Interview with a Quality Leader: Dr. Verna Gibbs on Surgical Safety

Susan V. White, Interviewer

A native of New Jersey and a third-generation physician, Dr. Verna Gibbs moved to San Francisco in 1979 after completion of her BA degree from Harvard University and her MD degree from Duke University Medical School. She completed her residency in General Surgery at the University of California, San Francisco (UCSF) in 1984 and continued her clinical training in renal transplantation with a fellowship at the California-Pacific Medical Center in San Francisco. Under the auspices of the Harold Amos Medical Faculty Development Program, she did a molecular biology fellowship at Genentech Inc., South San Francisco, which she completed in 1989. She then joined the faculty in the Department of Surgery at UCSF where she is currently a Professor in Clinical Surgery. Her first clinical assignment was at the San Francisco General Hospital where she was a General and Trauma surgeon and in 1991 she moved to the San Francisco Veterans Affairs Medical Center (SFVAMC) where her clinical practice has focused in general surgery. From 2002 to 2004 she was Chief of General, Vascular and Thoracic Surgery at the San Mateo Medical Center.

In 2000, Dr. Gibbs shifted her 10-year research interest from the molecular interactions of the interferon receptor system to areas in health services, quality improvement, and patient safety. She is currently engaged in studies examining issues in surgical patient safety, quality improvement, and error analysis. In October 2004, she started the national surgical patient safety project “NoThing Left Behind”: Prevention of Retained Surgical Items. Over the past 7 years, she has worked with her perioperative colleagues from around the country to develop and implement evidence-based, all stakeholder policies and practices in hospital operating rooms (ORs), procedure rooms, and labor and delivery areas where surgical items are used. They have also studied and introduced technological adjuncts to ensure that surgical sponges, needles, and instruments are properly accounted for and there is “NoThing Left Behind” in patients.

Currently, Dr. Gibbs is the Chair of the SFVAMC Surgical Service Quality Improvement Committee, the Physician Utilization Management Advisor, and faculty director of the VA Surgical Quality Improvement Program (VASQIP) at SFVAMC. She is Chair of the Physicians Relations Committee for Quality Improvement at Anthem Blue Cross of California and is a member of the Wellpoint Physicians Advisory Council. She is also on the Board of Overseers of Harvard University.

**Q** What sparked your interest in surgical patient safety?

**A** I had been engaged in work in Surgical Quality Improvement for about 10 years, primarily with the implementation of the National Surgical Quality Improvement Program (NSQIP), when it was first being introduced in the VA system. Through this work, I was introduced early to the new thinking around systems of care and systems rather than individuals being implicated in errors. I read *To Err is Human* and quickly realized that in general, we had extensive experience in customized care but very little in safe care and that we had to go back to examine the issues in patient safety. Then, there was a case of a retained sponge at the VA hospital in which I worked, and as the director of the SQIP, I studied and used that case example to explore “system solutions” to look at problem investigation. The questions this case posed were as follows: why did the sponge get retained; what did nurses and doctors think about the problem; were there differential approaches to resolution; how could we change the way the people worked to prevent recurrence; and how frequently did miscounts occur that were the...
close calls of retained events. I became Chair of the SQIP at UCSF and continued the work on retained sponges reaching out now to study the new technological adjuncts just coming to market. This work led to thinking about problems that were unique to the OR environment, which now are considered in the realm of surgical patient safety in distinction to issues generally in patient safety, both of which are part of the larger issues of quality improvement.

Describe the “NoThing Left Behind” Program.

This is a project I started in 2004, which spread to work I had started after that initial retained sponge case in 1999. From an evidence review report, written as part of an Agency for Healthcare Research and Quality (AHRQ) assessment, we identified that there was very little research looking at specific preventive measures related to prevention of retained surgical items. Essentially, everything seemed to rely on “counting” that has been done forever, and was being performed during operations yet, our surgical material was still being left inside patients.

