

**OSHDP** Office of Statewide Health Planning and Development



**Hybrid Hospital Building Safety Board**

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**HOSPITAL BUILDING SAFETY BOARD  
Technology Committee Workshop**

***Clinical Systems Technologies***

**Wednesday, October 14, 2015  
10:00 a.m. - 4:00 p.m.**

**Office of Statewide Health Planning and Development  
Sacramento River Room  
400 R Street  
Sacramento, CA 95811  
(916) 440.8453**

**Committee Members Present**

Eric Johnson, Chair  
Deepak Dandekar  
Michael Foulkes  
Mike Hooper  
Michael O'Connor  
Carl Scheuerman  
Joe La Brie, Consulting Member

- 1 **1. Welcome and Introductions**
- 2 Chair Eric Johnson opened the workshop and welcomed everyone present. The
- 3 Committee members introduced themselves.
- 4 **2. First Presentation: *Hybrid O.R.s / Intraoperative MRI Technologies***
- 5 -- Bill Rostenberg, FAIA, Architecture for Advanced Medicine
- 6 -- Irene Bickell, RTKL Associates Inc.



1 **A presentation on the design of state-of-the-art healthcare facilities, with the**  
2 **focus on imaging, interventional imaging and surgery, as well as a high-level**  
3 **summary of changing technologies of this advanced medical equipment.**

4 Mr. Johnson introduced Mr. Rostenberg and Ms. Bickell.

5 Mr. Rostenberg gave a presentation entitled *Hybrid Operating Room Design*.

- 6 • There are many different variations of hybrid ORs (HOs).
- 7 • An HO is a procedure room designed for:
  - 8 ○ “Open” and/or “closed” surgical procedures
  - 9 ○ Surgical sterile control precautions, including the establishment of a
  - 10 “surgical red-line” of demarcation
  - 11 ○ Use of general anesthesia
  - 12 ○ Advanced image-guidance
- 13 • It combines interventional imaging with conventional surgery.
- 14 • Mr. Rostenberg provided the reasons for building an HO. One of the most
- 15 important is to provide a multidisciplinary collaborative approach to providing
- 16 care.
- 17 • Mr. Rostenberg listed the types of physicians who use them.
- 18 • He listed the possible locations of HOs, and the percentages of renovations
- 19 versus new constructions.
- 20 • Surgery and imaging are not always ideally compatible, so ways to make them
- 21 compatible must be found.
- 22 • Mr. Rostenberg described the types of HOs.
- 23 • He noted the many types of equipment in ceilings – prime real estate in the HO.
- 24 • A key question is: Do you move the CT or MRI scanner to the anesthetized
- 25 patient, or do you move the patient to the scanner? This magnifies the
- 26 complexity of the design/construction and the operation of the built environment.
- 27 • MRI is surrounded by a lot of safety criteria, while surgery is surrounded by a lot
- 28 of infection control criteria. This creates a dichotomy of safety versus sterility.
- 29 Interoperative MRIs may also be designed for use as backup diagnostic
- 30 magnets.

- 1 • Mr. Rostenberg explained the design considerations.
- 2 • He showed drawings of I-MRI / D-MRI procedure rooms. In the Intraoperative
- 3 MRI, the design must provide for both extreme infection control and MRI safety.
- 4 • The most important issue may be the various interpretations in the various states
- 5 regarding the visibility from the operator in the control room, into the magnet
- 6 room. Mr. Rostenberg's opinion was that the interpretation of the view down the
- 7 bore of the magnet to the control room really needs to be looked at very
- 8 comprehensively and determined on a case-by-case basis.

