



Recommendation Ideas for the Project

We need to think "out of the box".
Challenges and Opportunities
Critical Design/Planning Issues
For children, in particular

- Departmental Stacking: Program Analysis**
 - Option A – Similar to RFP's Horizontal Bldg Version
 - Option B – Vertically Stacked Tower Version
(More Efficient Land Use)
- Departmental Planning & Design Criteria**
- Green Design Strategies**
- Published Articles by Cathryn Bang**
 - **Advances in Imaging Technology and Emerging Patient Care Models Drive Healthcare Facility Design**
 - **Patient Room of the Future**

We need to think "out of the box".

The pace of change is accelerating and that every medical and technology breakthrough can bring new requirements. We also anticipate that once separate disciplines will merge and become synergistic, thus removing divisions that have long been accepted as a fact of hospital life.

To take account of unforeseeable changes, we need to emphasize openness and flexibility, designing a technologically smart building with the capacity to be upgraded. We need to save space by clustering related activities on a single floor, or by stacking them in vertical cores to concentrate services. But we also need to work to ensure that most of the rooms can be readily adapted to different purposes.

The emergency care services departments need to be grouped on the ground floor, with bed-sized elevators to convey patients from rooftop helipads. Operating and other interventional rooms need to be concentrated on a single floor with mechanical services on the floor above.

Patient rooms need to take up the top floors, clustered in "pods" of 32 around the perimeter of the building. Each room needs to be private, and a generous size, allowing many procedures to be conducted in the rooms using sophisticated equipment, and providing a convertible sofa a friend or relative to sleep on.

Each of the elevators needs to be dedicated to use by patients, medical or service staff. Patients and visitors circulate in the "front of house," leaving the stage and rear of house to staff.

Unlike an office, which can be laid out in radically different ways, the choices are limited in organizing a hospital. Proximity is a crucial issue. There are a great number of small rooms so you need a lot of circulation. A big block requires more internal corridors, which use up space. So it needs to be functional as well as environmental and aesthetic sense to articulate the bed towers and the diagnostic & treatment podium, breaking up the mass of the building and pulling natural light into the building.

Light defines space. Light also affects the human body. It's tremendously important to experience the natural cycle of light and dark and to be wheeled out into the sun. Visitors used to be closely regulated; now they enjoy 24-hour access to loved ones as a right, and we have to provide them with space and privacy.

Another key feature advocated by doctors who wanted spaces that would generate chance encounters among their peers, fostering a free-flowing exchange of ideas without having to wait for a scheduled meeting. We need to design a grand staircase for just that purpose, putting corridors around the outside perimeter of the building wherever possible. An enclosed corridor is like a tunnel and you speed along it. But you may linger in a corridor where you can see out, and if there's a wider bay and the sun is streaming in.

We need to encourage ourselves to think of this dominant building as a piece of the ability to articulate a box, creating what we call a "virtual hospital," employing the most advanced computer technology to share the benefits of medical practice with everyone in the building, and with hospitals and schools across country and around the world. And there should be a tangible benefit to the sick. Instead of allowing technology to make medical care seem more sterile and impersonal, the new hospital uses technology in an invisible way to speed the delivery of care and make patients even larger partners in their healing.

Challenges and Opportunities

CHALLENGES:

- Consumers are savvy. sophistication in lifestyle enables patients to demand superior quality in the most modern, comfortable facilities and latest technology available.
- Consumers expect interdisciplinary care, not sequential care.
- Rapidly developing technology - Age of Targeted Therapy - Virtual Visits - Gene Therapy - Smart Medicine
- Need for better information management to help efficient coordination and collaboration

OPPORTUNITIES:

- Responsive to community needs while creating competitive advantage with new generation of hospital aesthetics.
- New hospital to become center of community

Critical Design/Planning Issues

SERVE THE 'Growing' LOCAL COMMUNITY EMERGENCY & TRAUMA HEALTHCARE NEEDS:

- Optimal patient flow
- Efficient patient management
- Accommodate acuity changes
- Provide patient comfort
- Anticipate changes and advancements not yet invented
- Opportunities to re-assign space as needed
- Designed to easily expand in future
- Added flexibility to manage future variations in demand
- Enhanced patient experience
- Home-like surroundings / Hotel-like amenities
- "Family-centered" care

- Improved recruit and recruitment of physicians and nurses
- Enhance physician integration for performance type model
- Better interdepartmental cooperation & collaboration
- Enable staff to work in an environment that exemplifies their expertise.

For children in particular, we need to create a cheerful and reassuring environment for sick and injured children and their concerned families. The Hospital need to have its own distinctive entrance for pediatrics patients designed to be inviting to children, with an interactive welcome wall. A large terrace on the pediatrics floor should be provided to allow children direct access to the outdoors so that they can play in the sunshine. Patient rooms should be designed to benefit from an abundance of natural light and a sense of plentiful space with large windows that overlook gardens, green spaces and gathering places.

Creating a home-like atmosphere for children, the pediatrics nursing floors need to address the social and emotional needs of children and families in the hospital with design features. Specialists should provide individualized therapeutic intervention, play and educational programs. The building design should incorporate the beauty of the outdoors and sunlight into the space to enhance the healing process.

Multiple age-appropriate playrooms and a family resource room should be provided and extend to a large outdoor play terrace with therapeutic views. The outdoor area should be designed to allow children to safely play in the open air and enjoy the healing effects of natural light. A multi-media room should be provided on the pediatrics floor to give teens a special place to play video games or watch movies.

Each pediatrics nursing unit should have its own minor procedure room so young patients can undergo certain treatments away from their sleeping area to avoid associating pain or distress with their own room. Spacious patient rooms should feature large windows with therapeutic views and a window seat with a daybed so family members can comfortably spend time in the room.

To help ease the anxiety of sick and frightened children, the Emergency Department should feature pediatric-friendly exam rooms with colorful murals and decorated ceiling tiles.

New A&E Hospital Zebel Ali
Dubai, UAE

DEPARTMENTAL STACKING

Recommendation A - Staying Similar to RFP's Horizontal Bldg Version

CATHRYN BANG + PARTNERS
Architecture Planning Interiors

December 24, 2007

SERVICE	RFP	CBP	CBP	%	RFP	CBP Comments for Recommendation.
	Net Area (NSM)	Recomm (Dept Grossing Factor)	Dept. Area (DGSM)			
BASEMENT 1						
INPATIENT BUILDING						
+ Food Services - Dietetics	100	1.3	130	0.3%		CBP Recomm Additional Services for Dietary Consult
Food Services - Kitchen	1,000	1.3	1,300	2.9%		
Food Services - Kitchen Changing Room	100	1.3	130	0.3%		
Patient Escort	200	1.3	260	0.6%		
subtotal						1,820
DIAGNOSTIC & TREATMENT BUILDING						
Materials Management - Goods Receiving	900	1.3	1,170	2.6%		
Materials Management - Waste	100	1.3	130	0.3%		
Materials Management - Dispatch	300	1.3	390	0.9%		
Materials Management - Storage	1,000	1.3	1,300	2.9%		
Central Sterile Supply & Distribution	400	1.3	520	1.2%		
Pharmacy	150	1.3	195	0.4%	G Fl	CBP Recomm on B Fl to be near Goods Receiving.
Morgue	100	1.3	130	0.3%		
Bed Cleaning	300	1.3	390	0.9%		
Laundry	400	1.3	520	1.2%		
Housekeeping	100	1.3	130	0.3%		
Maintenance	200	1.3	260	0.6%		
Information Technology	100	1.3	130	0.3%		
Medical Records	200	1.3	260	0.6%		
Staff Changing	400	1.3	520	1.2%		
On-Duty Room	200	1.3	260	0.6%	3rd Fl	CBP Recomm on B Fl to be near Staff Changing.
+ Bioengineering	100	1.3	130	0.3%		CBP Recommended Additional Services.
subtotal						5,135
CLINIC BUILDING						
-						-
subtotal						-
GROUND FLOOR						
INPATIENT BUILDING						
+ Information/Safety	100	1.3	130	0.3%		CBP Recommended Additional Services.
Entrance Hall	400	1.3	520	1.2%		
Shops	200	1.3	260	0.6%		
Food Services - Restaurant	800	1.3	1,040	2.3%	2nd, 3rd Fl	CBP recomm on G Fl for easier public access.
Conference Center	1,600	1.3	2,080	4.7%	2nd, 3rd Fl	CBP recomm on G Fl for easier public access.
Administration	600	1.3	780	1.8%	1st Fl	CBP recomm on G Fl for easier public access.
Admission	200	1.3	260	0.6%		
Social Services	200	1.3	260	0.6%	2nd Fl.	CBP Recomm on G Fl to be near Admission.
Prayers Room	100	1.3	130	0.3%		
Physiotherapy	200	1.4	280	0.6%		
subtotal						5,740
DIAGNOSTIC & TREATMENT BUILDING						
Emergency - Ambulance Hall	200	1.5	300	0.7%		
Emergency	3,000	1.5	4,500	10.1%		
Radiology	800	1.5	1,200	2.7%		
Functional Diagnosis	200	1.4	280	0.6%		
subtotal						6,280

New A&E Hospital Zebel Ali
Dubai, UAE

DEPARTMENTAL STACKING

Recommendation A - Staying Similar to RFP's Horizontal Bldg Version

CATHRYN BANG + PARTNERS
Architecture Planning Interiors

December 24, 2007

SERVICE	RFP	CBP	CBP	% of Total	RFP	CBP Comments for Recommendation.
	Net Area (NSM)	Recomm (Dept Grossing Factor)	Dept. Area (DGSM)		Location	
CLINIC BUILDING						
+ OP Lobby	200	1.3	260	0.6%		CBP Recommended Additional Services.
+ OP Registration & Administration	200	1.3	260	0.6%		CBP Recommended Additional Services.
+ OP Pharmacy	150	1.3	195	0.4%		CBP Recommended Additional Services.
+ Shops	100	1.3	130	0.3%		CBP Recommended Additional Services.
+ Paediatrics Clinic	100	1.4	140	0.3%		CBP Recommended Additional Services.
+ VIP Clinic	100	1.4	140	0.3%		CBP Recommended Additional Services.
subtotal						1,125
1ST FLOOR						
INPATIENT BUILDING						
ICU/CCU	750	1.5	1,125	2.5%		
Intermedite Care	750	1.5	1,125	2.5%		
Burn Center	500	1.5	750	1.7%		
Stroke Unit	250	1.5	375	0.8%		
Neonatology	400	1.5	600	1.4%		
+ Prayer Rooms	100	1.3	130	0.3%		CBP Recommends Prayer Rooms on this Floor also.
subtotal						4,105
DIAGNOSTIC & TREATMENT BUILDING						
Surgery	1,400	1.6	2,240	5.1%		
Endoscopy	400	1.5	600	1.4%		CBP recomm it on 1st FI to be near Surgery.
Angiography	250	1.5	375	0.8%		
Laboratory	300	1.3	390	0.9%	G FI	CBP recomm it on 1st FI to be near Surgery.
Dialysis	250	1.4	350	0.8%		
+ Respiratory Therapy	130	1.3	169	0.4%		CBP Recommended Additional Services.
+ Non-Invasive Cardiology	400	1.4	560	1.3%		CBP Recommended Additional Services.
+ Invasive Cardiology	500	1.5	750	1.7%		CBP Recommended Additional Services.
+ Interventional Imaging	300	1.5	450	1.0%		CBP Recommended Additional Services.
+ Pain Management Center	300	1.4	420	0.9%		CBP Recommended Additional Services.
subtotal						6,304
CLINIC BUILDING						
Clinic 1	500	1.4	700	1.6%	1st FI	CBP recomm separate, medical office bldg for OP.
Clinic 2	500	1.4	700	1.6%	1st FI	CBP recomm separate, medical office bldg for OP.
subtotal						1,400
2ND FLOOR						
INPATIENT BUILDING						
Acute Care Ward 1	750	1.5	1,125	2.5%		
Acute Care Ward 2	750	1.5	1,125	2.5%		
Acute Care Ward 3	750	1.5	1,125	2.5%		
Acute Care Ward 4	750	1.5	1,125	2.5%		
Prayer Rooms	100	1.3	130	0.3%		
subtotal						4,630
DIAGNOSTIC & TREATMENT BUILDING						
Helipad	400	1.2	480	1.1%		
subtotal						480
CLINIC BUILDING						
Clinic 3	500	1.4	700	1.6%		CBP recomm separate, medical office bldg for OP.
Clinic 4	500	1.4	700	1.6%		CBP recomm separate, medical office bldg for OP.
subtotal						1,400

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SERVICE	RFP Net Area (NSM)	CBP Recomm (Dept Grossing Factor)	CBP Dept. Area (DGSM)	% of Total	RFP Location	CBP Comments for Recommendation.
3RD FLOOR						
INPATIENT BUILDING						
Acute Care Ward 5	750	1.5	1,125	2.5%		
Acute Care Ward 6	750	1.5	1,125	2.5%		
Acute Care Ward 7	750	1.5	1,125	2.5%		
Acute Care Ward 8	750	1.5	1,125	2.5%		
Prayer Rooms	100	1.3	130	0.3%		
						4,630
DIAGNOSTIC & TREATMENT BUILDING						
-						
		subtotal				-
CLINIC BUILDING						
-						
		subtotal				-
DEPARTMENTAL TOTAL						
	31,380		44,350	100%		
<i>Building Grossing Factor</i>						
Interdepartmental Circulation			7,982	18%		
Mech/Elect/Telecom			5,233	10%		
Envelope			2,303	4%		
		BGSM	59,867	1.35		
		BGSM/Bed Ratio	186			
			322 IP beds			(6 Dialysis, 6 Angio, 64 Emergency beds not counted in Bed Ratio Calc.)

New A&E Hospital Zebel Ali
Dubai, UAE

DEPARTMENTAL STACKING

Recommendation B - Vertically Stacked Tower Version (More Efficient Use of the Land)

CATHRYN BANG + PARTNERS
Architecture Planning Interiors

December 24, 2007

SERVICE	RFP Net Area (NSM)	CBP Recomm (Dept Grossing Factor)	CBP Dept. Area (DGSM)	% of Total	RFP Location	CBP Comments for Recommendation
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BASEMENT 1

INPATIENT BUILDING

+ Food Services - Dietetics	100	1.3	130	0.3%		CBP Recomm Additional Services for Dietary Consult.
Food Services - Kitchen	1,000	1.3	1,300	2.8%		
Food Services - Kitchen Changing Room	100	1.3	130	0.3%		
Patient Escort	200	1.3	260	0.6%		
subtotal						1,820

DIAGNOSTIC & TREATMENT BUILDING

Materials Management - Goods Receiving	900	1.3	1,170	2.5%		
Materials Management - Waste	100	1.3	130	0.3%		
Materials Management - Dispatch	300	1.3	390	0.8%		
Materials Management - Storage	1,000	1.3	1,300	2.8%		
Pharmacy	300	1.3	390	0.8%	G FI	CBP Recomm on B FI to be near Goods Receiving.
Morgue	100	1.3	130	0.3%		
Central Sterile Supply & Distribution	400	1.3	520	1.1%		
Bed Cleaning	300	1.3	390	0.8%		
Laundry	400	1.3	520	1.1%		
Housekeeping	100	1.3	130	0.3%		
Maintenance	200	1.3	260	0.6%		
Information Technology	100	1.3	130	0.3%		
Medical Records	200	1.3	260	0.6%		
Staff Changing	400	1.3	520	1.1%		
On-Duty Room	200	1.3	260	0.6%	3rd FI	CBP Recomm on B FI to be near Staff Changing.
+ Bioengineering	100	1.3	130	0.3%		CBP Recommended Additional Services.
subtotal						5,330

GROUND FLOOR

INPATIENT BUILDING

+ Information/Safety	100	1.3	130	0.3%		CBP Recommended Additional Services.
Entrance Hall	400	1.3	520	1.1%		
Shops	200	1.3	260	0.6%		
Administration	300	1.3	390	0.8%	1st FI	CBP Recomm on G FI for easier public access.
Admission	200	1.3	260	0.6%		
Social Services	200	1.3	260	0.6%	2nd FI.	CBP Recomm on G FI to be near Admission.
Prayers Room	100	1.3	130	0.3%		
Physiotherapy	200	1.4	280	0.6%		
subtotal						2,230

DIAGNOSTIC & TREATMENT BUILDING

Emergency - Ambulance Hall	200	1.5	300	0.7%		
Emergency	3,000	1.5	4,500	9.8%		
Emergency - 23 Hour Radiology	300	1.5	450	1.0%		
subtotal						5,250

CLINIC BUILDING

+ OP Lobby	200	1.3	260	0.6%		CBP Recommended Additional Services.
+ OP Registration	100	1.3	130	0.3%		CBP Recommended Additional Services.
+ OP Pharmacy	160	1.3	208	0.5%		CBP Recommended Additional Services.
+ Shops	100	1.3	130	0.3%		CBP Recommended Additional Services.
+ Paediatrics Clinic	100	1.4	140	0.3%		CBP Recommended Additional Services.
+ VIP Clinic	100	1.4	140	0.3%		CBP Recommended Additional Services.
Administration	300	1.3	390	0.8%	1st FI	CBP Recomm on G FI for easier public access.
subtotal						1,400

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SERVICE	RFP Net Area (NSM)	CBP Recomm (Dept Grossing Factor)	CBP Dept. Area (DGSM)	% of Total	RFP Location	CBP Comments for Recommendation
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1ST FLOOR

INPATIENT BUILDING

Stroke Unit - 6 beds	250	1.5	375	0.8%		
Neonatology - 6 beds	400	1.5	600	1.3%		
+ Observation Unit	750	1.5	1,125	2.4%		CBP Recommended Additional Services.
+ NeuroDiagnostics	100	1.5	150	0.3%		CBP Recommended Additional Services.
+ Prayer Rooms	50	1.3	65	0.1%		CBP Recommend Prayer Rooms on this Floor also.
subtotal						2,315

DIAGNOSTIC & TREATMENT BUILDING

Radiology	800	1.5	1,200	2.6%	G FI	CBP Recomm on 1st FI for easier IP Access.
Angiography	250	1.5	375	0.8%		CBP Recomm on 1st FI to be near Radiology.
Endoscopy	400	1.4	560	1.2%	G FI	CBP Recomm on 1st FI to be near Radiology.
Functional Diagnosis	200	1.4	280	0.6%	G FI	CBP Recomm on 1st FI to be near Radiology.
+ Radiology Future Expansion, Shelled	200	1.5	300	0.7%		CBP Recomm Additional Space for Future Expansion.
+ Interventional Imaging	300	1.5	450	1.0%		CBP Recommended Additional Services.
+ Non-Invasive Cardiology	400	1.4	560	1.2%		CBP Recommended Additional Services.
+ Invasive Cardiology	500	1.5	750	1.6%		CBP Recommended Additional Services.
+ Shared Prep/Recovery	300	1.5	450	1.0%		CBP Recommended Additional Services.
subtotal						4,925

CLINIC BUILDING

Clinic 1	500	1.4	700	1.5%	1st FI	CBP recomm separate, medical office bldg for OP.
Clinic 2	500	1.4	700	1.5%	1st FI	CBP recomm separate, medical office bldg for OP.
subtotal						1,400

2ND FLOOR

INPATIENT BUILDING

ICU/CCU - 24 beds	750	1.5	1,125	2.4%	1st FI	CBP Recomm smaller Floor Plate for optimal land use.
Intermedite Care - 24 beds	750	1.5	1,125	2.4%	1st FI	CBP Recomm smaller Floor Plate for optimal land use.
+ Prayer Rooms	50	1.3	65	0.1%		CBP Recommend Prayer Rooms on this Floor also.
subtotal						2,315

DIAGNOSTIC & TREATMENT BUILDING

Surgery	1,400	1.6	2,240	4.9%		
Laboratory	300	1.3	390	0.8%	G FI	CBP recomm it on 1st FI to be near Surgery.
Dialysis	250	1.4	350	0.8%		
+ Respiratory Therapy	300	1.3	390	0.8%		CBP Recommended Additional Services.
+ Pain Management Center	300	1.4	420	0.9%		CBP Recommended Additional Services.
+ Surgery Future Expansion, Shelled.	700	1.6	1,120	2.4%		CBP Recomm Additional Space for Future Expansion.
subtotal						4,910

CLINIC BUILDING

Conference Center 1	800	1.3	1,040	2.3%		
subtotal						1,040

3RD FLOOR

INPATIENT BUILDING

Acute Care Unit 1 - 32 beds	750	1.5	1,125	2.4%	2nd FI	CBP Recomm smaller Floor Plate for optimal land use.
Acute Care Unit 2 - 32 beds	750	1.5	1,125	2.4%	2nd FI	CBP Recomm smaller Floor Plate for optimal land use.
Prayer Rooms	50	1.3	65	0.1%		
subtotal						

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DEPARTMENTAL STACKING

Recommendation B - Vertically Stacked Tower Version (More Efficient Use of the Land)

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SERVICE	RFP Net Area (NSM)	CBP Recomm (Dept Grossing Factor)	CBP Dept. Area (DGSM)	% of Total	RFP Location	CBP Comments for Recommendation	
							2,315
DIAGNOSTIC & TREATMENT BUILDING							
Helipad	400	1.2	480	1.0%			
subtotal							480
CLINIC BUILDING							
Conference Center 2	800	1.3	1,040	2.3%			
subtotal							1,040
4th FLOOR							
INPATIENT BUILDING							
Acute Care Unit 3 - 32 beds	750	1.5	1,125	2.4%	2nd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
Acute Care Unit 4 - 32 beds	750	1.5	1,125	2.4%	2nd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
+ Prayer Rooms	50	1.3	65	0.1%		CBP Recommend Prayer Rooms on this Floor also.	
subtotal							2,315
5th FLOOR							
INPATIENT BUILDING							
Acute Care Unit 5 - 32 beds	750	1.5	1,125	2.4%	3rd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
Acute Care Unit 6 - 32 beds	750	1.5	1,125	2.4%	3rd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
+ Prayer Rooms	50	1.3	65	0.1%		CBP Recommend Prayer Rooms on this Floor also.	
subtotal							2,315
6th FLOOR							
INPATIENT BUILDING							
Acute Care Unit 7 - 32 beds	750	1.5	1,125	2.4%	3rd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
Acute Care Unit 8 - 32 beds	750	1.5	1,125	2.4%	3rd Fl	CBP Recomm smaller Floor Plate for optimal land use.	
+ Prayer Rooms	50	1.3	65	0.1%		CBP Recommend Prayer Rooms on this Floor also.	
subtotal							2,315
7th FLOOR							
INPATIENT BUILDING							
Restaurants 1	400	1.3	520	1.1%	2nd Fl	CBP Recomm on Top Fl for pleasant environment.	
Restaurants 2	400	1.3	520	1.1%	3rd Fl	CBP Recomm on Top Fl for pleasant environment.	
subtotal							1,040
DEPARTMENTAL TOTAL	32,460		46,053	100%			
Building Grossing Factor							
Interdepartmental Circulation			6,447	14%		Less Circulation Required than Stacking Version A	
Mech/Elect/Telecom			5,250	10%			
Envelope			2,310	4%			
BGSM			60,060	1.30			
BGSM/Bed Ratio			187				
			322 beds			(6 Dialysis, 6 Angio, 64 Emergency beds not counted in Bed Ratio Calc.)	

