

**UAMS College of Medicine Series**  
Showcase of Medical Discoveries:  
**A Focus on Telemedicine**



**Wednesday, June 4, 2014**  
**4:00—5:30 p.m.**

***A Research Reception Featuring  
UAMS / UA Investigators Discussing their  
Research and Discoveries.***

Winthrop P. Rockefeller Cancer Institute  
10th Floor Rotunda

Poster #1

***Breath Connection: A School-Based Telemedicine Program  
for Rural Children with Asthma”***



Tamara T. Perry, MD, Jill Halterman, MD, Rita H. Brown, BS, Cassandra R. Hunter, MPH, Shemeka M. Randle, MS, J. Mick Tilford, PhD, and Mallikarjuna Rettiganti, PhD

Asthma-related morbidity is high among rural children living in the Mississippi Delta region of Arkansas. Large-scale interventions to decrease the asthma burden for rural children have not been designed, and interventions designed for urban populations are not always feasible due to distance and lack of subspecialty asthma services in rural communities. We are conducting a trial aimed to improve asthma health outcomes for children living in the Delta region, a rural and medically underserved environment. We will enroll 540 children, ages 7-17 years, from rural public school districts in the Delta. The school-based intervention will provide comprehensive asthma education via telemedicine to rural children with asthma, their caregivers and school nurses. We will also monitor asthma symptoms and lung function via telemedicine and provide primary care providers with treatment prompts according to nationally published asthma guidelines. The impact of the intervention will be compared to usual care.

Dr. Perry’s primary research interest focuses on reducing asthma disparities for children with special emphasis on high-risk and underserved populations. The research is currently funded by the National Institutes of Health, UAMS Translational Research Institute, and Arkansas Biosciences Institute. Her work aims to implement interventions and utilize innovative technology to tailor asthma care to the specific needs of high risk children. She is the Principal Investigator for asthma research programs that utilize telemedicine and mobile health applications.

Clinical Poster #4

***Overview of the Arkansas Hand Trauma Consult Program***



Terry Imus, RN, BSN

Trauma Telemedicine Coordinator

- Arkansas leads the nation in being wired for Telemedicine.
- With this, having the nation’s first telemedicine hand trauma program allows for patients with hand injuries to be quickly evaluated by hand experts via telemedicine, regardless of the location or staffing of the hospital emergency room.
- Seven hand surgeons from various locations in Arkansas share call for coverage of hand trauma across the entire state 24/7.
- This Hand Trauma Telemedicine Consult program officially began in January 2014.

### Clinical Poster #3

#### *The Effectiveness of a Statewide Trauma Call Center in Reducing Time to Definitive Care for Severely Injured Patients*



Austin Porter, Deidre Wyrick, Stephen M. Bowman, John Recicar, and R. Todd Maxson, MD

Arkansas implemented an inclusive trauma system in July 2010. The Arkansas Trauma Call Center (ATCC) is a central component in the system, designed to facilitate scene transports and inter-facility transfers. The first 18 months were examined to evaluate the relationship between ATCC utilization and emergency department length of stay (EDLOS) at sending facilities.

ATCC data were linked to the Arkansas Trauma Registry. Patients with significant injury, requiring transfer to a hospital with a higher level of care were examined. Significant injury was defined as hypotension (SBP <90 mm Hg), Glasgow Coma Scale (GCS) <9 or Injury Severity Score (ISS)  $\geq 16$ . Patients less than 15 years of age were excluded from analysis.

Eight hundred and fifty-six patients met inclusion criteria; 632 (74%) utilized and 224 (26%) did not utilize the ATCC. There was no statistically significant difference between the groups in terms of ISS, SBP, and GCS. The results of a linear regression model showed that ATCC utilization decreased EDLOS at the sending facility by 21 minutes when controlling for age, SBP, GCS, ISS, and gender ( $p=0.005$ ).

In the first 18 months following inception, the ATCC was effective in expediting the transfer process, thus reducing the time to definitive care for severely injured patients.

### Poster #2

#### *Neurology Telemedicine Interest in Arkansas*



Maryam Bashiri, Sukanthi Kovvuru and L. John Greenfield Jr.

Telemedicine involves use of live audiovisual contact between healthcare personnel and patients at a remote site. In neurology, it has been used to extend specialty consultation to distant hospitals lacking neurologic expertise, particularly to determine whether tPA should be given for acute stroke. It can also be used for routine follow-up when patients must travel great distances or have difficulty with travel due to their illness or socioeconomic status. Prior to implementing a teleneurology clinic, we sought to determine patient interest in telemedicine and possible motivations for this interest. A questionnaire was given to all patients presenting to UAMS Neurology clinic between March 2011 - Dec. 2012.

