1. SPECIFIC AIMS

The critical need to identify and treat psychiatric co-morbidities in individuals with epilepsy has been recently recognized (Kanner et al, 2010; Gliem et al, 2006). The Mobile Health Rural Ambulatory Care Coordination (mRACC) initiative facilitates translating such evaluation and management into practice. This initiative is a novel patient-centered population health management (PHM) outreach delivery model for delivering subspecialty care for refractory chronic epilepsy and co-morbid mood disorders in Northwestern Illinois. The initiative is designed for replication and deployment throughout rural Illinois (FIGURE 1).

An independent community-based PHM coordination hub within the Epilepsy Foundation of North Central Illinois (EFNCIL) has been established in McHenry County. It facilitates access to community social service resources, mobile health-enhanced subspecialty expertise and 'on-demand' internet-based patient education. Such a community-based health information technology (IT) bridge for managing refractory epilepsy is critical for accommodating a markedly increased patient throughput following implementation of the Affordable Care Act.

This initiative aims to improve the co-morbidity patterns and healthcare use/behavior of the majority of the individuals in the rural underserved community with refractory epilepsy. The clinical implementation and replication of this strategy in other communities hinges on the scalability of an efficient networking technology that contributes to efficiencies in patient care. Independent community-based coordination centers linked with mobile health IT become effective systems linking efficient access to subspecialty care for increased number of patients, while maintaining patient autonomy.

2. METHODS

The methodology combines the following four innovative components:

1. A HIPAA-compliant portable video-conferencing communication protocol and technology for remote access of specialists at Rush University Medical Center (RUMC) with patients and community-based healthcare providers (FIGURE 2).

2. A custom-designed web-based networking technology employing a relational database for accessing and tracking allocation of all geographically distant community resources and providers (FIGURE 3).

3. Computer-intensive production, archiving and on-demand streaming of an animated education series targeting epilepsy and mental health to accommodate closed virtual classrooms (FIGURE 4).

4. An independent community-based PHM coordination hub (EFNCIL) facilitating the above innovative components.

3. ANIMATED EDUCATIONAL VIDEO SERIES

A MOBILE HEALTH-INTENSIVE COMPREHENSIVE CARE DELIVERY MODEL FOR AMPLIFYING OUTREACH FOR REFRACTORY EPILEPSY AND CO-MORBID MOOD DISORDERS

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Mobile Health Rural Ambulatory Care Coordination (mRACC) Initiative

FIGURE 1. A schematic of integration between geographically distant community resources and providers in underserved areas to contribute to efficiencies in patient care. Independent community-based coordination centers are linked with mobile health IT to become effective systems linking efficient access to subspecialty care for increased number of patients, while maintaining patient autonomy.

Screening for Depression (NDDI-E) and Generalized Anxiety Disorder (GAD-7) 2013-2014

FIGURE 2. Preliminary dataset for English-speaking adults between 2 consecutive clinic/video visits.

Changes in psychiatric co-morbidities between 2 consecutive clinic/video visits

FIGURE 3. Preliminary dataset for English-speaking adult patients for major and sub-epilepsy episodes using the NDDI-E and GAD-7 screening tools. The model was validated in previous studies and has proved to be valid and reliable.

Mobile Health IT further defined: An on-going web-based animation-intensive video library is currently under development as a means for educating patients and caregivers living with epilepsy.

4. RESULTS

- A four-fold increase is observed in successful epilepsy specialist referrals at the distant tertiary care center (RUMC) of children and adults evaluated between 2012-2013.
- "On-demand" community psychosocial resources were matched with all patients using our networking provider database.
- The NDDI-E and GAD-7 facilitated recognizing major and sub-syndromic mood disorders in ambulatory epilepsy patients.
- The PHM workflow facilitated identification of psychiatric adverse events to AEDs (FIGURE 2).

5. CONCLUSIONS

- This mobile health IT-intensive PHM-based outreach delivery model overcomes barriers preventing such coordinated care from being implemented.
- The model significantly expands the geographic reach of a distant tertiary care medical center to an underserved region. Preliminary data suggest that an independent community-based coordination hub can efficiently maximize patient access to community psychosocial resources, medical expertise, and customized patient education.
- Next steps will include remote PHM case management of both children and adults via mobile health in the geographically distant emergency departments. An expanded suite of quick assessment tools will be employed, such as: 1) The Child Depression Inventory, 2) Family Inventory Resources for Management tool, 3) a standardized survey for assessing perceptions of care and accessibility of community services from clinicians and group practices (CAHPS), and 4) the Telehealth Patient Satisfaction Survey (http://www.utahtelehealth.net).
- Progress of the mRACC model can be followed at: http://www.synapticom.net

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7. REFERENCES

- Gliem et al, 2006; 5:399
- Kanner et al, 2010; Leopoldo Cendejas et al., 2014
- Ryan Hanson et al, 2013
- Lundbeck, Inc
- Ryan Hanson et. al, 2013
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