May 20, 2009

Re: ***David and Kathleen Pluchinsky, Individually and as Representatives of the John Albert Pluchinsky Estate vs. Houston Racquet Club***

TO WHOM IT MAY CONCERN

I am Patrick M. Kochanek, M.D. I was asked to review the medical records, statements, deposition testimony and other documents in this litigation and provide my opinions regarding John Pluchinsky's state of health prior to his death, comments regarding the process of drowning, the poolside resuscitation effort, and an opinion regarding John Pluchinsky's chance of survival had immediate, appropriate resuscitation efforts been instituted poolside. As a result of studying medical records and testimony I was prepared to provide medical opinion testimony in the lawsuit. This letter summarizes my opinions following my extensive review of the documents and testimony. It also includes a number of recommendations on how to address some of the deficiencies that I have identified.

QUALIFICATIONS, TRAINING AND EXPERIENCE

I am a medical doctor and I am currently the director of the Safar Center for Resuscitation Research and a tenured professor in the Department of Critical Care Medicine with secondary appointments in Pediatrics and Anesthesiology at the University of Pittsburgh School of Medicine in Pittsburgh, Pennsylvania.

I received my M.D. degree from the University of Chicago Pritzker School of Medicine in 1980. After a residency in pediatrics at the University of California-San Diego, I did a pediatric critical care Fellowship at the Children's National Medical Center in Washington, D.C. During my Fellowship, I also trained in the area of experimental brain

ischemia (lack of blood supply) at the United States Naval Medical Research Institute in Bethesda, Maryland.

Since 1986, I have been a faculty member at the University of Pittsburgh. I direct the Pediatric Critical Care Medicine research effort at Children's Hospital of Pittsburgh and since 1994 I have been Director of the Safar Center for Resuscitation Research. I have also regularly and actively worked in the Critical Care Unit taking care of critically ill infants and children. I have had the good fortune of being cited in numerous publications such as "Best Doctors in America," "America's Top Doctors,"and "Guide to America's Top Pediatricians" among others.

The Safar Center for Resuscitation Research at the University of Pittsburgh School of Medicine addresses many areas of resuscitation medicine used in its very broadest sense. Our programs involve studies of traumatic brain injury, cardiopulmonary arrest, hemorrhagic shock, and emergency preservation and resuscitation. The mission of the Safar Center for Resuscitation Research is to identify, promote, and improve methods of preventing premature death and reducing associated disability from trauma and cardiac arrest in people with "hearts and brains too good to die." Our center has specifically carried out research on drowning and asphyxia in both the clinical experimental settings.

The Safar Center for Resuscitation Research was founded by the late Peter Safar in 1979. Dr. Safar was, of course, well known as one of the primary persons who developed cardiopulmonary resuscitation (CPR). He may be less well known for the fact that he developed this country's first intensive care unit and paramedic ambulance service. He was nominated three times for the Nobel Prize in Medicine.

As a result of my work as the Director of the Safar Center for Resuscitation Research for 15 years, as well as my original research in the area of resuscitation and traumatic brain injury I was asked to participate in the World Congress on Drowning which was held in

Amsterdam in 2002. Death by drowning is a world-wide problem which has been the focus of many clinical and research endeavors throughout the world for hundreds of years. Until the World Congress, however, a meeting of experts on all aspects of drowning, including epidemiology, prevention, rescue, resuscitation, hypothermia, and other aspects, had never been held. Thus, the World Congress on Drowning was organized and for the first time, gathered together hundreds of world experts to speak, listen, discuss and learn from one another. As a result, the papers and presentations to the World Congress were published as the definitive compilation of the latest research and techniques related to drowning in the *Handbook on Drowning* edited by Joost J.L.M. Bierens. I was a member of the Task force on Brain Resuscitation and contributed Chapter 8.5 to the brain resuscitation section. My chapter concerned pediatric considerations in brain resuscitation of drowning victims.

My CV is attached.

MATERIALS REVIEWED

I carefully reviewed this matter. Specifically, I reviewed the deposition testimony of the lifeguards and camp counselors and others who were involved in managing the pool and swim camp. I also reviewed their original statements to investigators in addition to the testimony and statements made by club managers and members of the Board of Directors.

In addition, of course, I reviewed John Pluchinsky's medical records prior to his death. I also reviewed the EMT transport records, the emergency room records, and the autopsy report by the Harris County Medical Examiner's Office.

