Advanced Clinical Engineering Workshop
Lima, Peru
November 12-16, 2012

ACCE Volunteer Faculty:
Mario Castañeda, HealthiTek
Thomas Judd, Kaiser Permanente
Ismael Cordero, Clinical Engineering Consultant
Tobey Clark, University of Vermont, Faculty Leader
Introduction

Health Technopole CENGETS at Pontificia Universidad Católica del Peru (PUCP) provided a proposal for the ACEW in late 2011 and an agreement between ACCE and PUCP was signed in July 2012.

The Advanced Clinical Engineering Workshop took place in the El Condado Hotel and Conference center in Lima, Peru over the period November 12-16, 2012. To accommodate the participants work schedule, the workshop was held between 2-6pm Monday-Friday.

The primary sponsor of the workshop was Pontificia Universidad Católica del Peru. Additional sponsorship was provided to CENGETS by the International Federation of Medical and Biological Engineering, Set-Gat from Colombia, and other minor sponsors. Supporting organizations included the Ministry of Health, PAHO, DIGEMID (regulatory), INMP-Maternity Hospital of Lima, APBIO, CENETEC, CORAL, EMB Peru and University of Vermont.

Fourteen conference calls were held between the ACCE faculty members with an additional six meetings with CENGETS and ACCE faculty. The estimated total volunteer time of the faculty was over 500 hours. The final ACEW plan was version 17.

The workshop theme was Leadership and Innovation. Each day focused on a specific aspect of healthcare technology.

1. Public Policy for Health Technology Planning and Management
2. Role of public and private organizations in Healthcare Technology Planning
3. Healthcare Technology Management-HTM for a modern health system
4. Better Access to Health through Telemedicine and eHealth
5. Case Studies from Peru and Mexico/Participant Case Study Presentations

The workshop topics were derived from the focus areas above and invited speaker topics. The ACCE faculty received sample presentations from each other and the ACEW presentation library. The presentations and supporting materials were uploaded to Dropbox for exchange and review. These presentations were then downloaded to the workshop CENGETS PUCP website for use by the participants.

To engage the participants and produce deliverables, each day included two 30 minute review and discussion sessions including:

- Key points from discussions
- Key questions
- Input from group – answers to question
- Review list and identify top priorities

These sessions were modeled along the lines of the AAMI Summits.
Participant case studies were another important part of the workshop. Three participant groups were created to develop presentations and/or role play activities in the areas of:

- Policy and Planning
- Safety
- Maintenance

The assignment was:

1. Define example clearly looking at significant areas of Technology Management
2. Collect the information e.g. factors, issues
3. Analyze the problem using techniques from the workshop
4. Develop solutions – determine best course of action

The faculty and program sponsors would vote on the best presentation using the following criteria:

1. Clarity of presentation
2. Use of principles and processes from the workshop
3. Development of a working, successful solution to the problem
4. Creativity of approach

The ACEW presenters included ACCE faculty team and:

- Rossana Rivas, Health Technopole CENGETS
- Luis Vilcahuamán, Health Technopole CENGETS & Director, Master’s Program in Biomedical Engineering PUCP
- Dr. Cesar Cabezas, Chief, National Institute of Health
- Dr. Pedro Mascaro, Director, Maternity Hospital of Lima (INMP)
- Dr. Amelia Villar Lopez, Director
- Herbert Voigt, Phd, Professor – Boston Univ. & President, IUPESM/Past Pres. IFMBE
- Walter Rios, IEEE/EMBS Peru
- Eduardo Toledo, PUCP Engineering Faculty
- Alvaro Velasquez, Director - HMC Architects South America
- Dr. Walter Curiosos, Director General Office of Statistics and Information, MoH Peru
- Roberto Ayala Perdomo, Director – Biomedical Engineering, CENETEC, Mexico
- Dr. Pedro Yarasca, DIGEMID - MINSA
- Dr. Silva Perez, DIGEMID – MINSA
- Patricia Ramirez, Health Technopole CENGETS (INMP)
**Workshop Overview**

Luis Vilcahuamán and Rossana Rivas of Health Technopole CENGETS coordinated all aspects of the workshop. The venues, announcements, course materials, and arrangements were of very high quality. Simultaneous English to Spanish translation was provided for all participants and the quality was excellent.

