

## NOMINATION FOR FIRST CLAIRE POMEROY AWARD

Nominee Name: Paul Kelly, MD FACS  
Nominated By: Kathryn E Kelly, DrPH  
Device Name: CellSaver®  
Time Period: Devices whose qualifying impact became apparent prior to 1990 (till present)  
Date: 19 March 2010

I would like to nominate Dr Paul Kelly, inventor of the CellSaver® technology, for this prestigious award.

### Bio/Background

Dr. Paul B. Kelly graduated from Stanford University in 1957. He attended the McGill Faculty of Medicine (in Montreal, where I was born), graduating with honors in 1961. He completed additional training in general surgery and then thoracic surgery at the University of California, San Francisco. Following his residency, Dr. Kelly entered the U.S. Army Medical Corps and was stationed in Heidelberg, Germany, for three years.

Upon his return in 1971, Dr. Kelly was invited to join a rapidly growing cardiovascular program at Sutter Memorial Hospital. Dr. Kelly was honored by the American Heart Association in 2006 with a *Heart of Gold* award, along with his colleagues, for creating the first heart transplant program which began in 1989 and continues today in the Sacramento area.

Dr Kelly also received the Sacramento Medical Society's Golden Stethoscope award in 2006 and the Dale Smith Award from the AABB in 2008 for "his groundbreaking work performed in the application of technology to the practice of transfusion medicine." The citation for the award reads: "For his work on developing methods of blood salvage and autologous transfusion, a method of recovering blood lost by a patient during surgery which is cleaned and made available for transfusion back to the patient, reducing or eliminating the need for the patient to be transfused with donated (allogeneic) blood. Dr. Kelly's work led directly to the creation of the Cell Saver prototype, manufactured by Haemonetics and widely used in operating rooms today."

### CellSaver

As the CellSaver was invented nearly 40 years ago, some history of its development might be appropriate. Dr. Forrest Junod, a former colleague of Dr. Kelly's at the Sutter Heart Institute, remembered that in the early days of heart bypass surgery (late 1960s and early 1970s), a surgeon did not go into the operating room without at least 15 units of blood. Five units went into the heart-lung bypass pump, five units were needed by the patient during surgery, and the additional five units were held in case post-operative transfusions were needed. During open heart surgery at that time, the heart had to be stopped so surgeons used a heart-lung machine to oxygenate the blood while the patient's heart and lungs were bypassed. The oxygenator that was in use in that era was fairly crude and required that a large volume of saline be added to the patient's blood to make it work. It was basically a big plastic bag, the total volume of which was three liters.

At the end of the surgery, after the patient's heart had been restarted, the bag contained two or more units of the patient's valuable red cells, which would have helped the patient recover; however, the bag also contained more than two liters of saline. It was impossible to give 3 liters of fluid back to the patient after the bypass machine was stopped. It was simply too much fluid, so the usual procedure was to pour the contents of the oxygenator down the drain. Dr. Kelly, frustrated at throwing away perfectly good red cells, began to think about how the saline could be removed and the red cells concentrated so that they could be transfused to the patient.

Dr. Kelly borrowed a cell washer from the Sacramento Blood Bank and brought it into the operating room. The Latham bowl (Haemonetics) was very efficient at concentrating the red cells, but the cell washer was designed for use in a fixed location in the blood bank, so it was somewhat cumbersome to move it into the operating room. Nonetheless, it worked, so Dr. Kelly's team used it routinely.

Dr. Don Schoendorfer, a biomechanical engineer who holds over 50 US patents related to medical technology and a 1990 recipient of Baxter Healthcare's Distinguished Technical Award for bringing automated plasma collection technology to the marketplace, writes "Paul is a remarkable man and was a remarkable surgeon. Though not an engineer, he had a profound understanding of the technical aspects behind blood processing. Even more remarkable though was his interest in advancing technology by simply 'trying things'. That is why the CellSaver came to existence, as most "experts" had no room for such a new idea. With Paul, once he was convinced that the safety of the patient and the success of the operating procedure were not jeopardized, he was all for seeing what happens. It was Paul's open mind to change that gave Haemonetics the opportunity to develop this valuable, life saving technology."

Today, in 2010, there is often no need for blood transfusions or very few. According to Dr. Junod, "Dr. Kelly's work to develop a formal process to conserve blood from the operative field was pioneering. He was able to conceptualize a way to save usable blood from cardiac surgery and develop techniques that meant fewer blood transfusions were needed." The Cell Saver had a tremendous impact – especially in the pre-testing age of AIDS, HIV, and other blood borne viruses – by reducing the amount of blood needed per operation and preventing the transmission of blood borne diseases. You may remember that Arthur Ashe, the famous tennis player, contracted AIDS in 1984 following a blood transfusion after cardiac bypass surgery. A whole new perspective – unfavorable - regarding blood transfusions exploded at this time. Dr. Kelly's work to minimize the need for allogeneic transfusions in the operating room played a pivotal role at a critical time in the blood services industry, allaying fears of allogeneic transfusions fueled by the emerging HIV/AIDS epidemic and blood borne viruses. Dr. Abe Fuks, former Dean of Medicine at McGill University in Montreal, commented, "Dr. Kelly's work as a pioneering cardiac surgeon had enormous impact on the lives of his patients and their families over a span of 35 years, and his innovative work on blood conservation was an inspiration to many colleagues."

### **In Sum**

The CellSaver device certainly meets your criteria of an "innovative, important, and high-impact inventions and products that transform an important aspect of the practice of medicine and/or the delivery of healthcare services, making them safer, more effective, and less costly." The concept was ingenious, the impacts are global, and the economic impacts of diseases prevented are literally incalculable. I would not know how to quantify the benefits CellSaver has brought to Sacramento and to blood transfusions performed in operating rooms throughout the world. Now retired, Dr. Kelly remains actively involved in the Sacramento medical community from his home in Fair Oaks and is working on the development of other medical devices of equal public health significance.

I appreciate this chance to recognize Sacramento's contributions and special achievements in medical devices, and I hope you consider Dr Kelly for this important award.

Sincerely yours,

Kathryn E Kelly, DrPH