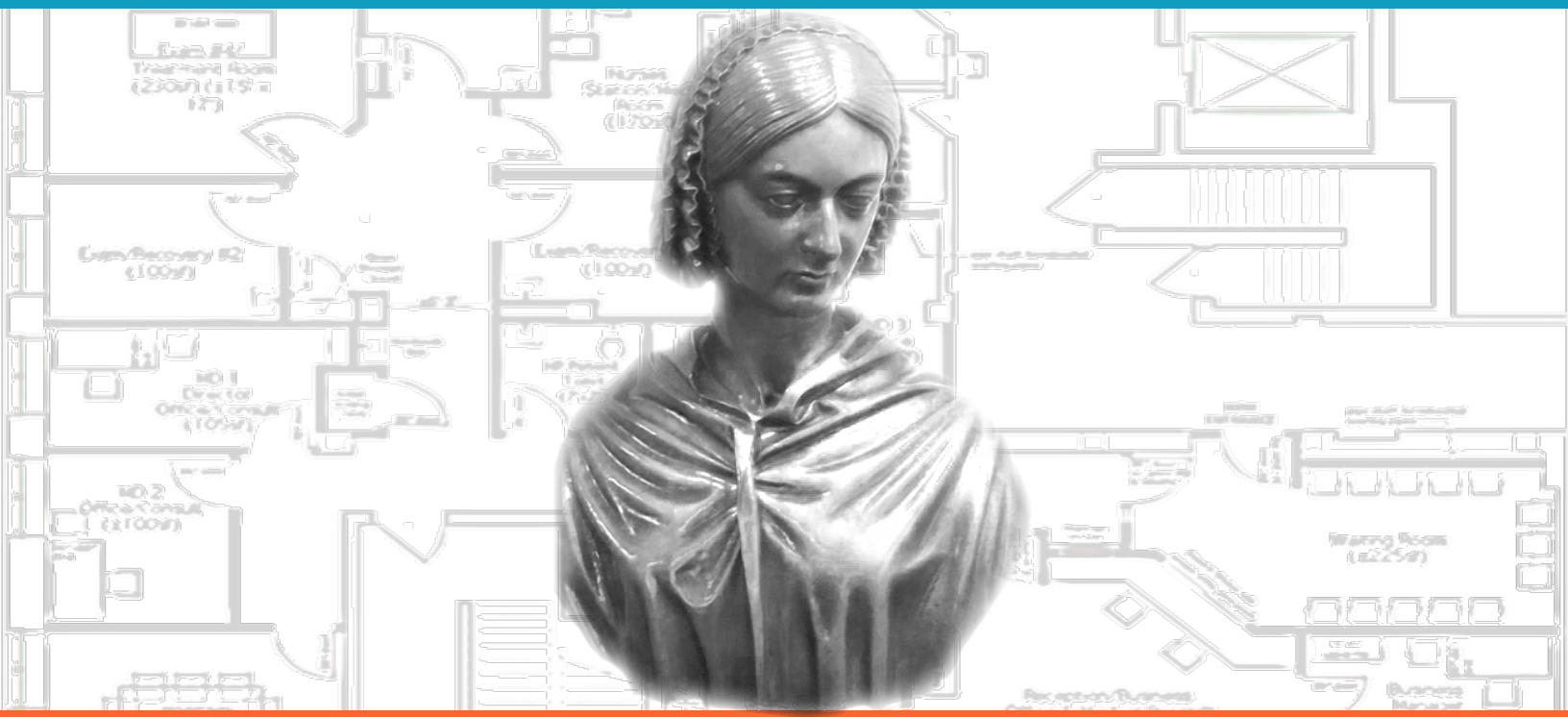

2021 Virtual International Nursing Conference for Excellence in Healthcare Design: Local to Global Research, Design and Solutions

Summer 2021

Presented by the Clemson University School of Nursing, the Clemson University Academy of Nursing for Excellence in Design, and in joint providership with Upstate AHEC (Area Healthcare Education Center)

CLEMSON UNIVERSITY
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EXCELLENCE IN DESIGN

School of
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Upstate AHEC
Excellence In Health Care Through Education

Table of Contents

Share your conference experience, #NHDC2021. Be sure to tag the Clemson University School of Nursing on Facebook or LinkedIn, @Clemson_Nurse on Twitter and @clemson_nursing on Instagram.

Conference Mission

The mission of the conference is to:

- Disseminate new knowledge obtained through research related to the effect of healthcare design on patient (family), provider and organizational outcomes
- Identify best practices for nurse leadership in healthcare design and opportunities for nurse, patient/family input into safety improvements in healthcare design,
- Stimulate innovation in healthcare design and encourage interprofessional collaboration and engagement, and
- Foster an inclusive platform for specialty design settings (global health, military health, integrative health, etc.) that expands and supports the role of nurse leaders in the design of specific specialty practices

Front cover artwork
Floor plan design: Mark Sullivan, AIA, NCARB ©2009, Provided by Susan O'Hara.
Florence Nightingale photo provided by Kathleen Valentine.

From the Director

Dear Participant,

Welcome to the Clemson University International Nursing Conference for Excellence in Healthcare Design: Local to Global Research, and Solutions.

At Clemson University, we deliver state-of-the-art education to aspiring nurses and create a world-class interdisciplinary community of scholars, who contribute to knowledge generation and engage in leadership, research, practice, and service to optimize health and quality of life for people locally, nationally, and globally.

The phenomena of the environment is of central interest to the discipline of nursing, guiding activities for research, education and practice. It includes both characteristics external to us, such as a setting or place, as well as a person's internal environment, such as genetics and immune functioning. This conference will explore both the internal and external dimensions of the phenomena of environment and how it affects health and well-being.

We are confident that you'll enjoy this conference and be inspired by the outstanding presentations and speakers.

Sincerely,

Kathleen L. Valentine

Kathleen Valentine, *Ph.D., MS, RN*
Chief Academic Nursing Officer,
Director, School of Nursing
Clemson University

From the Conference Chairs

Dear Participants,

Welcome to the International Nursing Conference for Excellence in Healthcare Design: Local to Global Research, Design and Solutions. We are excited that you are a part of this innovative virtual conference. This is a dream we have envisioned for years, and with the formation of the Clemson University Academy for Excellence in Healthcare Design in 2017, we took those first steps in creating this conference.

Nurses have a place at the design table and should be included when designing a health care facility, an outpatient unit or a community based program. As nurses ourselves, we have worked to help bridge this gap to guide and encourage more nurses to become involved with the design process from concept to post occupancy whether inpatient, outpatient, or in the community setting. This year's theme: Local to Global Research, Design and Solutions, reinforces the nurse's roles in healthcare design, and aims to leave the participants inspired by the innovative research in the field of healthcare design and the importance of interdisciplinary teams. Our goal is to improve the quality and safety of care for our patients, families and caregivers. The research-based approach to this conference gives all stakeholders an opportunity to learn from our colleagues and inform our future work together, bridging the gap between academia and practice.

This summer, leaders in nursing and healthcare design will call on us to learn about research, design and innovative solutions to healthcare design from a local to a global scale.

We are grateful to Dr. Kathleen Valentine, Director of the School of Nursing for her leadership and the Academy founding members for their support. We are also very appreciative of the support and collaboration of the School of Architecture. We are also so thankful for our sponsors: Clemson University School of Nursing, IFMA, McMorrow Reports, NIHD, Atreo, Ecore, SSR, Humana and RLF. You have believed in our mission and we want to acknowledge your support.

As we reflect on all of the activities that go into attending a conference– submitting abstracts, arranging schedules, and pre-recording your presentations– we want to thank each of you for choosing to be a part of the scholarly dialogue of nursing in healthcare design. We believe that we are breaking new ground here and offer you all the chance to be part of this movement.

Sincerely,
Susan and Debbie

Susan O'Hara, P*h.D., MPH, RN, EDAC, FNIHD,* Assistant Professor Clemson School of Nursing and School of Architecture; Chair, Nursing Conference for Excellence in Healthcare Design
Debbie Gregory, *DNP, RN,* Senior Clinical Consultant, SSR; Co-Chair, Nursing Conference for Excellence in Healthcare Design

Planning Committee

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Conference Schedule

The virtual conference platform will open July 12 and participants will have from then until the conference closes on September 14, to view the pre-recorded sessions and earn professional development hours.

July 12, 2021	Virtual Conference Opens
	Live Session: 9:45 a.m. - 10 a.m. EST – Opening address and introductions by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director 10 a.m. - 11:30 a.m. EST– **Tim Porter-O'Grady**, *DM, EdD, ScD(h), APRN, FAAN, FACCWS*, Senior Partner, Tim Porter-O'Grady Associates, Inc. - ***A Glimpse Over the Horizon: Fresh Insights on Post-Digital Healthcare*** 11:30 a.m. - 11:45 a.m. EST – Break 11:45 a.m. - 12:15 p.m. EST – Q&A
July 13, 2021	***Live Session:*** 9:45 a.m. - 10 a.m. EST – Welcome and introductions by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director and sponsor message from IFMA 10 a.m. - 11:30 a.m. EST – Live lecture with **David Allison**, *FAIA, FACHA, NCARB*, Director of Graduate Studies in Architecture + Health, Clemson University - ***Health Care at the Intersection of Architecture and Nursing*** 11:30 a.m. - 11:45 a.m. EST – Break 11:45 a.m. - 12:15 p.m. EST – Q&A

July 14, 2021	***Live Session:*** 9:45 a.m. - 10 a.m. EST – Welcome and introductions by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director and sponsor message from The McMorrow Reports 10 a.m. - 11:30 a.m. EST– Live lecture with **John Maher**, Senior Associate, MASS Design Group, and **John Shakpeh**, Nursing Services Director, Redemption Hospital in Monrovia, Liberia - ***Design That Heals*** 11:30 a.m. - 11:45 a.m. EST – Break 11:45 a.m. - 12:15 p.m. EST – Q&A
July 15, 2021	***Live Session:*** 9:45 a.m. - 10 a.m. EST – Welcome and introductions by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director and sponsor message from The McMorrow Reports 10 a.m. - 11:30 a.m. EST – Live lecture and panel with Artificial Intelligence panel led by **Nathan McNeese**, *Ph.D.*, Director of the Team Research Analytics in Computational Environments (TRACE) Research Group, Clemson University - **AI, Nursing, Health and Design** 11:30 a.m. - 11:45 a.m. EST – Break 11:45 a.m. - 12:15 p.m. EST – Q&A
	12:45 pm. - 1 p.m. EST – Opening address and introductions by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director, and sponsor message from ECORE 1 p.m. - 2:30 p.m. EST – Live panel - ***Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*** 2:30 p.m. - 2:45 p.m. EST – Break 2:45 p.m. - 3:15 p.m. EST – Q&A
September 13, 2021	***Live Session:*** 9:45 a.m. - 10 a.m. EST – Opening address and introductions by by Kathleen Valentine, *Ph.D.*, Clemson University Chief Academic Nursing Officer and School of Nursing Director, and sponsor message from Atreo 10 a.m. - 11:30 a.m. EST – Live ***State of the Science*** Panel 11:30 a.m. - 11:45 a.m. EST – Break 11:45 a.m. - 12:15 p.m. EST – Q&A
	Live Session: 1 - 2 p.m. EST – Q&A with conference presenters

Keynote speakers

David Allison, *FAIA, FACHA, NCARB*

David Allison is an Alumni Distinguished Professor and Director of Graduate Studies in Architecture + Health. His teaching, research and scholarship involve the study of relationships between health, healthcare and the built environment. He is a founding member and Fellow of the American College of Healthcare Architects [ACHA], serves on its Board of Regents and received its Lifetime Achievement Award in 2019. He was selected in 2007 as one of "Twenty Making a Difference" by Healthcare Design Magazine and identified again in 2009, 2010 and 2012 as "one of the most influential people in healthcare design." Design Intelligence Magazine named him one of the nation's 30 Most Admired Design Educators in 2013-14 and again in 2019. He was also recognized as the Center for Health Design 2019 Changemaker.

Tim Porter-O'Grady, *DM, EdD, ScD(h), APRN, FAAN, FACCWS*

Tim Porter-O'Grady has been involved in health care for 48 years and has held roles from staff nurse to senior executive in a variety of health care settings. Tim is currently senior partner of an international healthcare consulting firm in Atlanta specializing in health futures, organizational innovation, conflict and change, as well as complex health service delivery models. He is noted for his work on professional governance models, clinical leadership, conflict, innovation, complex systems, and health futures. As Professor of Practice and leadership scholar at Arizona State University, College of Nursing and Health Innovation, he co-lead the implementation of the new Masters, Ph.D. and DNP tracks in Health Innovation. He was also Clinical Professor and Leadership Scholar at the Ohio State University College of Nursing in the DNP program and is currently a member of the Dean's Advisory Board and a clinical professor at Emory University, School Nursing, Atlanta, Georgia. Porter-O'Grady holds graduate degrees in clinical leadership, 2 earned doctorates; one in learning behavior and a second in organizational and systems leadership. In addition, he received a Doctor of Science degree, honoris causa, from the Medical University of Ohio. He is multi-board certified as a nurse executive; and advanced practitioner (APRN-CNS) in gerontology, and as a board certified wound specialist. Porter-O'Grady is also certified by the Georgia Supreme Court's Office of Dispute Resolution as a registered mediator and arbitrator. He is a Fellow in the American Academy of Nursing and is a clinical Fellow in the American College of Clinical Wound Specialists. He practices in the Mercy Care Street Medicine Program in Atlanta.

