Inaugural International Nursing Conference for Excellence in Healthcare Design: History, Design & Innovation

August 14-17, 2019

Clemson University Nursing building
605 Grove Road
Greenville, SC 29605
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
- Stimulate innovation in healthcare design
- Encourage interprofessional collaboration and engagement
- Identify opportunities for nurse, patient/family input into safety improvements in healthcare design
- 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.
From the Director

Dear Participant,

Welcome to the Clemson University Nursing building, a new site of instruction for the Clemson University School of Nursing. We are so excited to be hosting the Inaugural International Nursing Conference for Excellence in Healthcare Design.

We opened this beautiful building in 2018 as a vibrant academic learning center to enable our growth as a National League for Nurses Center of Excellence in Nursing Education, and to meet the demand for increased enrollment in our undergraduate, masters, and doctoral programs. Here, 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 return home inspired by the outstanding presentations, speakers and poster session. The City of Greenville offers you a warm welcome. Please do not hesitate to let us know how we can make your stay more enjoyable and comfortable.

Sincerely,

Kathleen Valentine, Ph.D., MS, RN
Director, School of Nursing
Clemson University
Dear Participants,

Welcome to the International Nursing Conference for Excellence in Healthcare Design: History, Design and Innovation in beautiful Greenville, South Carolina. We are excited that you are a part of this inaugural 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. As nurses ourselves, we have worked to help bridge this gap and guide and encourage more nurses to become involved with the design process from concept to post occupancy, since they ultimately work in these spaces, whether inpatient, outpatient, or in the community setting. This year’s theme: History, Design and Innovation, reinforces nurses’ roles in healthcare design, and aims to leave the participant inspired by the innovative research in the field of healthcare design and the importance of interdisciplinary teams.

Over the next few days, leaders in nursing and healthcare design will call on us to learn from the history of healthcare design and how this can lead to an innovative future.

We are grateful to the support of the Academy founding members: Kathleen Valentine, Director of the School of Nursing; Jaynelle Stichler, founding co-editor of HERD journal; Yolanda Keys, associate professor at Texas A&M University; Joyce Durham, RN, AIA, EDAC, Director Facilities Strategic Planning, New York Presbyterian Hospital and immediate past president NIHD; Jennie Evans, Director of Business Development at Mazzetti; Kathy Okland, formerly with Herman Miller and current clinical and healthcare design consultant; Susan Silverman, vice president of CannonDesign; Christine Staples, clinical planner with the Defense Health Agency; Terri Zborowsky, research co-chair for NIHD & design researcher with HGA Architects & Engineering, Inc.; and the planning committee comprised of Clemson University staff members and passionate nursing and industry leaders. Thank you also to the Clemson University faculty and staff for their support with this conference.

As we reflect on all of the activities that go into attending a conference—submitting abstracts, arranging schedules, and traveling—we want to thank each of you for choosing to be a part of the scholarly dialogue of nursing in healthcare design.

Sincerely,

Susan and Debbie

Susan O’Hara, Ph.D., MPH, RN 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

Ben Card   Jessica Martin   Susan Silverman
Joyce Durham   Aleesa Millet   Christine Staples
Jennie Evans   Kathy Okland   Jaynelling Stichler
Debbie Gregory   Susan O’Hara   Kathleen Valentine
Yolanda Keys   Frances Parrish   Terri Zborowsky
Susan E. Ziel

Thank you to our NHDC2019 Sponsors

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Keynote speakers

Lynn McDonald, PhD

Lynn McDonald is Professor Emerita at the University of Guelph, Ontario. She completed her PhD at the London School of Economics and has an honorary doctorate and is a member of the Order of Canada. She is director of the 16-volume Collected Works of Florence Nightingale. She has also published on sociological theory, especially women theorists, and criminology. She is a former member of Parliament, when her Non-Smokers' Health Act was the first legislation in the world to establish smoke-free work and public places. A climate change activist, she is the co-founder of JustEarth: A Coalition for Environmental Justice.

*Lynn McDonald is sponsored by Smith Seckman Reid, Inc.*

Jaynelle Stichler, DNS, RN, NEA-BC(r), EDAC, FACHE, FAAN

Jaynelle F. Stichler is Professor Emerita at San Diego State University, Founding Co-Editor of the HERD Journal, and Research Consultant for the Center of Nursing Excellence, Sharp HealthCare. Dr. Stichler has authored over 200 articles in peer reviewed journals and books and is a frequent presenter at national and international nursing and healthcare design conferences. She has a Doctorate of Nursing Science from University of San Diego and is a Fellow in the American Academy of Nursing, Nursing Institute for Health Design, and the American College of Healthcare Executives.

*Jaynelle Stichler is sponsored by the Nursing Institute for Healthcare Design.*
Keynote speakers

**Emily Patterson, PhD**

Emily S. Patterson is an associate professor in the Division of Health Information Management and Systems, School of Health and Rehabilitation Sciences, College of Medicine at the Ohio State University. She has a PhD in Industrial and Systems Engineering from Ohio State University. Dr. Patterson applies human factors engineering to improve patient safety and quality in healthcare. She has served as a scientific advisor for The Joint Commission and the National Institute of Standards and Technology. She serves as Associate Editor for Human Factors and on the Editorial Advisory Board for the Joint Commission Journal on Quality and Patient Safety.

*Emily Patterson is sponsored by the Clemson University School of Nursing.*

**D. Kirk Hamilton, PhD, FAIA, FACHA, FCCM, EDAC**

Kirk Hamilton is the Julie & Craig Beale Endowed Professor of Health Facility Design at Texas A&M University, teaching healthcare design at the graduate level after 30 years of active practice. Board certified by the American College of Healthcare Architects, with a bachelor’s degree in architecture from the University of Texas, a Master’s Degree in Organization Development from Pepperdine University, and a recently completed PhD in Nursing & Healthcare Innovation at Arizona State University, studying ICU nurse movement patterns and interaction with objects. A prolific author and advocate for evidence-based design, Hamilton co-edits the peer-reviewed, interdisciplinary Health Environments Research & Design Journal (HERD) of which he is a founding co-editor.

*D. Kirk Hamilton is sponsored by Nexxspan Healthcare, LLC.*
### Agenda - Wednesday, Aug. 14

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<td>10 - 11:30 a.m.</td>
<td>Bus transportation from The Westin Poinsett Hotel to the Clemson University Nursing building &amp; Registration at the Clemson University Nursing building</td>
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<tr>
<td>11 a.m. - 12 p.m.</td>
<td>Light lunch in lobby of Clemson University Nursing building</td>
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<td>12 p.m.</td>
<td>Welcome</td>
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<tr>
<td>12:15 - 1:15 p.m.</td>
<td>Keynote: “Florence Nightingale and the Built Environment for Health”</td>
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<td>Lynn McDonald, Ph.D., Professor Emerita University of Guelph, Ontario, Member of the Order of Canada. Director of the 16-volume Collected Works of Florence Nightingale</td>
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<td>1:30 - 2:30 p.m.</td>
<td>Family Engagement in the Neonatal ICU: How the Design of Single-family Rooms is Influencing Parental Behaviors: Herminia Machry, PhD Candidate, MSc; Anjali Joseph, Ph.D.; pg. 46</td>
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<td>Neonatal Nurses' Emotional Work in a Single-Family Room NICU: Megan Doede, PhD, RN; pg. 27</td>
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<td>Journey to Household Healthcare Design: Beth C. Cecil, MA-HRD, LNHA; Andrew Nelson, TRS, LNHA; Stuart Barber, AIA; pg. 24</td>
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<td>Designing a Seamless Transition: Cassandra Church, MSN, BSN; Jessica Mabie, MHA; pg. 25</td>
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<td>2:30 p.m.</td>
<td>Coffee Break / Networking - Lobby</td>
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<td>2:45 - 3:45 p.m.</td>
<td>The Role of Built Environment in Physician Handoff Process in Emergency Departments: A Literature Review: Rutali Joshi, PhD Student, MS; Anjali Joseph, PhD; pg. 39</td>
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<td>Environmental Needs, Barriers, and Facilitators for Optimal Healing in the Post-Operative Process, A Qualitative Study of Patient Experiences: M. van Kordelaar, MSc; pg. 42</td>
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<td>4:15 - 5:15 p.m.</td>
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<td>Informing the Quadruple Aim: Development of a Tool to Assess Healthcare Staff Wellbeing &amp; Aspects of the Built Environment: Terri Zborowsky, Ph.D., Kara Freihoefer, PhD, NCIDQ, EDAC, LEED ID+C; pg. 70</td>
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<td>Evaluating Nurse Perceptions of Alternative Preoperative Room Designs in Virtual Reality Using Scenario-based Simulations: Deborah Wingler, PhD, MSD-HHE; pg. 66</td>
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<td>Utilizing Research Findings to Guide Decision-Making in the Design Process: A Case Study: Joyce Durham, BSN, MARch, AIA; pg. 28; Sponsored by Atreo Group</td>
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<td>5 - 6 p.m.</td>
<td>Bus transportation to the Westin Poinsett Hotel</td>
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<td>6 - 9 p.m.</td>
<td>Dinner and Music Reception at the Westin Poinsett Hotel</td>
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Welcome by International Facility Management Association and track chairs: Susan Silverman, Teri Oelrich and Kay Rademacher

Music by Synergy Twins

**Color Key:** Measuring Outcomes, Patient Experience, Healthy Work Environment, Innovation & Healthcare Design
## Agenda - Thursday, Aug. 15

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<td>7-8 a.m.</td>
<td>Bus transportation from The Westin Poinsett Hotel to the Clemson University Nursing building</td>
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<td>8-9 a.m.</td>
<td><strong>Keynote:</strong> “Nursing and Design for Health”&lt;br&gt;Jaynelle Stichler, DNS, RN, NEA-BCR, FACHE, FAAN, Professor Emerita, San Diego State University; Co-Editor of HERD Journal; Consultant- Research Sharp HealthCare Center of Nursing Excellence&lt;br&gt;<em>Room 120 - Auditorium</em></td>
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<td>9:15 - 10:15 a.m.</td>
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<td>9:15 - 10:15 a.m.</td>
<td><strong>Examining the Impact of the Physical Healthcare Environment on Nurse Fatigue:</strong> Deborrah Wingler, PhD, MSD-HHE; Kathy Okland, MPH, RN; pg. 67</td>
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<td>10:15 a.m. - 10:45 a.m.</td>
<td><strong>Coffee Break/ Networking - Lobby</strong></td>
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<td>11 a.m. - 12 p.m.</td>
<td><strong>Utilizing a Treatment Room to Decrease Medical Traumatic Stress in Hospitalized Children:</strong> Holly Moss-Rosen, MA, CCLS; Cassy Weeks, BSN, MBA; pg. 52</td>
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<td>11 a.m. - 12 p.m.</td>
<td><strong>Healthcare Design Impact on Liberia Health Workforce: A Pre-Assessment Project:</strong> Robin Toft Klar, DNSc.; Deborah Chyun, PhD, RN; pg. 41</td>
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<td>12 - 1 p.m.</td>
<td><strong>Lunch - Rooms 464/468</strong></td>
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<td>1 - 2 p.m.</td>
<td><strong>Standardizing Patient Handoff Communication in the Acute Care Setting:</strong> Lucrecia Wright, MSN, RN, CNML; pg. 68</td>
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<td>1 - 2 p.m.</td>
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<td>2:15 - 3:15 p.m.</td>
<td><strong>Building an Interprofessional Care Model into a Hospital:</strong> Tracy Lowerre, RN, MS. CPN; Zach Isbell, CHC; Kate Renner, AIA; pg. 57</td>
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<td>2:15 - 3:15 p.m.</td>
<td><strong>Condition Critical: Clinician Well Being And Workplace Implications:</strong> Adeleh Nejati, PhD, AIA; Kathy Okland, MPH, RN; pg. 54</td>
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<td>3:15 p.m.</td>
<td><strong>Coffee Break / Networking - Lobby</strong></td>
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<td>4:30 - 6:30 p.m.</td>
<td>NIHD Poster Reception&lt;br&gt;&lt;br&gt;Poster presentation - 4:30 - 5 p.m. - Rooms 464/468&lt;br&gt;Reception - 5 - 6:30 p.m. - Fourth Floor Connector</td>
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<td><strong>Bus Transportation to the Westin Poinsett Hotel</strong></td>
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<td><strong>Merlijn Smits</strong>, MSc</td>
<td>A Qualitative Study of Subjective Wellbeing During a Simulated Hospital Admission Towards the Optimal Healing Environment pg. 61</td>
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<td>Making a Case for Evidence-Based Design Precedents in Architectural Education pg. 21</td>
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<td><strong>O. Michael Duty</strong>, AIA, NCARB; <strong>Gabriel Massa</strong>, AIA, NCARB</td>
<td>HYPERPOD ICU pg. 29</td>
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<td><strong>Kelly Landsman</strong>, BME</td>
<td>Achieving Patient Care Device Innovation: Embracing the Nurse Engineer to Evolve the System. pg. 43</td>
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<td>Students as Designers: Modeling Interdisciplinary Collaboration and Stimulating Innovative Solutions for Better Healthcare Access in Rural Communities pg. 31</td>
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<td><strong>Beth C. Cecil, MA-HRD, Licensed Nursing Home Administrator, LNHA; Andrew Nelson, TRS, LNHA; Stuart Barber, AIA</strong></td>
<td>Journey to Household Healthcare Design pg. 24</td>
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<td><strong>Bailey Leopard,</strong> student in B.S. program in Bioengineering</td>
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<td><strong>Keynote:</strong> “Applying Human Factors to Room Design to Support Nurses’ Work”</td>
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<td>Emily Patterson, PhD, Associate Professor in the Division of Health Information Management and Systems, School of Health and Rehabilitation Sciences, College of Medicine at the Ohio State University</td>
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<td>9:15 - 10:15 a.m.</td>
<td><strong>An Innovative Nurse Led Intervention to Reduce Non-Ventilator Associated Hospital Acquired Pneumonia Among Veterans:</strong> Shannon Munro, PhD, APRN; pg. 53</td>
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<td><strong>The Quadruple Aim: Designing for Safe Discharge:</strong> Laurie Waggener, BSRC, RRT; Jennie Evans, RN, MS; Ella Franklin, MSN; pg. 65</td>
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<td><strong>Caregivers’ Lived Experience of Decentralized Nurse Station Design and the Delivery of Quality Care:</strong> Susan McDevitt, MSN, ARNP; Francesqca Jimenez, MS; pg. 48</td>
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<td><strong>Integrating Post Occupancy Evaluation into the Design Process:</strong> Pamela Jones, RN, MS, RN; Erin Clark, RN; pg. 37</td>
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<td><strong>Two Simulation Labs: Considerations for New and Existing Lab Space:</strong> Kathleen Valentine, PhD, RN; Jean Ellen Zavertnik, DNP, RN; Kevin McDonough; Kristen Lawson, MILS; pg. 63</td>
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<td><strong>Using A Human-Centered Approach to Design Safer OR Environments: Learning From A 4-Year Patient Safety Lab:</strong> Anjali Joseph, PhD</td>
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<td><strong>Pediatric ED Crisis Evaluation, Patient Experience:</strong> Janice Siegle, M.Ed, OTR/L; Jon Boyd, AIA, LEED AP; pg. 59</td>
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<td><strong>FACILITATE Expansion: A Unique Cross-Collaborative, Inter-Professional Initiative to Improve the Communication Skills of Nursing Students:</strong> Alexis del Vecchio, B.A., MD Candidate; Phillip Moschella MD, PhD; Cami Pfennig, MD, MHPE; pg. 64</td>
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<td><strong>A Review of Quantitative Measurement Tools for Nurse Experience Related to the Inpatient Care Environment:</strong> Renae Rich, MS; Francesqca Jimenez, MS; pg. 58</td>
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<td><strong>Cultivating Creativity and Innovation in Healthcare Design and Nursing:</strong> Debbie Gregory DNP, RN; Jennie Evans, RN, MBA; Oriana Beaudet, DNP, RN; pg. 34</td>
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<td><strong>Continuous Monitoring of Hospitalized Patients - a Paradigm Shift in Healthcare:</strong> Merlijn Smits, MSc; pg. 62</td>
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<td><strong>Nurses Wear Hardhats: The Many Faces of the Nurse in Healthcare Design:</strong> Terri Zborowsky, PhD, Debbie Gregory, DNP, RN, Jennie Evans, RN, MBA, EDAC, LEED AP, LEAN SIX SIGMA, Oriana Beaudet, DNP, RN, PHN; pg. 71</td>
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<td><strong>R4Heal: The Development of an Interactive Healing Environment For Better Recovery of Post-Operative Patients:</strong> H. Van Goor, MD, PhD, FRCS; pg. 33</td>
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<td><strong>At My Witt's End: The Environment and Intellectual Disabilities:</strong> Kendall Marsh, MHID, Dak Kopec, PhD, MCHES; pg. 47</td>
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<td><strong>Using a Social Ecological Model to Design a Strategic Action Plan for a Rural Promise Zone:</strong> Julia Smith Dempsey, PhD; Veronica Clevenstine, BS; pg. 26</td>
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<td>4:40 - 5:40 p.m.</td>
<td>Panel: Nurse Leaders in Healthcare Design: Creating a Movement for Advocacy and Change</td>
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Panelists

