Team Telemedicine:

Implementing and Running a Collaborative General Teleneurology Clinic in Rural Southern Utah

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Disclosures

1. Nothing to disclose

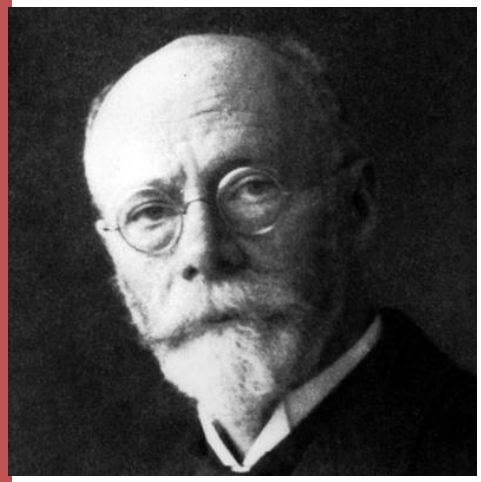
Objectives

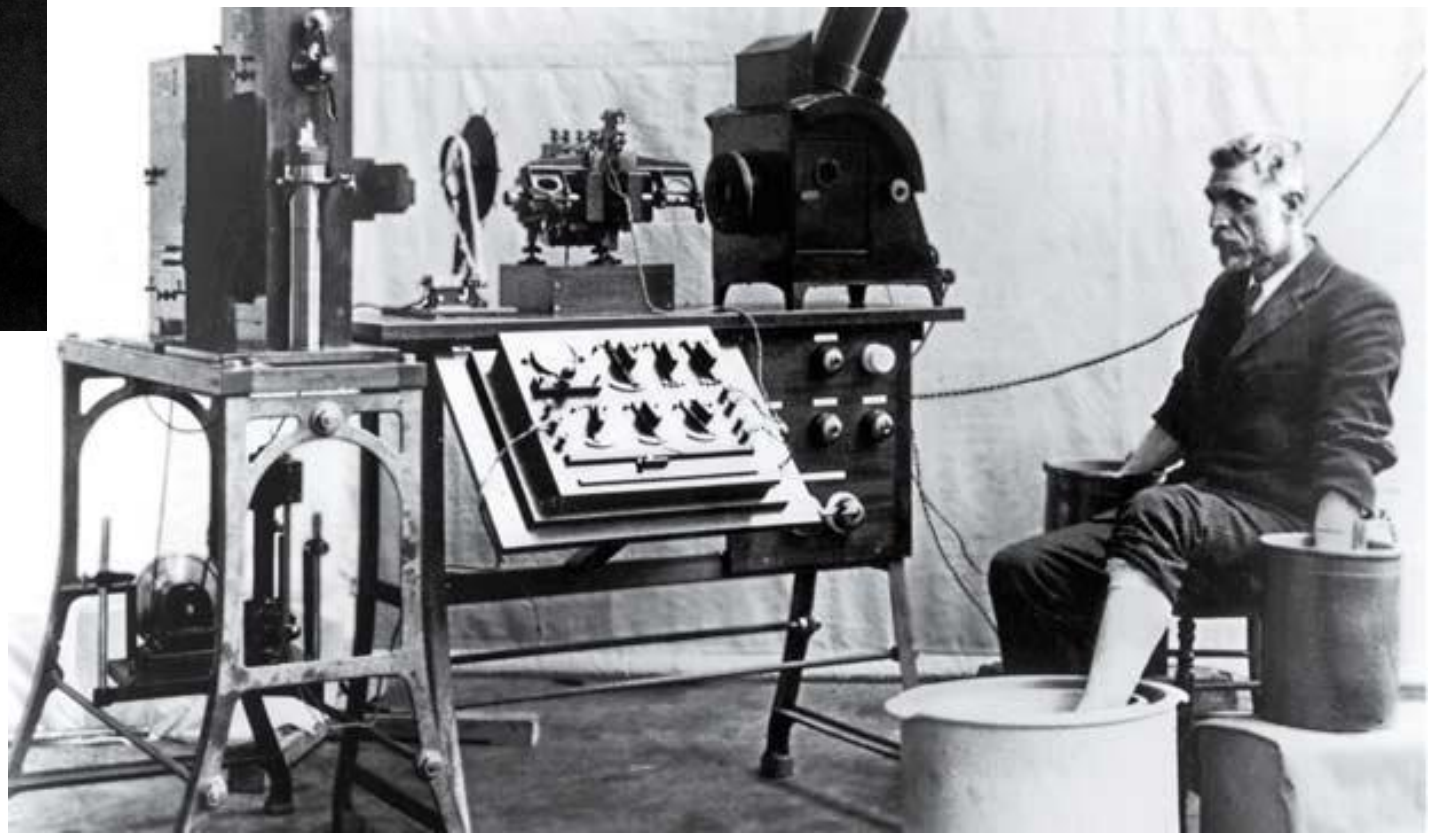
1. Brief history of Teleneurology
2. Models of outpatient Teleneurology
3. Tele-Pharmacist
4. Blanding Teleneurology Clinic
5. Case presentations
6. Discussion

