

## European Health Property Network

### Operating Theatre Block Planning and Design

# O'Connell Mahon Architects |



# National Children's Hospital- Dublin

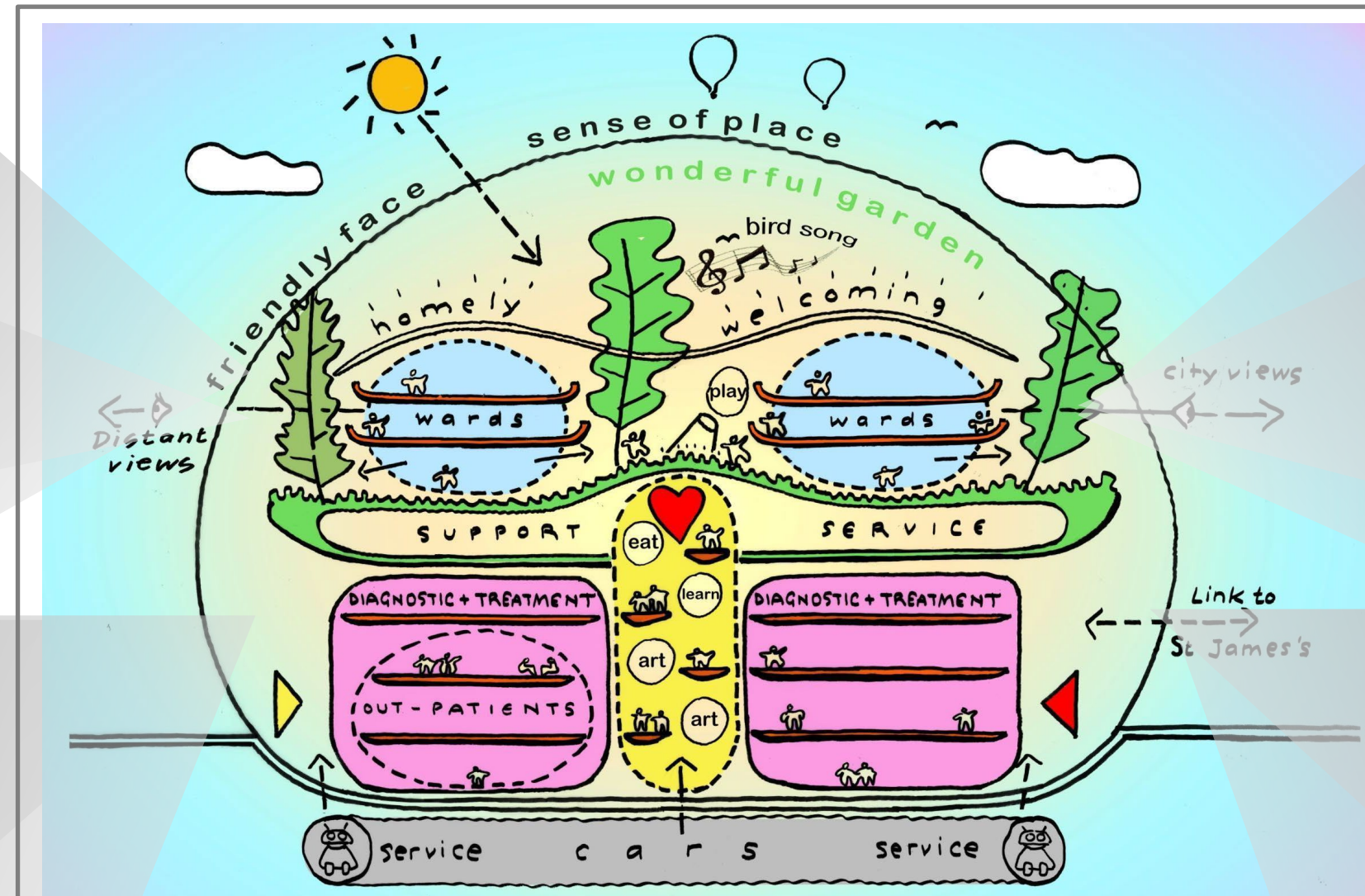
BDP. and O'Connell Mahon Architects



Daylight, social interaction, safe, age appropriate, homely yet exciting



100% inpatient single rooms, en-suite, family area



AGV transport

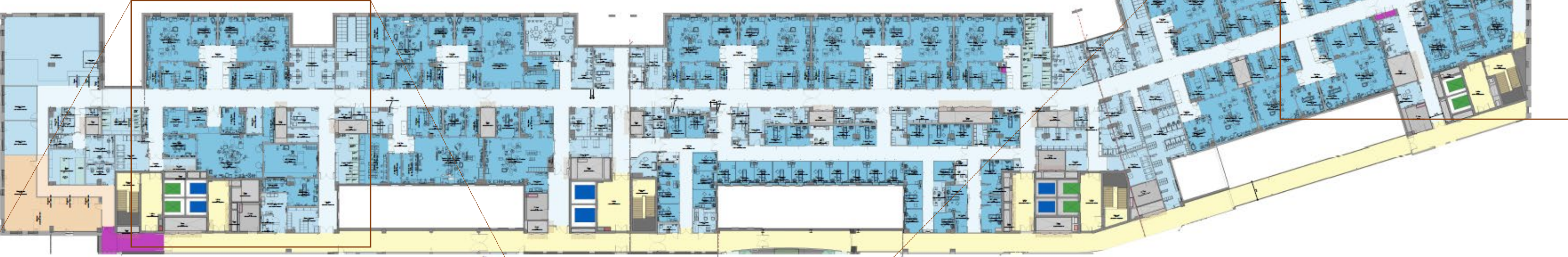


Paeds OPD & UCC at Tallaght & Connolly Hospitals approx. 4,500m<sup>2</sup> & 5,000m<sup>2</sup>

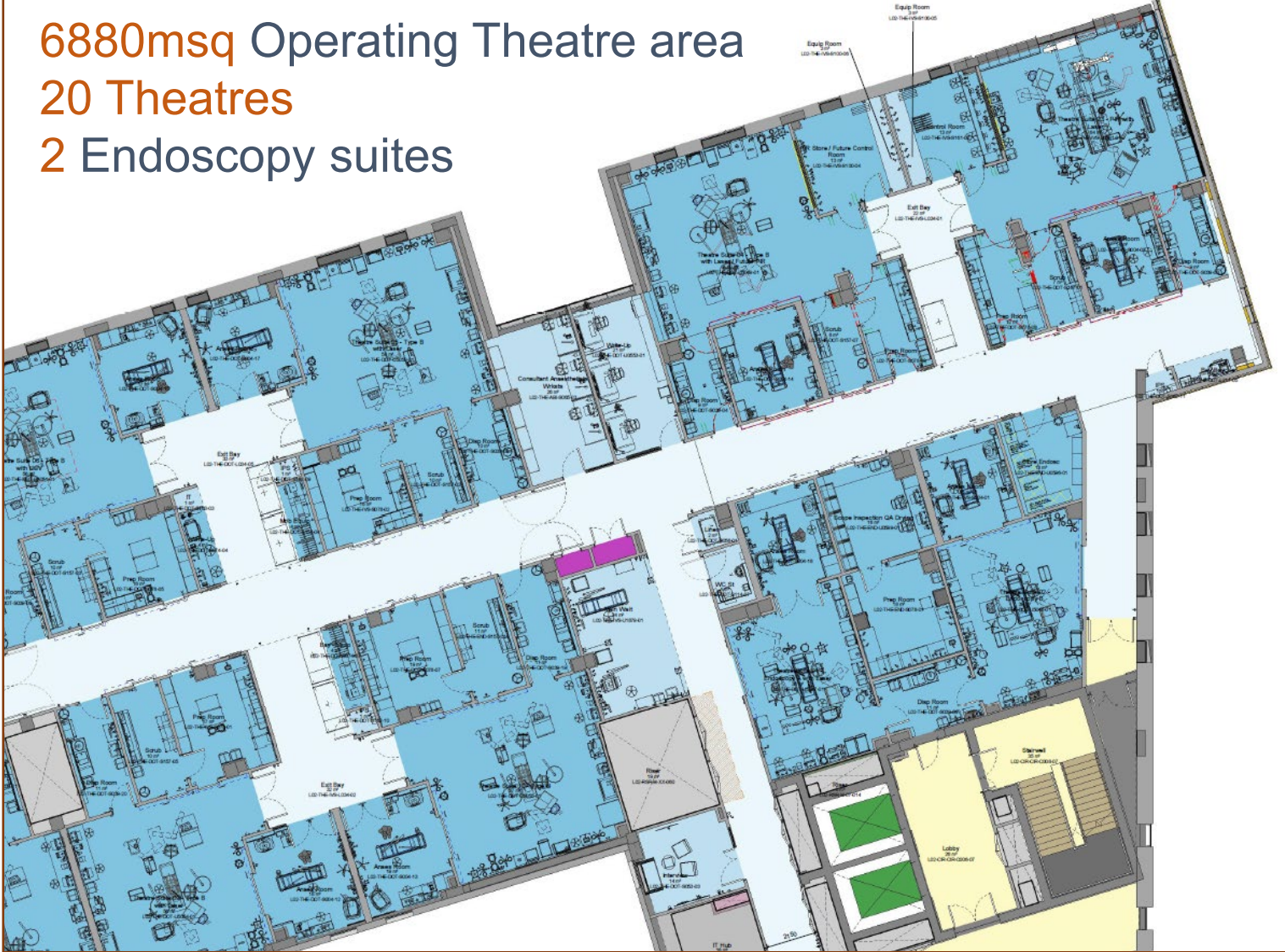
- **160,000m<sup>2</sup>** total floor area, approx., including basement.
- **473 beds** (380 In-patient & 93 day care)
- **22 theatres**
- **110 OPD** rooms, 12 SSOU beds & 36 assessment bays
- Advanced diagnostics, intervention and theatre facilities
- Play areas, external gardens and courtyards
- Therapy area with hydro pool & gym
- Hospital School
- Children's Research & Innovation Centre
- Adjacent parent / family accommodation (RMcDHC)