The goal of the project has been to identify best practices, study them, distribute them, and implement them. If we could not identify any best practices, or better practices than our current practice, we worked with hospitals around the country to develop them. This work is based on experimental and experiential research. We studied domains across personnel boundaries including surgeons, nurses, surgical technologists, radiologists, radiology technologists, administrators, and risk managers. This ensured the perspective of multiple stakeholders. We also looked at management practices of all types of surgical items ranging from soft goods such as sponges, towels, and dressings, to sharps/needles, instruments, and miscellaneous small items left in all kinds of body spaces. We did not have a well-defined plan but a series of ideas and approaches to try. We learned through observation and work. We knew that hospitals had individual cultures and what might work at one hospital would not necessarily work someplace else. So, we facilitated groups of surgeons and nurses working as a team to develop better practices to manage sponges, prevent retained vaginal packs, prevent needlestick injuries, decrease needle miscounts, prevent instruments from being retained, and managing other surgical items. All the things we have learned have been put on the website http://www.nothingleftbehind.org for anyone to use.

Is the Sponge ACCOUNTing Program part of the “NoThing Left Behind” Program or is it a separate process?

Sponge ACCOUNTing is a “deliverable” of the NoThing Left Behind program. Initially, we thought that the answer to prevention of retained sponges was going to be in new technological devices. However, we quickly learned that the new technology was not going to be “the answer,” could be an answer for some hospitals, but not for others. While we were investigating and looking at all the technological adjuncts coming to market, we continued to develop and improve a defined manual process for how to manage the sponges, which will lead to the desired outcome of zero. This multistakeholder standardized practice is called the Sponge ACCOUNTing System because the goal is to have the sponges “accounted for” not just counted. I like to think of it as “seat belts for surgery” because it is simple and inexpensive and must be used in every case just like seat belts in cars. It has the same requirement as seat belts in that if you do not fasten them they will not protect you in an accident. Similarly, if nurses and surgeons do not use the practice correctly they can expect to have cases of retention. The necessity to change human behavior, to change a sponge management practice, is common to all the modalities being used today, manual, or technological. What is different in my estimation is the strength of the forcing function to change human behavior.

How does the “NoThing Left Behind” Program fit with other surgical safety initiatives such as the Joint Commission’s Time Out or Safe Surgery Checklist?

When I started NoThing Left Behind I thought of it as akin to the Universal Protocol and was thinking of it as the third solution to the surgical safety problems. The three surgical safety problems are (1) The Wrongs, (2) Retained Surgical Items (RSI), and
(3) Surgical Fires. The Universal Protocol was the solution for The Wrongs. Nothing Left Behind was the solution for RSI, and Surgical Fires were being addressed with the Fire Triangle. The Safe Surgery Checklist came after these solutions were already developed and actually the Checklist is a general all encompassing tool to address all things safe in the OR because it gives you the means to make sure the individual components get done. The Safe Surgery Checklist is divided into the following three general parts: (1) what is done preop/preincision, (2) incision/during the operation, and (3) postop/postincision closure. The Checklist has reminders for preventing the wrongs, covering the elements to prevent surgical fires, and making sure all items have been accounted for. These are all great and simple tools for making operations safer, yet have all met with resistance and reluctance to adopt.

Q: What other current safety issues do you see with surgery, including minimally invasive procedures?

A: Currently, I have focused on the role and education of the surgical technologist. It turns out that surgeons, nurses, radiologists, and radiology technologists have pretty well-defined roles and responsibilities in the OR. But surgical technologists have a mixed bag of rules, oversight, training, and education. Over the past year, we have seen that retained sponges are no longer the most commonly retained surgical items, but now the miscellaneous small items and what I call “surgical junk” is left behind in patients. These are drill bits, nuts, parts of instruments, and devices that I think are a direct result of the plethora of new equipment, which has multiple parts, that is passed back and forth between the surgeon and the surgical technologist. But neither of these persons has a very deep understanding of all of the parts of the objects they are working with. I am interested in trying to improve the way in which surgical technologists have in-services and learning activities about all this new material and equipment. Also, the largest safety issue still remains the problems with human perception and the lack of understanding about human failures. There is still a lack of appreciation for the way in which the environment and system sets humans up to fail in the OR and still too much blame is placed on the patient when OR errors and complications occur. I still hear at Morbidity and Mortality (M&M) Conference examples such as, a case presentation of a post-op pulmonary embolus and factors such as the patient was obese and sedentary, but no details about the timing, dosage, and administration of chemoprophylaxis and placement of Sequential Compression Devices (SCD). The point is they focus on the immutable characteristics of the patient and not on the analysis of the specific care elements that can be improved. It is better than 5 years ago, but a long way from being the best it could be.