_Nurse Leaders in Healthcare Design: Creating a Movement for Advocacy and Change_

Robin Toft Klar, DNSc, RN

Robin Toft Klar is a Clinical Assistant Professor at NYU Meyers College of Nursing. Her clinical, teaching, and research career has focused on health promotion from a community perspective. Her work examining the environment has evolved over the years going beyond air, water, and soil to include the built environment. Her current clinical and research work focuses on the social and physical environmental impact on health workforce capacity building in low and middle income countries (LMICs). Klar’s teaching scholarship brings principles of the built environment and their impact on population health to graduate nursing students and nurse practitioners.

Geralyn McDonough, MA, BSN, CENP

Geralyn McDonough is never satisfied with the status quo. With over fifteen years’ experience as a nurse leader, McDonough’s passion is advocating for nurses and the practice environment. After leaving NYC in 2014, Geralyn relocated to Greenville, SC and joined the Nursing Leadership team at Greenville Memorial Hospital. Along with the CNO, Lori Stanley collaborated on leading Greenville Memorial Hospital to their first Magnet® Designation. Currently serving as the Director of Nursing Quality & Practice and Magnet Program Director, McDonough ensures the voice of the clinical nurse is heard through shared governance.

Kay Rademacher, MSA, RN, NEA-BC, EDAC **Sponsored by Midmark Corp.**

Kay Rademacher has more than a decade of experience in health facility activation and transition planning. She has overseen new hospital transitions, been the project manager for two major health facility construction projects and has played a major role in the operational and activation planning for two separate hospitals. Kay focuses on project activation, transition planning, and workflow improvement. Her attention to detail, structure and project management skills provide guidance and leadership for a successful project.

Kathleen Valentine, PhD, MS, RN

Kathleen Valentine is the director of Clemson University’s School of Nursing, associate dean of CBSHS, and academic nursing officer at Prisma Health–Upstate. An international leader in nursing education, she has served as dean of nursing at the University of New Brunswick and associate dean at Massachusetts General Hospital Institute for Health Professions and Florida State. Her research focuses on the economic value of human caring, nurse-managed primary care clinics, and inter-professional collaboration providing services for the aging. Dr. Valentine is a past president of the International Association for Human Caring and founding editor for the International Journal for Human Caring.
Agenda - Saturday, Aug. 17

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<td>7-8 a.m.</td>
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<td>8-9 a.m.</td>
<td><strong>Keynote: “Evidence-Based Nurse/Architect Collaboration Impacts Outcomes”</strong>&lt;br&gt;D. Kirk Hamilton, PhD, FAIA, FACHE, Julie &amp; Craig Beale Professor of Health Facility Design, Texas A&amp;M University and Co-Editor of HERD Journal&lt;br&gt;<em>Room 120 - Auditorium</em></td>
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<td>9:15 - 10:15 a.m.</td>
<td>State of the Science International/National Panel&lt;br&gt;<em>Room 120 - Auditorium</em></td>
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<td>10:15 - 11:15 a.m.</td>
<td>Clemson University State of the Science Panel&lt;br&gt;<em>Room 120 - Auditorium</em></td>
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<td>11:15 - 11:30 a.m.</td>
<td>Closing Remarks&lt;br&gt;<em>Room 120 - Auditorium</em></td>
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Thank you to our sponsors HKS and nora by Interface for sponsoring our lunches, and thank you to ECORE, Mazzetti, and NBBJ for sponsoring the coffee breaks and networking.

We hope you will join us for next year’s conference in summer 2020.
Panelists

*International/National State of the Science Panel*

**Lily Salkoff**

Lily Salkoff has been actively involved in working with healthcare facilities for over 18 years. She is a Healthcare Specialist for Tremco Roofing & Building Maintenance. She works with healthcare facility professionals, construction services, architects, consultants and contractors to assist in finding cost-effective long-term solutions for roofing and building envelope issues. She is also actively involved in multiple organizations, including International Facility Management Association’s Health Care Council, Association for Facility Engineers, and the Florida Healthcare Engineering Association.

**Kathy Reno, PhD, MBA, BSN, RN**

Since the 1970s, Kathy Reno has been involved in hospital design, and throughout her career has served in administrative roles in healthcare organization as well as been a part of renovation and new construction projects. Since her retirement in 2007, she has been consulting with Joint Commission Resources and Joint Commission International on a blended approach with Evidence-Based Design principles and Joint Commission standards. She has reviewed hospital plans for facilities in every continent as well as lectured around the world on designing for safety.

**Brenda McDermott, MSN, EDAC**

Brenda McDermott serves as the Clinical Lead for the Defense Health Agency [DHA] Facilities Division. She is responsible for developing and sustaining the DoD space planning criteria, space templates and the Space and Equipment Planning System (SEPS). Ms. McDermott represents DHA as a member of The Facility Guidelines Institute’s Health Guidelines Revision Committee. With experience as a licensed family nurse practitioner, she has provided clinical planning and design input on DoD projects, including medical centers and hospitals, ambulatory care and surgery centers and National Intrepid Centers of Excellence satellite clinics.

**J. Todd Robinson, FAIA, EDAC**

Todd Robinson, ESa’s President, is responsible for the design and project management of hundreds of new, renovated and expanded medical facilities of almost all types across the country. His designs encourage operational efficiency while providing a patient-focused environment incorporating hospitality elements and Lean principles. While his projects possess hallmarks of meeting schedules and budgets, he’s most proud of creating spaces that make clients successful while also promoting healing and humanity.
Panelists

*Clemson University State of the Science Panel*

**David Allison, FAIA, FACHA** Sponsored by EYP Architecture & Engineering

David Allison is an Alumni Distinguished Professor and Director of Graduate Studies in Architecture + Health, and holds an appointment as a Faculty Scholar in the Clemson University School of Health Research. 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 and serves on its Board of Regents. 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.

**Anjali Joseph, Ph.D., EDAC**

Anjali Joseph is the Spartanburg Regional Health System Endowed Chair in Architecture + Health Design and Director of the Center for Health Facilities Design and Testing at Clemson University. Joseph is focused on using simulation and prototyping methods to research and test effectiveness of promising design solutions that may impact patient safety in high stress healthcare environments. She is currently leading a multidisciplinary AHRQ funded project to develop a learning lab focused on improving patient safety in the operating room. She was recognized as the 2018 Researcher of the year by Healthcare Design Magazine for her contributions to healthcare design research.

**Nathan McNeese, Ph.D.**

Nathan McNeese is an assistant professor and the 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. He also holds an affiliation in Clemson’s Human Factors Institute. For over 10 years, he has conducted research mainly focused on teamwork and collaborative technology within a variety of different contexts. His current research interests span across the study of better understanding the relationship of team cognition and technology, human-machine teaming, and the development/design of human-centered collaborative tools and systems.

**Susan O’Hara, Ph.D, MPH, RN**

Susan O’Hara is an Assistant Professor in the School of Nursing and the School of Architecture. Recently, she has worked with the School of Architecture as an advisory board member for the RIPCHD.OR project, building a computer simulation model for the MUSC ambulatory center. She has also collaborated with the Department of Industrial Engineering and School of Computing. She is the President and Founder of O’Hara Healthcare Consultants, LLC, specializing in architectural healthcare programming and design review for medical facilities. Using simulation modeling, she has worked with hospital administrators and architects providing occupancy planning services, and detailed architectural programming services.
Mission Control: The Heart Of An Integrated Procedural Platform At Oregon Health & Science University

Barbara Anderson, MSN, RN, Principal/Medical Planner, ZGF Architects
Lisa Newman, MSN, RN, Nurse Manager, Oregon Health & Science University
Solvei Neiger, AIA, ACHA, Principal/Medical Planner, ZGF Architects

Purpose
During the planning and design of the new 14-story ambulatory tower for Oregon Health & Science University's Center for Health & Healing South, the project team developed an innovative approach to co-locating disparate procedural services that resulted in improved operational efficiency while enhancing the patient experience, reducing the space required and the cost of care.

Relevance/Significance
This case study exemplifies setting the stage for innovation to occur, with best practice results in the planning and design of procedural areas within healthcare organizations. The presenters will share the planning approach that led to innovation, opportunities for physician/nurse/patient engagement, and how this approach expanded the role of nurse leaders in the design of specialty practices.

Strategy and Implementation
Co-locating Endoscopy, Cardiology, and Interventional Radiology into one multispecialty procedural platform—“mission control”—and standardizing pre- and post-procedural care offered benefits on several different levels.

Evaluation/Outcomes
The presenters will provide data and key findings from the first several months of operation and outline the benefits of combining like services. They will compare patient experience, staffing requirements, and organization and utilization of resources, such as space and supplies, with the previous model where these three service lines were not co-located.

Implications for Practice
Operating as one procedural unit improved efficiency by consolidating staffing resources and supplies, enhancing flow and throughout, and streamlining the onboarding process of new staff. Standardizing procedural services improved the patient experience, enhanced patient safety, and increased on-time starts, resulting in decreased overtime, all contributing to the reduced cost of delivering care.
Best Practices in Telemedicine Environment Design: An Integrative Review

Lauren A. Beretich, MS, LCGC, School of Nursing, Clemson University
Jane M. DeLuca, PhD, RN, CPNP, School of Nursing, Clemson University

Purpose
To synthesize key factors in the design of a telemedicine environment.

Background/Significance
Telemedicine is an expanding service delivery model. Healthcare organizations and providers will have the opportunity to thoughtfully design telemedicine environments, as programs are developed and grow, with optimum patient and provider satisfaction in mind. While current resources and recommendations are available, there is yet to be a general practice guideline which details the best practices for telemedicine environment design.

Methods
Literature which focused on the design of telemedicine environments was systematically selected using a three-arm search strategy. First, relevant publications were identified from active telemedicine programs and organizations. Next, PubMed and EBSCO host were searched using the key terms “telemedicine room design” and “telemedicine environment.” Lastly, the reference lists of literature meeting inclusion criteria were thoroughly reviewed to identify additional literature.

