DISCLOSURE

• In this discussion I talk about multiple different telemedicine services, products, and programs at varying institutions. I do mention several products by name brand. This is meant for educational purposes and I do not endorse a specific product over another. I have no financial incentive in these companies.

• I am the Director of Pediatric Telemedicine Services at RWJ-Barnabas. It should be disclosed that we are launching a new service line soon and that is part of the subject of discussion. That service line uses InTouch Telemedicine Services.
TELEMEDICINE IN PEDIATRICS

• Definitions within Telemedicine
• History of Communications Technology in Medicine
• General Applications using Telemedicine
• Legal issues and Bureaucracy
• Update on St. Barnabas/Rutgers RWJ program
• Potential Future Pediatric Applications
• Demonstration!

DEFINITIONS – CLINICAL SCENARIO

• Dr. Jefferson is a Pediatric Neurologist in a “Pediatric University Hospital” office and is part of the telemedicine team with a neurology network in the state of NJ.
• Dr. English is a primary care physician who has scheduled a consultation with pediatric neurology for her patient JM. JM is sitting in Dr. English’s office in Somerset NJ.
• Before the session, Dr. English forwards all of JM’s medical records and studies electronically to Dr. Jefferson’s HIPPA secure account.
• Dr. Jefferson calls Dr. English prior to the encounter to discuss the goals of the consultation.
• Dr. Jefferson “beams in” to a device sitting in Dr. English’s office. She is able to examine JM through a robotic interface, provide advice on medication, symptom relief and follow-up timeline.
• Both Dr. English and Dr. Jefferson document the encounter.
DEFINITIONS – CLINICAL SCENARIO

• Where did this consult take place?
  A) Pediatric University Hospital: Where the consultant is
  B) Somerset NJ: Where the patient is
  C) Somerset NJ: Where the primary care physician is
  D) “Cyberspace” – because it happened at both places at once
  E) Nowhere – because existentially, the consultation is just information passing between multiple sources of consciousness that cannot be defined by a location.

TELEMEDICINE DEFINITIONS

• Telemedicine – “Tele-health,” “e-health”: The remote diagnosis and/or treatment of patients utilizing communications technology.

• American Telemedicine Association: “Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status”

• Agency for Healthcare Research and Quality (AHRQ): “Telehealth is the use of telecommunications technologies to deliver health-related services and information that support patient care, administrative activities, and health education”
TELEMEDICINE DEFINITIONS

- World Health Organization: “The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities”
  * 104 peer reviewed definitions of the word

TELEMEDICINE DEFINITIONS

- Center For Medicare and Medicaid Services: “For purposes of Medicaid, telemedicine seeks to improve a patient’s health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment.”
OTHER DEFINITIONS - CMS

• **Originating site**: The location of the patient at the time the service being furnished via a telecommunications system occurs. “Spoke site” (Dr. English’s office)

• **Distant site**: Site at which the physician or other licensed practitioner delivering the service is located at the time the service is provided via telecommunications system. “Hub site” (Dr. Jefferson’s office)

OTHER DEFINITIONS - TECHNOLOGY

• **Store and Forward – Asynchronous Telemedicine**
  - Not live
  - Data is taken, converted into an electronic media, and sent to a distant site for evaluation
  - EKG, Radiology, EEG

• **Real-time Monitoring**
  - One-way live feed of video and/or data
  - ICU vital signs/monitors

• **Interactive two-way video conferencing w/ or w/o other forms of data – “Synchronous”**
HISTORY OF TELEMEDICINE

• Who was the first physician to utilize telemedicine in the broadest of terms?
  • A) A civil war era Cirgeon.
  • B) A Cardiologist
  • C) A Radiologist
  • D) A Psychiatrist
  • E) A Neurologist

HISTORY OF TELEMEDICINE

• Willem Einthoven, M.D. (1860-1927)
  • Dutch Physician
  • Professor at the University of Leiden
  • Won the Nobel prize in 1924
  • Invented the “String Galvanometer”
  • Required 5 people to operate, weighed 600 lbs, and needed liquid cooling system for powerful electromagnets.
In 1904 using telephone wires, he conducted “EKG” readings in his office 1.5km away from the hospital.

