Telemedicine: The Live Interactive Method

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Disclosures

- **My role:**

  Medical Director
  Psychiatric Emergency Services
  OSU Wexner Medical Center

- **No financial disclosures to report**

Objectives

1. **Understand the use of live interactive telemedicine**
2. **Recognize advantages and pitfalls in this technology, using Telepsychiatry as an example**

Telepsychiatry

- **Definition**
  - **Use of technology to provide and support mental health care when distance separates the participants**
- **Live interactive and synchronous**
  - **Most viable model for mental health care**

Telepsychiatry

- Also called telemental health
- Interdisciplinary workforce
  - Psychiatrists, psychologists, APPs, social workers, clinical counselors
- Clinical encounters
  - Initial assessment (ED or comprehensive)
  - Medication management
  - Therapy (individual or family therapy)
  - Patient education

Telepsychiatry Applications

- Direct to consumer
  - Provider to patient
  - Can be patient initiated, from home
- Hub and Spoke models
  - Medical settings:
    - Emergency Department, Inpatients, Outpts
  - Non-medical settings:
    - Prisons, Nursing facilities, Schools
- On-Demand vs. Scheduled

Advantages of Telepsychiatry

4 key factors for telemedicine success:

- Process and acceptability
- Clinical outcomes
- Access
- Cost

Mishkind et al., *Telemed J E Health*, 2013.

Key Factor: Process/Acceptability

Patient Satisfaction

- Patients typically prefer use of telepsychiatry over waiting for face-to-face (FTF) assessment
- Some patients prefer telemedicine to FTF
  - Anxious, avoidant, youth

Provider Satisfaction

- More mixed; rural more satisfied than suburban
- Cite concerns about treatment alliance

Key Factor: Clinical Outcomes

Clinical Outcomes

- Review assessed 13 RCTs comparing Telepsychiatry interventions to treatment as usual / FTF interactions
- Treatment of depression, ADHD, bulimia, general psych population
- Outcomes focused on symptom severity
- 12 of the 13 showed telepsychiatry at least equivalent to TAU / FTF interactions

Hubley et al. *World J of Psychiatry* 2016

Reliability of telepsychiatry interview

- 73 ED patients assessed by a second psychiatrist either in person or via telepsychiatry
- Diagnosis and disposition recommendations
- No difference in reliability, supports use of telepsychiatry for ED assessment

Seidel and Kilgus, *J Telemed and Telecare*, 2014

Key Factor: Access

Barriers to mental health care:

- Most US counties have a shortage of MH providers
- Geography limits access to care in rural or underserved urban areas
- Mobility limitations (physical disability, lack of transportation, incarcerated populations) limit access
- Not just physical limitation but also timeliness of care, e.g., faster consultation in the ED

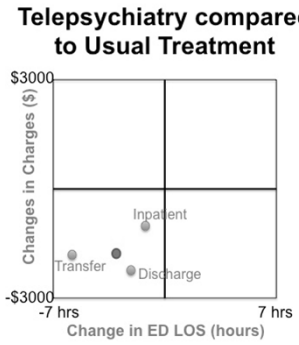
Satiani et al, *Psych Services*, 2018

Key Factor: Cost

- Enables psychiatrists to work at multiple institutions in the same day
- Community facilities that need limited psychiatrist coverage can purchase the amount of coverage needed
- Has greater up-front costs
- Tipping point (patient volume) at which telepsychiatry becomes cost effective

Cost efficient care

- Use of telepsychiatry for pediatric mental health emergencies
- Measured time (ED LOS) and hospital charges
- Providers and parents reported high satisfaction



Thomas et al, *Psych Services*, 2018

Are there downsides?