Results: 1442 questionnaires were returned. 52.4% of patients (755/1441) indicated they were potentially interested in using telemedicine for follow-up visits. 53.5% (766/1433) indicated they travel more than 1 hour by car to clinic. 50.9% (717/1410) endorsed difficulty with travel due to their neurological condition. 15.1% (215/1423) indicated they had missed medical appointments due to travel problems. 27.1% (383/1411) agreed that travel to clinic created a financial hardship.

Teleneurology interest was strong among patients at our university neurology clinic, likely due to long distances traveled by many patients, expense of travel and transportation difficulties created by neurologic illness. Illness-related problems may include physical difficulty with travel (e.g., patients with MS, ALS, or Parkinson's disease who have mobility problems) or those with restrictions on driving (epilepsy). Tele-neurology may be a viable option for many of these patients.

### Poster #3

#### *Use of a Statewide Telecolposcopy Network for Recruitment of Participants in a Phase I Clinical Trial of an HPV Therapeutic Vaccine*



Shawna L. Stratton, Mayumi Nakagawa, William W. Greenfield, Gordon Low, and W. Chuck Hitt

As Arkansas' only comprehensive academic medical center, UAMS provides its researchers with opportunities to collaborate with numerous intramural and extramural partners/programs to better recruit potential participants in clinical trials. One such program is Arkansas START (System To Access Rural Telecolposcopy), a federal grant-funded collaborative program that provides interactive high-definition video stations in various local County Health Units run by the Arkansas Department of Health, where UAMS physicians and APNs are overseeing local practitioners who conduct colposcopy-guided biopsies. Partnering with this program, our current Phase I clinical trial of an HPV therapeutic vaccine has been able to recruit women diagnosed with high-grade squamous intraepithelial lesion (HSIL) by pap and/or colposcopy from all over the state. Once seen in the local clinics and diagnosed with HSIL, women are informed about the study. If a potential participant expresses interest, contact is made by the Study Coordinator. This method of recruitment has been the most successful to date, outperforming direct advertising, in-clinic advertising, local flyer postings, and the use of social media.

### Clinical Poster #2

#### *Improving Healthcare for Youth Athletes with Sport-Related Concussion in Arkansas: Identifying a need for "Teleconcussion"*



R. J. Elbin, Ph.D., Damon Lipinski, PhD, and Darrell Nesmith, MD, MPH

Sport-related concussion (SRC) is a serious public health concern as 1.6 to 3.8 million SRC occur every year in the United States. Characterized by an inconsistent presentation of cognitive, emotional, physical, and somatic symptoms and impairments, SRC can adversely affect the social, academic, and physical well being of youth athletes ( $\leq 17$  years). Concussions among youth athletes have doubled during the past decade, and concussed youth athletes demonstrate a more prolonged recovery compared to college-aged athletes. Youth athletes are also at risk for catastrophic outcomes (e.g., second impact syndrome) if clinically mismanaged due to the vulnerable nature of the developing pediatric brain. Youth sport leagues often lack appropriate medical oversight and access to medical providers trained in SRC. Improving access to care for youth athletes with SRC is critical. While youth sport participation continues to rise across the U.S., most youth sport leagues in Arkansas are located in rural areas and participants often experience barriers to accessing appropriate healthcare, especially for SRC.

Telemedicine is an effective means of remotely providing appropriate care for youth athletes with SRC that may otherwise lack access to appropriate healthcare. "Teleconcussion" would eliminate geographical (urban, rural) barriers for access to appropriate healthcare for SRC. Researchers at the UA Office for Sport Concussion Research are collaborating with UAMS and ACH clinicians with training in SRC to create a pilot model for implementing teleconcussion in Arkansas. This abstract will highlight the need for a teleconcussion program for Arkansas youth with SRC.

## Clinical Poster #1

### *Clinical Genetics*



- Clinical Genetics at UAMS / ACH
- Conducting multiple telemedicine services which includes outreach to Kansas (24 clinics per year in Wichita) as well as consultations to NICU'S in Arkansas
- Conducting individual follow up, counseling, and test reporting across the states for Arkansas patients
- Adding a 2nd site in far western Kansas
- In negotiations to begin a new clinic in Tulsa, OK.