Telemedicine

Formally defined, telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patient's clinical health status

History of Telemedicine: 1905 Willem Einthoven





http://protomag.com/statics/SP_09_gty_RM_82581339_a_hz.jpg?1323704592
http://www.einthovenlaboratory.com/wp-content/uploads/Willem-Einthoven2.jpg

Hugo Gernsback: 1925

http://blogs.smithsonianmag.com/paleofuture/2012/03/telemedicine-predicted-in-1925/

Telemedicine: 60s and 70s

- 50's-70's: First wave of telemedicine began in US
- 1964: Nebraska Psychiatry Institute began using 2-way closed circuit TV links for education and consultations with Norfolk State Hospital about 112 miles away
- 1967: MGH uses 2-way microwave audio/video link to provide care to patients at Brogan International Airport 24-7
- 1970's: a number of large-scale telemedicine programs were enacted by organizations such as U.S. National Library of Medicine, NASA, The Health Care Technology Division of the US Dept of Health Education & Welfare (HEW) in order to study the reliability of telemedicine systems and to provide care to underserved areas and populations

Ryu, S. History of Telemedicine: Evolution, Context, and Transformation. Healthcare Informatics Research 16, 65 (2010).
Allen, R. A Brief History of Telemedicine. Electronic Design (2006).at <http://electronicdesign.com/components/brief-history-telemedicine>

80s and beyond

http://images.businessweek.com/ss/06/05/phaidon/image/9_843-apple-macintosh.jpg

Teleneurology: Telestroke
Levine & Gorman 1999

- *"Telestroke" : The Application of Telemedicine for Stroke*

- NINDS: 50% of patients arrived too late to receive treatment, even though the 8 clinical centers that took part in the trial had around-the-clock stroke coverage

- "How can more acute stroke patients benefit from the expertise and experience of these stroke teams?"

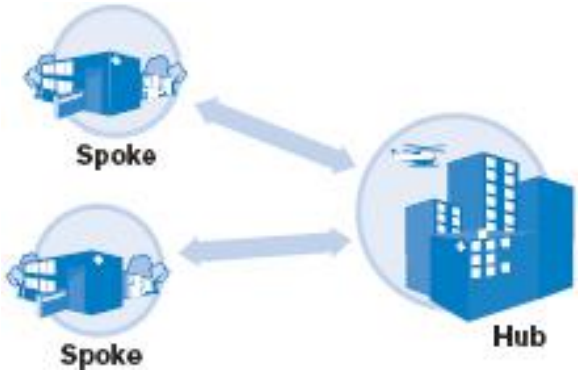
Levine, S. R. & Gorman, M. "Telestroke" : The Application of Telemedicine for Stroke. Stroke 30, 464–469 (1999).

Levine & Gorman: Telestroke

- "A stat page that establishes a video-telecommunication link connecting the stroke physician on call to the local emergency room (ER)"

- This technical link provides capabilities for assisting the local ER physician to perform
  - a standardized stroke scale (NIHSS)
  - to review inclusion/exclusion criteria
  - to obtain and interpret a stat head CT scan
  - to review laboratory studies
  - and to discuss the risk/benefits with patient/family/local physicians.

Levine, S. R. & Gorman, M. "Telestroke" : The Application of Telemedicine for Stroke. Stroke 30, 464–469 (1999).



http://healthcare.utah.edu/neurosciences/news/pressreleases/Telestroke.html
http://i.ebayimg.com/t/Antique-Wooden-Cart-Wheels-Wagon-Wheels-Carriage-Wheels-XL-1-2meters-tall-/00/s/MTIwMFgxNjAw/$(KGrHqZ,!lgF!Zgber4VBQI8Y(mT1Q~~60_35.JPG
http://www.activase.com/images/sub/img-model-hub-spoke.jpg
http://www.wakehealth.edu/Referring-Physicians/Neurosciences/Telestroke/Telestroke-Network.htm

Teleneurology in the Outpatient Setting

- Telestroke systems are still going strong, however there has been considerable growth into other areas patient care—specifically more outpatient-based and follow-up care

- George et al, *Telemedicine in Leading US Neurology Departments*, 2012
  - "More than 85% of leading US neurology departments use or plan to use telemedicine within the next year."
  - "Currently, telestroke is the most common application of telemedicine, however other applications are developing"

Benjamin P. George, MPH et al, Telemedicine in Leading US Neurology Departments. Neurohospitalist. 2012 Oct; 2(4): 123–128.