# National Children's Hospital- Dublin, Operating Theatres

BDP. and O'Connell Mahon Architects



6880msq Operating Theatre area  
20 Theatres  
2 Endoscopy suites





# National Children's Hospital- Dublin

BDP. and O'Connell Mahon Architects



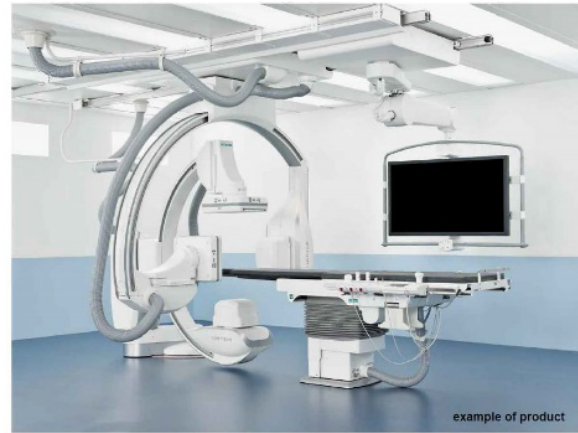
# National Children's Hospital- Dublin

BDP. and O'Connell Mahon Architects



# National Children's Hospital- Dublin, Operating Theatres

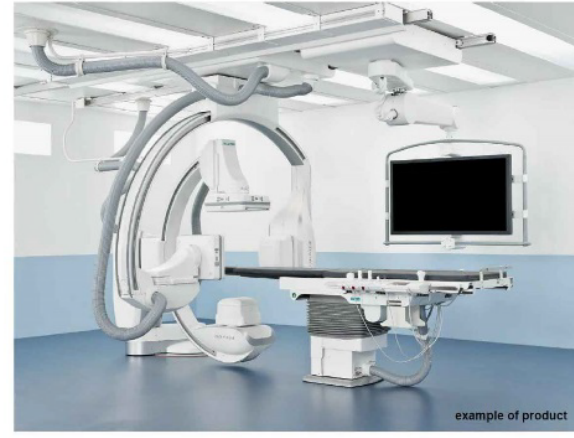
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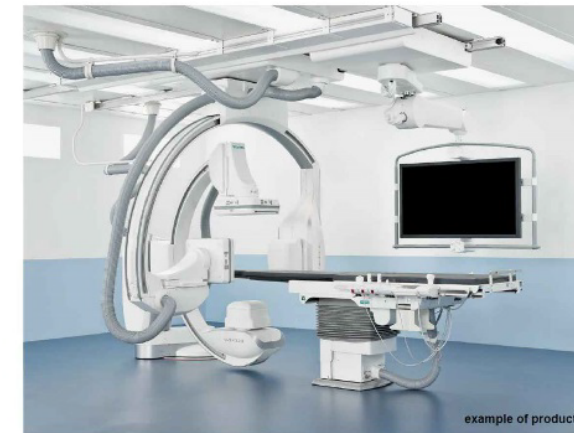
example of product



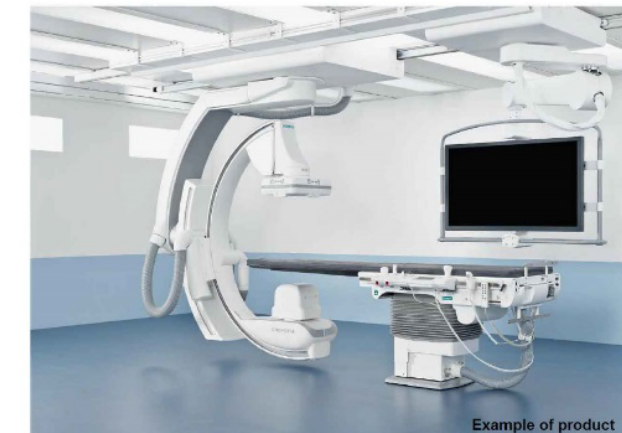
MAGNETOM Verio 3T



example of product



example of product



Example of product

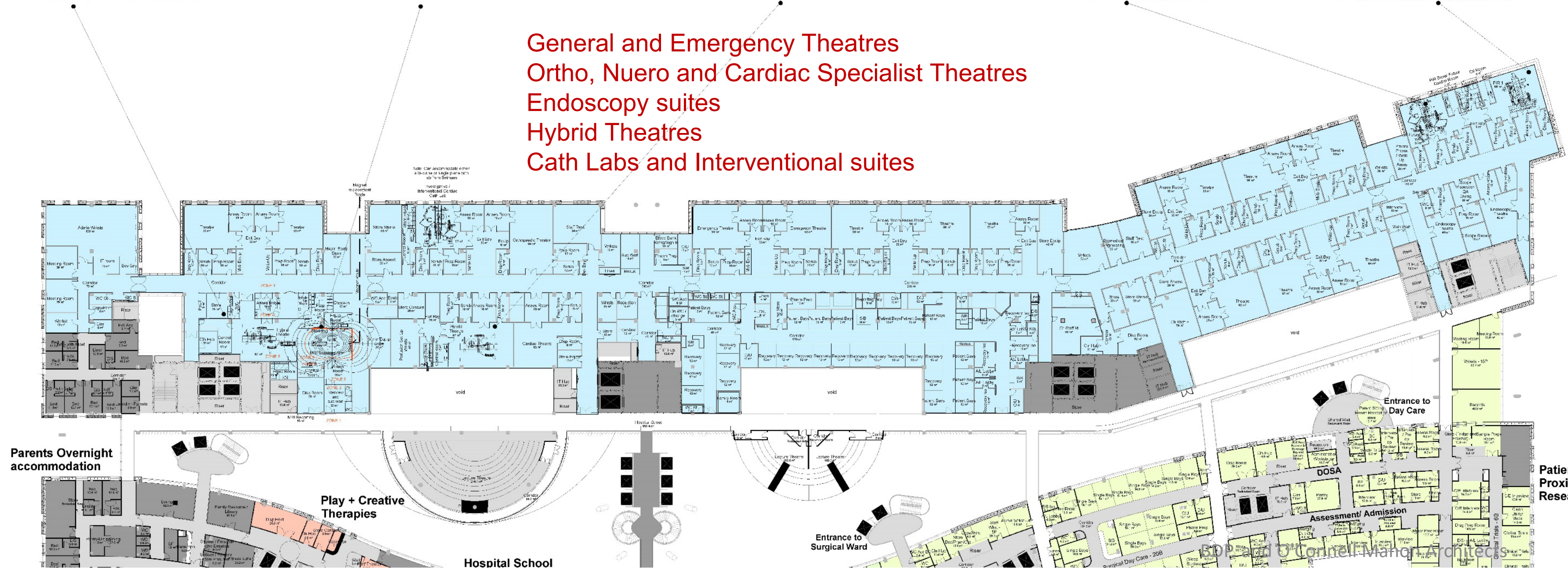
Siemens - Artis Q / Q.zen biplane (Angio) for Future PIR room

Siemens - Artis Q / Q.zen biplane (Angio) for Future PIR room

Siemens - Artis Q / Q.zen biplane (Angio) for Future PIR room

Siemens - Artis Q / Q.zen ceiling (Angio/Card)

General and Emergency Theatres  
Ortho, Nuero and Cardiac Specialist Theatres  
Endoscopy suites  
Hybrid Theatres  
Cath Labs and Interventional suites







# European Health Property Network- Questions to consider

1. Why do differences in OT block design arise, even in the case of contemporaneously planned and constructed facilities?
2. What evidence is used by planners and designers?
3. Whose voices are heard during the planning and design phases, for new build or refurbishment?