#### **G. Bradley Schaefer, MD, FAAP, FACMG**

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Founding Director, Division of Medical Genetics  
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## Poster #4

### *Effect of a Novel Telemedicine Based Educational Intervention on Glucose Control in Type 2 Diabetes in the Arkansas Delta*



Peter A. Goulden, MD, Mary Sha Moriatty, Josephine Jackson, Becky Hall, Donna Ussery, Zoran Bursac, and Curtis Lowery, MD

This pilot project in the AR Delta assessed the impact of a novel, combined endocrinologist educator telemedicine intervention on glucose control within subjects with type 2 diabetes in an underserved community. It paired a rural diabetes educator, with dedicated endocrinologist and certified diabetes educator, combining patient and provider education. The study was planned as an 8 week intervention, combining one session of group education with 6 fifteen minute visits to a telemedicine clinic to reinforce and individualize the key educational messages. Biometrics and quality of life data were collected.

The study recruited 20 participants from the Helena AR Delta region. All participants received group education at visit one, and all were offered six consecutive weekly 15 minute telemedicine education sessions at visits 2-7. The mean age of participants was 54.2, with an average duration of Type 2 diabetes of 7.1 years. The mean HbA1c pre study was 8.9%. HbA1c fell from 8.9% to 7.6% ( $p=0.011$ ). There was also a significant improvement in a number of the quality of life measures from the DSTQs questionnaire. The combination of local group education with telemedicine reinforcement used over a six week period may be an effective method of improving glycemic control and treatment satisfaction.

***Arkansas START: "System to Access Rural Telecolposcopy"  
Summarizing 3 Years of Success***



W. C. Hitt , MD; Gordon Low, MSN, APRN

Historically, The Arkansas Medicaid program for low-income women in Arkansas has provided cervical cancer screening, in the form of Pap smears, and treatment for women with high-grade dysplasia or cancer but has not reimbursed for the diagnostic means of bridging the two through colposcopy. In response to this gap in care, the UAMS ANGELS Program and Center for Distance Health developed an innovative collaborative telemedicine pilot program with the Arkansas Department of Health that utilized both specialty physician oversight and nurse examiners. Poor rural patients from the Department of Health were provided with colposcopy services via interactive telemedicine at four separate rural, underserved spoke-sites.

During each weekly 3-hour clinic, an Advanced Practice Nurse/Nurse Practitioner at each of the spoke-sites performs the exams and collects biopsies under the real-time, interactive supervision of an experienced faculty member at the hub-site.

Between September 1, 2009 and August 31, 2012, the program scheduled 4400 visits, involving patient referral from 68 of Arkansas's 75 counties, and produced 2784 colposcopic exams.



UA Poster #3

*Logistics Planning for Initiation of Telemedicine-Based Collaborative Care at the Psychiatric Research Institute*



Shengfan Zhang, Ph.D., Edward A. Pohl, Ph.D., Fan Wang, M.S., and Kaitlyn Thomas

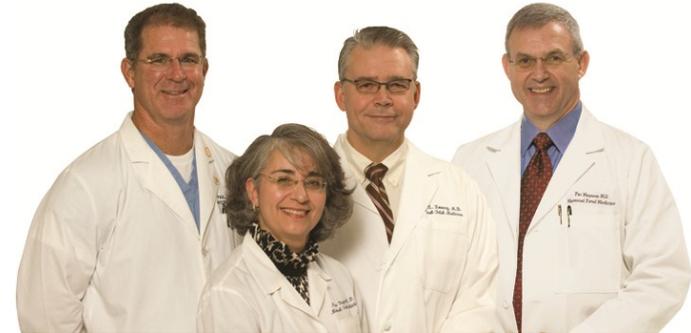
The goal of this project is to plan and initiate telemedicine-based collaborative care at the UAMS Psychiatric Research Institute (PRI). This can help reduce the patient waiting time to the first appointment at the PRI, which currently is more than two weeks due to inefficiency in the system.

Specifically, the objectives of this project are to: (1) understand and estimate the current capacity at PRI, (2) improve efficiency in the outpatient services by optimizing service schedules for both practice-based and telemedicine-based care, (3) conduct a pilot study within UAMS and test the models developed for scheduling and forecasting, and (4) propose future plans on telemedicine programs with community partners throughout Arkansas.

This project is led by Dr. Shengfan Zhang and Dr. Ed Pohl, researchers at the Center for Innovation in Healthcare Logistics (CIHL). CIHL is an industry-university partnership based at the University of Arkansas in Fayetteville that leads a nationwide effort to identify and foster system-wide adoption of ground-breaking healthcare supply chain and logistics innovations.

