5.13: UMHHC - HEALTHCARE PROCEDURE ROOM INFECTION CONTROL TYPES AND REQUIREMENTS (SBA-K-H)

General

This Special Building Area (SBA) guideline applies to new procedure rooms within University of Michigan Hospitals and Health Centers (UMHHC) inpatient and outpatient facilities, owned or leased. This SBA applies to clinical areas where invasive to minimally invasive procedures are performed.

The definition for, and the use and understanding of, the various procedure rooms names used within a healthcare setting (i.e. “Operating Room”, “Procedure Room”, “Treatment Room”, etc) varies greatly amongst healthcare codes, industry standards, design professionals, and UMH healthcare staff. Therefore the room types noted below and throughout the document were developed by UMHHC to better clarify the needs and requirements of the various procedure rooms.

This SBA was therefore created to establish a universal understanding amongst our design professionals, construction coordinators and staff, clinicians, infection control, and maintenance on how these spaces should be designed and operated. The information expressed in this SBA is meant to standardize the design and performance of procedure room types and requirements across the UMHHC campuses and is based on close coordination with the State of Michigan Department of Community Health and the UMHHC Infection Control and Epidemiology Department (ICE), along with industry-wide best practices. Where the information in this SBA seems to exceed that of regulating healthcare codes, the AE shall nevertheless utilize the information expressed here in this SBA. Where the information in this SBA would serve to conflict or be in direct violation of regulating healthcare codes, the A/E shall bring this to the attention of the University Project Manager. At no time shall governing healthcare codes be violated.

The use and application of these procedure room types is governed by UMHHC Infection Control and Epidemiology (ICE) in conjunction with the MI Health Facilities Engineering Section (HFES). All determinations on room types, and the procedures performed within, shall be made by UMHHC ICE and MI HFES. UMHHC Infection Control and Epidemiology shall be the authority on room type classifications for specific procedures.

Please refer to SBA 5.16 "UMHHC Requirements for Critical Pressure Sensitive Rooms" for information on detailing and other requirement where air pressure is critical.

UMHHC Definitions:

Semi-Restricted Corridor/Rooms: The corridor area within the “Red Line” where proper attire is required, including scrubs or protective coveralls (“Bunny Suit”) and hair coverings.

Restricted Corridors/Rooms: The sterile core or other restricted areas where proper attire is required, with the possible addition of a surgical face mask as directed by Infection Control.

Operating Room: A room licensed by the state as an Operating Room. (Infection Control “IC” Room Type 1 room as noted below)

Treatment, Procedure Rooms: General clinical room names used to describe clinical rooms where various surgical and non-surgical “procedures” are performed, varying in invasiveness from an Operating Room to an Exam Room. The goal of this document is to clarify these room names by the use of the IC Room Types 1 through 7.

Clear Area (Clear Square Footage): All room areas are to be calculated based on the actual clear floor area, excluding any built in cabinetry, boxed out low wall air returns, columns and the like.

Equipment List: A list of all equipment for a room or space, provided by UMHHC Facilities Planning and Development (FPD) Capital Equipment Planner.
Equipment Plan: A scaled 2-D or 3-D architectural plan which shows all “equipment”, furniture, built-ins and other items graphically within a room or space. These may include floor plans, reflected ceiling plans, and interior elevations, and are prepared by the A/E. “Equipment” here includes all items located in the room, as noted on the Capital Equipment “Equipment List”, Contractor installed equipment and infrastructure items, times provided by Interior Design, Medical Center Information Technology (MCIT) supplied equipment, and/or re-use items.

Equipment Plan and Room Size:

The size of each room type listed below is the minimum per code. In many cases, however the Equipment Plan will dictate that the room needs to be larger than the code minimum based on the equipment to be used within the room and staff movement paths.

For example, a room required to be 400 clear square feet might have overall dimensions within the interior walls of 24’ x 24’ (576 SF) within the walls if 2’ of built-ins, air returns and equipment around the perimeter are required. Additional equipment and staff movement paths may dictate the room be even larger.