ACCIDENT & EMERGENCY DEPARTMENT

Emergency Medicine provides comprehensive emergency services including treatment, stabilizing and/or life saving care of critical, emergent, urgent and non-urgent trauma, and medical/surgical patients.

Critical patients and those admitted shall continue to increase. Factors affecting this projected growth include:

- Increase of patient acuity
- Increase in network
- A new, friendlier ambulatory environment shall attract more patients

External Adjacencies

- Public Access (Visible)
- Dedicated Trauma Elevators (to critical services)
- Radiology / MRI / CT (**Dedicated Radiology within department**)
- Angiography & Cardiac Catheterization
- Peri-Operative Services
- Critical Care Units
- Stat Lab / Blood Bank
- Heli-Port

Planning & Design

Access

- The Emergency Medicine Center shall be easily accessible with clearly denoted signage.
- Access paths for ambulances and emergency vehicles shall be separated as much as possible from normal vehicular traffic.
- **The ambulance entry shall be visually separated from emergency patient parking, the walk-in entrance and the waiting rooms.**

The ambulance entry should lead directly into the trauma / acute monitored area.

- Adjacent dedicated emergency parking shall be provided with easy access to the EMC. A drop-off shall be provided for non-ambulance patients.

A valet parking service should be considered especially if an adequate number of parking spaces aren't provided immediately adjacent.

- A separate vehicular access study shall be developed by traffic consultants in close coordination with the Emergency Medicine Center.

ACCIDENT & EMERGENCY DEPARTMENT - Cont'd.

Public Areas / Triage

- **Walk-in patients shall initially present at Central Triage where they shall be assessed and evaluated for the severity of the situation.**

Patients shall either be taken to the emergent care area, the fast track area, or directed to the waiting and/or registration area.

Triage shall include a provision for private discussion and examination.

- **Because Emergency is the hospital's front door for many patients and family, the experience of the waiting room greatly contributes to their image of the facility as a whole.**

The environment of this area must be sensitive to the situation by providing quiet area(s), television area(s), a semi-private pediatric play area, and sufficient public facilities including phones, restrooms, drinking fountains, vending, etc.

Individual chair televisions should be considered.

An adjacent exterior area would also be beneficial.

- Family consultation and grieving rooms should be immediately adjacent to the waiting area with separate, controlled access to be used by care providers and family for private exiting.
- Security shall be provided at the entrance(s) to the Emergency Medicine Center with direct visual control of drop-off, entrances and waiting area(s).

This shall be planned to provide high level security with "friendly" appearance.

- **Registration shall be primarily at the bedside.**
- Registration booths should be planned for occasions when bedside can not be provided.

Fast Track

- **Sub-acute patients should be seen in a separate but adjacent Fast Track area, staffed by the EMC with the appropriate level of personnel for acuity being treated.**
- A waiting area (visually separated from the main waiting area) shall be planned for Fast Track.

ACCIDENT & EMERGENCY DEPARTMENT – Cont'd.

Exam / Treatment

- **Exam/treatment spaces should be standardized and as modular as possible to increase the utilization and overall flexibility of services.**
- **Soft space shall be strategically located so as not to land-lock the EMC for future expansion.**
- Trauma/cardiac resuscitation rooms shall be immediately adjacent to the ambulance entry.

These rooms should provide reasonable sterility.

Space shall be planned for the option of having a family member within the trauma room.

- Specialized exam/treatment spaces include OB/Gyn, Pediatrics, Psychiatric, Ortho (cast), ENT and Isolation.
 - OB/Gyn rooms shall have visual privacy.
 - Pediatric room(s) shall have a child friendly environment with special equipment & furniture.

These room(s) should have visual and auditory separation from the adult area yet under visible control by nursing.
 - Psychiatric room(s) shall have special security and safety requirements.
 - Cast areas need additional space for treatment and storage/equipment.

Sinks shall have plaster traps.

- Head & Neck (ENT) has special equipment / supply requirements.
- Sufficient isolation rooms shall also be provided.
- The layout of the acute treatment area shall provide central station(s) with the ability to monitor patients from any location (except for specialty areas).
- Acoustical and patient privacy is critical.
- **Patient areas shall be separated by partitions rather than curtains; and they shall also be designed with sliding glass doors.**

Some of these doors shall be specifically designed for psychiatric or agitated patients.

ACCIDENT & EMERGENCY DEPARTMENT – Cont'd.

- A separate sterile procedure room should be provided in the acute exam/treatment area.
- Provide a forensic exam room for women and children abuse.
- Multiple decentralized charting and dictation areas shall be planned near patient areas.

Ancillary Services

- **Immediate access to Imaging Services shall be provided within the EMC** and include general radiographic rooms with necessary support (viewing, processing, etc.).

A “filmless” radiology system shall be planned.

CT shall be immediately accessible.

- **Fast Track patients shall have separate access to imaging services.**
- Trauma rooms shall be planned with fixed radiology equipment and surgical lights. Processing shall be close to trauma area.
- Portable ultrasound and EKG shall be accessible to patient areas.
- **A satellite lab shall be provided within Emergency with a connection to the stat lab via pneumatic tube system.**

General

- Sufficient storage space and alcoves for supplies, portable equipment, carts, etc. is critical.
- A decontamination room should be provided with exterior access and a separate water collection system.
- Various clinical research trials are performed in the EMC. Dedicated space is required for these studies.
- Support spaces, including medication room, nourishment, equipment storage, supply areas, utility rooms, etc. should be grouped for maximum efficiency.
- Automated supply storage systems shall be used. Inventory stock is enormous and stocked multiple times daily.

ACCIDENT & EMERGENCY DEPARTMENT – Cont'd.

- Faculty requires office and sleep space within the department.
- An infra-red tracking system for patients and staff should be planned.
- Clinical and clerical supervisory offices should have view of the clinical and clerical areas.
- Provide an interview room and a multi-purpose consultation/grieving room with access from waiting and the patient care area. The social worker's office shall also be adjacent to both the clinical and public areas.
- Natural light (through use of high windows) shall be planned to benefit patients and staff.

Transport

- Patient transport to Surgery, Angio/Cath, ICU's and from Heli-Port is critical.

Immediate adjacency is required with primary access from trauma area.

If services are located on a different floor, then dedicated trauma elevator(s) shall be provided.

- The new facility must be planned for catastrophes where transportation systems may be damaged and unavailable.
- Access to critical services must be provided.

ICU/CCU

The Intensive Care Unit is responsible for providing constant observation, treatment and expert nursing care of adult patients experiencing acute life-threatening impairments due to medical, surgical, cardiac or neurological conditions.

Primary External Adjacencies

Medical Intensive Care Unit

- Radiology
- Clinical lab (stat)
- Respiratory therapy
- Endoscopy/fluoroscopy procedure unit

Patients are referred for CT scans, chest and abdominal x-rays, and interventional radiology procedures

Surgical Intensive Care Unit

- Peri-operative services
- Emergency department and observation unit
- Step down unit
- Pharmacy
- Clinical lab (stat)
- Respiratory therapy
- Non-invasive diagnostics (radiology)

Patients are referred for diagnostic testing and treatment, most frequently to Radiology (Ultrasound, CT, MRI, Pulmonary Function Testing, x-ray)

Cardiac Care Unit

- Cardiac observation unit
- Emergency medicine center
- Cardiac catheterization
- Cardiodiagnostics
- Cardiopulmonary procedure lab
- Pharmacy
- Clinical lab (stat)
- Respiratory therapy

Patients are referred for diagnostic test or treatment (cath lab, CPL, cardiodiagnostics, etc.)

Neurosurgery Intensive Care Unit

- Radiology (MRI, CT)
- Surgery
- Emergency department and observation unit
- Respiratory therapy
- Pharmacy
- Clinical lab (stat)

ICU/CCU – Cont'd.

Planning & Design

Patient Rooms

- Patient beds are to be provided in single room accommodations.
- The beds shall have an exterior window.
- Visual and audible control of all beds from the central communication center or decentralized chart stations is required. This shall be accomplished with glass partitions and charting alcoves between patient rooms.
- Provide large break away glass doors at entry to patient room.
- Lighting provision for each patient bed area shall require multi-level general room illumination with dimmers, examination light (appropriate for surgical procedures) and night light.

The lighting design should separate patient areas, family areas and staff work areas.

- IV tracks should be located in the ceiling.
- Headwall (or power column or ceiling mount) system should allow for changes in electrical, mechanical and plumbing systems.

Each bed area shall have various medical gases, vacuum, medical air, portable x-ray and electrical outlets. All electrical outlets shall be on emergency power. Each bed shall have a nurse call system linked directly from the patient bed to the communication center.

Rooms should be planned for hooking up to other gases (i.e. nitric oxide, helium).

- Patient rooms should be designed so that access to the head is unimpeded.
- Headwall (or power column or ceiling mount) system should have space reserved for respiratory therapy equipment. The reserved space should not be positioned behind the head of the bed.
- Adequate floor space is required for mechanical ventilation and future technologies. Optimal placement of this floor space is directly in front of the reserved wall space.
- Patient rooms need to accommodate cardiac and EEG monitors in addition to TV, IV pumps, cooling blankets, dialysis machines and other invasive monitors.
- **All ICU patient rooms should be piped for dialysis.**

ICU/CCU – Cont'd.

- Hard-wired physiological monitoring from beds to the nursing station is required.
- **Percentage of beds to be isolation capable: 30% minimum, 50% optimum, 100% preferred.**
- Patient rooms should be easily wired for future technologies.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate “end points” to avoid inappropriate use).
- **The neurosurgery ICU requires a high capacity air conditioning system and may require special wall plumbing connections for water circulation cooling systems.**
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, technology and supporting infrastructure.
- **Patient rooms need to be large enough to accommodate surgical procedures taking place in the rooms. Rooms need to be able to accommodate heart-lung bypass, dialysis and pheresis machines simultaneously in addition to staff. Work space in each patient room for setup trays for procedures is needed.**
- Storage for patient belongings and supplies should be provided in each patient room. This space should include adequate wardrobe space, for patient and guest.
- Patient rooms shall have flush systems that shall be hidden.
- Patient rooms in the cardiac care ICU shall have private toilet/shower facilities.
- Strategically/abundantly placed hand washing fixtures are imperative in the ICU units.

Communication Areas

- Decentralized charting stations shall be positioned between patient rooms.
- Storage space should be adequate for storing decentralized supplies and equipment.
- ICU patients are involved in numerous clinical and drug studies. Thus, ICUs should have adequate storage (shelf space and file cabinets) and working space (including a computers terminal) for research activities.
- Small workspace on units shall be necessary for admitting personnel.
- The communication center shall house the unit secretary/reception and unit assistant staff.

ICU/CCU – Cont'd.

- Unit should be designed to ensure access to the following items:
 - EDP/MIS equipment
 - Central monitoring area
 - Pneumatic tube system
 - Administration/Open work stations
 - Emergency cart park

Unit Design

- **The ICU shall be configured as a twelve bed unit. Patient rooms with have a glass break away door and glass partitions between rooms. This shall provide shared observation, charting and continuum of care.**

- Patient units should be located close to a vertical transportation core which shall move patients and service traffic.

Visitors shall be moved via a separate vertical core. Patient and service transport should be separate from and mix as little as possible with visitor traffic.

- **It is desirable to provide two entries into the patient unit, one for staff and patient transport and one for visitor traffic.**

- Floors need to absorb shock on feet and noise reduction in the unit needs to be built into the design

- **Entry into the ICU should be controlled from outside the unit. This could be accomplished with a manned information desk adjacent to the waiting area.**

- Only those administrators crucial to the daily operations of the unit shall require office space in the unit. Other offices shall either be in other locations within the hospital or in an off-site location.

- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units (i.e. case managers, research staff, chaplains, etc.).

Hoteling workspace should include phones and computer hookups and be easily wired for anticipated technologies.

- Services Located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center
 - Clean linen room
 - Clean supply room (including automated supply)

ICU/CCU – Cont'd.

- Soiled utility
- Janitors closet
- Consultation room
- Other services in the unit should be:
 - Care team workroom (with shelf space for medical texts, library of electronic medical text, access to the hospital information system and the internet, etc.)
 - Conference room (with a white board, multimedia computer, network connections to the hospital information system, etc.)
 - Office (Hoteling)
 - Staff lounge/lockers
 - Staff toilet/shower facilities
 - Crucial staff offices
 - Alternate site testing area.
- Located outside the nursing unit and could possibly be shared with other ICU units on the floor are:
 - Satellite respiratory therapy room (to be equipped with at least one outlet of oxygen, medical air and vacuum, computer, ventilator storage space)
 - Family waiting (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Family sleep rooms with showers
 - Consultation room
 - Public telephones
 - Public toilets
 - Satellite Pharmacy
 - Procedure Suite
 - Staff offices (social workers, admitting, dietary, discharge planners, etc.)
 - Staff on-call rooms
 - Team Room
 - Classrooms
 - Dietary Warming Kitchen
 - Storage areas
 - Radiology storage/processor room

Patient Transportation

- **Critical care elevators shall link the unit with the emergency department, surgery, special procedures and the heli-port.**

Material Movement System

- Par level replenishment system shall be employed for the distribution of linen and supplies.
- A pneumatic tube station shall be located in the communication center of the unit to be connected to designated areas.

PICU

The Pediatric Intensive Care Unit is responsible for providing constant observation, treatment and expert care of pediatric patients, from newborns to teen years of age, experiencing acute life-threatening impairments due to various diagnosis.

Planning & Design

Patient Rooms

- Patient beds are to be provided in single room accommodations.
- The beds shall have an exterior window.
- Visual and audible control of all beds from the central communication center or decentralized chart stations is required. This shall be accomplished with operable sliding glass partitions and work alcoves between patient rooms.
- Lighting provision for each patient bed area shall require multi-level general room illumination with dimmers, ceiling mounted examination light (appropriate for surgical procedures) and night light. Lighting zones should be established for patient, family, etc. IV tracks should be located in the ceiling or integrated with the bed.
- Headwall (or power column or movable power column) system should allow for changes in electrical, mechanical and plumbing systems.

Each bed area shall have oxygen, vacuum, medical air, portable x-ray and electrical outlets. All electrical outlets shall be on emergency power.

Each bed shall have a nurse call system linked directly from the patient bed to the central control station. Rooms should be planned for hooking up to other gases (i.e. nitric oxide, helium). Patient rooms should be designed so that access to the head is convenient.

- Headwall (or power column or ceiling mount) system should have space reserved for respiratory therapy equipment. The reserved space should not be positioned behind the head of the bed.
- Adequate floor space is required for mechanical ventilation and future technologies. Optimal placement of this floor space is directly in front of the reserved wall space.
- Patient rooms need to accommodate cardiac and EEG monitors in addition to TV, DVD, games, IV pumps, cooling blankets, dialysis machines and other invasive monitors
- Hard-wired physiological monitoring capability from beds to the control center is required. All alarms should be transmitted to a location outside the patient room.
- Storage for patient belongings and supplies should be provided in each patient room.

PICU – Cont'd.

- All ICU patient rooms shall be piped for dialysis.
- Percentage of beds to be isolation capable: 30% minimum, 50% optimum, 100% preferred.
- Patient rooms should be easily wired for future technologies.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate “end points” to avoid inappropriate use).
- The neurosurgery ICU requires a high capacity air conditioning system and may require special wall plumbing connections for water circulation cooling systems and patient warming capability.
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, technology and supporting infrastructure.
- Patient rooms need to be large enough to accommodate surgical procedures taking place in the rooms. Patient rooms need to be able to accommodate heart-lung bypass, dialysis, pheresis machines and future technologies, in addition to staff. Work space in each patient room for setup trays for procedures is needed.
- Storage for patient belongings and supplies should be provided in each patient room. This space should include adequate wardrobe space, for patient or guest.
- Patient rooms shall have flush systems that shall be hidden. Patient rooms in the cardiac care ICU shall have private toilet/shower facilities.
- Strategically/abundantly placed hand washing fixtures are imperative in the units.
- **Provide adequate space in patient room for parent to sleep over.**

Patient Areas

- Decentralized charting stations shall be positioned between patient rooms. Charting areas shall also be provided in patient room.
- Storage space should be adequate for storing decentralized supplies and equipment.
- ICU patients are involved in numerous clinical and drug studies. Thus, ICUs should have adequate storage and working space (including a computer terminal) for research activities.
- The communication center shall be located to control access to the bed areas. The communication center shall house the unit secretary/reception and unit assistant staff.

PICU – Cont'd.

- Unit should be designed to ensure access to the following items:
 - EDP/MIS equipment
 - Telemetry monitoring area
 - Fax machine
 - Pneumatic tube system
 - Administration
 - Emergency cart park
 - Open workspace

Unit Design

- The ICU shall be configured as a twelve bed unit. Patient rooms will have a glass break away door and glass partitions between rooms. This shall provide shared observation, charting and continuum of care.
- Patient units should be located close to a vertical transportation core which shall move patients and service traffic.

Visitors shall be moved via a separate vertical core.

Patient and service transport should be separate from and mix as little as possible with visitor traffic.

- It is desirable to provide two entries into the patient unit, one for staff and patient transport and one for visitor traffic.
- Entry into the ICU should be controlled from outside the unit.
This could be accomplished with a manned information desk adjacent to the waiting area.
- Floors need to absorb shock on feet and noise reduction in the unit needs to be built into the design
- Only those administrators crucial to the daily operations of the unit shall require office space in the unit. Other offices shall either be in other locations within the hospital or in an off-site location.
- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units (i.e. case managers, social workers, discharge planners, research staff, etc.) Hoteling workspace should include phones and computer hookups and be easily wired for anticipated technologies.
- Services Located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center (with microwave)

PICU – Cont'd.