**The Problem?**



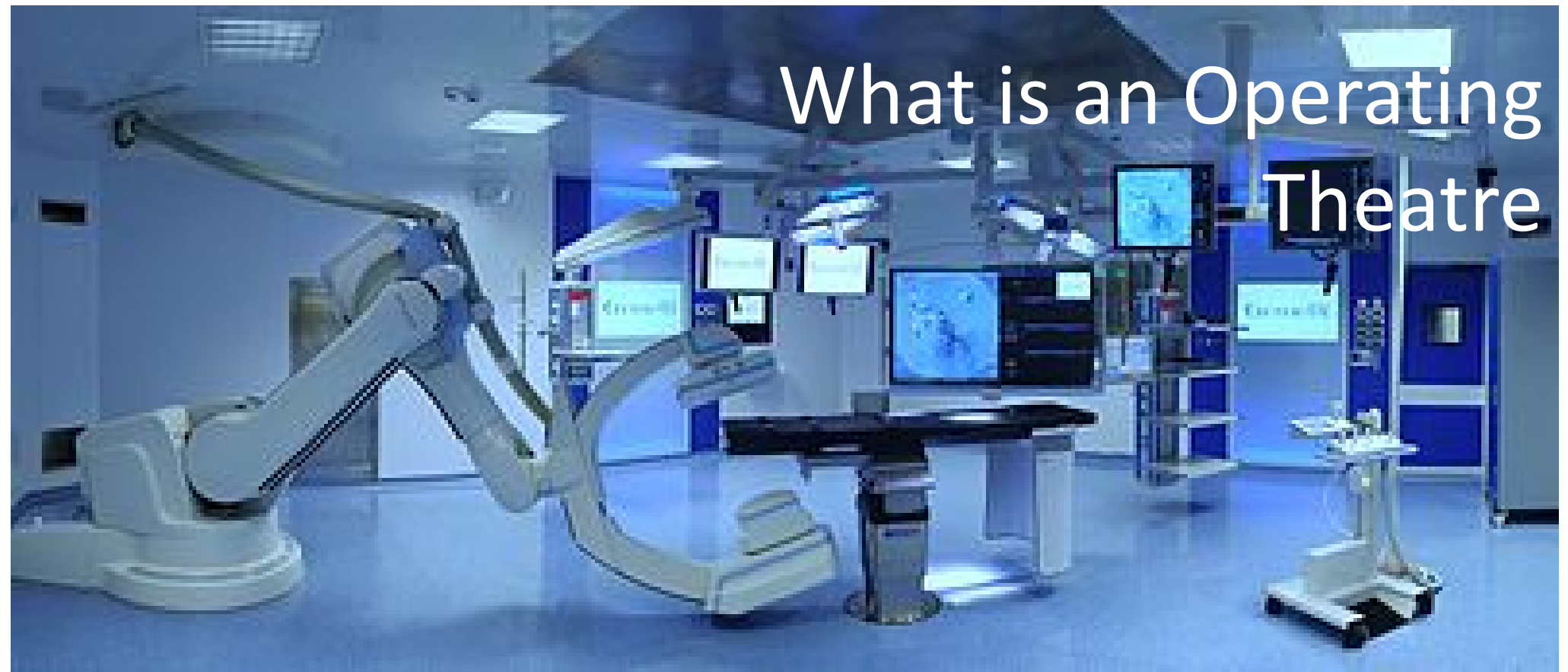
**The Research**



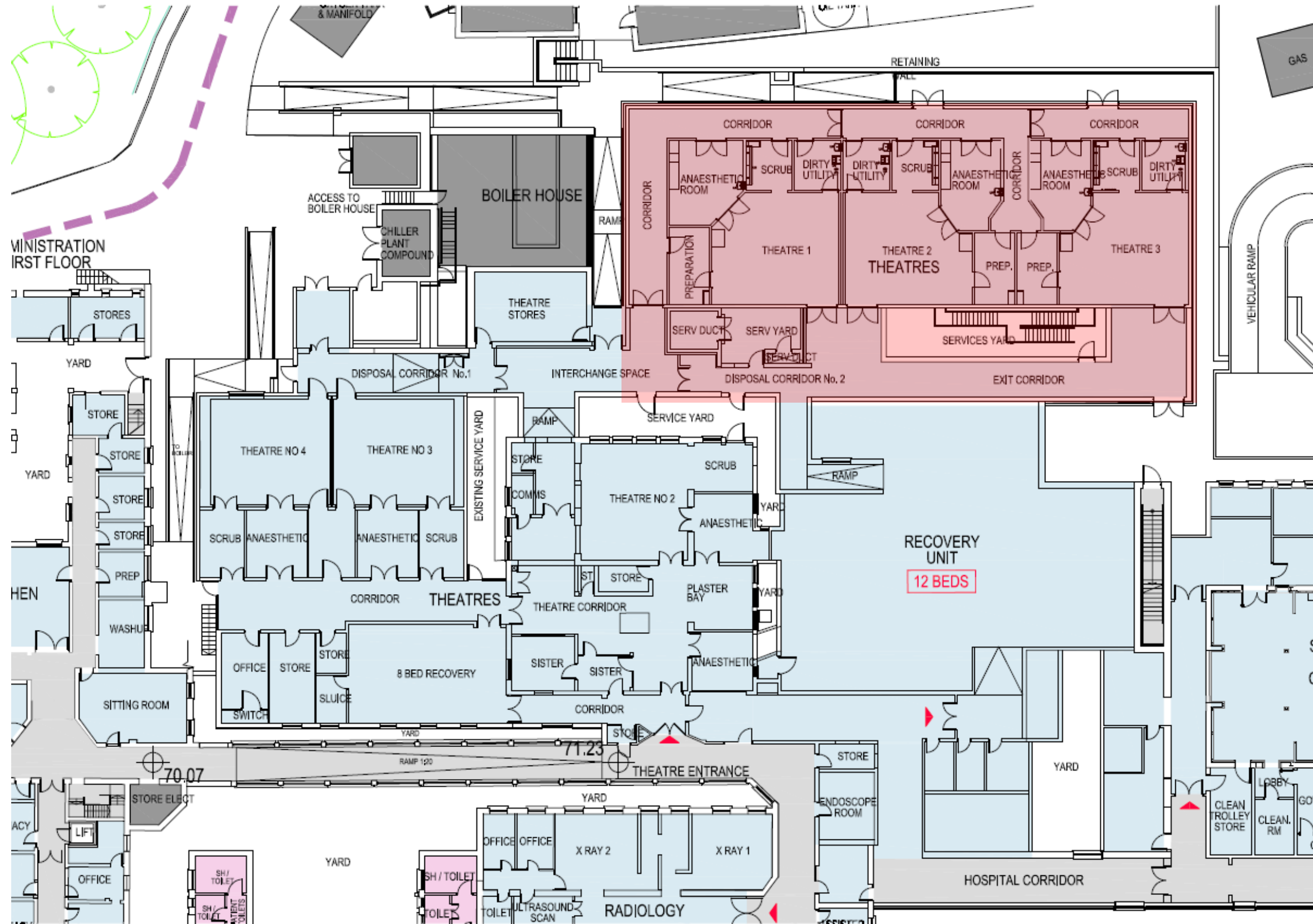
**The Results**



**A Proposal**



# Ad-hoc operating theatre development



**What is the Resultant Problem?**

***“Built Catastrophes”***

***“...Hardly Ever Functional”***

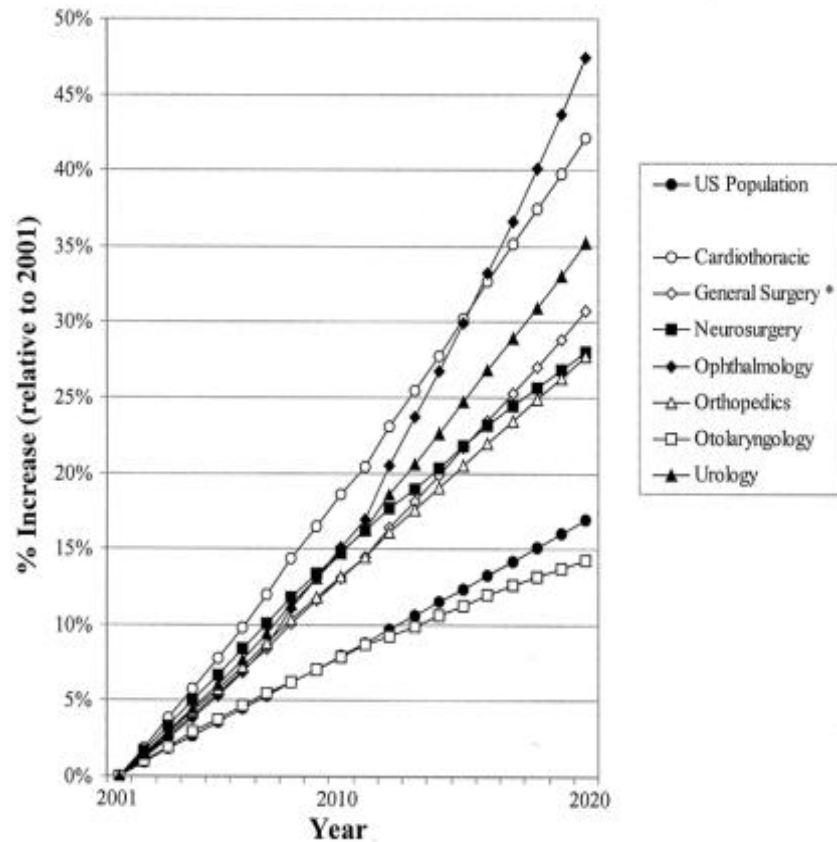
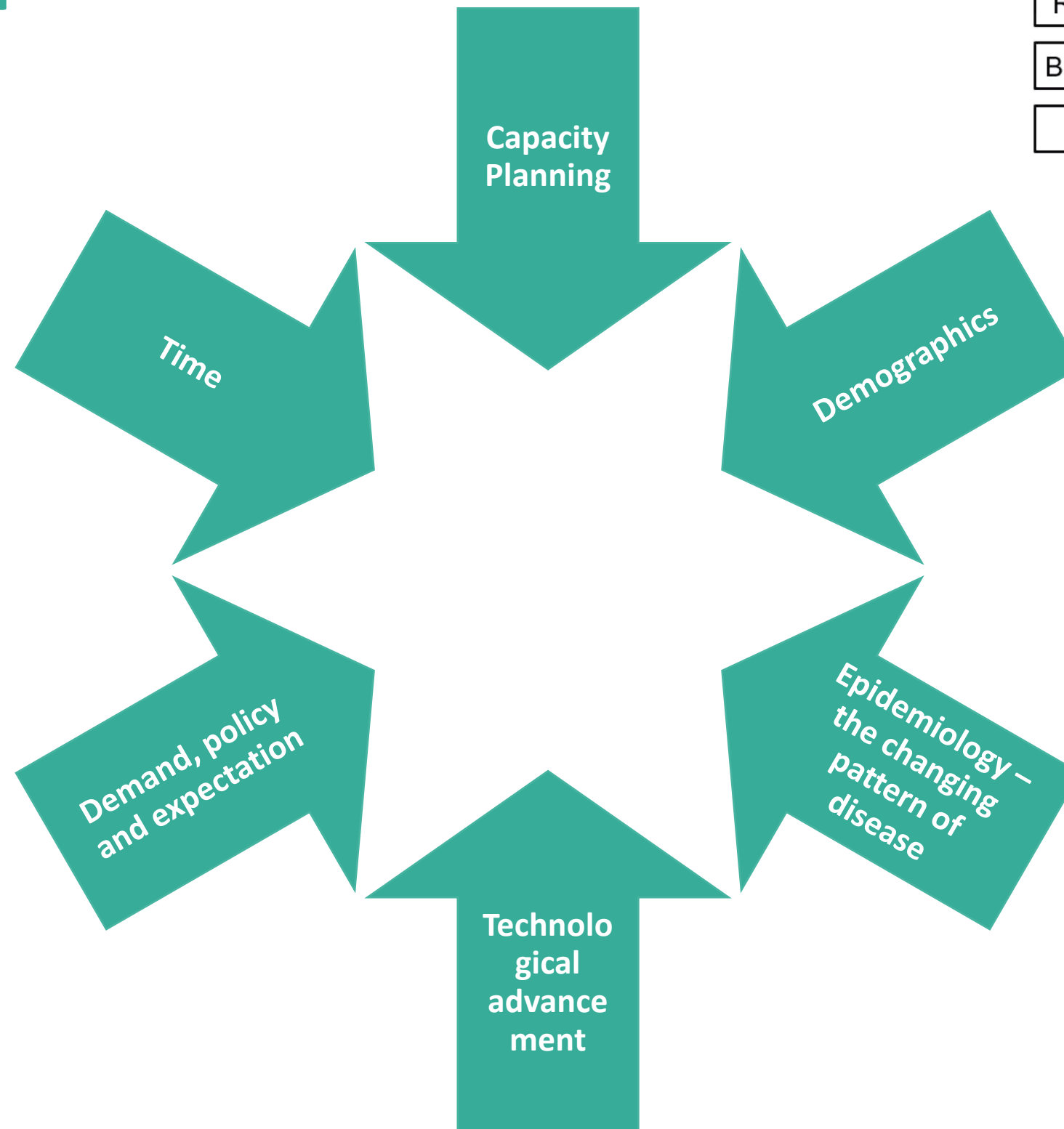
Wagenaar, 2006