Prior to finalizing room size, the A/E shall create Equipment Plans, including all fixed and movable equipment and furnishings to be used in the room for the specific cases expected in the room. If multiple procedures or equipment layouts are expected, each case should be laid out individually. Any equipment to be stored in the room when not in use for a particular case shall be accounted for. The Equipment Plan must include patient and staff locations, and include adequate circulation space (min. 30") for staff to circulate fully around the perimeter of the room, and through the doors to the room, during the case. A Reflected Ceiling Plan should be created where ceiling mounted equipment are planned. Particular attention should be made to all boom and lighting layouts, and the “Sterile Field” created with the air supply. If a sterile field is to be created, it should be superimposed on the Equipment Plan. In all layouts, the location of the patient must be within the sterile field.

In addition to Equipment Plans, the cases should be mocked up with the actual equipment. The Equipment Plans shall be reviewed and approved by the Clinical department, ICE, and FPD.
Classification of Infection Control Room Types

In an effort to clarify the various types of surgical and procedure rooms and the procedures performed in each, UMH standardizes on (7) seven infection control room types for these spaces. These room types are defined in Table 1 below. UMHHHC Infection Control and Epidemiology Department shall maintain a separate list of procedures for each room type.

**TABLE 1**

<table>
<thead>
<tr>
<th>Infection Control Room Type</th>
<th>Surgical Procedure/ Invasiveness</th>
<th>Common Terminology (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Invasive, major surgical procedures, above or below fascia, may involve bone or implants</td>
<td>Licensed Operating Room (OR)/ ASHRAE Class C Surgery/C-Section</td>
</tr>
<tr>
<td>2</td>
<td>Invasive, minor surgical procedure, minimally invasive- below fascia, may involve bone or implants</td>
<td>Procedure Room/ Minor Surgical Procedure Room/ ASHRAE Class C Surgery</td>
</tr>
<tr>
<td>3</td>
<td>Cardiac Catheterization, Angiography and Interventional Radiology</td>
<td>Procedure Room/ Angiography/ ASHRAE Class B Surgery</td>
</tr>
<tr>
<td>4</td>
<td>Minimally invasive- above fascia only</td>
<td>Treatment Room/ ASHRAE Class A Surgery</td>
</tr>
<tr>
<td>5</td>
<td>Endoscopic, non-invasive</td>
<td>General Endoscopy/ ASHRAE D&amp;T</td>
</tr>
<tr>
<td>6</td>
<td>Bronchoscopy</td>
<td>Bronchoscopy/ ASHRAE D&amp;T</td>
</tr>
<tr>
<td>7</td>
<td>Needle guided procedure</td>
<td>Exam Room/ ASHRAE D&amp;T</td>
</tr>
<tr>
<td>8</td>
<td>Minimally invasive- above fascia only</td>
<td>Exam Room/ASHRAE D&amp;T</td>
</tr>
</tbody>
</table>

(1) Terminology per HFES Minimum Design Standards for Healthcare Facilities in Michigan, AIA Guidelines and/or ASHRAE Standards.

The A/E shall clearly indicate the Room Name & Room Type (i.e. Procedure Room- IC Type 3) on the preliminary and final construction contract documents, and in the Operational Narrative.
IC (Infection Control) Room Types

The A/E shall ensure that all rooms identified under this SBA shall conform to the criteria stated under Table 2 “Architectural”, Table 3 “Electrical” and Table 4 “Mechanical” at the end of this document.

IC Room Type 1 and IC Room Type 2:

Architectural

Due to the need to maintain space pressurization control, the A/E shall give special attention to providing a sealed space envelope; including extending all walls to the structure above and sealing all floor, wall and ceiling penetrations (i.e. light switch back boxes, conduit and pipe penetrations, etc) as well as the intersection of the wall and underside of the structure above.

In an effort to maintain a sealed, pressurized room envelope, the A/E shall limit the infrastructure (i.e. ductwork, piping, conduit, etc) passing over an IC Type 1 or 2 room to only that which serves the space. All items requiring regular maintenance (i.e. terminal air boxes, etc.) or accessibility (i.e. valves, etc.) shall be located outside of the room envelope so as to preclude the need to access such devices from within the space.

