Preface: Last summer, the Center for Global Health (CGH) at the Colorado School of Public Health and Children’s Hospital Colorado signed a Memorandum of Understanding with the Jose Fernando Bolaños Foundation to collaborate in improving maternal and child health outcomes in the Trifinio region of Guatemala.

A team of physicians, anthropologists, health and behavioral scientists, and students conducted a rapid needs assessment (RNA); their findings determined that many basic prerequisites of public and personal health such as clean water, flood-safe housing, and proper medical facilities were lacking.

The following details some of the important non-medical work that is being proposed for Guatemala’s Southwest Trifinio region.

When Jose Fernando Bolaños harvested his first banana crop in 1976 he never imagined the long hours of physical labor in the hot, humid climate in the southwest corner of Guatemala would lead to anything greater than a successful crop. Over the years his hard work and business savvy led to his success and desire to give back to his community.

Thanks to his children that dream is coming to fruition on a level that Jose never dreamt.

With the vision and leadership of Phil Gallegos, Fred Andreas and their students, an undeveloped swatch of soil is being transformed into his dream.

Here is the first of two articles in this issue of the Global Health link that outlines Jose Fernando Bolaños grand plan; proving one person can touch so many lives.

A ten-acre plot in in the Trifinio area of southwest of Guatemala has been designated by the Jose Fernando Bolaños Foundation to become a Global Health Center campus that will house a maternal-pediatric clinic, a birthing center, research laboratories, training community center, and affiliated housing for students, residents and faculty.

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When considering public health tactics, architecture and engineering are not often the first approaches that come to mind. Industrialized countries tend to take for granted that health and illness are inherently connected to civic and environmental infrastructure. In many ways, how a town is built and how it can curb the impact of environmental hazards and contribute to economic and social growth is a precursor to the success of many public health strategies. While beginning to design the public health strategies for just such a community in the Trifinio region of Guatemala, the preliminary work by the Center for Global Health at the Colorado School of Public Health determined that architectural plans and infrastructure designs would be necessary preludes to any sustainable medical intervention there.

The private-public partnership established with the Jose Fernando Bolaños Foundation includes the designation of a ten-acre plot in the Trifinio area for the construction of a global health and human development campus. This is the first time that a piece of land in the area has been assigned to the University of Colorado to carry out its international endeavors.

A population of approximately 29,000 individuals live in the area surrounding the ten-acre strip, and there are some essential infrastructure concerns that must be addressed for this weather-prone, under-resourced communities.

The nearest community, Chiquirines (name of the flying cricket in the area) suffers from flooding during the rainy season and from poor water access in the dry months.

Brainstorming potential solutions to some of the engineering problems that characterize Chiquirines and other Trifinio communities has been the task of Fred Andreas, AIA, LEED AP BD+C, Assistant Professor Adjunct, College of Architecture and Planning at the University of Colorado Denver, and his students.

Having done similar projects in a small village on Mexico’s western coast, Andreas is using his previous experience to propose realistic, comprehensive solutions to the range of issues that the Trifinio communities face.

Water collection, sanitation, power, floodwater management, community development, and housing are points of focus for Andreas and his students.

A semester of work in Andreas’s Advanced Green building Studio resulted in many inventive and innovative student proposals. In addition to re-imagining a physical environment where health can flourish, the students have proposed several approaches that will also generate considerable educational and skills-development opportunities.

Equipped with the right skills and materials, the local population can begin to make stepwise progress toward resolving some of the obstacles to health and human development that currently affects them.

Proposing these solutions are only a preliminary step in a lengthy development process; the nature of this work gradual. The students recognize that they have proposed solutions and technologies that are as yet unseen in Guatemala, and that the vocational skill sets their projects require will necessitate ongoing training of the townspeople.

Taken all together, the students’ proposals constitute an overwhelming, almost unrealistic amount of work, but it is important to recognize that even one proposal seen to completion will effect great change in the community.

The University of Colorado is no stranger to infrastructure development. From the Boulder campus, Marco Kuhlmann and David Espinoza, Ph.D., both former students of the Interdisciplinary Telecom Program and the Department of Engineering Management at the University of Colorado, designed and constructed a system of wireless telecommunication towers along 450 miles of the Peruvian Amazon River basin in 2007.

