SUPPORTING DATA

Table of Contents

Vision

To design a hospital that improves patient care through a coordinated synthesis of operational, technological and construction innovations.

Vision

- Beyond the immediate goals established by the terms of this competition, our team identified several additional goals. We asked ourselves the following:
  - *How can we **reduce the operational costs** of delivering care in a sustainable manner over the life cycle of the proposed hospital? Can we **improve patient care** through **greater systems efficiencies**?*
  - *How can we develop a **smaller, more efficient building design** that meets or exceeds its mission requirements and vision? Can we develop a model that is more space efficient than the existing Kaiser Template Hospital?*
  - *Can we design a building that will be **cheaper and faster to construct** while lending itself to **long term flexibility and change**? Can this building achieve a carbon net zero performance?*
- Space needs and operations are intricately entwined. Operational costs have many facets. In this competition study we focused on care delivery models and on building systems. **Our immediate Goal is reduce operational costs by at least 10%. Our target is a 50% reduction in overall operational costs**.
- The Appendices section that follows will touch upon our ideas for achieving efficiencies and innovation at the Kaiser 100-bed hospital

Space Program

Summary

- The result of operational and programmatic changes proposed in our competition design solution, and as elaborated in the following document, is a **significantly more space-efficient hospital**. Typically the Kaiser Template Hospital, based on 150 bed capacity would result in about 2,000 building gross square feet (BGSF) per bed. Our suggested program results in a hospital with about **25% reduction of area at 1,500 BGSF/bed**.
- This is coupled to an adjacent 'B' Occupancy building at about 185 BGSF/bed. This alternated model reduces the space demand for **Diagnostic and Treatment space by about 50%** when compared to the Template Hospital Basis, while the area assigned to the **Patient Care increases by about 20%**. There are addition reductions of about 50% in Administrative space and Support Service space.

  (See following space program summary)

Space Program

	Conventional Small Hospital		New Small Hospital		Community Building	Notes
PATIENT CARE						
Critical Care Unit	10	8306	8	6640		
Critical Care Unit/Telemetry	10	8306	8	6640		
Acute Care Unit	24	14400	24	14400		Higher Acuity/Telemetry
Acute Care Unit	24	14400	36	21600		Acute
Acute Care Unit	24	14400	24	14400		Lower Acuity
Universal Care Unit	0		10	9739		Mid Beds- Not licensed- 23hr stay
Short Stay-Observation						
Pre-Post OP Level 2						
Perinatal Unit	0	10062		0		
Neonatal Critcal Care Unit	6	1540		0		
Newborn Nursery	0	568		0		
Acute Care -Perinatal	16	7212		0		
Subtotal Patient Care	**114**	**79193**	**110**	**73419**		
DIAGNOSTIC AND TREATMENT						
Clinical Lab and Pathology				1800		Supported by Regional Reference Lab
Clinical Lab	0	5500		0		
Emergency	24	13800	12	9600		
Imaging	8	8220		6000		
Morgue	0	500		300		
Pathology	0	2160		0		
Perioperative Services	0	16488		10600		
Procedure Suite- Perioperative Services	0	1143		0		
Pre-Op & Recovery - Perioperative Services	0	10260		2500		
Pharmacy, Inpatient	0	3000		1500		Supported by regional Medical Center
Respiratory Care	0	1800		700		
Sterile Processing Department	0	5360		3600		
EKG-Echocardiography	0	612		600		
Inpatient Rehab	0	840		840		
Technology Dock Portal				400		
Intake-Discharge Center		0			3409	
Subtotal Diagnostic & Treatment		**69683**		**36240**		

Space Program

	Conventional Small Hospital		New Small Hospital		Community Building	Notes
ADMINISTRATION						
Meditation	0	300			300	
Provider Call Rooms	0	1448		448	1000	
Patient Transportation	0	300			300	
Administration, Nursing	0	2200			2000	
Hospital Conference	0	1800		500	1300	
Gift Shop	0	575			575	
Volunteers	0	600			600	
Public Ammenities	0	2500		500	2000	
Guest Ammenities/Concierge					400	
Pharmacy, Retail					800	
Staff Ammenities	0	1550			1365	
Control Center	0	0				
Nursing Coord				200		1-2 fte's per position
Case Mgmt/Care Coord				200		1-2 fte's per position
Bed Control				200		1-2 fte's per position
Physician Advisor				200		1-2 fte's per position
Diagnostic/Treatment Coord				200		1-2 fte's per position
Support Service Coord				200		1-2 fte's per position
Community Service Coord				200		1-2 fte's per position
Operations, Hospital				200		1-2 fte's per position
Subtotal Administration		**11273**		**2100**	**10640**	
SUPPORT SERVICES						
Bio- Medical Engineering	0	600			600	
Cafeteria& Food Court	0	5000			2500	
Food Service	0	2500		2500		
Communications - CBX operators	0	500			500	
Environmental Services	0	1000		400	600	
Materials Management	0	4500		3500		supported by Regional Warehouse
Linen Services	0	1500		300		
Loading Dock	0	700		2000		
Subtotal Support Services		**16300**		**8700**	**4200**	
Total Department Gross Square Feet (DGSF)		**176,449**		**120,459**	**14,840**	
Net to Gross		1.35		1.35	1.35	
Building Gross Square Feet (BGSF)		**238,206**		**162,620**	**20,034**	
BGSF/Bed		**2090**		**1478**	182	

Care Delivery Model

Overview

- Our approach was to first examine traditional care delivery operational models and then **envision how these models might be different in the future**. We examined if technology in every facet could be used differently and more effectively to reduce the number of FTE's that might be required. Could we reduce the number of FTE's per patient discharge? Could we reduce the number of FTE's per patient visit? Our goal was to **focus on activities that added value and to minimize unnecessary waste**.

- Overall we addressed the composition of the likely membership who would be using this facility. We made the following assumptions based on the normal distribution of patient acuity. We postulated that if we could limit the patients (members) coming to this facility, to the middle acuity range, this would increase the **opportunity to create a more predictable patient care model**. These patients would then be treated using standard protocols and regimens. The schedule could be more tightly managed with less likelihood of events that would disrupt and efficient care delivery model. Thus the highest acuity (10- 15% of total) member patients would be diverted to the regional medical center. In some instances emergent patients would need to be first stabilized before they are transferred. The lowest acuity/primary (10-15% of total) member patients would be attended through the community based micro clinics and other MOBs in the catchment area. The net result would be to create a **model of care that is patient focused, efficient, safe and effective**. This was a fundamental assumption that allowed us to assume higher utilization of resources that resulted in less waste and fewer more effectively used resources.

Care Delivery Model

- Based on normal distribution of patient acuity in the population, the highest acuity (less predictable) patients (top 15% of total) will be diverted to regional tertiary /quaternary medical centers. The lowest acuity (more predictable) patients (bottom 15%) will be cared for at community based clinics by the primary care teams.

- The remaining 70% of patients are on average mid- acuity and more predictable resulting in an a opportunity to apply more standard processes. This will result in higher efficiency, improved safety and improved quality of care for this population group. Care will be provide in more timely manner.

Care Delivery Model

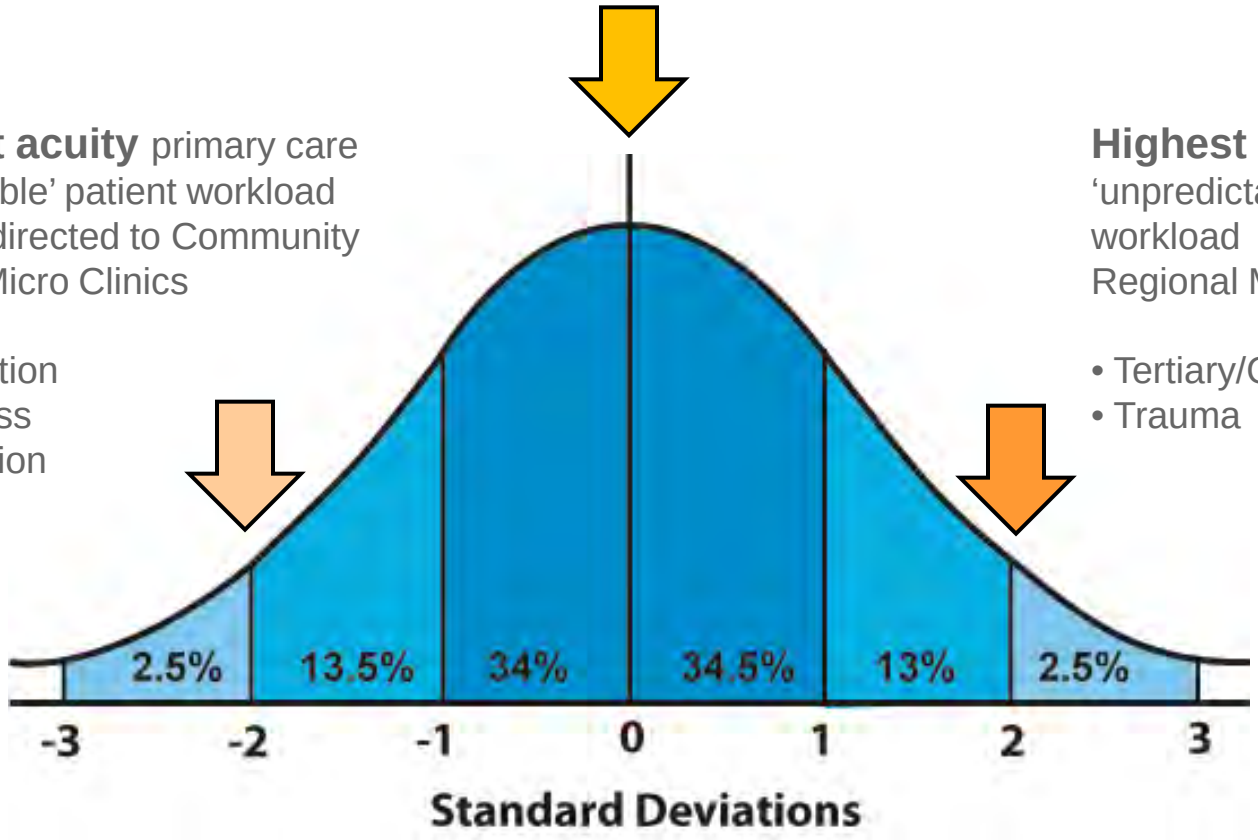
Average/normal acuity - largely predictable patient workload volume directed to Small Community Hospital

Lowest acuity primary care 'predictable' patient workload volume directed to Community Clinics/Micro Clinics