The stretcher access doors shall be automated with touch-less hand actuated sensors. The width will be determined by clinical needs and site conditions; a typical room might have a pair of doors totaling 6 feet wide. A wall mounted shut-off switch for these doors will be located on the room side to prevent accidental usage during a procedure. Where possible, a bi-directional “man-door” should be used for staff traffic. Push paddle hands-free type hardware should be used so that it is possible to enter the room without using hands or arms. All doors shall have closers. The door material should be carefully considered for durability, for example fiberglass rather than painted hollow metal, and door frame protection should also be installed.

Provide properly sized and placed access hatches to allow for maintenance and related activities associated with any equipment placed, or may be placed, above the ceiling. Properly sized meaning they are big enough for a normally sized person, to access and maintain the equipment easily and safely. Where shoulder clearance is required, access hatches shall be a minimum of 24” x 24”.

The Architect shall provide carefully and completely laid out reflected ceiling plan showing all diffusers, lights, surgical column supports, fire suppression sprinklers, smoke detectors, access hatches, A/V equipment, and any other equipment to insure coordination and utility of the design. Also, provide cross-section of above ceiling space, sufficiently detailed to insure proper space and accessibility for all installed systems is available above the ceiling. The ceilings will consist of a gasketed accessible ceiling system. The ceiling tiles shall have a washable surface and must stay in place during the washing process. Tile clips will only be allowed where tiles are less than 2 square feet in size or as directed otherwise by the Design Manager.

All room finishes will be selected by UMHHC FPD, Interior Design, in consultation with IC and other UMHHC staff. Monolithic, non-porous wall surfaces, such as PVC or FRP are preferred. Flooring material and base material shall be monolithic, such as terrazzo or an epoxy flooring product, or a resilient sheet flooring.

Colors of ceilings, walls and floors shall be selected with consideration of their effects on the lighting levels in the room in all room types. Reflectance levels of less than 80% for ceilings, 50% for walls and 20% for floors shall be allowed for in the lighting design.

Flooring patterns may be desired to indicate the sterile field. If provided, construction documents must indicate that floor patterns match the extent exactly. Floor patterns may be desired to indicate other operational or equipment limits, such as gauss lines.

Mechanical

Rooms shall be served by a dedicated HVAC control zone to actively maintain the room’s thermal comfort and pressurization (typically either a dedicated AHU or supply and return terminal airflow control boxes in conjunction with a reheat coil). System shall be controlled to maintain room temperature and balanced to
maintain room pressurization, as measured via a differential pressure monitor across the main doorway from the clean corridor. Dynamic pressure control is neither required nor desired. Return airflow shall be controlled to maintain the active measured supply airflow minus a fixed airflow offset setpoint (initially assume an offset of 300-500 CFM, depending on number & size of doorways into space). Airflow offset shall be determined by test & balance contractor, as required to maintain a room pressurization of 0.04”-0.06”wc. 

See Table 4 for mechanical requirements for these spaces.

Space temperature and humidity sensors shall be mounted in the common return air main from the room. DDC shall monitor the door status (ie open/ closed) of all doors into the space. Provide a wall mounted human machine interface (HMI) panel within the room that displays room temperature, temperature set-point, humidity, occupied/ unoccupied mode, space pressurization, door status and airchange rate. All points shall also be integrated into the BMS frontend. Panel shall allow the users to adjust temperature within the room. Panel shall provide local indication if room humidity, air change rate, or pressurization are outside of acceptable limits. Protect wall-mounted panel with a stainless steel “crash-guard” where applicable. HMI shall provide the following local status/ alarms to surgical staff:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Normal (Blue)</th>
<th>Alarm (Red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Humidity</td>
<td>60%RH-20%RH</td>
<td>&gt;60%RH or &lt;20%RH</td>
</tr>
<tr>
<td>Airchange Rate</td>
<td>≥15 ACH</td>
<td>&lt;15 ACH</td>
</tr>
<tr>
<td>Room Pressurization (1)</td>
<td>≥0.01” wc</td>
<td>&lt;0.010” wc for ≥ 15 min</td>
</tr>
<tr>
<td>Temperature</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Occupancy Status</td>
<td>Occupied</td>
<td>Unoccupied</td>
</tr>
<tr>
<td>Door Status</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

(1) Room pressurization alarms to the BMS frontend shall be disabled when door status is open.

Additional front-end alarms may be required, contact UMH project engineer for standard sequence of operation for OR HVAC systems.

