

ACCE News

Vol. 10, No.3- May 2000

See You in San Jose!

3rd ACCE Symposium on Medical Telemetry June 3, 2000

Experts from government, industry and the hospital community come to grips with medical telemetry. How will frequency allocation affect you? What about interference? **See back cover!**

ACCE General Membership Meeting Tuesday, June 6, 2000 Fairmont Hotel 6:15-9:00 PM

ACCE NEWS FEATURES

Mending Errors ☞

Marvin Shepherd lends his keen perspective on the medical errors issue, p. 3

ACCE Teleconference ☞

Sign up today for the information-packed Teleconference series! p. 11

International CE Survey ☞

Marianna Glouhova and Nicolas Pallikarakis span the globe with their survey of clinical engineering. p. 13.

Dominican Republic ACEW ☞

The 9th Advanced Clinical Engineering Workshop was an outstanding success, p. 9

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ACCE News

21 Bob's Lane

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American College of Clinical Engineering

ACCE News

ACCE Mission

1. To establish a standard of competence and to promote excellence in Clinical Engineering Practice.
2. To promote safe and effective application of Science and Technology to patient care.
3. To define the body of knowledge on which the profession is based.
4. To represent the professional interests of Clinical Engineers.

ACCE Web Page

[http:// accenet.org](http://accenet.org)

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President's Message

Jennifer C. Ott, MSBME, jennifer.ott@tenetstl.com

Well, it is that time of year again the meeting season is upon us. I have just returned from HealthTech and would like to express many kudos to Binseng Wang who did a fantastic job organizing the clinical engineering track for ACCE. He received a standing ovation for a job well done. Yadin David and Marv Shepherd deserve thanks as well. Their round table discussion, *Medical Errors and the Role of Clinical Engineering and ACCE*, roused many of us up at 7am. It helped to generate many new ideas and the focus for an ACCE position statement currently under development. The early morning discussion was followed later by an official HealthTech session led by Dave Simmons. We had a general membership meeting Monday night complete with wine. Due to Joe Dyro's absence we even had enough for everyone! A synopsis of ACCE activities was provided and interest in upcoming activities was solicited.

I encourage all of you to attend our next general membership meeting, which will be held at the Fairmont Hotel during AAMI in San Jose on Tuesday, June 6th beginning at 6:30pm. This will be a wine and cheese reception followed by an update on the ACCE activities for the past year and upcoming projects. I cannot express how important this meeting is for you as a member and really encourage you to attend and participate. The Board of Directors represents the membership and we need to have feedback.

As many of you know we are all volunteers in this effort and with the limited capacity of time all of us are suffering assistance is sorely needed. We are not asking for a major time commitment just a little bit here and there to ensure the viability of ACCE in the future. We have openings on the Board due to term expiration so if you are interested please contact the Nomination Committee chair, Bob Morris at [moris@ohsu.edu](mailto:morris@ohsu.edu). There is also great assistance needed on the many ACCE committees, including Advocacy, Education, International, Membership, and Nominations. Please contact me if you are interested in a particular committee or would be willing to serve where needed. We can always use assistance for contacting manufacturers and other sponsors to offset ACCE News, Symposium, and Membership Meeting expense. Please contact me if you are interested. Remember we are a relatively small society and what better way to interact with your colleagues than to be more active in ACCE activities.

Okay, off the soapbox!!

Other stimulating ACCE activities include the 3rd ACCE Symposium to be held on Saturday, June 2nd as part of AAMI. This will be great discussion with potentially some major announcements regarding *Frequency Allocation in Medical Telemetry*. I hope to see you there! Frank Painter and the CCE committee have submitted the ACCE proposal to AAMI to transfer the certification process. The USCC is meeting in June so we may hear feedback shortly. I already mentioned the Medical Error issue that will continue to be addressed by the ACCE *ad hoc* committee. If you are interested in participating please let me know.

ACCE has had a very exciting year and I have been very happy to be a part of it. The next year is going to prove to be even more exciting. I look forward to seeing you at AAMI or to hear from you soon. Cheers!



Jennifer Ott

ACCE News

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Mending the Way of Our Errors

Marvin Shepherd, mshepherd@devteqpub.com

National legislation to minimize medical errors now appears on the horizon. With publication of the Institute of Medicine report⁽¹⁾ there has been a significant increase in national interest in the reduction in medical errors. The Senate just issued a press release announcing a bipartisan bill that will require the establishment of a Center for Patient Safety and the mandatory reporting of adverse events. (See www.senate.gov/~grassley/releases/2000/p0r4-06.htm) Previously, the VA hospital system established and funded four, Patient Safety Centers of Inquiry. These are only two indicators of the serious intent to address the issue of medical errors.

