RESEARCH PAPER

Impact Of Operation Theatre Design On Surgical Safety, Infection Control, And Healthcare Costs: A Comparative Analysis Of Modular And Conventional Systems.

Rajesh Kumar Yadav[1*], Dr. Arti Rauthan[2]

[1*]Ph. D – Research Scholar, 24-25 (Odd Semester). Department of Healthcare Management, COER University, 7th KM Haridwar, National Highway Vardhmanpuram, Roorkee, Rehmadpur, Uttrakhand – 247 667
[2]Associate Professor, Healthcare Science Department, COER University.

***Corresponding Author –** Rajesh Kumar Yadav
Email – hospimedfoundation@gmail.com

ABSTRACT

Background: Operating theatre design ensures that surgical procedures can be performed safely while hospitals can save money through their operations. Traditional operation theatres (TOTs) have higher contamination risks due to poor ventilation and limited disinfection. Modular operation theatres (MOTs) establish standardized designs which use advanced air filtration systems to decrease surgical site infections while improving patient outcomes. This study compares MOTs and TOTs in maintaining safety, infection control, and their economic impact on healthcare facilities.

Methodology: The study included 100 patients divided into two groups of 50. The researchers collected data through examination of hospital records and infection logs and billing systems. The researchers studied five different factors which included SSI rates and hospital stay and microbial load and operational efficiency and cost. The researchers conducted statistical analysis by using SPSS software.

Results: MOTs demonstrated lower SSI rates at 6% compared to TOTs which recorded 20% SSI rates. The method achieved three results by decreasing microbial contamination and enhancing operational efficiency and reducing hospital stay durations. The higher initial costs of MOTs led to decreased total medical expenses for patients throughout their treatment period.

Conclusion: MOTs are more effective than TOTs in enhancing surgical safety, reducing infections, and improving cost-efficiency, making them a preferred choice in modern healthcare settings.

Keywords: Modular operation theatre, surgical site infection, infection control, healthcare cost, surgical safety, operation theatre design

How to cite this article: Yadav RK, Rauthan A. Impact Of Operation Theatre Design On Surgical Safety, Infection Control, And Healthcare Costs: A Comparative Analysis Of Modular And Conventional Systems. Int J Drug Deliv Technol. 2026;16(53s): 580-586. DOI: 10.25258/ijddt.16.53s.107

1. INTRODUCTION

Operation theatres (OTs) are among the most critical and controlled environments within healthcare facilities, playing a central role in ensuring surgical safety, infection prevention, and optimal patient outcomes. The worldwide demand for surgical procedures has grown because of two factors which are increasing population numbers and advancing medical technologies. The need for safer and more effective surgical environments has increased because of the worldwide growth in surgical procedures that results from population expansion and aging populations and medical technology advancements. Worldwide healthcare systems face major difficulties because surgical site infections and intraoperative complications which lead to higher patient suffering and extended hospital stays and increased medical expenses.

Surgical site infections continue to affect developing countries more severely because their infection rates exceed those found in developed nations. Operating room environmental conditions control infection rates because these conditions determine air quality and ventilation systems and they establish guidelines for maintaining sterility and controlling room design. Non-compliant operation theatres create microbial contamination risks because they lack proper design standards and maintenance procedures which results in increased postoperative complications for patients. Operating theatre design improvements now serve as the primary method for hospitals to reach their infection control goals while protecting patient safety.

The medical field has recognized modular operation theatres as a modern solution which provides better performance than traditional operating room systems. The design of modular OTs consists of standardized prefabricated units which feature smooth seamless surfaces and advanced air filtration systems that include laminar airflow and environmental control systems. The system has been developed to achieve three specific objectives which include reducing microbial contamination and maintaining sterile environments and meeting international safety regulations. The design of conventional OTs usually follows traditional construction methods which lead to design variations that create limitations for both

*Author for Correspondence: hospimedfoundation@gmail.com

infection control measures and maintenance procedures.