- Clean linen room
- Clean supply room (including automated supply)
- Soiled utility
- Staff Lounge with adjacent toilet
- Janitors closet
- Consultation room

Other services in the unit should be:

- Care team workroom (with shelf space for medical texts, CD library of electronic medical text, access to the hospital information system and the internet, etc.)
- Conference room (with a white board, multimedia computer, network connections to the hospital information system, etc.)
- Office (Hoteling)
- Respiratory therapy storage/work room
- Crucial staff offices

Located outside the patient unit and could possibly be shared with other ICU units on the floor are:

- Satellite respiratory therapy room (to be equipped with at least one outlet of oxygen, medical air and vacuum, computer, ventilator storage space)
- Family waiting with greeter/reception (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
- Consultation room
- Family sleep facilities with toilet/showers
- Public telephones
- Public toilets
- Procedure Suite
- Satellite Pharmacy
- Satellite Lab
- Staff locker room
- Staff toilet/shower facilities
- Staff offices
- Staff on-call rooms
- Dietary Warming Kitchen
- Storage areas (**PICU dedicated and ECHMO storage**)

Patient Transportation

- Critical care elevators shall link all ICU's with other trauma and critical care patient departments in the hospital. This shall include a connection to the heli-port.

Material Movement System

- An exchange cart system shall be employed for the distribution of linen and supplies.
- A pneumatic tube station shall be located in the control center of the unit to be connected to all designated areas in the Hospital.

ACUTE CARE UNIT

The Medical/Surgical Acute Care Patient Units provides continuing high quality care to general medical, surgical, and postpartum patients.

Primary External Adjacencies

- **Other medical/surgical patient units for swing ability**
- **Step-down/telemetry to allow for designated disease management and clinical clustering**

Planning & Design

Patient Rooms

- **Percentage of beds to be isolation capable: 10 % minimum.**
- Patient rooms should be wired for future technologies and monitoring capabilities.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate "end points" to avoid inappropriate use).
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, private facilities (toilet, showers, bath tubs), technology and supporting infrastructure.
- Headwall system should allow for changes in electrical, mechanical and plumbing systems.

Each bed area shall have medical gases, vacuum, medical air, portable imaging and electrical outlets. All electrical outlets shall be on emergency power.

Each bed shall have a nurse call system linked directly from the patient bed to the communication center.

- Storage for patient belongings and supplies should be provided in each patient room. This space should include adequate wardrobe space, flower shelf and writing desk, with data outlet, for patient and guest.
- All patient rooms shall have private toilet/shower facilities. Grab bars and emergency pull cords shall be installed in all patient toilet rooms. Provide storage shelf for patient care supplies.
- Morbid obesity patients require toilet and bathing capability for 700 lbs.
- Provide multiple levels of lighting in patient rooms to accommodate patient, care giver and family areas.

ACUTE CARE UNIT – Cont'd.

Care Giver Areas

- Decentralized charting stations shall be positioned between patient rooms.
- Storage space should be adequate for storing decentralized supplies and equipment.
- **Small workspace on each patient floor shall be necessary for admitting personnel to provide bedside admitting in each unit.**
- The communication center shall be located to control access to the bed areas. Grouped in this space should be:
 - Unit secretary
 - EDP/MIS equipment
 - Telemetry monitoring area
 - Pneumatic tube system
 - Open work stations
 - Lockable storage (for personnel belongings)
 - Emergency equipment
 - Patient call system

Unit Design

- Patient units should be located close to a vertical transportation core which shall move patients and service traffic.

Visitors shall be moved via a separate vertical core.

Patient and service transport should be separate from and mix as little as possible with visitor traffic.

- It is desirable to provide two entries into the patient unit, one for staff and patient transport and one for visitor traffic.
- Only those administrators crucial to the daily operations of the unit shall require office space in the unit. Other offices shall either be in other locations within the hospital or in an off-site location.
- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units (i.e. case managers, research staff, etc.).

Hoteling workspace should include phones and computer hookups and be easily wired for anticipated technologies.

ACUTE CARE UNIT – Cont'd.

- Services Located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center
 - Clean linen room
 - Clean supply room (including automated supply)
 - Soiled utility
 - Janitors closet
 - Consultation room

- Other services in the unit should be:
 - Care team workroom (with access to technologies such as the Internet and hospital information system)
 - Conference room
 - Office (Hoteling)
 - Respiratory storage/workroom
 - Staff lounge/lockers
 - Staff toilet/shower facilities
 - Crucial staff Offices

- Reception/information/unit access control should be located at the entry into unit.

- Located outside the patient unit and could possibly be shared with other Med/Surg units on the floor are:
 - Family waiting (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Consultation room
 - Family shower facilities
 - Family vending area
 - Satellite rehab gym
 - Public telephones
 - Public toilets
 - Procedure Suite
 - Admitting Office
 - Staff offices
 - Staff on-call rooms
 - Nutrition assembly area
 - Point of care testing capability

Material Movement System

- A par level system shall be employed for the distribution of linen and supplies.

- A pneumatic tube station shall be located in the communication centers of the unit to be connected to designated departments.

- **Patient meals shall be distributed from a nutrition prep room shared by all units on a floor.**

NEURO REHAB NURSING UNIT

The Neuro Rehabilitation Nursing Unit provides inpatient rehabilitation services primarily for individuals who have neurologic impairments and functional disabilities caused by stroke, brain or spinal cord injury, an acute polyneuropathy, critical illness neuromyopathy after transplant, and multiple trauma.

The service offers a comprehensive, multidisciplinary approach to treating a patient population with complex functional and psychosocial needs. The intensive approach to patient care in this service allows patients to return to their homes.

Rehab programs are individualized to facilitate greater independence in functional abilities of the patients served. The patient's family plays an essential role in the interdisciplinary care team.

The clinical program is highly integrated into the ongoing care provided by the Stroke Center, Brain Tumor Program and other services of the neurology and neurosurgery Neurosciences Nursing Unit. **Patients require access to hydrotherapy.**

The future of this service includes working with patients with robotic implants. 20% of the patients require isolation precautions.

Planning & Design

Patient Rooms

- Patient beds are to be provided in single room accommodations.
- The beds should be located parallel to the corridor and have an exterior window.
- Audible control of all beds from the communication center is required.

Travel distances between beds and nursing station must be minimal.

- Due to the inclusion of family members in the treatment, family sleeping space should be included in all rooms.
- Lighting provision for each patient bed area shall require multi-level general room illumination with dimmers, examination light and night light. IV tracks should be located in the ceiling.
- Need to be able to monitor oxygen saturation, heart rhythms
- **Percentage of beds to be isolation capable: 30 % minimum.**
- **All patient rooms shall be handicapped accessible.**
- Families should have access to use laptops, modems, etc.

NEURO REHAB NURSING UNIT – Cont'd.

- Patient rooms should be easily wired for future technologies.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate “end points” to avoid inappropriate use).
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, private facilities (toilet, showers, bath tubs), technology and supporting infrastructure.
- Headwall system should allow for changes in electrical and mechanical systems. Each bed area shall have oxygen, vacuum, medical air, portable x-ray and electrical outlets. All electrical outlets shall be on emergency power.

Each bed shall have a nurse call system linked directly from the patient bed to the communication center.

- Storage for patient belongings and supplies should be provided in each patient room. This space should include adequate wardrobe space, flower shelf and writing desk for patient or guest.
- All patient rooms shall have private toilet/shower facilities. Grab bars and emergency pull cords shall be installed in all patient toilet rooms.
- Provide transitional patient room for patients preparing to move from the hospital to a home environment. This room should be located close to the ADL kitchen.

The room should be equipped with a “home type” bed and should resemble a one-bedroom apartment.

Nursing Areas

- Decentralized nurse charting stations shall be positioned between patient rooms.
- Storage space should be adequate for storing decentralized supplies and equipment. It should be large enough for many wheelchairs and other therapy items.
- The communication center shall be located to control access to the bed areas.

This area should be open. There should not be a wall between care givers and patients.

Grouped in this space should be:

- Unit secretary/control/reception area
- EDP/MIS equipment
- Telemetry monitoring area
- Pneumatic tube system
- Administration/work station
- Emergency cart park

NEURO REHAB NURSING UNIT – Cont'd.

Unit Design

- Nursing units should be located close to a vertical transportation core which shall move patients and service traffic.

Visitors shall be moved via a separate vertical core.

Patient and service transport should be separate from and mix as little as possible with visitor traffic.

- It is desirable to provide two entries into the nursing unit, one for staff and patient transport and one for visitor traffic.
- Only those administrators crucial to the daily operations of the unit shall require office space in the unit. Other offices shall either be in other locations within the hospital or in an off-site location.
- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units (i.e. case managers, research staff, etc.).

Hoteling workspace should include phones and computer hookups and be easily wired for anticipated technologies.

- **A closed circuit TV may be helpful for viewing patients.**
- Services Located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center
 - Clean linen room
 - Clean supply room (including automated supply)
 - Soiled utility
 - Janitor closet
 - Consultation room
- Other spaces in the unit should be:
 - Care team workroom (with access to technologies such as the Internet and hospital information system)
 - Conference room
 - Occupational therapy room
 - ADL kitchen (can be used by others throughout the hospital)
 - Patient laundry room
 - Day room
 - Patient dining room/RT room
(high ceiling; Potential to pull tables up off the floor)
 - Office (Hoteling)

NEURO REHAB NURSING UNIT – Cont'd.

- Staff lounge/lockers
 - Staff toilet facilities
 - Crucial staff offices
 - Quiet treatment space for traumatic brain injury patients
– **can be a contained area in the gym**
 - Tub room
 - Storage for large movable equipment
 - Room with one way mirror so trainees can view patient care
- Located outside the nursing unit and could possibly be shared with other units on the floor are:
 - Family waiting
(Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Consultation room
 - Gymnasium
(with an area with a variety of walking surfaces for ambulating practice)
 - Public telephones
 - Public toilets
 - Staff offices
 - Dietary warming kitchen
 - Storage areas
 - Access to patient drop off area for rehabilitation purposes
(i.e. for car transfers)

Patient Transportation

- Patients shall be transported to and from surgery, imaging, vascular studies, head and neck, dentistry, podiatry and special procedures by the hospital transportation team.
- Transport to outpatient areas with Rehab staff.

Material Movement System

- An exchange cart system shall be employed for the distribution of linen and supplies.
- A pneumatic tube station shall be located in the central nursing station of the unit to be connected to the main inpatient pharmacy and stat lab

PEDIATRICS ACUTE CARE UNIT

The Pediatric Medical/Surgical Unit provides state of the art comprehensive pediatric care, for all medical, surgical and ancillary sub specialties. The average length of stay for this unit is projected to be less than six days. The patient focused care model shall be used on this unit in delivering care to children ranging in age from just beyond newborn to teen years of age.

Primary External Adjacencies

- Emergency Room
- Perioperative services
- Imaging/ Cath Lab
- Pediatric Intensive Care Unit
- Satellite Pharmacy

Planning and Design

Patient Rooms

- **Percentage of beds to be isolation capable: 30 % minimum.**
- Patient rooms should be easily wired for future technologies.
- All patient rooms should have monitor capabilities.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate "end points" to avoid inappropriate use).
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, private facilities (toilet, showers, bath tubs), technology and supporting infrastructure.
- Headwall system should allow for changes in electrical, mechanical and plumbing systems.

Each bed area shall have medical gases, vacuum, medical air, portable imaging outlets, and electrical outlets. All electrical outlets shall be on emergency power.

Each bed shall have a nurse call system linked directly from the patient bed to the communication center.

- Secured storage for patient belongings and supplies should be provided in each patient room. The rooms should include adequate wardrobe space, dining area, flower shelf and writing desk, with data outlet, for patient and guest.

Rooms should also have appropriate space for activities of daily living such as dining, recreation and school functions.

PEDIATRICS ACUTE CARE UNIT – Cont'd.

- All patient rooms shall have private toilet/shower/bathtub facilities.

Grab bars and emergency pull cords shall be installed in all patient toilet rooms. Provide the ability to monitor patient output in toilet facility.

Provide flexibility for children friendly fixtures in toilet facilities.

- Morbid obesity patients require toilet capability for 700 lbs.
- Provide refrigeration facilities in all patient rooms for food storage.
- Provide appropriate storage in patient rooms for pediatric patient supplies.

Communication Areas

- Decentralized charting stations shall be positioned between patient rooms. Patient information should be available at various locations to authorized personnel throughout the unit.
- Storage space should be adequate for storing decentralized supplies and equipment.
- Small workspace on each patient floor shall be necessary for admitting personnel to provide bedside admitting in each unit.
- The communication center shall be located to control access to the bed areas. Grouped in this space should be:
 - Unit secretary/control/reception area
 - EDP/MIS equipment
 - Telemetry monitoring area
 - Pneumatic tube system
 - Administration/work area
 - Emergency cart park

Unit Design

- Patient units should be located close to a vertical transportation core which shall move patients and service traffic. Visitors shall be moved via a separate vertical core. Patient and service transport should be separate from and mix as little as possible with visitor traffic.
- It is desirable to provide two entries into the patient unit, one for staff and patient transport and one for visitor traffic.
- Only those administrators crucial to the daily operations of the unit shall require office space in the unit. Other offices shall either be in other locations within the hospital or in an off-site location.

PEDIATRICS ACUTE CARE UNIT – Cont'd.

- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units. (i.e. case managers, research staff, attending physicians, consulting physicians, etc.)

Hoteling workspace should include phones and computer hookups and be easily wired for future technologies.

- Services Located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center **(with additional space for storing and mixing formula)**
 - Clean linen room
 - Clean supply room (including automated supply)
 - Charting Alcoves (1 per two patient rooms)
 - Soiled utility
 - Janitors closet
 - Consultation room
 - Dedicated area for attending and consulting services
- Other services in the unit should be:
 - Care team workroom (10-12-people) (with access to technologies such as the Internet and hospital information system)
 - Conference room (10-12 people)
 - Office (Hoteling)
 - Exam/Treatment Room
 - Respiratory therapy workroom/storage
 - Play room
 - Staff lounge and lockers
 - Staff toilet/shower facilities
 - Crucial staff Offices
 - Multipurpose room for daily use (capacity, 50)
- Located outside the patient unit and could possibly be shared with other pediatric units on the floor are:
 - Family waiting (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Consultation room
 - Play therapy room
 - School room
 - Toys and supply storage
 - Public telephones
 - Public toilets
 - Satellite Pharmacy
 - Procedure Suite
 - Satellite rehab gym
 - Admitting Office

PEDIATRICS ACUTE CARE UNIT – Cont'd.

- Staff offices (social services, dietary, admitting, patient education etc.)
 - Staff on-call rooms
 - Dietary Area
 - Storage areas
 - Pediatric Library
- **Pediatrics shall require an outdoor play area. It must be close to the inpatient unit and provide fifty square feet per child. The area should be secured and child safe.**
 - **The playroom should be age appropriate spaces and should be located in close proximity to the communication center with good visibility. Equipment storage room for toys and games should be adjacent.**
 - **The Pediatric unit should be designed with child friendly colors and functions.**
 - Patient rooms should be designed with a window viewing each room from the corridor.
 - **Each patient room should provide space for one parent to stay overnight with the patient.**

A window seat situation would be advisable to be used for visitor seating during the day and convertible to sleeping accommodations at night.

- One treatment/exam room should be provided in each patient unit.
- **The soiled utility room must be lockable.**

Patient Transportation

- Patients shall be transported to and from other departments by the hospital transportation team.

If patients are being monitored, they shall be accompanied by licensed pediatric staff.

Material Movement System

- An exchange cart system shall be employed for the distribution of linen and supplies.
- A pneumatic tube station shall be located in both communication centers of the unit to be connected to designated departments in the medical center.
- There shall be a nutrition distribution room for patient meals in the core support area. This shall be shared by all units on the floor.

PERINATAL UNIT

The Perinatal Unit is responsible for 1) providing constant observation and expert care to antepartum patients and 2) performing vaginal deliveries of infants.

After labor, delivery, and recovery, low risk postpartum patients shall be transferred to a medical/surgical unit for the duration of their stay.

High risk postpartum patients shall remain in the Perinatal Unit until a transfer is medically appropriate.

The high risk perinatal C-section rooms should be located adjacent to the surgery department for shared support and departmental efficiencies. Cesarean surgical patients shall recover in the surgical recovery area.

Fetal diagnostic testing is also performed by this unit.

Planning & Design

Patient Rooms

- All rooms should be designed as LDRs. The beds should have an exterior window. Visual and audible control of all beds from the central communication center or decentralized chart stations is required.
- Lighting provision for each patient bed area shall require multi-level general room illumination with dimmers, examination light and night light.
- Hard-wired physiological monitoring for both mother and baby from beds to the nursing station is required.
- All patient rooms shall be piped for dialysis.
- Morbid obesity patients require toilet capacity for 700 lbs.
- Patient rooms should be easily wired for future technologies.
- Thermostats and controls in each patient room, available at bed side (with a range of appropriate "end points" to avoid inappropriate use).
- Patient rooms shall be designed to provide adequate levels of: patient care and care giver space, family space, private facilities (toilet, showers, bath tubs), technology and supporting infrastructure.
- Headwall system should allow for changes in electrical, mechanical and plumbing systems.

Each bed area shall have oxygen, vacuum, medical air, portable imaging and electrical outlets.

PERINATAL UNIT – Cont'd.

All electrical outlets shall be on emergency power.

Each bed shall have a nurse call system linked directly from the patient bed to the communication center.

- Storage for patient belongings and supplies should be provided in each patient room. This space should include adequate wardrobe space, flower shelf and writing desk for patient or guest.
- All patient rooms shall have private toilet/shower facilities.

Grab bars and emergency pull cords shall be installed in all patient toilet rooms.

- Patient rooms need to be equipped with TVs, DVDs, CD players and under counter refrigerators.

Care Team Areas

- Decentralized charting stations shall be positioned between patient rooms.
- Storage space should be adequate for storing decentralized supplies and equipment.
- Small workspace on each nursing floor shall be necessary for admitting personnel to provide bedside admitting for each unit.
- The communication center shall be located to control access to the bed areas. Grouped in this space should be:
 - Unit secretary
 - EDP/MIS equipment
 - Telemetry monitoring area
 - Pneumatic tube system
 - Administration/work area
 - Emergency cart park

Unit Design

- **Hard wired video cameras for infant security should be provided.**
- Patient units should be located close to a vertical transportation core which shall move patients and service traffic.
- Visitors shall be moved via a separate vertical core.
- Patient and service transport should be separate from and mix as little as possible with visitor traffic.

PERINATAL UNIT – Cont'd.

- It is desirable to provide two entries into the patient unit, one for staff and patient transport and one for visitor traffic.
- Only those administrators crucial to the daily operations of the unit shall require office space in the unit.

Other offices shall either be in other locations within the hospital or in an off-site location.

- Hoteling workspace shall be created for individuals who are not permanently assigned to the unit yet spend a significant amount of time floating between units (i.e. case managers, research staff, chaplains, etc.).

Hoteling workspace should include phones and computer hookups and be easily wired for anticipated technologies.

- Services located adjacent to the communication center and central to patient beds should be:
 - Medication room (with space for automated supplies)
 - Nourishment center
 - Clean linen room
 - Clean supply room (including automated supply)
 - Soiled utility
 - Janitors closet
 - Consultation room
- Other spaces in the unit should be:
 - Care team workroom (with access to technologies such as the Internet and hospital information system)
 - Conference room
 - Ultrasound procedure room
 - Fetal monitor test room
 - Office (Hoteling)
 - Staff lounge/lockers
 - Staff toilet/shower facilities
 - Crucial staff Offices
- The reception/information/unit access control should be located at the entry into the unit
- Spaces and services located outside the nursing unit and could possibly be shared with other units on the floor are:
 - Family waiting (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Family shower facilities
 - Consultation room
 - Public telephones

PERINATAL UNIT – Cont'd.

- Public toilets
- Admitting personnel work space
- Satellite Pharmacy
- Stat Lab
- Staff offices
- Staff on-call rooms
- Dietary warming kitchen
- Storage areas

Patient Transportation

- **A high speed elevator with minimal traffic that connects surgery (c-section rooms) with the Perinatal unit is critical.**
- Patients shall be transported to and from surgery by the Perinatal staff.
- Trauma elevators shall link the unit with the emergency department and the Heliport.

Material Movement System

- A par level system shall be employed for the distribution of linen and supplies.
- A pneumatic tube station shall be located in the communication centers of the unit to be connected to designated departments.
- Patient meals shall be distributed from a nutrition prep room shared by all units on a floor.

NICU

The Neonatal Intensive Care Unit (NICU) is responsible for providing constant observation, treatment and expert nursing care of neonates experiencing acute life-threatening impairments due to prematurity, surgical, medical or cardiac conditions.

Planning & Design

Patient Area

- **A private patient room is preferred by the College of Pediatrics & Neonatal Physician Association.**

However a flexible concept providing a modular layout of bassinets with minimal architectural impediments could be employed in the design of the NICU.

