

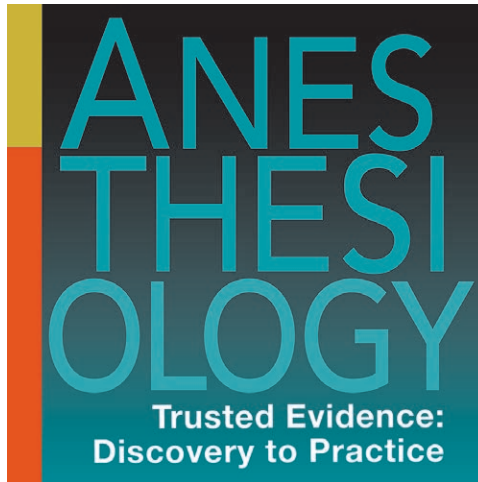
Uncertainty and Certainty

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The novel coronavirus and COVID-19 pandemic of 2019 to 2020 changed the world, and our personal and professional worlds, in ways unimaginable and unprecedented. Lives have been lost, life has been disordered, and uncertainty reigns supreme. Anesthesiologists and certified registered nurse anesthetists have become frontline practitioners in an unfamiliar infectious disease milieu, in the operating room, intensive care unit, emergency response, and institutional leadership teams. We are unaccustomed to our profession entailing great clinical uncertainty and potential personal peril. Nonetheless, colleagues worldwide look past this daily, with the certainty of mission and professional dedication. At this writing we are still deep in the maelstrom and unknowing of what emergence will look like. The editors and editorial team at ANESTHESIOLOGY acknowledge these circumstances.

Since becoming editor-in-chief in 2016, it has become my custom in the July issue to reflect on the previous year's journal achievements and share plans for the future. In 2016 I described our overarching goal: to maximize the richness and reach of ANESTHESIOLOGY content while satisfying our customers, achieving the journal's mission, and meeting the desire of the American Society of Anesthesiologists to improve scientific understanding, clinical practice, and education in the specialty. That goal remains unchanged, certain, and steadfastly pursued.^{1,2}

The steady routine of the journal was disrupted in February 2020 by the necessity of an extraordinary response to unprecedented circumstances.³ The epidemic that originated in Wuhan, China, grew exponentially, followed by international seeding and the commensurate risks and disease that ensued. The anesthesiology community, first in China and later elsewhere, responded in unprecedented ways and reached out to ANESTHESIOLOGY, and we in turn reached out to them, to provide firsthand information, scholarly reviews, protocols, and recommendations on the



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ongoing COVID-19 (then) epidemic and (now) pandemic.

Unlike news media, which cycles hourly and daily, a monthly scientific and scholarly journal is not built or resourced to respond quickly to emerging events. Nevertheless, ANESTHESIOLOGY recognized that anesthesiologists and other critical care physicians would encounter and care for patients with COVID-19 through their roles as experts in emergency airway management, acute and intensive care, and perioperative anesthesia, and that the care they would provide presented a significant risk for their own health.

Seeking to provide trusted evidence, albeit more clinical than our usual original investigations, ANESTHESIOLOGY, its editors, and its contributors worked swiftly to submit, review, and

publish a special online series in March 2020 featuring COVID-19–related articles from China and elsewhere. We are grateful to our Chinese colleagues, the Chinese Society of Anesthesiologists, and the Chinese Association of Anesthesiologists for their collaboration in this effort. Recognizing the immediate need for reliable and relevant information, the editorial board decided to publish these articles emergently, in their uncorrected proof form, and free to view by anyone. An infographic and two Featured Article podcasts accompanied these first seven articles.

ANESTHESIOLOGY is proud to have led the international anesthesia community in the profession's COVID-19 publication efforts. Our publication metrics tell us that the value and reach of these articles was considerable. Additional articles were and will continue to be added quickly as the pandemic evolves. As the initial wave of pandemic and patient care operational exigencies recedes, we hope that the anesthesiology community turns next to addressing and answering important COVID-19 questions through scholarly scientific investigation. Our goal is to publish that trusted evidence.

The coronavirus pandemic has markedly perturbed the research enterprise. Many academic medical centers and

research institutes have closed all but their hospitals, shuttered their laboratories, and ceased all but essential clinical research. The trajectory of the restart will be shallower and more challenging than the precipitous shutdown. It will be variable and uncertain. While most clinical studies involving life-threatening conditions, strong possibility of patient benefit, or patient harm if stopped, are continuing, others will need to restart. Unlike traditional institutional research regulation, which considers risks and benefit to research participants, restart regulation will also have to consider risks to research staff. That is a whole new world of research administration. Research sponsors and funders will also have to address inevitable productivity and financial shortfalls in research programs. “Partial,” underpowered clinical research studies are not a viable option. We face uncertainty.

