

**American Academy of Pediatrics  
Section on Pediatric Pulmonology  
and Sleep Medicine**

ORAL HISTORY INTERVIEW

**Thomas George Keens, MD**

**Interviewed by  
Geoffrey Kurland, MD**

June 10, 2022

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**American Academy of Pediatrics**

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Preface	i
About the Interviewer	ii
Interview of Thomas George Keens, MD	1
Curriculum Vita, Thomas George Keens, MD	20



## PREFACE

Oral history has its roots in the sharing of stories which has occurred throughout the centuries. It is a primary source of historical data, gathering information from living individuals via recorded interviews. Outstanding pediatricians and other leaders in child health care are being interviewed by the Section on Pediatric Pulmonology and Sleep Medicine of the American Academy of Pediatrics. The purpose is to record and preserve the recollections of those who have made important contributions to the advancement of the health care of children through the collection of spoken memories and personal narrations.

This volume is the written record of one oral history interview. The reader is reminded that this is a verbatim transcript of spoken rather than written prose. It is intended to supplement other available sources of information about the individuals, organizations, institutions, and events that are discussed. The use of face-to-face interviews provides a unique opportunity to capture a firsthand, eyewitness account of events in an interactive session. Its importance lies less in the recitation of facts, names, and dates than in the interpretation of these by the speaker.

## ABOUT THE INTERVIEWER

Geoffrey Kurland, MD

Geoffrey Kurland is a Professor of Pediatrics at the University of Pittsburgh School of Medicine and member of the Division of Pulmonology. Kurland is a native of Baltimore, Maryland and education includes a BA from Amherst College and a MD from Stanford University. His pediatric Residency at Stanford was followed by a 4-year combined Pediatric Pulmonology-Allergy Fellowship with an addition year with Adult Pulmonology. His first full-time academic appointment was at the University of California, Davis, Medical Center in Sacramento, California. He moved to Pittsburgh in 1988 and has remained on the faculty here since that time.

Kurland considers himself primarily a clinician. He has special expertise and interest in Pediatric Flexible Bronchoscopy, Childhood Interstitial Lung Disease, as well as Pediatric Lung Transplantation. His clinical patients, however, cover the wide range of Pediatric pulmonary problems and include interstitial lung disease, bronchopulmonary dysplasia, asthma, cystic fibrosis, and numerous causes leading to end-stage lung disease requiring transplantation.

Kurland's research interests include interstitial lung disease in infants and children and novel approaches to transplant graft surveillance. He is a PI or Co-PI on many of the clinical research projects in his Division. He has lectured at many institutions nationally and internationally. He has authored or co-authored more than 60 peer-reviewed articles, as well as 13 book chapters. He has also written a book describing his own experience as a patient with Leukemia.

## Oral History of Thomas G. Keens, MD, FAAP

DR KURLAND: Okay. Today is June the 10th, 2022. I'm Geoff Kurland. And I'm interviewing Thomas G Keens. Hello, Tom.

**DR KEENS: Hi.**

DR KURLAND: So, I was hoping to start... I've looked at your CV by the way, but I was hoping to start at the beginning. Looking back -way back - when you were - well, growing up in San Pedro, California and going to college in Santa Fe; were there any influences back then that would've put you where you are now?

**DR KEENS: Yes, so I think a couple things that are probably a little different about my background. So, when I was in high school, which was actually in San Pedro, which is the Harbor LA and it's, it's really a blue-collar community. So, San Pedro high school was not a college prep school. And I was interested in math and science, and I was in all honesty, very narrow-minded at that time. I thought if you couldn't analyze or prove something by math and science, it wasn't worth thinking about. I had a very influential English teacher, actually, and I ended up taking a lot of classes from her. By the way, I took journalism, which was probably the best thing I did in high school because it taught me how to write. And she suggested to me that I was a little narrow minded and maybe a liberal arts sort of preparation would be a good thing for me at the time. I actually thought I wanted to be a theoretical astrophysicist. So, I thought, you know, I'm going to have to go to graduate school for that. I'm going to take four years off to just broaden myself. And so, I went to St. John's college, which is a Great Books curriculum. And this is the...**

DR KURLAND: By the way, this is the branch of, or part of the college is in Santa Fe?

**DR KEENS: Correct. There are two campuses, actually the original one was in Annapolis and the second one was in Santa Fe. And I was actually in the first class of that campus. And basically, there are no majors. Everybody takes the same thing, two years of ancient Greek, two years of French, four years of mathematics, four years of lab, a year of kind of music theory and then seminar, which is kind of philosophy, maybe political science, literature, et cetera. And all of this is done reading "The Great Books". So, we learned physics by reading Einstein, for example, and Newton and stuff like that. And this really started, I mean, for me, this is obviously a curriculum that does not appeal to a lot of people, but for me, I was like a kid in a candy shop. I mean, I just thought, oh, this is great.**

**And I just tried to learn everything I could. So fine. So about midway through, I kind of changed my mind and thought I wanted to go into medicine. But the St John's curriculum was not exactly what medical schools were looking for at**

that time. So, I thought I'd probably have to take a fifth year primarily to get organic chemistry, which we did not have at St John's, but of course I got impatient, and I applied to a few schools and most of them said, are you kidding? Essentially. And, and we used to have these big metal waste baskets in our rooms. And so, my, my ritual was when I got rejected by medical school, I burned their catalog in the company of my friends, sort of a ceremony sort of thing,

DR KURLAND: Kind, of an arson...

DR KEENS: I did not burn the school down. So anyway, I did get into UCSD, and I got into USC and I anguished about that decision but decided to try out UCSD. So again, I was in the first class. And so there, we were randomly assigned advisors and my advisor was Genarro Tisi who was fresh out of fellowship from the CVRI [Cardiovascular Research Institute], and he was a respiratory physiologist.

Now I have to say, I, wasn't very excited about this because, you know, usually pulmonary is not taught in a very interesting way in most general physiology classes. But you know, it was what it was so about halfway through the first year I went to him and I said, "are there any jobs for first year medical students in the in the medical school?" And I've never seen anyone do this, he jumped out of his chair and he said, "You can work for me." And he ran me up and down the medical center because he had labs from research labs to the pulmonary lab, to pulmonary lab for TB and other things on different floors. So having no better offer, I said, "okay". So, we had our respiratory physiology in the spring. So, knowing I was going to do that in the summer, I probably paid more attention to it and did better than I otherwise might have.

So, I got there in the summer and they said, oh, Tom, you did really great in pulmonary physiology. You can help teach the fellows. Well, no, I didn't teach the fellows, but I learned with the fellows. So, the first thing that they did was basically throw me to the pulmonary function techs. So for about a month, I learned how to become a pulmonary function technician, which was invaluable in my subsequent career because I've run the pulmonary lab at Children's Hospital Los Angeles ever since I arrived here and the techs could not pull all over my eyes, I knew how they did things and I knew what they could and couldn't do. And then we started research, which also became my, my thesis, but Tisi was so charismatic and enthusiastic about respiratory physiology. That by the end of that summer, I said, pulmonary, I'm doing pulmonary period.

Now at the time, at least at UCSD the most powerful department was medicine. And I was told by the people in medicine, you, if you want to do pulmonary, you need to go into medicine because in five years there will be no



pediatric subspecialists. We're going to be handling all of the lung disease. Fortunately, that turned out not to be true. Yes, that's right. <Laugh> I, I did start to think about medicine, but I changed my mind because I just had so much more fun in pediatrics. And frankly, this has started what, for me, I think, has been a marvelous career because pediatric pulmonary didn't really exist as a formal specialty at that time. No. You know, there were some giants at that time: Ernie Cotton, Lynn Taussig, Will Waring, Tom Boat, Leroy Matthews, Carl Doerschuk, you know, a number of people like that. Jere Mead, well, he wasn't pediatrics,

DR KURLAND: But he did a lot of pediatric stuff!

DR KEENS: Yeah, well, he did. That's true. And so, I basically came out of medical school saying "pulmonary". And then "pediatric pulmonary". I got into Children's Hospital Los Angeles for my residency. I actually changed late. So, I applied late and I was pretty pessimistic, but it was my first choice. And I suspect that Bill Nyhan, who was the Chair of Pediatrics, gave them a call because I'm not sure I would've gotten in any other way. My letter from the university talked about internal medicine, you know, all that kind of stuff. So fine.

So, Children's did not have a pulmonologist when I started as an intern. And the funny thing was that rheumatologist, for example, who would have pulmonary function tests done on their patients somewhere else would bring those tests to me to interpret <laugh>.

So, Arnold Platzker did arrive at Children's toward the beginning of my second year of residency. And he trained at the CVRI and he brought the CVRI model to CHLA. So, a combined neonatal and pulmonary division.

DR KURLAND: Right. Yes.

DR KEENS: And so - of course, this is before computers. It was hard to find fellowships in pulmonary. They weren't really many out there. Many of them were neonatal fellowships and although I enjoyed neonatology because there's so much pulmonary in it, I really wanted to be a pulmonologist. So Platzker heard that there was a resident interested in pulmonary and basically tracked me down and started to talk with me about, you know, what I was interested and what I should do. And he said, well, you really should go to either Toronto to work with Charlie Bryan, CHOP, or Yale to work with Etsuro Motoyama.

And so, I did in fact interview in all those places. And I must say Etsuro Motoyama was like the consummate gentleman. You know, after our interview in the morning, he took me to lunch at the faculty club at Yale and he asked me, "what are you going to do the rest of the day?" I said "well, my

wife couldn't come along. So, I'm going to take pictures of the area so she knows where we might be going." He said, "oh, I'll give you a tour of the university. " I mean, he literally spent the time to do that. But I really thought that that the opportunities in Toronto were more to my liking. So, I decided to go there. So, Toronto was for me, just unbelievable.

DR KURLAND: Yeah, if I can interrupt, what was it like working with Henry Levinson and Charlie Bryan? I mean you must have stories!

DR KEENS: How long do you have?

DR KURLAND: We don't have that long, but you never know.

DR KEENS: Well, alright, so let me just tell you a quick starter. So, you know, I'm a resident, and in those days, you had to go apply to places and that's on your own dime. So, I said to both Toronto and Yale, I said, you know, is there a place I could stay during the interview - a call room or something like that? So, I don't have to spend money for a hotel. And so Etsuro Motoyama put me up in a faculty visiting quarters. He said, "if anybody asks, your're visiting faculty", but it was free for me.

Levison said, "oh, just come stay with me." Well, that was a little closer than I had kind of anticipated, but, alright fine. So, Henry Levison did not drive. So, he said, "all right, here's how you get to my place from the airport." And so, I show up at 8 or 8:30, 9 o'clock at night, something like that. He opens the door. And the first thing he says is "don't step on the art." So of course, I freeze and there's this huge metal, kind of oval looking thing, with a couple of saw cuts in it, which presumably is modern art. Now I could have jumped up and down on this iron thing and not dented it, but I wasn't supposed to step on it. So, I didn't.

So, coming from California, of course, I didn't realize how cold it can be in February in Toronto <laugh>. So, I brought a sweater, because I heard you were supposed to dress in layers, and a sport coat. Well, we had to walk to the subway station and then from the subway station to the hospital, and I was freezing to death, but trying to grin and bear it, and not give away my weakness, let's put it that way. So, I actually had a great interview. I was really thrilled.

I just loved it. And so, you know, I left and then about two weeks later, so it's still February. Okay. So, Henry calls me up and offers me the job. So of course, I say, absolutely. Yes. So, we're chitchatting a little bit and he says, "so what's the weather like out there now?" I now know what it was like in Toronto in February. Well, we were having a heat wave here. It was about 85 or 90 degrees. And I told him that, and there was silence on the phone. And

then he said, "you bastard." And I said, "wait, wait, I still got the job, don't I? The weather's not my fault."

DR KURLAND: <laughs>

**DR KEENS:** So, I got to Toronto, and you know, in our era, the fellowships were two years in those days. And most of them were a clinical first year and a research second year. Okay. So, I got there expecting that, and Henry looks at me and Henry says, "oh no, you're a research fellow for two years. You're not doing any clinical work." I said, "Oh, okay. All right." People start talking to me about projects, you know. So, I, say, "oh, wow. That sounds good. Yeah, I'll do that." and "Oh, that sounds good. I'll do that." So, by the end of the first week, I had agreed to do a project with Noe Zamel and Tony Mansell on diffusing capacity. [Am Rev Respir Dis 1974 Nov;110(5):683-4. Letter: Use of the RC time constant for CO in the measurement of diffusing capacity N Zamel PMID: 4429264).

I had agreed to do a project with Robert Orange, who's the guy who discovered SRSA, which is now IL-something Charlie Bryan basically assigned me my major project. So, I know I needed to do that. And a couple of others. So, I had racked up like five or six projects in the first week. And of course, what happened is Henry would come around to say, "how are you doing?" And of course, I'd been working on another one. And clearly that was a mistake. Now, Toronto was non-directed in that sense. I mean, they didn't say "here's your project, do it." You kind of could fiddle and do what you wanted to do.

Oh, the other one was that Henry had a graduate student. He said, "I can't handle this guy. You can supervise this project" which actually turned out to be a good project that I enjoyed. But so, I basically had to kind of settle down. Henry used to come through our fellows room - all the fellows were in the same office ...

DR KURLAND: And, can I ask how many fellows were with you at that time? Do you remember?

**DR KEENS:** Well, let's see. So, there was me, Christina...umm... I think there were five of us. Okay. From around the world. Really one was from Australia. One was Canadian. I was the only...Well, no, there was Jim Robotham was there. So, there were two Americans. And oh, Jean Guy LaPierre was from Quebec, which you could argue is, or is not Canada.

DR KURLAND: <Laugh>.

**DR KEENS:** and we were all doing different things. Meyer Katan actually took a month as a resident. He was a third year or actually in Canada, fourth year resident. And started fellowship the year after that. So, he and I were fellows together my second year. And I actually worked on some projects with him as well.

So, Henry comes through at three o'clock and says, "What have you done?" Now in the first week, you know, I've never been a research fellow before and I thought, holy, maybe I'm supposed to have done something already. So actually, by the end of about the second week, I had done a lot of work on my diffusing capacity project. Which of course, Henry let on like this was expected and you are behind, but talking to others subsequently I realized, you know, this is pretty phenomenal actually. So, Henry and Charlie, they were both great to work with and they were very different. Henry studied like hundreds of people. I mean, his paper would have a hundred CF patients or ...

**DR KURLAND:** That's... in my training that was known as a "Levinson unit."

**DR KEENS:** Exactly.

**DR KURLAND:** 100 Patients. That's what I called it. That's where that came from.

**DR KEENS:** So, I coined this at least in Toronto and I called it...a Levison unit was...

**DR KURLAND:** Yes. So, you're the originator of that famous phrase. That's very good. Yeah.

**DR KEENS:** Charlie was the consummate physiologist and his studies usually had one or two patients. Right. So, I said, a Bryan unit is one. And so, I said, all right, for my career, I'm going to take the geometric mean and a "Keen's unit" is going to be 10. And so, a lot of the studies I did there had 10 to 20 subjects - in that range. So, it was kind of fun. So, they were very different in that respect. I mean, Charlie tossed out ideas a minute. And what I realized was you couldn't run with all of those. You just had to think about which ones might be something to do and which ones weren't.

Henry was more...I mean, to give an example of the diffusing capacity project, when I first got there, he said, "Tom, have you ever noticed that cystic fibrosis patients who have bad lung disease have higher diffusing capacities than those who are normal?" Well, of course I hadn't noticed that, but so he had data on like 200 CF patients. So, we had a plotter there that we could do that. So, I plotted it out and yeah, it was true. We looked at asthmatic patients the same way. And so, this was this first study where I took a cork and put a small hole in it and had myself and the other fellows and a couple of techs do diffusing

capacities, either normally, or with an obstruction. And our diffusing capacities increased with obstruction. We took some asthmatics and did their diffusing capacities before and after bronchodilators. And if they had a bronchodilator response, their diffusing capacity fell. So, it was really, it was, it was a fun sort of project to do. And, and it really started with Henry's observation of 200 CF patients - that sort of thing.

DR KURLAND: <Laugh>.

**DR KEENS:** So, so that's how that worked. Now, Charlie - when I walked in, Charlie said "I want you to work on a project on ventilatory muscle endurance." Well, of course I, I had never even heard of that. And frankly, although Arnold Platzker was a really good mentor for me in terms of teaching me pediatric pulmonary, mostly clinical sort of stuff. Nobody was interested in respiratory muscles in those days. You know, it was the lungs. So, I was taken a little bit by surprise, but of course, you know, I started reading into it and Charlie basically was the type of person was I'll talk to you again when you have data. So, you know, it's kind of reading. So, I had to build this big apparatus to measure ventilatory muscle endurance by basically isocapnic hyperventilation. So, it was a system where I had a CO2 scrubber and you know - it was actually a rebreathing system so that we kept the CO2 up at a certain level and so on - and basically measured the highest level that people could sustain for 20 minutes.

Okay. It was kind of a grueling experiment to be a subject in because I had enrolled myself and my colleagues to do ventilatory muscle training 30 minutes a day, five days a week, breathing on this machine. And, to my gratitude they all did it religiously for six weeks. And we all showed that we could improve endurance. But I kind of had to put this together. And it was based on a paper that the layout of David Leith's lab who worked with Jere Mead. So, I built this thing. We had an engineer in the lab, but he was kind of a grouchy guy. And you know, when people would come to him and say, "would you build me this"? He got really pissed off, but he liked me because I was actually trying to build this myself and just called him when I needed help. So, he helped me a lot. So, we got this thing going, and we did this project and showed that you could increase ventilatory muscle endurance with training. And actually, that I presented at what very few people recognize as the CF club. So ...

DR KURLAND: Probably you are are one of the few that are left that remember the CF club.

**DR KEENS:** Right? The predecessor of NACFC [North American Cystic Fibrosis Conference]. So, at the North American CF conference now, when, when Bob Beall or whoever used to get up and ask " how many of you were at

**the first NACFC meeting?" I was tempted to get up and say, "how many of you were ever at a CF club meeting?"**

DR KURLAND: <Laugh> you and me. And a few others.

**DR KEENS: So, I presented there that early work and our question was - CF patients, because they have lung disease, maybe they have a chronic training stress?**

DR KURLAND: I'm sorry, what?

**DR KEENS: A chronic training stress for their ventilatory muscles.**

DR KURLAND: Yeah. Yeah.

**DR KEENS: And so, we, in fact did this on a bunch of CF patients and found that in fact, their ventilatory muscles were increased in endurance, suitably corrected, and this is another fun thing we did. So how do you correct isocapnic hyperpnea essentially between normals and people of lung disease, because, you know, if they have lung disease it's going to decrease. So, we, we kind of did an experiment to do this, and we did this by quote- unquote "inducing lung disease". And we induced lung disease in the group of us normals by breathing, instead of heliox, 80% SF6 in 20% oxygen. Okay. Sulfur hexafluoride is a very heavy gas. And, you know when you breathe heliox, how you sound like Donald Duck. When you breathe SF6, you've got a real basso profundo, you know, thing, but it does because it's a denser gas, it does blunt your flow-volume curve.**

**So, we basically tried various correctors, either percent of MVV or Jean Guy LaPierre, actually, who was a French Canadian who was working on entirely different project, he said, I think you should use FEV1s per minute. He said that will compensate for both restriction and obstruction. And he turned out to be right. That was the best corrector that as we got the most consistent value when we corrected that way. So, it was kind of fun. And that project went forward. We then tried to train CF patients to see if we could improve their ventilatory muscles further. And, and those were also the days of CF summer camps or CF camps.**

DR KURLAND: Yeah, yeah. Back in those days.

**DR KEENS: So, we also had a camp where they did a lot of swimming and canoeing, and we found out that upper body exercise also increased ventilatory muscle endurance. So that, that was kind of a fun project.**

**So, a little quirky thing about Henry. So, I had this thing going for a month and I trained two physical therapists who were really gung-ho about this**

project. Matter of fact, they're the second and third authors on the paper. And I knew that they were going to do this right. And Henry used to come in and say to me "are you sure your study is going okay, do you want to go up and look?" I said, okay. So, I'd drive up there - it was about a hundred miles out of Toronto. And of course, they were doing great. So, I'd go up there and, you know, if they had questions or something, we talked, then we'd have lunch in the lunch hall, and then I'd go out sailing or canoeing or something on the lake.

DR KURLAND: You deserve a break.

