January 2010

SSI News

A newsletter from the Sustainable Sciences Institute

SSI: Leading the Way

After two decades of work, SSI's core mission - building scientific capacity to strengthen public health in the developing world - is more relevant than ever. This year we were ready for action when the first wave of influenza A H1N1pdm hit Nicaragua. We witnessed how SSI's long-term partnership with the Ministry of Health (MOH) was crucial in dealing with the epidemic simultaneously with the worst dengue outbreak in over a decade in Managua. SSI and MOH personnel were called upon to advise national policy, and they implemented timely diagnostic assays, surveillance protocols and treated patients, evidencing the direct link between investment in scientific capacity and public health outcomes. Our work continues to be inspiring to scientists and global health advocates worldwide, as highlighted by SSI's participation in conferences, panels and publications addressing global inequalities of access to scientific knowledge and resources. The importance of providing a venue for sustainable research, information-sharing and publishing is underscored by the enormous popularity of our workshops and the small grants for research program. As always, we at SSI continue to derive our energy from the people who work with us, and as a result new programs take shape and evolve. We are thrilled that the implementation of Information and Communication Technologies in the Nicaraguan dengue cohort study has developed into an international eHealth program where SSI's mission of capacity-building, advocacy and visionary of appropriate application of new technologies continues to flourish. On behalf of the scientists, health professionals and communities that benefit from our programs, we thank you for your continued support, which is needed now more than ever before!

First Wave of Influenza Pandemic Hits Nicaraguan Cohort

June 1st, 2009 was an important day in the Nicaraguan Influenza Cohort Study (NICS). Not only did it mark the beginning of the third year of the study, but the first child in the cohort, a 5-year old girl, tested positive for influenza A H1N1pdm on that day. This was the first case detected in the cohort as well as the first case detected in Nicaragua.

Like all countries, Nicaragua moved quickly to prepare for "swine flu" when it was determined that the outbreak of severe respiratory illness in Mexico was due to a new virus, influenza A H1N1pdm. Public health officials and researchers worldwide rapidly moved to monitor the virus as it spread quickly around the world in a matter of weeks. SSI aided Nicaragua in setting up real-time RT-PCR testing for H1N1pdm in the Nicaraguan National Laboratory by sending experts and supplies to the lab in the first week of May. By the time that June 1st rolled around, the National Virology Laboratory had been able to test for several weeks and was well-prepared to diagnose cases as they occurred both in the cohort and in the country.

Between June 1st and October 31st, 177 H1N1pdm cases were detected in the NICS cohort. Because only 25% of children with respiratory symptoms are randomly selected for testing, that number of cases translates into an attack rate of 16.6% in the cohort children. Cases of H1N1-pdm are still occurring on a daily basis in the cohort, and it is likely that the attack rate will reach

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ICT For Health Program Builds eHealth Tools and Connects with International Community

Participants at the 1st Latin American Open Source Health Informatics meeting and workshop (IMeCA 2009) in Lima, Perú October 26-31, 2009

In addition to supporting the SSI-Ministry of Health (MOH) research studies on influenza and dengue in 2009, the ICT team continued to work on new projects in the eHealth Solutions Laboratory in Managua, Nicaragua. Efforts focused on several promising informatics tools to help meet challenging health information management needs in limited-resource settings. Using the open source web-based electronic medical record system OpenMRS, and with support from the global OpenMRS community, we are focusing on building the first immunization record and prenatal health tracking modules for use in primary care settings. Our goal is to use OpenMRS to eventually include infectious and chronic disease tracking modules and to more easily integrate with existing hospital, pharmacy and laboratory information management systems. We are also trying out several cell phone-based mobile health (mHealth) data collection systems based on the open source OpenROSA platform to facilitate seamless pregnancy patient tracking and vaccine tracking between field teams and the clinic databases. These tools allow for real-time data integration at the point of care, improving the quality and speed of data recording. Decision-support tools are also being implemented and evaluated by our ICT team with MOH partners to determine their impact in improving the use of health

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Success Story: Naglaa Zayed

Dr. Naglaa Zayed

Dr. Naglaa Zayed, an Assistant Professor in Tropical Medicine and Hepatology at Cairo University in Egypt, is the second El-Hefni scholar to receive a scholarship through SSI's Egypt Program. Right now, Naglaa is in San Francisco, CA, where she is working with Dr. Stewart Cooper on HCV patient liver transplantation outcomes at the California Pacific Medical Center.