The architectural design of operating rooms serves two functions because it protects against infections while it determines how surgical procedures will be carried out and how medical staff members will work and how much money healthcare organizations will spend. Although modular operating theatres need more money to establish their system, they deliver better value through their lower ongoing costs and decreased infection rates and enhanced performance throughout their operational lifespan. The financial advantages of traditional operating theatres become apparent at the beginning, but these systems will cost more money throughout their entire lifespan because their design problems and operational shortcomings and growing infection rates will lead to additional expenses. The healthcare sector needs to conduct full studies that assess the performance of modular operating theatres because their usage has increased but requires comparison with traditional systems which must assess their effectiveness in surgical safety and infection control and financial results. The healthcare administrators and policymakers and hospital planners need to learn these distinctions so they can make correct choices about spending on infrastructure and programs to enhance quality.

Therefore, this study aims to assess the impact of operation theatre design on surgical safety, infection control, and healthcare costs by comparing modular and conventional OT systems. The findings of this research are expected to provide valuable insights into the role of infrastructure design in enhancing patient care, reducing infection risks, and optimizing resource utilization within healthcare settings.

2. RESEARCH METHODOLOGY

2.1. Study Design

The research used a cross-sectional comparative design to assess how various operating room designs affected surgical safety and infection control and healthcare expenses. The researchers collected data at one specific time to examine the differences in clinical outcomes and costs between modular operation theatres and traditional operation theatres. The researchers obtained actual operational data and patient outcome information while matching clinical conditions to decrease study bias. Researchers conducted a retrospective analysis which examined surgical and hospital records from the past year to determine infection rates and reoperations and resource usage, which enhanced the comparative research findings.

The research took place in Kolkata and its surrounding regions which included Paschim Medinipur and Purba Medinipur through their tertiary care hospitals. The hospitals were chosen because they operated both modular and traditional operation theatre systems while conducting multiple types of surgical procedures. The environment provided multiple medical specialties together with established clinical protocols which allowed researchers to obtain consistent results across various medical situations.

2.2. Study Population and Sampling

The study involved adult participants who required multiple surgical treatments which included both planned and urgent procedures in two different types of operating rooms which stayed open throughout the study period. The team collected multiple operational metrics which included all cost-related information through their systematic approach to patient data collection. Participants needed to meet two requirements which included reaching 18 years of age and providing complete documentation of their perioperative and postoperative data. The research team only included patients who gave their permission and returned for follow-up checks on their clinical results after surgery. The research team established specific exclusion criteria to protect data accuracy and repetitive testing and overall research quality. The study excluded day-care surgical cases which required no overnight hospital stay because this method did not provide enough information to track postoperative infection rates. The study excluded patients who disappeared from the study during the time when their infections were being tracked. The study excluded surgeries that took place in partially upgraded operating theatres because those spaces did not provide distinct identification between modular and traditional operating environments.

The study included 100 patients who were divided into two equal groups of 50 participants each to create the modular operation theatre group and the traditional operation theatre group. The researchers conducted sample size determination through statistical methods to achieve sufficient power for detecting differences between two groups on surgical site infection rates and cost-related outcomes. The researchers used purposive sampling to select appropriate surgical cases which they documented throughout the entire data collection period. The researchers implemented matching procedures to create comparable groups by selecting cases that shared identical surgical procedures and surgical specialties and patient risk factors. The research team used this method to decrease potential confounding effects while increasing study results validity and reliability.

2.3. Data Collection Methods

The data collection process used multiple sources, including operation theatre records, billing systems, infection control logs, and patient medical records. The research team used a standardized data collection form which maintained data integrity through complete anonymization of all collected information. The research team acquired cost data through procurement and finance departments which included both capital and operational expenses for equipment and maintenance and sterilization and delays and cancellations. The research team used three variables which included average surgery time and turnover time

and sterilization-related delays to assess operational efficiency. The clinical outcomes measured infection control together with safety indicators. Surgical site infections (SSIs) were monitored within 30 days, or up to 90 days for implant surgeries, using standard definitions. The additional data set contained information about readmission rates and reoperations and postoperative hospital stay. The infection control team reports were used to confirm SSI diagnoses because they provided accurate information about infection control team reports.

2.4. Data Analysis

Statistical analysis of the data was conducted through the usage of SPSS and R software. The researchers used descriptive statistics to present demographic information and clinical outcome data and cost-related measurements. The researchers used appropriate statistical tests to conduct comparative analysis of the modular operation theatre system and the traditional operation theatre system. The researchers used the chi-square test to compare surgical site infection rates between two groups while they used independent t-tests and Mann-Whitney U tests to compare average costs and operation theater durations based on how data were distributed. Multivariate logistic regression analysis was used to control confounding factors which included patient health status and surgery duration and wound classification. The researchers considered p-values below 0.05 to be statistically significant because they showed substantial differences between the two groups.