DR KEENS: Yeah. And then drive back and, you know, a few days later Henry would say, "are you sure your project's going okay? You sure?" Yeah. Maybe I better go look <laugh>.

So, another thing that was fun about my fellowship was - so we did these studies, but I'm starting to think, you know, this is really effort dependent. I mean, how much of this is real? And it turned out there was a graduate student who was working in our lab from York university. That was actually a different university than U of Toronto, which is where Sick Kids was. He said, "I know a guy who's a muscle physiologist, and maybe you should talk to him." So, I went up and spent a morning with him and found out that he's measuring oxidative enzymes and muscles, and doing histochemistry, and looking at how muscle fiber types change.

And I'm thinking, oh my God, this is exactly what I need. We could take rats and we could put a respiratory load on them. And what we did was we basically tied an umbilical tape around their trachea. Now I tried this in adult rats, and actually they died immediately. That did not work. But I took young rats and put it around. And so, they grew into an obstruction. It actually turned out to be a pretty severe obstruction. We were going to do this for six weeks and by six weeks, a lot of the rats were starting to die. So, we cut it to five weeks and then looked at their diaphragm in terms of biochemistry and histochemistry. And indeed, found not only changes in histochemistry, and biochemistry, which is kind of known, but we also were able to change the fiber types, which was actually unknown at the time. And it took over a year to get that paper published because the muscle physiologists that were reviewing it didn't believe it. So, I kind of made a little bit of an impact in other area. So, it was kind of fun.

So fine. So, it was a great time. I loved Toronto. It was really cold. I learned what cold was like as the California boy.

DR KURLAND: <laugh>.

**DR KEENS:** But I can still remember because Toronto had a great subway system - coming out of the Queens Park Station. So, Sick Kids is on University Avenue, which runs perpendicular to Lake Ontario. And, you know, it's surrounded by high buildings. This is a wind tunnel. Okay. A wind coming off the lake. And you come up the steps out of the Queens Park subway station, and just get your head above the last step and be hit with this icy cold blast. I mean, in the winter, obviously. I still remember that. So of course, the other thing was in those days, you know, we wore kind of rubber boots and so on when you're outside, but in the hospital, you couldn't wear those because your feet would be, you know, sweating to death. So, I took a pair of shoes to the hospital that I kept there for two years you know, basically because we wore the boots outside and of course one time they super glued my rubber boots to the floor, and said "Tom, hurry up, hurry up."

So, my Children's Hospital of LA mentor, Arnold Platzker started writing me really in my first-year fellowship saying "are you interested in coming back?". And I knew that Children's didn't have any pulmonary thing really. I mean, although he was trying to start one, his first priority really was the NICU.

**DR KURLAND:** Right.

**DR KEENS:** So, I thought there's a tremendous potential here. And our family was back there. So, I basically agreed to go before - usually people started looking for jobs in the fall of their second year, in those days. But I was pretty much signed, sealed and delivered by the end of my first year and decided I'd come back. Now, my Toronto fellowship turned out to be probably the best preparation for what I was going to do, because as I mentioned to you, it was non-directed that, you know, I wasn't told to do this. I was basically offered a bunch of things and, and ultimately figured out the ones I completed. And of course, when I got back to LA there wasn't a going research factory, like there was at Toronto. I pretty much had to start from scratch,

**DR KURLAND:** But I have a question. When you went to Toronto, it was a two-year fellowship and it was a two year research fellowship. Right? Sure. So, when did you add, how did you get the clinical stuff done? And when did you do that?  
<Laugh>

**DR KEENS:** Yeah, well, yes. <Laugh> so I got some of it from Platzker before I left. Because I did take a month or two with him. And of course, there were clinical pediatric pulmonary fellows, and we did have conferences. But that was about it. And the rest of it was kind of on the job training. And I don't mean to dismiss anybody's talents, but I guess I do believe that if you really understand respiratory physiology, you can figure out most clinical and diagnostic issues. Obviously, there are a lot of special areas, especially now - rare lung diseases, all that genetics and so on. But you know, of course that wasn't being taught in those days anyway.



DR KURLAND: It wasn't recognized. It wasn't known back then.

**DR KEENS: Right. Right. Exactly.**

DR KURLAND: So, you did a lot of that when you went back to LA you, - I mean, were you able to pick that stuff up and run with it?

**DR KEENS: Well, apparently. I'm still here.**

DR KURLAND: <Laughs>

**DR KEENS: Yeah. No, I think I could. That's not to say that I don't keep learning. But yes, I think my approach has always been physiologically based and I have to say - one of the areas that I keep hammering our fellows is, you know, if you understand the physiology, this, this will work. So let me give you a quick example. So, this was actually only about four or five years ago. So I teach-respiratory physiology to our fellows and traditionally we've had like Tuesdays at noon and, and I used to have these as kind of freewheeling sort of, of things at the Blackboard Socratic, because, you know, we only have a maximum of six fellows and you could kind of look around the room and you could see, all right, this person's really interested. This person is not really interested, but they're sitting here being polite, you know, sort of thing. So, I was on service with one of those fellows and it was a weekend and we got a call from the emergency room that there was a 15 year old with muscular dystrophy who had a, pCO<sub>2</sub> of 85, I think it was. And a sat in the same ballpark, 80-something like that.**

DR KURLAND: Yeah. Right.

**DR KEENS: And you know, we need to come down and see him. So, we went down and, and this had been a kid who had been lost to follow up. He hadn't been seen by our service in two years and clearly had deteriorated at that point in time. X-Ray did not show any pneumonia or anything like that. His blood gas was completely compensated, so this was chronic respiratory failure. So, we talked to him and said we've got to admit him and we have to decide what you want to do. But you need some kind of ventilatory support. So, we're back up writing notes, electronic medical records. So, you know how that goes. And so, my fellow gets a call from the emergency room saying "we found out that this guy has a history of blood clotting. We think we should do a spiral CT to rule out pulmonary embolus as a possible explanation for his hypoxia." So, my fellow said, "sure, go ahead." And then just happened to come into my office to tell me. I said, "wait a minute". I said, "how much hypoxia would you expect with someone from with a pCO<sub>2</sub> of 85?" And he didn't know. I said, "have you heard of the... "**

DR KURLAND: He gave you a blank look?

**DR KEENS:** Yeah, yeah. Headlights. I said, "have you heard of the alveolar air equation?" "No." I went over that with him. No, <laugh> OK. Let's go through this. And of course, it turned out that it predicted exactly what his pO<sub>2</sub> was. And I said, "you don't need to postulate any additional problem. It's all explained as by his hypoventilation, tell the residents not to get it." So, after that, he said "physiology's great!" <Laugh> So maybe I've been able to kind of fake my way through it by understanding the physiology and using that to you know to figure things out.

DR KURLAND: You know, I think that all of us if we're lucky enough have those teaching moments where we can show our fellows or whoever we're training the connection between the physiology and the patient in front of them.

**DR KEENS:** Yeah.

DR KURLAND: And, and I think that always proves to be useful, not just for them at least, but certainly for me to have that opportunity, you know, unlike you I'm someone who has to relearn physiology almost continuously.

**DR KEENS:** Oh. So do we all. Come on <laugh>

DR KURLAND: So do we all. Okay.

**DR KEENS:** You know, listen, you know, everyone looks at me like saying, well, we're going to have to go over that again. I said, I know. And they said, but you seem to know it. I said, I've been doing this for 50 years, you know? So, when you've been doing it for 50 years, it will probably be easier for you to,

DR KURLAND: So, so let me ask you a couple things. You have had an interesting career at children's hospital, but I saw for a little bit, you were also on the faculty, is this true of UCLA? And how did that occur?

**DR KEENS:** Yeah, so USC and UCLA are vicious crosstown football rivals.

DR KURLAND: Absolutely. Okay. <Laugh>.

**DR KEENS:** And it was interesting when I came back on the faculty, which was 1977 here at Children's, which is a USC affiliated hospital. You could not even as a volunteer - now., remember, in those days, a lot of pediatricians used to volunteer for half a day, you know, supervising residents in clinics and so on - doesn't seem to happen so much now, but it was popular then - you couldn't even volunteer at both a USC and a UCLA affiliated hospital. I mean that is just nuts. It's just crazy.

DR KURLAND: Right. <Laugh>.

**DR KEENS:** So, this is the culture in Los Angeles. All right. So, UCLA did not have a pulmonary service and they tried to recruit me actually a couple times, but... Their recruitment, in my opinion was a bit of a joke. They wanted a "pulmonary presence". Now, I'm in a place now that we've got fellowships, we're doing research. Why would I want to go there to be a "pulmonary presence?" You know? So, I didn't accept the job. But our division originated as a neonatal and pulmonary division. And actually, the funny thing is in terms of funding, when we were the Neonatal division, nobody cared if we billed or not for pulmonary clinical care, you know, because it was a spit in the bucket, you know? So, there was a split for political reasons. The Dean thought there should only be one neonatal program in the university and county had Joan Hodgeman. So Neonatal was split and went to them. But the funny thing for me - so I was a neonatologist for the first 20 years of my career, as well. The funny thing for me was that both of the two division heads were fighting over me. They said, no, he's a neonatologist. No, he's a pulmonologist. Of course, in academics, you can't leverage that for salary raises or anything. So, but pulmonary is my thing. So that's where I stayed.

So, I did not accept the offer at UCLA. And so Platzker - who really thought outside the envelope sometimes - thought, you know, we've got two major medical schools in LA, but do they have to duplicate everything? And so, he offered for us to be the pediatric pulmonary service for UCLA as well which we were for about six years.

And, and I thought this was hysterical because they had to give me an academic appointment. Now this is a city where you couldn't volunteer on both sides. <Laugh> but I was a visiting professor for two years and that's, as long as you can be a visiting professor. So, then I had to be an adjunct professor. But the problem with that was ... so I was one of the ones that rounded over there three months a year. Maybe, I think it was three months a year. I think there were four of us doing it. The problem was I still had a full-time job here. I was the fellowship director at that time. I was actually the chair of the IRB also. And no one was doing that job when I was over at UCLA. So, it got a little bit crazy. I mean, the institution was fun to be at, I think in all honesty, it had a bit more of an academic atmosphere than Children's does. The residents had fewer patients, so they were a bit more interested in some things. I remember I asked the residents to get pulmonary function testing on a patient. I think it was a lupus patient and, and the resident looked at me and said, "okay, but only if you'll come back and explain it to me" and I'm thinking, "God, when's the last time I heard that at Children's?" <Laugh>

**DR KURLAND:** Somebody who's interested! <laughs> What do you say?

**DR KEENS:** So, we covered, it was a small service compared to here. I mean we probably averaged six to 10 inpatients at a time. And they were covered very much by the house staff. I mean, I got called, but we weren't expected to come in or do anything. They might call us - actually, they should have called us more sometimes. I remember I had a kid with Goodpasture syndrome, and I said, now, if this kid bleeds a hundred mls, I want you to call me. Well, I came in the next morning, the kid had bled 300 mls and they didn't call me. So, you know, those things.

So that worked out, but then again, politics showed up and for no reason - I mean, people were happy with our service, but there were some other things going on between Children's and UCLA and, and the department chair just said, I'm going to cut everything. Which I was happy about because it was, it was a little stressful to try and cover two things if, if you were assigned to be in UCLA

**DR KURLAND:** Well. Absolutely. I would think that would be very difficult. Yeah. Especially with the population. I mean, CHLA is a fairly busy place as they say. Yeah. That's an understatement.

**DR KEENS:** Yeah.

**DR KURLAND:** You know, over the course of your career you have seen a lot of changes in both the institution you're working in and in pulmonology as a specialty or sub-specialty. Are there any things that stand out to you that that were important in your development and your training and your teaching and your work that have stuck with you and made sort of major changes that helped you in your career? That's a hard question, but...

**DR KEENS:** Yes, it is a hard question. I'll preface that by saying, I just am so thankful. I came into this at such a unique time in the history of our specialty. I mean, we had some of the early giants ahead of us, but a lot of the development of the specialty came along, you know, from my fellowship on, through my early and even current faculty years. You know, when I first went to ATS [American Thoracic Society] as a fellow first of all, there were virtually no poster presentations. They were all oral and pretty much all of the pediatric research presentations at ATS were in two morning sessions. And the room had maybe a hundred people in it. And that was the pediatric pulmonologists in the country.

Henry Levison was really good to me and to all of us, actually. As a fellow, he said, at ATS you stick with me, I will introduce you to everybody. So, I knew everybody, you know, who were the leaders of the field at that time. And, so I think it allowed a number of things. First of all, it was very inspiring. I mean, you talk to people like Bob Mellins, Lynne Taussig and others and you kind of

walk away awestruck and that, I think as much as anything, just gave you a motivation to really do things, I think my mentors at Toronto were that way too. At Children's really, as I said, I started pretty much alone. I mean, Platzker was there, but he wasn't really doing pulmonary research. I got the PF lab up and running - he'd started it, but I fine-tuned it.

DR KURLAND: But in many ways, you helped to build that program.

DR KEENS: Yes. Pulmonary, I think I did. Yes. we still do things. I mean our pulmonary function testing - I mean, I'm just adamant about the fact you can't interpret flow-volume curves if you don't know the lung volumes they are measured at. So, you know, we always do lung volumes as well, even though the CF foundation doesn't require us to do that for our patients. I got enamored with slope of phase three to look at distribution of ventilation. We do that as a routine.

I think my growth happened a lot with my fellows. I've had a tremendous - I think we've had 73 pulmonary fellows since I've been at Children's that have graduated and moved on. And of course, there are a variety of them but there are some superstars. I mean, people like David Gozal, Carol Marcuss, Soumya Swaminathano is the head scientist at the World Health Organization. You know, some of these people were just super spectacular, but to be honest with you, those that came in and you knew they didn't want to do research, particularly as a career, but went out to places where there was no pediatric pulmonary programs for home ventilation or some of the things that we do here and started programs where they didn't exist - I'm equally proud of them. I mean, they really have made the world a better place.

And you learn as much from your fellows as you do teach them. I think because, the good ones especially -someone like David. Hell, he'd read 10 times as many things on a topic as I had, by the time we came to talk about something <laugh>. He was interesting as a fellow. As an entering fellow, he had more research publications than anybody in the division, except for me. And I only had a few more than he did <laugh>

DR KURLAND: Somehow that's not surprising.

DR KEENS: Yeah, no,

DR KURLAND: He had a military career.

DR KEENS: Yes, he did. And actually, he says, "well, I did a lot more research, but it was classified, and we couldn't publish it." In the Israeli army. So, I think a lot of it really - I think I enjoy probably teaching and mentoring the fellows as much as anything that I've done and now some junior faculty as

**well. And, and I think the opportunity to work with eager people that really want to do things is really what kind of moved me along.**

**I was a visiting professor at Hershey...**

DR KURLAND: I saw that.. I saw that you were the Ray Croc Visiting Professor.

**DR KEENS: Yes. Well, what, yeah, I guess there was a title <laugh> and it was one of my intern and resident buddies, Steve Wassner, who was their Vice Chair who invited me out and, and it actually was a lot of fun, but he introduced me to the residents. And at that time, I had - I don't know, a little over a hundred publications, maybe 110, something like that. And, he said to the residents, there's a unique thing about him. If you look at his CV, he's only got five first author publications. The rest of them, his fellows are all the first author. And I actually took that as a compliment because I think you know, not just doing the research, but mentoring others to do it and kind of encouraging them to contribute and continue in that line to me is very satisfying. So, so I enjoy that. I don't know if I've answered your question, I'm not sure. I think,**

DR KURLAND: I think that's sort of the answer that I was hoping for. I mean, what, I think what we, what you and I have in common, I, I hope I have it in common with you is the desire to see my fellows flourish, as you do, to teach and have people teach me. Yes. And I think you and I share that. There's a lot of things we share we have in common actually.

**DR KEENS: Absolutely. Which is why I suggested that we should interview each other on this.**

DR KURLAND: Yes. Well, we'll do that later, but we were both Eagle Scouts

**DR KEENS: <Laugh> oh, okay.**

DR KURLAND: Okay. We both went to liberal arts colleges.

**DR KEENS: Yes. All right.**

DR KURLAND: For undergrad. So that's, so we both have that, that in common. Well, I read all the great books, but what I mean is, is I, I see your career is, is one of, well for wont of a better word, as a mensch. In other words, you know that's a compliment that's meant as strict. Yeah. You know, because you have been so supportive of so many people over the years that it's no wonder that, for example, that you were awarded the ATS Pediatric Assembly Founder's Award and the Kendig Award because of that. And the people who've known you and worked with you, when I talk with them, they always mention that. And I've had the pleasure of being in the course with you at the ATS, which we both enjoy.

**DR KEENS:** Oh yes.

DR KURLAND: But I have a last question for you, Tom.

**DR KEENS:** Okay.

DR KURLAND: Okay. Now, when I went into pulmonology, I'll tell you my mentor at the time was the late and interesting Norm Lewiston, said, "this is a great time to be in pulmonology or pediatric pulmonology", he said, and I've said that to my fellows over and over. Now, do you see - maybe this is going to be an easy question - but do you see this be becoming even more so over the next five or 10 years?

**DR KEENS:** Oh, absolutely. So, you know, I was actually originally a Cystic Fibrosis Foundation fellow that was funded by them in Toronto. I came back to Children's with the anticipation of being a CF researcher, but the CF clinical division was actually separate at that time. Because historically it long preceded us.

DR KURLAND: So, who, who ran it?

**DR KEENS:** Her name was Chun-I Wang

DR KURLAND: Okay.

**DR KEENS:** She was kind of the old school. She saw all the patients, you know expert clinician and actually just a quick, funny story. I'm a second-year resident. Okay. So, Chun-I is originally from Taiwan, and she wants to go back to Taiwan for a month of vacation. So, I happened to be the senior on the adolescent ward at that time. And in those days, CF patients died in adolescence, the median survival...

DR KURLAND: Yes. The median survival was about 14...

**DR KEENS:** Yes. So, Chun-I came to me, this would never happen today as a second-year resident and said, Tom, would you cover the CF service while I'm gone for a month? <Laugh>

DR KURLAND: And you stupidly said...

**DR KEENS:** "Sure." I said, "sure." <Laugh>

DR KURLAND: Right.

**DR KEENS:** Okay.

DR KURLAND: That wouldn't happen today!

**DR KEENS:** During that month, five adolescents came in and died. And I'm thinking, holy, you know, when Chun-I comes back, I'm going to be out of the residency. I mean, you know, so I went down, she came back, and I went down to tell her, and she just kind of looked at me. She said, well, that's what CF is. That's why we need to do better. So anyway, Chun-I did not let me do research with her group since I wasn't part of her group. So, I went off and did other things that I'm probably better known for, but about now 11 years ago we needed a CF center director and my division had tapped me and said, you're the only one here with the qualification's academics, et cetera. So, I I've been our CF center director for the last 11 years. And I have to say, I really loved it. But the changes that have happened with CFTR modulators are just - they're mind blowing. Yes. I mean, if, if I think back to what CF patients look like when I was a resident, if they were alive adolescents, they were scrawny, they were cyanotic, they were pale, they were clubbed. They were coughing their lungs out

DR KURLAND: And they died.

**DR KEENS:** They were terrible. And they died. Nowadays, our CF patients - you couldn't tell most of them from anyone else. With Trikafta, they're not even coughing. Can you imagine a CF patient not coughing? I mean, it's crazy. So, you know, the transformation that's happened in that disease. CF was first described in 1938. So, we're what - we're only 80 years. Yes. Remarkable. From when it was discovered to it, it being so remarkably treated at the basic level. And gene therapy is not probably far down the road.

DR KURLAND: Yeah. I agree with you

**DR KEENS:** 10 years or so.

DR KURLAND: So, it's still a good time to go into pulmonology, correct?

**DR KEENS:** Well, this is the point. This is the kind of thing that's happening in pulmonary. Right, and you know, CF is not the only disease we need to conquer. I mean, there are a lot of others that are I think going to - I think modulators are going to be a model for other genetic diseases. You know, while waiting for the definitive gene therapy sort of stuff.

DR KURLAND: Yes. And gene therapy's coming along for some of them anyway.

**DR KEENS:** Yeah. Right.

DR KURLAND: Which is, I mean, even better. And I absolutely agree with you.

**DR KEENS:** I think it's just been the transformational change in some of the diseases we deal with. And asthma. So, the other thing is, I mean, you know,



**asthma now is kind of a piece of cake because we've got so many good medications for most patients, at least. Yes. But you know, when I was an intern and resident and you were, you know, basically we had theophylline.**

DR KURLAND: That was it. We had IV theophylline when they got sick. And the long acting theophyllines were the "breakthrough".

