Visit to the Care Institute of Health Sciences Laboratory
Hyderabad, India
April 8, 2019

A Conversation and tour with ACCESS Health Chair and President, William A. Haseltine, ACCESS Health India Country Director, Krishna Reddy, and Drs. Nichols Mathur, Vijay Anand, and Raj Gopal.

William Haseltine (WH): Thank you for your time today. I am here to learn what you do.

Dr. Nichols Mathur (NM): This is Care Institute of Health Sciences.

WH: This is a medical simulation laboratory and a medical skill training institute. Is that correct?

NM: Correct. WE will begin by a tour the simulation laboratory and then discussion of skill training programs.

We begin by examining a medical mannequin.

WH: We are looking at a mannequin made by Laerdal. *(We inspect a mannequin)*

NM: The mannequin we are looking at is called a SimMan 3G. It is one of the most advanced mannequins available in the world. Except walking and learning, it does everything that a human body does.

WH: A male body.

NM: Yes. Dr. Anand and I will explain the details. I will start with the head.
The mannequin can sweat, cry, and can have nasal secretions. This patient can have oral secretions also.

Vijay Anand (VA): Yes, he can vomit also.

WH: Do the mannequins produce odors?

NM: Yes, for poisoning cases, the toxicology cases.

VA: We can see pupillary reactions just like a human being.

WH: You can control the pupils?

VA: Yes. We can control each pupil independently. We can also intubate these patients. We can do a tracheostomy. We can have an intubation.

NM: What is important with the intubation is you can create different scenarios. We can

create a difficult intubation. For example, when you cannot open the mouth or the tongue is swollen. We can simulate trismus (lock jaw).

WH: Is somebody in the control room now?

NM: Yes.

WH: Is that why he is blinking?

VA: Yes. While doing an intubation, you can also see the vocal chords, everything can be seen like any normal human being. We can minimize the neck movements, neck stiffness.
We can hear the normal breath sounds, normal heart sounds, abnormal heart sounds, and abnormal breath sounds.

NM: You can program crackles, wheezing, have breath sounds on one or both sides.

VA: Coming to the abdominal part, we can hear the bowel sounds.

WH: Can you do EKGs and ECGs?

VA: Yes we can. We can feel all the pulses: central pulses, peripheral pulses, carotid pulses, femoral pulses also. This patient can pass urine also. We can do a catherization also in this patient. We can change the genitals.

VA: We can feel the radial pulse and the peripheral pulses over here. This is an IV access.

(The control room simulates a cardiac arrest)

The patient just went into cardiac arrest now. I need to do compressions now. What I do can be recorded now to measure the depth and rate for example. I can monitor the depth of the chest compression. I can monitor the rate of the compression. Ventilation also can be monitored. Everything can be monitored on this. I will give two breaths again. I need to start chest compressions for that. We have a defibrillator when it is, this is monophasic. I can give three hundred sixty joules. It will tell us how many joules the shocks were. Meanwhile somebody can start CPR. Compression should not be stopped at any cost. If it is delayed, we can continue with the chest compressions.

NM: We monitor team dynamics, communications, eam roles, the effectiveness of the team leader.

WH: Where are your cameras?

NM: There are our cameras *(points to two cameras in the ceiling)*.

VA: This one provides a 360 degree view. That one provides a fixed point of view.

NM: Audio, video, everything gets recorded.

VA: We can monitor drug administration. We measure how much of the drug is actually delivered. All these things can be captured through these two cameras. We also record all sounds.

WH: Can you see his gallbladder?

VA: Yes, if we change the scenario. We have many different scenarios.

WH: Kidneys?

VA: Yes.

WH: Can you see kidney stones?

VA: No.

NM: This mannequin is not for training for interventions There are other mannequins from other companies for that.

WH: Are all your mannequins supplied by one company?

NM: Yes.

WH: You have maternal delivery mannequins?

NM: Yes.

(We move to the control room)

VA: This is the control room. This is an instructional laptop. We can control the whole scenario from here. The patient you just saw as well as a second patient can be simutanously monitored and controlled.

WH: You can make sounds?

NM: They do make sounds.

VA: We can make some normal sinus sounds and rhythms. We can control the oxygen saturation from here. If it goes below eighty, the whole character will turn blue. We can control the blood pressure.

Here is the control for the pupils. Now they are wide open. If you want to make them

half open. You can make the patient unconscious. If you want to make one eye open, we can do that. If you want to see the reaction of the pupils, we can also adjust the pupil size from here. You can control the blinking.

