Designing a Hospital for Performance & Satisfaction

Barry S. Rabner, President & CEO,
Princeton HealthCare System

Princeton HealthCare System

Redefining Care

Overview of Princeton HealthCare System

Princeton HealthCare System is one of New Jersey's most comprehensive healthcare systems.

PHCS' major clinical units include:

- University Medical Center of Princeton at Plainsboro
- Princeton House Behavioral Health
- Princeton Rehabilitation
- Princeton HomeCare
- Princeton Fitness & Wellness Centers
- Princeton HealthCare System Foundation

PHCS Key Characteristics — Projected 2015

Total Number of Employees	3,600
Medical Staff	1,300
Residents	45
Annual Revenue	$438,600,000
Annual Expense	$428,200,000
Operating Margin	2.2%
EBIDA	11.6%

University Medical Center of Princeton at Plainsboro Design Capacity and Targets 2015

231-bed, 10 operating room acute care teaching hospital serving central New Jersey population of 1.5 million

- Occupancy rate: 90%
- Length of stay: 4.2 days
- Admissions: 18,577
- Patient days: 75,090
- Outpatient visits: 256,908
- Emergency visits: 65,000
- Clinic visits: 30,000

Partnerships & Affiliations

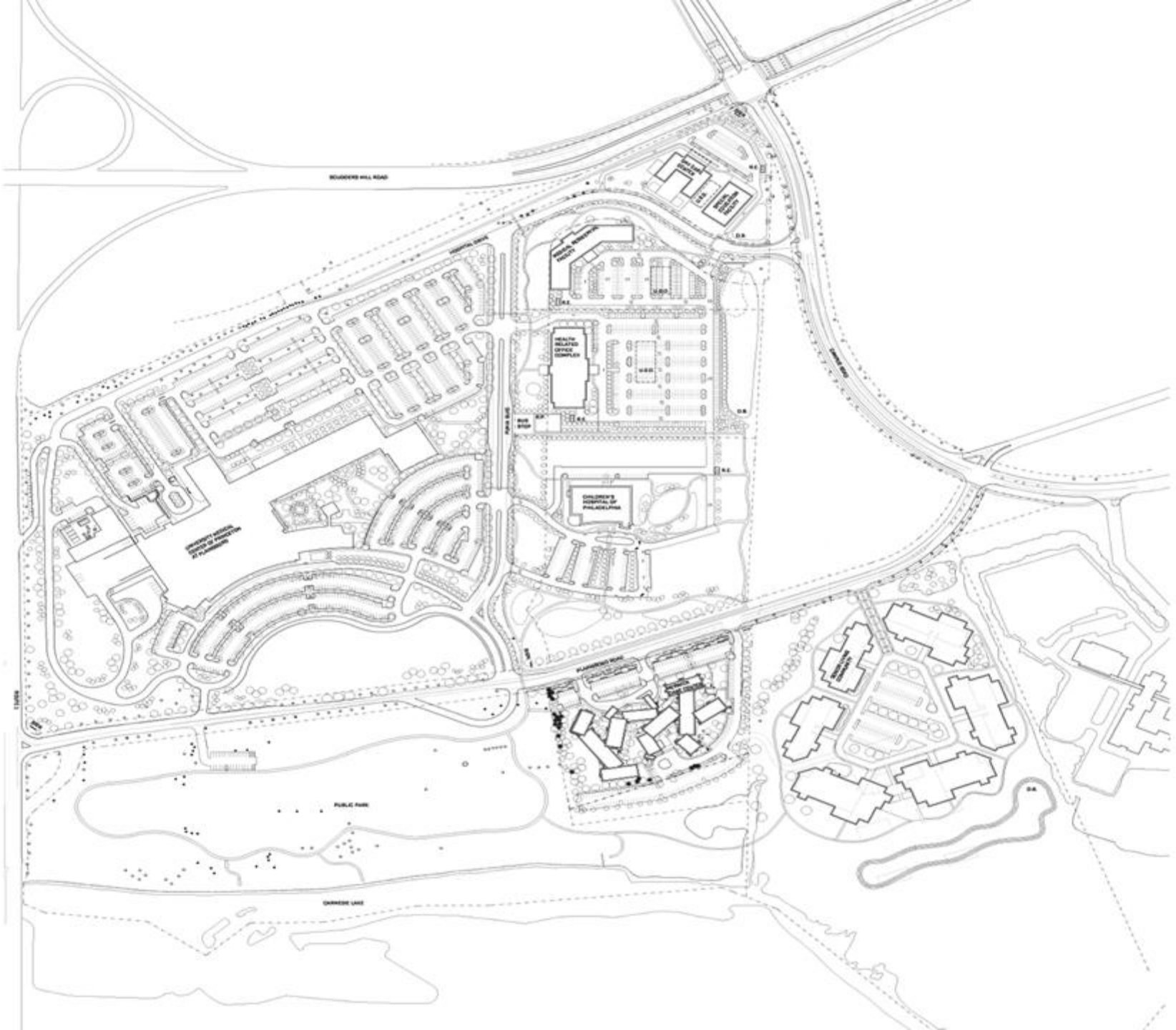
- Robert Wood Johnson Medical School, New Brunswick, NJ
- The Children's Hospital of Philadelphia, PA
- The Cancer Institute of New Jersey
- Hospital of the University of Pennsylvania Maternal Fetal Medicine
- Fitness & Wellness Centers
- 2 surgery centers, 2 imaging centers and endoscopy center with physician partners

Centers for Care

- Edward & Marie Matthews Center for Cancer Care
- George & Estelle Sands Center for Cardiac & Pulmonary Care
- Llura & Gordon Gund Center for Critical Care
- Center for Eating Disorders Care
- Center for Emergency Care
- Center for Maternal & Newborn Care
- Center for Neuroscience Care
- Regan Family Center for Pediatric Care
- Center for Surgical Care
- Center for Testing & Treatment

See Appendix A
Statement of Operations, Listing of Programs and Services, and Additional Operating Targets

Planning the New UMCPP


BOUDERS HILL ROAD
HOSPITAL DRIVE
CAMDEN
PUBLIC PARK
CHERRY LANE

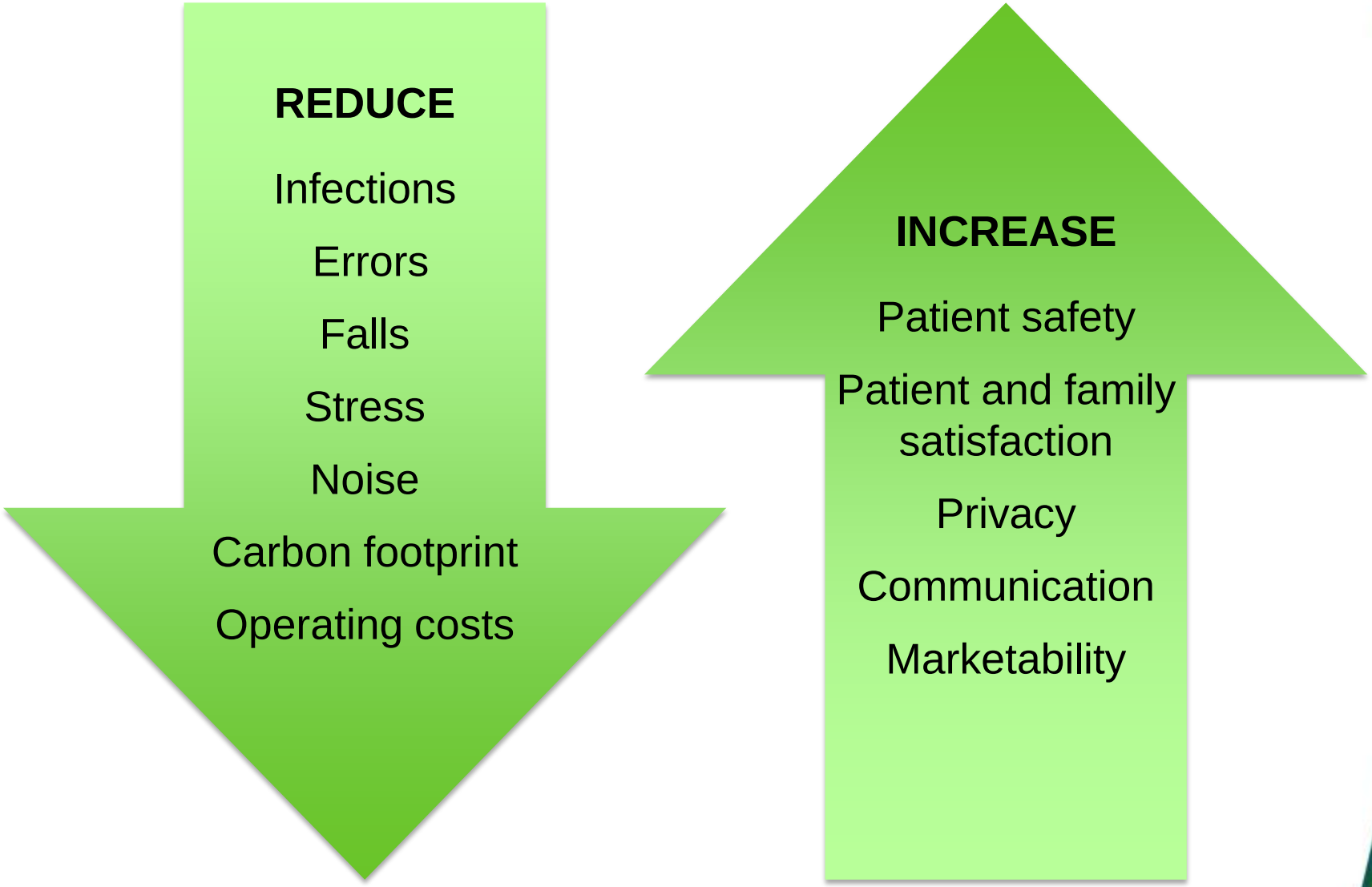
Project Mission Statement and Guiding Principles

The project mission statement and guiding principles are broad statements defining the vision and linking the major direction of the project to the organizational model of care delivery.

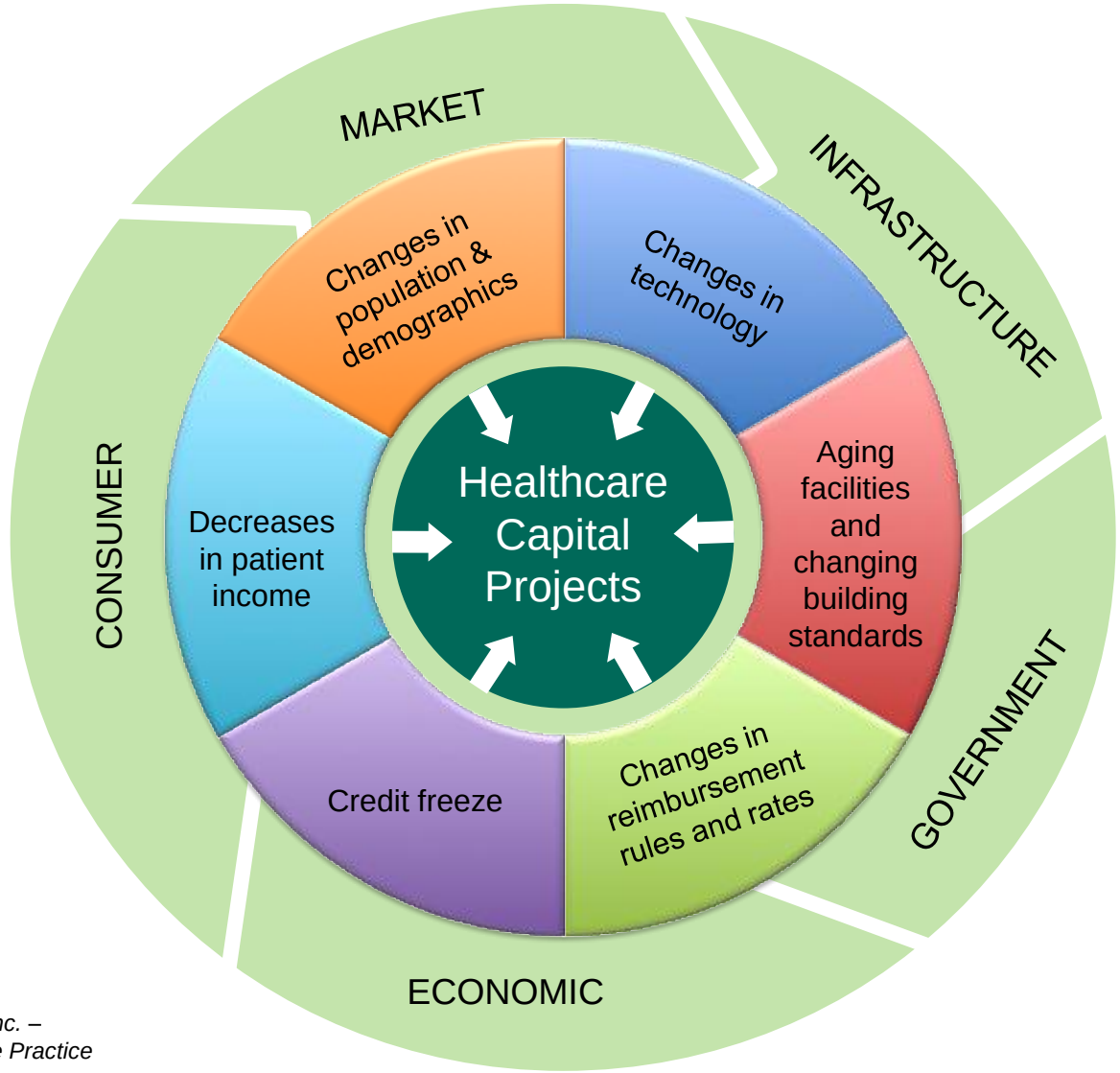
Project Mission Statement

Princeton HealthCare System will bring together compassion, clinical expertise and technology to provide outstanding care and value to the community we serve. By creating a culture of excellence among those who serve our patients, we will ensure that each patient has the best possible experience. We will create and maintain a safe, state-of-the-art teaching and healing environment that is visually pleasing, sophisticated and ecologically responsible.

