

The Outcomes Research Consortium Celebrates 25 Years of Discovery

The Outcomes Research Consortium (<http://www.or.org/>) is heading into its 26th year of world-class research in perioperative medicine. The consortium was founded in 1990 by Daniel I. Sessler, MD, and has since published more than 950 articles. Last year, its members published a peer-reviewed paper every four days—contributing a good fraction of the world’s published clinical anesthesia research.

It would be difficult to overemphasize the influence and importance of the consortium’s research and effect on anesthesiology and perioperative medicine. Dr. Sessler and his collaborators have fundamentally changed the practice of medicine. Countless patients have experienced improved outcomes, and countless lives and dollars have been saved as a result of the work of these researchers and clinicians.

“He built a following of people with an interest in improving perioperative outcomes, people with an interest in performing excellent research,” Henry Rosenberg, MD, said of Dr. Sessler. “He opened up a whole new world in the understanding of thermoregulation and many other areas of perioperative medicine.” Dr. Rosenberg is professor of anesthesiology and director of medical education in the Department of Anesthesia at Saint Barnabas Medical Center, in Livingston, N.J.

The Outcomes Research Consortium has a unique structure. “All members of the group agree to collaborate with at least one other member from another institution,” Dr. Rosenberg told *Anesthesiology News*. “There are no membership dues. Members are free to conduct independent research, and they usually generate their own funding.

“The members of the group were among the first in anesthesia to conduct large-scale outcome trials,” Dr. Rosenberg wrote in an editorial published recently in *Anesthesiology* (2015;123:1233-1234). “That is, randomized trials with meaningful hard primary outcomes, such as 30-day mortality, myocardial infarction or injury, and wound infection. They were also among the first anesthesia investigators to conduct large-scale registry research. The group has conducted hundreds of cohort, case control, and health policy analyses. They have developed several accurate risk stratification models, which permit accurate comparisons across divergent patient groups.

“The Outcomes Research Consortium is a unique research organization that values and promotes first-rate, clinically relevant research related to anesthesia and perioperative medicine, while training future researchers. So much has been accomplished in the first quarter century. I look forward to the next 25 years,” Dr. Rosenberg wrote in his editorial.

The Story Begins With Thermoregulation

The consortium grew out of the Thermoregulation Research Group at the University of California, San Francisco (UCSF). Their initial research into perioperative thermoregulation yielded clinically important results that fundamentally changed the practice of medicine. The name was eventually changed because the investigators planned to expand beyond the study of thermoregulation.

The groundbreaking study, “Perioperative Normothermia To Reduce the Incidence of Surgical-Wound Infection and Shorten Hospitalization,” was published in *The New England Journal of Medicine* (1996;334:1209-1216). Related studies showed that even mild hypothermia promotes bleeding, augments transfusion requirements, slows drug metabolism and prolongs recovery. As a result of those findings, perioperative normothermia has become the worldwide standard of care.

“The phrase *outcomes research* was largely unknown at the time,” Dr. Sessler explained in an interview with *Anesthesiology News*. He deliberately avoided including the term *anesthesia* when renaming the group so that members would be free to address issues related to perioperative medicine, health policy and topics that were conventionally considered surgical, such as wound infection.

The consortium’s administrative center moved from UCSF to the University of Louisville, in Kentucky, in 2000, and then to the Anesthesiology Institute at the Cleveland Clinic in 2005, where it remains. At the Cleveland Clinic the consortium benefits from considerable institutional support, along with data on a large number of surgical patients, and advanced information systems. In 1990, Andrea Kurz, MD, was appointed as the group’s associate director. Today, Dr. Sessler is the Michael Cudahy Professor and Chair of the Department of Outcomes Research at the Cleveland Clinic. Dr. Kurz is chair of the Department of General Anesthesiology at the Cleveland Clinic.

“Outcomes Research includes an extraordinary group of people who have brilliant ideas,” explained Peter Szmuk, MD, professor of anesthesiology and pain management in the Department of Anesthesiology at University of Texas (UT) Southwestern Medical Center School of Medicine and Children’s Medical Center Research Institute at UT Southwestern, in Dallas.

“These investigators present their ideas at our meetings, and the group discusses, criticizes and supports concepts for research projects. Such group discussions help researchers crystallize ideas,

formulate the research, sharpen hypotheses and generally offer support. There is no competition and no financial interest; it is just a group of effective investigators trying to help each other do good science," he told *Anesthesiology News*. Dr. Szmuk contributes to the Outcomes Research Consortium as a pediatric anesthesiologist.