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Mission Statement

IFMA's Health Care Council is a specialized networking group within the association for professionals who manage health care facilities. Recognizing the critical role of FM in enabling health care operations, our mission is to effectively address the challenges of managing medical centers, hospitals, clinics, palliative care and related sites to enhance quality of caregiving.

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- **Topical Webinars**
- **White Papers to help deepen members knowledge of issues they face**

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Keynote speakers

John Maher

John Maher joined MASS in early 2014 and spent two and a half years working in MASS' Kigali office, and is now based in Chicago. John has led design teams on two hospital projects currently under construction in Rwanda, Munini and Nyarugenge District Hospitals, and most recently New Redemption Hospital in Caldwell, Liberia. Maher has managed and led design teams and consultants through complex projects in healthcare, education and community development across Africa, South Asia, and North America. He is a visiting professor at Washington University in St. Louis teaching design studios centered around community health in North St. Louis with a focus on community engagement. Prior to joining MASS, Maher was awarded two Public Service Center Fellowships from MIT for water, sanitation, and hygiene projects in Tamale, Ghana. Maher received his Master of Architecture from Massachusetts Institute of Technology and his Bachelor of Arts in Architecture from Washington University in St. Louis.

Nathan McNeese, *Ph.D.*

Nathan J. McNeese is an Assistant Professor and Director of the Team Research Analytics in Computational Environments (TRACE) Research Group within the division of Human-Centered Computing in the School of Computing at Clemson University. His research interests focus on human-centered artificial intelligence (AI) and human-AI teaming. He currently serves on multiple international and societal program and technical committees, in addition to multiple editorial boards. He is a member of the National Academies of Science Panel on Human Factors Science, and previous member of the Army Research Lab HERD Technical Advisory Board. His research has received multiple best paper awards/nominations and has been published in peer-reviewed venues over 65 times. In addition, he has acquired over $8M in research funding from agencies such as NSF, ONR, AFOSR, and AHRQ.

John Shakpeh

John Kuoh Shakpeh is the Nursing & Midwifery Services Director at Redemption Hospital in Monrovia, Liberia. Previously he served as Nursing Administrator, and in his role managed nurses at the Seventh Day Adventist Cooper Hospital from 1992 – 1996. He served as operating theater supervisor from 2002 to 2006; Assistant Nursing Director from 2006 to 2015; and Nursing and Midwifery Director for the Redemption Hospital. John worked with UNOPS to design the Integrated Severe Infection Treatment Unit at Redemption Hospital following the Ebola outbreak and also worked with MASS Design to design the new Redemption hospital. John qualified as a professional Nurse from the Tubman National Institute of Medical Arts 1984; and obtained Diploma in nurse anesthesia from the University of Nigeria Teaching Hospital in Enugu and a Bachelor of Science in Nursing from Mother Patern College of Health science 2012.

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Our team has spent 30+ years working closely with facility managers, architects, interior designers, engineers, building management professionals and real estate experts helping them with the challenges of maintaining workplaces, optimizing productivity, connectivity, investment strategy, and design for the future of the built environment. Our experienced journalists cover the most relevant news, conferences, product showcases, research and innovations impacting the built industry.

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June 16: Securing Healthcare Facilities Webinar

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June 10, 2021

Panelists

Artificial Intelligence (AI), Health and Design Panel

Suzan Ahmad, *Ph.D., MSN, RN*

Suzan Ahmad is nurse, health informatics expert, and nurse leader for the last 30 years serving as an Assistant Professor at Rutgers University. During her informatics career, she managed many successful Electronic Medical Records (EMR) implementations around the world in operational and greenfield sites, especially in the Persian Gulf region and USA. Dr. Ahmad's scholarship work focused on implementing Clinical Information system parts such as CDS and alerts in electronic health records and subsequent training post implementation. Also, studying the usability of utilizing Artificial Intelligence in various aspects in nursing practice and administration.

Jim Peraino, *RA, EDAC*

Jim Peraino is co-founder and CTO of Spatio Metrics. As a licensed architect and software developer, Jim believes that making it easier to generate, access, and act upon data during the design process will lead to more impactful buildings. Prior to co-founding Spatio Metrics, Jim worked at MASS Design Group, and his projects have included hospitals, workplaces, and residential buildings across the world. He holds a Master of Architecture from Harvard GSD and a MS in Computer Science from MIT, where his research focused on leveraging machine learning and data visualization to understand relationships between architecture and health outcomes.

Maxim Topaz, *Ph.D., RN, MA*

Maxim Topaz is the Elizabeth Standish Gill Associate Professor of Nursing at the Columbia University School of Nursing. He is also affiliated with Columbia University Data Science Institute and the Center for Home Care Policy & Research at the Visiting Nurse Service of New York. His research focusses on artificial intelligence and he finds innovative ways to use the most recent technological breakthroughs, like text or data mining, to improve human health. Dr. Topaz's research moto is "Data for good". Dr. Topaz is one of the pioneers in applying natural language processing on data generated by nurses. His current work focusses on developing electronic tools to solutions to support clinical decision making and improve patient outcomes. Dr. Topaz research portfolio includes more than 8 million dollars and he published more than 90 articles in some of the leading scientific journals.

Panelists

Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design Panel

Lisa Newman, *RN, MSN*

Lisa Newman is the Nurse Manager of the MultiSpecialty Procedure Unit & Endoscopy Department at Oregon Health & Science University (OHSU) in Portland, Oregon. She holds a BSN from Pacific Lutheran University and a MSN from Western Governor's University. Newman is a member of Sigma Theta Tau, the nurse honor society, the Society of Gastroenterology Nursing, and Nursing Institute for Healthcare Design. She has made a high level commitment to her nursing profession and is passionate about healthcare facility design, particularly ensuring the patient is the focus of all design and workflow elements. Newman has taken the clinical lead in 3 endoscopy unit remodels and 2 Cath Lab remodels at OHSU and has participated in Integrated Design Events. She is a design thinker who believes in using Lean Methodology and a "Yes Culture" to improve patient outcomes and experience. She has spent 19 years of creative problems solving at OHSU and has a reputation of being a leader who is willing to think outside the box and exceed expected results.

Amanda LeMatty

Amanda LeMatty is a recent Clemson University graduate from Summerville, South Carolina. She holds a B.S. in Bioengineering and a minor in Nonprofit Leadership. During her time at Clemson, she participated in a low-resource medical device design creative inquiry where she worked with collaborators in Tanzania to solve global health challenges, and this group is where she began her work with COVID-19 solutions in partnership with Prisma Health clinicians. Following graduation, LeMatty plans to pursue her Ph.D. in Biomedical Engineering at the University of Utah in their bioInnovate program. She plans on maintaining a global health focus as she completes her Ph.D. program.

Panelists

Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design Panel

Robert Falconer

Robert Falconer is a recent graduate of Clemson University where he studied Bioengineering with a concentration in Biomaterials. During his time at Clemson, he enjoyed participating in research focused on global health initiatives and low resource design. He is now preparing to begin a Ph.D. program at the University of Utah in Biomedical Engineering.

Molly Scanlon, *Ph.D., FAIA, FACHA*

Molly M. Scanlon is an Environmental Health Scientist, as well as a licensed and certified Healthcare Architect working with Phigenics, as the Director of Standards, Compliance and Research. Dr. Scanlon's work and research involves impacts to human health from construction activities associated with the growth and spread of waterborne pathogens in building water systems. She recently served as Chair of the American Institute of Architects (AIA) COVID-19 Task Force for Alternative Care Sites during the COVID-19 pandemic and Public Health Advisor for AIA Reopening America Charrettes. Dr. Scanlon also contributed as an author and content developer for the Center for Disease Control and Prevention's (CDC)'s Prevent LD (Legionnaires' Disease) Online Training Program through her work at the University of Arizona Mel and Enid Zuckerman College of Public Health. Dr. Scanlon's undergraduate and master's degrees in architecture are from Clemson University.

Douglas Grove, *AIA*

Doug Grove has over 30 years of healthcare planning experience with 15 years dedicated to Lean process improvement in healthcare design and operations. A versatile healthcare architect, Grove provides medical planning, process improvement, workshop leadership and transition planning for healthcare organizations pursuing integrated and exceptional care. As a Certified Lean Leader trained by Virginia Mason Medical Center in Seattle and Shingijutsu Global in Japan, Grove co-developed a Lean design methodology that includes Production Preparation Process (3 P) tools and Integrated Project Delivery (IPD) principles. This design methodology is a key component of the NBBJ Process Design practice.

Panelists

State of the Science Panel

Erin Clark, *RN, MS, EDAC*

Erin Clark is a Registered Nurse, Clinical Operations Specialist and Transition Planner with over 15 years of healthcare experience. As a Transition Planner, Clark has worked with over 30 hospitals and healthcare facilities as they transitioned and activated new hospitals and healthcare facilities. Using this experience, she founded ClarkRN and has developed a strategic approach to ensuring efficient clinical operations when planning new healthcare environments. Her role as the clinical specialist ranges from programming, design, technology planning, interdisciplinary and specialty-specific operations planning, transition planning, activation and post activation analysis. Working with a wide range of healthcare institutions across the US, Clark has a unique perspective, set of tools, and lessons learned to bring to the front end of planning and design as organizations create innovative care delivery solutions in a competitive healthcare market.

Brenda McDermott, *MSN, EDAC*

Brenda McDermott serves as the Clinical Lead for the Defense Health Agency [DHA] Facilities Division. McDermott is responsible for developing and sustaining the DoD space planning criteria, space templates and the Space and Equipment Planning System (SEPS), and Appendix A Behavioral Health Design, of the UFC 4-510-01. McDermott represents DHA as a member of The Facility Guidelines Institute, Health Guidelines Revision Committee (2015 to present) and is on the Editorial Board of the HERD Journal. Prior to joining DHA in 2013, McDermott held the position of Senior Clinical Planner, at the U.S. Army Health Facilities Planning Agency for 11 years. With experience as a licensed family nurse practitioner, McDermott has provided clinical planning and design input on DoD projects throughout the U.S. and overseas, to include medical centers and hospitals, ambulatory care and surgery centers, behavioral health facilities, National Intrepid Centers of Excellence satellite clinics, dental, and veterinary facilities.

Michelle Trott, *AIA, NCARB, ACHA, Lean Six Sigma Green Belt*

Armed with a passion for healthcare architecture, coupled with a commitment to mentorship and community involvement, Michelle Trott has devoted her career to improving the well-being of the people who occupy the spaces and communities she designs. Throughout her career, Trott has produced consistent and significant contributions to healthcare through her work, and the study and implementation of the best healthcare design practices. Her enthusiasm and passion are evident in every ndeavor she takes on. Trott is a LEAN Six Sigma Green Belt, and serves on numerous boards including RGHA TWIG, and the NYS Regional Code Board. She is an active member of the AIA Rochester Chapter, and was recently selected to serve on the AIA Academy of Architecture for Health Board as a leader in codes.

Panelists

Lori Stanley, *DNP, MSM, R.N., NEA-BC, CENP*

Lori Stanley brings more than 30 years of experience in healthcare and currently serves as the Chief Nursing Officer at Greenville Memorial Medical Center and Vice Chair of Nursing Academics for Prisma Health-Upstate in Greenville, South Carolina. Clinically trained in adult critical care and emergency nursing, she has had the opportunity to hold various nursing leadership roles. Prior to her arrival to Greenville, she served as CNO at IU Health University Hospital in Indianapolis, Indiana. Her experiences primarily have been served in the adult setting with seven years in the stand-alone children's health care arena. She has had the pleasure to serve as the Director of Emergency Services for 5 distinct Emergency Departments in the State of Florida. Originally from Pittsburgh, Penslyvania, Dr. Stanley earned a Bachelor's of Science in Nursing from the University of Pittsburgh, a Masters in Management from Florida Institute of Technology, and a Doctorate in Nursing Practice from Florida State University. Her doctoral work focused on nurse staffing and patient acuity. She has had the pleasure to serve on several AONL committees as both chair and co-chair. She is certified as an Advanced Nurse Executive and Certified as an Executive in Nursing Practice. She has served on the Board of Directors for the American Organization for Nursing Leadership, is a Past President of the Florida Organization of Nurse Executives, past president of the Tampa Bay Organization of Nurse Executives and has served as faculty with various colleges of nursing.