Project Guiding Principles

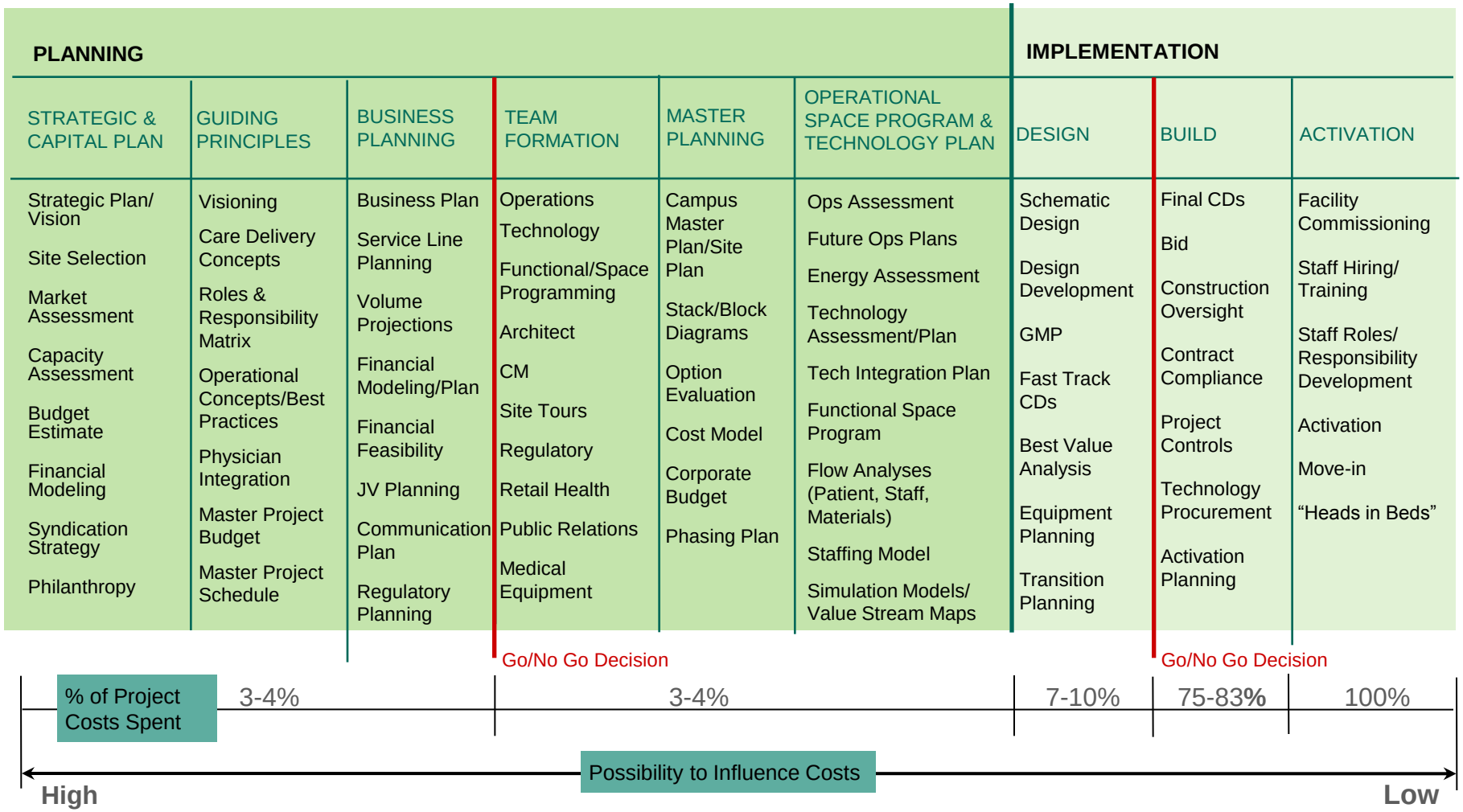


Influences on Healthcare Capital Projects



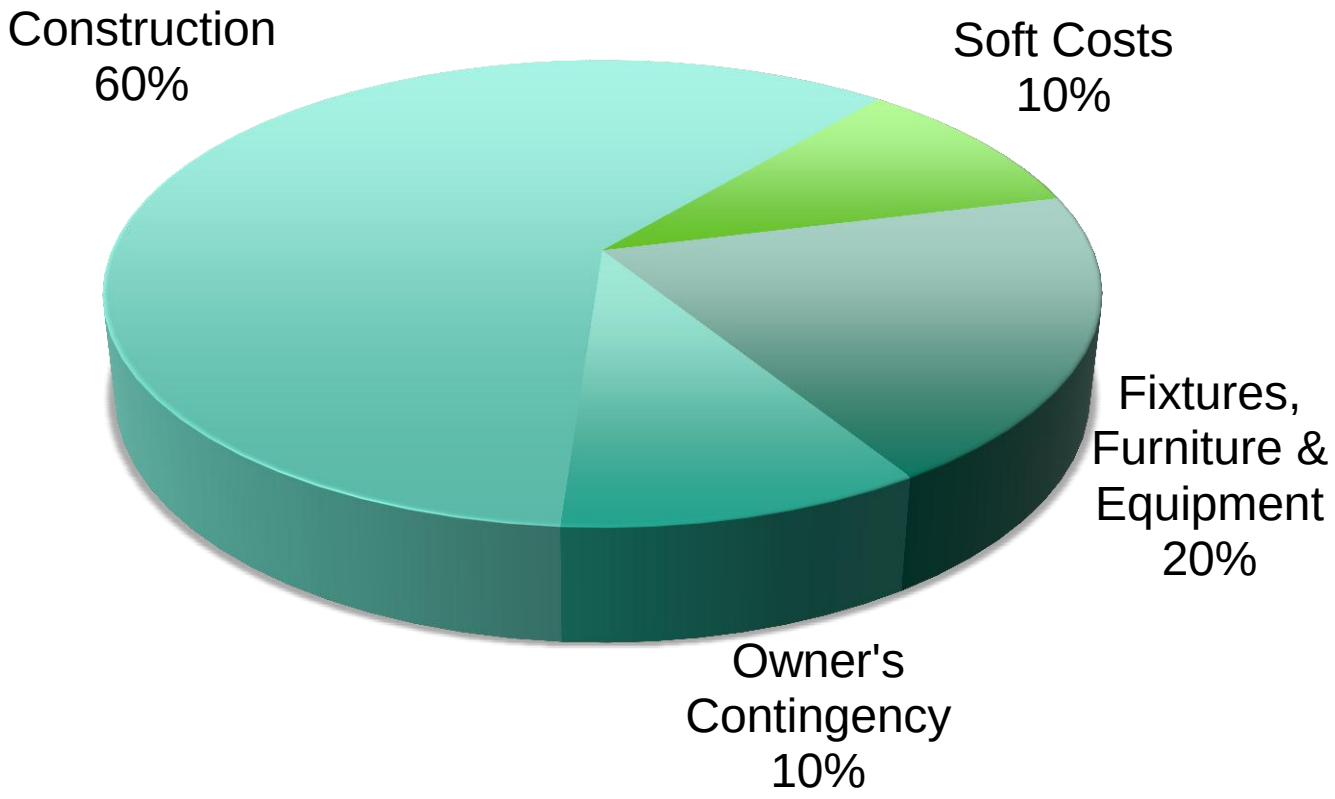
Source:
Navigant Consulting, Inc. – Healthcare Real Estate Practice

Strategic Facility Planning & Implementation



Source: *Navigant Consulting, Inc. – Healthcare Real Estate Practice*

Model Project Costs



See Appendix B
Model Project Schedule

Evidence-based Design

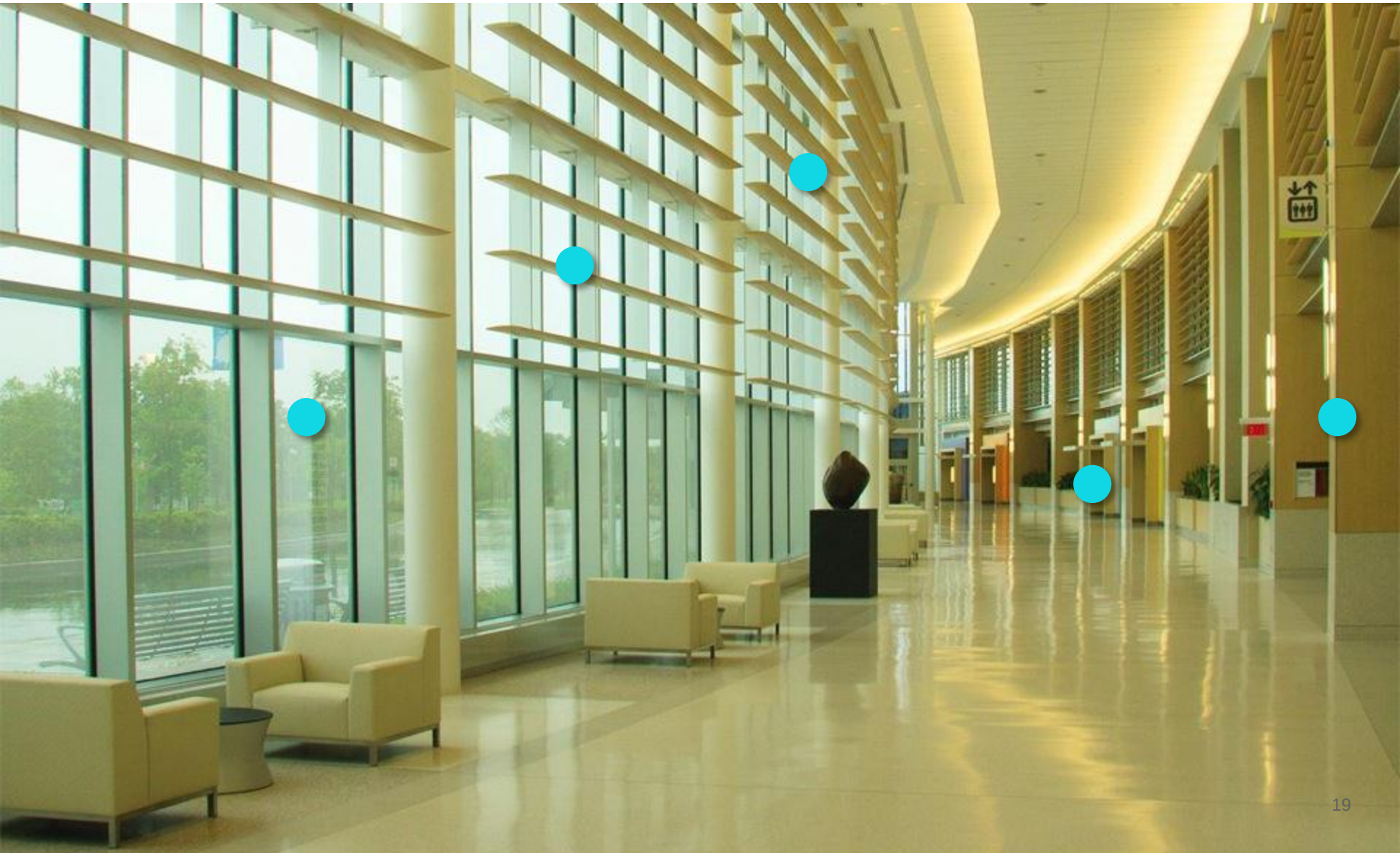
Evidence-based Design

Evidence-based design is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes. It is a process used by owners, architects, interior designers, facility managers and others in the planning, design and construction of commercial buildings.

See Appendix C
Information About Sustainable Design

Key Features of the New UMCPP

Atrium



Atrium

East/west building orientation and extensive use of glass to provide natural light in 90% of patient space.

The glass façade is reflective, double-paned and gas-filled to conserve energy.

Atrium

Fixed sun-shade louvers on interior Atrium walls and south-facing exterior wall.

Atrium

Greeters at primary entrance welcome people and provide way finding assistance.

Atrium

Highly visible, centrally located concierge desk to answer questions and provide services such as assistance with hotel and restaurant reservations, maps and directions to local destinations, and loans of e-readers.

Atrium

Two-story water feature flows down the glass separating the Atrium from the elevator banks. Reduces stress, adds humidity and aids in way finding.

Atrium

Convenient access to Centers for Care, where related services are grouped together, making navigating the hospital easier and more efficient for patients and visitors.

Atrium

Modest Atrium seating area as well as decentralized waiting and registration areas for each of the Centers for Care.

Atrium

Two color-coded elevator banks for visitors are located off the Atrium. The hospital features 18 elevators, each of which is dedicated for use by visitors, staff or transportation of materials.

Inpatient Room Design

Patient & Family Room Design

All single-patient rooms to reduce infections and improve communications, privacy and sleep. Positive impact on utilization. Encourages family involvement.

Canted room design to orient patient to the outside. All rooms same-handed to reduce errors and falls.

Family Zone

Family zone with sleeper sofa, comfortable chairs, a reading light and oversized windows to maximize daylight and views of nature.

TV with Patient Engagement System

42-inch, flat-screen TV with a patient engagement system provides entertainment options for adult and child patients.

Education features help patients better understand their condition and treatment. Future features will enable patients to communicate their pain level with prompt notification to their nurse. Will also be able to order their meals through the TV.

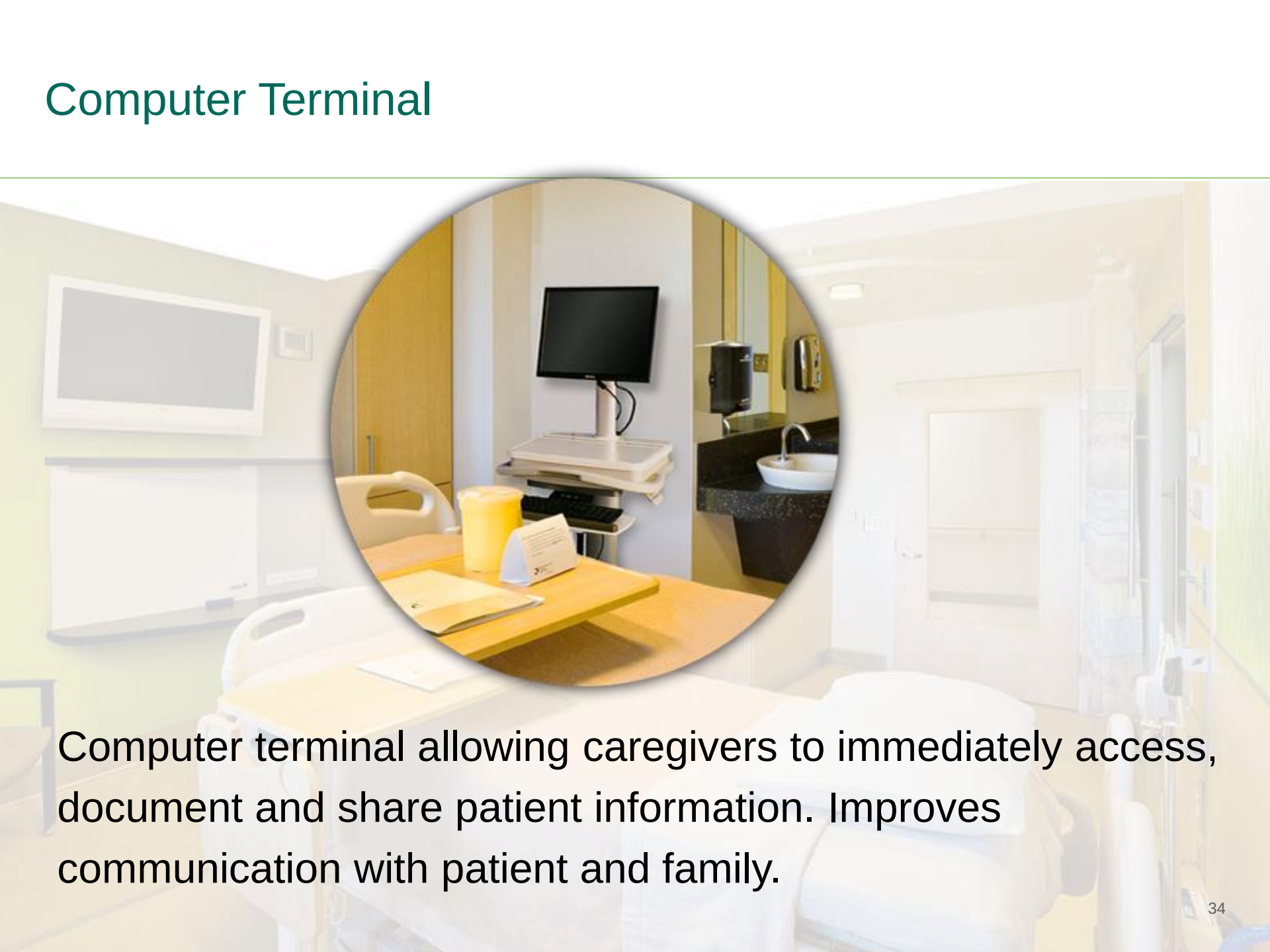
Work Desk

Work desk with a soft reading light and outlets for computers and cell phones. The building is equipped with WiFi access. White board for nursing to note their name, title and provide other information. Magnetic to hold cards, pictures, etc.

Closet

Closet for suitcases, clothing and personal belongings, and a safe to secure valuables.

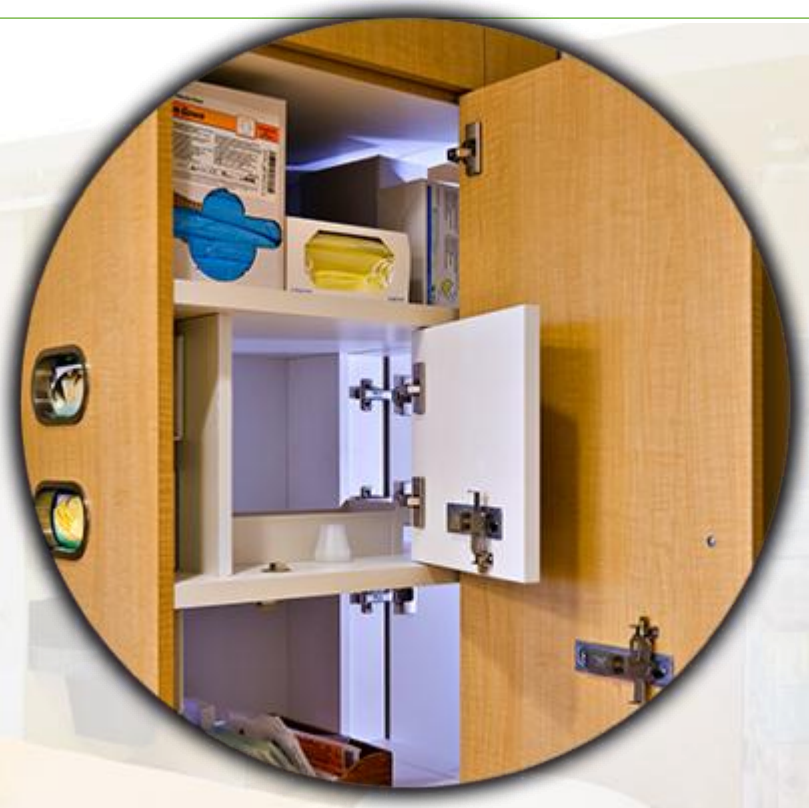
Computer Terminal



Computer terminal allowing caregivers to immediately access, document and share patient information. Improves communication with patient and family.

Nurse Server

Nurse server stocked from corridor with necessary supplies, including a locked section for medication. Nurse able to spend more time with the patient. Reduces number of staff entering room, reducing infections.



Hand-washing

Hands-free sink and soap dispenser for easy hand-washing immediately upon entering room.

One sink for every two employees in building. Hand sanitizers near most door openings. All reducing infections.

Air & Temperature Control

Individual temperature controls and consistent temperature maintained in all areas of the room.

100% fresh, filtered air in all patient care areas, reducing infections.

Noise Management

Sound absorbing materials in corridor and patient room. Curve of building, staff conference rooms at every nursing station and irregular corridor wall shape to lower ambient noise. Improves sleep, communications and reduces errors.

Paging in building limited to emergencies. All nurses carry mobile devices to communicate directly with patients.

Antibacterial Floors & Curtains

Flooring and privacy curtains have antibacterial properties, reducing infections.

Private Bathroom

Private bathroom located three feet from bed with handrails to the bathroom and around the toilet to help prevent falls.

Sliding Bathroom Door

Sliding bathroom door to minimize door interference with patient and staff. Frosted glass in door allows in natural light, improves orientation and lights path at night.

Low-level Lighting

Light box for soft lighting in the room.

Low-level lighting under bed and wall below handrail, leading from bed to bathroom, to improve safety at night.

Beds

Bed can be lowered to 16” off the floor to help prevent falls. Pressure-relieving mattresses. Built-in scale eliminates need to transfer patient for weighing. Bed contacts nurse directly if high-risk patient is getting out of bed without assistance.