Poster #6

*Evolving Trends in Maternal Fetal Medicine Referrals in a Rural State Using Telemedicine*



Everett F. Magann MD, Janet Bronstein PhD, Samantha S. McKelvey MD , Paul Wendel, MD, Dora M. Smith, MD, and Curtis L. Lowery, MD

The study objective was to determine maternal fetal medicine (MFM) referral trends in a Medicaid population over time. Sixteen clinical guidelines and 23 clinical conditions were identified where co-management/consultation with MFM specialist is recommended. Linked Medicaid claims and birth certificate data for 2001-2006 were used to identify pregnancies with these conditions and whether they received co-management/consultation from a MFM specialist.

Between 2001 and 2006, there were 108,703 pregnancies with delivery of 110,890 neonates. Forty five percent had one or more of the conditions identified for co-management/consultation. Overall pregnancies receiving MFM contact remained unchanged at 22.2% in 2001 and 22.1% in 2006. However, face to face contacts decreased from 14.7% (2001) to 9.2% (2006) while telemedicine consults increased from 7.6% (2001) to 12.6% (2006). Health departments were most likely and family practitioners least likely to refer to MFM ( $p < 0.001$ ). Pregnancy complications leading to MFM referrals include cardiac complications, renal disease, systemic disorders, PPRM, suspected fetal abnormalities, and cervical insufficiency. Referral of high risk pregnancies to MFMs varies with the level of expertise at the primary prenatal site. Increased contact between MFMs and local providers increased MFM referrals.

Poster #7

**Center For Translational Neuroscience: Telemedicine Core Facility**



R Whit Hall MD, Core Director

The Telemedicine Core Facility brings subspecialty care to underserved areas through tele-communication. Peds PLACE is a weekly interactive educational conference including pediatrics, and translational research that reaches out through telemedicine to pediatric providers in community settings. Attendees are from communities in Arkansas, surrounding states and Puerto Rico. Evaluations from 172 attendees from remote sites, and 94% stated the conference as effective as traditional education. Peds PLACE has 80 consensus guidelines available on the web for pediatric health care providers.

ED's PLACE is an interactive weekly educational conference that reaches out through telemedicine to Emergency Department providers in community hospitals and clinics throughout Arkansas. There were 6 units placed in community Emergency Departments, and 9 more have been added through a telemedicine stroke program.

Tele-nursery communicates 3x weekly with community nurseries and obstetrical providers. It has led to enhanced regionalization of intensive care nurseries. Deliveries of very low birthweight neonates in telemedicine equipped community nurseries decreased from 13.1% to 7.0%,  $p < 0.01$ , while neonatal mortality decreased from 13% to 6.7%,  $p < 0.05$ .

UA Poster #2

***Saving Lives Through Selfies: First Ever, Virtual Skin Cancer Screening for Arkansas***



Kevin St.Clair M.D., Eric Stewart M.D., Josephine Park M.D.,  
Orrin Davis M.D., and Chris Schach M.D.

A novel mobile application has been successfully employed by dermatologists to provide store-and-forward teledermatology consults to patients in Arkansas. By offering the first, statewide, smartphone application based virtual skin cancer screening, we sought to study the ability of dermatologists to provide useful information through patient direct, teledermatology consults. We also sought to determine patient satisfaction and the effect a teledermatology consult has on patient self-monitoring for skin cancer.

This pilot began May 1, 2013 and concluded on Melanoma Monday, May 6, 2013. Virtual consults were submitted directly by patients to volunteer dermatologists. Patients installed the smartphone application, created a HIPAA secure account, through the app portal took at least 3 photos of their skin lesion, completed a basic medical history, and submitted the virtual consult to the secure "cloud" waiting room. During this time, 15 dermatologists volunteered their time to view a total 90 virtual photo consults sent by 90 patients from Arkansas. Patient satisfaction and self-monitoring data was measured by a 5 point likert scale survey and questionnaire.

The images were of sufficient quality that viewing dermatologists were able to give helpful feedback regarding probable diagnosis and next steps regarding care in 87.7% of cases. Early data showed patients to be satisfied to very satisfied with the teledermatology platform and the care they received from their consulting dermatologist.

## UA Poster #1

### *Understanding the Role of Telemedicine User Capabilities in Shaping Telemedicine Evaluations and Diagnostic Outcomes*



Christina Serrano, Ph.D.

The study focuses on telemedicine user capabilities and their role vis-à-vis telemedicine technology capabilities in shaping diagnostic outcomes. We theorize the user capabilities of presentation (information giving) and elicitation (information seeking) and their impact on performing evaluation and diagnostic tasks via telemedicine.

