New Parkland Hospital Facility Evaluation

Research Study Summary

March 20, 2019

Parkland

edra core CERTIFIED

BLUE COTTAGE CONSULTING

CORGAN

focus EGD

HDR

HermanMiller

Mitchell

Study Team

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01

Parkland Hospital

Parkland Facts

- Founded in 1894
- Licensed for 878 Beds
- >1.5 million patient encounters per year
- Primary teaching hospital for UTSW Medical Center
- 12 Community Based Clinics & 12 School Based Clinics
- Safety net hospital for Dallas County and healthcare provider for the Dallas County Jail System

Parkland Designations

- First Level I Trauma in North Texas
- First Level III NICU unit in Dallas
- Certified Primary Stroke Center
- International recognition for disaster preparedness & research studies
- Only Burn Center in North Texas verified by the American Burn Association and the American College of Surgeons Committee on Trauma

Parkland Vision

- Guiding Principles
- Engagement in Evidence-Based Design (EBD) Process

Pebble Project Involvement

- Impetus for Design Research
- Commitment to Contribute to the Body of Evidence
- Publications and Presentations

Obstacles Faced

- CMS
- Leadership Turnover
- Resources and Support

Design Intent

“The New Parkland Hospital will be a safe, welcoming, patient-centered healing environment.”

Design at many levels

- Park-like design
- Create a new city center to live, work, and heal
- Mass transit hub for easy transportation
- Links within the building between functions
- Icon for health