Teleneurology

General Neurology is in many ways ideally suited for telemedicine

- In many rural areas, local neurology expertise is unavailable
- In many urban areas, hospitals may not have neurologists on staff
- Many neurologic conditions limit mobility & ability to drive
- Many neurologic conditions require a caretaker—loss of work, time away from home, cost, etc to make long distance appointments

Wechsler et al. Teleneurology applications: Report of the Telemedicine Work Group of the American Academy of Neurology. Neurology. 2013 Feb 12;80(7):670-6

Teleneurology

General Neurology is in many ways ideally suited for telemedicine

- In degenerative conditions, familiar locations and providers can help decrease anxiety/confusion
- Telemedicine services can also potentially extend to chronic care facilities such as nursing homes, providing neurologic expertise to patients who otherwise could not be easily transported to a neurology office
- Neurologic disease is common!

Wechsler et al. Teleneurology applications: Report of the Telemedicine Work Group of the American Academy of Neurology. Neurology. 2013 Feb 12;80(7):670-6

Teleneurology: Outpatient models of care

- Direct consultation
  - Clinic setting
  - In-home
- Team based consultation
- ECHO model
- Store and forward (radiology, labs)
- ‘Email’ consultation

Teleneurology: VA

- 2006, Rural Veterans Care Act
- Development of Community Based Outpt Clinics (CBOCs)
- Begin utilization of clinical video telehealth (CVT) systems to connect specialists to PCPs in CBOCs
- In “2012, VA telehealth networks provided care to 497,342 patients who received 1,429,424 episodes of care”

Davis et al. Teleneurology: successful delivery of chronic neurologic care to 354 patients living remotely in a rural state. Telemed J E Health. 2014 May;20(5):473-7.
http://www.columbiamo.va.gov/images/image_TelehealthJan2014.jpg

Teleneurology: VA

- Davis et al, 2014. *Teleneurology: successful delivery of chronic neurologic care to 354 patients living remotely in a rural state.*

- Over 2 year period, 354 patients seen in rural NM, CO, AZ and TX at 11 CBOCs with follow-up telemed visits
- Initial evaluation at Albuquerque VA, follow-up via telemedicine
- Usually neither CBOC staff assistant nor the CBOC provider in room
- 30 min visit

- Limited neuro exam
  - "difficulties arose when trying to grade subtle strength difference between the sides, measuring muscle tone, and evaluating cogwheeling"
  - "we did not conduct an exam of the deep tendon reflexes, a careful sensory exam, retinal exam, or complete oral exam of the palate movements"

Davis et al. Teleneurology: successful delivery of chronic neurologic care to 354 patients living remotely in a rural state. Telemed J E Health. 2014 May;20(5):473-7.

Teleneurology: VA

- Types of patients
  - PD 36%
  - Seizure disorders 26%
  - Chronic headaches 13%
  - MS 7%
  - Dementia 6%
  - 'Misc' 12%

- 92% of Pts reported they felt teleneurology saved them time, money or both
- 90% 'fully satisfied' with their visits
- 95% wanted to continue care by teleneurology

- The "rate of neurologic condition-related ER visits or hospitalizations was similar to that experienced by follow-up patients attending regular Albuquerque neurology clinics"
- $48,000 savings in mileage reimbursement

Davis et al. Teleneurology: successful delivery of chronic neurologic care to 354 patients living remotely in a rural state. Telemed J E Health. 2014 May;20(5):473-7.

Teleneurology: VA

2018 Follow-up: “Analysis of First 1,100 Patients”

- 701 (64%) responded
  - 90% perceived they received good care
  - 91% felt there was good communication
  - 88% liked the convenience
  - 96% reported saving time, money or both
  - 87% would like to continue teleneurology

- Patient breakdown
  - Parkinson disease (32%); epilepsy (19%); and headaches (15%) (Fig. 1). The other group (19%) includes patients with essential tremor, myasthenia gravis, dizziness, peripheral neuropathies, strokes, immune disorders, postacute encephalopathy, and myopathies.

Davis et al. Using Teleneurology to Deliver Chronic Neurologic Care to Rural Veterans: Analysis of the First 1,100 Patient Visits. Telemed J E Health. 2018 Jul 17.

Teleneurology: PD

- Dorsy et al, 2013. *Randomized Controlled Clinical Trial of "Virtual House Calls" for Parkinson's Disease*

- Intervention group utilized Vidyo and home-based, web-cam and internet enabled computers

- 20 patients enrolled randomly assigned to telemedicine (n=9) or in-person care (n=11)

- All patients had baseline PDQ-39 and UPDRS assessments performed in clinic
  - Followed by 3 follow-up visits over 3 months

- Change in QOL, as measured by PDQ-39, did not differ between groups
  - (+) "telemedicine for me has become a real convenience, in particular the distance we live from Hopkins"

Dorsey et al. Randomized controlled clinical trial of "virtual house calls" for Parkinson disease. JAMA Neurol. 2013 May;70(5):565-70.