- Prevention
- Wellness
- Education

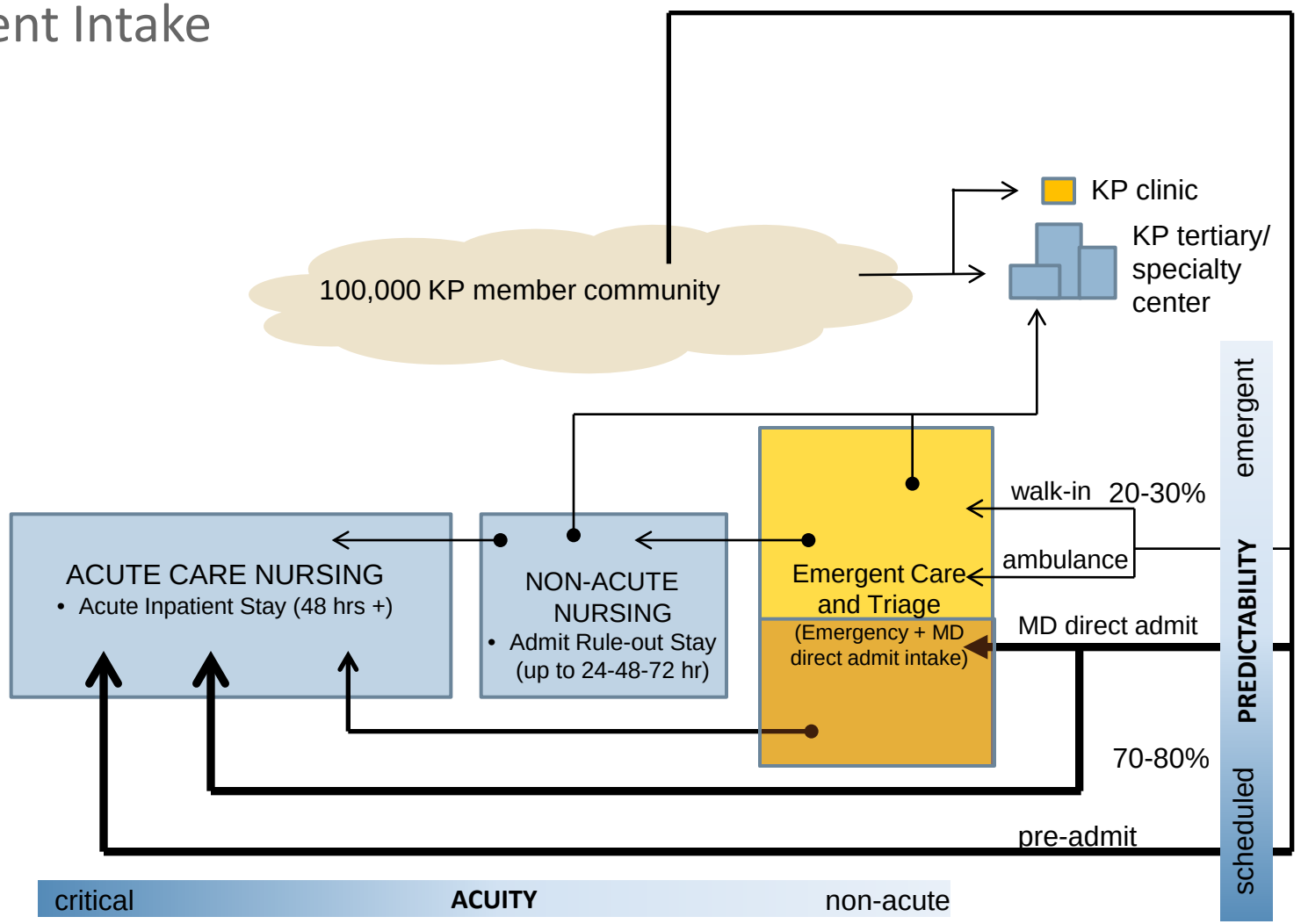
Highest acuity complex 'unpredictable' patient workload volume directed to Regional Medical Centers

- Tertiary/Quaternary
- Trauma



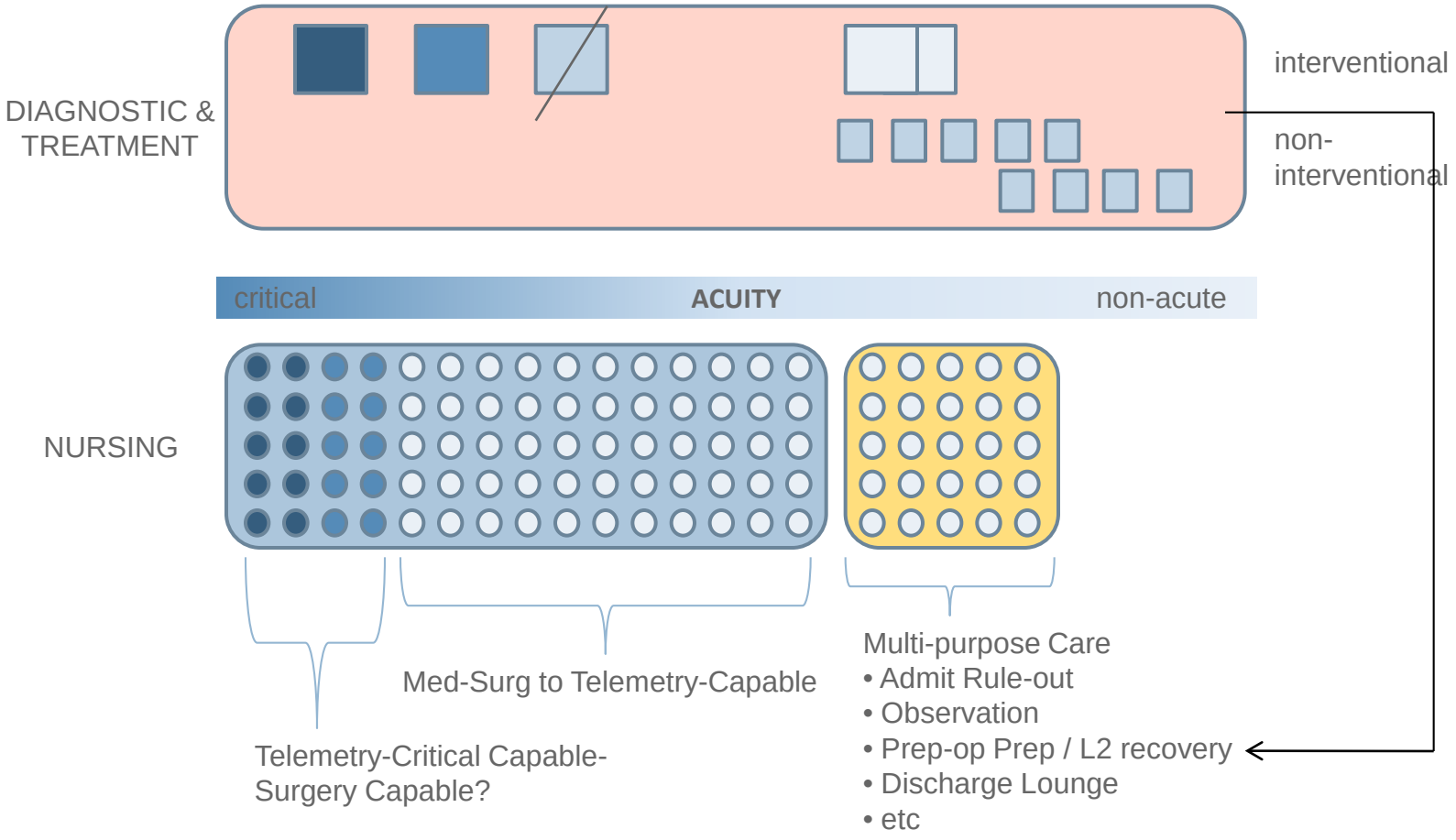
Care Delivery Model

Patient Intake



Care Delivery Model

Organizational Diagram



Care Delivery Model

Organizational Change

- Organizationally we created several new program elements to support a more efficient workflow and management of resources.
  - ***Operational Control Center***: Organized and staffed to manage and schedule patient flow through the system. Scheduling and managing all resources including staff, equipment and space. Coordinates with regional services including primary and specialty community based care.
  - ***Continuum of Care***: The inpatient care unit organization is based on the use of the universal patient room for all middle and lower acuity patients. Supplemental to the 100 licensed bed capacity is a Universal Care unit for < 23 hour stay patient and the Discharge Lounge located with Patient Intake. The Critical Care unit remains a dedicated licensed unit but is collocated with the highest acuity of general beds to allow for swing capacity of patient by virtue of increased staffing levels and skill sets
  - ***Universal Care Unit***: This unit is conceived as a less than 23 hour stay unit. It is collocated with both the Emergent Services and Interventional services. This unit provides several different care modalities with this relationship. These include: Emergent observation and admit rule-out; Pre- Operation/Procedure processing and holding; Post operative Stage 2 Recovery; 23 hour stay.
  - ***Patient Intake and Discharge Center***: This unit does not need to be located in the 'I' occupancy hospital building. It is intended that the proposed 'B' occupancy 'Community building is directly connected to the hospital. The Patient Intake and Patient Discharge Center will be located in this building. It is intended that patients will be able to pre-admit through the Intake center on the day before any scheduled procedure or inpatient stay at the hospital. This pre admit process will speed up the patient registration on the day of the procedure, and provide greater surety that patients will be completely prepared to avoid scheduling delays. Timely patient discharge is key to a well managed bed control system. A patient discharge lounge collocated with the Intake center will provide continued staff supervision of these member patients until they are collected.

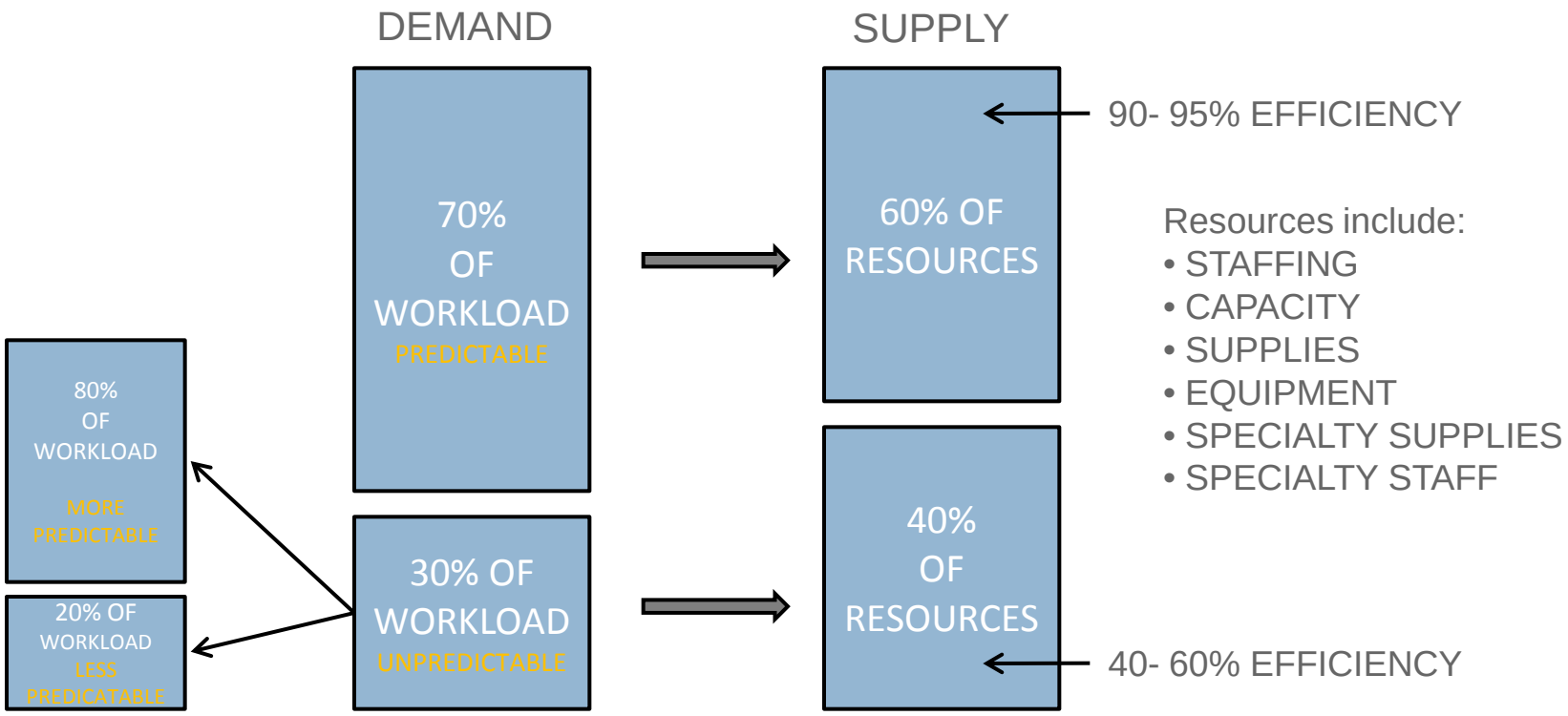
Care Delivery Model

Organizational Change

- **Regional Support System Integration**: We analyzed a model that relied more effectively on regional use of support systems to reduce the demand for more than minimum requirements for space and resources in the hospital. We analyzed this concept applied to the following services: Clinical Lab and Pathology; Materials Management; and Linen Services.
  - We suggest using an **integrated regionally based materials management system** servicing the hospital with a just-in-time model, delivered in the lowest unit of measure required at the point of care or use. This will reduce the demand for materials management space on-site.
  - Clinical Lab and Pathology similarly offer the opportunity by using regional services either at other medical centers and or regional reference labs to significantly **reduce space requirements on-site** to support a 'Stat' Lab service.