We employed multiple methods (qualitative field study and a controlled lab experiment) to develop and test our research model within the context of real-time telemedicine consultations. Specifically, we grounded the development of the research model by interviewing 42 telemedicine users in the United States. To test the research model, we conducted a controlled lab experiment with 93 nursing students who performed a telemedicine assessment of a patient (confederate).

Convergent findings across the studies suggest that both user capabilities and technology capabilities are important facilitators of telemedicine diagnostic outcomes and that these capabilities interact in a compensatory manner. Findings from the lab experiment suggest that telemedicine decision outcomes can be superior in audio-only conditions as compared to video-and-audio conditions, particularly when the telemedicine users are highly skilled in communication and problem solving tasks.

When telemedicine users are highly skilled in information seeking and information giving tasks, they are able to compensate for limitations in telemedicine technology and achieve quality decision outcomes.

## Poster #8

### *Utilization of Telemedicine to Improve Rates of Home Dialysis*



Dumitru Rotaru, MD, Ashutosh Shukla, MD, and Andrea Easom, BA, MNSc

Home dialysis (HOD) is underutilized in the management of End Stage Renal Disease (ESRD). Nephrologists seek to improve its rates with a target of around 30-40% of the prevalent End Stage Renal Disease population.

Telemedicine advancements have enabled a team of multidisciplinary professionals to deliver patient education to more patients over a wider geographical area in a cost effective manner through real-time interactive video technologies. Based on early data and available published literature, we hypothesize that telemedicine is an effective tool to increase the choice of HOD for renal replacement therapy (RRT) in patients with stage 4-5 CKD patients.

This study will randomize 184 stage 4-5 Chronic Kidney Disease (CKD) patients being seen in Arkansas using a permuted-block randomization design with random allocation for 6 centers and a block size of 4. Participants randomized to the education group will participate in 3 interactive education sessions at their local AR Dept. of Health (ADH) center. Education will be presented by UAMS Nephrology educators with an additional 92 participants enrolled from the Nephrology clinic to serve as a benchmark.

Our study assesses the viability of telemedicine in improving patient awareness, care and choice of HOD modalities. It will provide insight into issues involved in setup of such project and the nature/degree of resources needed. Results will provide the primary data regarding impact of tele-CPE on patients' Quality of Life (QoL), outcomes of CKD, CV events, hospitalization and mortality and allow further exploration in our next phase of large-scale studies. If proven efficacious, our goal would be to replicate and test a similar approach within other UAMS telemedicine network sites, which includes community hospitals, approaching the VA, which has mandated the higher use of HOD and invited proposals to establish measures to improve it.

## Poster #9

### *Reducing CHF Readmissions Using Telehealth*



Donna J. Ussery, RN and Amy L. Hester, PhD(c), BSN, RN, BC

Since 2004, UAMS ANGELS has been coupling a robust statewide telemedicine infrastructure with a 24/7 call center staffed with high risk obstetrical registered nurses to provide guidance to rural, high-risk pregnant women seeking answers to questions, pregnancy advice, and triage.

In January 2013, ANGELS partnered with the UAMS Medical Center Congestive Heart Failure (CHF) Bundled Payment Committee to start incorporating the CHF patient population into the patients they served. The Committee was charged with reducing 30 day all cause readmissions in this population starting in July 2012 when the Arkansas Bundled Payment Initiative officially began. At the time, the 30 all cause day readmission rate was 24.99% compared to a national benchmark of 23.99%. Efforts of the interdisciplinary Committee resulted in reducing the all cause 30 day readmission rates to 18.69% (20/107) during the February / March/ April 2013 timeframe compared to a national benchmark of 19.56%.

In May 2013, the ANGELS call center began contacting CHF patients the day after their discharge and providing telephone triage using a CHF triage algorithm. During this time, ANGELS followed up with 80 post discharge phone calls, 11 triage calls and 1 informational call to 80/86 patients discharged with CHF from the May/June/July timeframe. No patients who were triaged were readmitted. After 3 months, the 30 day all cause readmission rates was 12.79% (11/86), compared to a national benchmark which remained steady at 19.17%.

The cost of a CHF admission to UAMS from July 2012 to July 2013 averaged \$12,000. Had our rates of 30 day all cause readmissions remained the same for the May/ June/ July timeframe, we would have readmitted 16 patients. Instead, we readmitted 11 patients - a 31% decline representing a savings of \$60,000 to the organization which would not have been reimbursed under the Arkansas Bundled Payment Initiative.