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These buildings constitute the first phase of a master plan developed by Isabel Valle, an architect from Guatemala City, and Edwin Asturias, M.D., Senior Investigator at the Center for Global Health and Assistant Professor in the Department of Pediatrics in the School of Medicine at the University of Colorado Anschutz Medical Campus who directs the Center for Global Health efforts in Latin America.

But, what kinds of construction materials make for a good health facility? Advanced industrial materials such as rolled steel, various plastics and specialized glass? What about bamboo, rocks, and hay?

In the Trifinio region of Guatemala, there is limited access to developed industrial materials. The local materials available bamboo and hand-made gabions [wicker baskets packed with earth and stone] have a promising future. They not only represent innovative construction techniques, but also could symbolize a forthcoming diversification of economy and the prospect of reigniting an education system that has literal value for the community.

In December 2011, following the multidisciplinary nature of the CGH mission, Dr. Asturias connected with Phil Gallegos, Arch.D., an architect and associate professor in the College of Architecture and Planning at the University of Colorado Denver.

He knew that Gallegos would soon be traveling in Guatemala doing work with the Tecnico Maya Environmental School is a green building organization that focuses resource recovery and repurposing to aid impoverished communities.

Asturias asked Gallegos to visit the future location of the medical campus during his trip, and proposed that Gallegos join the project and begin researching appropriate materials and techniques to accommodate the various environmental, economic, and social conditions that typify the Trifinio region.

Phil Gallegos has always had a mind for sensible architecture that allows for practical construction. In fact, he authored a Design-Build program at the University of Colorado Denver that teaches students about the considerations of construction, and the importance of a functional, executable design.

Gallegos explains, “Differing conditions include lack of some highly developed industrial materials. Any material must be replaced or cleaned after any flooding. Concrete, while readily available, absorbs bacteria from floods [causing mold and therefore, respiratory issues] and cannot be easily replaced.”

The students were faced with the immense task of putting together a list of materials that were accessible and acceptable for building. After completing extensive research, they defined some possibilities.

Gallegos has asked his students to develop designs for five different building types, a health clinic for patient treatment, a birthing center, a lab for research, a center for education and community development, and housing for the immediate surroundings of the health campus.

The communities around the Trifinio area are more than an hour away from the nearest health facility, and the high mortality in newborns and frequent complications during pregnancy and delivery show a need for a closer source of medical care, which is why the global health campus is a priority for the population. As of now, the Trifinio communities have only an understaffed health post that mainly distributes vaccines to children.

Gretchen Domek, M.D., a graduate from Harvard Medical School currently completing a pediatric residency at the Children’s Hospital Colorado will become the first fellow in Global Health in July 2012. She recently traveled to the
Trifinio area in Guatemala, and met with traditional birth attendants to explore if a birthing center would be a welcomed addition in the community.

The birthing center is vital to improving birth outcomes in the community, given the current state of complications in pregnancy and newborns as two of every 3 births usually take place in the home.

At the College of Architecture and Planning, Gallegos has challenged his students to think outside the box by encouraging them to consider the cultural sensibilities of the local population, specifically, the disparate medical culture that exists in Guatemala.

The event of pregnancy and birth is an excellent example of the divergent ideas of biomedicine and Guatemalan cultural precepts. While over the past fifty years, pregnancy in the United States has increasingly taken place in hospitals, traditional home birth is still predominant in Guatemala.

Architecture student Sarah Segers is developing plans for a birthing unit, which will be proximal to the health clinic. She describes her motivations for designing this building, "A birthing center is a new building type, even for here in the United States. We talked about the high infant mortality rate, and how having a place for safe births is a big problem in Guatemala. We’ve been thinking about how it should feel like home, but that it should be close to the clinic in case there are complications. I’m designing it as a separate facility from the clinic, so that it’s not under direct control of the medical staff. It’s more of a community place than a hospital."

The challenge of balancing a functional building design with a medically appropriate design, while still acknowledging that the culture of medicine and health in Guatemala is very different, should not to be understated. There are many criteria to satisfy here, certainly more than your average design project.