Teleneurology: State of affairs

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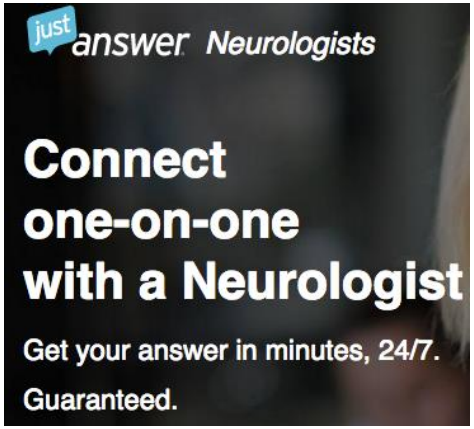


Specialists On Call seeks to commoditize the telemedicine cart

This product promises to lower hospital telemedicine hardware costs by as much as 60 percent, according to Specialists On Call. More importantly, the cart is another step toward the commoditization of telemedicine hardware.

https://medcitynews.com/2016/09/specialists-call-seeks-commoditize-telemedicine-cart/
https://www.justanswer.com/sip/neurology
http://tele-specialists.com
https://www.soctelemed.com/
https://secure.defenders.org/site/SPageNavigator/wagc_elephant.html&s_src=3WEW1511EHXX1&s_subsrc=081015_ElephantPromo_homepage

Teleneurology: State of affairs

- Telemedicine has been successfully applied in the outpatient setting for evaluation of many nonacute neurological conditions.
  - PD/Movement disorders
  - Epilepsy
  - Headache
  - Sleep disorders
  - Dementia

Wechsler. Advantages and limitations of teleneurology. JAMA Neurol. 2015 Mar;72(3):349-

Pharmacist & Telemedicine

- Niznik et al. 2018. *Impact of clinical pharmacist services delivered via telemedicine in the outpatient or ambulatory setting: A systematic review*
- Chronic conditions managed by pharmacists
  - Hypertension (7 studies)
  - Diabetes (4 studies)
  - Anticoagulation (3 studies)
  - Depression
  - Hyperlipidemia
  - Asthma
  - Heart failure
  - HIV
  - Other (PTSD, CKD, Stroke, COPD, smoking cessation)

Niznik.Res Social Adm Pharm. 2018 Aug;14(8):707-717.

Pharmacist & Telemedicine

- Niznik et al. 2018. *Impact of clinical pharmacist services delivered via telemedicine in the outpatient or ambulatory setting: A systematic review*
  - Most pharmacist-involved telehealth clinics used scheduled appointments with telephonic management for chronic diseases
  - Studies focus on adult population with at least 1 chronic condition
  - Majority of studies reported an overall positive impact on outcomes
    - Outcome categories were clinical disease management, patient self-management, and adherence
  - Did not include specialty pharmacy services for high cost or high touch medications
    - Multiple sclerosis disease-modifying therapy
    - Role of Specialty Pharmacist

Niznik.Res Social Adm Pharm. 2018 Aug;14(8):707-717.

Pharmacist & Telemedicine

- Taylor et al. 2018. *Integrating innovative telehealth solutions into an interprofessional team-delivered chronic care management pilot program*
  - 69 patients participated in program
    - Mean age 61.7 yr, most with Medicaid/Medicare
  - Pharmacist receives referral and performs independent video-conference evaluation with patient
  - Depends on physician to accept recommendations
    - 37.5% of 200 telepharmacist recommendations were taken
  - No face-to-face time between pharmacist and physician
  - Most common chronic conditions did not include neurological illnesses

Taylor.J Managed Care Spec Pharm. 2018 Aug;24(8):813-818.

