

Managerial Decision-Making

- This talk includes many similar slides
 - Paging through produces animation
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- Google Chrome, Microsoft Edge, Firefox, or Safari
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Updated 09/07/20



Using Technology to Help Anesthesiologists with Managerial Decisions

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Financial Disclosure

- I am employed by the University of Iowa, in part, to consult and analyze data for hospitals, anesthesia groups, and companies
- Department of Anesthesia bills for my time, and the income is used to fund our research
 - I receive no funds personally other than my salary and allowable expense reimbursements from the University of Iowa, and have tenure with no incentive program
 - I own no healthcare stocks (other than indirectly through mutual funds)

Financial Disclosure

- Lecture includes several of the 8 educational studies performed to improve my course
 - Operations research for surgical services
 - 50 hour analytics course, 35 hours CME credit
 - Given 58 times over >15 years
- Course participants and organizations pay University for me to teach this material



Scope of Talk

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Strategies for Net Cost Reductions with the Expanded Role and Expertise of Anesthesiologists in the Perioperative Surgical Home

Franklin Dexter, MD, PhD, and Ruth E. Wachtel, PhD, MBA

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Anesthesia & Analgesia 2014;118:1062-71

Substantive Opportunities for Cost Reduction

1. Reduce unnecessary interventions that do not have potential to benefit patients
 - Use encouraged by “Choosing Wisely” campaign
 - Use related to new payment systems
 - Research additional interventions and assess their value
 - Anesthesiologists’ roles are as managers (systems-based practice)
 - Director of Anesthesia Informatics
 - Preoperative Assessment Clinic Medical Director

Substantive Opportunities for Cost Reduction

2. Staffing & provider mix, staff scheduling, staff assignment, and case scheduling
 - Cost reduction applies principally to facilities with workdays > 8 hours (e.g., hospitals)
 - Anesthesiologists' roles are as managers (systems-based practice)
 - Director of Anesthesia Informatics
 - Operating Room Medical Director
 - In this role, anesthesiologist has other opportunities to reduce costs such as best use of expensive disposables and implants

Surveys of Anesthesiologists' Roles in Management

- Among chief anesthesiologists and head operating room nurses of public Finnish hospitals with >10 ORs, both reported $\cong 75\%$ of hospitals have anesthesiologist "explicitly assigned for daily operative management of the ORs"
 - Surgeons 8% of hospitals and all respondents reported that in combination with others

Surveys of Anesthesiologists' Roles in Management

- Each of 64 faculty in anesthesia department tracked hourly activity for 2 week period
- Time commitment of faculty for managerial activities $\cong 126\%$ time spent on education, $\cong 107\%$ time spent on research, and 112% time spent on mandatory indirect clinical support (e.g., fire safety or medical education)

Dexter F et al. A&A Case Rep 2015



Using Technologies to Help Clinicians Comply with Best Evidence/Best Practices



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Most Typical Method to Identify Evidence-Based Practice

Most Typical Method to Identify Evidence-Based Practice

Difficulties and Challenges Associated with Literature Searches in Operating Room Management, Complete with Recommendations

Ruth E. Wachtel, PhD, MBA,* and Franklin Dexter, MD, PhD*†

Anesthesia & Analgesia 2013;117:1460-79

Most Typical Method to Identify Evidence-Based Practice

- We performed a systematic literature review
- Finding
 - Most people seeking assistance with medical or computer-related issues rely on colleagues



Using **Technologies** to Help Clinicians Comply with Best Evidence/Best Practices

Meetings and Asking Colleagues



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Meetings and Asking Colleagues

- Need to know conditions when such communication results, at least on average, in evidence-based management decisions



Meetings and Asking Colleagues

Review of Experimental Studies in Social Psychology of Small Groups When an Optimal Choice Exists and Application to Operating Room Management Decision-Making

Andrew Prael,* Franklin Dexter, MD, PhD,† Michael T. Braun, MA,* and Lyn Van Swol, PhD†

Meetings and Asking Colleagues

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Anesthesia & Analgesia 2013;117:1221-9

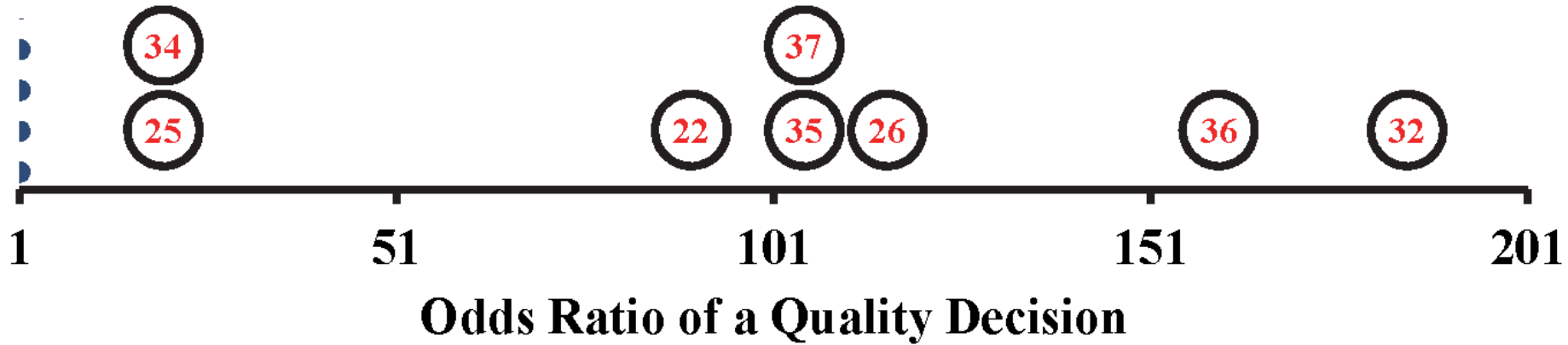
Meetings and Asking Colleagues

Review of Experimental Studies in Social Psychology of Small Groups **When an Optimal Choice Exists** and Application to Operating Room Management Decision-Making

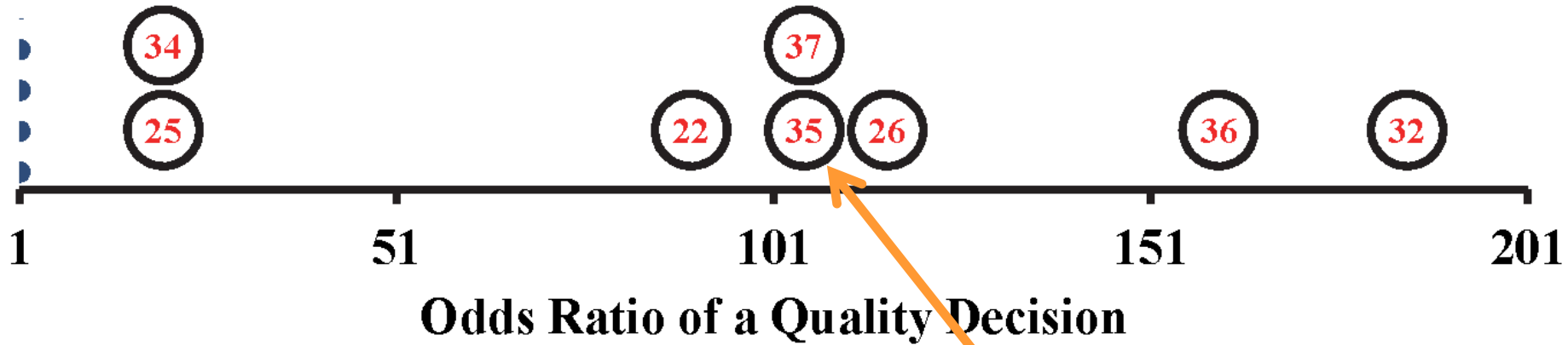
Andrew PrahI,* Franklin Dexter, MD, PhD,† Michael T. Braun, MA,* and Lyn Van Swol, PhD†

