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Daniel I. Sessler, M.D.

Recipient of the 2002 Excellence in Research Award

Think back to the mid-1980s. The introduction of pulse oximetry and expired gas measurements had revolutionized anesthesia practice. Numerous studies advanced our understanding of neuromuscular physiology and anesthetic effects on the cardiovascular and respiratory systems. Perioperative thermoregulation, however, lagged far behind: there were perhaps only 40 publications on the subject, and most were superficial reviews or simple observational reports.

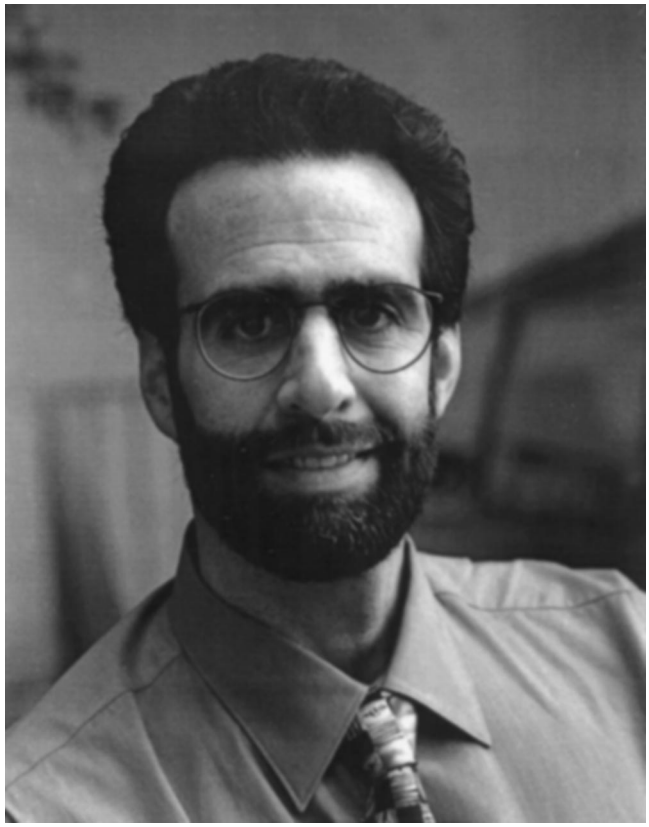
Enter onto the scene Dr. Daniel Sessler, a young faculty member at the University of California in San Francisco. With his initial exploratory investigations, it became obvious to Sessler that much of what was believed at the time was simply wrong. This led him to a 17-yr–long series of studies that eventually nearly fully characterized the effects of anesthetics on temperature regulation, perioperative heat balance, and the adverse effects of mild hypothermia.

One of the most surprising observations that Sessler reported is that most perioperative core hypothermia results from an internal core-to-peripheral redistribution of body heat rather than simple loss of heat to the environment. He has also shown that while all anesthetics impair thermoregulatory control, inhibition is only relative in that effective arteriovenous shunt constriction is reestablished once patients become sufficiently cold. Vasoconstriction, in turn, prevents further core hypothermia. The combination of redistribution hypothermia and the core temperature plateau characterize the typical hypothermia curve.

Among Sessler's most important work is a series of major outcome studies demonstrating that mild hypothermia (*i.e.*, 1.5–2°C) causes numerous serious complications. These include a threefold increase in the risk of surgical wound infection, increased blood loss and transfusion requirement, prolonged duration of postoperative recovery, and prolonged hospitalization.

Sessler's interest in wound infection and immune function led to another series of landmark investigations. He and his group have demonstrated that 80% supplemental perioperative oxygen halves both the risk of wound infection after colon surgery and the incidence of nausea and vomiting, without provoking atelectasis as had been feared. Recent studies explore the interaction of anesthetic agents and the febrile responses.

These studies were performed with considerable skill and accuracy. In particular, Sessler's group has learned to tightly control clinical circumstances, which reduces response variability; they can therefore test hypotheses with relatively few patients or volunteers. Sessler has



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been continuously funded by the National Institutes of Health since 1987 and has received numerous grants from other peer-reviewed and corporate sources; the total now exceeds $4.5 million.