SUMMARY OF OPINIONS

John Pluchinsky was a healthy 4-year old who had no medical problems which contributed to his death by drowning. There is nothing to suggest that John vomited, aspirated, had a seizure or had any other condition that would have caused him any difficulty

while in the pool at the Racquet Club. His death, in my opinion, was not due to any other factor other than inattention and improper resuscitation (basic life support) by those with the responsibility of observing the swimming pool where he was playing.

The efforts to resuscitate John Pluchinsky at the poolside were chaotic, inappropriate, and ineffective. It is well recognized that quick, effective CPR can result in intact neurological recoveries in pediatric drowning cases—even in some children who are cyanotic (blue), limp, apneic (not breathing), and appear lifeless after submersion. The effort in John's case, however, did not give him this last chance. Those in charge of training the teenagers and young adults who were the lifeguards and camp counselors failed in their responsibilities to train these young people to respond to emergencies and as a result, sadly placed these young people in a position where the only predictable result was exactly what occurred – chaos, a woefully inadequate poolside resuscitation, and the poorest possible outcome.

JOHN PLUCHINSKY'S MEDICAL HISTORY

John Pluchinsky was a healthy 4-year old. There is absolutely nothing in his medical history indicating that he had any medical condition or event which contributed to his drowning death. On the morning of July 18, 2007, John was a healthy young boy when he went swimming for the last time.

THE AUTOPSY

I have had considerable experience as a critical care doctor caring for children who were near drowning victims. Many of these victims died while in the intensive care unit. In addition to my clinical experience and research, I have also done extensive laboratory and animal model investigation into drowning, brain injury, and brain resuscitation as I will describe momentarily. As a result of my clinical and laboratory experience, I intimately am familiar with the autopsy findings involved in a drowning death as well as factors that may

have contributed to drowning. Based both on my review of John's medical records during his life as well as the autopsy report by the Harris County Medical Examiner including the microscopic slides, I can say with a high degree of medical certainty that John Pluchinsky did not have any medical condition or malady which would have contributed to his drowning.

DROWNING PATHOPHYSIOLOGY

As indicated above, I have had extensive clinical and laboratory experience in issues related to drowning. I am fortunate to be considered one of the leading authorities in the world on brain resuscitation of children in this and other related conditions. As part of my experience I became involved with the World Congress on Drowning held in May 2002. The World Congress involved experts from a wide variety of different backgrounds and specialties who gathered for the first time to discuss many diverse issues related to drowning. The World Congress resulted in a unique book, *Handbook on Drowning.*, published in 2006, which contains the research findings of many devoted researchers throughout the world.

Water is obviously the most common medium for drowning. Thus, death from drowning in water has a recognized pattern and can be distinguished from a death occurring before submersion or even as a result of other cooperating factors.

As a result of extensive research throughout the world we know that drowning, by definition, is death by acute asphyxia (lack of oxygen) while submerged, whether or not water enters the lungs. A number of investigators have described a sequence of events that occur in drowning victims. Initially, the victim struggles as he/she realizes they have encountered danger. As the victim's face goes underwater, the victim engages in breath holding which medically is called apnea which means no breathing. Depending on whether the victim surfaces again will depend on how long the process takes. Breath holding results in more awareness of danger and eventually extreme panic. The struggle to gain a breath consumes additional oxygen. The respiratory drive (drive to breathe) in humans is

importantly related to the amount of carbon dioxide in the blood. During apnea, the oxygen in the body is used by the cells and carbon dioxide is given off. Thus, the level of oxygen in the blood decreases while the level of carbon dioxide increases. Increasing carbon dioxide concentration in the blood and ultimately the brain leads to a stronger and stronger respiratory drive. At the point at which a person reaches the breath holding break point, where the victim can no longer voluntarily hold his or her breath, which typically occurs at a partial pressure carbon dioxide of around 55 millimeters of mercury, the victim attempts to breath. Water enters the airway triggering laryngospasm, that is to say the vocal cords in the throat constrict and try to seal the lungs. Thus, in the first phase of drowning water generally enters the stomach. Laryngospasm relaxes sometime after unconsciousness is reached and water then can enter the lungs. A continued state of inadequate supply of oxygen to the brain causes what in medicine is called hypoxia. That is to say there is insufficient oxygen being delivered to the brain to support its continued viability—or more specifically, the viability of the neurons (the most critical cells in the brain) in the brain. This will cause the victim to become unconscious. Of course, the brain does not function without sufficient oxygen nor does the heart or any other bodily organ. Eventually, cardiac arrest will occur and this stops the flow of blood at which point the brain is completely deprived of oxygen (a state called anoxia).