A/E shall clearly state the room pressurization requirement (i.e. goal is 0.04”-0.06”wc) on the design drawings and indicate a means of achieving pressurization (i.e. throttle return/ exhaust airflow).

Rooms shall include controls to automatically reduce ventilation during unoccupied periods for energy conservation. This control system shall include at least two ceiling or wall mounted dual technology (passive infrared plus microphonic sensing) occupancy sensors per room, selected for full room sensing coverage, to automatically determine room occupancy. All room sensors must simultaneously detect unoccupied conditions for a period of not less than 30 minutes in order to enable unoccupied mode operation. The system must be designed such that a failure at any level (i.e. loss of power to sensor, cut or disconnected communication wire, etc.) will cause the system to assume occupancy and operate in an occupied mode. During unoccupied mode operation, airflow shall be controlled down to the minimum level necessary to maintain required room pressurization, and to maintain the room temperature setpoint.

UMHHC preference is to provide humidity control in each room via a central AHU humidifier (set to maintain a discharge air humidity level) in conjunction with a dedicated duct-mounted “booster” humidifier for each room to fine-tune humidity levels to meet individual room set points. Where dedicated room humidifiers are not provided, the maximum number of rooms on a common humidifier shall be limited to four (4) rooms. The A/E shall verify requirements with HFES and UMHHC Mechanical Engineer.

Where ceiling booms are used for medical gas service, in addition to those gases provided on the boom, provide the following properly labeled medical gas outlets on the wall at the head end of the table: (2) MVAC with slides, (1) OX, (1) WAGD, and (1) MA.

**Electrical**

These rooms shall be served by critical power derived from two separate transfer switches, distributed on separate power risers and served from separate panels. Since these rooms are to be considered ‘wet locations’, isolated power supplies (IPS), with line isolation monitors, shall be installed in each room – two per room. The isolated power supplies shall be connected to the two critical power sources noted above.
A minimum of 48-outlets (24-duplexes) shall be installed in each room, with 50% fed from one IPS and the balance from the other IPS. Please note that 48 is the minimum, provide more when the program dictates the need for more. [This number of outlets is in addition to any normal power supplied outlets that may be required by code.] The outlets shall be conveniently, and evenly, spaced around the room— including those installed in the surgical booms. All outlets shall be hospital grade.

Outlets shall be served by 20-ampere circuits, using XHHW-2 wire. Normally no more that 4-outlets (2-duplexes) shall be connected to each circuit – unless the circuit is being dedicated to a single purpose. [A good policy is to limit power to 1000-watts per circuit.]

Lighting shall be 5000-K fluorescent, with a maintained room lighting level of minimum 150-footcandles within 6-feet of operating table/theatre. The balance of the room shall have minimum 75-footcandles. Provide switching and controls to permit reduced lighting during portions of the procedures that may mandate this, as noted in the program. All of the lighting will be on critical power, served from two circuits that are fed from different transfer switches. Approximately 33% of the lighting fixtures shall be battery back-up to one of the ballasts in the fixture, to provide illumination during the period before emergency power is restored. [All of the above are in addition to the lighting provide by the surgical lights themselves.]

Provide power receptacles, and data outlets, for at least three large, wall-mounted, video display units (large computer screens) at locations defined by OR staff. Carefully coordinate the mounting elevation, and locations, of these with the staff.

Provide a raceway, junction and pull box system, power and data outlets, for installation of A/V equipment that may be provided either in the base project, or at a future date. A detail drawing will be made available to assist in this.

At least 50% of the power outlets, and lighting, in scrub area, shared imaging rooms, and/or adjacent equipment rooms shall be on critical power, but not necessarily on IPS power. The outlets not on IPS shall have GFCI. Coordinate exact needs for power and data with equipment planners and OR staff. In addition, imaging systems, critical for completion of the surgeries, shall be served by critical power.

When program notes need for laser power outlets, these outlets may be supplied by a shared IPS serving several rooms. Carefully coordinate with Capital Equipment Planner, Bio-Medical Engineering and OR staff in the placement and sizing of these outlets.

Provide open channel communications system (in essence hands free) to allow communication for persons anywhere in the room to other defined remote locations. Said locations needing this system will be defined during DD.