“Where there is a link, actual and figurative, between laboratory and hospital, and collaboration between physiologist and clinician, each remaining master in his territory, there one may fruitfully utilize these new electrical methods of research”. 
HISTORY OF TELEMEDICINE

The busy doctor, fifty years hence, will not be able to visit his patients as he does now. It takes too much time, and he can only, at best, see a limited number today. Whereas the services of a really big doctor are so important that he should never have to leave his office; on the other hand, his patients cannot always come to him. This is where the teledactyl and diagnosis by radio comes in. – Hugo Gernsback
HISTORY OF TELEMEDICINE

• 1948 (published 1950) radiology images were sent from Philadelphia, PA to West Chester, PA over 24 miles.
• 1959 Images read by radiologists transmitted over coax-cable
• 1959 University of Nebraska used closed-circuit, two-way video recording for neurological and psychiatric examinations projected to medical students.
• 1964 University of Nebraska linked with Norfolk State Hospital for Neurologic exams, Difficult psychiatric diagnosis, Speech therapy and educational seminars and case presentations
• 1965 Ship to Shore transmission of EKGs
HISTORY OF TELEMEDICINE

• 1967 Massachusetts General Hospital had a link to Boston’s Logan Airport and had audio, visual, and stethoscope capabilities. Provided 24 hr a day coverage for emergencies.
• 1968 EKGs transmitted from EMS services. (Jackson Memorial Hospital, FL)
• 1972: NASA began trial runs of its Space Technology Applied to Rural Papago Advanced Health Care (STARPAHC) program for telemedical help for people living in remote locations with little or no medical services.

CURRENT FORMAL APPLICATIONS

• Tele-Radiology
• Tele-Psychiatry
• Tele-Neurology/Stroke Assessment
• Other
  • Monitoring/ICU care
  • Primary Care
  • Nursing homes
TELE-RADIOLOGY

• The first major medical specialty to use the modern interpretation of Tele-health.

• Two different types of delivery systems:
  • “Store and forward” – Xrays, CT scans, MRIs
  • “Real time” – Ultrasound, Fluoroscopy, interventional

• Allows for 24-7 availability of emergent radiologic services.
  • Most important for ED and ICU cases in the evening
  • Has many other clinical benefits

TELERADIOLOGY

• In the past week, I...
  • Received a disc from an outside institution with an MRI that requires evaluation from our neuro-radiologist
  • Had an xray performed at an outside “University Radiology” group location pulled up and read by our pediatric specialists
  • Asked an attending Radiologist AND an attending Orthopedist look at scans from home to help in the diagnosis and management of a patient
  • Input my actions into an electronic interface so the radiologist is aware of action that I took based upon MY read of an image.
TELERADIOLOGY

- Domestic Model
  - Local radiologist available during the day
  - On-Call radiologist at home available for emergencies w/ home workstation
  - Non-emergent films are read in the AM
- "Nighthawk" model
  - US licensed doctors are stationed in Australia, Spain, etc
  - All emergent or requested images are transmitted to their workstation
  - Every Radiologist works 9-5! (Hyperbole)
  - MEDICARE AND MEDICAID: ALL FILMS READ OUTSIDE OF THE US MUST BE RE-READ BY A DOMESTIC PHYSICIAN WITHIN 24 HOURS.

TELEPSYCHIATRY

- Supply and Demand of resources: Too many patients who require care and not enough resources
  - Rural areas where hospitals or population cannot support a FT psych
  - Rural region where nearest outpatient psychiatrist is many miles away
  - Schools for evaluation of children in real time (Bullying, SI, etc) and can f/u
  - Hospital services where a psychiatrist is not employed
  - Treatment/Diagnostic specialists
**TELEPSYCHIATRY AT RWJ**

- Patient presents to the ED in need of psychiatric services
- Medical screening exam occurs where organic issue is ruled out
- Patient has “Psych Screen” by Tele-psychiatrist
- Psychiatrist determines if voluntary/involuntary commitment is required vs outpatient therapy.
- Based upon Psych recommendations, social worker is able to investigate available rooms at local facilities

**TELENEUROLOGY**

- Primary use is in stroke diagnosis
- In stroke evaluation, decision to give TPA is most often left to consulting neurologist.
  - Requires evaluation within a specific time frame for intervention
  - Many facilities cannot have a Neurologist in-house within an appropriate amount of time for diagnosis and management
  - Joint commission primary stroke certification often hinges upon this exam from the stroke team
  - Using Interactive Audio/Video communication device, A Teleneurologist can perform an exam within minutes of arrival
OTHER TELEMEDICINE APPLICATIONS

- Neonatal ROP evaluation
  - Store and forward technology
  - Previously, bedside indirect ophthalmoscopy was standard of care
  - Remote Digital Fundus Imaging has been proven capable of replacing direct exam.
  - Single Ophthalmologist can “round” at multiple hospitals where resources are scarce
OTHER TELEMEDICINE APPLICATIONS

• VA – Minneapolis based Intensive care telemedicine program
  • Started in 2011 serving VA hospitals in 6 states
  • Two intensivists real-time monitor all locations
  • Expanded to 13 institutions in 9 states in 2015
  • Has a “sub-hub” in the Chicago area