What have you been able to accomplish since arriving in the United States?
I have been attending clinical rounds and lectures. I have also been working on my research project, which involves the variable factors that affect hepatitis C patients who have undergone a liver transplantation. Hepatitis C recurrence is universal in post-liver transplantation; unfortunately, approximately 20% of individuals can develop severe HCV-related complications, such as cirrhosis, within a few years of transplant. The full understanding of this process or the factors contributing to it will add much to our knowledge in this field and might affect the clinical decisions taken during patient management. My research includes liver transplant patients in the United States as well as Egypt. The main difference is that liver transplants in Egypt are only performed from living donors, as cadaveric transplantation is currently not allowed. Thus, the number of liver transplants in Egypt are rather small compared to the large need and only a few centers are performing them. Liver transplantations were only introduced in Egypt eight years ago, and it is very useful for me to gain knowledge from physicians in the United States who have been performing liver transplantations over a longer period of time.

What is it like to perform research in Egypt?
In Egypt, researchers can be helpful to each other with the available limited resources that they have. Senior staff often help and advise their junior fellows. On the other hand, there are many challenges that researchers in Egypt face and serve as obstacles to their goals. The main challenges are the lack of available funds and resources, lack of complete medical records in most of the hospitals, and sometimes lack of adequate experience, especially in newly introduced medical techniques.

How is SSI helping in the fight against HCV?
SSI is helping HCV research by supporting Egyptians to come to the United States to gain knowledge and experience, by offering grants for researchers to conduct their research in Egypt, and by conducting workshops and training courses for Egyptian researchers. The workshops include training in proposal-writing, biostatistical analysis, and manuscript-writing.

What will be you working on once you return to Egypt?
I will be joining the liver transplantation program at our institution.While in San Francisco, I will try to gain as much experience about the clinical practice of liver transplantation as well as the management of possible complications. I look forward to sharing this knowledge with my colleagues when I return to Egypt.

2009 Dengue Epidemic in Nicaragua: Update on SSI Dengue Studies

Nicaragua is experiencing its most severe dengue season in over a decade. The staff of SSI's community-based cohort and hospital-based pediatric dengue studies have been working overtime—literally and figuratively—to care for sick study participants. The dengue season, which normally starts off slowly in July or August and picks up later in the fall, began in mid-August and by October 24, 101 dengue virus infections had been confirmed in the cohort, and 115 in the hospital study. Previously, the most cases identified in the cohort in an entire year was 65, in 2005-6. Around 80% of 2009's infections were caused by dengue virus 3 (DENV-3), a serotype that had not been seen in dengue cases in Nicaragua between 2000 and 2007, leaving many children susceptible. Disease caused by DENV—dengue fever and the life-threatening dengue hemorrhagic fever and dengue shock syndrome—has been far more severe and has shown more rapid onset than in previous years. Through October 24th, 51 (51%) cohort patients with confirmed DENV infections were hospitalized -- a rate that is five to ten times greater than what we have observed in the previous 5 years. This dengue season is concurrent with a severe outbreak of Influenza A H1N1pdm that continues to circulate among study participants. Several children had confirmed co-infections of influenza A H1N1pdm and DENV including some participating in the cohort study (see 'First Wave of Influenza Pandemic Hits Nicaraguan Cohort'). To investigate the frequency of H1N1pdm antibodies in dengue cases and possible interactions that might cause more severe dengue, SSI is helping implement a Hemagglutination Inhibition testing for H1N1pdm at the National Virology Laboratory and gearing up for follow-up research studies. The Ministry of Health stepped up prevention efforts in late September, hoping to lower dengue transmission for the rest of the year. SSI researchers are collecting invaluable data during the current epidemic that will help increase knowledge, particularly about severe dengue and possible interaction with pandemic influenza. Although current cohort funding ends in December 2009, the study will continue through the 2010 annual sample, and beyond if we can secure funds. Importantly, since most DENV infections are asymptomatic or inapparent, in order to provide investigators a complete picture of the current epidemic, we will collect a healthy blood sample in July/August from all participants in the 2009-10 dengue season to measure anti-DENV antibodies and determine which children were infected, even if they did not develop disease. Determining the ratio of symptomatic to inapparent DENV infections will help solve the mystery of the current severe dengue epidemic. SSI is committed to continuing to support dengue studies in Nicaragua beyond 2010.