9 Ms. Bickell gave a presentation entitled *Hybrid OR's Medical Equipment Impact*.

- 10 • She focused on the challenge of medical equipment in the HO; the importance of
- 11 mock-ups; and the different technologies that have impact on
- 12 design/construction.
- 13 • Ms. Bickell listed the guidelines and principles for use of the HO.
- 14 • She explained the value of mock-ups and how equipment figures in. After mock-
- 15 ups are performed, no room retains the same configuration later in construction.
- 16 • Regarding equipment technologies, Ms. Bickell focused on the change that OR
- 17 integration has had to the Cath Lab, the IR room, and the OR room.
- 18 • She mentioned that there have been many lessons learned pertaining to BTUs.
- 19 • A large piece in the iMRI and Neuro Hybrid is neuro navigation systems.
- 20 • Ms. Bickell described the coordination of support equipment and perfusion
- 21 equipment location.
- 22 • The surgeons must be involved in equipment location decisions.
- 23 • In control rooms the main factor is coordinating the plethora of server equipment.
- 24 • Surgical tables are usually mounted to the floor and must communicate with the
- 25 imaging devices, as well as coordinating with the other factors.
- 26 • Ms. Bickell explained the options and limitations for monitor booms.
- 27 • Floor pedestals must be closely coordinated with the technology that needs to
- 28 plug into them.
- 29 • Committee discussion and public input

1 Glenn Gall of OSHPD asked about mechanical integration in the ceiling while providing  
2 a sterile field in the room. Ms. Bickell responded that at the point where the client has  
3 put the equipment where functions most ideally, then lighting and ventilation is designed  
4 and the client works to shift squares around. Mr. Rostenberg stated that luminous  
5 ceilings seem to be the future trend – every piece is washable and infection-tight but  
6 also has the capability to provide surgical-quality lighting in different areas. He  
7 cautioned that when you have a hard ceiling, which due to function requirements has  
8 many modifications, it may no longer be seamless.

9 Steve Juett of RTKL Associates Inc. commented that air flow requirements are being  
10 augmented by longer-reach arms on lights and booms that can be mounted externally  
11 outside, minimizing the interruption of the ceiling air flow.

12 Paul Coleman of OSHPD asked about changes to space requirements in the *2018 FGI*  
13 *Guidelines*. Mr. Rostenberg replied that the minimum 650 square footage for HOs is not  
14 intended to be an ideally functional room. Provisions in the code say the room has to  
15 work. In the guidelines that Mr. Rostenberg has been involved with, not listing minimum  
16 square footages has been better because each room is different.

17 An audience member asked about the future regarding subsidizing iMRIs with spare-  
18 time use as diagnostic – the two have the potential to compete. Mr. Rostenberg did not  
19 necessarily see that situation changing for two reasons: currently there is not a lot of  
20 reimbursement for iMRIs, and most hospitals do not have the luxury of eight magnets in  
21 one project. He stressed the value of understanding the additional complexity of that  
22 non-surgical workflow and solving for it, as well as ensuring that the diverse user group  
23 understands what the implications are – resulting in facilitating a collective  
24 understanding.

25 Mr. Rostenberg also pointed out that the HO is pressed more than any other space –  
26 licensing and permitting issues need to come together.

27 An audience member relayed an experience about a very small HO in which the  
28 anesthesiologist and the robotic arm both wanted the position at the head of the patient.  
29 The solution was to move the robotic arm 30° off of center.

1 Mr. Rostenberg responded that the pressures to make these rooms smaller are very  
2 real and can't be immediately dismissed. He also pointed the usefulness of a zoning  
3 diagram for the complicated choreography of an HO.

4 An audience member asked about HOs in Chapter 12 of the CBC – it contains Surgery  
5 and OR sections. He then asked if equipment is getting smaller or larger. Mr.  
6 Rostenberg responded that he did not see equipment getting smaller, with a few  
7 exceptions. Ms. Bickell added that with increasing procedures and software, the  
8 electronics room is getting more cabinets.

9 Regarding the CBC question, Mr. Rostenberg answered that the Guidelines now have a  
10 chapter and subchapter that will probably move to be equally in line with Surgery and  
11 Interventional. Mr. Gall stated that OSHPD has proposed language for the 2016 CBC  
12 that is based on the 2014 Guidelines.