Notes

Notes

My Personalized 2021 Virtual International Nursing Conference for Excellence in Healthcare Design: Local to Global Research, Design, and Solutions

Keynote Sessions

Session	Date Watched	CEU applied for:	#Hours
Tim Porter-O'Grady			
David Allison			
John Maher & John Shakpeh			
Nathan McNeese & AI Panel			

Panels

Session	Date Watched	CEU applied for:	#Hours
Disaster Panel			
State of the Science			

Conference Pre-recorded Presentations

(Alphabetically listed by lead presenter)

Session	Date Watched	CEU applied for:	#Hours
Barbara Anderson, *ZGF Architects* Lisa Newman, *Oregon Health & Science University* Dio Sumagaysay, *Oregon Health & Science University*	Not Your Average Ambulatory Surgery Center: The Magic Behind Our Breakthrough Results **Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*		

Dina Battisto, *Clemson University Architecture + Health* Xiaowei Li, *Clemson University*	Creating Walkable Streetscapes for Urban Healthcare Campuses		
Helen Byce, *LS3P Associates, Ltd.* Lindsey Stang, *LS3P Associates Ltd.* Julie Heckman, *Medical University of South Carolina* Cameron Ebron, *UNC Health*	The Most Important Member of the Design Team is YOU		
Sara Camp, *Belmont University School of Nursing* Martha Buckner, *Belmont University School of Nursing*	Graduate Nursing Students' Perspectives on Participating on a Clinical Design Team		
Lynn D'Esmond *University of Massachusetts*	Distracted Practice and Patient Safety: Development of the Distracted Practice Scale		
Stephanie C. Davis, *Clemson University School of Nursing* Jennifer Rice, *Clemson University School of Nursing* Lena Burgess, *Clemson University School of Nursing* Tracy Fasolino, *Clemson University School of Nursing* Misty Seaborn, *Self Regional Medical Center*	Care Where There are No Walls: Service Learning for Nurse Practitioner Students on a Medical Mission Trip. A Spring Break to Remember!		
Alexis Diamond *Vantage Technology Consulting Group*	Risk vs. Opportunity of Connected Healthcare: The Showdown		
Byron Edwards *Clemson University School of Architecture*	Developing Benchmarking Tools for both Architects and Clinicians		
Elizabeth Elmore *University of Alabama College of Nursing* Casey L. Norris*, Lincoln Memorial University*	Improving Patient Comfort in Primary Care Using Evidence-Based Design in Waiting Areas		
Jennie Evans, *HKS* Debbie Gregory, *SSR* Marjorie Serrano, *HEI*	Transforming Care: A Toolbox for Ideation, Creativity, and Empathy		

Robert Falconer, *Clemson University* Amanda LeMatty, *Clemson University* Noah Ashley, *Clemson University*	Creation and Implementation of the Covering for Operations During Viral Emergency Response (COVER) **Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*		
Debbie Gregory, *SSR, Inc.* Terri Zborowsky, *HGA*	Healthcare Technology Questionnaire Development: Validating an Approach to Data Gathering		
Kirk Hamilton, *Texas A&M University, Center for Health Systems & Design*	Horseshoe, Cockpit, & Dragonfly: Results from a Critical Care Nursing Dissertation		
Faria Islam, *Woolpert*	Evaluating Nurses' Perception of Patient Safety Design Features in ICUs		
Suzanne Kleeman, *University of Connecticut School of Nursing*	Use of an Interprofessional Care Transitions Program to Improve Medication Reconciliation Practice: A Program Evaluation		
Kristina Krail, *Healthcare Consultant + Transition Advisor* Douglas Grove, *NBBJ* Susan Bower, *NBBJ* Cody Aarons, *NBBJ*	Moving the Mission in the Midst of a Pandemic: Two Hospitals' Experience Relocating during COVID **Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*		
Steven Langston, *RLF* Brian White, *RLF*	Utilizing Augmented and Virtual Reality Tools to Optimize the Built Healthcare Environment		
Amanda LeMatty, *Clemson University* Robert Falconer, *Clemson University* Noah Ashley, *Clemson University*	A Low-Cost Droplet Barrier for Emergency Medical Service Transport During COVID-19 Pandemic **Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*		
Tina McCormick, *Inspira* Linda Sadler, *SSR* Fernanda Pires, *Ballinger*	Working Smarter Not Harder: The impact of Technology Optimization on Improving Clinical Workflow and Transformation		

Anthony Mistretta, *Perkins&Will* Christopher Koss, *Perkins&Will*	Reducing Waste and Optimizing Supply Expenditures in the Operating Room		
Kimberly Montague, *HKS, Inc.* Camilla Moretti, *HKS, Inc.* Linda Sadler, *SSR Inc.*	The Story of the Denture Cup: Starting a Conversation Around Point of Care Supplies and Aligning Supply Chain Goals with Clinical Outcomes		
Jeff Monzu, *Leo A Daly* Michael Harvey, *Syracuse Area Health*	Not Just a Hospital: Healthcare Design in Rural Communities		
Jan Neugebauer, *University of South Bohemia* Valérie Tóthová, *University of South Bohemia*	ICU and Rehab ward – compare of providing care		
Susan O'Hara, *Clemson University School of Nursing* Kathleen Valentine, *Clemson University School of Nursing* Steve Langston, *rlf* Veronica Parker, *Clemson University School of Nursing*	A Study of Multiple ICUs and Caring Behavior: Does Layout or Unit Size Matter?		
Emily S. Patterson, *The Ohio State University* Joseph Gerard, *The Ohio State University*	Recommendations for Lighting Design for Post-natal Patients, Companions and Infants for Hospital and Home Settings: Tailoring Guidelines for Me		
Tonya Pedersen, *UVA Health*	Safe Medication Preparation: Making More out of Little Space		
Troy Savage, *Mazzetti* Jeff Hunter, *Catalysis* Walt Vernon, *Mazzetti* Robert D. White, *Regional Newborn Program, Beacon Children's Hospital* Judy Smith, *Smith Hager Bajo, Inc*. Mindy Goodroe, *HKS* Annette Roehl, *Swedish Medical Center* Mardelle McCuskey Shepley, *Cornell Institute for Healthy Futures, Cornell University*	Reimagining the Neonatal Intensive Care Unit, an experiential approach to advance healthcare environments through the lenses of empathy and experience		

Molly M. Scanlon, *Phigenics, LLC*	Advancing Emergency Management: Integrating the Built Environment into Public Health Pandemic Response **Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design*		
Kaycee Shiskowsky, *UCHealth* Nicole Brown, *UCHealth*	From Programming to Post-Occupancy: Clinical Leadership in Healthcare Design and Activation.		
Susanne Siepl-Coates, *Kansas State University* Micaela Lindemann, *Kansas State University* Anne Criddle, *Kansas State University* Lauren Uhls, *Kansas State University*	Examination of the designs of various Maggie's Centers in terms of their 'healing' potential.		
Susanne Siepl-Coates, *Kansas State University*	Life Worth Living: User Perceptions at the Palliative Care Center in Göttingen, Germany		
Merlijn Smits, *Radboud University Medical Center*	How Continuous Monitoring Changes Our Daily Work		
Merlijn Smits, *Radboud University Medical Center*	Integrated Patient Room 'Healing' Technology Design – A Stepwise Approach		
Jaynelle F. Stichler, *Sharp HealthCare*	Knowledge Synthesis as Mixed Methods Research		
Jaynelle F. Stichler, *Sharp HealthCare*	Measuring Outcomes in Healthcare Design Projects		
Marvina Williams, *Perkins&Will* Brian Sykes, *Perkins&Will*	The Impact of Virtual Reality (VR) as an Innovative Tool in Lean Operational Planning, Design, and Patient Experience at a Major Academic Medical Center		
Janice E. Wilson, *Lehigh Valley Health Network*	The Impact of Nurse Documentation Location on Charting Time		
Adam Yeeles, *HDR* Madeline Didier, *HDR* Francesqca Jimenez, *HDR* Jeri Brittin, *HDR*	Hospital Acoustics: Understanding the Problems and Finding Solutions		
Scott Zeller, *Vituity* Frank Pitts, *architecture +* Virginia Pankey, *HOK*	Psychiatric Crisis Centers and ED's: Trends and Case studies		

Not Your Average Ambulatory Surgery Center: The Magic Behind Our Breakthrough Results

Barbara Anderson, *MSN, RN*, Principal/Medical Planner, ZGF Architects
Lisa Newman, *MSN, RN*, Nurse Manager, Oregon Health & Science University
Dio Sumagaysay, *RN, MS*, Associate Chief Nursing Officer, Multispecialty Procedure Unit and Perioperative Services, Oregon Health &Science University

Purpose
The Oregon Health & Science University's (OHSU) Center for Health & Healing 2 is a 14-story ambulatory tower with an integrated multispecialty procedural and surgical platform. Last year, the project team shared their innovative approach to co-locating disparate procedural services that resulted in improved efficiency and patient experience. Since then, new services have come online and surgery volumes have exceeded expectations. Outpatient procedural and perioperative services are now fully integrated across the three-level unit, comprised of 14 procedural rooms and 10 operating rooms.

Relevance/Significance
One year after opening, OHSU has realized the benefits of integration, innovation, standardization, and collaboration across procedural and perioperative services. The presenters will share specific examples of integration of space, staff, central sterile processing, support services, policy procedure, and more.

Methods/Strategy/Implementation
This presentation is based on a 1-year longitudinal studysupported by continuous data collection through patient experience surveys; procedure reports; financial reports; patient, surgeon, and staff interviews; and direct observation. The presenters will describe how clinical leaders are monitoring outcomes and making continuous improvements, including decisions to build out shelled space to support increasing volumes.

Results/Evaluation/Outcomes
The new model has resulted insurprising findings, including a 20% increase in surgical volumes in the first year and how staff have learned to operate in an integrated way, providing long-term value for the university, staff, and patients they serve.

Conclusions/Implications for Practice
Lessons learned from this case study can benefit other healthcare institutions looking to implement similar models of care to improve efficiency, capacity, safety, collaboration, and the patient experience.

Presentations: International Nursing Conference for Excellence in Healthcare Design, July 2019: "Mission Control: The Heart of an Integrated Procedural Platform at Oregon Health & Science University"

Healthcare Design Conference, November 2019: "Mission Control: The Heart of an Integrated Procedural Platform" at Oregon Health & Science University

Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design

Access the recorded session here.

Creating Walkable Streetscapes for Urban Healthcare Campuses

Dina Battisto, *Ph.D., MArch.*, Associate Professor, Architecture+Health, Clemson University
Xiaowei Li, *MLA*, Doctoral Student, PDBE Ph.D. Program, Clemson University

Purpose
To understand how environmental design factors of streetscapes on urban healthcare campuses influence walkability.

Relevance/Significance
Academic medical centers are incorporating wellness-oriented programs and urban design strategies to encourage health-promoting behaviors like walking. Streetscapes are integrated design and landscape strategies used to increase walkability on campuses offering pedestrians pleasant visual appearances, views to ever-changing street life, and access to therapeutic landscapes. Walkability is a key indicator of vibrant, healthy, and mixed-use public spaces across various developments. However, no studies show how streetscapes contribute to walkability on medical campuses.

Methods/Strategy/Implementation
This explorative case study investigated three urban medical campuses to develop a new Street Design Walkability Framework, comprised of seven street-level dimensions. Each dimension is defined by street design characteristics captured using multiple types of data, including GIS archival data, Google views, and field photos. Thirty streets were studied to develop a new method to assess street design characteristics on walkability.

Results/Evaluation/Outcomes
This presentation will focus on the Street Design Walkability Framework and a new method to assess street design characteristics on walkability. For the next step of this research, the design characteristics of ninety streets will be studied, and walkability indicators collected through a satisfaction survey of pedestrian walking experience and field observations of street use.

Conclusions/Implications for Practice
This study aims to provide an empirical basis for creating pedestrian-friendly streetscapes on healthcare campuses that encourage health-promoting behaviors and offer places for respite for patients, families, and staff. Further, the audience will learn how to create streetscapes that support walkability.

Access the recorded session here.

The Most Important Member of the Design Team is YOU

Helen Byce, *AIA, LEED® AP BD+C, GGP*, Healthcare Architect, LS3P
Lindsey Stang, *AIA, GGP*, Healthcare Architect, LS3P
Julie Heckman, *MSN, RN, NE-BC*, Director of Ambulatory Services for Children's & Women's Services, Medical University of South Carolina
Cameron Ebron, Senior Planning Manager, Real Estate & Development, University of North Carolina Health Care

Purpose
This session will explore two architectural case studies in which energized staff engagement led to a highly successful design process.

Relevance/Significance
Healthcare providers teach patients to advocate for themselves throughout the healing process; we know that this empowerment leads to better outcomes and more effective healing. Architects do well to embrace a similar model, empowering the people who will use their buildings to advocate for their needs.

Methods/Strategy/Implementation
In designing healthcare facilities, architects bring design skills, research, and best practices, but healthcare providers have the expertise, wisdom, and boots-on-the-ground knowledge of what they need to do their jobs effectively. Their input, along with the patients' input, is instrumental to the success of clinical design, leading to spaces that support more effective operations, a work environment with a holistic approach to wellness, and a better patient experience.

Results/Evaluation/Outcomes
Through leadership structure, creative design processes, and collaborative engagement, the MUSC Children's R. Keith Summey Medical Pavilion in North Charleston, South Carolina and UNC Health-Care's Panther Creek Ambulatory Surgical Center and Medical Office Building in Cary, North Caroliona, were designed to respond to the cultural shifts that these organizations desired to create. The vital input from healthcare providers and patients alike led to significant and positive impact on the facilities operations and design.

Conclusions/Implications for Practice
We will demonstrate how architects use their most important tool–listening–to translate research and healthcare design best practices into a facility that is tailored to the needs of both staff and patients.

Presentations: MUSC Children's R. Keith Summey Pavilion was presented in as a case study at the 2019 Healthcare Design Conference under the title of "Changing What's Possible for Pediatric Care"

Access the recorded session here.