PEDIATRIC CRIT CARE INTERNATIONALLY - PCH

• Pittsburg Children’s Hospital has a Telemedicine Command Center with a large international program
  • Clinical rounding in multiple foreign institutions
  • Consultative services for post-operative management of pediatric transplant patients
  • Educational lectures and interventions for foreign counterparts
  • Current locations
    • Cali, Bucaramanga, and Medellin, Colombia
    • ISMETT (Istituto Mediterraneo per i Trapianti e Terapie ad Alta Specializzazione), Italy
    • Hospital Infantil e Mexico, Federico Gomez, Instituto Nacional de Salud in Mexico
GENERAL MODELS FOR TELEMEDICINE USE

- Radiology Store-and-forward
  - Nighthawk, fee for service
  - On-call system
- Consultation Service
  - Physician to Physician w/ patient present
  - The Teledoc is a “consultant,” not the attending
- Primary Care
  - Direct to patient marketing/teledoc
  - Nursing Home/assisted living facility care
  - Rural, in home access
- Real time monitoring
  - Tele-ICU
- Education
  - Experts can demonstrate for residents, nurses and techs from across large distances.
  - Educational “rounding” for an audience with a Tele-expert

OTHER TELEMEDICINE APPLICATIONS
We prescribe medical treatment for a wide range of conditions:

**General Medical**
- Cold & flu
- Bronchitis
- Allergies
- Pink eye
- Urinary tract infection

**Dermatology**
- Skin infection
- Acne
- Skin rash
- Mole/slow growth

**Behavioral Health**
- Stress/anxiety
- Depression
- Addiction
- Domestic abuse
- Grief counseling

Our mobile app is the most convenient way to Teladoc and feel better.
GENERAL LEGAL ISSUES

• Malpractice – Low liability
  • Coverage varies by insurance company, but most cover as long as physician is within scope of practice and adheres to standards of care
  • Very few cases where Telemedicine is involved.
  • Commercial direct-to-patient services likely have disclaimers

• Licensure
• Credentialing
• Self Referral
• Currently a State-to-State legislative issue

WHY IS THERE NO FEDERAL LEGISLATION?

• Medicare Telehealth Parity Act of 2015
  • General expansion of Medicare services to include Telehealth services
  • 3 Phase enactment
  • Last action was referred to the Subcommittee on Health in 2015, currently dead.

• Expanding Capacity for Health Outcomes (ECHO) Act
  • Signed into law in Dec 2016
  • Directed Department of Health and Human Services to Study “Project ECHO” in New Mexico
  • Must report back to Congress no later than 2 years after implementation
GENERAL LEGAL ISSUES

• There is no “National Telemedicine License”
  • Wherever the patient is sitting, that is the location where the service is considered to be taking place.
  • All practitioners need a state medical license for each location they consult
• Based upon the type of facility at which the patient is located, full or partial credentialing must be obtained
  • i.e. All of our physicians are credentialed at RWJ-Somerset under “Tele-Pediatrics”

INTERSTATE TELEMEDICINE MEDICAL LICENSING COMPACT

• State by State legislation
• A physician licensed in one of the Compact States can easily apply to receive a license in any other compact state through the “Interstate Medical Licensure Compact Commission”
  • Single source application for multiple states
  • Fee paid to the commission counts as fee for all states
  • Commission approves the application and files for licenses in the requested states.
  • Licenses are expedited through this process
In 2011 the Federal Registry added a rule to aid in the ease of credentialing at remote facilities. (Federal Register/Vol. 76, No. 87/May 5, 2011, pg 25550)

- A hub facility with multiple physicians must be Joint Commission accredited
- Spoke facilities may “trust” the credentialing process of the accredited facility
- Written and formal agreements between the facilities are required.

But…there is one problem: VERY FEW HOSPITALS USE THIS
STARK LAW

• A set of US federal laws preventing self referral.
  • Cannot refer to institutions or practitioners from which you or a direct family member have the capacity for financial gain.
  • In the case of Telemedicine, a consultant cannot self-refer or be in collusion with the originating site to automatically refer to such an institution
  • Specific and applicable example:
    • If a child within NJ requires admission to a tertiary care hospital
    • “We recommend admission to a tertiary care facility. Your ER doctor can discuss with you the available options. If you decide to come to BMSCH, we will be happy to see you and facilitate the transfer.”