WH: Are the pupils light sensitive?

VA: Yes, they are light sensitive. They react to light according to the scenario we can make many different types of reactions. We can restrict the neck movements by selecting this control. You can also control the tongue. The tongue will be swollen if you want.

WH: Congratulations. Very nice. Are this and the EMRI simulation lab the only ones here in Hyderabad? Does Apollo have a simlab?

NM: Apollo also has a simlab but they are not really active.

VA: Everything we did in the simulation lab was recorded. We can play back the audio and video and what happened with the mannequin.

(We move to a different room)

VA: This is a small classroom and there is a debriefing room. These are the computer controlled advanced mannequins. These are the feedback devices. It will tell us how we are doing in a compression, especially for basic life support. We can analyze our performance. If I start like this *(compresses the mannequin's chest)* it will tell us the depth I am going to and how many compressions I am doing.

WH: This in real time.

VA: Yes.

WH: Will this keep somebody alive?

VA: Yes.

NM: It works.

WH: For how long?

VA: At least when the medical help comes. About thirty minutes.

WH: Do you compress babies too?

NM: Yes. We use a different method.

VA: This is a two finger technique to use if you are the only one present. We can do it

like this. The monitor will let us know if we are using the correct rate. My rate was a little bit high. The system gives us feedback. Now I am doing it right. The technique to use is different if two people are present.

VA: We can practice trauma management. We can change the parts of the body.

WH: Do you have exam rooms for your standardized patients?

VA: Yes, we do.

WH: For real people?

VA: No that would require additional resources.

(*We look at another mannequin)*

NM: This mannequin is known as a MamaBirthie. This is a low fidelity mannequin. It costs hardly anything. This set illustrates the process of crowning during birth.

NM: Let's simulate a birth.

(An assistant straps on a full term pregnant belly and simulates the birthing process, including a naturally released afterbirth and an afterbirth that fails to descend.)

VA: So, you can see the baby is coming out. We can make them push. Now we can see the baby is coming, push, push. So, we will teach them how to hold the baby where they will slowly assist the baby coming out and you can see there is an umbilical cord also. Now that the umbilical cord is there, we clamp, we keep the baby on that and we clamp and we cut. Then we slowly take out the placenta. So right after the baby comes out, hold it like this, so we can take the placenta out. After doing that we also teach them how to do a neonatal resuscitation when the baby is sick. These are the fontanelles of the fetus to show giving birth. We also teach them how much pressure should be given. This is in a vacuum delivery. We will teach them in which access, which angle we will make, we need to push. We teach them what access and how much pressure it should be here and how to relieve that and after delivery we may see some kind of injury. So that can be shown to the participants. We also teach them how to tell when it is a forceps delivery. How to place the blades and how to pull the baby. So we teach that also. This is how we need to show it. This is a little bit advanced again. We can connect it to the monitors.

NM: What we saw downstairs on that mannequin, all the functions for a baby can be done on this.

VA: We also teach them intraosseous IV access. If the baby's veins are too small you can insert an intraosseous IV.

(Shows us a different mannequin.)

VA: This is a trauma mannequin. We give specific trauma protocol workshops. Most of the injuries in this mannequin can be seen externally. However, if you do not follow the trauma protocol you may miss a deep laceration under the hair for example. See this one under the hair. It is a deep laceration. The student must follow the trauma protocol properly.

NM: So exposure becomes one of the most important things for trauma patients. If you do not do the steps right in the given manner then you are treating the other things but you miss this, the patient.

VA: This is for chest drain and needle decompression. You can feel each rib. This is useful for teaching needle decompression and ICD. This mannequin is for training how to perform lumbar punctures for anesthesia. We simulate cerebrospinal fluid.

We teach them about foreign body obstruction. Now, what is the best way to manage a patient who has foreign body obstruction? We learn that we should do the Heimlich maneuver, but most of them do not know how to do that. So, what we do usually is we educate the participant that they should place the fist above the umbilicus and hold a patient like this. This is an umbilicus in an adult. We need to press inwards, upwards so that the object will come out.

NM: These are low fidelity mannequins but very important for our training.

VA: We can also learn how to care for a mastectomy patient. We can remove one side of breast. That is the mastectomy. We can change all the parts of the body.

WH: Can you simulate a prolapsed uterus?

VA: Not yet.

NM: We do not simulate interventional care. We focus on emergency care at the moment.

(We leave the simulation lab to learn about the Care Institute's skill training programs.)

Raj Gopal (RG):

Wings of Care is our skill training center where we train rural youth for entry level jobs into the health sector. I will cover that.