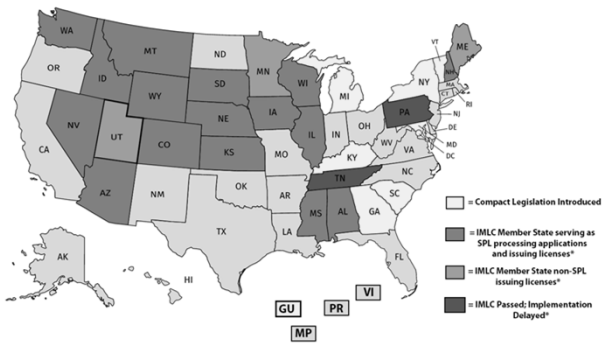
- Telepsychiatry has favorable profile for:
  - Process and acceptability
  - Clinical outcomes
  - Access
  - Cost
- But also has its pitfalls:
  - Technological constraints
  - Provider licensure
  - Reimbursement

Technological considerations

- Technology must be HIPAA Compliant
  - Skype™, FaceTime™ are not
- Interruptions can occur
  - Lost Internet access, audio/video malfunction, bandwidth issues
  - Importance of having a back-up system
- Access and integration with EMR
  - Provider at remote site, overreliance on patient report

Provider licensure

- Telemedicine rules vary by state: Most states require that the provider is licensed in the state where the patient is located
- Exceptions: physician-to-physician consultations, US Military, medical emergencies / natural disasters
- National licensure compact: Some states are banding together to offer expedited pathway for licensure in multiple states



Graphic modified from source: http://licenseportability.org/

Reimbursement

	Setting	Provider type
Medicaid	Must be located in a clinical site. At least 5 miles between provider and patient.	Physicians, APPs, psychologists
Medicare	Requires that a patient be in a county outside a Metropolitan Statistical Area (MSA) or in a Rural Health Professional Shortage Area (RHPSA).	Physicians, APPs, psychologists, clinical social workers
Commercial	Varies	Varies

Telepsychiatry at Ohio State University

OSU Current Use of Telepsychiatry:

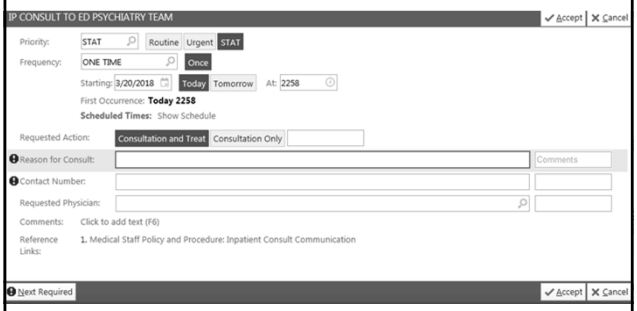
Psychiatry Consultation in OSU East ED

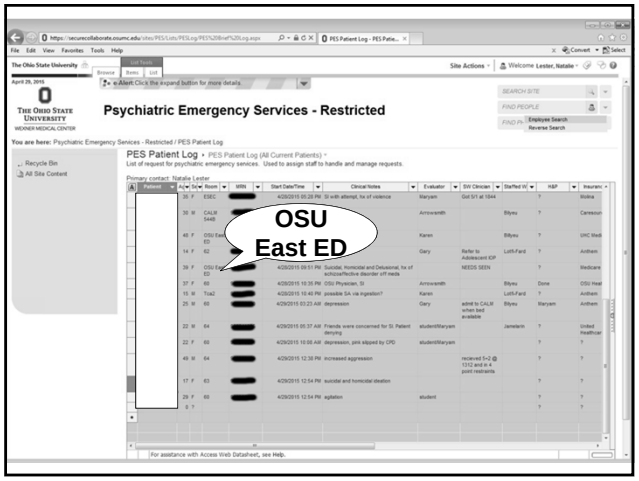
- **OSU East is smaller, more community oriented**
- **Psychiatry Consult Volumes in 2012:**
  - **OSU Main Campus ED: ~400 per month**
  - **OSU East ED: 42 per month**
- **Not enough volume to support psychiatric staff**
  - **Telepsychiatry was implemented to improve access to timely assessments**