NEW JERSEY BILL – S291

• Sets up definitions, rules and authorizes the use of telemedicine and telehealth throughout the state of NJ
• Partner Bill A1464 in the Assembly
• Introduced 1/12/16
  • 2 revisions from Senate Sub-Committees
  • Senate Budget and Appropriations Committee
  • Senate Health and Human Services Committee
NEW JERSEY BILL – S291

• All providers must be licensed in NJ and in compliance with regulations

• For the use of Telemedicine, providers must establish “Provider-patient relationship”
  • Identifying the patient and the provider (including credentials)
  • Obtaining appropriate consents (oral is allowed within standard of care)
  • Obtaining history and physical exam
  • Discussing treatment plan
  • Ensuring or recommending followup
  • Keeping a patient record and allowing access by request

NEW JERSEY BILL – S291

• Real-time audio and video conferencing is preferred, but store-and-forward images with real-time audio is allowed IF same standard of care can be provided

• Prescriptions can be written or called secondary to Telemedicine experience
  • Provider-patient relationship (PPR) must be established
  • No questionnaires as a substitute for PPR
  • CDS allowed, but only after an in-person PPR established prior to Telemedicine consult
  • After CDS Rx, in-person visit required every 3 months
  • EXCEPTION to PPR: Minor under 18 getting Rx from Psych for a stimulant medicine
NEW JERSEY BILL – S291

• EXCEPTIONS to the PPR rule
  • Informal consultations from another health care provider, without compensation
  • Episodic consultations by a specialist to a certified and licensed in-state provider
  • Medical assistance during an emergency or disaster situation, without compensation
  • The provision of health care services by an on-call, or cross-covering, provider so long as they are of the same specialty and have been previously designated as the covering provider

NEW JERSEY BILL – S291

• All state managed care agencies, (Medicaid, NJ family care, various insurance carriers, State Health Benefits Commission, and School Employees’ Health Benefits Commission) are required to remit payments for services rendered via telemedicine at the SAME RATE as an applicable in-person service
  • Deductibles, co-payments, and co-insurance can apply, but cannot exceed the amount for the applicable in-person service
  • Coverage only applies to what is deemed “Medically Necessary”
  • Cannot coerce patients into using telemedicine services in-lieu of in-person service
WHEN WILL S-291 BECOME LAW?

OUR TELEMEDICINE PROGRAM
OUR TELEMEDICINE PROGRAM

• Emergency Dept to Pediatric Emergency Dept consultation service
• Initially beginning at RWJ Somerset with plans to expand throughout the RWJ-Barnabas system
• Consultations for pediatric patients in the adult emergency department
  • Not being used for code scenarios
  • Not a pre-screen for admissions
  • Advice for the patients “in between” simple evaluation and definitive admission

OUR TELEMEDICINE PROGRAM

• Goals:
  • Have comprehensive history and exam with patient, family and physician
  • Provide recommendations for further testing and treatment if required
  • If possible, prevent unnecessary transports and allow the patient to stay in their community
  • Improve the quality of care by providing pediatric expertise
OUR TELEMEDICINE PROGRAM

• Attempt ½ hr response time
• Adult ED attending must see the patient and discuss consultation with the family
• A mid-level provider or higher must be in the room at the time of consultation to assist in exam
• Note will be forwarded in the system within 1 hour of consultation

OUR TELEMEDICINE PROGRAM

• Phase 1 – Beginning now
  • ED to ED consult with RWJ Somerset as first pilot site.
  • 24hr coverage on weekends (Friday – Sunday)

• Phase 2 – Expansion
  • Offer services to other spoke sites within the RWJ-Barnabas system
  • Expand to 24/7 coverage

• Phase 3 – Incorporate Subspecialty consultations
ADVANTAGE AND PITFALLS

• Advantage: You can perform Telemedicine from anywhere!
  • On Call systems from home
  • For most consultants, no change from current on-call system

• Disadvantage: Strict ethical and professional guidelines
  • Dress code / hygiene code
  • Clean office
  • Appropriate background

BAD DOCTOR/GOOD DOCTOR
WHAT COULD POSSIBLY GO WRONG?

UNLIMITED POTENTIAL IN CONNECTIVITY

• What do you need to perform telemedicine?
  • Expertise
  • A video device
  • An internet connection
  • A medical record

• So the questions we should be asking are:
  • What kind of patients would you like to connect to?
  • Why not DO IT?
EXAMPLE OF PRIMARY CARE POTENTIAL

• Surgical subspecialists use their clinic time for pre-op evaluations after referrals from primary pediatricians
  • Appointments are delayed
  • Sometimes patients have not obtained or did not bring outside studies
• What if...
  • Every Tuesday afternoon in PCP office was “Peds surgery” day?
  • Tele-setup in the office with appointments booked every 20 minutes
  • Patient feels comfortable and doesn’t have to come to NB
  • Coordination between PCP and surgical team
• OR….neurology team, endocrine team, GI team, etc.

WHY NOT?

• Why not have a program where our clinic patients can connect to residents overnight?
• Why not establish a relationship with an international children’s hospital? (BTW, I am heading to Panama tomorrow…)
• Why not have a relationship between primary care and specialists?
  • We can start this right now!
• Why not have primary care “see” their patients when it is an urgent matter instead of “Go to the ER?”
CITATIONS

• Strehle EM, Shabde N. One hundred years of telemedicine: does this new technology have a place in paediatrics? Archives of Disease in Childhood. 2006;91(12):956-959. doi:10.1136/adc.2006.099622.
