

CLEAN FLOW

FACT OR FICTION?

F05

October 7, 2015
8:00 AM – 9:00 AM



HEALTHCARE
FACILITIES
symposium and expo



#HFSE

SPEAKERS



Marie Keim, BS, MT, CIC

- Director Epidemiology, Infection Control and Prevention, Reading Hospital
- 30+ Years Healthcare Experience
- 20+ years in Infection Prevention



Louis A. Meilink, Jr., AIA, ACHA, ACHE

- Principal at Ballinger
- 28+ Years Healthcare Experience
- Design + Planning of Surgical Suites for Top Academic Medical Centers, Regional and Community Hospitals



Dwight Smith, AIA, EDAC

- Senior Healthcare Planner, Ballinger
- 40+ Years Healthcare Experience
- 20+ Years Planning of Surgical Suites



LEARNING OBJECTIVES

In this session, you will learn...

- The current strategies for clean flow and where it should be applied
- How to differentiate between code minimum and best practices
- How the physical environment can affect the hospital's bottom line
- What resources and tools are available

F05



DEFINITIONS

CLEAN TECHNIQUE

The process used to prevent contamination with microorganisms. It prevents or reduces the risk of transmission of organisms from one person to another or from one place to another.

ASEPTIC TECHNIQUE

The purposeful prevention of contact and contamination of objects and areas with microorganisms e.g. sterile gloves/gowns, masks, drapes, skin prep, disinfection/sterilization instruments

SURGICAL ASEPSIS

Use of sterile technique to prevent the transfer of any organism from person to another or from one body site to another

DEFINITIONS

ANTISEPTIC

A substance used on skin or living tissue that inhibits the growth and development of microorganisms

DISINFECTANT

An item used on inanimate objects that destroys, neutralizes or inhibits microorganisms

IMU

Immediate Use Sterilization

SSI

Surgical Site Infection

SIR

Standard Incidence Ratio $SIR = \frac{\text{Observed \# SSI}}{\text{Expected \# SSI}}$

CLEAN FLOW IN THE SURGICAL SUITE

UNRESTRICTED ZONE

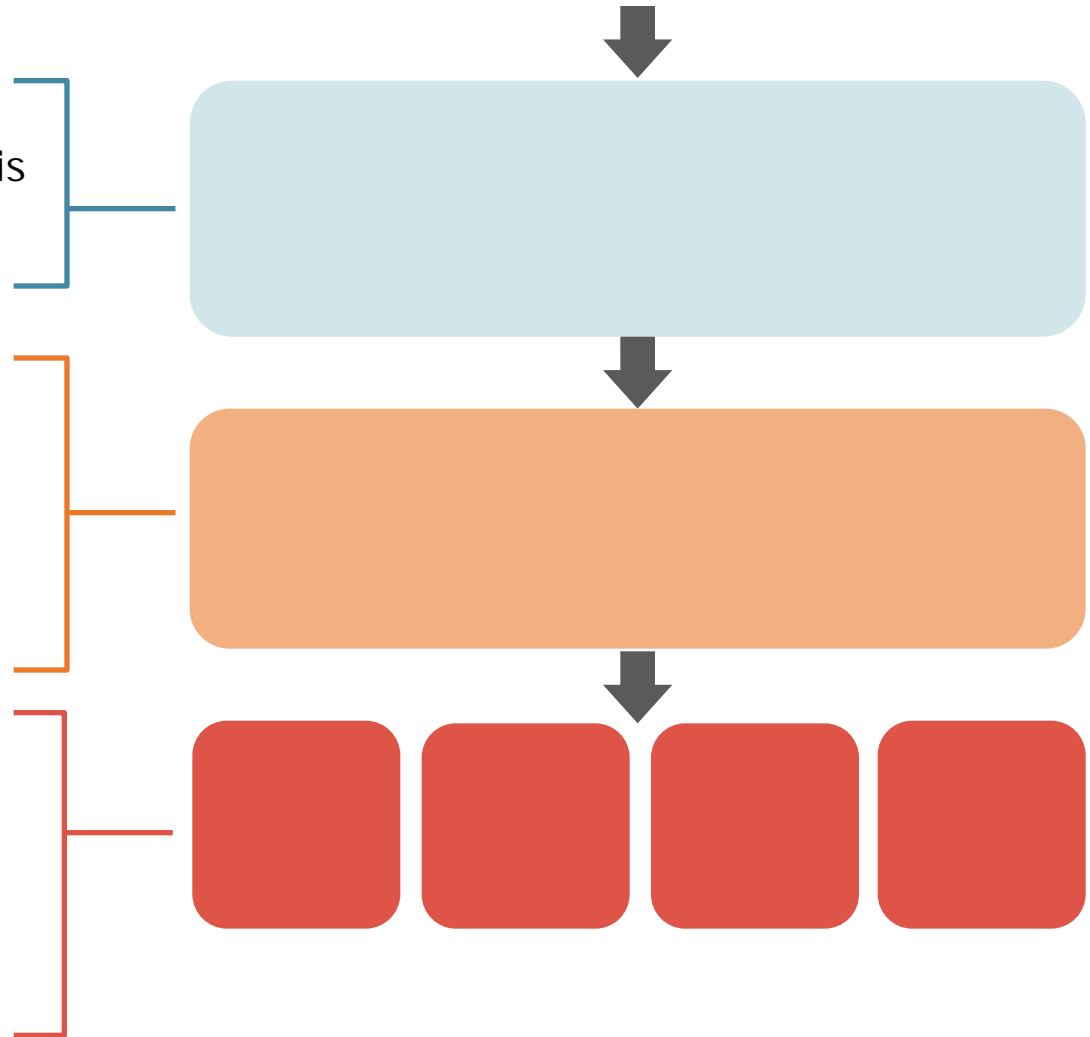
Street clothes are permitted in this area and traffic is not limited.

SEMI-RESTRICTED ZONE

Traffic is limited to authorized personnel and patients. Personnel are required to wear surgical attire and cover all head and facial hair.

RESTRICTED ZONE

Surgical attire and hair coverings are required. Masks are required where open sterile supplies or scrubbed persons may be located.



