td>75%</td>
<td>83%</td>
<td>74%</td>
</tr>
<tr>
<td>&gt;65</td>
<td>59%</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>66%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>63%</td>
<td>71%</td>
<td>69%</td>
</tr>
<tr>
<td>Income &lt;$30,000</td>
<td>56%</td>
<td>71%</td>
<td></td>
</tr>
</tbody>
</table>

Pew Research Center. Internet/Broadband Fact Sheet and Mobile Fact Sheet  
Patient Visits by Age, Language, and Insurance Before and After Telemedicine Scale-Up

This chart shows the proportion of patient visits seen by age, language preference, and insurance type prior to (2/17–2/28/2020) and after (3/23–4/3/2020) scaled-up telemedicine implementation to address the Covid-19 pandemic at the UCSF General Internal Medicine Primary Care Practice (P=0.002 for age ≥65 and P<0.001 for other comparisons). A significantly smaller proportion of visits after scaled-up telemedicine implementation were with vulnerable patients.

Patient Visits by Race/Ethnicity Before and After Telemedicine Scale-Up

This chart shows the proportion of patient visits seen by patient race/ethnicity prior to (2/17–2/28/2020) and after (3/23–4/3/2020) scaled-up telemedicine implementation to address the Covid-19 pandemic at the UCSF General Internal Medicine Primary Care Practice (P=0.006 using chi-squared test). A smaller proportion of visits with vulnerable populations occurred after implementation.

2. Prepare Patient (with Equity in Mind)

- Identify potential disparities in access
  - Older adults
  - Low SES
  - Limited Health Literacy
  - Limited English Proficiency
  - Racial/Ethnic Minorities
2. Prepare Patient (with Equity in Mind)

- Mitigate digital literacy and resource barriers
  - Develop education and training materials
  - Inform patients about free and low cost access to broadband and devices:
    - Digital Inclusion Network “Resource Document”
  - Workflows: “Virtual Visit Concierge”
2. Prepare Patient (with Equity in Mind)

- Remove Health System Barriers
  - Offer video visits to every patient
  - Ensure access to interpreters
  - Screen for barriers
  - Offer telephone as an alternative to video
  - Increase system leader awareness of barriers to telemedicine
3. Acquire Appropriate Tools & Technology

- HHS and OCR are exercising “enforcement discretion” related to HIPAA.
- Directories for vendors:
  - https://www.techhealthdirectory.com/
  - https://telemedicine.arizona.edu/servicedirectory
4. Prepare Your Team

- Workflows
- Scripting
- Scheduling Guidelines
5. Have a Good Visit

<table>
<thead>
<tr>
<th>Workarounds</th>
<th>New Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient reported vitals</td>
<td>Medication Review</td>
</tr>
<tr>
<td>Self-exam</td>
<td>Use bystander to collect collateral information</td>
</tr>
<tr>
<td>Visualize a lesion</td>
<td>Close follow-up</td>
</tr>
<tr>
<td>Teleprompter</td>
<td></td>
</tr>
</tbody>
</table>
5. Have a Good Visit

<table>
<thead>
<tr>
<th>Establish Rapport</th>
<th>New Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prepare with intention</td>
<td>• Look at the camera to make eye contact</td>
</tr>
<tr>
<td>• Listen intently and completely</td>
<td>• Adjust lighting</td>
</tr>
<tr>
<td>• Agree on what matters most</td>
<td>• Ensure patient privacy</td>
</tr>
<tr>
<td>• Connect with the patient’s story</td>
<td></td>
</tr>
<tr>
<td>• Explore emotional cues</td>
<td></td>
</tr>
</tbody>
</table>

6. Assess Outcomes and Adapt

- Quality Improvement Team:
  - Front desk staff, medical assistants, back office staff, providers
- Data:
  - Volume, Access, Productivity, Quality
7. Payment Reform