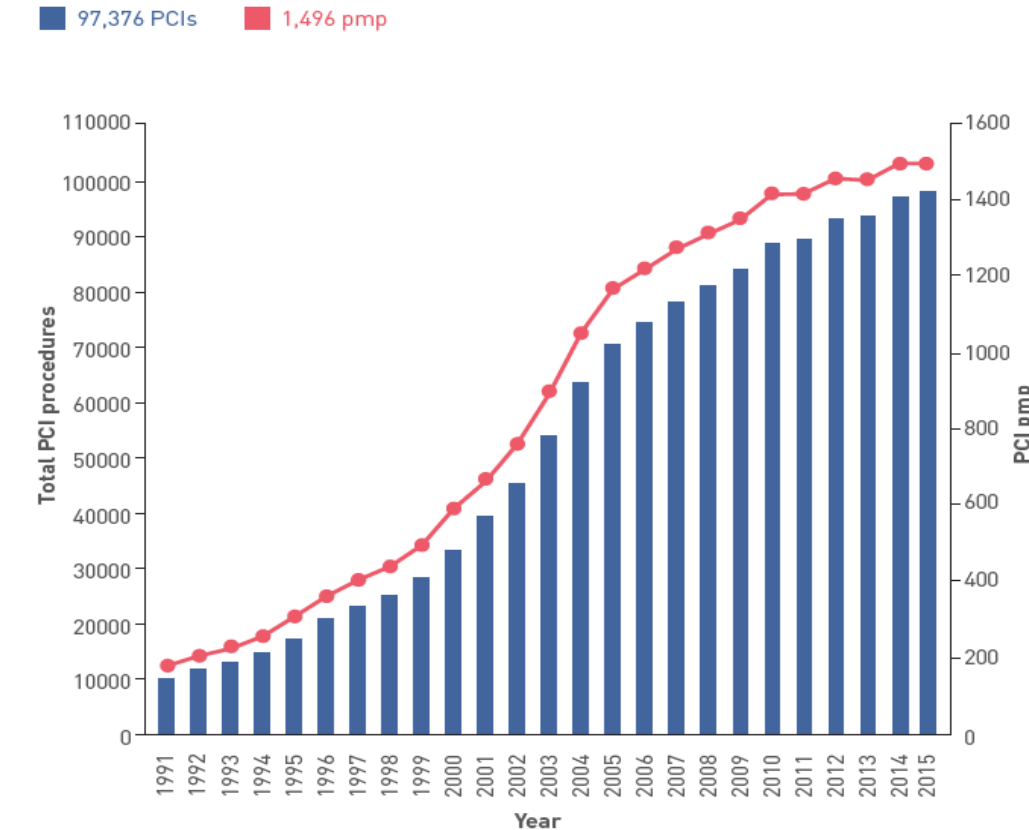
# The Challenges of Predicting Theatre Numbers And Types?



Building Design	60 years					
Change in use	30 years			30 years		
Refurbishment	15 years	15 years	15 years	15 years	15 years	15 years
Business Model	5	5	5	5	5	5
Technology	[8 vertical bars]					



Forecast increase in US surgical work by specialty (Etzioni et al, 2003)



Percutaneous Coronary Interventions trends (NICOR, 2017)

# The Challenges To Predicting Theatre Numbers And Types?



## Capacity Planning

- a. Decision making
- b. Clinical opinion
- c. Building design and physical infrastructure
- d. Data
- e. Political influence
- f. Separated funding streams
- g. Misunderstanding of terminology





# The Research Subjects



Ulster Hospital Inpatient ward Block (IWB), Dundonald, Opened April 2017



South West Acute Hospital, Enniskillen, Opened June 2012



Tullamore General Hospital, County Offaly, Ireland. Opened 2008



Mater Misericordiae University Hospital, Dublin, Opened April 2012



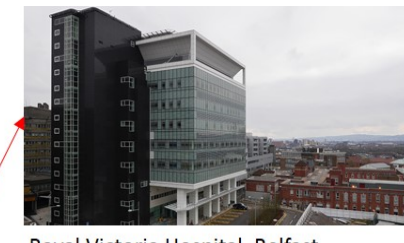
St Vincent's Private Hospital, Dublin, Opened November 2010