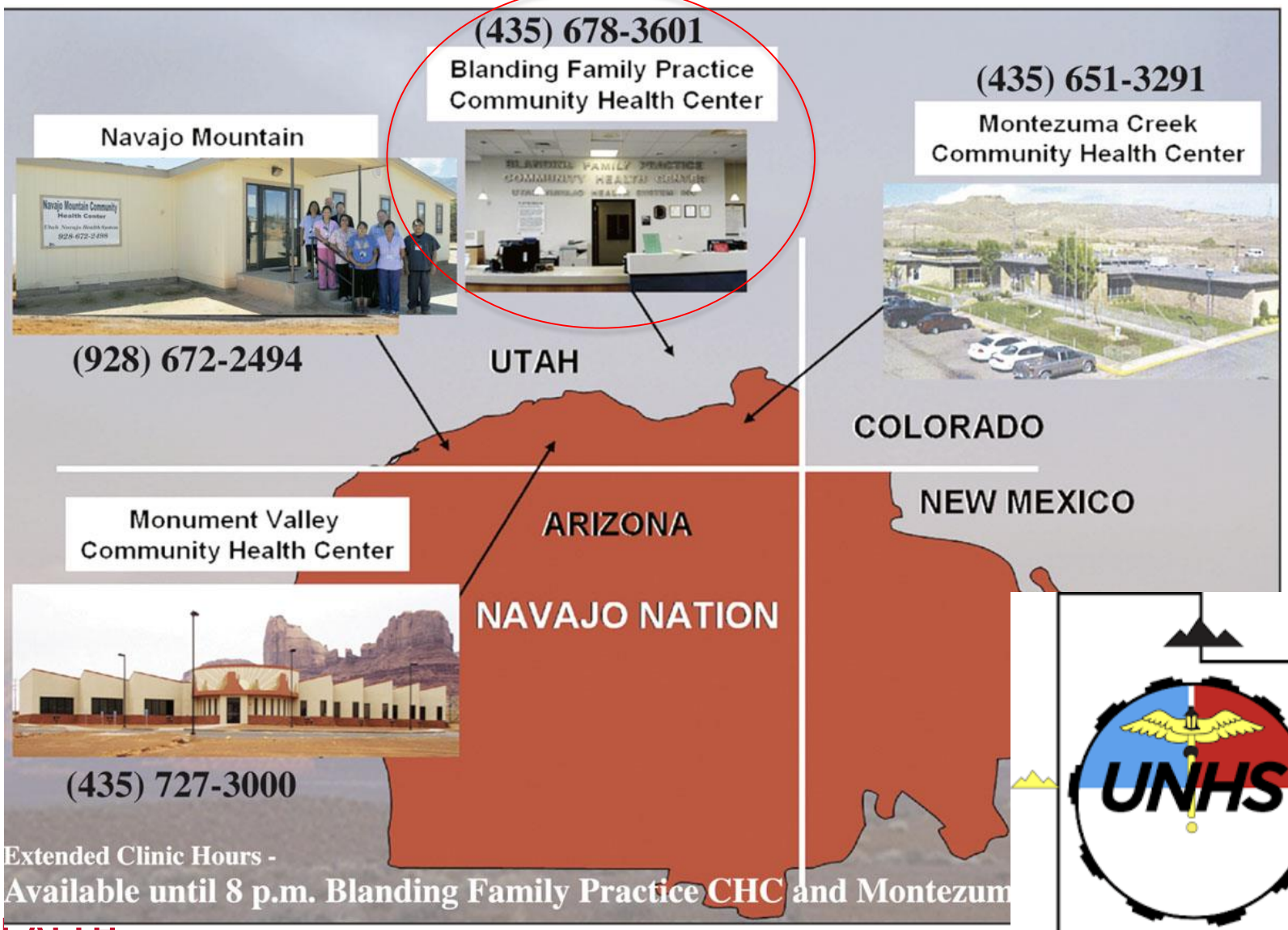
Blanding General Teleneurology Clinic

- Started June 2015
  - Several meetings between UU and BFP to discuss feasibility
- Goal: To improve access to Neurology specialty care in the area
  - Decrease wait time
  - Decrease drive time
  - Decrease associated costs (gas, food, room/board)
  - Improve access/triage when necessary to advanced diagnostics and evaluation
- 2 site, multi-provider
  - **MD, DNP, PharmD**
  - Local training on neurology exam skills, 1 week/multi-clinic experience
- General Neurology patients from Blanding and surrounding area