ORGANIZATIONS

AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes

American College of Surgeons



Association for Professionals in Infection Control and Epidemiology



Association of PeriOperative Registered Nurses



Association for the Advancement of Medical Instrumentation



Facility Guidelines Institute



Infectious Disease Society of America



The Society for Healthcare Epidemiology of America

ASEPTIC TECHNIQUE TIMELINE

1861 LOUIS PASTEUR GERM THEORY

1846 ANESTHESIA FIRST USED IN SURGERY

US CIVIL WAR

1884 GUSTAV NEUBER: GOWNS, CAPS

1929 ALEXANDER FLEMING: PENICILLIN

1964 WOUND CLASSIFICATION ACS

1960 DHEW: GENERAL STANDARDS FOR HOSPITAL CONSTRUCTION

1976 FIRST EDITION OF THE GUIDELINES

1840s

1920s

1970s

1847 IGNAZE SEMMELWEIS: HAND-WASHING

1890 WILLIAM HALSTED: GLOVES

1913 AMERICAN COLLEGE OF SURGEONS

1947 HILL-BURTON ACT: USA HOSPITAL REGS

1985 WOUND/ASA PREDICTIVE MODEL

1886 GUSTAV NEUBER: ASEPSIS APPLICATIONS

1974 SENIC PROJECT

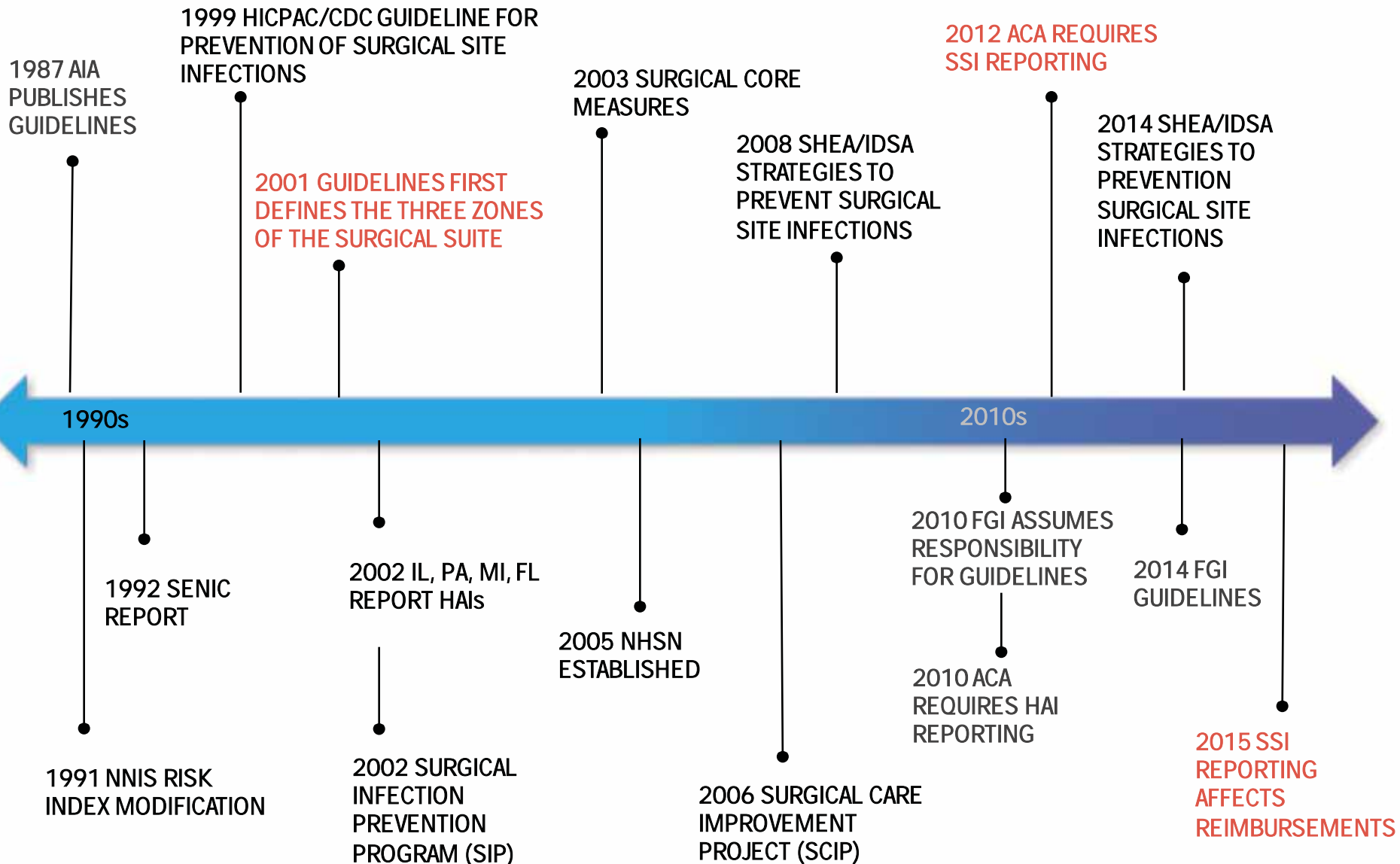
1865 JOSEPH LISTER: CARBOLIC SPRAY

1926 COLLEGE OF SURGEON'S STANDARDS

WWI

WWII

ASEPTIC TECHNIQUE TIMELINE



WHY CLEAN FLOW?



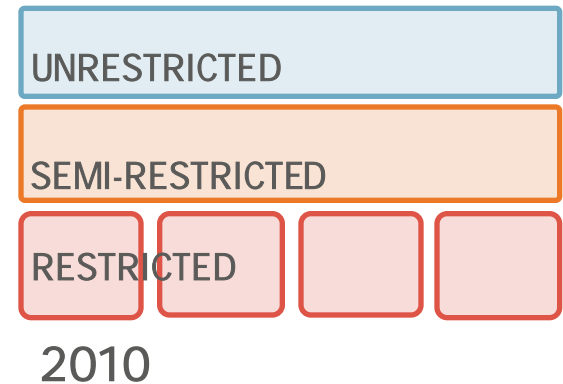
FGI GUIDELINES

CLEAN FLOW

2010 VERSION

2.2-3.3.1.2 Location

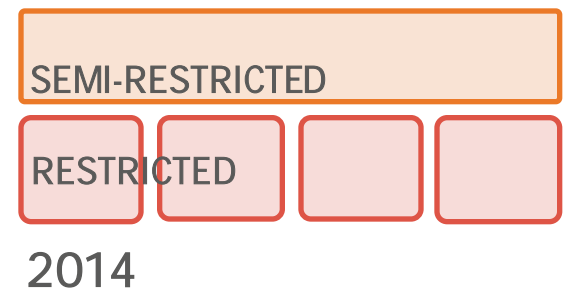
(4) The surgical suite shall be divided into three designated areas—unrestricted, semi-restricted, and restricted—defined by the physical activities performed in each area..



2014 VERSION

2.2-3.3.1.1 (4)

The surgical suite shall be divided into two designated areas—semi-restricted and restricted—defined by the physical activities performed in each area.



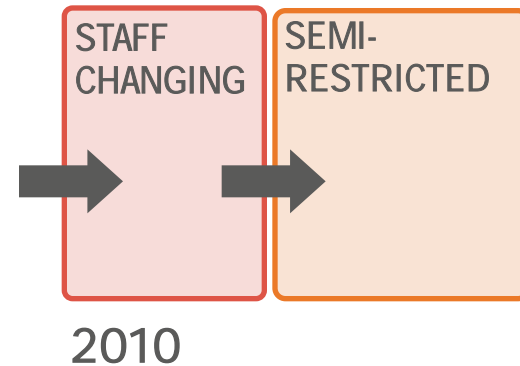
FGI GUIDELINES

CLEAN FLOW

2010 VERSION

2.2-3.3.7.2 Staff Changing areas and toilet facilities

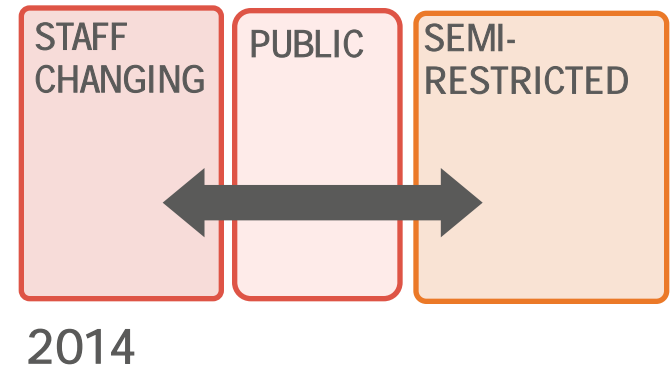
These areas shall be designed to provide a one-way traffic pattern so that personnel entering from outside the surgical suite can change and move directly into the surgical suite.



2014 VERSION

2.2-3.3.7.2 Staff changing areas and toilet facilities

(1) A locker area with one or more private changing rooms or areas shall be provided for male and female staff working in the surgical suite.



FGI GUIDELINES

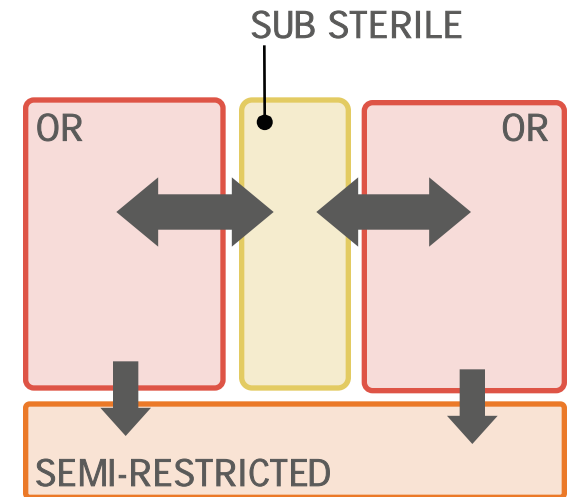
CLEAN FLOW

2010 VERSION

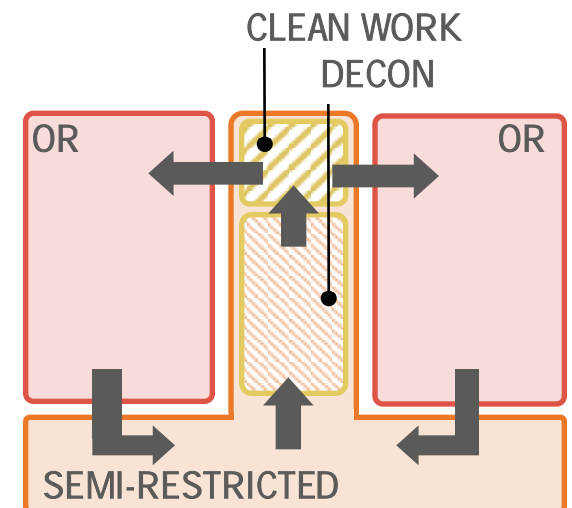
2.2-3.3.6.14 A substerile room.