3. RESULTS

A multicentre randomized longitudinal comparative study was conducted on 100 patients out of which 50 patients were alloted to Modular Operation Theatre (MOT) Group and other 50 patients to Traditional Operation Theatre (TOT) Group. Results The results are grouped within demographic characteristics and surgical safety outcomes and infection control indicators and cost and operational efficiency.

The demographic and baseline clinical characteristics of patients in both groups were found to be statistically comparable, indicating a well-balanced study population. The mean patient age in the MOT group was 45.6 years with a standard deviation of 12.3 years while the TOT group had a mean age of 47.2 years with a standard deviation of 13.1 years ($p = 0.521$). Gender distribution was also similar, with 28 males and 22 females in the MOT group compared to 30 males and 20 females in the TOT group ($p = 0.678$). The mean body mass index (BMI) was 24.8 ± 3.5 kg/m² in the MOT group and 25.2 ± 3.9 kg/m² in the TOT group ($p = 0.612$). The two groups showed no significant difference in diabetes mellitus comorbidity present in 24% of one group and 28% of the other group ($p = 0.652$) and hypertension comorbidity which affected 30% of one group and 34% of the other group ($p = 0.671$). The smoking history was present in 20% of MOT patients and 24% of TOT patients ($p = 0.629$). The distribution of ASA grades was comparable, with 72% of patients in the MOT group and 68% in the TOT group classified as ASA Grade I–II ($p = 0.662$). The types of surgeries performed, including clean, clean-contaminated, and contaminated procedures, were also evenly distributed between the groups. The average surgery duration for both groups showed no significant difference, with MOT group patients experiencing 92 minutes of surgery as their average time while TOT group patients had 98 minutes of surgery as their average time ($p = 0.284$). The two groups show perfect homogeneity which makes them suitable for assessment.

Table 1: Demographic and Clinical Characteristics of Study Participants

Variable	MOT (n=50)	TOT (n=50)	p-value
Mean Age (years)	45.6 ± 12.3	47.2 ± 13.1	0.521
Gender (Male/Female)	28 / 22	30 / 20	0.678
BMI (kg/m²)	24.8 ± 3.5	25.2 ± 3.9	0.612
Diabetes Mellitus (%)	12 (24%)	14 (28%)	0.652
Hypertension (%)	15 (30%)	17 (34%)	0.671
Smoking History (%)	10 (20%)	12 (24%)	0.629
ASA Grade I–II	36 (72%)	34 (68%)	0.662
ASA Grade III–IV	14 (28%)	16 (32%)	0.662
Type of Surgery (Clean)	28 (56%)	27 (54%)	0.842
Clean-Contaminated	15 (30%)	16 (32%)	0.834
Contaminated/Dirty	7 (14%)	7 (14%)	1.000
Mean Duration of Surgery (minutes)	92 ± 25	98 ± 30	0.284

The research found major differences between the two groups when assessing surgical safety results. The MOT group showed a 6% surgical site infection (SSI) rate, which the researchers found statistically significant when they compared it to the 20% rate in the TOT group ($p = 0.037$). The MOT group showed a lower reoperation rate of 4% when compared to the TOT group which showed a 14% rate, but this difference did not achieve statistical significance ($p = 0.082$). The MOT group showed a lower readmission rate of 6% when compared to the TOT group which showed an 18% rate ($p = 0.048$). The MOT group experienced fewer intraoperative complications at a rate of 4% while the TOT group had a complication

rate of 12%, but the difference did not achieve statistical significance (p = 0.140). Both groups displayed low mortality rates, with 2% in the MOT group and 4% in the TOT group (p = 0.556). The MOT group showed a much shorter average hospital stay than the TOT group, with the MOT group staying for 5.2 ± 1.8 days and the TOT group staying for 7.6 ± 2.4 days, which achieved highly significant results (p = 0.001). The MOT group required ICU at a rate of 10%, which was lower than the TOT group requirement of 18%, but this difference did not achieve statistical significance (p = 0.248). The study results show that modular operation theatres have better surgical safety results than traditional operating rooms.