Anesthesia & Analgesia 2013;117:1221-9

Decision Quality With or Without Unshared Information



Decision Quality With or Without Unshared Information



Reference
Numbers

Decision Quality With or Without Unshared Information

- Control group
 - Information needed to make correct decision provided to all members before discussion
- “Real world” condition
 - Information to make correct decision provided to one group member ahead
 - This is from managerial perspective the one person who knows the operations research, informatics, engineering, analytics, etc.

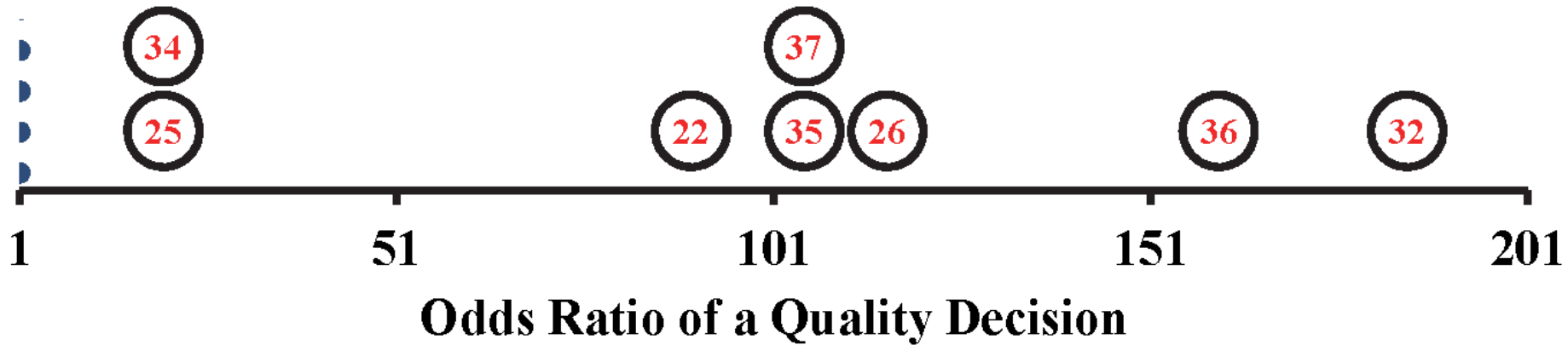


Decision Quality With or Without Unshared Information

- Effect size is odds ratio
- Odds ratio of 107 implies that the control group's odds of producing a correct decision was 107 times odds of "real world" group
 - Correct decision by 89% of control groups
 - Correct decision by 7% "real world" groups
 - Odds ratio 107 =
$$\left(\frac{89\%}{[100\% - 89\%]} \right) / \left(\frac{7\%}{[100\% - 7\%]} \right)$$

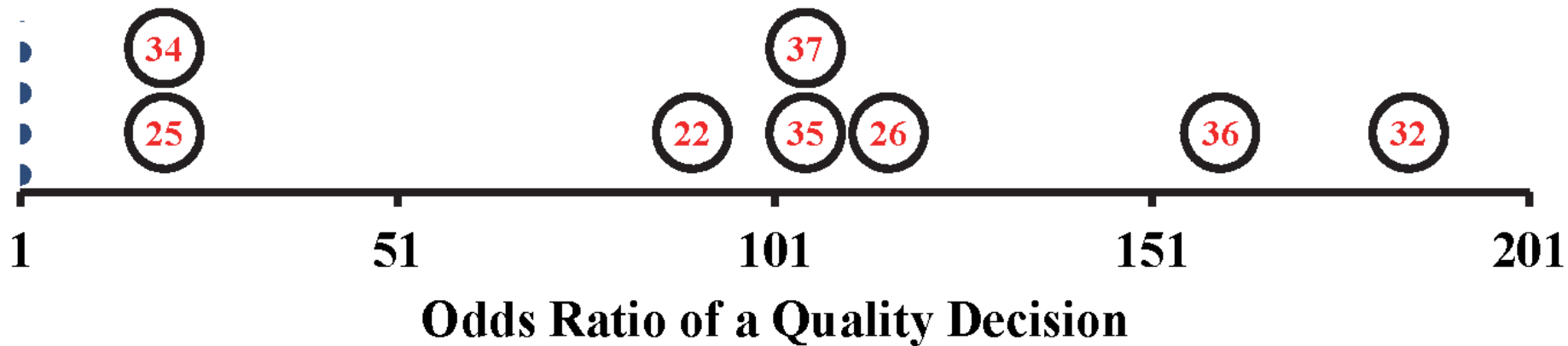


Decision Quality With or Without Unshared Information



- Minimum effect size = $18 > 0$

Decision Quality With or Without Unshared Information



- Minimum effect size = $18 > 0$
- For problems with correct answers, but fact there is a correct answer is not demonstratable without study by all participants, the odds that group will make the correct decision is very low

Shared and Unshared Information

- Shared information is information that group members all know before group discussion
 - Example is that surgeons differ in case durations (OR times) for the same procedure
- Unshared information is known only to one group member before discussion and becomes known to others during the discussion



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Shared and Unshared Information

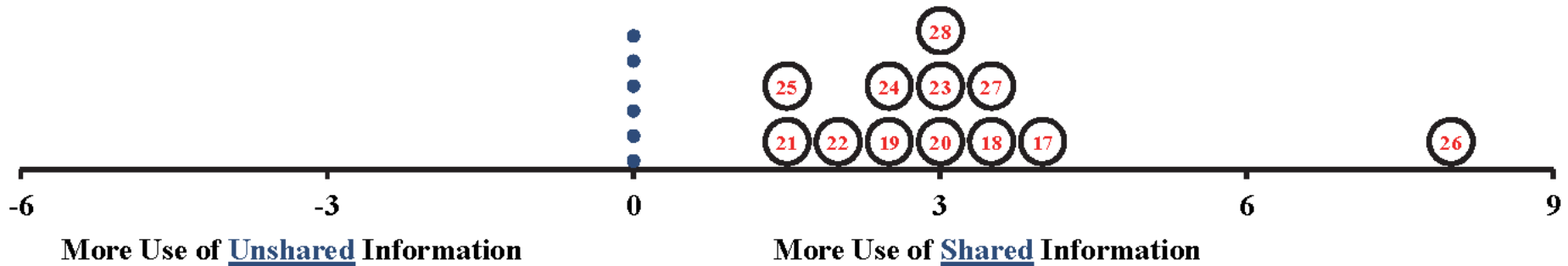
- Shared information is information that group members all know before group discussion
 - Example is that surgeons differ in case durations (OR times) for the same procedure
- Unshared information is known only to one group member before discussion and becomes known to others during the discussion
 - Example is that extra time attributable to the primary surgeon when averaged over all cases at a hospital $\cong 0.4$ minutes (SE 0.1)