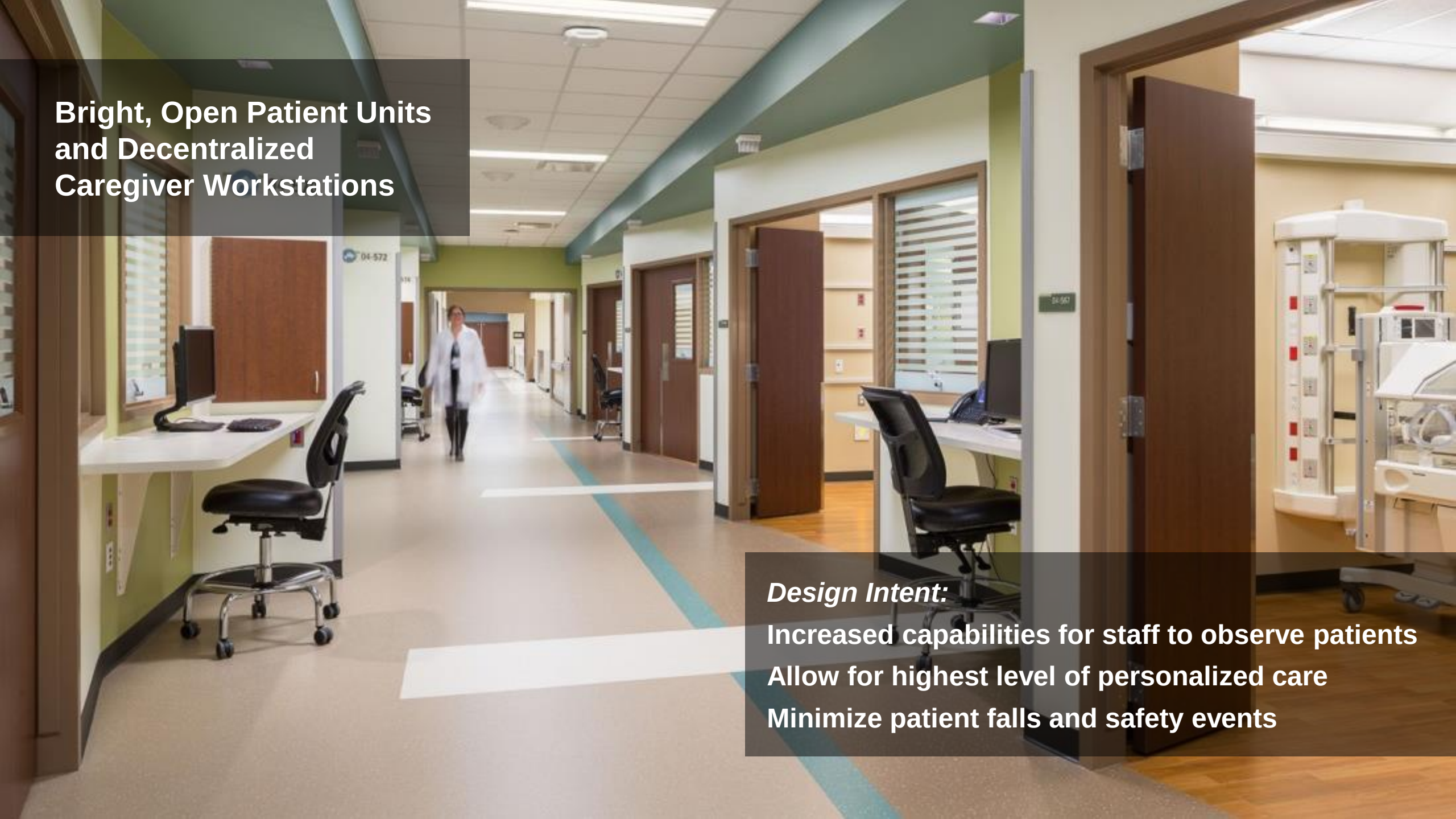
Focus on patient arrival on the campus

- Quick access to portals of care
- Intuitive wayfinding
- Natural navigation cues
- Separate public and clinical functions space

Research Integration through Project Stages

- Visioning and operational goal setting
- Pre-design planning: operational planning and functional space programming
- Operational planning: pilots, mock-ups, and simulations
- Activation and post-occupancy follow-up


Best evidence-based principles to enhance patient- and family-centered care model.
HOSPITAL ENTRANCE



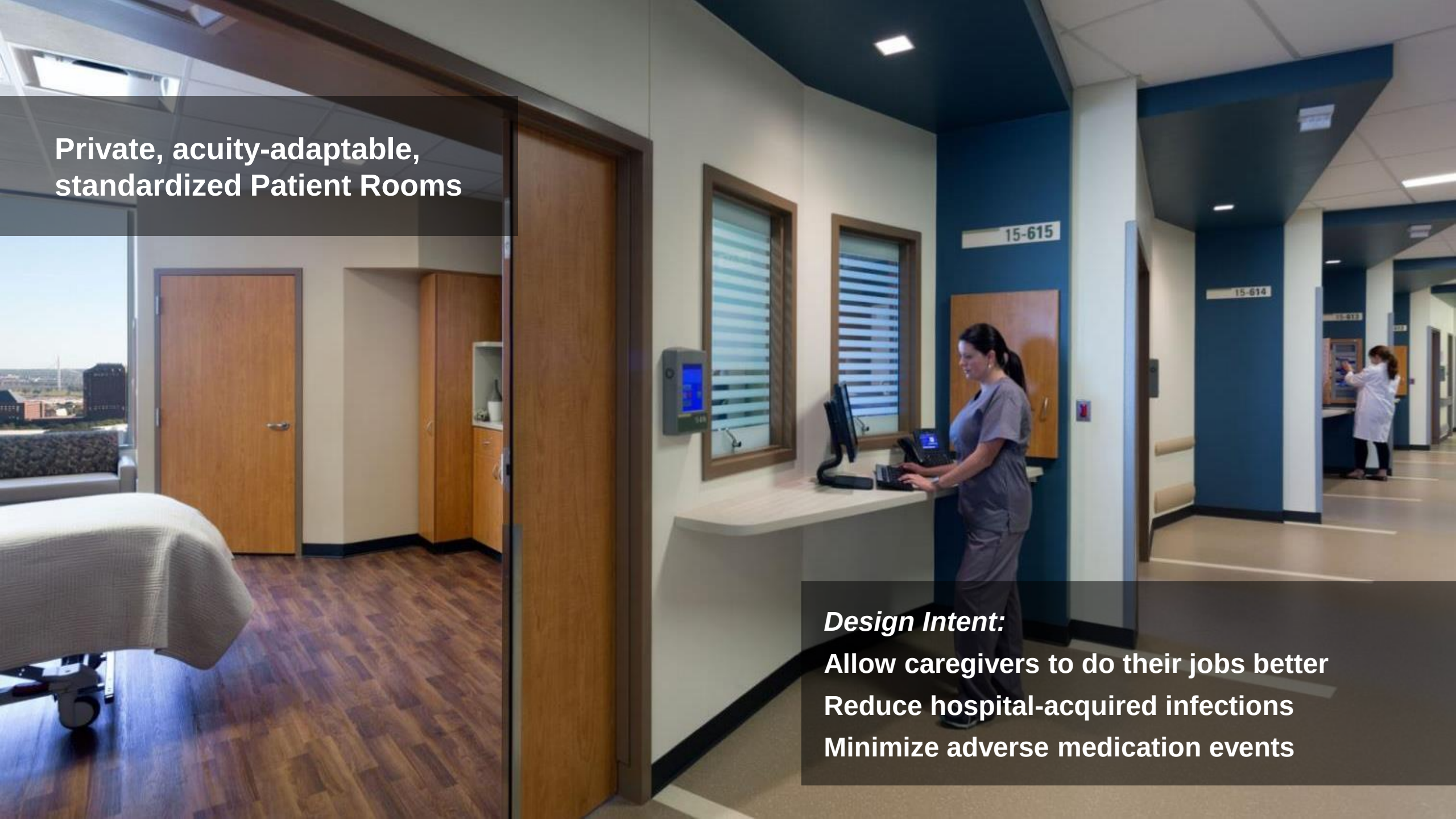
Bright, Open Patient Units and Decentralized Caregiver Workstations