Graduate Nursing Students Perspectives on Participating on a Clinical Design Team

Sara Camp, *DNP, RN, CHSE*, Assistant Professor, Belmont University School of Nursing
Martha Buckner, *Ph.D., RN*, Associate Dean of Nursing, Belmont University School of Nursing

Participants
Graduate nursing students from two universities participated in a healthcare design charrette with a team of students from various schools of architecture, engineering and construction management. The objective was collaboration among the disciplines to complete the design challenge over three days following specific instructions.

Purpose
The purpose for this research study is to explore graduate nursing student's perspectives on participating on a clinical design team.

Relevance/Significance
Nurses are a relatively recent addition to the healthcare design team. However, as more nurses are given voice in this process the benefits have become obvious. Since nurses have unique perspective on the impact of clinical design on patient care, more nurses are serving as consultants and assuming leadership roles in project management. The authors are seeking to explore the experiences of nursing students who were unfamiliar with the role of nurses in clinical design and thus provide insight for nurses interested in project design.

Methods/Strategy/Implementation
The research study design will be a mixed methods design. A Qualtrics survey will elicit qualitative and quantitative data via free text questions and Likert scale questions from the graduate nursing students regarding their experience on the design team.

Evaluation/Outcomes
Data from the participants questionnaires will be analyzed for common themes and learning relevant to nurses who are interested in providing consultation for clinical design.

Conclusions/Implications for Practice
Significant findings will be identified and recommendations for future research will be addressed.

Access the recorded session here.

Distracted Practice and Patient Safety: Development of the Distracted Practice Scale

Lynn K. D'Esmond, *Ph.D., RN, CNE*, Assistant Professor, University of Massachusetts, Dartmouth

Participants
349 health professionals in the acute care setting (nurses, physicians, and pharmacists) participated in the study.

Purpose
The purpose of this study was to develop and psychometrically test a scale to measure distracted practice.

Relevance/Significance
Health care continues to become increasingly complex challenging all professionals as they interact with the environment and technology in the performance of their role. This is where distracted practice happens. It is a human experience when an individual shifts from thinking critically into an automatic mode due to limited available cognitive resources. Environmental disruptions are one of four factors that merge resulting in distracted practice. This is where errors happen that can potentially affect patient and staff safety. Despite increased efforts preventable errors reported by hospitals in Massachusetts grew 60% in 2015. The overall goal of this research is to decrease distracted practice which we believe will result in a reduction of preventable errors thereby improving safety.

Methods/Strategy/Implementation
The distracted practice framework was used in this multi-method eight step instrument development study. Face and content validity with experts resulted in 25 scale items. A pilot test was followed by administration of the scale to a developmental sample of healthcare professionals. Data analysis included testing for internal consistency reliability, test re-test reliability, content, criterion-related and construct validity.

Evaluation/Outcomes
Principal component factor analysis with varimax rotation identified a uni-dimensional, 16-item scale that explained 57% of the variance, a Cronbach's alpha .90, test re-test reliability .84 andcontent v alidity .88. Higher distracted practice scores were found in participants with fewer years working in the role and lower mental well-being.

Conclusions/Implications for Practice
The study suggests we have a valid and reliable measure of distracted practice to now use in identifying interventions effective for reduction. Further research is needed for understanding how the environment impacts distracted practice, positively or negatively, and isessential for reducing errors, thereby improving safety for patients and staff.

Presentations: Sigma Theta Tau, Theta Kappa Chapter, Dartmouth Massachusetts, April 2019

Eastern Nursing Research Society, Boston, Massachusetts, March 2020

Access the recorded session here.

Care Where There are No Walls: Service Learning for Nurse Practitioner Students on a Medical Mission Trip. A Spring Break to Remember!

Stephanie C. Davis, *Ph.D.*, *APRN, FNP-BC,* Director of Graduate Programs and Professor, Clemson University School of Nursing
Jennifer Rice, *DNP, APRN, FNP-BC, FNP*, Coordinator & Clinical Assistant Professor, Clemson University School of Nursing
Lena Burgess, *MSN RN, CMSRN, CNE*, Lecturer, Clemson University School of Nursing
Tracy Fasolino, *Ph.D., APRN, FNP-BC, ACHPN*, Associate Professor, Clemson University School of Nursing
Misty Seaborn, *MS, APRN, FNP-BC*, Family Nurse Practitioner, Self Regional Medical Center; Lecturer, Clemson University School of Nursing

Purpose
The purpose of this presentation is to describe a service-learning experience in remote, underserved areas of the Dominican Republic for Nurse Practitioner students.

Relevance/Significance
Watson (2010) stated that nurses serve as an archetype of humancaring in the world. In establishing an international service learning experience faculty are to combine community service with classroom instruction.

Methods/Strategy/Implementation
Nurse Practitioner students have the unique opportunity to attend a medical mission trip to the Dominican Republic. Through this service learning experience, students provide care to patients in the most remote, poor, and underserved areas of the Dominican Republic service both the Dominican and Haitian populations. There exists a huge disparity between the resort side of the island and the Haitian border. Students are given the opportunity to make monitored house calls, allowing assessment of local housing, diets, and daily activities.

Results/Evaluation/Outcomes
Students participate in the service learning experience as part of the clinical experience for their final practicum course. They receive a clinical grade and submit a reflection paper related to the experience comparing the healthcare provided in the Dominican Republic and U.S. standards of care.

Conclusions/Implications for practice
Nurse practitioner students learn to use skills to diagnose/treat patients rather than relying on x-rays, CT scanners, serology, and other modern diagnostic tests. Treatment is often creative due to lack of medical availability and costs in underserved countries.

Presentations: The service learning experience has been presented at the National Organization of Nurse Practitioner Faculties as a method for international clinical experiences. This presentation will be unique.

Access the recorded session here.

Risk vs. Opportunity of Connected Healthcare: The Showdown

Alexis Diamond, *Assoc. AIA, CTS*, Associate Healthcare Technology Specialist, Vantage Technology Consulting Group
Joanna Lyn Grama, *JD, CISSP*, Associate Vice President for Network Security and Strategy, Vantage Technology Consulting Group

Purpose
Connected healthcare technologies, such as smart speakers, in-room cameras, wearable sensors and other devices, polarize opinions between the promise of improved workflow and enhanced safety and patient privacy and liability concerns. This debate-style presentation explores the two sides and identifies the potential compromises between them.

Relevance/Significance
Connected healthcare devices can improve quality of care by facilitating access to information, engaging patients in their care, and decreasing medical errors. Data collection, analysis, storage and retrieval are becoming a major factor in improved patient care, facilitating personalized medicine, integrated research and holistic care models. However, the collection and use of this data creates new risks for patient privacy and exploitation.

Methods/Strategy/Implementation
This point-counterpoint debate between two leading industry practitioners addresses both sides of four different connected healthcare technologies and explores how health-care practices might have to change to take advantage of the opportunities while protecting patient's privacy and safety.

Results/Evaluation/Outcomes
The arguments for and against connected healthcare are strong; this presentation dissects several use cases with a variety of results that demonstrate that an institution must understand the opportunities and liabilities before deploying these devices.

Conclusions/Implications for Practice
Attendees will discover how to approach new technology opportunities and how to review future technology implementations. The discussion will highlight the real-world benefits and actual risks and potential liabilities of connected healthcare devices, giving attendees tools they need to deploy these technologies at their institutions.

Access the recorded session here.

Developing Benchmarking Tools for both Architects and Clinicians

Bryon Edwards, *AIA, ACHA, EDAC, LEED AP*, Professor of Practice, Clemson University School of Architecture

Purpose
To improve the dialogue between Healthcare Architects, Planners and Nurses and to create additional "benchmarking tools" to help "bridge the gap" between Design and Nursing as well as Research and Practice.

Relevance/Significance:
Create a more formal approach to sharing of Design Award Winning Project information bycreating a database for a qualitative and comparative baseline of scalable metrics that in turn will enable best practice benchmarking analyses on past projects which may eventually lead to more rigorous RESEARCH opportunities (such as POEs, etc.).

Methods/Strategy/Implementation
The initial purposes of this Case Study effort was intended to:

- Identify peer-reviewed case studies to share with the Industry
- Use the AIA/AAH Health Care Design Awards program as a source for case studies
- Define a standardized format and encourage firms and their clients to use it
- Create an AIA/AAH Case Study Repository or Library for sharing case studies.
- Consider other peer-reviewed award winning projects (e.g. Critical Care Nursing Design Awards)

Results/Evaluation/Outcomes
Case Study Benchmarking Tools

Conclusions/Implications for Practice
Improved "benchmarking" and "rules of thumb" lessons learned for advancing Quality of Designs.

Presentations: A presentation and Interactive Discussion on the AIA/AAH Case study Library. We hope to include academics, researchers and practitioners in the field of Nursing in the development of our case study library and "benchmarking" effort, so that we might "raise the bar" in the quantity and quality of our case studies and benchmarking utilizing other more clinical perspectives as well as by introducing Post Occupancy Evaluations to the Library over time.

Access the recorded session here.

Improving Patient Comfort in Primary Care Using Evidence-Based Design in Waiting Areas

Elizabeth Elmore, *DNP, CRNP*, Clinical Assistant Professor, University of Alabama College of Nursing

Purpose
The purpose of the quality improvement project was to determine if cost-effective, evidence-based design strategies improve patient comfort within the primary care waiting environment.

Relevance/Significance
Most healthcare visits occur in the primary care setting. A majority of the visit is spent in the patient waiting area. Aesthetics of the office have been found to affect patient satisfaction in their healthcare visit.

Methods/Strategy/Implementation
A two-part Quality Improvement study was conducted where wall color, live plants, and local artwork were used to improve the aesthetics of the waiting area. The initial phase had low participation, therefore a second phase of the project was conducted that included less restrictive inclusion criteria to recruit a larger number of participants. A satisfaction survey with before and after photos of the waiting area was given to determine the effectiveness of the intervention.

Results/Evaluation/Outcomes
There was a statistically significant change in patient comfort and perceived attractiveness of the waiting area in the second phase of the study. Patient comfort showed a mean increase from pre-test ($M=3.0377$, $SD= 0.70608$) to post-test ($M=3.7547$, $SD= 0.47659$), $t= -7.565$, $p<0.0005$ (two-tailed).There was an increase in the mean of patient's perception of attractiveness of the waiting area from pre-test ($M= 2.98$, $SD=0.77187$) to post-test ($M=3.8302$, $SD= 0.42679$), $t= -8.033$, $p < 0.0005$ (two-tailed), indicating an improvement in perception of attractiveness of the waiting area.

Conclusions/Implications for Practice
The use of evidence-based design can create a reduction in the practice gap by improving comfort in healthcare environments which in turn will improve patient participation and health outcomes.

Presentations: This topic has been presented internally within the University of Alabama in Huntsville College of Nursing for purposes of a DNP project presentation.

Access the recorded session here.

Transforming Care: A Toolbox for Ideation, Creativity, and Empathy

Jennie Evans, *RN, MBA, EDAC*, Development Director, Community, HKS
Marjorie Serrano, *APRN, MArch, AIA*, Clinical Consultant, HEI
Debbie Gregory, *RN, DNP*, Senior Clinical Consultant, SSR

Purpose
Forbes magazine and many executive companies are now using techniques that include improvisation, visual skills such as drawing on the right side of the brain and gaming techniquesto improve team work, listening, and creativity in their businesses. Finding new skills and tools for all nurses to become transformative leaders is essential.

Relevance/Significance
Nurses are taught to be good listeners, collaborators and problem solvers. Leadership positions require the same skills, yet the challenges are more complex requiring the management and integration of multi-disciplinary teams and a systems-thinking approach. A new type of leader is emerging, one that can cross into right and left brain thinking and promote innovation to unlock solutions that are non-traditional and include a collective creative team.

Methods/Strategy/Implementation
Advances in neurocognition now provide us with the knowledge of different techniques used to develop and open creative channels in our brains. This interactive session will provide attendees with didactic as well as interactive sessions to create their own toolbox of new leadership skills for transforming care. Creativity tools, improv skills and other right-brain techniques to enhance creativity will be shared and practiced.

Results/Evaluation/Outcomes
Attendees will be able to take these tools into their practice and apply them to their leadership role. Research demonstrates that creativity and improvisation promote active engagement, listening, empathy, and collaboration over competition.

Conclusions/Implications for Practice
Discuss specific implications for practice. Attendees will be able apply the skills they learn and will be encouraged to advance their knowledge and use of these techniques to share with their teams.

Access the recorded session here.

Creation And Implementation of the Covering for Operations During Viral Emergency Response (Cover)

Robert Falconer, B.S. Bioengineering, Clemson University
Amanda LeMatty, B.S. Bioengineering, Clemson University

Purpose
The COVER is a low-cost, portable isolation chamber that fits a patient's torso. It uses directed airflow and filtration to create a barrier between the patient and the clinical environment. Filtration of air leaving the chamber captures airborne COVID-19 particles inside the COVER. This prevents the spread of COVID-19, or any other respiratory illness, in hospital settings.

Background/Significance
Because of material shortages due to the pandemic, hospitals were unable to obtain personal protective equipment like gloves and masks. There was a need for a device to protect clinicians from COVID-positive patients.

Methods/Strategy/Implementation
The COVER was developed using only materials found at an average hardware store such as PVC, clear sheeting, and HEPA filters. It costs less than $250 and is predominantly reusable, with a cost of $15 per use. Eight devices are currently deployed at Prisma Health's Emergency Department.