OSU East ED Telepsychiatry

1. **East ED physician orders psychiatry consult**
   - ***Exact same process as FTF assessment for patients in Main Campus ED***
2. **Psychiatric Emergency Services (PES) team sees patients from both Main ED and East ED in the order of the consult**
3. **East ED patients are assessed using InTouch™ telemedicine software**

Process





Telepsychiatry Consult

- **OSU East ED Staff will take the "Robot" to the patient's room**
- **Psychiatric assessment is conducted over video but is otherwise the same as a FTF assessment**
- **Provider may be a social worker, clinical counselor, nurse practitioner, or psychiatrist**

Telepsychiatry Consult

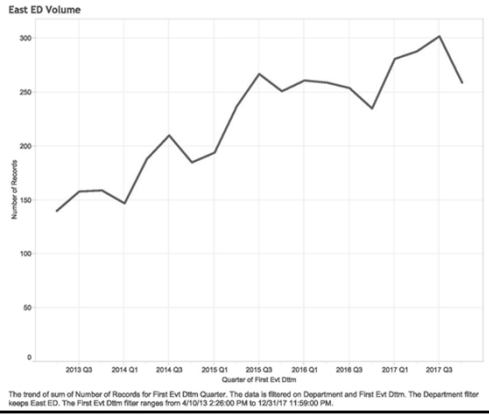
- **Provider's view through telepsychiatry software**

Outcomes

- **April 2013 - December 2017, we had completed 4,275 psychiatry consults in the OSU East ED**

	Before Telepsych (2012)	With Telepsych (2013)	Change
Volume	41.7 consults/month	64.5 consults/month	↑ 54.7%
ED LOS (Mean)	23.8 hours	17.4 hours	↓ 27.1% ↓ 6.4 hours
ED LOS (Median)	19.4 hours	12.5 hours	↓ 35.6% ↓ 6.9 hours

Growth in East ED Volume



Acknowledgements

- **Karen Jackson, John Wooten, Brittany Locklear with the OSU Outreach Team. Our partners in the OSU East ED and our dedicated Psychiatric Emergency Services team.**

Questions?

- **Natalie.Lester@osumc.edu**

Using telepsychiatry with non-English speaking patients

Telepsychiatry in child and geriatric psychiatry

Telemedicine: The Store-and-Forward Method

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Disclosures:

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My Wife's Conflicts of Interest: Janssen, Novartis, Amgen, Sandoz, Abbvie, Eli Lilly Co.

Off Label Treatments: No

The Future of Digital Medicine

"For the first time, last year, we had over 110 million interactions between our physicians and our members,"

52% of them were done via smartphone, videoconferencing, kiosks, and other technology tools

-Bernard Tyson, CEO Kaiser, Oct 2016

http://fortune.com/2016/10/06/kaiser-permanente-virtual-doctor-visits/

Objectives

- **1. Understand the use of store-and-forward telemedicine**
- **2. Recognize advantages and pitfalls in this technology, using dermatology as an example**

Store-and-Forward Telemedicine

- **Dyssynchronous**
- **May be direct-to-consumer**
- **New CPT Codes 99446-99449**
- **Reimbursed in some Western States, Veterans Affairs Systems, patchwork elsewhere**
- **We will use Dermatology or teledermatology as a prototypical specialty conducive to S&F telemedicine.**

Background on Store and Forward Telemedicine (Teledermatology)

- **There is a substantial wait for patients with medical complaints nationally; locally, we had over 2000 patients on our waitlist**
- **Live interactive telemedicine is not a viable model for dermatology**
- **Store-and-forward well-described in dermatology but not reimbursed here**
- **With proper patient selection, patient outcomes generally similar to in-person care** (Pak et al. 2007, Lasiera et al 2012)

Benefits:

- **Non-inferior in diagnosis and management in specific scenarios**
- **From societal perspective, tends to be cheaper than conventional referrals to the payer(s)** (Datta et al 2015).
- **Frequent change in diagnosis, in hospital/ED setting decrease rate of admission for skin disease** (Duong et al. 2014)
- **Improves access to dermatology among Medicaid enrollees** (Uscher-Pines 2016)