The average daily attendance was 35 in Lima and an additional 20 in other regions of Peru, plus the countries of Paraguay, and Guatemala who attended via videoconference. The audience consisted of Ministry of Health, ESSALUD, and private hospital administrators, physicians, and engineers, PUCP faculty and biomedical engineering students, and additional participants from other parts of Peru and Latin America.

Participant case study work with Ismael

Rossana Rivas engages the audience with her presentation on Project Management

The workshop schedule appears in Appendix A
Monday, November 12th

The opening ceremony included an introduction by Luis Vilcahuamán and Rossana Rivas. Presenters included Dr. Cesar Cabezas, Dr. Pedro Mascaro, and Dr. Amelia Villar Lopez. Following a condensed overview of the workshop (Tobey Clark), the Day 1 topics focused on Policy (Tom Judd), Leadership & Innovation (Mario Castaneda & Rossana Rivas), and Regulations & Standards (Ismael Cordero and Eduardo Toledo). A session on education and training provided the US Perspective (Tobey Clark), International (Herb Voigt) and Peru (Luis Vilcahuamán).

Tuesday, November 13th

The second day of the workshop started off with an overview of the Participant Case Study exercise by Tobey Clark.

Tuesday’s focus was on Healthcare Technology Planning with topics: Planning System (Ismael Cordero), Assessment (Mario Castaneda), Replacement (Tobey Clark), New Technologies (Tom Judd), and Acquisition (Ismael Cordero).

Following the last session there was time for the Case Study groups to form with ACCE Faculty Facilitators: Policy and planning (Mario Castaneda & Tom Judd), Safety (Ismael Cordero) and Maintenance (Tobey Clark). Each group developed its own topic related to work challenges in the healthcare system in Peru.

ACCE faculty, hospital directors, CENGETS staff and Herb Voigt at INMP
Wednesday, November 14th

Healthcare Technology Management was the focus of the third day: Scope and Impact (Mario Castaneda), Project Management (Rossana Rivas), HTM Unit Startup (Ismael Cordero), Maintenance Management (Tobey Clark), Vendor Management (Tom Judd), Biomedical Metrology (Luis Vilcahuamán) and Patient Safety/Risk Management (Tom Judd).

Thursday, November 15th

The Electronic Health Record and Telehealth was the Thursday focus. Networks & Enterprise Solutions (Tobey Clark), Electronic Health Record (Mario Castaneda), Telehealth (Tom Judd), Peru: eHealth (Dr. Walter Curioso), and Mexico: eHealth (Roberto Ayala). Additional presentations were made covering the healthcare environment by Alvaro Velasquez, HMC Architects, and CENETEC background, role, functional units, and new initiatives in Mexico (Roberto Ayala).

Time was provided for Participant Case Study groups to prepare their presentations at the end of the workshop timeframe.
Friday, November 16th

Health Technopole CENGETS provide an outstanding presentation on their program with a focus on their work at Maternity Hospital of Lima (INMP), the nation’s center for maternal and child care. The Healthcare Technology Management department employing PUCP graduates who went through the five month clinical engineering internship at the University of Vermont provides services to this 500+ bed hospital.

Other presentations included Dr. Silvia Perez of DIGEMID, the FDA of Peru, on their regulations related to medical devices and other products, and Walter Rios, IEEE/EMBS.

Friday was the most enjoyable day of the weeklong conference. This was the day for the case study presentations. The three groups showed significant self-initiative in developing topics and brainstorming, and all developed role play “sitcoms” combined with presentations to demonstrate their case studies. The studies showed good use of the principles of the workshop and more importantly the enthusiasm of the groups. The grand prize, Dyro’s Clinical Engineering Handbook donated by Tom Judd was signed by all of the group’s participants and will be shared through placement in the Universidad Nacional Mayor de San Marcos* library. Also, there was talk of scanning the book and providing it to all participants. (*) Public University located in Lima.

A key activity of the final day was the collation of all the ideas generated during the review and discussion sessions throughout the week into actionable and sustainable goals for the country. The results will be presented in the Summary section of this report.