In 1972, Bruner, Aronow, and Cavicchi reported on a study of electrical incidents in a large hospital over a 42-month period. They were convinced that their study captured most electrical incidents because "our professional activities keep us in touch with clinical apparatus and the people using it."⁽²⁾ This perceptive comment suggests an intriguing possibility. Clinical Engineering departments could identify operator (human) errors associated with devices if they would more carefully gather, document and analyze incidents in which a device did not provide its clinical benefit, but the safety and performance tests on the device were normal, i.e., a trivial incident or a near miss.

Clinical Engineers and BMETs have a unique position in the healthcare system. They are omnipresent wherever devices are used in healthcare sites. They already document the failures, or complaints of failures, of these devices including some identified as operator errors (a sub-set of medical errors). They are approached in elevators and hallways by healthcare personnel and asked about some real incidents and some near miss incidents. They discuss some of these incidents at the Safety Committee meetings or with the Risk Manager and they investigate device-related accidents involving injuries and deaths. Probably, an active, communication network such as this would not miss major incidents and through vigilance could markedly improve the detection and documentation of near miss incidents.

Gathering and studying near miss, device-related incidents has many benefits⁽³⁾ over gathering adverse events. It applies the ideal risk management approach of identifying potentially harmful conditions prior to an injurious event; since no injury has occurred, information gathering will be less impeded by fears of personal or professional embarrassment; and since the legal liability would be negligible the information gathered could be more openly discussed with colleagues and shared with others.

The information gathered must focus on root causes rather than direct causes

In the past, once we determined that the direct cause of an event was probably "operator error" the mystery was solved and we stopped our investigation. Leaders in the studies of human error are convinced that operator (human) errors are more likely due to conditions, systems or processes, i.e., root causes surrounding an

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Letters

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The Editor encourages readers to express their views by way of letters that might be printed here for the benefit of the readership. He also likes to get mail.

ACCE News

event, rather than by the operators⁽⁴⁾. In recognizing this change in the way we view "causes", we must study the root causes of operator (human) errors more closely. (It is interesting to note that a Clinical Engineer, Ray Zambuto⁽⁵⁾, suggested in 1992 that "operator error" be included as a maintenance quality indicator.) In addition, we must develop questionnaire forms that accurately document conditions at an incident site at the time of occurrence. Developing this form will not be a simple task, and it's one that perhaps the ACCE could address so that a standardized form would be available.

Many high-risk devices, i.e., defibrillators, ventilators, and the like, fail at critical moments. However, after a performance and safety test, the results are documented in a "maintenance database." (On occasion, they are also included in the risk management database.) Perhaps near misses and *all other incidents in which a device failed to provide its clinical benefit* should be included in a "device-related incident database." This change in focus raises the overall management of device-related incidents to a new level of importance and moves the Clinical Engineering Department closer to the clinical environment.

Performing incident investigations and identifying root causes, will eventually prove to be of greater importance in lowering

healthcare costs, reducing patient suffering, and enhancing patient outcomes than will pure maintenance efforts. With their present network in place, Clinical Engineering Departments have an opportunity to lead the way in reducing device-related, operator errors, and to make some major advances in patient safety. Gathering the additional incidents may seem easy, but the information gathered must prove useful in accurately identifying root causes. However, now is the time to lead and your facility is the place to begin. Perhaps we can mend the way of our errors.

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5. Zambuto, R. (1992) *Evaluating Operator Error as a Quality Indicator*, ASHE Tech Doc Series, #055450.

Meetings

Binseng at Brazil Enftec

Binseng Wang, binseng@voicenet.com

Every two years, a major nursing conference is held in Brazil to discuss the impact of technology in nursing. This year, the 7th Technology in Nursing Meeting (Enftec) was held in São Paulo city from April 4 to 7, 2000, at the Grand Melia Hotel.

Eber R. dos Santos, an ACCE member, assisted Enftec's scientific committee in choosing the topics and speakers. Two speakers were invited from the US. Joanne Disch from the University of Minnesota made a presentation about the current status of the nursing profession in the US and conducted a workshop on *Practical Aspects of Nursing Cost Management*. The other speaker invited from the US was Binseng Wang, also an ACCE member. He made a presentation about

technology cost management and conducted a workshop on technology management and strategic planning in technology.

The meeting had over 850 registered participants and consisted of conferences, workshops, exhibits, and many informal discussions. Both presentations were attended by about 650 persons and the workshops were limited to 300 registered participants.

On Saturday, 4/8/00, the Brazilian Clinical Engineering Certification Committee, composed of Paulo Palombo Camargo, Lúcio F. Brito, Binseng Wang, and Dr. Sérgio S. Mühlen (the first three being ACCE members), held a meeting to plan the certification activities for 2000. It was decided that a test would be applied in the last week of June during the traditional Hospitalar equipment show. About a dozen applicants are expected

to take this test. Candidates that pass this test will be offered the opportunity to take the written and oral exams later this year. In addition, a marketing campaign to explain and advertise the role of certified clinical engineering will be launched using a brochure that has been drafted.