Background on Teledermatology:

Active Programs	2003	2011
Number	62	37
Annual Volume	184 (3-1500)	309 (5-6500)
Delivery Method		
Live Interactive	59%	14%
Store-and-Forward	29%	51%
Both	12%	19%

Armstrong et al. J Am Acad Dermatol. 2012; 67(5):939-44

Access to Care

Access for Underinsured

	Before Teledermatology			After		
	Enrollees	>0 Visit	Rate/1000	Enrollees	>0 Visit	Rate/1000
Users						
Telederm	0	0	0	1938	0.8	15.5
In-Person	2790	1.2	40.6	5155	1.1	50.9
All	2790	1.2	40.6	7093	1.9	66.7
Non-Users						
Telederm	0	0	0	67	0.2	2.7
In-Person	962	1.2	37.1	1902	1.3	57.1
All	962	1.2	37.1	1969	1.5	59.4

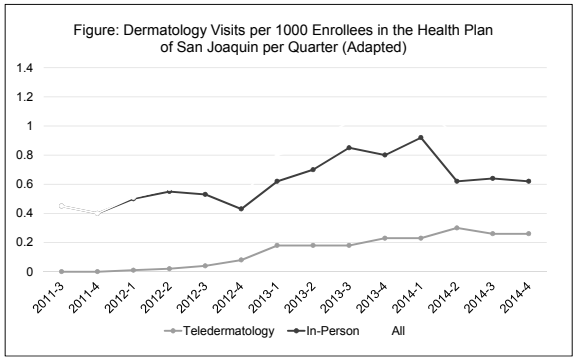
Uscher-Pines L. et al. JAMA Dermatol 2016; 152(8)905-12

Access for Underinsured

	Change Fraction with any Derm visit	Change All Derm visits per 1000
User Practices	63.8*	64.6*
Nonuser Practices	20.5	60.1

Uscher-Pines L. et al. JAMA Dermatol 2016; 152(8)905-12

Access for Underinsured



Uscher-Pines L. et al. JAMA Dermatol 2016; 152(8)905-12

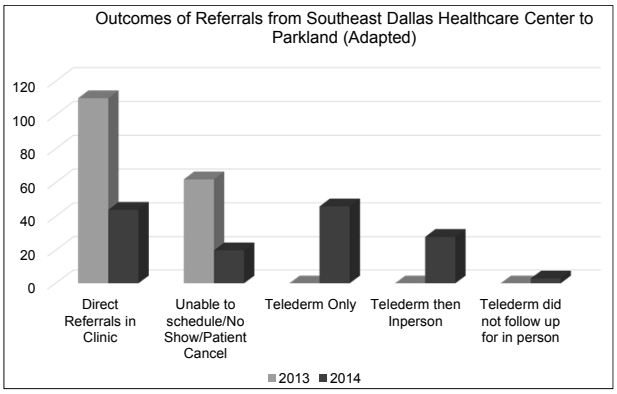
Access for Underinsured

Adjusted Rates of Derm Services in 2014 for Newly Enrolled vs Continuously Enrolled Patients (Adapted)

Type of Visit	# Enrollees	>0 Visit	Rate per 1000	% Telederm Visits
Continuously Enrolled				
Telederm	1039	1.1	17	**17.5%**
In-person	4907	1.8	97	
All	5946	3.0	112.8	
Newly Enrolled				
Telederm	837	1.7	19.7	**43.0%**
In-Person	1110	0.6	28.1	
All	1947	2.2	45.5	

Uscher-Pines L. et al. JAMA Dermatol 2016; 152(8)905-12

The Parkland UTSW Model



Carter ZA et al. JAMA Dermatol 2017.