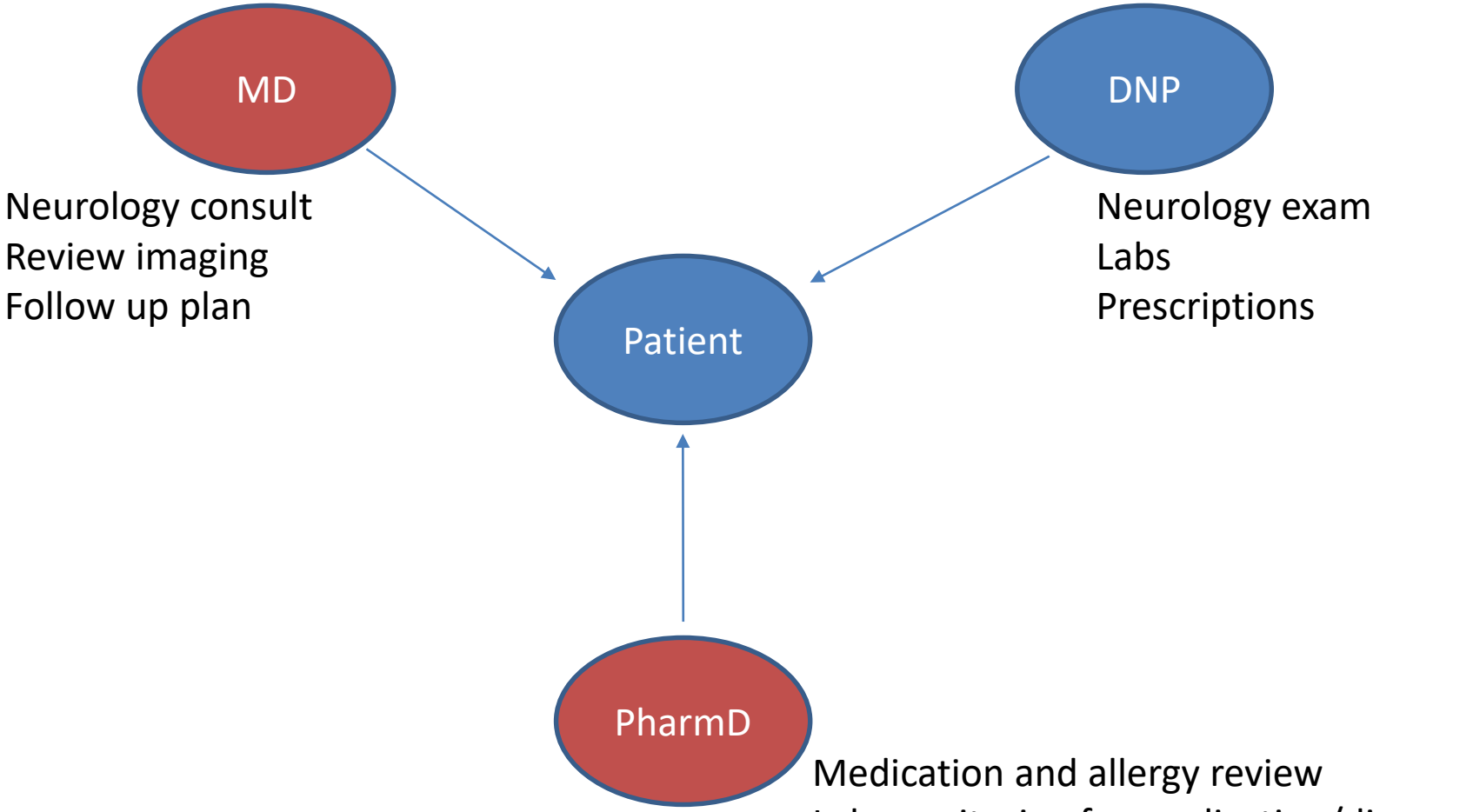
Blanding General Teleneurology Clinic

https://www.standsandmounts.com/AVTEQMobileTelemedicineCartforFlatScreensupto32inchesTMP200.aspx

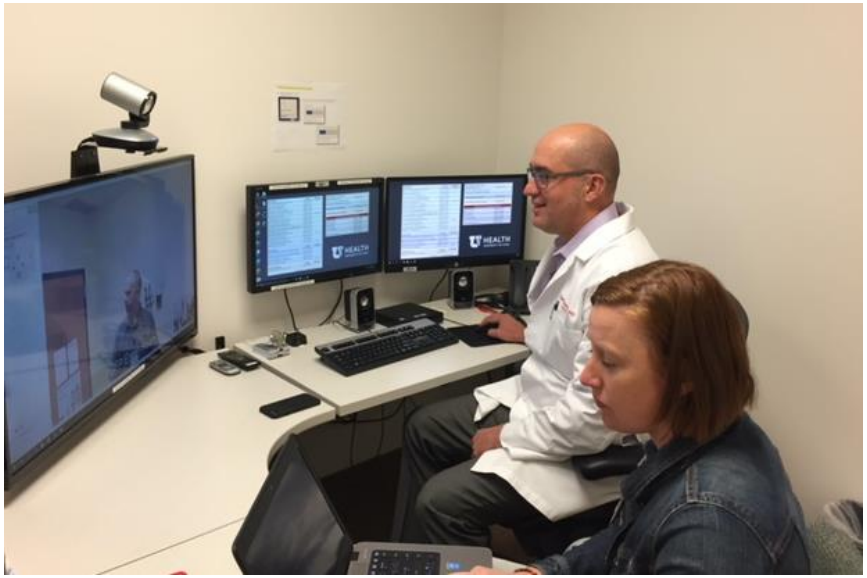
Blanding General Teleneurology Clinic



Bladding General Teleneurology Clinic



Blanding General Teleneurology Clinic



Teleneurology Clinic: Workflow

Pre-clinic

- Patients get scheduled at BFP
- Schedule sent to CNC via email
- Patient referral documentation emailed from BFP to UU
- Template entered on UU side
- Ensure schedules match on both ends
  - New patients 45min, returns 30min