If the functional program requires emergent sterilization, a room(a) for this purpose shall be provided in the surgery suite.

(1) This substerile room shall be either accessible from the operating room(s) it serves or shall be located inside the clean core if the clean core is directly accessible from the operating room(s). This room shall be able to be accessed without traveling through any operating rooms.



2010



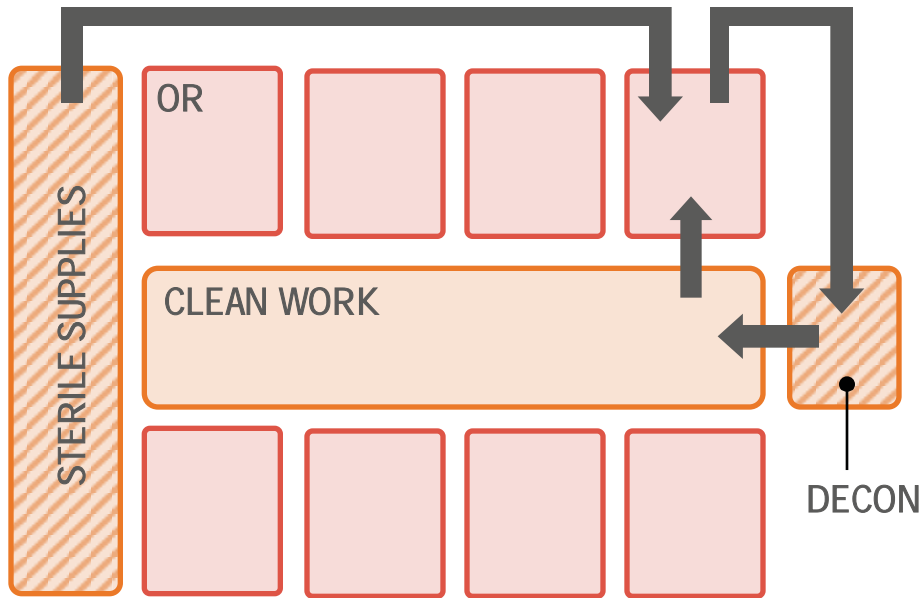
2014

2014 VERSION

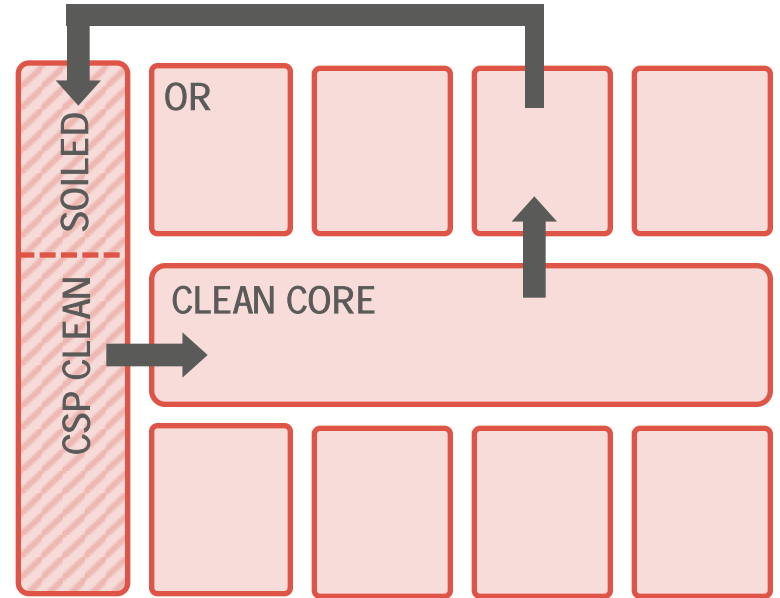
2.2-3.3.6.13 Sterile processing room

When sterilization processes are conducted in the surgical suite, a sterile processing room shall be provided.

FGI GUIDELINES CLEAN FLOW



CLEAN WORKROOM
(Semi-Restricted)

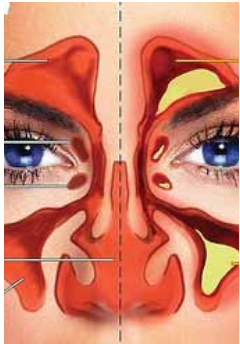
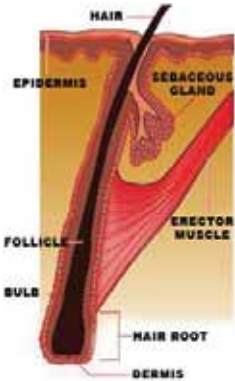


CLEAN CORE
(Restricted)

SURGICAL SITE INFECTIONS (SSI) RISK FACTORS

ENDOGENOUS

internally to the patient



SKIN + HAIR

NASAL



EXOGENOUS

externally to the patient



ENVIRONMENT



INSTRUMENTS



STAFF

RISK FACTORS

USP 797

“Squamous cells are normally shed from the human body at a rate of 10^6 or more per hour, and those skin particles are laden with microorganisms.”

CDC 1999

Sterile dressings should be used for incisions that have been closed primarily for the first 24-48 hours postoperatively

SHEA 2014, AJIC 2012

Minimize OR traffic

SSI RISKS + PREVENTION MEASURES

BEFORE SURGERY

MRSA history/decolonization, nutrition, CHG bathing

IMMEDIATELY BEFORE SURGERY

Antibiotic prophylaxis, clip hair if removal is required, hand hygiene, incision site prep e.g. CHG

DURING SURGERY

Glycemic (glucose) control, normothermia, change gloves if dirty to clean area, limit door openings, room temperature and humidity, scrubs attire, hand hygiene, sterile equipment. Microbial load is directly proportional to the number of people in the room.

AFTER SURGERY

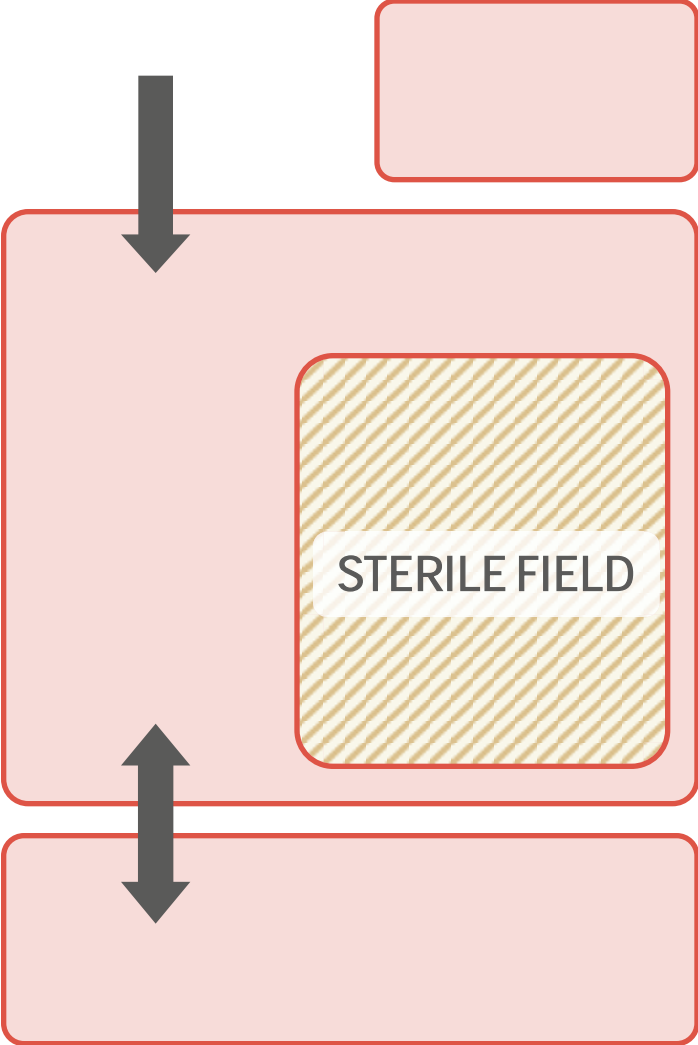
Decolonization treatment, glucose monitoring