Role play of patient demise related to respiratory device failure

Final ceremonies included handing out certificates to all participants, and final messages by the ACCE faculty and CENGETS.
Summary

In terms of energy and engagement as evidenced by the number and merit of questions, the overall quality of the program was extremely successful. The faculty team from ACCE was outstanding due to their experience and unique expertise in areas of Healthcare Technology Management and/or Clinical Engineering. Their will to contribute wherever necessary was commendable.

On the final day, all review and discussion session priorities for action were reviewed. Based on a final prioritization, the workshop participants came to a consensus on the most important actions to take so Healthcare Technology Management and Clinical Engineering can leapfrog current practice to have high value in Peru:

Law/policy
1. Raise the awareness of healthcare technology management (HTM)
   a. Creating laws mandating every hospital requires a clinical engineering team
   b. Reform the health laws so that maintenance and calibration is included in the health laws
2. Promote policies that elevate the awareness of HTM

Proposals
1. Creation of vice health ministry level healthcare technology assessment (HTA) position
2. Streamline and organize national HTM processes
3. Combined proposal to MoH from multiple universities; socialize proposals with all relevant entities
4. Start fresh with new hospitals. Do it now!
5. Peru healthcare catch-up in informatics and digital health
6. Planning for equipment by multidisciplinary team

Education
1. Educate the population re: health technology
2. Training and education in colleges and universities in biomedical and clinical engineering
3. Research and development in HTM and biomedical and clinical engineering.

The workshop evaluation is found in Appendix B. The content and effectiveness of presenting HTM received high marks along with the knowledge of the presenters, quality of the presentations, and meeting the objectives of the workshop. As has been the case with other workshops, the participants would have like more time for the workshop. Final materials were made available after the evaluations on the last day of the workshop. It was very encouraging to see that 85% of the attendees will use the knowledge at their healthcare workplace.
Lessons learned:
1. Leaving time for review and discussion after several talks produced good engagement of participants and priorities for action.
2. Following the format of the AAMI Summits to “boil down” the priorities and actions was a nice addition to plan future activities and sustainability.
3. First time involvement of the IFMBE both as a speaker/participant and financial sponsor should be pursued in future ACEWs. This was a positive action.
4. Providing ACCE handouts was valuable in introducing participants to ACCE. International, Certification, CE/IT and basic brochures were provided. (Also a large box of publications was provided by AAMI and the HTF).
5. Order ACEW pens early.

Future

ACCE’s presence was strengthened via the workshop. With the international membership and teleconference structure, additional Peruvian ACCE members are a strong potential. In addition to the relationships developed with the participants resulting in continued communication, organizations attending the event are interested in discussing a number continuing projects involving ACCE or ACCE members acting as individuals or with their organizations are possible. This includes proposals to the National Institute of Health-NIH, continuing the University of Vermont clinical engineering internship training and activities with PAHO Lima—see appendix C. In Peru, ACCE should continue to support CENGETS, biomedical society growth, clinical engineering education and certification.

ACEW Faculty visit Neonatal ICU graduates party: “Feast of premature child” at Maternity Hospital of Lima
## Peru 2012 Advanced Clinical Engineering Workshop

### Technical Program Version 17

<table>
<thead>
<tr>
<th>TIME</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
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<tr>
<td>2:00 PM</td>
<td>Opening Ceremony</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
<td>Hospital - holistic design and patient experience</td>
<td>Releases of Medical Products in Peru - Peter Yerkes [CREED - MERK]</td>
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<tr>
<td>2:15 PM</td>
<td>Case Studies Overview: Sports Clinic</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
<td>Hospital - holistic design and patient experience</td>
<td>Releases of Medical Products in Peru - Peter Yerkes [CREED - MERK]</td>
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<tr>
<td>2:30 PM</td>
<td>Condensed Overview of the workshop: State of the Art</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
<td>Hospital - holistic design and patient experience</td>
<td>Releases of Medical Products in Peru - Peter Yerkes [CREED - MERK]</td>
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<tr>
<td>2:45 PM</td>
<td>Appropriate Healthcare Technology Management policy: Florida, USA</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
<td>Hospital - holistic design and patient experience</td>
<td>Releases of Medical Products in Peru - Peter Yerkes [CREED - MERK]</td>
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<tr>
<td>3:00 PM</td>
<td>Leadership and Innovation: Important components for other success: Mario Castañeda, Assistant Chief</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
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<td>3:15 PM</td>
<td>Planning for the Reimbursement of Healthcare IT Investments: Mario Castañeda</td>
<td>Healthcare Technology Management System: Scope and Impact</td>
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<td>3:30 PM</td>
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<td>Biomedical Engineering: Introduction</td>
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## Appendix B