The coronavirus pandemic has also markedly altered scholarly medical publishing. The volume of articles is unprecedented. As of April 28, 2020, PubMed lists more than 7,300 COVID-19 articles, all since the first of 2020, with hundreds added daily. This is exerting substantial pressure on journals and peer reviewers. More broadly, the World Health Organization has described a “massive ‘infodemic’—an over-abundance of information—some accurate and some not—that makes it hard to find trustworthy sources and reliable guidance.”⁴ Authors are even bypassing the peer review system entirely and simply posting online, at preprint servers, their raw findings or preliminary manuscripts before or in place of peer review. They see immediacy of availability as a paramount goal. Perhaps well intentioned, this approach nevertheless deprives readers of the highly valuable peer-review process, which helps maximize the veracity of data and conclusions. Information on preprint servers may be correct or incorrect, unvalidated, misleading, or even disinformation. It may change often even after posting online, could create false expectations, and is subject to potential misinterpretation or misuse, and media, political, or social media hype. Preprints may actually, inadvertently, or unwillingly be obstructing the progress of knowledge in this current crisis. An unsuspecting public cannot differentiate between preprint postings and peer-reviewed, published, trusted evidence. Preprint server hosts, unaccustomed to policing themselves, have suddenly been confronted with this newfound reality. All this is sowing even more uncertainty and threatens the public trust in the scientific enterprise.^{5,6}

Contrasting with these uncertainties has been the past year of certain value to our readers and the specialty. *ANESTHESIOLOGY* continues to attract and publish high-quality original investigations and summative articles and to be highly viewed and valued. The journal experienced an 8% increase in the submission of Original Investigations from 2018 to 2019. In the past 2 yr alone, *ANESTHESIOLOGY* has had more than 200,000 full-text PDF downloads and 1,350,000 full-text html article views. Online usage for “engaged” users, those spending 2 min or more on our site,

increased 29% from 2018 to 2019. The *ANESTHESIOLOGY* 2-yr impact factor, a metric about which I have written and cautioned previously,² nonetheless remains number one in the specialty for another year, at 6.424, representing 28,995 citations to our content. Perhaps more importantly, and as a metric of our enduring importance and foundational value, are the 5-yr impact factor of 6.766, a 2018 cited half-life of 11 yr, and the fact that 71% of 2019 online article usage (PDF downloads and full text) was for articles published before 2017. We are publishing important, relevant, and enduring trusted evidence. To provide further context for this reader value, we identified the number of times that an article is read, either online or *via* PDF download. Tables 1 and 2 list the 20 most-read articles in 2019 that were published in 2018 and 2019.

Additional certainties include the progress made in new journal features, policies, and leadership in the specialty and scientific community. Our podcast program continues to grow, with the 89 podcasts in 2019 constituting a 78% increase compared with 2018. We added Korean to the family of foreign-language translations of the monthly editor-in-chief podcast, which now includes Chinese, French, Japanese, Korean, Portuguese, and Spanish. In 2019 we launched a new type of article “Understanding Research Methods,” the first in an entirely new type of articles called the “Readers’ Toolbox.”⁷ These articles are introductory primers on existing and emerging research methods intended for both clinicians and investigators, to help them keep pace and to better critically read and understand the Original Investigations in the journal and elsewhere. We published six Toolbox articles in 2019 and 2020, which were well received, and the program will continue. We addressed the important policy issue of sex as a biologic variable and the fact that too many research studies, particularly in basic science, which lags behind clinical investigation in implementation, still fail to study both sexes.⁸ We communicated journal requirements for reporting and expectation of studying both sexes. We also addressed the importance of transparency in reporting observational and retrospective research and the journal requirement that authors clearly disclose whether they formulated and memorialized a prespecified data analysis plan before inspecting the data and with the encouragement that this will become standard in the field.² Understanding that certain research areas are highly complex, with conflicting findings, and with important clinical implications, the journal provided an updated synthesis and perspective on developmental anesthetic neurotoxicity in animals and its apparent absence in humans.⁹

In concert with the outstanding progress over the past year, there are also many certainties ahead for *ANESTHESIOLOGY*. Visual abstracts, which are brief one-panel graphical summaries of the key points in a research paper, have been included with many research articles for the past few years. These have been popular with authors, readers,

Table 1. 2018 Anesthesiology Articles Most Read in 2019

Articles	Volume:Pages
Practice guidelines for moderate procedural sedation and analgesia 2018: A report by the American Society of Anesthesiologists task force on moderate procedural sedation and analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology	128:437–79
Among body parts and colleagues: Finding my team in the rubble on 9/11	129:1186–8
Effectiveness of lumbar facet joint blocks and predictive value before radiofrequency denervation: The Facet Treatment Study (FACTS), a randomized, controlled clinical trial	129:517–35
Averting opioid-induced respiratory depression without affecting analgesia	128:1027–37
Individual positive end-expiratory pressure settings optimize intraoperative mechanical ventilation and reduce postoperative atelectasis	129:1070–81
Antifibrinolytic therapy and perioperative considerations	128:657–70
Machine-learning algorithm to predict hypotension based on high-fidelity arterial pressure waveform analysis	129:663–74
Persistent postsurgical pain: Pathophysiology and preventative pharmacologic considerations	129:590–607
Malignant hyperthermia susceptibility and related diseases	128:159–67
A review of the impact of obstetric anesthesia on maternal and neonatal outcomes	129:192–215
Propofol-based total intravenous anesthesia is associated with better survival than desflurane anesthesia in colon cancer surgery	129:932–41
Neuroinflammation and central sensitization in chronic and widespread pain	129:343–66
Abuse-deterrent opioid formulations	128:1015–26
Neuropsychological and behavioral outcomes after exposure of young children to procedures requiring general anesthesia: The Mayo Anesthesia Safety in Kids (MASK) study	129:89–105
Association of multimodal pain management strategies with perioperative outcomes and resource utilization: A population-based study	128:891–902
Use of uncrossmatched erythrocytes in emergency bleeding situations	128:650–6
Argatroban and bivalirudin for perioperative anticoagulation in cardiac surgery	128:390–400
Impact of intravenous acetaminophen on perioperative opioid utilization and outcomes in open colectomies: A claims database analysis	129:77–88
Clinical evidence for any effect of anesthesia on the developing brain	128:840–53
Four types of pulse oximeters accurately detect hypoxia during low perfusion and motion	128:520–30