THE RESTRICTED ZONE CLEAN CORE CONCEPT

SCRUB

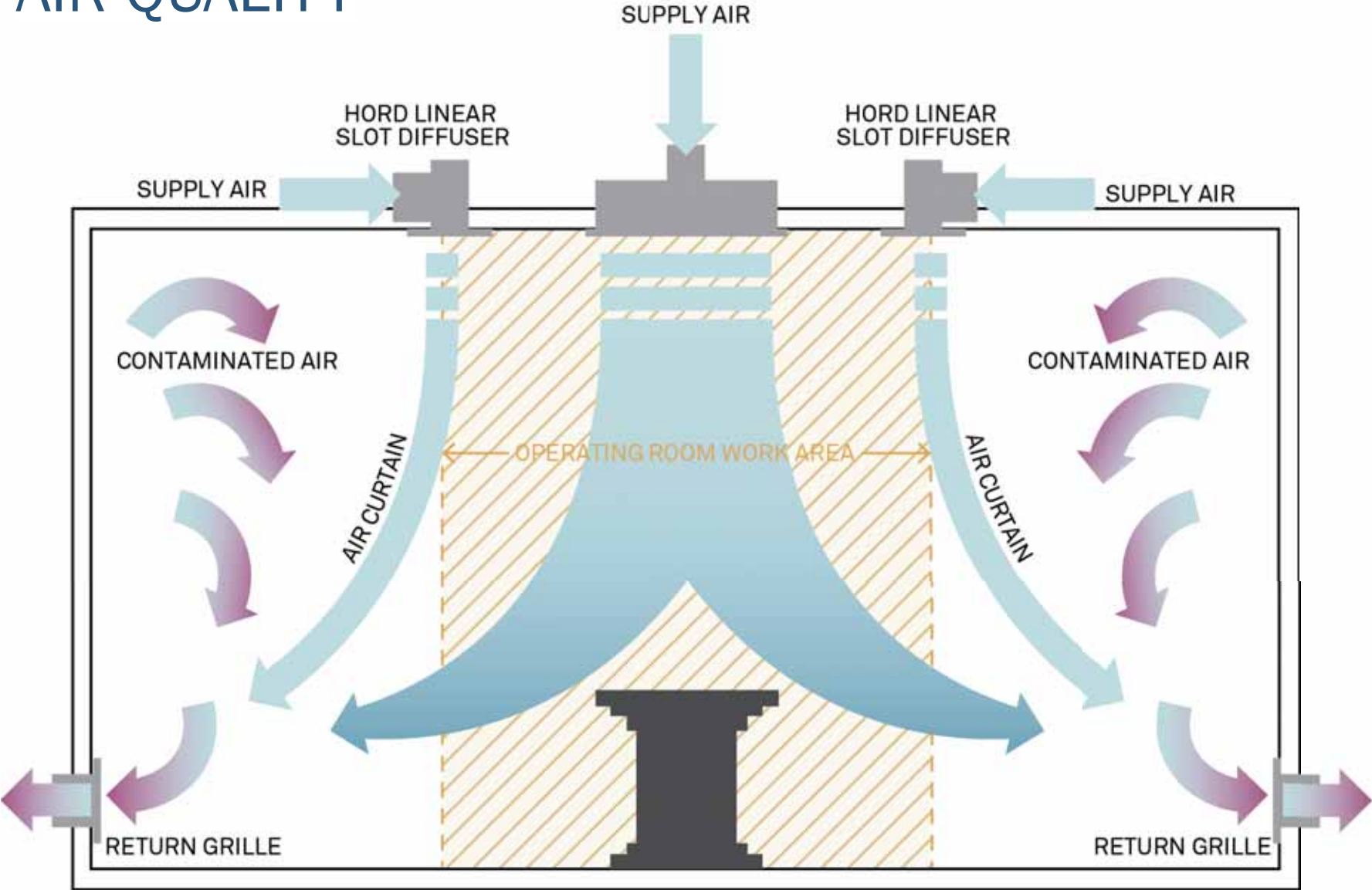
OPERATING ROOM

CLEAN CORE



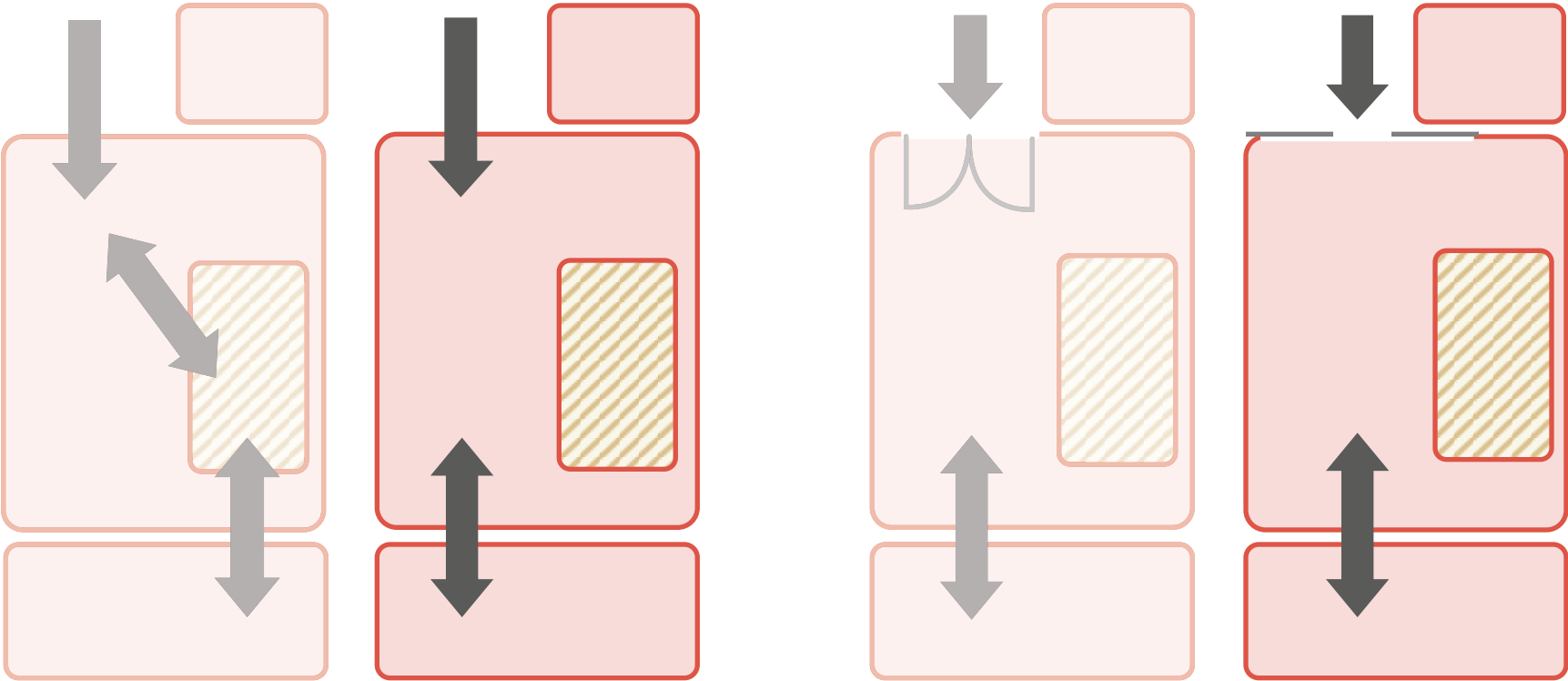
ENVIRONMENTAL CONTROLS THE DESIGNER'S TOOLS

AIR QUALITY



ENVIRONMENTAL CONTROLS THE DESIGNER'S TOOLS

TRAFFIC PATTERNS

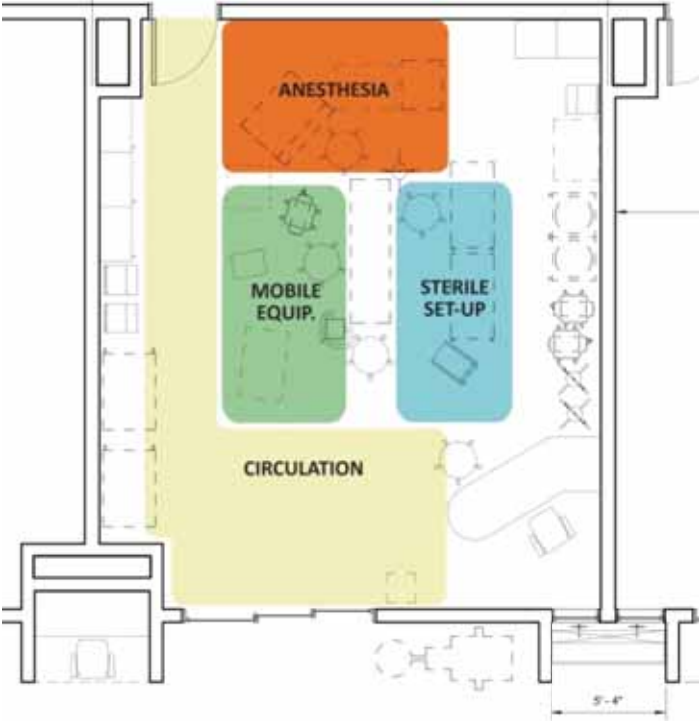


ENVIRONMENTAL CONTROLS THE DESIGNER'S TOOLS STAFF CONTACT



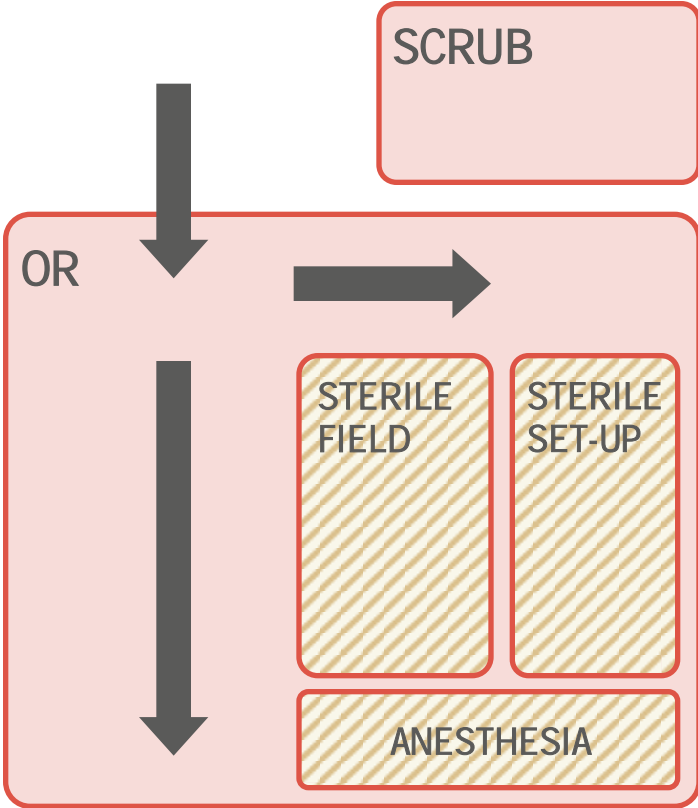
ENVIRONMENTAL CONTROLS THE DESIGNER'S TOOLS

OPERATING ROOM ZONING