Shared and Unshared Information

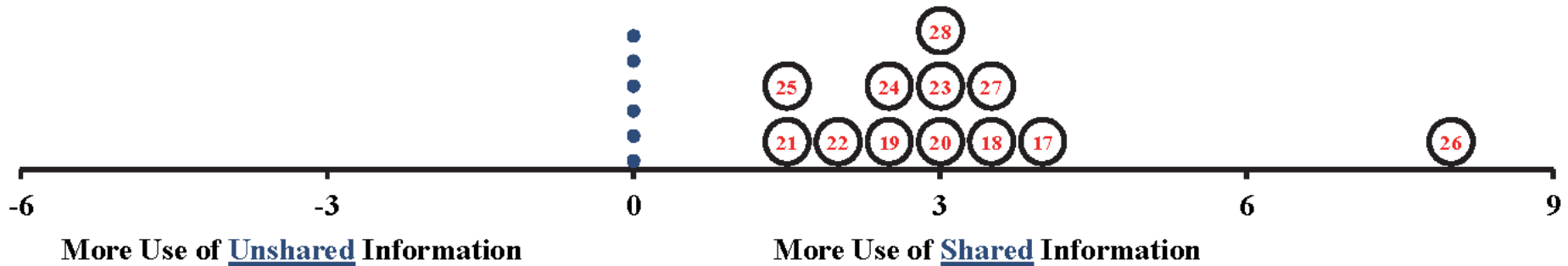
- Effect size is the standardized mean difference
 - Groups discussed mean 10.72 items of shared information versus 7.05 items unshared information, with pooled SD of 0.96 items
 - Standardized mean difference is effect size
 - $3.84 = (10.72 - 7.05) / 0.96$



Shared and Unshared Information

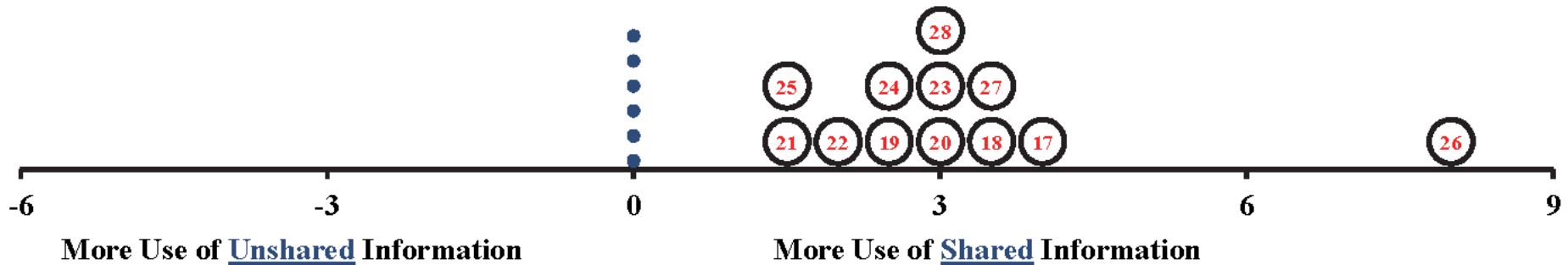


Shared and Unshared Information



- Minimum effect size = $1.25 > 0$

Shared and Unshared Information



- Minimum effect size = $1.25 > 0$
- Shared information is more influential during group discussions than is unshared information

Shared and Unshared Information

- Shared information is discussed earlier than unshared information ($P < 0.001$).^{18,21}
- Shared information is repeated in discussion more than unshared information ($P < 0.001$).²⁰
- Group members with primarily shared information take more speaking turns than members with primarily unshared information ($P < 0.005$).³¹

Prahl A et al. Anesth Analg 2013



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Meetings and Asking Colleagues

- Meetings are ineffective for these problems when used for group level decision-making (i.e., consensus) or consultative type level 2 decision-making (i.e., peer discussion)

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- Meetings are ineffective for these problems when used for group level decision-making (i.e., consensus) or consultative type level 2 decision-making (i.e., peer discussion)
 - Technologies to assist leader in obtaining solutions from outside his/her department

Using Technologies to Help Clinicians Comply with Best Evidence/Best Practices

Literature Search



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Difficulties and Challenges Associated with Literature Searches in Operating Room Management, Complete with Recommendations

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Literature Search Depends on Knowledge of the Vocabulary

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Literature Search Depends on Knowledge of the Vocabulary

- Experiments
 - Using PubMed, could not create protocols to identify [known] article(s) with solutions to problems (decisions) without using the precise vocabulary
- Experiments explain observational studies
 - Frustration with search to find solutions arises from having to know vocabulary before search



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- Search is effective technological tool once one knows vocabulary and/or one relevant article



Application by Teams Depends on Knowledge of the Vocabulary



Application by Teams Depends on Knowledge of the Vocabulary

- Rank “team attributes according to what was the most important towards completing a) the problems in the course completed as a team and b) similar tasks you have worked on since the course within small teams”
 - No differences based on years earlier when the 88 respondents had taken course, 2009 to 2019

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- Rank “team attributes according to what was the most important towards completing a) the problems in the course completed as a team and b) similar tasks you have worked on since the course within small teams”
 - No differences based on years earlier when the 88 respondents had taken course, 2009 to 2019
 - ✓ Successful needs assessment of team skills

Application by Teams Depends on Knowledge of the Vocabulary

- Two items significantly important ($P < 0.0001$)
 - Knowledge of basic statistics, operations research, and operating room management concepts sufficient for everybody in the team taking part in discussions.
 - Members in the team recognize a good contribution when one member mentions it during discussion, based on members' understanding of the statistics, operations research, and operating room management concepts.



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Application by Teams Depends on Knowledge of the Vocabulary

- Results from lesser scores of other items show that insufficient that participants:
 - Value and trust importance of such knowledge
 - The team members need to know it
 - Have good teamwork, building upon effective internal communication
 - Need shared knowledge of the analytics and operating room management science

Application by Teams Depends on Knowledge of the Vocabulary

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 - **Web site** or communicate with advisor



Division of Management Consulting



Education in Operating Room Management

An intensive course with CME credit is given at the University of Iowa in Iowa City, at hosted sites, and online; specific dates are listed on the registration pages. The course is based on these case studies and the lectures below:

- Statistics for anesthesia
- Anesthesia preoperative evaluation clinics *webinar*
- Decision-making on the day of surgery *webinar*
Includes scenarios to train for decisions on afternoon, evenings, and weekends
- Service-specific operating room staffing
- Operating room financial assessment for tactical decision-making
- Economics of reducing turnover times *webinar*
- Economics of anesthetic agents *webinar*
- Strategic planning: financial impact of different types of surgery
- Anesthesiologist and nurse anesthetist staffing
- Physician agreements – Anesthesia support & surgeon blocks
- Showing differences among hospitals and their surgical practices



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Anesthesia Information Management Systems (AIMS)

[Click here](#) for an annotated bibliography of the AIMS articles below, arranged by topic.

