Clinical Opportunities for TeleHealth: TeleNeurology and Other Stories

14th Public Health Leadership Forum

Massachusetts Medical Society

Juan Estrada, MSc, MBA- Sr. Director, TeleNeurology/TeleHealth

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MGH 1811 MASSACHUSETTS GENERAL HOSPITAL
TELEHEALTH

Connecting patients and providers, virtually anywhere

Defining TeleHealth

- Telehealth is a broad and rapidly evolving concept, and it can represent many types of patient interactions, including media such as video, texting, secure email, remote monitoring, and structured patient questionnaires.

Defining TeleHealth

- It can also involve patients who don't have a prior MGH affiliation including video-augmented second opinions for patients who will never be physically seen or cared for at MGH.

- We have chosen to broadly classify these activities into 4 distinct programs

MASSACHUSETTS GENERAL HOSPITAL TELEHEALTH

	Real Time "**Synchronous**"	Store and Forward "**Asynchronous**"
Visits (Provider to Patient)	***Virtual* Visit** Video visit between MGH MD and patient[1]	***e*Visit** Online exchange of medical info between MGH MD & patient[1]
Consults (Provider to Provider)	**Virtual Consult** Video consult from MGH MD to patient's MD[2]	***e*Consult** **MGH eConsults** *Less complex* consult from PCP or Specialist[2] **Second Opinions** *Formal* consult for *complex* medical questions[2]

[1] Exchange where the provider gives the patient medical advice, or determines if travel to MGH for in-person encounter is advisable
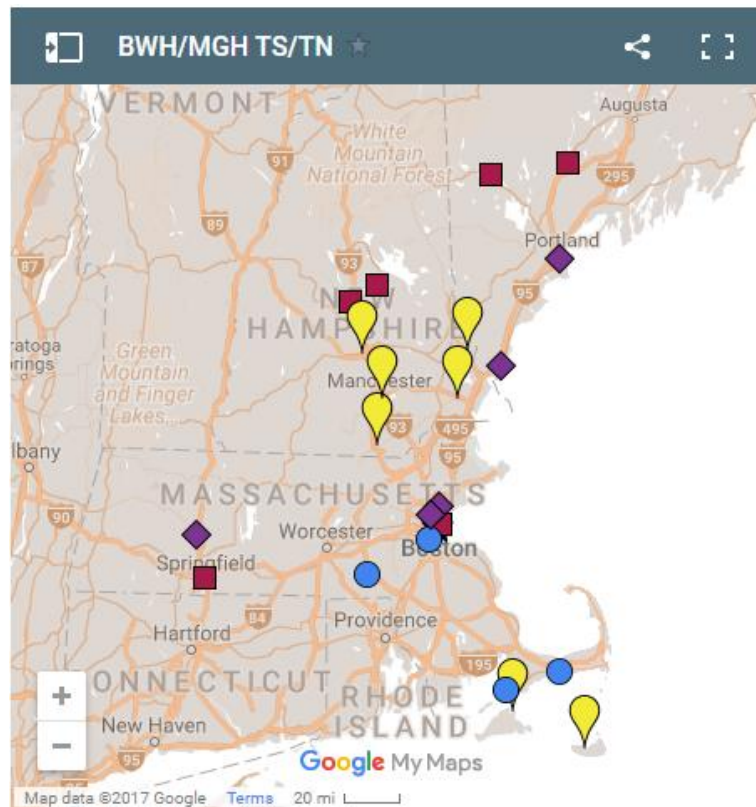[2] Exchange where the MGH consultant "Expert" gives referring provider medical advice

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Synchronous TeleHealth Activity

- TeleHealth activity at MGH

- Over **300** providers from **15** departments have provided

  – **9,000** virtual visits since 2013

  – **13,000** virtual consults since 2001

TeleNeurology Service	Recipient	Description	Consulting Neurologists	Milestone	~Duration
Virtual Visits	MGH established patients	Scheduled follow up , MGH patients	72	2,000 Visits	20 min.
Routine/Urgent Neurology (Practice Based)	2 clinics in MA/ME	Scheduled virtual clinic to external practice	2	Stable Model NCH/York TeleALS to FL	30 min.
Routine/Urgent Neurology (Hospital)	6 New England Hospitals in ME & MA	Unscheduled inpatient consult to community hospitals	8	1,000 Consults (soon) TeleNeuroCritical Care to OK AMC 24/7	15 min.
Emergency Neurology	11 hospitals in MA,NH and ME	Non Vascular Emergency	13	-	15 min.
TeleStroke	24 hospitals in MA,NH and ME	Acute Stroke	21	10,000+ Consults 400+ Bed Hospital	20 min.