**DR KEENS: Yeah. And IV isuprel. Were you guys doing isuprel drips?**

DR KURLAND: Yes, we, yeah. Unfortunately, I, I had the first case report of a fatality. Yeah.

**DR KEENS: Oh, well, we didn't, but it was really juggling bronchodilation versus tachycardia for those., But you know, those kids, asthmatics did not do well in those days. I mean, we didn't have very good treatment. No. And you know, if you were in the emergency room, you almost had a private practice of asthmatics. So that's another one that's not quite as dramatic as CF, but it but is so different compared to what it was.**

DR KURLAND (54:01): Yeah.

**DR KEENS: So, so yeah. Pulmonary is moving rapidly and there's just so much, I, I love the physiology. I think that's so much fun. What people are doing with bronchoscopy now. I mean, I've kind of stepped aside from that, but I was actually the second person here that did flexible bronchoscopy in our division and so I did it for quite a while. There's a lot now that's being done there that wasn't even done before. Yep. So, you know, you can kind of pick it - you like chronic care, you like acute care, you like gadgets, like the lab, you like procedures, doing bronchs. There's something for everybody.**

DR KURLAND: Well, I think that about sums it up and with that maybe we should call it a day for now. Is that okay?

**DR KEENS: Thank you.**

## CURRICULUM VITAE

**Name:** Thomas George Keens, M.D.  
**Present Position:** Professor of Pediatrics, Physiology and Neuroscience  
Keck School of Medicine of the University of Southern California

Attending Pediatric Pulmonologist.  
Director, Cystic Fibrosis Care Center  
Medical Director, Pulmonary Physiology Laboratory  
Division of Pediatric Pulmonology and Sleep Medicine  
Children's Hospital Los Angeles

**Citizenship:** United States of America

**Medical License:** State of California License Number G25220

### EDUCATION:

#### UNDERGRADUATE:

St. John's College, Santa Fe, New Mexico 1964-1968  
Degree: B.A. in Liberal Arts  
B.A. Thesis: Einstein and Poincaré: The Determination of the Geometry of Space.

#### MEDICAL:

University of California, San Diego, School of Medicine. La Jolla, CA. 1968-1972  
Degree: M.D.  
M.D. Thesis: The Regional Ventilation/Perfusion Profiles of the Pink Puffer and Blue Bloater: A Pathophysiologic Basis for their Divergent Pattern of Breathing.

#### PEDIATRIC INTERNSHIP AND RESIDENCY:

Children's Hospital Los Angeles. Los Angeles, California 1972-1975

#### POSTDOCTORAL FELLOWSHIP IN PEDIATRIC PULMONOLOGY:

Research Institute, Hospital for Sick Children. 1975-1977  
University of Toronto Faculty of Medicine. Toronto, Ontario, Canada.  
Pediatric Respiratory Physiology.  
Supervisors: Henry Levison, M.D., and A. Charles Bryan, M.D., Ph.D.  
Cystic Fibrosis Foundation (U.S.) Clinical Fellowship Grant

#### FELLOWSHIP IN MEDICAL EDUCATION:

2004-2007  
Division of Medical Education. Keck School of Medicine of the University of Southern California. Los Angeles, California.

### ACADEMIC APPOINTMENTS:

Professor of Physiology and Neuroscience (formerly Physiology and Biophysics) 1998-  
Professor of Pediatrics 1990-

Associate Professor of Pediatrics	1983-1990
Assistant Professor of Pediatrics	1977-1983
Keck School of Medicine of the University of Southern California Los Angeles, California.	

Adjunct Professor of Pediatrics	1999-2002
Visiting Professor of Pediatrics	1997-1999
University of California, Los Angeles, School of Medicine. Los Angeles, California.	

**EMPLOYMENT:**

Division of Pediatric Pulmonology and Sleep Medicine  
(formerly Division of Neonatology and Pediatric Pulmonology),  
Department of Pediatrics.  
Children’s Hospital Los Angeles. Los Angeles, California.

Attending Pediatric Pulmonologist	1977-
Medical Director of the Pulmonary Physiology Laboratory	1977-
Director, Cystic Fibrosis Care Center	1989-1991, 2011-
Director, Pediatric Pulmonology Fellowship Training Program	1992-2014
Attending Neonatologist	1977-87, 1994-1997
Attending Extracorporeal Membrane Oxygenation physician.	1986-87, 1994-1997
Associate Division Head for Pediatric Pulmonology	1988-1994

Committee on Clinical Investigations (Institutional Review Board).  
Children’s Hospital Los Angeles. Los Angeles, California.

Chair Emeritus	2014 -
Chair	1990-2014
Vice Chair	1983-1990
Acting Chair	1985-1986

Division of Pediatric Pulmonology	1997-2002
Department of Pediatrics Mattel Childrens Hospital at UCLA University of California, Los Angeles, School of Medicine. Los Angeles, California.	

**CERTIFICATION:**

Pediatric Pulmonology, American Board of Pediatrics	1986
Recertified, Pediatric Pulmonology	1995, 2002
Neonatal-Perinatal Medicine, American Board of Pediatrics	1983
American Board of Pediatrics	1978
National Board of Medical Examiners of the United States	1973
Council for Certification of IRB Professionals	2000
Recertified, Certified IRB Professional.	2003, 2006, 2009

**HONORS:**

- 1990. Morris and Mary Press Humanism Award. Children's Hospital Los Angeles. Los Angeles, California.
- 1992. Senator Daniel E. Boatwright Award "for extraordinary public service on behalf of Californians touched by SIDS". California Sudden Infant Death Syndrome Advisory Council. California Sudden Infant Death Syndrome Program. Long Beach, California.
- 1997. Fourth Apnea of Infancy Award. Annenberg Center for Health Education at Eisenhower. Rancho Mirage, California.
- 2015. Robert M. McAllister Faculty Mentoring Award. Children's Hospital Los Angeles. Los Angeles, California.
- 2016. Margaret Pfrommer Memorial Lecturer in Long-term Mechanical Ventilation. 2016 CHEST. American College of Chest Physicians. Los Angeles, California.
- 2019. Pediatric Founder's Award, Honoring the Pioneers of Pediatric Pulmonary Medicine and Research. Pediatric Scientific Assembly. American Thoracic Society. Dallas, Texas.
- 2022. Edwin L. Kendig, Jr. Award, for Lifetime Achievement in Pediatric Pulmonology. Section on Pediatric Pulmonology and Sleep Medicine. American Academy of Pediatrics.

**OTHER AWARDS:**

- 1962. Eagle Scout. Boy Scouts of America.
- 1990-94. Expert in Pneumology. International Panel of Experts. International Pediatric Association. Paris, France.
- 1990. Life Care Recognition Award in Recognition of Key Contributions to Home Mechanical Ventilation. LifeCare Respiratory Equipment. Boulder, Colorado.
- 1995. Humming-Bryan Fellowship for Teaching in Japan. National Children's Hospital. Tokyo, Japan.
- 1999. Ray Kroc Visiting Professor of Pediatrics. Milton S. Hershey Medical Center. Children's Hospital. Pennsylvania State University College of Medicine. Hershey, Pennsylvania.
- 2001. Fellowship for Foreign Scientists to Japanese Institutions. Japan Foundation for Emergency Medicine. Tokyo, Japan.
- 2001. Distinguished Service Award. Medical Staff. Children's Hospital Los Angeles. Los Angeles, California.
- 2003-2008. Member. Sub-Board for Pediatric Pulmonology. American Board of Pediatrics. Chapel Hill, North Carolina.  
2007-2008, Chair, Pediatric Pulmonology Subboard.
- 2006. Champion of Public Health. Centennial Celebration. Long Department of Health and Human Services.
- 2009-2011. Member, Board of Directors (representing Pediatric Subspecialties). American Board of Pediatrics. Chapel Hill, North Carolina.
- 2009. 8<sup>th</sup> Annual George Polgar Lectureship in Pediatric Pulmonology. The Children's Hospital of Philadelphia. Philadelphia, Pennsylvania.
- 2009. Second Annual Phillip George Lecturer in Pediatric Pulmonology. Le Bonheur Children's Medical Center. University of Tennessee School of Medicine. Memphis, Tennessee.

- 2009. Visiting Professor. Children's Medical Center at Dallas. University of Texas Southwestern School of Medicine. Dallas, Texas.
- 2010. Visiting Professor. C.S. Mott Children's Hospital. University of Michigan. Ann Arbor, Michigan.
- 2010. Drew Wiltsie Memorial Lecturer and Visiting Professor. Children's Hospital of Pittsburgh. Pittsburgh, Pennsylvania.
- 2014. Award of Merit. St. John's College Alumni Association. St. John's College. Santa Fe, New Mexico.
- 2015. Breath of Life Humanitarian Award. Los Angeles Chapter, Cystic Fibrosis Foundation. Los Angeles, California.
- 2016. In Grateful Appreciation for Over 20-Years of Outstanding Dedication and Service to CF Research. Therapeutic Development Network, Cystic Fibrosis Foundation. San Antonio, Texas.
- 2018. S, Michael Marcy M.D. Memorial Lecturer. Parmelee Spring Meeting, Los Angeles Pediatric Society. Los Angeles, California.
- 2019. Lifetime Achievement Award for Dedication to the SIDS Community. California Sudden Infant Death Syndrome Community. Long Beach, California.
- 2021. Fellow of the American Thoracic Society.

**SOCIETY MEMBERSHIPS:**

- American Physiological Society
- American Pediatric Society
- Society for Pediatric Research
- American Academy of Pediatrics, Fellow  
(Section on Diseases of the Chest)
- American Thoracic Society, Fellow  
(Pediatric Scientific Assembly)
- Sleep Research Society
- American College of Chest Physicians, Fellow
- Public Responsibility in Medicine and Research (PRIM&R; *formerly* Applied Research Ethics National Association).
- International Society for the Study and Prevention of Perinatal and Infant Death.
- Western Society for Pediatric Research
- California Thoracic Society  
(Respiratory Care Assembly)
- Los Angeles Pediatric Society, Life Membership
- International Brotherhood of Magicians  
Order of Merlin.
- The Academy of Magical Arts

**PROFESSIONAL ACTIVITIES (Active):**

- 1977- Medical Director. Pulmonary Function Laboratory. Children's Hospital Los Angeles. Los Angeles, California
- 1979- Committee on Clinical Investigations (Institutional Review Board). Children's Hospital Los Angeles. Los Angeles, California
- 1983-1990 Vice Chairman

- 1985-1986 Acting Chairman  
 1990-2014 Chairman  
 2014- Chairman Emeritus
- 1979- Southern California Regional SIDS Council. California Sudden Infant Death Syndrome Program. State of California Department of Health Services.  
 1984-1985, Moderator.  
 1990-1992, President.  
 1994-1996, President.
- 1990- California Sudden Infant Death Syndrome Advisory Council, State of California Department of Public Health.  
 1990-1992, 1994-1996. Ex-officio member.  
 1996-2006. California District IX of the American Academy of Pediatrics Representative.  
 2006- Member Appointed by California Department of Public Health.  
 2006-2008 Vice Chair.  
 2008- Chair.
- 2005- Developmental Physiology Working Group. International Society for the Study and Prevention of Perinatal and Infant Death.
- 2009- Member, Scientific Advisory Board. Sudden Unexplained Death in Childhood Program. Hackensack, New Jersey.
- 2011- Accreditation Appeals Panel for Pediatric Pulmonology. Accreditation Council on Graduate Medical Education. Chicago, Illinois.
- 2011- Director, Cystic Fibrosis Care Center. Children's Hospital Los Angeles. Los Angeles, California.
- 2013- Director, Therapeutic Development Center. Cystic Fibrosis Care Center. Children's Hospital Los Angeles. Cystic Fibrosis Foundation Therapeutic Development Network.

**PROFESSIONAL ACTIVITIES (Previous):**

- 1970-1972. Board of Directors. Tuberculosis and Respiratory Diseases Association of San Diego and Imperial Counties. San Diego, California
- 1978-1992. Childrens Lung Disease Committee. American Lung Association of Los Angeles County. Los Angeles, California  
 1979-1980 Chairman. 1982-1983 Vice Chairman
- 1982-1985. Pediatric Pulmonary Consultant. Department of Pediatrics. Kern Medical Center. Bakersfield, California
- 1982-1990. Board of Directors. Greater Los Angeles Chapter. National Sudden Infant Death Syndrome Foundation. Los Angeles, California
- 1983-1984. Annual Meeting Program Committee (Pulmonology Subspecialty Section). Society for Pediatric Research. San Francisco, California
- 1984-1991. Executive Planning Committee. Annual Conference on Apnea of Infancy. Annenberg Center for Health Sciences. Eisenhower Medical Center. Rancho Mirage, California
- 1984-2005. Chairman and Member, Ad Hoc Committees for Faculty Promotion. Faculty Appointments and Promotions Committee. University of Southern California School of Medicine, Los Angeles, California
- 1985-1986. Committee on Mechanical Ventilation in the Home and at Alternate Community Sites. American College of Chest Physicians. Chicago, Illinois
- 1987-1988. Chairperson. Physician and Research Council. National Association of Apnea Professionals

- 1988-1994. Associate Division Head for Pediatric Pulmonology. Head, Pediatric Pulmonology Section. Division of Neonatology and Pediatric Pulmonology. Children's Hospital Los Angeles. Los Angeles, California
- 1988-1990. Consultant on Infant Sleep Apnea. Diagnostic Classification Steering Committee. American Sleep Disorders Association. New York, New York
- 1989-1990. Chairman, The Lung Club. Society for Pediatric Research. Anaheim, California
- 1989-1992. Board of Directors. American Lung Association of Los Angeles County.
- 1989-1990. State of California Sudden Infant Death Syndrome Advisory Committee. March of Dimes Birth Defects Foundation. California State Senate. Sacramento, California
- 1989-1994. Deputy Division Head. Division of Neonatology and Pediatric Pulmonology. Children's Hospital Los Angeles. Los Angeles, California
- 1989-1991. Acting Director, Cystic Fibrosis Center. Pediatric Pulmonology Section. Division of Neonatology and Pediatric Pulmonology. Children's Hospital Los Angeles. Los Angeles, California
- 1990-1995. Sudden Infant Death Syndrome Uniform Autopsy Protocol Development Committee. Maternal and Child Branch. State of California Department of Health Services. Sacramento, California
- 1990-2021. Ethics Resource Committee. Children's Hospital Los Angeles. Los Angeles, California.
- 1990-2000. Judge and Chair of Medicine and Health, Microbiology, Pharmacology, Physiology and Zoology Categories for Junior and Senior High School Students. Los Angeles County Science Fair. Los Angeles County Office of Education. Los Angeles, California.
- 1990-1994. Cub Scout Pack 515. San Gabriel Valley Council. By Scouts of America. La Canada, California.  
 1990-1992: Assistant Cubmaster.  
 1992-1994: Cubmaster.  
 1992-1994: Webelos Den Leader.
- 1991-1994. Committee on Home Mechanical Ventilation. American Thoracic Society. New York, New York.
- 1991-1992. Consultant in Pediatric Pulmonology. American Board of Sports Medicine. Atlanta, Georgia.
- 1991-1992. Annual Meeting Program Committee (Pulmonology Subspecialty Section). Society for Pediatric Research. Baltimore, Maryland.
- 1991-1993. Advisory Committee. Study of the Impacts of Air Pollution on Urban Children. Natural Resources Defense Council. San Francisco, California.
- 1991-1999. Chairman, Protocol Development. Multi-Centered Study on Home Apnea Monitoring in Infants at Increased Risk for SIDS (1 U01HD29056 01). National Institute of Child Health and Human Development. Bethesda, Maryland.
- 1992-2014. Director, Pediatric Pulmonology Fellowship Training Program. Children's Hospital Los Angeles. Los Angeles, California.
- 1992-1994. Consultant in Primate Respiratory Disorders. Greater Los Angeles Zoo. Los Angeles, California.
- 1993-1996. Institutional Biosafety Committee. Children's Hospital Los Angeles. Los Angeles, California.
- 1993-1998. Consensus Development Committee on Mechanical Ventilation Beyond the Critical Care Unit. American College of Chest Physicians. Northbrook, Illinois.

- 1994-1996. Assistant Scoutmaster. Boy Scout Troop 509. San Gabriel Valley Council. By Scouts of America. La Canada, California.
- 1994-1997. Extracorporeal Membrane Oxygenation (ECMO) Coordinating Committee. Children's Hospital Los Angeles. Los Angeles, California.
- 1996-2008. Board of Directors. Sudden Infant Death Syndrome Foundation of Southern California. Pasadena, California.
- 1996-1998. Board of Directors. Mt Wilson Vista Girl Scout Council. Girl Scouts of the U.S.A. Arcadia, California.
- 1996-2004. Developmental Physiology Working Party. Global Strategy Task Force for SIDS. Melbourne, Victoria, Australia.
- 1996-1999. Consensus Development Committee on the Diagnosis and Management of Congenital Central Hypoventilation Syndrome. American Thoracic Society. New York, New York.
1998. Co-Chair. Clinical Research Task Force. Children's Hospital Los Angeles Research Institute. Los Angeles, California.
- 2001-2002. Clinical Research Task Force. Children's Hospital Los Angeles. Los Angeles, California.
- 2002-2010. Member, Academic Council. Children's Hospital Los Angeles. Los Angeles, California.
- 2002-2005. Consultant. Japanese National SIDS Project. Tokyo Women's Medical University. Shinjuku, Tokyo, Japan.
- 2003-2008. Member. Sub-Board for Pediatric Pulmonology. American Board of Pediatrics. Chapel Hill, North Carolina.
- 2007-2008. Chair, Pediatric Pulmonology Subboard.
- 2003-2011. Director, Pediatric Subspecialty Fellowship Education. Department of Pediatrics. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 2004-2010. Member, Saban Research Institute Council. Children's Hospital Los Angeles. Los Angeles, California.
- 2004-2011. Vice Chair, Children's Hospital Institute for Medical Education. Children's Hospital Los Angeles. Los Angeles, California.
- 2007-2010. Consensus Development Committee on the Diagnosis and Management of Congenital Central Hypoventilation Syndrome. American Thoracic Society. New York, New York.
- 2009-2011. Member, Board of Directors (representing Pediatric Subspecialties). American Board of Pediatrics. Chapel Hill, North Carolina.
2009. Member, Executive Committee.
- 2009-2011. ATS Conference Pediatric Program Committee. American Thoracic Society. New York, New York.
- 2009-2011. Edwin L. Kendig, Jr., Award Committee. Section on Pediatric Pulmonology. American Academy of Pediatrics.
- 2012-2014. Education Committee. American Thoracic Society. New York, New York.
- 2013-2018. Board of Directors. Cystic Fibrosis Foundation, Los Angeles Chapter. Los Angeles, California.
- 2014-2018. Medical Advisory Board. Cystic Fibrosis Research, Inc. Palo Alto, California.

**TEACHING (Classes Taught):**

- 1996- Course Instructor, Respiratory Physiology. Biologic Systems II. 1<sup>st</sup> year Pharmacy students. School of Pharmacy. University of Southern California. Los Angeles, California.



- 2004-2011. Course Director. Core Curriculum on Scholarship Skills. 1<sup>st</sup> year Postdoctoral Fellows in Pediatric Subspecialties. Department of Pediatrics. Children's Hospital Los Angeles. Los Angeles, California.
- 2004-2007. Guest Lecturer: "Sudden Infant Death Syndrome and Bedsharing". Health Promotion and Disease Prevention; HP-402: Maternal and Child Health. Undergraduate course from the Department of Preventive Medicine, University of Southern California. Los Angeles, California.
- 2004- Course Instructor, Respiratory Physiology. Respiratory Organ System. 2<sup>nd</sup> year Medical Students. Keck School of Medicine. University of Southern California. Los Angeles, California.
- 2005- Course Instructor and Coordinator, Respiratory Physiology. INTD 572: Medical Physiology. Graduate Students, Program in the Biological and Biomedical Sciences (PIBBS). Keck School of Medicine. University of Southern California. Los Angeles, California.
- 2004- Course Instructor, Introduction to Medical Science (Core Principles). 1<sup>st</sup> year Medical Students. Keck School of Medicine. University of Southern California. Los Angeles, California.
- 2006-2020. Course Instructor, INTD500: Ethics and Scientific Accountability. Children's Hospital Los Angeles, University of Southern California. Los Angeles, California.
- 2008- Guest Lecturer: "Mechanisms of Pulmonary Diseases". N230B: Advanced Pathophysiology. Nurse Practitioner Program. School of Nursing. University of California, Los Angeles. Los Angeles, California.
- 2012- MEDS 260: Challenges in the Forefront of Biomedical Ethics. University of Southern California. Los Angeles, California.
- 2015- Guest Lecturer: "Pulmonary Physiology and Pathophysiology". Masters Entry Clinical Nurses Program. School of Nursing. University of California, Los Angeles. Los Angeles, California.
- 2016- Course Instructor. "Acid Base Balance", and "Gas Exchange and V/Q". Pediatric Pulmonology Board Review Course. American College of Chest Physicians and American Academy of Pediatrics.