Table 2: Surgical Safety Outcomes

Parameter	MOT (n=50)	TOT (n=50)	p-value
Surgical Site Infection (SSI)	3 (6%)	10 (20%)	**0.037**
Reoperation Rate	2 (4%)	7 (14%)	**0.082**
Readmission Rate	3 (6%)	9 (18%)	**0.048**
Intraoperative Complications	2 (4%)	6 (12%)	0.140
Mortality Rate	1 (2%)	2 (4%)	0.556
Mean Hospital Stay (days)	5.2 ± 1.8	7.6 ± 2.4	**0.001**
ICU Requirement	5 (10%)	9 (18%)	0.248

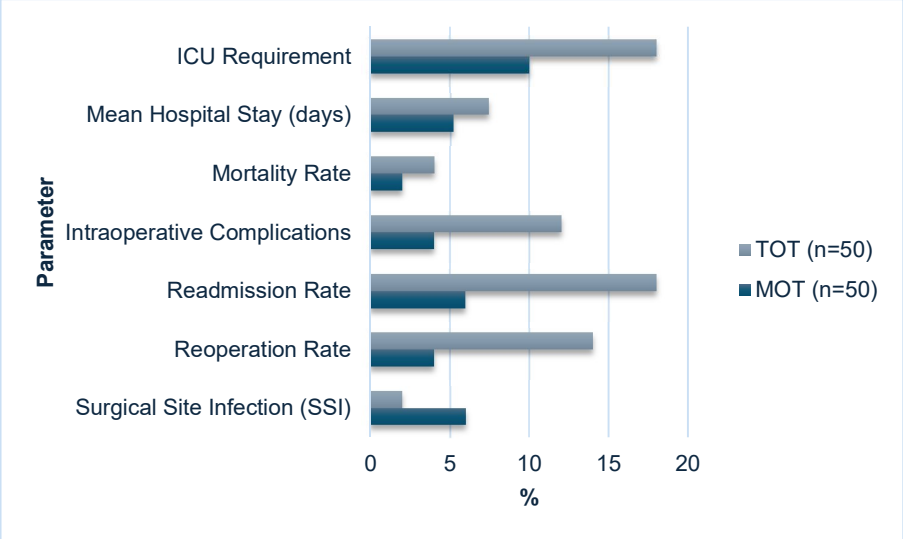

Figure 1: Surgical Safety Outcomes

The modular operation theatres achieved better results than traditional methods for both infection control and operational efficiency assessment. The airborne microbial load was significantly lower in the MOT group (35 ± 10 CFU/m³) compared to the TOT group (110 ± 25 CFU/m³), with a highly significant difference (p < 0.001). Instrument contamination incidents were considerably fewer in MOTs (4%) than in TOTs (22%) (p = 0.009). The operational efficiency of MOTs improved through the demonstration of reduced operation theatre turnover time, which lasted 18 ± 5 minutes, compared to the 32 ± 8 minutes duration of TOTs (p < 0.001). The MOT group experienced surgery delays in only 10% of cases, while the TOT group experienced delays in 28% of cases (p = 0.022). Equipment failure rates were significantly lower in MOTs (6%) compared to TOTs (20%) (p = 0.037). The MOT group showed minimal sterility breach incidents, which occurred at a rate of 2%, while the TOT group experienced 16% of such breaches (p = 0.015). Modular operation theatres achieved 94% compliance with infection control protocols, while traditional settings demonstrated 78% compliance, which resulted in a highly significant difference (p < 0.001). The results show that modular systems provide better infection control and operational efficiency benefits to their users.

Table 3: Infection Control and Operational Efficiency Indicators

Parameter	MOT (n=50)	TOT (n=50)	p-value
Airborne Microbial Load (CFU/m³)	35 ± 10	110 ± 25	**<0.001**
Instrument Contamination Incidents	2 (4%)	11 (22%)	**0.009**
OT Turnover Time (minutes)	18 ± 5	32 ± 8	**<0.001**
Surgery Delays (%)	5 (10%)	14 (28%)	**0.022**

Equipment Failure (%)	3 (6%)	10 (20%)	**0.037**
Sterility Breach Incidents	1 (2%)	8 (16%)	**0.015**
Compliance with Infection Protocol (%)	94%	78%	**<0.001**