Virtual Consults: Expanding our National Reach, Serving 6.5M NE Residents, Filling our MGH IP Beds with Complex Care While Keeping 80%-95% of Cases at the Referring Hospital

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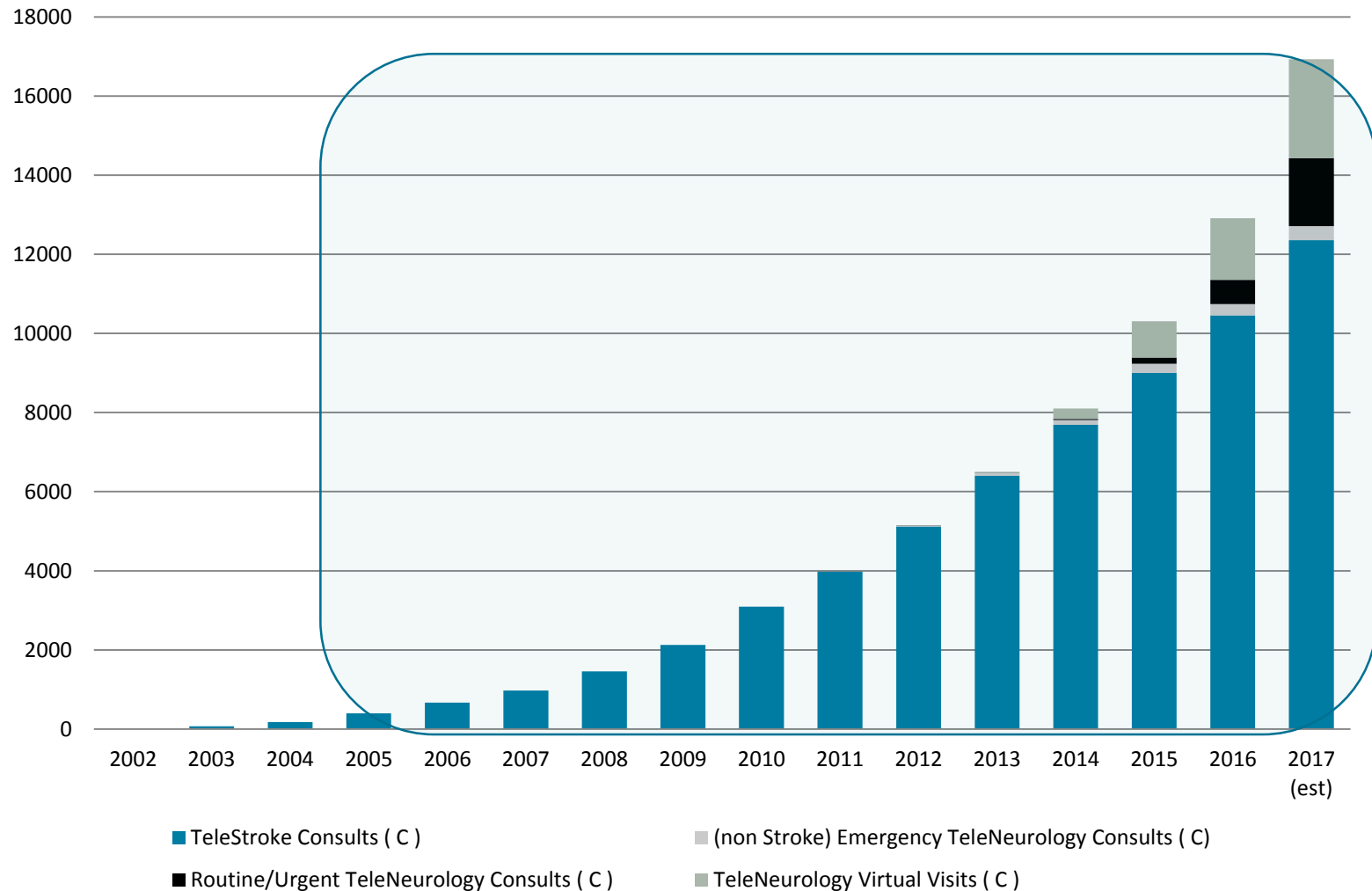TELEHEALTH

MGH TeleStroke and TeleNeurology
Rumford Hospital
Central Maine Medical Center
Mercy Medical Center
Bridgton Hospital
Lakes Region General Hospital
Franklin Regional Hospital
SRH-Boston, NWH, NSMC
Wentworth Douglass Hospital
Southern New Hampshire Medical Center
Nantucket Cottage Hospital
Martha's Vineyard Hospital
Exeter Hospital
Elliot Hospital
Concord Hospital
York Hospital
Mercy Hospital
Melrose - Wakefield Hospital
North Shore Medical Center- Salem
North Shore Medical Center- Union
Newton Wellesley Hospital
Lawrence Memorial Hospital
Cooley Dickinson Hospital

BWH Telestroke
Milford Regional Medical Center
Brigham and Women's Faulkner Hospital
Falmouth Hospital
Cape Cod Hospital

TeleNeurology- Trends

Cummulative Activity- MGH TeleNeurology Services

Legend:
- TeleStroke Consults (C)
- (non Stroke) Emergency TeleNeurology Consults (C)
- Routine/Urgent TeleNeurology Consults (C)
- TeleNeurology Virtual Visits (C)

Virtual Consults: Clinician to Clinician Video Consults
A Regional and National TeleStroke Network