Clinical engineering is clearly growing steadily in Brazil in spite of the economic challenges occurred in 1999. Most major public and non-profit hospitals have at least a clinical engineer. Unfortunately, not everyone has been fully trained to perform technology management duties. Certification will, therefore, allow the employers to distinguish the better-qualified professional from others.

EMBS Baltimore Section IEEE meetings

Bob Berkovits, BerkovitsR@jsc.mil

The attendance was 18 for the March 30 meeting held at the Homewood Campus of Johns Hopkins University. The speaker was Dr. David Sherman of the JHU Biomedical Engineering Department. The topic was "Diagnostic Methods for Neural Injury." He presented the results of the early experiments on perinatal and neonatal pigs. They had successfully improved the prediction of outcomes from episodes of mild hypoxemia incidents during the first six hours after birth. The talk was about EEG waveform analysis, monitoring and analyzing the bursts in the EEG waveform and developing new algorithms for outcome prediction. They had developed a portable PC type instrument using National Instrument LabView data acquisition software. I think it was Lab Windows/PCI.

The attendance for the April 20 meeting was 14. The speaker was Dr. Scot C. Kuo, Assistant Professor of Biomedical Engineering, Johns Hopkins University. His topic is "At the intersection of cell biology and engineering: Cell mechanics from Angstrom-level measurements". This was an extremely interesting talk. Dr. Kuo discussed monitoring cellular motion, laser tweezers, concepts of radiation pressure, and equipment for non-invasive monitoring with a red laser. He first showed the movement of macrophages and capturing of particles. He then showed motion pictures of the *Listeria* penetrating cells and moving around inside, exiting and penetrating other cells. This sometimes-deadly bacterium (SARA LEE Hot Dogs) is unique in the large forces it exerts in doing its deadly job.

Abstract of Dr. Kuo's talk

Despite the power of modern molecular biology and biochemistry, fundamental cellular processes, in particular crawling and eating, remain mysterious. These cellular functions are

mechanical in nature. However, instrumentation for mechanical measurements has lagged behind molecular techniques. I will describe a new, noninvasive approach that we invented to measure cell mechanics. Completely non-invasive, no forces are applied to cells, yet quantitatively accurate viscoelastic moduli can be acquired in one second. The core instrumentation is high-resolution particle tracking with laser optoelectronics that results with Angstrom-level spatial resolution and 50kHz bandwidth. After applying theorems of stochastic processes and statistical physics, these particle trajectories reveal the mechanics of their local environment. Three applications will be described: mapping subcellular mechanics, resolving mechanical events during cell eating, and determining mechanisms of pathogen motility inside infected cells. The technology is fully compatible with modern biological techniques, including fluorescence microscopy and genetic engineering, and it offers a powerful complementary tool to understand cell biology.

The EMBS has to try to get some BMETs and clinical engineers at these meetings.

Medical Error Meeting

Yadin David,

ydavid@msmail.his.tch.tmc.edu

Recently in Dallas, members of ACCE met to discuss the current hot topic of medical errors. Marv Shepherd and Yadin David presented the highlights of the Institutes of Medical (IOM) study on "To Err is Human", additional publications on the Medical Error subject from British Medical journal, regulatory and manufacturing publications as well as from the New York Times 2/29/00 were presented. Definitions of safety, error, accident were described by Yadin and Marv proceeded to present his device incident event investigation manual. The discussion then moved to addressing questions prepared by the moderators.

- What is the role of technology in reducing medical errors?
- What are the role and the responsibility of engineering, especially of CE and of ACCE?
- What is the body of knowledge that CEs must have in order to be a productive partner at the table of solutions?
- Can a system study of failure classifications identify specific causes and conditions that if removed will improve the deployment of a safer technology?

An active audience participation lead the session into focus on the following recommendations:

1. ACCE should become more involved in the efforts to reduce medical errors as they relate to technology.
2. A white paper on this topic will be drafted by Yadin and Marv and be presented for adoption over the next 30 days.
3. ACCE should increase awareness of this issue to its membership, other CE non-members, and to other healthcare professionals such as risk managers, nursing, safety managers, Q.I. managers, physicians, and others.
4. Recommended practices and standardized procedures relating to the use and servicing of medical devices should be developed.
5. ACCE should list resources and engaged in broad educational effort to change the "culture of blame".
6. Share lessons learned from the "electrical safety" crisis of 30 years ago.
7. ACCE should develop coalitions to achieve the above goals.

The above was presented at the ACCE membership meeting held in Dallas, Texas, Monday night, May 1. The response to the recommendations was positive.