Center for Maternal & Newborn Health

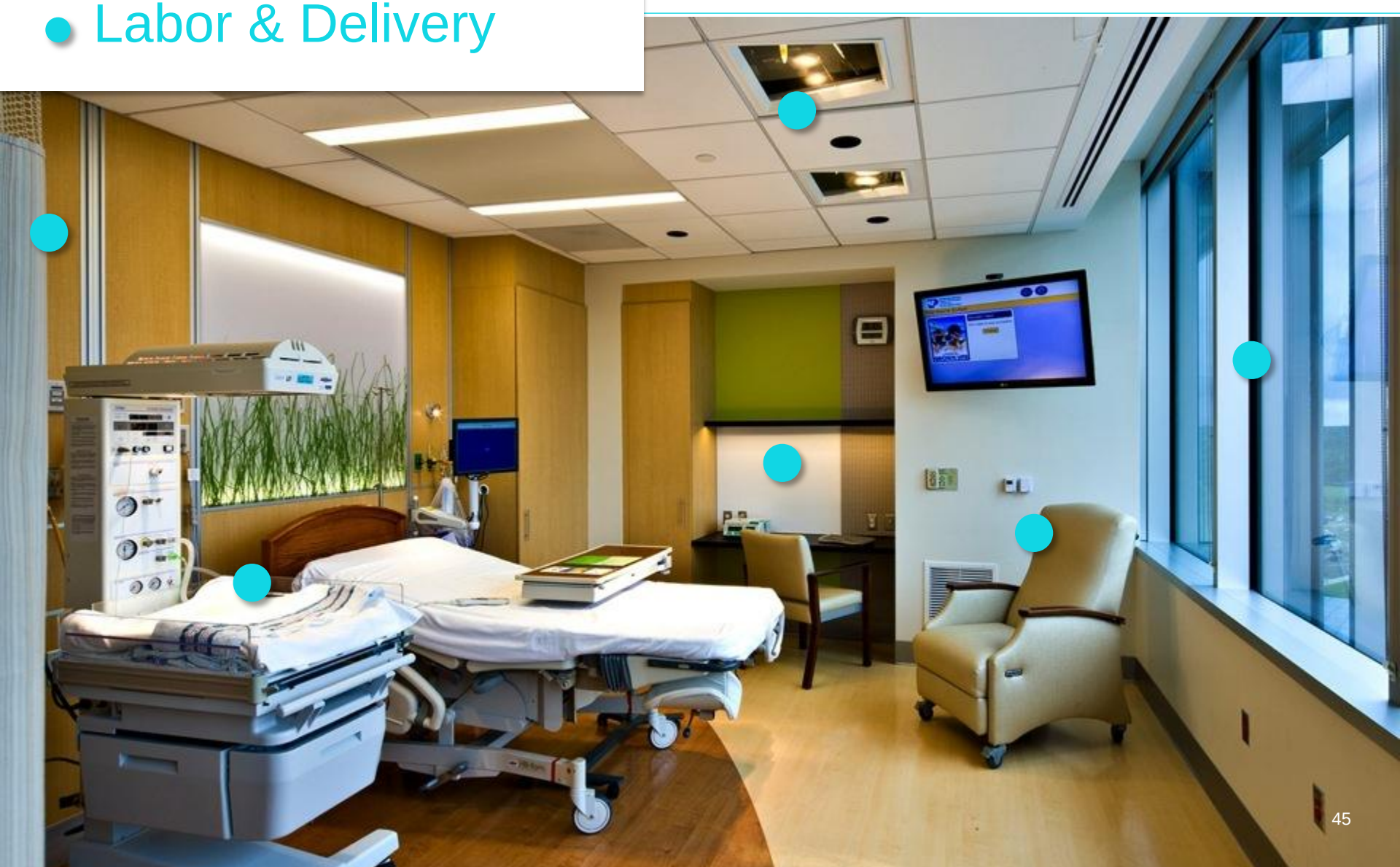
Labor & Delivery

Mother-Baby Unit

Neonatal Intermediate Care Unit (NICU)

Center for Maternal & Newborn Health

- Labor & Delivery



- Labor & Delivery

Remotely controlled, ceiling-mounted surgical lights.

Labor & Delivery

The Labor & Delivery unit includes comfort features, such as private delivery and recovery suites and two dedicated rooms with whirlpool tubs to ease back pain during labor.

- Labor & Delivery

Space in room to accommodate advanced incubators to regulate newborns' temperature after birth.

- Labor & Delivery

Relaxing recliners and desk area with computer access.

Labor & Delivery

Natural light and nature views.

Center for Maternal & Newborn Health

- Mother-Baby Unit

- Mother-Baby Unit

Each room has a spacious, private bath.

- Mother-Baby Unit

Private phones connect each mother directly to her nurse.

- Mother-Baby Unit

Bassinet to enable baby to stay in room.

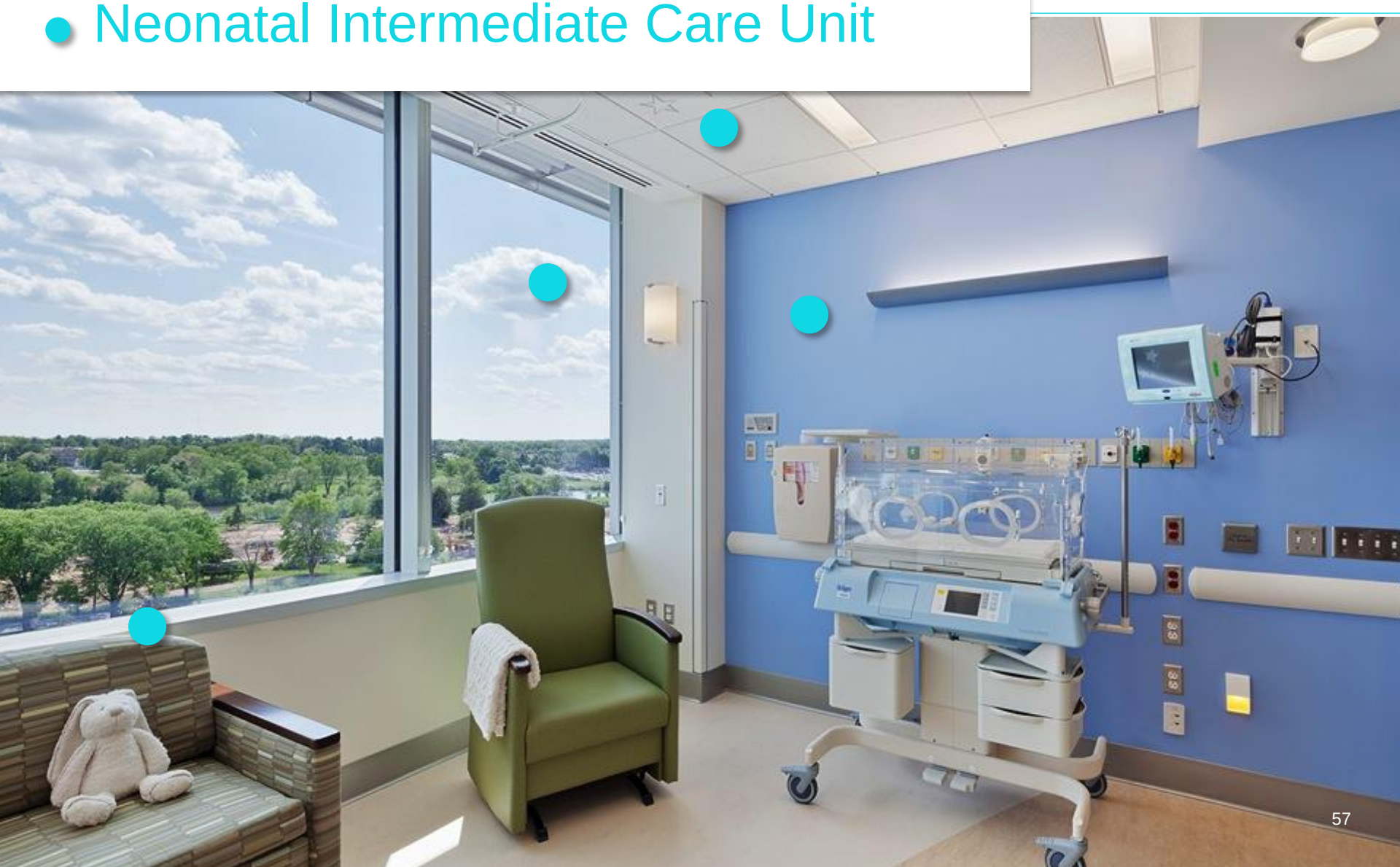
- Mother-Baby Unit

Sleeping accommodations for visitors.

- Mother-Baby Unit

Internet access through the patient interactive TV—post newborn's photos online or email to family and friends.

- Neonatal Intermediate Care Unit



Neonatal Intermediate Care Unit

Intermediate Care Unit where board certified neonatologists from The Children's Hospital of Philadelphia provide specialized care for newborns.

Neonatal Intermediate Care Unit

Private rooms with sleeping accommodations for parents.

- Neonatal Intermediate Care Unit

Nurses station positioned between every two patient rooms with windows for closer nursing presence.

Intensive Care Unit

Intensive Care Unit

Rooms are mirror images and face into nurses station for easy visualization of two patients.

Blinds can be closed from within the patient room or external nurses stations.

Intensive Care Unit

Overhead lighting for treatments and procedures.

Large-screen cardiac monitor at bedside for highly visual monitoring of cardiac functions and vital signs.

Rooms are larger to accommodate a large team of care providers at the same time.

Interventional Platform

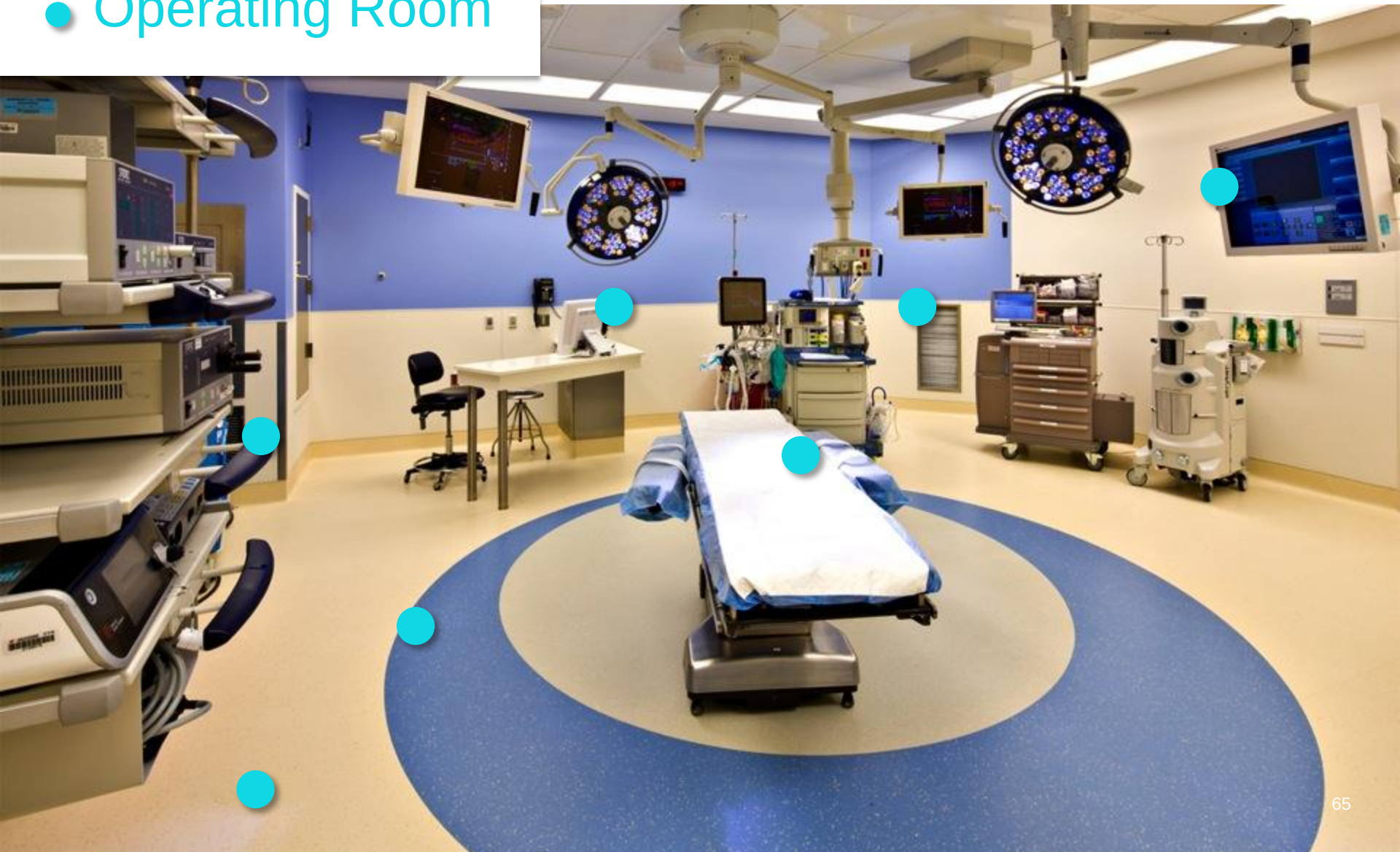
Operating Room

Cardiac Catheterization Laboratory

Integrated Radiology

Interventional Platform

- Operating Room



- Operating Room

Instrumentation and equipment suspended from ceiling at eye level to improve visibility, mobility and safety and to reduce room turnaround time.

Operating Room

100% fresh air is moved through operating room 25 times an hour through HEPA filters, providing the cleanest possible environment for surgery.

Interventional Platform

Operating Room

Video-conferencing capabilities, allowing the surgical team to communicate in real time with specialists, such as pathologists in the laboratory who are analyzing excised tissue samples.

Procedures can be watched in Education Center in different building.

All clinical data (labs, imaging studies, etc.) viewable during a procedure.

- Operating Room

Nurse documentation station faces the operating table, rather than against the wall, for better interaction with the surgical team. Computers and OR systems accessible from station and corridor for easy access.

- Operating Room

Storage of most supplies is located immediately outside the operating rooms to allow for easy access, while minimizing clutter in the operating room.

Interventional Platform

- Operating Room

Fully equipped for advanced minimally invasive surgical techniques, including robotic surgery.

- Operating Room

Special floor markings increase safety awareness and compliance with surgical device positioning in clean air flow. Flooring material is antibacterial.

Interventional Platform

- Cardiac Catheterization Laboratory

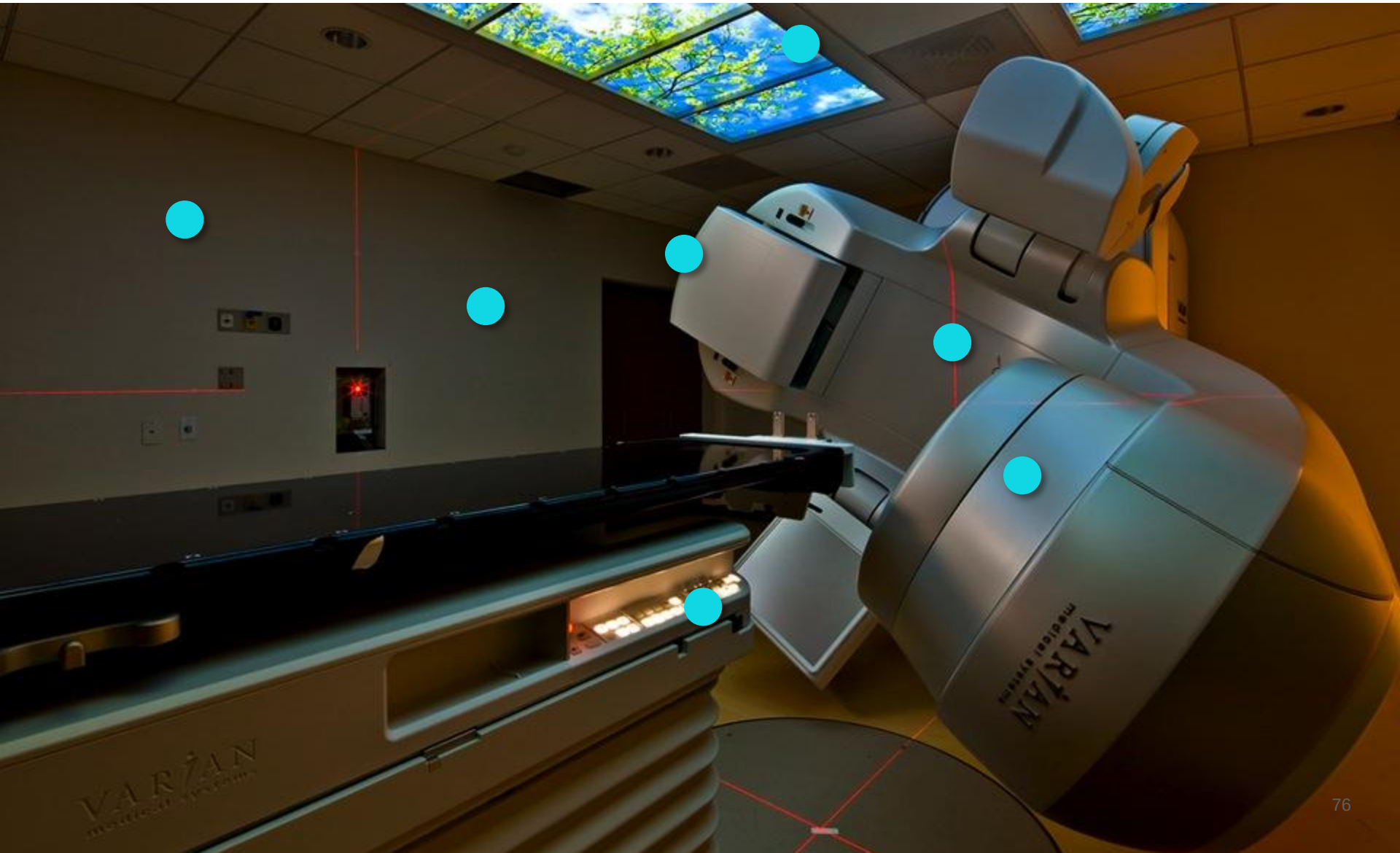
Cardiac Catheterization Laboratory

Fully digital equipment and technology. High-resolution monitors, state-of-the-art procedure lighting and streamlined overhead equipment.

Cardiac Catheterization Laboratory

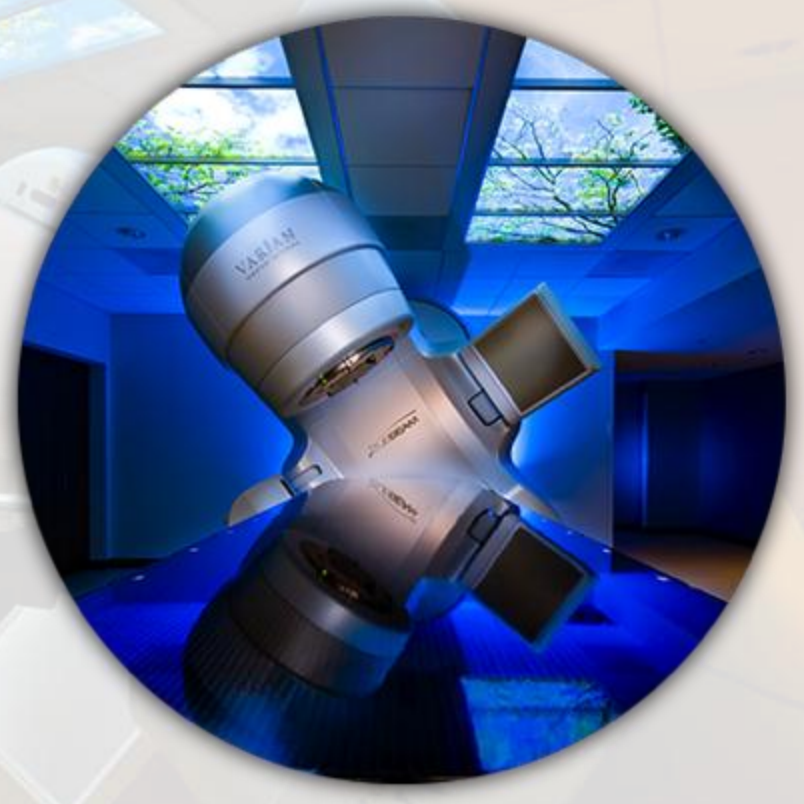
Control room for hemodynamic cardiac monitoring and analysis of parameters, as well as documentation of procedures at the point of care.