### Evaluation of Workshop by Participants- Results:

27 Evaluation forms submitted.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Question</th>
<th>Average Score (Max 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Content</td>
<td>How relevant was the workshop to your work?</td>
<td>5.6</td>
</tr>
<tr>
<td>2. Effectiveness in relation to healthcare technology management</td>
<td>Did the workshop reaffirm your commitment to your work?</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>Did the workshop improve your knowledge of the subject matter?</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Did the workshop improve your information of the subject matter?</td>
<td>5.2</td>
</tr>
<tr>
<td>3. Quality</td>
<td>Technical materials</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>Knowledge of the presenters</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>Quality of the presentations</td>
<td>5.5</td>
</tr>
<tr>
<td>4. Efficiency</td>
<td>Time allotted for the subject matter</td>
<td>4.6</td>
</tr>
<tr>
<td>5. Objectives</td>
<td>Were they met?</td>
<td>5.5</td>
</tr>
<tr>
<td>6. Accommodations</td>
<td>Conference room</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Coffee Breaks</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>Administrative support</td>
<td>5.1</td>
</tr>
<tr>
<td>7. What did you think were the strengths of the workshop?</td>
<td>Quality of presenters</td>
<td>88.9 % (24/27)</td>
</tr>
<tr>
<td></td>
<td>Topics covered</td>
<td>40.7 % (11/27)</td>
</tr>
<tr>
<td>8. What did you think were the weaknesses of the workshop?</td>
<td>Limited time. Inadequate schedule.</td>
<td>44.4% (12/27)</td>
</tr>
<tr>
<td></td>
<td>Lack of materials</td>
<td>22.2% (6/27)</td>
</tr>
<tr>
<td>9. How will you apply the knowledge learned?</td>
<td>At work</td>
<td>85.18% (23/27)</td>
</tr>
<tr>
<td>10. What are the next steps that you will take to implement HTM?</td>
<td>Regulations and legislation</td>
<td>25.9% (7/27)</td>
</tr>
<tr>
<td></td>
<td>Diffusion</td>
<td>29.6% (8/27)</td>
</tr>
<tr>
<td></td>
<td>Continuous education</td>
<td>25.9% (7/27)</td>
</tr>
<tr>
<td></td>
<td>Maintenance plans. Management of equipment.</td>
<td>14.8% (4/27)</td>
</tr>
<tr>
<td></td>
<td>Awareness</td>
<td>33.3% (9/27)</td>
</tr>
</tbody>
</table>
Appendix C

Additional scheduled visits and meeting with healthcare organizations

1. National Institute of Health (INS), an agency of the Peruvian Ministry of Health – several meeting was held with INS personnel including the director, Dr. Cabezas. The focus of these meeting was on challenges INS faces related to technology. They fall into three categories:
   a. Heavy metal pollution from mining
   b. Maternal and child health
   c. Development of a healthcare technology division

Several conference calls were held after the workshop to develop a proposal for INS involving PUCP and potential partners from University of Vermont, IUPESM, and consulting groups. ACCE is considered a partner also.

2. Pan American Health Organization (PAHO) Lima office was the location of a meeting with ACCE faculty, CENGETS and Herb Voigt. The focus here was on building capacity in healthcare technology through training and general support issues.

3. Maternity Hospital of Lima (INMP) is the national center for maternal and child health. The visit included CENGETS healthcare technology management office, the neonatal ICU, the biomed shop, and a celebration for neonatal ICU graduates where Mario Castañeda and Tobey Clark were interviewed by Univision TV for the Peruvian television network regarding CENGETS, the ACEW and HTM. The INMP directors agreed to pay for the travel costs of CENGETS staff to be trained at the University of Vermont.

ACEW Faculty with HTM team at Maternity Hospital of Lima