

INTERNATIONAL LUNG  
SOUNDS ASSOCIATION  
HISTORICAL PERSPECTIVES

# GREETINGS

I am very pleased to have the opportunity to speak with this distinguished group and I hope you all enjoy and learn a lot at this meeting.

# Coment

- As one of the original founders of the International Lung Sounds Association I am pleased to be a part of something that for so many years that has helped to improve lung sound analysis.
- I am proud to be a part of such an esteemed audience of colleagues who share a common vision of improving health care.

# BACKGROUND

- When doing physical examinations on workers exposed to asbestos I heard crackles (they were called rales at that time).
- The workers with crackles were more likely to have other signs of asbestosis, - abnormal x-ray findings, decreased vital capacities and abnormal respiratory symptoms as compared to those without crackles
- These findings were related to the duration of their exposure to asbestos.

# BACKGROUND

- This work was part of a doctoral thesis at the Harvard School of Public Health.
- My mentor, a Public Health physician was unimpressed by my findings.
- “How do we know that the crackles are not between your ears” he asked.

# MIT ENGINEERS

- Job (in 1968) at the Massachusetts General Hospital seeing patients at Logan airport 2.7 miles away (Michael Crichton Five Patients Ballantine Books, NY 1970)
- Engineers from MIT interested in the project's tools for evaluating patients at a distance
- When told of the crackle problem one said:  
**“If you can hear them we can show them to you.”**

# TIME EXPANDED WAVEFORM ANALYSIS

- Electronic stethoscope from the MGH
- Tape recorder from HSPH
- Bus ride from Boston to Bath, Maine
- Tape recorded asbestos exposed workers lung sounds

# TIME EXPANDED WAVEFORM ANALYSIS (2)

- Recorded lung sounds of asbestos workers
- Large computer at MIT
- Program with time expanded waveform analysis
- Expanded waveforms were different for crackles, wheezes, pleural friction rubs



# TIME EXPANDED WAVEFORM ANALYSIS(3)

- Engineers unimpressed:
- “We do time expansion all the time.”
- David Cugell, MD, Professor of Pulmonary Medicine, University of Chicago publishes an article pointing out that TEWA was the first method of separating lung sounds visually.
- Patented the work

# THE LITTLE PRINCE and THE ORIGIN OF ILSA

- Talk at the American Thoracic Society on occupational asthma.
- Trouble defining ATOPY
- It reminded me of the Little Prince from the planet B612 and asked a man to draw a picture of a sheep.
- He didn't like the pictures.
- The man drew a box and said your sheep is inside. "Just what I wanted", the prince said.

# ROBERT LOUDON

- Robert Loudon was in the audience at a meeting of the American Thoracic Society when I gave this talk on my problem with the definition of atopy in occupational asthma.
- He said he was intrigued with someone who could incorporate Antoine de Exupery's Little Prince into a medical talk.



# FIRST MEETING

- Robin and I talked for over an hour after my lecture.
- He, a professor of Medicine from Ohio, was interested in the quantification of cough.
- He made tape recordings of coughs at weekly Grand Rounds for months.
- Cough counts correlated with air pollution levels

# ACOUSTICS IN MEDICINE

- We asked each other about who we knew that was interested in quantification of acoustics in medicine.

We contacted those we knew and had the first meeting in Boston, October 1976

The meeting was attended by physicians, engineers, psychologists, nurses, etc.

# STATED OBJECTIVES(1)

- “To provide an opportunity for exchange of ideas and experiences among those who have an active interest in the subject”.
- “Clinicians, physiologists, engineers and perceptual psychologists can each contribute to a better understanding of what lung sounds mean”.
- “We hope that comparisons of methods of recording, analyzing and describing lung sounds will reduce ambiguity”.

# STATED OBJECTIVES (2)

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- “We hope that discussions about work in progress may prevent unnecessary duplication of effort”.
- “We hope that investigators will save time and avoid some mistakes by observing what others have done”.



# Early Meetings

- We were fortunate to have many distinguished experts attend the early meetings including:
- Jere Mead
- Ed Gaensler
- Roger Mitchell
- Shoji Kudoh
- Richiro Mikami
- Paul Forgacs
- Jeff Fredberg
- Forbes Dewey
- Peter Macklem

# Features of the Meetings

- Interdisciplinary nature of the work presented
- The international audience
- The large proportion of time devoted to discussion

# Things that ILSA likely contributed to:

- Standardization of lung sound nomenclature
- Multiple publications that document the clinical value of computerized lung sound analysis.
- Devices are now on the market to provide computerized lung sound analysis.

# ILSA Meeting Summary (1976-2009)

- There have been meetings in 14 Countries.
- Over 800 Authors have contributed.
- Over 900 Abstracts have been presented.

# Medical Opinion

To some lung sounds are not important. I found the following in a text:

“When it comes to diagnosis of chest diseases, the stethoscope is an entirely useless instrument. Nevertheless it does play an important role. Apprehensive patients feel reassured when the feel the chest piece on their pectoral muscles.”

Rubin and Rubin Textbook of Chest Medicine  
1960.

# WHY SO MANY MEETINGS?

- As noted, to some, lung sounds are not very important.
- Award for 25 years teaching Medical Students at Tufts
- Dean Harrington introduced me saying that I had an **ARCANE** interest in lung sounds, **BUT** I was a good clinician.

# ARCANE

Dictionary definition:

known or understood only by those having,  
special, secret knowledge; esoteric

# IMPORTANCE OF LUNG SOUNDS (1)

- All living humans have lung sounds
- Lung sounds frequently change when disease is present
- These changes can help clinicians know that disease is present and often what kind of disease it is



# IMPORTANCE OF LUNG SOUNDS(2)

- Lung sounds can help monitor the course of a variety of illnesses
- The stethoscope has been in use for 200 years because it can provide clinicians with important clinical information. It is so commonly used by physicians that it has become a symbol of the profession

# IMPORTANCE OF LUNG SOUNDS(3)

- Computers have greatly improved the efficiency and accuracy of getting diagnostic information from patients.
- Observer variability is circumvented
- Computers will not be uninvented.
- Computers continue to improve.
- Computers have become less expensive

# IMPORTANCE OF LUNG SOUNDS(4)

- Acoustic sensors are not expensive.
- Computerized acoustic analysis can reduce radiation exposure. This is particularly important for pregnant women and children.
- The information obtained can be telemetered. This can aid care in places remote from x-rays and other medical technology.

WHY BE INTERESTED IN  
LUNG SOUNDS?????

BECAUSE THEY CAN HELP  
**SAVE LIVES AND MONEY**

- The 39<sup>th</sup> International Lung Sounds Association Meeting will be held in Boston 2014 at Steward St. Elizabeth's Medical Center in Boston, Massachusetts, Affiliate of Tufts Medical School.
- October 10<sup>th</sup> and 11<sup>th</sup>.
- Dr. Sadamu Ishikawa will be the host.
- We hope to see you there.

# **FUTURE OF ILSA**

The work of ILSA must go on.  
Major advances have been made.  
Patented technology is already  
out there that helps diagnose and  
monitor diseases.

**ILSA can remain a forum for  
international collaboration.**