On the Move and In the News

Velázquez Receives Reed Medal

During the Advanced Clinical Engineering Workshop in Santo Domingo, Dominican Republic, Antonio Hernandez of the Pan American Health Organization presented Adriana Velázquez with the Walter Reed Medal in recognition of her outstanding accomplishments in the field of Clinical Engineering. Joseph McClain the Director of the Clinical Engineering Division at Walter Reed Army Medical Center normally presents this medal of distinction and honor to those in his division who have excelled in the Clinical Engineering and/or Biomedical Equipment Technology. As Director of the Division he has the authority to present the medal to others outside the division for exemplary deeds in the profession.



Joe states that because of Adriana's outstanding accomplishments over the last couple of years he and his Division

wanted to recognize her by making her an honorary member of the Can Do Division. The back of the coin reads, "Top Performer in Clinical Engineering & Biomedical Equipment Technology."

Presenting a coin of excellence is normally a military tradition. Reader wishing more information on the tradition may visit <http://www.militarycoins.com/history.html>.

Bronzino Steps Down

Dr. Joseph Bronzino Joe is resigning as the clinical director of the internship program at Trinity College in Hartford, Connecticut. He will no longer have anything to do with the program. Joe said he is ready to step back. He is 62 this year and has been involved in the internship program for 25 years.

The Clinical Engineering Internship program (see *ACCE News*, Vol. 10, No. 2, p. 12) under Dr. Bronzino's guidance has produced a constellation of brilliant clinical engineering stars. In placing this glorious array of clinical engineers in our healthcare system, Joe has left a legacy unrivaled in the clinical engineering education field.

Patail Honored

Bryanne Patail will be honored at the Engineering Society of Detroit Annual Awards Banquet Program on May 31, 2000 in Detroit. Bryanne will be recognized as Outgoing Secretary, Vice Chair and Chair, and Affiliate Council Chair. He leaves after 4 years of service on the Council.

ESD - The Engineering Society was founded in 1895, as the Association of Graduate Engineers of the University of Michigan. ESD has since evolved into

the largest multi-disciplinary engineering and scientific society of its kind with members throughout the Great Lakes Region. ESD has nearly 8,000 individual members and 400 corporate members.



ESD's mission is to unite multi-disciplinary engineering, scientific professionals and technologists into a growing vibrant and financially stable organization; and to enhance professional development, advance technology, and promote the engineering and scientific professions, thereby enabling their positive contributions to society,

To learn more about ESD's services, professional programs, member benefits, and affiliate societies, visit www.esd.org.

Nunziata in Mozambique

Enrico Nunziata

I flew over some of the lands covered by the water and visited one of the major camps for the population that has been displaced in flood-ravaged Mozambique. I also visited the Camp Hospital the Spanish Army installed close to the camp. We flew over a Rural Hospital, which went completely under water.

We are trying hard along with a lot of other entities to assess the amount for initial maintenance. Many NGOs and local organizations are helping in the recovery efforts. The situation is improving slightly through their generous efforts.

Berkovits Chairs Sensor Session

At the IMTC/2000 in Baltimore this month, Bob Berkovits will chair the session on Sensor Application. This is one of three sessions on medical applications at this IEEE Region 2 Baltimore Section conference. In

addition, about 12 poster papers will be presented on 3 May on medical applications.

Biomed Bubba Takes Up Car Surgery

Biomed Bubba, moonlighting as a mechanic, was removing the cylinder heads from the motor of a car when he spotted the famous heart surgeon Dr. Michael DeBakey, who was standing off to the side, waiting for the service manager to come take a look at his Mercedes.

Bubba shouted across the garage, "Hey DeBakey! Is dat you? Come on ova' here a minute."

The famous surgeon, a bit surprised, walked over to where Bubba was working on the car. "Don't you fix my heart-lung machine at the hospital?" said DeBakey.

Bubba straightened up, wiped his hands on a rag and asked argumentatively, "So Mr. Fancy Doctor, look at dis here work. I also open hearts, take valves out, grind 'em, put in new parts, and when I finish, dis baby will purr like a kitten. So how come you

get da big bucks, when you an' me is doing basically da same work?"

Dr. DeBakey leaned over and whispered to Bubba the loudmouth mechanic. "Try doing it with the engine running."

Dyro, Wear & Zambuto Australia Bound

Joe Dyro, Jim Wear and Ray Zambuto are invited speakers at EPSM 2000, The Annual Conference of Engineering and the Physical Sciences in Medicine. EPSM 2000 will be held November 5-9, 2000 in Newcastle, New South Wales, Australia. It is the annual meeting of The Institution of Engineers, Australia - College of Biomedical Engineers, The Australasian College of Physical Scientists and Engineers in Medicine, and The Society for Medical and Biological Engineering (NSW).