2014

Avidan A, Dotan K, Weissman C, Cohen MJ, Levin PD. [Accuracy of manual entry of drug administration data into an anesthesia information management system](#). Canadian Journal of Anesthesia 61:979-985, 2014

Herasevich V, Ellsworth MA, Hebl JR, Brown MJ, Pickering BW. [Information needs for the OR and PACU electronic medical record](#). Applied Clinical Informatics 5:630-641

Kappen TH, Moons KGM, van Wolfswinkel L, Kalkman CJ, Vergouwe Y, van Klei WA. [Impact of risk assessments on prophylactic antiemetic prescription and the incidence of postoperative nausea and vomiting: a cluster-randomized trial](#). Anesthesiology 120:343-354, 2014

Stol IS, Ehrenfeld JM, Epstein RH. [Technology diffusion of anesthesia information management systems into academic anesthesia departments in the United States](#). Anesthesia and Analgesia 118:644-650, 2014

Warner ME, Chong EY, Lowe ME, Sprung J, Weingarten TN. [Emergency pages using a computer-based anesthesiology paging system in ambulatory surgical centers: a retrospective review](#). Anesthesia and Analgesia 119:145-150, 2014

Using Technologies to Help Clinicians Comply with Best Evidence/Best Practices (Web Sites for Vocabulary)



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Communication with Advisor

E-mail as the Appropriate Method of Communication for the Decision-Maker When Soliciting Advice for an Intellectual Decision Task

Andrew Pahl,* Franklin Dexter, MD, PhD,† Lyn Van Swol, PhD,* Michael T. Braun, PhD,‡
and Richard H. Epstein, MD, CPHIMS§

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Anesthesia & Analgesia 2015;121:669-71

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Anesthesia & Analgesia 2015;121:669-71

Narrative review of technologies to communicate with advisors for engineering type problems (e.g., for use by course participants for follow-up)

Communication with Advisor

- Experimental and some observational studies of the different communication technologies
 - Face to face meeting
 - Video (web) conference
 - Animated computer agents (avatars)
 - Telephone (audio)
 - Live electronic chat
 - E-mail (asynchronous 1:1 written)
 - Discussion forum (listserv, social media)



Advantages of E-mail for Communication with Advisor

- Easy to use across organizational boundaries
- Convertible to tasks (e.g., set follow-up flag)
- Asynchronous; no appointment arranged
- Absence of expectation of immediate response
- Presence of expectation of a response
 - Responsibility and reduced social loafing
- Training significantly increases productivity in use (e.g., search rather than folders)



Advantages of E-mail for Communication with Advisor

- Decision-maker can construct (frame) the message carefully to increase likelihood of receiving a useful response
- Decision-maker can read response when least distracted and reread complicated portions
- Decision-maker has reduced cognitive load vs. face-to-face, video conferencing, or avatar
 - For factual material, written text consistently easier to understand and as effective or more effective at changing behavior



Advantages of E-mail for Communication with Advisor



- Advisor can control cues to appear credible
 - Titles and degrees in signature line expected
- Advisor can focus on constructing message rather than appearance of hair, color of slides
- Advisor can include attachments with details
- Advisor can include written expression(s) of confidence in advice
 - Best predictor of usage in experimental studies



E-mail ... It's so Old Fashioned; Segment Based on Use Case



E-mail ... It's so Old Fashioned; Segment Based on Use Case

- Personally relevant decision
Subject has need for cognition
 - Subjects use brief textual advice (e.g., e-mail)
no more often when include emoticons 
- Not personally relevant decision
Subject has low need for cognition
 - Subjects use brief textual advice (e.g., chat)
more frequently when include emoticons 

Duan J et al. Comput Hum Behav 2018



E-mail to Provide Feedback to Individuals Within Department

Influencing Anesthesia Provider Behavior Using Anesthesia Information Management System Data for Near Real-Time Alerts and **Post Hoc Reports**

Richard H. Epstein, MD,* Franklin Dexter, MD, PhD,† and Neil Patel, MD‡

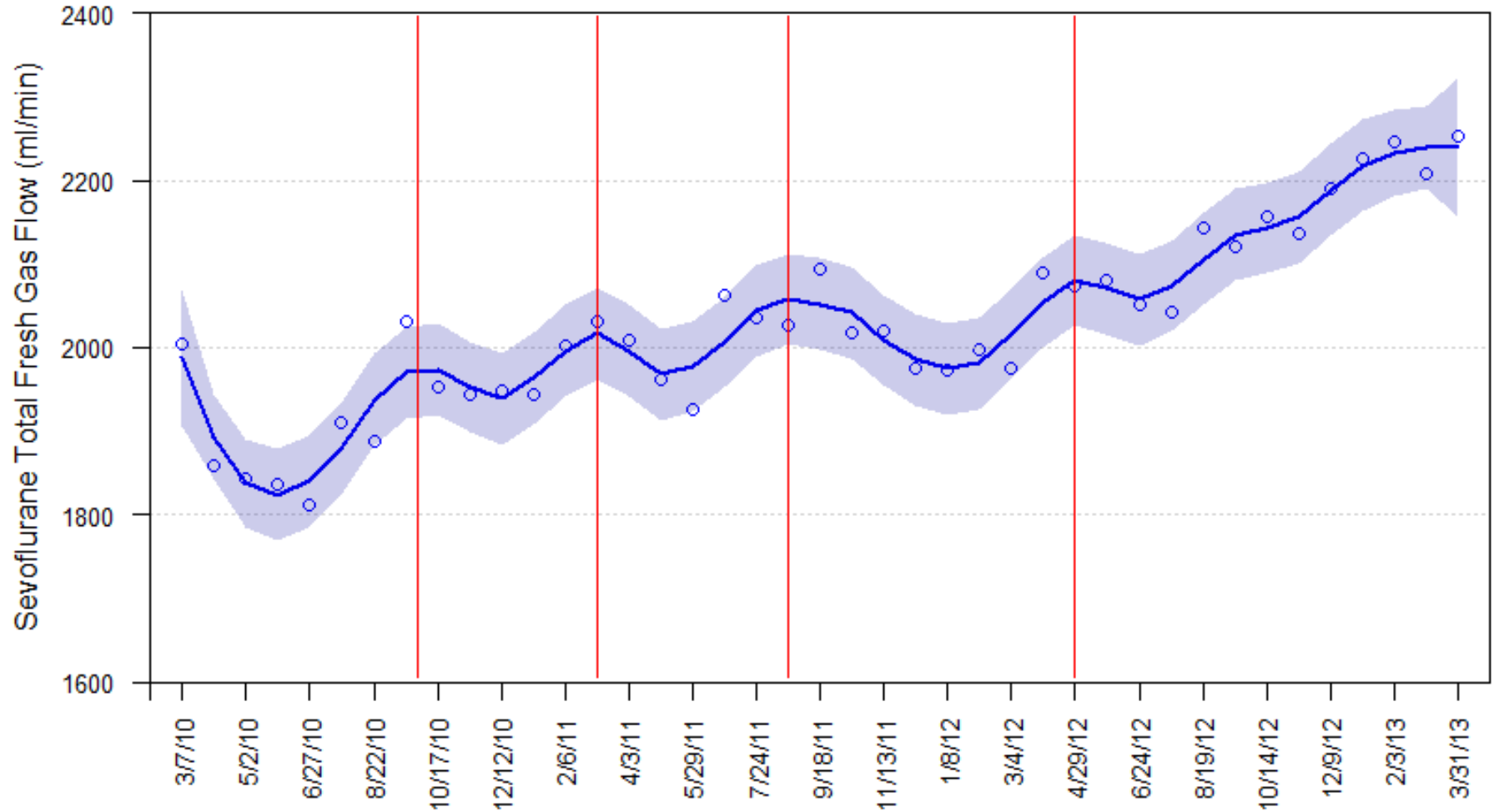
Anesthesia & Analgesia 2015;121:678-92

E-mail to Provide Feedback to Individuals Within Department

- Departmental weighted fresh gas flow for sevoflurane calculated as:
sum for each case of
product of the duration of surgery and
mean fresh gas flow for the case
between the beginning and end of surgery
divided by the total duration among all cases