Conclusions and Implications for Practice
Multiple key factors should be considered when designing a telemedicine environment including location, lighting, room color(s), and technology. It is apparent the aesthetic design is equally important to the technological function of telemedicine environments. Thus, both aesthetics and function should be critically evaluated prior to the implementation of a telemedicine program. Further research is necessary to assess key factors unique to healthcare specialties utilizing telemedicine.
Making a Case for Evidence-Based Design Precedents in Architectural Education

Cameron Campbell, AIA, M.Arch, Registered Architect & Senior Associate Dean in the College of Design and Associate Professor of Architecture, Iowa State University
Daejin Kim, PhD, EDAC, CAPS, Assistant Professor, Iowa State University
Babafemi Ade-Aina, M.Arch, Graduate Student, Iowa State University

Purpose
The presentation will include multiple examples of analysis of Evidence-Based Design (EBD) projects that have been completed and the resulting academic lessons. One challenge that should not go without consideration is that companies are reluctant to share the proprietary experience. Ironically, one of the cardinal components of EBD practice is a commitment to share findings and performance outcomes about the project in order to further develop the body of knowledge. A meaningful discussion can take place about the merits of sharing this information and how to handle the proprietary versus the academic benefit to the design and healthcare community at large.

Relevance/Significance
Evidence-Based Design (EBD) has been proven to be a research-supported way to improve design and ultimately the quality of wellness projects. In the academic realm, EBD has great opportunity for research projects and student engagement. We will discuss the benefits for students, usually early in their wellness studies, to engage in a deep analysis of previously completed professional projects that employed EBD process. What this allows is unique access into lessons learned and to see the full trajectory of an EBD project. This type of study is a customized learning tool that puts the student in the center of the research and actively engages the student in the critical assessment of the EBD outcomes.

Strategy and Implementation
The strategy is to identify meaningful projects that implement EBD, acquire the materials such as process materials, plans, research, etc. from the firms, and analyze the results.

Evaluation/Outcomes
The outcomes are twofold: students carefully analyze an EBD project and share their results to an audience; and students simultaneously learn from the EBD examples. The evaluation of success is dependent on the audience. In some cases the reflection can connect with the firm or other EBD experts to evaluate the methods and findings.

Implications for Practice
This presentation shows the benefits of case studies and post-evaluation of EBD. It allows us to share findings as well as provide a parallel education to the student about design solutions.
Lessons from an Interdisciplinary Wellness Design Practice Studio

Cameron Campbell, M.Arch, Registered Architect & Senior Associate Dean in the College of Design and Associate Professor of Architecture Iowa State University
Daejin Kim, PhD, EDAC, CAPS, Assistant Professor, Iowa State University
Jihyun Song, Associate IIDA, IDEC, LEED AP, Associate Professor, Mary Mount University

Purpose
The main purpose of this presentation is to describe the unique interdisciplinary healthcare design practice studio and pedagogical strategies used to engage students in the interdisciplinary setting.

Relevance/Significance
Multiple design disciplines within one college, provide a unique opportunity to teach about healthcare settings and leverage the strengths of each discipline. This particular learning environment provides a perfect opportunity for students to share knowledge and techniques. Not only does this experience prepare students for a career in healthcare design, but it also prepares students in general for a career in practice that relies so heavily on the ability to work across disciplines and generate new ideas. There are many challenges and critics of this type of education—from those who claim that it suffers from superficiality to the students who are reluctant to truly engage this interdisciplinary learning environment. However, the benefits far outweigh the challenges.

Strategy and Implementation
We have designed very careful tools that help build interdisciplinary teams and we have a wonderful model where design and healthcare professionals can contribute deeply to the educational goal.

Evaluation/Outcomes
To build interdisciplinary teams, students conduct a survey about the personality and preferences of work at the beginning of the class. The student evaluations at the end of design projects were conducted to explore their experience and perception in this class.

Implications for Practice
This presentation shows creative and innovative design solutions for different healthcare settings as well as pedagogical strategies for teaching healthcare design to college level students.
Creating a Chromatic Organization System to Improve Efficiency in Hospital Stockrooms

Hannah Cash, Department of Bioengineering, Clemson University
Taylor Seawell, Department of Bioengineering, Clemson University
Serena Gilmore, Department of Bioengineering, Clemson University

Participants
Students in the Department of Bioengineering volunteered for this study.

Purpose
The goal of this research was to develop an efficient stockroom system that utilized color-coding to improve the experience for nurses by reducing the time it takes to locate items.

Background/Significance
Hospitals strive to find a balance between providing the best possible care and maintaining a responsible budget. Due to current methods, nurses have difficulty quickly retrieving items from hospital stockrooms. As a result of delays in stocking and retrieving items, the hospital can lose money, and nurses become frustrated with the complex systems that they are expected to use.

Methods
To test whether color coding can improve stock room efficiency, a simulated test stocking scenario was performed by participants (N = 32). Participants were timed in locating materials in an achromatic organization system and then in a color-coded organization system.

Conclusions and Implications for Practice
When examining the results for gender, there was a statistical difference between the average time it took men to locate materials in the achromatic organization system versus color-coded organization system. In terms of age, participants that were under 39 years located materials quicker in the color-coded organization. Across all groups, the average time it took to locate materials in the chromatic organization was lower than the necessary time for the achromatic organization. A color-coding organization system may be beneficial for hospital stockrooms by decreasing the amount of time spent in stockrooms, and ultimately, color-coding organization could be implemented in stock rooms universally.

Presentations
Journey to Household Healthcare Design

Beth C. Cecil, MA-HRD, Licensed Nursing Home Administrator, LNHA, Leadership Enrichment Director, White Oak Management
Andrew Nelson, Therapeutic Recreation Specialist, TRS, LNH, White Oak Management
Stuart Barber, AIA, McMillan Pazdan Smith

Participants
Administration, Nursing, Social Services, Dining Services, Life Enrichment Services, Architect

Purpose
Nursing home construction prior to 1990 was modeled after hospital units. Our conceptual design was completed by focusing on an innovative Seven Household Design Principles Model: home is familiar; seek normalcy; life happens around the hearth; honor privacy; bedrooms are personal sanctuaries; and life is purposeful. Utilizing the Minimum Data Set (MDS) 3.0, Quality Indicators and satisfaction surveys measure the impact of the Household Model on patient care.

Relevance/Significance
With 10,000 people turning sixty-five every day, replacement of these institutional dinosaurs with a Household Model is becoming a best practice in healthcare design. To transform the architectural design and model of care in skilled nursing facilities (SNF) from institutional to resident-centered care, improving the quality of life for residents through innovation using collaboration between design team and nursing care team is critical.

Strategy and Implementation
As a result, the Household design positively impacts the well-being of people who live and work in these buildings. The proximity of private spaces to public has been found to enrich quality of life. Higher ratios of private rooms and bathrooms foster the practice of person-centered care. Smaller work areas enable Nurse Leaders to manage and facilitate connections with their geriatric patients for improved quality of care.

Evaluation/Outcomes
In conclusion, the collaboration with the architect and healthcare team created a quality environment experience for nurses and their patients. Gaps in the process were discovered and need to be addressed with the next healthcare design process.

Implications for Practice
Future projects will include collaboration with university researchers to measure design effectiveness and quality of life metrics.
Designing a Seamless Transition

Cassandra Church, MSN, BSN, BA, RN, NEA-BC, RNC-NIC, John R. Oishei Children’s Hospital
Jessica Mabie, MHA

Purpose
This session will review the steps taken to successfully design, build, open and populate a new 185 bed women and children’s hospital. 125 patients were transported 1.2 miles from the retired campus and the success is due to the design of the facility, team and project management structure. We will review communication best practices, project planning and implementation, transition planning and activation of a clinical project on such a large scale. The team will review the construction timeline, technology implementation and human aspect of each milestone.

Relevance/Significance
The inaugural international nursing conference for healthcare design is going to provide learners with best practices in healthcare design, innovation in design and collaboration and to provide an inclusive setting for nurse leaders in design. This presentation will include real-life examples and best practices that the target audience is expecting to learn about collaboration in new-building activation, mock-moves, transition planning, and steps taken in both design and readiness to ensure a healthful environment for patient and staff members alike.

Strategy/Implementation
This presentation will educate the audience on how to develop and implement a multi-faceted collaborative project plan for a new facility. The audience will learn who should be included, the timeline of a successful project and the design elements on which collaboration between construction, architecture and clinical are paramount.

Outcomes
125 patients were moved individually 1.2 miles to the new women and children’s hospital. 2,200 staff members including nurses, aides, environmental services, physicians, administrators, unit secretaries, advanced practice nurses and general hospital team members were educated and participated during each phase of this activation, implementation and transition.

Implications for practice
To date there is not a single body of knowledge available to a clinical leader planning to design, activate or inhabit a new physical space. This presentation will allow for those in attendance to understand the available resources, partnerships and experiences of those who have moved multiple hospitals, clinics and patients.

Presentations (all listed below were poster-format)
SYNOVA NICU Leadership Forum – 2018; Airborne Neonatal Transport Conference – 2018; Children’s Hospital Association – 2018
Using a Social Ecological Model to Design a Strategic Action Plan for a Rural Promise Zone

Julia Smith Dempsey, PhD, Assistant Professor Emeritus, Georgia Southern University; Coordinator, South Carolina Promise Zone
Veronica Clevenstine, Clemson University ’22, National Scholars Program, Environmental and Natural Resources (B.S.)

Participants
Community members

Purpose
The purpose of the proposed project is to design a delivery framework for the Strategic Action Plan of the South Carolina Promise Zone through application of a Social Ecological Model.

Relevance/Significance
A Social Ecological Model provides a framework for research that emphasizes consideration of environmental factors on health.

Strategy and Implementation
The coordinator of the proposed project will employ past research experience with the Social Ecological model to design an innovative pathway to determine and deliver needed health-related interventions.

Evaluation/Outcomes
Expected outcomes of the project include new knowledge related to the feasibility of applying a Social Ecological model to a region's Strategic Action plan for delivery of health-related interventions.

Implications for Practice
Critical thinking skills gained from clinical and academic nursing and research experience will contribute to the development of the project coordinator role in a community setting. Evaluation of the resulting project outcomes will support application of a Social Ecological Model to future community action plans.

Presentations
Results of the project coordinator’s dissertational study were published in the International Journal of Nursing and Clinical Practice. The study and proposed project have not been presented through any other venue.
Neonatal Nurses’ Emotional Work, Stress and Burnout in a Single-Family Room NICU

Megan Doede, PhD RN, University of Maryland School of Nursing

Purpose
To describe neonatal nurses’ emotional work in a single-family room NICU.

Background
In the past twenty years, NICUs have undergone changes in layout from open-bay (OPBY) to single family room (SFR). This has implications for nurses’ emotional work—the ability to project the expected emotional climate during caregiving.

Methods
Interpretive description guided this study. A total of fifteen (N=15) nurses working in one SFR NICU participated in interviews and observations over a six-month period. Interview and observation data were coded broadly, then collapsed into themes as patterns within the data emerged. The conceptualization of emotional demands as antecedents to emotional work, and further stress and burnout, informed analysis.

Results
Four themes emerged: families “living on the unit,” isolation of infants, ability to form trust and bonds, and sheltering. Emotional demands increased surrounding families living on the unit and the isolation of infants. This increased nurses’ emotional work and therefore stress and burnout. In relation to forming trust and bonds and sheltering, emotional demands were lessened, emotional work decreased, and stress and burnout were alleviated.

Implications
Care should be taken in the design of the NICU, as physical layout impacts nurses’ emotional work. Understanding this relationship can aid nurse leaders in preparing nurses for the transition from open bay to single family room layout.

Contributors: Debra L. Wiegand, PhD, RN, CCRN, CHPN, FAHA, FPCN, FAAN (posthumous); Alison M. Trinkoff, ScD, MPH, RN, FAAN
Utilizing Research Findings to Guide Decision-Making in the Design Process: A Case Study

Joyce Durham, BSN, BArch, MArch; RN, AIA, EDAC, New York Presbyterian Hospital

Purpose
The purpose of this case study was to develop a method to communicate the recent research findings to the planning team such that they could use the information to decide whether to provide decentralized nursing stations in a new bed tower.

Relevance/Significance
In the typical facility planning process, information brought to the planning group is often anecdotal or an individual’s opinion. The scope of research into healthcare facility design has increased dramatically over the past decade but there is rarely a point in the design process where current research findings are reviewed. As a result, recent research findings are not used as a basis for design decision-making.

Strategy and Implementation
In this case study, a process was developed to do two things, first present a single-page summary of research findings to assist the group in quickly understanding the advantages and disadvantages of decentralized nurse stations. And, second, use research findings to identify how the disadvantages can be mitigated.

Evaluation/Outcomes
The research summaries provided the planning team with a basis for decision-making. As a result, team member had the confidence to make decisions in a timely fashion especially on highly debated topics such as decentralized nursing stations.

Implications for Practice
Typically, the healthcare facility design process does have a “research” activity in the pre-planning phase which often consists of a series of site visits. The findings of this case study suggest that the “research” phase should also include a short, easily digestible, summary of recent research which can serve as a basis for future decision-making.
Purpose
The renovation of the Intensive Care Unit at Greenville Hospital posed serious challenges to achieving a design which maximized the use of the space available. A critical factor in achieving a successful design was the requirement for natural light into all of the ICU suites.

Relevance/Significance
The Greenville Hospital space was quite large, but with limited exterior wall.