MGH/BWH: MA, NH,
Yale: CT
UVA: VA
Integris: OK
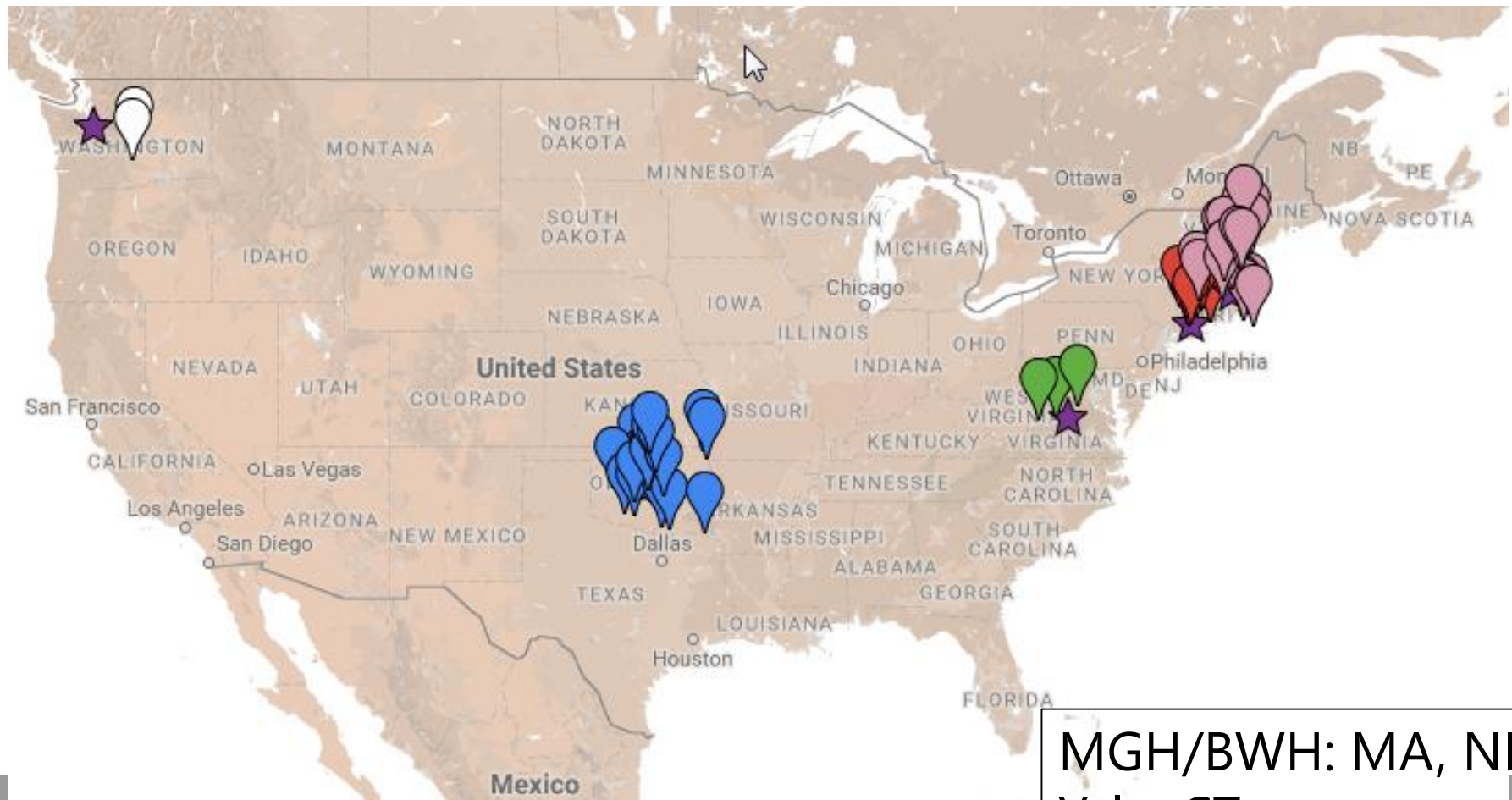
Caring for the Region: 3 States- 24 spokes
Caring for the Nation: 7 States- 55 spokes

MGH MASSACHUSETTS GENERAL HOSPITAL
TELEHEALTH

1 CONSULT REQUEST

When a patient with stroke/neurology symptoms is in need of emergent care, your team pushes the patient's imaging studies and pages the on-call TeleNeurology specialist for a consultation.

2 CASE REVIEW

The TeleNeurology specialist immediately begins the assessment of the images and returns the page by phone to review the case; the consult may transition to a videoconference call, if appropriate. Using the video connection, the specialist will review the patient's presentation with your emergency department physician and, aided by your local staff, will perform a neurological assessment and discuss the findings with you. Together you decide on the plan of care.

3 ONLINE ASSESSMENT

The TeleNeurology specialist documents the information within the TeleNeurology Web Portal. You can access the portal to retrieve your local EMR or have it sent via fax.

4 COLLABORATIVE DECISION MAKING

Upon completion of the examination, the findings will be discussed with your team. Together you decide on a plan of care.