The economic effects of operating room design were revealed through the analysis of costs. The MOT group showed a higher average surgical cost of ₹52000 but this difference between groups showed no statistical importance with a p-value of 0.064. The MOT group showed lower costs for handling complications than its counterpart group. The infection management costs in MOTs were much lower than in TOTs with costs of ₹2500±1200 and ₹9800±3500 respectively which showed statistical significance at p less than 0.001. The MOT group had lower reoperation costs than the TOT group with costs of ₹3200±1000 and ₹11500±4200 respectively which showed statistical significance at p less than 0.001. The hospital stay expenses for MOT patients amounted to ₹10400±3200 which represented a major decrease from the expenses faced by TOT patients who stayed in hospitals at a cost of ₹18200±5000 with statistical significance established at p less than 0.001. The monthly operating expense for modular operation theatres reached ₹120000 yet this amount exceeded the cost of traditional theatres which required ₹90000 to operate during the same period. The total patient expenses in the MOT group reached ₹68100±9200 which resulted in significant cost reductions compared to the TOT group whose average expenses reached ₹87500±12400 with a p-value below 0.001. The MOT group demonstrated superior economic efficiency through its cost-effectiveness ratio which reached 1.25 while the TOT group showed lower efficiency with a 0.82 ratio.

Table 4: Cost Analysis and Economic Impact

Cost Component	MOT (INR)	TOT (INR)	p-value
Mean Cost per Surgery	52,000 ± 8,500	48,000 ± 7,800	0.064
Infection Management Cost	2,500 ± 1,200	9,800 ± 3,500	<0.001
Reoperation Cost	3,200 ± 1,000	11,500 ± 4,200	<0.001
Hospital Stay Cost	10,400 ± 3,200	18,200 ± 5,000	<0.001
Maintenance Cost (monthly)	1,20,000	90,000	—
Total Average Cost per Patient	68,100 ± 9,200	87,500 ± 12,400	<0.001
Cost-effectiveness Ratio	1.25	0.82	—

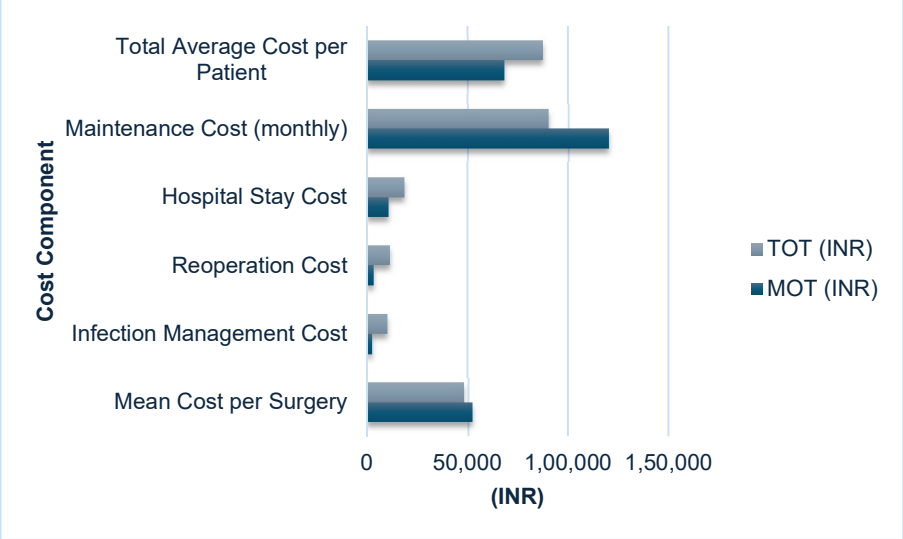

Figure 2: Cost Analysis and Economic Impact

The study results show that modular operation theatres deliver superior benefits to traditional operation theatres because they achieve lower infection rates and better surgical results and higher operational efficiency and greater cost effectiveness, although their initial and maintenance costs are more expensive.