No fire alarm strobes or speakers shall be installed in these rooms. Nor shall they be in adjacent corridors, if intervening walls have extensive glass. These instead will be placed in control rooms, or scrub areas not in line of sight of stall working on the patient.

**IC Room Type 3:**

Architectural

Due to the need to maintain space pressurization control, the A/E shall give special attention to providing a sealed space envelope; including extending all walls to the structure above and sealing all floor, wall & ceiling penetrations (i.e. light switch back boxes, conduit & pipe penetrations, etc) as well as the intersection of the wall and underside of the structure above.

In an effort to maintain a sealed, pressurized room envelope, the A/E shall limit the infrastructure (i.e. ductwork, piping, conduit, etc) passing over a Type 3 room to only that which serves the space. All items requiring regular maintenance (i.e. terminal air boxes, etc.) or accessibility (i.e. valves, etc.) shall be located outside of the room envelope so as to preclude the need to access such devices from within the space. The stretcher access doors shall be automated with touch-less hand actuated censors. A wall mounted shut-off switch for these doors will be located on the room side to prevent accidental usage during a procedure. Where possible a bi-directional "man-door" should be used for normal procedure traffic. Push paddle hands-free type hardware should be used. All doors shall have closers.
Provide properly sized and placed access hatches to allow for maintenance and related activities associated with any equipment placed, or may be placed, above the ceiling. Properly sized meaning they are big enough for a normally sized person, to access and maintain the equipment easily, and safety. The number of hatches shall be based upon equipment installed above ceiling; however, at least two shall be installed regardless. Where shoulder clearance is required, access hatches shall be a minimum of 24” x 24”.

Architect shall provide carefully and completely laid out ceiling plan showing all diffusers, lights, surgical column supports, fire suppression sprinklers, smoke detectors, access hatches, AV equipment, and any other equipment to insure coordination and utility of the design. Also, provide cross-section of above ceiling space, sufficiently detailed to insure proper space and accessibility for all installed systems is available above the ceiling. The ceilings will consist of a gasketed accessible ceiling system. The ceiling tiles shall have a washable surface and must stay in place during the washing process. Tile clips will only be allowed where tiles are less than 2 square feet in size or as directed otherwise by the Design Manager.

All room finishes will be selected by UMHHC FPD, Interior Design, in consultation with IC and other UMHHC staff. Flooring patterns may be desired to indicate operational limits. If provided, construction documents must indicate that the floor patterns match the limits exactly.

**Mechanical**
See requirements for IC Room Type 1 & 2 above.

**Electrical**
These rooms shall be served by critical power derived from two separate transfer switches, distributed on separate power risers and served from separate panels, two per room. Since these rooms are to be considered ‘wet locations’, isolated power supplies (IPS), with line isolation monitor, shall be installed in each. The isolated power supplies shall be connected to the one of the critical power sources noted above.

A minimum of 36-outlets (18-duplexes) shall be installed in each room, with 50% fed from one IPS and the balance from the second IPS. Please note that 36 is the minimum, provide more when the program dictates the need for more. [This number of outlets is in addition to any normal power supplied outlets that may be required by code.] The outlets shall be conveniently, and evenly, spaced around the room-including those that may be installed in the surgical booms. All outlets shall be hospital grade.

Outlets shall be served by 20-ampere circuits. Use XHHW-2 wire for all wiring in these rooms. Normally no more that 4-outlets (2-duplexes) shall be connected to each circuit – unless the circuit is being dedicated to a single purpose. [A good policy is to limit power to 1000-watts per circuit.]

Lighting shall be 5000-K fluorescent, with a maintained room lighting level of 75-footcandles within 6-feet of operating table/theatre. (IR shall have 150 fc) The balance of the room shall have min 25-footcandles. Provide switching and controls to permit reduced lighting during portions of the procedures that may mandate this, as noted in the program. All of the lighting will be on critical power, served from two circuits that are fed from different transfer switches. Approximately 33% of the lighting fixtures shall be battery back-up to one of the ballasts in the fixture, to provide illumination during the period before emergency power is restored. [All of the above are in addition to the lighting provide by the surgical lights themselves.]