EduMed is the partnership that we have for universities like Alfred Health and Monash University to run courses in India on their behalf.

WH: How does EduMed work? Does Monash run a course in India?

RG: Alfred Health runs a course in India certified by Monash University. We are the vehicle to make that happen in India.

WH: Who do they train and how are they paid?

RG: The courses are run through faculty in India. Alfred Health trains the faculty in India. The courses are mostly online. Alfred Health trains the faculty in India in various hospitals. The Indian trainees will in turn train the students here. We have a care at home or home care division and community care division. In education, we have four sub entities. This is what I will cover.

WH: It is SaferCare now we are talking about.

RG: No. SaferCare is the simulation based center that you just went to. I will be talking about Wings of Care and EduMed. Wings of Care are skilling centers. EduMed is a partnership with foreign universities to run courses in India. We have a learning management system which we created by tweaking Moodle for our online content. Moodle is an online learning management system. We customize Moodle for our own use. Moodle is a very popular online system. We also have a community care division. We have home care training. We also have programs for training how to manage noncommunicable diseases. This is our website for our Care Institute of Health Services*.(Goes online to show the website.)*

RG: So coming to SaferCare, we are an American Heart Association accredited center. They do onsite due diligence before granting an ITC accreditation. We were accredited in January. All our courses are actually jointly certified by Laerdal as well as the Care Institute of Health Sciences. They also help us in many ways to develop a faculty. You are well aware of the advantages of simulation based training. A lot of backend work, the so called unglamorous work of training goes on here. We really do not want to be a center which only does technical training through mannequins. So the creation of scenarios and simulations with scaling is where most of our focus goes. I will show you our training content. This is the new syllabus that just came out about six months back where they are mandating simulation based content.

WH: This is for every medical student?

RG: Every medical student.

WH: Are you saying that as of now all medical students in India are required to go through simlab training. How many doctors does India train a year?

RG: About fifty thousand a year.

WH: So every one of those has to go through simlab training?

RG: Yes. According to the latest requirements.

WH: Can you simulate strokes?

NM Yes.

RG: Stroke management for non neuro physicians, that is what we created.

NM: The education system in the United States is more advanced than what it is in India. Replicating test taking here will not work here to be very honest, whether you're taking nurses or whether you're taking medical graduates, they are at some other level. I am being very open to you. Our education system lacks certain things in India. We all accept, we all understand that. So whenever you are creating and conducting a course, all those things have to be kept in mind.

WH: Does it vary by regions in the country?

NM: Yes.

WH: So whatever you are going to do in Bengal will be different from what you do in Tamil Nadu.

NM: In fact it varies by city as well. There are many discrepancies in medical education here.

RG: Nobody in India offers such a large repertoire of courses as do we. We offer sixty different courses today and we are adding many more. Presently content has been developed for about nine to ten more courses. We also realize that you cannot in a straight way launch into simulation based instruction.

I wanted to show you the sample of some of the workbooks that we have designed for these courses. *(Shows us some books.)* Each of the trainees carry home a workbook, sort of a textbook, or something that captures the essentials. For example, this is a book for a one day course which the Consortium of Academic Healthcare Organizations wanted for professionals. All our courses are covered by some sort of book that people can carry home.

WH: Who printed this? It is a high quality print.

RG: All this is printed by us.

WH: This is local printing. Printing in Hyderabad?

RG: Yes.

WH: Very nice printer.

RG: There is a printer called Seiteja, local guys. The design is done by our in house teams. We produce all of our content. It is hashed out by doctors and nurses. We have a whole instruction design team which does this.

WH: Do you have an aspiration to train people from many regions of India?

RG: Yes.

WH: How will you adapt your training to the local situation?

RG: We will train others how to adapt our programs to suit local conditions.

NM: These will be train the trainer courses.

RG: Think of our programs like making your own sandwich at a sandwich counter. Our courses can be customized, co-created courses that suit the needs of a local population.

WH: Are all the courses in English?

RG: They are bilingual. Medical and nursing education in India is all in English.

WH: Are the EMRI courses in English

RG: Yes. English.

WH: That must mean that if a person is not proficient in English they cannot benefit from the training.

VA: That is a general problem.

WH: Must all emergency technicians be English speakers?

VA: Yes.

RG: Our courses are bilingual.

NM: There are many places in India that have beautiful simulation laboratories that are not actually used.

WH: And the reason is?

RG: They do not have so many courses. They are restricted to the ITC.

WH: Will you sell your software also?