Teleneurology Clinic: Workflow

In Clinic

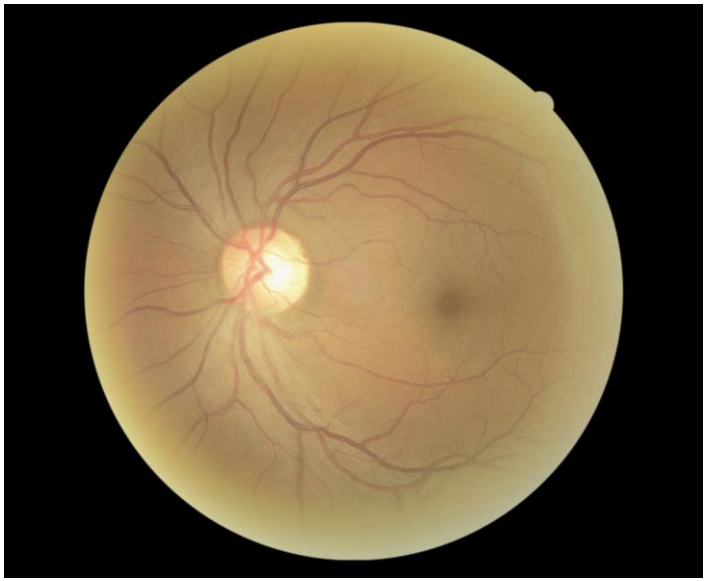
- Roomed at BFP
  - Vitals
  - Meds
  - ROS
- NP alerts MD that patient is ready
- Vitals/medications emailed to MD
- PharmD reviews medications
- MD, NP and PharmD see patient together
- Plan is discussed, orders are entered locally
- PharmD may answer medication questions
- Documentation in EMR
  - UU via EPIC
  - BFP via Athena

Teleneurology Clinic: Workflow

Post-Clinic

- Patient may get retinal imaging performed at BFP as needed
- PharmD
  - May call patients to discuss medications, regimens, etc
- Patient referral documentation emailed from BFP to UU
- BFP FNP will provide any local referrals, labs/imaging orders, follow-up instructions
- UU MD may help facilitate advanced referrals, imaging