Q: Discuss the cultural change you think is needed in ORs to achieve improvements in patient safety and advance change?

A: OR culture is basically “the way we do it here.” There is still too much variation and customization in ORs with a need to standardize practices for the majority of procedures so that customized approaches are the exception not the rule. This is difficult to implement because of the longstanding traditions of surgeon preferences and difficulties getting surgeons to relinquish some perceived entitlements and long held practices. There has been some traction in this realm developed around moving ORs to single vendors for certain equipment that were developed primarily for cost savings. There is early information that on these instrument sets that have hundreds of instruments, only 25–50% of the instruments are actually used. So, having more OR instrument trays standardized with fewer instruments might help decrease the complexity of the trays and thereby minimize the time spent “counting” instruments. This seemingly simple task is tremendously complex and is only one example. There is still resistance and failure to accept safety practices such as checklists, site marking, time outs, read-back communication, in addition to the perceived practice intrusions of glucose management, venous thromboembolism (VTE) prophylaxis, and surgical site infection (SSI) prevention. Yet, while no one modality has proven effective, the combination of actions has reduced patient morbidity. It is also clear that without external forces pushing the safety agenda, clinicians did very little in an organized way even if there were individual efforts. The largest culture change has to be OR
professionals coming together to strengthen relationships and working together to resolve OR problems way beyond the issues of start times, turnover times, who gets add-ons, and bump lists. The ORs are the sources of emergency room (ER) backups and huge determinants of flow throughout the hospital. It seems imperative that they change. The ORs also do not have great depth of quality improvement processes and application of team-based action plans that actively engage all stakeholders. Many operate more in a command-and-control fashion within heavily siloed arrangements. Lastly, I think ORs make great sites for observational and experiential research. It is a controlled environment with many unknowns, especially in the social and cultural realm that can and should be more aggressively studied.

Q What solutions are being introduced for counting and can you briefly describe these?

A There are three commercial devices that are currently available worldwide as adjuncts to a manual sponge count (see A-C). All three are in use in many different hospitals throughout the United States. The systems are not interchangeable and once a hospital commits to one system all the sponges used in that facility are switched to the specific new technology sponge management system. There is not a lot of data on the implementation success or failures of these systems, but as experience is gained more reports will be forthcoming. All three use different and distinct technological approaches and have different applications. The essential components of each device are a distinct type of detection element attached to a surgical sponge and a distinct compatible electronic readout system. The devices can be separated into (1) one that can count sponges, (2) one that can detect sponges, and (3) one that can count and detect sponges. The other adjunct to counting is the Sponge ACCOUNTing system described earlier (see D).

Q Is there any evidence yet that these technology applications are really improving care and safety?

A All three electronic sponge management systems have been commercially available for years and in hospitals that use them have led to reduced cases or no cases of retained sponges. The Sponge ACCOUNTing practice has also led to zero-retained sponges in hospitals that use the practice, so all new systems have improved care and can solve this problem. The important element in all of the technological applications is that they, just like a manual practice change, require human interactions. It is the people who interact with the machines and therefore, there will be human/machine interface failures just like there are human/human failures with other practices. These technologies, all require behavior change to use and as I said earlier what is different about the technological adjuncts, in my opinion, is that they have stronger forcing functions. By that I mean, if you have a manual sponge counting practice in place, for example, counting out of kick buckets, and want to change that practice by purchasing a computer-assisted sponge counting system, you must have every OR staff and every nurse retrained in the utilization of the new system. If you mandate a change in policy only saying, count harder or count more things, the staff does not necessarily comply. They hold onto their beliefs and frequently do not adopt the change. But, if they must use the computer console to get a readout of a correct count, then that is a stronger forcing function than just saying what is the count? On another direction, there are not technological adjuncts for items other than sponges. There is some early work on instruments, but it is not widespread by any means, which means that for the majority of cases in the majority of hospitals, we still have to deal with human/human interactions and manual practices. Therefore, I maintain my thinking that it is important to focus on the improvement of these relationships and interactions to really get to a safer OR culture.

Q What role do you see for professional organizations and associations in advancing improvements in quality and safety within surgical practice?