Design Intent:

Increased capabilities for staff to observe patients

Allow for highest level of personalized care

Minimize patient falls and safety events



Private, acuity-adaptable, standardized Patient Rooms

Design Intent:

Allow caregivers to do their jobs better

Reduce hospital-acquired infections

Minimize adverse medication events


Private Patient Rooms
Built-in Family Area
Private Bathroom
Expansive City Views
Design Intent:
Optimize patient experience
Reduce patient length of stay
Reduce hospital-acquired infections

Private-Family NICU Patient Rooms

Design Intent:

Increase family involvement

Provide peaceful environment

Improve growth and feeding patterns

Reduce patient length of stay

Reduce hospital-acquired infections

02

New Parkland Hospital Research Coalition

Post-Occupancy Research

- Organizational commitment to and user interest in evaluation and learning
- Operational changes challenge before/after measurement
- Interest from several firms in contributing to evaluation

A Collaborative Team with a Purpose

Collaborative Multi-Disciplinary Team

- Designers/Architects
- Researchers and Statisticians
- Clinical experts
- Medical data experts

Appropriate Analyses

- Individual level data
- Conceptual model of causal pathway
- Appropriate statistical methods
- Conclusions supported by the results

Research Coalition Charter

Participants

- *Parkland Hospital*
- *Blue Cottage Consulting*
- *Corgan*
- *HDR*
- *Herman Miller Healthcare*
- *Mitchell Design*

Strategies

- Embrace Parkland Hospital as a full partner, participant and beneficiary of the research
- View patient outcomes as central to the inquiry
- Disseminate knowledge and information freely between and among participating stakeholders and the intended audience
- Foster conditions for communication, collaboration & co-creation
- Demonstrate that diverse inter-organizational collaboration can optimize performance outcomes
- Introduce a research model that demonstrates the power of collaborative and transparent engagement

Project-Integrated Design Research at Parkland

2012–2014

- Pre-Project Studies
- Published qualitative article on supplies standardization
- Pebble Research Partner

2015–2016

- New Parkland Hospital opening August 20, 2015
- New Parkland Hospital (NPH) Research Coalition inception April 2016
- NPH Research Coalition Charter and Administrative approval

2017

- IRB Protocol development and submission
- Research Coalition concept and process dissemination

2018–2019

- Research Collaboration agreements finalized
- Data collection
- Data analysis
- Results dissemination

Research Focus Areas

1. **Occupant Experience of the New Environment**
    - Quantitative staff survey
    - Nurse focus groups
        - Experience with environment
        - Organizational factors

2. **Design Impacts on Patient Outcomes**
    - Electronic medical records
    - Other hospital-collected data

Research Documentation

- Research Protocol
- IRB Exemption Determination
- Data Use Agreement
- Research Collaboration Agreements

WIRB
Global Leader | Proven Expert

February 15, 2018

Jeri Brittin, PhD
HDR
8404 Indian Hills Drive
Omaha, NE 68114

Dear Dr. Brittin:

SUBJECT: REGULATORY OPINION—IRB EXEMPTION
Protocol Title: New Parkland Hospital Facility Evaluation
Investigator: Jeri Brittin, PhD

This letter is in response to your request to Western Institutional Review Board (WIRB) for an exemption determination for the above-referenced research project. WIRB's IRB Affairs Department reviewed the exemption criteria under 45 CFR §46.101(b)(2):

> (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
> (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

We believe that the focus group and survey portions of the research fit the above exemption criteria. The data will be collected in a way so that the subjects cannot be identified, directly or through identifiers linked to the participants.