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MASSACHUSETTS GENERAL HOSPITAL
TeleHealth

6.5 MILLION
NEW ENGLAND RESIDENTS now with immediate access to our team of neurologists.

A TOTAL OF **1,202 CASES**

542 Video consults

660 Telephone consults

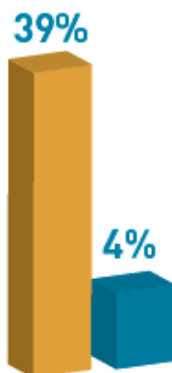**107 CASES** identified as candidates for Intra Arterial Therapy (IAT)

14 PERCENT OF IV-TPA CASES

remained in community hospitals.

207 OUT OF 532 STROKE CONSULTS
over video received IV-tPA compared to four percent national rate, allowing more patients a chance to avoid stroke permanent disability, assisted living, or death.

39%
4%

MGH Video TeleStroke tPA rate

National tPA rate

OUT OF THE 1,202 TOTAL CASES
65% REMAINED AT THEIR COMMUNITY HOSPITALS

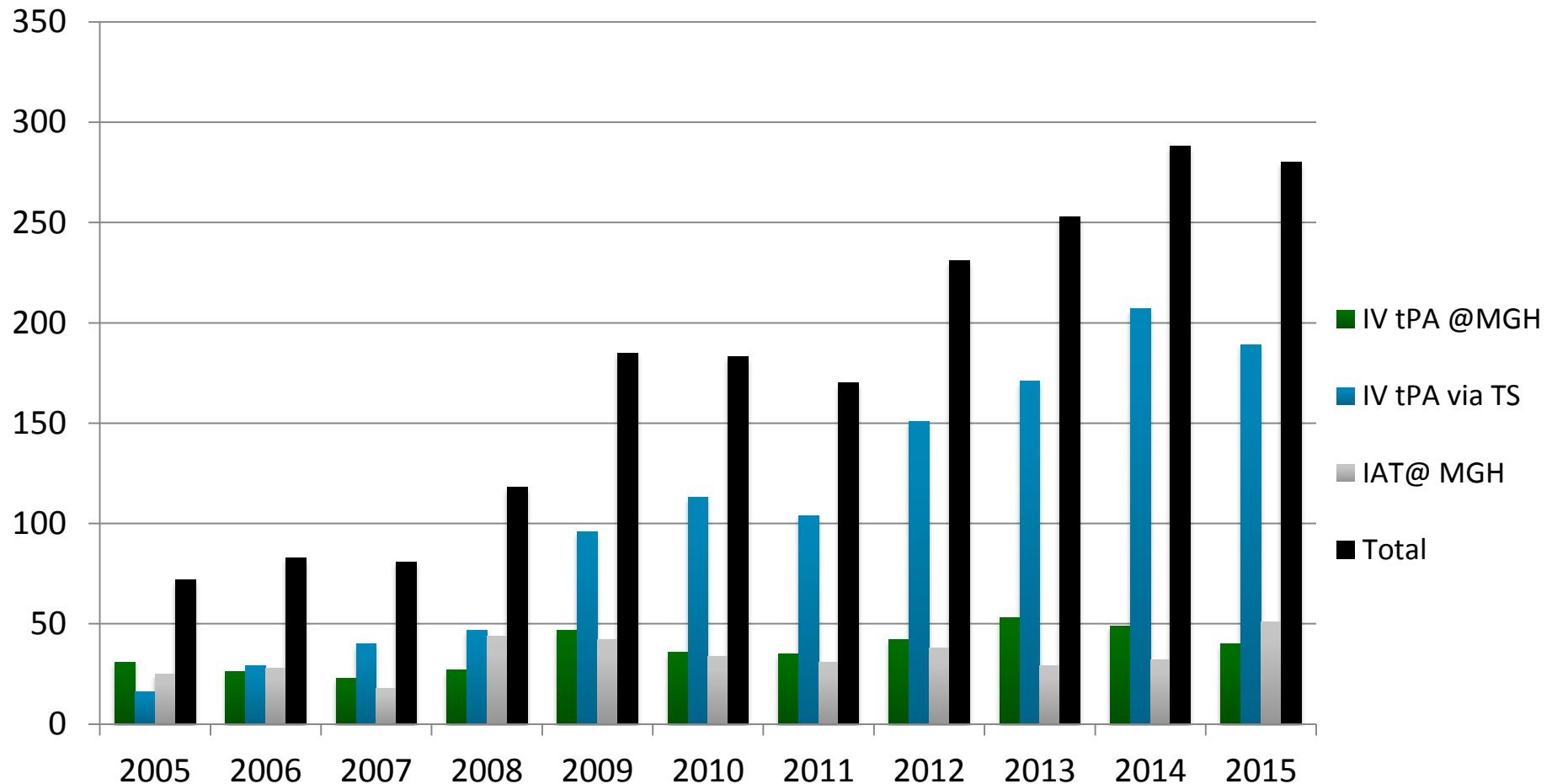785 patients out of the 1,202 total cases