ENVIRONMENTAL CONTROLS THE DESIGNER'S TOOLS

STAFF FLOW



CASE STUDIES

- UNIVERSITY OF MARYLAND MEDICAL CENTER
SHOCK TRAUMA CENTER
- NYU LANGONE MEDICAL CENTER
AMBULATORY CARE CENTER
- READING HOSPITAL
7TH AVENUE BUILDING
- NEW YORK PRESBYTERIAN
DAVID H. KOCH CENTER



UNIVERSITY OF MARYLAND MEDICAL CENTER

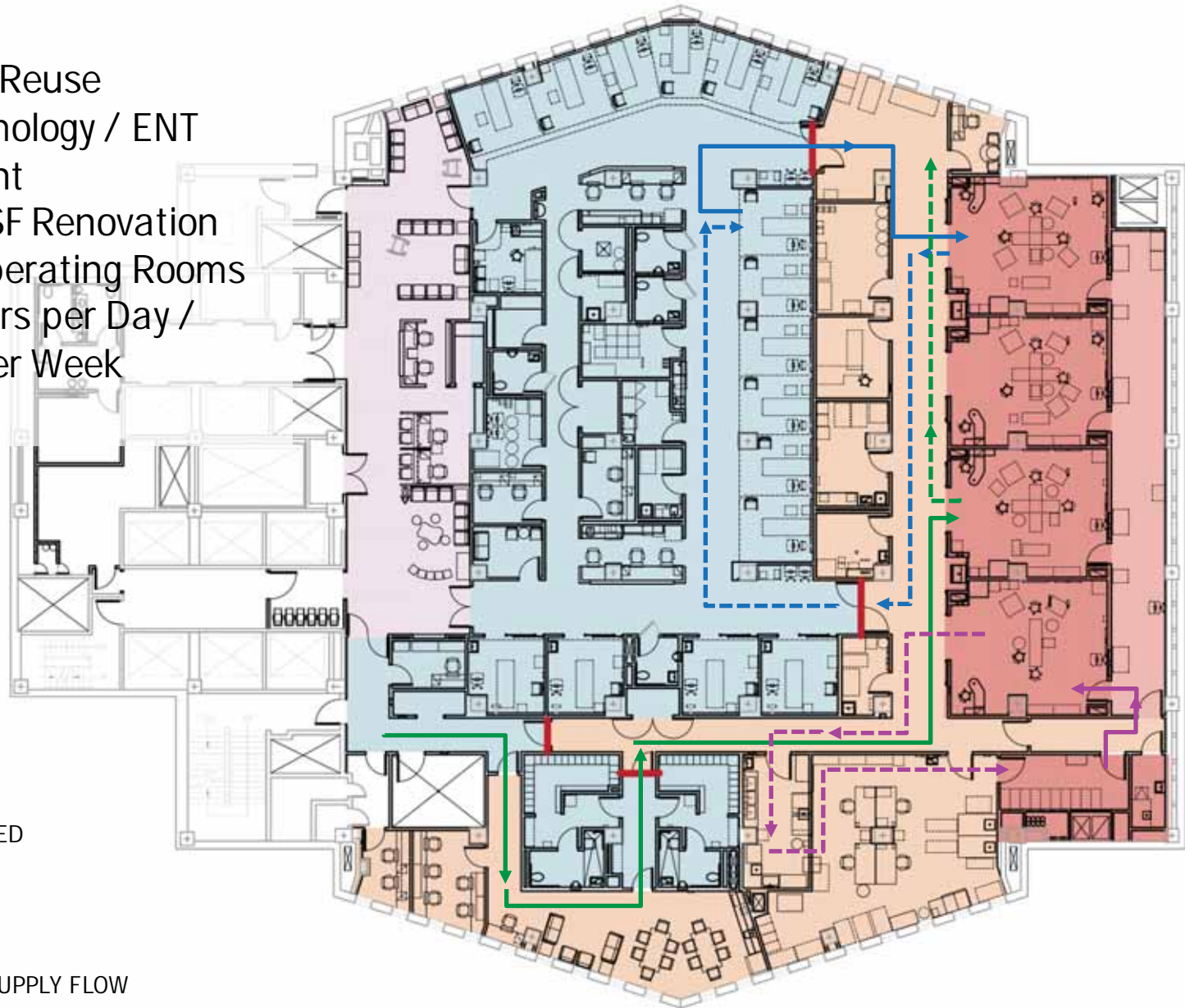
- New Construction / Renovation
- Trauma Inpatient
- 18,000 SF New /
9,500 SF Renovation
- 10 New Operating Rooms
- 20 Existing Operating Rooms
- 24/7 Operation