#### **RESEARCH GRANTS:**

- 1982-1983. T.G. Keens. Sudden Infant Death Syndrome. Las Madrinas Guild. \$30,000.
- 1982-1993. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Guild for Infant Survival, Los Angeles County. \$60,000.
- 1982-1992. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Guild for Infant Survival -- Orange County. \$95,000.
- 1982-1984. T.G. Keens. Respiratory control in sudden infant death syndrome. Biomedical Research Support Grant. Children's Hospital Los Angeles. \$19,000.
- 1985-1989. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Kern County Chapter, Guild for Infant Survival. \$4,600.
- 1987-1992. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Inland Empire Guild for Infant Survival. \$2,025.
- 1987-1990. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Greater Los Angeles Chapter. National Sudden Infant Death Syndrome Alliance. \$22,250.
- 1987-1991. T.G. Keens. Apnea of Infancy. The Ruth and Vernon Taylor Foundation. Denver, Colorado. \$8,000.

- 1988-1990. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Washington State Sudden Infant Death Syndrome Foundation. \$32,500.
- 1988-1989. T.G. Keens and S.L. Davidson Ward. Abnormal Hypoxic Arousal Responses and Increased Risk for SIDS. National Center for the Prevention of Sudden Infant Death Syndrome (Baltimore, Maryland). \$103,000.
- 1989-1992. T.G. Keens and S.L. Davidson Ward. Hypoxic Arousal Responses and Increased Risk for SIDS. (1 R01 HD22696-01A1) National Institute of Child Health and Human Development. \$546,889.
- 1989-1990 S.L. Davidson Ward and T.G. Keens. Sudden Infant Death Syndrome. Junior Women's Club of Orange. \$5,000.
- 1990-1992. D. Gozal, and T.G. Keens. The ventilatory response to hypoxia and hypercapnia in cystic fibrosis before and after a short exposure to high-inspired oxygen. H.N. & Frances C. Berger Foundation Grant. \$60,000.
- 1991-1996. T. Hoppenbrouwers and T.G. Keens. Home Apnea Monitoring in Infants at Increased Risk for SIDS. (1 U01HD29056 01) National Institute of Child Health and Human Development. \$821,676.
- 1992-1995. T.G. Keens, and S.L. Davidson Ward. Sudden Infant Death Syndrome. Sudden Infant Death Syndrome Alliance. Baltimore, Maryland. \$134,000.
1992. T.G. Keens and S.L. Davidson Ward. National Survey of Infant Sleeping Position. (1 R01 HD22696-01A1) National Institute of Child Health and Human Development. \$117,868.
1993. T.G. Keens and S.L. Davidson Ward. Sudden Infant Death Syndrome. Guild for Infant Survival, San Diego County. \$1,000.
- 1998-2000. T.G. Keens and S.L. Davidson Ward. Effect of Development and Sleeping Position on Hypoxic and Hypercapnic Arousal Responses. Sudden Infant Death Syndrome Alliance. \$156,236.
- 2002-2004. C.W. Sullivan. (T.G. Keens, co-investigator). SCCISSARS: An e-Solution to Protect Human Subjects. National Institutes of Health (1 S07 RR018274-01. \$700,000.
2004. T.G. Keens. Sudden Infant Death Syndrome. Sudden Infant Death Syndrome Foundation of Southern California. \$7,500.
- 2004-2007 T.D. Coates. (T.G. Keens, co-investigator). "Human Models of Sickle Cell Vascular Damage". National Heart, Lung, and Blood Institute: 1R01HL071801 \$800,000.
- 2005-2006. P. Malik (T.G. Keens, co-investigator). "Role of Placenta Growth Factor in Sickle Cell Acute Chest Syndrome". National Heart, Lung, and Blood Institute: RFA-HL-04-015.
- 2005-2009 C.J.L. Newth (T.G. Keens, co-investigator). "Collaborative Pediatric Critical Care Research Network". National Institute of Child Health and Human Development: 1 U10 HD050012-01 \$1,765,491.
- 2006-2007 M.C.K. Khoo (T.G. Keens, co-investigator). "Autonomic and Metabolic Dysfunction in Obese Children with Sleep Disordered Breathing". University of Southern California Center on Transdisciplinary Research on Energetics and Cancer. National Cancer Institute: U54 CA 16848. \$50,000.
- 2006-2008 T.G. Keens. "A Multi-Center, Double-Blind, Placebo-Controlled Randomized, Efficacy and Safety Study of Denufosal Tetrasodium (INS37217) Inhalation Solution in Patients With Mild Cystic Fibrosis Lung Disease (Tiger-1; NCT00357279)". *Merck Sharp & Dohme Corp.*
- 2007-2010 M.C.K. Khoo (T.G. Keens, co-investigator). "Markers of Autonomic and Metabolic Control in Childhood Obesity". National Heart Lung and Blood Institute: HL090451. \$724,979.

- 2006-2008 T.G. Keens. “A Multi-Center, Double-Blind, Placebo-Controlled Randomized, Efficacy and Safety Study of Denufosal Tetrasodium (INS37217) Inhalation Solution in Patients With Mild Cystic Fibrosis Lung Disease (Tiger-1; NCT00357279)”. *Merck Sharp & Dohme Corp.*
- 2008-2010 T.G. Keens. “A Phase 3, International, Multi-Center, Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, Efficacy and Safety Study of Denufosal Tetrasodium Inhalation Solution in Patients With Cystic Fibrosis Lung Disease and FEV1 Greater Than or Equal to 75% Predicted But Less Than or Equal to 110% Predicted (Tiger-2; NCT00625612)”. *Merck Sharp & Dohme Corp.*
- 2010-2014 M.C.K. Khoo (T.G. Keens, co-investigator). “Model Based Phenotyping of Obstructive Sleep Apnea Syndrome in Pediatric Obesity Using Dynamic MR Imaging”. National Heart Lung and Blood Institute: 1R01HL105215-01. \$878,588.
- 2011-2012 T.G. Keens. “A Phase 3, Multi-center, Multinational, Randomized, Double-blind, Placebo controlled Study to Evaluate the Efficacy and Safety of MP-376 (Levofloxacin Inhalation Solution; Aeroquin) in Stable Cystic Fibrosis Patients (MPEX 207; NCT01180634)”. *MPEX Pharmaceuticals, Inc.* \$15,000.
- 2011-2012 T.G. Keens. “A Phase 3, Open-label, Randomized Trial to Evaluate the Safety and Efficacy of MP-376 Inhalation Solution (Aeroquin™) Versus Tobramycin Inhalation Solution (TIS) in Stable Cystic Fibrosis Patients (MPEX 209; NCT01270347)”. *MPEX Pharmaceuticals, Inc.* \$17,000.
- 2011-2012 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$78,740.
- 2011- T.G. Keens. “A Prospective, 5-year Registry Study to Monitor the Susceptibility to Aztreonam of Pseudomonas aeruginosa (PA) Isolates from Patients with Cystic Fibrosis in the United States (GX-US-205-0128; NCT01375036)”. *Gilead Sciences, Inc.*
- 2012-2013 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$68,420.
- 2013 T.G. Keens. "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS12Y0. \$98,000.
- 2013-2015 T.G. Keens. “A Phase 3, Randomized, Double-Blind, Placebo-Controlled, Multicenter Study of Aztreonam for Inhalation Solution (AZLI) in a Continuous Alternating Therapy (CAT) Regimen of Inhaled Antibiotics for the treatment of Chronic Pulmonary pseudomonas aeruginosa Infection in Subjects with Cystic Fibrosis (GS-US-205-0170; NCT01641822).” *Gilead Sciences, Inc.* \$27,000.
- 2013-2014 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$71,190.
- 2013 T.G. Keens. "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS12Y0. \$98,000.
- 2013-2014 T.G. Keens. “A Phase 3, Randomized, Double-Blind, Placebo-Controlled, Parallel-Group Study to Evaluate the Efficacy and Safety of Lumacaftor in Combination With Ivacaftor in Subjects Aged 12 Years and Older With Cystic Fibrosis, Homozygous for the F508del-CFTR Mutation (VX12-809-103; NCT01807923)”. *Vertex Pharmaceuticals.* \$119,000.
- 2013- T.G. Keens. “A Point Prevalence Study to Evaluate the Prevalence of Antibodies to Selected Porcine Viruses in Patients with Cystic Fibrosis Who Are Receiving Porcine-Derived Pancreatic Enzyme Replacement Therapy: A Harmonized Protocol Across Sponsors (JSPP-12-01; NCT01858519).” *AbbVie Inc., Aptalis Pharma U.S. Inc., Janssen Research & Development, L.L.C.*
- 2013- T.G. Keens. “A Phase 3, Rollover Study to Evaluate the Safety and Efficacy of Long-term Treatment With Lumacaftor in Combination With Ivacaftor in Subjects Aged 12 Years and

Older With Cystic Fibrosis, Homozygous or Heterozygous for the F508del CFTR Mutation (VX12-809-105; NCT01931839)". *Vertex Pharmaceuticals*.

2013 T.G. Keens. Leadership and Learning Collaborative 8 (LLC8), *Cystic Fibrosis Foundation*. \$13,160

2014 T.G. Keens (7.5%). "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS13Y0. \$86,000.

2014-2015 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$82,820.

2014 T.G. Keens (7.5%). "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS13Y0. \$86,000.

2014-2015 T.G. Keens. "CHLA eQUIP-CR Coaching Program Travel Grant." *Cystic Fibrosis Foundation Therapeutics, Inc.:* KEENS14PE0. \$3,083.

2014-2015 T.G. Keens. "A 24-week, Open-label, parallel group, Interventional Phase IV study Comparing Tobramycin Inhalation Powder (TIP) administered Once Daily Continuously versus TIP administered BID in 28 day on/28 day off cycles for the treatment of pulmonary *Pseudomonas aeruginosa* in patients with Cystic Fibrosis (CTBM100CUS03; NCT02015663)". *Novartis Pharmaceuticals*. \$36,000.

2014-2015 T.G. Keens. "A multi-center, human factors engineering (HFE) usability study in cystic fibrosis patients to validate the approved instructions for use (IFU) of TOBI® Podhaler™ (tobramycin inhalation powder) using placebo capsules (CTBM100C2412; NCT02178540)". *Novartis Pharmaceuticals*. \$31,000.

2014- T.G. Keens. "A Phase 3 Efficacy and Safety Study of Ataluren (PTC124®) in Patients with Nonsense Mutation Cystic Fibrosis (PTC124-GD-021-CF; NCT02139306)". *PTC Pharmaceuticals*.

2015-2016 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$71,800.

2015 T.G. Keens (7.5%). "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS14Y0. \$99,000.

2015 T.G. Keens. "TDN Spring Meeting Supplement." *Cystic Fibrosis Foundation Therapeutics, Inc.:* KEENS15Y1. \$5,630.

2015-2018 T.G. Keens. "Additional Research Coordinator (ARC) Award." *Cystic Fibrosis Foundation Therapeutics, Inc.:* KEENS14Y4. Y1: \$97,200, Y2: \$81,000, Y3: \$51,029

2015- T.G. Keens. "A Two-part Multicenter Prospective Longitudinal Study of CFTR-dependent Disease Profiling in Cystic Fibrosis (PROSPECT-OB-14)". CFF Therapeutic Development Network, *Seattle Children's Hospital*.

2015- T.G. Keens. "A Randomized, Double-blind, Placebo-controlled, Parallel-group Study to Evaluate the Safety and Efficacy of P-1037 Solution for Inhalation in Patients with Cystic Fibrosis (CF) (PS-G201; NCT02343445)". *Parion Sciences, Inc.*

2015- T.G. Keens. "A Phase 3, Double Blind, Placebo Controlled, Parallel Group Study to Evaluate the Efficacy and Safety of Lumacaftor in Combination With Ivacaftor in Subjects Aged 6 Through 11 Years With Cystic Fibrosis, Homozygous for the F508del CFTR Mutation (VX14-809-109)". *Vertex Pharmaceuticals*.

2015 T.G. Keens (7.5%). "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS14Y0. \$99,000.

2015 T.G. Keens. "TDN Spring Meeting Supplement." *Cystic Fibrosis Foundation Therapeutics, Inc.:* KEENS15Y1. \$5,300.

2015-2018 T.G. Keens. "Additional Research Coordinator (ARC) Award." *Cystic Fibrosis Foundation Therapeutics, Inc.:* KEENS14Y4. Y1: \$97,200, Y2: \$81,000.

- 2015-2018 T.G. Keens. Cystic Fibrosis Learning Network collaborative, *Cystic Fibrosis Foundation*. \$79,800
- 2015-2018 T.G. Keens. Mental Health Associate Grant, *Cystic Fibrosis Foundation*. \$161,824
- 2015-2018 T.G. Keens. "A Phase 3, Double Blind, Placebo Controlled, Parallel Group Study to Evaluate the Efficacy and Safety of Lumacaftor in Combination With Ivacaftor in Subjects Aged 6 Through 11 Years With Cystic Fibrosis, Homozygous for the F508del CFTR Mutation (VX14-809-109)". *Vertex Pharmaceuticals*.
- 2016-2017 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$140,750.
- 2016-2018 T.G. Keens. "OPTIMIZing Treatment for Early Pseudomonas aeruginosa Infection in Cystic Fibrosis The OPTIMIZE Multicenter, Placebo-Controlled, Double-Blind, Randomized Trial: OPTIMIZE-IP-12". Therapeutic Development Network, Cystic Fibrosis Foundation.
- 2017-2018 T.G. Keens. Cystic Fibrosis Health Check Pilot Program, *Cystic Fibrosis Foundation*. \$10,000
- 2017-2018 T.G. Keens. "CF Center Grant." *Cystic Fibrosis Foundation*: CC-014-14 \$144,790.
2017. T.G. Keens (7.5%). "Therapeutic Development Center." *Cystic Fibrosis Foundation Therapeutics, Inc.* KEENS14Y0. \$76,950.
- 2017- T.G. Keens. "Prospective, Randomized, Placebo-Controlled Trial of the Efficacy and Safety of Inhaled Nitric Oxide N(NO) in Cystic Fibrosis (CF) Patients. Novoteris Pharmaceuticals.
- 2017- T.G. Keens. "Testing the Effect of Adding Chronic Azithromycin to Inhaled Tobramycin. A randomized, placebo-controlled, double-blinded trial of azithromycin 500mg thrice weekly in combination with inhaled tobramycin (the TEACH study)". Therapeutic Development Network, Cystic Fibrosis Foundation.
- 2017- T.G. Keens. "A Phase 3, Open-label Study to Evaluate the Pharmacokinetics, Safety, and Tolerability of VX-661 in Combination With Ivacaftor in Subjects 6 Through 11 Years of Age with Cystic Fibrosis, Homozygous or Heterozygous for the F508del-CFTR Mutation Vertex Study Number: VX15-661-113". Vertex Pharmaceuticals.
- 2017- T.G. Keens. "Phase 3b, Randomized, Double-blind, Placebo controlled, Parallel Group Study to Assess the Safety, Efficacy, and Tolerability of Tezacaftor/Ivacaftor (TEZ/IVA) in an Orkambi experienced Population Who Are Homozygous for the F508del-CFTR Mutation: Vertex Study Number: VX16-661-114". Vertex Pharmaceuticals.
- 2018- T.G. Keens. "Collection of Gene Mutations for Laboratory Quality Assurance". Sequoia Foundation and CDCP.
- 2018- T.G. Keens. "A Two-Part Multicenter Prospective Longitudinal Study of CFTR-Dependent Disease Profiling in Cystic Fibrosis (PROSPECT-OB-14)". Therapeutic Development Network, Cystic Fibrosis Foundation.
- 2018- T.G. Keens. "A Phase III, Randomized, Double-Blind, Placebo-Controlled Study of AeroVanc for the Treatment of Persistent Methicillin-Resistant Staphylococcus Aureus Lung Infection in Cystic Fibrosis Patients". Savara Pharmaceuticals.
- 2018- T.G. Keens. "A Phase 3, Open-label, Rollover Study to Evaluate the Safety and Efficacy of Long-term Treatment With Tezacaftor in Combination With Ivacaftor in Subjects With Cystic Fibrosis Aged 6 Years and Older, Homozygous or Heterozygous for the F508del-CFTR Mutation". Vertex Pharmaceuticals.
- 2018- T.G. Keens. "A Phase 3, Randomized, Double-blind, Controlled Study Evaluating the Efficacy and Safety of VX-445 Combination Therapy in Subjects With Cystic Fibrosis Who Are Heterozygous for the F508del Mutation and a Minimal Function Mutation (F/MF)". Vertex Pharmaceuticals.

- 2018- T.G. Keens. "A Phase 3, Randomized, Double-blind, Controlled Study Evaluating the Efficacy and Safety of VX-445 Combination Therapy in Subjects With Cystic Fibrosis Who Are Homozygous for the F508del Mutation (F/F)". Vertex Pharmaceuticals.
- 2018- T.G. Keens. "A Phase 3, Open-label Study Evaluating the Long-term Safety and Efficacy of VX-445 Combination Therapy in Subjects With Cystic Fibrosis Who Are Homozygous or Heterozygous for the F508del Mutation". Vertex Pharmaceuticals.
- 2018- T.G. Keens. "A Phase 3, Open-label, Rollover Study to Evaluate the Safety and Efficacy of Long-term Treatment With Tezacaftor in Combination With Ivacaftor in Subjects With Cystic Fibrosis Aged 6 Years and Older, Homozygous or Heterozygous for the F508del-CFTR Mutation". Vertex Pharmaceuticals.
- 2018-2023. T.G. Keens, PI at CHLA. Overall PI, D.M. Cooper. Transforming Exercise Testing and Physical Activity Assessment in Children: New Approaches to Advance Clinical Translational Research in Child Health. National Heart Lung, and Blood Institute. U01TR002004. \$1,121,981.
- 2019-2021. T.G. Keens, PI. "Implementation of Outpatient Clinical Pharmacy Services". Implementation of Outpatient Clinical Pharmacy Services of the Cystic Fibrosis Foundation (CFF). Application #: 628250. \$150,000.