13 An audience member commented on the integration of equipment. Ms. Bickell noted  
14 that they try to integrate and implement new technology as much as possible, but it still  
15 requires many inputs and cables.

16 Mr. Juett added that to address the issue of connective medical equipment, the  
17 American College of Clinical Engineering, the Association of Medical Instrumentation  
18 from AAMI, and the Health Information Management Society have created an Integrated  
19 Health Care Enterprise Workgroup. They are trying to write standards and create inter-  
20 company communication. As companies design a product, they need to keep in mind  
21 the communication with foreign devices; there may still need to be a product in the  
22 middle for “handshakes.”

23 Mr. Rostenberg asked OSHPD about a scenario involving an Intraoperative MRI with a  
24 code that said the Control Room needed to look directly down the bore on the magnet.  
25 If he felt that so doing would create a situation that was less safe rather than more safe,  
26 what would be the recommended process for having a dialogue? Mr. Gall suggested  
27 the Functional Program, for integrating a licensing component along with a permitting  
28 component at the front end of a project. Mr. Coleman suggested that if the code has a  
29 specific standard, an Alternate Method of Compliance would be required to examine  
30 meeting the intent of the code in an alternative manner.

1 An audience member observed that some of these issues are driven by functionality.  
2 When surgeons and others are weighing in, and they come up with a compromise, we  
3 should listen to their opinions.

4 An audience member commented that in dealing with doctors who want the latest and  
5 greatest, multiple revisions result. He asked how long it takes to design an HO  
6 correctly. Mr. Rostenberg responded that if there is relative agreement in terms of what  
7 is wanted in the HO, it should only be a little longer than a typical OR. The problem that  
8 he has encountered over the years in every health care project is the disruption that  
9 comes with decision-making. He believed that any project, large or small, should start  
10 with a decision critical path. Eighty percent is how clearly the right questions are being  
11 posed and decisions made, and in what order – this is more significant than how many  
12 hours it takes to draw and design.

### 13 **3. Second Presentation: *Next Generation of Medical Equipment Planning***

14 **- Steve Juett, RTKL Associates Inc.**

15 **Review of the many changing technologies in healthcare, including:**

- 16 **a. Medical equipment that is moving into the healthcare facility environment**  
17 **b. Planning flexible facilities that can adapt to changes in advanced medical**  
18 **equipment as well as changing staffing requirements**

19 Mr. Johnson introduced Mr. Juett, who provided disclosure for RTKL as a vendor-  
20 neutral consultant. He began the presentation.

- 21 • Technology is literally coming out of hospital walls.  
22 • Infection control is a dominant hospital issue.  
23 • Planning and design begins with a user interview; then drawings are developed.  
24 • Mr. Juett showed drawings and photos of typical hospital wall structures,  
25 including stainless steel, lead lined, and panels.  
26 • He listed the components of design development and the steps for finalizing  
27 construction documents.  
28 • He explained the automation and tools available to assist in planning.

- 1 • He explained how the wall systems impact procurement – the critical path and  
2 construction schedule.
- 3 • He showed the improvements that have occurred in construction administration  
4 and installation coordination to windows, pre-fabrication, walls, ceilings,  
5 base/floors, electrical, doors, and storage.
- 6 • Computers, CPUs, processors, codecs and other technology need to be put into  
7 electronic enclosures and to be accessible.
- 8 • Different types of lighting can be installed quickly and easily without airborne  
9 dust. LED lighting provides various options.
- 10 • Lead bricks in walls can stop radiation from penetrating outside a space.
- 11 • A trend in technology is the virtual presence, in which an operating theater can  
12 be observed without having visitors physically present.
- 13 • IT challenges include data management, the perioperative department,  
14 connected medical equipment, and cable management.
- 15 • Mr. Juett showed photographs of an existing high-tech OR that manages air flow  
16 without booms, pods to provide utilities, an operating table with remote controls,  
17 waste management, seamless walls, sterilization capability that uses ozone,  
18 controlled lighting behind the walls, and “post office” exchange of surgical items.
- 19 • We can move away from the use of film illuminators in radiology.
- 20 • We need to understand how to adapt to change without being too prescriptive –  
21 without stopping the advancement of new technology.
- 22 • Committee discussion and public input