4. DISCUSSION

The current research demonstrates that modular operation theatres (MOTs) provide significant improvements in surgical safety and infection control which result in better cost efficiency when compared to traditional operation theatres (TOTs). The research results confirm existing studies which show that environmental management together with standard operating procedures handles environmental control to decrease postoperative complications. The research found that surgical site infections (SSI) occurred less frequently in the MOT group with a rate of 6% than in the TOT group which had a rate of 20%. The reduction

results from Anderson et al. who found that insufficient infection control systems together with environmental contamination create the main causes of severe SSIs which occur in hospital environments. Kirby and Mazuski demonstrated that preventing surgical site infections requires complete operation room cleanliness which protects patients from all forms of bacteria throughout their surgical procedures. The advanced air filtration systems and controlled airflow together with their ability to prevent contamination create better infection control in MOTs than traditional operation theatres which lack these controls.

The MOTs demonstrated decreased airborne microbial load because the study proved that environmental design contributes to infection control. Memarzadeh and Jiang demonstrated that operation theatre geometry and ventilation systems play a crucial role in protecting the surgical site from airborne contaminants [20]. The present findings further reinforce this concept, as MOTs are designed with laminar airflow and HEPA filtration systems that effectively reduce microbial burden. The studies conducted by Perdelli et al. and Cristina et al. demonstrated that medical procedures generate aerosols which spread infection through environmental contamination [16,17]. The study found that MOTs showed lower instrument contamination rates and sterility breaches which confirmed previous research results.

The operational efficiency of the modular operation theatres increased when their turnover time showed improvement and their surgical delays decreased and their equipment failure rates dropped. The organizational enhancements of the standard layout implementation and advanced technology integration with MOTs led to these improvements. The World Health Organization [12] emphasizes that healthcare workers must follow infection control protocols which include proper hand hygiene and workflow management. The study found that MOTs achieved 94% compliance rates while TOTs had 78% compliance which shows that structured environments help people follow protocols more.

The use of modular systems in surgical procedures leads to better safety results which include higher readmission rates and extended hospital stays. The use of surgical safety checklists which represent structured safety practices has been proven by Haynes et al. [13] to decrease both morbidity and mortality rates. The surgical environment achieves better results in MOTs because its structured safety protocols receive proper compliance from the staff. The study's economic evaluation demonstrated that modular operation theatres incur higher initial and maintenance expenses but result in decreased total patient costs because they lead to fewer complications and shorter hospital stays and reduced need for reoperations. The finding demonstrates that spending money on modern healthcare facilities will produce financial benefits for hospitals over an extended period. Wolcott et al. showed that complex microbial infections lead to higher treatment expenses which demonstrate the need for better infection control systems [15].

The existence of multidrug-resistant organisms creates a major problem for hospital-acquired infections because these organisms remain active in healthcare settings. Cristina et al. reported outbreaks of multidrug-resistant Acinetobacter baumannii associated with environmental contamination in healthcare settings [11]. The present study shows that MOTs experience reduced infection rates because better environmental control systems succeed in stopping the transmission of resistant pathogens. The findings of this study demonstrate that modular operation theatres provide multiple benefits which include better surgical results and reduced infection risks and higher cost-effectiveness. The results of this study confirm previous research findings which demonstrate that healthcare facilities should implement modern operating room designs to enhance patient safety and improve healthcare delivery.

Conclusion

The present study demonstrates that modular operation theatres (MOTs) provide superior surgical safety and infection control capabilities and operational efficiency compared to traditional operation theatres. The installation and maintenance costs of MOTs are higher than traditional systems but they provide a substantial drop in surgical site infection rates and associated complications and reoperations and extended hospital stays. This process results in improved patient results and reduced expenses for medical treatment. The modular systems display greater reliability and effectiveness because they establish better environmental control and create standardized workflows and their users demonstrate higher adherence to infection prevention protocols. Modern surgical facilities should use modular operation theatres as their optimal option because healthcare institutions need to adopt these systems despite their initial costs.

Acknowledgement

The authors express their sincere gratitude to the participating hospitals, healthcare professionals, and patients for their valuable cooperation and support in completing this study. The entire team acknowledges the basic support from all people who worked on data collection and data analysis and manuscript writing.