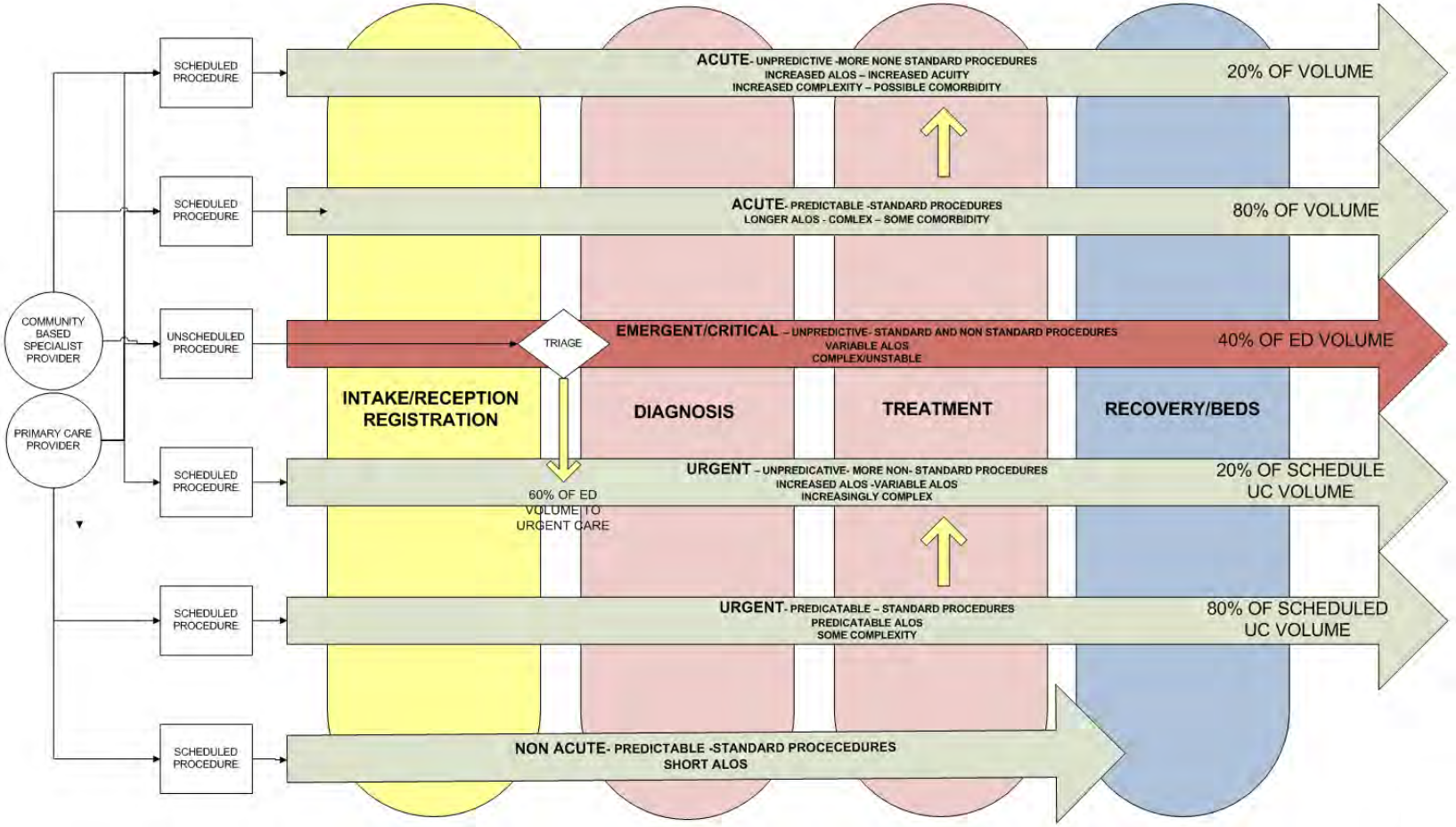
Care Delivery Model

Community Hospital Services
Optimized For The Predictable (68-70%) Workload



Care Delivery Model

Patient pathways by Acuity and Predictability



Operational Assumptions

- **Predictability** allows for the development and use of standard protocols and standard procedures, resulting in:
  - Improved safety
  - higher efficiency and utilization of resources
  - less waste
  - Tighter scheduling.
  - lower operational costs
  - Improved patient satisfaction

- **Patient Safety**
  - Highest acuity patients diverted to Regional medical center
  - Universal standard patient rooms for Acute and UCU
  - Universal ED exam room
  - Standardized Clinical Procedures and techniques
  - RFID and Bar coding for cross checking of patient identity with care delivery process and products/services.
  - Automation and Robotics

Operational Assumptions

- **Automation**
  - Pneumatic Tube system
  - RFID technology to:
    - monitor equipment location
    - Monitor and track Clinical and support staff location
    - Track Patient location
    - Track Visitors location
- **Robotics** will be used extensively to lower total number of FTE's per patient discharge
  - Clinical
    - Interventional ; Da Vinci ,
    - RoboDoc
  - Clinical Support
    - Nurse Assist Robots 2-3 increase in RN productivity / effectiveness
  - Support
    - Delivery
    - Cleaning

- **Separate Ambulatory Care Building** (MOB) located on shared site with the new small community hospital

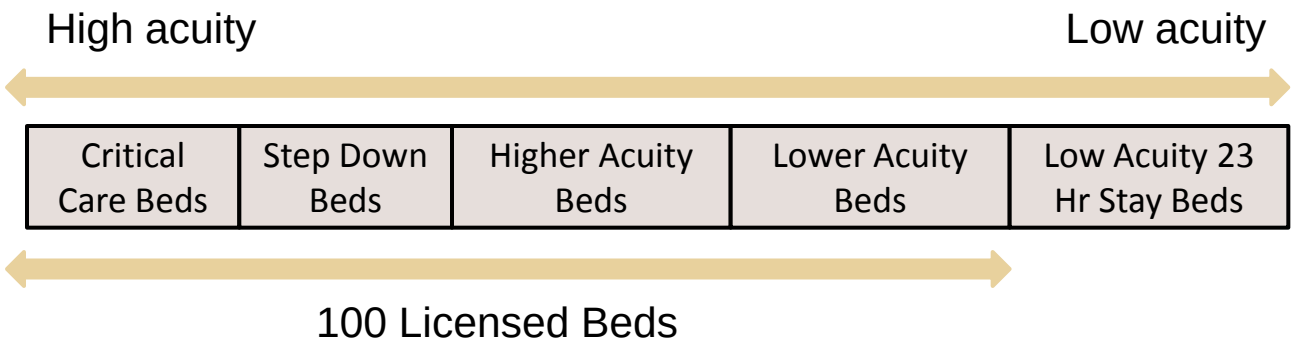
Operational Assumptions

Continuum of Care:	100 Beds
Area:	37,000

Nursing Units

- Organize all beds into a single continuum of patient care based on acuity, with Critical Care bookending one end, and < 23 hour Care(UCU) at the other end.

- VALUE:
  - **Universal room module** to support flexibly assigning beds based on acuity
  - **Improved bed utilization**
  - Universal patient room simplifies Patient room management
  - **Easier management** of staffing assignment based on patient acuity.

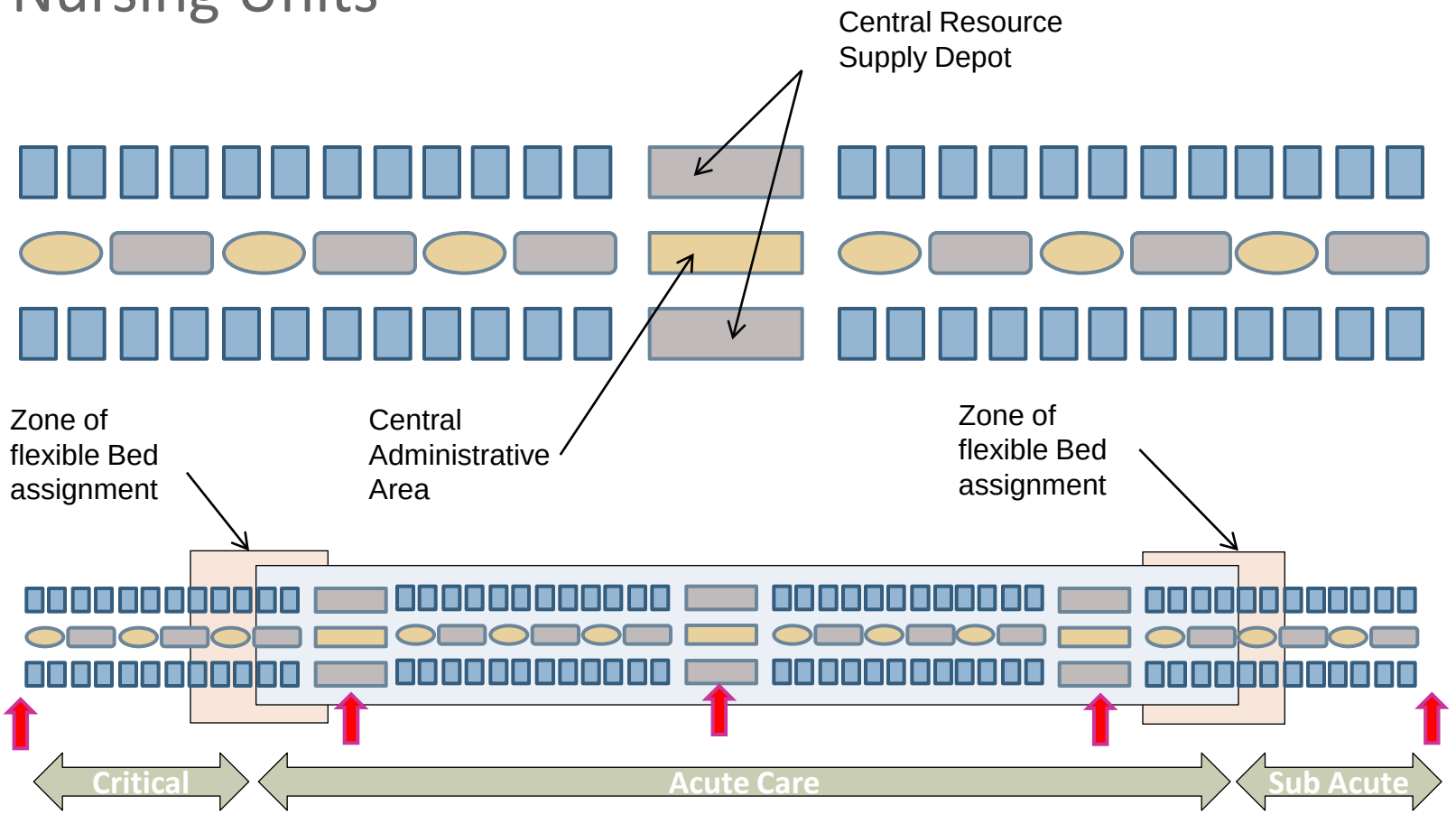


PROGRAM

Operational Assumptions

Acute Care:	60 Beds
Area:	36,000

Nursing Units



Operational Assumptions

Continuum of Care:	100 Beds
Area:	37,000

Nursing Units

- Reduce and centralize primary support functions into depots . JIT inventory management systems
  - **Large Floor Supply Depots** supports automation and better inventory control management.