23 An audience member asked about fire rating for wall systems. Mr. Juett answered that  
24 some vendors have completed that process while some are just yielding to the old  
25 process.

26 Mr. Juett discussed film illuminators with an audience member; the code could be  
27 written better.

28 An audience member asked about OSHPD Preapproval of Manufacturer’s Certification  
29 (OPM). Roy Lobo of OSHPD answered that you can still use an OPM on the website  
30 that matches your needs; OPMs started with the 2013 code. Chris Tokas of OSHPD

1 explained that OSHPD Preapprovals of Anchorage (OPAs) do not continue in the 2013  
2 or later issues – that is why OSHPD developed the OPM program.

3 Mr. Gall asked if Mr. Juett has been seeing a trend away from clean cores in surgical  
4 settings. Mr. Juett replied that clean cores are still active; the issue he has seen is the  
5 need for immediate re-use sterilization. He felt that facilities should anticipate the need  
6 to keep spares on hand, although this can be very expensive.

7 Mr. Rostenberg added that the model for a clean core is to have a sterile flow going in,  
8 and everything else (patient, staff, used supplies) going out. He felt that more often  
9 than not, it isn't adhered to when it is operational. He also said that statistically many of  
10 the European models which are not clean core have lower infection rates. He felt that  
11 there are many valid alternatives to clean core.

#### 12 **4. Third Presentation: *Wireless Technologies / Electronic Health Records (EHR)***

13 **-- Jim Goddard, Executive Director, Cyber Security Technology Risk Office**

14 **Kaiser Permanente**

15 **Presentation on wireless technologies and their associated risks, such as**  
16 **maintaining services during electrical disruptions, disasters, malicious activities,**  
17 **etc., as well as a discussion on the risks related to hospital systems' Electronic**  
18 **Health Records (EHR) exposure to hacking.**

19 After an introduction and short bio from Mr. Johnson, Mr. Goddard highlighted the  
20 gravity of the cybersecurity situation. He said that an unprotected system on the  
21 Internet takes an average of seven seconds to be compromised.

22 Mr. Goddard began the presentation.

- 23 • In 2014, health care came into focus for cyber threats. Credit cards have  
24 become harder to steal, but personal information – names and Social Security  
25 numbers – have become very valuable. That information is permanent, as is  
26 medical information. It is valuable from both monetary and national security  
27 perspectives.

- 1 • Because we are dealing with nation states going after our infrastructures, there is  
2 no guarantee in cybersecurity. Our environment is becoming more and more  
3 complex, and the adversaries are both sophisticated and persistent.
- 4 • The six domains of privacy and security are information security, data  
5 management, vendor risk management, privacy and compliance, regulatory  
6 implementation, and edge IT.
- 7 • Encryption is not a silver bullet – for data to be valuable, it must be decrypted at  
8 some point so people can read it. Attackers have found user accounts that have  
9 the decryption key; they get the key and then decrypt.
- 10 • At the end of the day, security is a cultural issue; it is important to have senior  
11 executive endorsement and support.
- 12 • Kaiser Permanente’s security foundations are protection, detection, and  
13 response.
- 14 • Cyberattacks occur in “Kill Chain” stages: reconnaissance, infiltration, lateral  
15 movement, and reach objective. Kaiser Permanente has aligned its security  
16 teams and tools to the Kill Chain to mimic attackers.
- 17 • Mr. Goddard explained the methods attackers use.
- 18 • The Cyber Risk Defense Center monitors 24/7. It employs people from  
19 government, health care, financial services, and technology. Mr. Goddard  
20 stressed the importance of the ongoing collaboration among the employees.
- 21 • Mr. Goddard stressed the benefit of information-sharing among industries in  
22 dealing with cyberattacks.
- 23 • Weekly Indicators of Compromise relay information on other systems that have  
24 been compromised.
- 25 • Kaiser Permanente constantly runs practices for what to do when a breach  
26 happens in order to minimize the effect of an actual breach.
- 27 • Kaiser Permanente has a program that continually assesses new technology of  
28 all kinds coming into the environment.
- 29 • The sources of new technology are the vendors. Kaiser Permanente must use  
30 mitigating controls on vendors whose technology has bugs, when the technology  
31 cannot be pulled from the workplace because of its lifesaving capabilities.