In addition to delivery keynote addresses, Dyro and Zambuto will present papers and give workshops.



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For further details, reach me at **(450) 656-0832** or email your questions to:

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Bruno Hamel, Biomedical Engineer

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THE VIEW FROM THE PENALTY BOX *David Harrington, davesbt@kersur.net*

What is happening in our society? Football players killing or having people killed. Hockey players hitting other players over the head with sticks. Unlike the World Wrestling Federation (WWF) these are not stage props and they hurt. Politicians taking bribes and lying to everyone about it is nothing new but seems to be more common.

Here in the Boston area we have one of the biggest highway projects underway, putting the Central Artery underground. The project, termed *The Big Dig*, started off at \$2.3 billion and now is up to \$13.4 billion. The manager was recently fired because he withheld that the \$10.4 billion figure that had been Gospel for 2 years was \$1.4 under the latest estimate. An audit added another \$1.6 to get final estimate of \$13.4. This does not include the cost of all the upcoming prosecutions and new jail space that will be required to handle all those who dipped into the project. But anyway, thanks for your tax dollars as the federal government is paying for up to 90%, not including the new jails.

Now you add the drug companies pushing those little side effects like liver failure, internal bleeding and brain damage competing with the tobacco companies to see who can shorten our life expectancies the most. Just to be sure that no one is left out the gas prices are at the highest levels in years. But there always is the "expert" that says in real dollars everything is at its cheapest point in

history.

Over the past few months I have visited hospitals in 10 states around the country. I have been in or gone past at least 120 of the Nation's Top 100 Hospitals, according to the signs out in front of them. I have seen hospital lobbies that put most four-star hotels to shame only to get to the OR and be knocked over by the smell and amazed at the outdated equipment still being used. What is happening to healthcare? I read about hospitals that "loose" millions on providing care to Medicare and Medicaid patients but they still have administrators making over \$500,000 a year and nursing shortages on the floors. But then you get a notice on what was billed to your insurance company for an office or clinic visit. I recently had pneumonia and the bill for one clinic visit including a chest x-ray was over \$1,700. I have big lungs, but this is ridiculous. I was there for a total of 2 hours and saw a physician for maybe 10 minutes and they claim they are losing money.

Am I discouraged? Yes. Am I becoming more skeptical of our leaders and healthcare's future? Yes. So what is next for all of us. Unlike the quiz show we have no lifeline or 50/50 questions but very hard decisions that we will have to make. I recently met with physicians from several developing countries, here for some training in the Boston area. The discussion got around to the major differences between healthcare in this country and theirs. It came down not to

physician training, or nursing, or facilities but equipment, more specifically working equipment. What was a true shock to me is that most of the local physicians that had worked overseas agreed that working equipment is the major difference in how healthcare is delivered.

For the first time since 1979 and only the third time since 1969 I will not be at the AAMI meeting. After reading the program, there are not enough sessions of interest or benefit to me to spend the \$1,500 or more to go to the meeting. I will miss the hallway sessions and the after hours gatherings but this year I cannot justify the expenditure of funds. Is that a reflection on the program organizers? No. They have worked long and hard to put together the program but they cannot be all things to all people. Also at the ACCE Annual Symposium and Annual General Membership Meeting I hope that there is a lively discussion as to our future direction.

Now the good news. The Red Sox have been picked to go all the way this year, not only by *Sports Illustrated* but by the Sony play station, they were right the last three years so maybe the curse is over.



Dominican Republic Advanced Clinical Engineering Workshop

The Ninth Advanced Clinical Engineering Workshop was held in The Dominican Republic on March 13-17, 2000. Over 40 delegates came from Antigua, Colombia, Mexico, Panama, Peru, Venezuela, and The Dominican Republic. The venue was the Hotel V Centenario in Santo Domingo on the palm tree-lined sea wall facing the azure Caribbean Sea. Diógenes Hernández and Dalia Castillo coordinated local arrangements for the delegates and faculty. Faculty was comprised of Tom Judd (ACCE workshop coordinator), Frank Painter, Bob Morris, Joe Dyro, Antonio Hernández, Diógenes Hernández, Adriana Velázquez, Kok-Swang Tan, and Jonathan Gaev. Introductory remarks were made by Dr. Juan Octavio Ceballos, Secretary of State of Public Health and Social Assistance, Ing. Hugo Morales Arias, Sub-Director of the Office of Engineering Supervisors of the President of the Republic, and Dr. Socorro Gross Galiano, the Pan American Health Organization office of The Dominican Republic.