REFERENCES

1. Anderson DJ, Kaye KS, Classen D, et al. Strategies to prevent surgical site infections in acute care hospitals. *Infect Control Hosp Epidemiol.* 2008;29(S1):S51–S61. doi:10.1086/591064.
2. Astagneau P, L'Hériteau F. Surveillance of surgical-site infections: impact on quality of care and reporting dilemmas. *Curr Opin Infect Dis.* 2010;23(4):306–310. doi:10.1097/QCO.0b013e32833ae7e3.
3. Hranjec T, Swenson BR, Sawyer RG. Surgical site infection prevention: how we do it. *Surg Infect*

(Larchmt). 2010;11(3):289–294. doi:10.1089/sur.2010.021.
4. Wenzel RP. Minimizing surgical-site infections. *N Engl J Med.* 2010;362(1):75–77. doi:10.1056/NEJMe0908753.
5. Diab-Elschahawi M, Berger J, Blacky A, et al. Impact of different-sized laminar airflow versus no laminar airflow on bacterial counts in the operating room during orthopedic surgery. *Am J Infect Control.* 2011;39(7):e25–e29. doi:10.1016/j.ajic.2010.10.035.
6. Sydnor ER, Perl TM. Hospital epidemiology and infection control in acute-care settings. *Clin Microbiol Rev.* 2011;24(1):141–173. doi:10.1128/CMR.00027-10.
7. Cristina ML, Spagnolo AM, Sartini M, et al. Spread of multidrug carbapenem-resistant *Acinetobacter baumannii* in different wards of an Italian hospital. *Am J Infect Control.* 2011;39(9):790–794. doi:10.1016/j.ajic.2011.01.016.
8. Gonçalves KJ, Graziano KU, Kawagoe JY. A systematic review of surgical hand antisepsis utilizing an alcohol preparation compared to traditional products. *Rev Esc Enferm USP.* 2012;46(6):1484–1493. doi:10.1590/S0080-62342012000600028.
9. Barbot V, Robert A, Rodier MH, et al. Update on infectious risks associated with dental unit waterlines. *FEMS Immunol Med Microbiol.* 2012;65(2):196–204. doi:10.1111/j.1574-695X.2012.00971.x.
10. Fernstrom A, Goldblatt M. Aerobiology and its role in the transmission of infectious diseases. *J Pathog.* 2013;2013:493960. doi:10.1155/2013/493960.
11. Cristina ML, Spagnolo AM, Cenderello N, et al. Multidrug-resistant *Acinetobacter baumannii* outbreak: an investigation of the possible routes of transmission. *Public Health.* 2013;127(4):386–391. doi:10.1016/j.puhe.2013.01.025.
12. World Health Organization. WHO guidelines on hand hygiene in health care: a summary. Geneva: WHO; 2009.
13. Haynes AB, Weiser TG, Berry WR, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med.* 2009;360(5):491–499. doi:10.1056/NEJMsa0810119.
14. Kirby JP, Mazuski JE. Prevention of surgical site infection. *Surg Clin North Am.* 2009;89(2):365–389. doi:10.1016/j.suc.2009.01.001.
15. Wolcott RD, Gontcharova V, Sun Y, et al. Bacterial diversity in surgical site infections: not just aerobic cocci any more. *J Wound Care.* 2009;18(8):317–323. doi:10.12968/jowc.2009.18.8.43630.
16. Perdelli F, Spagnolo AM, Cristina ML, et al. Evaluation of contamination by blood aerosols produced during various healthcare procedures. *J Hosp Infect.* 2008;70(2):174–179. doi:10.1016/j.jhin.2008.06.012.
17. Cristina ML, Spagnolo AM, Sartini M, et al. Evaluation of the risk of infection through exposure to aerosols and spatters in dentistry. *Am J Infect Control.* 2008;36(4):304–307. doi:10.1016/j.ajic.2007.07.019.
18. Perdelli F, Dallera M, Cristina ML, et al. Environmental contamination by MRSA with reduced susceptibility to glycopeptides in intensive care units. *Int J Hyg Environ Health.* 2008;211(1–2):213–218. doi:10.1016/j.ijheh.2007.04.002.
19. Anderson DJ, Sexton DJ, Kanafani ZA, et al. Severe surgical site infection in community hospitals. *Infect Control Hosp Epidemiol.* 2007;28(9):1047–1053. doi:10.1086/520731.
20. Memarzadeh F, Jiang Z. Effect of operating room geometry and ventilation system parameter variations on the protection of the surgical site. *Indoor Air Quality (IAQ).* 2004;1–6.