Sessler was raised in Berkeley, California, in a remarkably scientific family. His father is a physicist, as was his mother. Andrew Sessler is the former director of the Lawrence Berkeley National Laboratory, a member of the National Academy of Sciences, and a recent president of the American Physical Society. His sister, Ruth, is a geologist, and his brother, Jonathan, is a prominent professor of chemistry who has published 250 full research papers and has been granted 65 patents.

Sessler describes a childhood home that had a fully equipped chemistry laboratory but no television. Much of the brothers' free time was devoted to increasingly complex pyrotechnic experiments, which ended only after several major explosions. "All chemists start by trying to blow themselves up," their father quipped, "and the good ones succeed!" Typical dinnertime conversation consisted of solving physics problems such as

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determining the circumference of the earth or distance to the moon.

Sessler attended the University of California at Berkeley, where he majored in chemistry but never graduated. "Turns out that an undergraduate degree isn't actually required for medical school," he notes. Graduation from the Columbia University College of Physicians and Surgeons in New York City was followed by residencies in Pediatrics and Anesthesia at the University of California at Los Angeles. During this period, Sessler ran a "pretty good" business photographing portfolios for models.

While in Los Angeles, he also met his lovely wife, Ximena Valdes; she is a pediatrician and also a faculty member at the University of Louisville. They are both avid runners who also enjoy bike riding and hiking. Cultural pursuits include the opera and the symphony; they also enjoy art and have an impressive collection of 20th century paintings.

Sessler spent the subsequent 15 yr in the Department of Anesthesiology at the University of California in San Francisco. In 2000, he moved to the University of Louisville, where he is Assistant Vice-President for Health Affairs, Associate Dean for Research, Distinguished University Research Chair, and the Lolita and Samuel Weakley Professor of Anesthesiology. Concurrently, Sessler is Professor and Vice-Chair at the Ludwig Boltzmann Anesthesia Institute at the University of Vienna.

Over the years, Sessler has trained nine graduate students and 40 research fellows. Most have subsequently become academic physicians, and four now chair anesthesia departments. Many continue to collaborate with Sessler and form the nucleus of the Outcomes Research® Group, now an Institute at the University of Louisville (Available at: http://www.or.org).

Sessler is quick to credit members of Outcomes Research® for his success. Most remarkable to me is that this worldwide group of 70 investigators are linked by bonds of friendship and a sincere desire to perform first-class, meaningful research; Outcomes Research® is thus a virtual worldwide web of anesthesia and perioperative medical research that is by no means restricted to anesthesiologists. Sessler busily gives advice and suggestions regarding issues ranging from protocol design to manuscript preparation. His relationship to the team is that of a mentor, coinvestigator, and guru. Unsurprisingly, he spends nearly half of his time traveling, making frequent visits to study centers in Europe, North America, and Japan. His efforts pay off: Outcomes Research® is the most prolific anesthesia research group in the world, typically publishing more than 20 papers per year.

Sessler *et al*. have published more than 250 research papers, including well over 100 in ANESTHESIOLOGY and half a dozen in the *New England Journal of Medicine* or *Lancet*. He has served on the editorial boards of four journals and as a reviewer for more than 25 others. He has been an invited speaker at more than 150 institutions and has received a dozen previous awards, including the $3,000 ÖGARI Anesthesia Research Prize and the $9,000 Schülke Prize. Sessler also makes time to serve as a hotline consultant for the Malignant Hyperthermia Association and provides considerable additional service to the community.

Sessler's impact on the practice of anesthesia would be difficult to overestimate. He is among the few anesthesiologists in recent decades to so extensively modify routine care. When he began thermoregulatory research, temperature monitoring was rare, and few patients were effectively warmed. Furthermore, there was little understanding of which systems were effective; consequently, considerable effort and cost was expended on systems that Sessler has since shown to be virtually ineffective.

Sessler's work is well known in the anesthesia and surgical communities; especially his major outcome studies demonstrating severe consequences of mild hypothermia. Consequently, temperature monitoring has become routine, and most surgical patients are kept normothermic. In fact, temperature monitoring and thermal management are now so routine that it is easy to forget that current practice is recent and is almost entirely due to Sessler's efforts. The anesthesia community can look with pride and gratitude to an investigator who has so improved patient care.

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