- Acoustic zones should be planned to reduce noise transmission and special consideration should be given to the lighting and temperature control for the nursery modules.
- Provide two isolation rooms with shared ante room.
- Each infant bassinet area should be sized to allow for ventilators, monitoring and family. Cubical curtains at each bassinet area should be provided for privacy.
- Provide space for a supply cart at each bassinet.
- Provide charting space at each bassinet.
- Focused procedure lights shall be utilized at each bassinet.
- Communication Areas
- CRT's should be de-centrally located with a ratio of one for every 4-5 patients.
- One hand washing sink for every 4 infants should be provided in the NICU.

One sink for every isolation infant should be provided.

- The support area for the nursery should be planned central to patient care areas.

These support areas shall include:

- Dictation
- EDP/MIS equipment
- Monitoring area
- Emergency cart park

NICU – Cont'd.

Unit Design

- **An intermediate nursery should be located adjacent to the NICU to provide flexibility in staffing and space depending on infant census and acuity.**
- **The isolation nursery shall need to be sized to accommodate critically ill as well as intermediate care infants who require ventilators and monitoring.**
- It is desirable to provide two entries into the nursing unit, one for staff and patient transport and one for visitor traffic.
- The unit should include the following support functions:
 - Medication room (with space for automated supplies)
 - Clean linen room
 - Clean supply room (with automated supply)
 - Soiled utility
 - Janitors closet
 - Unit secretary/control area (near entry to unit for control)
 - Consultation room
 - Lactation room
 - Care team work room
 - Conference room
 - Crucial staff offices
 - Staff toilets
 - Exam/treatment room
 - Large equipment storage room
 - Satellite Pharmacy
 - Point of care testing area
 - Respiratory therapy workroom/ storage room
 - Parent Transition Rooms with toilet/showers
 - Sibling play room
- Located outside the NICU area but in close proximity should be:
 - Family waiting (Located in such a manner that it is not necessary to go through it or by it on the way to the unit.)
 - Family sleep rooms
 - Consultation room
 - Public telephones
 - Outdoor area
 - Public toilets
 - Staff offices
 - On-call rooms
 - Staff lounge/locker room
 - Staff toilet/shower facilities
 - Storage areas
 - Transport office/Storage
 - Teaching Room (w/ AV capabilities)

NICU – Cont'd.

- **A corridor should be provided adjacent to the unit for viewing of infants without entry into the unit.**
- An equipment holding area providing multiple electrical wall outlets, shall be provided for the holding of transport equipment, isolettes, bassinets and portable equipment.
- **A parent transition room shall be provided for parent whose infant is being discharged and shall require special care at home.** This room should be in close proximity to the NICU and be sized to accommodate a double bed, bassinet and other amenities. This room shall also require a toilet/shower.

Additional requirements shall be: infrared camera observation, voice communication to and from the NICU nurse station, a nurse call button, oxygen, suction and extra electrical outlets.

- Scrub and gown storage alcoves should be provided at all entries to the NICU.

Patient Transportation

- Neonates shall be transported from surgery by trained NICU hospital staff.
- **The location of the NICU should take into consideration that transfers from other medical facilities shall be coming via helicopter & ambulance transport.**

Material Movement System

- An exchange cart system shall be employed for the distribution of linen and supplies.
- A pneumatic tube system is preferred for quick transport of specimens, pharmaceuticals and/or supplies.

NEWBORN NURSERY

The Newborn Nursery provides constant observation and treatment to healthy infants who are not rooming in with the mother due to her medical condition. The average length of stay for this unit is anticipated to be 2 days.

Planning & Design

Patient Areas

- Provide 35 sqft minimum per bassinet.
- Provide a work room adjacent to nursery.

Unit Design

- **The Nursery should be located adjacent to the postpartum communication center for constant observation and shared staffing.**
- Provide charting space adjacent to bassinets.
- Windows should be appropriately placed in the nursery for family and visitors viewing infants.
- Provide clean supply room for storage of infant supplies.

This space should include a refrigerator for the storage of breast milk.

- Provide a hand washing sink at entry to nursery and at the bassinets.

Patient Transportation

- Neonates shall be transported by trained hospital staff.

Material Movement System

- A par level replenish system shall be employed for the distribution of linen and supplies.
- A pneumatic tube system is preferred for quick transport of supplies.

OBSERVATION UNIT

The Observation Unit provides the following services to adult inpatients and outpatients:

- Pre procedure outpatients and select inpatients (cardiac catheterization, Angiography, interventional radiology, neuro radiology, kidney biopsies and cardiac biopsies)
- Pre operative preparation (all Same Day Admit patients and select inpatients)
- Post procedure observation and discharge teaching (cardiac catheterization, Angiography, interventional radiology, neuro radiology, kidney biopsies, cardiac biopsies, and conscious sedations)
- Post procedure observation of inpatients receiving conscious sedation (GI/Pulmonary)
- Rule out MI, Rule out pneumothorax, serial neuro checks, pain management, asthma, fever of unknown origin from the Emergency Department.
- Overflow of observation level patients who need to be admitted from the Emergency Department
- Infusions (blood, blood products, hydration, antibiotic therapy)
- 23 hour stay patients (from Surgery Center Friday and Saturday night stay patients, MPU late cases or overnights, ER, IP Surgery, Ambulatory Surgery IIIs and IVs)
- Cystoscopy pre and post care

Pediatric Observation Unit

Pediatric patient care is to be provided in a separate pediatric observation unit.

The scope would include all of above plus:

- Fluoroscopy pre and post care
- Cardiac biopsies pre and post care
- Kidney biopsies pre and post care
- EEG and Neurology Outpatients requiring conscious sedation

Services Not provided in the Observation Units

- Chemotherapy
- Care for ETOH or drug withdrawal

The adult unit shall be projected to be open 24 hours per day 7 days per week. Plan to flex down on weekends.

OBSERVATION UNIT – Cont'd.

There is general opinion that the observation unit should be on the same floor adjacent to the procedure rooms, the operating rooms, and the PACU. Adjacency to the PACU is seen as important to maximize efficiencies associated with staffing and flexing of beds. If, however, it is not possible to house all programs on one floor due to space constraints, the observation unit should then be adjacent to procedure rooms wherever they are placed.

There shall be elevator access from adjacent areas above and below directly into the observation unit to assure rapid transport of patients between services.

Both interventional radiology and the cardiac cath lab require, if the observation unit is on a different floor, a holding unit in order to minimize down time.

The anesthesia would need a holding unit adjacent to the OR if the observation unit was on a different floor in order to minimize down time.

Planning & Design

The ability to do portable x-rays in the observation units shall be required.

In-Take

- Clear and convenient access shall be provided for outpatients and family.
- Educational materials for patients and family shall be planned within the waiting, dressing and consultation areas. Include hard copy, video and on-line computer information.
- Private consultation/interview room(s) shall be provided off of waiting with separate access for care providers.
- Separate male and female dressing rooms shall be provided.

Prep / Recovery

- **Patient access to and from surgery/procedure suite shall be as direct as possible via non-public circulation.**
- **Patient positions shall be as generic and modular as possible for increased utilization and flexibility.**
- **Unit design should emphasize nurse visibility of patients.**

RADIOLOGY

Radiology provides adult and pediatric inpatient services including diagnostic radiology and fluoroscopy, IVP/tomography, ultrasound, CT and MRI.

Planning & Design

General Issues

- The design should take into account opportunities to geographically consolidate equipment and personnel into one area, while separating inpatient and outpatient traffic.
- The service needs a "heart" (i.e. an area with a front desk / reception area, a central viewing area, consult rooms)
- A waiting room can be shared with other adjacent services (i.e. nuclear medicine, non-invasive cardiology, etc.)
- Secured department design is required.
- Visibility between work areas is required.
- Visibility between technician work and patient care areas is required to ensure visual monitoring.

Ambulatory Issues

- Radiology must be accessible for large volume of outpatients; a reception for outpatients can be shared with another diagnostic department on the floor.
- A separation shall be maintained for outpatient and inpatient flow.
- A multifunctional pre & post procedure unit (Observation Unit) should be easily accessible.

Procedure Rooms

- All procedure rooms shall be designed and planned so as to provide maximum flexibility for various procedures (multi-functional).
- Standardizing the size and co-locating similar rooms allows the flexibility to change as needs evolve (with minimal construction costs and down-time).

Soft space should be strategically located so as to be easily converted to procedure rooms if needed.

RADIOLOGY – Cont'd.

- Procedure rooms shall be organized around a central work core which contains processors, tech work areas, etc. This room shall provide staff access to procedure rooms (control area) and to back-of-house support areas such as reading/dictation, supplies, etc.
- Radiology rooms have special design requirements including:
 - Ceiling: minimum heights and structural systems for equipment
 - Proper shielding for radiation protection
 - Telemetry monitoring (specialty rooms and CT)
 - Medical gases
- The configuration of service shall be planned for rapid response by locating tech work areas central to patient areas.
- Magnetic Resonance Imaging equipment has special construction requirements.
- Reading and dictation area should be provided in a group configuration except for Angio and Neuro.
- Inpatient Holding area is required.

Patient Transportation

- Patients shall be transported to Radiology by the hospital transportation team.
- Provide good patient elevator access into the service.
- Patient movement should be minimized by locating high volume procedure rooms closest to access points.

Material / Staff Flow

- There must be effective, convenient flow of staff and materials from procedure rooms to processing, sorting, viewing and filing areas.
- Equipment and supplies storages should be consolidated and easily accessible to staff.
- Intensive Care Units, Surgery, Emergency and other appropriate inpatient areas shall be furnished with fixed and/or portable radiographic equipment and digital processing.
- Portable x-ray machine and stretcher/wheelchair storage areas should be located so that equipment is secured and convenient for easy transport to and from other areas of the hospital.

INTERVENTIONAL RADIOLOGY

Interventional Radiology provides imaging guided, minimally invasive procedures to adult and pediatric inpatients and outpatients who can be relatively well or critically ill.

These procedures may be performed under fluoroscopy, MR, CT or ultrasonographic guidance. Vascular / Interventional Radiology services include diagnostic vascular studies, vascular access & reconstruction, biopsies, biliary and GI procedures.

Some procedures are performed to assist procedures in the operating room by Surgery, Urology or Gastroenterology.

Interventional Neuroradiology performs diagnostic studies as well as interventional treatments for tumors, vascular malformations, aneurysms, ischemic disease, stroke and spinal lesions.

This field is expected to continue to increase due to the increased need for minimally invasive imaging-guided procedures.

Planning & Design

Procedure Suite

- CT/MR are now being incorporated into a new neuroradiological modality to combine DSA/CT or DSA/MR or OR/MR.

These combined rooms shall be used independently most of the time but may be opened into a large room for combined use. Magnetic Resonance Imaging (MRI) requires special construction.

- All procedure rooms shall have lead lining, medical gases and independent temperature / humidity controls for maximum flexibility in room utilization.
- Each procedure room shall be video equipped and electronically linked for teaching activities within the Conference Center, the School of Medicine and elsewhere.
- Special considerations shall provide for electrical hazard control, emergency power, radiological exposure hazard control, adequate isolation capability, aseptic environmental characteristics, controlled access via functional flow arrangement, demarcation lines, graphics / physical barriers and a waste gas exhaust system.
- Information System infrastructure to include: PACS, RIS, HIS, Omnicell, Radiology AIS, Phones.

INTERVENTIONAL RADIOLOGY – Cont'd.

Pre & Post Procedure

- The 23 Hour Observation Unit shall provide pre and post procedural care for most patients. Some patients shall require care in OR recovery. This shall be located adjacent for immediate access. (Vertical adjacency is acceptable.)
- Inpatients shall be held and prepped in the pre-procedure holding area with visual separation from recovering patients.
- **A separate small recovery area (fully monitored) shall be located directly adjacent to the procedure rooms for those occasional patients requiring immediate, high level care. The PACU would likely be too remote and the 23 Hour Observation Unit would likely not have the staffing expertise for such situations.**
- Planning should focus on patient flow so that there is a separation between inpatients, outpatients, pre-procedure and post-procedure patients.
- There needs to be a balance of security and accessibility so that physicians and house staff have ability to personally communicate with physicians during procedure and have access to view images.
- Technology is critical for the highest level of patient care and to be as operationally efficient as possible.

The information infrastructure should consist of PACS, RIS, HIS, Radiology AIS, automated supply and medication storage systems and phones.

- Staff lounge, locker, shower and toilet facilities shall be shared with other procedural services located adjacent.

Patient Transportation

- Patients shall be transported by 23 Hour Observation Unit staff and/or by Patient Transport.
- Provide trauma elevator(s) link between Emergency, Heli-port, the invasive floor, and Diagnostic Radiology.

Material Movement System

- Procedure rooms shall be supported by a sterile core with separate access for sterile and soiled items.
- Automated supply storage systems shall be utilized (supplied daily) for catheters, wires, dilators, stents and other procedural devices and supplies.

SURGERY

Peri-Operative Services is responsible for performing elective and emergency surgical procedures for adult and pediatric patients on a 24 hour basis.

Peri-Operative Services is also responsible for operating the Urological Procedure Unit, Post Anesthesia Recovery Unit (PACU), Surgical Admissions Unit (SAU), and Sterile Processing.

PACU and SAU shall also provide services for Cardiac Cath, Angiography and invasive CT/MRI patients. Anesthesia for C-sections and Invasive Imaging are also supported.

Planning & Design

General

- While inpatient surgical services (operating/procedure rooms, Anesthesia & Sterile Processing) may be separate from outpatient services (located in Outpatient Block) coordination of resources and services shall be important for efficient operations of both. Some outpatient procedures may be performed within the hospital.
- Catheterization, Angiography and Invasive Imaging Services shall be co-located with Peri-Operative Services in the hospital and shall serve both inpatient and outpatient populations.
- Observation Unit (24 hour Transient area for short-term stays) should be available for post-surgical patients.
- Recovery from hospital-based outpatient procedures shall be within the PACU and/or the Observation Unit.
- Sterile Processing shall be operated by Peri-Operative services.

Surgical Suite

- Operating/procedure rooms shall be designed and planned so as to provide maximum flexibility for various procedures (multi-functional).

Standardizing the size and co-locating similar rooms allows the flexibility to change as needs evolve (with minimal construction costs and down-time).

Operating rooms should be as much as possible similarly equipped.

- Although designed in a modular fashion, OR's can be customized to meet the specific equipment needs of cardiothoracic surgery, neurosurgery, orthopedic surgery and transplant surgery.
- 4 - 6 OR rooms per module is desirable.

SURGERY – Cont'd.

- Separate operating rooms should be provided for adult and pediatric patients.
- Image guidance and functional imaging capabilities should be designed into the operating suites.

Movable MRI and portable CT and Angiographic equipment is predicted to be readily accessible.

- A Pathology frozen section lab should be planned within Peri-Operative Services.
- Decentralized storage for large equipment is required.
- Each operating/procedure room shall be video conferencing equipped and electronically linked for teaching activities within the Conference Center, the School of Medicine and elsewhere.
- Sufficient electrical outlets are required in OR rooms.
- An overhead, voice activated telephone should be at the surgeon's position. Operating/procedure rooms should have modem connections and an intercom to nursing and Anesthesiology.
- Operating suites should be designed to accommodate dedicated OR supply elevator and dumb waiter (delivery of case carts and assistance in emergency instrument use, etc.).
- All operating/procedure rooms shall have individually controlled (also controlled in room) independent temperature / humidity controls for maximum flexibility in room utilization.
- **There should be a patient tracking system which automatically registers when a patient enters and exits operating/procedure rooms. This should be monitored at the nurses' station.**
- Provide individually controlled built in music/stereo system in operating/procedure rooms.
- Special considerations shall provide for electrical hazard control, emergency power, radiological exposure hazard control, adequate isolation capability, aseptic environmental characteristics, controlled access via functional flow arrangement, demarcation lines, graphics / physical barriers and a waste gas exhaust system.
- PACs and Pathology Imaging devices should be provided with sufficient network capacity.

SURGERY – Cont'd.

Support Areas

- Sufficient equipment and supply storage must be provided.
- **Front Desk area with view banks for viewing continuous schedule updates as well as video feed from individual OR rooms should be located at the front of the OR suite.**
- Other patient care areas include an anesthesia induction room and a minor procedure room for vascular access.
- A separate work area adjacent to operating rooms should be provided for support staff (with computer hook-ups).
- Work room for Anesthesia assistants should be provided.
- Scheduling area should be provided adjacent to the Front Desk for scheduling staff and Nurse Manager.
- Surgery faculty work stations are required. (Equipped with phones, computers, fax, etc.)
- Lounge and Lunch areas for surgeons, anesthesiologists, residents and nursing staff is required. (w/ refrigerators, vending machines) (staff has only 30 min. lunch break)

Pre & Post Procedure

- The anesthesia line room - area for starting central lines and Catherizations (transitional room as part of SAU) should be located with contiguous connection to OR.

This room should provide immediate post-procedure care of patients with continuous monitoring (telemetry) by licensed personnel.

The PACU also provides pre-procedure therapeutic medications, pre-procedure invasive line placement and monitoring.

- Planning should focus on patient flow so that pre-procedure patients do not have visual contact with post-procedure patients.
- Although Catheterization, Angiography and Invasive Imaging procedure rooms shall be shared between inpatients and outpatients, a separation shall be provided for outpatient flow, pre-procedure holding and post-procedure recovery.

SURGERY – Cont'd.

Patient Transportation

- Provide trauma elevator link from heli-port directly to the surgical suite.
- Elevators and doors to operating/procedure rooms should be sized to accommodate patients in beds with traction, ventilators and other life support systems.

Material Movement System

- All sterile processing shall be consolidated in Perioperative area.

Equipment and trays for Surgery, ICU's and Emergency shall be standardized with general and specialty items for higher utilization (in lieu of department or physician customization).

- A distribution team shall be part of this service (instead of using nurses for some functions).

This team should deliver, breakdown, verify inventory and stock items to support all invasive procedures.

- **A case cart system shall be employed for all invasive services.**

An exchange cart system shall be employed for the distribution of linen and supplies.

- **A sterile core is planned to support all operating and procedure rooms on the invasive floor.**
- **A dedicated clean elevator shall provide immediate access to this sterile core. This elevator also allows personnel to quickly deliver needed items during a procedure.**

Equipment Cleaning and Sterilization

- **Instrument cleaning, inspection and tray packaging shall occur in Sterile Processing.**
- **Sub-sterile rooms in the surgical suite shall be provided for quick sterilization of dropped/contaminated instruments.**
- The soiled utility room shall temporarily hold soiled supplies and exchange carts to be transported to the soiled receiving area of Sterile.

INVASIVE CARDIOLOGY

The Cardiac Catheterization and Electrophysiology Laboratories provide diagnostic and therapeutic cardiovascular procedures to adult and pediatric outpatients and inpatients. These services employ state of the art technologies and equipment to remain at the forefront of the diagnosis and treatment of heart disease.

Cardiac catheterization procedures include hemodynamic and angiographic diagnostic studies, endomyocardial biopsies, coronary and other angioplasties, valvuloplasties, placement of intravascular stents, embolization of vascular structures, occlusion of intracardiac defects, direct emergency revascularization of acute myocardial infarction, and minor surgical procedures primarily for vascular access or in conjunction with cardiothoracic surgery for snaring of ASD's.

The Cardiac Electrophysiology (EP) services function within catheterization laboratories to provide diagnostic and therapeutic services for adult and pediatric inpatients and outpatients with cardiac arrhythmias. These potentially life-threatening conditions are treated through the use of cardioversion, selective tissue destruction (catheter ablation), and the implantation of pacemakers and automatic defibrillators.

The pediatric EP service is associated with a high acuity pediatric congenital heart surgery program and a pediatric electrophysiology basic science program.

Capacity Assumptions

All of the cardiology invasive clinical services anticipate significant growth, because of demographic changes, technological advances, and growth of healthcare enterprise.

Within medicine in general, and especially in cardiology we expect the trend to substitute "less invasive" procedures for surgical operations to continue.

Factors include:

- o Aging of population - The population over age 65, the demographic group most needing cardiac procedures, is expected to increase significantly
- o Extension of percutaneous revascularization to many more patients because of improving technology. Possible new modalities such as intracoronary radiation to suppress restenosis, direct trans-ventricular myocardial revascularization, improved stenting permitting definitive treatment of patients with multi-vessel coronary artery disease
- o Extension of indications for ICD's to new clinical situations
- o Technological advances in other catheter-based cardiac procedures reducing the need for the prolonged inpatient hospitalization associated with surgical treatment of cardiovascular disease
- o Greater coordination with cardiac surgeons for more combined surgical/interventional procedures

INVASIVE CARDIOLOGY – Cont'd.