- UNRESTRICTED
- SEMI-RESTRICTED
- RESTRICTED
- PATIENT FLOW
- STAFF FLOW
- INSTRUMENT/SUPPLY FLOW



NYU LANGONE MEDICAL CENTER

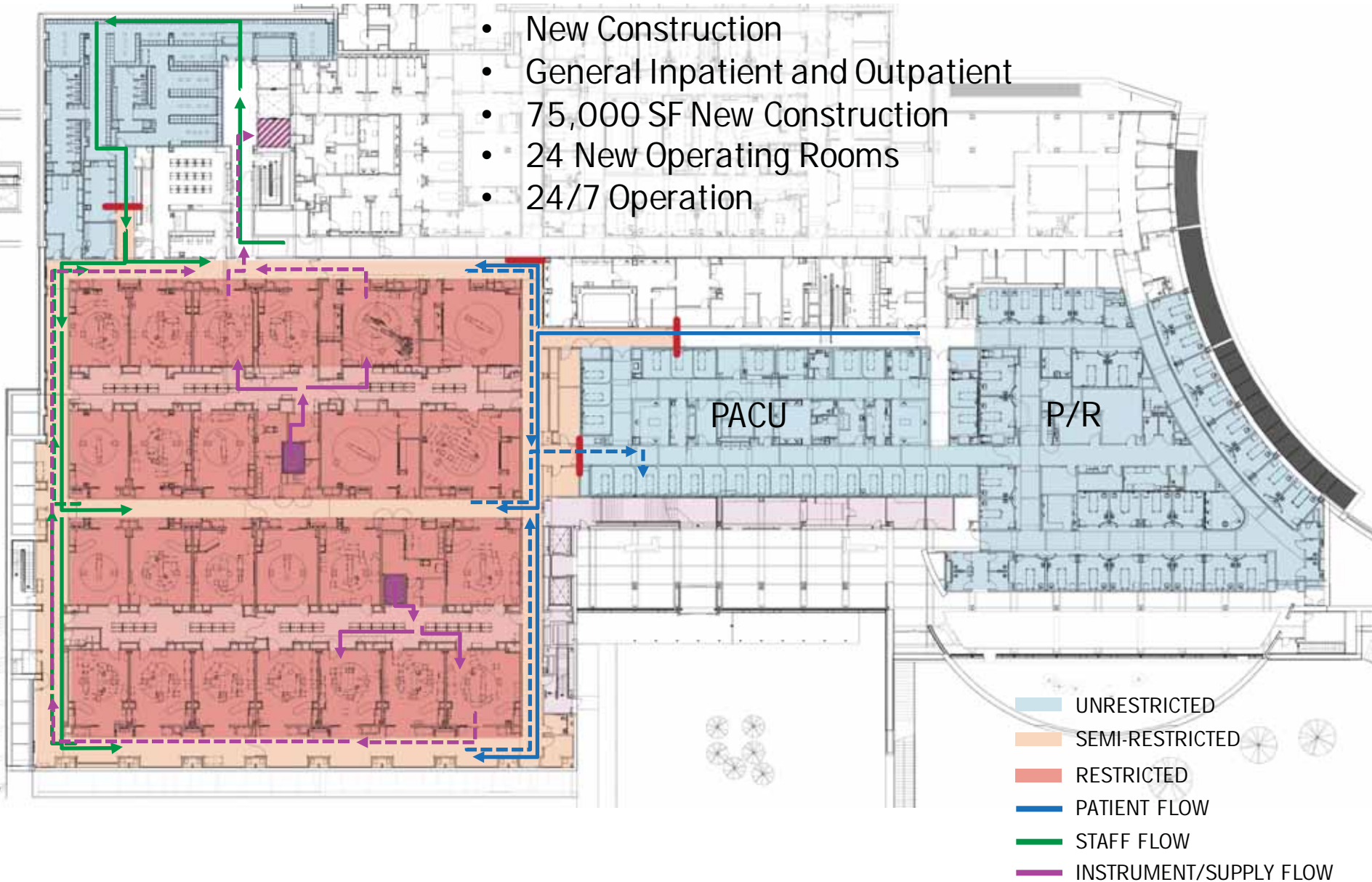
- Adaptive Reuse
- Ophthalmology / ENT
Outpatient
- 15,000 SF Renovation
- 4 New Operating Rooms
- 8-10 Hours per Day /
5 Days per Week



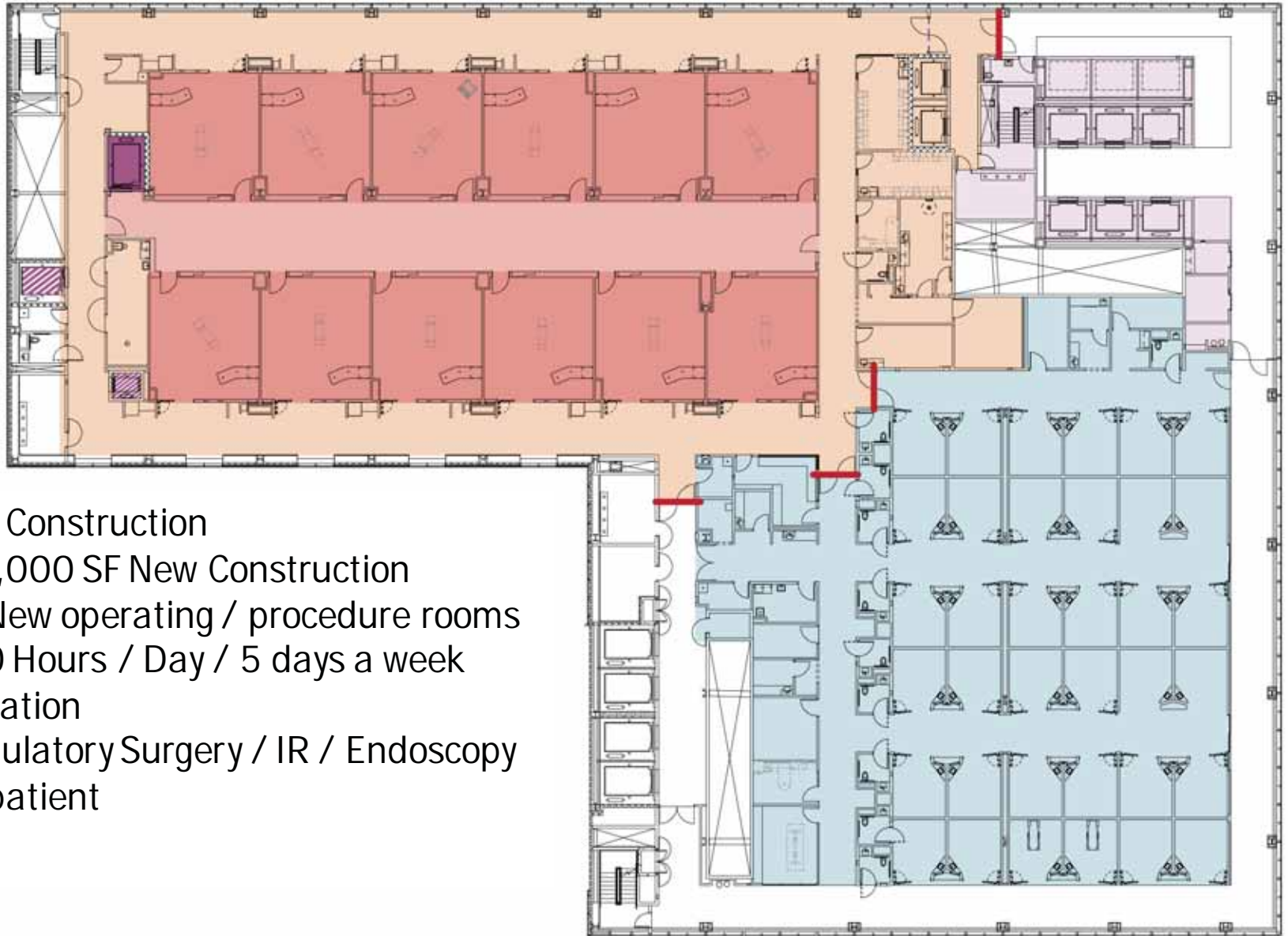
- UNRESTRICTED
- SEMI-RESTRICTED
- RESTRICTED
- PATIENT FLOW
- STAFF FLOW
- INSTRUMENT/SUPPLY FLOW

READING HOSPITAL

- New Construction
- General Inpatient and Outpatient
- 75,000 SF New Construction
- 24 New Operating Rooms
- 24/7 Operation