Results/Evaluation/Outcomes
We have proven the efficacy of the COVER with air flow and particulate testing conducted by collaborators in Clemson University's Construction Science Management Department. These trials determined that our device contained particles more effectively than a standard hospital negative pressure room.

Conclusions/Implications for Practice
The COVER is an effective, low-resource method for clinicians to reduce the spread of COVID, increasing clinical safety. The COVER also has uses besides the COVID-19 pandemic, as it can be used to prevent the spread of any illness that is transmitted through airborne particulate matter.

Presentations: 2020 Biomedical Engineering Society Annual Meeting

2020 Engineering World Health Design Competition

Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design

Access the recorded session here.

Healthcare Technology Questionnaire Development: Validating an Approach to Data Gathering

Debbie Gregory, *DNP, RN*, Senior Clinical Consultant, SSR
Terri Zborowsky, *Ph.D., RN, EDAC, CPXP,* Design Researcher, HGA

Purpose
The goal of this project is to validate a questionnaire that will be used to gather data on the satisfaction of technology in healthcare settings. As an industry we know that technology and technological systems will be at the forefront in all healthcare settings—witness the recent acceleration of 'telemedicine'—but there have been few attempts to research any outcomes on the satisfaction of all technology used within a healthcare setting. This research project is in the questionnaire validation stage before it gets launched into practice and is intended to be a learning opportunity for all.

Participants
Participants of the validation process are experts in this field from a variety of settings. We included both clinical staff, as well as healthcare engineers, planners, and architects.

Relevance/Significance
Many technological adoption theories exist (Lau, 2017) but few address or acknowledge the importance of the systems working as a whole or include design as a variablein a healthcare setting (Diño & Ong, 2017; Huston, 2013; Locsin, 2017; Sandelowski, 1997). The Sociotechnological Framework (Locsin, 2017; Mumford, 2006) has been used to evaluate the safety of HC workplace settings, yet, aspects of the designed environment are not typically included in the discussion. Few authors have studied the relationship between technology and aspect of design (Real,et al, Inpress). So, we are left with the question, "What is the relationship between technology and design in healthcare settings?" In developing the questionnaire, a content analysis was conducted. This presentation will present the findings of that content analysis with the goal of sharing how a content analysis is completed, how it helps with questionnaire development and validation.

Methods/Strategy/Implementation
A questionnaire was developed that drew from a few sources (Diño & Ong, 2017; Huston, 2013; Locsin, 2017; Sandelowski, 1997). Most of the questions were crafted from experience of the authors, both registered nurses, one a technology integration expert, the other a medical planner and design researcher. The questionnaire has been formatted to include the content headings of communication technology, safety technology, technology that supports patient flow and operations, and technology that supports staff flow and operations. It has been sent out to content experts to conduct content analysis, which allows for the researchers to ensure that every item corresponds to a desired measurement and that everything that should be measured is actually measured.

Results/Evaluation/Outcomes
We are waiting on final data analysis. We anticipate reporting on expert analysis validation findings using both quantitative descriptive graphs, along with open-ended responses. Next steps for our study will be presented.

Conclusions/Implications for Practice
The findings will help practitioners learn more about validating survey tools such as questionnaires and present the development of this unique questionnaire.

Access the recorded session here.

Horseshoe, Cockpit, & Dragonfly: Results from a Critical Care Nursing Dissertation

D. Kirk Hamilton, *Ph.D., FAIA, FACHA, FCCM, EDAC (licensed architect: Texas 5585)*, Julie & Craig Beale Endowed Professor of Health Facility Design, Fellow, Center for Health Systems & Design, Texas A&M University,

Participants
The participants were a convenience sample of 20 experienced critical care nurses, half on day shift and half on nights, at 5 East Coast academic medical center ICUs.

Purpose
The exploratory study was to investigate nurse movement patterns in patient rooms and to observe their interactions with fixed and moveable objects.

Relevance/Significance
Search of the relevant literature revealed little material on the topic. The potential significance of the findings is an opportunity to shed light on the way the work of ICU nurses is affected by the designed environment and a potential to improve those designs.

Methods/Strategy/Implementation
The study involved field observations of ICU nurses in the headwall type patient room for 256 hours over the course of equal numbers of full 12-hour day and night shifts, and semi-structured subject interviews, at 5 critical care units at academic teaching institutions on the US East Coast. Ethnographic methods were used for data collection, including photos and plan drawings. Constructivist Grounded Theory was used for data analysis.

Results/Evaluation/Outcomes
The design of a comprehensive cancer center that balances all the competing priorities. Further study will be done in Post-Occupancy Evaluations after construction is complete.

Conclusions/Implications for Practice
The findings provide insight into the way nurses prepare the space and objects in it at the start of a shift, and how they move within the room. The study provided insights into the positioning of furnishings and equipment to minimize conflict with caregiving tasks. The study also resulted in a hypothesis that spatial awareness is a component of situation awareness, and that it might be taught.

Presentations: The Arizona State Ph.D. dissertation on which this topic is based has been on file with Proquest, and the topic was later published as: Hamilton, DK. (2018). Horseshoe, Cockpit, and Dragonfly: Nurse Movement in Headwall Patient Rooms. Critical Care Nursing Quarterly, 42(1), 47-52.

Access the recorded session here.

Evaluating Nurses' Perception of Patient Safety Design Features in ICUs

Faria Islam, *Ph.D., Assoc. AIA, EDAC*, Architectural Designer, Woolpert
Mahbub Rashid, *Ph.D., RA*, Interim Dean, School of Architecture and Design, University of Kansas

Purpose
A methodological study was conducted to test the validity and reliability of the patient safety (PS) scale developed by Rashid for evaluating nurses' perception of adult ICU physical environmental features related to patient safety. The study examined the underlying dimensions of the 21 items of the PS scale to develop reliable subscales. These subscales were then used to study whether nurses' perception was influenced by nurse demographics (e.g., gender, education) or ICU unit characteristics (e.g., layout).

Relevance/Significance
A validated and reliable scale for evaluating nurses' perception of ICU physical environmental features related to patient safety can be helpful for designers and healthcare personnel interested in ICU design.

Methods/Strategy/Implementation
Data for the study were collected using web-based survey. A link to the survey was posted on the website of American Association of Critical-Care Nurses for interested nurses working in ICUs in different U.S. states to participate.

Results/Evaluation/Outcomes
Factor analysis identified four subscales in the PS scale with 19 items: Efficient Work Process, Patient Room, Accessibility and Visibility, and Maintain Sterility. Based on ANOVA and regression analysis, the study found that nurses' perception of ICU design in relation to patient safety was influenced by unit characteristics and nurse demographics.

Conclusions/Implications for Practice
The study identifies four subscales of the PS scale that can be used as variables in subsequent research to help understand the different facets of patient safety in relation to ICU design.

Presentations: The paper was published in Critical Care Nursing Quarterly, 2018.

Access the recorded session here.

Use of an Interprofessional Care Transitions Program to Improve Medication Reconciliation Practice: A Program Evaluation

Suzanne Kleeman, *MSN, APRN, AGACNP-BC*, DNP Student, University of Connecticut
Paula McCauley, *DNP, APRN, ACNP-BC, FAANP*, Major Advisor DNP Committee, University of Connecticut
Millicent Malcolm, *DNP, APRN, GNP-BC, FAANP*, Associate Advisor DNP Committee, University of Connecticut
Tera Falcetti, *PharmD, BCPS, BCACP*, Pharmacy Liaison & Preceptor, St. Francis Hospital & Medical Center, Trinity Health of New England

Purpose
To evaluate an interprofessional program aimed at reducing medication discrepancies, improving medication reconciliation (MR) practice and reducing 30-day hospital readmissions at a 617 bed hospital in the northeast. The project aims to 1) identify gaps and barriers that exist in MR processes from admission to discharge and make recommendations to improve the program; 2) evaluate its effectiveness at reducing 30-day readmissions and 3) assess the perceptions of collaborative practice of interprofessional team members involved to identify strengths, limitations, and opportunities for improvement.

Relevance/Significance
The evaluation highlights the effectiveness of an interprofessional program designed to improve the safety of care transitions from admission to discharge for patients which is relevant to the conference mission of measuring outcomes for quality and safety of an innovative healthcare program.

Methods/Strategy/Implementation
Retrospective chart audits for the 204 patients enrolled in the program will establish the program's success at reducing medication discrepancies and 30-day readmissions. Distribution of the Collaborative Practice Assessment Tool (CPAT) to team members who participated in the first year of the program to evaluate the perceptions of interprofessional collaborative practice among team members has been completed.

Results/Evaluation/Outcomes
Evaluation is in progress. Preliminary data suggests that the program incurs lower 30 day readmission rates then overall hospital unit readmission rates. Collection of the CPAT is still ongoing.

Conclusions/Implications for Practice
The evaluation will highlight the success of the program and will provide guidance on how it may evolve to better meet patients' needs.

Implications for the Designed Environment
Creating an interprofessional collaborative medication reconciliation process that includes pharmacy staff, registered nurses and licensed providers will improve medication reconciliation during transitions of care, especially admission and discharge, reduce medication discrepancies for patients and ehance medication adherence at home. As the program is interprofessional, improved collaboration and teamwork among healthcare providers who participate in this enhanced program will demonstrate more efficient and improved patient care which will lead to better patient outcomes.

Access the recorded session here.

Moving the Mission in the Midst of a Pandemic
Two Hospitals' Experiences Relocating during COVID

Kristina Krail, *BSN, MPH, RN, NEA-BC, FACHE, PMP, EDAC,* Healthcare Consultant + Transition Advisor
Douglas Grove, *AIA*, Senior Associate, Healthcare Process Improvement Strategist, NBBJ
Susan Bower, *MBA, BSN, EDAC*, Principal, Healthcare Planner + Transition Advisor, NBBJ
Cody Aarons, *MCP, BSN, RN*, Clinical Transition Specialist, NBBJ

Purpose
Two hospital transition projects – a complete campus relocation and a major tower expansion – were poised in early 2020 to transition and open by year's end. However, the COVID pandemic presented and immediately impacted the ability to proceed as planned. Strategic modifications to the project work plans were necessary to ensure clinical training competency, effective building-loading, and safe patient moves.

Relevance/Significance
The pandemic stressed all usual transition best practice approaches. "Waiting for things to return to normal" was not an option. Different ways to meet project goals through modifying tactics, altering expectations, and streamlining priorities were required. Each hospital's unique approaches demonstrated that solving complex healthcare design activation challenges may be achieved in multiple ways.

Methods/Strategy/Implementation
Leadership attention shifted away from transition responsibilities and in-person collaboration was essentially eliminated. Transition advisors focused on virtual activities, select small group engagements, and innovative communication strategies to fulfill project scope and schedule requirements.

Results/Evaluation/Outcomes
Virtual meetings improved attendance; however, certain preparatory activities could not be accomplished virtually. This resulted in creative changes to approach and modification of expected outcomes. Despite the pandemic, both hospitals were successfully activated close to original timelines.

Conclusions/Implications for Practice
Many circumstances interrupt project plans and schedules. Authentic project management includes continuous performance improvement. Organizations would benefit from considering the project change strategies developed in response to pandemic constraints and applying lessons learned to future transition projects or other types of initiatives.

Presentations: As one of four case studies, portions of this content were included in HCD Virtual 2020 "Revisiting Operations as the Primary Driver of Healthcare Design." Other portions of this subject matter were included in an abstract submitted to HCD Conference + Expo 2021.

Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design

Access the recorded session here.

Utilizing Augmented and Virtual Reality Tools to Optimize the Built Healthcare Environment

Steven M Langston, *AIA, ACHA, EDAC, LEED AP*, Computational Design Leader, rlf
Brian White, *AIA NCARB LEED AP*, Design Director, rlf

Purpose
Most of the design profession uses architectural plans and elevations to explain a proposed design to the healthcare caregiver and administrators (non-design professionals). Often these non-design professionals (users) do not truly understand a two-dimensional drawing and are asked to make decisions/approvals that they may not really understand. This can lead to significant flaws/errors in the final built project that can make the delivery of healthcare to the patient more difficult requiring either "work-arounds" or construction changes.

We have developed a four-dimensional tool called "Perspective" that allows a user to experience a proposed design, in both an augmented and virtual reality (3D) in real-time, allowing them to experience the movement through the space (4D) visually. The designer can modify the designs in real-time with the user, thus optimizing the space and improving the design of the proposed built environment before it is built. This saves time and can greatly improves the use of the space for both the healthcare provider and ultimately the patient.

In this presentation, we will use real project case studies that show both quantitative and qualitative improvements in existing built healthcare environments. We can also demonstrate this tool in a workshop with the session attendees showing the power of this tool.

Background/Significance
This new immersive visual tool allows the non-design professional to completely understand a proposed design in three dimensions through time/movement through the space (4D). It allows the end-user to manipulate the proposed healthcare environment with the designer to optimize the design which will allow for the improved delivery of healthcare to the patient and a better experience for the caregiver.

Methods/Strategy/Implementation
This computational design tool allows the user to visually experience how the environment will be used allowing the user to make changes with the aid of the designer to improve the use of the environment. The software measures each improvement/change.

Results/Evaluation/Outcomes
We use comparative documents to show the quality differences between two, three, and four-dimensional views, along with simulation modeling to develop quantitative results showing improvements to the altered physical environment utilizing this immersive tool.