In accordance with the regulation and guidance, the use of de-identified information in research without intervention or interaction with humans does not involve human subjects and thus is not research requiring IRB review. The following is the basis for this opinion.

Federal regulation 45 CFR 46.102(f) defines a human subject as—

> Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains

Western Institutional Review Board®
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Office: (360) 252-2500 | **Fax:** (360) 252-2498 | **www.wirb.com**

03

Patient Outcomes: Methodology and Initial Results

Data Acquisition

Patient Outcomes Data

1. **No Single Data Source**
   Medical records data, safety events, medication related events, and supplies use statistics all collected by different departments in different systems.

2. **Many Meetings across the Organization** to identify: a) who collected & maintained the data, b) who could query and provide the data, and c) what data was available.

   First meeting with Quality led to 9 more meetings with other areas of the hospital to explore other aspects of the physical environment.

Fire Marshal
(Elevator Entrapment/Fire Alarm Activations)

Operational Administration
(ED throughput)

Nutrition
(Meal tray delivery times and efficiency)

Supply Chain
(supplies use)

Police Department
(theft & assaults)

Pharmacy
(*medication related events)*

Infection Control
(hospital acquired infections)

Nurse Staffing

Shared Recovery Area

Adult Patient Population

- Encounters included for those admitted between **January 1, 2013** and **December 31, 2017**

- **192,066 encounters** were included
  - 100,186 with admit date prior to the move
  - 91,880 with an admit date after the move

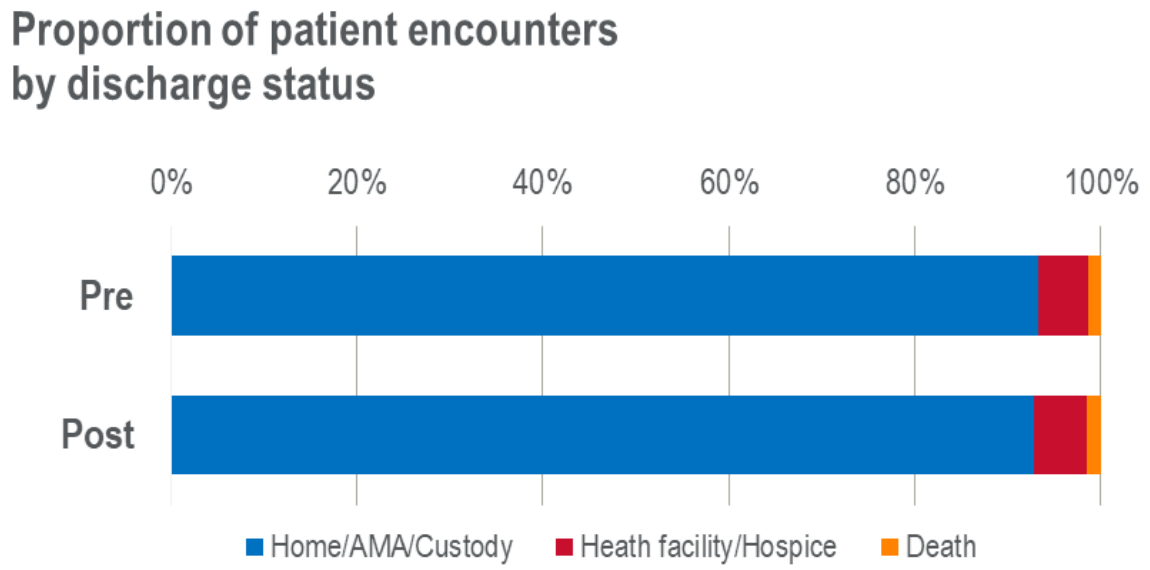
- Three different **divisions of patient services**
  - Women and Infant Specialty Health (35%)
  - Surgical and Trauma Services (25%)
  - Medicine Services (40%)