- VALUE
  - **Sharing of resources** and support reduces space demands.
  - **Tighter inventory control**.

Operational Assumptions

Continuum of Care: 100 Beds

Area: 37,000

Nursing Units

- Use **Robots as Nurse Assistants** to fetch and carry items from depots- Provide one Robot for each Nurse. Nurse's provide primary care
  - Nurse assistant
  - Patient Lifting
  - Patient Monitoring
- VALUE:
  - **Increased nurse productivity** and ' face time' with patients
    - Direct patient care- improve quality and effectiveness
    - Patient/Family education
    - Possible reduction in ALOS
  - **More time available for Nurse value added activity**
    - Reduced errors/improved patient safety
    - Reduced nurse stress- less walking

PROGRAM

Operational Assumptions

Continuum of Care: 100 Beds

Area: 37,000

Nursing Units

- **Universal Patient Rooms**
  - Two standard room types
    - Critical Care and Step-Down
    - Acute Care and Universal Care
- VALUE
  - **Easier bed assignments**
  - **Improved safety**
  - **Cost management**
- Decentralize supplies to point of care- JIT
- Family and Patient Centric Environment of Care
- **Active Case Management and Discharge Planning teams** and process to actively manage ALOS and patient discharge from units
  - Interdisciplinary teams

Operational Assumptions

PROGRAM	
Critical Care:	18 Beds
Area:	14,940

Nursing Units

CRITICAL CARE

- **Continuum of Care** between the Critical Care Beds/Unit and the Step-Down Beds/Unit - Integrated unit
- 16 – 18 Beds flexibly assigned and staff as needed
- **Rapid response Teams** to monitor and manage patient flow in and out of the ICU
- "**ICU without walls**" . RoboDoc provides Hospitalist support from regional medical centers
- Highest Acuity patients triaged to regional medical center
- Terminally ill patients offered Palliative Care
- **Use the "e-ICU" model** to provide ICU support and monitoring

Operational Assumptions

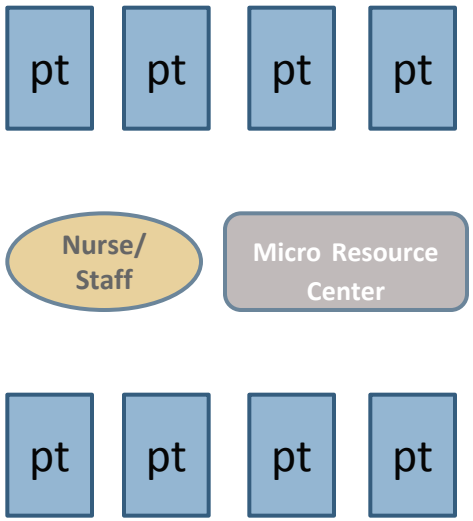
PROGRAM

Acute Care:	60 Beds
Area:	36,000

Nursing Units

ACUTE CARE

- Continuum of Care between the Critical Care Beds/Unit and the Step-Down Beds/Unit - Integrated unit
- **Universal Patient Room**- (Same hand)
- Beds organized into **smaller 8 bed pods**
  - Decentralized nurse stations with micro resource center 1:8 beds
- **Centralized Resource Supply Depots**
  - Automated supply servicing
  - Robotic Deliveries



PROGRAM

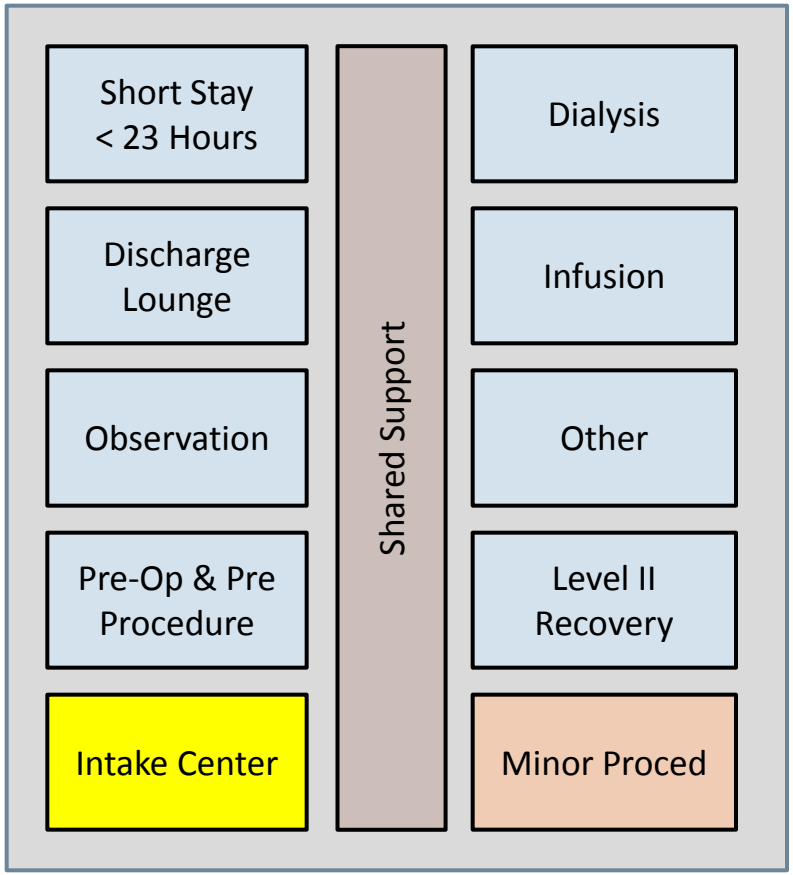
Operational Assumptions

Universal Care:	20 beds
Area:	11,000

Nursing Units

INTEGRATED UNIVERSAL CARE UNIT - Option

- Integrated non acute AMBULATORY nursing services
  - Short Stay/ < 24 hour stay
  - Observation(CDU)
  - Dialysis
  - Infusion
  - Ambulatory Procedure Center
  - Patient Intake Center
  - Pre-Op
  - Level 2 Post Op/Procedure Recovery
  - Patient Discharge Lounge



PROGRAM

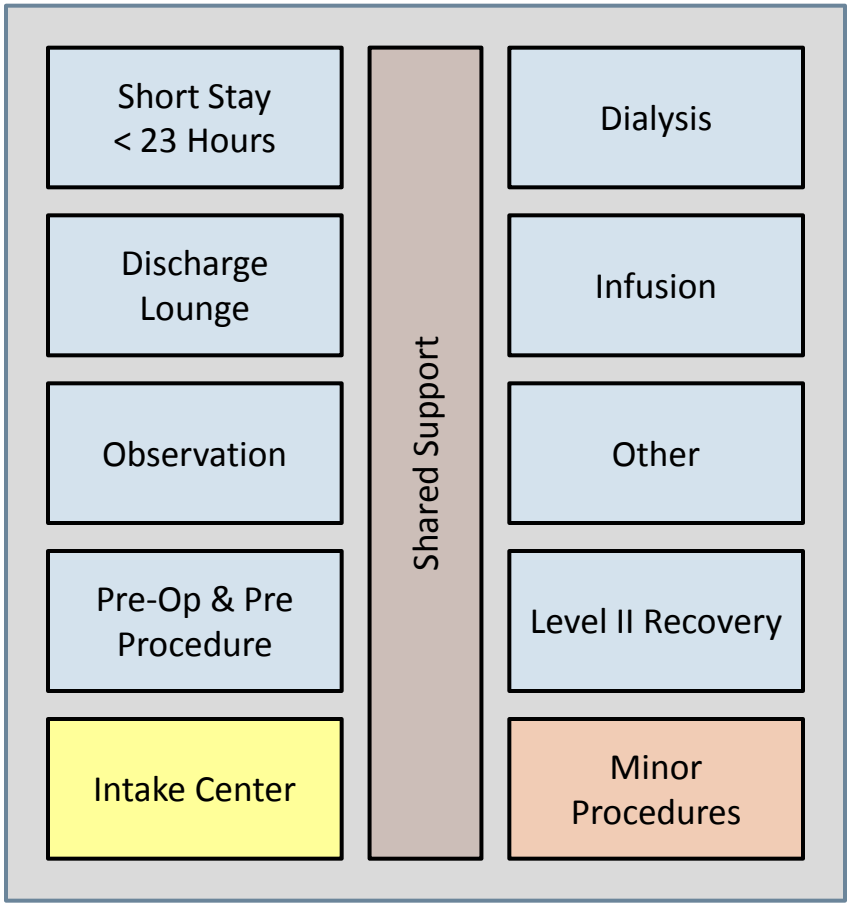
Operational Assumptions

Universal Care: 20 beds

Area: 11,000

Nursing Units

- **UNIVERSAL Patient Room**
  - Room use is shared across all services based on schedule/demand
- Shared nurse staffing- cross trained
- VALUE:
  - **Reduce FTE's per patient visit** and or discharge
  - **Improved quality and timelines** of care
  - **Improved resource efficiency**.
  - **Space reduction**