RG: Yes. That is the intention. We have already created a number of workshops.

NM: We have programs for pre-hospital care, in-hospital care, and post-hospital care. We provide paramedical training, doctor training, and nursing training. We will provide an end to end school of management.

RG: We trained about almost six thousand people last year. We have just initiated training for nurses and doctors. This map *(shows a map)* depicts the cities in which we have conducted the courses. It also shows the cities where we are planning to conduct sessions in the next two months. Our training teams travel with the mannequins from place to place.

WH: Do you have an extra set of portable mannequins?

RG: Yes, we do.

WH: Do they take up seats on the plane or train? I am joking. Do you send them by air or by land?

NM: It depends on the location.

WH: I see no sites on the map in the east.

RG: We have not gone to Calcutta**.** Several states want us to train close to four thousand people over the next four years. We plan to create three new simulation centers. Kerala will be first. We will begin by training nurses, medical technicians, and medical students.

WH: All in emergency care?

RG: In Kerala, they want simulation training for all the nurses at one level and also training for the emergency department. We will offer two or three types of courses.

NM: We are conducting a training needs assessment for the government hospitals in Hyderabad. There are many issues in the internal transfer operations of patients in that system. They have a lot of problems even extending to housekeeping.

WH: Do most of the deaths occur from the time an ambulance delivers a patient to the hospital to the time when they receive in hospital treatment?

NM: Yes. From the hospital to get to the emergency department and from the emergency department to a place for appropriate care such as an intensive care ward. The majority of deaths occur during intra hospital transit. Training of doctors only is not the solution. The entire staff must be trained.

WH: Who will pay for the training?

RG: The Tata Foundation. They will pay to setup the center and pay for education for two years.

WH: With whom at Tata did you speak?

Krishna Reddy (KR): Srinivas. He was at Reliance before Tata.

WH: Where were you trained to use the mannequins?

RG: Here.

WH: Laerdal came here and trained you?

RG: Yes. They came here.

WH: They must have seen a big market.

RG: Probably.

WH: How big is their market here? Do you know?

RG: For simulation training?

WH: No, for the mannequins. Where do they make most of their money? Training or mannequins?

RG: Mannequins.

WH: Next time Chang Liu, our director for greater China and Singapore, comes to India, I hope he can visit you here. It would be very interesting for him for two reasons. They have studied elder care models in China that might be useful for you here. He could learn from you as well. Laerdal would be a good partner for ACCESS Health China. You must have excellent connections with Laerdal?

RG: Yes we do.

WH: How many simulations have you developed.

RG: More than sixty.

The Wings of Care Program: A Discussion led by Dr. Raj Gopal

WH: Please describe the Wings of Care Program.

RG: Wings of Care is a program accredited by the National Skill Development Corporation of India. There are eighteen skill sectors in the National Skill Development Corporation. The Corporation is a government initiative. The health sector being one of the eighteen sectors. There are three accredited partners of the corporation in the health sector. We are one. Today we are running sixteen centers in partnerships in several states.

WH: Does the government pay for this?

RG: Yes. They pay us as the course progresses for specified milestones. We retrain youth. This program is not a greatly profitable business. If we do it well, we will probably break even. It is more of a social enterprise. We have trained close to fifteen thousand youth over the last three years. These are all rural youth traned for entry level jobs into medicine.

WH: Are the courses in English?

RG: No, they are bilingual.

WH: Bilingual meaning Hindi and English.

RG: English and the local language. We have developed sixteen different courses. The courses run from four to eight weeks each.

WH: Does high quality AI translation for many Indian languages exist?

RG: I am not aware. Translation systems exist for Hindi and Bengali. We manually translate our programs into Telegu. We use Google translate.

These are online courses they run for four months to eight months. These are the books that we have created. *(Shows the books).* We train high school students, university undergraduates and graduate students. When they graduate the government issues them a certificate.

WH: Can a person get a job based on the certificate?

RG: My mandate is also to provide jobs. I have a team that helps place certificate holders in hospitals. For example, those that hold certificates as emergency technicians may serve as emergency care workers in ambulances.

Hospitals hire them as emergency technical aid assistants. They join as assistants. There are certain statutory compliances. Not everybody can touch a patient. There are issues around that. Today the National Skill Development Corporation is working to adjust standards to allow our certificate holders to work with patients directly.

My job is to mobilize the youth, to set up our training centers, to set up faculty, to set up

skill labs, to establish computer labs. In short train according to the state specifications, to prepare them for assessment by the state and to help them find jobs. That's the entire supply chain.