Royal Stoke Hospital, Stoke on Trent. Opened December 2012



Southmead Hospital, Brunel Building Bristol, Opened May 2014



Royal Victoria Hospital, Belfast Phase 2b 2015



Victoria Hospital Kirkcaldy, Fife Opened in 2012



Queen Elizabeth Hospital, Birmingham Opened in 2010



Tunbridge Wells Hospital, Pembury. Opened January 2011



The Royal London Hospital, Opened in February 2012



St Bartholomew's Hospital, London, Opened in June 2016



# The Results



**62%**  
CHANGE

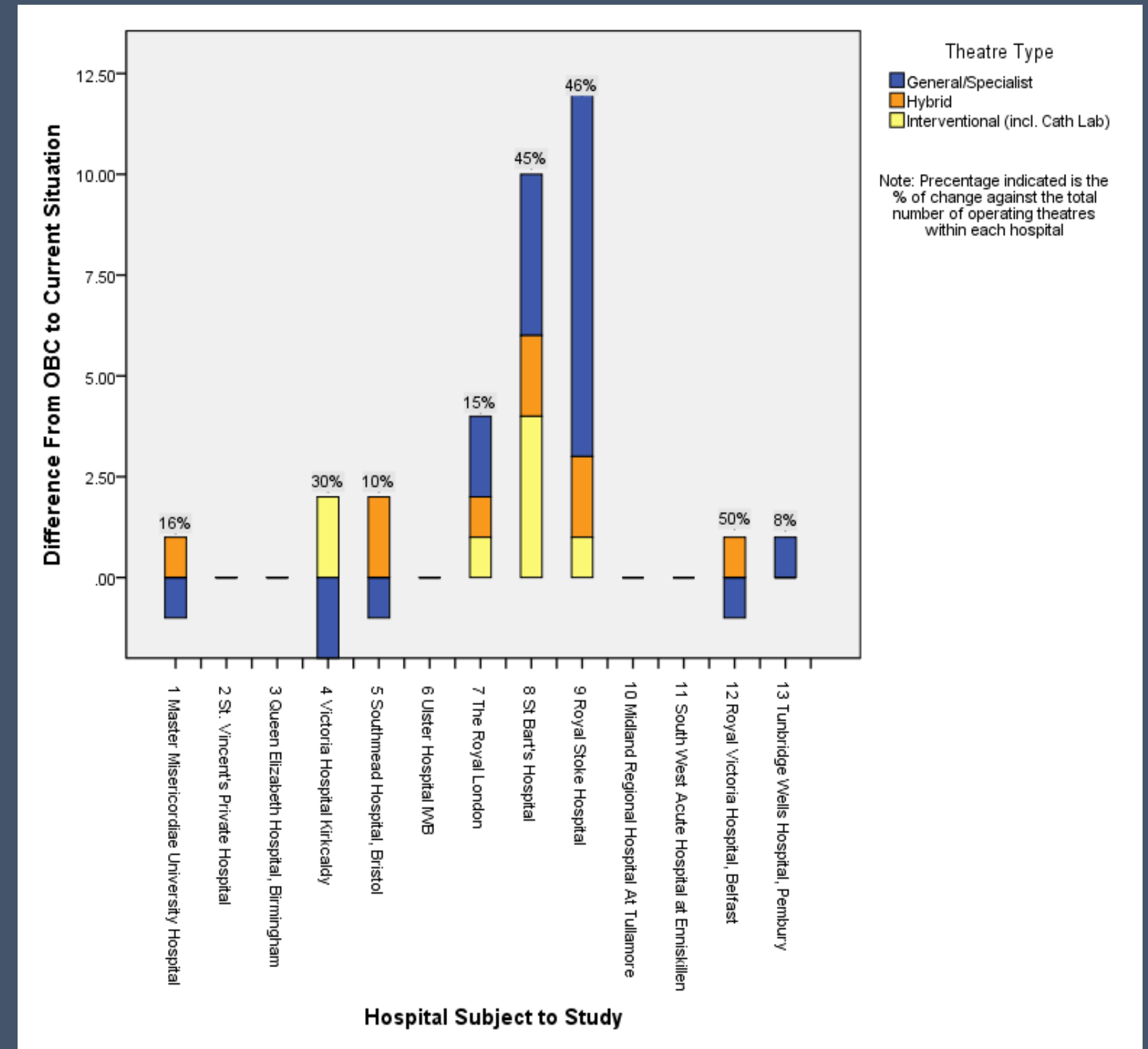
**±6**  
YEARS

**+4 -2**

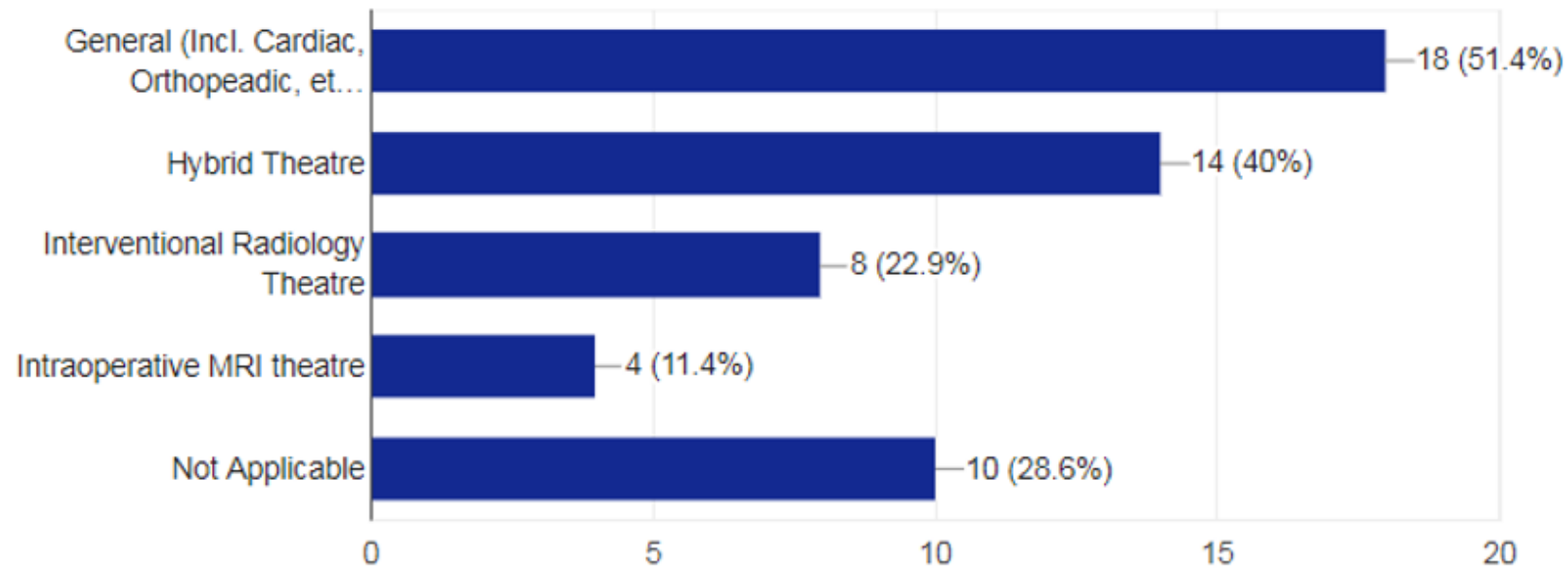
STATISTICALLY



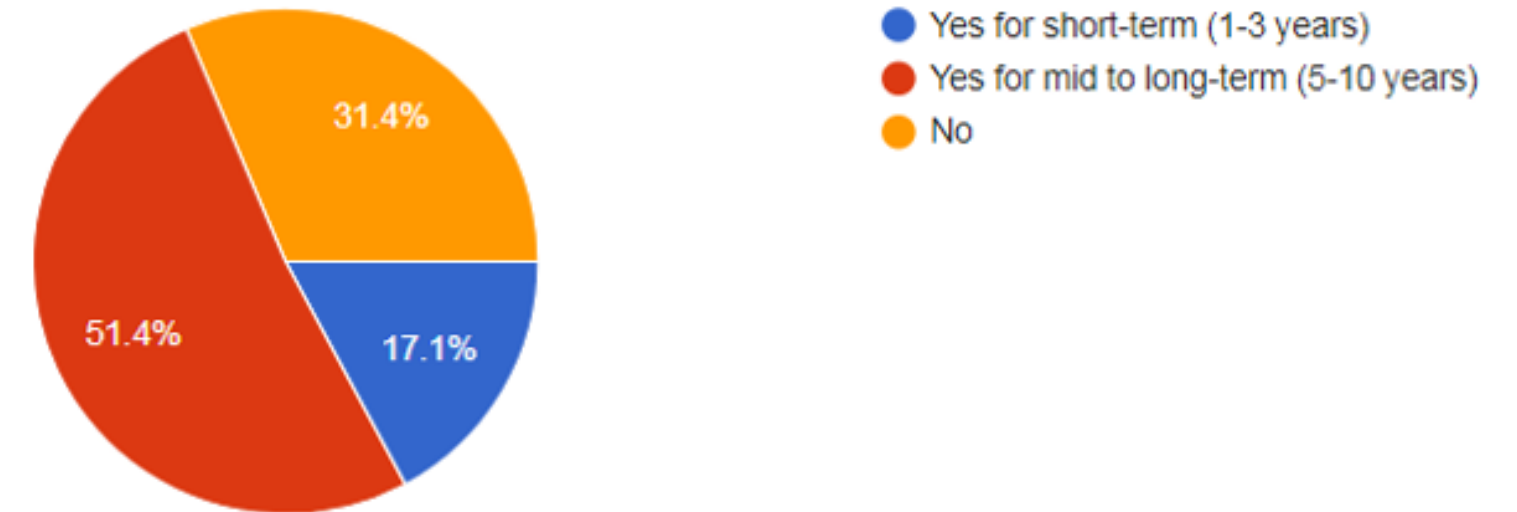
GENERAL THEATRES



# The Qualitative Study



More???

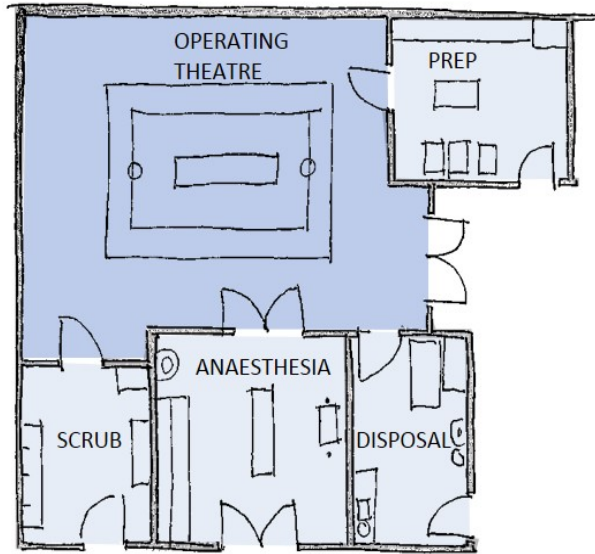


Do you have the skills to forecast strategic or tactical needs of your operating theatre?

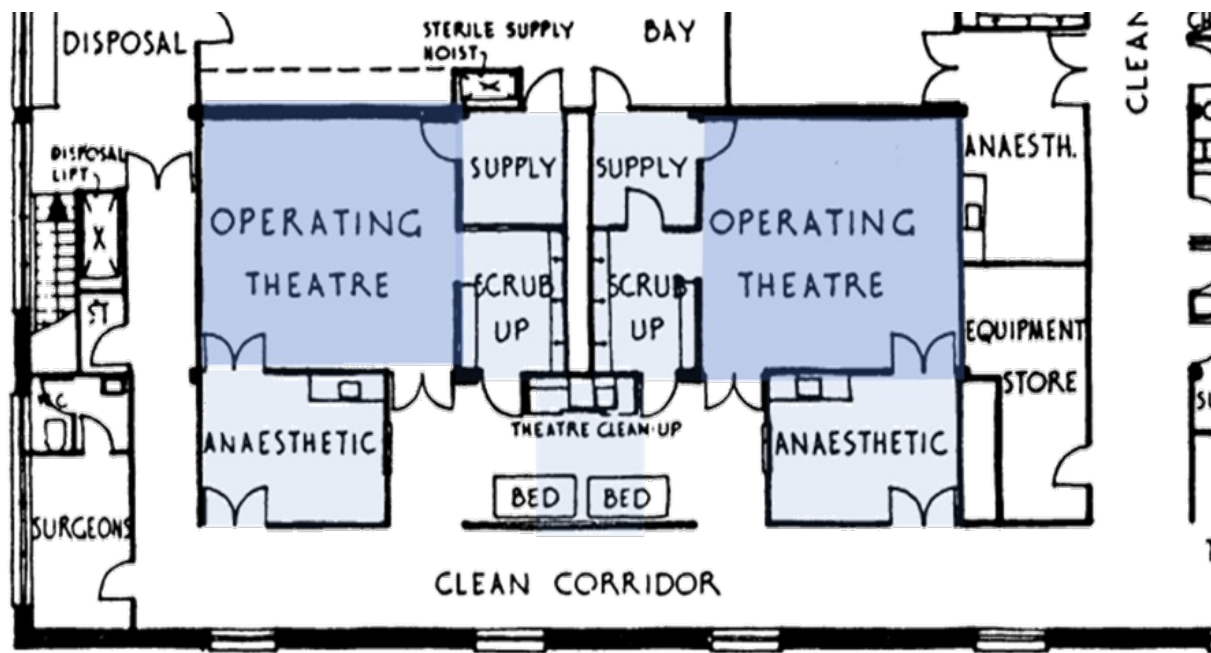
# Current Guidance- Health Building Note (HBN) and alternatives



2019



Current HBN 26 (2004)  
Operating Theatre layout



1962

Operating Theatre suite accommodation requirements by type									
General Operating Theatre (DOH, 2004)		Specialist Theatres; orthopaedic, neurological, cardiovascular		Catheter laboratory (DOH, 2013)		Hybrid Operating Theatre		Intra-operative MRI suite	
Room	Area m <sup>2</sup>	Room	Area m <sup>2</sup>	Room	Area m <sup>2</sup>	Room	Area m <sup>2</sup>	Room	Area m <sup>2</sup>
Operating theatre	55	Theatre	55 <sup>1</sup> 70-75 <sup>2</sup>	Catheter lab.	50	Theatre	70-90 <sup>4</sup>	Theatre	55 <sup>1</sup> 70-75 <sup>2</sup>
Anaesthetic room	19	Anaesthetic room	19	Anaesthetic room	19	Anaesthetic room	19	Anaesthetic room	19
Preparation room	12	Preparation room	12	Preparation room	9	Preparation room	9	Preparation room	12
Dirty utility room	12	Dirty utility room	12	Dirty utility room	12	Dirty utility room	12	Dirty utility room	12
Scrub-up: 3 places	11	Scrub-up: 3 places	11	Scrub-up: 2 places	7	Scrub-up: 2 places	7	Scrub-up: 3 places	11
Storage	1	Storage	1	Storage	4	Storage	4	Storage	1
				Computer room	10	Computer room	10	Computer room	10
				Control room	12	Control room	12	Control room	12
								Intra-operative MRI	42 <sup>3</sup>
Totals (maximum figures taken)	110		130		113		163		184

- 1 HBN 26 and HBN 01-01 suggest that Orthopaedic (Ultra-clean) and Cardiac theatres should be sized at 55msq, similar to general theatres (DOH, 2004), however recent operating department briefs have included specialist theatres up to 85msq in area.
- 2 Area as recommended area by the American Society of Anesthesiologists, (Block and Helfman, 2012)
- 3 Area as recommended HBN 6, Facilities for Diagnostic Imaging and Interventional Radiology (DoH, 2001)
- 4 Area as recommended by Siemens AG, (Siemens, 2015), Nollert et al (2012), Block and Helfman, (2012), Kpodonu (2010)

