University of Iowa Carver College of Medicine — University of Iowa Health Care

Department of Anesthesia — Division of Management Consulting

Operations Research For Surgical Services

Purpose of Course is to teach participants how to apply principles of operations research to solve problems in the operating room and perioperative environment:

- Monitoring operational and financial performance of surgical suites and anesthesia groups ("descriptive analytics"),
- Forecasting case durations, time remaining in cases, use of staffed OR time ("predictive analytics"),
- Applying principles of operations research to make common decisions, such as staffing levels, block time planning, case scheduling and assignment, financial management, and strategic planning ("prescriptive analytics"),
- Identifying in-house expertise to aid in problem-solving and determining whether outside consultants are needed,
- Evaluating current decision-support systems.

See: Wachtel RE, Dexter F. Curriculum providing cognitive knowledge and problem-solving skills for anesthesia systems-based practice. ACGME Journal of Graduate Medical Education 2: 624-632, 2010

See: Wachtel RE, Dexter F. Difficulties and challenges associated with literature searches in operating room management, complete with recommendations. Anesthesia & Analgesia 117: 1460-1479, 2013

See: Dexter F, Van Swol LM. Influence of data and formulas on trust in information from journal articles in an operating room management course. Anesthesia & Analgesia Case Reports 6: 329-334, 2016

See: Ahn PH, Dexter F, Fahy BG, Van Swol LM. Demonstrability of analytics solutions and shared knowledge of statistics and operating room management improves expected performance of small teams in correctly solving problems and making good decisions. Perioperative Care and Operating Room Management 19: 100090, 2020

Case Studies completed in class are an integral part of the course. Participants include both clinicians and analysts. Many of the case questions include electronic literature searching using publicly available materials. The cases help participants learn. which techniques should be applied to different types of problems, how best to present results to hospital stakeholders, and leadership principles for team-based OR management decision making.

Cancelled with the 2025 revisions to AHRQ and HCUPnet. Please consider the half-day, one day, and two day course options for operational decisions.

Course Schedule (www.FranklinDexter.net/education.htm)

Day 1

8:00 AM — Use of economically rational ordered priorities to make patient flow decisions

Lecture is based on the following reference article:
Dexter F, Epstein RH, Traub RD, Xiao Y. Making management decisions on the day of surgery based on OR efficiency and patient waiting times. Anesthesiology 101: 1444-1453, 2004

10:50 AM — Cases 1 and 2

1:00 PM — Incorporating uncertainty into decision-making

3:00 PM — Cases 3 and 4

5:15 PM — Discussion of cases

Day 2

8:00 AM — Allocating OR time operationally (few months before day of patient care)

Lecture is based on the following reference article:
McIntosh C, Dexter F, Epstein RH. The impact of service-specific staffing case scheduling, turnovers, and first-case starts on anesthesia group and operating room productivity: tutorial using data from an Australian hospital. Anesthesia & Analgesia 103: 1499-1516, 2006

10:00 AM — Allocating OR time tactically based on utilization (1 yr before day of patient care)

Lecture is based on the following reference article:
Wachtel RE, Dexter F. Tactical increases in OR block time for capacity planning should not be based on utilization. Anesthesia & Analgesia 106: 215-226, 2008

10:45 AM — Cases 5 and 6

1:00 PM — Allocating OR time tactically based on financial and strategic criteria

Lecture is based on the following reference article:
Dexter F, Ledolter J, Wachtel RE. Tactical decision making for selective expansion of operating room resources incorporating financial criteria & uncertainty in sub-specialties' future workloads. Anesthesia & Analgesia 100: 1425-1432, 2005

2:30 PM — Cases 7 to 9

5:15 PM — Discussion of cases

Day 3

8:00 AM — Economics of small reductions in OR times and turnover times

10:00 AM — Financial impact of differences among hospitals

Lecture is based on the following reference article:
Wachtel RE, Dexter F, Lubarsky DA. Financial implications of a hospital's specialization in rare physiologically complex surgical procedures. Anesthesiology 103: 161-167, 2005

10:45 AM — Cases 10 and 11

1:00 PM — Empirical methods for staffing and assignments

Lecture is based on the following reference article:
Dexter F, Epstein RH. Optimizing second shift OR staffing. AORN Journal 77:825-830, 2003

2:00 PM — Physician agreements: Anesthesia institutional support and surgeon block time

Lecture is based on the following reference article:
Dexter F, Epstein RH. Associated roles of perioperative medical directors and anesthesia: hospital agreements for operating room management. Anesthesia & Analgesia 121: 1469-1478, 2015