Exactly how long the drowning process takes until unconsciousness is reached is debatable. What we do know is that drowning is not at all instantaneous. There is a greater or lesser amount of time involved in the drowning process depending upon oxygen utilization.

Traditionally it is thought that a human "dies" or suffers significant brain damage when they go without oxygen for approximately five minutes. While this may well be true in certain circumstances, we also know that children are able to be resuscitated from longer submersion in water than an adult. There are documented cases and dozens of medical

studies demonstrating that children can be revived by quick, effective basic life support resuscitation – 5, 10, 15 minutes or possibly even longer following submersion. This is not possible, however, unless there is effective on-scene life support resuscitation.

THE HISTORY OF RESUSCITATION

Attempts to help drowning victims have a long history. It is only relatively recently, however, that we have learned resuscitation techniques that are effective if appropriately applied.

RESUSCITATION

Resuscitation as we know it today has a long history of incremented medical discoveries dating back many decades. The first successful open heart human defibrillation occurred in 1947, following an operation on a 14-year old boy. The first successful closed chest human defibrillation occurred in 1955 followed in 1962 by direct current defibrillation. Out of hospital resuscitation, however, became the focus of a number of researchers among whom was Peter Safar for whom the Safar Resuscitation Research Center is named. After much work the technique we know today for external cardiac massage integrating airway, breathing, and closed chest circulation methods was published by Safar and others in 1961. In 1966, the first CPR guidelines were published and the concept of educating the lay public in the techniques of CPR began to be advocated by a number of physicians and organization. Beginning in 1970, in Seattle, Washington, a number of physicians developed and implemented an ambitious project that instructed 100,000 citizens how to perform CPR. Training of lay people was formally sanctioned in 1974 by the American Heart Association and the National Academy of Sciences. Since then, of course, CPR or more accurately described – Basic Life Support – has been taught to several generations of people worldwide.

Basic Life support (known as BLS) is simple and if done properly is an effective tool particularly in non-trauma, non-heart attack-induced situation such as pediatric drowning.

Several studies now confirm that lives are indeed saved by immediate action of on-scene bystanders, be they lay people or professional rescuers, initiating prompt, effective CPR. This cannot be emphasized enough. Without on-scene resuscitation, and continued resuscitation on transport to the hospital, the use of subsequent advanced invasive life support techniques in a hospital critical care unit are really of little value in almost every case. Unfortunately, John's case is a perfect example of this stark reality since his chaotic and inadequate poolside resuscitation gave him no chance despite excellent medical resuscitation in the emergency room. The data regarding on-scene resuscitation are particularly applicable to children because their normal state of health is almost uniformly better than adults and, as we all know, children more rapidly recover from and insults than do adults.

At the World Congress on Drowning in 2002, and subsequently in the book that came out of the conference – *Handbook on Drowning* – an entire task force was devoted solely to the issue of resuscitation. The task force comprised some of the world's most recognized experts in resuscitation medicine including members from anesthesia, critical care, emergency medicine, internal medicine, pediatrics, public health, pulmonary medicine, surgery, general practice and several other disciplines. The members included practitioners as well as researchers, and included research organizations like the International Liaison Committee on Resuscitation, the American Heart Association, the Australian Resuscitation Council, the European Resuscitation Council, the International Life Saving Federation, the International Committee on Resuscitation, the American Academy of Pediatrics, the American College of Emergency Physicians, and the National Association of EMS Physicians as well as the National Institutes of Health and Centers for Disease Control and Prevention. The focus of the Task Force was to review the world's scientific data on resuscitation and drowning and arrive at conclusions and recommendations.

The main conclusion of the Task Force was that basic resuscitation skills should be learned by all volunteers and professional rescuers as well as laypersons who frequent aquatic areas including those who supervise others in a water environment. The Task Force concluded that instant, optimal institution of resuscitation techniques was the single most important factor to insure survival after a drowning event had occurred. It was recommended that all groups involved in the aquatic environment promote widespread CPR training for anyone who was assigned to work in a water environment. The Committee also recommended that additional research and public health initiatives be implemented to increase the probability that there will be immediate performance of CPR and other first aid techniques at every drowning incident.