Strategy and Implementation
Utilizing the existing length of exterior wall in a classical room layout would result in a low yield of treatment units. During programming or evidence based design, as it currently is known, the design team focused on adapting a 4 unit “pod” layout around the exterior wall which resulted in obtaining 4 units in the space of 3, utilizing classical spacing. Each pod had its own light well around which the units were arranged, thereby gaining the required light and also creating a 4 unit subunit within the nursing care overall unit. This required approaches to the layout of nursing care space which were a variation to the norm. With careful programming and planning, a plan was reached which served the nursing community well.

Evaluation/Outcomes
A substantial benefit to this arrangement was the distinctive “sense of space” which the 4 bed subunit created within the ICU Department overall. It was believed that the identity that these subunits extended to the staff, the patient, and to family members was a positive result of the design to maximize natural light, which of course the design achieved in a graceful manner.

Implications for Practice
The primary implications is to illustrate: 1) How to creatively capture light into otherwise closed spaces in response both to new codes and to the universal understanding of the role of natural light in the healing environment. 2) How the design of the Hyperpod can yield new approaches to other healing spaces by favoring the natural healing of light, and the developing of sub groups of care givers as well as lessening the anxiety of family members. 3) How identifying one “crucial factor” can trigger the review of other assumptions as we seek new and innovative solutions.

Presentations
Has not been presented before except briefly at Phoenix Health Care Conference.
Nursing Station Typologies: A Space Syntax Comparison of Unit-related Factors

Lindsey Fay, MSArch, EDAC, University of Kentucky
Kevin Real, PhD, University of Kentucky
Hui Cai, PhD, University of Kansas

Purpose
This study utilized a multi-site, multi-methodological approach to analyze the effects of decentralized and hybrid nursing unit models on staff efficiency, visibility, and communication.

Background/Significance
The centralized nurse station has gradually been replaced by variations of decentralized, hybrid, or mobile work stations to achieve increased visibility, time with patients, and efficiency. However, there is little systematic research examining the various typologies and their impact on staff and patient outcomes.

Methods
Multiple methods were employed in this study that examined four units across two states. Plans of the units were analyzed using space syntax to assess peer-to-peer visibility, nurse-to-patient visibility, and communication. Systematic onsite observation and data collection were additionally conducted on all sites and included measurements of staff walking distance, time in patient rooms, and frequency of visits to patient rooms.

Results/Findings
Observational results indicate that in the decentralized units, there was greater proximity to patients, more visits to and time spent in patient rooms, and increased staff walking distances. Although the decentralized model and hybrid model positioned staff closer to patients, visibility to other patients and peer line-of-sight were limited. Results from the space syntax analysis will be presented at the conference.

Conclusions and Implications for Practice
This study helps to better understand how different nurse station models perform and illustrates how visibility and proximity are important spatial mechanisms affecting nurses’ teamwork, communication, and efficiency. As such, the unit typology, the shape of the corridor, and the supply model must be considered together with the level of decentralization in future nursing unit designs.
**Students As Designers: Modeling Interdisciplinary Collaboration And Stimulating Innovative Solutions For Better Health Care Access In Rural Communities**

**David Feinauer**, PhD, PE, David Crawford School of Engineering, Norwich University  
**Cara Armstrong**, M. Arch, MFA, AIA Assoc., School of Architecture + Art, Norwich University  
**Llynne C. Kiernan**, DNP, MSN, RN-BC, School of Nursing, Norwich University

**Purpose**  
This project involved cross-disciplinary collaboration among our institution’s key professional programs through modelling meaningful classroom collaboration with our undergraduate students while mentoring them in design thinking to address stakeholder needs. Professional relationships were leveraged to challenge students to address innovation related to rural healthcare access.

**Relevance/Significance**  
Stimulating interdisciplinarity by challenging us to make space and develop shared values for effective collaboration while modeling it for our students. Course learning objectives include exercises in empathy and inclusive gathering to excite innovation and inspire human-centered design. The specific context addressed healthcare access in rural communities for business collaborators. Thus, the project intersects four of the six conference objectives. Impediments to rural citizens that result from healthcare disparities underscore the relevance of the challenge.

**Strategy and Implementation**  
Students explored the development, management, evolution, and broad context of healthcare innovation. They examined how technologies could improve healthcare access for students of rural institutions and for people with stress living in rural areas, particularly veterans with PTSD. Students gathered information and built an understanding at the personal and clinical levels (interviews, observations, literature review). They developed problem statements, defined opportunities to effect change, ideated solutions, and tested multiple prototypes.

**Evaluation/Outcomes**  
Student engagement, overall performance, and feedback from external partners serve as measures of project effectiveness. Requests for future projects from all partners have resulted.

**Implications for Practice**  
This work will serve as the catalytic foundation for our long-term goal of developing a collaborative team working on accessible, high-impact, healthcare access solutions.
The View from my Chair: Improving Care Firsthand

Ronn Goodnough, RN, MN, MBA, EDAC, Clinical Project Manager, Nursing Administration, CHI/Franciscan Health
Janet Dugan, AIA, LEED AP, Principal, Healthcare Studio, NBBJ

Participants
Departmental staff and clinical leadership of the existing three oncology units at Harrison Medical Center.

Purpose
To present a case study illustrating the importance of the viewpoints of oncology patients during design.

Relevance/Significance
Designers and architects have many ways to simulate a patient or caregiver experience shadowing nurses, tracing experience flows, even becoming a “secret shopper” in the healthcare environment. But nothing gives perspective on patient experience like sitting in an infusion chair. In fact, planning a cancer center from this viewpoint is invaluable.

Strategy and Implementation
Meet two cancer patients– a nurse and architect– who are leading the design of a new comprehensive cancer center. This duo partnered to bring three community oncology clinics together into an integrated setting. Their unique perspectives– clinician, designer, patient, manager, introvert, extrovert– allowed them to capably unite differing cultures and viewpoints of patient care. The challenge has coalesced into a design that responds directly to the operational, physical, and emotional needs of all the humans within the space– especially through the patient lens. This presentation will include first-hand accounts of issues plaguing patients that you won’t hear from a focus group. The discussion will touch on the concerns in blending different cultures and long ingrained clinical habits. Also, participants will learn how the evolving patient mindset plays an important part in establishing relationships that improve care.

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.

Implications for Practice
Providing choices for patients beyond the obvious, creating sight lines for safety, flexibility to adapt for patient needs easily, and encouraging nurses to actively partner with architects during design to create truly innovative spaces.

Presentations
This session was presented and favorably received at HCD18 in Phoenix, AZ in November 2018.
R4HEAL: The Development Of An Interactive Healing Environment For Better Recovery Of Post-Operative Patients

H. Van Goor, MD, PhD, FRCS, Radboud University Medical Center, The Netherlands

Purpose
The project R4heal aims to develop an individualised interactive healing environment for the improvement of patients’ well-being and recovery by targeting pain, stress, sleep and mobility in a single patient room.

Relevance/Significance
During post-operative recovery, patients suffer from pain, stress, sleep disturbances and immobility. These four factors interact, negatively affecting recovery and well-being. Healthcare design may contribute to improving the factors. However, most initiatives fail to generate significant impact because they focus on only one factor, do not take individual preferences into account or cannot be adjusted according to a patient’s recovery process. New digital technology enables to improve all four factors in an integrated manner and adjusted to different patient’s needs.

Strategy and Implementation
Via an iterative process, we develop a personalised interactive healing environment using digital technology. We start with designing the separate elements (e.g. audiovisuals, virtual reality, serious gaming, sensing technology) and testing these with volunteers and patients in various authentic care scenarios in an experimental patient room at the normal ward. The elements will be brought together into one validated interactive healing environment system.

Evaluation/Outcomes
The effects of the various technologies acting individually and together are determined on mentioned factors. First test results indicate positive but varying effects on stress and pain and adjusted behavior of nurses, stressing the importance of personalization in ‘healing environment’ design and the strength of an experimental patient room at the normal ward for nurses.

Implications for Practice
This stepwise process benefits the gradual acceptance of healing environment aspects by patients and nurses.
Cultivating Creativity and Innovation in Healthcare Design and Nursing

Debbie Gregory, DNP, RN, Smith Seckman Reid, Inc.
Jennie Evans, RN, MS, Mazzetti, Inc.
Oriana Beaudet, DNP, Array Advisors

Purpose
Healthcare Transformation requires new and creative models of leadership and management. Collective creativity and the development of supportive organizational contexts for creativity is one of the primary management and leadership challenges of today. Innovation begins with creativity in conjunction with opportunity identification. The cultivation of new ideas, change management, and creativity can be used to guide the evolution of professional nursing practice and ultimately advance patient care.

Significance
Organizational creativity occurs at the intersection of personal motivation, supporting resources, and management strategies. Changing the landscape of healthcare calls for divergent thinking and promoting creativity within the professional culture and to expand the professional nursing role. Healthcare Design Nurses must lead creatively and advocate for nurses to be empowered to cultivate a creative culture that embraces change and innovation.

Implementation
Healthcare design projects create the perfect environment for engaging design thinking, human centered design, and innovation. Leading nursing teams in the design process is a leadership opportunity to educate and instill design principles within the health systems we serve. Examples of creative and innovative processes and tools will be discussed. A list of resources will be shared for cultivating a creative and innovative culture.

Evaluation
A successful organization can stretch the limits of individual and collective knowledge, skill, and ability to meet the complex needs of the organization. Engaging in creative and design thinking can shift an organization culturally and within the professional practice. Examples and successes of organizational change and innovative leadership will be discussed.

Implications for Practice
Nurse Leaders in Healthcare Design can expand their professional practice to engage and empower creativity, design thinking, and innovation. This professional nursing design group must expand their scope of practice to include the nursing creative and innovation communities to further strengthen the impact on the future of healthcare.
Panel

Nurse Leaders in Healthcare Design: Creating a Movement for Advocacy and Change

Panel Moderators: Debbie Gregory DNP, RN, Smith Seckman Reid, Inc. Susan O’Hara, PhD, MPH, RN, NIHD Fellow, Clemson University School of Nursing, School of Architecture

Participants
Present and Past Nursing Institute for Healthcare Design (NIHD) Presidents

Purpose
The Nursing Institute for Healthcare Design emerged as a “grass roots” organization in 2005. Nurse leaders joined together in response to a lack of advocacy and professional support surrounding clinicians that were involved in the design of healthcare environments. Through education, advocacy, and activism, the organization has grown into a movement of nurses and partners advocating to engage and integrate clinical expertise into the planning and design of healthcare environments.

Significance
This conference is a milestone of the mission and movement of the nurses that have pioneered this industry and helped put the nursing profession at the design table. The vision for each of the panelists has been to disseminate new knowledge, identify best practices, stimulate innovation, encourage interprofessional collaboration, and improve safety.

Implementation
Hear from the leaders of this movement and how it has evolved and grown over time. The panel will describe the challenges and successes of creating a supporting structure for nurses in healthcare design. The panel will discuss how ideas can be turned into action through systems thinking and organizational change.

Evaluation
This co-created learning community has emerged as a powerful force. The sharing of resources and interests has created a supporting structure for career development, skill building, advocacy and ultimately impactful to the larger healthcare ecosystem. The panel will describe milestones and the continued vision for the future.

Implications for Practice
The panel will describe how the organization has supported nurse leaders and impacted the practice of nursing in healthcare design. Examples and opportunities for involvement and leadership for the future will be shared.
The Impact of Daylight and Views on Post-Myocardial Infarction Patients in Cardiac ICUs

Roxana Jafarifiroozabadi, MArch, EDAC, Clemson University Architecture + Health
Andrea Franks, MSN, RN, CCRN-K, AnMed Health
Anjali Joseph, PhD, EDAC, Professor, Spartanburg Regional Healthcare System Endowed Chair in Architecture + Health Design; Director, Center for Health Facilities Design and Testing; School of Architecture, Clemson University

Purpose
This study investigates the impact of daylight and views on post-myocardial infarction (MI) patients’ length of stay and MI symptoms in a cardiac ICU.

Background/Significance
Being diagnosed with heart diseases such as MI can lead to symptoms such as depression, anxiety, pain, sleep disruption, and delirium that are linked to prolonged hospital stays. Evidence indicates that presence of daylight and views can influence these adverse outcomes positively. Nevertheless, no studies to date have differentiated the impact of daylight from views on post-MI patients’ recovery.

Methods
An IRB approved two-phase study was conducted in a cardiac ICU comprised of rooms with the same size and three unique types of daylighting and viewing accommodations including rooms with daylight and no access to window views, windowless rooms, and rooms with daylight and window views. Retrospective patient data were analyzed in phase one. In phase two, real-time data regarding MI symptoms are being collected from patients through questionnaires, actigraphy, and data loggers as well as electronic medical records.

Results/Findings
Analysis of retrospective data from June 2017 to November 2018 did not show a significant difference in patients’ length of ICU stay across the rooms. Collecting the real-time data is still in progress to determine the impact of daylighting and viewing accommodations on MI symptoms.

Conclusions and implications for practice
Findings from this study will delineate similarities and differences in post-MI patients’ health outcomes associated with rooms with different types of daylighting and viewing accommodations to inform the future design of cardiac ICUs.
Integrating Post Occupancy Evaluation Into The Design Process

Pamela Jones, MSN, MS, RN, EDAC, FACHE, Page Southerland Page Architects
Erin Clark, MS, RN, EDAC; HTS, Inc.

Purpose
Develop a Post Occupancy Evaluation (POE) process that:
• Begins in predesign
• Is integrated in design throughout the entire project
• Tracks design initiatives and goals developed in predesign against design elements in the working plans across all phases of the project
• Provides a mechanism to assess the impact of design on occupant outcomes

Relevance/Significance
Integration of POE into the design process at every stage not only ensures the evaluation is completed; but it also fosters interprofessional collaboration. The lifetime of a project from concept to completion can span many years, resulting in changes in leadership, change orders, and value engineering that misalign with the original intent. A POE can be a great source of valuable information for future healthcare design projects.