Landmark Studies

It is difficult to overestimate the consortium's contributions to the science of medicine. About 200 of the consortium's papers have been published in *Anesthesiology*, and another 200 or so have been published in *Anesthesia & Analgesia*. More than a dozen others were published in *The New England Journal of Medicine* and *Lancet*. Not only is the number of publications impressive; Dr. Sessler noted that the group's work has been cited more than 30,000 times.

The consortium's initial focus was perioperative thermoregulation, and included determining the dose-dependent effects on thermoregulatory control of every major anesthetic and sedative, and consequent alterations in heat balance. The group also extensively evaluated complications of hypothermia. More recently, the focus of consortium research has expanded to include examination of surgical site infection, comparisons among anesthetic techniques, airway management, fluid management, hypnotic depth, and the quality and safety of various interventions.

"For example," Dr. Sessler noted, "consortium investigators recently showed that even small amounts of intraoperative hypotension are strongly associated with myocardial injury—which is the leading cause of 30-day postoperative mortality. What is impressive about these studies is that blood pressures that anesthesiologists used to tolerate routinely, or even induce deliberately, are associated with acute kidney and myocardial injury. By the time mean arterial pressure reaches 55 mm Hg, it's just a minute or two to increase mortality.

“Another focus for the group has been surgical pain. About a hundred studies evaluate the prevention of acute pain, including peripheral nerve blocks and multimodal analgesia. The group is now especially interested in preventing persistent incisional pain [see sidebar].”

Research Collaboration

Collaboration is an essential aspect of large-scale clinical research. Independent researchers collaborate extensively within the consortium, and the consortium itself routinely collaborates with two other large anesthesia trial groups: the Population Health Research Institute and the Australian and New Zealand College of Anaesthetists Trials Network.

“In a series of huge trials,” Dr. Sessler explained, “these groups have shown that perioperative myocardial injury is common, clinically silent, deadly and hard to prevent. Hypotension, however, appears to contribute, and several consortium studies show strong associations between hypotension and postoperative mortality.” These findings are just one recent example of consortium investigators identifying phenomena that are likely to improve patient outcomes.

“The consortium strives to address most important clinical anesthesia questions and, because of its size, is able to attack perhaps a dozen topics simultaneously. It also attacks each topic from many angles. It is thus typical for the consortium to initiate five to 10 near-simultaneous studies around a selected issue,” Dr. Sessler noted. A consequence is that over the years the team has contributed meaningfully to many of the big questions facing perioperative medicine. In fact, there are few topics the consortium has not meaningfully addressed at some point in its distinguished 25-year history.

—*John Henry Dreyfuss*

Publications History: A Small Slice

Prominent publications include:

- Schmied H, Kurz A, Sessler DI, et al. Mild intraoperative hypothermia increases blood loss and allogeneic transfusion requirements during total hip arthroplasty. *Lancet*. 1996;347:289-292.
- Greif R, Akça O, Horn E-P, et al; Outcomes Research Group. Supplemental perioperative oxygen to reduce the incidence of surgical wound infection. *N Engl J Med*. 2000;342:161-167.
- Taguchi A, Sharma N, Saleem RM, et al. Selective postoperative inhibition of gastrointestinal opioid receptors. *N Engl J Med*. 2001;345:935-940.
- Apfel CC, Korttila K, Abdalla M, et al. A factorial trial of six interventions for the prevention of postoperative nausea and vomiting. *N Engl J Med*. 2004;350:2441-2451.
- Koch CG, Li L, Sessler DI, et al. Duration of red-cell storage and complications after cardiac surgery. *N Engl J Med*. 2008;358:1229-1239.

Each of the following articles has been cited more than 150 times, most many more. Of course, one likely remembers the quirky and unforgettable finding that redheads need more volatile anesthesia and are resistant to local anesthesia, which was featured in *National Geographic*:

- Liem EB, Lin CM, Suleman MI, et al. Anesthetic requirement is increased in redheads. *Anesthesiology*. 2004;101:279-283.
- Liem EB, Joiner TV, Tsueda K, et al. Increased sensitivity to thermal pain and reduced subcutaneous lidocaine efficacy in redheads. *Anesthesiology*. 2005;102:509-514.
- Binkley CJ, Beacham A, Neace W, et al. Genetic variations associated with red hair color and fear of dental pain, anxiety regarding dental care and avoidance of dental care. *J Am Dent Assoc*. 2009;140:896-905.