Planning & Design

- Adult & Pediatric Cardiac Catheterization and Electrophysiological Laboratories should be co-located with other interventional procedure areas (Vascular/Interventional Radiology, Neuroradiology, Electrophysiology and Perioperative Services) due to the following:
 - Immediate access to operating rooms when conditions require surgery
 - Sterile environment required for procedures
 - To benefit from shared staff and support resources.
- Procedure rooms shall be designed and planned so as to provide maximum flexibility.

Standardizing the size and co-locating similar rooms allows the flexibility to change as needs evolve (with minimal construction costs and down-time).

- Pediatric & adult procedure rooms shall not be dedicated solely for each service.

Rooms primarily used for pediatric patients shall be designed with a pediatric environment understanding that at times the room may be used by adult patients as well. This shall increase room utilization.

Rooms used primarily for adult patients shall be designed with the understanding that at times they may be used for pediatric patients as well.

- At least one of the pediatric rooms should have surgical level of sterility, to permit performance of collaborative procedures between cardiologists and cardiac surgeons.
At least one of the adult rooms should likewise have a surgical level of sterility to permit appropriate conditions for implantation of permanent devices.
- To optimize efficiency, staff shall be cross-trained to a degree still allowing specialization to provide the highest quality of care.
- Adult and pediatric services shall share equipment when possible.
- All procedure rooms shall have lead lining, medical gases and independent temperature / humidity controls for maximum flexibility in room utilization.
- Each procedure room shall be video equipped and electronically linked for teaching activities within the Conference Center, the Education Center and elsewhere.
- Control rooms shall be separated to avoid possible confusions in procedure directions.
- Special considerations shall provide for electrical hazard control, emergency power, radiological exposure hazard control, adequate isolation capability, aseptic environmental characteristics, controlled access via functional flow arrangement, demarcation lines, graphics / physical barriers and a waste gas exhaust system.

INVASIVE CARDIOLOGY – Cont'd.

Pre & Post Procedure

- The 23 Hour Observation Unit shall provide pre and post procedural care for adult patients. This shall be located adjacent for immediate access.
- The 23 Hour Pediatric Observation Unit to be located in the Pediatric Nursing Floor shall provide pre- and post- procedure care for pediatric patients.
- Inpatients shall be held and prepped in the pre-procedure holding area with visual separation from recovering patients. Pediatric patients should be held in a separate, segregated part of the holding area.
- **Pediatric pre & post procedure patients would be better served within Pediatric Nursing Floor located ideally near the PICU (due to staff specialties).**
- Planning should focus on patient flow so that there is a separation between inpatients, outpatients, pre-procedure and post-procedure patients.
- There needs to be a balance of security and accessibility so that physicians and house staff have ability to personally communicate with physicians during procedure and have access to view images.
- Technology is critical for the highest level of patient care and to be as operationally efficient as possible.
The information infrastructure should consist of PACS, Cardiology IS, RIS, HIS, Radiology AIS, automated supply and medication storage systems and phones.
- Staff lounge, locker, shower and toilet facilities shall be shared with other procedural services located adjacent.

Patient Transportation

- Patients shall be transported by 23 Hour Observation Unit staff and/or by Patient Transport.
- Provide trauma elevator(s) link between Emergency, Heli-port and the invasive floor.
- Provide dedicated ICU elevators for transport to and from Critical Care Unit.

Material Movement System

- Procedure rooms shall be supported by a sterile core with separate access for sterile and soiled items.
- Automated supply storage systems shall be utilized and supplied daily with catheters and other procedural devices and supplies.

NON-INVASIVE CARDIOLOGY

Non-invasive Cardiologic services include electrocardiography, echocardiography, holter monitoring studies, Cardiopulmonary (CPX) and stress testing.

Electrocardiography services are decentralized throughout the hospital and outpatient clinics with receiving, reading and filing being performed centrally.

Refer to separate programs for Pediatric Echocardiography, and Invasive Cardiology services for Cardiac Catheterization and Electrophysiology.

The Chest Pain Center is for the evaluation and management of patients presenting with chest pain. This service shall be provided within the Observation Unit.

Planning & Design

- **Non-invasive Cardiologic services should ideally be planned along a product-line organization by being located adjacent to other Cardiology services (CCU, etc.).**

This relationship is important for physician and staff interaction as well as for equipment resources.

- Portable Cardiologic equipment shall be provided in Emergency and on every nursing unit floor (for acute & critical care).
- Procedure rooms shall be set up universally for electrocardiography and echocardiography. Rooms shall contain an ECG machine, tech work area (w/ network connectivity), stretcher, counter with sink & cabinets, medical gases, IV pump, BP monitor and sufficient space for emergency cart and access to either side of the patient. Provide indirect lighting with dimmer switches.
- Stress testing room shall contain a treadmill, stretcher, medical gases, crash cart, utility carts, chair, and a counter with sink & cabinets.
- Provide a separate patient holding area with view from the nurse station. Holding shall include medical gases.
- Provide special ventilation for holter scanning equipment.
- Reading room shall provide reading stations with computer terminals and dictation capability.
- The echo tech work area shall contain computer terminals, cabinets and lockers.
- The computer equipment room should contain the network file server and jukebox for data storage.

MEDICAL PROCEDURE UNIT

The Medical Procedures Unit provides elective and emergency endoscopy and bronchoscopy services to adult and pediatric inpatients and outpatients.

Other services include motility, hydrogen breath analysis, indirect calorimetry and portable procedures for the following:

- ICU's for endoscopy and bronchoscopy
- Radiology for ERCP's
- Outpatient MPU for endoscopic ultrasound

Pediatric Services

Pediatric services shall continue to remain with adult because there isn't enough volume to support its own unit. Volumes are dropping and procedures are becoming less invasive. Breath tests are increasing and replacing motility tests. Parents are involved in the prepping of children.

Planning & Design

- Provide good access to patient care areas especially ICU's.
- Provide a non-public enclosed connection for any needed inpatient procedures. This connection shall also provide good access for staff and shared equipment.
- The Observation Unit, should be utilized for waiting, prep and recovery of patients.
- The Medical Procedures Unit would be ideally located on the invasive floor.
- Procedure rooms have specific requirements for air flow (some negative), lead-lining, laser capabilities and video / image transmission.
- Scope cleaning rooms shall have vacuum and fume hood(s) for proper ventilation.
- Lounge and locker facilities shall be shared with an adjacent service.
- Remote storage areas shall be provided in or near intensive care units for portable GI & Bronch procedures.

UROLOGY

The Urology Services provides diagnostic and treatment services to both adult inpatients and outpatients experiencing acute urological disorders. The three primary functional services include the Outpatient Clinic, GU Radiology and the GU Procedures Unit.

Unique diagnostic and treatment modalities include CTU, CT/fluoroscopy and Videourodynamics.

GU Radiology provides imaging and immediate super-specialized radiological consultation. Services are provided for rare and standard procedures including interventional procedures and support to lithotripsy. Practically all studies require active radiologist involvement.

Capacity Assumptions

There shall be a steady increase in contrast and non-contrast CTU because it is the most efficient method of evaluating the urinary tract for stones, tumors and other complications.

Planning & Design

General

- Procedure rooms shall be designed and planned so as to provide maximum flexibility for various procedures (multi-functional).
- Standardizing the size and co-locating similar rooms allows the flexibility to change as needs evolve (with minimal construction costs and down-time).
- Each procedure room shall be video equipped and electronically linked for teaching activities within the Conference Center and elsewhere.
- Special considerations for procedure rooms shall be provided such as emergency power, radiological exposure hazard control, adequate isolation capability, aseptic environmental characteristics, controlled access via functional flow arrangement and demarcation lines.
- Planning should focus on patient flow so that there is a separation between inpatients, outpatients, pre-procedure and post-procedure patients.
- Comprehensive integration of high resolution, digital images and electronic data is essential with universal connectivity provided at various locations.

UROLOGY – Cont'd.

Outpatient Clinic

- The reception area should provide acoustical privacy from the waiting area. The waiting area should be visible from reception. Activities behind reception should also have privacy.
- The clinic shall be off of the main corridor to reduce traffic. The exam unit layout should have a U-shaped configuration with a central nurses station to provide maximum visibility of patient areas and to reduce travel times.
- Each exam / procedure room should be sized to accommodate various imaging equipment (e.g. ultrasound, video imaging equipment, etc.). This room shall have direct access to a shared toilet (between 2 rooms).
- **Anesthesia services in the outpatient clinic are anticipated to increase with more conscious sedation of patients for procedures.**

This shall require a recovery observation area that complies with hospital policies for anesthesia services. (e.g. monitoring, discharge, etc.).

- A small lab shall be provided within the clinic. A pneumatic tube system located at the nurses station shall connect to the Clinical Laboratory and to Pharmacy.
- The outpatient clinic shall have dedicated and direct access to GU Radiology.

GU Radiology

- **Soft space shall be strategically located adjacent to procedure rooms to allow for future conversion to a procedure room if ever needed.**
- Provide medical gases in the CT/Fluoro and Radiographic/Fluoro rooms.
- Procedure rooms shall provide separate access for patients and staff. Staff access from control areas shall be to a central work core which supports all procedure rooms.

This work core shall include processors and work areas. The work core shall be immediately accessible to support areas such as the reading room, supply area, physician's office, etc.

- The central reading room should be acoustically quiet, not visible to patients and accessible to physicians and staff. They should include enough space for the reading of digital images, dictation and allow space for teaching sessions.
- Patient consultation shall be provided in either a consultation room or within the radiologist's office.

UROLOGY - Cont'd.

GU Procedures Unit

- **The GU Procedures Unit shall be located on the invasive floor for the following reasons:**
 - **Co-locate similar functions to provide flexibility to adjust to future changes in procedure room allocation.**
 - **Sterile environment with support**
 - **Consolidate services requiring anesthesia**
 - **Consolidate services requiring recovery**
 - **Higher utilization of rooms when not being used for urological procedures (multi-use).**
- Dedicated and direct access to GU procedure rooms shall be provided.
- Recovery services for GU Procedures Unit patients shall be within the PACU and/or possibly within the Observation Unit (23 Hour) if an extended stay is required during off hours. Inpatients requiring GU procedures shall be held and prepped in the Urology department (with visual separation from recovering patients).

Materials Distribution System

- Provide convenient flow of equipment, materials and supplies in and out of the center minimizing passage through patient care areas.
- **The GU Procedures Unit shall be supported by CSSD and utilize the same material distribution system as Perioperative Services (case cart system for instruments and exchange cart system for supplies and linen).**

A sterile core shall hold sterile supplies for procedure rooms using pass-thru supply cabinets.

- An automated supply storage system shall be utilized to streamline the process of inventory control and billing. This also allows the potential to share supplies between areas or services.

Support / Staff Facilities

- Clinical research focuses on kidney, prostate, testes, and bladder cancer, and nutrition and cancer. Research staff should be consolidated in one area adjacent to the Urology Department and include women's urology research.
- The GU Procedures Unit shall share the locker / changing facility with other invasive services on the floor.
- Various other staff areas are also required within the Urology Department such as administrative offices, conference room, residents work area, research work area and physician's offices.

NEUROPHYSIOLOGY

The Clinical Neurophysiology services are:

- The Sleep Disorders Center
- Evoked Potential Laboratory,
- Neurophysiology Administration
- Electroencephalography (EEG) Laboratories
- Pediatric Neurodiagnostics Laboratory
- Adult Telemetry Laboratory
- Seizure Disorder
- Cerebral Blood Flow Laboratory.

Inpatient EMG Services shall also be conducted under the auspices of this Department.

The Autonomic Function Laboratory is part of the Sleep Disorders Center.

Common procedures performed in the laboratories include:

- Overnight polysomnography (sleep) studies
- Sleep and awake electroencephalography (EEG) Testing
- OR and ICU EEG monitoring
- Evoked potential testing and OR EP monitoring
- 24-hour, closed circuit TV monitoring with continuous EEG (for seizure disorders)
- Trans-cranial doppler/cerebral blood flow testing
- Electromyography (EMG) studies.

Planning & Design

General

- Majority of inpatient testing is done at the patient bedside.
- The sedation/holding room should be located near the EEG room.
- Outpatient waiting area.
- Lab and Administrative functions need to be adjacent.
- The EEG and Evoked Potential rooms should have sufficient space for electronic technology and monitors.
- The EEG rooms should be large enough to accommodate an inpatient bed and transfer of one patient to the EEG bed as well as a crash cart in case of emergencies.
- The EEG and EP Labs need to be adjacent to a nursing unit "hopper" for the disposal of patient waste for those patients traveling to the labs by bed.
- The doors to the EEG/EP patient testing rooms should be four feet wide with the extra one foot leaf to accommodate patient beds.

NEUROPHYSIOLOGY – Cont'd.

- The doors to the EEG/EP labs themselves should be four feet wide with the extra one foot leaf to accommodate large pieces of patient testing equipment.
- The EEG Reading/Interpretation room should be located in the diagnostic area.
- Selected Neuro and Peds inpatient rooms and all Neuro ICU rooms should be hard-wired to the remote recording room in the Clinical Neurophysiology Department for 24-hour EEG recordings.
- The Autonomics Function Laboratory requires a special bathroom in which the patient can be heated up safely (for the sweat test).
- Clean electricity is required for this service.
- Natural light is required for the Sleep, EEG and EP Labs.
- Sleep Lab furnishings should be hotel quality.
- The Department requires access to the Neuro floor Conference Room as well as a conference room within the Department.
- Require space in the laboratories for physicians to review and dictate records.
- The Telemetry Unit requires a Dayroom with cabling and video cameras for group therapy sessions with other seizure disorder patients adjacent to the Telemetry patient rooms.
- The Pediatric Playroom and Teen Activity Center on the Pediatric Floor shall need to be cabled and have video cameras installed so that seizure disorder patients who are being monitored can utilize these facilities as well.
- The physician and technologist working areas need to be well separated from the patient and family areas.
- The Peds tech area must have a sink.
- The Medical Transcription function must be near to the Fellows/Clinical Instructors.
- A centralized Department mailroom with copy machine and fax would greatly aid with the signing and distribution of test result reports.
- A tube system should be considered for movement of lab and pharmacy materials.
- Such a tube system must not be located near the patient testing areas due to the noise factor. Patients are asked to fall asleep.

DIALYSIS

Adult and pediatric dialysis services include acute renal failure of inpatients and very small pediatric outpatients (10 kg or less).

Capacity Assumptions

Volumes are expected to increase due to the following:

- Increase in overall patient acuity (correlated primarily w/ high acuity surgeries & ICU patients).
- Patient population is aging requiring more dialysis services.
- New technology and modalities (e.g. cvvh/cvvhd, liver dialysis, etc.).

Planning & Design

- Treatment spaces shall be large to accommodate dialysis equipment. Special requirements include medical gases, reverse osmosis water system and special drainage.
- Provide 2 isolation rooms each with an attached toilet . 1 shall double (and be set-up) as a pediatric room.
- Patient treatment spaces/rooms should be in an open design with direct observation from the central nurses' station.
- The nurses station should included workstations (computers, etc.), an automated medication area, a pneumatic tube station (to Lab and Pharmacy), a crash cart, files and hard copy reference materials.
- Dictation / consultation room and a nurse manager's office should be adjacent to the nurse station.
- Clinical research studies are expected to increase in the future. A work area shall be provided for this function.
- The peritoneal room shall contain peritoneal machines, supplies, files, and a workstation (computer, fax, etc.).
- Due to the noise produced, the reverse osmosis water room should be located distant to primary areas with an alarm to the nurses station.
- Dialysis repairs and set-up all of its own equipment (not clinical engineering). A dedicated space for this function shall be provided in the unit and include domestic and treated water supply & sink.
- Just-in-time systems for supply storage shall be planned. An automated supply storage system shall be utilized and be immediately accessible to all patient treatment spaces as well as the nurses station.

DIALYSIS – Cont'd.

- **Dialysis produces an enormous quantity of contaminated waste. Provide space for waste receptacle in close proximity to patient stations. A secured space also needs to be provided at the dock.**
- A waiting area shall be provided for family and outpatients. This may be shared with another service if adjacent.
- Staff facilities for lounge, lockers, conference, etc. can be shared with another service if proximal.

Patient Rooms (on ICU Floor)

- **Provide space adjacent to ICU patients for potential dialysis machine.**
- **ICU's require special dialysis treated water system.**
- **The possibility of providing treated water throughout the facility should be explored. This pure water would be beneficial for all patients.**

PHYSICAL THERAPY & REHAB

The Rehab Service, which includes, physical therapy, occupational therapy, speech pathology, audiology, prosthetic and orthotics services provides therapies to the entire hospital's inpatient population as well as selected outpatients.

In addition to providing direct patient care, the acute rehab service provides a full spectrum of clinical education and training for internal as well as external professionals and participates in clinical research.

Planning & Design

Unit Design

There should be no architectural barriers to the handicapped, either within the department or the facility. However, the ADL areas should be "real life", and not modified for handicapped accessibility.

- Therapist charting areas should be centralized within the treatment areas and the office/staff support areas should be located adjacent to the unit. Provide staff lockers in the area.
- There should be a workstation adjacent to the entrance of the gym for monitoring entry and activities.
- Good ventilation and temperature control, especially in areas such as hydrotherapy.
- The hydrotherapy area should include two full body tanks and one portable extremities tank. Provide overhead heating devices in the hydrotherapy tub room. This area shall also require special plumbing and flooring.
- A hand washing sink should be provided in each treatment area.
- The exercise area should be designed with a minimum 12 foot ceiling height.
- Fire doors should be on magnetic hold opens.
- Provide storage for respiratory equipment in department.
- Provide storage and work bench for prosthetics/orthotics in the rehab area.
- **Sound proofing, special ventilation and temperature considerations should be given to this area.**

Fire alarms should be modified to accommodate excessive heat due to special equipment in this area.

- Provide a waiting area adjacent to the rehab gym for family members.

PHYSICAL THERAPY & REHAB – Cont'd.

- Lockable storage closets should be provided in the gym.
- The Rehab gym could be shared with Psych Units.
- **The Audiology department needs a storage area in the NICU.**
- Provide O2 and suction outlets in the rehab department.
- This department requires an intradepartmental intercom or communication system.
- There should be emergency pull cords in various locations of the rehab department.
- Provide private rooms off the gym for easily distracted or agitated patients.
- Provide patient toilets off the gym.
- Provide storage space for speech equipment.
- The gym area should accommodate patients transported from the nursing units in beds and wheelchairs.
- A storage area for large movable equipment is required adjacent to the gym.
- Department needs to be designed for easy and safe flow of patients transported in and out of the rehab department.

NUCLEAR MEDICINE

Nuclear Medicine - Pharmacology provides diagnostic, therapeutic and investigative radionuclide services for inpatients and outpatients.

Unique approach of having the Department of Pharmacology associated with the Department of Medicine allows modern biology and genetics to join together with medicine to cure diseases.

Planning & Design

Flow / Access

- **Nuclear Medicine would be ideally located within outpatient services area due to the significant outpatient activity and the need to have highly outpatient services out of expensive hospital space.**

The location would have to be immediately adjacent to the inpatient units to provide good access also for inpatients.

A separation shall be maintained for inpatient and outpatient flow with inpatients having a "back door" to the service.

- Patients shall be transported to and from Nuclear Medicine by the hospital transportation team.

Procedure Areas

- The layout of procedure areas and room sizes shall maximize flexibility.
- **Strategically locate soft space to allow future expansion.**
- PET scan rooms shall be immediately adjacent to the hot lab and the cyclotron.
- Procedure rooms shall include control work areas within the room.
- The radiation injection room shall be visually observed.

Cyclotron

- The cyclotron prepares radioisotopes for PET studies. Ideally, this should be located adjacent to the PET scan rooms and hot lab for quick access to minimize radioisotope decay times.

If for some structural or mechanical reason the cyclotron needs to be built in the new hospital, it should be located as close as possible to the service.

NUCLEAR MEDICINE – Cont'd.

- The cyclotron room shall contain:
 - Self-shielded cyclotron w/ compound making equipment.
Provide sufficient access space.
 - Power supply equipment (preferred within room for immediate access)
 - Gas storage closets
 - Dedicated pneumatic tube system to PET hot lab (if not immediately adjacent)
 - Work counters
- The cyclotron requires special mechanical requirements for air temperature / humidity and plumbing. A dedicated water cooling system should be provided.

Support Areas

- A radioisotope hot lab shall be shared for PET and conventional nuclear medicine and shall be located immediately adjacent to procedure rooms.
- Provide a reading room that is accessible to procedure rooms.
- Teaching space shall be provided for house staff.
- Provide space for clinical physicists for development and maintenance of equipment.
- Other support areas include patient toilets, administrative areas, faculty offices, conference/library, material support, staff facilities, etc.