Strategy and Implementation
Implementation of this POE begins by customizing the initial evaluation based on client needs/priorities identified during predesign. The evaluation is revisited at various stages along the continuum of the project to ensure the initial design intent is maintained.

Evaluation/Outcomes
This tool facilitates the measurement of performance indicators developed by the client based on their future environment.

Implications for Practice
Previous post occupancy interviews suggest that the design intent and functionality of a new space often does not align with staff expectations. This tool will assist in bringing the vision through to occupancy as well as evaluating changes against measurable indicators/outcomes.
Using A Human-Centered Approach To Design Safer OR Environments:
Learning From A 4-Year Patient Safety Lab

Anjali Joseph, PhD, EDAC, Professor, Spartanburg Regional Healthcare System Endowed Chair in Architecture + Health Design; Director, Center for Health Facilities Design and Testing; School of Architecture, Clemson University

Purpose
A four-year Patient Safety Learning Lab funded by the Agency for Healthcare Research and Quality explored how different aspects of the OR impact patient safety.

Relevance/Significance
Adverse events such as surgical site infections and surgical errors are a huge problem in the operating room (OR) due to the highly vulnerable state of the patient and the complex interactions required between providers of different disciplines and a range of equipment, technology and the physical space where care is provided.

Strategy and Implementation
Research conducted in the first year through in-depth observations of surgeries, case studies of different facilities, literature review and interviews with clinicians formed the basis for an OR prototype that was then iteratively tested and refined over six rounds of simulations. The scenario-based simulations utilized a systems approach, and were used to evaluate the effectiveness of alternative design options for select pediatric and orthopedic outpatient surgical procedures with varying combinations of clinical team members. Each round of simulations and their evaluations increased in fidelity, resulting in a high-fidelity prototype with fully integrated video, data, and surgical tool capabilities and full surgical team simulations complete with high-fidelity clinical simulator mannequins.

Evaluation/Outcomes
Insights gained from the simulation evaluations were highly effective in providing a deeper understanding of how design features in the OR influence outcomes related to overall safety and efficiency.

Implications for Practice
This presentation describes the iterative design and testing process, and provides an understanding of how to utilize a human-centered approach and the principles involved in designing a safer more ergonomic OR.
The Role of Built Environment in Physician Handoff Process in Emergency Departments: A Literature Review

Rutali Joshi, PhD Student, MS (Architecture+Health), EDAC, Planning, Design and Built Environment, Clemson University
Anjali Joseph, PhD, EDAC, Professor, Spartanburg Regional Healthcare System Endowed Chair in Architecture + Health Design; Director, Center for Health Facilities Design and Testing; School of Architecture, Clemson University

Purpose
To synthesize research on impact of built environment of emergency departments (ED) on physician handoff communication process.

Background
EDs are high-risk, dynamic and error-prone environments. Handover errors contribute to 11% of medical errors and adverse events, all of which are preventable. Physician handoffs are crucial episodes of exchange of information, responsibility and authority between 2 or more physicians directed toward patient care. There has been a burgeoning interest in standardizing and improving the process itself. However, little is known about how the built environment of EDs can contribute to improving handovers.

Methods
Published empirical literature and non-empirical best practice papers at the intersection of handoffs, emergency medicine, and healthcare built environments were identified.

Results
A Systems Engineering Initiative for Patient Safety (SEIPS) framework was used as a basis to analyze the impact of systems components (task, tools and technology, built environment, organizational and individual factors) on handoffs. Literature reveals that handovers are impacted negatively by interruptions from staff or due to technology, and positively by team processes (individual behaviors or organizational influences). Though no study was found that relates physical characteristics of the surroundings (like spatial layout, ergonomics, or noise) to the ED handovers location, research in critical healthcare settings like ICUs suggest that layout may impact visibility and connectivity of the task location affecting interruptions and teamwork processes.

Conclusions and implications for practice
Acknowledging the limited emphasis of physical design on handovers, this review recognizes the opportunity to draw from studies conducted in other settings and evaluate EDs using rigorous research in the future.
Nurses Need to Know their Patients: Bringing Mobile to the Bedside

Tiffany Kelley, PhD MBA, RN-BC, University of Connecticut School of Nursing

Purpose
Nurses working in care settings deliver higher quality care when they know their patients. The Know My Patient ® innovation supports nurses in this effort through a mobile platform and interoperability framework that allows for contextualization of the place where patients receive care. Through Know My Patient ®, we hold the potential to drive higher quality care by addressing the limitations of our current workaround tool: the scrap paper that exists in every nurse’s pocket.

Relevance/Significance
Imagine as a patient, you overheard nurses in the hallway saying, ‘I feel like I don’t know my patients anymore.’ This is a real possibility for nurses today with current information needed to know their patients collected on a scrap paper which serves as their lifeline to provide individualized patient care. The scrap paper presents great risks for the delivery of safe, efficient, timely, and patient-centered care.

Strategy and Implementation
Observations, interviews, analysis of nursing scrap papers and other contextual information allowed for us to develop the Know My Patient ® app.

Evaluation/Outcomes
Nurses across care environments validated Know My Patient ®. Next steps include testing the Know My Patient ® innovation in a live environment while addressing the cultural, financial, and technical barriers that delay health innovation implementations.

Implications for Practice
Nurses must embrace the opportunity to leverage innovative solutions that address our nursing needs in new ways not previously available to our practice environments. This presentation will focus on the importance of the space and context where nurses provide care each day for innovative solution development.
Healthcare Design Impact on Liberia Health Workforce: A Pre-Assessment Project

Robin Toft Klar, DNSc, RN, New York University, Meyers College of Nursing
Deborah Chyun, Ph.D., RN

Participants
Both authors, two Architecture staff, Clinton Health Access Initiative (CHAI) staff member, and staff of eight nursing and midwifery training institutions and health care facilities in which students receive training.

Purpose
Conduct academic and clinical site assessments to identify faculty and student needs. Report from data analysis served as support for CHAI and Ministry of Health’s budget requirements to funding organization.

Relevance/Significance
Post the recent Ebola epidemic, the Liberia Health Workforce Program aims to expand the country’s health workforce capacity to be responsive and resilient to future emergencies and disasters. A critical goal is to also expand access to maternal and newborn care as Liberia, at the time of this pre-assessment had the 2nd highest maternal mortality in the world.

Strategy and Implementation
In collaboration with U.S. and Liberia stakeholders, a plan was created for the participant team to conduct site visits at the eight identified nursing and midwifery training institutions. A Site Evaluation Form was created and data were entered at each site visit.

Evaluation/Outcomes
Lack of basic equipment at both the academic and clinical facilities was consistently present. Infrastructure plans had been developed, however without the input from the site leaders.

Implications
Building quality nursing and midwifery capacity requires a well-supported infrastructure. Without this consideration students will enroll but may not be successful and faculty may not be retained.
Environmental Needs, Barriers And Facilitators For Optimal Healing In The Postoperative Process: A Qualitative Study Of Patient’s Lived Experiences And Perceptions

M. van Kordelaar, MSc, Radboud University Medical Center, The Netherlands

Purpose
This study aims to explore the environmental needs, barriers and facilitators for optimal healing in the postoperative process, as experienced by patients.

Background/Significance
An optimal hospital environment can enhance patient’s postoperative recovery and shorten length of stay. However, insights lack into patient’s environmental needs for optimal healing after surgery and how these needs are being met.

Methods
A qualitative study with patients who underwent elective major abdominal surgery in a Dutch university hospital. Data was collected through context-mapping exercises (i.e., diary, drawings, photos), and interviews (i.e., narrative and in-depth) to capture patients’ lived experiences. Data were systematically analyzed according to the principles of thematic content analysis.

Results
Three themes were identified representing perceived needs, and experienced barriers and facilitators. First, participants valued having a sense of control over their: treatment and recovery, ambient features, privacy, nutrition and help requests. Participants also described the need for positive distractions including: personalizing the bedroom, connecting with the external environment and the ability to undertake activities. Moreover, participants expressed the importance of functional, practical and emotional support from professionals, peers and relatives.

Conclusions and Implications for Practice
The hospital environment often does not meet up to patient’s needs for postoperative recovery. Needs fulfillment can be improved by practical adjustments to the physical and interpersonal environment and considering patient’s individual changing preferences and needs during the recovery process. Patient narratives, pictures and drawings are valuable sources for hospital managers in their efforts to design evidence-based environments that anticipate to patient-specific needs for achieving early recovery.
Stimulating Patient Care Device Innovation: Embracing the Nurse Engineer to Evolve the System

Kelly Landsman, Biomedical Engineer, Applicant to Direct Entry Master of Nursing Student, University of Minnesota, Principal Engineer/Owner, Landsman Engineering LLC

Purpose
This innovation project is an exploration into the potential role of a healthcare professional that has formal training in biomedical or health systems engineering and nursing. In addition to defining the necessary responsibilities of this healthcare change agent, the project explores how this role functions within the existing system used for the design and development of “Patient Care Devices” to evolve the existing methodology in ways that bring clinician and patient voices to the forefront. The goal of this effort is to introduce the topic, raise awareness, and gather feedback relevant to the nurse engineer.

Relevance/Significance
Many existing healthcare environments and patient care related medical devices (“Patient Care Devices”) do not function optimally and do not promote the healthcare triple aim. The existing system is inadequate and does not provide a robust, reliable or comprehensive means to define appropriate design requirements. This innovation project seeks to highlight the utility and define the role of the nurse engineer as a change agent within the existing “Patient Care Device” ecosystem. By raising awareness and collecting the insights, needs and concerns of all relevant stakeholders, this new healthcare professional, currently in the education/training phase of their development, can be fully utilized to bring positive change to the existing system used to design and develop “Patient Care Devices”. This effort directly meets the following conference goals: 2. Identify best practices for nurse leaders in healthcare design; 3. Stimulate innovation in healthcare design; 4. Encourage interprofessional collaboration and engagement; 5. Identify opportunities to bring the voice of the nurse, patient, family members, and other informal caregiver’s input into safety improvements in healthcare design.

Strategy and Implementation
Through clinical article publication, conference presentations, and hosting of a website, the role and responsibilities of the nurse engineer are explored and feedback regarding such is collected. Feedback is reviewed, synthesized and shared (where possible) to bring definition to the nurse engineer role and raise public awareness.

Evaluation/Outcomes
The role of the nurse engineer has the potential to provide an ongoing, clinically based, working relationship between nurses and engineers. If fully utilized, this role may be used to drive system wide change to the way that “Patient Care Devices” are considered, defined, and developed. Nurse Engineers are positioned to accurately define patient, clinician, and healthcare system design requirements as well as streamline the development and implementation of these innovations. Many “Patient Care Devices” are woefully inadequate, lead to healthcare errors and do not promote the optimal patient or clinician journey. An interprofessional role, the nurse engineer, is desperately needed to advance “Patient Care Device” design and development.

Implications for Practice
Encourage innovation and focus in the area of “Patient Care Devices”, bring nursing and patient voices to the forefront of design and development, reduce healthcare error and clinician burnout, and drive collaborative practice between nursing and engineering.

Presentations
This innovation project has a related manuscript that has been submitted to OJIN and is currently under review. In addition, it is related to the content presented at nurseengineer.com. However, no posters or presentations related to this topic have been done.
The Cange Hospital Operating Room Project

Bailey Leopard, Student in a B.S. Program for BioEngineering, Clemson University

Purpose
The operating rooms in Hopital Bon Saveur in Cange, Haiti do not meet World Health, ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning), and FGI (Facility Guidelines Institute) minimal safety standards. Our team faces the challenge of returning the operating rooms to service with a safer standard of care.

Relevance/Significance
By reopening the operating rooms to the public, Zanmi Lasante, the Haitian non-governmental organization, would be able to treat more community members and reduce wait time for their surgical needs.

Strategy and Implementation
A three-phase implementation plan will be used to return the operating suite to service with the help of Clemson interns living in Haiti. Phase one will define the initial operating condition developed from a set of priority actions, such as restoring all operating equipment to function, renovating the operating theatre to building codes and procuring the remaining necessary equipment. Phase two will require the implementation of supporting equipment such as an uninterruptible power system and ventilation methods. Phase three will constitute the implementation of all architectural renovations, procurement of room items, and in-depth operation plans for the function of the operating rooms. All implementation will occur in partnership with the organization Zanmi Lasante.

Evaluation/Outcomes
The three-phase plan is designed to improve patient outcomes by reducing safety risks, allow for further innovation of the hospital as necessary to address the public need, and improve the sustainability of surgical practice in Cange with the added sustainability of equipment.

Implications for Practice
With a great need for sustainable surgical practices in developing countries, the three-phase plan approach to operating room renovation provides a more involved partnership with local communities in order to improve surgical care.
Purpose
The purpose of this study is to understand the nurses’ perspective on how the design of collaborative work environments support or deter the delivery of team-based primary care.

Background/Significance
Escalating healthcare costs, increasing workload pressures, and the shortage of healthcare providers are fueling a movement toward team-based primary care. One such model, the Patient-Centered Medical Home (PCMH) model, is showing promise for reducing costs, improving health outcomes, and increasing staff and patient satisfaction. Team-based primary care utilizes registered nurses and licensed practical nurses as integral team members. The shift from physician-centric to a team-centric model of care has resulted in changes to the care delivery process and how nurses use equipment, space, and various technologies. To support this new model, team-based care modules are emerging as a spatial concept that clusters resources and creates shared staff workspaces. Despite the rapid adoption of the PCMH model, little is known on how physical environments influence the nurse’s ability to deliver patient care. This study aims to address a gap in research and support the role of nurse’s in designing team-based primary care environments.