**PEER REVIEWER: Journals:**

Journal of Applied Physiology  
 Science  
 New England Journal of Medicine.  
 American Journal of Respiratory and Critical Care Medicine  
*(formerly American Review of Respiratory Disease)*  
 Pediatric Research  
 Pediatrics  
 Journal of Pediatrics  
 Respiration Physiology  
 Sleep  
 Chest  
 Pediatric Pulmonology  
 European Respiratory Journal  
 Respiratory Medicine  
 Medicine, Exercise, Nutrition, and Health  
 Journal of Neuropathology and Experimental Neurology  
 European Journal of Pediatrics  
 Free Radical Biology and Medicine  
 Clinical Pediatrics  
 Journal of Perinatology  
 The Journal of Respiratory Diseases  
 American Journal of the Medical Sciences.  
 Cancer Management

**PEER REVIEWER: Research Grants:**

- 1981-84. Selection Committee, McAllister Endowment Research Fellowships. Children's Hospital Los Angeles. Los Angeles, California.
- 1984-87. Grant Reviewer, Health Sciences Research Committee. Chicago Lung Association. Chicago, Illinois.
- 1985-90. Grant Reviewer. Clinical Research Grants Program. March of Dimes Birth Defects Foundation. White Plains, New York.
- 1986. Grant Reviewer, Chronic Pulmonary Disease Research Program. The Flinn Foundation. Phoenix, Arizona.
- 1986-87. Grant Reviewer, American Thoracic Society. New York, New York, New York.
- 1986-87. Grant Reviewer, Behavioral Medicine Study Section. National Institutes of Health, Bethesda, Maryland.
- 1987-90. Grant Reviewer. Basic Research Grants Program. March of Dimes Birth Defects Foundation. White Plains, New York.
- 1988-91. Grant Reviewer. Medical Research Council of Canada. Ottawa, Canada.
- 1988-92. Investigative Group Fellowship Awards Study Section and Site Visitor. Greater Los Angeles Affiliate. American Heart Association. Los Angeles, California.
- 1990. Merit Review Board for Respiration. Veterans Administration. Perry Point, Maryland.
- 1990. Field Reviewer. Federal Drug Administration Office of Orphan Products Development. Rockville, Maryland.
- 1991-1992-94. Grant Reviewer. National Association of Apnea Professionals. Toledo, Ohio.
- 1993. Grant Reviewer. James H. Zumberge Faculty Research and Innovation Fund. University of Southern California. Los Angeles, California.
- 1993-94. Grant Reviewer. National SIDS Council of Australia, Ltd. Hawthorn, Victoria, Australia.
- 1996-1998. Grant Reviewer. The Hospital for Sick Children Foundation. Toronto, Ontario, Canada.
- 2003. Chair, Study Section ZHD1 MCHG-B 27 1, RFA: Pilot Clinical Trials in the Epidemiology, Prevention, and Treatment of Respiratory Failure in Children. National Institute of Child Health and Human Development. Bethesda, Maryland.
- 2004. Grant Reviewer. Fondazione Telethon. Milano, Italy.
- 2005. The 2006 Japan Prize. "The Development of Novel Therapeutic Concepts and Technologies". The Science and Technology Foundation of Japan. Tokyo, Japan.
- 2007. Rett Syndrome Research Foundation. Cincinnati, Ohio.
- 2017. Sudden Unexpected Death in Childhood Foundation. Cedar Grove, New Jersey.\
- 2019. ROHHAD Association. Alexandria, Scotland, United Kingdom.

**PEER REVIEWER: Protection of Human Research Subjects.**

- 1991. Consultant. Institutional Review Board. Children's National Medical Center. Washington, D.C.
- 1996-1997. Division of Human Subjects Protection. Office for Protection from Research Risks. National Institutes of Health. Bethesda, Maryland.
- 1997. Health Research Council of New Zealand. Auckland, New Zealand.
- 1997. Department of Pediatrics. University of Chicago. Chicago, Illinois.
- 1997. Ethics Committee. Health Research Council of New Zealand. Auckland, New Zealand.

2003. Committee on Clinical Research in Children. Institute of Medicine of the National Academies. Irvine, California.

**PEER REVIEWER/EXAMINER: Graduate Student Theses:**

1977. Master of Science Thesis by John W. Wong. "The effects of gravity on mucous clearance. Department of Medical Biophysics". University of Toronto. Toronto, Ontario, Canada.
1993. Doctor of Philosophy Thesis by Karen A. Waters. "Sleep Disordered Breathing and Its Treatment in Children. Faculty of Medicine". University of Sydney. Sydney, New South Wales, Australia.
1994. Doctor of Philosophy Thesis by Frances A. McNamara. "Sleep Disordered Breathing in Infants, Its Evolution and Treatment". Faculty of Medicine. University of Sydney. Sydney, New South Wales, Australia.
1995. Doctor of Philosophy Thesis by Dominic A. Fitzgerald. "Manifestations of Occult Hypoxemia in Chronic Neonatal Lung Disease". Faculty of Medicine. University of Sydney. Sydney, New South Wales, Australia.
2000. Doctor of Philosophy Thesis by Lin Gao. "Glutathione Metabolism and Transport in Cystic Fibrosis Airway Epithelia". Department of Molecular Pharmacology and Toxicology. School of Pharmacy, University of Southern California. Los Angeles, California.
2005. Doctor of Philosophy Thesis by Zheng Lin. "Noninvasive assessment of cardiovascular autonomic control in children with obstructive sleep apnea syndrome and congenital central hypoventilation syndrome". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2006. Doctor of Philosophy Thesis by Jaree Chaicharn. "Time-varying closed-loop modeling of circulatory control in sleep disordered breathing". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2007. Doctor of Philosophy Thesis by Suradej Treiriluxana. "Ultradian Rhythmicity of autonomic function in Sleep-Disordered Breathing". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2008. Master of Arts Thesis by Peggy Sisson. "The Impact of Losing a Child to Sudden Infant Death Syndrome (SIDS) on Family Relationships from a Mother's Perspective". Department of Human Development. Pacific Oaks College, Pasadena, California.
2008. Doctor of Philosophy Thesis by Wenli Wang. "Effects of Impaired Glucose Tolerance on Cardiac Autonomic Function". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2008. Doctor of Philosophy Thesis by Djordje Popovic. "Utility of Forehead EEG for Sleep Staging". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2009. Doctor of Philosophy Thesis by Limei Cheng. "Integrative Modeling of Autonomic and Metabolic Interactions in Sleep-Disordered Breathing". Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2010. Doctor of Philosophy Thesis by Orquidea Rogers. "Exogenous progenitor Amniotic Fluid Stem Cells (AFSCs) as a therapy in lung injury and fibrosis.". Department of Systems Biology. Keck School of Medicine, University of Southern California. Los Angeles, California.



2010. Doctor of Philosophy Thesis by Flavia Maria Guerra de Sousa Aranha Oliveira. “Autonomic and Metabolic Effects of Obstructive Sleep Apnea in Childhood Obesity”. Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2016. Doctor of Philosophy These by Leonardo Nava-Guerra. “Development of Physiologic Biomarkers of Autonomic Reactivity, Intermittent Hypoxemia, and Sleep Fragmentation in Obstructive Sleep Apnea”. Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.
2016. Doctor of Philosophy These by Winston H. Tran. “Model-Based Stability Assessment of Ventilatory Control in Overweight Adolescents with Obstructive Sleep Apnea During NREM Sleep.” Department of Biomedical Engineering. Viterbi School of Engineering, University of Southern California. Los Angeles, California.

### **PUBLICATIONS (Peer Review):**

1. Kattan, M., T.G. Keens, J.G. Lapierre, H. Levison, A.C. Bryan, and B.J. Reilly. Pulmonary function abnormalities in symptom-free children after bronchiolitis. *Pediatrics*, 59: 683-688, 1977.
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#### **PUBLISHED ABSTRACTS:**

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- sleep apnea in childhood obesity. *American Journal of Respiratory and Critical Care Medicine*, 181: A2541, 2010.
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272. Diep, B., A. Wang, S.S. Kun, J.G. McComb, D. Shaul, C.E. Shin, T.G. Keens, and I.A. Perez. Can congenital central hypoventilation syndrome patients be ventilated by diaphragm

- pacing without tracheostomy? *American Journal of Respiratory and Critical Care Medicine*, 191: A2615, 2015.
273. Gwaltney, D., M. Vanderlaan, S. Davidson Ward, I.A. Perez, and T.G. Keens. Do congenital central hypoventilation patients sigh, sneeze, or cough? *American Journal of Respiratory and Critical Care Medicine*, 191: A6341, 2015.
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  274. Salinas, D.B., C. Azen, S. Young, T. Keens, M. Kharrazi, and R. Parad. Phenotypes associated with (IVS8)-(TG)M-5T increasing TG repeat length in children with a positive California cystic fibrosis newborn screen. *Pediatric Pulmonology*, 41 (Suppl.): 380, 2015.
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  279. Chang, G.Y., A. Karnwal, T. Salazar, S.S. Kun, J. Ellashek, C. Shin, J. McComb, T.G. Keens, and I. Perez. Peri-operative outcomes of congenital central hypoventilation syndrome patients undergoing general anesthesia. *American Journal of Respiratory and Critical Care Medicine*, 195: A4137, 2017.
  280. Hong, H., M. Bansal, T. Keens, C. Lew, I. Perez, E. Sohn, K. Haynes, J. Hammoundeh, M. Urata, and S.D. Ward. Body position evaluated during sleep by polysomnography in infants with Pierre-Robin sequence. *Sleep*, 40: A324, 2017.
  281. Kasi, A.S., C.P. Wee, T.G. Keens, and D.B. Salinas. Lung clearance index and single breath nitrogen washout tests are comparable measures of ventilation inhomogeneity in CF children. *Pediatric Pulmonology*, 47 (Suppl.): A447, 2017.
  282. Gore, W., A. Kasi, and T.G. Keens. Does a standardized sick call protocol improve follow up? *Pediatric Pulmonology*, 47 (Suppl.): A576, 2017.
  283. Morse, K., E. Hribernick, W. Gore, and T.G. Keens. Will CF patients and families participate in pre visit planning and does it meet their needs? *Pediatric Pulmonology*, 47 (Suppl.): A744, 2017.
  284. Kasi, A.S., A. Wang, T.J. Jurgensen, S.S. Kun, T.G. Keens, and I. Perez. Mild phenotype in nonpolyalanine repeat mutations of PHOX2B in congenital central hypoventilation syndrome. *American Journal of Respiratory and Critical Care Medicine*, 195: A1990, 2018.
  285. Coleman, J.K., G.M. Lupica, G. Kimball, A. Freed, C. Lins, and T.G. Keens. Can weekly crib audits improve safe infant sleep adherence in an acute care hospital? *American Journal of Respiratory and Critical Care Medicine*, 195: A2011, 2018.



284. Laifman, E.P., T.G. Keens, and I.A. Perez. Cardiac rhythm disturbances in congenital central hypoventilation syndrome patients. *Sleep*, 41: A314, 2018.
285. Gajo, M., J. Kim, and T.G. Keens. What is the impact of the pediatric pharmacist in a multidisciplinary cystic fibrosis clinic? *Pediatric Pulmonology*, 53 (Suppl.): A791, 2018.
286. Kretzmer, R., S. Rubin, T.G. Keens, and C.J. Newth. Clinical diagnoses, ventilator settings, and blood gas characteristics of pediatric chronic respiratory failure: children initiated on long-term ventilation via tracheostomy following acute ventilation in the PICU. *American Journal of Respiratory and Critical Care Medicine*, 197: A3585, 2019.
287. Kun, S.S., S.L. Davidson Ward, and T.G. Keens. Management of home emergencies in children on home mechanical ventilation. *American Journal of Respiratory and Critical Care Medicine*, 197: A4364, 2019.
288. Rowan, E., M. Reyes. K. Lewinter, M. Maloney, and T.G. Keens. Are parents limiting the exercise and activity of children with cystic fibrosis? *Pediatric Pulmonology*, 54 (Suppl.): A145, 2019.
289. Ginsburg, D.K., J. Gold, T.G. Keens, and D.B. Salinas. What is the impact of CFTR-related metabolic syndrome/cystic fibrosis screen positive inconclusive diagnosis on maternal mental health? *Pediatric Pulmonology*, 54 (Suppl.): A688, 2019.
290. Kun, S.S., J.L. Lira, S.L. Davidson Ward, J. Lao, J.O. Ellashek, and T.G. Keens. Training of home health nurses on pediatric home mechanical ventilation emergencies: A five year qualify improvement research project. *American Journal of Respiratory and Critical Care Medicine*, 199: in press, 2020.
291. Balakrishnan, K., I. Perez, T.G. Keens, A.R. Siculo, J. Punati, and T.F. Danialifar. Hirschsprung's disease in patients with congenital central hypoventilation syndrome. Digestive Disease Week, Chicago, 2020.
292. Lazzarini, L., J. Werner, L. Ramos-Platt, M. Seruya, I. Perez, and T. Keens. Respiratory outcomes in acute flaccid myelitis following intercostal and phrenic nerve transfer. *Muscle and Nerve*, (in press, 2020).
293. Lazzarini, L., J. Werner, L. Ramos-Platt, M. Seruya, I. Perez, and T. Keens. Long term outcomes following diaphragm paralysis due to acute flaccid myelitis. *Muscle and Nerve*, (in press, 2020).
294. Salinas, D.B., D.K. Ginsburg, C. Wee, M.M. Saeed, T.G. Keens, and J.J. Brewington. CRMS/CFSPID children at risk to reclassify to CF. *Pediatric Pulmonology*, 55: S2: A188, 2020.
295. Ginsburg, D.K., J. Gold, T.G. Keens, and D.B. Salinas. What is the impact of CFTR related metabolic syndrome/cystic fibrosis screen positive inconclusive diagnosis on maternal health? *Pediatric Pulmonology*, 55: S2: A603, 2020.
296. Kiang, J.B., S.S, Kun, C. Shin, J.G. McComb, T.G. Keens, and I.A. Perez. Diaphragm pacer malfunction requiring surgical repair in CCHS patients. *Sleep*, 43: A338, 2020.
297. Maher, S.K., S. Kun, T.G. Keens, and I.A. Perez. Patients with congenital central hypoventilation syndrome do not wake up to ventilator alarms. *Sleep*, 43: A333, 2020.

#### **SELECTED PRESENTATIONS:**

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- 04/30/1972: "Regional ventilation-perfusion profiles of the pink puffer and blue bloater: a pathophysiologic basis for their divergent pattern of breathing". National Meeting. American Federation for Clinical Research. Atlantic City, New Jersey.

- 04/27/1976: "Ventilatory muscle endurance in cystic fibrosis: implications for the prevention of respiratory failure". Annual Meeting. Cystic Fibrosis Club. St. Louis, Missouri.
- 04/06/1977: "Cellular adaptation of the diaphragm in response to a chronic respiratory overload in rats". Spring Meeting. American Physiological Society and Federation of American Societies for Experimental Biology. Chicago, Illinois.
- 05/05/1977: "Development of the Human Diaphragm". Neurosciences Grand Rounds. McMaster University School of Medicine. Hamilton, Ontario, Canada.
- 10/12/1977: "Development of fatigue-resistant muscle fibers in the human diaphragm and intercostal muscles". Fall Meeting. American Physiological Society. Miami, Florida.
- 04/08/1978: "Obstructive Lung Diseases in Children". Spring Meeting, American Academy of Pediatrics. Los Angeles, California.
- 06/01/1978: "Development of Fatigue-Resistant Muscle Fibers in the Human Diaphragm". International Symposium on the Diaphragm. National Institutes of Health and American Thoracic Society. University of Virginia. Charlottesville, Virginia.
- 02/21/1980: "Ventilatory Muscle Development and Adaptation". Pediatric Pulmonary Conference. Baylor College of Medicine. Texas Childrens Hospital. Houston, Texas.
- 04/14/1980: "Effect of altered thyroid state on the diaphragm". Spring Meeting. American Physiological Society and Federation of American Societies for Experimental Biology. Anaheim, California.
- 05/20/1980: "Problems of the Child with Asthma in the School". Annual Meeting. American Lung Association/Canadian Lung Association. Washington, D.C.
- 05/08/1981: "Ventilatory Muscle Fatigue in the Newborn". Care of the Sick Neonate Symposium. Memorial Hospital Medical Center of Long Beach. University of California, Irvine, School of Medicine. Long Beach, California.
- 05/11/1981: Chairman. Pediatric Scientific Session on Lung Function in Health and Disease. Annual Meeting. American Thoracic Society. Detroit, Michigan.
- 06/24/1981: "Breath-taking Concepts in Near-Miss Sudden Infant Death Syndrome". Pediatric Grand Rounds. Harbor-UCLA Medical Center. Torrance, California.
- 12/10/1981: "The Role and Physiology of the Diaphragm in the Neonate and Pediatric Patient", and "Phrenic Nerve Pacing for the Pediatric Patient with Loss of Diaphragm Function". Annual Meeting. American Association of Respiratory Therapists. Anaheim, California.
- 01/13/1982: "Evaluation and Management of Near-Miss SIDS". 21<sup>st</sup> Annual Parmelee Lecture and Neonatal Symposium, Los Angeles Pediatric Society and American Academy of Pediatrics Chapter 2. Los Angeles, California.
- 02/05/1982: "Diaphragm Pacing". Pediatric Grand Rounds. Rancho Los Amigos Hospital. Downey, California.
- 03/05/1982: "Evaluation and Management of Near-Miss SIDS". Pediatric Grand Rounds. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 03/18/1982: "Ventilatory Muscle Adaptation to Chronic Lung Disease in Children". Research Seminar. Respiratory Physiology and Medicine Division. Harbor-UCLA Medical Center. Torrance, California.
- 5/17-18/1982: "Exercise Programs for Asthmatics: Are They Indicated?" Symposium on Controversies in Pediatric Asthma. "Pneumograms Do Not Predict Subsequent

- Apnea in Near-Miss Sudden Infant Death Syndrome". Annual Meeting. American Thoracic Society. Los Angeles, California.
- 05/20/1982: "Infant Apnea: The Role of Home Apnea-Bradycardia Monitoring and Pediatric Pneumograms". Frontiers in Health Care Symposium. Home Health Care - The Direction of the '80s. Sickroom Service 15th Annual Seminar and Exposition. Milwaukee, Wisconsin.
- 06/05/1982: "Predicting the Risk of Sudden Infant Death Syndrome". Charter Class 10<sup>th</sup> Anniversary Academic Program. University of California, San Diego, School of Medicine. La Jolla, California.
- 06/28/1982: "DPT Immunizations Do Not Affect Pneumograms in Near-Miss SIDS". International Research Conference on Sudden Infant Death Syndrome. The SIDS Institute, University of Maryland, and United Kingdom Foundation for the Study of Infant Deaths. Baltimore, Maryland.
- 09/24/1982: "Overview of Infant Apnea Programs in California". Second Annual California Conference on Sudden Infant Death Syndrome and Infant Apnea. SIDS Information and Counseling Project. California State Department of Health Services. San Francisco, California.
- 11/11/1982: "Hypoxic and Hypercapneic Challenges and Pulmonary Function Tests of Infants at Risk". First Annual Conference on Infantile Apnea and Home Monitoring of the High Risk Infant. Eisenhower Medical Center. Palm Springs, California.
- 02/06/1983: "Post-operative Apnea in Small Infants". 21<sup>st</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital Los Angeles. Los Angeles, California.
- 10/10/1983: "Overview of Sudden Infant Death Syndrome". Third Annual California Conference on Sudden Infant Death Syndrome. SIDS Information and Counseling Project. California State Department of Health Services. Costa Mesa, California
- 10/25-26/83: "Evaluation and Management of Infant Apnea". Annual Meeting. American Academy of Pediatrics. San Francisco, California.
- 11/30/1983: "How Sudden Infant Death Syndrome Victims Die: A New Theory". Department of Physiology and Biophysics Research Seminar. University of Southern California School of Medicine. Los Angeles, California.
- 01/27/1984: "Sudden Infant Death Syndrome". Pediatric Grand Rounds. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 01/28/1984: "Use and Abuse of Preoperative Pulmonary Function Testing in Children". 22<sup>nd</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital of Los Angeles. Los Angeles, California.
- 02/10/1984: "Sudden Infant Death Syndrome". Pediatric Grand Rounds. Children's Hospital of Los Angeles. Los Angeles, California.
- 03/15/1984: "Infants with Apnea: Are They at Risk for Sudden Infant Death Syndrome?" Second International Conference on Expected and Unexpected Risks for the High Risk Infant: Transition from Hospital to Home. March of Dimes Birth Defects Foundation. Los Angeles, California.
- 05/04/1984: Chairman. Pulmonary Scientific Session. Society for Pediatric Research Annual Meeting. San Francisco, California.