- 1 • 100% of breaches in health care start with an email – someone clicks on  
2 something they shouldn't have. Kaiser Permanente participates in Security  
3 Awareness Month; often individual users see something wrong and report it.
- 4 • Committee discussion and public input

5 Mr. Goddard agreed with an audience member that a lot of money must be spent to  
6 defend the system. Many organizations are looking at expanding their capabilities  
7 based on the threat.

8 An audience member asked about the malicious variety of attack. Mr. Goddard  
9 responded that in most cases, the attackers aren't trying to shut down systems. So far,  
10 attackers mostly want to take the data.

11 An audience member pointed out that gaining control of medical equipment could be a  
12 very serious security issue. Mr. Goddard concurred that this situation was possible.

13 An audience member asked about the automation of building systems becoming a  
14 target. Mr. Goddard responded that in most breaches, the target is data itself.

15 An audience member pointed out that in automated building systems, cyber networks  
16 are the weakest link. Hospitals rely on all kinds of systems that are linked to much  
17 lower level data systems that could be easily shut down, crippling the hospital's delivery  
18 of care. We should be focused on the weakest points. Mr. Goddard responded that  
19 there are always potential threats – we have to prioritize according to the threats that  
20 are most likely.

21 An audience member commented that a preventive measure is to consider a vendor's  
22 provision of security before you buy.

23 Mr. Coleman commented that anyone can request and obtain a hospital's plans and  
24 specs. Mr. Goddard agreed that having them would give some advantage in planning  
25 an attack. However, currently the most common threat is directly targeting systems that  
26 house a lot of sensitive data.

27 An audience member asked about best practices for the building side of cybersecurity.  
28 Mr. Goddard recommended network segmentation: putting very sensitive information

1 on a network with very limited access. He was not aware of any best practices being  
2 published. Some useful documents are *Cybersecurity Framework* and *SANS Top 20*.

3 Mr. Johnson asked if wireless projects expose networks to increased problems. Mr.  
4 Goddard replied that they do not if they are properly done.

5 **5. Committee Discussion: The Committee will discuss possible actions the**  
6 **Committee and/or OSHPD should consider regarding building standards,**  
7 **regulations and policies for technologically related equipment and systems in**  
8 **hospitals.**

- 9 • Committee discussion and public input

10 An audience member commented on performance-based code considerations for some  
11 of the architectural requirements. He suggested that other OSHPD divisions outside of  
12 FDD keep careful track of the performance of health care organizations in California for  
13 systems to be proven.

14 **6. Comments from the Public/Board Members on Issues not on this Agenda**  
15 **The Board will receive comments from the public/members at this time on**  
16 **matters not on the agenda. Matters raised at this time will be taken under**  
17 **consideration for placement on a subsequent agenda.**

18 Mr. Johnson noted that the third Technology Committee workshop is scheduled for  
19 November 10. Its topic is *Building Design Systems*.

20 **7. Wrap-up and adjournment**

21 The workshop ended at approximately 3:00 p.m.