E-mail to Provide Feedback to Individuals Within Department

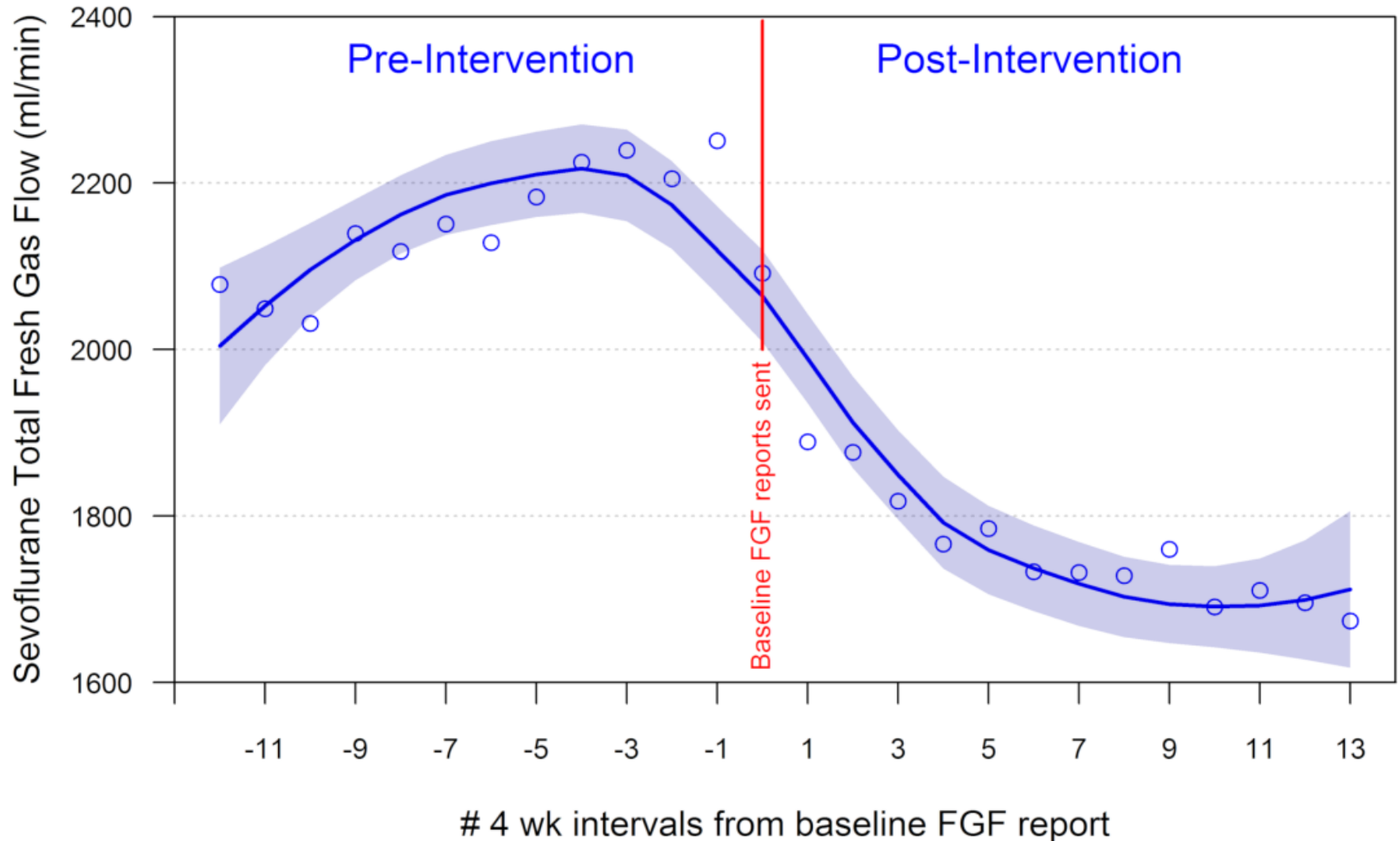


E-mail to Provide Feedback to Individuals Within Department

- Individualized, automated e-mail feedback to all anesthesia providers about their fresh gas flows for each case, by volatile anesthetic
 - Sent approximately monthly



E-mail to Provide Feedback to Individuals Within Department



E-mail to Provide Feedback to Individuals Within Department

- Using e-mail after case avoids concerns related to potential creation of medical device
 - Administrative function designed to enhance overall compliance with a departmental quality practice objective
 - Not effort to dictate care of individual patients



Choosing When to Send E-mail and To Whom to Send E-mail

Choosing When to Send E-mail and To Whom to Send E-mail

Bernoulli Cumulative Sum (CUSUM) Control Charts for Monitoring of Anesthesiologists' Performance in Supervising Anesthesia Residents and Nurse Anesthetists

Franklin Dexter, MD, PhD,* Johannes Ledolter, PhD,† and Bradley J. Hindman, MD‡

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Anesthesia & Analgesia 2014;119:679-85

Daily Evaluation of Anesthesiologists' Supervision

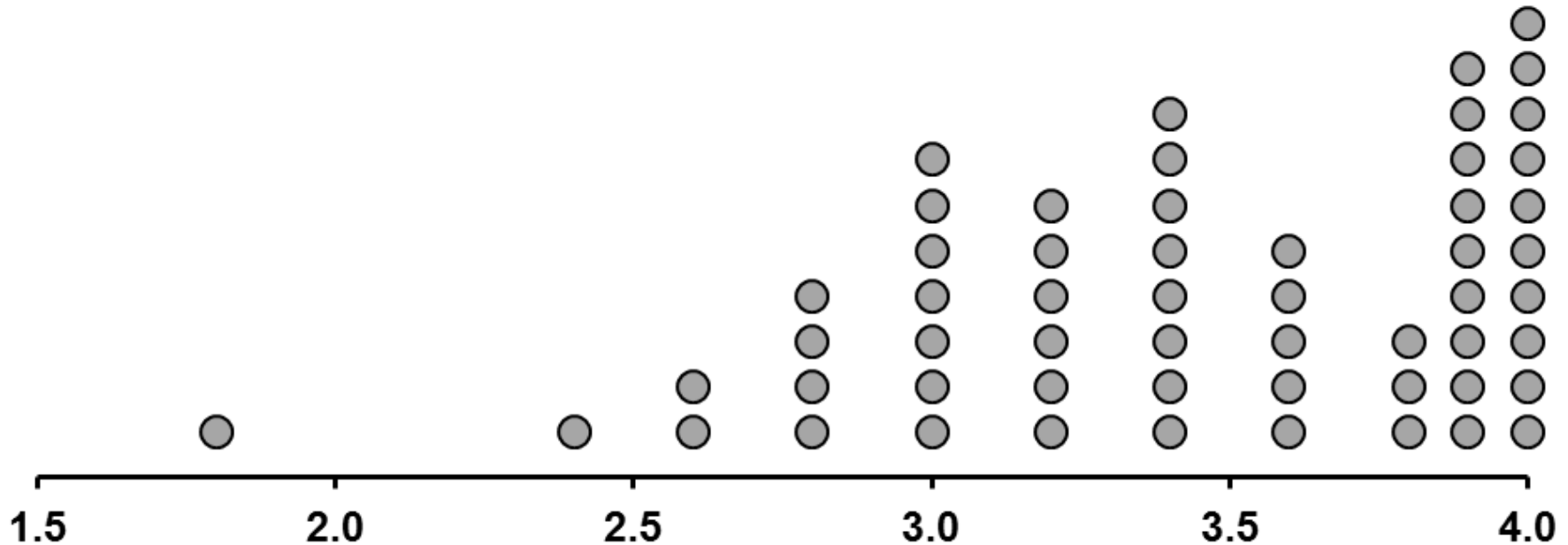
Influence of Provider Type (Nurse Anesthetist or Resident Physician), Staff Assignments, and Other Covariates on Daily Evaluations of Anesthesiologists' Quality of Supervision