Linear Accelerator



Linear Accelerator

All-digital, latest generation of linear accelerator, TrueBeam™ delivers radiation treatments with unparalleled precision and speed, reducing the number and duration of treatments. Improved targeting accuracy and greater versatility in treatment design.



Linear Accelerator

Automatically monitors accuracy every 10 milliseconds during treatment—synchronizing to adjust for minor movements that may occur with a single breath.

Supports Intensity Modulated Radiation Therapy, Image Guided Radiation Therapy, Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy that deliver radiation with pinpoint precision to tumors.

Linear Accelerator

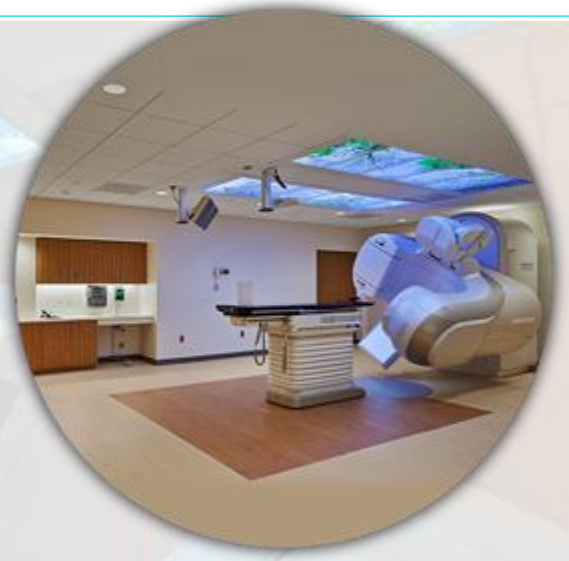
The ceiling above the linear accelerator is equipped with a motion detector used to track the motion for the respiratory gating application on the TrueBeam™ Imaging workstation, which uses the motion detector to synchronize with the patient's respiratory cycle.

Linear Accelerator

Remotely controlled cameras used by staff to monitor and communicate with patients when outside room.

Linear Accelerator

The room is designed to promote comfort and reduce stress through the use of decorative wall features, low-level lighting, skylights and generally open space.



Magnetic Resonance Imaging (MRI)

Magnetic Resonance Imaging

Open-architecture MRI provides non-claustrophobic imaging. Room design emphasizes an open layout with minimal in-room storage.

Magnetic Resonance Imaging

Soothing skylight features and natural light reduce stress and support a healing environment.

JoAnn Heffernan-Heisen Infusion Therapy Suite

JoAnn Heffernan-Heisen Infusion Therapy Suite

Accommodates 19 patients in a semi-private setting, generally featuring “pods” of four. These grouped stations provide for efficient staffing, patient safety and privacy.

JoAnn Heffernan-Heisen Infusion Therapy Suite

Infusion stations can be oriented toward window wall overlooking healing garden, allowing nature views and the maximum amount of daylight into the space. Ample room for guest.

JoAnn Heffernan-Heisen Infusion Therapy Suite

Each chair is equipped with built-in massage and heat—all at the patients' fingertips—for comfort during sometimes lengthy procedures.

Patient can control lighting and entertainment from chair.

JoAnn Heffernan-Heisen Infusion Therapy Suite

Suite is based on an open room design, with a central nurse station that overlooks the entire space for advantages in clinical supervision.

JoAnn Heffernan-Heisen Infusion Therapy Suite

Includes two individual rooms for patients who prefer privacy or require it because of their medical condition(s).

JoAnn Heffernan-Heisen Infusion Therapy Suite

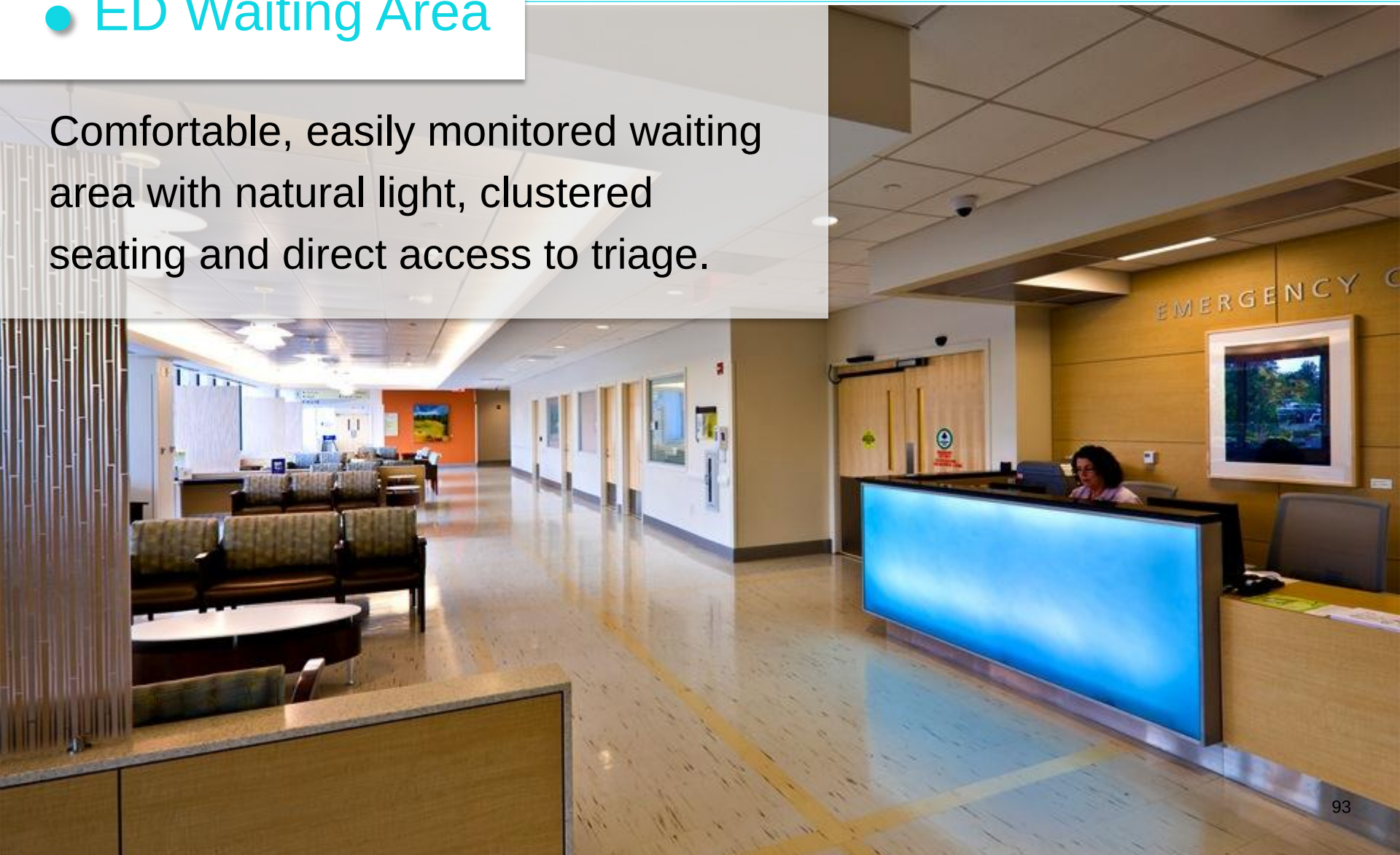
Pharmacy located in the infusion suite.

Center for Emergency Care (Emergency Department)

Center for Emergency Care (Emergency Department)

- ED Waiting Area

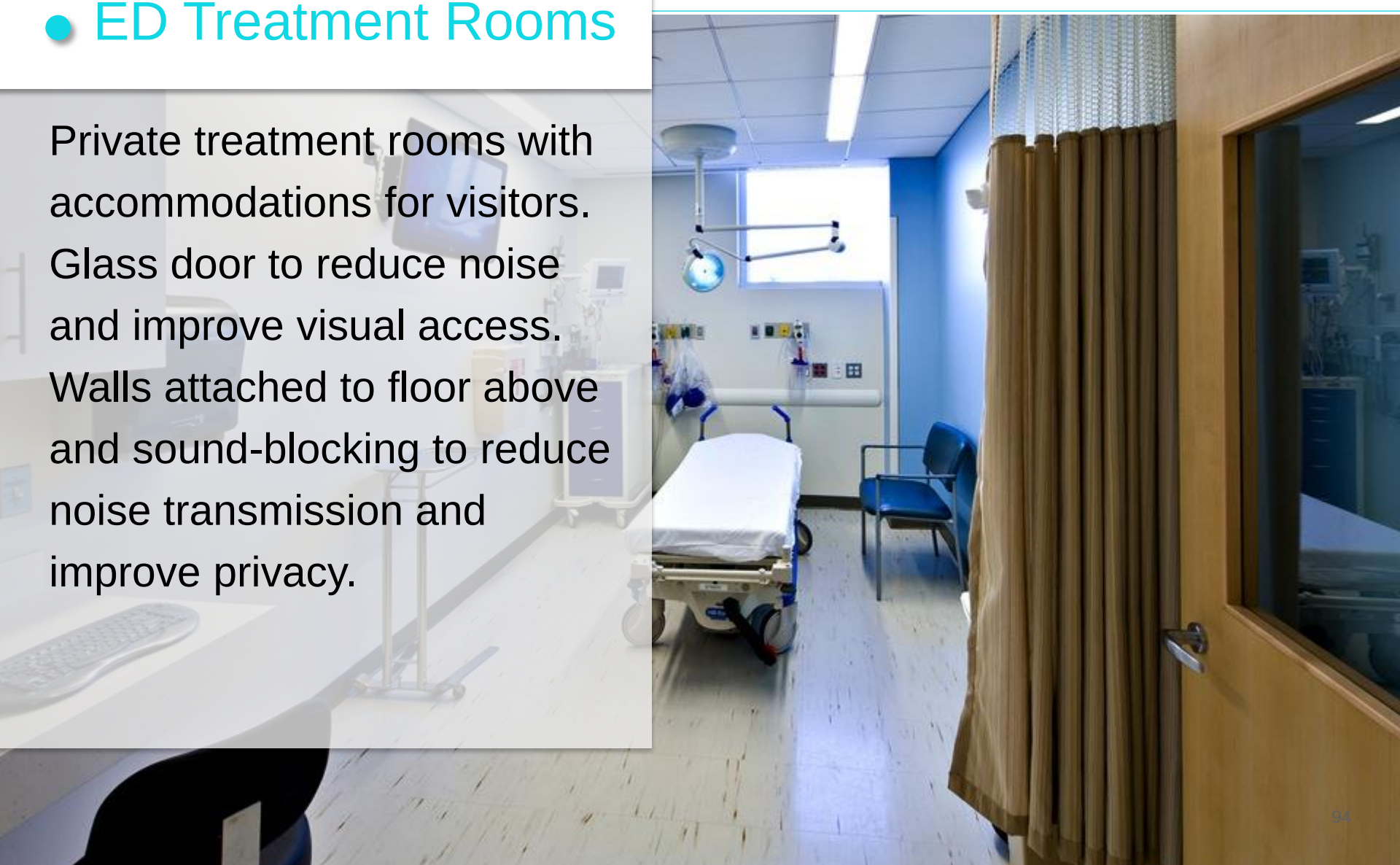
Comfortable, easily monitored waiting area with natural light, clustered seating and direct access to triage.



Center for Emergency Care (Emergency Department)

ED Treatment Rooms

Private treatment rooms with accommodations for visitors. Glass door to reduce noise and improve visual access. Walls attached to floor above and sound-blocking to reduce noise transmission and improve privacy.



Center for Emergency Care (Emergency Department)

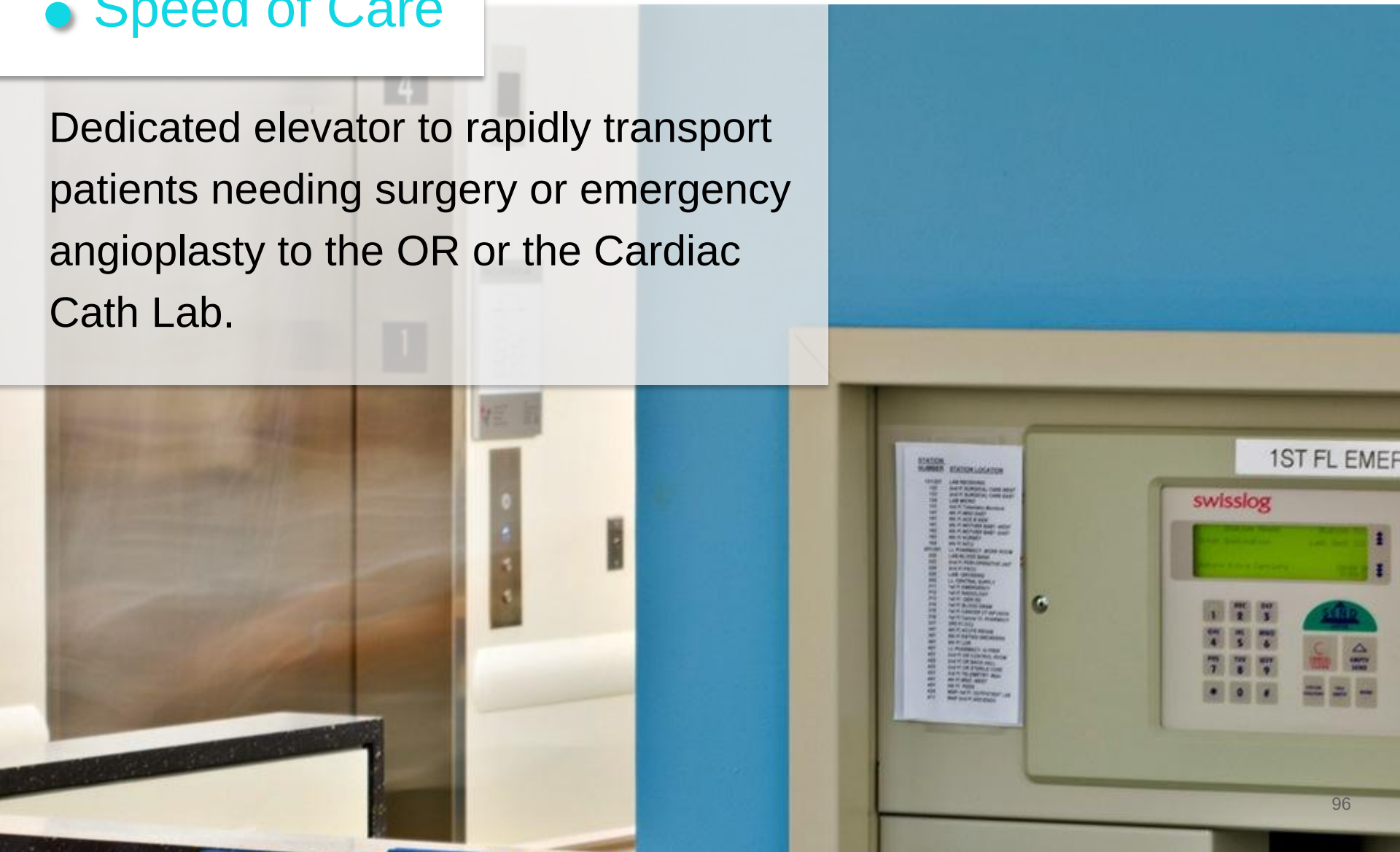
- Imaging

Comprehensive digital imaging and diagnostics capabilities available directly in the ED to reduce wait time.

Center for Emergency Care (Emergency Department)

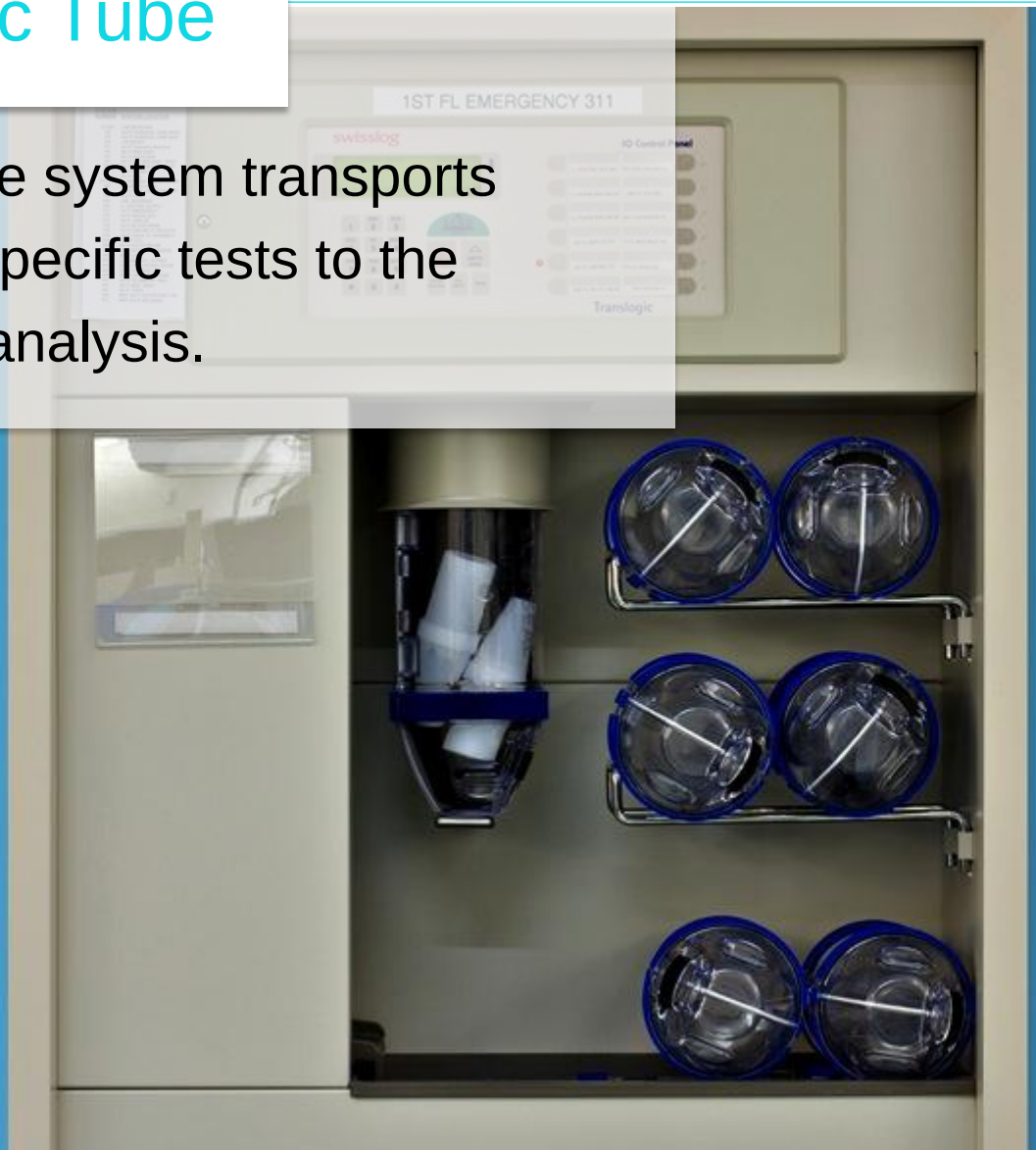
- Speed of Care

Dedicated elevator to rapidly transport patients needing surgery or emergency angioplasty to the OR or the Cardiac Cath Lab.