Existing payment reforms have expiration dates

<table>
<thead>
<tr>
<th>Service</th>
<th>Before March 1</th>
<th>After March 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual (99213)</td>
<td>Facility Rate ($107)</td>
<td>Office Rate ($153)</td>
</tr>
<tr>
<td>Commercial (United Healthcare)</td>
<td>Facility Rate ($52 )</td>
<td>Facility Rate +Q3014 ($79.81)</td>
</tr>
<tr>
<td>Medicare</td>
<td>Facility Rate ($52 )</td>
<td>Facility Rate +Q3014 ($79.81)</td>
</tr>
<tr>
<td>Telephone (99442, 11-20 min)</td>
<td>$0</td>
<td>Office Rate ($56.63)</td>
</tr>
<tr>
<td>Commercial (United Healthcare)</td>
<td>$0</td>
<td>Office Rate ($56.63)</td>
</tr>
<tr>
<td>Medicare</td>
<td>$0</td>
<td>Facility Rate ($52.76)</td>
</tr>
</tbody>
</table>
7. Payment Reform

"I think the genie's out of the bottle on this one. I think it's fair to say that the advent of telehealth has been just completely accelerated, that it’s taken this crisis to push us to a new frontier, but there's absolutely no going back."

- Seema Verma, CMS Administrator
7. Payment Reform

Digital Health Access is a Public Health Concern

- Advocate for “Digital Inclusion”
  - Broadband access, smartphones

- Fund digital health deployment in less resourced health centers

- Pay parity for telephone and video visits

- Differentiate between visits with a medical home vs. immediate care or virtual care-only providers.
| **Virtual Visit** | Two way video visit between patient and provider via MyChart  
Provider connects via Epic  
Urgent Care, Primary Care and Specialty Care |
|------------------|--------------------------------------------------------------------------------------------------|
| **eVisit**       | Asynchronous communication between patient and provider via MyChart  
Provider access via Epic Inbasket  
Efficient (85% completion success rate. Specialist time similar to eConsult) |
| **eConsult**     | Asynchronous communication between PCP and Specialist  
Goal to reduce unnecessary visits to the specialist  
Efficient (90%+ success, PCP completes <10 minutes, specialist completes <8 minutes) |
| **Telemedicine to Outreach Clinics** | Two way video connection to clinic with telemedicine capability  
Allows for a higher level of exam due to tele-presenter (vitals, wound exam cams, stethoscope)  
Medicare visits covered when clinic located in rural setting |
| **Telephone Visits** | Visits with established patients  
Low complexity in nature  
Documented in Epic |
Operations Report: eVisit Volume Data

Dermatology eVisit Volume
August 2017 to May 2020

War on Melanoma Campaign
Launched May 18, 2019
Operations Report

eConsult Volume
March 2016 to May 2020

Phase 1: DHC Pilot
Avg 6/mo ~ 29% Referred

Phase 2: Internal Exp
Avg 53/mo ~ 7% Referred

Phase 3: Internal Exp
Avg 185/mo ~ 4% Referred

Phase 4: Internal Exp + Redesign
Avg 346/mo ~ 4% Referred
## COVID 19 Screening Tool in MyChart:
Symptom Checker Endpoints from April 2020 to May 2020

<table>
<thead>
<tr>
<th>Endpoint Description</th>
<th>Event Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassurance: No cough, fever, SOB or exposure</td>
<td>37.57%</td>
</tr>
<tr>
<td>Virtual visit: Cough, fever, SOB</td>
<td>22.92%</td>
</tr>
<tr>
<td>eVisit: Cough or fever, no SOB</td>
<td>13.02%</td>
</tr>
<tr>
<td>Occ Health: No cough or fever</td>
<td>6.61%</td>
</tr>
<tr>
<td>Seek care: SOB</td>
<td>6.29%</td>
</tr>
<tr>
<td>Occ Health: Frontline W symptoms</td>
<td>3.77%</td>
</tr>
<tr>
<td>Self Isolate: No cough or fever, W exposure</td>
<td>2.96%</td>
</tr>
<tr>
<td>Testing Locations: Healthcare worker, Other W symptoms</td>
<td>2.84%</td>
</tr>
<tr>
<td>Seek care: SOB over--65</td>
<td>2.76%</td>
</tr>
<tr>
<td>Discontinued/Abandoned</td>
<td>1.26%</td>
</tr>
</tbody>
</table>

Event Count: 0, 500, 1000
Remote Patient Monitoring

In home monitoring for patients with chronic disease &/or high risk for (re)admission