THE CRITICAL ROLE OF LAY PERSONS IN RESUSCITATION

The Task Force on Resuscitation at the World Congress recognized what has been accepted for many years in resuscitation medicine: victims of drowning incidences who received instant on-scene basic life support (CPR) by bystanders is the essential factor in determining survival for pediatric drowning victims. Multiple studies from around the world and from the United States support this essential conclusion. In particular, the Houston Pediatric Drowning Data, a decade-long examination of the bystander contribution to pediatric resuscitation after drowning confirmed the role bystander CPR can play in pediatric survival. In this impressive study the inclusion criteria excluded any victim that was not clearly unresponsive, lifeless, apneic and cyanotic or did not have subsequent x-ray and laboratory abnormalities consistent with water aspiration. As a result of this unique study, the data are extremely reliable and the conclusion is abundantly clear. Prompt, effective CPR can save children who are, for all intents and purposes, clinically dead when pulled from the water. The key to success, however, as the data proves can be summed up in four words: Prompt and effective CPR.

JOHN PLUCHINSKY'S CPR

John Pluchinsky's rescuers were handicapped. His rescuers had forgotten their CPR training. It is not surprising that in the moment that these rescuers needed to recall their CPR training they were unable to do so. It is a known fact that without significant, repetitive practice any one will, in a moment of high stress, neglect and forget what they have not stored in memory through repetition and practice. A number of the rescuers had expired CPR certificates which is another indication of the lack of practice.

It is a known fact that responding to an emergency is a high-stress situation and it is also a known fact that high stress creates interference with functioning of the human mind. That is why medical professionals routinely practice emergency responses. Repetition is what overcomes stress and results in improved performance and the potential for success. John's rescuers never practiced a rescue response and, in fact, there was not even an emergency plan that had been put on paper. The lack of training, the lack of drills, and the lack of an emergency plan, all dictated that the response to John's drowning would be exactly what it was, a chaotic, uncoordinated, delayed, and technically incorrect response that, in retrospect, accomplished nothing. Indeed, beyond the inappropriate individual training, the entire concept of team training, which has emerged as a vital component of resuscitation, was totally overlooked.

A basic tenet of rescuers responding to a drowning victim, particularly a pediatric victim, is to initiate rescue breaths first, and then begin chest compressions. There is no need to clear the airway of a drowning victim and certainly never a need to perform the so-called Heimlich Maneuver nor even check for a pulse as far as a lay rescuer is concerned. This is clearly outlined in the aforementioned *Handbook on drowning* regarding basic life support. What is important, and what is taught in Basic Life Support, is to give two breaths immediately, even while the victim is still in the water. As soon as the victim is out of the

water he/she should be positioned as flat as possible and vigorous chest compressions begun. In the statements and deposition testimony of the rescuers it was uniformly noted that it took more than a few seconds once John was recognized as being in trouble in the water to then get him to poolside. No rescue breaths were initiated and more importantly, his legs were left dangling in the pool. Rather than initiating chest compressions the rescuers, at least three of them, repeatedly pushed on his stomach in a pseudo-Heimlich Maneuver which is, as I noted above, an inappropriate maneuver in Basic Life Support of a child pulled from a swimming pool. Precious time was lost at the most critical juncture in the continuum of care.

Given all of the facts in this case, it was obvious that none of the rescuers, including the supervisory personnel who responded to John Pluchinsky, could accurately repeat the appropriate number of chest compressions and breaths that are taught in Basic Life Support (CPR). While this is important, the specific ratio of breaths to compressions may be less important than the central tenant of high quality CPR which is "Push Hard-Push Fast." The idea expressed in this saying is that blood circulation through chest compressions is the most important action a rescuer can take. None of John's rescuers remembered this basic resuscitation tenet. Unfortunately, rather than initiating rescue breaths followed by vigorous chest compressions, the rescuers pushed on his stomach multiple times. The explanation for this action was misguided and flawed in that one of the rescuers described the action as an action to relieve potential airway obstruction. Of course, John did not have an airway obstruction. If rescue breaths had been given, the rescuers would have known if in fact there had been some airway obstruction because they would not have been able to get air into the lungs. This again is basic principle of CPR training.