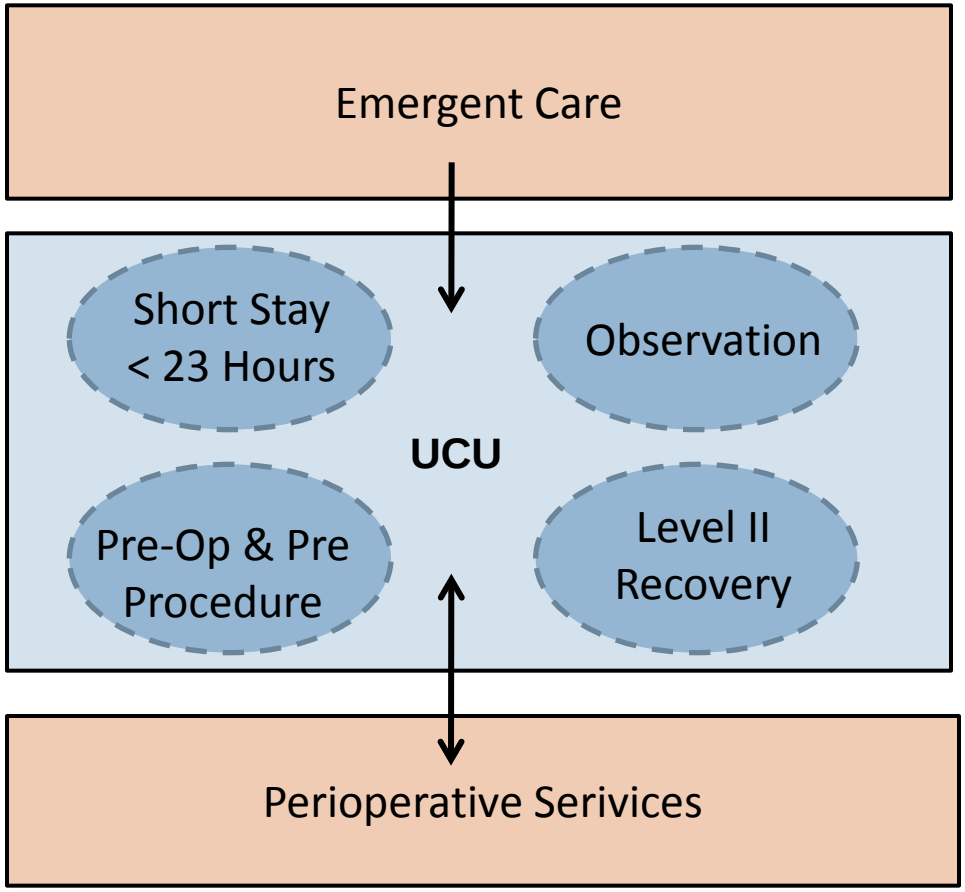
PROGRAM

Operational Assumptions

Program: 10 beds

Area: 9,739

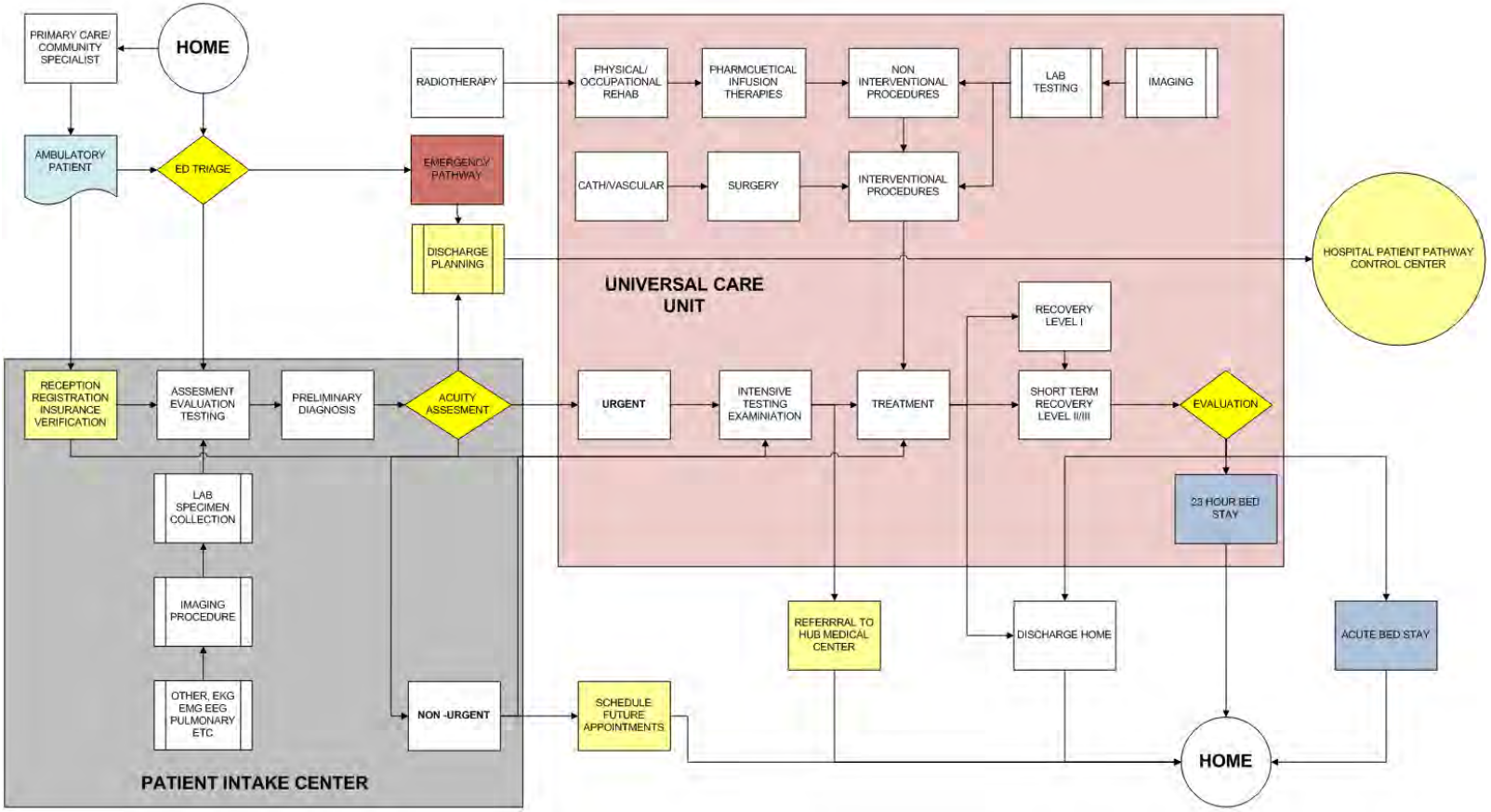
MODIFIED Universal Care Unit



- <23 hour stay
- Operates 24/5 to 24/7
- **Staffing Efficiency**
  - Cross Training
  - Scheduled and Special Procedures
- Short Stay beds and Observation beds swing with ED to **provide flexibility**
- Short Stay beds swing with Level 2 Recovery to provide capacity flex
- **Universal Bed/platform** configurations
  - Horizontal/Bed
  - Inclined/Seated

Operational Assumptions

Urgent care pathway



Operational Assumptions

PROGRAM

Area: 9,600

Emergent Care and Triage

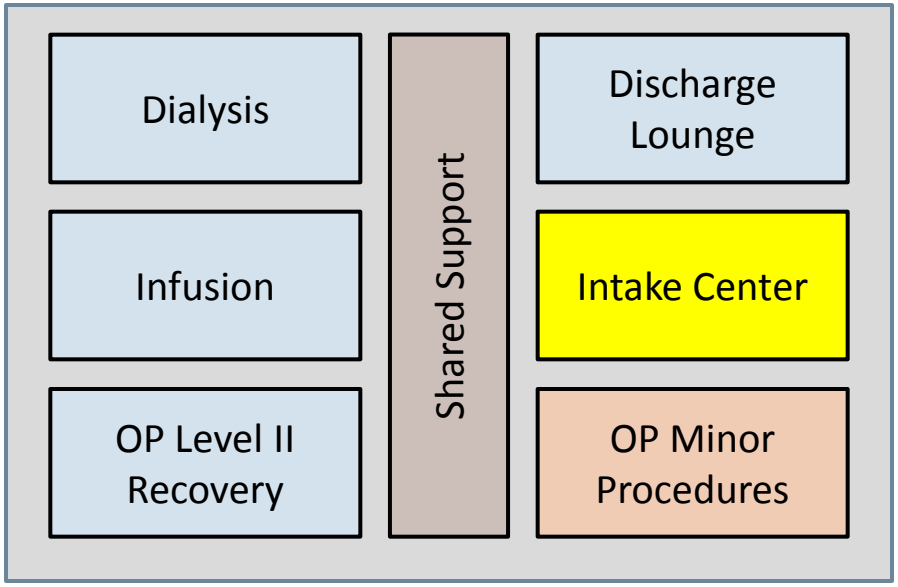
- **12 Emergency Rooms**
  - 2 Triage/Fast Track (+ 5 Results Waiting positions)
  - 8 Exam/Treatment (incl. peds observation)
  - 2 Resuscitation Rooms
  - Fast Track and Exam rooms **all sized @ 150 SF**
- Working Assumptions
  - Operational assumption on separating Urgent Care cases
  - **Observation beds/patients located with UCU**

Operational Assumptions

PROGRAM

Area: 3,400

Intake- Discharge Center



- **Located in** adjacent/ connected **community- Outpatient building**
- Intake Center **manages both Inpatient and outpatient flow** for scheduled procedures in hospital and outpatient building
- Operates 12/5 to 12/7
- Discharge lounge **supports efficient Bed management/ Scheduling**

Operational Assumptions

PROGRAM

Area: 6,000

Imaging Services

- Inpatient and ED Imaging
  - 1 CT
  - 2 Rad/Fluoro
  - 1 Ultrasound + portable units
  - 1 Nuclear Medicine Digi-rad
  - (MRI off-site)
- Working Assumptions
  - Complex Nuc Med cases transported to full NM in OP
- Building Planning Opportunity

Operational Assumptions

PROGRAM

Area: 1,800

Clinical Lab and Pathology

- **Inpatient & ED Immediate Response Lab**
  - Specimen processing
  - Phlebotomy, urinalysis, hematology, coagulation, chemistry, blood gas
  - Blood bank
  - Pathology workstation

- Working assumptions
  - **Minimal back-up lab services**; lab services at other campuses to provide support – regional medical center
  - Specimen collection by nurses
  - **Flexible Lab casework / equipment**

Operational Assumptions

PROGRAM

Area: 15,640

Interventional Services

- **Combined Inpatient and Outpatient Surgery** (100 Bed)
  - 2 ORs – Large multi-purpose with Robot/Telemedicine Assist- RoboDoc and Da Vinci
  - 1 Special Procedure Room (minimum OR size) with Telemedicine Assist- RoboDoc
  - 2 Cardiac Cath. and Interventional Imaging
  - 5 level 1 PACU
  - **Pre-op and Level 2 Recovery located with UCU**

- Working assumptions
  - **Less Intensive OP procedures** (Eyes, Pain, Plastics, Podiatry) done in Outpatient Building
  - **If hospital expands to 200 beds** then it will need to add Interventional capacity including
    - 2 Operating rooms
    - 1 Special Procedure Room
    - 1 Interventional Imaging Room
    - 5 Level 1 PACU

Operational Assumptions

PROGRAM
Area: 3,600

Central Sterile Services

- Central Sterile Services to support Hospital Interventional Platform
  - Decontamination
  - Instrument Processing
  - Case Cart Set-up
  - Case Cart Staging
- **Future Option: Offsite Regional SPD service**
- Working Assumptions
  - **Increased support from other campuses** (i.e. reduced capacity to store soft supplies)

Operational Assumptions

	PROGRAM
Pharmacy:	1,500
Rehab :	600
Respiratory Therapy:	700

Other Diagnostic Services

- **Pharmacy**
  - Full service pharmacy
  - Oncology/chemotherapy/infusion programs located with UCU
  - Off-hours (after 11PM) pharmacist consult provided via pharmacist on-call from home or from Regional Medical Center
  - Points of Care use Automated Dispensing Machines
- **Rehab**
  - Located with Patient Care Unit for direct access
- **Dialysis**
  - Inpatient - Bedside Dialysis
  - Outpatient - locate with UCU
- **Respiratory Therapy**
  - Located with ICU
  - Co-location with CSS will provide some space efficiencies

Operational Assumptions

PROGRAM

Nerve Center: 2,000

Administrative Services

- **Command and Control Center**
  - Serves as central hospital and nursing administration
  - **Resource management and monitoring**
    - Clinical and Support staffing
    - Equipment and room scheduling
    - Supplies and instrumentation
    - Clean-up and servicing
  - **Bed monitoring/Patient flow, EMR-ROI**
    - Case Management
    - ALOS /Patient Discharge/Room Clean-up
    - Discharge Lounge

Operational Assumptions

PROGRAM

Admitting Area: 1,000

Administrative Services

- **Admitting/Patient Registration**
  - Unit to support ED and on-site follow-up issues
  - Preadmissions activity to be coordinated with Case Management teams and Intake Center located with UCU
  - Patient Concierge Service to assist patients unfamiliar with electronic/computer based systems

- **Active multi-disciplinary Case Management** and Discharge planning teams to manage patient needs, resources and patient flow.
  - **Coordinated with the Control Center** (Nerve Center)

Operational Assumptions

PROGRAM

Area: 2,500

Nutritional Services

- **Kitchen**
  - Room Service Model
  - Limited Room Service Menu
  - Finishing kitchen with grilling capability
  - Some bulk food prep off-site
  - Less support for cafeteria

- **Cafeteria**
  - Smaller café to provide more area to kitchen
  - Vending service for after hours

Operational Assumptions

PROGRAM

Materials Mgt: 3,500

EVS, Linen, Materials Management

- **Materials Management and Central Supply**
  - Loading Dock- Dedicated separate clean and dirty docks
    - Dedicated Linen, Trash and Food docks
  - Supported by **Regional Materials Management Warehouse**
  - Scheduled truck delivery 24/7 by Regional delivery service
  - **Minimal In-hospital area** for back-up storage
  - 96-hour emergency supply distributed in working inventory in hospital

  - **DISTRIBUTION**
    - **Robotic/Automated cart delivery and pick up** to and from point of use
    - PTS backup for small item delivery
    - Bar Coding of all supplies- Inventory control and management
    - RFID of all equipment for inventory management.