- Adult Chemo Symptom Mgmt
- Interstage Monitoring for Single Ventricle infants
- NICU “Feeders & Growers”

- Improve outcomes
- Reduce readmissions
- Facilitate early discharge for safe motivated patients (Home as the 4th campus)
- Patient satisfaction
COVID specific response

Ambulatory
  telephone and video
  early adopters to everyone
  from “luxury” to necessary, overnight
  rethink training

Symptom Checker to triage to appropriate level of follow-up care

COVID Connected Care Center
  RN triage - feeds Virtual Visit as indicated
  Where to get testing in state
  Manage results

Inpatient work
  primary team use to decrease exposure & PPE utilization
  video & phone consults
  code team response
Telehealth Across the Care Continuum

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Telemedicine tools</th>
<th>Telemedicine services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinician to clinician</td>
<td>• Clinicians often communicate through email, video, or both</td>
<td>• Dermatology&lt;br&gt;• Radiology&lt;br&gt;• Surgical peer mentoring&lt;br&gt;• Emergency trauma and ICU care</td>
</tr>
<tr>
<td>Clinician to patient</td>
<td>• Video&lt;br&gt;• Phone&lt;br&gt;• Email&lt;br&gt;• Remote wireless monitoring&lt;br&gt;• Internet</td>
<td>• Care for chronic conditions&lt;br&gt;• Medication management&lt;br&gt;• Wound care&lt;br&gt;• Counseling&lt;br&gt;• Postdischarge follow-up&lt;br&gt;• Mental health</td>
</tr>
<tr>
<td>Patient to mobile health technology</td>
<td>• Wearable monitors&lt;br&gt;• Smartphones&lt;br&gt;• Mobile apps&lt;br&gt;• Video&lt;br&gt;• Email&lt;br&gt;• Web portals&lt;br&gt;• Games</td>
<td>• Health education&lt;br&gt;• Monitoring of physical activity&lt;br&gt;• Monitoring of diet&lt;br&gt;• Medication adherence&lt;br&gt;• Cognitive fitness</td>
</tr>
</tbody>
</table>

Integration with electronic medical records<br>Data analytics

OHSU:
• Acute Care<br>• e-Consults<br>• Project ECHO

Virtual Visits
• to Clinic/SNF<br>• to Home

e-Visits
Remote Pt Monitoring
Imaging, Study Interpret
CCC

e-Visits
Symptom Checker

Abbreviation: ICU, intensive care unit.
Future Considerations

From Telemedicine to Telehealth to ‘Digital Health’

Equity – Digital Divide

AI tools – SmartExam, Chat-bots

Payment & Regulatory Reform

Defining optimal use cases per clinical, economic, efficiency considerations
Telehealth Resources

- OHSU Telemedicine
  ohsu.edu/telemedicine
- Telehealth Alliance of Oregon
  ortelehealth.org
- American Telemedicine Association
  americantelemed.org
- Center for Telehealth & E-Health Law
  ctel.org
- Office for the Advancement of Telehealth (OAT)
  telehealth.hrsa.gov
Telehealth Equity Resources

Digital Denied: The Impact of Systemic Racial Discrimination on Home-Internet Adoption

Healthcare From Anywhere: Telehealth Use & Perceptions in Rural Michigan (Feb 2020) – Connected Nation Michigan
connectednation.org/blog/2020/03/05/healthcare-from-anywhere-groundbreaking-study-looks-at-the-impact-of-telehealth-in-rural-america/

NEJM Catalyst: Innovations in Care Delivery - Addressing Equity in Telemedicine for Chronic Disease Management During the Covid-19 Pandemic
catalyst.nejm.org/doi/full/10.1056/CAT.20.0123

National Digital Inclusion Alliance
www.digitalinclusion.org/
Telehealth Equity Resources

Oregon Broadband Office Strategic Plan


Oregon Broadband Map

www.oregon4biz.com/Broadband-Office/Interactive-Map/

Portland Resources for Digital Inclusion


$10/month internet:  www.portlandoregon.gov/oct/article/709742

Digital Divide Fact Sheets (Broadband, Mobile Devices)

OHSU TeleHealth Services

ohsu.edu/telemedicine    o2.ohsu.edu/telehealth