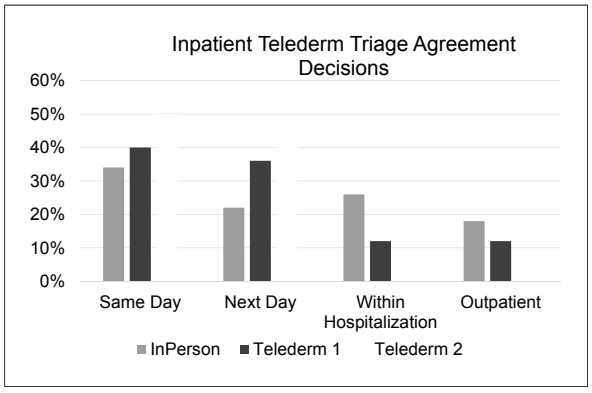
The Parkland UTSW Model

Table 2. Diagnostic and Management Concordance Between PCPs, Teledermatologists, and In-Clinic Dermatologists

Concordance Comparison (Total No. of Cases)	Discordant, No. (%)	Partially Concordant Level 1, No. (%)	Partially Concordant Level 2, No. (%)	Completely Concordant, No. (%)	Observed Concordance (Partial 1 and 2 and Completely),	Expected Concordance (Partial 1 and 2	1-Sided P Value Using Yates Correction
PCP vs tele 1 Diagnosis	49 (62)	9 (11)	10 (13)	11 (14)	30 (38)	68	>.99
Tele 1 vs tele 2 Diagnosis	0	10 (13)	44 (56)	25 (32)	79 (100)	88	0.001
Tele 1 vs derm clinic Diagnosis	3 (10)	5 (17)	10 (35)	11 (38)	26 (90)	67	.008
PCP vs tele 1 Management	44 (56)	8 (10)	23 (29)	4 (5)	35 (44)	61	.99
Tele 1 vs tele 2 Management	12 (15)	4 (5)	33 (42)	30 (38)	67 (85)	75	.03

Carter ZA et al. JAMA Dermatol 2017.

Hospital Access



Barbieri et al. JAMA Dermatol. 2014

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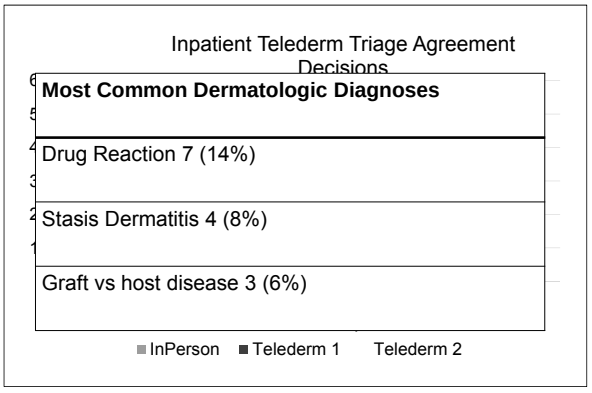


Barbieri et al. JAMA Dermatol. 2014

Potential Cost Savings

Emergency Dept and Inpt Management

Intervention Costs Incurred by Referral Group (adapted)

Cost Element	Referral Group, Cost, $					
	Conventional (n = 196)			Teledermatology (n = 195)		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
Teledermatology referrals	NA	NA	NA	5120	2258	11 724
Dermatology clinic visits	45 353	37 905	50 843	32 032	26 711	35 909
Intervention costs	45 353	37 905	50 843	37 152	28 969	47 633

Datta SK, et al. JAMA Dermatol. 2015

Cost

VA Perspective and Societal Perspective Total Costs by Randomization Group (adapted)

Cost Element	Referral Group, $	
	Conventional	Teledermatology
VA perspective		
Intervention, mean	45 353	37 152
(minimum/maximum)	(37 905/50 843)	(28 969/47 633)
Travel reimbursement	3591	3072
Dermatology medication	17 201	19 693
Total	66 145	59 917
(minimum/maximum)	(58 697/71 635)	(51 794/70 398)
Other incurred		
Travel	6460	5732
Productivity	32 600	22 643
Care sought outside the VA	989	1231
Total	40 049	29 606
Societal perspective		
Total, mean	106 194	89 523
(minimum/maximum)	(98 746/111 684)	(81 400/100 400)