A Professional organizations have to continue to educate their associates and members about current practices and most importantly about the skills necessary to understand and analyze and engage in quality improvement efforts. Collecting data from everyday experiences and reporting them can be
the foundation of a safety program. I know that is how I started, basically looking at the work we were doing in our ORs, looking at our outcomes, our M&M rates, and working together with surgeons, nurses, risk managers, and quality improvement staff to design and develop clinical programs that could address these findings. That is at least one way we can be sure that when we operate on people we can tell them with confidence at the end of the procedure that there will be “NoThing Left Behind.”

Adjuncts to Counting

A. Computer-Assisted Sponge Count

This system consists of two-dimensional matrix labeled sponges and a scanning device that can read the labels. The matrix label is scanned-in with a handheld or table-mounted scanner as the sponges are put on the sterile field and then each sponge is scanned out when the sponges are removed from the table. The matrix labels are embedded onto surgical sponges of various sizes and each sponge has a unique identifier that enables the scanner to count different types of sponges. The sponges are counted maintaining “line of sight” for each sponge. The placement and presence of the matrix label does not interfere with the usability of the sponges. These sponges can be rolled up and put down trocars with ease. In order to account for all sponges at the final count, the sponges must be removed from the patient and individually passed under the scanner. The scanner has no capacity to “read-through” the patient and detect the presence of a matrix labeled sponge. In the event of a missing sponge an X-ray is used to determine if it is in the patient.

B. Radiofrequency Detection System

This system consists of sponges that have a small passive radiofrequency tag sewn into a pocket on each sponge and a handheld wand or mat, which contains the antennae and detection system. The tag is 4 × 12 mm and is recognized as only a yes or no signal. The tag is detected when the handheld wand or mat is activated and the computer console presents a visual and audible signal that a sponge has been detected. The system does not distinguish between sponge types or number of sponges. The signal readout will be the same intensity if there are one or five sponges. The tag is small and is present on multiple different sponge types and does not interfere with the usability of the sponge. Sponges with these tags can be rolled up and can fit down 10-mm trocars. In the event of a missing sponge, the wand can be activated to determine if the sponge is in the patient or the mat can be used to scan the patient or scan the trash to find the sponge. This system does not count sponges.

C. Radiofrequency Identification System

This system has a unique radiofrequency identification chip sewn into each type of sponge and a separate computer console with a scanning bucket into which used sponges are placed. This passive chip is about the size of a dime and when present on small raytex sponges is noticeable and is too large to fit down trocars. A smaller 7-mm chip has recently been made available which should fit down 10-mm trocars. There is not much experience with this new chip to know if it functions equivalently to the larger version. Each sponge has a specific identifying chip and thus sponges of different types pooled together can be distinguished and counted. Unopened packages of sponges are placed on a front panel of the console to be electronically counted and the sponges are then opened and placed on the sterile field. Used sponges can be put directly into the bucket or into a plastic bag lined kick buckets and the entire plastic bag full of sponges then placed into the scanning bucket. The sponges will all be individually counted. If there is a missing sponge, it can be detected with a wand that is attached to the bucket by a long cord. When the missing sponge is found, it must be added to the sponges in the bucket to reconcile the count. This device offers a complete sponge counting and detection system.
D. Sponge ACCOUNTing System

Sponge ACCOUNTing is a manual practice that uses the adjuncts of plastic hanging sponge holders in which to place the sponges, and a wall-mounted dry erase board on which to record the surgical counts. These are the required structural elements of Sponge ACCOUNTing. There is a defined process for how to use the holders and record the counts, which will lead to the desired outcome of zero-retained surgical sponges. This multi-stakeholder standardized practice is called the Sponge ACCOUNTing System because the goal is to have the sponges “accounted for” not just counted. Current manual counting practices usually include just counting out of kick buckets and then adding up all the places where the sponges are and getting a “correct count.” Sponge ACCOUNTing uses the hanging sponge holders and a dry erase board with defined IN counting practices so the sponges are managed only in multiples of 10. At the final count ALL of the sponges (used and unused) must be in the holders. There is a large visual component to having all the sponges hanging right there which is very easy to see. Everyone is taught not so much to “count” the sponges but to look at the holders and make sure there are “no empty pockets,” which indicates that all the sponges have been accounted for. This is NOT what is usual manual “counting” therefore, it is as different as the other systems but it is not “electronic.”

Authors’ Biography

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