Conclusions/Implications for practice
This tool can vastly improve the communication between designer and healthcare provider in the design of the physical environment.

Access the recorded session here.

A Low-Cost Droplet Barrier for Emergency Medical Service Transport During COVID-19 Pandemic

Amanda LeMatty, *B.S Bioengineering*, Clemson University
Robert Falconer, *B.S. Bioengineering*, Clemson University
Noah Ashley, *B.S. Bioengineering*, Clemson University
John DesJardins, *Ph.D.*, Robert B. and Susan B. Hambright Leadership Professor, Clemson University Department of Bioengineering
Phillip Moschella, *M.D., Ph.D.*, Prisma Health

Purpose
To design and implement a novel isolation barrier in emergency medical service vehicles.

Relevance/Significance
The likelihood of COVID-19 transmission is heightened in confined spaces such as emergency medical service (EMS) vehicles. Despite the widespread impact of the pandemic, there is little being done to protect the environment and personnel inside EMS vehicles while transporting COVID-positive or presumptive positive patients. Commercial devices on the market are high cost at approximately $300 per use.

Methods/Strategy/Implementation
Device frames were constructed using cross-linked polyethylene (PEX) pipe, elbow fittings, male adapter fittings, and polyvinyl chloride (PVC) fittings. The final assembly ncludes attaching end PVC fittings to the underside bars of an ambulance stretcher, draping a clear sheet over the curved frame, and using PEX clip pieces to secure the plastic sheeting on the frame. Once implemented in local EMS vehicles, data was collected on device usage and satisfaction via survey. Data analysis used System Usability Scores and Single Ease Question tools.

Results/Evaluation/Outcomes
The device was implemented in forty EMS vehicles. Preliminary results had varied responses on ease-of-use and safety provided by the device. Four medical procedures were documented, and seven medical devices were used in conjunction with the barrier. Multiple improvement suggestions were offered to improve the usability of the device.

Conclusions/Implications for Practice
Preliminary data highlights various flaws in the system. Written feedback suggested improvements in terms of assembly and surrounding comfort of patients. This data is useful for individuals and companies looking to design future devices.

Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design

Access the recorded session here.

Working Smarter not Harder: The impact of Technology Optimization on Improving Clinical Workflow and Transformation

Tina McCormick, *RN*, Clinical Informatics Transformation Leader, Inspira
Linda Sadler, *EDAC*, Principal, Technology Consultant, SSR
Fernanda Pires, *EDAC, Lean Green Belt*, Senior Associate, Array Architects

Purpose
Designing a new hospital to replace an outdated facility should improve everything from the interior and exterior of the building, furnishings, fixtures, as well as the flow and function of the space. With a lens for process improvement, clinical transformation, and improved workflows, projects today are overlaid and enriched with new technologies that can align and compliment the built environment for better outcomes. With this interdisciplinary team combining architecture, technology, and clinical expertise, Inspira Health, was able to create an environment that intentionally utilized technology to improve and optimize workflow and the transformation of care. A pre and post occupancy observation was conducted to determine how new and emerging technologies would improve clinical workflow and outcomes.

Relevance/Significance
Designing new buildings that encompass new and emerging technologies should improve clinical workflow and transform care. This case study demonstrates why these technology investments can indeed improve care and outcomes. The advanced smart room technology planned at Inspira Mullica Hill was intended to promote efficiency and enhance the patient experience.

Methods/Strategy/Implementation
A pre and post occupancy evaluation was done to determine the difference these technologies can bring to a project. Observation and questions were presented before and after the implementation.

Results/Evaluation/Outcomes
Clinical workflow, patient experience, and operational processes were improved and optimized through technologies such as Interactive TV, Digital Displays, Patient and Asset Tracking, and Vital Sign Integration. These technologies improved clinical outcomes as well as improved patient and family satisfaction. Additional improved outcomes related to quality and safety were measured.

Conclusions/Implications for Practice
Emerging technologies can significantly contribute to workflow optimization and care transformation. An interdisciplinary team can create a use-case template and scenarios to integrate and improve workflow with technology. Involving clinical staff through this transformational process improves staff satisfaction and enhances clinical leadership and collaboration.

Access the recorded session here.

Reducing Waste and Optimizing Supply Expenditures in the Operating Room

Anthony Mistretta, *MSN, RN, Lean Black Belt*, Prosci Change Management Practitioner, Healthcare Operations & Strategic Planning Executive, Perkins&Will
Chris Koss, *MA, EDAC, LEED GA*, Medical Planner, Perkins&Will

Purpose
To define evidence-based strategies for reducing operating room (OR) waste by compartmentalizing waste into categories, providing their respective environmental and healthcare costs, and proposing proven waste management strategies in order to optimize disposal costs and benefit the environment compared to typical OR waste management.

Relevance/Significance
Within U.S. hospitals, the most particularly resource-dependent and wasteful space is the OR. By incorporating the best OR waste management practices, hospitals would improve its sustainability and drastically reduce supply expenditures.

Methods/Strategy/Implementation
Conducted extensive literature review on hospital waste and create created categorizations for waste streams. Quantified costs associated with each stream and identified potential savings of waste in landfills. Identified and quantified evidence based solutions that practice green health and provide cost reductions.

Results/Evaluation/Outcomes
Identified and defined nine evidence based waste reduction strategies for the OR with estimations for cost reduction and waste diversion from landfills. The results provide an "a la carte" option for healthcare executives to choose the strategies most appropriate for their organizations.

Conclusions
This study concluded that hospitals could dramatically reduce their environmental impact and spending in its most critical, resource-demanding space by applying evidence-based OR waste management strategies.

Implications for Practice
If each strategy were implemented into a single OR, the potential cost-savings would be $65,950 and approximately 50 tons of diverted waste annually. At a macro scale, if the entire U.S. healthcare industry adopted all of the waste reduction strategies, the industry could save approximately $2 billion and divert 890,000 tons of waste in a single year.

Presentations: Internally to Perkins&Wills' Healthcare Practice Council; Los Angeles AIA Meeting

Access the recorded session here.

The Story of the Denture Cup: Starting a Conversation Around Point of Care Supplies and Aligning Supply Chain Goals with Clinical Outcomes

Kimberly Montague, *AIA EDAC LEED AP*, Vice President, HKS Inc.
Alison Smith Avendt, *OT/L, MBA,* Senior Healthcare Operations Advisor, HKS, Inc.
Camilla Moretti, *AIA, ACHA, LSSGB, LEED AP BD+C*, Medical Planner, HKS, Inc.
Linda Sadler, *EDAC*, Principal, SSR Inc.

Purpose
Improving quality and efficiency while controlling cost is imperative across healthcare. Supply Chain goals to reduce redundancy and waste center around vendor relationships, pricing, product utilization,standardization and inventory management strategies. By providing the right products at the right time, clinicians presumably have more time with their patients potentially leading to improved outcomes, quality, safety and satisfaction. Are we missing another important component to support clinical outcomes? Is the product in the right place? Can we design a point of care supply process that improves clinical workflows and optimizes patient care?

Relevance/Significance
The literature is silent when searching for an evidence-based approach to point of care supply models. Frontline clinicians report spending on average 17% of their work week managing inventory issues, about two hours per shift. Time spent looking for supplies leads to a lack of trust manifested in hoarding of supplies. Supplies are stashed in drawers in patient rooms, on counter tops, and in scrub pockets. End user workarounds lead to waste, stockouts, and potential for expired product.

Methods/Strategy/Implementation
Interviews with clinical and supply chain stakeholders reveal a misalignment of goals.

Results/Evaluation/Outcomes
We will share this data as well as leading practice examples of successful implementation of point of care supply solutions.

Conclusions/Implications for Practice
Implementing a point of care supply strategy requires interdisciplinary consensus and a structured process aligning supply chain goals with clinical outcomes. Through an interactive discussion, we intend to grow a body of knowledge to guide decision making in designing a point of care supply solution.

Presentations: This topic was presented as a roundtable discussionin 2018 at the College of Healthcare Operations Management Conference, Washington D.C.

Access the recorded session here.

Not Just a Hospital: Healthcare Design in Rural Communities

Jeff Monzu, *AIA, NCARB*, Vice President and Senior Project Manager, LEO A DALY
Michael Harvey, *MBA, CRT, FACHE*, CEO, Syracuse Area Health

Purpose
In a rural context, healthcare facilities fulfill roles they do not in more urban environments. We will discuss ways to identify these roles through engagement with nurses, staff, patients and families, which leads to greater nurse, staff and community participation in order to define criteria for successful facility design.

Relevance/Significance
This presentation will equip participants to examine global trends in healthcare services through the lens of relevance to smaller communities. For example, a rural healthcare facility may function as a community meeting place, the largest employer and the region's chief economic engine. Building or renovating a facility, holistically, will yield positive, lasting impacts on quality of life for nursing and other staff. It will also benefit the local economy and even a community's identity, not to mention residents' long-term health outcomes.

Methods/Strategy/Implementation
We brought the right people to the table. Understanding the impact of the facility's multiple roles enhances the ability tofund, planand design a modern facility with the programming and equipment to provide high-quality care in a rural context —and with enough flexibility to grow and adapt during the coming years.

Results/Evaluation/Outcomes
Staff-satisfaction survey data improved. Operational costs data will be evaluated to determine level of improvements.

Conclusions/Implications for Practice
Staff-to-patient interactions are enhanced. Amenities are selected and tailored specifically to meet the unique needs of the community.

Presentations: Healthcare Design Expo & Conference 2019

Access the recorded session here.

CU and Rehab ward – Compare of Providing Care

Jan Neugebauer, *MSN*, University of South Bohemia
Valérie Tóthová, *Ph.D.*, Vise-Dean for Science and Research, University of South Bohemia

Participants
ICU and Rehab health-care facilities in all of the Czech Republic

Purpose
The main aim was to examine the environment and other opportunities in providing nursing care for people with physical disability and compare it between health care facilities.

Relevance/Significance
There are many differences between providing care in an ICU ward and standard rehabilitation ward. In the ICU standardized care is focused on vital functions with nurses measuring patients with physical disability in the same way as the other patients. In the rehab ward nurses use specific planning systems and try to focus on patient's goals and return the patient back to "normal" life.

Methods/Strategy/Implementation
We have chosen a qualitative method of research with the technique of non-standardized questionnaire. Our research includes two group of nurses –nurses from rehab ward and nurses from ICU from all over the Czech Republic who take care of patients with a physical disability. In first part we observed and described a typical and an atypical rehab ward and the ICU as well. After this we asked nurses to fill in the questionnaire. We have 1200 completed questionnaires from all parts of Czech Republic and we evaluated it using the SASD program.

Results/Evluation/Outcomes
We have strict rules about the designed environment but, many of our older buildings are in the process of rebuild and many of these are limited by position, money, or other issues. In many ICUs we don't have enough space for rehab equipment and that may be the reason why nurses don't want to use it. The second part is building arrangement. A lot of buildings are old but full of history and typical environment. Others would like to rebuild but they also need a large place somewhere to build new training halls with equipment and new trainings methods for elderly people or people with physical disability. At both wards the nurses has been educated about physical disabilities, risk factors and other specific circumstances based on primary diagnosis and physical disability.

Conclusions/Implications for Practice
The results show in Czech nursing we need to reconstruct many of our rehab wards. When we use any fitness equipment or pool benefits, we will increase the activity and mobility patients with physical disability at rehab wards. At ICU wards we must be focused on vital function, but we can also plan strategies plan with patients as well. When the patients are able to do any exercise, the nurse should support them and use any rehab and supportive aids. We can use more education for nurses, but we also need support from government and health-care facilities, because our main problem is that primary is space needed.

Access the recorded session here.

A Study of Multiple ICUs and Caring Behavior: Does Layout or Unit Size Matter?

Susan O'Hara, *Ph.D., MPH, RN,* Assistant Professor Clemson University
Kathleen Valentine, *Ph.D., MS, RN*, Chief Nursing Academic Officer, Professor, Director School of Nursing, Clemson University
Steve Langston, *AIA, ACHA, EDAC, LEED BD+C*, Design Director, rlf architecture.engineering.interiors
Veronica Parker, *Ph.D.*, Director, Center for Research on Health Disparities, Professor/Biostatistician, Clemson University

Participants
Several ICUpatients or family members

Purpose
To identify key correlations between Caring Behavior Inventory-16 (CBI) selected survey question results within ICUs and between ICUs.

Relevance/Significance
It builds on existing caring science, design principles, and environmental theory. Research question: "Can ICU design be improved with a detailed investigation of caring behavior?"

Methods/Strategy/Implementation
Part of a larger ethnographic study, CBI-16 survey data collected over 2 years and analyzed. The sample target: 200 respondents (patient or family) to be completed by PI, patient or family. Floor plans, architectural analysis, (distances traveled between patient rooms, visibility into patient rooms/isovist views) used.

Results/Evaluation/Outcomes
Preliminary results of 70 respondents (complete analysis in progress) cardiovascular to general ICU patients in 6 to 16 beds ICUs with size ranging between approximately 4,000 to 17,000 dgsf. Using SPSS: Cronbach's Alpha of .912 and .924 based on standardized items with item mean of 5.629. The average total scale score: 90 (range 57-96) and variance =71. Correlation studies completed on distances traveled to 4 key areas: nurses stations, medication room and equipment storage, and the CBI scores were statistically significant between these locations and question #14 and #15. Qualitatively, we report Caring Behavior is related to spatial layout; however, it is a multidimensional theoretically driven concept.