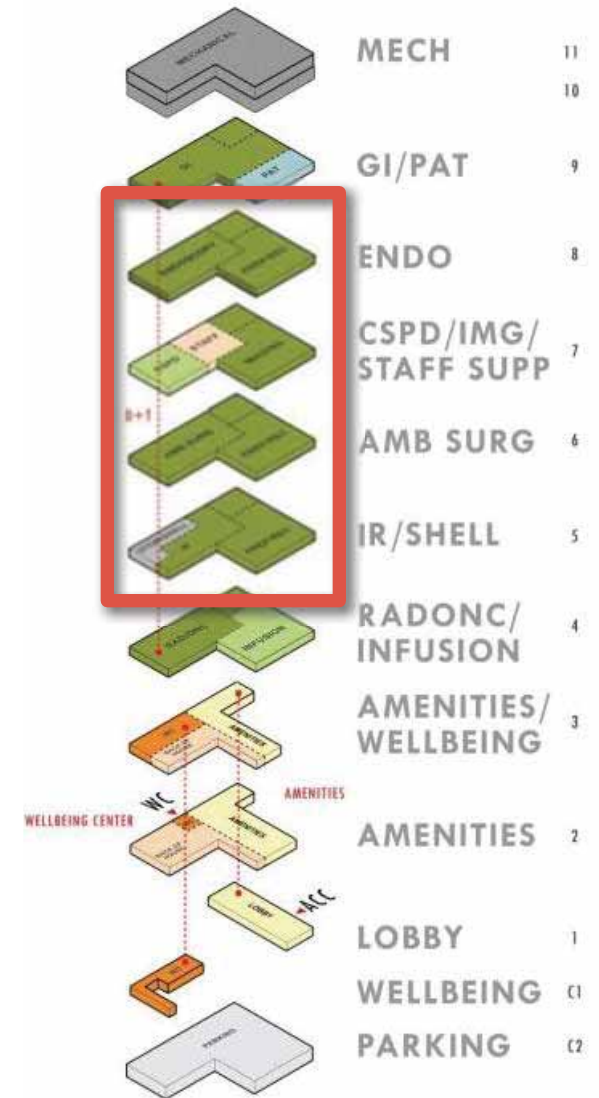
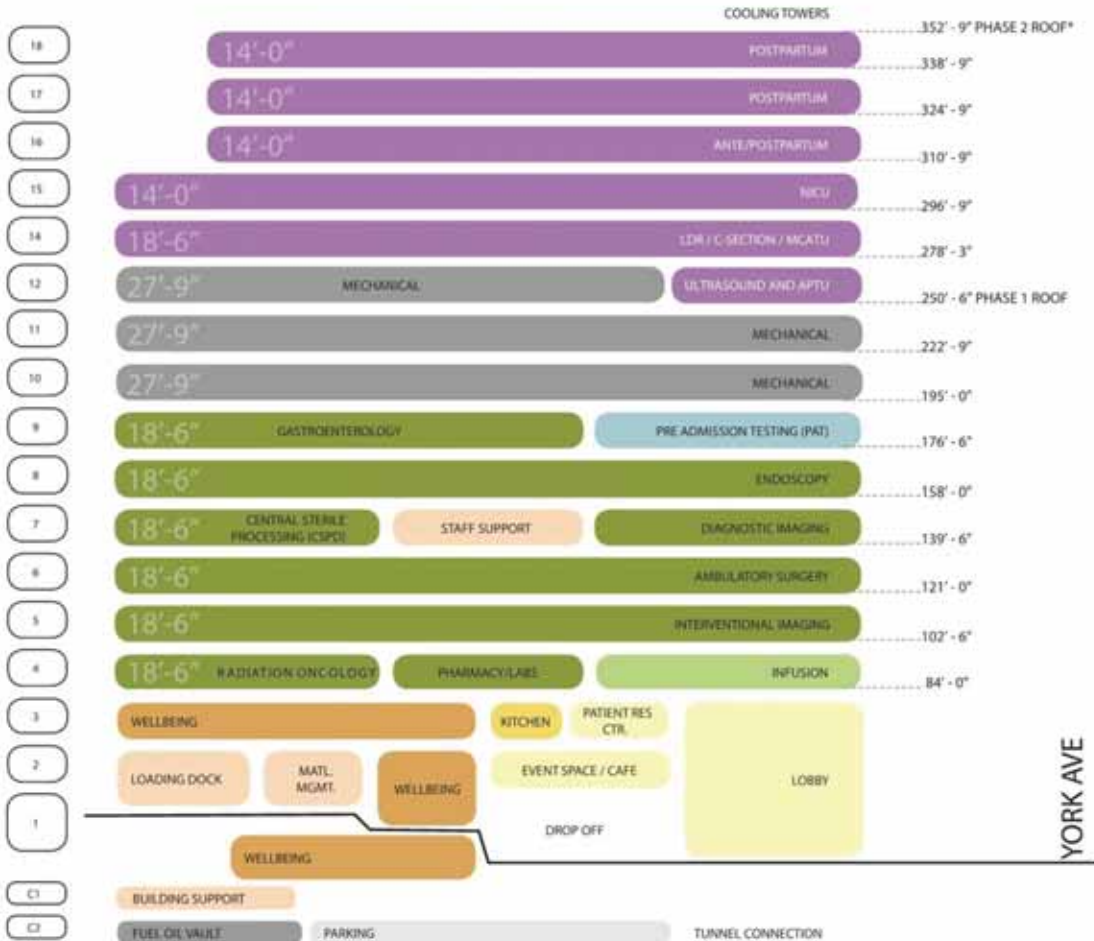


NEW YORK PRESBYTERIAN



- New Construction
- 145,000 SF New Construction
- 29 New operating / procedure rooms
- 8-10 Hours / Day / 5 days a week operation
- Ambulatory Surgery / IR / Endoscopy Outpatient