Digital fundoscopy

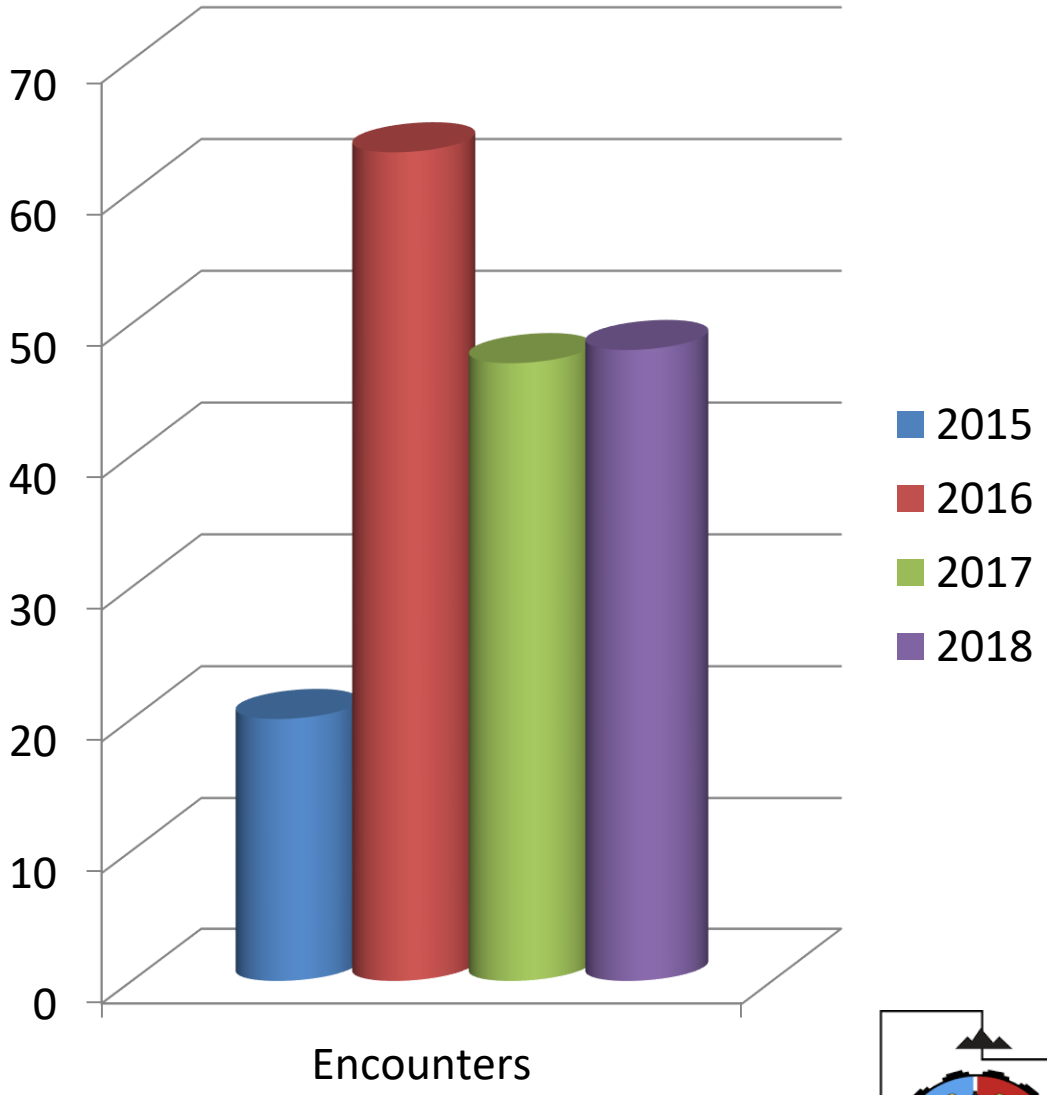


Patient Encounters

First clinic:

June 4, 2015

Total Patient Encounters since start of the clinic = 178



Types of Patient Encounters

- Migraine – 16%
- Epilepsy – 14%
- CVA Follow Up – 11%
- Parkinson Disease – 8%
- Dizziness – 6%
- Memory Loss – 5%
- Tremor Evaluation – 5%
- Other – 35%
  - Multiple Sclerosis, Paresthesia, Syncope, Weakness, Neuropathy, etc.

Pharmacist Role/Duties

- Review patient referral documentation prior to clinic as available in UU EMR
- Meet MD in teleneurology suite for scheduled clinic
- Request current medication/allergy list from patient/family and DNP
- Document medication/allergy information in UU EMR
- Develop therapy plan with team
  - Focus on past medication trials, evidence-based efficacy, cost, side effects, patient “buy in”
  - Provide medication education to patient/family
- Update therapy plan based on follow-up information from DNP
  - Information usually obtained from email
  - Lab abnormalities
    - Dose adjustment based on organ function, hyponatremia
  - Efficacy (eg, seizure burden, migraine days, etc) and side effects
  - Facilitate specialty medication form completion and approval process

Differences in Our Clinic

- Pharmacist services are not fee-based but part of usual clinical work
  - Specialty Pharmacist employed by health system
- No collaborative practice agreement required since provider is present
- Rural access to clinical pharmacist with specialized knowledge about neurological disease states and medications
  - Real-time medication review and recommendations during provider's visit
- Pharmacist progress note documented in patient chart
  - Focused documentation on initial patient visit or if any changes were recommended on follow up visits
  - Note placed on same day as teleneurology visit

DNP Role/Duties

- Review cases with MD prior to clinic.
- Provide cultural awareness
  - Ensure Navajo Language interpreter available if needed.
  - Familiarize MD and PharmD about local resources, referral issues, and Rx formulary.
- Explain to new patients how the clinic works (telemedicine).
- Brief documentation in EMR
  - Forward vitals and current medication list to MD.
- Perform Neurologic exam.
- Order any necessary labs, Rx, or imaging.
- Relay all results to MD.
- Ensure that patients are scheduled for appropriate follow up visits.

MD Role/Duties

- Review referral paperwork, any available imaging
- Review cases with MD prior to clinic.
- Interview patient
- Observe exam over the camera
  - Add additional elements
  - Request clarifying maneuvers
- Discuss proposed diagnosis and management options
- Review medications with PharmD and DNP
- Discuss feasibility of management options with DNP, PharmD and patient/family
- Put in local referrals as needed
- Document encounter in EPIC

Challenges We've Faced

- Startup & training
- Technology failures
- Lack of cross-talk in EMRs (labs, vitals, historical records and imaging)
- Lack of cross-talk in scheduling
  - Last minute changes to scheduling
  - Referral paperwork
- Cultural competency learning curve

Challenges & Barriers to Tele-Care

- Licensing
- Reimbursement
- Liability
- Technology
- Records sharing
- Startup challenges
- Potential exam limitations over the camera

If we could…

- Failure-proof technology
- Shared EMR, access to:
  - Orders
  - Intake: vitals, medications, ROS
  - Results
  - Historical records
- More collaborative scheduling
- Increased ease of provider communication across institutions (messaging, etc)

Successes

- Increased access to specialty neurology care in Blanding and surrounding area
- Comprehensive ‘1-stop’ care via collaborative team-based care
- Able to facilitate further care for complicated patients
- Multi-directional learning for all providers involved

Successes

- Strengthened professional relationships between our institutions
- Sustainable solution—does not subtract from other clinical duties or earnings
- Not only do we feel it provides great care, it's an enjoyable experience for us!

Discussion

http://animalpictureoftheday.blogspot.com/2010/09/group-discussion.html

Thank you!