Operational Assumptions

PROGRAM	
EVS:	500
Linen:	300

EVS, Linen, Materials Management

- **EVS**
  - **Minimal central In-hospital area**
  - Support space in non-hospital buildings on-campus
  - Robotic floor cleaning equipment
  - Non-Toxic green cleaning agents
- **Linen**
  - **Minimal In-hospital area** with 96-hour emergency supply
  - Automated /Robotic Cart delivery and return (exchange cart)
  - Exchange Delivery Container at dedicated loading dock

Operational Assumptions

Security and Disaster Preparedness

- Ability to **secure public lobbies after hours**; have one main entry (preferably) via ED area (not through ED) after hours, yet still provide after-hours building access to Staff/MD's
- Separate entrances for public and ED walk-in
- Isolated access systems that allow specific floors to be secured
- **Visitor badge system** to manage entry into elevators and circulation within the hospital
- Loading Dock activity to monitored and secured
- Ability to **control access to upper floors** of the hospital, shield lobby activities from the street, and limit blast exposure.
- Preplan the location and **design of critical disaster stations** (EOC, Labor Pool, Media and Care Stations, overflow Triage/Treatment). Locations should not be readily accessible to public and be easy to secure, pre-equipped with additional phones, power supplies, etc
- **Patient tracking systems** for disaster preparedness

Operational Assumptions

Security and Disaster Preparedness

- **City required communications** - 800 MHz for EOC and satellite radio
- Prevent public access to roofs and access to outdoor air intakes
- **Secured lobbies, loading docks** and all entry and storage areas
- Secured mechanical systems and building information systems
- Decontamination room and negative air isolation rooms planned for ED
- Consider location for exterior shower-heads for **mass decontamination** to be done without necessitating a tent
- Isolation rooms included with every nursing and recovery units
- Building in **ability to isolate an nursing unit** in response to mass biohazard exposure to be considered
- **Emergency command center (Nerve Center)** to be located in close proximity to Security hub

Information Technology

Overview

- Technology plays a supporting role in nearly every aspect of modern care delivery. However the technological landscape is rapidly changing. Now it demands:
  - Environments that meet **ever-advancing expectations of the most wired**, connected and technology-savvy individuals.
  - **New and Unique models of care** that take advantage of rapid technological developments and respond to the shifting needs of both, people and services.
  - **Intelligent spaces promoting positive outcomes** through context-awareness, enabled by ubiquitous connectivity.
  - A social building empowering the occupants to **effortlessly reach beyond physical limits** of the space.

Information Technology

Overview

- **Vision of the new hospital** is predicated on the use of new and rapidly evolving technologies. We are assuming the **use of a sophisticated state of the art IT system** that integrates all communications from every source into a singular platform available and managed for all users. We assume this wireless infrastructure will:
  - Be capable of supporting present care models while being **flexible enough to support future care models**, technologies and spaces as they evolve.
  - **Keep patients and family fully informed** with all relevant personal data and schedules.
  - Be integrated into a **Central Resource Management** and patient flow system to be used by the control center managing patient flow through the system.
  - **Track all patient and staff locations** and Keep all staff informed with every piece of data they require when they need it to perform their duties effectively and efficiently.
  - **Track the location of every significant resource** including, supplies, significant equipment and furniture using RFID technology.

Information Technology

- Implied social networks can engage participants through the entire cycle: from pre-visit education through recovery

Information Technology

Building A Social Network

- **A robust deployment of technology infrastructure**, capable of supporting high bandwidth, real-time, interactive and data-rich health management systems of tomorrow, will ensure that the various healthcare systems will work in concert to provide the best experience for the end users:
- **For the digital natives, the next generation of building users**, who will have dramatically different expectations about when, where, and how the interactions with caregivers take place
- **Ubiquitous connectivity**, through smartphones and tablets, will enable users to experience a whole new space that permeates the physical space of buildings and enables remote interaction across digital devices. As we move into a smarter building, technology systems that connect through open standards will create **discreet social networks for information sharing among participants**.
- Location-based services in the facility automatically attach and detach mobile devices to these networks, making the process both simple and secure.
- All patient monitoring systems including the 'smart' patient room, 'smart' bed and directly applied monitoring systems will run through cloud technology to **keep the patient EMR and staff informed**.
- Telemedicine will enable more patients to manage illness from home and allow multiple institutions to **share resources across healthcare enterprise**.
- For administrators, the social building's location-indexed information will provide for hyper-targeting of **improvements for efficiency, safety and outcomes**.

Information Technology

- We understand that the **future viability of the systems** that support Kaiser's business **objectives demands smart, informed, decision-making in the present**. The deployment of infrastructure that begins at today's basic technology needs: electronic medical records, patient scheduling, remote patient monitoring, delivery of educational content, issuing medication reminders, etc. must be capable of supporting the high bandwidth, real–time, interactive, and data-rich health management systems of tomorrow.
- We envision an "**integrated technologies design process**" that will involve designing information technology infrastructure, telecom distribution, audiovisual systems, universal communications, security, nurse call, and control systems all at the same time, under one roof, by the same design team in order **to provide the best experience for the future end users**.

Information Technology

Automation and Robotics

- With the focus on the Patient Care units: We surmised that **currently nurses spend less than 50% of their time in direct patient care**, the remaining time being spent walking, collecting and transporting materials/supplies/medications etc. and charting at the nurse station.
- **The proposed model assumes active use of Nurse Assistant Robotics**. These units will be in constant communication with the patient care team, and the patient monitoring systems. The intent of these devices is **to fetch and carry all items the care team needs** either on scheduled basis or on an as needed basis from a central supply depot. This will double or triple the effective **value added time the nurse and care team have to provide direct patient care**.
  - The care plan for every patient including every inpatient is predetermined and scheduled prior to patient admissions.
  - The patient Care coordinators, in consultation with the hospital care team and the medical home teams will develop a detailed care plan, based on best practice standard procedures and protocols, that is integrated into the Operational Control Center work flow system.
  - The Robots will be alerted to the impending needs of the care team and pre-empt scheduled procedure using standard protocols and resources, thus freeing up the care team time, which will result in reduce staff stress, **higher staff satisfaction, improved quality of care and reduced ALOS**.
  - This results in **higher utilization** and value being achieved throughout the patient care area.
  - Unexpected events will be quickly monitored assessed for changes in plan and procedures. Complex issues with increasing acuity will be referred to the regional medical center via telemedicine systems for consultation.

Information Technology

Automation and Robotics

- Significantly increased use of automation and robotics **will directly impact the number of FTE's** required per patient discharge and visit. We assume using these technologies in the following capacity:
  - **Clinical**
    - Robotic/telemedicine ORs – 'Da Vinci'
    - Lab automation
    - Pharmacy Automation
  - **Patient Care**
    - Nursing Assistance
    - Monitoring
    - 'RoboDoc'
  - **Support Services**
    - Cleaning
    - Transportation/Delivery

Building Design and Construction Technology

Overview

Our goal is to develop an approach to the design and to construction technology that would achieve the following goals:

- **Construct and occupy the building faster** compared to conventional construction process and technology.
  - Our approach uses several building design approaches that address ease and speed of construction.
    - Build a smaller building. (1500 BGSF/bed)
    - **Long Span single story "warehouse" concept for the Diagnostic & Treatment (D&T)**, Support Services Component.
    - **Prefabrication modules for construction of the Patient Care wing**. Prefabrication will be applied to the bathroom module and patient head walls. This is then coupled with the concept of unitized exterior wall systems
    - Prefabricated Modular Central Plant
- **Provide long term flexibility**- Change happens
  - The hospital area most likely to change significantly over the lifetime of the building will be in the D&T areas. The building system with long span lends itself to easy changes to both the partitions and Mechanical/Electrical and Piping(MEP) systems in support of those spaces.
- **Provide for incremental expansion**
  - Developing the D&T block as a single story structure allows for the building to be expanded incrementally in defined pathways. The advantage is that each increment of development is not necessarily dependent on other development as would typically occur in multi-story construction.
  - The Patient Care wing while currently designed as 2 story wing can easily be added in increments or 40-50 beds, in the event the hospital is required to grow to 200 beds and or include a new Obstetrics program.

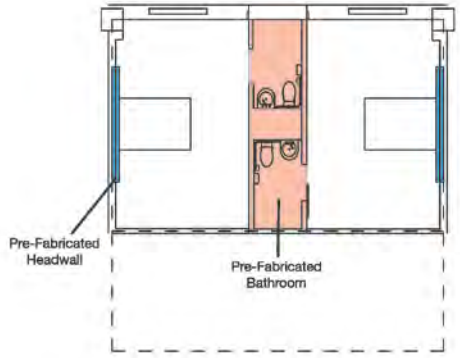
Building Design and Construction Technology

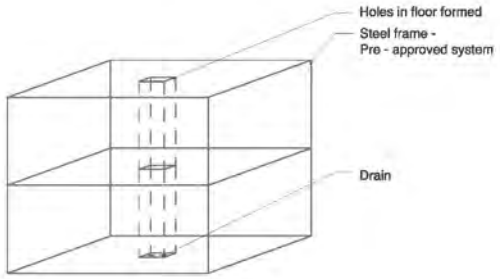
- Provide a **sustainable environmental response**.
  - This build concept results in a building with the following attributes:
    - Low visual impact building
    - Smaller building with smaller ecological footprint
    - Maximization of north-south exposure with minimized east-west exposure.
    - Opportunity to use Green Roofs for both thermal control and environmental quality
    - Photovoltaic Arrays used to provide both building shading and energy production.
- **Environment and member patient experience**
  - Our intent is to create a memorable experience for patients and family that is based in a concept of total health and well being. We are creating a building experience that will be both 'high-tech' but 'high-touch'. We propose to integrate **nature into public spaces and private space at every opportunity** with the Central Green space separating the Patient Care Wing and the D&T block.
    - Patient rooms will have large windows with views of green space and landscape
    - Large multi- media wall screens in each patient room will allow patients to see any types of images accompanied by sounds that bring them the greatest comfort.
  - The patient rooms will be **smart rooms equipped with smart technology** to monitor both the patient's condition and the quality of space. The intent is **to provide each patient the ability to control and modify their experience**.
    - Light levels and lighting color
    - Sound levels and sound design
    - Smell
    - Room Temperature and ventilation (operable windows).
    - In-room entertainment systems and educational systems
    - Comfortable space and amenities for family attendees.