Table 2. 2019 Anesthesiology Articles Most Read in 2019

Articles	Volume:Pages
Perioperative fluid therapy for major surgery	130:825–32
Quadratus lumborum block: Anatomical concepts, mechanisms, and techniques	130:322–35
Total intravenous anesthesia <i>versus</i> inhalation anesthesia for breast cancer surgery: A retrospective cohort study	130:31–40
Driving pressure during thoracic surgery: A randomized clinical trial	130:385–93
Operating room fires	130:492–501
Effect of intraoperative goal-directed balanced crystalloid <i>versus</i> colloid administration on major postoperative morbidity: A randomized trial	130:728–44
Practice advisory for perioperative visual loss associated with spine surgery 2019: An updated report by the American Society of Anesthesiologists Task Force on Perioperative Visual Loss, the North American Neuro-ophthalmology Society, and the Society for Neuroscience in Anesthesiology and Critical Care	130:12–30
Long-term impact of crystalloid <i>versus</i> colloid solutions on renal function and disability-free survival after major abdominal surgery	130:227–36
Norepinephrine infusion for preventing postspinal anesthesia hypotension during cesarean delivery: A randomized dose-finding trial	130:55–62
Intraoperative methadone in surgical patients: A review of clinical investigations	131:678–92
Postoperative delirium and postoperative cognitive dysfunction: Overlap and divergence	131:477–91
Upper airway collapsibility during dexmedetomidine and propofol sedation in healthy volunteers: A nonblinded randomized crossover study	131:962–73
Incidence, severity, and detection of blood pressure perturbations after abdominal surgery: A prospective blinded observational study	130:550–9
Nociception-guided <i>versus</i> standard care during remifentanyl-propofol anesthesia: A randomized controlled trial	130:745–55
Adjunctive corticosteroid treatment in septic shock	131:410–9
Electromagnetic interference with protocolized electrosurgery dispersive electrode positioning in patients with implantable cardioverter defibrillators	130:530–40
Assessment of common criteria for awake extubation in infants and young children	131:801–8
Reversal of partial neuromuscular block and the ventilatory response to hypoxia: A randomized controlled trial in healthy volunteers	131:467–76
Delays in cardiopulmonary resuscitation, defibrillation, and epinephrine administration all decrease survival in in-hospital cardiac arrest	130:414–22
Positive end-expiratory pressure and postoperative atelectasis: A randomized controlled trial	131:809–17

and on social media, providing a quick way to digest key findings. As of this issue, ANESTHESIOLOGY is expanding this effort with the goal of a visual abstract for every Original Investigation article. As part of the ANESTHESIOLOGY goal to reach a broad scientific audience, we have maintained a very active Twitter and Facebook presence led by our social

media editors, Drs. Jorge Galvez and Allan Simpao. To assist Drs. Galvez and Simpao in these efforts, we have enlisted a select group of active social media experts from the anesthesia community to engage as social media ambassadors on behalf of the journal. Please engage with them. These social media ambassadors are now listed on an expanded masthead.

Follow ANESTHESIOLOGY @_Anesthesiology on Twitter and facebook.com/ASAanesthesiology. The ANESTHESIOLOGY Twitter Journal Club will be relaunched on September 17, 2020, in partnership with Duke Anesthesiology Twitter Club. Follow that discussion on Twitter using the #ANESJC hashtag.

Additional improvements are also certain. ANESTHESIOLOGY will have a refreshed online presence this fall. We can hint at improved access to journal content, improved search functionality, new trending topic alerts, and new viewer ability to change page layout to split view, enabling easier navigation between content and figures/tables. It will also feature an author resource center—a one-stop shop for authors to access all important submission instructions and information. First-time authors can obtain advice about publishing in the journal straight from our editors and other published authors. More information will follow as the new website launch approaches.

Despite the uncertainties, it is certain that we will go where science takes us.

Competing Interests

Dr. Kharasch is the editor-in-chief of ANESTHESIOLOGY and his institution receives salary support from the American Society of Anesthesiologists (Schaumburg, Illinois) for this position.

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