Conclusions/Implications for Practice
Using CBI provides valuable insight for designing caring ICU environments. Future research includes adding ICU sites to inform facility guidelines on caring environments.

Access the recorded session here.

Recommendations for Lighting Design for Post-Natal Patients, Companions, and Infants for Hospital and Home Settings: Tailoring Guidelines for Medical-Surgical Hospital Room

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he Ohio State University
Joseph M. Gerard, Student, Biomedical Sciences Program, The Ohio State University
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Alison M. Stuebe, *MD, MSc,* Professor, Department of Maternal and Child Health,
University of North Carolina

Purpose
To make recommendations for lighting design to reduce patient falls and sleep disruptions for the first 90 days of post-natal care.

Relevance/Significance
Ten lighting design guidelines for hospital rooms, including nurseries,exist to reduce falls, increase patient and visitor control, and support nursing tasks.

Methods/Strategy/Implementation
We coded parsed transcripts from prior interviews and focus groups to identify issues with lighting design in medical-surgical hospital rooms. We identified relevant issues for post-natal care and generated recommendations.

Results/Evaluation/Outcomes
Top issues in acute care: 1) night lighting insufficient, 2) inconsistent controls across rooms, 3) patients getting out of bed to control overhead light, 4) nurses not having sufficiently easy-to-use controls, and 5) overhead, procedure, and exterior lighting disturbing sleeping patients. Relevant issues in post-natal care: 1) night lighting insufficient, 2) patients getting out of bed to control overhead light, and 3) overhead, procedure, and exterior lighting disturbing sleeping patients.

Conclusions/Implications for Practice
Recommendations for the hospital and home setting are: 1) Remote control of electric lighting, window coverings, and TV without requiring exiting a bed, couch, or chair or disturb a sleeping or breastfeeding newborn, 2) Personal attachable light that is portable, cleanable, hands-free and water resistant, 3) Low-watt diffuse night lighting (warm, red, or yellow tone) to safely navigate from the patient bed to the bathroom, the bassinet, the changing table, and trash receptacle, and from the companion's bed to the bathroom, 4) Motion-activated low-watt lighting when adult exits bedandenters bathroom.

Presentation: Related work will be presented at the 2021 International Human Factors in Healthcare Conference.

Access the recorded session here.

Safe Medication Preparation: Making More out of Little Space

Tonya Pedersen, *MSN, RN-BC*, Clinical Program Coordinator, University of Virginia Health

Purpose
Registered Nurses lacked a dedicated area for medication preparation at the bedside due to infection prevention measures which reduced horizontal surfaces.

Relevance/Significance
Safe medication preparation requires a dedicated location where nurses can scan and prepare medications while accessing the electronic medication administration record (eMAR). An innovative design based on frontline nurse practice needs was necessary to ensure a safe, comfortable, and healing environment for patient care.

Methods/Strategy/Implementation
Initial information collection occurred through direct observations and interviews with nurses. Failure points of previously trialed solutions were included in data collection. Pilot locations were identified and new product testing was implemented. Likert scale survey with comments was developed to capture the staff response to the new work surface solution.

Results/Evaluation/Outcomes
The ideal medication preparation location was identified at the computer using existing wall mounted track for the dual arm computer stations. Dual arms provided greater ergonomic placement. Three units surveyed after the pilot implementation with 18 respondents provided positive reaction to the work surface system. Additional feedback was generated through individual interviews.

Conclusions/Implications for Practice
Dedicated work surfaces enabled nurses to work more efficiently with less interruption to their workflow. The work surface took up less space due to being able to fold out of the way.

Presentations: An internal presentation to the clinical nurse leaders was performed once the determination was made to go house wide with the work surfaces. No external presentations have been made.

Access the recorded session here.

Reimagining the Neonatal Intensive Care Unit

Troy Savage, *MESc, Mdiv,* Project Manager, Mazzetti
Jeff Hunter, *MHA*, Faculty, Catalysis
Walt Vernon, *PE, MBA, JD, LEED AP,* CEO, Mazzetti
Robert D. White, *MD*, Director, Regional Newborn Program, Beacon Children's Hospital
Judy Smith, Principal, Smith Hager Bajo, Inc.
Mindy Goodroe, *AIA, ACHA, LEED AP, EDAC, LSSYB*, Associate Principal and Senior Vice President, HKS
Jennifer Ries, Senior Medical Planner, Vice President, HGA
Annette Roehl, *M.Arch, MUP, RN, CCRN, CHSE, EDAC*, bedside nurse, Swedish Medical Center

Purpose
The Reimagining Neonatal Intensive Care Unit (NICU) virtual workshop, organized by the Sextant Foundation and supported by FGI, Gravens Conference, and Catalysis is scheduled for March 2021. Ideas to meet challenges faced by NICU clinicians and families will be developed, prototyped and tested by interdisciplinary teams. Founding members of the Gravens Conference and authors of the Recommended Standards for Newborn ICU Design will be among the participants in this workshop along with architects and healthcare designers, clinicians and family members with recent NICU experiences. This session will explore the challenges and resulting ideas developed at Reimagining the NICU. Healthcare simulation experts and healthcare architects will explore how building design might change to support lessons learned and inform future FGI design and construction guidelines to encourage innovation that support neonatal wellness.

Relevance/Significance
Participants ideated new solutions to NICU design challenges.

Methods/Strategy/Implementation
Participants of the workshop utilized the design thinking process as a framework to develop new solutions to challenges in the NICU in diverse teams.

Results/Evaluation/Outcomes
Participants presented solutions for further exploration and possible influence in the next FGI guidelines.

Conclusions/Implications for Practice
These novel new approaches to NICU solutions require further exploration by the larger NICU design community. They will also help assure the FGI guidelines allow/encourage design innovation in the NICU environment.

Access the recorded session here.

Advancing Emergency Management: Integrating the Built Environment into Public Health Pandemic Response

Molly M. Scanlon, *Ph.D., FAIA, FACHA***,** Director Standards, Compliance & Research, Phigenics

Purpose
The purpose of this analysis is to identify the need for integration of the built environment,including healthcare surge capacity,within models for Whole-of-Society pandemic risk management response.

Relevance/Significance
During a pandemic,maintaining civil society and accomplishing healthcare surge capacity requires a network offacility infrastructure beyond the immediate hospital to triage the rapidly growing numbers of infected individuals and emerging disease cases. Providing continuity-of-care requires an assessment of buildings for alternative care sites to extend healthcare operations into non-healthcare settings.

Methods/Strategy/Implementation
Conducted a series of strategic workshops through appointed task forces of the American Institute of Architects involving public health and healthcare professionals in conjunction with architects and engineers to develop toolkits for use during the U.S. COVID-19 alert, pandemic, and transition phases of emergency risk management.

Results/Evaluation/Outcomes
The task forces developed eleven toolkits to be used throughout the emergency management life cycle including four related to healthcare surge capacity and seven in the transition phase for re-opening and maintaining civil society operations.

Conclusions/Implications for Practice
The built environment plays a critical role supporting emergency pandemic response to ensure the health, safety, and welfare of all building occupants. Interdisciplinary healthcare, public health and design teams need to evaluate alternative cares sites for healthcare surge capacity and additionally evaluate re-opening building criteria to maintain civil society operations.

Presentations: These toolkits were presented in AIA National continuing education webinars and translated into multiple languages for deployment by the U.S. Department of State.

Part of the panel: Disasters, Communicable Diseases, and Pandemics: Impact on Healthcare Design

Access the recorded session here.

From Programming to Post-Occupancy: Clinical Leadership in Healthcare Design and Activation

Kaycee Shiskowsky, *RN, MBA NE-BC*, Manager of Clinical Planning and Design, UC Health
Nicole Brown, *MSN RN,* Manager of Operational Planning, UC Health

Purpose
The goal of our project is to create an organizational clinical leadership team to support all phases of new facility construction. This clinical teams primary focus is to create innovative system standards and processes to be utilized in all new construction efforts to gain efficiency, consistency, with clinical accountability.

Relevance/Significance
Annual spending on outside activation and operational planning consultants totaled over $750,000 for our system. With consultants, efficiencies and lessons learned from each project were not being realized and corrected on subsequent projects resulting in preventable delays and redesigns. Utilizing internal clinical leaders instead of consultants created a better integration with the design standards, operational system standards, and specialty workflows needed to advocate for clinical staff throughout the construction process.

Methods/Strategy/Implementation
During the spring of 2018, nine multidisciplinary clinical leaders were hired to support 3 greenfield projects in various stages of construction. These clinical leaders supported all functions of facility design and construction from programming and design to operational planning and activation.

Results/Evaluation/Outcomes
In addition to the financial savings from eliminating consultants, incredible outcomes were achieved through development of a standardized design, consistent operational plan, and a streamlined activation, all with a patient-centered and clinical focus. On all three projects the direct outcomes realized included successful regulatory accreditation surveys, reduced command center time, and overall staff satisfactionon post occupancy surveys.

Conclusions/Implications for Practice
This abstract further identifies the benefits of having clinical and nursing leaders at the design and planning table. Innovative solutions to healthcare design continues to occur when we set the stage for interdisciplinary collaboration.

Access the recorded session here.

Life Worth Living: User Perceptions at the Palliative Care Center in Göttingen, Germany

Susanne Siepl-Coates, *Dipl.Ing., M.Arch.,* Professor, Department of Architecture, Kansas State University

Relevance/Significance

Persons with terminal diseases commonly experience extreme physical pain as well as psychological and spiritual anguish (Kuhl, 2000), diminishing the potential for life-affirming occasions. The research reported here aimed to understand if fundamental human place-based factors can significantly and positively affect the psychological wellbeing of patients and families in a palliative care setting.

The Palliative Care Center in Göttingen is a ten-bed in-patient unit that treats persons primarily due to cancer in advanced stages. Opened in January 2007, the care center is the remodel of an oncology ward in an existing conventional 1970 teaching and research hospital. The architect intended for the unit to provide an ambience that lets patients and their loved ones focus on living.

Methods/Strategy/Implementation

A continuum of spaces, from interior to exterior, was created to support and enhance the quality of life of patients and their families, including a Room of Sound and a spa-like bathroom. Spacious patient rooms with attached terraces and gardens are reminiscent of residential characteristics and thus afford users a sense of normalcy during serious life circumstances. By means of a qualitative study involving structured interviews with patients and family, user responses were elicited from five subjects each.

Results/Evaluation/Outcomes

The outcome indicates that environmental factors do impact users' perceptions of well-being, including physical, psycho-social and spiritual dimensions.

Conclusions/Implications for Practice

Furthermore, the outcome supports conclusions offered by Kader (2017) and builds on them to provide deeper insights into design-related issues toward empathically considered care settings, for palliative care and other environments where people are stressed and vulnerable.

Access the recorded session here.

Maggie's Centers: Instruments of Healing?

Susanne Siepl-Coates, *Dipl.Ing., M.Arch.*, Professor, Department of Architecture, Kansas State University
Micaela Lindemann, *M.Arch. cand.*, Kansas State University
Anne Criddle, *M.Arch. cand.*, Kansas State University
Lauren Uhls, *M.Arch. cand.*, Kansas State University

Purpose
Examination of the designs of various Maggie's Centers in terms of their 'healing' potential.

Relevance/Significance
Located mostly in the United Kingdom, Maggie's Centers are walk-in supportand information facilities for cancer patients. Maggie Jencks, co-founder of these centers and a cancer patient herself, emphasized the quality of physical spaces to be of utmost importance in uplifting clients and transforming them from victims toward strong individuals able to cope with their traumatic experiences. All Maggie's Centers are designed to the same program brief, albeit by different architects. Thus, they provide a unique research topic to gain insight into the rich and multi-layered physical manifestations that can be interpreted as contributing to a healing sense of place.

Methods/Strategy/Implementation
Using Gesler's suggestion (2003) that a healing sense of place can be achieved when a setting is characterized by the presence of four related and overlapping environments (built, natural, social and symbolic), an analytic examinations of various Maggie's Centers was undertaken in light of evidence-based design research outcomes and selected scholarly readings.

Results/Evaluation/Outcomes
Maggie's Centers offer a wide range of architectural qualities and characteristics to support human well-beingas demonstrated by evidence-based research findings.

Conclusions/Implications for Practice
Referencing Aalto about the Paimio Sanatorium, Maggie's Centers can indeed be understood as instruments of healing. The work of architects and other design professionals can be inspired by Maggie's Centers, whether they work on healthcare facilities or not. Shouldn't all settings be 'healing environments'?

Access the recorded session here.

Integrated Patient Room 'Healing' Technology Design – A Stepwise Approach

Merlijn Smits, *MSc.*, Design Manager R4heal, Radboud University Medical Center, Department of Surgery, Nijmegen, The Netherlands
Harry van Goor, *MD, PhD, FRCS,* Professor of Surgical Education, Radboud University Medical Center, Department of Surgery, Nijmegen, The Netherlands

Purpose
Developing a stepwise approach to healing technology design and testing (technology for patient (activity) sensing, hygiene compliance, gaming and audio/visuals for patient distraction and relaxation).