RADIATION ONCOLOGY

The radiation oncology department provides inpatient and outpatient radiation therapy services for both adults and children. Patients are seen for brachytherapy, stereotactic, total body irradiation, and megavoltage treatments.

Planning & Design

- Proper shielding for radiation protection is required for rooms designated for radiation use.
- Special attention must be given to the electrical requirements for this area as well as potential electrical interferences and noise abatement.
- Consideration should be given to the ceiling height requirements in the therapy room(s) as well as a radiation emission alarm system.
- The department should be convenient to a private vehicle entrance for outpatients and near the vertical circulation for inpatients.
- The radiation oncology area should be designed for good separation of inpatient, outpatient and staff traffic and provide easy orientation for patients

RESPIRATORY THERAPY

Respiratory Therapy

Respiratory Therapy provides therapeutic respiratory services which compliments the care given by the entire team of healthcare providers. Responsibilities include patient care, equipment maintenance, quality control, departmental administration and education.

Patient care includes traditional modes of respiratory care such as oxygen therapy, humidity and aerosol therapy, respiratory treatments, ventilatory life support, rehabilitative and diagnostic services.

Patient services also include specialty care for neonatal, pediatric, cardio-surgical, adult critical care and geriatrics.

Equipment maintenance responsibilities include processing, maintaining and distributing all respiratory therapy equipment.

Quality control responsibilities include assuring the quality, appropriateness of respiratory care and optimization of therapeutic procedures.

Administrative responsibilities include personnel, fiscal management, coordination of logistic and clerical operations and liaison with other divisions of the medical staff.

Educational responsibilities include the provision of staff development, policy and procedure development and new employee orientation.

Pulmonary Function

Pulmonary Function provides services to inpatients and outpatients with various types of lung diseases. Services consist of consultations, pulmonary function testing including exercise and bronchial challenge tests and other epidemiologic surveys.

Pediatric services shall be consolidated with adult due to low volume of service.

Pulmonary Function is currently developing skilled fluoroscopy program.

Capacity Assumptions

Respiratory therapy services have increased substantially due to the fact that the population is getting older and the acuity level of patients is increasing, this service is expected to continue to grow.

RESPIRATORY THERAPY – Cont'd.

Planning & Design

- **Satellite respiratory areas shall be provided near nursing units with the highest adjacency to Critical Care Units and within Emergency, Surgical Recovery and the NICU. Storage shall be provided for ventilators, supplies and medications.**
- **The NICU workroom shall also contain space for transport isolettes and gases to check them. This space could also be used for teaching rounds.**
- **The main department for Respiratory Therapy may be located on the basement or ICU level provided immediate vertical access is provided to all critical adjacencies. Except for satellite areas, bulk storage and supplies shall be adjacent. Equipment processing and maintenance shall be centralized in the hospital and support both inpatient and outpatient services.**
- The equipment processing area should permit the orderly flow of equipment including soiled receiving, processing, maintenance /repair and testing. This area shall also include storage for supplies, tools and for assembled equipment. Medical gases shall be provided within the testing area. An alarm system for hospital-wide medical gases should be provided here as well as remotely in the Communications Department.
- Other areas include cylinder storage area (large & small bulk), various offices, report & conference room, audio-visual room, storage room and other staff facilities such as lounge, change rooms, toilets, etc.
- Central Supply provides the delivery of cylinder gases.
- Equipment processing and calibration shall be planned in accordance to regulatory requirements.
- All radiological areas and procedure rooms shall have piped in medical gases.
- Critical care patient areas shall have specific clear wall/column & floor space for respiratory equipment and services. Refer to those programs for requirements.
- **Respiratory Therapy staff for the NICU shouldn't be planned as separate staff due to the expense and lack of departmental cohesiveness.**
- **Clinical specialist shall be decentralized for each ICU yet part of central department.**

CRITICAL SUPPORT SERVICES_ Over View

- Critical Support Services directly supporting patient care shall be provided as close to the point of care as possible.
- Services shall be decentralized when rapid response to patient or staff needs is required; Services shall be centralized when decentralizing services is cost prohibitive or quality control is difficult to maintain
 - » Facility implication: adequate space for storage of decentralized supplies and equipment is essential.
- Potential criteria for determining decentralization include:
 - Accessibility requirements
 - Acquisition cost of technology
 - Adequate volumes to maintain efficiency and quality of services
 - Staffing implications
- Pyxis -type storage systems shall be utilized to store, control and dispense common oral medications throughout the hospital; Decentralized satellite pharmacies shall be used for mixing IV solutions, other medications, and possibly blood supplies
 - » **Facility implications: work space appropriate for pharmacy services on patient care floors and/or select units; Pyxis systems located near nursing stations (meds area)**
- All order entry (lab, pharmacy) shall be interfaced with other hospital information systems and done at or near the bedside.
 - » **Facility implications: Space/network access within or near patient rooms. If technology does not exist for caregiver bedside ordering, then space for multiple input sites needed on the unit.**
- The Hospital shall make use of technology (both proven and cutting edge) to operate support functions efficiently.
- Automated, just-in-time materials inventory controls shall allow better inventory management.
 - » **Facility implication: Appropriate, low unit-of-measure storage space on patient care units**
- Robotics shall be considered in housekeeping, material distribution, and other areas where it is demonstrated to be cost effective
- Expanded use of state-of-the-art transport systems (i.e. pneumatic tube system, etc.) shall be considered for delivering specimens/meds/materials to the patient care units, lab, pharmacy and other areas.

CLINICAL LABORATORY

The Clinical Laboratory/Pathology is responsible for performing examinations and analyzing tissue and fluid specimens obtained from patients for the purpose of diagnosis or monitoring disease process.

The feasibility of automation and robotics, in the pathology shall be investigated.

Primary External Adjacencies

- A satellite lab and the blood bank shall be located adjacent to the Emergency Department.
- Anatomical pathology should be located in close proximity to surgery for transfer of tissue specimens and blood samples.
- The autopsy area should be contiguous to the morgue.

This area shall require proximity to service elevators from inpatient units and a location near the service dock.

- The specimen collection center and transfusion medicine must be located in the Hospital. The remainder of clinical laboratory/pathology could be located elsewhere as long as a reliable specimen delivery system is in place.
- With regard to lab sites adjacent to clinical nursing units -- as long as the Hospital has a readily accessible sophisticated tube system to and from the lab (specimens and blood), it is assessed not necessary to have "mini" lab sites (i.e. staffed by lab personnel) side by side the nursing units.

Fully equipped and staffed labs adjacent to each nursing units/floor would not be feasible from a financial perspective and would be poor utilization of lab resources.

It is primarily a "service" issue (need for immediate results with STAT labs) rather than a proximity issue. If service or rapid turn around time is established, adjacency becomes much less of an issue.

State of the art electronic systems and computer links within each nursing unit is therefore critical to support clinical information needs and lab reporting. This includes linking up AST sites to the lab electronically, and implementing a "bar coding" system for rapid identification of patient and staff.

There must be adequate space allotted within each nursing unit for AST lab testing (e.g. for HemoCue, Accuchecks, and storage of disposable supplies for testing and QC, and computer links for downloading) to enable staff to do bedside testing as necessary.

CLINICAL LABORATORY – Cont'd.

Planning & Design

- Clinical lab/pathology should be planned with flexibility for future technology and expansion.
- Open areas should be planned with modular systems to provide flexibility for changing technology.
- **Pneumatic tubes should be located as far away from any heat source as possible to prevent damage to lab specimens being sent through tubes.**
- Fume hoods or exhaust hoods shall be required in some of the laboratories for removal of noxious fumes and/or odors.
- Laboratory supervisors should be located with lab areas.
- A tissue typing lab should provide for the support of the transplant program, if included.
- The blood bank shall provide storage, typing, cross matching and other related testing: Consultation lab test, stem cell propagation and support for the bone marrow transplant program.

The major patient function of the blood bank is to provide blood and blood products for transfusions.

- A supply of de-ionized water is required for the operation of laboratory equipment.
- Holding areas for infectious, hazardous, radioactive and chemical waste must be located in close proximity to the core laboratories, surgical pathology, autopsy and satellite laboratories.
- Staff lockers with gown/mask/glove change areas should be located adjacent to the lab work areas for infection control.
- Twenty-four hour staffed satellite labs shall be located on all inpatient floors, operating room and emergency areas.
- Research and development projects shall be located within the appropriate labs.
- The autopsy room should contain autopsy tables.

It should have fluorescent lighting, a ceiling-mounted track for body transfer at the autopsy tables, a specimen scale, and one body hoist.

This room shall have special air handling requirements, including a low level horizontal 100% exhaust at each table and tissue cutting area.

CLINICAL LABORATORY – Cont'd.

Operational Systems

Material Movement System

- The planning of satellite labs is predicated on having a state-of-the-art pneumatic tube system for the transportation of specimens to and from the labs.
- All supplies needed by clinical lab/pathology shall be requisitioned by its own procurement personnel.
- Active stores shall be located in the departments, but bulk stores shall be maintained in the Materials Management central warehouse.

Information Systems

- Clinical lab/pathology should have access to computerized hospital information systems, admission/discharge and transfer systems, as well as order/entry reporting systems.

These computerized systems shall enable the lab to initiate physicians orders for laboratory test and retain the information for use in concurrent review and for charging:

To input test results into the system for access by authorized users and for retention in the patient oriented data base

To assign accession numbers to specimens, schedule instruments for analysis, perform quality control operations, produce management reports, and provide direct interface for selected laboratory instruments.

- **A freestanding mainframe computer shall be required within the clinical laboratory/pathology department, but appropriate interface to other system functions also should be supported.**
- Test results shall be reported from laboratory to ward terminals by the computer system.
- Bar coding of patient specimens within the nursing units shall improve quality assurance and expedite the handling of patient specimens.

PHARMACY

The Pharmaceutical Services is responsible for participating in all activities of Hospital wherever pharmaceuticals or intravenous solutions are utilized or drug information is provided. Specific responsibilities include: procuring, distributing and controlling all pharmaceuticals; evaluating and disseminating comprehensive information about drugs and their use to staff and patients, and ongoing monitoring of services to achieve optimal outcomes of drug therapy.

Centralized pharmacy is desired if the following can be achieved:

- Reliable and responsive service from centralized pharmacy
 - » orders received, filled and distributed in a reasonable timeframe using electronic order entry and mechanical means of delivery
 - » Satellites pharmacies only necessary in two areas, if provided.
 - Oncology
 - Pediatrics

Nursing units should be supported by clinical pharmacists with workspace allocated on patient floors for "rounding" clinical pharmacists

Planning & Design

General

- Pharmacy shall order its supplies through the hospital's materials management system. Supplies shall be delivered directly from vendors to the pharmacy. All IV additives shall be handled in the central pharmacy.
- Administration, nutritional support, drug information, billing and materials management functions can be grouped together in an office suite next to the central pharmacy.
- The outpatient pharmacy requires a patient counseling area in a confidential environment (enclosed). The area should be handicap accessible.
- Bar-coding/scanning technology is needed to move drugs in and out of storerooms.
- The central pharmacy should be designed to take advantage of automated distribution systems and delivery robots that have been proven to be cost effective.

Layout of rooms

- The central department should be designed for maximum efficiency by providing for the logical flow of supplies through the department from receiving to storage, to processing, and to dispensing. The IV additive zone should be out of the central flow of traffic.
- The receiving/stocking function should be separate from the compounding/packaging and dispensing functions.

PHARMACY –Cont'd.

- The drug information library should be located adjacent to the IV additive zone.
- Alcohol/flammable storage must be vented through an outside wall or roof as required by code and, therefore, should be located accordingly.
- The pharmacy storeroom must be designed to house flammable/volatile liquids and chemotherapy agents.
- Storage areas should be designed to meet Joint Commission requirements (i.e. all drugs stored at a minimum of 6" off the ground and not to exceed 18" from the ceiling).
- Controlled substances need to be maintained in a secured area within a secured area.

The controlled substance vault must be secured from all sides including ceiling and floor.

A steel vault combination door with electronic key entry on the inside gate/door is recommended.

An emergency door release inside the vault area is needed.

Security cameras and motion detectors need to be hardwired to the Campus Police Station.

Panic buttons are also required.

An intermediate room where business can be conducted is needed since access to the vault storage area is limited to authorized personnel.

- The computer room needs to be temperature controlled. Any fire alarm system should be installed so as to minimize damage to computer equipment.
- The reception, waiting and administrative functions in the outpatient pharmacy should be grouped together. Production functions should be grouped together to provide separate traffic flows.
- The satellite pharmacies shall require adequate space to house the following: computer workstations, worktable tops, laminar airflow hood and/or bio-safety cabinet, refrigerator, freezer, locked drawers, shelving units and carts for drug supply and IV solutions. All areas should be secured and hard wired to the central pharmacy.

PHARMACY – Cont'd.

Special Design Considerations

- **The primary special design requirements are for flexible planning in the central pharmacy as well as the satellites.**
- The compounding, packaging, manufacturing, solution storage, and bulk storage spaces may be located in a large, open work area.
- Security systems, video and other surveillance systems need to be hardwired in order to protect the increased dollar value of on-hand inventory.
- A secured drug storage area for IDS that meets state and federal standards is needed.

A walk-in refrigerated storage space with shelving units and freezer is required along with a minus 70 degree freezer.

Work counter space is needed to receive and stage investigational drug materials.

A biohazard safety hood, biohazard storage and preparation area with laminar airflow hood is also required.

- IV solutions must be mixed in an area with a laminar flow hood.
- Narcotic and alcohol storage should be in enclosed rooms with proper security.
- Security alarm system and perhaps visual observation system should be provided in the central pharmacy. Satellite pharmacies should have a security alarm system.
- Special exhaust for chemotherapy IV hoods should be provided.

Operational Systems

Material Movement System

- A tube system should be considered for movement of pharmacy orders (including IV's) from the central pharmacy to the nursing units and satellite pharmacies.
- The central pharmacy should have easy access to vertical transportation to satellite pharmacies for manual delivery of routine and stat orders and supplies as a back-up to the tube system.

FOOD SERVICES

The food service department shall serve patients, employees, medical staff, and visitors. Vending shall be decentralized throughout the facility.

The narrative of this functional program assumes the food system shall be a cook-chill system.

Materials management shall receive and deliver all non-perishable food products and dry goods for the department. Perishables shall be received by the department.

Meal trays for inpatients shall be assembled in the production kitchen and delivered to the nursing units in enclosed carts.

A rethermalization kitchen shall be available on all patient floors to heat the food.

Patients shall have a meal selection option (possible computer based). The meals are therapeutic diets, and their selection parameters shall reflect appropriate meal options.

Primary External Adjacencies

Employee/visitor cafeteria should be located convenient to food production kitchen or have a dumbwaiter/elevator for movement of food.

Food prep area and storage should be convenient to the service entrance of the hospital to facilitate the receiving of food. It is also important that the kitchen be convenient to the cart lifts.

The galleys on each patient floor should be adjacent to the food service cart lifts.

Conference and meeting room facilities should be easily accessible from food service and have a holding and serving facility adjacent to the conference rooms for serving meals.

Planning & Design

Layout of Room Elements:

- **A logical flow of food from receiving, to storage, to preparation, to cooking, to cafeteria or patient area is essential.**
- Clean and soiled functions within the department should be separated to the extent possible.
- The Staff Dining Cafeteria should have a scramble line with an open dining area.

FOOD SERVICES – Cont'd.

- The dining area should be designed so that there is no cross traffic. Ideally, this suggests that patrons enter and exit from separate areas.

The flow should be from entry, to serving line, to dining, to busing, to exit.

- The departmental layout should also consider staff who shall be going through the serving line and eating in private dining/meeting rooms or outside the dining area.
- All dining spaces should be pleasantly decorated, and exterior windows would be desirable.
- The data/purchasing area should be located near the storeroom.

Special Design Considerations:

- Provide an audio system and powered screen in the doctor's dining room.
- Provide for steam and gas lines.
- Electrical lines should be dedicated.
- Drains should be close to end of line and without bends.
- Provide for exhaust hoods.
- Provide fire prevention system over grill.

Transportation

- Trays shall be transported to the floors in fully-enclosed, specialized carts on cart elevators with automatic load/unload equipment, dedicated to dietary use.
- On the nursing units nursing shall prepare the patient for dining, but food service staff shall heat, pass and pick up trays. Food service staff shall provide scheduled nourishments to the units.
- Garbage disposal from the department shall be through an automated garbage reduction system.

MEDICAL RECORDS

The Medical Records Department is the Hospital's primary patient care information center maintaining an accurate and complete health care record on all patients treated at the Hospital, whether as an inpatient, outpatient, or an Emergency Department patient. The primary responsibilities of the Medical Records Department include the collection and management of health data for a variety of purposes, including assurance that the Hospital is in compliance with all laws, rules, and regulations governing health data, medical record completion including documentation analysis, release of information, storage and retrieval of medical records (records management), and performance of special studies and projects.

Transportation of medical records shall be accomplished by carts and pneumatic tubes.

Future

The Hospital shall move towards an electronic record. It is anticipated that the process shall continue to be phased. Space must be allocated in this program for hard copy medical records since the electronic record is a phased project. Additionally, space must be allocated for use of the non-electronic hard copy records which may continue to exist.

The Medical Records Department systems shall include:

- Document Deficiency Management system
- Chart Locator system
- Document Management system
- EMPI system

Primary External Adjacencies

- Quality Improvement
- Utilization Management
- Medical Coding
- Utilization Review

Planning and Design

- Protection of CONFIDENTIALITY is a major concern along with SECURITY for any and all records.
- A medical record completion area must be conveniently located for physicians.

This area must be easily controlled/monitored by departmental staff.

- The public reception area for the department should be located so as to control access to the Medical Records Department and contain appropriate waiting space for all visitors.

MEDICAL RECORDS – Cont'd.

- The photocopy area should be centrally located and accessible to all departmental divisions. Storage for duplicating supplies should be located in the photocopy area.
- Release of Information division must have area with sufficient space and electrical outlets to accommodate multiple outside photocopy companies at one time.
- Release of Information division must have area designed to ensure confidential discussions with patients.
- Release of Information division must have space easily accessible to patients and their families.
- An appropriately climate controlled computer room for Medical Records Department (and other related departments systems servers and other equipment) must exist within the department. This room should have controlled access via a security pad lock pass.
- The work area for outside staff should be accessible to the outside staff, but in an area that can be controlled/monitored by Medical Records personnel. There must be sufficient space, storage space, PCs, and electrical outlets to accommodate multiple users at one time.
- An administrative area for the department should be separated from the functional working areas. The support staff area should be convenient to all the administrative offices and should control access to the area.
- A conference room should be provided for within the departmental space.

IT (INFORMATION TECHNOLOGY)

Information Technology Services shall be the provider of Health Authority Enterprise level Information Services for the Hospital. These services include network connectivity, workstation support, application development/support, enterprise server support, and client training/support. Information Services currently works with individual departments to interface their systems to enterprise systems and provide backbone connectivity to support their departmental requirements.

Information Systems must enable Health Authority Enterprise to transform its business, educational, and clinical processes into a model of health care services and medical education that succeeds in the competitive marketplace, continuously improves quality and cost effectiveness, measures and manages health outcomes, leads in medical education, and offers outstanding services to patients, physicians and the communities it serves.

Primary External Adjacencies

- Customer Training and Support for enterprise and departmental systems.
- Staging areas for installation, maintenance, and support of ITS infrastructure.
- IT Analyst interactions with Hospital personnel for system development and project management tasks for ITS project development/implementations

Planning and Design

- The telephone company requires a Minimum Point of Entry (MPOE) that is easy to access, within distance limitations of the Main Distribution Facilities (MDFs), and secure. Dual entrance facilities should be built for the MPOE to prevent single point of failure for communications lines servicing the building.
- Each building requires a minimum of (1) Main Distribution Facility (MDF) and a minimum of (1) Intermediary Distribution Facility (IDF) per floor. The number of IDFs is a function of the floorspace and geographical layout of any given floor.
- The MDF room shall be dedicated to communications equipment. It cannot be used for storage. The MDFs and IDFs shall require adequate air conditioning, electrical and security systems. The MDFs (voice and/or data - could be two separate facilities) may require dual power sources, one from the electric company, another from building generators/backup.
- In addition to the MDF, additional secured space shall be required on each floor or the facility which shall serve as Intermediary Distribution Facilities (IDF's) to permit distribution of fiber optic, twisted pair and coaxial cable to the workstations and patient rooms located on each floor. The number of IDF's shall be determined by the cable distance from the workstation/patient bed to the IDF. As with the MDF room, the IDF room must be dedicated to its function.