3:00 PM — Cases 12 to 15

Day 4

8:00 AM — Discussion of cases from preceding day

9:50 AM — Differentiating among hospitals and surgical practices

Lecture is based on the following reference article:
Dexter F, Ledolter J, Hindman BJ. Quantifying the diversity and similarity of surgical procedures among hospitals and anesthesia providers. Anesthesia & Analgesia 122: 251-263, 2016

11:00 AM — Cases 16 and 17

11:55 AM — End of course

Open discussion during lunch

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Alternatives to the Original Intensive Course

The intensive course ended with the 2025 changes to AHRQ. There were 20-hours of independent statistics review and reading followed by 35-hours of class time. For lectures and cases, go to FranklinDexter.net/education.htm. Participants learned how to apply operations research to problems in operating room and anesthesia group management, including descriptive, predictive, and prescriptive analytics. Financial disclosure and curriculum vitae are at: FranklinDexter.net/Contact_Info.htm.

Alternative #1 is an in-person or internet live course, 8 AM to 1 PM with breaks. The turnover time lecture is presented first, followed by the use of ordered-priorities for decision-making on the day of surgery. This course option is suitable for anesthesiologists, managers, and nurse anesthetists aiming to learn enough to decide whether they want to pay attention to OR management science. This is not a course in operations research or analytics, but in the basic principles of OR management. No prerequisite knowledge is assumed. Participants will need to read two review articles ahead (click here and click here), learning the vocabulary. The review will take approximately 6 hours. The University's charge is for 0.5 days presenting and 1.0 days preparation and travel: $3750, plus travel expenses, based on using the above agreement. When this alternative is given as an internet live course, there can be an unlimited number of participants simultaneously; charge $2500.

Alternative #2 is an internet live course given using Zoom over one day, 8 AM to 7 PM. The topics are (1) Decision-making on the day of surgery and (2) Case duration prediction including patient arrival time and add-on case scheduling. Click here for the lectures. This option is suitable for OR and PACU nursing staff who need to follow decisions. This option also is suitable for anesthesiologists, nurse anesthetists, and anesthesiology residents who want to understand decision-making at the end of the workday. There is trust in the manager's evidence-based decisions. The prerequisite is having taken any introductory statistics course in any discipline and reviewing many such statistical word problems ahead of time. During the statistics review, participants essentially relearn the material that they once knew. The review matches that required for the American Society of Anesthesiologists' BASIC examination. A review article is learned ahead, as well as a second article showing application of these topics to working late. This preparation takes approximately 12 hours. In the course, the first 5 of the cases are used to learn how to apply the knowledge of basic statistics. Participants receive immediate, adaptive feedback from an Excel workbook; for details, click here and see Table 2, Figure 2, Appendix, and associated text. The University's charge is for 1.0 days presenting and 0.5 days preparation, $3750, based on the above agreement. There can be up to 5 participants.

Alternative #3 is a two-day internet live course given using Zoom, 8 AM to 7 PM. The course also can be four half-day periods. The topics are (1) Decision-making on the day of surgery, (2) Case duration prediction including patient arrival times, add-on case scheduling, etc. [click here], (3) Planning staffing for existing cases, (4) Reducing turnover times, and (5) Surgeon blocks. This option is suitable for participants interested in decision-making on the day of surgery and wanting to understand why decisions need to be made as they are made on the day of surgery. The course is suitable for anesthesiologists and nurse anesthetists who have little institutional responsibilities in OR management but know that they have to follow rules and occasionally explain why they are doing what they are doing on the day of surgery (e.g., when taking call at night). Unlike the older intensive course, this option does not satisfy the eight core components of the ACGME systems-based practice competency. From an organizational perspective, it is important to understand that the people with this knowledge should not be ones who then need to "think" about implementation or talk about it publicly, other than for decision-

making on the day of surgery. Material skipped includes anesthesia and hospital agreements (i.e., labor costs) and implant/ disposable costs (i.e., supply costs), which are the principal drivers of organizations' decision making on a long-term basis (e.g., annually). The second day of this alternative #3 has extensive discussion of different "what if" scenarios that arise on the day of surgery. The prerequisite is having taken any introductory statistics course in any discipline and reviewing many such statistical word problems ahead of time. In addition, review articles for lectures 1 and 2 and for lectures 3 and 4 are learned ahead, along with corresponding vocabulary (e.g., using the provided dictionary file). This preparation work will take approximately 15 hours. In the course, the first 6 of the cases are used to learn how to apply the knowledge of lectures #1-#4 and readings. Participants receive immediate, adaptive feedback from an Excel workbook; for details, click here and see Table 2, Figure 2, Appendix, and associated text. The University's charge is 2.0 days presenting and 1.0 days arranging: $7,500, based on using the above agreement. There can be a maximum of 5 participants.