Methods
Using a qualitative case-study approach, three PCMH clinic designs were investigated using ethnographic observations and semi-structured interviews with 38 registered nurses and licensed practical nurses.

Conclusions and Implications for Practice
Findings provide insight on how the layout of team-based clinical modules and collaborative work spaces address the needs of nurses while delivering team-based primary care in clinics. This study informs innovative planning recommendations to enhance healthcare design for team-based primary care.
Family Engagement In The Neonatal ICU: How The Design Of Single-Family Rooms Is Influencing Parental Behaviors

Herminia Machry, PhD Candidate, MSc, EDAC, Clemson University School of Architecture
Anjali Joseph, PhD, EDAC, Clemson University Architecture + Health

Purpose
This study aims to uncover design characteristics of single-family rooms that are influencing family engagement behaviors in neonatal intensive care units (NICUs).

Significance
Welcoming parents in the NICU has become best practice in healthcare, as parental participation in infant care activities has been associated with improved infant development, decreased NICU length of stay, and reduced hospital readmissions. Included in activities like infant care and education, parents are encouraged to move from passive to active caregivers at the NICU, in a family engagement process. NICUs have integrated single-family rooms (SFRs) to support parental involvement in infant care, but there is no empirical evidence showing how design characteristics of the SFR are facilitating or hindering family engagement behaviors.

Methods
Using a qualitative approach and a case study research design, family engagement interactions occurring in SFRs were assessed in two NICUs. Design characteristics of different types of SFRs were collected through a physical assessment tool, while observation logs recorded different types of family engagement interactions in SFRs as to the physical elements and people involved, tracking their position and movement. Additionally, interviews with parents and staff elicited descriptions of design characteristics supporting family engagement interactions in SFRs.

Findings
Design characteristics related to layout and furniture design emerged as factors to family engagement behaviors in SFRs, providing evidence to inform the design of NICUs incorporating the SFR model in the future.

Conclusions and Implications for Practice
This study contributes by providing a framework to investigate the relationships between design and family engagement behaviors in healthcare environments.
At My Witt’s End: The Environment and Neurodevelopmental Disorders

Kendall Marsh, MHID Student, University of Nevada Las Vegas, School of Architecture
Dak Kopec, PhD, MCHES, HonFASID, Associate Professor, University of Nevada Las Vegas, School of Architecture

Purpose
To identify if, and to what degree environmental factors have been used as a moderator or mediator of behavioral responses by young people affected with a neural developmental disorder.

Background/Significance
Consideration of the interior environment has long been neglected, or undervalued, within the continuum of healthcare. Throughout the past decade, much research has been published on the ways the environment can be modified to yield better health outcomes for people with neurodevelopmental disorders. These disorders encompass a broad range of health conditions based on irregular neural connections and processing deficits. Hence, they require specialized attention when developing the person’s environment.

Methods
This study was based upon a review of 50 websites providing information to parents and teachers for the different types of neurodevelopmental disorders. Each website was assessed for services and information provided. Specific variables of analysis were clustered according to biological, social, and environmental interventions.

Results/Findings
Most websites focused on socially based interventions requiring person-to-person interaction. Some of the websites discussed biological means for intervention, and very few discussed the designed environment.

Conclusions and Implications for Practice
The implication is that many social service agencies who serve people with neurodevelopmental disorders continue to exclude environmental factors within the total scope of care. This means that greater attention needs to be focused on the education of social service agencies to include the designed environment as a part of their service plan.
Caregivers’ Lived Experience of Decentralized Nurse Station Design and the Delivery of Quality Care

Susan McDevitt, MSN, ARNP, EDAC, LSSGB, Senior Healthcare Consultant, HDR
Francesqca Jimenez, MS, Researcher, HDR

Participants
Participants included 28 caregivers engaged in direct inpatient care at two community hospitals. Caregivers worked in Medical Surgical, Women and Children’s or Intensive Care units that transitioned from a centralized nursing station design to a decentralized model with individual alcove nursing stations.

Purpose
The purpose of this research was to qualitatively explore caregivers’ perspectives of a decentralized nursing station model to better understand the design’s impacts on the delivery of quality patient care.

Background/Significance
Current literature defines decentralization broadly and includes several designs that aim to place caregivers closer to patients. However, previous research is mixed and suggests that decentralized nurse stations may benefit patients, while creating challenges for staff.

Methods
As part of a larger study to evaluate the impact of decentralized nursing station design, six focus groups were conducted. Focus group discussions were structured around communication, documentation, stress and well-being, and the delivery of quality care. Transcriptions were evaluated using a phenomenological approach with NVivo software. Participants also completed a 12-item questionnaire.

Conclusions and Implications for Practice
Questionnaire responses indicated that for most care delivery tasks, a centralized nurse station was preferred. Focus groups uncovered that in the decentralized units, caregivers expressed difficulty in finding help when needed and knowing when other staff needed help. The decentralized design was also perceived to compromise communication and teamwork among caregivers. This study provides insight for nurse leaders and administrators who are often in the position of making design decisions and providing change leadership during projects that impact staff and patients.
The Use Of A Zen Den And The Reduction Of Stress In Patient Care
Associates

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Purpose
The study objective was to evaluate the effectiveness of using a Zen Den for stress reduction among hospital-based PCA’s.

Background/Significance
Healthcare workers are frequently exposed to a number of job stressors which can decrease work engagement and adversely affect their mental and physical health. Patient safety and patient satisfaction are directly impacted by the level of stress in the work environment. Although studied often in nurses, few studies explore the impact of stress among PCAs. The research question was: do PCAs who utilize a Zen Den for their scheduled work breaks experience a decrease in perceived stress levels over a 10 week period?

Methods
A quantitative, quasi-experimental, one-group pretest-posttest, 10-week study involving PCAs in an acute care hospital was conducted. Participants completed the Perceived Stress Scale-14 (PSS-14) at baseline, week 5 and week 10.

Results
Statistical analysis was performed at the 0.05 confidence level. ANOVA was used to test for significance (F = 3.685) with a significance value of p = 0.033; demonstrating the changes in PSS-14 mean scores over time; comparing baseline, week 5, and week 10 were statistically significant.

Conclusions and Implications for Practice
Zen Den use during a scheduled 15 minute break at least once a week for 10 weeks had a notable effect on perceived stress levels of PCAs over a 10 week period. Changes in PSS-14 mean scores from baseline, week 5, and week 10 were found to be statistically significant. When PCAs used this setting for breaks, it provided the opportunity for them to return to the work recharged and refreshed.
Tips for Navigating an Academic/Private-Sector Hospital Merger While Improving Outcomes and the Patient Experience

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Purpose
Consolidate an academic teaching hospital on a private medical center campus to rethink established processes and to achieve greater efficiency.

Relevance/Significance
In an increasingly complex healthcare market, we must continue to focus on innovation in healthcare education that improves patient care and prepares physicians for the challenges that lie ahead. These hospitals were also part of a large system within the Omaha market, and there was an increased need to improve and consolidate duplicate operations.

Strategy and Implementation
We brought the right people to the table. Consolidating a teaching hospital and a private, faith-based healthcare institution involved reconciling two ways of operating. Having the right strategic decision makers at the table during master planning allowed the two to come together, update their processes and address improvements to the overall patient experience.

Evaluation/Outcomes
Staff-satisfaction survey data improved. Significant cost reduction from the consolidation of two campuses.

Implications for Practice
Two major medical groups in Omaha, with separate locations but similar missions, collaborated to design a teaching hospital medical campus that improves the education of future healthcare professionals and delivers high quality care.

Presentations
Healthcare Facilities Symposium and Expo, October 2018
Medical Construction & Design Magazine, November/December 2018 Edition
C-Difficile: Today’s Focus, Tomorrow’s Impact

Justine Moore, RN, BSN, VA-BC, Clinical Outcomes Leader, Yale New Haven Hospital

Participants
Medicine Service Line Leadership, including Clinical Outcomes Leaders, Educators, Quality and Safety Managers, Managers, and Director.

Purpose
Clinical outcome leaders’ provide clinical leadership needed to reduce the incidence of C-Diff Infections (CDI) across the medicine service line by aligning quality improvement efforts of the organization while mentoring front-line staff to drive culture change.

Relevance/Significance
The medicine service line had a rise in hospital acquired C-Diff in 2018 of 49 from 43 in 2017.

Strategy and Implementation
The Medicine Service Line CDI Committee assisted in implementing and disseminating a bundle approach with a culturing algorithm to bring organization-level goals for CDI reduction to the frontline staff. The committee collaborated with the information technology team to develop a CDI dashboard to oversee utilization of best practices by providers and staff. The committee initiated CDI champions to serve as a 24/7 peer mentors and resources on the unit level.

Evaluation/Outcomes
Since the implementation of our medicine service line performance improvement plan (PIP), we have seen a significant reduction in C-Diff orders with the use of a culturing algorithm. Last quarter, a 14.19% total reduction in number of samples were ordered for testing of C-Diff.

Implications for Practice
There is a demand for clinical leadership at the unit level to influence and motivate front line staff to utilize evidence-based practices in the care and prevention of CDI across a medicine service line. Reducing the number of unnecessary orders is only a starting point of this larger scale project.
Utilizing a Treatment Room to Decrease Medical Traumatic Stress in Hospitalized Children Undergoing Minor Painful Procedures

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Cassy Weeks, BSN, MBA, RN, Intermountain Healthcare, Primary Children’s Hospital

Purpose
To decrease medical traumatic stress in hospitalized children undergoing minor painful procedures by utilizing the treatment room.

Relevance/Significance
Hospitalized children experience traumatic stress related to procedures performed in their rooms. Pediatric healthcare experts recommend using a separate “treatment room” for minor procedures, not the patient room.

Strategy and Implementation
Child Life collaborated with nursing during interdisciplinary rounds. Incentives and rewards were given and positive outcome stories were shared to support culture change. Utilization was reinforced through informal in-services. Data measuring parent/family and staff satisfaction were collected and staff educated on best practice.

Evaluation/Outcomes
Utilization of the treatment room yielded high parent and staff satisfaction, and reduced post-procedure calming time in patients. The project has resulted in treatment rooms being included in upcoming inpatient unit remodeling. On-going education emphasizes the importance of treatment rooms and supports culture change.

Implications for Practice
All inpatient pediatric units should offer a calming, child friendly room outside of their hospital room for the performance of minor painful procedures. Care providers need on-going support to include the use of treatment rooms into workflow. Parents can advocate for the use of treatment rooms.
An Innovative Nurse Led Intervention to Reduce Non-Ventilator Associated Hospital Acquired Pneumonia Among Veterans

Shannon Munro, PhD, APRN, BC, NP, Veterans Health Administration

Purpose
The aim of this interprofessional pilot study was to determine the effect of oral care on the incidence of non-ventilator associated hospital acquired pneumonia (NV-HAP) on our long-term care (CLC) units. With Diffusion of Excellence Initiative funding and support, this innovative practice was expanded to 8 VA hospitals with plans for additional spread.

Background/ Significance
Despite being the number one hospital-acquired infection in U.S. hospitals, NV-HAP is not tracked and has the highest associated mortality rate and health care costs. Consistently delivered oral care, 2-3 times daily, reduces the risk of NV-HAP by lowering the oral bacterial burden.

Methods
This single arm intervention study used pre/post population data to determine the effectiveness of a universal, standardized oral care protocol versus usual care in preventing NV-HAP. This phase followed a 10-year retrospective study (2002-2012) that determined the pre-intervention levels of nursing care provided and the overall disease prevalence.

Conclusions and Implications
The incidence rate decreased from 105 to 10.4 cases per 1,000 hospitalized patients (90%), yielding an estimated cost avoidance of $3.8M and 17 lives saved (95 cases prevented) over 26 months. With the expansion to 8 VA hospitals as QI, an estimated 158 cases were avoided as of December 2018 with a cost avoidance of $6.33M and 28 Veteran lives saved. With a predicted annual cost avoidance of $1.8M at the pilot site, the VA can expect to save $207M per year with national deployment. The impact is substantial in terms of health, quality of life, and reduction in healthcare cost.
**Condition Critical: Clinician Well Being and Workplace Implications**

**Adeleh Nejati**, AIA, PhD, LEED AP, WELL AP, EDAC; HMC

**Kathy Okland**, RN, MPH, EDAC, Herman Miller

**Participants**
1000 Medical - Surgical nurses identified the attributes of space for environments conducive to renewal and restoration which has prompted further exploration.

**Purpose**
Mental fatigue and clinician burnout is an epidemic. How can restorative staff environments foster clinician well-being?

**Background/Significance**
The criticality of support for replicable research, restoration spaces, the culture to support it and how neuroscience can inform healthcare design is a compelling initiative.

**Methods**
The primary research included a multi-method approach. A current literature review, emerging body of neuroscience and site-specific examples emphasizes the imperative of continued focus.

**Conclusions**
Staff break areas are more likely to be used if they are near nurses’ work areas, have complete privacy from patients and families, and provide opportunities for individual privacy, socialization with coworkers as well as physical access to private outdoor space. The frontier of neuroscience reveals a cellular response to the environment. We feel before we think. Feelings inform thoughts. Places of practice can be determinants of, verses detriments to, clinician wellbeing.

**Implications for Practice**
Improvements in the restorative quality of break areas may significantly influence caregiver behaviors, experience, and wellbeing – and ultimately the proficiency of practice and organizational outcomes. Applying “Health of Houses”, Nightingale stated “it will be unhealthy just in proportion as they are deficient” (Notes on Nursing, 1860).