The five-day workshop followed the general outline of the preceding eight workshops. Tom Judd covered the topics of healthcare technology management, quality improvement, performance excellence, and radiology safety, maintenance management, and equipment acquisition. Frank Painter addressed

maintenance and service management, equipment control programs, organizing workloads, risk-based equipment management, ongoing relationships with manufacturers, managing outside service providers, technical administration of service contracts, medical gas and vacuum systems, maintenance procedures, and installation of medical equipment. Bob Morris spoke on unscheduled service, budgeting and financial reporting, setting up a new program, budgeting strategies, electrical distribution systems, and year 2000 lessons learned. Joe Dyro gave presentations on human resources development, defining job responsibilities, staffing levels, roles of supervisors and managers, defining and measuring productivity and cost-effectiveness, training, user error, professional development, safety and risk management, integrated safety program, heating, ventilation, and air-conditioning systems, and donated medical equipment. Diógenes Hernández presented the clinical engineering situation in The Dominican Republic, water systems, and used medical devices. Antonio Hernández spoke on acquisition of refurbished equipment and the role of PAHO in promoting and developing clinical engineering, Adriana Velázquez gave a case study of productivity and cost-effectiveness and presented the status of the clinical engineering certification program and the latest trends



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in clinical engineering in Mexico. Kok-Swang Tan presented the Canadian system of regulation of medical devices and new developments in electromagnetic compatibility. Jonathan Gaev addressed technology assessment and strategic planning, planning, procurement and management, and information tools for managing medical equipment.



The intimate workshop setting was conducive to lively interaction

Hospitality could not have been better. All faculty members were made to feel at home. The accommodations at the workshop hotel were superb. Lunches featured local cuisine as well as a wide variety of standard fare. The dessert table was particularly well endowed as I recall.

The Secretary of Health of the Dominican Republic arranged a tour of the historic district of Santo Domingo. Craft market, amber and laramar shops, monument to Christopher Columbus, and the oldest house in the Americas were among the many highlights. Some in the group took not a casual interest in the shops featuring hand-made premium cigars.



Bob Morris, Antonio Hernández, and Tom Judd assessing and acquiring local products

The tourists were then treated to a traditional dinner including live music and native dancers. The beat was strong and the melodies intoxicating. It wasn't long before all were strutting their stuff on the dance floor. Getting the Latin beat came easy for some, others needed more coaching. Fortunately for the visitors to this warm and spirited country, the local hosts had specialist in not only clinical engineering but also in the merenge.



Mercedes, Javier, Oliva, Jonathan, Dalia, Kok-Swang, Frank & Adriana loosen up

Dalia Castillo was exceptionally talented in this regard, as was Diógenes Hernández. There is no doubt in the mind of all who were on hand that night that the dance lessons Dalia gave to Dr. Kok-Swang Tan and the resulting fine mood he experienced led him the very next day to complete an application for membership in the ACCE. The Membership Committee noting that Dr. Tan excelled not only in electromagnetic interactions with medical devices but also in the merenge recommended membership. The Board agreed.



The cultural tour of Santo Domingo observed apprentice cigar rollers learning their craft

The delegates and faculty received certificates of participation in the closing ceremonies. The Medical Association of the Dominican Republic, represented by Dr. Alberty Estrella, hosted the ACEW participants at the Association's facility. The evening of disco and dining will not soon be forgotten. But above all, the warmth and good will of all the people of The Dominican Republic will forever be imbedded in our memories.

Plans were discussed for future ACEWs in Panama, Peru and Venezuela.

Clinical Engineering for the Millennium

- June 15, 2000** **"Equipment Management Inclusion Criteria: An improved method for including equipment into the program and determining inspection frequency."**
Binseng Wang, Sc.D., CCE and Al Levenson, B.Sc., MEDIQ/PRN Life Support Services, Inc
Pennsauken, NJ 08110
- July 20, 2000** **"Lessons Learned from Y2K"**
Steve Wexler, Chief Biomedical Engineer, Chief Network Office (10NB), VA Headquarters
810 Vermont Avenue NW, Washington, DC 20420
- August 17, 2000** **"Human Error as the Cause of Medical Device Failures"**
Marvin Shepherd, PE, DEVTEQ, 2977 Ygnacio Valley Road, Walnut Creek, CA 94598-3535
- September 21, 2000** **"Why Is Clinical Engineering a Profession"**
Raymond P. Zambuto, CCE, FASHE, President, Technology in Medicine, Inc.
115 Water Street, Milford, MA 01757
- October 19, 2000** **"Investigating an Equipment Incident"**
Joseph F. Dyro, Ph.D., President, Biomedical Resource Group, 21 Bob's Lane, Setauket, NY 11733
- November 16, 2000** **"Value Center for Medical Service"**
Walt Gasparovic, The Gasparovic Group, 1700 Rand Road, Suite 100, Palantine, IL 60074
- December 21, 2000** **"Medicare/Medicaid Reimbursement Strategies"**
Speaker to be announced later

*The course fee includes phone charges, master copy of handout materials and CEU certificates.
Information: Call James O. Wear (501) 257-4175*

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International Survey of Clinical Engineering Departments

Mariana Glouhova and Nicolas Pallikarakis,

marianna@bit.med.upatras.gr

Twelve years ago Monique Frize conducted an international survey of clinical engineering departments (CEDs). Due to the important changes introduced to the sector it was felt that updating the information on the current situation worldwide was needed.