Provide power receptacles, and data outlets, for at least two large, wall-mounted, video display units (large computer screens) at locations defined by OR staff. Carefully coordinate the mounting elevation, and locations, of these with the staff.

Unless noted otherwise in the program statement, provide a raceway, junction and pull box system, power and data outlets, for installation of A/V equipment that may be provided either in the base project, or at a future date. A detail drawing will be made available to assist in this.

At least 50% of the power outlets, and lighting, in scrub area, shared imaging rooms, and/or adjacent equipment rooms shall be on critical power, but not necessarily on IPS power. The outlets not on IPS
shall have GFCI. Coordinate exact needs for power and data with equipment planners and OR staff. In addition, imaging systems, critical for completion of the surgeries, shall be served by critical power.

When program notes need for laser power outlets, these outlets may be supplied by a shared IPS serving several rooms. Carefully coordinate with Capital Equipment Planner, Bio-Medical Engineering and staff in the placement and sizing of these outlets.

Provide open channel communications system (in essence hands free) to allow communication for persons anywhere in the room to other defined remote locations. Said locations needing this system will be defined during DD.

No fire alarm strobes or speakers shall be installed in these rooms. Nor shall they be in adjacent corridors, if intervening walls have extensive glass. These instead will be placed in control rooms, or scrub areas not in line of sight of staff working on the patient.

**IC Room Type 4:**

See Tables 2, 3, 4. All doors shall have closers.

**IC Room Type 5 and 6:**

See Tables 2, 3, 4

**IC Room Type 7:**

See Tables 2, 3, 4.

**IC Room Type 8:**

*Architectural*

Refer to typical Infection Control Room Type layout drawings on [Standard Details] page. Doors should be 3’-2” minimum. Privacy should be provided at doorway by way of curtains and/or hinge gasketing. Walls should be full height to structure above, and acoustically insulated. If plenum returns are used, walls should extend as far as practical above ceiling plane and return-air acoustical boots should be installed. Wall finishes should be durable and cleanable. Wall protection should be installed. Sink should be located as close to the doorway as practical. Flooring should be seamless, with an applied cove base typically.
<table>
<thead>
<tr>
<th><strong>Infection Control Room Type</strong></th>
<th><strong>Access Restrictions</strong></th>
<th><strong>Minimum Room Size (Clear Square Footage)</strong></th>
<th><strong>Actual Size determined by Equipment Plan</strong></th>
<th><strong>Min. Room Ceiling Height (ft)</strong></th>
<th><strong>Floors Monolithic</strong></th>
<th><strong>Base</strong></th>
<th><strong>Walls</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Access from semi-restricted hall in a semi-restricted suite, room is restricted during procedure</td>
<td>400 sq. ft. min. clear/ 600 for ortho, cardiac. Equipment may dictate significantly larger</td>
<td></td>
<td>10’-0”</td>
<td>Yes</td>
<td>Integral FRP/PVC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Access from semi-restricted hall, room is semi-restricted or restricted during procedure Not to be a shared semi-restricted hall that also serves Room Type 1 above.</td>
<td>250 sq. ft. code minimum; Equipment may dictate significantly larger</td>
<td></td>
<td>10’-0”</td>
<td>Yes</td>
<td>Integral FRP/PVC</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Access may or may not be from a restricted hall, room is unrestricted when sterile field not present</td>
<td>400 sq. ft. code minimum. (Note 1) Equipment may dictate significantly larger</td>
<td></td>
<td>10’-0”</td>
<td>Yes</td>
<td>Integral FRP/PVC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Access may or may not be from a restricted hall, room is unrestricted when sterile field not present</td>
<td>250 sq. ft. code min. Equipment may dictate significantly larger</td>
<td></td>
<td>9’-0”</td>
<td>Yes</td>
<td>Applied Washable</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Unrestricted access and room</td>
<td>250 sq. ft. code min. Equipment may dictate significantly larger</td>
<td></td>
<td>9’-0”</td>
<td>Yes</td>
<td>Integral Washable</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Unrestricted access and room</td>
<td>250 sq. ft. code min. Equipment may dictate significantly larger</td>
<td></td>
<td>8’-0”</td>
<td>Yes</td>
<td>Integral Washable</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Unrestricted access and room</td>
<td>Highly dependent upon equipment</td>
<td></td>
<td>Yes</td>
<td>Applied</td>
<td>Washable</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Unrestricted access and room</td>
<td>120 sq. ft. (inpatient) 100 sq. ft. (outpatient) Code min.</td>
<td></td>
<td>8’-0”</td>
<td>Yes</td>
<td>Applied</td>
<td>Washable</td>
</tr>
</tbody>
</table>