Franklin Dexter, MD, PhD,* Johannes Ledolter, PhD,† Thomas C. Smith, BS,‡ David Griffiths, BS,‡ and Bradley J. Hindman, MD‡

Reliability and Validity of the Anesthesiologist Supervision Instrument When Certified Registered Nurse Anesthetists Provide Scores

Franklin Dexter, MD, PhD,* Danielle Masursky, PhD,† and Bradley J. Hindman, MD‡

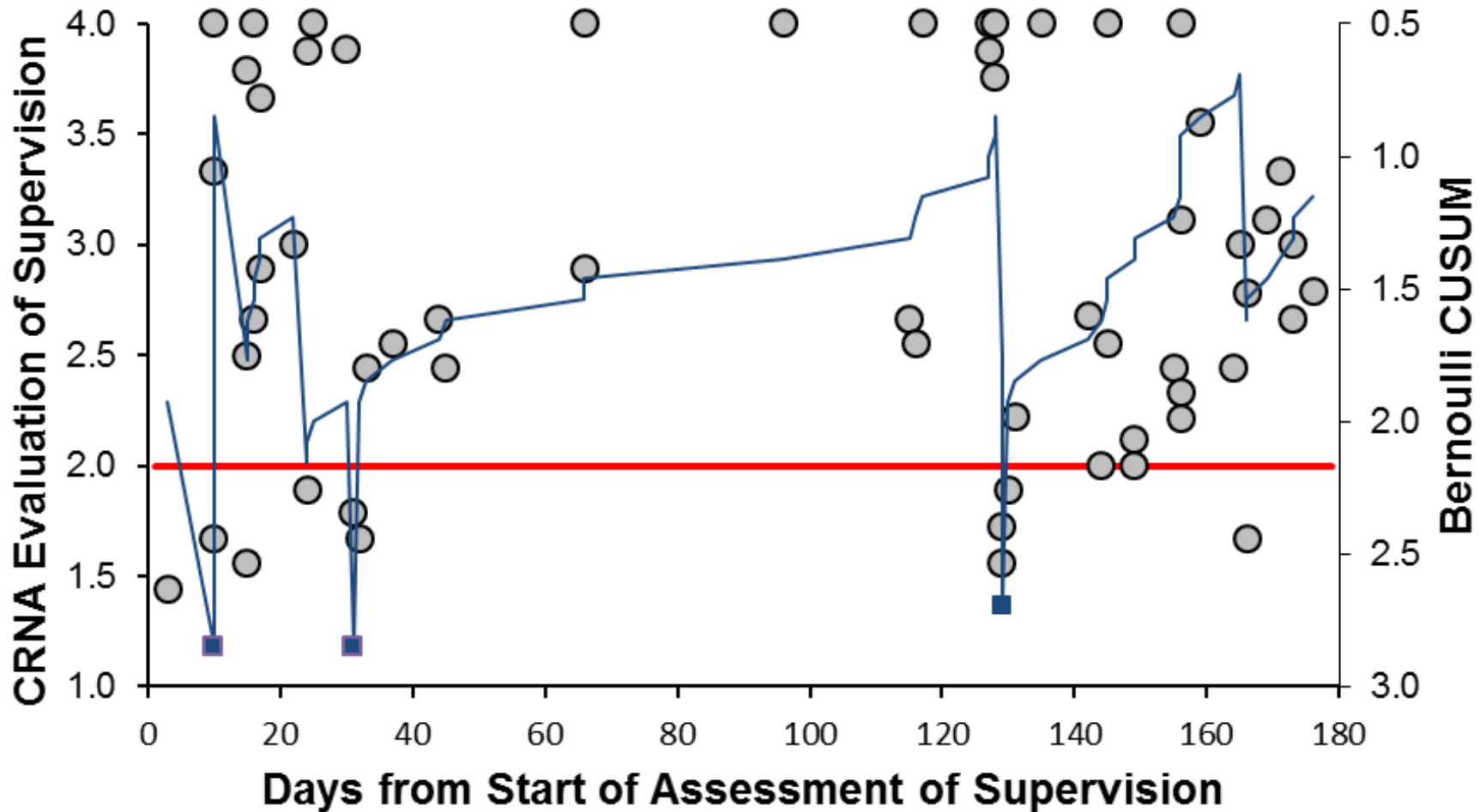
Daily Evaluation of Anesthesiologists' Supervision



1=never, 2=rarely, 3=frequently, 4=always

For example: The faculty was promptly available to help me solve problems with patients and procedures