Speaking to the specific requirements of this project, architecture student Miles Dake explains, “Usually we’ll design for a building in a city somewhere. This project is out in the middle of nowhere, so being away from civilization and away from traditional building materials is really interesting. The building that I’m designing is a sterile research lab. Most of the buildings there are open to the environment, so creating a sterile environment is tough. My design is built on sandbag base, and uses rammed earth walls (tamped layers of dirt, hay and small amounts of concrete). Tile will probably be the best way to keep the interior clean since they don’t have man-made materials like linoleum. We’ve been thinking about the materials and processes that can be used that are perhaps labor intensive but cost effective.”

Bamboo is another material that the students’ plans utilize.

Using bamboo grown in Guatemala is an innovative strategy that not only solves some construction dilemmas, but also helps to diversify the local economy. While working with Tecnico Maya in Comalapa, Gallegos discovered that another group from Thailand had introduced bamboo to Guatemala. With exceptional growth rates (up to 2 inches in one hour), bamboo is an excellent building resource that replenishes quickly. He explains, “There are all kinds of ways to use bamboo in construction, furniture, and framing; it is flexible, strong, and grows very quickly.”

Bamboo is also conducive to modular building, which is a strategy that allows families to purchase a kit of parts (or several) to meet the varying needs of the traditional extended families, which are common in Guatemala. “Kit of parts” construction is a special subset of pre-fabrication that not only attempts to achieve flexibility in assembly and efficiency in manufacturing, but also by definition requires a capacity for de-mountability, disassembly, and reuse, which is ideal for the flood-prone Trifinio area.

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Another strategy generated by this project is the opportunity for education, as training will be necessary for the local population to master the new techniques and technologies being presented. Gallegos confirms, “Innovative materials such as bamboo and gabions as building materials will have to be taught, and skill sets developed in construction.

Additionally, we would like to establish a research center at the College of Architecture and Planning to respond to questions and to develop other innovative construction methods, to monitor, and to help repair work that needs a response. I think it will require training at both our end, and on the site on a continuous basis.” This educational component would be vital to update and broaden the economic potential of the community. This project looks far into the future, and offers forward-thinking solutions to many issues that extend well beyond the realm of clinical expertise.

The type of planning and design that Gallegos and his team are doing are important prerequisites to successful medical intervention in this under-resourced area of the world.

In addition to poverty, the people in the Trifinio region endure annual flooding, which infects the potable water resources and the buildings in the area, bringing mosquitoes, mold and bacteria. The average annual rainfall in Guatemala is approximately 1,000 millimeters with June being the wettest month with an average of 10.8 inches.

These are great challenges for the average building, but some of the solutions to these challenges present the fortunate by-product of potentiating economic growth through materials-systems development. Implementing a Guatemala-Denver training system will be key for community members to learn how to replace materials after flooding, maintain potable water systems, and utilize plant systems to repair damaged landscape.

The long-term nature of this work is daunting, but the long-term nature of the various environmental and civil struggles that have plagued this area is proportionally overwhelming.

To have an aptly experienced architect such as Phil Gallegos within at the College of Architecture and Planning and a part of the project in Guatemala’s Trifinio region is a huge windfall for the Center for Global Health; his work is very much aligned with the global health initiatives being planned for this site.

**Students of Phil Gallegos’s Advanced Architecture Studio**

- Lura Blumenfeld – Winter 2012
- Will Campbell – Spring 2012
- David Carson – Winter 2012
- Miles Dake – Spring 2012
- Patricia DiMario – Spring 2012
- Michelle Draschil – Spring 2012
- Minjae Lee – Spring 2012
- Cameron Minor – Winter 2012
- Chris Norman – Winter 2012
- Sarah Segers – Spring 2012
- Jessica Weyandt – Spring 2012
- Tim Williams – Spring 2012

To learn more about Phil Gallegos and his students’ work, contact him at phil.gallegos@ucdenver.edu.

To learn more about the Center’s Trifinio Guatemala Project, please contact Edwin Asturias, M.D., Principal Investigator of the project at edwin.asturias@childrenscolorado.org
With this United Nations funded measure, communication towers connecting villages to health posts and hospitals using wireless signals for phones allowed remote communities to coordinate in the prevention of malaria outbreaks and other diseases, set quarantines, arrange evacuations of patients to hospitals, and call for physicians with medication (http://www.colorado.edu/engineering/profile/telecom-student-takes-wireless-communication-remote-areas-peru).