**References:**
- UMH Infection Control Policy, Surgical Site Infection Prevention, 2008
- Guidelines for Design and Construction of Health Care Facilities, 2010

**Note:**
1. IR Single plane, 600 SF; BiPlane 650 SF; CT/Biplane (Hybrid) 700 SF
   IR Equipment room Single plane 60 SF, BiPlane 80SF, CT/Biplane (Hybrid) 200 SF
   IR Control Room: Single plane 180 SF, BiPlane 200 SF, CT/BiPlane (Hybrid) 250 SF
### TABLE 3: ELECTRICAL

<table>
<thead>
<tr>
<th>Infection Control Room Type</th>
<th>Wet Location</th>
<th>Number of Power Sources (Note 1)</th>
<th>Isolated Power (IP) Required</th>
<th>Number of IP (Note 5)</th>
<th>Minimum Number of Outlets (Note 2)</th>
<th>Multi-level Room Lights (Note 12)</th>
<th>Battery Lights</th>
<th>Green (Color) Lights (Note 6)</th>
<th>Fire Alarm ‘Horns’ and Strobes</th>
<th>Hands Free ‘Intercom’ (Note 9)</th>
<th>Audio/Visual ‘Ready’ (Note 8)</th>
<th>Flat screen monitor (White Board) Ready (Note 10)</th>
<th>Radiology Display Ready (Note 10)</th>
<th>Booms (Note 9, 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>2 (Note 3)</td>
<td>Yes</td>
<td>2</td>
<td>48</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>2</td>
<td>Yes</td>
<td>2 (Note 3)</td>
<td>Yes</td>
<td>2</td>
<td>48</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>2 (Note 3 and 13)</td>
<td>Yes</td>
<td>2</td>
<td>36</td>
<td>Yes</td>
<td>Yes</td>
<td>(Note 7)</td>
<td>No</td>
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**General Notes:**

- In room types 1, 2, 3 and 4 provide sufficient battery backed lighting to maintain a minimum of 30-fc, in at least the sterile field area of the room, for the 10-seconds required to bring on line the generator power.
- In rooms needing green lighting, provide multi-lamp fixtures with individual switching controls for at least the sterile field area of the room. Critical Power shall be provided as noted in the following example. The green color shall be achieved through the use of standard 5000-K lamps, but with green color sleeves over the lamps. [One such design scenario might include the use of six-lamp fluorescent fixture system, in the area of the sterile field. In such a design the middle two (5000-K) lamps would be tied to a Critical Power circuit and would have battery back-up, the two lamps nearest the sterile feed (5000-K) would be tied to a second Critical Power (but with no battery back-up), and the final two would be the green color lights, also tied to Critical Power.]
- Nurse station area in the room, shall have dimmable task light - LED or equivalent.
- Newer Type 1, 2, and 3 rooms have been equipped with lighting control system to control all lighting in the room. Base systems have typically had 6-buttons – up to 5 ‘scenes’ plus off. Control stations at entrance to room from sterile corridor, and another at the nurse’s station in the room. Provide manual over-rides to accommodate failure of lighting controller when appropriate.
- Low, recessed, wall mounted lighting (LED or equivalent) shall be provided for the safety of the staff in the room, when main lighting is off as may be required for any given procedure.
- All receptacles served from Critical Power shall be red, with red cover plates. Those fed from normal power shall be ivory, or brown, to match the building standard.
- When Normal Power is the second source to a room, the number of equally spaced receptacles shall be similar to the number of Critical Power receptacles. In rooms with only one power source being needed, and that source is from the Critical Power branch, also provide at least one normal power receptacle on each wall.
- In room types 4, 5, 6, and 7, located in buildings without generators, provide battery-backed power in the overhead lighting fixtures (or by separately mounted...
wall 'bug-eye' fixtures) to provide a minimum of 15-foot-candles of lighting for 20-minutes or more.