Relevance/Significance
Many patients suffer from stress, pain, sleep disturbances, immobility, and decreased autonomy and well-being. Healing technologies in the patient room provide opportunitiesfor safety and well-being improvement.

Methods/Strategy/Implementation
To guide design and testing of patient room technologies, we developed a stepwise approach providing with every phase feedback on technology's feasibility, acceptability, and tolerability. It consists of four phases: anticipate, demonstrate, consult, validate. Within anticipate we foresee the effects and use of technologies by testing these ourselves with makeshift solutions. In demonstrate, we invite healthcare workers for feedback on technologies that we place in a mock-up room with the exact layout of an original patient room. During consult, we admit volunteers to the mock-up room for simulated care and analyse the human-technology interactions. Validate involves testing of patients' well-being in a mock-up room at the normal ward equipped with 'healing' technologies. Each testing phase is followed by a redesign phase improving the healing technologies based on gained insights.

Results/Evaluation/Outcomes
Our stepwise and iterative approach to technology testing provides meaningful information on well-being of patients and workflow of healthcare workers enabled by integrated technologies.

Conclusions/Implications for Practice
Our approach cuts time, costs and research load for patients and healthcare workers. The early nurse involvement and a functioning mock-up room at the normal ward can benefit technology adoption and a seamless adaptation of workflow after occupying a new ward with single patient 'smart' rooms.

Access the recorded session here.

How Continuous Monitoring Changes Our Daily Work

Merlijn Smits, *MSc*, Design Manager R4heal, Radboud University Medical Center, Department of Surgery, Nijmegen, The Netherlands
Robin Verweij, *BSc.*, Nurse, Radboud University Medical Center, Department of Surgery, Nijmegen, The Netherlands
Harry van Goor, *MD, Ph.D.*, *FRCS*, Professor of Surgical Education, Radboud University Medical Center, Department of Surgery, Nijmegen, The Netherlands

Purpose
All patients on 60 beds at 2 different wards (Surgery and Internal medicine) are continuously and remotely monitored for vital signs since June 2018. A multidisciplinary team including nurses, physicians and healthcare designers assisted in the implementation of this technology and monitored behavioral and organizational changes in practice and potential improvements of the technology (human-technology interaction). The changes and improvements are presented from a multi-angle perspective.

Relevance/Significance
Continuous monitoring (CM) at the normal ward can help to improve safety and quality of patient care and reduce workload of nurses. Iterative evaluation of this technology by a multidisciplinary team from the start can identify relevant 'changemakers' regarding patient care, nurse activities and redesign of the technology.

Methods/Strategy/Implementation
A team of nurses, physicians, and healthcare designers was installed for 18 months after implementation to monitor implementation of CM. By means of observations, regular meetings, structured interviews, quantitative research and co-creation, theuse of continuous monitoring was iteratively evaluated for yield in safety and quality of care, work-efficiency, nurse job satisfaction, and technology improvement.

Results/Evaluation/Outcomes
CM reduces the number of unplanned IC admissions and rapid response team calls. Changes were identified in daily routine, nurses interacting with physicians and patients and technology, and job satisfaction.

Conclusions/Implications for Practice
An multidisciplinary team with a healthcare designer helps to identify opportunities for improvement of care, work efficiency, job satisfaction and technology redesign associated with continuous monitoring of vital signs at normal wards which at present are piloted.

Access the recorded session here.

Knowledge Synthesis As Mixed Methods Research

Jaynelle F. Stichler, *DNS, RN, NEA-BC, EDAC, FACHE, FAAN,* Consultant – Research & \ Professional Development, Caster Institute of Nursing Excellence, Sharp HealthCare

Purpose

This presentation contrasts different types of literature reviews for knowledge synthesis and presents the mixed methods research steps for conducting and publishing knowledge synthesis research.

Relevance/Significance

The presentation supports the conference goal to disseminate new knowledge obtained through healthcare design research.

Methods/Strategy/Implementation

The traditional literature review has been replaced with rigorous scientific methodologies or prescribed processes to synthesize existing knowledge and evidence on specified topics. While literature reviews identify existing information and gaps in the literature, reports of individual studies are not robust enough to guide design decision-making. With a growing body of scientific knowledge, synthesis of the evidence identifies inconsistencies in findings, gaps in knowledge, and types and sources of evidence. Systematic reviews, using steps prescribed by PRISMA, identifies, appraises and synthesizes all empirical evidence meeting pre-specified, eligible criteria for research questions. Meta-analyses and meta-syntheses combines data from multiple studies as if they were one data source and provides the most powerful form of evidence. Scoping reviews address exploratory research questions aimed at mapping key concepts, types of evidence, and gaps in the evidence. Integrative reviews, the most comprehensive of all methods, synthesize both experimental and non-experimental studies to capture the breadth and depth of a topic and application to practice.

Results/Evaluation/Outcomes

A 2019 study of healthcare journal editors (n = 72) indicated that 80% considered systematic reviews and other methodologically robust reviews as original mixed methods research.

Conclusions/Implications for Practice

Nurses can be leaders in conducting knowledge synthesis studies and sharing findings to guide design decisions.

Access the recorded session here.

Measuring Outcomes in Healthcare Design Projects

Jaynelle F. Stichler, *DNS, RN, NEA-BC, EDAC, FACHE, FAAN,* Consultant – Research & Professional Development, Caster Institute of Nursing Excellence, Sharp HealthCare

Purpose
The purpose of this presentation describes the importance of measuring tangible and intangible outcomes in healthcare design projects.

Relevance/Significance
The presentation supports the conference goal for nurse leadership best practices.

Methods/Strategy/Implementation
Evaluating the design's effect on measurable outcomes is critical to the design process. While controversy exists as to whose responsibility it is to measure outcomes, it is an interdisciplinary process with healthcare and architectural leaders working in partnership to identify critical goals before design and to measure the outcomes of those goals post occupancy. Because nurse leadersare familiar with organizational metrics used to measure quality, they can provide direction to the outcome measurement process. Everyday organizational data can be used as a metric for outcome measurement and design research. Nurse sensitive indicators, Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), financial indicators, patient and provider satisfaction scores, efficiency measures, and other metrics can be used as pre-design measurable goals and post-occupancy outcome measures.

Results/Evaluation/Outcomes
Designers and healthcare leaders must be accountable to Boards of Directors and the public for financial stewardship. Measuring the effect of the design on patient, provider and organizational outcomes ensures accountability for design decision making and creates evidence useful for future design projects.

Conclusions/Implications for Practice
Measurable outcomes should be identified pre-design to guide design decision making. The same outcomes can be compared post-occupancy to determine the effect of the design on patients, providers, and organizations.

Presentations: This topic was discussed in an Editorial in HERD Journal.

Access the recorded session here.

The Impact of Virtual Reality (Vr) as an Innovative Tool in Lean Operational Planning, Design, and Patient Experience at a Major Academic Medical Center

Marvina Williams, *RN BSN*, *Lean Black Belt*, Senior Associate, Senior Medical Planner, Perkins and Will
Brian Sykes, *AIA, NCARB, PMP®, LEED® AP BD+C*, Lean Green Belt, Healthcare Practice Leader, Associate Principal, Perkins and Will

Purpose
The purpose of this presentation is to outline the impact of virtual reality on an Emergency Department and Bed Tower Expansion. VR can be used separately, or in conjunction with mock-ups to disseminate knowledge immediately for those users having difficulty visualizing design concepts and floor plans.

Relevance/Significance
Lean operational planning and physical design are intertwined to create a facility that is efficient and functional. It is becoming best practice in nursing to bring VR visualization to projects to inform their planning phases. It also works as another tool for evaluating the efficiency of operational planning, design alternatives, and in familiarizing all nursing applications and other staff to new areas being planned and built.

Methods/Strategy/Implementation
This process involves meetings with senior leadership, nursing directors, medical directors, nurse managers, clinical staff, ancillary staff, and patient/family focus groups. Utilizing VR which is a very immersive, interactive interprofessional and participatory process helps inform Lean operational planning and design.

Results/Evaluation/Outcomes
Using virtual reality, challenges to design interventions can be discussed and changes made to improve the space. VR is innovative in many ways and provides opportunities to staff and patient/family focus groups to be involved in a design that is efficient and safe. For example, in an emergency department, visibility is important, and an area can be quickly visualized and changed through virtual reality.

Conclusions/Implications for Practice
The further benefit of virtual reality is the way staff and students can interact in charrettes to create a new generation of caregivers that are able to experience the patient experience, while exploring the multiple opportunities that could be possible within this facility.

Access the recorded session here.

The Impact of Nurse Documentation Location on Charting Time

Janice E. Wilson, *DNP, RN, CPHIMS*, Vice President, Chief Nursing Information Officer,
Lehigh Valley Health Network

Participants
Medical Surgical clinical bedside registered nurses, documenting admissions and assessment data.

Purpose
Identify differences in charting times based on computer location among medical surgical nurses and challenges to charting in an EMR (Electronic Medical Record) by examining sociodemographic variables and computer location.

Relevance/Significance
The American Recovery and Reinvestment Act of 2009 appropriated funds with hopes of moving the country toward use of an EMR, with little available research to recommend best practice.

Research question
What is the impact of nurse documentation location on charting time?

Methods/Strategy/Implementation
This wasa non-randomized, four-week cross-sectional study, comparing two documentation locations at a large community hospital, with a total of 53 nurses from 16 units.The source of data was a system audit log and a Charting Workflow Questionnaire. Data were analyzed for statistical significance using chi-square testing and Fisher's exact test. Average per-day number of minutes charting were analyzed with independent two-sidedt-test and Mann-Whitney U. Positive and negative impacts were reported as counts and percentages.

Results/Evaluation/Outcomes
The sample consisted of an in-room and out-of-room group of equal numbers. Negative out-of-room impacts were patient acuity and patient/family interruptions, different from the in-room group. No statistical significance was achieved for any sociodemographic variables. There was no statistical significance for charting time between charting groups (p= .601).

Conclusions/Implications for Practice
Times between the in-room and out-of-room charting groups were very close, but the standard deviations were very large. Additional research would further understand the perceived positive and negative impacts on charting and the large time standard deviations between groups.

Presentations: This research was presented internally at Research Day at Lehigh Valley Health Network, October 2019.

Access the recorded session here.

Hospital Acoustics: Understanding the Problems and Finding Solutions

Adam Yeeles, *Ph.D.*, Research Strategist, HDR
Madeline Didier, *MAE*, Acoustician, HDR
Francesqca Jimenez, *MS*, Research Strategist, HDR
Jeri Brittin, *Ph.D.*, Director of Research, HDR

Purpose
The purpose of this presentation is to discuss how the acoustic environment of inpatient hospital settings impacts patient and staff outcomes, and to discuss where to go from what we know.

Relevance/Significance
From cacophonies of noise to environments that can make hearing and understanding speech difficult, healthcare settings often do not meet current acoustic design standards which can negatively affect both staff and patients. This presentation will provide an overview of the ways the acoustic environment in inpatient settings impacts occupant health, safety and well-being. As an approach to addressing these issues, acoustic modeling techniques will be explained to further illustrate the importance of designing for the sound environment when making architectural decisions. Specifically, design strategies to mitigate sound issues, and to improve the positive soundscape for optimal patient healing and staff performance will be discussed.

Methods/Strategy/Implementation
A brief review of the literature of relevant strategies to improve acoustics in inpatient hospital settings will be presented, along with applicable examples of how acoustics can be designed both to provide auditory privacy and support optimal healing.

Results/Evaluation/Outcomes
The acoustic environment has significant impacts on both staff and patients in hospitals. Findings relate to noise levels, as well as measures relevant to the intelligibility of speech within hospitals.

Conclusions/Implications for Practice
Acoustics is an important factor of the built environment in hospitals and should be considered during the design process in order to maximize positive occupant outcomes.

Access the recorded session here.

Psychiatric Crisis Centers and ED's: Trends and Case Studies

Scott Zeller, *MD*, Vice President, Acute Psychiatry, Vituity
Frank Pitts, *FAIA,FACHA, OAA*, Principal, architecture +
Virginia R. Pankey, *AIA, EDAC, LEED,* Senior Medical Planner, Principal, HOK

Purpose
Appropriate emergency department utilization and focusing on care of those in actual need of emergency care has been a systematic problem for many years. Increasing volume of emergency departments (ED) presentations for urgent psychiatric care has brought real pressures to ED operations and challenging populations to patient caseloads. This combination of systemic change in care models coupled with an increased volume has created a crisis for both emergency departments and for the care of those suffering from emergent mental illness.

Relevance/Significance
We will discuss systemic trends underlying the contemporary experience. ED behavioral patients are often boarded without treatment for long hours awaiting inpatient beds, when prompt, appropriate care would instead result in discharge for most affected individuals.

Methods/ Strategy/ Implementation
Providing therapeutic emergency environments designed for crisis mental healthcare leads to rapid improvement and decreased need for inpatient care. Examples of care environments responding to these trends will be presented.

Results/ Evaluation/ Outcomes
Mental health crisis patients in this setting are treated sooner and allow regular re-evaluations of patient response to treatments. In the majority of cases restraints and inpatient care are not needed.

Conclusions/Implications for practice
ED emergency psychiatric units help to stabilize most crises in less than 24 hours, improving general ED capacity, length of stay and throughput.

Access the recorded session here.