- Pneumatic Tube

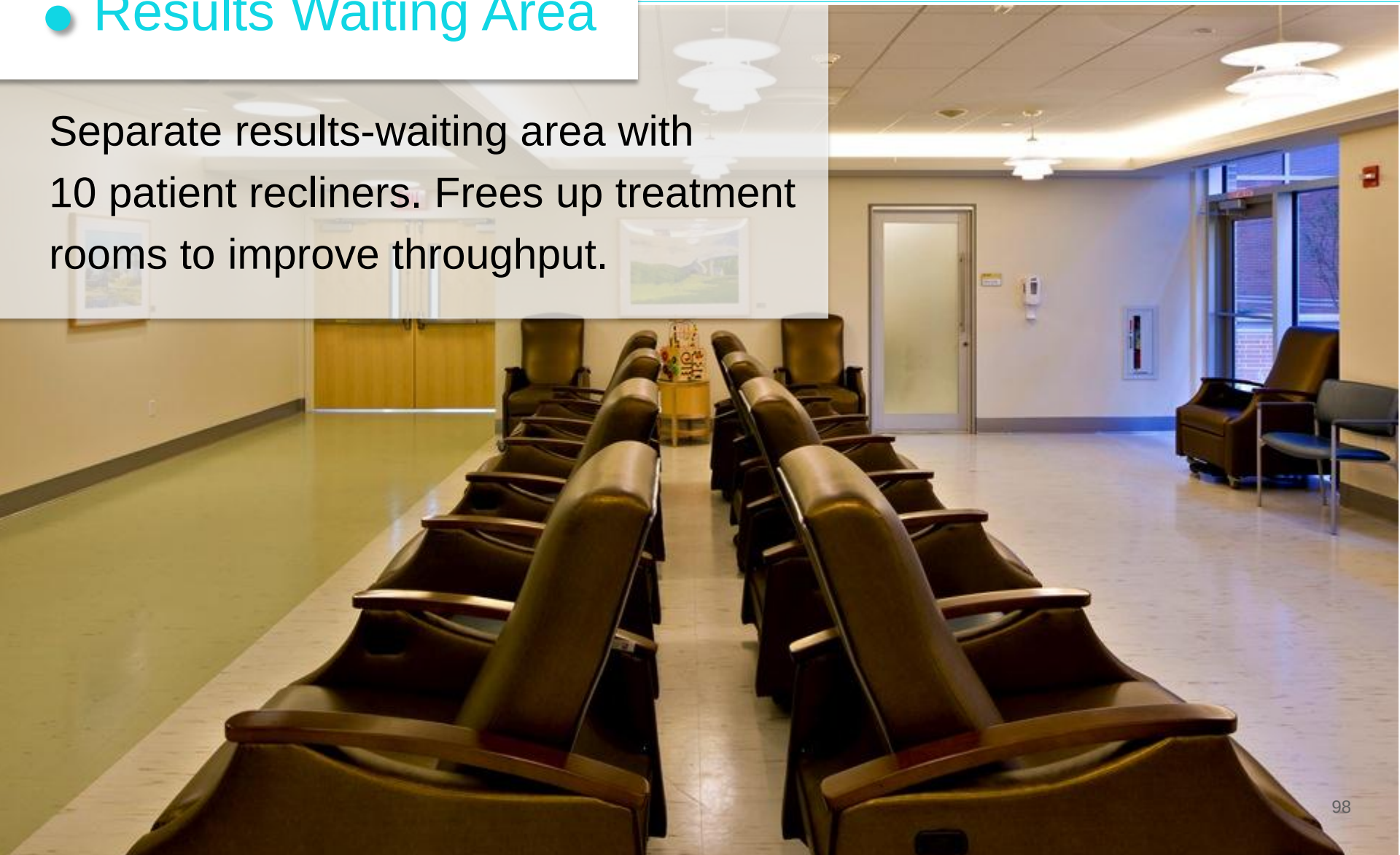
Pneumatic tube system transports samples and specific tests to the laboratory for analysis.



Center for Emergency Care (Emergency Department)

- Results Waiting Area

Separate results-waiting area with 10 patient recliners. Frees up treatment rooms to improve throughput.



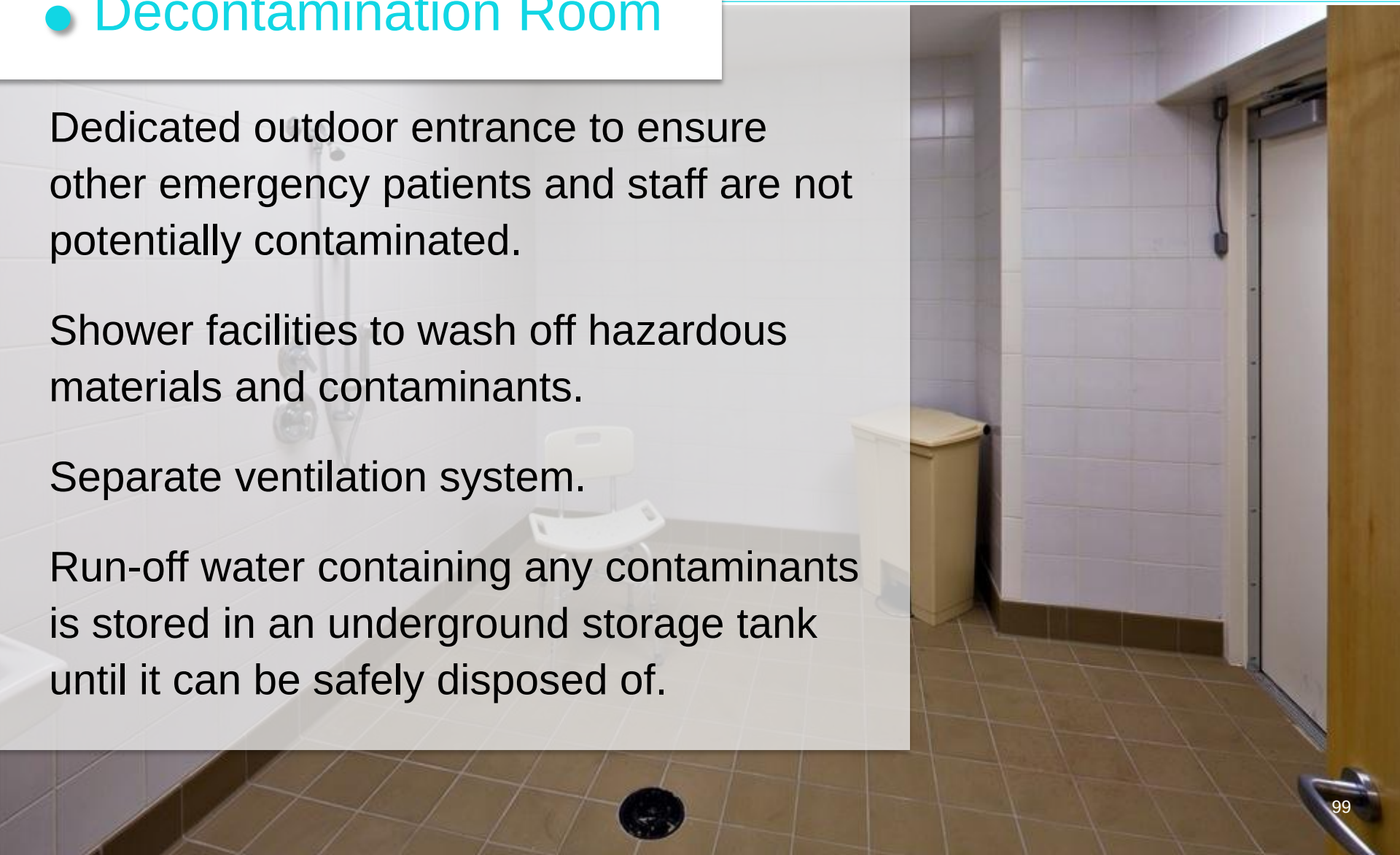
Decontamination Room

Dedicated outdoor entrance to ensure other emergency patients and staff are not potentially contaminated.

Shower facilities to wash off hazardous materials and contaminants.

Separate ventilation system.

Run-off water containing any contaminants is stored in an underground storage tank until it can be safely disposed of.



Center for Emergency Care (Emergency Department)

- Behavioral Health Area

- Behavioral Health Area

Incorporates design elements to prevent patients from harming themselves, including solid ceiling, sealed lights, immovable bed and door handles that collapse.

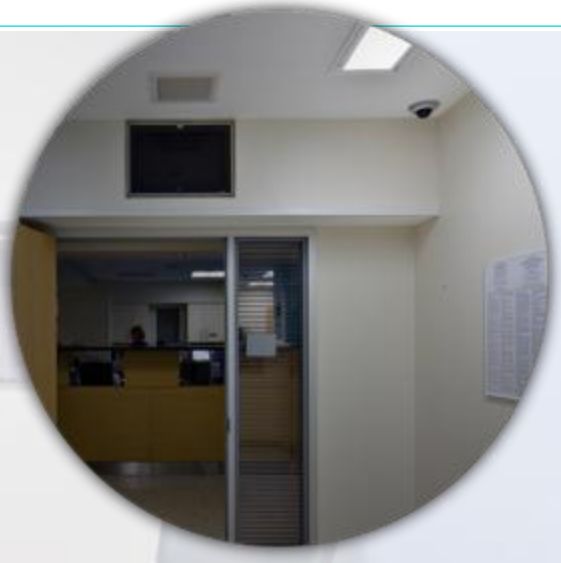
Center for Emergency Care (Emergency Department)

- Behavioral Health Area

Control switches, gasses and supplies on the wall are covered by a polycarbonate panel to limit access to patients while allowing individual to see contents.

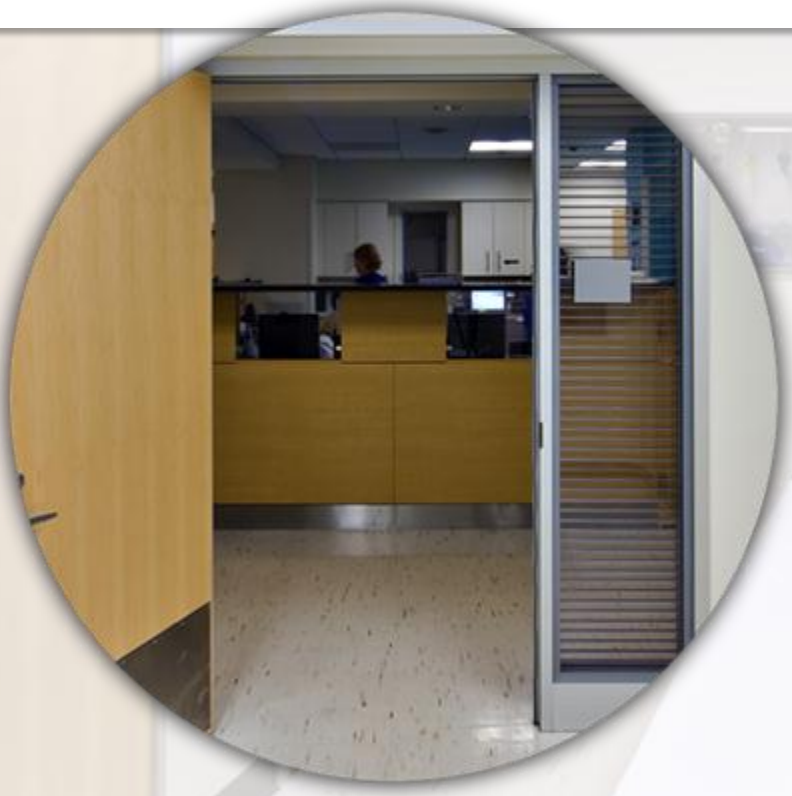
Center for Emergency Care (Emergency Department)

- Behavioral Health Area



Security camera in each room and button staff can press for Security assistance.

- Behavioral Health Area



Self-contained unit for greater privacy, safety and control. Staff station allows for visual access but has a high ledge to protect staff.

Shade in doorway to provide privacy.

Center for Emergency Care (Emergency Department)

- Geriatric Emergency Unit

Geriatric Emergency Unit

Six-bed unit with spacious rooms.

Features include slip-resistant flooring, scales built into beds to reduce falls, pressure-relieving mattresses to reduce bed sores. Large windows improve orientation to time and place and provide nature views to reduce stress.

- Geriatric Emergency Unit

Toilet and sink located in each room behind privacy screens to reduce falls.

Center for Emergency Care (Emergency Department)

- Geriatric Emergency Unit

One-third of the furniture in the hospital is designed to accommodate people who are obese.

Center for Emergency Care (Emergency Department)

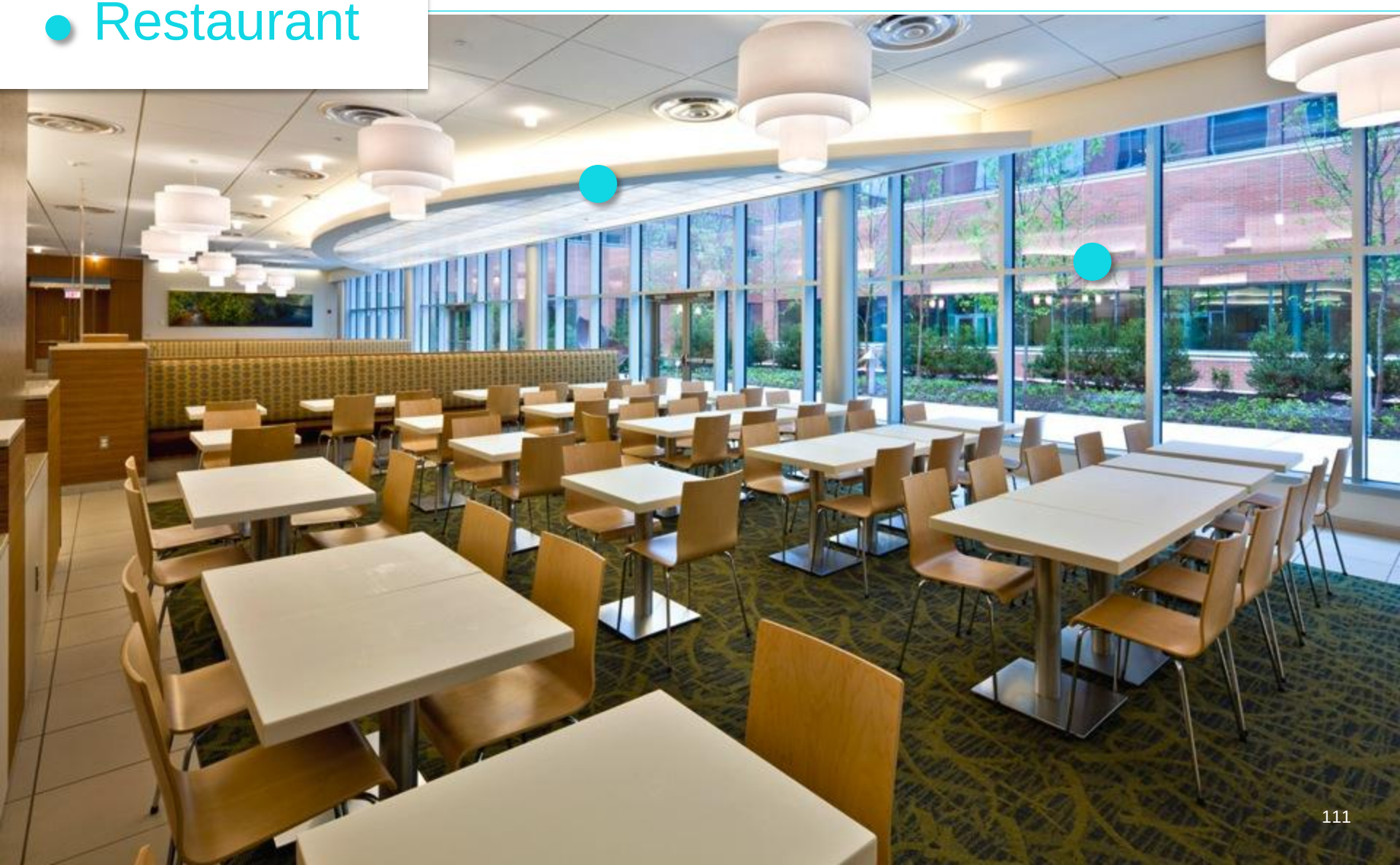
- Geriatric Emergency Unit

Doctors certified in geriatric medicine and clinical emergency pharmacists to review medication interactions available for consultation.