- 10/25/1984: "Overview of SIDS". Fourth Annual California Conference on Sudden Infant Death Syndrome. California Sudden Infant Death Syndrome Information and Counseling Project. Mercy Hospital Medical Center. San Diego, California.
- 01/19/1985: "Monitored Deaths in California", and Moderator of the Session on Monitored Deaths. Third Conference on Infantile Apnea and Home Monitoring. Eisenhower Medical Center. Palm Springs, California.
- 03/08/1985: "Hypoxic Arousal Responses in Infants at Increased Risk for Sudden Infant Death Syndrome". Research Seminar. Division of Respiratory Physiology and Medicine. Harbor-UCLA Medical Center. Torrance, California.
- 03/19/1985: "Long Term Management and Pulmonary Prognosis". 90<sup>th</sup> Ross Conference on Pediatric Research: Bronchopulmonary Dysplasia and Related Chronic Respiratory Disorders. Ross Laboratories. Carefree, Arizona.
- 05/11/1985: "Special Ventilation Considerations in the Child", and "Management of the Child with Congenital Central Hypoventilation Syndrome". Symposium on the Ventilator Dependent Adult and Child: Hospital to Home. California Thoracic Society. Rancho Los Amigos Medical Center. Anaheim, California.
- 05/13-14/1985: "Variable Weight Training Reduces Hyperinflation and Increases Body Weight in Cystic Fibrosis"; "Meet the Professor Seminar: Lung Function Testing in Infants and Young Children"; and "Medical Aspects of Home Care for Ventilator Dependent Children". Annual Meeting. American Thoracic Society. Anaheim, California.
- 06/14/1985: "Special Ventilatory Considerations in Ventilator Assisted Children at Home". Pediatric Grand Rounds. Rancho Los Amigos Medical Center. Downey, California.
- 10/15/1985: "Home Monitoring -- A Benefit in the High Risk Infant -- Fad or Fact?" Eighth Annual Meeting. California Perinatal Association. Monterey, California.
- 01/17/1986: "Comparison of Pneumograms Recorded at Home and in Hospital in Infants and Children with Apnea". Fourth Conference on Infantile Apnea and Home Monitoring of the High Risk Infant. Eisenhower Medical Center. Palm Springs, California.
- 10/17/1986: "Overview of Sudden Infant Death Syndrome and Current Research". Sixth Annual California Conference on Sudden Infant Death Syndrome. California SIDS Information and Counseling Project. Cypress College. Cypress, California.
- 10/24/1986: "Pneumograms and Hypoxic Challenges in the Evaluation of Infants with Unexplained Apnea", and Panel on Clinical Problems. Current Dilemmas in Infant Apnea and Sudden Infant Death Syndrome. Phoenix Children's Hospital. Phoenix, Arizona.
- 01/17/1987: "Clinical Management: Apnea of Infancy and Asymptomatic at-Risk Infants", Panel on Subsequent Siblings of SIDS Victims, and Moderator of Abstract Session. Fifth Annual Conference on Apnea of Infancy. Eisenhower Medical Center. Palm Springs, California.
- 02/01/1987: "Preoperative Assessment of Postoperative Risks in Children" 25th Clinical Conference on Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital Los Angeles. Los Angeles, California.
- 01/13-15/1988: "Respiratory Failure in Pediatric Patients and Patients with Neuromuscular Diseases", "Ventilatory Management in Pediatric Patients and Patients with Neuromuscular Diseases", and "Weaning Pediatric Patients and Patients with

- Neuromuscular Diseases". 1988 Advanced Postgraduate Course: The Mechanically Ventilated Patient. California Thoracic Society. Yosemite National Park, California.
- 01/18/1988: "Nutrition and Pulmonary Function". Symposium on Nutrition and Chronic Lung Disease in Pediatrics. 12<sup>th</sup> Clinical Congress. American Society for Parenteral and Enteral Nutrition. Las Vegas, Nevada.
- 01/28/1988: Moderator, "Prematurity: Cardiorespiratory Pattern and Risk for SIDS". Panel, "Clinical Management of Intrauterine Drug Exposed Infants". 6<sup>th</sup> Annual Conference on Apnea of Infancy. Annenberg Center for Health Sciences. Eisenhower Medical Center. Rancho Mirage, California.
- 01/31/1988: "Preoperative Prediction of Postoperative Risk", and "Long-Term Sequelae of Infant Lung Disease: Hidden Hazards@". 26<sup>th</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital of Los Angeles. Los Angeles, California.
- 05/09/1988: "Interstitial Pneumonitis in Pediatrics". Meet the Professor Luncheon Seminar. Annual Meeting. American Thoracic Society. Las Vegas, Nevada.
- 07/22/1988: "Ventilatory Management of Pediatric Patients and Patients with Neuromuscular Disease", and "Home Ventilator Management of Pediatric Patients and Patients with Neuromuscular Disease". Ventilation and Monitoring: From Hospital to Home. Sequoia Hospital District. Redwood City, California.
- 09/02/1988: "Management of Ventilator Dependant Children at Home". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 10/04/1988: "Challenging the Control of Ventilation". Pediatric Respiratory Disorders Symposium. Annual Meeting. American College of Chest Physicians. Anaheim, California.
- 10/14/1988: "Subsequent Siblings of SIDS Victims: Recurrence Risk, Physiologic Studies and Clinical Management". 8<sup>th</sup> Annual California Conference on Sudden Infant Death Syndrome. California SIDS Program. Loma Linda University. Loma Linda, California.
- 01/29/1989: "Long-term Sequelae of Infant and Childhood Lung Disease", and "Obstructive Sleep Apnea in Children". 27<sup>th</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital Los Angeles. Los Angeles, California.
- 02/24/1989: "Outcome of Children Surviving Bronchopulmonary Dysplasia". Pediatric Grand Rounds. Department of Pediatrics. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 04/19/1989: "Sudden Infant Death Syndrome". Testimony, Health and Human Services Committee. California State Senate. Sacramento, California.
- 06/16/1989: "Evaluation and Management of Infant Apnea", "Obstructive Sleep Apnea" and "Pulmonary Function Testing in Pediatrics". Pediatric Pulmonary Course. Childrens Hospital of San Diego. San Diego, California.
- 07/05/1989: "Ventilatory Response to Exercise in Children with Absent Chemoreceptor Function". Respiratory Physiology Research Conference. Division of Respiratory and Critical Care Physiology and Medicine. Harbor-UCLA Medical Center. Torrance, California.
- 10/05/1989: "Panel on Current Research in Sudden Infant Death Syndrome". Ninth Annual California Conference on Sudden Infant Death Syndrome. California SIDS Program.

- California Association of Public Health Nursing Directors. California Department of health Services. San Francisco, California.
- 10/19/1989: "Sudden Infant Death Syndrome Autopsy, Diagnosis and Current Research". In-service Education Conference on Sudden Infant Death Syndrome. Los Angeles County Medical Examiner/Coroner's Office. Los Angeles, California.
- 11/20/1989: "Patterns of Respiratory Control Disorders in Children with Brainstem Dysfunction". Research Seminar. Brain Research Institute. University of California, Los Angeles. Los Angeles, California.
- 01/26-27/90: "Control of Breathing in Myelomeningocele", and "Stress Testing for the Evaluation of Control of Breathing in Infants". Eighth Conference on Apnea of Infancy. Annenberg Center for Health Sciences. Eisenhower Medical Center. Palm Springs, California.
- 01/28/1990: "Preoperative Prediction of Postoperative Risk", and "Preoperative and Postoperative Management of BPD". 28<sup>th</sup> Annual Clinical Conference in Pediatric Anesthesiology. Division of Anesthesiology. Children's Hospital Los Angeles. Los Angeles, California.
- 09/18/1990: "Sudden Infant Death Syndrome Research". Annual Conference. California State Coroner's Association. Oxnard, California.
- 10/19/1990: "Sudden Infant Death Syndrome: Recent Research and Implications for Subsequent Siblings of SIDS Victims". Tenth California Conference on Sudden Infant Death Syndrome. California Sudden Infant Death Syndrome Program. Santa Barbara, California.
- 01/24-25/1991: Moderator, Abstract Poster Symposium. Moderator, Research Update in SIDS Session. Ninth Conference on Apnea of Infancy. Annenberg Center for Health Sciences. Eisenhower Medical Center. Palm Springs, California.
- 01/27/1991: "Neuromuscular Diseases". 29<sup>th</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital Los Angeles. Los Angeles, California.
- 03/10/1991: Workshop on Pediatric Home Care Issues. Course on Current Concepts in Home Ventilator Care. Third International Conference on Pulmonary Rehabilitation and Home Mechanical Ventilation. National Jewish Center for Immunology and Respiratory Medicine, and the American College of Chest Physicians. Denver, Colorado.
- 03/11-12/1991: "Outcome of children treated for chronic respiratory failure by mechanical assisted ventilation at home", "Marital discord and increased stress in parents of ventilator assisted children at home", and "Coping resources to combat stress in parents caring for ventilator assisted children at home". Moderator, Abstract Poster Symposium: Pediatric Home Ventilation. Moderator, Symposium on Pediatric Home Ventilation: Issues and Answers. Rap with the Professor Workshop on Pediatric Home Ventilation. Third International Conference on Pulmonary Rehabilitation and Home Mechanical Ventilation. National Jewish Center for Immunology and Respiratory Medicine, and the American College of Chest Physicians. Denver, Colorado.
- 03/18/1991: "Infant Apnea: New Thinking and Testing". 1991 Spring Session. American Academy of Pediatrics. San Diego, California.

- 07/26/1991: "Uses and Abuses of Noninvasive Respiratory Monitoring: Physiology and Technology". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 10/11/1991: "Sudden Infant Death Syndrome Research in the 1990s: Current Understanding and Future Directions", Combined Pediatric Grand Rounds. Oregon Health Sciences University, Emanuel Hospital, and Kaiser Permanente Medical Center. Portland, Oregon.
- 10/11-12/91: "Why Did My Baby Die? SIDS Research Update", and "The Monitoring Decision". Sudden Infant Death Syndrome: Where Are We Going? Fifth Annual Conference. Oregon Chapter of the National Sudden Infant Death Syndrome Alliance. Emanuel Hospital. Portland, Oregon.
- 10/17/1991: "Sudden Infant Death Syndrome". 21<sup>st</sup> Annual Pediatrics Course. University of Southern California School of Medicine, Postgraduate Division. Pasadena, California.
- 10/29/1991: "Hypoxic and Hypercapnic Arousal Responses in Children with Respiratory Control Disorders". Reproductive Medicine Research Group Research Seminar. Alberta Heritage Foundation for Medical Research Visiting Lecturer. The University of Calgary Faculty of Medicine. Calgary, Alberta, Canada.
- 10/29/1991: "Current Trends in SIDS Research". Sudden Infant Death Syndrome 1991. Calgary Chapter, Canadian Foundation for the Study of Infant Deaths. Calgary, Alberta, Canada.
- 11/06/1991: "Apparent Life-Threatening Events and Apnea of Infancy". Symposium on Pediatric Sleep Disorders. 57<sup>th</sup> Annual Scientific Assembly. American College of Chest Physicians. San Francisco, California.
- 11/09/1991: "SIDS Research Update". SIDS: Turning the Corner. First Annual Conference of the National Sudden Infant Death Syndrome Alliance. Santa Monica, California.
- 01/09/1992: "Control of Ventilation in Children with Ondine's Curse". Southern California Ventilatory Control Society. University of California, Los Angeles. Los Angeles, California.
- 02/14/1992: "Myelomeningocele: Problems of the Arnold-Chiari Malformation". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 02/20/1992: "Sudden Infant Death Syndrome Research". California SIDS Gala: An Evening to Honor Lloyd and Dorothy Bridges and to Launch Red Nose Day USA. National Sudden Infant Death Syndrome Alliance. Beverly Hills, California.
- 06/26-28/1992: "Office Pulmonary Function Testing", "Apneas of Prematurity and Infancy", and "Bronchopulmonary Dysplasia". Current Concepts in Pediatric Respiratory Diseases 1992. Children's Hospital and Health Center. San Diego, California.
- 08/14/1992: "Sudden Infant Death Syndrome". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 10/22-23/1992: "Basic Sudden Infant Death Syndrome Facts", and "Recent Advances in Sudden Infant Death Syndrome Research". Twelfth Annual California Sudden Infant Death Syndrome Conference: Resolving Grief. California Sudden Infant Death Syndrome Program. Long Beach, California.
- 01/23/1993: "Congenital Central Hypoventilation Syndrome". Eleventh Conference on Apnea of Infancy. Annenberg Center at Eisenhower. Rancho Mirage, California.

- 02/19/1993: "SIDS: The Silent Killer". Fifth Annual Dealing With Death Seminar: When A Child Dies. The Greater Victoria Hospital Society. Victoria, British Columbia, Canada.
- 05/14/1993: "Respiratory Control in Children with Congenital Central Hypoventilation Syndrome". A Symposium in Honour of A. Charles Bryan. The Hospital for Sick Children. University of Toronto Faculty of Medicine. Toronto, Ontario, Canada.
- 05/16-17/1993: "Pediatric Home Ventilation", and "Frequency, Causes, and Outcome of Home Ventilator Failure". 1993 International Conference. American Thoracic Society. San Francisco, California.
- 10/11/1993: "Control of Ventilation in Children with Congenital Central Hypoventilation Syndrome (Ondine's curse)". Research Seminar. Department of Thoracic Medicine. Royal Children's Hospital. Melbourne, Victoria, Australia.
- 10/13/1993: "Respiratory Support for Infants with Bronchopulmonary Dysplasia and their Long-term Outcome". Grand Rounds. Queen Victoria Hospital for Women. Women's and Children's Hospital, Adelaide. Adelaide, South Australia, Australia.
- 10/13/1993: "Home Mechanical Ventilation in Children". The Regency Park Centre for Young Disabled. Kilkeny, South Australia, Australia.
- 10/13/1993: "Management of Respiratory Complications of Neuromuscular Disease". Pediatric Grand Rounds. Adelaide Children's Hospital. Women's and Children's Hospital, Adelaide. Adelaide, South Australia, Australia.
- 10/18/1993: "Home Mechanical Ventilation for Children with Ventilatory Muscle Dysfunction". Australian Quadriplegic Association. Sydney, New South Wales, Australia.
- 10/19/1993: "Pulmonary Function Testing in Children". Diploma of Child Health Course. Royal Alexandra Hospital for Children. The Children's Hospital, Camperdown. Sydney, New South Wales, Australia.
- 10/19/1993: "Control of Ventilation in Children with Congenital Central Hypoventilation Syndrome (Ondine's curse)". Symposium on Respiratory Control Disorders in Paediatrics in Honour of Professor Keens' Visit. Royal Alexandra Hospital for Children. The Children's Hospital, Camperdown. Sydney, New South Wales, Australia.
- 10/20/1993: "Sudden Infant Death Syndrome". The Douglas Reye Memorial Oration. The Annual Postgraduate Meeting 1993. Royal Alexandra Hospital for Children. The Children's Hospital, Camperdown. Sydney, New South Wales, Australia.
- 10/20/1993: "Ventilatory Support for Children with Chronic Respiratory Failure". Sleep Disorders Unit. Royal Prince Alfred Hospital, Camperdown. Sydney, New South Wales, Australia.
- 10/21/1993: "Development of the Infant Respiratory System and Its Susceptibility to Disease", and "The Ethics of Home Mechanical Ventilation in Children". The Annual Postgraduate Meeting 1993. Royal Alexandra Hospital for Children. The Children's Hospital, Camperdown. Sydney, New South Wales, Australia.
- 10/22/1993: "Development of the Infant Respiratory System and Ventilatory Support for Infants with Bronchopulmonary Dysplasia". Perinatal Seminar. King George V Hospital for Women and Infants, Camperdown. Sydney, New South Wales, Australia.
- 10/22/1993: "The Magic Show". The Royal Alexandra Hospital for Children Dinner. The Annual Postgraduate Meeting 1993. Royal Alexandra Hospital for Children. The Children's Hospital, Camperdown. Sydney, New South Wales, Australia.



- 01/24/1994: "IRB Panel: Review of Human Research Protocols". Ethical Issues in Human Subject Research: Catastrophic Illness and Minorities. National Workshop, Office for Protection from Research Risks, National Institutes of Health. City of Hope National Medical Center. Pasadena, California.
- 1/31-2/2/1994: "Diagnosis and Management of Infant Apnea", "Bronchopulmonary Dysplasia: Outcome and Management after the NICU", "Development of the Respiratory System: Implications for Lung Disease in Infants and Small Children", and "Sudden Infant Death Syndrome". 19<sup>th</sup> Annual Winter Ski and Study Symposium. California Chapters 1 and 2, American Academy of Pediatrics. Lake Tahoe, Nevada.
- 04/15/1994: "Reducing the Risk of Sudden Infant Death Syndrome". Second Annual Red Nose Day Oration on Sudden Infant Death Syndrome at Children's Hospital Los Angeles. Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 10/12/1994: "The Possible Role of Hypoxic Arousal Responses in Sudden Infant Death Syndrome". San Diego SIDS Research Conference. Children's Hospital of San Diego. San Diego, California.
- 10/20/1994: Conference Chairperson. "SIDS: Basic Facts and Research Information", and "Ask the Researchers". 14<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. SIDS: Surviving Grief: A Community in Action. California SIDS Program. California Department of Health Services. San Diego, California.
- 01/20-21/1995: "Home Monitoring: Who to Monitor, For How Long, and When to Discontinue" and "Grand Rounds: Clinical Management of the Infant/Child with a Functional Abnormality of the Upper Airway". Thirteenth Conference on Apnea of Infancy. Annenberg Center at Eisenhower. Rancho Mirage, California.
- 03/15/1995: "Pediatric Long-term Ventilation: Invasive vs Noninvasive: Pulmonary vs Neuromuscular", and "Airway Management in Children". Fifth International Conference on Pulmonary Rehabilitation and Home Ventilation. National Jewish Center for Immunology and Respiratory Medicine. Denver, Colorado.
- 04/27-28/1995: "The Scope and Limits of Parental Authority: The Ethical Assessment of Innovative Therapies", "The Scope and Limits of Parental Authority: Can Parents Volunteer their Children for Non-Therapeutic Research?", and "Genetic Research and Gene Therapy: The Problems, the Possibilities, and the Ethical and Moral Climate". Ethical and Policy Issues in Research with Children and Adolescents. Public Responsibility in Medicine and Research. Children's Hospital Medical Center. Boston, Massachusetts.
- 07/14/1995: "The Respiratory System in Infants and Children: Implications for Clinical Care". Pediatric Grand Rounds. Rancho Los Amigos Medical Center. Downey, California.
- 08/11/1995: "Sudden Infant Death Syndrome". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 09/14/1995: "Home Mechanical Ventilation". Special Commentator, Pathophysiology Research Laboratory Research Seminar. National Children's Medical Research Center. Tokyo, Japan.
- 09/14/1995: Clinical Pulmonary Conference. Tokyo Pediatric Pulmonology Group. National Children's Hospital. Tokyo, Japan.
- 09/16/1995: "Cystic Fibrosis" and "Sudden Infant Death Syndrome". Second Workshop on Pediatric Critical Care. Japanese Society for Pediatric Critical Care. Tokyo, Japan.

- 09/17/1995: "Ventilatory Muscle Contributions to Respiratory Failure" and "Home Mechanical Ventilation". Workshop on High Frequency Oscillation. Japanese Society for Pediatric Critical Care. Tokyo, Japan.
- 10/18/1995: "Sleep Disorders in Children". 1995 Annual Meeting. American Academy of Pediatrics. San Francisco, California.
- 10/19/1995: "What's Back to Sleep All About? Sleep Position and Other SIDS Risk Factors". 15<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. Sacramento, California.
- 02/17-23/96: "Sudden Infant Death Syndrome", "Diagnosis and Management of Infant Apnea", "Outpatient Management of Childhood Asthma", "Obstructive Sleep Apnea and Sleep Disorders", and "Management of Asthma and Chronic Lung Disease". Pediatric Potpourri: State of the Art 1996. University Childrens Medical Group. American Academy of Pediatrics, California Chapter 2. Kaanapali Beach, Maui, Hawaii.
- 05/11/1996: "Exercise Physiology in CCHS", and "Diagnostic Criteria for CCHS". First International Congenital Central Hypoventilation Syndrome Symposium. Tulane University School of Medicine. New Orleans, Louisiana.
- 06/08-10/96: "Respiratory Disorders". PREP: The Course. American Academy of Pediatrics. Portland, Oregon.
- 10/17/1996: "Sudden Infant Death Syndrome: Insights from the Fourth SIDS International Conference". SIDS: Living On. 16<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. Palm Springs, California.
- 11/02-04/96: "Respiratory Disorders". PREP: The Course. American Academy of Pediatrics. Kansas City, Missouri.
- 11/10/1996: Moderator, "Ongoing IRB Issues", and "Pediatric Research: Unique Concerns". How to Cope with an Ever Increasing Workload in the Face of Diminishing Resources and New Ethical Challenges. Applied Research Ethics National Association. San Diego, California.
- 11/11/1996: "Special Considerations in the Review of Pediatric Research". Strategies for Addressing the IRB's Current Obstacles: Holding It Together and Measuring Our Success. Public Responsibility in Medicine and Research. University of California, San Diego. Tufts University School of Medicine. San Diego, California.
- 01/18/1997: "SIDS and Apnea in the Space-Time Continuum". Apnea of Infancy Award Keynote Lecture. 15<sup>th</sup> Conference on Apnea of Infancy. Annenberg Center for Health Education at Eisenhower. Rancho Mirage, California.
- 02/01/1997: "Postoperative Respiratory Problems in Small Infants". 35<sup>th</sup> Clinical Conference in Pediatric Anesthesiology. Pediatric Anesthesiology Foundation. Children's Hospital Los Angeles. Universal City, California.
- 05/20/1997: "Central Hypoventilation Syndrome: Clinical Spectrum and Physiologic Studies". Symposium on Normal and Abnormal Control of Ventilation. 1997 International Conference. American Thoracic Society. San Francisco, California.
- 05/30/1997: "Overseas Video-telephone Consultation in Pediatrics (via Video-telephone)". Symposium on Telemedicine in Pediatric Home Care. Third International Conference on Medical Aspects of Telemedicine. Kobe International Conference Center. Kobe, Japan.