Kuhlman and Espinoza established an influential and multifaceted resource for the villages lining the Amazon through one straightforward (though not uncomplicated) task.

Developing infrastructure in the Trifinio region must also be driven by similarly clear, practicable goals. Communities along the Amazon River basin in Peru and in the Southwest region of Guatemala both face many pressing infrastructure issues, and it is important to remain candid about what is achievable, and setting priorities is tricky.

Andreas’ students’ proposals will provide a basis for determining what seems reachable in the near future, and partnering with the community establishing what will be feasible to accomplish and disrupt the current vicious cycle of poverty and plague.

The student proposals covered clean water, sanitation, energy and power, river hydrology, community development and housing solutions. To follow are some of their ideas from Fred Andreas’ Advanced Green building Studio.

Clean water is an important feature of successful town infrastructure. Implementing a simple, low-cost system of water catchment and treatment can preclude many of the health issues that stem from unsafe drinking water. The collection and treatment of water is a particular challenge in coastal areas of Guatemala, where there is often severe flooding, which contaminates clean drinking water through ground water, and through human and animal waste on the surface.

Architecture students Curtis Koldeway and Brittany Taylor have proposed roof catchment systems leading to at-home tanks where the water will be treated. Enough water would eventually be captured that excess could run to an underground cistern, which would generate back-up supplies. The students call upon the brand iCATIS (www.icatis.org) for ceramic filters designed to sanitize water for in-home use, citing the fact that this filter demands no energy, has a simple manufacturing process, has a lower number of broken filters, requires uncomplicated maintenance, and adequately removes pathogens and viruses from the water.

Sanitation is connected to safe water; controlling waste and keeping it away from water resources is imperative.

Greenbuilding Studio students Inaam Khalifa and Tamzida Khan have proposed two main solutions for sanitation management in the Chiquirines that could be applied to the Trifinio area at large.

One solution, the composting toilet, uses rainwater catchment to fill a tank that will supply both the kitchen sink and an in-home toilet. The urine is diverted from the toilet, diluted, and used for fertilizer. The solid waste travels down a sloped chamber to an enclosed composting chamber, where it will be mixed with kitchen scraps to create compost.

A second solution is localized, small-scale biogas digesters. Biogas is formed from waste materials (including kitchen and garden waste), and may be applied in direct combustion systems (boilers, turbines, or fuel cells) for producing space heating, water heating, drying, absorption cooling, and steam production. This two-pronged approach offers a solution to waste management, and creates an opportunity for a new energy system to be put into operation.

Energy and power are basic resources that require unique and appropriate development in this setting, which is particularly challenging without greater governmental support.

Architecture students Adam Acree and James Anderson have suggested using a solar powered battery exchange network, which would involve significant up-front expenses, but could be established through a micro-loan program, and managed locally.

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The block-by-block solar charging stations would offer multi-use batteries at 20 cents per charge in order to fuel homes, water pumps and street lighting. If the energy generated exceeds the community’s needs could be sold to energy service companies elsewhere in Guatemala.

Precedents for the solar powered battery exchange system have been set in Mexico, Cambodia and Malaysia.

Managing nature’s river hydrology in the Trifinio communities is probably the most challenging.

Acknowledging the difficulty of rallying governmental support and financial backing to procure equipment for “hard” engineering strategies like dredging flood relief channels, strengthening levees and embankments, and building flood retention basins, architecture students Kala Koepke and Jennifer Callison considered some “soft” approaches that more affordable and more environmentally friendly, like riverbank stabilization and afforestation.

According to Koepke and Callison, riverbank stabilization would help decrease the amount of silt in the river water, and would also help create intentionally-floodable environments in order to grow certain cash crops (like bamboo).

Architecture students Ellen Adams and Elizabeth Thrussel have discussed using other engineering tools like bioswales and bioretention filters; both are landscape techniques to filter storm water runoff before it rejoins with surface water. They emphasize the importance of controlling storm water in the home setting, and then taking the next step of managing community blocks by directing water away from the homes and toward agricultural areas or strategic flood retention basins, such as a well-placed soccer field.