Restaurant & Servery

Restaurant & Servery

- Restaurant



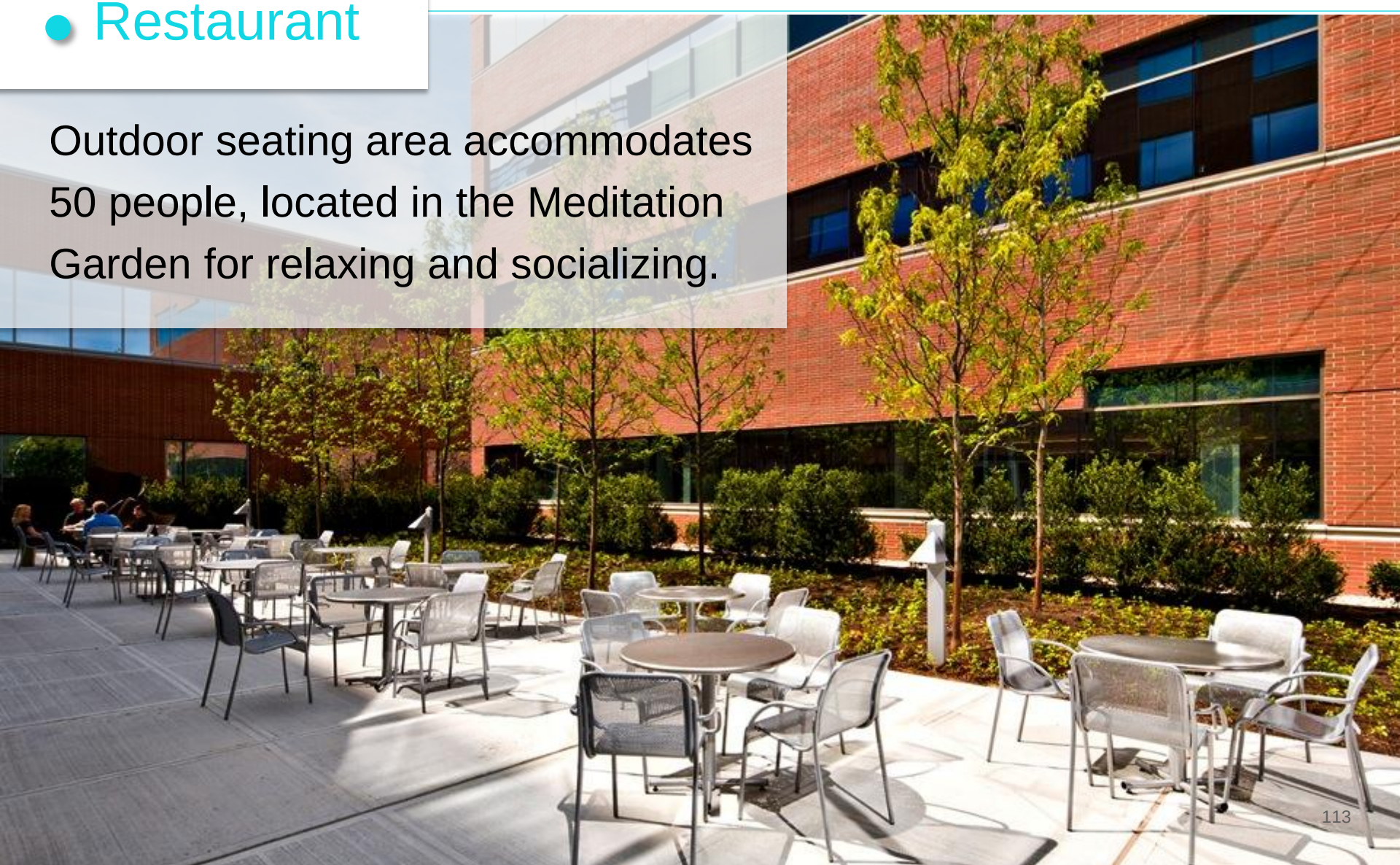
- Restaurant

Large, centrally located dining area that accommodates more than 200 diners in light-filled room overlooking garden and sculpture to reduce stress.

Restaurant & Servery

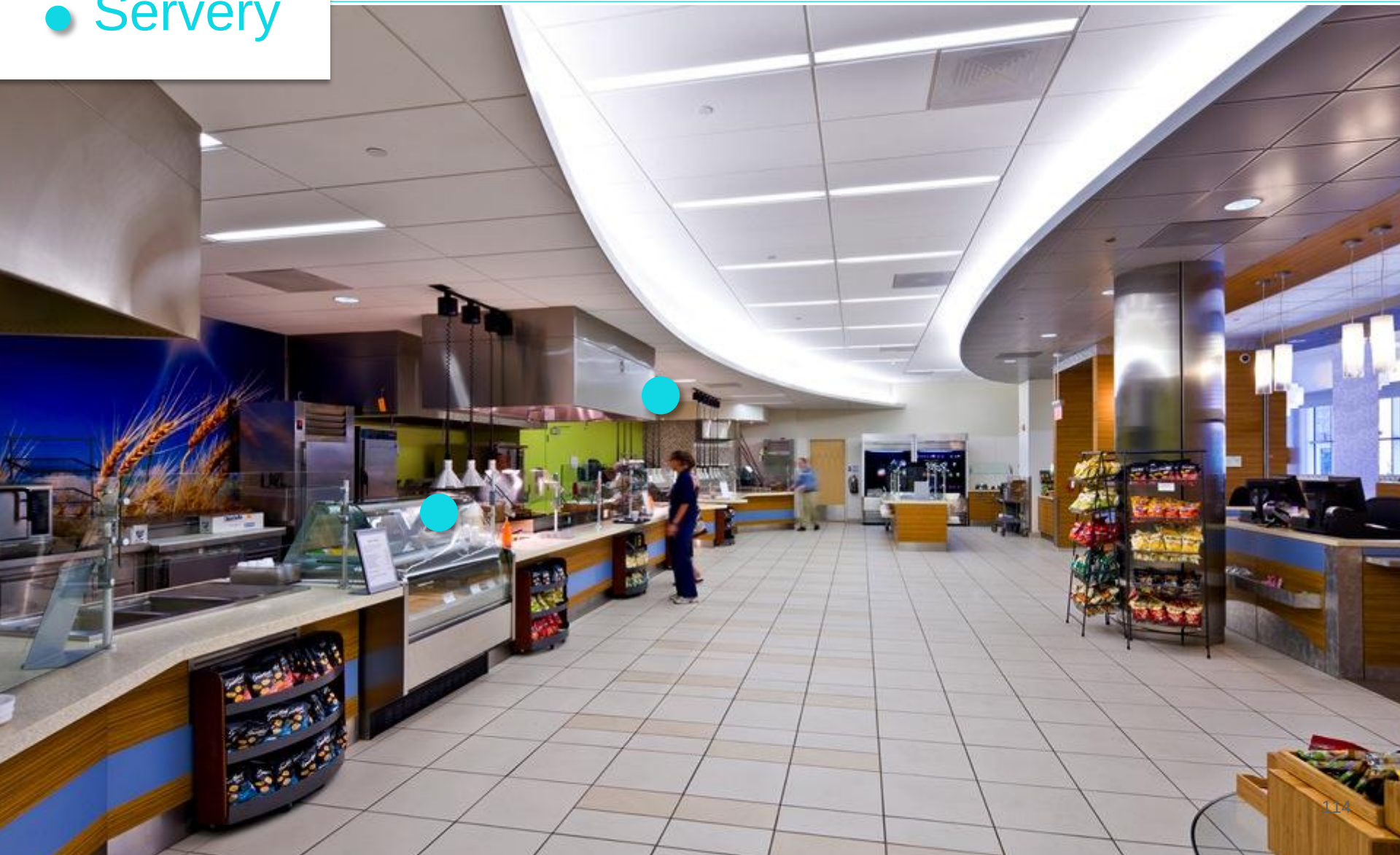
- Restaurant

Outdoor seating area accommodates 50 people, located in the Meditation Garden for relaxing and socializing.



Restaurant & Servery

- Servery



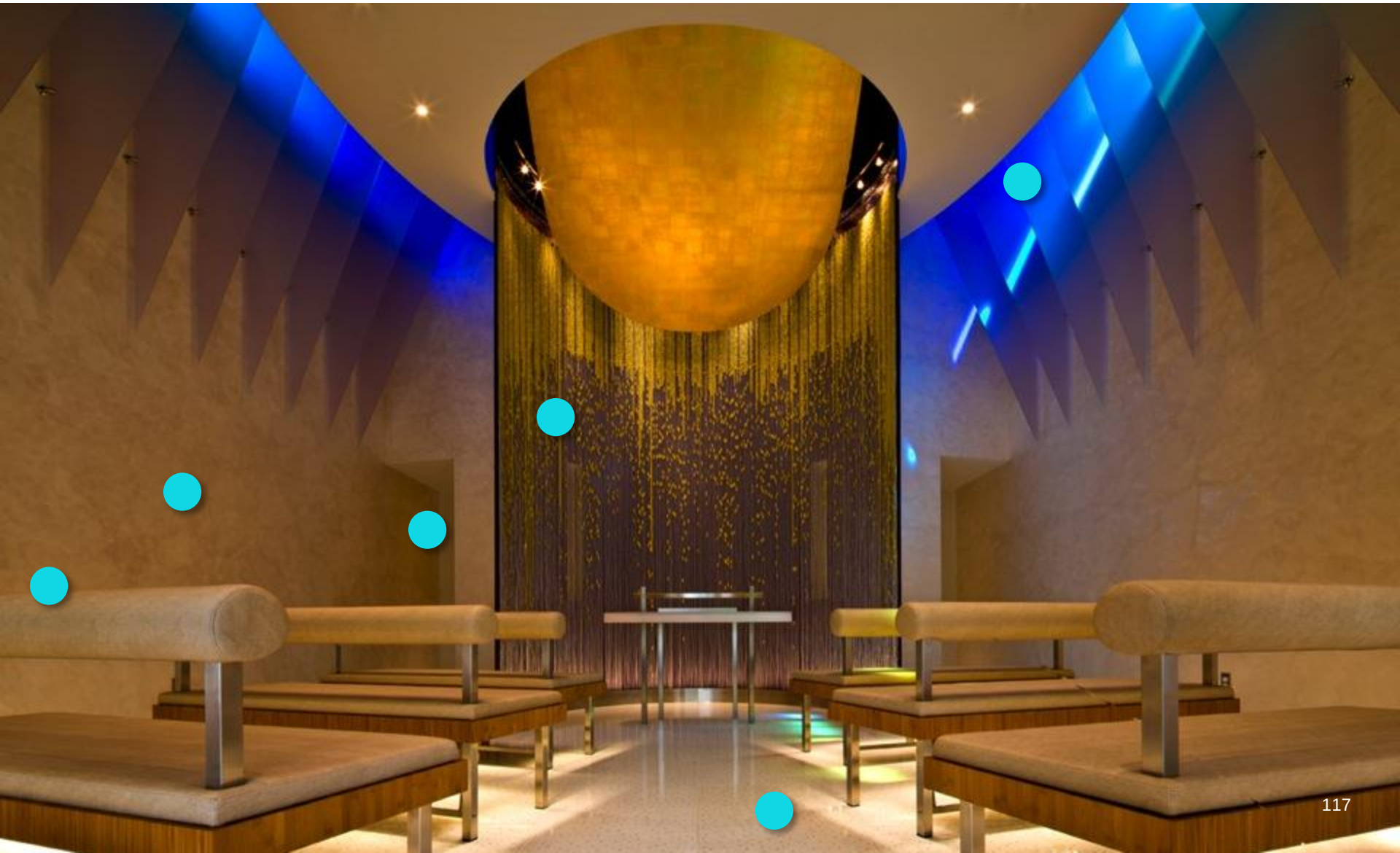
- Servery

Large servery area with multiple food and beverage areas, including separate spaces for pre-packaged meals, as well as fresh, hot entrees that include a variety of ethnic food options catering to hospital's diverse community.

- Servery

Wood-fired pizza oven, salad bar and specialty gourmet dishes daily where chef prepares food while diners wait.

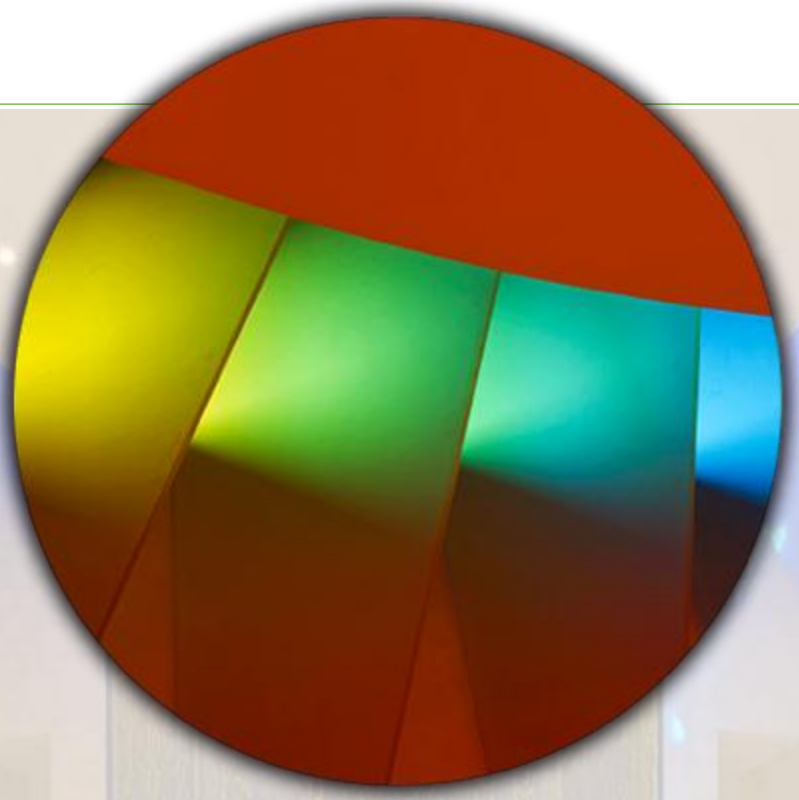
Chapel of Light



Chapel of Light

Designed to be welcoming to all, regardless of whether they practice a specific religion or not.

Chapel of Light



Multicolored windows tint the light entering room, changing throughout the day as the sun crosses the sky.

Chapel of Light

15-foot-high curtain of gold-colored and clear beads that are encoded to represent the books of the Hebrew bible, the New Testament and the Qur’an.

Chapel of Light

Sensitile Terrazzo floor tiles shimmer in response to light and movement.

Chapel of Light

Office of Religious Ministries is located directly behind chapel.

A marker on the floor of the chapel points to Mecca, for those of Muslim faith.

Art for Healing at UMCPP

Art for Healing at UMCPP

The mission of the Art for Healing program at UMCPP is to create an environment that enhances the well-being of patients, staff, physicians, volunteers and visitors.

Art for Healing at UMCPP

Art for Healing at UMCPP

Art for Healing at UMCPP

According to entomologist E.O. Wilson, humans have a partial genetic tendency to respond positively to nature, a condition called *biophilia*, so our own genetic wiring can be exploited to speed the healing process.

Art for Healing at UMCPP

Art for Healing at UMCPP

In healthcare facilities, art is more than a decorative aesthetic.

Research has shown art plays a role in restorative health and healing, shorter length of stay, less anxiety and pain, greater levels of patient satisfaction and overall perception of care.

See Appendix D
Art for Healing

Energy & Sustainability

Energy & Sustainability

$34 million combined heat and power facility developed by NRG Energy, which is twice as efficient as traditional power systems.

Photovoltaics

A solar grove in the employee parking lot will produce 250 kilowatts of power, equivalent to the energy needed to power 30 homes.

Electric-powered vehicles can be recharged at stations at the solar panel columns.

Energy & Sustainability

Recycling system provides electric and thermal energy from natural gas. Heat is created as a byproduct from the creation of electricity and is used to produce steam that heats the hospital.

Chilled water thermal energy storage system, removing thousands of kilowatt hours of demand from the power grid during high-cost, peak-demand times.

Energy & Sustainability

Computer control system, providing optimal energy and fiscal efficiency.

Energy & Sustainability

200% power backup through public power and diesel-powered emergency generators. Batteries back up major clinical equipment.

Energy & Sustainability

Indigenous landscape plantings eliminate the need for pesticides, fertilizers and irrigation.

Energy & Sustainability

Bikeways, walkways, shuttles and bus rapid transit access.

UMCPP Sustainable Design Features

Operational

- Purchase green energy off-grid
- Recycle demolition materials
- Use of non-toxic/sustainable cleaning agents
- Use of regional materials/supplies
- Standardization of materials/supplies
- Organic dietary
- Comprehensive recycling
- Public transportation access
- Bicycle use support
- Power hook-ups for alternate fuel vehicles

UMCPP Sustainable Design Features

Architectural/Engineering

- Building orientation
- Natural daylight
- Passive shading
- Environmental controls
- Photovoltaics
- Water-saving fixtures
- Sustainable materials/finishes
- Use of regional materials
- Cogeneration
- Chilled water storage
- 100% fresh air
- Energy recovery

UMCPP Sustainable Design Features

Site

- Reuse of potential Brown Site and some existing structures
- Indigenous landscape materials
- Passive irrigation
- Healing gardens

Energy & Sustainability

UMCPP's energy and sustainable features result in a 50% decrease in carbon footprint and a 20% decrease in energy costs.

Education Center

A hub of learning for medical professionals and students, patients, families and public. Includes high-tech classrooms designed with flexibility for alternate use as an auditorium and video-conference rooms.

Education Center

Medical Library & Business Center features reference and literature searches, book/interlibrary loans, access to both print and electronic materials, study carrels, comfortable seating and audio-visual materials. Business services include copying and printing, commercial shipping and notary services.

Medical Arts Pavilion

A five-story, 145,000 square-foot Medical Arts Pavilion is located adjacent to the new hospital, accessible from its own entrance, as well as from the hospital via corridors on the first and second floors.