Building Design and Construction Technology

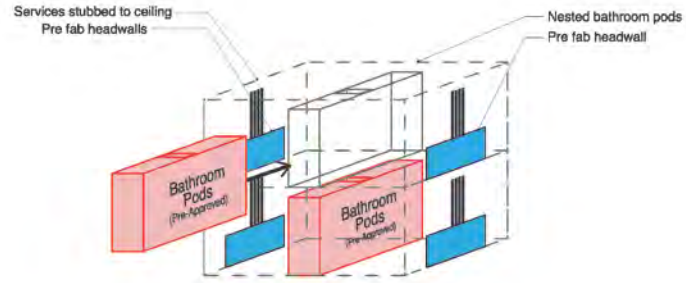
Prefabrication

- **OSHPD pre approved prefabricated components** will be used where practicable
  - To speed construction
  - Ensure consistent quality
  - Reduce cost

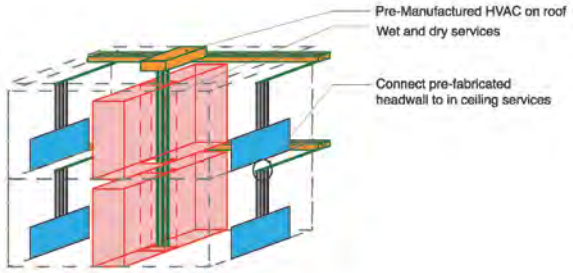




Stage 1 - Frame + Shafts



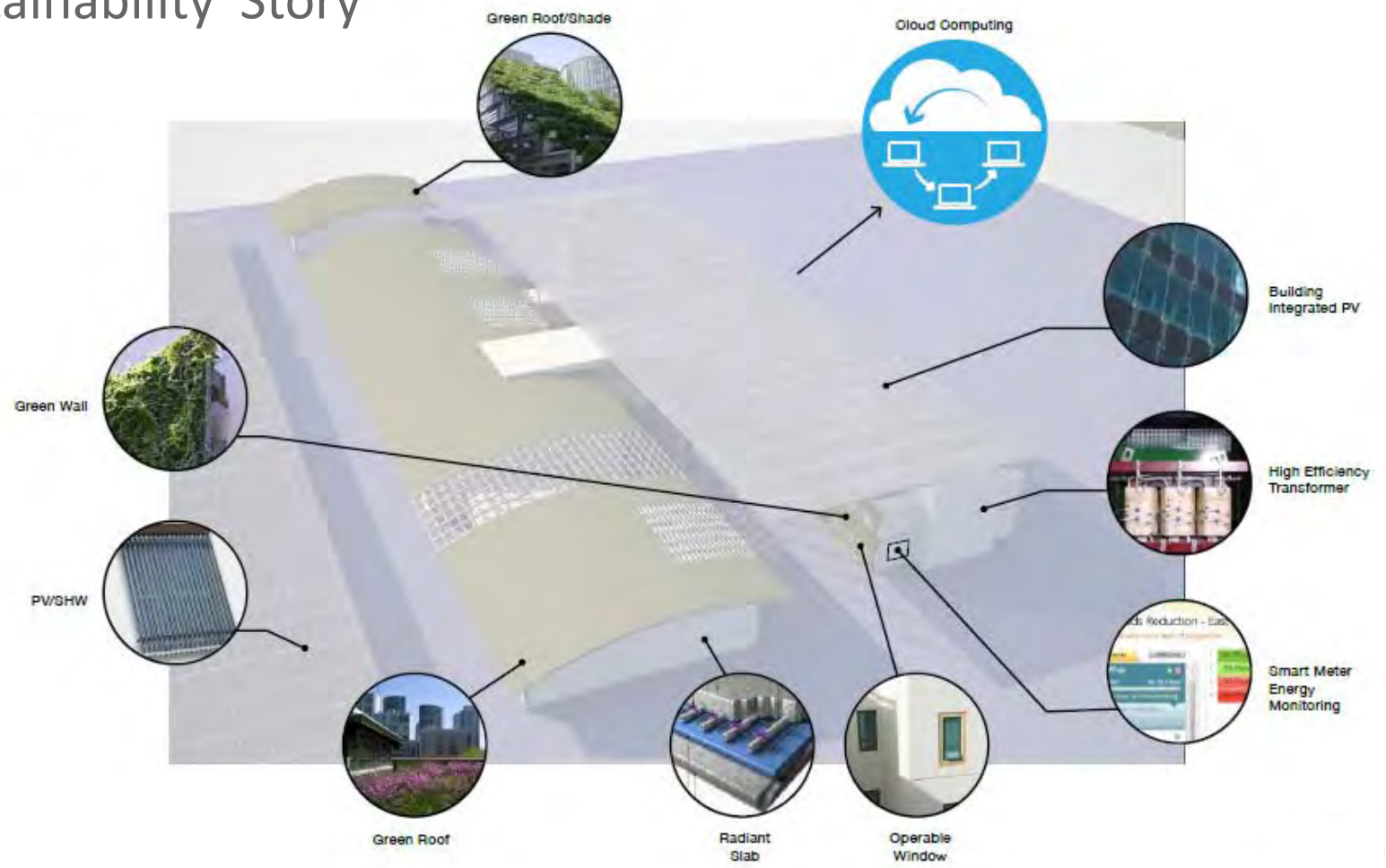
Stage 2 - When building weather proof - install in dry shell



Stage 3 - Dry shell - connect pods

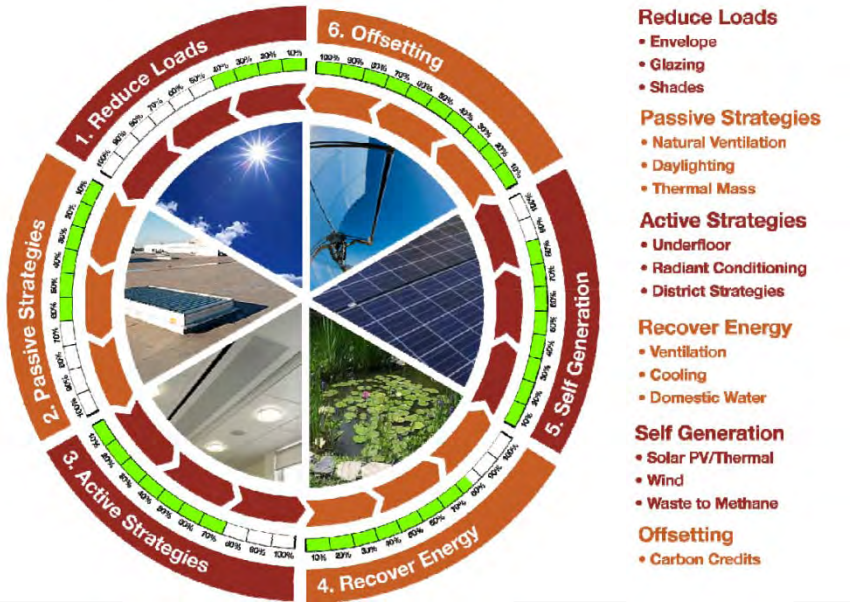
Sustainability: at a glance

Sustainability Story



Sustainability: Energy Story

- Energy performance will be optimized through a 6 step process that achieves a **comprehensive, cost effective, and prioritized approach to the owner's investment**.
  - Steps 1-3 emphasizes load reduction, passive operation, and efficiency;
  - Step 4 seeks energy recovery opportunities;
  - Step 5 incorporates self-generation; and
  - Step 6 allows for successful carbon-neutral operation through offsets.



Sustainability: Water Story

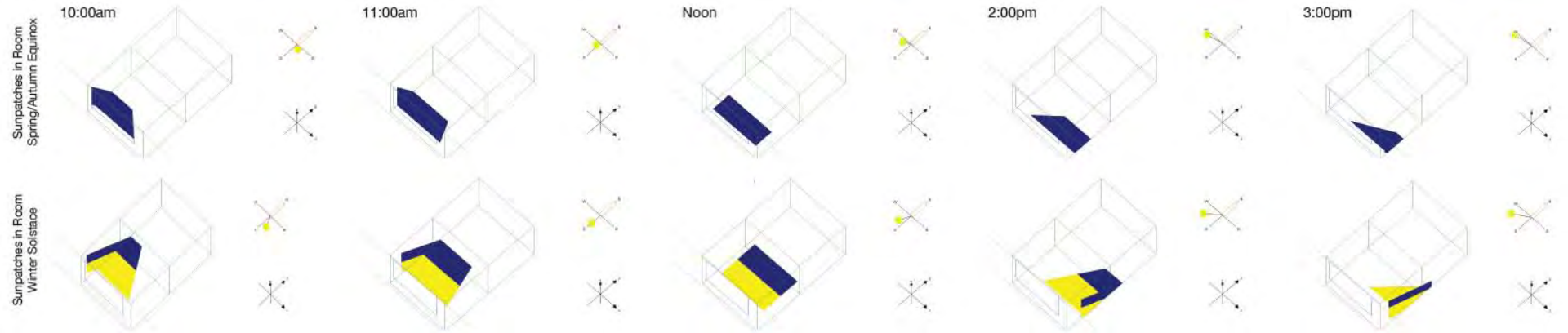
- Situated in a Mediterranean climate with frequent water shortages - and recognizing that water would soon be a limiting factor in the organization's continued development – the **design team proposes to aggressively pursue both water efficiency and alternative water sources.**

- To address Kaiser's water performance goals meaningfully, the team will take a similar step by step approach to that for energy
  - Steps 1-2 of the water story emphasize reduced water use in landscaping and the building
  - Step 3 reclaims water use
  - Step 4 captures and stores greywater
  - Step 5 captures and stores rainwater
  - and Step 6 focuses on water use offsets

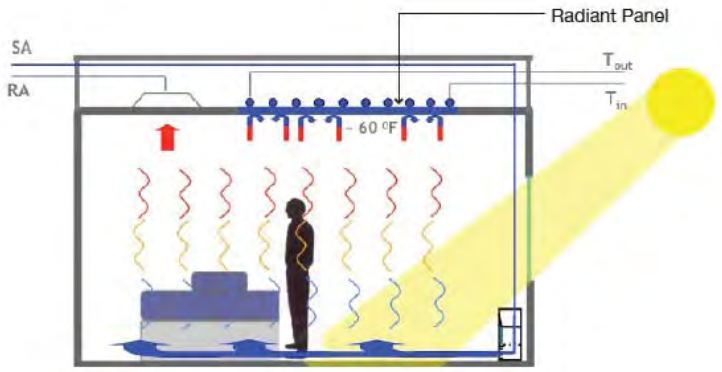
Building Design: Energy Efficiency

Integrated Design Approach

- **External façade shading elements** reduce solar gain whilst allowing for good daylight levels
- Structural concrete system combined with displacement system can potentially **reduce floor to floor height by 12 inches** on nursing tower levels, reducing HVAC energy loads
- **Reduced electrical emergency power** with VAV and Displacement systems
- **Reduced cooling central plant capacities** of over 25%