Please take a look at some of the training books we have produced.

WH: Do you have statistics on how many doctors, how many nurses, how many medical technicians are active and what their sub specialties may be? Does the government have that data?

KR: The central government does not have such data. Actually, it may have the data but not centralized in one place. The central government does not even have data regarding what doctors are still practicing and what doctors are in the country or practicing abroad. They only have records of medical schools. They do not follow the subsequent careers of doctors trained in Indian medical schools.

WH: Do the states have such data?

KR: Some states are attempting to acquire such data. A national registry of doctors is meant to be part of the digital health plan for the country.

WH: So, they know how many doctors and other healthcare workers are active? Do they know where they work and what type of work they doing?

KR: Everyone in India should have a unique number. That number should be tracked starting with Asha workers. Eventually the information should be comprehensive, including those who work in both the formal and the informal health sector.

RG: We began our training programs over a year ago. To date we have trained about eighteen hundred people and we have placed eight hundred jobs.

WH: What has happened to the remaining one thousand?

RG: They are still in the training. Our program is called EduMed. EduMed does these programs as a part of the Alfred Health or Global Health Alliance partnership.

WH: Does Alfred Health train emergency medical care workers?

RG: They receive certificates for emergency care, or a fellowship in emergency medicine. We also have a clinical educator program, and a program for clinical nurse specialists in elderly care.

WH: Who are your trainees?

RG: The first program is for junior doctors. The second one is for nurses. The third one is for experienced doctors.

WH: Is Alfred Health a wholly owned subsidiary of Monash University?

RG: I do not think so. I think the courses are just certified by Monash.

WH: Does Monash have an ownership in Alfred Health?

RG: I am not sure.

WH: Could you please try to find out and let me know? I understand that you manage a home care program. Can you please describe it?

RG: One component is telehealth. The other is doctor rounds visiting at home.

WH: Did you develop the telehealth technology on your own?

RG: We adapted existing technologies for our own use.

WH: Are you a care center?

RG: No. Care at Home does the homecare visits.

NM: This is the general technology. It could be home care, it could be simulation. He is just explaining the general technology. It is not just related to homecare.

WH: But do you actually do it? Who is delivering this care?

RG: We are talking about Care at Home. These are technology solutions we are using, whether it is education or for homecare.

WH: Do I understand correctly? You are teaching people how to do it. You are not doing providing care yourself. This is an education center not a care center.

RG: Correct.

WH: Are electronic health records such as Epic widely used in India?

RG: No.

KR: The need never arose.
WH: The need never arose. How can that be?

KR: The concept of medical record documentation has not come to India. Most of the solutions used in India are for internal management of the hospitals themselves. Health insurance by private providers is a very small part of hospital payments. Therefore a system that keeps track of what was done for insurance reimbursement has not been

developed here in India. Medical records in India are still manual, not electronic.

WH: Does any hospital system in India use electronic medical records?

KR: Some hospitals like Gleneagles and Continental do have their own electronic medical records. Gleneagles is a Singapore based hospital system that has acquired some hospitals here in India.

RG: We actually do not develop our own information systems from scratch. It would be too costly for us. We tweaked an existing software system called Moodle to suit our purposes.

WH: Let's talk about your finances.

RG: It cost about $300,000 US to set up this center, including forty five mannequins and the information system.

WH: That seems inexpensive.

KR: The entire initial cost was $700,000.

WH: All inclusive?

KR: Yes.

WH: Who paid for it?

RG: The money came the founder, Professor Soma Raju.

WH: Did he provide all of the startup funding money to do this?

RG: Half came from him and half from the Care Hospital group.

KR: The founder group gave thirty five crores. The Care Hospital group gave thirty five crores. So that is fifty crores. Fifty crores is about seven million dollars US. Part was to cover the initial cost, part for the corpus, what you call the endowment.

WH: What faction of the endowment must you spend a year?

KR: There is no such requirement for Indian foundations.

WH: Do I understand it correctly that initially the plan was to start with this center which would be the first step toward creating a new medical school?

KR: Yes. That was the original plan.

WH: What is the annual budget?

RG: We just started a year ago so. I cannot give you exact the figures at present. Roughly $1.5 million dollars US per year.

WH: How many people work here now?

RG: About two hundred eighty in the skilling center.

WH: Very efficient.

KR: It is frugal innovation.

WH: Is there a requirement for doctors practicing in India to have continuing education?

KR: As of now, no.

WH: Thank you for your time.

RG: You are welcome.

END