Once the flow is controlled out of the town, Adams and Thrussel have recommended a levee with a system of dikes to control flooding in the agricultural fields, and increased vegetation to control erosion and absorb excess water.

Architecture students John Hillyard and Meg Sheff-Atteberry suggested that water management become a key element of the primary and secondary/vocational education system, so that the community can manage water sanitation and system upkeep. Hillyard and Atteberry stress the importance of sanitation in the curriculum as well, so that the communities can implement methods that will not only manage waste, but will also generate alternative sources of energy and income through the production of methane gas for cooking, etc.

Sustainable farming methods and building with alternative and recycled materials are other pertinent skill sets that could be included in primary education. Architecture students Kevin Xu and Qi Shan have been looking to the future to understand what the unprecedented level of 30% population growth will mean for the Trifinio communities.

They have created a chronological sequence of plans that depicts an optimal growth process, with strategically placed roads, designated open spaces and market places, with residential areas filling in over time. The planners of the town must be mindful of the flow of seasonal floodwaters in order to maximize the safety and practicality of the proposed designs.

Housing solutions were proposed by each team of students. Most students focused on the conditions of flooding/standing water, extreme heat, humidity, and high mosquito presence. Many solutions include designs that enhance passive airflow, so that homes can take full advantage of natural breezes passing through.

Most students also emphasized the importance of local materials and skills; flexibility and modularity; these choices reflect lower manufacturing costs, and with a kit of parts, families can more easily personalize a home space to suit their needs.

Creating Live-Work spaces will allow a home to double as a production or retail space, perhaps making it easier for a group of women, for instance, to share a loom for weaving, or other equipment that might be unreasonably priced for any one individual. Home and community design require a broad sensitivity to cultural, environmental, and economic needs.

Fred Andreas and his students have carefully considered many of the special characteristics that these homes must exhibit, and have proposed a wide array of options to assist in the safe, affordable and strategic development of communities in the Trifinio region.

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Andreas’s students have done an excellent job of envisioning solutions that are energy efficient, environmentally suitable, and culturally sensitive. Their proposals also have the long-term benefit of invigorating interest in education and generating new jobs.

Andreas explains, “The systems we’ve developed will produce opportunities and prototypes for rebuilding the existing infrastructure, housing, systems, schools and settlements. A training program could be implemented through the proposed rebuilt school system. Our plans include an expansion of kindergarten through twelfth grade education. This includes not only the physical buildings, but also a learning plan replacing the current first through third grade system with Computers for Kids, One Laptop Per Child (OLPC) (www.laptop.org/laptop) an online learning program similar to the Khan Academy (www.khanacademy.org) that would include trade and building system training focused on green, indigenous and sustainable building practices.”

Actualizing their proposals will take an investment of time, money and manpower, but their vision of an improved Trifinio inspires motivation to create that future.

Students in Fred Andreas’ Advanced Green building Studio, Spring 2012
Adam Acree, Ellen Adams, James Anderson, Jennifer Callison, John Hillyard, Inaam Khalifa, Tamzida Khan, Kala Koepeke, Curtis Koldeway, Qi Shan, Megan Sheff-Atteberry, Brittany Taylor, Elizabeth Thrusell and Kevin Xu

To learn more about Fred Andreas and his students’ work, contact him at fred@unitdesignstudio.net.

To learn more about the Center’s Trifinio Guatemala Project, please contact Edwin Asturias, M.D., Principal Investigator of the project at edwin.asturias@childrenscolorado.org

Center for Global Health receives WHO designation

The World Health Organization identifies maternal and child health program as an international collaborating center

The maternal and child health division within the Colorado School of Public Health’s Center for Global Health was designated by the World Health Organization as a WHO Collaborating Center for Promoting Family and Child Health. The division, which is a partnership between Children’s Hospital Colorado and the University of Colorado School of Medicine, is one of only two programs in the Americas to receive this designation in maternal and child health.

“This designation means that the center will be more actively engaged in developing transformational maternal and child health interventions and programs which can then be taken to a global scale,” states center director and CU School of Medicine professor of pediatrics and public health Stephen Berman, MD.