Datta SK, et al. JAMA Dermatol. 2015

Cost

Per-Participant Cost and Utility Change Score by Randomization Group (Adapted)

Randomization Group	Perspective Cost, Mean (SD), $		Change in Utility Score, Baseline to Month 9, Mean (SD)
	VA	Societal	
Conventional	338 (291)	542 (403)	0.02 (0.18)
Teledermatology	308 (298)	460 (428)	0.03 (0.19)

Datta SK, et al. JAMA Dermatol. 2015

Cost

Table 3. Management Comparison Between Dermatologist and ED Physician (Adapted)

Management	ED Physician (n = 110)	Dermatologist (n = 111)	Concordance Cohen κ (95% CI)	P Value
No immediate specialized consultation	109 (99.1)	111 (100)	0.75 (0.64-0.86)	0.04
No specialized consultation	79 (71.8)	54 (69.2)	0.49 (0.14-0.84)	<10−4
No immediate hospitalization	101 (91.8)	103 (92.8)	0.49 (0.41-0.57)	<10−4
Patient discharges (no)	67 (60.9)	59 (53.2)	0.74 (0.67-0.81)	<10−4

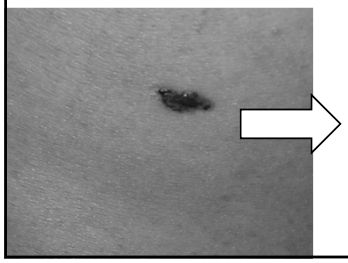
Duong et al. JAMA Dermatol 2014.

Clinical Equivalence Outcomes

Factors Associated with "Success"

1. Selecting Patients Appropriate for Telederm Consult
2. High Quality Photography
3. Dermoscopy for Pigmented Lesions
4. Effective Infrastructure and Culture to Implement Consults

Landow et al. J Am Acad Dermatol 2014



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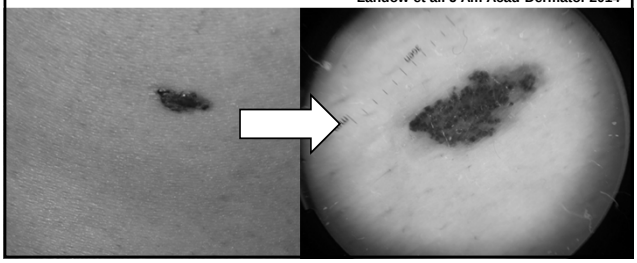


Mobile-Phone Based Screening for Skin Cancer

Concordance measures between in-person and mobile teledermatology evaluation				
Outcome:	% Concordance N=107	95% CI	Cohen Kappa	P Value
Aggregated Diagnostic Concordance	0.62	0.51-0.71	0.6	<0.01
Primary Categorical Diagnostic Concordance	0.82	0.73-0.89	0.62	<0.01
Management Concordance	0.81	0.72-0.88	0.57	<0.01

Lamel SA et al. J Am Acad Dermatol. 2012

Diagnostic Concordance

Diagnostic Concordance

In over 2009 Telederm Images:

-51% of patients retained their medical home
-12 days to specialty appointment vs 81 days for conventional referral
- Concordance rates: K>0.8 among observers
- Sensitivity 99% for malignancies (Imaged)
- Specificity 62% for malignancies

Moreno-Ramirez et al. Arch Dermatol 2007

An Example of an Ineffective System

Time Impact Study (Adapted)	
Item	Average Time (min)
Time invested by dermatologist in consultation	6
Time invested in face to face consultation	10
Time spent by GP to take image	12.3
Time spent by GPs to complete referral information	6.7
Total Time spent by GP	19
Time invested by GP in normal dermatology consultation	10

LaSierra N et al. Int J Med Inform. 2012

Apprehensive about the Amazonification of Dermatology? Its happening!