Bernoulli CUSUM Performance to Decide When to Send E-mail



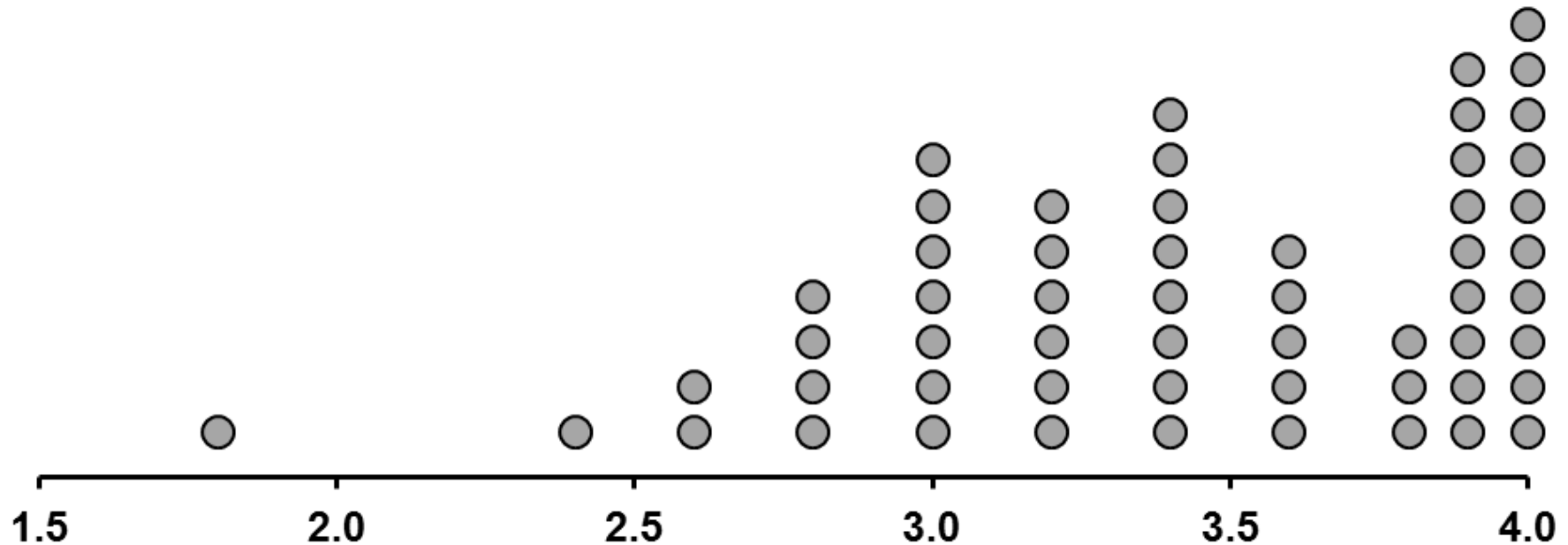
Bernoulli CUSUM Performance to Decide When to Send E-mail

- Among upper half of anesthesiologists (29/58) based on each CRNA's equally weighted mean, only 1 of 29 was detected (flagged) during the 6 months by the Bernoulli CUSUM
 - Among the lower quartile of anesthesiologists (14/58), 13 of 14 were detected

Bernoulli CUSUM Performance to Decide When to Send E-mail

- Among upper half of anesthesiologists (27/55) based on each resident's equally weighted mean, only 0 of 27 was detected (flagged) during the 6 months by the Bernoulli CUSUM
 - Among the lower quartile of anesthesiologists (13/55), 12 of 13 were detected

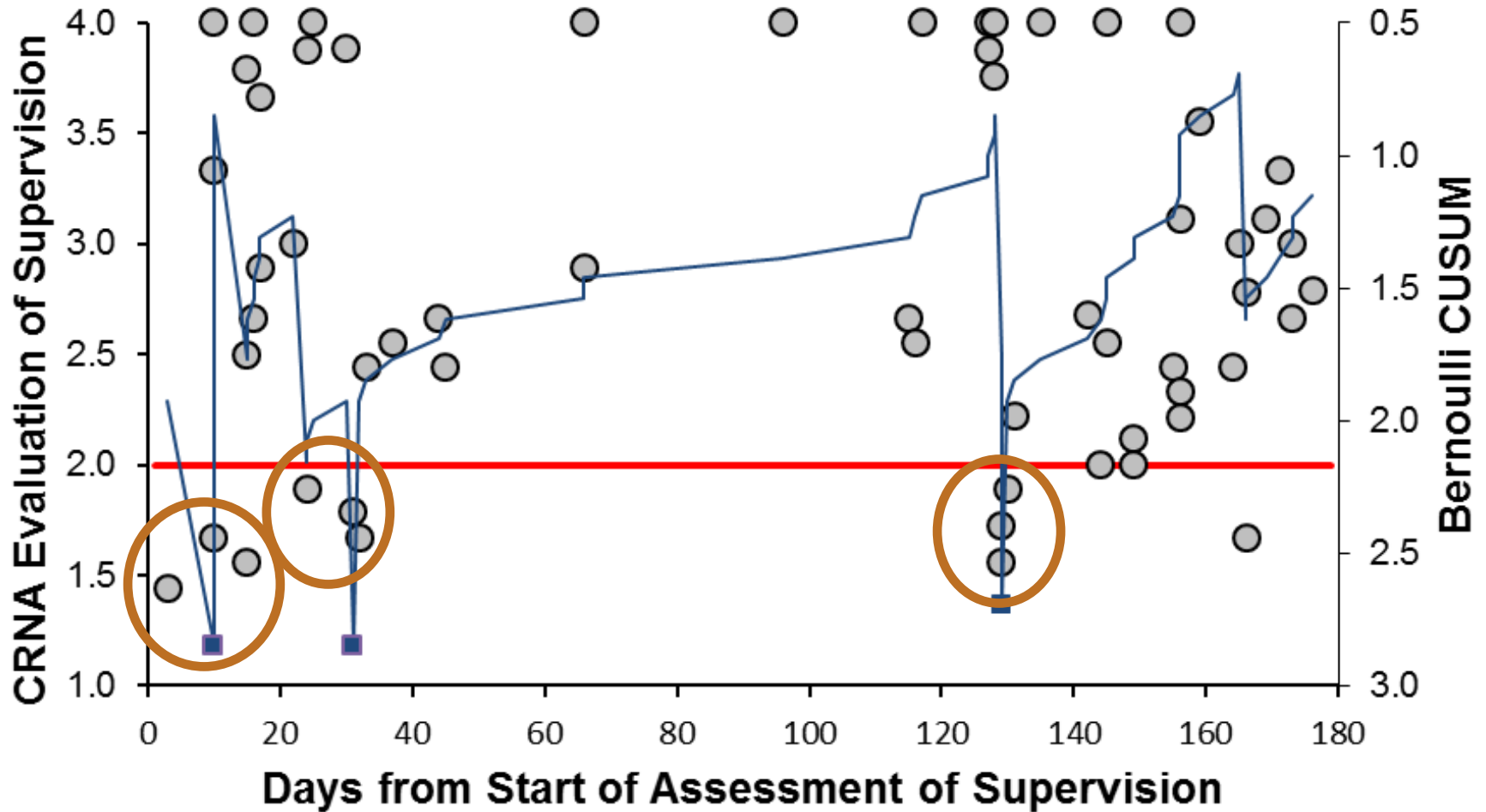
Bernoulli CUSUM Performance to Decide When to Send E-mail



Dot plot took 180 days of data to be reliable

Bernoulli CUSUM 50 (median) \pm 14 (quartile deviation) days

Do Need to Use Mathematics



Do Need to Use Mathematics

- Assumption of statistical independence
 - If no correlation among evaluations, and with p representing pooled estimate for low score, then among days with 2 evaluations, p^2 would be probability both scores are low
 - Among the CRNAs' 1182 evaluations on days with 2 evaluations by CRNAs, $p = 5.92\%$
 - There were 4.34-fold more days with 2 low scores than expected at random ($P < 0.0001$)



Bernoulli CUSUM Workflow for Who Receives the E-mail

- If anesthesiologist works today with a resident, and this evening Bernoulli CUSUM alerts, likely the resident's evaluation indicated less than desirable supervision
- E-mail directly to the rated anesthesiologist would result in loss of confidentiality of the resident's evaluation



Bernoulli CUSUM Workflow for Who Receives the E-mail

- Bernoulli CUSUM is process for detection
- Detection prompts e-mail notification of the relevant human resources professional, not the rated anesthesiologist
- Vice Chair for Faculty Development receives e-mail with hyperlink but without identifiers
 - Logs in
 - Sees name of anesthesiologist and evaluations from past 15 different raters

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(E-mail)



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Influence of Data and on Trust in the Information

- E-mail can include attachments, often with the expert as one of the authors
- What type of articles should be attached?
 - Review article with text and simple figures or primary article including data?
 - With/without appendices with formulas?