With the new designation, the center’s maternal and child health division will focus on four major program outcomes in partnership with the WHO and its regional affiliate, the Pan American Health Organization:

• Assist countries in reducing health inequality and excessive morbidity and mortality among mothers, infants, children and adolescents;
• Accelerate vaccine research and implementation;
• Train vulnerable communities and countries in disaster preparedness in ways that will meet the needs of children; and
• Train doctors, nurses, midwives and other birth attendants in the Helping Babies Breathe program, to reduce neonatal asphyxia.

Although the WHO designation is new, the division’s faculty have a long standing involvement improving health outcomes for mothers and children around the world.

“World-class children’s hospitals extend their efforts to support the health of women and children all over the world. We’re proud that our faculty members have been major architects of several programs developed in partnership with WHO that have and are being implemented world-wide,” states Children’s Colorado President and CEO Jim Shmerling, DHA, FACHE.

The center’s maternal and child health division is co-directed by Eric Simoes, M.D., professor of pediatrics, and Susan Niermeyer, M.D., M.P.H., professor of pediatrics. Senior investigators include Edwin J. Asturias, M.D., assistant professor of pediatrics, and Gretchen Heinrichs, M.D., assistant professor of obstetrics and gynecology.
The two-day summit began with representatives from Brazil, Colombia, Panama, Peru, Mexico, Argentina, Jamaica, Chile, Canada and the U.S. discussing how their nations deliver vaccines and the challenges of confronting rumors that can endanger immunization programs.

Carlos Castillo Solorzano, regional advisor on vaccines and immunizations for the Pan American Health Organization (PAHO), said proactive, honest communication was critical in a crisis. If there are unfounded rumors about a vaccine they must be confronted directly, he said. “Bad communication can make a good immunization strategy a failure,” said Solorzano, a physician from Peru.

They cited misinformation associating certain vaccines with diseases despite a lack of scientific proof. In one instance, cases of polio in Nigeria spiked after leaders there claimed the vaccines were part of a worldwide conspiracy against them. In the West, some have connected autism with flu vaccines and encephalopathy with the pertussis vaccine.

Public health officials from across the Americas converged on the Anschutz Medical Campus May 10 - 11, 2012 for the first Pan-American Vaccine Safety Summit, aimed at creating new ways of delivering immunizations safely.

The summit was organized by Edwin Asturias, M.D., an assistant professor of pediatrics at the University of Colorado School of Medicine. “At the end we expect to have a basic framework to develop a network for vaccine safety throughout the Pan-American region,” said Asturias, who is director for Latin America at the Center for Global Health at the Colorado School of Public Health.

Safety standards for vaccines must be high because they are given to healthy rather than sick people, said Claudia Vellozi, deputy director of the immunization office at the Centers for Disease Control and Prevention. She said the CDC has an extensive vaccine monitoring system where incidents are compiled in vast databases.

The head of the World Health Organization’s vaccine safety program, Patrick Zuber, M.D., M.P.H., delivered the keynote address where he acknowledged that vaccines have caused seizures, shock and other health issues. Yet the numbers of such incidents were small compared to the amount of immunizations given. Still, he said, it’s hard to battle a rumor.

“When these types of beliefs, once they start, are hard to erase.”

Patrick Zuber, M.D., M.P.H.

To see Dr. Zuber’s keynote lecture, click here.

The Center for Global Health at the Colorado School for Public Health will receive $100,000 for an innovative new vaccine program through Grand Challenges Explorations, created by the Bill & Melinda Gates Foundation, to enable individuals worldwide to test unorthodox ideas that address persistent health and development challenges.

Edwin Asturias, M.D., assistant professor of pediatrics and director for Latin America at the Center for Global Health, is the principal investigator on the project entitled, ‘Short Messaging Service (SMS) Mobile Technology for Vaccine Coverage and Acceptance in Guatemala.’

Grand Challenges Explorations funds scientists, researchers and entrepreneurs to explore ideas that can solve global health and developmental challenges. Asturias’s project is one of six Grand Challenge Explorations II grants announced today. “Grand Challenges Explorations encourages individuals worldwide to expand the pipeline of ideas where creative, unorthodox thinking is most urgently needed,” said Chris Wilson, director of Global Health Discovery and Translational Sciences at the Bill & Melinda Gates Foundation. “We’re excited to provide additional funding for select grantees so that they can continue to advance their idea towards global impact.”