As I described above, the drowning process results in a victim generally taking in copious amount of water into the stomach. Thus when the victim is pulled from the water, the stomach may be distended which means it looks very full. This should be a fact known to

rescuers because it is taught during basic CPR. It is also taught that rescuers should not push on a distended abdomen because it may force the water from the stomach back up to the esophagus and subsequently into the lungs causing what medically is known as aspiration. Any aspiration into the lungs will interfere with subsequent rescue breaths as well as potentially damaging the lung by introducing stomach acid and stomach contents. Many drowning victims have survived the drowning only to subsequently succumb to pneumonia and other pulmonary (lung) problems created as a result of aspirating gastric (stomach) contents into the lung. Thus, basic CPR teaches rescuers not to push on the victim's stomach. Sadly, the inappropriate resuscitation efforts not only failed to provide John a chance at recovery, they may have thus contributed to further insult.

Ultimately John Pluchinsky may have survived no rescue breaths and the multiple rescuers pushing on his stomach if one of the rescuers had at least initiated chest compressions immediately upon pulling John from the pool. We know that any delay in chest compressions is a delay in the perfusion (delivery of blood flow) to the heart and brain at a time these organs vitally need blood flow and oxygen. This is the fundamental reason for the aforementioned sequence of rescue breaths followed by vigorous chest compressions. Thus, any delay in getting blood flow to vital organs simply magnifies the damage being done through the ischemia (no blood flow) that is a result of the cardiac arrest Indeed, even seconds can be critical depending on the duration of the cardiac arrest.

JOHN PLUCHINSKY'S CHANCE OF SURVIVAL

Medical studies prove that children in particular can be resuscitated following drowning events. The question is always how long after heart stoppage can a child be resuscitated. It is, of course, difficult to be precise because there is no way medicine can measure exactly when breathing stops and/or when the heart ceases to beat in any particular drowning victim. Based upon the best studies available, however, it is a general consensus in

the United States that any pediatric drowning victim in the water for one hour or less should have resuscitation attempted particularly cold water drowning victims. The time frame is probably less with warmer water. It is challenging, given our medical current data, to make predictions about when resuscitation efforts will be futile. The prognosis of any particular individual is dependant upon many, many factors some of which cannot be measured by medicine and science—and certainly not at poolside. Nevertheless, based upon the medical studies which have been published and based upon the estimated time that John was in the water without discovery, which I understand to be around 10 minutes, it is my opinion that if John's rescuers had responded to John with appropriate, timely CPR techniques of rescue breaths and chest compressions without abdominal thrusts, the chances of resuscitating John Pluchinsky were on the order of 50%. I cannot say that he would be neurologically normal but that is certainly possible. Given all that we know about resuscitation, however, it is apparent that the failure of these rescuers to respond appropriately certainly deprived this young man of a chance at life.

I again emphasize that the young people who were placed in the situation of being lifeguards and camp counselors were not responsible for their own training, preparation, organization, and/or practice. It is up to the adult supervisors, the club managers, and ultimately the club members to insist that the young people put in charge of watching children at play in a swimming pool be appropriately trained in resuscitation techniques, be currently certified in Basic Life Support, and most important of all, be given weekly if not daily training and drills so that they can execute an emergency plan and respond appropriately to emergency situations such as they were faced with John Pluchinsky when he was discovered face down in the club pool. Sadly, the response to John's emergency was chaotic, unorganized, ineffective, inappropriate, and unrehearsed—a situation that should not have been allowed to occur.

Finally, many wonderful, inexpensive, effective, and highly portable tools are readily available for daily or weekly practice of basic life support (CPR), such as the American Heart Association-endorsed "*CPR Anytime.*" Similarly, there are a number of publications on the value of team training to ensure that key roles are defined within a given team. This approach has been taken in settings from emergency rooms and hospital wards to Dental offices, and of course its roots are well beyond resuscitation or even medicine (Making Decisions Under Stress: Implications for Individual & Team Training; by Janis A. Cannon-Bowers [Editor], Eduardo Salas [Editor]). A vast body of literature has also been published on the need for practice and re-assessment. In addition to ensuring quality leadership and appropriately documenting certification and credentials, it is, thus, essential to put in place a program, foster practice by both individuals and as a team, monitor the capabilities of the staff, and document appropriate performance. It might also be appropriate to consider inviting local experts in CPR and/or drowning to your facility to speak to the group and thus ensure access to the highest quality and most contemporary information. Hopefully, John's unfortunate fate can energize the Houston community to take serious action to prevent a future catastrophe and "save a heart and brain too good to die."

Sincerely,

Patrick M. Kochanek, M.D.