**Presentations**
This presentation in its entirety has not been presented to date. Initial findings have been presented at HCD and published in HERD.
Experiential Qualities of a Multisensory Space

Dafne Odette, MHID Student, University of Nevada Las Vegas, School of Architecture
Michael Sagun, Student, University of Nevada Las Vegas, School of Architecture
Dak Kopec, PhD, MCHES, HonFASID, Associate Professor, University of Nevada Las Vegas, School of Architecture

Purpose
This formative exploratory study, based on the Gestalt Law of Continuity, assessed the relationship between sensory stimulating elements within a linear perceptual framework.

Relevance/Significance
The design and development of sensory stimulating spaces are increasing in popularity among memory care centers located within continuing care retirement communities. The design of these spaces often involves a reductionist approach based on segmentation. This approach often neglects the effects of integration from pre- and post-experiential factors.

Strategy and Implementation
Data were obtained through multi method qualitative approaches based on architectural case study analysis interwoven with personal observations and experiences. Existing tools and environmental factors intended to promote sensory stimulation were assessed. The assessment was based on each of the five senses in relation to the relative size of the areas within the brain dedicated to the sensory interpretation and response.

Evaluation/Outcomes
Data were distilled into probable experiential factors that carried from one experience to another. The next step was to identify the factors that yielded the greatest experience, and then develop a space based on the maximization of pre and post experiences from one element to another within a continuous arrangement. The goal was to identify arrangements that may yield greater experiential qualities without adverse effects.

Implications for Practice
The development of multisensory spaces can be of tremendous value within memory case centers. The process, ordering or multiuse of stimulation however can determine the efficacy of the multisensory space.
Understanding the Effect of CVICU Layout on Caring Behaviors: A Qualitative Study Triangulating Ethnographic, Architectural and Survey Data

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Kathleen Valentine, Ph.D., MSN, RN, Clemson University School of Nursing

Veronica Parker, PhD, Clemson University School of Nursing, Center for Health Disparities,

Steven, M. Langston, AIA, ACHA, EDAC, LEED BD+C; rlf architecture.engineering.interiors

Participants
Patients and families in the 20-bed Southeast Medical Center CVICU

Purpose
To replicate an original qualitative study to determine the effect of the healthcare built environment on macrocognition and expand on the sample participants’ to include patients and families.

Background/Significance
This study expands original qualitative research on a 40-bed pediatric intensive care unit concluding’ neighborhoods’ offered the best opportunity for observation, team interactions, and visibility. However, no patients and families were included. It was hypothesized that their perception of caring may be affected by their location and visibility on the unit. This research expands on visibility as a factor for improved ICU outcomes to include patients and families perceptions of care.

Methods
This IRB approved focused ethnographic qualitative research design included observation, focus groups and additionally, a validated survey. The Caring Behaviors Inventory 16 with two approved additional demographic questions: 1. Unit and room location, and 2. length of stay was administered to patients and families, n=13. Analysis was performed on four ‘space related’ questions determined to have the greatest dependence on CVICU layout. Results were triangulated using architectural analysis comparing isovist field views (visibility) between patient rooms and nurses stations. Coded field notes were applied to understand these scores.

Conclusions and Implications for Practice
The lowest scored rooms were directly across surgical transfer corridors and without visibility to nurses’ station. Heads of beds (HOB) were not visible from nurses’ stations. The highest scoring rooms had visibility between nurses’ station and HOB. Visibility and location on unit is a valuable indicator on Patient/Family perceptions of caring and requires additional research. This relationship, not previously explored, can be a factor in future ICU design.

Presentations
Variations of this presentation have been reported at the CANS annual meeting and CHD Icons and Innovators webinar.
Building an Interprofessional Model into a Hospital

Jacob Poarch, RN. VCU Health System
Tracy Lowerre RN, MS. CPN; VCU Health System
Zach Isbell, CHC Senior Project Manager; JILL
Kate Renner, AIA, EDAC, Lean Six-Sigma CE; HKS

Purpose
The challenge academic medical centers face, is aging facilities that support patient-care services. This ever-evolving issue can hinder the ability to provide a patient-care model congruent to the health system’s goals. An interprofessional care model (collaboration between nursing, physicians, and ancillary services) becomes increasingly more difficult to implement with the lack of standardized infrastructure between patient care units.

Background
Clinical areas from 3 distinctly different buildings are being populated into new standardized facilities to supplant some of the aging structures on the campus. A dedicated children’s hospital and adult hospital that will promote an interprofessional care model as the foundation and maximizes the patient experience for a holistic and healing environment.

Methods
Utilizing Lean Six Sigma methodology, a series of current state assessment activities including: design diagnostic (shadowing, behavior mapping, interviews, observations, and surveys), patient experience mapping, and current state mapping were completed. These exercises included over 130 individuals from patient care services, support services, and family.

Conclusion
Collection of data from these exercises has yielded 265 unique opportunities that will be used to drive optimization and provide a base for schematic design. The current state mapping exercises give the health system the ability to diagnose and optimize current practices, as well as inform design to their optimal care model vision.

Presentations
These exercises and subsequent information have been shared internally within the Health System to Leadership, key stakeholders, and those participating in the relocation.
A Review of Quantitative Measurement Tools for Nurse Experience Related to the Inpatient Care Environment

Renae Rich, MS, EDAC; HDR
Francesqca Jimenez, MS; HDR

Purpose
The aim of this study was to review available quantitative instruments intended to measure nurse experience related to the built environment.

Background/Significance
Rigorous healthcare design research is critical to informing and improving design decisions. Current limitations of the field include lack of consistent and valid measures for constructs about the role of the built environment in producing desirable human outcomes. Validated instruments to quantitatively measure nurses’ experiences of the patient care environment need to be explored and developed.

Methods
A literature review was conducted to assess quantitative tools measuring nurses’ ability to work efficiently and effectively in their environment. The study focused on instruments intended to measure the relationship between nurses and the built environment in terms of the delivery of patient care, along with constructs that consider physical design or are hypothesized to be related to the environment, such as job satisfaction, teamwork, and organizational factors.

Conclusions and Implications for Practice
The built environment encompasses a largely overlooked set of variables in nursing research. There is no instrument specifically intended to quantitatively measure nurses’ experiences specific to the physical environment. Such an instrument would be valuable in generating quantitative and standardized data, making associations between other factors, such as organizational support, and comparisons across time and facilities possible. Within the healthcare design industry, this capability would lead to greater knowledge about the aspects of a healthcare facility that best support nurses’ work and that are associated with their ability to provide quality patient care.
Pediatric ED Crisis Evaluation, Patient Experience

Janice Siegle, BSOT, OTR/L, M.Ed, Maine Medical Center
Jon Boyd, AIA, LEED AP, E4H Environments for Health Architecture

Purpose
According to the Agency for Healthcare Research and Quality (AHRQ) in 2015, 6% of Pediatric Emergency Department visits nationwide were for mental or behavioral health related issues.

Relevance/Significance
The prevalence of mental health issues in Emergency Departments, particularly in adolescents and the time it takes to place them, presents a challenge in providing a positive patient experience. There are many qualified practitioners working on solutions to provide access to outpatient care, to prevent unnecessary emergency visits, to decrease length of stay in Emergency Departments and to ensure an appropriate number of inpatient beds are available for psychiatric care. However, according to well-respected members of the behavioral health community, “The most important aspect of a patient’s experience is not only the quality of medical care but how they are treated by staff.”

Strategy and Implementation
The team participated in a multi-disciplinary team of individuals in order to inspect the issues and develop strategies to improve the patient, family, and staff experience in Emergency Departments serving adolescents. Through provider interviews and an extensive research review, the group proposed solutions for the patient experience of adolescents in Emergency Departments supported by best practices.

Evaluation/Outcomes
Explorations and suggestions included in-room patient support and companion programs, including trained advocates as part of the care team, offering holistic treatment and therapy for extended stays, technology enabled positive distractions, telehealth psychiatric evaluations, family educational resource packets, and design for behavioral patients including natural light, accent graphics, and sound masking.

Implications for Practice
Examples of these recommendations will be reviewed in this session to provide a best-practices introduction to attendees.

Presentations
This white paper was presented at the Maine Health Emergency Physicians in 2017.

Sustaining Healthy Workplace Environments: An Innovative Approach

Rita V. Smith  DNP, MPA, RN, NEA-BC, Jersey City Medical Center
Patricia Steingall, MS, RN, NE-BC, Hunterdon Medical Center

Purpose
To develop an innovative and effective model for improving workplace environment and staffing in hospitals in New Jersey by giving clinical nurses a voice in resource allocation and a participative forum for creating and sustaining safer care environments.

Relevance/Significance
New Jersey, much like other states, has seen repeated efforts to legislate nurse staffing ratios in acute care nursing units. Regulated staffing cannot be effective since each care setting has a unique patient population and work environment. Moreover, clinical nurses and nurse leaders understand that environmental workplace factors influence work and the need for staffing resources.

Strategy and Implementation
Through the American Organization of Nurse Leaders, the literature regarding staffing and patient outcomes as well as models for healthy work environments was reviewed. A framework was developed based on the AACN Standards for Establishing and Sustaining Healthy Work Environments. This model was implemented in a one-year pilot project of nine acute care hospitals with education for all participants.

Evaluation/Outcomes
Following the completion of the one-year pilot two more cohorts joined, representing 29 hospitals throughout the state. This project demonstrates how nursing leaders and clinical staff in hospitals from all regions of a state-union and non-union, urban and rural, teaching and non-teaching, collaborated to develop a model to promote and sustain a healthy work environment.

Implications for Practice
Gaining control over workplace environmental factors impacts non-patient facing time spent by nurses and subsequently the nurse’s perception of staffing requirements.
A Qualitative Study Of Subjective Well-Being During A Simulated Hospital Admission –Towards The Optimal Healing Environment

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Purpose
This study aims to gain understanding in individual simulated ‘patient’ experiences for the development of an optimal and personalised healing environment.

Background/Significance
The well-being of admitted patients is affected by their environment. Particularly stress, pain, sleep and mobility are affected by the environment and compromise recovery. To optimize the design of the environment to improve well-being outcomes, the so-called ‘healing environment’, more insight should be gained in the experience of patients during hospital admission.

Methods
We investigated 14 healthy (ex-patient) volunteers during a simulated hospital admission. We chose the care path protocol of the first 24 hours after a major upper abdominal operation as simulated intervention. Participants received the same nurse and physician care as patients and had dummy IV lines, drains, tubes and a TENS device to simulate abdominal discomfort. Volunteers kept a diary and were interviewed via semi-structured open questions. Data were analyzed by means of the grounded theory approach.

Results/Findings
The following aspects need special attention: autonomy, ambience and involvement. ‘Patients’ preferred to be more independent and able to autonomously adjust the environment (e.g. lighting, curtains). The environment should express a familiar and comfortable feeling and provide positive distractions such as postcards or audiovisual technologies. More involvement in self-care was preferred to anticipate on stress, pain enhancing and sleep disturbance events. A categorized list of do’s and don’ts regarding environment, room equipment and nurse care was edited.

Conclusions and Implications for Practice
The study provides authentic ‘patient’ derived data for designing the healing environment of a single patient room.
Purpose
In this study, we aim to gain an anticipatory understanding of the potential effects of continuous monitoring on nurses and patients using the philosophical approach mediation theory.

Background/Significance
Traditionally, nurses measure the vital signs of hospitalized patients three times a day manually. Today, multiple devices can replace those sporadic manual measurements by automated continuous data, amongst them the FDA approved wearable ViSi Mobile (VM). VM has been tested in 60 patients over two wards in the Radboud UMC Hospital in Nijmegen. The device may create a paradigm shift in hospitals as it provides continuous data on patients’ health, could allow for early detection of clinical deterioration and reduces the workload of nurses. Yet, how will VM affect two of its users: nurses and patients, when implemented as standard care at the normal ward?

Methods
Within philosophy, mediation theory sees technologies as ‘mediators’ between users and their environment and aims to analyze how technologies shape action and perception. This theory has been applied to the data available from the studies on VM to analyze its effects on nurses and patients.

Results/Findings
The introduction of VM in hospitals requires nurses to rethink care and clinical decision making. For patients, VM’s current design could be improved to achieve greater patients’ autonomy and understanding of health.

Conclusions and Implications for Practice:
Before a wearable monitoring device will reshape hospital care, the design and path of implementing such a device need to be considered. There is potential in redesigning wearable devices such as VM for better empowerment of both nurses and patients.
Two Simulation Labs: Considerations for New and Existing Lab Space

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Jean Ellen Zavertnik, RN, DNP, CNE, CHSE, Clemson University School of Nursing
Kevin McDonough, Clemson University
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Purpose
To describe the design challenges for two distantly located simulation spaces with multiple learning objectives, large student classes, multi-disciplinary learners and faculty.

Relevance/Significance
Integrity of program delivery is essential regardless of site of instruction. Two distant simulation labs required similar design of instructional space, workflow, and simulation equipment to assure comparable student benefit.

Strategy and Implementation
Enrollment of undergraduate students increased from 256 in 2015 to 704 by 2021. The simulation lab plan took into account the increase in nursing student enrollment. One site of instruction was a purpose-built space with new construction, the other was renovated space in an existing building. One site had a capitol project budget, the other, a philanthropic donation. Matching the requirements for comparability to available funds required creativity with the architects and consulting faculty to the same pedagogical simulation approach.

Evaluation/Outcomes
Student and faculty evaluation of the simulation spaces at both facilities indicate a positive response. The physical space as designed and constructed support faculties’ ability to provide best practices in simulation pedagogy. This includes video recording, consistent simulation scenarios, and appropriate de-briefing space.