Influence of Data and Formulas on Trust in the Information

Influence of Data and Formulas on Trust in Information from Journal Articles in an Operating Room Management Course

Franklin Dexter, MD, PhD,* and Lyn M. Van Swol, PhD†

Influence of Data and Formulas on Trust in the Information

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A & A Case Reports 2016;6:329-34

Influence of Data and Formulas on Trust in the Information

- OR management course takes \cong 50 hours
 - 15 hours for statistics review and learning the vocabulary
 - 35 hours of class over 3.5 days
 - Mostly to work in teams and complete cases
- Within a few days of finishing the course, N = 17 subjects completed a 36 item survey form, with 9 items about each of 4 readings
 - Sequences of survey items fully randomized



Influence of Data and Formulas on Trust in the Information

- Example of one of the 4 readings
 - Reading for lecture #5
 - Formulas Yes
 - Data Yes
 - 19 references
 - Citation
 - Dexter F, Ledolter J, Wachtel RE. Tactical decision-making for selective expansion of operating room resources incorporating financial criteria & uncertainty in subspecialties' future workloads. *Anesthesia & Analgesia* 2005;100:1425-32



Influence of Data and Formulas on Trust in the Information

- Example of one of the 4 readings
 - Reading for lecture #4
 - Formulas No
 - Data No
 - 76 references
 - Citation
 - Wachtel RE, Dexter F. Tactical increases in OR block time for capacity planning should not be based on utilization. *Anesthesia & Analgesia* 2008;106:215-26



Influence of Data and Formulas on Trust in the Information

- Response scale for each of the **9 items**
 - 1, Strongly disagree
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7, Strongly agree



Influence of Data and Formulas on Trust in the Information

Scale	Item	Mean	SD	Cronbach's alpha
	Quality (sequence of the 3 items randomized)			
	In general, Reading #X provides me with high quality information.	5.93	0.90	
	Overall, I would give the information from Reading #X high marks.	5.90	0.88	
	Overall, I would give the information provided by Reading #X a high rating in terms of quality.	6.01	0.84	
	Pooled	5.95	0.84	0.95

Quality of reading

Influence of Data and Formulas on Trust in the Information

Scale	Item	Mean	SD	Cronbach's alpha
Usefulness (sequence of the 3 items randomized)				
	The information in Reading #X is helpful for my work.	5.51	1.23	
	The information in Reading #X is valuable for my work.	5.57	1.24	
	The information in Reading #X is informative for my work.	5.62	1.20	
	Pooled	5.57	1.18	0.91

Usefulness of reading

Influence of Data and Formulas on Trust in the Information

Scale	Item	Mean	SD	Cronbach's alpha
Reliability (sequence of the 3 items randomized)				
	The information in Reading #X is reliable.	5.97	0.91	
	Anyone trusting the information in Reading #X is helping himself/ herself.	5.94	0.90	
	The information in Reading #X can be trusted; there are many certainties.	5.88	0.94	
	Pooled	5.93	0.85	0.96

Reliability of reading

Influence of Data and Formulas on Trust in the Information

- 9 item assessment of trust in the information, including quality, usefulness, and reliability
 - Overall Cronbach alpha 0.94
 - 95% confidence interval 0.92 to 0.96



Influence of Data and Formulas on Trust in the Information

- 9 item assessment of trust in the information, including quality, usefulness, and reliability
 - Overall Cronbach alpha 0.94
 - 95% confidence interval 0.92 to 0.96
- Quality, usefulness, and reliability are attributes of unidimensional construct: trust in the information



Influence of Data and Formulas on Trust in the Information

Mixed effects analysis of trust (9 items \times 4 articles for each of N = 17 subjects)

Effect	Numerator Degrees of freedom	Denominator Degrees of freedom	F-ratio	P- value
Data versus no data	1	49	2.159	0.148
Formula versus no formulas	1	49	10.778	0.0019

Influence of Data and Formulas on Trust in the Information

- Residuals normally distributed
- Interaction not significant
- Count of references not significant
- Journal not significant



Influence of Data and Formulas on Trust in the Information

- Residuals normally distributed
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- Formulas in appendices serve a role, even for reader who does not understand them



Influence of Data and Formulas on Trust in the Information

- Residuals normally distributed
- Interaction not significant
- Count of references not significant
- Journal not significant
- Formulas in appendices serve a role, even for reader who does not understand them
 - Cue that the article can be trusted



Course for Trust in this Use of Technology for Management

- Examining use of technology to help clinicians, often anesthesiologists, comply with best evidence/ practices for managerial decisions
 - Web sites for vocabulary
 - Email, particularly with the few scientific articles
- Do courses further increase trust?

Dexter F et al. J Clin Anesth 2017

Vasilopoulos T et al. J Clin Anesth 2019



Course for Trust in this Use of Technology for Management

- Before the 1-day course and baseline survey
 - Statistics review to level required for American Board of Anesthesiologists' BASIC Examination
 - Read two papers on analytics to reduce how late anesthesiologists work, one with formulas, and learn the vocabulary

Dexter F et al. Anesthesiology 2004

Dexter F et al. Anesth Analg 2016



Course for Trust in this Use of Technology for Management

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- Before the 1-day course and baseline survey
 - Statistics review to level required for American Board of Anesthesiologists' BASIC Examination
 - Read two papers on analytics to reduce how late anesthesiologists work, one with formulas, and learn the vocabulary
- Team analytic problem solving, discussion; 9-hr
 - Trust in the quality, reliability, and usefulness of the information increases, $P = 0.005$



Course for Trust in this Use of Technology for Management

- Additional material during 2nd and 3rd day of full course includes understanding:
 - Methodological limitations
 - Conditions when usefulness limited
 - Lack of need for many organizations

Dexter F et al. J Clin Anesth 2017



Course for Trust in this Use of Technology for Management

- Additional material during 2nd and 3rd day of full course includes understanding:
 - Methodological limitations
 - Conditions when usefulness limited
 - Lack of need for many organizations
- No further increase in trust in the information
 - 95% confidence interval for increase
-0.03 to +0.10 on the 1 to 7 scale, $P = 0.30$

Dexter F et al. J Clin Anesth 2017



Summary

- Cost reduction achieved through management
- Small groups large odds poor quality decisions
- Obtain information from outside department by literature search, once know vocabulary
 - Web site lectures and question/answers
 - Expert consultation, typically by e-mail
 - Attach articles, especially if include formulas
 - One day course increases trust in content
- Use e-mail also for quantitative feedback within department, with evidence-based analytics

Additional Information on Anesthesia Group Management

- www.FranklinDexter.net/education.htm
 - Example staffing reports with calculations
 - Lectures on learning statistics [BASIC exam], OR allocation and staffing, PACU staffing, running preoperative clinic, reducing turnover times and late first case starts, tactical and strategic decision-making
- www.FranklinDexter.net
 - Comprehensive bibliography of peer reviewed articles in operating room and anesthesia group management