Capacity-Building Program Supports Scientists in Latin America

Designed to transfer scientific knowledge to scientists in the developing world, SSI's Scientific Capacity-Building Program continued to carry on its 21-year long mission. We did so through hands-on workshops, small research grants, and material aid donations. The training cycle started in January with a workshop on scientific manuscript-writing in Guayaquil, Ecuador. Co-sponsored by the Instituto Nacional de Higiene y Medicina Tropical of Ecuador, the workshop trained 18 scientists and provided them with the skills needed to transform existing data into publishable material. The workshop offered one-on-one tutoring from experts in the discipline, scientific advice, and technical writing skills. By the end of an intense week, trainees had in hand a solid first draft of their manuscript.

Participants, organizers and instructors of the 'Public Health Impact Evaluation' workshop February 12-14, 2009 in Managua, Nicaragua

In February, we launched a Special Topic Workshop in Managua, Nicaragua, on 'Impact Evaluation for Public Health'. A successful international, multi-institutional training collaboration, the workshop fostered building of knowledge networks in the region, in addition to training in impact evaluation itself. Co-sponsored by the Instituto Nacional de Salud Pública in Mexico, the Center for Evaluation for Global Action at the University of California, Berkeley, and the Nicaraguan Ministry of Health, the workshop trained 45 participants from five Central American countries and Mexico. In July, SSI conducted two workshops in Panama City, Panamá; one on scientific manuscript-writing and one on grant proposal-writing. Co-sponsored by Panamá's National Secretariat for Science, Technology and Innovation (SENACYT), the workshops trained 34 and 25 participants, respectively. We returned to Panamá in September for another workshop on grant proposal-writing. Co-sponsored by the Pan American Health Organization (PAHO), this workshop provided 14 scientists with the skills they need to pursue financial support for future research projects. In October, SSI co-sponsored the 1st Latin American Open Source Health Informatics Meeting (1ra Reunion de Informatica Medica Codigo Abierto - IMeCA 2009) in Lima, Perú with collaborators from Partners in Health (Boston), Socios en Salud (Perú), the international OpenMRS and OpenROSA communities, the social enterprise eHealth Systems (Chile) and with the support of the IDRC of Canada and PAHO. Forty-five participants from 11 countries in the region participated in an interactive forum and week-long workshop to address the urgent need to build local capacity in health information technologies in Latin America at a critical time in the global dialogue about eHealth.

Maria Elena Peñaranda, SSI's Scientific Director, receives a thank you gift from the Autoridad Panameña de Seguridad de Alimentos in Panamá for a material aid donation

In addition to the workshops, we awarded research grants to Betzabé Rodriguez from Nicaragua for the project: "Use of polymerase chain reaction for the detection of *Plasmodium* in residents from three municipalities in Chinandega" and to Manuel Baldeón from Ecuador for the project: "Study of plants with pharmacological potential from the Maquipucuna Reserve in the Pichincha Province". A small grant supported Hector Ricardo from Argentina to purchase used scientific equipment for the Instituto de Biología Molecular y Celular in Rosario, Argentina. Lastly, we sent donated scientific equipment and supplies worth $75,000 to Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Panamá. When combined with the training workshops, these donations help create full-scope laboratories able to perform high-quality scientific research.

Note: To sustain our goal of supporting researchers and laboratories in the developing world, we are in urgent need of funds and sponsorships. Can we count on you? Please, make an online donation at www.ssilink.org or send us a check. Any amount helps! Thank you!!!

Influenza Pandemic.....

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30-50% by the end of the first year of the pandemic. To date, two cohort study children with laboratory-confirmed H1N1pdm and four children with dual dengue/H1N1pdm virus infections have been hospitalized.