Medical Arts Pavilion

Includes fast-access to and flexibility with outpatient services:

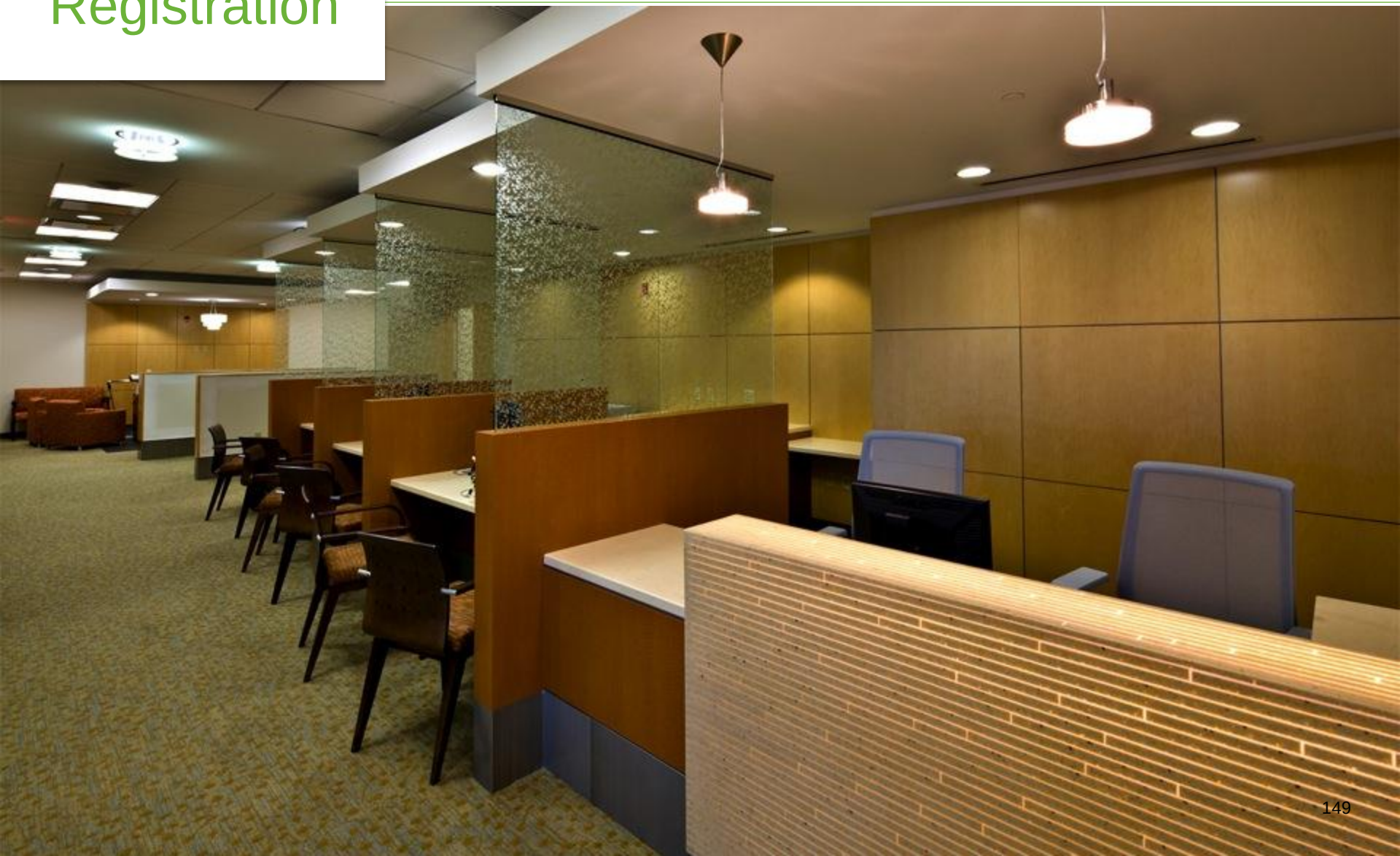
- Laboratory patient service center
- Occupational Health
- Outpatient Imaging
- Penn Maternal Fetal Medicine
- Sleep Center
- Stephen & Roxanne Distler Center for Ambulatory Surgery

Medical Arts Pavilion

Lobby

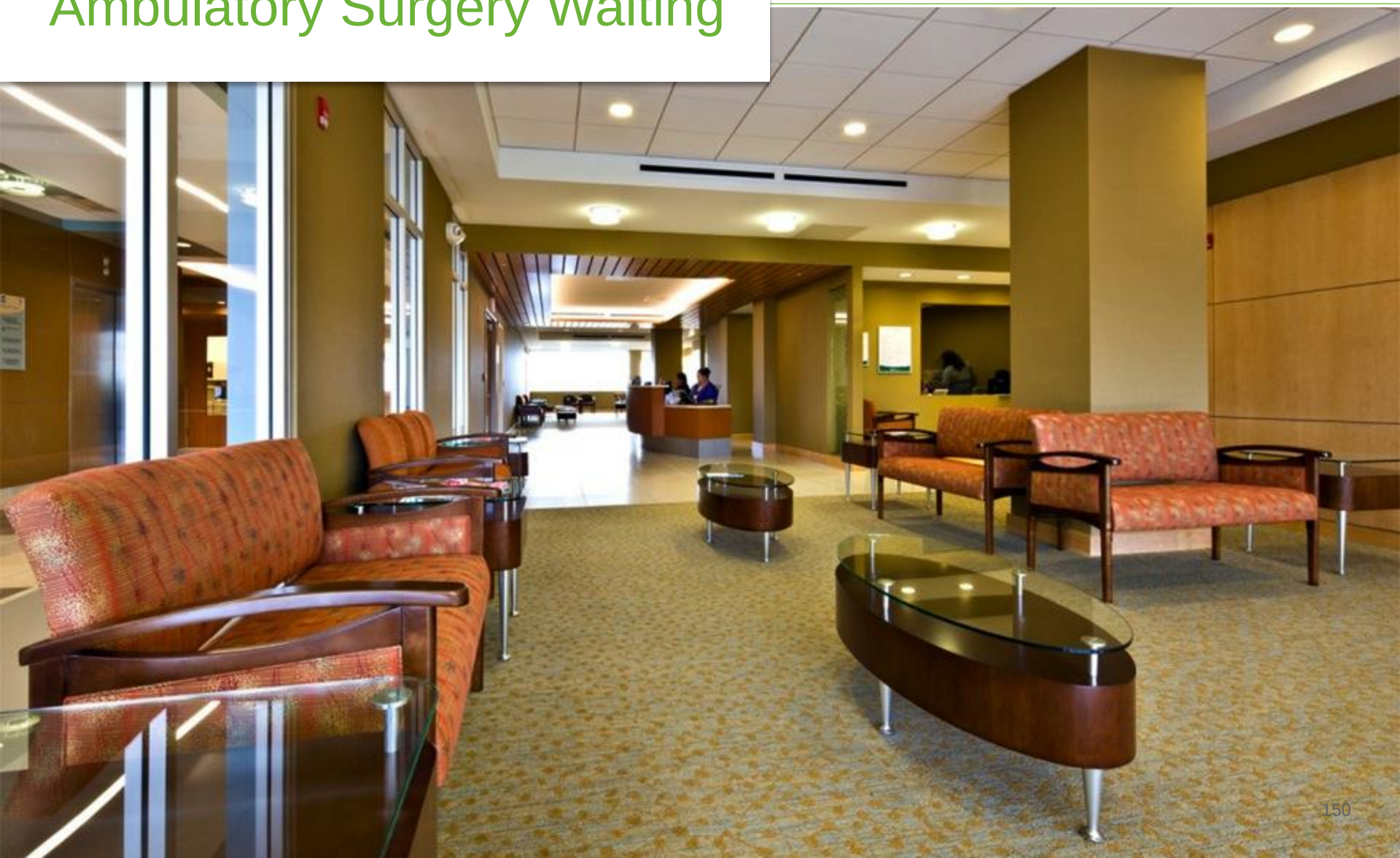
Medical Arts Pavilion

Registration



Medical Arts Pavilion

Ambulatory Surgery Waiting



Medical Arts Pavilion

Pre- and Post-op Ambulatory Surgery

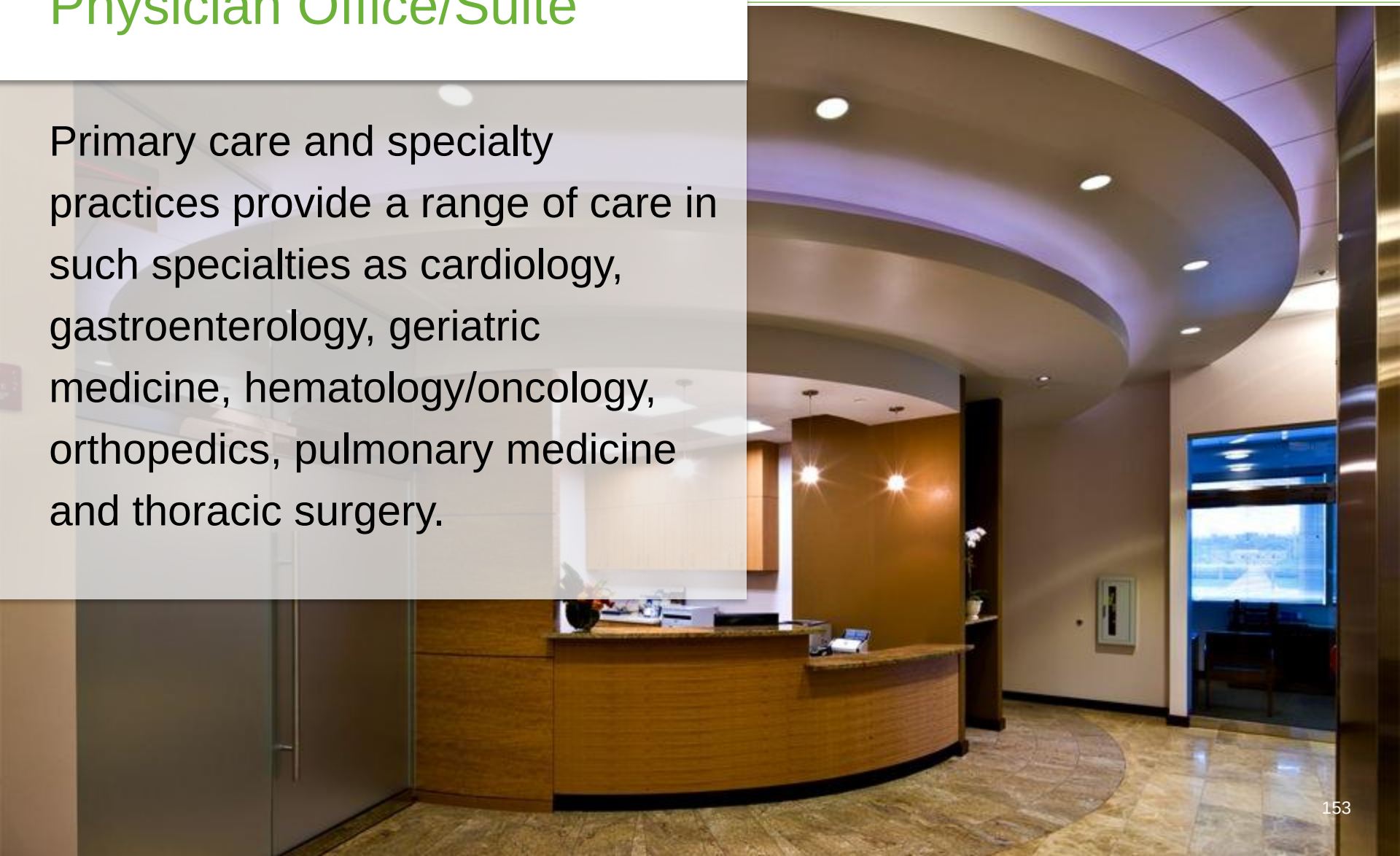
Medical Arts Pavilion

CT

Medical Arts Pavilion

Physician Office/Suite

Primary care and specialty practices provide a range of care in such specialties as cardiology, gastroenterology, geriatric medicine, hematology/oncology, orthopedics, pulmonary medicine and thoracic surgery.



Medical Arts Pavilion

Physician Exam Room

Transition Process

Overview

- Formed a Transition Steering Committee and six key transition teams made up of physicians, managerial and professional staff.
- Transition Steering Committee monitored schedule and budget compliance; performed troubleshooting; and helped avoid duplication of effort and expense and unauthorized activities.
- Transition teams focused on education and orientation, marketing, medical staff readiness, occupancy planning, operational readiness and patient move.
- Established a clearly defined process and assignment of responsibility to guide the teams.
- Formed and staffed an internal transition office to provide administrative support to steering committee and teams.
- Established team project plans, deadlines and budgets.

Key Transition Events

- Formation of teams and leadership training — 18 months prior
- Monthly team meetings — 17 months prior
- Monthly transition team check-ins with Steering — 15 months prior
- Operational Readiness teams formed — 12 months prior
- Development of project plans and deadlines — 8 months prior
- Hospital staff and physician training — 8 months prior
- Three Day-in-the-Life simulations — 7 weeks prior
- Mock patient move day — 4 weeks prior
  - Moved 23 model patients
  - Tested routes and handoffs
  - Simulated media activities

Operational Readiness

- 23 system and process cross-functional work groups
  - Ensured departments worked together prior to the move and developed concept for collaboration and sharing resources
- 73 functional unit work groups specific to each department and unit
- Developed day-in-the-life scenarios to test assumptions, process flow and equipment with employees, as well as community members
- Processes were refined and staff received additional education

Education & Orientation

- Scavenger hunt
- At-a-glance guide (key information and maps)
- Virtual tour
- Online testing
- Physician orientation
- Volunteer training, including training 100 volunteers to be guides on patient move day
- Re-training

Patient Move Day

Patient & Family Preparation

- Maternity patients due to deliver a month before or after move received a letter about what to expect and where to report based on their delivery date.
- Inpatients during the week of the move received extensive communication and rounding to keep them and their families informed.

Patient Move Day

Transport & Routes

- Identified and tested route several months before move.
- Nurse traveled with each patient in an ambulance and handed them off to their nurse at the new site.
- Additional ambulances stationed along the route to provide timely response and transport the patient in the event of a vehicular problem.

Timing & Duration

- Moved on weekday to enable manufacturers and contractors to be in hospital.
- Moved one patient per clinical unit every 4 minutes in a set rotation.
- Safely moved 99 patients in 7 hours.

See Appendix E
Transition Information

For More Information

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Appendix A
Statement of Operations — 2011
UMCPP Clinical Programs & Services
UMCPP Key Operating Targets

UMCP 2011 Statement of Operations

Total Operating Revenue	$268,375,000
Total Operating Expenses	$254,982,000
Operating Margin	5.0%

Additional Clinical Programs & Services

Inpatient

- Acute Rehabilitation Unit
- Nutrition Program (outpatient counseling available)
- Pain Management
- Pharmacy
- Telemetry

Outpatient

- Breast Health Center
- Cardiac and Pulmonary Rehab
- Diabetes Management Program
- Endoscopy (inpatient care as well)
- Laboratory Outreach Program
- Occupational Health
- Outpatient Imaging Services
- Outpatient Rehabilitation Network
- Sleep Center
- Stephen & Roxanne Distler Center for Ambulatory Surgery

UMCPP Key Operating Targets — 2015

Outpatient Volume	**281,208**
Ambulatory Surgery	4,100
Pain Management	1,500
Breast Health Center—Mammography	4,600
Breast Health Center—Other	2,800
Cardiac Cath	100
Cardiology	3,100
Computerized Tomography (CT)	3,000
Cystosopy	700
Eating Disorders Partial Day	1,300

UMCPP Key Operating Targets — 2015

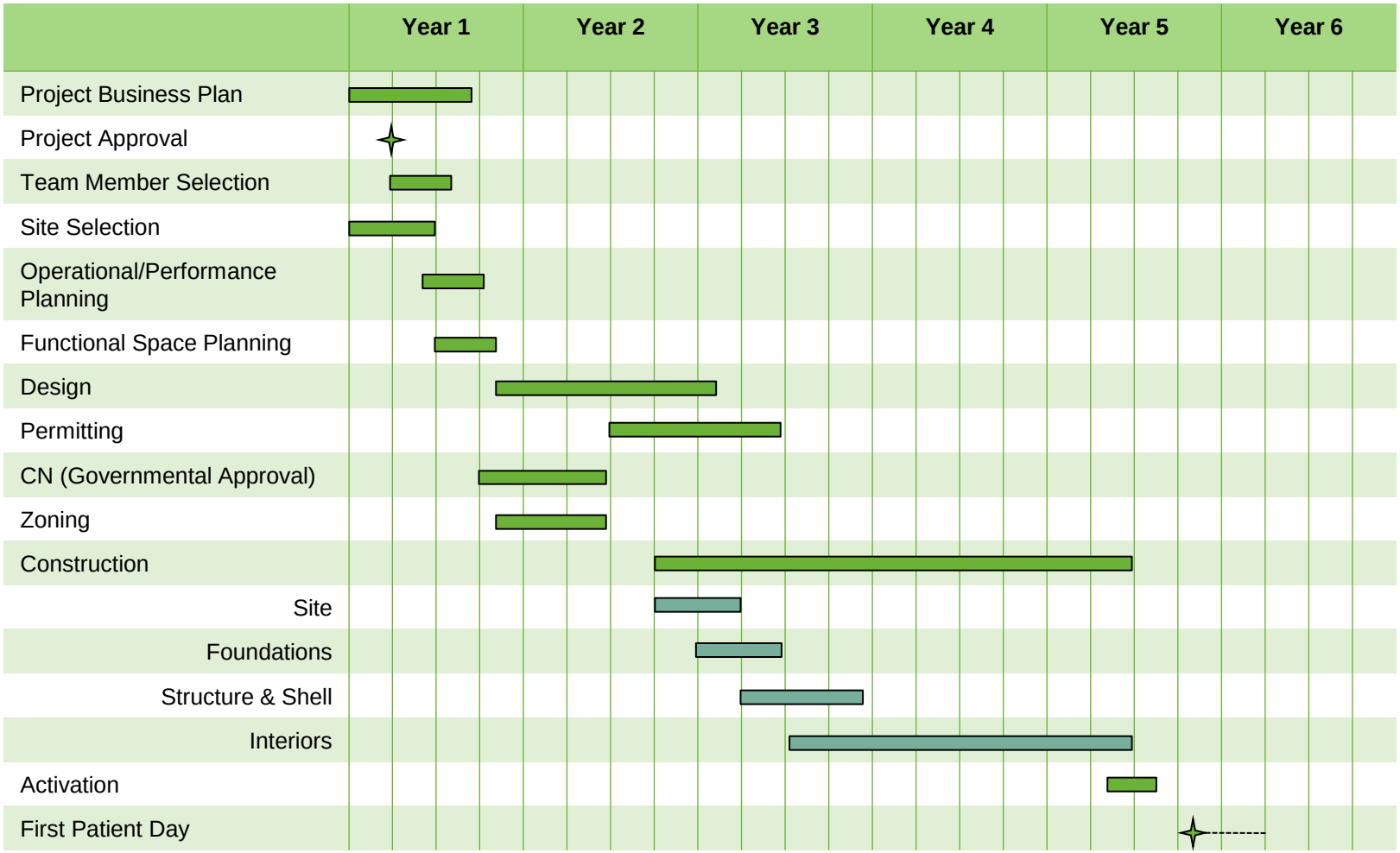
Outpatient Volume (continued)	**281,208**
Emergency Department	65,000
Endoscopy Procedures	6,100
Interventional Radiology	400
Laboratory	18,100
Laboratory Outreach	40,900
Mammography (UMCPP)	3,000
Maternal Fetal Medicine	6,900
Magnetic Resonance Imaging	3,600
Neurology	500

UMCPP Key Operating Targets — 2015

Outpatient Volume (continued)	**281,208**
Nuclear Medicine Tests	1,800
Operating Room Procedures	2,600
Observation Cases (medical non-OB)	1,800
Other Radiology	6,300
Radiation Therapy Procedures	2,300
Rehabilitation (PT, OT, ST)	30,600
Sleep Center Studies	900
Ultrasound	4,300
All other UMCPP OP	64,908

Appendix B
Model Project Schedule

Model Project Schedule



Appendix C
Sustainable Design Strategies and Decision Matrix

Directly Impacts Operating Costs

Energy Costs:

- Typically, healthcare facilities have an **overall operating margin** in the neighborhood of **5%** and **an energy cost equal to about 2% of operating costs.**

Maintenance Costs:

- 60% to 75% of hospital expenses are labor costs; **a design that increases operational efficiency and reduces staffing needs** has a major impact on the bottom line.
- Operations and maintenance costs over the typical 50-year life cycle of a hospital contribute up to 80% to the equation.