# A Case of Flexibility and Adaptability

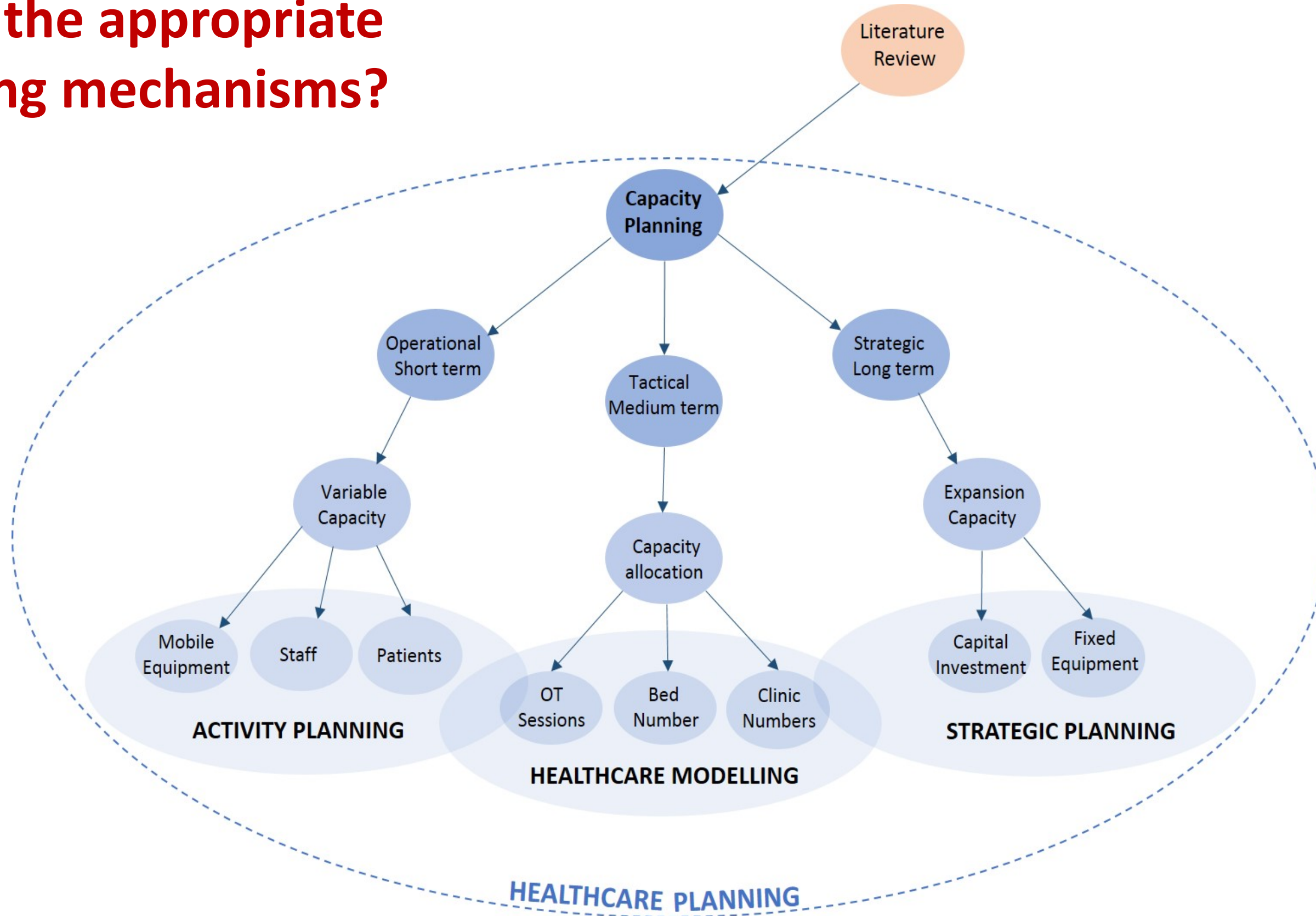


*“there are simply too many parameters that are unknowable”* (Rachel et al. 2009)

**We need a different mindset and approach**



# Use of the appropriate planning mechanisms?



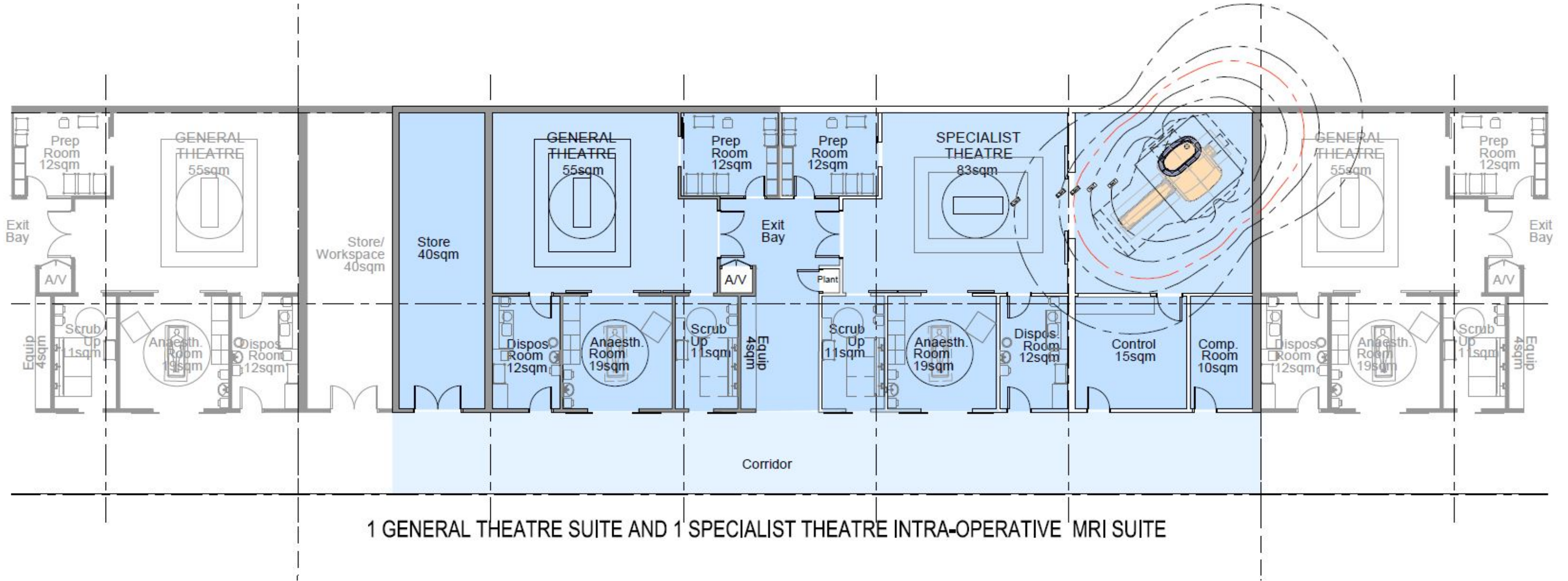


## The case for the Adaptable Estate

“The Adaptable Estate Specification seeks to develop a ‘design guideline’ for a generic Shell & Core approach to building developments that suits bespoke fit-out for different space typologies – healthcare, research, teaching and commercial - that can adapt over time.”

*The Adaptable Estate Strategy and Specification, presentation given at the European Healthcare Design Conference, June 2019, by Guy’s and St Thomas’ NHS Foundation Trust*

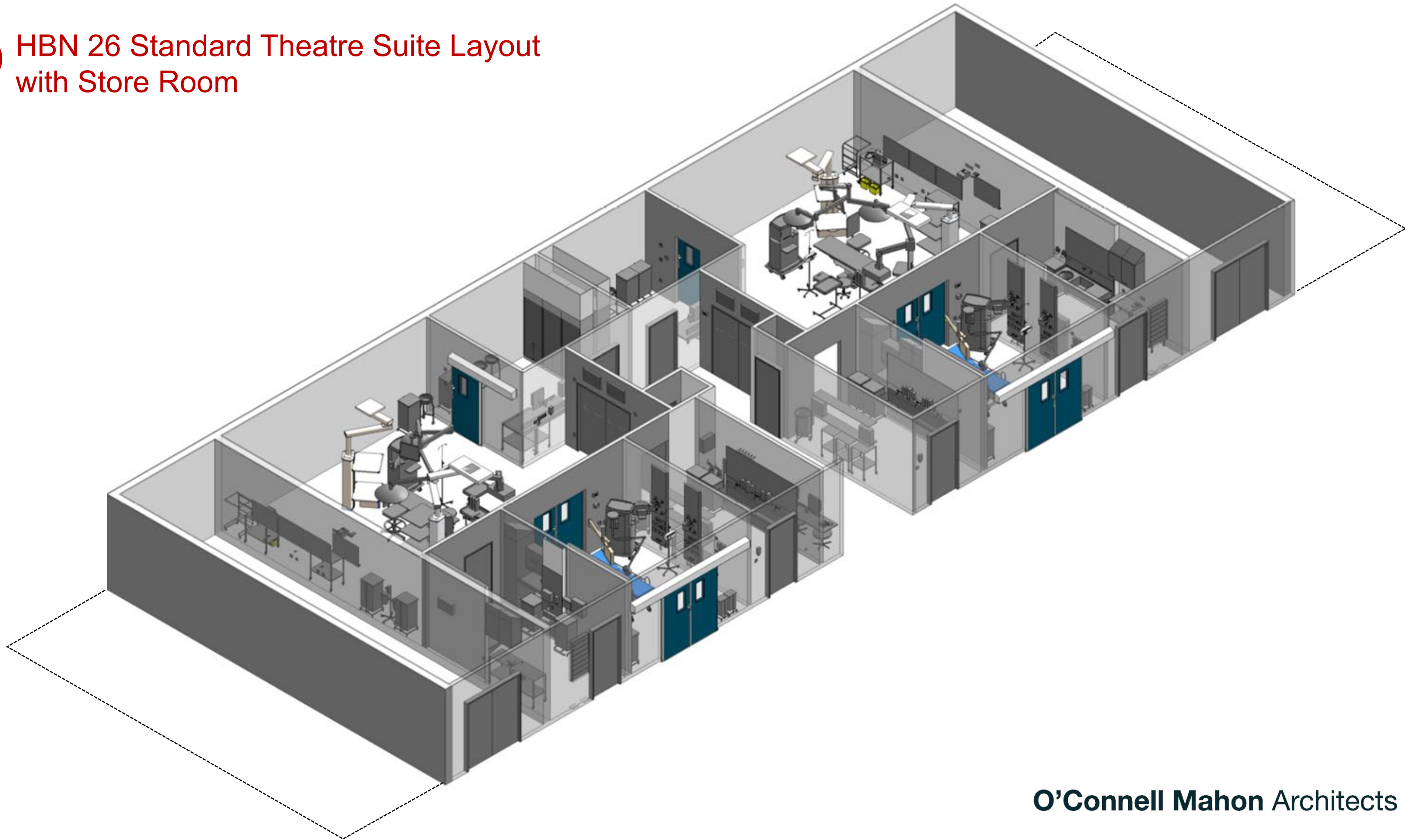
 **A new approach and mindset to Operating Theatre Design.**