Of 57 Encounters	
US BC Dermatologist (27)	NP Derm (3)
Internist (5)	PA Derm (3)
Emergency Medicine (3)	PA Emergency Med (1)
Family Medicine (3)	PCPs in India (5)
Ob/Gyn, PMR, Cardiology, Pain (1 each)	Dermatologists in Sweden (2)

Resneck JS. JAMA Dermatol 2016.

Apprehensive about the Amazonification of Dermatology? Its happening!

Correct Diagnoses/Management	
Secondary Syphilis	1/8 Completed Encounters
Stasis Dermatitis	7/7 Completed Encounters
Nodular Melanoma	11/14 Completed Encounters
Gram Negative Folliculitis	2/12 Completed Encounters

Resneck JS. JAMA Dermatol 2016.

Apprehensive about the Amazonification of Dermatology? Its happening!

Available Apps	
Dermatology Only	General Medical + Derm
DermatologistOnCall	Amwell
Dermcheck	First Opinion
DermLink	HealthTap Prime
Direct Dermatology	MD Live
First Derm	MeMD
SkyMD	Teladoc
Spruce	Virtuwell
Virtual Acne	
YoDerm	

Resneck JS. JAMA Dermatol 2016.

Regulations

The patient may be either new to the consultant or an established patient with a new problem or an exacerbation of an existing problem. However, the patient should not have been seen by the consultant in a face-to-face encounter within the previous 14 days

Medicare, Medicaid, private insurance

Coverage is not uniform. Generally covered by the Veterans Affairs Medical Centers and more likely in the West.

HIPAA, secure transmission and documentation

Documentation to be performed by consulting physician within secured medical record system

OSU Current Use of Teledermatology

1. **OSU Emergency Department: Informal Triage System since 2011**
2. **OSU East Consult Service with OSU Family Medicine for Skin Biopsies: Operational since 2014**
3. **Econsult Platform: Outpatient, Operational since 1/2017**
4. **Primary One Health: Outpatient, Operational since 8/2017**

Stakeholders: Primary Care Providers

- **Rapid and Direct Education and Feedback**
- **Patient Satisfaction with rapid confirmation/change plans**
- **Maintenance of Patient Medical home and Avoiding Fragmented Care**
- **Confirmation prior to Procedure (some)**

ECON Order	MRN	ECON Order	ECON Close	Calendar	Business
Grand Total				1.90	1.20

- **Used by 120 out of ~ 1700 Attending Physicians at this time**

Stakeholders: Health System

- **Removal of bottlenecks to additional specialists**
- **Testing for application for its ACO and the OSU Health plan**
- **Support to primary physicians**
- **Test Specialty for enhanced referrals/other Econsults**

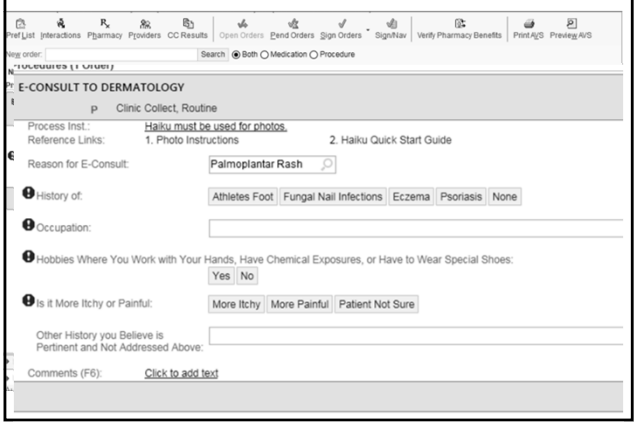
Dermatologists

- **Naturally Triage/Manage the Waitlist**
- **Remove intradepartment bottlenecks (surgery)**
- **Decrease "No-Show" rate**

Patient Access

- **71% Diversion Rate**
- **Free (currently)**
- **Patients seen within 2 weeks (3 mo or longer)**
- **Cancers removed faster**
- **Dermatologic Care at hospitals previously without**

Process



Process

Order Questions

Benjamin H Kaffenberger, MD
Dermatology

Progress Notes

Phys Exam: Annular plaque with central clearing and peripheral heterogeneity

Assessment/Plan;
Tinea Gladiatorum/Tinea faciei/corporis

I completely agree with your assessment. He likely developed this related to his Kung-Fu.