- A single (or dual) riser shall be required for communications circuits to run between MDFs and IDF. As it turns out, separate risers may be required for data and voice systems.
- There shall need to be space within the MDF or linked to the MDF for adequate Server Housing. This space shall be determined by the amount of system redundancy and access by local departmental ITS personnel that is required.
- The major Data Center(s) shall house the majority of the server capacity in off-site facilities.

Operational Systems

Material Movement System

- Delivery of supplies to departments via carts shall be through dedicated staff/service circulation, separate from public paths.
- Soiled Utility rooms shall be used to hold waste (general, hazardous & recyclable) by Environmental Services.
- Following collection, they shall be transported a central holding room adjacent to the material elevator(s). Waste shall then be transported to the Soiled Collection Center for pick up.

CLINICAL ENGINEERING

Clinical Engineering is responsible for the quality assurance of equipment operations, periodic scheduled preventive maintenance inspection, inspection of newly arrived equipment as well as being involved in setting up in-service education, product evaluations and recall campaigns. The department moderates equipment service contracts and participates in safety programs and risk management activities.

Capacity Assumptions

Equipment activities in the future are expected to increase due to the increase use of new technology in patient care areas and the overall increase in quantity.

Planning & Design

- Major functional areas consist of satellite work areas, main lab, radiology area, bed repair area, new equipment receiving and storage, new equipment testing area, pc repair area, general repair area and support areas (e.g. admin. offices, staff facilities, etc.)
- Satellite work areas shall be provided remotely to support:
 - Perioperative Services, Anesthesiology (avoids cleaning & disinfecting equipment every time they are moved in and out of that area).
 - CSSD (if not immediately adjacent).
 - Diagnostic Imaging (if not adjacent or immediately accessible).
 - Clinical Lab (verify need within hospital if majority of lab is off-site).
 - Outpatient Pharmacy
- The location of the technician lab has a direct impact on the response time to on-site service calls. Usually, service calls are received when there is a patient connected to the equipment.
- Centralize the main lab within the main hospital. A connection shall be provided to Outpatient Building for efficient equipment and staff access.
- The main lab needs to be easily accessible to service elevators. Paths, doors and work areas within this lab shall be adequately sized for the maneuvering of large equipment and supplies (pallets).
- The main lab has special requirements for decontamination, hoods (clinical lab & anesthesia equipment), piped medical gases, floor drains, distilled water, equipment lifts, computer network connections, etc.

CLINICAL ENGINEERING – Cont'd.

- The clinical lab satellite work area needs natural gas supply and a hood.
- The radiology area shall consist of a lead lined room to be used for x-ray exposures, laser calibration, etc.
- The equipment receiving and storage area needs to be accessible to the receiving dock. This area shall also be used to store medical equipment when a service undergoes renovation and construction. This needs to be a secure area.
- The new equipment testing area is for completing acceptance inspections and burn-in prior to installations.

This area (as well as other areas) needs computer network connections and sufficient power requirements.

More space flexibility shall be achieved if the new equipment testing area is combined with the equipment receiving and storage area within one room.

- Truck arrival, departure, turnaround and exhaust must be considered when designing the dock area.

ENVIRONMENTAL SERVICES

The necessary level of cleaning for each area is maintained according to the standards, guidelines, and regulations for that area.

Planning & Design

- Vehicular access for pick-ups shall be separate from public circulation.
- Provisions for ES equipment storage & cleaning, chemical storage and clean linen storage shall be integrated with Materials Management. Main Storage Area should have hot and cold water as well as hopper Sink.
- Emergency Power
- Storage for audio-visual equipment and educational materials.
- Soiled Utility rooms shall be used to hold waste (general, hazardous & recyclable) for pick-up by Environmental Services. Following collection, they shall be transported a central holding room adjacent to the material elevator(s). Waste shall then be transported to the Soiled Collection Center for pick up.
- Housekeeping closets throughout the facility shall be used to store carts & supplies (w/ floor sink).
- A central vacuum system should be planned throughout the new facility.

Material Movement System

- **Delivery of supplies to departments via carts shall be through dedicated staff/service circulation, separate from public paths.**
- Soiled Utility rooms shall be used to hold waste (general, hazardous & recyclable) for pick-up by Environmental Services.
- Following collection, they shall be transported a central holding room adjacent to the material elevator(s). Waste shall then be transported to the Soiled Collection Center for pick up.

PATIENT TRANSPORT

Patient Transport Service is responsible for the transport of patients from their rooms to ancillary services and discharge locations.

Patient Transport is responsible for ensuring the comfort of the patient while they are being moved within or between buildings.

Additional responsibilities include the transport of bodies to the morgue, medical record charts and some equipment movement.

Planning & Design

- Wheelchair and stretcher area should be sufficiently large to contain a parts and repair area as well as storage.
- The supervisor/dispatch area and the break/locker area shall be adjacent to each other in one open area. Wheelchair/stretcher storage should be adjacent to this area. Space should be sufficient for gurneys and employees.
- A lounge/locker room and waiting area are needed for this service. This may be adjacent to the Supervisor/Dispatch area.
- **Future space programming must consider that as the number of beds increase, the number of transports shall increase.**
- Service should have good access and communication to all areas of the hospital.
- The supervisor/dispatch area should have interior views and exterior views of employee seating area, elevator system, equipment areas, servicing, parking and entrances.
- Access to a Conference/Training area which can accommodate 25 people.
- Archive filing system
- Administrative office suite with offices and a small conference room. Not necessarily located adjacent to Supervisor/Dispatch area.

Operational Systems

- User areas call in a request for transport service to a central request and dispatch area. These requests include both future and immediate service. The time the request are received and the time service is required are logged. The dispatcher shall assign each transport duty to an available transporter. Paging systems are utilized after hours and on weekends. Transporters call the central dispatcher upon completion of a task to receive another assignment. If none is available, the transporter returns to the central dispatch area to await assignment.

INFECTION CONTROL

The Infection Control Services is responsible for the surveillance of infectious diseases within the hospital and the subsequent development of corrective action for their prevention and/or management.

Primary activities include surveillance rounds to inpatient units as well as committee work and liason activities with the Department of Health.

Primary External Adjacencies

- The department should be located with easy access to inpatient units, particularly ICU.

HOME HEALTH

The Home Health Services provides skilled nursing services, infusion services, nurse consultation services, maternal and child health services, hospice services, pediatric services, home health aide supervision, home health aide services, physical therapy, occupational therapy, speech therapy, medical social services, and nutrition counseling.

Planning & Design

- Since workers go into the field after obtaining supplies from the department, easily accessible parking is necessary.
- Secure area for medical supply storage.
- Separate secure area for medical waste
- Mandatory conference room
- Space for Home Care Coordinators.
- Field staff work space for supply pick-up, documentation, meetings.

SOCIAL SERVICES

The Clinical Social Services Department offers individual and family interviews, staff problem solving, education support groups, and social work student education. The scope of service includes: illness adjustment counseling, discharge planning, advocacy, domestic violence issues, and staff education.

Planning & Design

- An interview/consultation room is necessary. Computerized charting.
- Multidisciplinary consultation rooms, located on the units, shall be utilized and shared by other services.
- Acoustic attenuation between patient interview rooms is required to maintain confidentiality.
- Social Workers and Discharge Planners should have offices in the core on each floor.
- Private offices for the Social Work Managers shall be in the administration area.
- The Emergency Department component of Social Services shall consist of a workspace for a social worker.

PATIENT CARE SERVICES ADMINISTRATION

Patient care Services Administration provides leadership in current and changing nursing practice and in the organization and delivery of patient care services to assure a high quality practice. The administrative department functions include: central administration/management, nurse recruitment and 24 hour staffing, float team staffing, patient care resources, supportive services, trauma services, diabetes mellitus services, enterstomal therapy services and total parenteral nutrition services. The following briefly describes each area:

Central Patient Care Services Administration

Management responsibilities for the nursing units, departments and functions with the medical center

Staffing

Staffing responsibility for Registered Nurses, Licensed Vocational Nurses, Certified Nursing Assistants, Care Partners, Unit Support Coordinators, and Unit Support Associates. All temporary personnel must check in and receive assignments prior to shift.

Patient Care Float Team

Float Team staffing responsibility consists of supplying RNs.

Patient Care Resources

Responsible for entry and processing, benefits counseling, workers' compensation, disability/processing and maintenance of all personnel files for all patient care services personnel.

Supportive Services

Provide psychosocial support to patients, families and staff; provide interventions such as guided imagery, relaxation techniques, support groups, healing work, bereavement follow-up.

Trauma Services

Responsible for ensuring that quality care is provided to all patients admitted to the service and that care is provided in a cost efficient manner. Trauma services maintains all state and county regulations for a Level I trauma center and maintains the trauma registry.

Anticipate an increase in volume over time.

Diabetes Mellitus Education

Provide admission assessment, education, skills development, and discharge planning to help patients learn to live with diabetes mellitus.

Anticipate an increase in volume over time.

PATIENT CARES SERVICES ADMINISTRATION – Cont'd.

Enterstomal Therapy Nursing

Provide care for patients with draining wounds, fistuale, or skin breakdown secondary to circulatory compromise, incontinence, or trauma. The primary focus is on education and counseling. Patients are seen in the Emergency Department, inpatient areas, outpatient clinics, psychiatric units, and ET office.

Services are provided to a multifaceted population including neonatal, pediatrics, adult, and geriatric patients.

Total Parenteral Nutrition Services

Provide case management services, including patient education, discharge planning and coordination of follow-up care as well as consultation for Hospital staff in regards to management of patients requiring parenteral/enteral nutrient and care of parenteral/enteral devices.

Primary External Adjacencies

Central Patient Care Services Administration

- Patient Care areas
- Associate Director of Patient Care Services
- Hospital Administration

Recruitment/Staffing

- Float team Administration
- Patient Care Services Administration
- Bed Control / Financial Counseling

Patient Care Resources

- Patient Care Services Administration
- Human Resources
- Occupational Health
- Staff parking and commuter services

Supportive Services

- Oncology unit
- Social work
- Prayer rooms

Trauma Services

- Emergency Department
- ICUs
- Acute care nursing units caring for trauma patients

PATIENT CARES SERVICES ADMINISTRATION – Cont'd.

Diabetes Mellitus Education

- Nursing units
- Dietary
- Pharmacy
- Social services
- Physical therapy

Enterstomal Therapy Nursing

- Nursing units

Total Parenteral Nutrition Services

- Pediatric GI
- Inpatient inpatient care areas
- Home Care Pharmacy

Planning and Design

- Central Patient Care Services Administration should be accessible to the public and be located near the other Hospital Administration executive offices.
- Central Patient Care Services Administration needs conference room to accommodate 20 people.
- Clinical Directors, Asst Director, Special Projects and Finance Director need space for 6 people to meet in offices.
- Assistant to Chief Nursing Officer should have private office.
- Assistants should be located in proximity to the managers.
- Receptionist/waiting area should be visible to the public: remainder of Patient Care Service Administration offices should not be visible from the waiting area.
- Central Patient Care Administration requires space for a large copier and mail boxes.
- Recruitment/Staffing needs space for applicants to complete applications and to wait for interviews. Interviewing space also required.
- Float team administrative offices need to accommodate high volume of staff coming through and have adequate storage space for required documentation.
- Staffing Office should be located near main employee entrance so nurses can easily "check-in" before proceeding to their assigned units.
- Modular open office concept, in lieu of private offices should be utilized, where appropriate.

PATIENT CARES SERVICES ADMINISTRATION – Cont'd.

- All areas should be secured for departments that are staffed 24-hours per day.
- Private office within the oncology unit is needed for Supportive Services nurse.
- Enterstomal Therapy staffs need an office in an inpatient area that can double as a meeting area.
- Trauma services staff need an office near patient care areas.
- Computer Resource Manager requires space for network server to be in close proximity to office. Area must be able to be secured.
- Patient Care Services Business Managers need adequate space to maintain all appropriate documentation.
- Only one Nursing Supervisor is on duty nights, weekends, and holidays, and can therefore share office space.
- Float Team staff, except for manager and assistant, work in the patient care areas.
- Total Parenteral Nutrition staffs need an office in an inpatient area or close proximity.
- Patient Care Resources needs dedicated space to do new hire and benefit counseling for up to 10 people per session.
- Space needed for secure file room to hold personnel files for employees. Needs to be in close proximity to the Patient Care Resource offices.
- Restrooms need to be nearby.
- Staffing office needs emergency power access.

PATIENT RELATIONS

The Patient Relations Department plays an advocacy role for patients and their families. The department investigates complaints from patients, visitors, staff, etc., regarding services rendered by the hospital. Patient liaisons visit new admissions, explain the patient's bill of rights, resolve patient complaints and provide related support to other departments. Provide foreign and sign language interpretation and foreign language translation.

Planning & Design

A secretary/waiting area should provide reception and control access to the department with unobstructing standing room for 6.

- Patient Liaison's offices should be arranged to provide privacy to patients.
- Separate work stations for interpreters and administrative assistants in an open environment that is workable.
- Work stations for a minimum of 3 volunteers at one time.
- Patient families are seen on the nursing units as well as in the department.
- Formal office center with computer, printer, fax workspace for families.
- Information storage, secured exits, space for clerks, computers.
- Conference room to accommodate 6-10 for patient/doctor, or patient/staff.

ADMISSIONS

The Admissions and Registration is responsible for inpatient registration and admitting, insurance verification, and bed control. These processes include obtaining demographic and financial information from patients.

The Patient Administrative Service Teams are responsible for inpatient admissions and medical record abstracting for all discharges. This process includes obtaining all demographic and financial information and conducting financial case management and account processing. PAS teams shall be housed on nursing units according to patient aggregation. It is optimal that inpatient admissions take place in the patient room.

The Same Day Admit unit admits same day surgery patients adjacent to pre-op.

The Transfer Center, located in the Emergency Department, shall facilitate patient transfers from other patient care facilities to the Hospital.

Emergency patients shall be registered by the admitting/registration staff located in the Emergency Department.

Planning & Design

- Main admissions area and PAS team offices must be equipped with patient/family interview space to allow for confidentiality during interviews.
- The admissions department should be located such that it is not seen as the primary site for information or direction.
- PAS teams require office space on patient floors to support the admissions and financial processes for multiple units.
- PAS teams, utilization review and discharge planning staff supporting the same unit can be housed in one adequately sized room.

INFORMATION 'CONCIERGE' SERVICES

The mission of the Information 'Concierge' Services is to assist customers in making their experience at the Hospital as pleasant and comfortable as possible by responding to inquiries, resolving problems and bridging language barriers. Strive to meet the needs of patients, their families, visitors and staff in a spirit of compassion and humanism.

Planning & Design

- Information desk height to provide comfortable leaning and writing surface for standing visitors as well as those in wheelchairs. Length of desk for several at one time.
- Information desk to be placed approximately 60' from hospital main entrance to avoid weather health hazards to staff.
- Information desk to have ample storage
- Information desk needs house phones
- Information desk needs glass cabinets and digital displays to post coming events
- Cold water sink and vase spigot in work area for patient floral work.

GREEN DESIGN STRATEGIES

Strategies to be Set Out to Achieve:

- Energy: Systematic targeting of reductions in energy use and thereby reducing CO₂ emission levels.
- Waste: The effective and proper management, disposal and recycling, where available and appropriate, of clinical and domestic waste.
- Water: The management of water consumption.
- Transport: Progress towards Healthy Transport Plans

Actions and Benefits:

- ✓ Appraise and review impact of facilities, services and activities on the environment:
 - Energy efficiency program: Combine heat and power generates electricity at site; Utilizing heat and electricity generated can give efficiencies – better environmental performance, lower energy bills.
 - Work with suppliers to reduce packaging waste.
 - Consider opportunities for renewable energy.
- ✓ Recognize the social and economic factors:
 - Community involvement will generate local support.
 - Environmental benefits such as reducing power or waste can reduce cost
 - Consider whole life costing
- ✓ Introduce Environmental Management Systems
 - Identify benefits of a more sustainable approach right from the start, and build these into plans. - This will save on costs in amendments at a future date.
- ✓ Working Partnership:
 - Work with local authority to find out what is being planned in Local Agenda strategies so can work along with it. Let them know that you are doing it as it saves potential difficulties arising later.
 - Partnership and sharing arrangements are possible with other large hospitals to reduce costs, etc.
- ✓ Healthy Transport Plans
 - Develop healthy transport plans to reduce journeys.
 - Less pollution, better financial returns – Less stress from traffic jams
 - Be in line with local authority transport strategy.
- ✓ Energy
 - Efficient Management of its site and full advantage of power plant.

NEW A&E HOSPITAL ZEBEL ALI, DUBAI

GREEN DESIGN STRATEGIES - 2

- ✓ Waste:
 - Reduce clinical waste through proper segregation
 - Recycle office paper, reducing disposal costs and amount going to landfill
- ✓ Water
 - Save costs by the location and repair of long-term major leaks
 - Save costs by downsizing their water meter
- ✓ Transport
 - Start monitoring and recording traffic flow. Save staff travel expenses and reduced pressure on parking by introducing minibus service
- ✓ Sustainable Procurement
 - Take advantage of best practice and experience elsewhere to draw up criteria for construction
 - Produce a better designed facility, which is better for staff, patients and visitors
 - Check environmental credentials of those with whom Hospital do business

Case Studies in the United States:

The healing environments of hospital extend from the micro level of the patient to the macro level of the community to the super-macro level of the earth. To heal their patients and safeguard the health of their employees, hospital leaders recognize they must also do their part to transform their hospitals to promote healing, while using their purchasing power to heal their community and the planet.

In terms of the economy, although constructing green buildings is often perceived to be more expensive than building conventional structures, the evolving industry is now estimating that green construction represents only a 2% premium over traditional construction, with a payback period of up to 15 years. The largest investment and payback are associated with credits in the Green Guide for Healthcare's Energy & Atmosphere category. Still yet, since the capital is so tight, the Hospital leaders are being questioned their ability to follow through, even though everyone agrees that sustainable design is a good thing to do.

The local community just loves the fact that they are being environmentally responsible. Donors make a significant pledge contingent on the pursuit of green design. Because sustainable products and methods had been used whenever the cost had been comparable to that of traditional products and methods, it becomes possible to fulfill the request and accept the donation.

Going green also make the regulatory process smoother. Because the hospital is incorporating features such as green roofs, zoning do go much more smoothly than it did on their past projects.

The first cost can be mitigated over the life of the project, as operations of sustainable buildings are providing to be more resource-efficient, as well as more desirable to clients, patients, staff, and lessees.

The Hospital's initial pursuit of green design which was entirely in keeping with the hospital's publicity campaign of "Patient Care", the idea of green roof is spoken in terms of improving views from patient rooms, by designing them to overlook vegetation instead of a typical hard roofscape.

The hospital staff also comes to embrace the idea of sustainability from an operations perspective. Group of employees now form a committee to reduce impact of hospital operations on the environment. Their initiatives include commingling recycling at 18-20%, adoption of reusable sharps containers, audit of hospital-wide mercury usage, and assessment of pharmaceutical waste management. All levels of the organizations involved are constantly educated about green concepts and processes.

The Building Contractors are being asked to state where specified products are manufactured, so that sustainable products could be identified and used whenever their cost is not prohibitive. Construction Waste Contractors are able to recycle 70%-85% of the waste with no or very little additional cost; and petroleum-based red substance often being used to control dust at the construction site are being with a more environmentally friendly green type.

Available Knowledge in the United States

Green Design conforms to environmentally sound principles of building, material and energy use. The essential aim of green design is to create places and services in a way that reduces use of non-renewable resources, minimizes environmental impact, and relates people with the natural environment.

Principles of green design

While the practical application varies among disciplines, some common principles are as follows:

- Low-impact materials: choose non-toxic, sustainably-produced or recycled materials which require little energy to process
- Energy efficiency: use manufacturing processes and produce products which require less energy
- Quality and durability: longer-lasting and better-functioning products will have to be replaced less frequently, reducing the impacts of producing replacements
- Design for reuse and recycling: "Products, processes, and systems should be designed for performance in a commercial afterlife.
- Biomimicry: Redesigning industrial systems on biological lines, enabling the constant reuse of materials in continuous closed cycles.
- Service substitution: shifting the mode of consumption from personal ownership of products to provision of services which provide similar functions, e.g. from a private automobile to a carsharing service. Such a system promotes minimal resource use per unit of consumption (e.g., per trip driven).

- Standardization and modularity: standard, modular parts allow products to be repaired rather than replaced and promote interoperability so that systems can be upgraded incrementally rather than wholly scrapped and replaced.