Adult Patient Population

Patient demographics were similar between the pre and post setting

- Age
- Gender
- Race/Ethnicity
- Socioeconomic status

Similar discharge location and illness severity between pre and post



Analysis Methods

Adult Patient Length of Stay

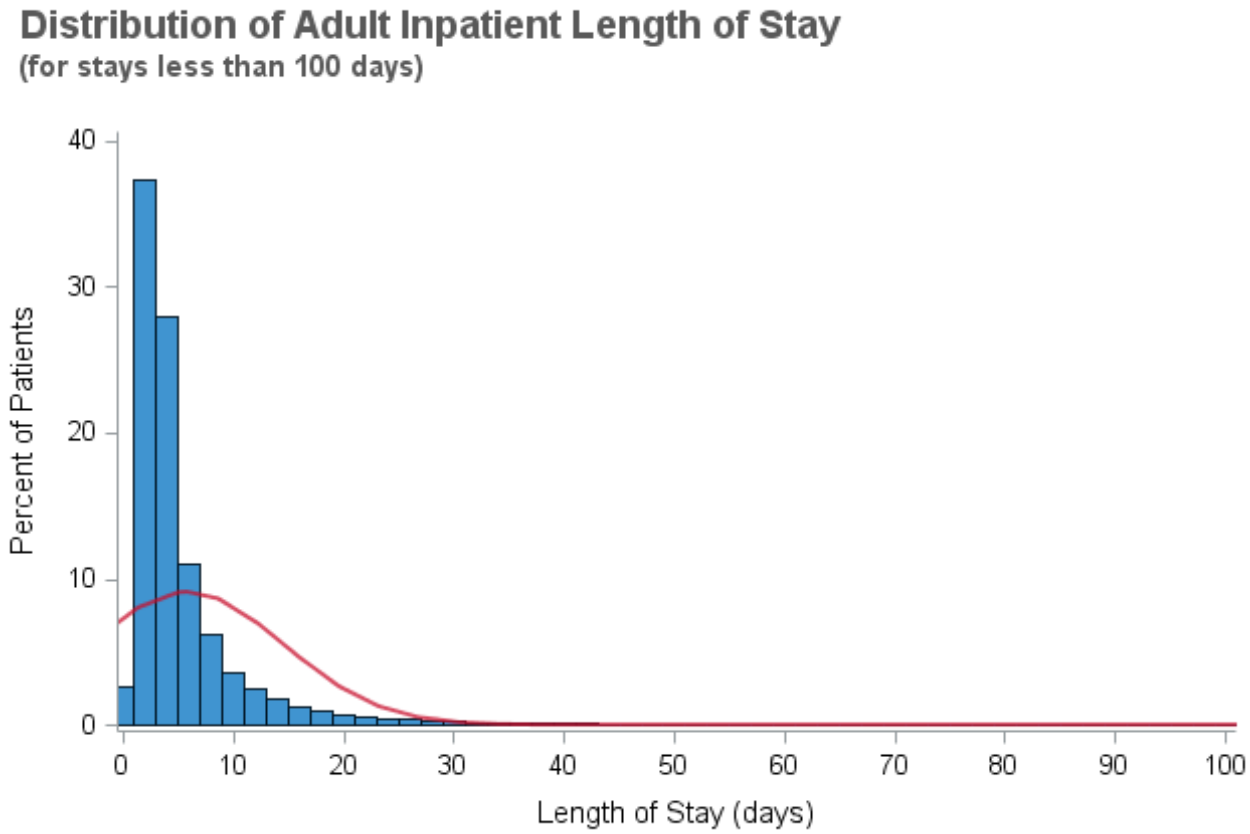
LOS right skewed – many short, and few long lengths of stay

Analysis models

- **Proportional Hazards Regression**
  - Non-normal data
  - Competing risks (time to discharge or death)

- **Time series**
  - Median monthly LOS
  - Control for confounders
  - Seasonal effects

- **Other sensitivity checks**
  - Exclude time just before and after move date
  - Imputation for missing values



Results

Adult Patient Length of Stay

- Regression model suggests higher LOS in the post period compared to the pre period
  - WISH division showed less change from pre to post

- A deeper look into the data with time series analysis suggests different trends before and after the move
  - Increasing prior to the move and decreasing after the move
  - Explains increase in post period compared to the pre period
  - Acuity level of patients (as measured by MS-DRG weight) also increasing over time