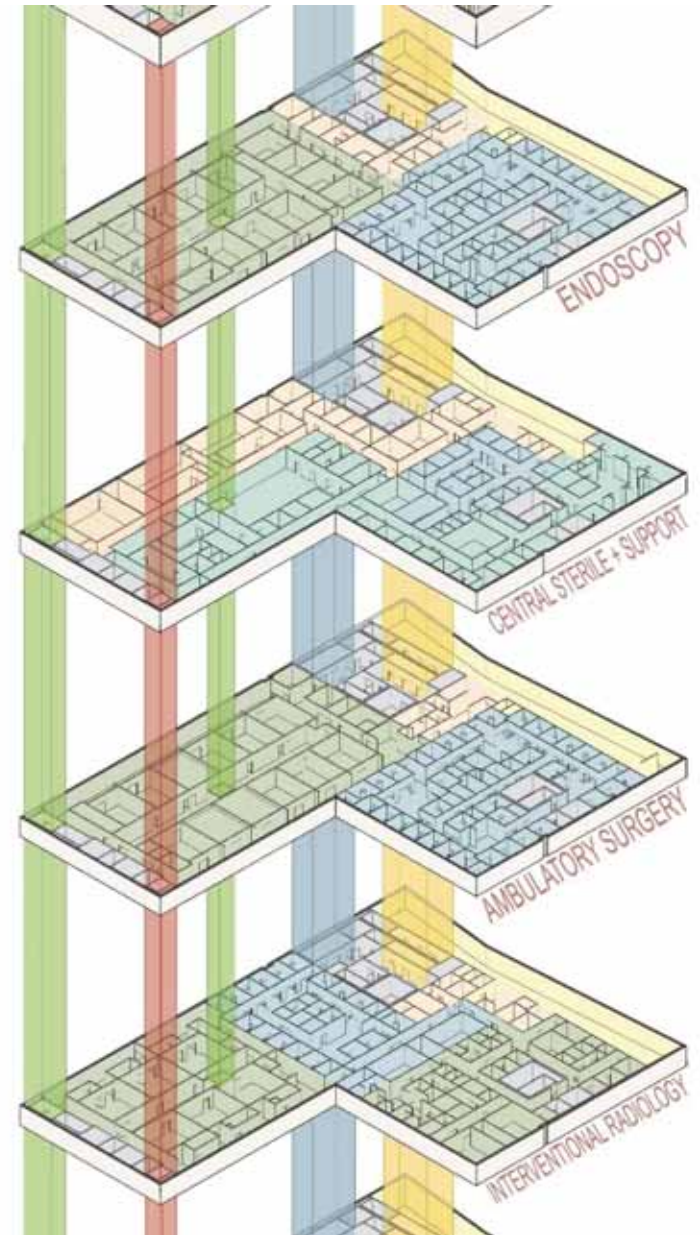
NEW YORK PRESBYTERIAN



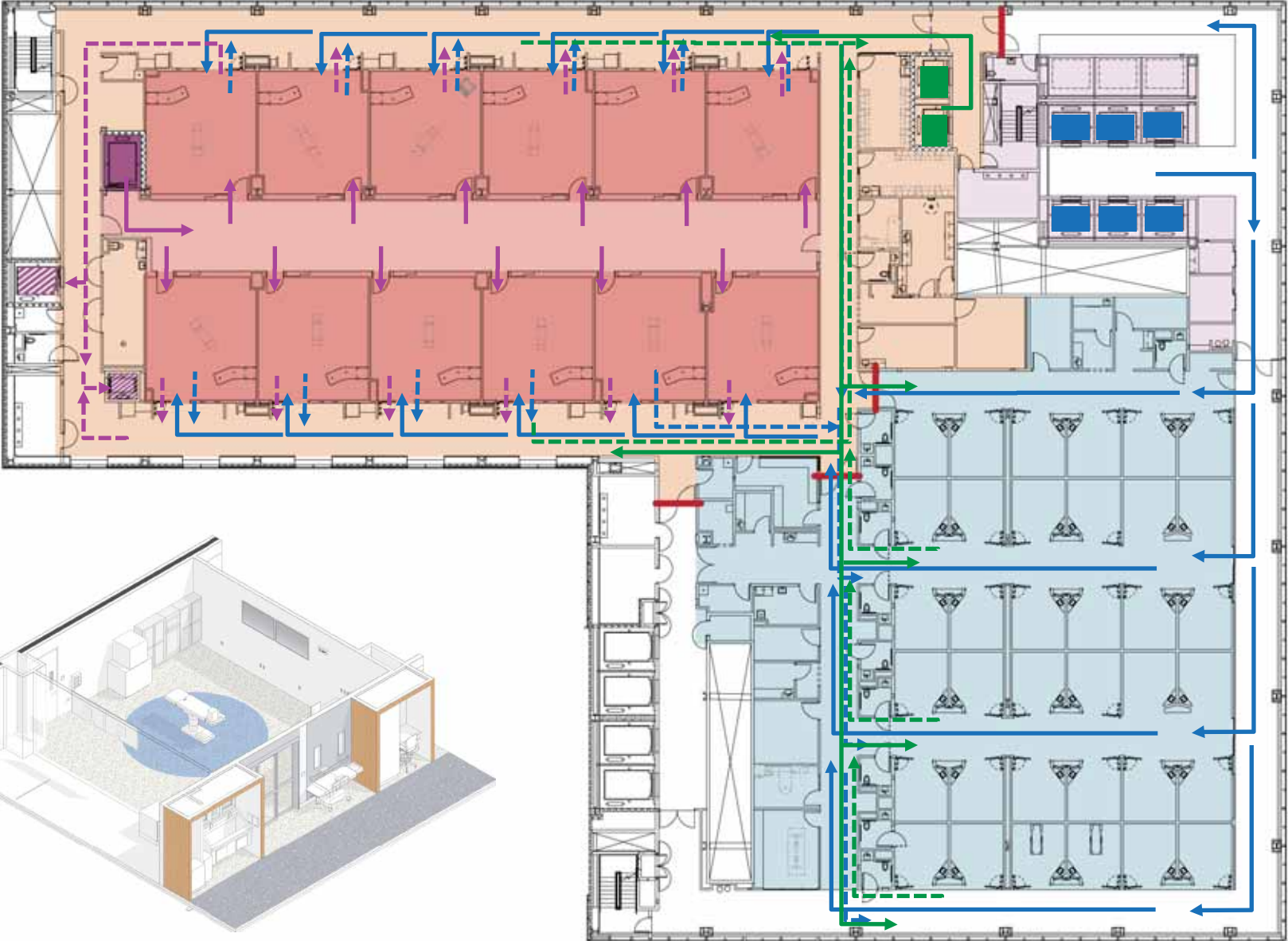
NEW YORK PRESBYTERIAN

THE "SANDWICH" FLOOR AND TEMPLATE DESIGN CONCEPTS

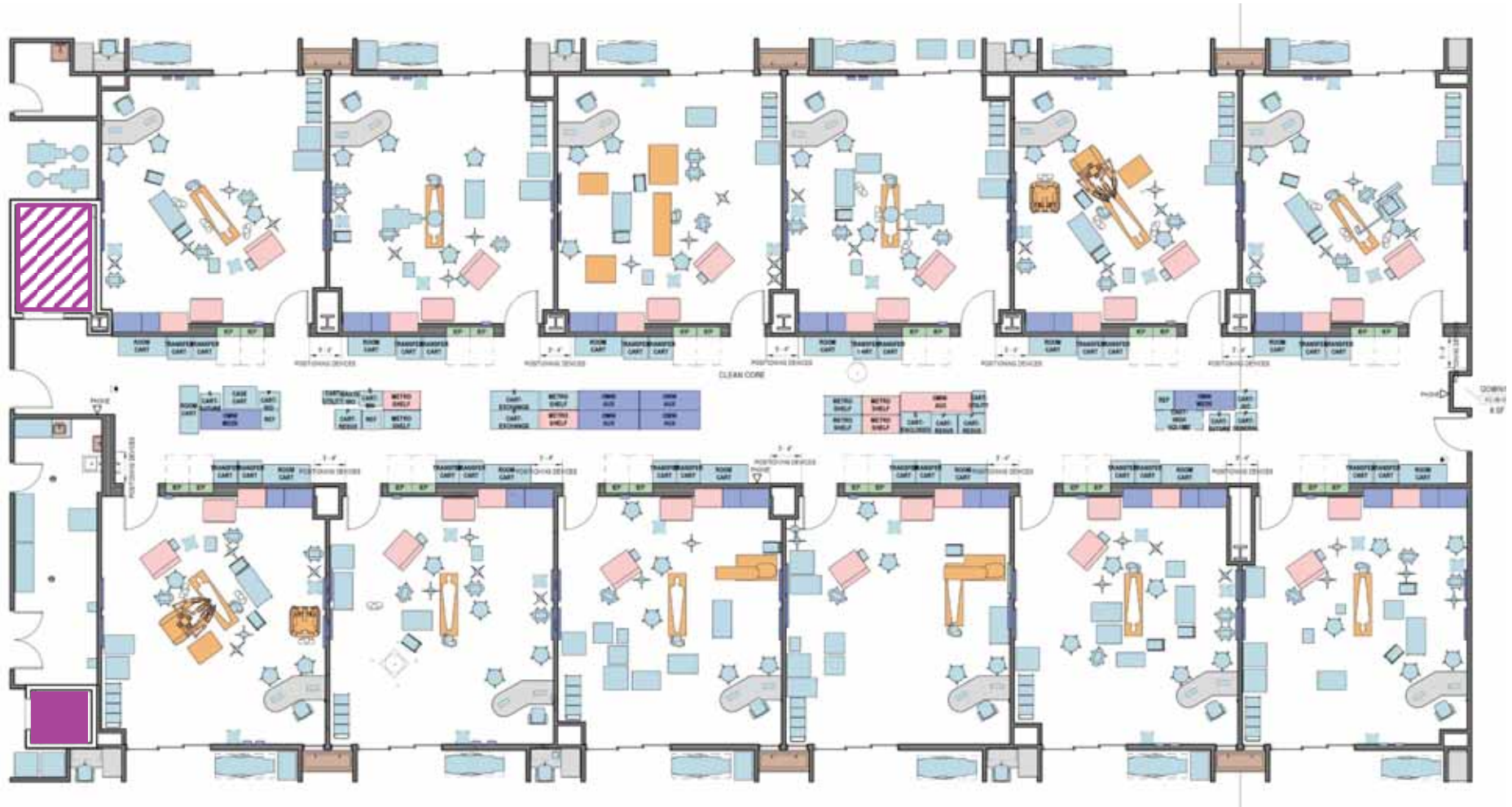
1. Maximize clinical program area on the department floor
2. Central Sterile and Shared Staff Lockers and Lounge on Level 7 serve Interventional Radiology, Ambulatory Surgery, and Endoscopy:
 - Maximizes clinical program on departmental floors
3. Provide restricted staff / clean circulation between lockers and departments (2 elevators, 1 stair)
4. Provide the flexibility to more easily accommodate new technology and procedures in the diagnostic and treatment areas as patient care processes evolve.
 - 700 sf target for Interventional Procedure Rooms
 - 600 sf Operating Rooms
 - Same Handed Operating Rooms
 - Stacked Floors



NEW YORK PRESBYTERIAN



NEW YORK PRESBYTERIAN



NEW YORK PRESBYTERIAN



NEW YORK PRESBYTERIAN

BOTTOM LINE

- In 1992 SENIC Report- Study of the Efficacy of Nosocomial Infection Control
- In 2002 four states (Illinois, Pennsylvania, Missouri, Florida) - HAIs
- In 2009 there were 300,000 reported SSI at an annual cost of \$10 Billion
- In 2010 the Affordable Care Act required National public reporting of selected inpatient Healthcare Associated Infections (HAI)
- In 2012 hospitals were required to report designated SSIs, followed up in 2013 by pay for performance incentive
- Full CMS reimbursements requires reporting and achievement of HAI goals
 - HAIs reporting requirements and goals vary
 - Federal Fiscal Year reimbursement
 - Inpatient Prospective Payment System (IPPS)
 - Value Based Purchasing (VBP)



CONCLUSIONS

CLEAN FLOW: **FACT**

- Clean flow or clean technique is a viable strategy to improve patient outcomes
- Clean flow should be an multidisciplinary protocol used in combination with endogenous processes
- Success of clean flow will only be as good as its weakest link
- A single protocol will not be applicable to every situation and must be tailored to fit
- More evidenced-based studies are needed
- **Maximizing clean flow processes will have a direct impact on patient safety and the bottom line**



RECOMMENDATIONS

BEST PRACTICES:

In approaching new construction or renovation all organizations should establish a multidisciplinary team to:

- Focus on opportunities to control airflow and turbulence
- Establish instrument movement to always flow from dirty to clean
- Stock equipment and supplies properly (location and quantity) to reduce staff movement and need for IMU
- Use proper room zoning to protect the sterile environment
- Remove unessential staff from the operating room

QUESTIONS?

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