Features pursued in designing the new UMCPP

Priority Sustainable Design Features Evaluated

Operational

- Purchase green energy off-grid
- Recycle demolition materials
- Use of non-toxic/sustainable cleaning agents
- Use of regional materials/supplies
- Standardization of materials/supplies
- Organic dietary
- Comprehensive recycling
- Public transportation access
- Bicycle use support
- Power hook-ups for alternate fuel vehicles

Features pursued in designing the new UMCPP

Sustainable Design Features Evaluated

Architectural/Engineering

- **Building orientation**
- **Natural daylight**
- Light shelves
- **Passive shading**
- Active shading
- **Environmental controls**
- Green roofs
- **Photovoltaics**
- Waterless urinals
- **Water-saving fixtures**
- **Sustainable materials/finishes**
- Sterilizing waste
- **Use of regional materials**
- **Cogeneration**
- Geothermal
- Fuel cells
- Wind energy
- **Chilled water storage**
- Gray water for cooling towers
- **100% fresh air**
- **Energy recovery**

Features pursued in designing the new UMCPP

Priority Sustainable Design Features Evaluated

Site

- **Reuse of potential Brown Site and some existing structures**
- **Indigenous landscape materials**
- Rain water collection
- **Passive irrigation**
- Wastewater reuse in irrigation
- Bioswales
- **Healing gardens**
- Pervious parking

Features pursued in designing the new UMCPP

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
Site Design Including Circulation							
1.	Site Selection	Industrial, underutilized, unattractive site needing cleanup	X		$3,500,000 to $4,000,000		Costs reflect Demolition of Bldg's in New Bldg. footprint and Utility Make-Ready work
2.	Site Development — Open Space	Demolition of 26 buildings (approx 300,000 sq ft) and creation of a 32-acre public park along the Millstone River	X	Required by Redevelopment Plan	$4,000,000 to $4,500,000		Costs reflect $2,000,000 for demolition of 300,000 gsf + $75,000/acre for the Park, $2,400,000
3.	Stormwater Design — Recharge	Maintaining recharge on the site to prevent runoff	X	DEP Regulations	$150,000 to $250,000		Detention Basins, Storm Drainage Piping for retention
4.	Bioswales – Recharge	Increasing the recharge on the site through special landscaping of the site		Not practical with extent of parking areas required. Enlarged bioswale areas can't be accommodated			
5.	Light Pollution Reduction	Utilizing full cut-off fixtures and timers	X	Dark sky Guidelines for Site Lighting – Required by Redevelopment Plan	$10,000		Additional fixtures required. Timers for site fixtures/circuits

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
6.	Native Landscaping	Indigenous species of plantings throughout site	X		$150,000 allowance	$2500 per year	Allowance for indigenous species of plantings. Savings realized through minimal irrigation
7.	Minimize Heat Island Effect	Green spaces and planting areas throughout the site to reduce the heat buildup	X	Parking areas improved with green spaces	$150,000		Assumes approximately 50,000 sf of site is plantings/green area in lieu of paved
8.	Pathways for Pedestrians and Bike Riders	Provide non-vehicular access throughout site and to Plainsboro town center	X	Required by Redevelopment Plan	$450,000 to $500,000		Assumes 50,000 sf of walk
9.	Amenities for Users of Non-Automobile Transportation, as well as Carpoolers	Bus rapid transit and conventional bus stop(s), bike racks, bike showers, guaranteed ride home program for carpoolers	X	Plan	$75,000 To $100,000		Bus Stop ($50,000), Bike Racks ($5,000), Bike Showers ($25,000) included. Transportation has not been included.
10.	Campus Shuttles	Provide shuttles to reduce single occupancy vehicular use to nearby points of interest, i.e., Plainsboro town center, Forrestal Village, Princeton Junction Train Station, Downtown Princeton					Matter for Hospital operations – not a construction item

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
Building Design							
1.	East-West Building Orientation	Maximizing natural light – reducing the use of artificial light in the facility; allows more productive use of the solar energy coming into the building	X	Linear east-west building oriented to water basin and main entrance		$750,000 to $1,000,000	Premium for linear, curved building footprint. Premium costs for larger windows at south elevation 8' in lieu of 6'. Misc larger windows throughout
2.	Recycling	Recycling all non-hazardous materials, i.e., plastic, metal, paper; materials will be collected, stored, sorted; cardboard will be baled.		Hospital is planning recycling program		$50,000 to $75,000 Cost is for construction debris only	Assume 500 dumpsters with a premium of $100 per container for sorting construction debris
3.	Reuse of Gray Water	Gray water collection system of underground tanks for irrigation purposes		Not in Budget	$300,000 to $375,000		Assumes 30,000 gal tank to backfeed irrigation system
4.	Horizontal Solar Shading	Reducing heat gains in spring and summer	X	Savings of 100 tons of air conditioning at any time air conditioning is in use	$1,500,000 to $1,750,000		Approximately 2100 sf of Horizontal Solar Shading

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
5.	Vertical Solar Shading	Extends efficacy of horizontal shading by lengthening the timeframe (i.e., adds another couple of months to the spring/summer season)		Currently not in budget	$3,500,000 to $4,750,000		Material selection/design/etc still required, assume an allowance similar to costs of horizontal screening
6.	Green Roofs	Landscaped roof areas, thus reducing impervious surfaces and increasing insulation value and life of roof		Budget consideration	$2,000,000 estimated		
7.	Light Colored Roof	Reflective color reducing head load		Budget consideration	$500,000 to $750,000		Assume reflective Roof at the Level 3 Roof only
8.	Sustainable Construction Materials	Materials that are reusable, recyclable, rapidly renewable, non-carcinogenic, manufactured locally, long useful life	X		$500,000 to $1,000,000		
9.	Views	Maximizing views from all patient rooms	X	Healing benefits to patients and LEED credit	$750,000 to $1,000,000		Glazed areas approximately 10,000 sf larger
10.	Low Volatile Organic Compound (VOC) Emitting Materials	Materials with limited off-gassing	X	Improved indoor air quality	$0		Materials are unavailable as anything other than Low VOC

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
Mechanical / Electrical / Plumbing							
1.	Wind Energy	Utilize Wind Turbines and Shape Building Form		Speed of prevailing winds not adequate, i.e., not practical			Per Syska, not achievable due to wind conditions
2.	Geothermal	Underground geothermal wells that use the heat of the earth to increase energy efficiency		Geothermal well field would have to be too large to support the hospital load of 3,000 tons, i.e., not practical			
3.	Solar Water Preheat	Solar energy used to warm domestic hot water		Under review – infection control considerations			Typically for residential / commercial. Requires tank – infection control issues for healthcare use
4.	100% Outside Air	Bed tower, operating suite, emergency department (IAQ outside air cycle) for approximately 75 percent of the building	X	Superior indoor air quality and infection control		$1,000,000	Increase in equipment sizing, possibly duct work as well
5.	High-efficiency Motors on Equipment	High efficient equipment reducing energy consumption	X	Good engineering design		$0	Industry standard – Pre-requisite for LEED

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
6.	Energy Recovery Mechanical System	Advanced mechanical systems to utilize the energy from the "exhausted" air	X	The system minimizes the energy impact on heating or cooling. Also provides 100 percent outside air for the interior environment	$1,000,000		Allowance – need scope definition for better analysis
7.	Low-Flow Plumbing Fixtures	Minimizing water consumption	X	Good engineering design; also latest code requirement			Code Requirement and is part of base project, since there is no alternative, this option would be the base project regardless.
8.	Waterless Urinals	Urinals minimizing water consumption		Not recommended for healthcare facility; infection control and indoor air quality are issues.			
9.	Hands-Free Faucets	Electronic faucets minimizing water consumption	X	Budgetary decision	$100,000 to $150,000		Assume 300 Faucets become Hands-Free, basically Patient Toilets and a few others

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
10.	High-efficiency Ballasts on Lighting Fixtures	Lighting fixtures with low energy consumption	X	Good engineering design	$0		Industry standard – Pre-requisite for LEED
11.	High-efficiency Light Source Fixtures	LED or light emitting diode fixtures that are more efficient			$500,000 estimated		Not yet defined if and how many of these fixtures are being considered
12.	Environmental Control Systems						
12a.	Patient Rooms – Individual Control for Lighting and Temperature	Improving overall efficiency for both heating and cooling; improves indoor environment quality	X	Good engineering design	$500,000		
12b.	Lighting Monitors w/ Control	Control system that varies light intensity based on ambient light		Budgetary decision	$1,000,000		Allowance – need scope to determine accurate cost
12c.	CO_2 Monitoring – Office Space	Control system that varies air volumes based on CO_2 content		Budgetary decision	$100,000		Central control at AHU only with return air (not 100% O.A.). Does not include local room controls. Areas include Bldg. 2 offices and Lower Level

Sustainability Matrix

	Sustainable Item or Approach	Description	Included in Project	Basis for Decision	Project Cost – Capital	Project Savings – Operating	Comment
13.	Cogeneration	Generating steam and electricity from the same power plant, producing chilled water for the hospital, and reducing carbon footprint and energy costs	X		$10,000,000 estimated		Cost represents premium for cogen plan when compared to more typical central utility plant.
14.	Photovoltaics	Generating electricity through solar power	X		$8,000,000 including trellis support at parking areas	$2,900,000 per year	Roofs are not practical with mechanical equipment. Estimates based on 400 kw configuration $10/watt
15.	Green Power	Purchasing of power from Green Power Sources.		Cogeneration would provide Green Power		Additional 10% approximate premium	Not a capital cost

Appendix D
Art for Healing

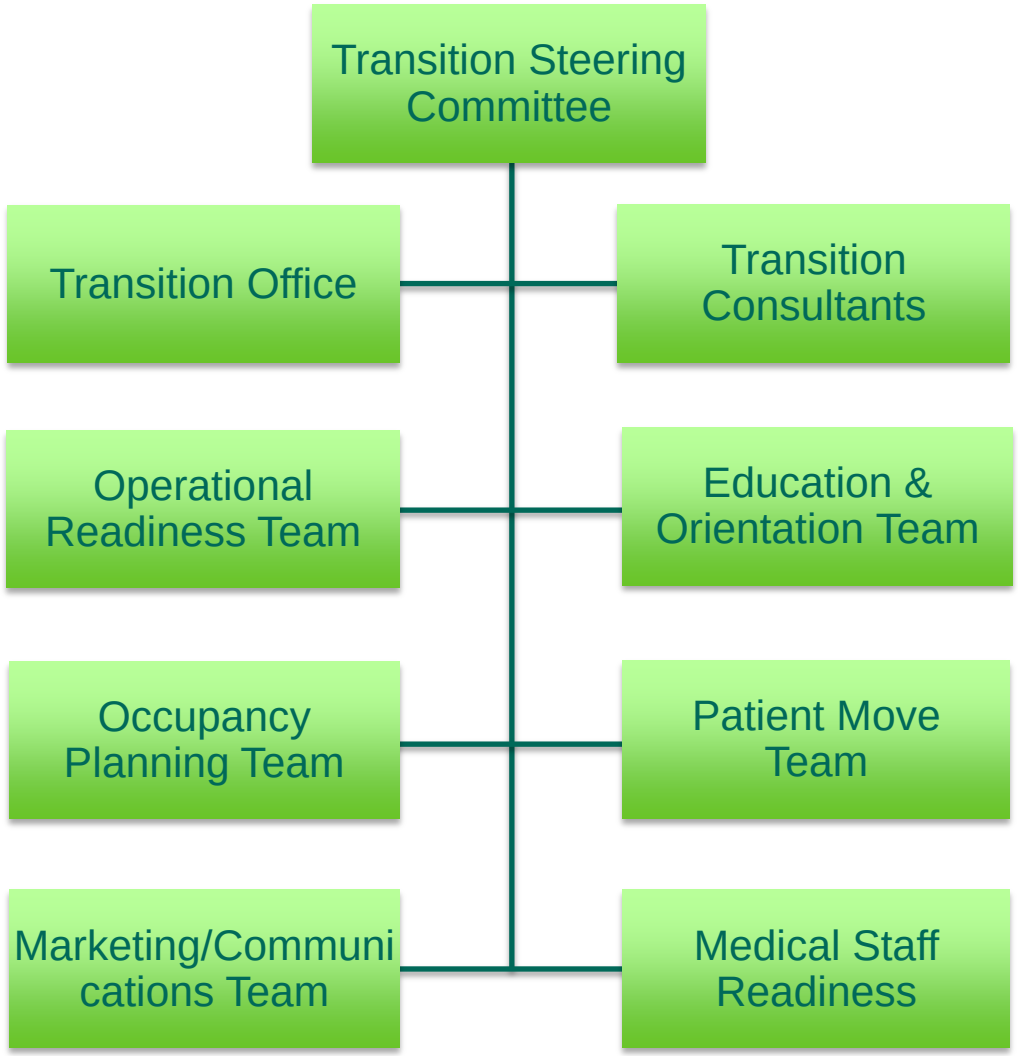
Art for Healing at UMCPP

Criteria for Choosing Art at UMCPP

- Help UMCPP to become a destination for viewing.
- Reduce stress for all who experience it.
- Create a sense of community and familiarity, without excluding those who are unfamiliar with or new to the central New Jersey area.
- Reflect UMCPP's commitment to diversity and inclusion.
- Reflect UMCPP's respect for each individual.
- Have a high likelihood of positively affecting those who view it by comforting, inspiring, empowering and/or enlivening them.
- Be of high quality.
- Be appropriate for the site where it appears.
- Be durable and easy to maintain.

Appendix E
Transition Information

Transition Structure & Teams



Team Charters

Steering Committee

Purpose: To develop policy for, guide and manage the Transition Process. To manage the reporting transition teams. To assure issues raised from the teams are tracked to resolution. To track and manage the following identified elements:

Element(s) of Responsibility:

- Transition assessment
- Transition structure
- Transition plan and documents
- Transition budget
- Transition process guiding documents
- Staffing and human resources
- Operational budget
- Space management
- Legal and regulatory
- Patient & family experience
- Implementation
- Start up
- Post-occupancy evaluation
- Certificate of need

Team Charters

Education & Orientation

Purpose: To develop, coordinate, implement and monitor education and orientation programs related to the project and Transition for employees and physicians. To provide guidance and input to the Steering Committee for all projects related to Education and Orientation, Change Management and Facility Tours.

Marketing/Communications

Purpose: To develop, coordinate and implement all internal project communications and external public relations programs and initiatives. To provide guidance and input to the Steering Committee for all projects related to Project Communications and Public Relations.

Team Charters

Medical Staff Readiness

Purpose: To provide management of Medical Staff issues for the Transition and function as a forum for dissemination of Transition information to the Medical Staff. To coordinate with other Transition Teams and provide input to the Steering Committee on the status of the process.

Occupancy Planning Team

Purpose: To provide development, management, integration and execution of the elements of Transition required for preparation of the building and Transition within the new facility. To coordinate with the other Transition Teams and provide information to the Steering Committee regarding the status of the Occupancy Planning process.

Team Charters

Operational Readiness

Purpose: To provide development, management, integration and execution of the elements of Transition required for day 2 operations in the new facility. To provide coordination with other teams and input to the Steering Committee on the process.

Patient Move

Purpose: To provide development of the patient move plan and management of the patient move. To coordinate with the other Transition Teams and provide information to the Steering Committee regarding the status of the Patient Move Process.

Issue Identification, Tracking & Resolution

Command Center

- Set up a command center one week prior to move as a central point for communications related to patients, equipment and stocking, and to handle urgent issues related to move.
- Staffed with senior leadership to ensure quick decision-making and deployment of resources.
- Open 24/7 week before the move and week after.
- Open 12 hours a day for two weeks after the move.

Issue Identification, Tracking & Resolution

Issue Tracking & Prioritization

- Issues assigned a priority number of 1 through 6.
- Set up call-in line so staff had one number to report issues.
- Callers/issues were advised of their priority number, tracking number when case closed.

Examples of Issues & Prioritization

Priority 1

Call bell system not sending a notification to the nurse that the patient needs help

Priority 2

Patient needs computer access

Priority 3

Department received partial furniture order

Priority 4

Paving a new parking lot

Priority 5

Lab requested an alarm alert when they receive a delivery via the pneumatic tube system

Priority 6

Lab needs more storage for supplies