The Colorado School of Public Health’s project aims to improve immunization rates in Guatemala by testing a new mobile phone system that sends periodic text reminders to mothers or custodians of infants when it’s time for their vaccinations.

Immunization rates in many parts of Guatemala are below the acceptable 80 percent reported at the national level for DPT3 (diphtheria, pertussis, tetanus) and measles vaccine. Many babies do not get immunized on time and completion of the recommended series of inoculations does not reach 70 percent of eligible infants by the time they are a year old. One major reason for this is a lack of reminders.

Yet despite being a largely low-income country, there are at least 15 million mobile phones for a population of 14 million. Four of out of five Guatemalan families have cell phones. Asturias hopes to tap into this communications infrastructure as a way to reach millions of people and boost immunization rates.

His project would allow health care workers to enter a child’s immunization record into a cloud-based information system augmented by text alerts going out to parents and caretakers to bring their children in for scheduled vaccines. They would also be regularly texted and asked if there were adverse reactions to the vaccinations.

Asturias said the time was right to use the latest communications technology to promote worldwide public health.

“Vaccines are among the most successful, preventive technologies of our time, saving the lives of millions of children every year,” he said. “So how we reach every child and sustain confidence in vaccines is of paramount importance. Using emergent mobile technology in developing countries may allow us to reach many more children and increase critical interaction between health care workers and families.”
Robinson Durst Scholarship

- **Dwi Agustian** (College of Liberal Arts and Sciences) – Survey on the Health Care Utilization for Influenza Like Illness in Two Sub-district Communities, Bandung District, West Java, Indonesia
- **Emily Chasco** (College of Liberal Arts and Sciences) – The Influence of Perceptions and Cultural Beliefs on Women’s Utilization of Cervical Cancer Screening Services in Ifakara, Tanzania
- **Madeline Cole** (School of Medicine) and **Dennis Gurfinkel** (Colorado School of Public Health MPH) – Responding to Community Needs: Development, Implementation and Evaluation of an Enhanced WHO IMCI Strategy for Education Community Healthcare Workers in the Peruvian Amazon
- **Karen Hampanda** (College of Liberal Arts and Sciences) – Investigating the relationship between intimate partner violence and utilization of prevention of mother-to-child transmission (PMTCT) or other pediatric HIV services – Lusaka, Zambia

Rotary International Health Scholarship

- **Dwi Agustian** (College of Liberal Arts and Sciences) – Survey on the Health Care Utilization for Influenza Like Illness in Two Sub-district Communities, Bandung District, West Java, Indonesia
- **Emily Chasco** (College of Liberal Arts and Sciences) – The Influence of Perceptions and Cultural Beliefs on Women’s Utilization of Cervical Cancer Screening Services in Ifakara, Tanzania
- **Kathryn Dovel** (College of Liberal Arts and Sciences) – Antiretroviral therapy for HIV positive males – Bala- ka, Malawi
- **Darren Eblovi/Lauren Mehner** (School of Medicine) – Anemia and parasitic screening and early language assessment for young children from poor communities – Southwest Guatemala
- **Anna Fagre** (Colorado School of Public Health MPH) – Zoonotic diseases and how they affect the human population via rabies, visceral leishmaniasis and other diseases – Sao Paulo, Brazil
- **Dennis Gurfinkel** (Colorado School of Public Health MPH) – Responding to Community Needs: Development, Implementation and Evaluation of an Enhanced WHO IMCI Strategy for Education Community Healthcare Workers in the Peruvian Amazon
- **Karen Hampanda** (College of Liberal Arts and Sciences) – Investigating the relationship between intimate partner violence and utilization of prevention of mother-to-child transmission (PMTCT) or other pediatric HIV services – Lusaka, Zambia
- **Julius Ngaile** (School of Medicine) – Evaluate the effectiveness and assess any further needs for training healthcare providers and local community on the use of personal treatment organizer (PTO) – Island, Scuba District, Kenya

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