- 10/16/1997: "Sudden Infant Death Syndrome: The Journey to Understanding", and "The Quest for Answers". 17<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. SIDS: A Journey toward Understanding. California Sudden Infant Death Syndrome Program. Maternal and Child Branch, California Department of Health Services. San Jose, California.
- 12/05/1997: "Twenty Years of Home Mechanical Ventilation at Children's Hospital Los Angeles". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 01/09/1998: "Sudden Infant Death Syndrome". Combined Pediatrics and Emergency Medicine Grand Rounds. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 03/05/1998: "Pathophysiology of Ventilatory Muscle Fatigue in Pediatric Patients" and "Sudden Infant Death Syndrome: One Cause or Many". 25<sup>th</sup> Annual Meeting of the Japanese Society for Intensive and Critical Care Medicine. Tokyo, Japan.
- 03/24/1998: "Sudden Infant Death Syndrome: Research Update". Colorado Sudden Infant Death Syndrome Program. Rose Medical Center. Denver, Colorado.
- 07/30/1998: "Informed Consent". Regional Workshop on Women as Research Subjects. Office for Protection of Research Subjects, University of California, Los Angeles. Office for Protection from Research Risks (NIH). U.S. Food and Drug Administration. Santa Monica, California.
- 09/15/1998: "Pulmonology". Third Annual Pediatric Board Review Course. UCLA Children's Hospital. Department of Pediatrics. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 10/15/1998: "SIDS: An Overview of Current Research", and "Ask the Experts: A Panel of SIDS Experts Answers Your Questions". 18<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. Shadows and Sunlight. California Sudden Infant Death Syndrome Program. Palm Springs, California.
- 02/12/1999: "Ventilatory Control in Children with Ondine's Curse". Seminar Series. Department of Physiology and Biophysics. University of Southern California School of Medicine. Los Angeles, California.
- 04/23/1999: "Cardiorespiratory Regulation during Sleep in Infants". Postgraduate Course: Sleep Across the Age Spectrum: Dawn to Dusk. 1999 American Thoracic Society International Conference. San Diego, California.
- 05/12/1999: "How Institutional Review Boards Institute the Regulations". Conducting Successful Clinical Trials under Good Clinical Practice Regulations to Facilitate to Product Approval Process. U.S. Food and Drug Administration Workshop. Association of Clinical Research Professionals. U.S. Food and Drug Administration. Los Angeles, California.
- 05/18/1999: "Sleep Apnea in Infants and Children". Pediatric Grand Rounds. Children's Hospital. Milton S. Hershey Medical Center. Pennsylvania State University College of Medicine. Hershey, Pennsylvania.
- 05/18/1999: "Ventilatory Control in Children with Ondine's Curse". Pulmonary/Critical Care Medicine, Department of Internal Medicine. Research Conference. Milton S. Hershey Medical Center. Pennsylvania State University College of Medicine. Hershey, Pennsylvania.

- 05/19/1999: "Sudden Infant Death Syndrome". 14<sup>th</sup> Annual Pediatric Referring Physician Program. Children=s Hospital. Milton S. Hershey Medical Center. Pennsylvania State University College of Medicine. Hershey, Pennsylvania.
- 05/20/1999: "Cardiorespiratory Control in Infants during Sleep". Neonatal/Perinatal Medicine Research Conference. Children=s Hospital. Milton S. Hershey Medical Center. Pennsylvania State University College of Medicine. Hershey, Pennsylvania.
- 09/02/1999: "Pulmonology". Fourth Annual Pediatric Board Review Course. Mattel Children's Hospital at UCLA. Department of Pediatrics. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 10/21/1999: "SIDS: An Overview of Current Research", and "Ask the Experts: A Panel of SIDS Experts Answers Your Questions". 19<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. Making the Journey Together. California Sudden Infant Death Syndrome Program. Concord, California.
- 11/19/1999: "Sudden Infant Death Syndrome". Pediatric Grant Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 01/21/2000 "Upper Airway Obstruction in Children with Craniofacial Abnormalities". 18<sup>th</sup> Annual Conference on Sleep Disorders in Infants and Children. Annenberg Center for Health Sciences at Eisenhower. Eisenhower Medical Center. Rancho Mirage, California.
- 03/11/2000: "Il trattamento ventilatorio domiciliare" (Home Mechanical Ventilation in Children). Congresso Internazionale L=Ospedale Pediatrico Virtuale (The International Congress on the Pediatric Virtual Hospital). Department of Pediatrics. Universita degli Studi, Firenze (The University of Florence). Florence, Italy.
- 03/17-18/2000: "Infant Mortality: Research and Risk Reduction Initiatives: Sudden Infant Death Syndrome", and "Discussing SIDS Research: What's Credible?" Assessing Infant Mortality in the New Millennium. Thirteenth Annual Conference. Association of SIDS and Infant Mortality Programs. San Diego, California.
- 09/08/2000: "Pulmonology and Cystic Fibrosis". Fifth Annual Pediatric Board Review Course 2000. Mattel Children's Hospital at UCLA. Department of Pediatrics. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 09/15/2000: "Protecting Human Research Subjects". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 10/20/2000: "SIDS: An Overview of Current Research", and "Ask the Experts: A Panel of SIDS Experts Answers Your Questions". 20<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. SIDS 2000: Sharing the Vision. California Sudden Infant Death Syndrome Program. Maternal and Child Branch, California Department of Health Services. Costa Mesa, California.
- 10/26/2000: "Sudden Infant Death Syndrome Research Update". Annual SIDS Conference. Sudden Infant Death Syndrome Foundation of Washington. Seattle and Spokane, Washington. (*Via video-telephone*).
- 10/31/2000: "Pediatric Research Issues". IRBs: New Directions in 2000. ARENA=s 2000 IRB Conference. Applied Research Ethics National Association. San Diego, California.
- 02/03/2001: "The CHIME Study: Cardiorespiratory Events Recorded from Healthy Infants and those at Increased Risk for SIDS in the Home", and "Epidemiological Study of Infant Sleeping Position in Orange County Hospitals". 7<sup>th</sup> Annual Meeting of the Japanese Society of Sudden Infant Death Syndrome. Minato-ku, Tokyo, Japan.

- 02/05/2001: “Development of Cardiorespiratory Control in Infants During Sleep”. Neonatology Conference. Neonatal Division. Maternal and Perinatal Center Tokyo Women=s Medical University. Shinjuku-ku, Tokyo, Japan.
- 02/06/2001: “Ventilatory Muscle Fatigue”. Department of Anesthesia and ICU Conference. National Children=s Hospital. Setagaya-ku, Tokyo, Japan.
- 04/10/2001: “Home Mechanical Ventilation”. Pediatric Grand Rounds. Women’s and Children’s Hospital. LAC+USC Medical Center. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 06/2-3/2001: “Sudden Infant Death Syndrome@, AApnea of Infancy”, and “Sleep Disorders in Children”. Practical Office Pediatrics. Children’s Medical Center, Atlantic Health System. Skytop, Pennsylvania.
- 6/29-7/2/2001: “Apnea in the Premature Infant”, and “SIDS Advances”. Current Concepts in Pediatric Respiratory Diseases: 2001. Children’s Hospital of San Diego. San Diego, California.
- 07/16/2001: “A View from the Chair: Perspectives on IRB Issues”. Conference on Informed Consent, Cultural Values, and Regulatory Issues: A Closer Look at Behavioral Issues in Biomedical and Social Science Research. OHRP/USC National Human Subject Protections Education Workshop. University of Southern California. Office for Human Research Protection. Long Beach, California.
- 09/07-11/2001: “Pediatric Pulmonology”. Sixth Annual Pediatric Board Review Course 2001. Mattel Children's Hospital at UCLA. Department of Pediatrics. University of California, Los Angeles, School of Medicine. Los Angeles, California.
- 09/20/2001: “SIDS: Current Research and Legislative Compliance Update”. Advanced Coroner’s Training 2001. California State Coroner=s Association. Ventura, California.
- 10/04-05/01: “The CHIME Study: Does Home Monitoring Prevent SIDS?”, and “Can SIDS Happen to Normal Infants? A Role for Hypoxia”. The Barry Fisher Memorial Lectures. Toward SIDS Prevention. Annual Meeting. American Association of SIDS Prevention Physicians, and National Association of Apnea Professionals. Austin, Texas.
- 10/20/2001: "SIDS Research: Stitching Together the Pieces", and "Unraveling the Mystery: SIDS Experts Answer Our Questions". 21<sup>st</sup> Annual California Sudden Infant Death Syndrome Conference: Threads of Hope: Weaving the Tapestry. California Sudden Infant Death Syndrome Program. Maternal and Child Branch, California Department of Health Services. San Mateo, California.
- 01/08/2002: “Sudden Infant Death Syndrome”. Pediatric Grand Rounds. Women’s and Children’s Hospital. Los Angeles County+USC Medical Center. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 01/17/2002: “Congenital Central Hypoventilation Syndrome: Clinical Management”. 20<sup>th</sup> Annual Conference on Sleep Disorders in Infants and Children. Annenberg Center for Health Sciences at Eisenhower. Eisenhower Medical Center. Rancho Mirage, California.
- 2//15-16/02: "Transitioning CCHS Children to Non-Invasive Ventilation". Second International Symposium on Congenital Central Hypoventilation Syndrome: Physiopathology, Management, and Outcome. Faculté de Médecine Bichat, Université Paris VII. Paris, France.

- 2/18-21/02: “Post-Graduate Course on Non-Invasive Ventilation”, “Non-invasive Ventilation in Children with Chronic Respiratory Failure in the Home”. “Non-Invasive Mask Ventilation for Children with Chronic Respiratory Failure in the Home”, and “Nap vs Overnight Sleep Studies”. Fifth International Congress on Pediatric Pulmonology (CIPP V). Acropolis Convention Centre. Nice, France.
- 03/01/2002: Robert F. Chinnock Memorial Lecture: “What’s New in SIDS?” 70<sup>th</sup> Annual Postgraduate Convention. School of Medicine and School of Public Health. Loma Linda University. Loma Linda, California.
- 06/20-21/2002: “Non-Invasive Ventilation for Children with Chronic Respiratory Failure in the Home”, “Obstructive Sleep Apnea Syndrome in Children”, “Home-Apnea-Bradycardia Monitoring: Does Apnea Cause SIDS?”, “Talking to Parents About Sudden Infant Death Syndrome”, and “How to Promote Clinical Research in Hospital Faculty”. Septimo Simposio anual de Actualizacion Pediatrica Dr. Carlos Gianantonio: Situaciones dificiles en la practica pediatrica Departamento de Pediatria del Hospital Italiano de Buenos Aires. Buenos Aires, Argentina.
- 07/25/2002: “Why Children Are Different: Long-Term Mechanical Ventilation in Children”. Medical, Neurology, and Pediatrics Grand Rounds. Rancho Los Amigos National Rehabilitation Center. Downy, California.
- 10/10/2002: “The Dimensions of SIDS C Experts Answer Our Questions”. 22<sup>nd</sup> California Sudden Infant Death Syndrome Conference: The Dimensions of Hope: Yesterday, Today, and Tomorrow. California Sudden Infant Death Syndrome Program. Indian Wells, California.
- 10/30/2002: “Sudden Infant Death Syndrome”. Grand Rounds. Family Practice Residency Program. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 11/02-05/02: “Non-Invasive Home Mechanical Ventilation”, “Diagnostics in Asthma: Pulmonary Function Tests”, “Mechanical Assisted Ventilation in Children with Neuromuscular Diseases”, and “Pulmonary and Physiologic Aspects of Pectus Excavatum”. CHEST 2002. Annual Meeting of the American College of Chest Physicians. San Diego, California.
- 11/17/2002: “It’s a Tough Job, but Somebody Has To Do It: IRB Chairs= Time to Talk”. 17<sup>th</sup> Annual Meeting of the Applied Research Ethics National Association. San Diego, California.
- 11/22/2002: “25-Years of Home Mechanical Ventilation at CHLA”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.
- 03/14/2003: “Bedsharing and the Risk of Sudden Unexpected Infant Death”. 16<sup>th</sup> Annual Conference: Ten Years of SIDS Risk Reduction: Lessons Learned in Research, Education, and Bereavement Services. Association of SIDS and Infant Mortality Programs. Washington, D.C.
- 03/15/2003: “Minimal Risk and the NHRPAC Report on Concepts in Federal Regulations”. Committee on Clinical Research in Children. Institute of Medicine of the National Academies. Irvine, California.
- 05/14/2003: “Why Are Children Different? Home Mechanical Ventilation in Children”. Educational Conference, Department of Pediatrics. Nagoya University Hospital. Nagoya, Japan.

- 05/15/2003: “How I Teach: Motivating Students to Learn”, Pediatric Advanced Life Support Instructors’ Course. “Why Are Children Different? Home Mechanical Ventilation in Children”. Educational Conference, Department of Anesthesia and ICU. National Children’s Medical Center. National Center for Child Health and Development. Tokyo, Japan.
- 05/16/2003: “Why Are Children Different? Home Mechanical Ventilation in Children”. Educational Conference, Clinical Research Center. National Center Hospital for Chest Diseases. Osaka, Japan.
- 10/01/2003: “Chronic Lung Disease and Respiratory Compromise as a Morbidity in Pediatric Intensive Care: Epidemiology and Child Health Implications”. Conference on Pediatric Critical Care: Pulmonary Processes and Informatics Solutions. National Institute of Child Health and Human Development. Bethesda, Maryland.
- 10/03/2003: “The Circle of Understanding C SIDS Expert Panel”. 23<sup>rd</sup> California Sudden Infant Death Syndrome Conference: The Circles of Support. California Sudden Infant Death Syndrome Program. Sacramento, California.
- 10/10/2003: “Sleep Apnea in Infants and Children”. Joint Meeting of the Society for Pediatric Anesthesia and the Japanese Society of Pediatric Anesthesiology. San Francisco, California.
- 11/7-9/2003: “Tragedies and Near-Tragedies: Apparent Life-Threatening Events”, “Chronic Cough: Will It Ever End?”, and “Exercise and Obesity: What Are the Issues?” Breathing Is Everything and Then Some ... A Pediatric Pulmonary Conference. Children’s Hospital and Research Center at Oakland. Seaside, California.
- 12/05/2003: “It’s a Tough Job, but Somebody Has To Do It: IRB Chairs’ Time to Talk”. 18<sup>th</sup> Annual Meeting of the Applied Research Ethics National Association. Washington, D.C.
- 05/13/2004: “SIDS and Infant Apnea”. Pediatric Grand Rounds. Department of Pediatrics. Harbor-UCLA Medical Center. Torrance, California.
- 06/29/2004: “SIDS and Infant Apnea”. Pediatric Grand Rounds. Department of Pediatrics. Women’s and Children’s Hospital. Los Angeles County+University of Southern California Medical Center. Los Angeles, California.
- 10/22/2004: “Understanding SIDS: Physiological Research”. Understanding Sudden Infant Death Syndrome. Symposium. The University of Redlands. Redlands, California.
- 11/12/2004: "Participation of Children in Research". The 23<sup>rd</sup> Annual Health Law Symposium: Contemporary Issues in Children’s Health. Center for Children’s Rights. Whittier Law School. Costa Mesa, California.
- 01/04/2005: "Congenital Central Hypoventilation Syndrome". Psychiatry Grand Rounds. Department of Psychiatry. Los Angeles County+University of Southern California Medical Center. Los Angeles, California.
- 03/5-6/2005: “Teaching Research Methodology and Proficiency in Teaching to Clinical Fellows: A Unique Core Curriculum”, and “Improving Education of Investigators in Protecting Human Research Subjects: A Comparison of Two Curricula for Re-certification”. Innovations in Medical Education Conference. Division of Medical Education. Keck School of Medicine of the University of Southern California. Pasadena, California.
- 09/20/2005: “Sudden Infant Death Syndrome: Research Update”. California Coroner’s Association Annual Conference. Fresno, California.

- 10/21/2005: “SIDS Research: A Look at the Past, Present, and Future”. Understanding Sudden Infant Death Syndrome Symposium. The University of Redlands. Redlands, California.
- 10/26/2005: “SIDS Research: A Look at the Past, Present, and Future”, “Current Day Concerns: SIDS Experts Answer Your Questions”, and “Addressing Pressing Problems and Current Concerns”. 25<sup>th</sup> Annual California SIDS Conference: Commemorating the Past, Present, and Future. California SIDS Program. Sacramento, California.
- 06/04/2006: “Developmental pattern of arousal responses to respiratory stimuli”. The 9<sup>th</sup> SIDS International Conference. Yokohama, Japan.
- 06/05/2006: “Clinical Care of Congenital Central Hypoventilation Syndrome”, “Acute Respiratory Failure in Cystic Fibrosis”. Education Conference. Department of Anesthesia and ICU. National Center for Child Health and Development. Tokyo, Japan.
- 06/09/2006: “Home Mechanical Ventilation in Children”. Pediatric Educational Conference. Tokibo, Ltd. Tokyo, Japan.
- 09/19/2006: “Where in the Brain is the Respiratory Control Center? Physiologic Studies in CCHS”. Clinical Research Seminar Series. General Clinical Research Center. Children’s Hospital Los Angeles. Los Angeles, California.
- 09/27/2006: “Apnea, Apparent Life-Threatening Events, and Use of Home Apnea-Bradycardia Monitoring”. Pediatric Grand Rounds. Huntington Memorial Hospital. Pasadena, California.
- 10/16-20/06: “Reducing the Risk of SIDS”; “Childhood Asthma”; “Chronic Cough in Children”; “Respiratory Treatments in Children: When to Use What?”; and “Obstructive Sleep Apnea Syndrome”. Aloha Update: Pediatrics<sup>0</sup> 2006. University Childrens Medical Group. Children’s Hospital Los Angeles. Koloa, Kauai, Hawaii.
- 10/27/2006: “SIDS: How Research Has Made a Difference”; and “Addressing Issues and Inquiries: SIDS Experts Answer Our Questions”. *Making a Difference Together*: 26<sup>th</sup> Annual California SIDS Conference. California SIDS Program, and California Department of Health Services. Riverside, California.
- 12/01/2006: “SIDS Update: New AAP Policy on SIDS”. Champions of Public Health Centennial Lecture Series. Long Beach Department of Health and Human Services. Long Beach, California.
- 04/19/2007: “SIDS: An Overview of Current Theories and Research” and “Reducing the Risk of SIDS: Implementing the AAP Recommendations”. Sudden Infant Death Syndrome Training for Emergency Responders and Public Health Professionals. California SIDS Program. Visalia, California.
- 09/29/2007: “Reducing the Risk of Sudden Infant Death Syndrome”. 35<sup>th</sup> Reunion of the Charter Class. Reunion Week-end 2007. University of California, San Diego, School of Medicine. San Diego, California.
- 10/26/2007: “Uncovering Answers About SIDS: SIDS Experts Answer Your Questions”. On the Threshold of Discovery. 27<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. San Francisco, California.
- 10/30/2007: “Home Infant Monitoring: When to Start; When to Stop”. American Academy of Pediatrics National Conference and Exhibition. San Francisco, California.
- 11/09-10/07: “New Aspects of the Adolescent and Adult Affected by CCHS”, “Diaphragm Pacing Without Tracheostomy: Transition from Positive Pressure via Tracheostomy”.



