Clinical Case 1: Clinic Referral

- Referral (12/5/16)
  - 49 y/o F with "worsening LFTs"
  - Prelim work-up: hepatitis serologies, liver US negative
  - Possible Dx: non-alcoholic steatohepatitis (NASH), cirrhosis

<table>
<thead>
<tr>
<th>Date</th>
<th>ALT</th>
<th>AST</th>
<th>GGT</th>
<th>ALK Phos</th>
<th>GLB Bil Direct</th>
<th>GLB Bil Total</th>
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<tbody>
<tr>
<td>5/28/2016</td>
<td>45</td>
<td>75</td>
<td>35</td>
<td>128</td>
<td>46</td>
<td>65</td>
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<tr>
<td>6/5/2016</td>
<td>47</td>
<td>51</td>
<td>38</td>
<td>123</td>
<td>41</td>
<td>57</td>
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<tr>
<td>10/2/2016</td>
<td>58</td>
<td>72</td>
<td>36</td>
<td>127</td>
<td>41</td>
<td>57</td>
</tr>
<tr>
<td>12/5/2016</td>
<td>56</td>
<td>72</td>
<td>36</td>
<td>127</td>
<td>43</td>
<td>57</td>
</tr>
</tbody>
</table>

- 5 months later in the clinic… (5/3/17)
  - Agreed: this is likely NASH cirrhosis
  - Further work-up ordered and **still pending** (9/1/17)
  - Patient advised weight loss and return to clinic in 6 months
Clinic Referral Model

Clinic Referral Model

Welcome to the neighborhood

Welcome to the neighborhood

Telehealth and Telemedicine

Telehealth and Telemedicine
Telemedicine Modalities

- Synchronous encounter
  - Videoconferencing between provider and patient, caregiver or other provider
- Remote patient monitoring
  - Remote cardiac telemetry or blood glucose monitoring
- Mobile health
  - iPhone® Health application or Fitbit®
- Store-and-Forward or asynchronous encounter
  - E-consults

E-consult Model

1. Referring provider crafts question for e-consult
2. Referring provider places e-consult
3. Specialist reviews e-consult
4. Specialist responds
5. E-consult answered and referral is closed
6. Additional information or evaluation needed
7. Face-to-face visit warranted and is arranged by specialist

Potential Benefits of E-consults

- Improved timeliness of expert specialist advice (days vs. weeks/months)
- Reduce waiting times for face-to-face (F2F) appointments
- Improve quality of F2F visit by specialist triaging referrals for completeness and urgency
- Versatility of platform lends to use in wide array of healthcare systems
### Examples of implementation models

<table>
<thead>
<tr>
<th>&quot;Closed&quot; care systems</th>
<th>&quot;Open&quot; care systems</th>
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<tbody>
<tr>
<td>• Veterans Health Administration</td>
<td>• Mayo Clinic</td>
</tr>
<tr>
<td>• Accountable Care Organizations: Partners (Harvard Medical School)</td>
<td>• Cleveland Clinic</td>
</tr>
<tr>
<td>• Safety-Net systems</td>
<td>• Children’s Hospital of Wisconsin</td>
</tr>
<tr>
<td>- San Francisco Health Network (UCSF)</td>
<td></td>
</tr>
<tr>
<td>- LA County (USC)</td>
<td></td>
</tr>
<tr>
<td>- NYC Health (NYU)</td>
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</table>

**"Closed" care systems**

- Half of veterans receive specialty care
- Community-based outpatient clinics (CBOC)
  - Many veterans live in rural communities
  - Effort to bring primary care to rural communities
  - Most specialty care remains in urban medical centers

**"Open" care systems**

- Mayo Clinic
- Cleveland Clinic
- Children’s Hospital of Wisconsin

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**U.S. Department of Veterans Affairs**

**Veterans Health Administration**

- VHA is the largest integrated healthcare delivery system in the U.S.
  - Half of veterans receive specialty care
- Community-based outpatient clinics (CBOC)
  - Many veterans live in rural communities
  - Effort to bring primary care to rural communities
  - Most specialty care remains in urban medical centers

