Posner KL: Health sciences research and clinical medicine: Moving together toward the 21st century. *ASA Newsletter* 58(6):11-14, 1994.

# Full Text

We are living and working in a time of great change for the practice of clinical medicine, including anesthesiology. Even as the debate over the structure and financing of health care services continues on a national level, dramatic changes in the practice of anesthesiology are already occurring. Whether or not a national system of managed health care competition becomes a reality in the United States, related changes such as clinical practice guidelines will continue.

Physicians have traditionally focused on keeping up with the latest advances in biomedical research; the physicians of today and tomorrow, however, will also need to keep apprised of the latest advances in health services research. What is this "health services research" that is becoming so intimately entwined with everyday clinical practice?

Health services research focuses on the entire health services system. This includes the organization and delivery of health services, manpower, access to care, health behavior, quality, effectiveness and the cost of care or any other problem related to providing health care services to the population. It draws heavily on the methodology of the social and behavioral sciences as well as the clinical sciences, physical sciences, epidemiology and biostatistics.

The scientists involved in health services research have varied backgrounds. Some are clinicians with special training in health services research issues and methods, often acquired with a Master of Public Health degree. Others are Ph.D.s with special training in health services research. (For example, this author received a Ph.D. in sociocultural anthropology but also underwent a two-year graduate level training program in health services research at the University of Washington School of Public Health.) Other common Ph.D. fields of health services researchers are biostatistics, business, economics, epidemiology, geography, political science, psychology and sociology.

## Health Services Research and Anesthesiology

In anesthesiology, health services research has been an important influence in medical liability, clinical practice guidelines and reimbursement. The ASA Closed Claims Project, under the direction of the Committee on Professional Liability, has investigated major areas of anesthesia liability risk[1] and pinpointed areas in need of increased biomedical research. For example, analysis of closed claims suggested that the causes of sudden unexpected cardiac arrest under spinal anesthesia are not clearly understood.[2] While biomedical research will be required to unravel the cause of such arrests, closed claims review has alerted anesthesiologists to this phenomenon, has indicated an area for additional research and, perhaps, has averted some disastrous outcomes for patients and reduced liability losses for anesthesiologists who heretofore had been assumed negligent when such an arrest occurred.

Closed claims review has also emphasized the potential value of pulse oximetry and capnography in averting the major cause of patient injury, i.e., problems related to respiratory system management.[3,4] These findings contributed to the introduction of pulse oximetry as a standard of care by many liability insurance carriers and eventually by ASA. End-tidal $CO_2$ measurement for verification of correct endotracheal tube placement was also subsequently adopted as an ASA standard for intraoperative monitoring. Changes in the anesthesia liability profile since the advent of these standards are now being tracked by the ASA Closed Claims Project.

Development of clinical practice guidelines is another area in which health services research plays a critical role. Hundreds of studies, of varying quality and result, on medical treatments and outcomes have been conducted over the years. Health services researchers have the training and knowledge to conduct critical analyses of the clinical practice literature and to guide clinical practice toward effective techniques.

For example, in the process of development of the ASA Practice Guidelines for management of the Difficult Airway,[5] health services researcher Richard Connis, Ph.D. worked with an ASA task force to critique the literature on airway management. Questionable "scientific studies" were culled, and sound scientific evidence was synthesized to create an algorithm to guide clinical practice in this key area of anesthesia. It is hoped that the critical areas in which good research was found to be lacking by this "meta-analysis" of the literature will be addressed by future biomedical research.

Dr. Connis has recently conducted a similar analysis for the ASA Task Force on Analgesia and Sedation by Nonanesthesiologists and will be working with other ASA task forces to develop clinical guidelines for acute pain management, cancer pain management and chronic pain management. Thus, health services research can guide clinical research in determining the most effective patient management strategies in anesthesia.

As in any area of research, methodology is important in health services research, as is also the process of drawing inferences from research results. Erroneous inferences have been drawn from health services research studies and surfaced in the policy debates over anesthesia manpower and reimbursement. For example, it is well-accepted among health services researchers that adverse outcomes are so rare in anesthesia that they are difficult to measure accurately. The National Halothane Study, often cited as the pinnacle of anesthesia-related outcome research, made this point as one of its most important contributions: namely, that it is nearly impossible to measure statistically significant differences among very rare outcomes.[6]

Yet nurse anesthetist organizations have interpreted the finding of "no difference" on the basis of methodological difficulties as an equality in outcome in their argument at both state and federal levels to obtain legislation to allow substitution of nurse anesthetists for anesthesiologists. Published reports have used this substitution argument to criticize payment differentials between anesthesiologists and nurse anesthetists.[8] However, any reputable researcher, health service or other, will not consider "no difference" equivalent to "the same." It only means that if a difference does indeed exist, this particular study was not powerful enough to detect it.

Another study that has surfaced repeatedly in the policy arena involved a survey of anesthesiologists and nurse anesthetists and found that complex tasks performed by anesthesiologists such as placing central lines are occasionally performed by some nurse anesthetists.[9] The authors, citing the lack of documented differences in outcomes between anesthesiologists and nurse anesthetists, interpreted this finding to mean that all nurse anesthetists can safely perform all anesthesia tasks nearly all the time. Their conclusions are generally far beyond their data in that they draw on abstractions about what nurse anesthetists say they sometimes do and ignore clinical context in recommending policy.

As we move toward the 21st century, attempts to rationalize the delivery of clinical care through practice guidelines and standards can be expected to continue. The Department of Health and Human Services Agency for Health Care Policy and Research has been charged by Congress to determine the effectiveness of medical care strategies and develop clinical practice guidelines. Health services researchers can be expected to play an ever-increasing role in the formation of policy on clinical practice and its reimbursement. Anesthesiology, through ASA, has begun to position itself through the collaboration with health services research specialists on clinical practice guidelines and anesthesia liability and outcome research. Such collaborations will become more common and more critical in this era of great change in the organization, delivery and reimbursement of anesthesia services.

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