Notes:
1. When two sources of power are required as noted above, and there is Critical Power from independent transfer switches, use these two Critical Power sources. In other cases use one Critical power source, and one normal source.
2. The noted number of outlets indicated is minimum number required by codes to meet clinical needs, supply additional outlets as clinical needs and/or good practice requires. (Note that the number indicated here is for the number of ‘outlets’, the number of duplexes is half of these numbers).
3. The outlets from the two sources shall be equally spaced around the room, except as modified by Note 5.
4. Normally not a wet location. Ask chief clinician if any of the Type 4 rooms will have procedures that should be considered ‘wet’. If wet location designation applies to any (or all) such rooms, provide one isolated power (IP) system in those room(s). Rooms, not defined as ‘wet location’, and not having isolated power, should have a sign at the entrance noting “Room is not equipped with isolated power supplies”.
5. When only one isolated power (IP) system is noted or required, confer with clinician on placement of IP outlets within room (evenly spaced or not).
6. Noted rooms shall normally be designed for green (color) lighting as a supplement to the white lighting. This green lighting is used in cases where normal white lighting is inappropriate. Affirm need with chief clinician assigned to project team.
7. Confer with chief clinician assigned to project team regarding the procedures to be done in some, or all, of the Type 3 rooms in project scope.
8. At minimum, intercom shall be among noted rooms and main nurse station (or control station) in suite. Ask if additional locations need to be included in the hands free intercom system.
9. Provide microphone, camera and speaker boxes in ceiling with raceways to an A/V ‘hub’ location in the room. Also, provide one 2” conduit from each boom to the hub, and two 2” conduits from the hub to a 12”x12” recessed box at nurse’s desk. Provide power from isolated power system to the hub location, and to the nurse’s desk. Affirm details on quantities of boxes and raceway sizes with assigned Electrical Engineer and Capital Equipment Planner.
10. Normally provide a duplex outlet, and data outlet, on wall at locations defined by chief clinician and/or their designee.
11. Provide power, data, A/V, gases, and other services to booms, confer with Capital Equipment planner.
12. Verify if dimming of lights is also required for certain procedures.
13. Imaging machines and associate controls shall be served by UPS power or sufficient space shall be allotted in the machine room for a future stand-alone UPS unit.
14. Critical power source required with one receptacle in room served by normal power.
15. Normal power source is acceptable with one receptacle in room served by critical power.
16. Normal power source is acceptable.
## TABLE 4: MECHANICAL

<table>
<thead>
<tr>
<th>Infection Control Room Type</th>
<th>Room Air Pressure</th>
<th>Pressure Monitor</th>
<th>Pressure Control (0.03*-0.10&quot;-w.c.)</th>
<th>Min. Air Changes/Hr. (Outside air)</th>
<th>Min. Air Changes/Hr. (Total)</th>
<th>Humidity (%RH)</th>
<th>Temperature range (User adjustable) (Note 1)</th>
<th>Final Filtration (MERV)</th>
<th>Air Supply Centered above surgical site</th>
<th>Non-Aspirating Supply</th>
<th>Ducted Air Return</th>
<th>Return Near Floor (Minimum two opposite locations)</th>
<th>Re-circulated Air Units</th>
<th>Hand Wash Sink in Room</th>
<th>Scrub Sinks Outside of Room</th>
<th>Washable Devices (i.e. thermostats, etc)</th>
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<tr>
<td>1</td>
<td>Out/ Positive</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
<td>20</td>
<td>30-60</td>
<td>62-73</td>
<td>17</td>
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<td>4</td>
<td>20</td>
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<td>68-73</td>
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<td>68-73</td>
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References:
- UMH Infection Control Policy, Surgical Site Infection Prevention, 2008

Notes:
1. Consideration must be given to user requests for elevated temperatures and / or rapid increase of room temperature based on the protocol of the procedures being performed, for example the need to maintain a 90 degree room temperature. Where non-aspirating supply is required, controls must be in place to maintain the air flow pattern (i.e. “sterile field”) while the temperature is increased.
2. Confirm minimum and maximum humidity levels with imaging or other equipment.