**E-consult program launched at 12 VHA medical centers (2011)**

- Cost savings
  - Reduced travel reimbursements
  - Estimated VHA savings: $3 million
- User satisfaction
  - Improved provider communication
  - Timeliness of specialist response

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• Large, integrated and academically-oriented tertiary care center
• Based in Minnesota with several satellite centers in U.S.
• Mayo Clinic Care Network
  - International network of member practices with access to Mayo Rochester providers
• Over 1.3 million individual patients cared for by Mayo Clinic in 2016

• Mayo Rochester’s Department of Medicine introduced e-consults in 2005
• Between 2009-2013, over 9000 e-consults performed
  - Significant number of external e-consults offered to Mayo Clinic Care Network
• As of 2016, over 50 specialty services offer e-consults

• Medicare Shared Savings Program (2011)
  - Medicare ACO
• “Triple Aim” of healthcare
• Factors that may facilitate success in ACO
  - Reduction of fragmentation
  - Improved communication
• E-consults are tools to integrate and coordinate care within ACOs
• Partners HealthCare System
  - Integrated healthcare network that participates in several ACO
  - Massachusetts General Hospital (MGH)
• MGH's cardiology e-consult program (2014)
  - E-consults accounted for nearly 10% of total outpatient consult volume
  - Observed decrease in face-to-face clinic visits

• 6-month follow-up of e-consults
  - 75% of e-consult patients were not seen in specialty clinic
• Cost Avoidance
  - Specialists reimbursed $52 per e-consult
  - 2014 Medicare provider reimbursement rate for new patient level 4 office visit (99204) in urban setting $176
  - $124 saved per e-consult that avoids clinic visit

• UT Southwestern Accountable Care Network
  - Medicare Shared Savings Plan
  - Next Generation ACO (2017)
• E-consult pilot program by Division of Cardiology (January 2017)
  - Multispecialty and general internal medicine clinics
• Other specialty services offer or plan to offer e-consults
  - Hematology
  - Neurology
Safety-Net Health Systems

- Entrusted with caring for vulnerable patient populations
- Significant barriers to access of both primary and specialty care
- Financially volatile
  - Reliance on public funds for operation
  - Uncompensated patient care
- E-consults may help address these challenges

San Francisco Health Network (SFHN)
- Zuckerberg San Francisco General Hospital
- Serves vulnerable population (123,000 patients)
- Specialty care access crisis (2005)
  - Gastroenterology clinic appointment wait list up to 11 months
- eReferral created
- Internal, web-based integrated specialty referral and consultation system

eReferral
- Designated specialist reviews and triages every referral
  - Clinic appointment immediately scheduled (49%)
  - Initial communication followed by scheduling (21%)
  - Referral entirely addressed via e-consult (30%)
- Effect of eReferral
  - Significant decrease in waiting time for initial F2F visits
  - PCPs: appreciated the helpfulness and educational value
  - Specialists: significant improvement in consultative question during F2F visits
• One of the largest public health systems (650,000 patients)
• 9-month wait to be seen in gastroenterology and urology clinics
• Patients referred to emergency department to obtain specialist consultation
• eReferral platform launched in 2012
  - 3,000 PCPs with access to 80 specialty services
  - 20% of eReferrals able to be addressed without F2F visit


• Dermatology
  - 5000 referrals per year
  - Average wait time for new patients was 67 days

Teledermatology launched in 2014
  - During 8-month pilot, 79 teledermatology consults were placed
  - Reduced median time to evaluation from 70 days to 0.5 days
  - Reduced median time to treatment from 73.5 days to 3 days


• PHHS GI/Liver Clinic
• One of the higher volume medicine specialty clinics at Parkland
• Three half-days of housestaff-run clinics with UT faculty supervision
• General and specialized gastroenterology and hepatology
  - Liver disease accounts for about 2/3 of patients
Closing the Gap: Increasing Supply

- Increasing the supply of clinic appointments
  - Data-driven analysis of referral indications
    - Treatment of chronic hepatitis C virus infection a common indication
  - HCV Treatment Clinic (2/2016)
    - CPRIT grant (PI: Amit Singal)
    - Three half-days of clinic
    - Multidisciplinary team

Clinic Capacity Gap

![Bar chart showing clinic capacity gap]