Analysis Methods

Adult Patient Adverse Events

Low number of events and few encounters with multiple events

Analysis models

- **Logistic regression**
  - Odds of at least one event in encounter
  - Adjusted for length of stay
  - Control for confounders
  - Check model assumptions
- **Time series**
  - Rate of events per patient day
  - Control for confounders
  - Seasonal effects
- **Other sensitivity checks**
  - Exclude time just before and after move date
  - Imputed data for missing values

Results

Adult Patient Falls

- Total of 2,324 falls during 2,070 encounters
- Logistic regression model showed no difference in odds of falls between the pre and post period
- Time series model found different slopes in the pre and post period
  - Increasing prior to move and steady after the move
  - No changes in estimates when adjusted for baseline fall risk score

Results

Adult Medication-Related Events

- Total of 1,731 medication events during 1,623 encounters

- Logistic regression model showed a reduction in odds of a medication event in the post compared to the pre period

- Time series model found medication events were decreasing over time and trend did not change after the move
  - Rate across time was constant, but dropped at the time of the move

Results

Adult Hospital-Acquired Infections

- Total of 834 HAI during 794 encounters
  - 740 C. diff and 94 MRSA HAI
- Logistic regression model showed no difference in odds of a HAI between the pre and post periods
- Time series analysis suggests different trends before and after the move
  - Increasing prior to the move and decreasing after the move

NICU Patient Population

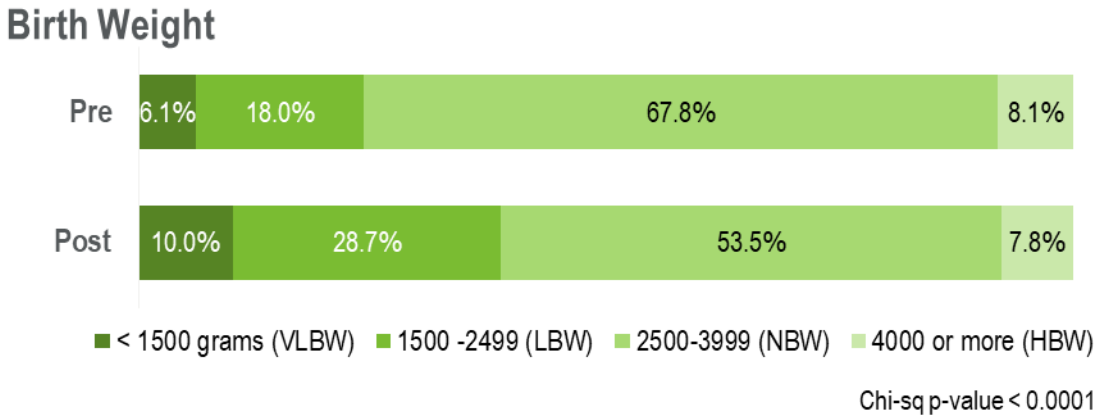
- Encounters included for those admitted between **January 1, 2013** and **December 31, 2017**

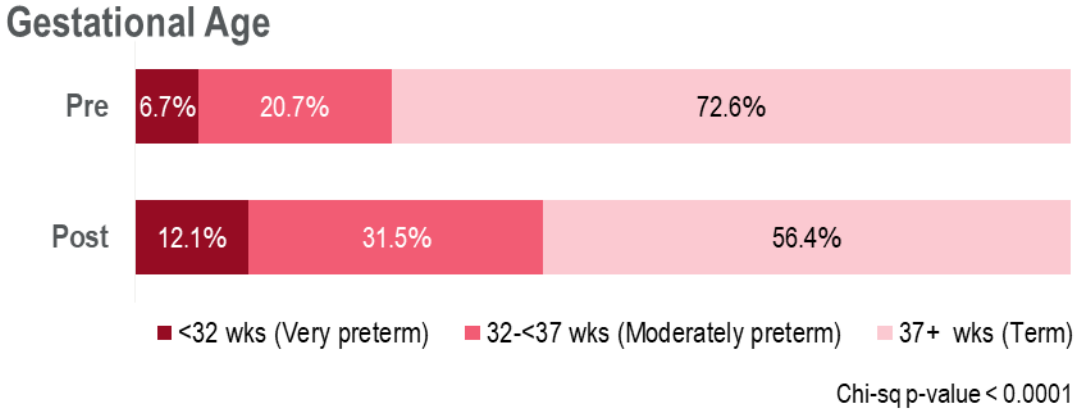
- **9,995 encounters** were included
  - 5,946 with admit date prior to the move
  - 4,031 with an admit date after the move