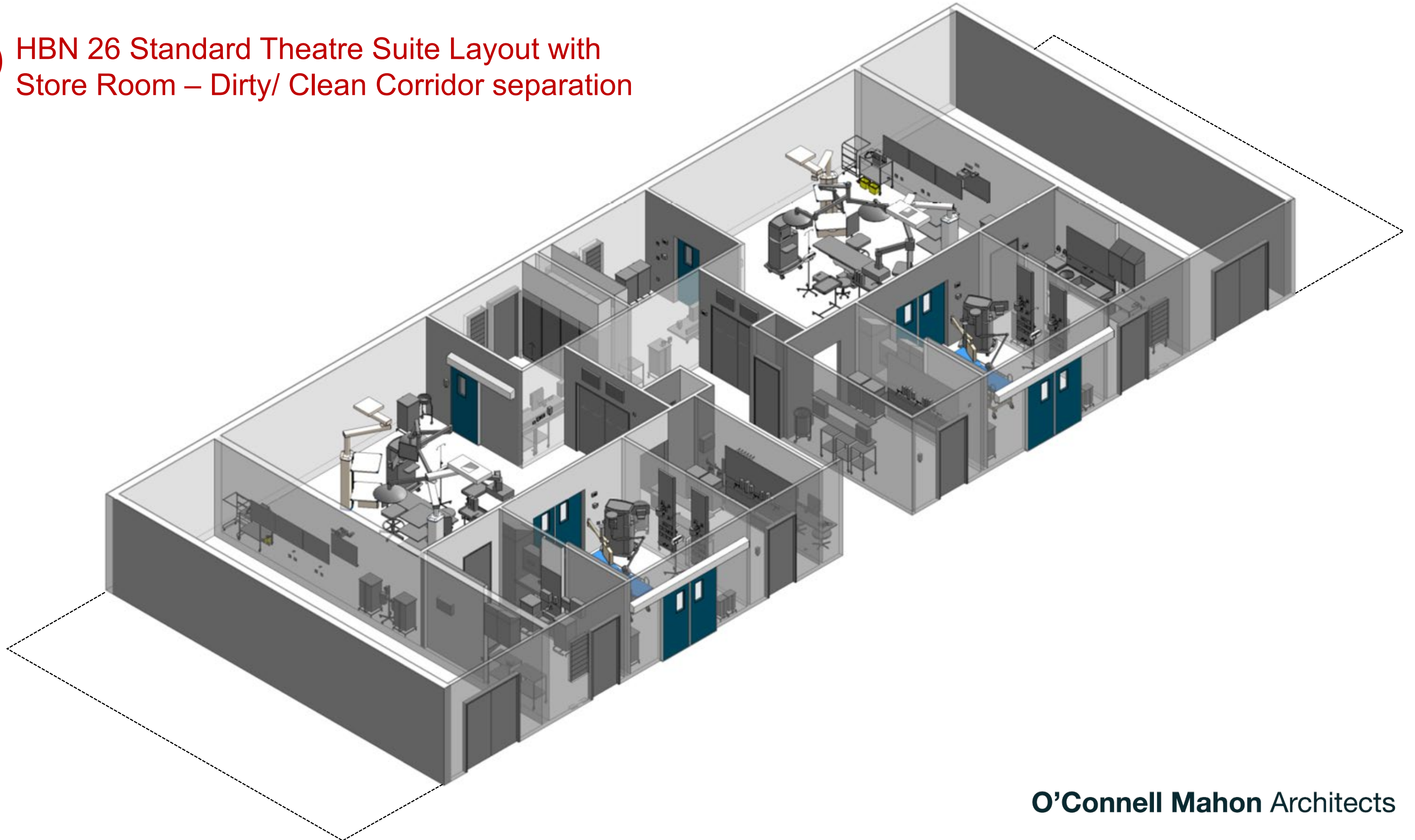


## HBN 26 Standard Theatre Suite Layout with Store Room



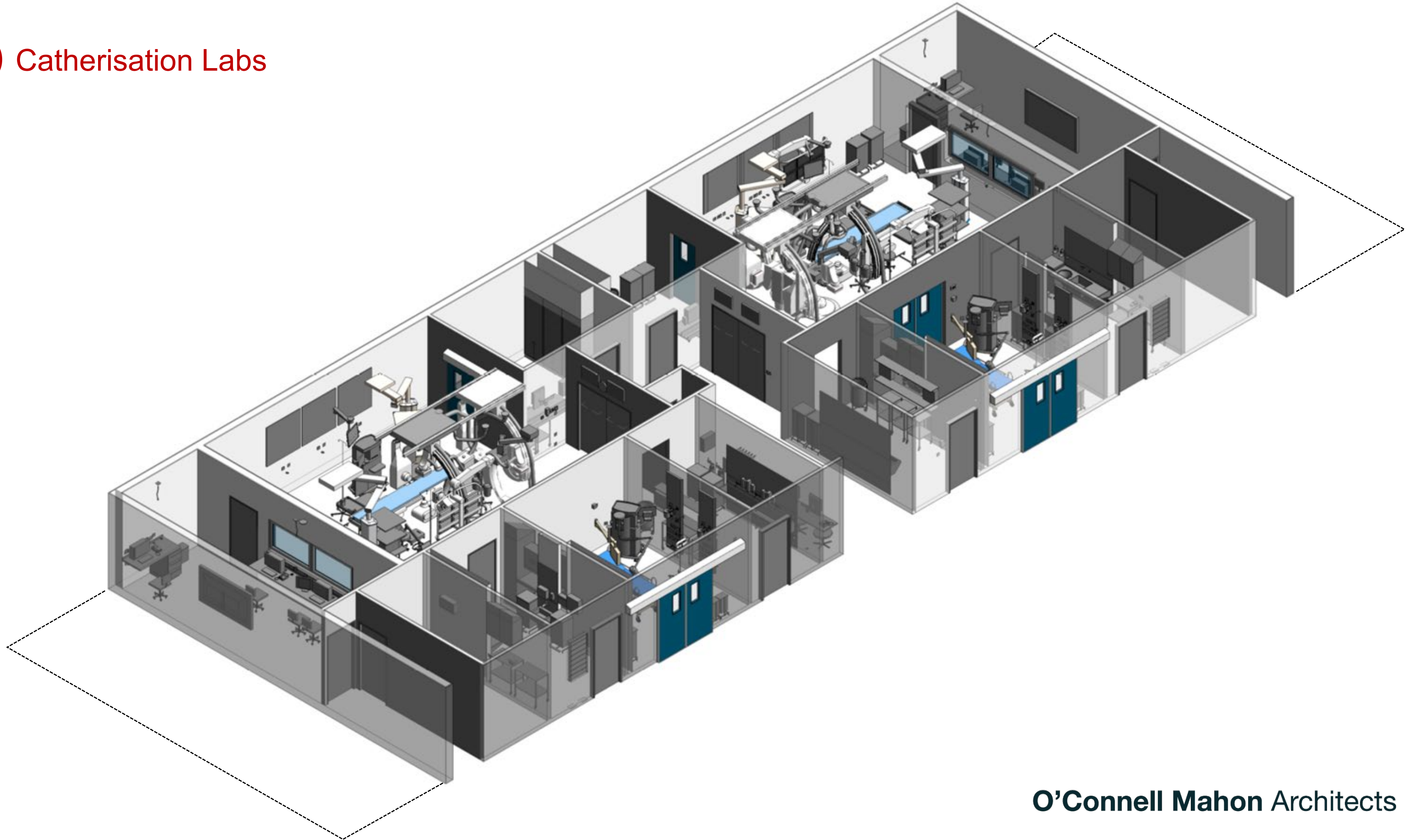


HBN 26 Standard Theatre Suite Layout with  
Store Room – Dirty/ Clean Corridor separation