748 STROKE CASES
remained in the community hospital, representing $6,000,000+ of potential reimbursement for community hospitals DRGs reimbusement.
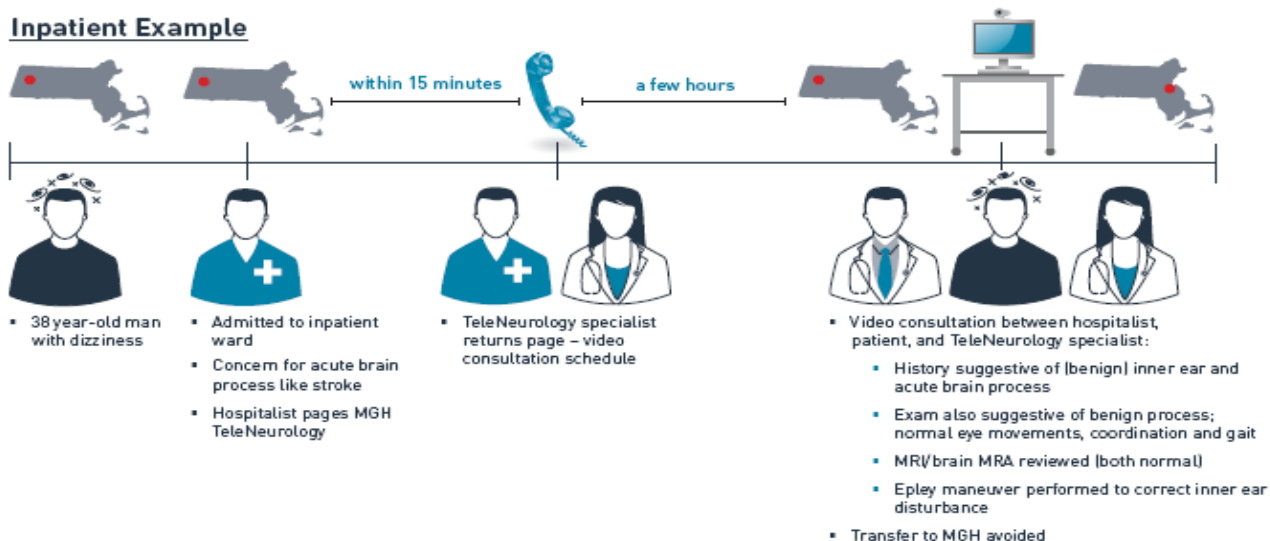
$6,000,000+ of potential reimbursement

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Patients Treated with IV tPA and IAT at MGH

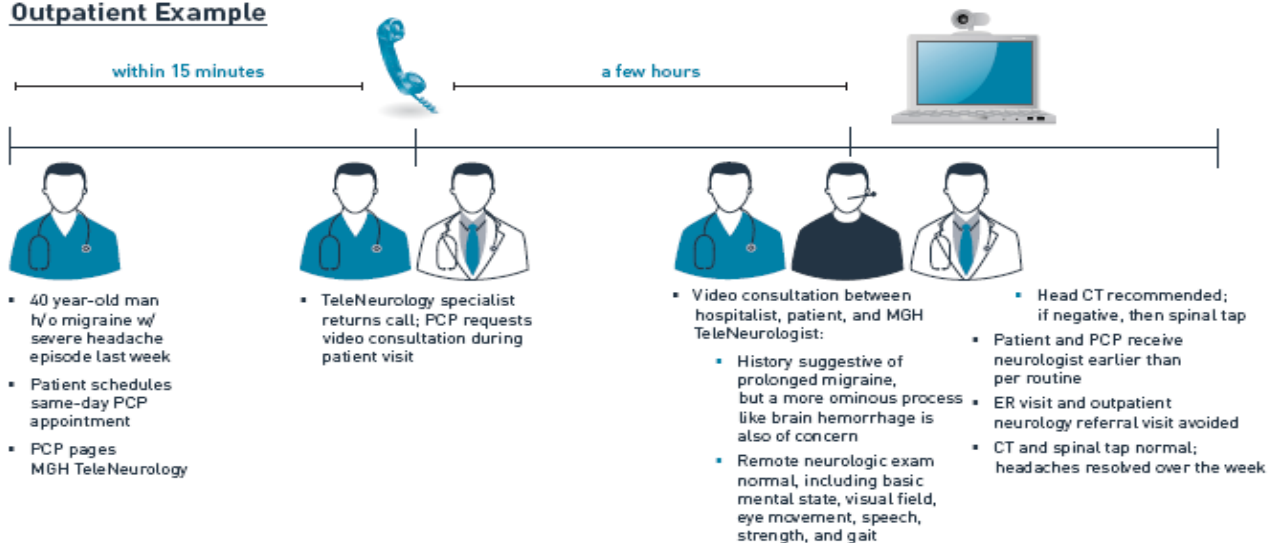Trends of Thrombolysis over Time (n=1944)
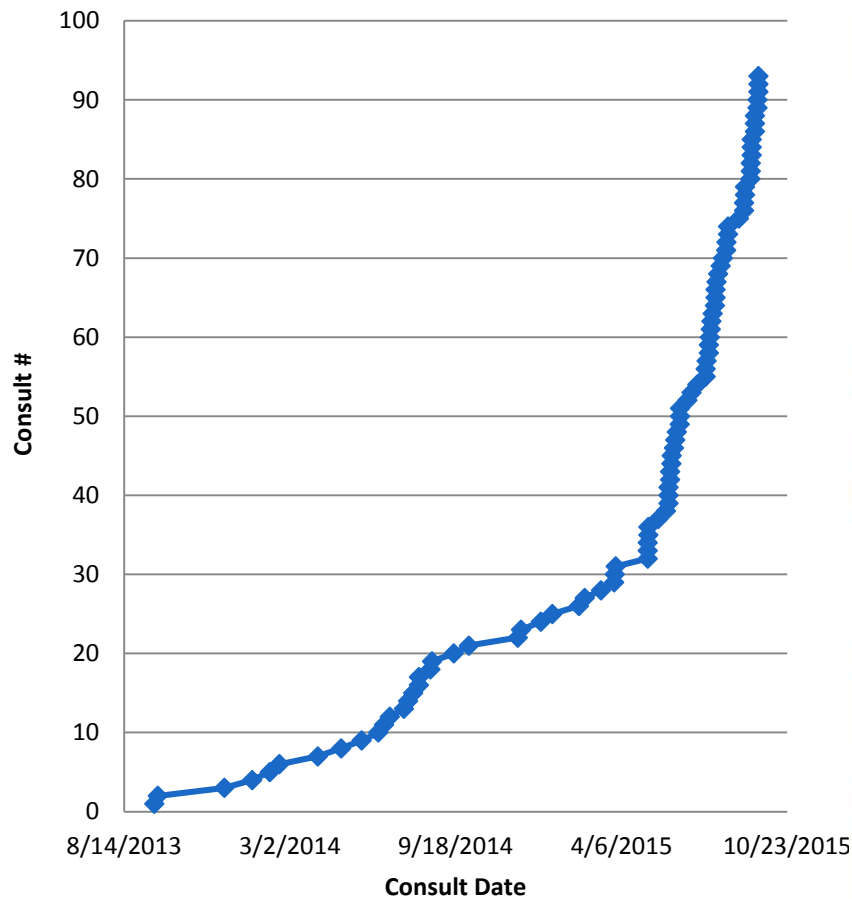
Non-Acute TeleNeurology Process