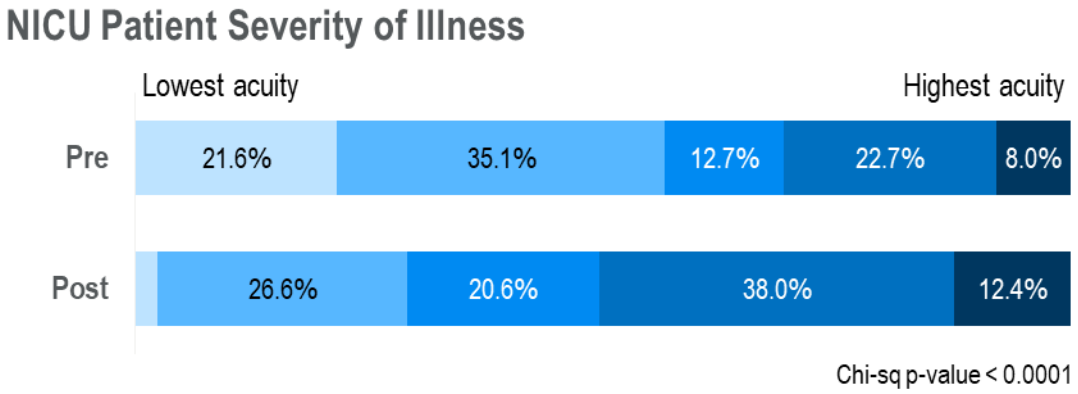
NICU Patient Population

Patient demographics were different in the post vs. pre period:

- Lower birth weight
- Lower gestational age
- Higher MS-DRG weights
- More infants with maternal substance use or withdrawal symptoms diagnoses