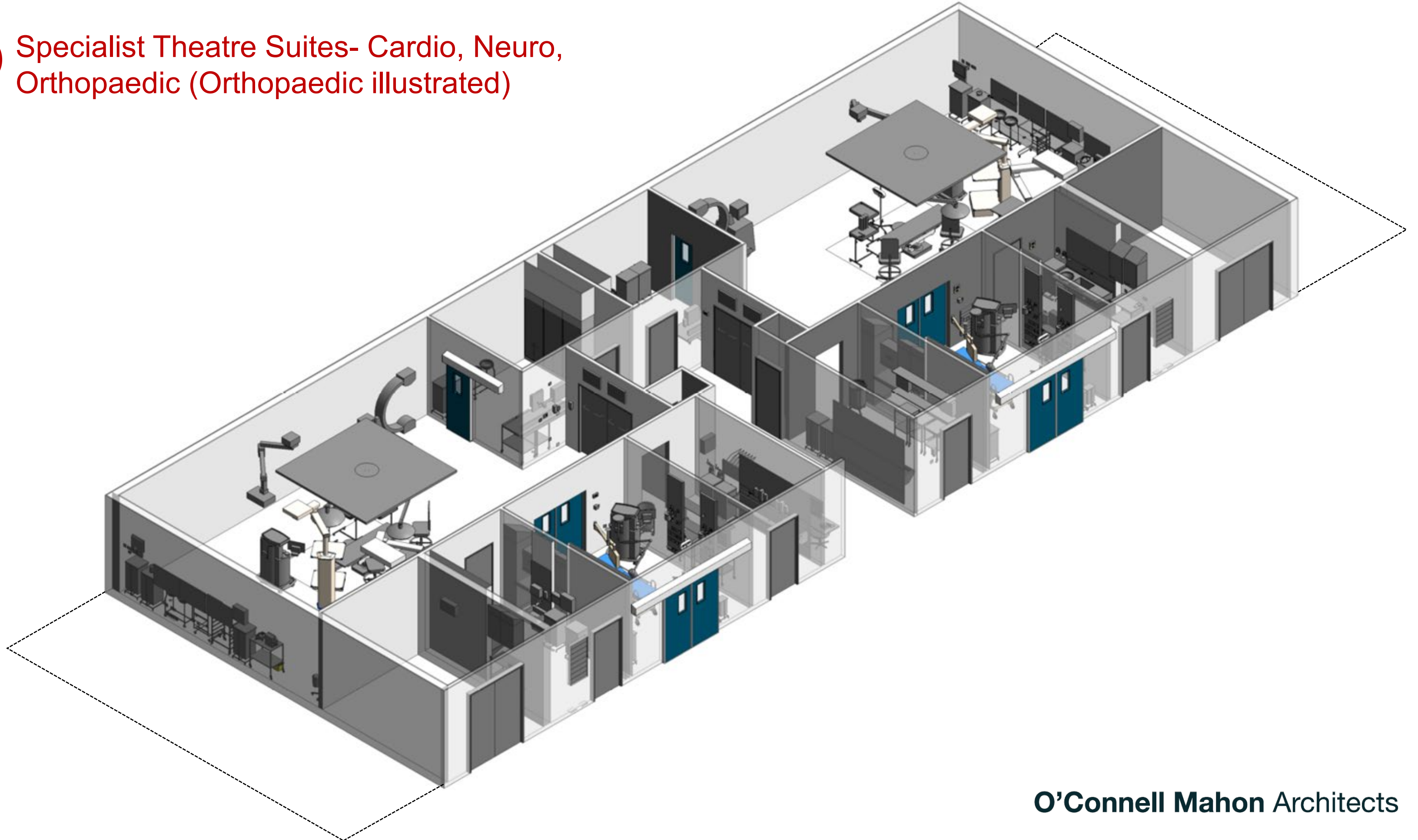


# Catherisation Labs

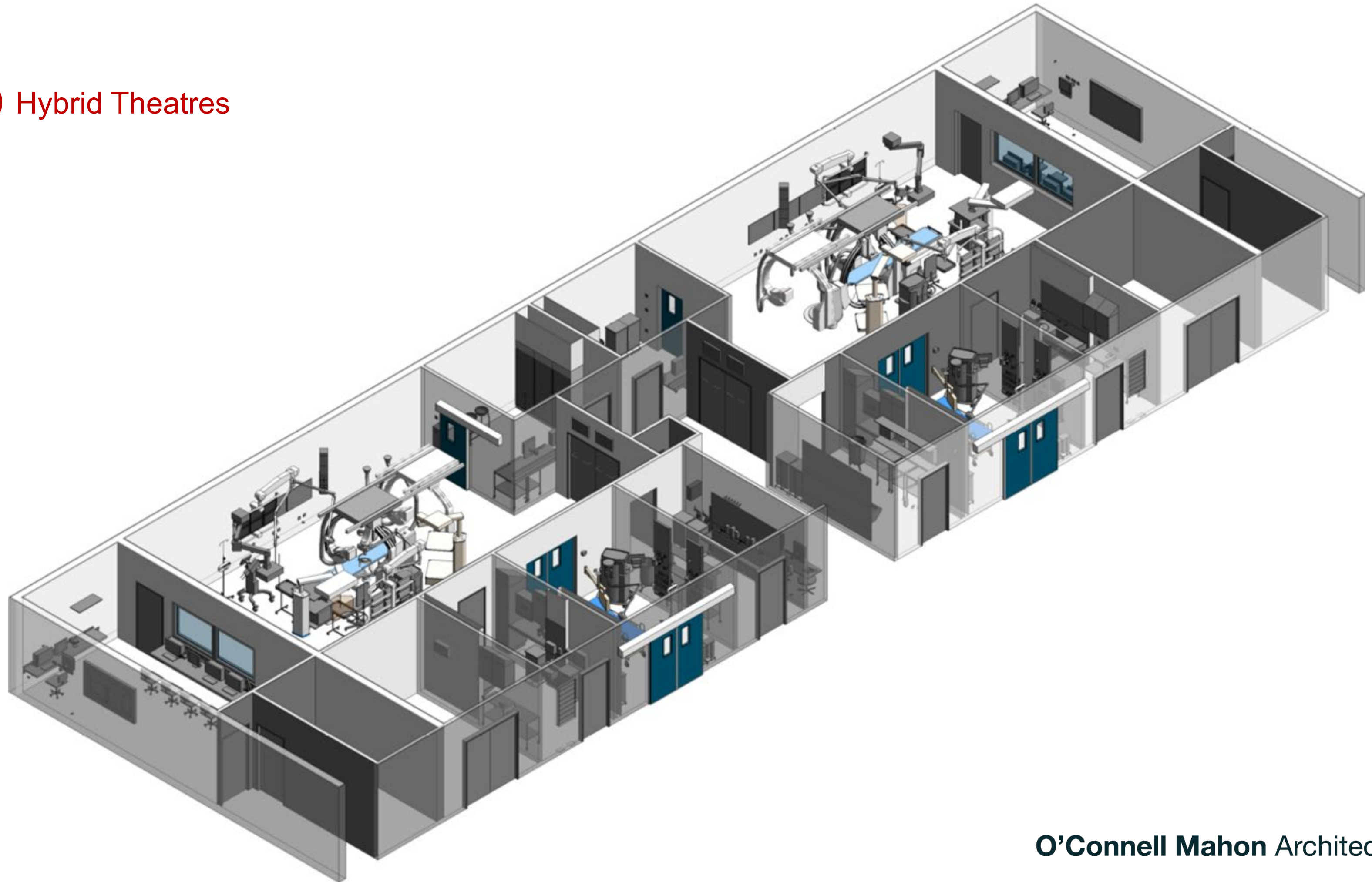




Specialist Theatre Suites- Cardio, Neuro,  
Orthopaedic (Orthopaedic illustrated)

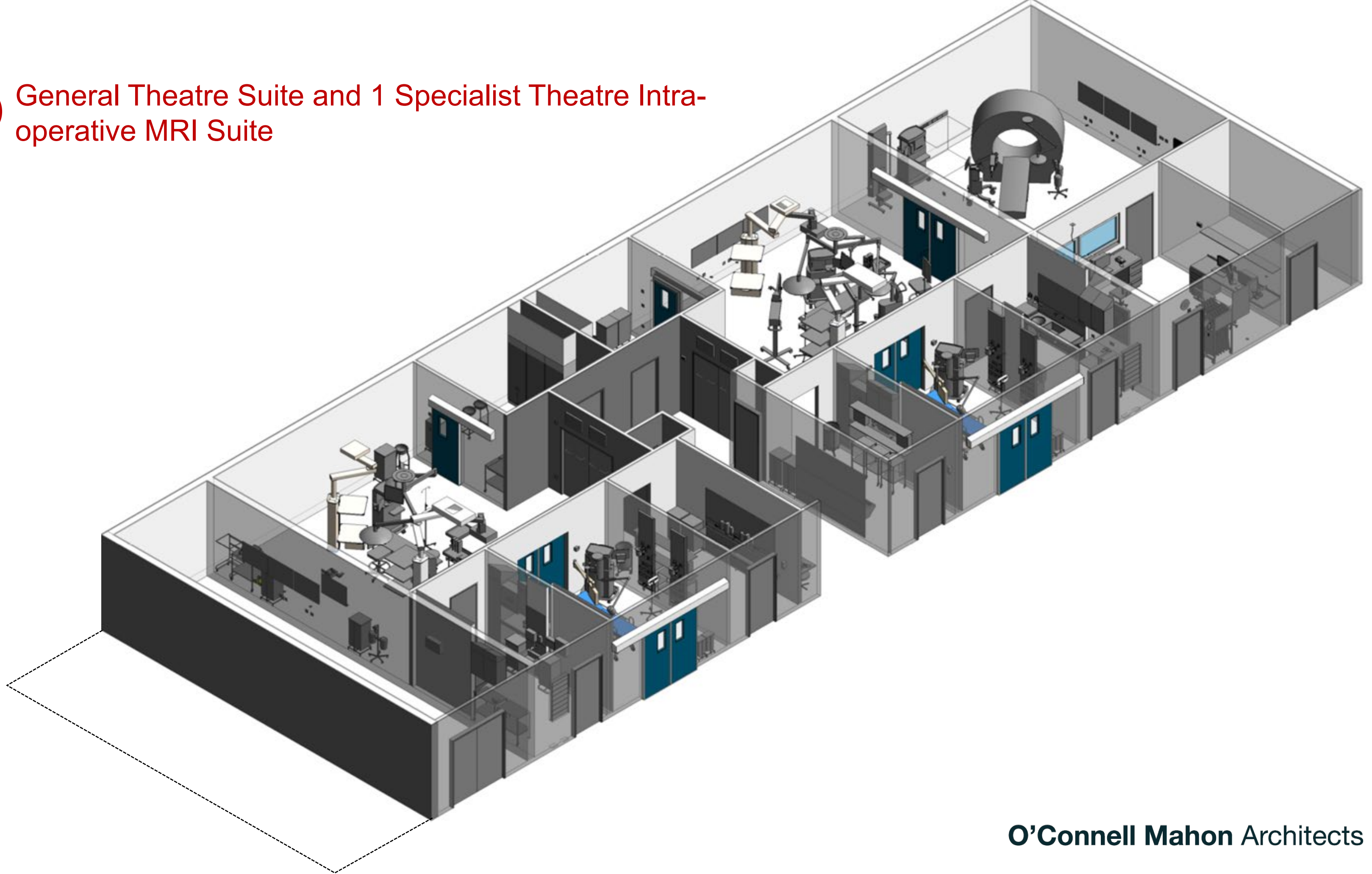


Hybrid Theatres





General Theatre Suite and 1 Specialist Theatre Intra-operative MRI Suite



# THANK-YOU

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