

Sachin Kheterpal, M.D., M.B.A., Recipient of the 2013 Presidential Scholar Award

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IN 1998, our Department of Anesthesiology at the University of Michigan entered into a codevelopment effort to build a perioperative anesthesia information management system with a small, local medical software company named Systems Engineering Consultants, Inc. (Ann Arbor, MI). Every Saturday morning at 7:30 AM I met with the project manager, Michael O'Reilly, M.D. (then the head of our Liver Transplant Team, now the Vice President of Medical Technologies, Apple Inc., Cupertino, CA); Vik Kheterpal, the President of Systems Engineering Consultants, Inc.; and Sachin Kheterpal, his younger brother, cofounder, and Chief Operating Officer of Systems Engineering Consultants, Inc., at Espresso Royal Café coffee shop to review and revise the software and the clinical content. This continued for approximately 2 yr at which time we had completed a preoperative evaluation, intraoperative module, and other aspects of a comprehensive system. During this time, I understood that Sachin Kheterpal was the lead product designer on the project and wrote code, but it was not for another year that I became aware that he was also in medical school at the University of Michigan. Sachin graduated from medical school in 1999 and rather than pursuing a clinical residency, he chose to continue his healthcare information technology career. Sachin received the Hewlett-Packard award, which is given to the top five graduating medical students each year. I joked that Sachin would use the accompanying classic Hewlett Packard stethoscope to diagnose hard drive problems rather than cardiac auscultation. Little did I realize that he would eventually put that stethoscope to clinic use.

In 2000, General Electric (Barrington, IL) purchased Systems Engineering Consultants, Inc., and from that point until 2004 Sachin worked for General Electric, ultimately becoming the Global General Manager for Product Development in General Electric Medical Systems Information Technologies Clinical Information Systems division. He also completed an M.B.A. degree during his corporate career, also at University of Michigan. In the winter of 2004, Sachin came to meet with me to discuss his returning to clinical medicine, and ultimately academic medicine. Having known and worked with him for 6 yr,

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Submitted for publication June 25, 2013. Accepted for publication June 25, 2013.

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I immediately offered him an internship, residency, and faculty position to follow. In 2008, he completed our residency as a chief resident and I could say started his academic career, but he actually initiated his academic career during his residency.

As a first-year resident, he completed his first large, observational electronic health record database study on the incidence and predictors of difficult and impossible mask ventilation.¹ This was accompanied by an editorial and has become a landmark article. By the time he graduated in 2008, he had nine peer-reviewed publications, with others on the way.²⁻⁹ In his first year as a faculty, he published another seven articles, several of which are impact articles.¹⁰⁻¹⁶ He developed and validated the first acute kidney risk index for patients undergoing general surgery, which not only identified the factors associated with postoperative renal failure, but also some important factors which did not, *i.e.*, low urine output.⁶ In another large database study, he developed preoperative and intraoperative predictors for postoperative cardiac events after general and vascular surgery.¹⁰ The intraoperative factors associated with these events were having blood pressure less than 40% of the preoperative baseline and heart rate greater than 100, both are controllable aspects of our care. This type of study provides an excellent opportunity for a prospective trial. In 2010, only his second

year as faculty, he was asked to join the Associate Editorial Board of *ANESTHESIOLOGY*. Sachin has continued to publish extensively in not only leading anesthesiology journals, but also in high-impact surgical literatures.¹⁷ At the University of Michigan Medical School, Sachin carries several enterprise roles, including Senior Director for Research Information Technology, reporting directly to the Associate Dean for Research, and Associate Chief Medical Information Officer.

More important than this impressive track record of personal academic productivity, Sachin has also been the Principal Investigator and driving force behind the development of a large outcomes database consortium for perioperative research; the Multicenter Perioperative Outcomes Group (MPOG).^{†18,19} In the winter of 2008, I met with a group of academic department chairs and discussed the possibility of the development of a large outcomes database in which the data were derived from various vendors of anesthesia information management system. A vendor-agnostic data repository would allow merging of data from multiple institutions throughout the country, to enable faculty access to a very large, high resolution dataset. We organized a meeting in August of 2008 where anesthesiologists and surgeons from these departments met at Ann Arbor to discuss the opportunities and develop a rough set of bylaws for this organization. Sachin led the discussions and demonstrated that although multicenter integration of electronic health record data was an obvious goal, realization of the vision required experience in software product development, sustainable infrastructure, database design, research execution, regulatory perseverance, and political savvy. For the past 5 yr, he has worked with several programmers and many institutions to develop a unique dataset extracted from electronic health records, registries, and administrative sources for the benefit of all the institutions and our specialty as a whole. In addition to the technical issues that were not insignificant, there were regulatory obstacles which he addressed including developing data use agreements and institutional review board applications to allow these data to be shared. Today, this infrastructure collects data from 11 institutions with many others in the process of joining. In addition, there are institutions from the Netherlands, Germany, and Canada who are also in the process of joining. To make this even more of a global effort, Sachin has worked with the European Society of Anaesthesiologists, who have recently initiated a European Perioperative Outcomes Group (EuPOG) data-sharing group as a sister organization to MPOG.

Every month he directs a Web-conference of the MPOG institutions where proposed studies are discussed in a setting which I think is unique to perioperative medicine. MPOG members from multiple time zones and continents log into the Web-conference and review, as a group, the proposed studies and provide useful input and evaluation of the proposed projects. This group is called the Perioperative Clinical Research Committee and before data access is provided for the fields requested, the Perioperative Clinical Research

Committee must approve the study. If there are questions or concerns, the committee provides input, requests changes to be made, and requests representation at a subsequent Perioperative Clinical Research Committee, if necessary. In this way, investigators derive the benefit of multiple academicians reviewing their proposal before initiating the analysis with the intent of improving the study such that articles derived from the MPOG dataset will be of the highest quality. It also promotes collaboration rather than competition.

In addition to this academic, technical, and administrative success, Sachin is an excellent clinician. He is a member of our Liver Transplant and Vascular Anesthesia Team and is an outstanding collaborator with other faculty within our institution and around the country.

I think it is accurate to say the work of Sachin Kheterpal has legitimized outcomes research derived from electronic health records. He has identified where they fit in the spectrum of clinical research and has been a proponent of using these large datasets in an appropriate manner. Rather than opportunities for “data fishing expeditions,” Sachin has always driven these datasets toward hypothesis-driven scientific work. He is always cognizant of their weaknesses and emphasizes that they are best used for analyzing infrequent events, associations, situations that are ethically impossible to randomize, and for focusing future prospective randomized trials.²⁰

It is a pleasure to have Sachin Kheterpal as a colleague, and I feel we are very fortunate to have him not only as a faculty member here at the University of Michigan, but also as a member of our specialty.

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