## Poster #12

### *HIV Health Education, Assessment, and Research in Telehealth (HEART): Improving Access for Rural Patients with HIV*



Sarah Rhoads Kinder, PhD, DNP, APN, Jon Allen, PA,  
Amy Moses, M.S.Ed., Keith Freeman, M.Ed.,  
and Adam Cherepski, M.Ed..

The AIDS Telehealth Training Center, entitled HIV HEART (HIV Health Education, Assessment, and Research in Telehealth) aims to provide collegial support for rural providers who have limited experience with HIV/AIDS rural patients by using interactive video technologies, online interactive streaming sessions, and online interactive enduring materials, while also providing people living with HIV/AIDS the opportunity to receive co-management of their condition through real-time, live video “virtual clinic” consultations from HIV/ AIDS specialists at UAMS and their rural provider. HIV HEART also aims to improve access to HIV/AIDS evidence-based, culturally appropriate continuing education to rural providers in the Mississippi Delta Region. In just one year, the HIV specialists have co-managed 27 patients with HIV who would have otherwise had to travel to the academic health science center and forgo care in their area. In addition, the interactive video education to providers has facilitated evidence-based education to 142 health care providers in this region. The new learning management system was launched July 1, 2013 and houses interactive modules to enhance learning for these providers. With an enhanced focus on pregnant women with HIV and neonates who are exposed to HIV in utero, HIV HEART aims to reduce rates of vertical transmission of HIV in Mississippi Delta Region.

Poster #11

*Emergency Stroke Care – Utilization of a State-wide*



Machael Manley, and Nicholas Bianchi, MD

An overview of the development of a state-wide tele-stroke program consisting of 2 Hubs and 31 spoke sites is presented. The Center for Distance Health at the UAMS is one of the nation's leading tele-health programs and provides direct oversight of AR SAVES (Stroke Assistance through Virtual Emergency Support). This state-wide tele-stroke program is funded by the Arkansas Department of Human Services Medical Division averaging over six million annually. This contract for services allows for the training, education, implementation, evaluation, equipment and maintenance of a successful tele-stroke program. This partnership allows for a non-competitive program that serves all Arkansans through a regionalized distribution of tele-care.

In an effort to increase access to stroke care in rural emergency departments, telemedicine allows for real-time consults by board certified vascular neurologists 24/7 in the treatment of an acute ischemic stroke. With the increased number of tele-stroke sites throughout the state, transport times have been reduced dramatically for a large percentage of Arkansans. Prior to AR SAVES less than 30% of the population was within 60 minute transport to an acute stroke treatment capable hospital. As of March 2011, 90% of the population was within 60 minute transport to an acute stroke treatment capable hospital (with or without telemedicine).

Poster #10

*Impact of Web-Camera Viewing of Neonates on Parent Stress, Anxiety, and Bonding*



Sarah Rhoads Kinder, PhD, DNP, APN, and A. L. Green, PhD, RN

Parents who have neonates in the neonatal intensive care unit may face weeks or months of separation from their neonate. Web-camera technology is being used to lessen the separation. Parents can view their neonate at any time on any computer. Little is known about the effect of web-camera viewing of a hospitalized neonate on parental stress, anxiety and bonding or about parental use of web-cameras. This concurrent nested mixed methods study examined the use and impact of web-camera viewing.

220 parents (119 mothers, 101 fathers) used the web-camera system since Sept. 1, 2010. Mothers and fathers means were similar in the number of log-ons (95 vs. 95.6 times) and the maximum time viewed (92 vs. 84 minutes).

Even though there was not a statistically significant difference in the stress, anxiety and bonding scores over time, it is important to note that this was a pilot study and with high attrition over the course of the study. Parents expressed considerable stress over how the baby looked and behaved. This portion of the scale asked questions like, how stressful is it "to see tubes and equipment on or near my baby," "when my baby looked sad," or "when my baby looked uncomfortable."

This finding goes along with the qualitative data that suggested that parents felt helpless when their neonate was crying or was in an uncomfortable position. One unexpected finding emerged from the overall usage statistics of the web-cameras. Mothers and fathers use the camera system equally and there were no statistically significant differences in the number of log-ons to the web-camera, number of minutes viewed, or maximum number of minutes viewed in one session. It has been well documented in the literature that fathers visit the NICU less than mothers to see their neonate. Web-camera viewing of the neonate could potentially be a way to enhance paternal involvement in the NICU.