He will need oral treatment for clearance. Please start terbinafine 250 daily. I do not generally check labs as no HFT issues have been detected in courses shorter than 6 weeks. He will need 3 weeks to clear his hair follicles in these areas (topicals will not clear the follicles). I would recommend seeing him back in 3 weeks afterwards and consider an addition 1-2 weeks depending on response.

Have him wash all clothes in a hot cycle at the same time to minimize risk of reinocculation.

Additional Documentation

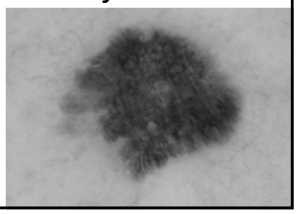
Encounter Info: Billing Info, History, Allergies, Detailed Report

Media

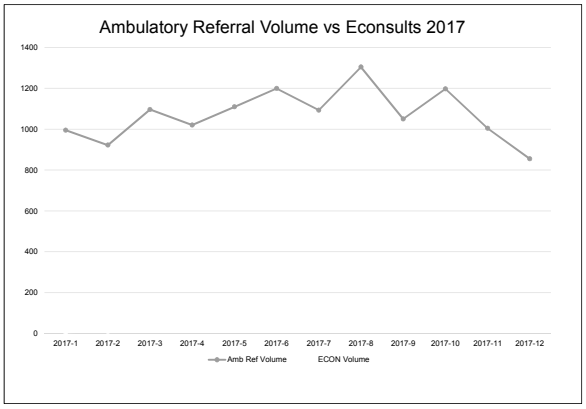
Scan on 4/3/2017 10:35 AM by
Scan on 4/3/2017 10:35 AM by
Scan on 4/3/2017 10:36 AM by
Scan on 4/3/2017 10:36 AM by
Scan on 4/3/2017 11:03 AM

Results:

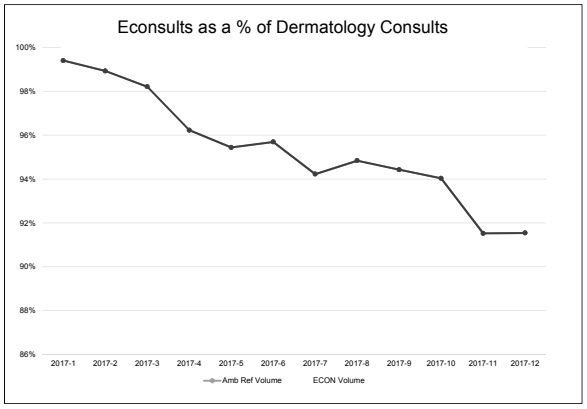
- **Went live January 15, 2017**
- **Averaging 3-5 E-Consults per Week after first several weeks and increasing**
- **Most users have become repeat users within 4 weeks**
- **Total Number of Consults: 630**
- **100 Consults monthly as of January 2017**
- **Estimated Diversion Rate:**



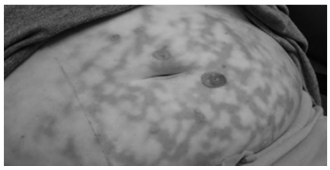
Results:



Results:



Future Plans



1. Develop teaching clinic
2. Collect official metrics And publish
3. Convince payers to cover 99446-8 codes
4. Develop direct-to-consumer arm
5. Provide digital dermatoscopic cameras to high-use PCP offices
6. Extend reach to outlying hospitals ? COPC, Primary One, FastCare? VA, Prisons

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- Questions?