Implications for Practice
The innovative design for the two simulation laboratories provides students with a large space for skill acquisition and multiple hospital patient rooms for patient care scenarios. This lab practice setting is nationally accredited and is now being utilized by academic and clinical nursing, medicine, and other disciplines such as emergency medicine.
Facilitate Expansion: A Unique Cross-Collaborative, Inter-Professional Initiative To Improve The Communications Skills Of Nursing Students

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Phillip Moschella, MD, PhD, University of South Carolina School of Medicine Greenville
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Purpose
The purpose of this study was to assess whether nursing students who participated in acting-based workshops felt they improved such interprofessional skills as non-verbal communication, active listening, and self-awareness.

Relevance/Significance
A growing body of literature suggests that healthcare professionals who demonstrate good communication skills obtain better clinical outcomes, experience greater wellbeing, and suffer less burnout. We created a novel curriculum rooted in theater and acting to teach such communication skills to medical and nursing students. The purpose of this study was to hold pilot sessions for nursing students and assess the participants’ perception of communication skills developed and improved.

Strategy and Implementation
Pilot sessions were delivered to Sophomore Clemson Nursing students.

Evaluation/Outcomes
This single-center, IRB-approved study utilized a confidential post-session survey using Likert scales (1-5: “strongly disagree”–“strongly agree”). 98% of participants completed the surveys (N=63). 78% of participants requested more sessions. 85% “agree” or “strongly agree” that the workshops challenged them to step outside their comfort zone, developed their skills of observation, adapt ability to change and flexibility, and enjoyed the experience. 90% “agree” or “strongly agree” the workshops developed their self-awareness, non-verbal communication skills, awareness of status, body language, situational awareness and presence, and improved their sensitivity to emotions expressed by others.

Implications for Practice
While these skills can be emphasized in traditional lectures, they are seldom taught through hands-on training. This study suggests that workshops practicing an array of communication skills can be both enjoyable and efficacious. Developing these skills early in students’ training may prove valuable as they transition to active clinical practice.
The Quadruple Aim: Designing for Safe Discharge

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Jennie Evans, RN, MBA, EDAC, Mazzetti, Inc.
Ella S. Franklin, MSN, RN, EDAC, MedStar Health National Center for Human Factors in Healthcare

Purpose
Inpatient length of stay is decreasing. Today, patients leave the hospital requiring more acute at-home nursing care. This requires the family to learn to be the at-home caregiver prior to discharge. The purpose of this presentation is to present how the built environment can support the family and healthcare providers as they empower families to confidently care for their loved one while inpatient and post discharge.

Significance
Evidence-based design demonstrates the importance of the environment on the health of the caregiver and the patient; and, the family as a caregiver. Research also demonstrates that family presence contributes to the patient’s healing and prevents medical errors. Recognizing the family as part of the multi-disciplinary care team as a bedside team member is vital to the patient flourishing post discharge.

Implementation
The inpatient care environment can successfully recognize the importance of the family by creating a welcoming, functional, and supportive space with amenities in the patient room and throughout the hospital. A literature search of how health systems provide support for families as caregivers as well as three qualitative interviews of health systems. In addition, the main speaker will provide her own recent hospital admission and outpatient experience.

Evaluation
Evaluation of inpatient unit plans that demonstrate supportive family environments and considerations for additional amenities will be presented along with research findings of successful family involvement in care. The qualitative interviews and the speaker’s personal experience will identify gaps in the industry’s provision of cognitive, physical and emotional support.

Implications for Practice
Nurses regardless of their role in the healthcare or in healthcare design must advocate to include the family as part of the multi-disciplinary team as well as advocate for environmental elements that will support and nurture the family as they prepare for care post discharge.
Evaluating Nurse Perceptions of Alternative Preoperative Room Designs in Virtual Reality Using Scenario-based Simulations

Deborah Wingler, PhD, MSD-HHE, EDAC, The Center for Health Facilities Design and Testing, Clemson University

Participants
This study was conducted with 21 nursing faculty at a southeast university.

Purpose
This study sought to identify a high performing preoperative room prototype and design features that support nurse work performance.

Background/Significance
To ensure that healthcare environments support the delivery of high quality care, it is essential to engage multiple stakeholders, including front line staff, into the design process. Virtual reality (VR) has become an increasingly popular method for designers to convey multiple design options and elicit subjective end user feedback. However, nominal evidence exists regarding how to leverage VR environments to systematically and objectively evaluate future functionality of designs or to compare different design options during the design process.

Methods
A within subjects, quasi-experimental study was conducted to evaluate three distinct preoperative room designs to determine which room best supports nursing work performance. A multimethod approach consisting of surveys, semi-structured interviews, and objective data pertaining to user motion and head gaze captured through tracking systems built into the VR platform was utilized to capture user feedback for the following five design characteristics: visibility, privacy, accessibility, flexibility, and aesthetic quality.

Conclusions and Implications for Practice
The survey analysis revealed significant difference for four of nine measures across the three rooms. One of the rooms performed significantly better than the others in terms of four of the nine survey measures, perceived accessibility to supplies and to the patient, and travel distance.

Presentations
Portions of this content have been presented internally and externally at multiple venues. However, this presentation in full has not been presented at any venue to date.
Examining The Impact Of The Physical Healthcare Environment On Nurse Fatigue

Deborah Wingler, PhD, MSD-HHE, EDAC, The Center for Health Facilities Design and Testing, Clemson University
Kathy Okland, MPH, RN, EDAC, Health Consultant

Purpose
This study sought to investigate contributing factors in the physical healthcare environment related to nurse fatigue.

Background/Significance
Due to the mentally complex and physically demanding work-related tasks, nurses continue to report high levels of physical, mental, and overall fatigue. Prior interventions for reducing nurse fatigue have largely focused on individual, organizational or unit policy changes, and have exhibited limited success. Nominal evidence exists regarding how the physical healthcare environment can be leveraged as part of the nurse work system to support reductions in nurse fatigue.

Methods
This study used secondary analysis from a previously conducted focus group. The focus group was conducted over eight hours, and consisted of multiple interactive activities, a series of open-ended questions, an ideation session, and demographic survey. Content analysis was conducted on all focus group artifacts. Member checking was used to establish credibility of the findings.

Results/Findings
Findings from this study depict nurse fatigue as a multi-faceted construct comprised of four interconnected yet discrete physical, cognitive, emotional, and social dimensions. Twenty-seven environmental features were identified within the physical healthcare environment as collectively contributing to the dimensions of fatigue through ergonomic, layout, sensory, and recovery factors. The effects of fatigue were found to be compounding, creating a relationship where effects related to decreases in care quality, internal motivation, and knowledge base resulted in increases in internal pressures, ultimately resulting for many in a career change.

Conclusions and Implications for Practice
This study contributes to a focused understanding of how the physical healthcare environmental can support efforts to reduce nurse fatigue.
Standardizing Patient Handoff Communication in the Acute Care Setting

Lucrecia Wright, MSN, RN, CNML, The Valley Hospital

Purpose
Standardizing patient handoff by creating a tool utilizing the 5Ps (Patient/problem, Precautions, Plan of Care, Purpose/Plan).

Relevance
As a high reliability organization, we always search for opportunities to identify best practices in healthcare design. We have restructured our shared governance model to be interprofessional to encourage collaboration and engagement of all clinical disciplines. Effective communication is a key element in patient handoff.

Strategy and Implementation
All council members assessed their department needs and utilized the 5P format to standardize patient handoff. We composed a standardized 5P handoff that encompasses important information for all specialties. Frontline clinicians were important stakeholders in providing pertinent information to be included during handoff. The 5P handoff was piloted on 2 units: a cardiac and neurology unit.

Evaluation and Outcomes
Clinicians of all levels verbalized how the standardization of handoff information identified opportunities to prevent safety errors. Everyone speaking the same language and using the same formatted tool enhances communication and can lead to minimal errors during the handoff procedure.

Implications of Practice
In the acute care setting, 5P handoff is utilized during shift to shift report and when transferring patients to another level of care. A standardized handoff improved communication which resulted in safer patient care and decreased errors.
Stimulation Project for Infants with Prenatal Substance Exposure

Mary Ellen Wright, PhD, APRN, CPNPBC, Clemson University School of Nursing

Purpose
The purpose of this evidence-based project was to inform interdisciplinary teams involved in the environment on mother/baby units and neonatal intensive care units on over-stimulating environments to promote interventions to change the environment for newborn transition.

Relevance/Significance
The opioid epidemic has increased the numbers of infants exposed to opioids prior to birth. Illicit use and use appropriate use of opioids for addiction therapy in pregnancy, both may result in infants withdrawing from the opioid exposure in the newborn period. The process of withdrawal is call Neonatal Abstinence Syndrome or Neonatal Withdrawal Syndrome. Some infants require support using methadone for withdrawal symptoms while other infants benefit from only non-pharmacologic measures. Included in non-pharmacologic measures is creating a quiet, low stimulating environment for the infant in the newborn period.

Strategy and Implementation
A film was developed to demonstrate to nurses, environmental health professionals and engineers in a tertiary care hospital of an over-stimulating environment and a low-stimulating environment.

Evaluation and Outcomes
As a result of the education actions were taken by this interdisciplinary team that included: using sound tiles on the units, controls on the TV volumes, instructions to new parents and visitors, window shading, and noise monitors.

Implications for Practice
Design plays a critical role in creating environments on mother/infant units and in neonatal intensive care units that foster low stimulating environments to ease neonatal withdrawal symptoms and create an appropriate transitional environment for infants.
Informing the Quadruple Aim: Development of a Tool to Assess Healthcare Staff Wellbeing & Aspects of the Built Environment

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Purpose
The purpose of this tool development was to understand the relationship between healthcare staff wellbeing and aspects of the built environment.

Relevance/Significance
In a recent article, Bodenheimer & Sinsky (2014) contend that the Triple Aim— to enhance the patient experience, improve population health, and reduce costs— can be attained only when the wellbeing needs of healthcare providers and staff are addressed. This study's research question was, “What role does the built environment play in helping to meet the wellbeing needs of healthcare staff?”

Strategy and Implementation
The tool development includes semi-structured focus groups, staff journey mapping and walking interviews. Sample methodology will be discussed as it needs to be carefully constructed to include a representative distribution of the healthcare environment, so all voices are heard. Quantitative and qualitative data can be coded into common themes and used to construct guiding principles around staff wellbeing, which includes design-based interventions.

Evaluations and Outcomes
The initial research study was conducted at a large academic medical center campus, but the results cannot be shared. The tool was tested during this project and findings were used to create a series of Guiding Principles that were used in the programming stage of the design. Due to the success of this project and the importance of this topic, these tools are undergoing a pilot study to provide findings that can be disseminated.

Implications for Practice
The implications for practice include application to any healthcare design project to help collect data on the impact of aspects of the built environment on staff well-being.

Nurses Wear Hardhats: The Many Faces of the Nurse in Healthcare Design

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Purpose
The purpose of this presentation is to explore the evolving role of the nurse in healthcare design. Presenters will reveal the variety of roles that nurses have in the healthcare design industry. Each presenter will share their journey to their current position, how nursing enabled their current role and their lessons learned along the way. The future of this field and the skill sets needed for this evolving field will be discussed with the audience.

Relevance/Significance
Nightingale set the path in the mid-1800 when she developed her Environmental Theory (1860) and then went on to write “Notes on Hospitals” (1858)\(^1\). In essence Nightingale was proposing that no one knows the patients’ needs better than the nurse. This presentation is germane to the goals of this conference. The new role of nurse leaders in this field and the skill sets they will need for best practice will be the central theme. Creating practice standards and elevating this position of leadership in the nursing community aligns with the Robert Wood Johnson Foundation’s focus of “Nurses take on new and expanded roles in healthcare.”\(^2\)

Strategy and Implementation
Discourse of the main theme of this presentation will be an interactive discussion with the audience. Personal experience and lessons learned will be shared during this presentation.

Evaluations and Outcomes
The outcomes of this presentation will be shared lessons learned and ideas on skills that nurses will need to flourish these new roles.

Implications for Practice
The implications for practice include current roles for nurses in healthcare design and discussion around specific skill sets that will create best practices for this area of practice.


The Clemson University School of Nursing is proud to present the Nursing Conference for Excellence in Healthcare Design

Clemson University stays committed to world-class education and research, as well as a high quality of life. Nestled in the Upstate of South Carolina, the University sits on 1,400 acres that include the shores of Lake Hartwell, the heights of the Blue Ridge Mountains and its very own forest.

The Clemson University School of Nursing is housed in the College of Behavioral, Social and Health Sciences. The college also offers degrees in communication; parks, recreation and tourism management; political science; psychology; public health sciences; and sociology, anthropology and criminal justice – all with a focus on building people and communities.

The School of Nursing is an integral part of Clemson University. The school is committed to the public service of South Carolina, the nation and the world. The mission of the School of Nursing as a scholarly center of learning, is to educate students at the baccalaureate, master’s and doctoral levels to become health care professionals who advance scientific knowledge and evidence-based practice through research and outreach.

The School of Nursing is shaping the future of nursing and health care through leadership, scholarship and practice. It puts a premium on the health and quality of life of all people everywhere.

The goals of the School of Nursing are to:

- Deliver state-of-the-art education to aspiring health care professionals to prepare them for excellence in practice and leadership within a dynamic health care environment.
- Create a vibrant, interdisciplinary community of scholars that contributes to knowledge generation and dissemination, thereby shaping practice and policy.
- Engage in leadership, research and service to optimize health and quality of life for people locally, nationally and globally.
- Increase diversity among faculty, students and staff within a mutually respectful, professional environment.
- Expand opportunities and resources through the development of relationships with clinical, community and corporate partners, and alumni.