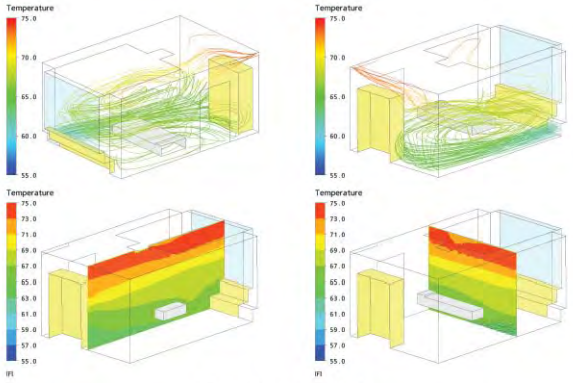
Energy Efficiency

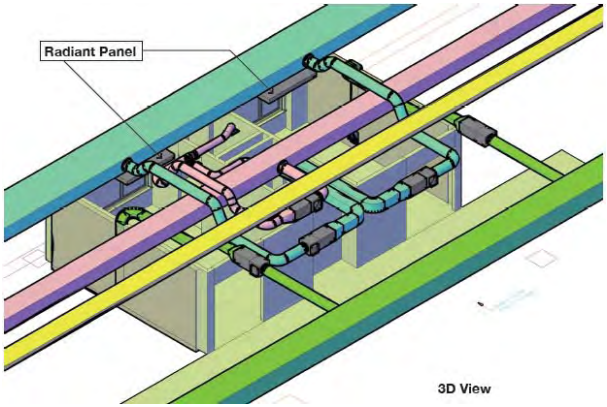


Concept **A**

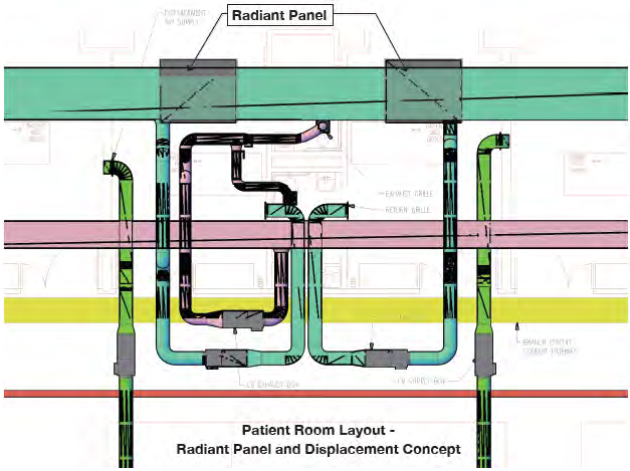
Radiant Panel and displacement for Patient Rooms

- **Reduces electrical energy consumption by over 40%** over a traditional constant air volume system
- **Reduced Ductwork infrastructure** size distribution
- **Reduced Air handling system sizes and mechanical spaces**
- **Reduced Air Handling capacity distribution** due to smaller Air handling Units


Patient Room CFD Study

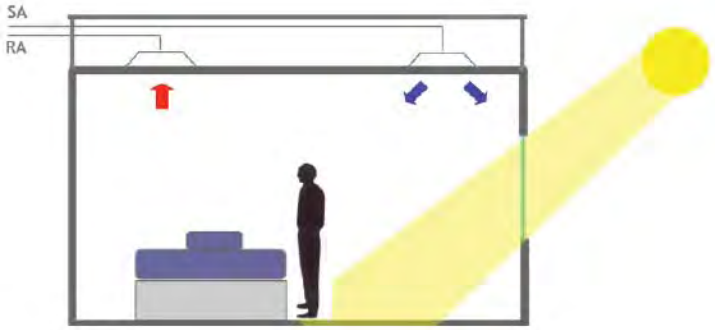


3D View



Patient Room Layout -
Radiant Panel and Displacement Concept

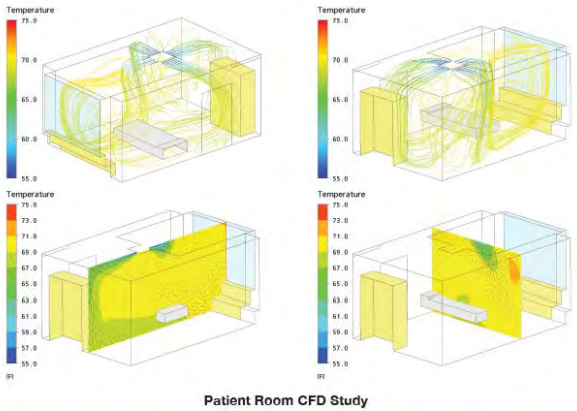
Energy Efficiency

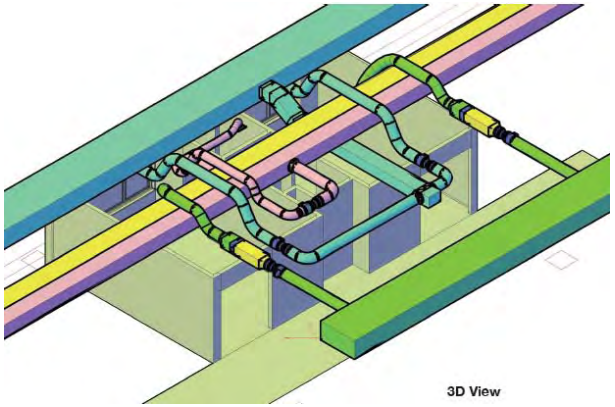


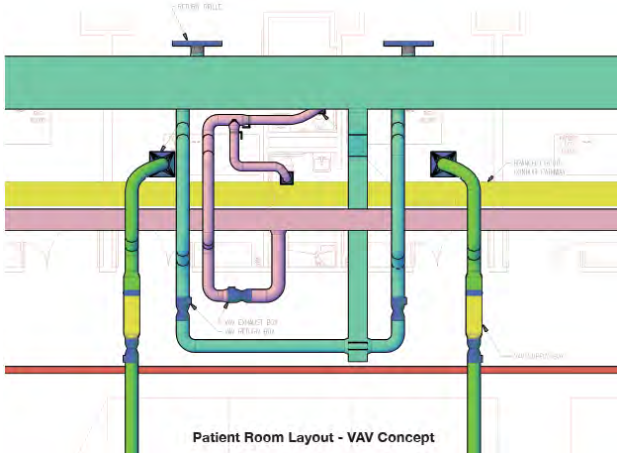
Concept **B**

VAV Recirculation with Fixed Outside Air

- **Reduced Airflow in non-peak conditions** provides increased patient comfort
- **Reduces electrical energy consumption by over 30%** over a traditional constant air volume system
- **Reduces acoustical factors** during non-peak conditions
- **Reduces heating water infrastructure**

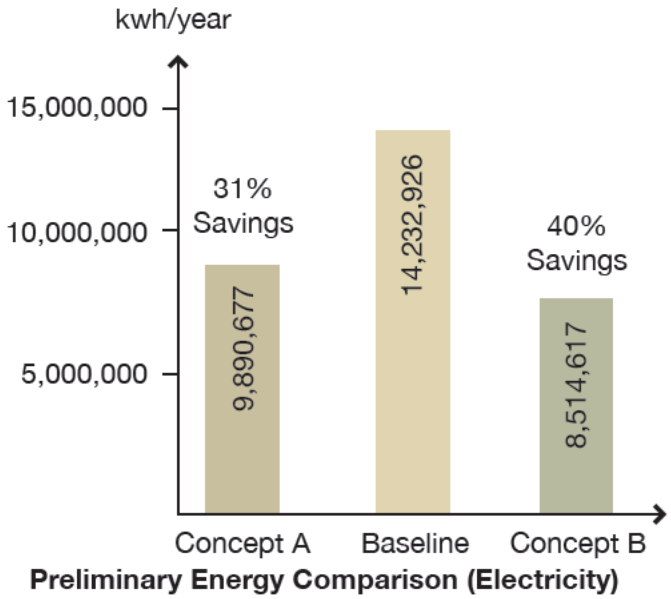

Patient Room CFD Study


3D View

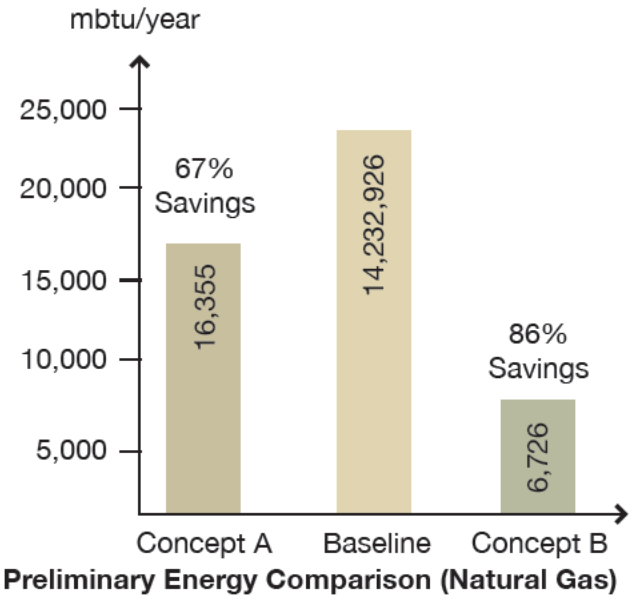

Patient Room Layout - VAV Concept

Energy Efficiency

Performance Comparison



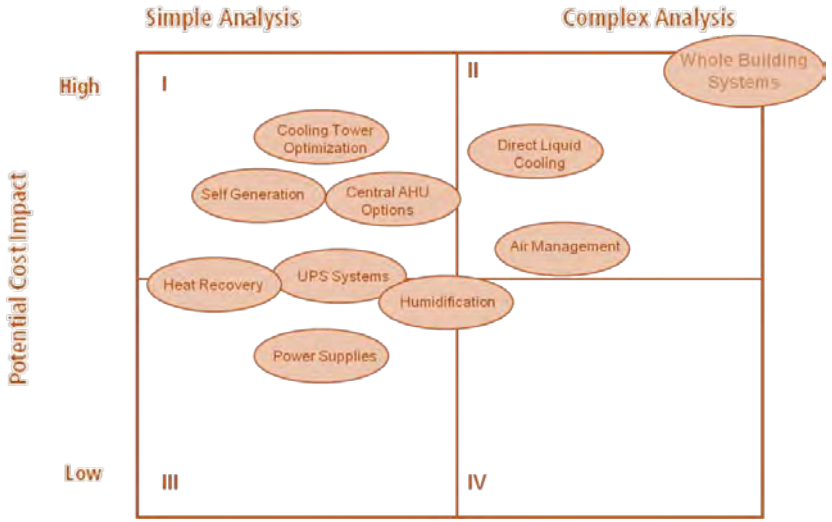
Preliminary Energy Comparison (Electricity)



Preliminary Energy Comparison (Natural Gas)

Cost Story

- Through the design process, the team will further examine multiple categories and associated multiple comparative analyses to explore **highest potential LCC benefit for the project**. An LCCA Decision Matrix can assist in this determination.
- The vertical axis represents the potential cost impact to the project. The horizontal axis reflects the complexity of the analysis required. When the categories and/or analyses are compared on such a matrix, they become easier to prioritize.
  - Those in **Quadrant I (simple analysis with high potential cost impact)** had the highest priority and were done early in the design phase
  - (Quadrant II): Studies that require complex analysis but have a high potential impact were prioritized next
  - (Quadrant III): Simple analyses with low potential impact were next, followed by
  - (Quadrant IV): Complex analyses with low potential impact
- By taking the time to prioritize LCC analyses, the project team can focus on those studies most appropriate for the project.



Cost Story

Life-Cycle Cost Saving Strategies

- **Patient Room Conditioning** strategy options:
  - (Radiant Panel + Displacement Vent) Vs. (VAV with recirculation + Fixed OA) Vs. (Traditional Constant Volume)- **Estimated 30% - 40% operational cost savings over baseline**
- **Building envelope** optimization:
  - (Operable windows with shades) vs. (operable without shades) vs. (non-operable windows with shades) vs. (non-operable windows without shades)- **Estimated 10% energy saving over standard**
- **Transformer study**:
  - high-efficiency Transformer vs. Standard- **Estimated 10% energy saving over standard**
- **Renewable energy study**:
  - PV options (building Integrated Vs. roof-mounted)
  - Roof mounted will be more efficient, but if integrated in to the building fabric then can be used to offset building fabric cost
- **Central Plant Study**:
  - Tri-generation vs. Water-side Economizer options at Central Plant Vs. typical Plant- **Estimated 10-15% savings at the central plant**