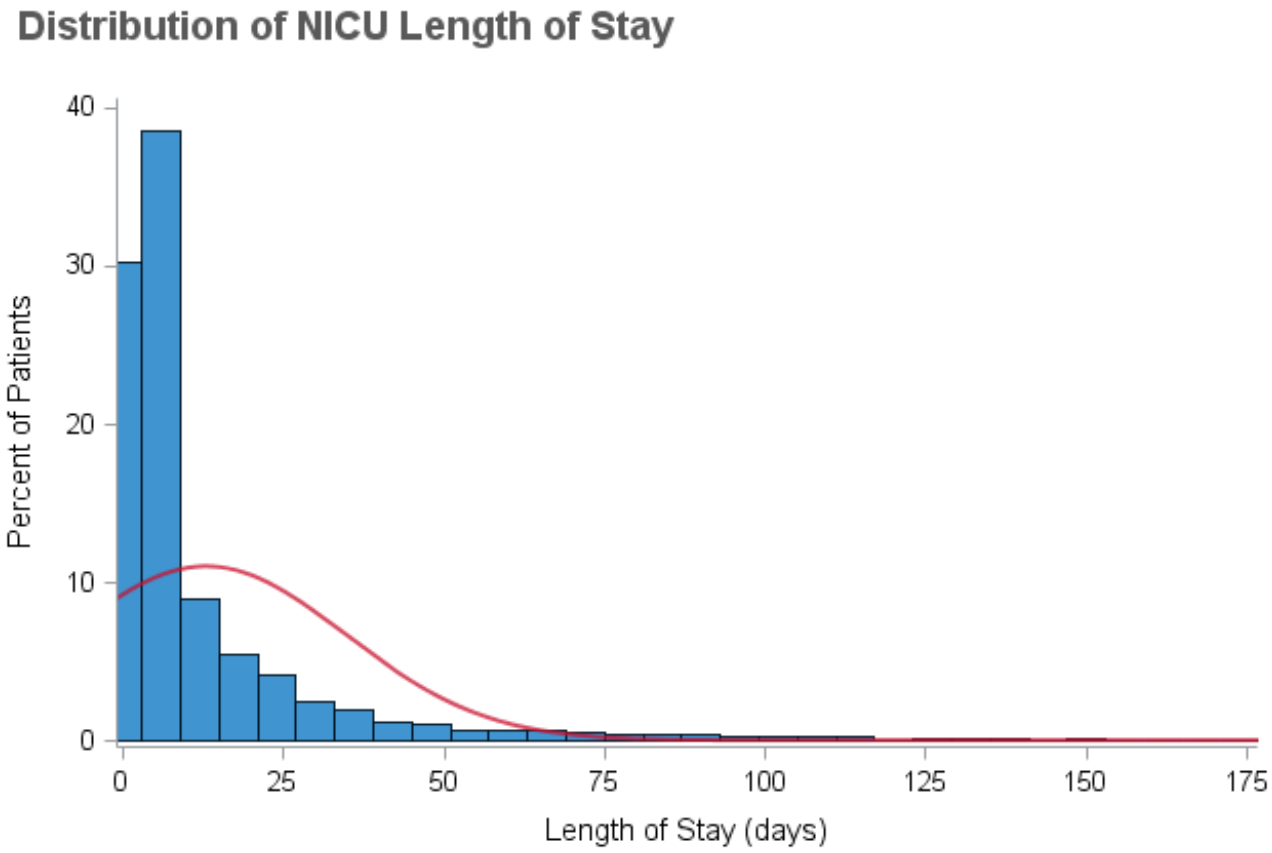
Analysis Methods

NICU Patient Length of Stay

LOS right skewed – many short, and few long lengths of stay

Analysis models

- **Proportional Hazards Regression**
  - Non-normal data
  - Competing risks (time to discharge or death)
- **Time series**
  - Level of aggregation
  - Control for confounders
  - Seasonal effects
- **Other sensitivity checks**
  - Exclude time just before and after move date
  - Imputed data for missing values



Results

NICU Patient Length of Stay

- Different results based on gestational age and size in regression model after controlling for other potential confounding factors
  - Pre-term, small/appropriately sized: shorter LOS in post period
  - Term/post-term, appropriately/large sized: longer LOS in post period

- Time series based on gestational age
  - Pre-term: decrease in LOS over time, trend did not change with move
  - Term/post-term: Change in trend and jump at time of the move
    - Possibly due to change in scoring of neonatal abstinence syndrome that coincided with move

Analysis Methods

NICU Patient Growth

Daily weight measurement

Limited to pre-term infants discharged to home

Analysis models

- **Cubic spline regression**
  - Random effect for each infant
  - Gestational age included as confounding variable

Results

- Pre vs. post time period not a predictor of growth trajectory

Analysis Methods

NICU Patient Oral Feeding

Time to first oral feeding

Limited to pre-term infants discharged to home

Analysis models

- **Proportional hazards regression**
  - Non-normal data
  - Control for confounding variables

- **Time series**
  - Median monthly time to first oral feed
  - Control for confounders
  - Seasonal effects

- **Other sensitivity checks**
  - Exclude time just before and after move date
  - Imputation for missing values

Results

NICU Patient Oral Feeding

- Regression indicated longer time to first oral feeding in the pre vs. post time period
- Time series showed decreasing trend in time to first oral feed over time
  - Trend did not change due to the move

Analysis Methods

NICU Patient Sepsis

Diagnoses of “Sepsis,” “Septicemia,” or “Bacteremia”

Analysis models

- **Logistic regression**
  - At least one diagnosis of sepsis during stay
  - Control for confounding variables

- **Other sensitivity checks**
  - Exclude time just before and after move date
  - Imputed data for missing values

Results

- Slight increase in cases after the move not significant after controlling for confounders

04

Staff Outcomes: Methodology and Initial Results

New Parkland Hospital Staff

Survey

- 9,822 staff and providers invited to participate
- Response (rate) by group
  - Nursing staff: 514 (20.0%)
  - Other employees: 918 (21.5%)
  - Physicians: 191 (17.9%)
  - Residents/Fellows: 75 (5.6%)

Focus groups

- Nurse managers and nursing staff invited
  - 5 groups (1 nurse managers, 4 nursing staff)
  - 63 total participants

Initial Themes

Impact of decentralized nursing design on nurse communication, teamwork, and learning

- Opportunities for learning affected due to visibility, technology, and socialization
- Frequency of interactions with coworkers and ability to know when coworkers need help perceived to decrease
- Increased nurse time spent in or near patient rooms supports quality patient care
- Limited availability of designated spaces for respite and connection with coworkers

Environmental impact on nurse wellness

- Large units lead to increased time and distance for nurses to walk
- Many units do not have a sufficiently-sized break room
- Personal safety & security and the support of the environment on efficiency most important for nurse comfort and productivity