The present survey, launched in July 1998, was performed in two successive stages, using structured questionnaires. The first stage involved a questionnaire aiming to identify the structure, personnel, responsibilities and resources of the departments in different countries. More than 1000 questionnaires were distributed all over the world, both by regular mail and through Internet. The second stage has the objective to investigate trends in current practices and addresses selectively those institutions, identified from the first stage, as having well established clinical engineering services. The results from the first stage are shortly presented below.

In total 150 valid responses were received and were grouped in regions as following: North America (USA and Canada), Nordic countries (Norway, Sweden, Finland, Iceland and Denmark), West Europe (Germany, the Netherlands, UK), South Europe (Italy, Greece and Cyprus), Australia and Latin America (Argentina, Brazil, Cuba and Mexico). The samples from Eastern European countries, Asia and Africa were considered inadequate and were excluded from the analysis. Figure 1 shows the regional distribution of answers.

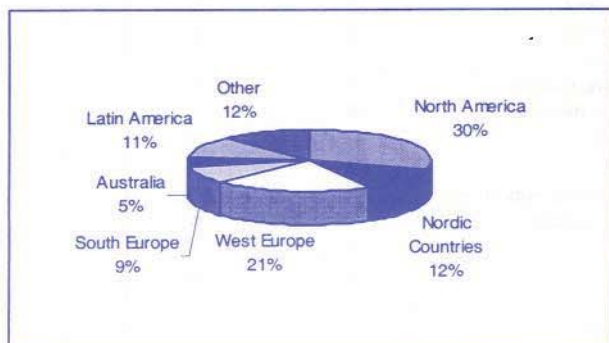


Figure 1: Regional distribution of answers

A good range of hospital sizes from about 100 up to more than 1500 beds was obtained. The predominant are teaching institutions. Generally, irrespective of the hospital type, a problem in handling financial data by CEDs was observed. Questions related to replacement value of biomedical equipment in hospitals, approximate budget for new equipment per year, replacement value of biomedical equipment under the CEDs management, were not always answered.

The majority of responses are coming from departments that exist as separate units. Few answers came from hospitals where the clinical engineering services function as a part of another department, revealing this to be 'plant operation' or 'engineering services' in North America, 'technical department', 'medical physics' or 'medical physics and

bioengineering' in Australia, 'clinical physics' or 'technical service' in Europe, 'engineering' or 'maintenance' department in Latin America. More than 70 % of all respondents however are satisfied with their reporting authorities despite the fact that they vary greatly in the different countries.

In all regions CEDs are staffed predominantly with BMETs (biomedical equipment technicians). However in some departments in the Nordic countries and Latin America, the number of engineers is equal or sometimes higher than the number of BMETs. In North America and Australia the number of engineers is relatively small compared to the number of BMETs. In Europe, very high percent of the CEDs employ engineers with Ph.D. degrees, in North America the majority hold MS degree, while in Australia and Latin America the predominant degree is B.Sc. In North America and Australia, all BMETs have 2-year technical education following high school. Nevertheless, there are BMETs with B.Sc. degrees and some in USA and West Europe hold even MS degrees. In Latin America all departments employ engineers, while in all other regions studied there are departments identified without any engineers. On the other hand, there are departments in Latin America and in Europe that do not employ any BMETs. CEDs in all regions still remain predominantly male work place however more than half of them have at least one woman employed. Most departments, in all regions report inadequate staffing levels.

Training and continuous professional development of CED personnel appears to be a common practice in most regions with the exception of Latin America. The highest frequency of training courses is in North America, Nordic countries and West Europe, where engineers and BMETs follow courses on the average every 6 months. In South Europe the majority follow courses once per year, while in Australia, once or twice every two years. Few departments in North America and South Europe report no training at all, while this is true for the majority of CEDs in Latin America.

CEDs in North America and Nordic countries usually support larger number of devices than the departments in other regions. In the majority medium-sized (501-1000 beds) hospitals in North America and Nordic countries and in the large (more than 1000 beds) hospitals in all regions, CEDs support more than 4000 devices and equipment valued more than US\$ 20 millions. In the largest hospitals, CEDs support even more than 10000 devices. More than half of the large hospitals in North America, Nordic countries and West Europe support equipment valued more than US\$ 40 millions.