Inpatient Example

within 15 minutes — a few hours

- 38 year-old man with dizziness
- Admitted to inpatient ward
- Concern for acute brain process like stroke
- Hospitalist pages MGH TeleNeurology
- TeleNeurology specialist returns page – video consultation schedule
- Video consultation between hospitalist, patient, and TeleNeurology specialist:
  - History suggestive of (benign) inner ear and acute brain process
  - Exam also suggestive of benign process; normal eye movements, coordination and gait
  - MRI/brain MRA reviewed (both normal)
  - Epley maneuver performed to correct inner ear disturbance
- Transfer to MGH avoided

Outpatient Example

within 15 minutes — a few hours

- 40 year-old man h/o migraine w/ severe headache episode last week
- Patient schedules same-day PCP appointment
- PCP pages MGH TeleNeurology
- TeleNeurology specialist returns call; PCP requests video consultation during patient visit
- Video consultation between hospitalist, patient, and MGH TeleNeurologist:
  - History suggestive of prolonged migraine, but a more ominous process like brain hemorrhage is also of concern
  - Remote neurologic exam normal, including basic mental state, visual field, eye movement, speech, strength, and gait
- Head CT recommended; if negative, then spinal tap
- Patient and PCP receive neurologist earlier than per routine
- ER visit and outpatient neurology referral visit avoided
- CT and spinal tap normal; headaches resolved over the week

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TELEHEALTH

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Activity and System

Non-Acute TeleNeurology

3 Transferred Cases

RUTN Activity, 2016: n=456
~2 Consults per business day in 2016, 9 per week

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TeleHealth

Disposition	Count of Disposition	Percentage
Discharge home	12	2.6%
Not Applicable	2	0.4%
Other	4	0.9%
Remain at Referring Organization	410	89.9%
Transfer to MGH	14	3.1%
Transfer to Non MGH facility	2	0.4%
(blank)	12	2.6%
Grand Total	**456**	**100.0%**

Patient Location	Count of Consult	Percentage
ED	14	3.72%
ICU	51	11.02%
INPATIENT	386	84.05%
OUTPATIENT	5	1.21%
Grand Total	**456**	**100.00%**

Patient Location	Distinct Count of Referring Provider
ED	14
ICU	20
INPATIENT	77
OUTPATIENT	4
Grand Total	**105**

Based on a smaller subset of data:

-Average Time to Consult: 2.36 hours

-Patient Age: Avg. 61; Range 38-90

-Hub Satisfaction Consult Average: 4.39/5 Stars

-Diagnoses:

- Stroke/TIA 38%

- Toxic-Metabolic Encephalopathy 10%

- Seizure 7%

- Weakness 7%

- Meningitis 2%

-Other 36%

TeleNeur

- 15 years of e
  relentless inr

- Develop clini
  sustainable a

That:

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MASSACHUSETTS GENERAL HOSPITAL
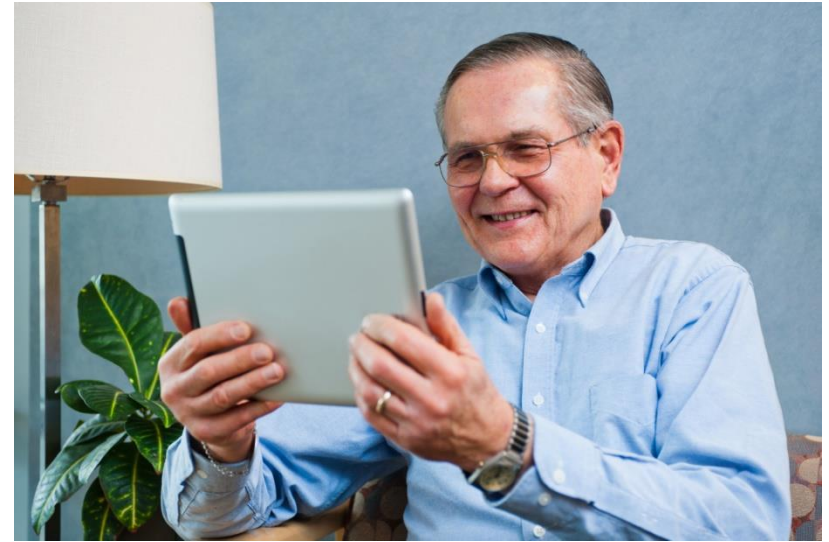TeleHealth

Welcome Log in to continue to TeleHealth

Username

Username

Password

Password

Log In

Forgot your password?

Request New Account

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4 COLLABORATIVE DECISION MAKING
Upon completion of the examination, the findings will be discussed with your team. Together you decide on a plan of care.

Discard Consult()
HUB_FELLOW

Discard Consult()
HUB_PROVIDER

Consult Discarded
HUB_PROVIDER

Send mail
HUB_PROVIDER

Parallel

COPY Notify HubProvider New Consult is ready
HUB_FELLOW

Start New Consult()
HUB_FELLOW

Draft Consult
(TELESTROKE_FULL)
HUB_FELLOW

Parallel

Notify HubProvider New Consult is ready
HUB_FELLOW

Parallel

Draft Consult (Started by Fellow)
(TELESTROKE_FULL)
HUB_PROVIDER

Echo signal for HubFellow
HUB_PROVIDER

Parallel

Notify Spoke Consult Completed
HUB_PROVIDER

Start New Consult()
HUB_PROVIDER

Draft Consult
(TELESTROKE_FULL)
HUB_PROVIDER

Parallel

Sign Consult
HUB_PROVIDER

Parallel

Notify HubProvider Consult Completed
HUB_PROVIDER

Send to Attending
HUB_FELLOW

Parallel

Consult completed (Ready for review)
(ICU_FEEDBACK)
SPOKE_CLINICIAN

Spoke enters feedback()
SPOKE_CLINICIAN

Consult Completed
(ICU_FULL_READ)
SPOKE_CLINICIAN

Parallel

Parallel
Parallel

Sign Consult
HUB_PROVIDER

Parallel

Echo signal for Hub
SPOKE_CLINICIAN

Parallel

Consult completed (Waiting for Spoke Feedback)
(ICU_FULL_READ)
HUB_PROVIDER

Spoke completes feedback
HUB_PROVIDER

Consult completed and Feedback Available
(ICU_FEEDBACK_READ)
HUB_PROVIDER

Parallel

Waiting for Attending review
(ICU_FULL_READ)
HUB_FELLOW

Catch Echo from HubAttending
HUB_FELLOW

Consult completed
(ICU_FULL_READ)
HUB_FELLOW

Spoke completes feedback
HUB_FELLOW

Consult completed and Feedback Available
(ICU_FEEDBACK_READ)
HUB_FELLOW

TeleNeurology Virtual Visits

In the *home*, post-acute, inpatient, outpatient clinic, & beyond...

TeleNeurology Virtual Visits
Quarterly Volume (Calendar Year), per Division-
2017 PHM Goal: 750 Visits plus model for scale & efficiency

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~900 VVs/Yr??