Green architecture is the design of sustainable buildings. Sustainable green architecture attempts to reduce the collective environmental impacts during the production of building components, during the construction process, as well as during the lifecycle of the building (heating, electricity use, carpet cleaning etc). This design practice emphasises efficiency of heating and cooling systems, alternative energy sources such as passive solar, appropriate building siting, reused or recycled building materials, on-site power generation (solar technology, ground source heat pumps, wind power), rainwater harvesting for gardening and washing, and on-site waste management such as green roofs that filter and control stormwater runoff.

The practice of green building can lead to benefits including reduced operating costs by increasing productivity and using less energy and water, improved public and occupant health due to improved indoor air quality, and reduced environmental impacts by, for example, lessening storm water runoff and the heat island effect.

Practitioners of green building often seek to achieve not only ecological but aesthetic harmony between a structure and its surrounding natural and built environment.

GREEN SITING AND LAND USE

Site Selection - Avoid development on sites that are: agricultural; in the 100-year flood plain; subject to landslides, erosion or wildfires; habitat to endangered species; wetlands.

Urban Redevelopment - Channel development to urban areas with existing infrastructure, protecting green-fields and preserving habitat and natural resources.

Alternative Transportation - Reduce pollution and land development impacts from car use by locating buildings near transit, providing bicycle amenities, encourage carpooling, and providing alternative fueling stations.

Reduce Site Disturbance - Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Storm water Management - Limit disruption of natural water flows by eliminating storm water runoff, increasing on-site infiltration and reducing contaminants. Minimize impervious surfaces. Implement groundwater recharge.

Landscape and Exterior Design to Reduce Heat Islands - Reduce heat islands by eliminating or shading blacktop paving and dark roof surfaces.

Light Pollution Reduction - Eliminate light trespass from the building site. Improve night sky access.

GREEN WATER

Water Efficient Landscaping - Minimize the use of potable water for irrigation by using high efficiency irrigation technologies, including drip irrigation, rainwater capture, gray water, etc.

Water Use Reduction - Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems. Specify water-efficient fixtures and equipment.

GREEN ENERGY AND ATMOSPHERE

Optimize Energy Performance through siting, orientation, building form, insulation, glazing, day lighting, and controls. Study performance with energy modeling programs. Practice integrated design including all parties of the project from inception.

Renewable Energy - Promote energy self-sufficiency and minimize reliance on limited fossil fuels by incorporating on-site renewable energy sources such as solar, wind, geothermal and biomass.

Building Commissioning - Verify that the building is designed, constructed, and calibrated to operate as intended with third party quality control assurance.

Eliminate HCFCs - Reduce ozone depletion by installing building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFCs.

GREEN MATERIALS

Building Reuse - Extend the life cycle of building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impact of new buildings.

Construction Waste Management - Divert construction, demolition, and land clearing debris from landfills. Redirect recyclable material back to the manufacturing process.

Resource Reuse - Specify salvaged or refurbished materials such as wood flooring/paneling/cabinets, doors and frames, mantels, ironwork, decorative light fixtures, brick, masonry.

Recycling/Recycled Content - Provide for occupant recycling of waste. Specify products that contain recycled material.

Local/Regional Materials - Specify materials that are harvested, extracted and manufactured regionally.

Rapidly Renewable Materials - Specify rapidly renewable materials such as straw, bamboo and some woods.

Certified Wood - Specify wood from certified sustain-ably managed forests.

GREEN INDOOR ENVIRONMENT

Carbon Dioxide Monitoring/Exhaust - Install independent system or make a function of building HVAC system.

Assure Ventilation Effectiveness - Employ architectural and HVAC design strategies to increase ventilation effectiveness and prevent short-circuiting of airflow delivery. Consider under-floor HVAC and operable windows.

Construction IAQ Management Plan - Implement during construction process to protect ventilation system and workers.

Low-VOC Materials - Specify low-VOC adhesives, sealants, coatings, composite wood products and carpet systems.

Indoor Chemical and Pollutant Source Control - Install entry grates to capture dirt. Segregate and separately ventilate areas of chemical use and storage. Appropriately plumb drains used for liquid waste disposal.

Controllability of Systems - Provide a high level of individual control of thermal, ventilation and lighting systems.

Daylight and Views - Provide a connection between indoor spaces and outdoor environment through the introduction of sunlight and views in a glare-free way. Consider courtyards, atriums, clerestory windows, skylights, and light shelves.

BENCHMARK #1:

LOS ANGELES COUNTY LEVEL I TRAUMA HOSPITAL <The largest Trauma and Burn Center in the Nation>

Trauma Medicine

Our Los Angeles County Trauma Hospital Project's Trauma Medicine Program provides around the clock expert care to **175,000 patients annually**, about 60% of whom are subsequently admitted to inpatient services.

The Emergency Department provides state-of-the-art evaluation and treatment for adult patients with a full spectrum of emergency medical needs. The most common serious complaints and diagnoses include chest pain/angina/myocardial infarction, heart failure, complications of alcohol and drug use, diabetes, epileptic seizures, cerebrovascular accidents, abdominal pain and gastrointestinal bleeding, pneumonia and respiratory diseases, systemic infections, abscesses, lacerations and orthopedic and rheumatologic complaints. The **Children's Trauma Medicine Program** also provides a level of expertise and range of services and resources dedicated to children in need of emergency medicine and trauma care.

The Emergency Department is one of a largest and top regional center for emergency and trauma care in the world. The Department also receives, evaluate and stabilize approximately **1,200 patients per year transferred from all over the World**. The Department is officially designated as a Level I Regional Trauma Center and a Burn Center for the County of Los Angeles.

The Trauma Hospital provides comprehensive care for injured patients. Upon notification and often prior to arrival, a specially trained and designated trauma team is assembled to begin the diagnosis and treatment of the trauma patient. The team evaluates the patient using carefully developed **trauma protocols**. This systematic assessment minimizes the chance that an injury will be missed. The trauma team is available 24 hours a day, seven days a week to treat the most severely injured patients. The **multidisciplinary team** members include both adult and pediatric trauma surgeons, physicians from other surgical and medical specialties, nurses and social workers.

Patients who use the Emergency Department (ED) will first encounter a large comfortable ultraviolet irradiation UV negative air **Waiting room** and **Triage room** with cheery color furniture, and bright walls decorated with art. Those with non-urgent medical needs will be sent to a special "**Fast Track**" area for quick treatment. Patients in need of urgent care will be brought to the **Trauma area**. Children will be treated in the ED's **Pediatric area**, which is designed to be child-friendly and non-threatening. It is also separate and private from the rest of the ED. Patients having an asthma attack will be treated in the ED's specially equipped **Asthma area**. Patients having a chest pain will be treated in the ED's specially equipped and monitored **Chest Pain area**. Patient having an acute stroke will be

BENCHMARK for ZEBEL ALI A&E HOSPITAL PROGRESSIVE TRAUMA PROGRAM EXPERIENCE - 2

treated in the ED's specially equipped **Stroke Center**. Women giving birth or requiring gynecological care will be treated in **OB/GYN Rooms**. Additionally, the ED is equipped with a **Decontamination Facility** that can process over 50 patients per hour, with special facilities, including a separate entrance and a decontamination shower for patients who may have been exposed to an infectious or toxic substance. Finally, **the entire ED has networked physiological monitors** that will notify care providers of a sudden change in a patient's vital signs from wherever they are in the unit.

The expansive services include such innovative programs as the **"MI Team"** and **"Stroke Team."**

The MI Team is a program dedicated to identifying acute coronary ischemia in ten minutes or less upon arrival.

The Stroke Team is a unique and dynamic trauma team fully prepared to rapidly evaluate and treat acute stroke.

Other emergency medicine initiatives include:

- **Paperless Emergency Department** – Ensure that "it's in the record" with its state-of-the-art complete electronic medical records system, allowing instant access to patient health records.
- **Care with Less Pain** - An ultrasound guided line placement catheter that greatly lessens pain for patients.
- **Childhood and Adolescent Emergencies** – Pediatric Emergency programs that specifically address the pain related needs of children.
- **Emergency Care for the Living** – Emergency Geriatric Care that specifically addresses the pain-related needs of the elderly.
- **Abdominal Pain Evaluation** – The State-of-the-art evaluation allows patients' access to premier gastroenterologists.

To be the Emergency Department that was **not only stylish, state-of-the-art, and safe, but could 'handle' a mass casualty event**, the Emergency Department facility's features include the following **Improved Readiness / Disaster Preparedness capabilities and capacities**:

Stemmed from the Hazard Vulnerability Analysis, was how to keep a facility safe from bioterrorism and or a chemical incident.

- This first meant preventing potential hazards from 'gaining access' to the facility by having triage and equipment for setup of the decontamination process being placed outside the new facility under a new ambulance drop-off overhang with emergency showers placed in the overhang above. This area could also serve as the mobile treatment areas for mass casualty.

BENCHMARK for ZEBEL ALI A&E HOSPITAL PROGRESSIVE TRAUMA PROGRAM EXPERIENCE - 3

- Secondly, it meant dealing with hazards, if by some chain of events, did become introduced within the buildings. To plan for this second contingency meant diving deeper into their engineering systems planned for this new facility. The Engineering ventilation or HVAC systems, although 'backstage', will play a 'visible' role when 'in the course' of responding to one of these contingent events.

The specific agents were identified to be Bacillus Anthracis, Ebola, Hepatitis A, Influenza, Small Pox, Yellow Fever, and hazardous chemical material. The biological particle size, over the range of specific hazards, was determined to be 3-100 microns. A high efficiency particulate arrestor (HEPA) could only contain particles down to 30 microns. However, if used in conjunction with ultraviolet irradiation (UV), the entire range could be accounted for. The appropriate number of supply, return, and exhaust air exchanges was designed within each individual public and staff area. To address the remaining risk, a hazardous chemical event, the use of carbon filtration, coupled with a 'shelter-in-place' ventilation sequence was incorporated.

These features have assisted Los Angeles County Trauma Hospital to balance their decision making process to provide a stylish, state-of-the-art, and safe new facility that will solidify their emergency services strategies through the year 2015 while maintaining their commitment to the community they serve through enhanced disaster response capacities and capabilities.

The Burn Center

The Burn Center is the largest and busiest in the nation, treating more than 2,300 inpatients and 4,000 outpatients annually. Its research has led to significant improvements in the survival rate and quality of life for both adults and children.

Providing the highest level of medical care and highest standards of clinical and therapeutic excellence has established the reputation for being one of the most caring and dedicated centers in the world. Furthermore, every year the Burn Center is trusted with the treatment of more than 1,000 children. Since the beginning, the Burn Center has also had a special relationship with the Los Angeles County Fire Department. The Center is honored to be the burn center most relied upon by the County's firefighters, many of whom played a major role in the development of the burn program. The Center also works closely with the Los Angeles County Firefighters Burn Center Foundation to ***educate the public on fire hazards and prevention.***

In addition to the most sophisticated treatment and technology currently available, the Center offers the expertise of a highly coordinated team, staffed with surgeons, therapists, dietitians, nurses and social workers. Together, the multidisciplinary team offers **comprehensive treatment for the three phases of burn-injury care**: burn shock, wound care/surgery, and rehabilitative/reconstructive.

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Critical Care

Los Angeles County Trauma Hospital has a Level 1 Trauma Unit and an extensive system of Intensive Care Units that offer the highest level of expertise in trauma and critical care management, with dedicated specialists available 24 hours per day.

Trauma and Critical Care medicine has a particular expertise in critical care of patients with acute neurological conditions and in pulmonary critical care. The extensive experience in treating Trauma makes the Trauma Hospital a particularly important resource in caring for patients with **critical injuries, head trauma and multi-organ trauma.**

Trauma and Injury Prevention

Injury prevention education is mission and responsibility of the Hospital's trauma programs. The trauma staffs provide outreach efforts to help keep the public safe throughout the year. Programs include child passenger safety initiatives, bicycle safety programs, summer safety, home safety, driving safety, and fall prevention in older adults. The Hospital has a designated full-time trauma nurse coordinator for the prevention program.

The Hospital also is a member of the Safe Kids Coalition of Los Angeles County. This is part of the National Safe Kids Campaign, a national organization committed to preventing unintentional childhood injury. The Hospital is also a member of The Injury Free Coalition for Kids (IFCK). IFCK is a hospital based, community driven injury prevention program that focuses on reducing injuries to the children of Los Angeles County. Partnering with the Department of Community Pediatrics, the Hospital is working **to build a safer community.**

BENCHMARK #2 - HOSPITAL SECURITY: TOTAL SECURITY SYSTEM

The biggest security challenge that a hospital faces is how to secure a space that is intended to be not only a secured public environment, but also *an inviting one.*

In most hospitals, security is compromised by the lack of a clear separation between public and secure areas. Creating a defensible space, (i.e. one that has clearly defined boundaries with controlled access through those boundaries), has the greatest impact on the success of any security measures taken by a hospital.

There are many considerations that facilities need to take into account when planning to implement a security system. ***It is not just a matter of adding cameras and card readers; it includes taking advantage of the latest advances in security technology, addressing security policies, and designing the hospital buildings with security in mind.**

There are many factors that have to be balanced to provide "the right amount" of security in a hospital setting. **These factors are comprised of the organizational, natural, and mechanical security subsystems:** *Together they provide the total security system.*

The first step in creating a secure hospital is to identify the threats from which it must be protected. The nature of these threats is typically influenced by the facility's type of organization, its location, and its community image.

Organizational Security can be defined as the priority that security has at a facility and the influence that the facility's culture has on security.

For example, you may have a sophisticated access control system with picture badges issued to every employee, and card readers, electrified locks, and cameras protecting every door, but a courteous employee can defeat all of these security measures by holding a door open for a "tailgating" perpetrator.

Security policies, procedures, and training measures need to be implemented to help protect both patients and staff. Hospital facilities should attempt to create a culture in which patient, staff, and information security is a top priority, to include a concerned awareness and a predefined standard response by hospital staff whenever there is an outside presence in secure areas. Policies and procedures also need to address how facility personnel should handle maintenance workers, outside vendors, visitors, and deliveries requiring access to secured areas. Additionally, policies should address how the facility should manage the review of those who have "administrative authority" for the systems and determine which employees require background checks. The handling of employee terminations is a very critical part of Organizational Security, as well. And HIPAA requires that we ensure that patients' health information remains private.

BENCHMARK for ZEBEL ALI A&E HOSPITAL PROGRESSIVE TRAUMA PROGRAM EXPERIENCE - 6

Natural Security is the second piece of the security puzzle and it usually receives the least amount of attention. Natural security involves taking into account the design of the building and campus, to include space planning, landscaping, and lighting, which, when properly designed should help prevent security breeches.

- *Space planning* involves creating defensible spaces, having clear boundary definition, and installing proper lighting and signage.
- *Landscaping* design considerations include creating open, welcoming entrances which are not hidden by shrubs and trees.
- *Outdoor lighting* is also a major concern in landscaping design, especially in parking lots and on large campuses where patients and staff may have to walk quite a ways at night.

The third piece of a properly designed security system is **Mechanical Security**. (This security subsystem is mistakenly considered the whole security system and it often receives the bulk of the attention.)

The Mechanical Security includes the hardware that is used to provide protection to patients and staff, including the door hardware, access control systems, cameras, infant protection systems, and emergency call boxes.

There are numerous manufacturers of security hardware, each with their own feature sets. A proper analysis needs to be done to determine which feature sets are needed to best enhance security at each facility.

- The different considerations for *door hardware* include electric locks, electric strike, magnetic locks, crash bars, and automatic doors. A thorough security review should be completed to help determine which types of door hardware to use.
- *Electronic access control systems* grant access based on the presented card, record door activity (who, what time, etc); monitor and communicate a variety of alarms, and communicate with other systems such as CCTV and fire alarm systems.

Biometric access control systems are becoming more attractive as the cost of the technology has declined. Biometric systems offer the obvious advantage that you don't forget your eye or your finger when going to the hospital, and any biometric identification is difficult, if not impossible, to steal or duplicate. There are a variety of biometric systems available today, including speech recognition, eye shape scanners, fingerprint, hand geometry, and facial recognition.

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• *Video surveillance systems* (CCTV) are installed in facilities for a number of reasons: most commonly, to deter crime; to view the space in response to an alarm; and to use as an investigative tool after an incident. It is rare for hospital facilities to have the staff to monitor all cameras in a facility in real-time, 24 hours a day, 7 days a week, so most systems record activity that can be reviewed later (However these systems are often connected to alarms that draw the immediate attention of security personnel under predefined conditions).

Internet protocol cameras are starting to emerge in the market and should be considered when planning a CCTV upgrade. Digital recording offers some significant advantages over the older video tape system and has become the industry standard. Digitally recorded images provide higher resolution and are much easier to access than VHS tapes. Both server-based and appliance digital recorders are available on the market today. In digital recording systems, the video image is compressed and stored on hard drives, from which it can then be accessed and viewed from the corporate network via client software loaded on a PC or through a web browser interface. The advantages of accessing security images from anywhere are obvious.

Optimal Departmental Planning Strategies that enhance Security:

- Basement level of the building as a General Support Services floor to limit most of outside Vendor access to this level.
- Ground Level as the main entry level for the hospital for all visitors, patients, families, faculty, students, and staff. *There shall be few entry points to the building.
 - The Lobbies at each entrance shall be interconnected by a wide corridor concourse, facilitating movement from one end of the building to the other. In addition, this concourse shall connect the public elevator lobbies with the main lobbies.
 - A central information desk and security stations with "conciierge" appearance shall be located along this concourse as well.
- Emergency Department:
 - The Emergency Center shall be easily accessible with clearly denoted signage.
 - Security shall be provided at the entrances to the Emergency Department with direct visual control of drop-off, entrances and waiting areas. This shall be planned to provide high level security with "friendly" appearance. (Because Emergency Department is the Hospital's Front Door for many patients and family, the experience of the waiting room greatly contributes to their image of the facility as a whole.)
 - An infra-red **tracking system for patients and staff** should be planned.

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- Some of doors shall be specifically designed for psychiatric or agitated patients.
- Visitors and families in the Emergency Department would have access to the main lobbies of the Hospital but access to the Emergency Department by all others shall be discouraged to maintain security.

○ Nursing Units:

- Visitors shall be moved via a separate vertical core.
- Patient and service transport should be separate from and mix as little as possible with visitor traffic.
- It is desirable to provide two entries into the patient unit, one for staff & patient transport and one for visitor traffic.
- Patients shall be transported by trained Unit staff and/or by the Patient Transport team.
- The reception/unit access control should be located at the entry into the Unit.
- There should be an **equipment tracking system**. This should be monitored at the Nurses' Station/Communication Center.
- Additional approach for **ICU**: Entry into the ICU should be controlled from outside the unit. This could be accomplished with a manned Information Desk adjacent to the Waiting area **to prevent unauthorized visitor access**.
- Additional approach for **PICU**: The Nurse Station(s) shall be located to control access to the bed areas.
- Additional approach for Perinatal Unit: Infant identification/security system and hard wired video cameras for infant security should be provided in the Perinatal Unit.
- Additional approach for NICU: A viewing corridor should be provided adjacent to the unit for viewing of infants without entry into the unit.
- Additional approach for Nursery: Windows should be appropriately placed in the Nursery for family and visitors viewing infants.
- Additional approach for **VIP Units**: The VIP shall have direct access from parking to a VIP reception and VIP elevator. VIP units shall have security and limited access for staff.

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○ Diagnostic & Treatment Departments and Clinics:

- The waiting area should be visible from reception. Activities behind reception should also be secured and have privacy.
- Unit design should emphasize nurses station(s) to have maximum visibility of patient areas and short travel times.
- Unit layout should be organized by separate zonings for Public, Patient Care, and Staff areas.
- A separation shall be maintained for inpatient and outpatient flow, with inpatients having a "back door" to the service.
- Patients shall be transported by trained Unit staff and/or by Patient Escort team.
- Provide separate flow of materials and supplies in and out of the Unit minimizing passage through patient care areas.
- There should be a **patient tracking system which automatically registers** when a patient enters and exits operating/procedure rooms. This should be monitored at the Nurses' Station.
- There should be an equipment tracking system. This should be monitored at the Nurses' Station/Communication Center.

○ General Support Departments:

- Pharmacy: Controlled substances need to be maintained in a secured area within a secured area. The controlled substance vault must be secured from all sides including ceiling and floor.

A steel vault combination door with electronic key entry on the inside gate/door is recommended. Security cameras and motion detectors need to be **hardwired to the Police Station**. Panic buttons are also required.

An intermediate room where business can be conducted shall be provided since access to the vault storage area is limited to authorized personnel.

Alcohol storage should also be in enclosed rooms with proper security.

Security alarm system and perhaps visual observation system should be provided in the Pharmacy. Satellite pharmacies should also have a security alarm system.

- Bio Engineering: The equipment receiving and storage area needs to be a secure area.