In assessing resources available to CEDs, comparisons were based on the value of test equipment, spare parts inventory and budget as a percentage of the replacement value of the equipment under CED management. Quite a number of respondents did not answer these questions. Based on the responses received however, it seems that the available test equipment and spare parts inventory are considered adequate, except in Latin America. Budget allocations are higher in teaching hospitals. Space allocations appeared to be most generous in the Nordic countries, followed by Australia.

Finally the survey showed that computerized systems for equipment management and quality assurance have widely penetrated the CEDs. The majority of them feel well accepted and recognized in their institutions. The main problems faced, are lack of highly qualified personnel and cost constrains. Both engineers and BMETs responded that a harmonized worldwide certification scheme would be useful.

In an attempt to collect more answers and therefore more representative results, we would like to invite biomedical/clinical engineers currently working in hospitals all over the world, to participate in the present survey by filling out the attached survey form or contact us.

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Calendar of Events

- DITEC 2K - Diagnostic Imaging Technology Education Conference, May 24-26, 2000, Cleveland, OH. (440) 519-1555, <http://www.ditecnet.com>.
- Third ACCE Symposium, San Jose, CA. June 3, 2000. Contact Brian Porras at (704) 733-5056, brian_porras@premierinc.com.
- AAMI 2000 Conference & Expo, June 3-7, San Jose, CA. 800-332-2264, ext. 233; education@aami.org.
- ACCE Annual General Meeting, June 6, 2000, San Jose, CA. (314) 577-8018.
- Medical Design & Manufacturing (MD&M) East 2000, June 6-8, 2000, NY, NY, (310) 996-9447, gretchen.hawley@cancom.com.
- 9th Annual National Expert Witness and Litigation Seminar, June 15-16, 2000, SEAK, Inc. Hyannis, MA, (508) 457-1111.
- ACEW, Advanced Clinical Engineering Workshop, July 21-23, 2000, Chicago, IL. <http://www.wc2000.org>.
- World Congress on Medical Physics and Biomedical Engineering, July 23-28, 2000, Chicago, IL, <http://www.wc2000.org>.
- Advanced Clinical Engineering Workshop, September 15-22, 2000, Vilnius, Lithuania, Al Jakniunas (202) 865-6312.
- IEEE-EMBS Asia-Pacific Conference on Biomedical Engineering, Sept. 26-28, 2000, Hangzhou, China. www.ee.cuhk.edu.hk/~APBME.
- EPSM 2000 - Annual Medical Physics and Biomedical Engineering Conference, Nov. 5-9, 2000, Newcastle, Australia. <http://www.newcastle.edu.au/department/ph/epsm2000.html>.
- II Congreso Latinoamericano de Ingenieria Biomédica, Mayo 23-27, 2001, La Habana, Cuba, www.hab2001.sld.cu.
- 10th International Conference on Biomedical Engineering, Dec. 6-9, 2000, Singapore. <http://www.nus.edu.sg/DB/icbme/>.
- 23rd Annual International Conf. of the IEEE Engineering in Medicine and Biology Society, Oct. 25-28, 2001. Istanbul, Turkey.

Third ACCE Symposium

Frequency Allocation Issues in Medical Telemetry

On Saturday, June 3, 2000, a panel of experts from government, the medical device industry, and the hospital community will lead a discussion of the upcoming changes to the landscape of medical telemetry. New provisions are being made to provide for some protection of medical telemetry systems from unwanted interference. However, these changes promise to have a major impact on device manufacturers and the hospital community. This program will address a variety of medical telemetry issues, with ample opportunity for audience participation for questions and answers, brainstorming, and alternate points of view. The formal program will run from 8 AM to 4 PM.

- Brian Porras – Premier, Inc. (Host and Moderator)
- Caroline Campbell – Washington Hospital Center (user perspective)
- Steven Juett – Baylor University Medical Center (user perspective)
- David Paperman – Texas Children's Hospital (user perspective)
- Hugh Van Tuyl – Federal Communications Commission (regulatory perspective)
- Don Witters – Food and Drug Administration (regulatory perspective)
- Mary Beth Savary Taylor or Curtis Rooney – American Hospital Association (AHA Task Force perspective)
- Stan Wiley – Spacelabs Medical (vendor perspective)
- Steve Hannah – VitalCom (vendor perspective)
- Mike Dempsey – Agilent Technologies (vendor perspective)
- James Brinsfield – GE Marquette (vendor perspective)

This symposium is being held as part of the AAMI 2000 Annual Meeting
San Jose McEnery Convention Center

When registering for AAMI, indicate that you wish to attend the ACCE Symposium
on Saturday, June 3, 2000

For information contact AAMI, 703-525-4890 or Brian Porras, 704-733-5056,
brian_porras@premierinc.com