~650 VVs/Yr

~650 VVs/Yr

Legend:
- Stroke
- Sleep Disorders
- Pedi Neurology
- Neurogenetics
- Neurobehavioral
- Nerve Injury Unit
- Movement Disorders
- Memory Disorders
- General Neurology
- Epilepsy Unit
- ALS

X-axis: 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1
2013 | 2014 | 2015 | 2016 | 2017

Massachusetts General Hospital — TeleHealth

Chart (bar graph) — values by provider:

- CHEN, DAVID W
- HOCH, DANIEL BRIAN
- CUDKOWICZ, MERIT ESTER
- KARAA, AMEL
- CASH, SYDNEY SAMUEL
- COHEN, ADAM B
- BOWLEY, MICHAEL P
- MEJIA GONZALEZ, NICTE I
- PAGANONI, SABRINA
- SCHWAMM, LEE H
- BERRY, JAMES D
- VERAS ROCHA DE MOURA, LIDIA MARIA
- SAWICKI, DARLENE ELECTA
- WESTOVER, MICHAEL B
- NICHOLSON, KATHARINE A
- FLAHERTY, ALICE WEAVER
- REDA, HAATEM M
- CHENG, JENNIFER RORIE
- PFEIFER, HEIDI
- SWOBODA, KATHRYN J
- THIELE, ELIZABETH ANNE
- CHU, CATHERINE J
- THIBERT, RONALD L
- DICKERSON, BRADFORD CLARK
- KLAWITER, ERIC C
- SIMS, KATHERINE BUSTIN
- MUKERJI, SHIBANI S
- CAMARGO FAYE, ERICA C
- BOEGLE, AIMEE
- ADUSUMILLI, JOSNA
- OAKLANDER, ANNE LOUISE
- MATEEN, FARRAH J
- ROSAS, HERMINIA DIANA
- HUNG, ALBERT Y
- CHENG, HSINLIN T
- WINKELMAN, JOHN WEYL
- TOWNSEND, LISA M
- CHO, TRACEY ALEXANDER
- ALBERS, MARK W
- WILLS, ANNE-MARIE A
- BIANCHI, MATT T
- SCHMAHMANN, JEREMY D
- JENNINGS, TARA D
- GLYKYS, JOSEPH C
- DREDGE, DAVID C
- MAUS, DOUGLAS
- MATIELLO, MARCELO
- SINGHAL, ANEESH BHIM
- SASSOWER, KENNETH CLAYTON
- LINNOILA, JENNY J
- HERSCH, STEVEN M
- COLE, ANDREW JAMES
- GREENBERG, STEVEN M
- ATASSI, NAZEM
- VISWANATHAN, ANAND
- SALINAS, JOEL A
- RATTI, ELENA
- GROWDON, JOHN HERBERT
- BLACKER, DEBORAH L
- SILVERMAN, SCOTT B

Overall MGH Virtual Visit Patient Experience

Patient ratings exceed National CAHPS 90th percentile (2012 data)

99% of patients said their clinicians explained things in a way that was **easy to understand**

98% of patients said their clinicians explained things in a way that was **listened carefully**

97% of patients said their clinicians spent enough time with me **spent enough time**

98% patients said they were seen within 15 minutes of appointment time **on-time visit**

High patient satisfaction with Virtual Visits

99% Would recommend a virtual visit to family and friends

91% Ranked their Virtual Visit 7 or more where 10 is BEST possible visit

N = 171 Patients, Response Rate = 65%
MGH TeleHealth/Mongan Institute Surveys, January 1 – July 31, 2014

Overall MGH Virtual Visit Provider Experience
Most Important Benefits

95% agree Virtual Visits
"are a valuable tool to enhance patient care"

Virtual Visits are convenient for patients

- "Decrease travel burden to patients, facilitate access to care, better evaluation compared to phone calls."

Virtual Visits improve access

- "Video visits allow patients who would otherwise not be able to come in (because of distance, weather, scheduling, or symptoms) to receive care …. reduces cancellations and no shows and patients are more likely to be on time."

Virtual Visits improve communications and care

- "The contact is very direct as you do not get distracted by other screens, the MAs, other sounds. It is just you looking at the patient and vice versa. It is quite intense and very good for communication …. you stay very focused on the patient which is great."

Time spent on Virtual Visits is reimbursed

- "We can see patients very quickly and be reimbursed for it."

3- Related Publications

MASSACHUSETTS GENERAL HOSPITAL
TeleHealth

Education and Certification Support

Measuring Success and Facing Challenges

MASSACHUSETTS GENERAL HOSPITAL
TeleHealth

Teleneurology performance metrics

Metric category	Quality	Cost	Rationale
Timing of services	✔	✔	• Acute stroke treatments
Timing of treatment	✔		• Patient/family preference • Community hospital reimbursement
Patient retention	✔	✔	• Clinic wait times & specialist access
Timing of access	✔	✔	
Service satisfaction	✔		• Acute stroke populations
Clinical outcome	✔		• Saved travel time
Time traveling & off work	✔	✔	• Saved patient & companion productivity

Current challenges for TeleHealth

Reimbursement
Medicolegal
Technology
Provider adoption & recruitment
Patient adoption & recruitment
Institutional adoption
Clinical examination
Clinical appropriateness
Service availability
Care continuity
Performance measures

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Recap of Challenges and Opportunities

- Challenges:
  - 20th Century regulations: lack of reimbursement, credentialing
  - Change takes time in healthcare
  - Flexibility: programmatic/operational design needs constant adjustment
  - Balance of standardization v. adaptation

- Opportunities
  - Increased access, convenience for patients and providers
  - Changes open door for new and better habits and service expectations
  - Operational efficiencies from optimized use of resources

Take Away
It's all about trust

Juan Estrada | jjestrada@mgh.harvard.edu