- Total Clinic Referrals: 3434
- New Patient Sites: 1476

Closing the Gap: Increasing Supply

- Total Referrals: 4600
- New Patient Sites: 1476
Closing the Gap: Decreasing Demand

- Decreasing demand for face-to-face clinic visits
  - Referrals that can be addressed without a face-to-face visit
  - Medication-related questions
  - Peri-operative risk assessment for chronic liver disease
  - Abnormal liver chemistry tests
  - Abnormal imaging

Gi/Liver E-consult Service

- April 2016
  - Gi/Liver E-consults pilot launched
  - One PHHS primary care site: Southeast Dallas Health Center
- August 2016
  - System-wide expansion to all primary and specialty care providers at PHHS

Ordering an E-consult
Provider Feedback

<table>
<thead>
<tr>
<th>Timeliness of Specialist Input</th>
<th>Improved Provider Communication</th>
<th>Education of Referring Provider</th>
<th>Avoid Unnecessary Clinic Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;I got answers to questions without having to wait several months and depend on the patient to go to their visit...&quot;</td>
<td>&quot;It increases provider communication to the specialist and decreases the frustration by leading to the next best route guided by the specialist...&quot;</td>
<td>&quot;Thank you so much for this wonderful service. It was very educational for me and definitely saved a clinic visit for the patient.&quot;</td>
<td>&quot;I believe the E-consult system limits unnecessary clinic visits and providers also receive good clinical information from the specialist.&quot;</td>
</tr>
<tr>
<td>&quot;Greatly appreciate your fast response!!&quot;</td>
<td>&quot;It was great to get the questions I needed answered without the extensive wait I've experienced with referral to the clinic.&quot;</td>
<td>&quot;Greatly appreciate your fast response!!&quot;</td>
<td>&quot;Greatly appreciate your fast response!!&quot;</td>
</tr>
</tbody>
</table>

Challenges to Implementation: Reimbursement

- Provider reimbursement
  - CMS does not recognize asynchronous telemedicine as a reimbursable form of delivery of care
  - Institutions develop their own reimbursement plans
    - Mayo
    - UCSF
    - MGH

Challenges to Implementation: Workflow and Integration

- Resistance to workflow change
  - Referring providers
    - Increased time crafting referral question
    - Implementation of specialist recommendations
  - Specialist
    - E-consults become "stale"

- Integrated Electronic Health Record
  - Shared access to electronic health record
Clinical Case 2: *E-consult*

- **E-consult ordered**
  - 57 y/o M with “abnormal LFTs”
  - Chronic, mild AST/ALT elevation
  - Prelim work-up: hepatitis serologies, liver US with steatotic changes
  - Possible Dx: non-alcoholic steatohepatitis (NASH), cirrhosis

Clinical Case 2: *E-consult*

<table>
<thead>
<tr>
<th>Days since E-consult</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>specialist replies to e-consult</td>
</tr>
<tr>
<td>17</td>
<td>additional work-up indicates cirrhosis</td>
</tr>
<tr>
<td>25</td>
<td>specialist acknowledges results and orders EGD</td>
</tr>
<tr>
<td>39</td>
<td>EGD performed</td>
</tr>
</tbody>
</table>

A Tale of Two Cases

<table>
<thead>
<tr>
<th>Clinic referral</th>
<th>E-consult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timing of Specialist Input</td>
<td>5 months</td>
</tr>
<tr>
<td>Time to Appropriate Intervention</td>
<td>&gt;9 months</td>
</tr>
<tr>
<td>Specialty Clinic Appointments Used</td>
<td>at least 2</td>
</tr>
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</table>
Summary

- Access to specialty care is a complex problem
  - Inadequate referral model
  - Fragmentation of care
  - Supply-demand mismatch

- E-consults can be applied to a wide array of healthcare systems
  - Resource-limited systems → close the clinic capacity gap
  - ACO → cost reduction and increase shared savings
  - Academic centers → improve health and broaden referral network

- Barriers to e-consult implementation exist
  - Worth overcoming to achieve the “triple aim”

“Technology is nothing. What’s important is that you have a faith in people, that they’re basically good and smart, and if you give them tools, they’ll do wonderful things with them.”

Steve Jobs
1994