- Third International Conference on Congenital Central Hypoventilation Syndrome. International School of Paediatric Sciences of the Istituto G. Gaslini, Genoa, Italy. Sestri Levante, Liguria, Italy.
- 11/30/2007: “Congenital Central Hypoventilation Syndrome: Forgetting to Breathe for 30-years at CHLA”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.
- 12/06/2007: “SIDS: An Overview of Current Theories and Research” and “Reducing the Risk of SIDS: Implementing the AAP Recommendations”. Sudden Infant Death Syndrome Training for Emergency Responders and Public Health Professionals. California SIDS Program. Los Angeles, California.
- 04/01/2008: “Congenital Central Hypoventilation Syndrome: Forgetting to Breathe for 30-years”. Pediatric Grand Rounds. Women’s and Children’s Hospital. Los Angeles County+University of Southern California Medical center. Los Angeles, California.
- 04/22/2008: ‘Protecting Human Research Subjects’. Clinical Research Seminar. The Saban Research Institute. Children’s Hospital Los Angeles. Los Angeles, California.
- 04/30/2008: “Sudden Infant Death Syndrome: Facts, Risk Reduction, and Current Research”. Taping for Training Video: “SIDS/SUID: Infant Death Investigations”. California Commission on Peace Officer Standards and Training (POST). San Diego, California.
- 05/22/2008: “Reducing the Risk of Sudden Infant Death Syndrome”. Pediatric Grand Rounds. Children’s Hospital of Orange County at Mission Hospital. Mission Viejo, California.
- 06/26/2008: “Sudden Infant Death Syndrome Risk Reduction, Bedsharing, and Safe Sleep Recommendations”. Making a Difference in Infant Health. Los Angeles County Public Health Department. Los Angeles, California.
- 09/23/2008: “Sudden Infant Death Syndrome: Challenges in Making the Diagnosis”. Advanced Training. California State Coroner’s Association. Riverside, California.
- 10/24/2008: “Learning About SIDS from the Experts: Panel Discussion”, and “Lessons and Challenges in Making and Accurate Diagnosis of SIDS”. 28<sup>th</sup> Annual California SIDS Program Fall Conference: Lessons of Love and Hope. California Sudden Infant Death Syndrome Program. Los Angeles, California.
- 11/11/2008: “Sudden Infant Death Syndrome”. Pediatric Grand Rounds. Children’s Hospital of Central California. Madera, California.
- 11/21-23/08: “Reducing the Risk of Sudden Infant Death Syndrome (SIDS)”, “Chronic Cough in Children”, Obstructive Sleep Apnea Syndrome”, and “Sleep Disordered Breathing: When to Test? When to Treat?” Pediatric Update: 30<sup>th</sup> Annual Las Vegas Seminars. California District IX, American Academy of Pediatrics. Las Vegas, Nevada.
- 02/08-12/09: “Reducing the Risk of Sudden Infant Death Syndrome”, “Co-sleeping and the Risk of Sudden Death in Infants”, “Chronic Cough in Children”, “Obstructive Sleep Apnea Syndrome”, and “Childhood Asthma: New Lessons from EPR3”. Pediatric Potpourri: State of the Art 1996. University Childrens Medical Group. American Academy of Pediatrics, California Chapter 2. Kaanapali Beach, Maui, Hawaii.
- 03/11-12/09: “Sudden Infant Death Syndrome: Research and Risk Reduction”, “Diaphragm Pacing for the Treatment of CCHS”, and “Childhood Asthma: New Lessons from

- ERP3". 2009. 8<sup>th</sup> Annual George Polgar Lectureship in Pediatric Pulmonology. The Children's Hospital of Philadelphia. Philadelphia, Pennsylvania.
- 04/21-22/09: "Home Mechanical Ventilation in Children", and "Diaphragm Pacing for the Treatment of CCHS". Second Annual Phillip George Lecturer in Pediatric Pulmonology. Le Bonheur Children's Medical Center. University of Tennessee School of Medicine. Memphis, Tennessee.
- 05/19/2009: "Tracheal Lesions in an Adolescent Girl with Crohn's Disease": Pediatric Clinical Chest Rounds. 2009 International Conference of the American Thoracic Society. San Diego, California.
- 06/01/2009: Reducing the Risk of Sudden Infant Death Syndrome". Pediatric Grand Rounds. Los Angeles County+University of Southern California Medical Center. Los Angeles, California.
- 10/6-7/2009: Pediatric Pulmonology Division Conference: "Home Mechanical Ventilation in Children". Pediatric Grand Rounds: "Forgetting to Breathe: Congenital Central Hypoventilation Syndrome". and Pediatric Residents' Teaching Conference: "Reducing the Risk of Sudden Infant Death Syndrome". Children's Medical Center at Dallas. University of Texas Southwestern School of Medicine. Dallas, Texas.
- 10/20/2009: "State of SIDS in California and SIDS Research Update". 29<sup>th</sup> Annual California SIDS Program Fall Conference: SIDS: A Journey of Hope. California Sudden Infant Death Syndrome Program. Sacramento, California.
- 02/06/2010: "Insights about SIDS from the CHIME Study". 16<sup>th</sup> Annual Conference, Japan SIDS Research Society. National Center for Child Health and Development. Tokyo, Japan.
- 02/09/2010: "Home Mechanical Ventilation in Children". 205<sup>th</sup> Shinsyu Perinatal Conference. Nagano Children's Hospital. Nagano, Japan.
- 02/10/2010: "Apparent Life-Threatening Events". Pediatric Resident Conference. National Center for Child Health and Development. Tokyo, Japan.
- 02/10/2010: "Home Mechanical Ventilation in Children". Multiple Tokyo Hospital Educational Conference. Tokibo International. Tokyo, Japan.
- 05/18/2010: "An 11-year old Boy with an Enlarging Chest Mass: Castleman Disease": Pediatric Clinical Chest Rounds; and "Home Management of Children with Central Hypoventilation Syndrome": Pediatric Year in Review. 2010 International Conference of the American Thoracic Society. New Orleans, Louisiana.
- 07/30/2010: "Reducing the Risk of Sudden Infant Death Syndrome". Pediatric Grand Rounds. Children's Hospital Los Angeles. Los Angeles, California.
- 08/17/2010: "Home Mechanical Ventilation in Children". Pediatric Grand Rounds. Children's Hospital of Central California. Madera, California.
- 11/15-16/10: "Some Thoughts on Home Mechanical Ventilation in Children". Pediatric Pulmonology Conference. "Diaphragm Pacing for the Treatment of Children with CCHS. Pediatric Grand Rounds. C.S. Mott Children's Hospital. University of Michigan Medical School. Ann Arbor, Michigan.
- 11/18/2010: "Forgetting to Breathe: Congenital Central Hypoventilation Syndrome". The Drew Wiltsie Memorial Lecture, Pediatric Grand Rounds. Children's Hospital of Pittsburgh. University of Pittsburgh School of Medicine. Pittsburgh, Pennsylvania.

- 02/09/2011: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. Pulmonary and Critical Care Medicine Conference. Harbor-UCLA Medical Center. Torrance, California.
- 05/24/2011: “Safe Sleep for Infants: New Data on Bedsharing and Increased Infant Deaths”. Southern California Public Health Association, Nursing Section. Long Beach, California.
- 07/01/2011: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. 2011 West Coast Conference. CCHS Family Network. San Diego, California.
- 10/19/2011: “Diagnosis of Sudden Unexpected Death in Infancy: Inconsistencies and Challenges”, and “SIDS Risk Factors: How Much Weight Should Coroners Place on Finding SIDS Risk Factors?” SIDS Summit 2011. West Coast Forensic Science Seminar. California State Coroners’ Association, and Los Angeles Office of Coroner. Studio City, California.
- 10/28/2011: “SIDS: Pathways to Progress in California”, and “California SIDS Experts Answer Your Questions”. Pathways to Understanding: 31<sup>st</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. Sacramento, California.
- 04/13-14/12: “Apnea and Sudden Infant Death Syndrome” and “Chronic Respiratory Failure in Children”. 15<sup>th</sup> Annual Conference. Turkish Thoracic Society. Side-Antalya, Turkey.
- 05/18/2012: “Central Hypoventilation Syndromes: Diagnosis and Management”. Post Graduate Course 10: Sleep Disordered Breathing and Associated Co-Morbidities in Children: From Bench to Bedside. American Thoracic Society International Conference. San Francisco, California.
- 05/19/2012: “Acute Respiratory Failure”. Post Graduate Course 21: The Physiological Basis of Pediatric Respiratory Diseases. American Thoracic Society International Conference. San Francisco, California.
- 07/08-13/12: “Evaluation and Management of Chronic Cough”, “Childhood Asthma: What’s New?”, “Reducing the Risk of Sudden Infant Death Syndrome”, “Bedsharing: Is it Protective? Is it Harmful?”, “Obstructive Sleep Apnea Syndrome”, and “Helping Obese Children and Adolescents with Exercise”. *Pediatrics in the Islands: Clinical Pearls 2012*. American Academy of Pediatrics and University Children’s Medical Group. Kaanapali, Maui, Hawaii.
- 10/19/2012: “Sudden Infant Death Syndrome: Lessons from the CHIME Study and from Brad Thach”. Symposium in Honor of Professor Bradley T. Thach. St. Louis Children’s Hospital. Washington University School of Medicine. St. Louis, Missouri.
- 10/30/2012: “Diagnosis of Infants Dying Suddenly: Is it SIDS, SUDI, or Undetermined? Does it Matter?” Hearts United in Healing: 32<sup>nd</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. Los Angeles, California.
- 04/11/2013: “Cystic Fibrosis: New Treatments Bring New Hope”. Pediatric Nursing: Care of the Hospitalized Child. Contemporary Forums. Anaheim, California.
- 05/17/2013; “Chronic Respiratory Failure”. Postgraduate Course 7: Pediatric Respiratory Physiology: What’s Right and When It Goes Wrong. 2013 International Conference. American Thoracic Society. Philadelphia, Pennsylvania.
- 05/19/2013; “Caring for the Ventilator Dependent Child at Home: What We Have Learned in Four Decades”. Meet the Professor Seminar. 2013 International Conference. American Thoracic Society. Philadelphia, Pennsylvania.

- 05/20/2013; “Twelve Year Old Girl with Productive Cough and Morning Neck Swelling: Lymphangiomatosis”, Pediatric Clinical Chest Rounds. 2013 International Conference. American Thoracic Society. Philadelphia, Pennsylvania.
- 05/22/2013; “Value of a Coordinated Care Approach to Develop Meaningful Outcomes in Children Needing Long Term Ventilation”. Rationale and Models for Multidisciplinary Care of Children with Complex Disorders Symposium. 2013 International Conference. American Thoracic Society. Philadelphia, Pennsylvania.
- 08/22/2013: “Protecting Human Research Subjects”. Psychiatry Grand Rounds. Los Angeles County+University of Southern California Medical Center. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 01/17/2014: “Reaching the First Birthday: Safe Infant Sleep”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.
- 05/10/2014: “Sudden Infant Death Syndrome”. Alumni Reunion. Children’s Hospital Los Angeles. Los Angeles, California.
- 05/17/2014: “Pulmonary Hyperinflation”. Postgraduate Course 18: Pediatric Respiratory Physiology in Health and Disease. 2014 International Conference. American Thoracic Society. San Diego, California.
- 08/01/2014: “Where Have We Been and Where Are We Going?” 27<sup>th</sup> National Cystic Fibrosis Education Conference: The Changing Faces of Cystic Fibrosis: Inspiring Hope. Cystic Fibrosis Research Institute. Redwood City, California.
- 10/17/2014: “[The State of SIDS in California: Council Action/Recommendations](#), Diagnosis Shift and Its Impact, Next Steps”. Bridges to Tomorrow: 33<sup>rd</sup> Annual California Sudden Infant Death Syndrome Conference. California Sudden Infant Death Syndrome Program. Sacramento, California.
- 11/06/2014: “Bedsharing and Sudden Infant Death Syndrome”. 17<sup>th</sup> Annual Emergency Medical System for Children Educational Forum. State of California Emergency Medical Services Authority,. Sacramento, California.
- 01/31/2015: “Sudden Infant Death Syndrome”. Women and Children’s Health Symposium. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 04/20-21/15: “Research Continuous Process Improvement”. Therapeutic Development Network Spring Meeting. Therapeutic Development Network. Cystic Fibrosis Foundation Washington, D.C.
- 05/16/2015: “Central Hypoventilation Syndromes”. Postgraduate Course 22: The Art of Respiratory Physiology: Form and Function. International Conference of the American Thoracic Society. Denver, Colorado.
- 08/01/2015: “The Search for a Cure”. Partners in Progress. 28<sup>th</sup> Annual Cystic Fibrosis Family Education Conference. Cystic Fibrosis Research, Inc. Los Angeles, California.
- 09/23/2015: “Sudden Infant Death Syndrome and Sudden Unexpected Infant Death”. Annual Meeting. California State Coroners’ Association. South Lake Tahoe, California.
- 09/25/2015: “Sudden Infant Death Syndrome and Safe Infant Sleep”. Grand Rounds. Mercy Medical Center. Redding, California.
- 11/19/2015: “Safe Infant Sleep and SIDS Risk Reduction”. 34<sup>th</sup> Annual California Sudden Infant Death Syndrome Conference. California SIDS Program. Los Angeles, California.
- 01/08/2016: “Cystic Fibrosis: The Search for a Cure”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.

- 02/06/2016: “Sudden Infant Death Syndrome and Safe Infant Sleep”. Women and Children’s Health Symposium. Keck School of Medicine of the University of Southern California. Los Angeles, California.
- 03/01/2016: “Cystic Fibrosis: The Search for a Cure”. Pediatric Grand Rounds. Los Angeles County+University of Southern California Medical Center. Los Angeles, California.
- 05/13/2016: “Weaning from Chronic Respiratory Failure”. Postgraduate Course 9: The Physiology of Pediatric Respiratory Failure. American Thoracic Society International Conference. San Francisco, California.
- 05/17/2016: “Forgetting to Breathe: Congenital central Hypoventilation Syndrome”. Annual Dinner Meeting. Assembly on Sleep and Respiratory Neurobiology. American Thoracic Society International Conference. San Francisco, California.
- 07/28/2016: “Sudden Infant Death Syndrome and Safe Infant Sleep”. Pediatric Grand Rounds. U.S. Naval Medical Center San Diego. San Diego, California.
- 08/20-21/16: “Acid-Base Balance”, “V/Q Relationships and Gas Exchange”, and “Acid-Base and Gas Exchange Lunch Workshops”. Pediatric Pulmonology Board Review Course. American College of Chest Physicians and American Academy of Pediatrics. Phoenix, Arizona.
- 08/30/2016: “Sudden Infant Death Syndrome and Safe Infant Sleep”. Pediatric Grand Rounds. Valley Children’s Hospital. Madeira, California.
- 09/22/2016: “Sudden Infant Death Syndrome: Research Trends and the Triple Risk Hypothesis”. SIDS Summit 2. Annual Meeting. California State Coroners Association. Indian Wells, California.
- 10/14/2016: “SIDS in California”. 35<sup>th</sup> Annual California SIDS Conference. California SIDS Program. Sacramento, California.
- 10/25/2016: Margaret Pfrommer Memorial Lecture “Unsung Heroes: Children on Home Mechanical Ventilation”. CHEST. Annual Meeting of the American College of Chest Physicians. Los Angeles, California.
- 10/26/2016: “Diaphragm Pacing in Pediatrics”. CHEST. Annual Meeting of the American College of Chest Physicians. Los Angeles, California.
- 05/19/2017: “Central Hypoventilation Syndromes: Post Graduate Course 09. Pediatric Respiratory Physiology: When Its Normal and When It’s Not. International Conference. American Thoracic Society. Washington, D.C.
- 05/22/2017: “John G. Brooks: Sudden Infant Death Syndrome: Infant Apnea to Safe Infant Sleep”. Founders’ Dinner. Pediatric Scientific Assembly. International Conference. American Thoracic Society. Washington, D.C.
- 12/01/2017: “Unsung Heroes: Celebrating 40-Years of Home Mechanical Ventilation at CHLA”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.
- 05/10/2018: “Sudden Infant Death Syndrome and Brief Resolved Unexplained Events”. S. Michael Marcy M.D. Memorial Lecturer. Parmelee Spring Meeting, Los Angeles Pediatric Society. Los Angeles, California.
- 05/11/2018: “Cystic Fibrosis: The Search for a Cure”. Fourth Annual S. Michael Marcy Lectureship. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.

- 05/17/2018: “Tests of Ventilatory Muscle Function”. Post Graduate Course 12: Pediatric Respiratory Physiology: Tests of Lung Function and Diseases They Test For. International Conference of the American Thoracic Society. San Diego, California.
- 06/20-23/2018: “Best Clinical Practice in CCHS”, “Research Roundtable: Organic Discussion About CCHS Research”, and “Pregnancy and CCHS”. Fifth International Congenital Central Hypoventilation Syndrome Conference. CCHS Network and CCHS Foundation. St. Louis, Missouri.
- 10/30/2018: “Sudden Infant Death Syndrome: Exploring the Medical Mystery”, and “Safe Infant Sleep” Central Valley Safe Infant Sleep Conference. Fresno County Public Health Department. Valley Children’s Hospital. Fresno, California.
- 11/05/2018: “Respiratory Muscle Weakness in Muscular Dystrophy and Spinal Muscular Atrophy?”. Sections on Pediatric Pulmonology and Sleep Medicine, and Neurology. National Conference and Exhibition. American Academy of Pediatrics. Orlando, Florida.
- 03/15/2019: “Sudden Infant Death Syndrome and Safe Infant Sleep”. Kern County Perinatal Symposium. Kern County Department of Public Health. Bakersfield, California.
- 05/10/2019: “Enriching and Extending the Lives of People with Cystic Fibrosis”. Mountain West Cystic Fibrosis Consortium. Las Vegas, Nevada.
- 05/18/2019: “Maturational Changes in the Apparatus of Breathing”. Post Graduate Course 19: Respiratory Physiology Over the Lifespan: When It’s Right and When It’s Not. International Conference of the American Thoracic Society. Dallas Texas.
- 05/19/2019: “A Kid in a Candy Shop”. Pediatric Founder’s Award Address. Pediatric Scientific Assembly. International Conference of the American Thoracic Society. Dallas Texas.
- 02/23-27/20: “Are E-cigarettes Safer Alternatives to Tobacco Smoking”, “Evaluation of Chronic Cough”, “Can Lung Disease Patients Exercise? Is it Safe?”. “When Snoring is More than Just Snoring: Obstructive Sleep Apnea”, “Infant Apnea and Brief Resolved Unexplained Events”, and “Safe Infant Sleep, SIDS, and Bedsharing”. Pediatric Potpourri: State of the Art 2020. Children’s Hospital Los Angeles Medical Group. Maui, Hawaii.
- 08/14/2020: “V/Q Relationships and Gas Exchange”, and “Acid-Base Balance”. Pediatric Pulmonology Board Review Course. American College of Chest Physicians. Washington, D.C.
- 10/20/2020: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. Division of Pulmonology and Sleep Medicine. University of California, San Diego, School of Medicine. San Diego, California.
- 03/05/2021: “Ventilatory Muscle Physiology”. Pediatric Pulmonary Grand Rounds. Children’s Healthcare of Atlanta. Emory University School of Medicine. Atlanta, Georgia.
- 04/29/2021: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. 2021 International Conference. Turkish Pediatric Pulmonology Society. Virtual.
- 05/21/2021: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. Pediatric Pulmonology Conference. Children’s Hospital of Eastern Ontario. University of Ottawa Faculty of Medicine. Ottawa, Ontario, Canada. Virtual.
- 06/01/2021: “Forgetting to Breathe: Congenital Central Hypoventilation Syndrome”. Pediatric Sleep Group Conference. European Respiratory Society. Virtual.

- 02/18-19/22: “Edwin L. Kendig, Jr. Award Lecture: CFTR Modulators”, and “CF Diagnostic Dilemmas: CRMS (CFSPID) CFRD, and Interpreting the NBS”. Celebration of Pediatric Pulmonology and Sleep Medicine. Section of Pediatric Pulmonology and Sleep Medicine. American Academy of Pediatrics. Scottsdale, Arizona.
- 03/11/2022: “It Takes a Village: Home Mechanical Ventilation”. Pediatric Grand Rounds. McLane Children’s Hospital. Baylor, Scott. and White Medical Center. Texas A&M University College of Medicine. Temple, Texas.
- 03/25/2022: “Congenital Central Hypoventilation Syndrome: Forgetting to Breathe”. Robert M. Mellins Memorial Lecture. Columbia University College of Physicians and Surgeons. New York City.
- 05/06/2022: “Cystic Fibrosis: The Search for a Cure”. Pediatric Grand Rounds. Children’s Hospital Los Angeles. Los Angeles, California.