As has been seen with seasonal influenza, many H1N1pdm cases in the cohort have experienced fairly mild symptoms. However, analyses comparing past seasonal influenza cases in the cohort to influenza A H1N1pdm cases have shown that children with H1N1pdm have significantly more lower respiratory symptoms, including more pneumonia in the first week of illness, than children with seasonal influenza. Because the cohort has been ongoing for over two years, we are in a unique position to make these comparisons. In addition to providing invaluable information on how pandemic influenza is affecting children in Central America, the data collected through the study will contribute to overall scientific efforts to understand influenza pandemics.

Egypt Program Awards Grants and Builds Research Laboratory

The future tissue culture room at Menoufeya University's National Liver Institute

During the spring of this year, we opened our call for proposals from Egyptian scientists for the 2009-2010 Small Grants cycle. We received a very healthy response, with more applications than we have seen in the recent past. Two very promising candidates were selected to receive one year of seed funding in support of their innovative research, which will be conducted in Egypt. We are proud to support Dr. Yasmin Saad and Dr. Rania Labib. Dr. Saad, a lecturer of endemic medicine and hepatogastroenterology at Cairo University, is committed to assessing the incidence of occult hepatitis C among cases of idiopathic hepatitis in Egypt. Based at the Children's Cancer Hospital (known more commonly in Egypt as 57357) in Cairo, Dr. Labib will be creating a biorepository amalgamating the best practices for collection, storage, retrieval and distribution of biological materials for research. Dr. Labib is collaborating on this project with one of our former grantees, Sameera Ezzat, who has had many achievements in her career and was recently appointed as the Director of Research at 57357.

We are also very excited about our ongoing progress and collaboration with Menoufeya University's National Liver Institute (NLI). Menoufeya is a governorate located 60 miles outside of Cairo and is well known as the hometown of President Mubarak. SSI and NLI are jointly building a research laboratory that will be housed in NLI, the only academic institute in Egypt whose focus is solely hepatology and liver-related diseases. As you can see from the photograph, we are still in the renovation stages. However, the progress made so far marks an important milestone. NLI recently appointed Dr. Mohamed Kohla as the Laboratory Director; Dr. Kohla was our former El-Hefni scholar who spent 2 years living in San Francisco and working with Dr. Stewart Cooper. His very recent experience and exposure to cutting-edge techniques in the Cooper Laboratory at California Pacific Medical Center will serve him well as he navigates the organization of a comparable facility in Egypt.

Thank You to our Volunteers and Donors!

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Your support is urgently needed. Please, give what you can today!
To make an online donation, go to www.ssilink.org. Thank you.

Presentations and Publications

In 2009, our team worked hard to represent our organization and programs at conferences around the world and with publications that highlighted SSI's mission and work. Eva Harris, President, spoke about SSI at Vanderbilt University (Nashville, TN), Stanford University's Hopkins Marine Station (Pacific Grove, CA) in March, Caltech (Pasadena, CA) in May, Novartis Vaccines (Siena, Italy) in July, the International Consortium for Antivirals (Corsica), and the University of Wisconsin, Madison, in October. Josefina Coloma, Executive Director, spoke about SSI at the International Health Conference (Vallejo, CA) in March and at the 50th Anniversary Meeting of the WHO's Advisory Committee on Health Research (Panama City, Panamá) in November.

Aubree Gordon, Influenza Program Coordinator, spoke about the Nicaraguan influenza cohort study at the XI International Symposium on Respiratory Viral Infections (Bangkok, Thailand) in February, the Influenza Dynamics and Evolutionary Analysis Workshop (Bethesda, MD) in June, the Emerging and Re-emerging Infectious Diseases Conference in Central and Eastern Europe (Sofia, Bulgaria) in September, and the Multinational Influenza Seasonal Mortality Study 3rd Regional Meeting (Vilamoura, Portugal) in September. Kate Standish, Project Coordinator, and other members of the SSI-Nicaragua team spoke about the PDVI Project at the Molecular Biology Center at Universidad Centroamericana (Managua, Nicaragua) and the Infectious Disease Symposium at Universidad Centroamericana (Managua, Nicaragua) in September. Heather Zornetzer, ICT for Health Program Coordinator, and William Avilés, Director of Informatics for the SSI-Nicaragua team, spoke about SSI at the University of California, Berkeley's Center for Global Health (Berkeley, CA) in September, about our ICT for Health Program at the first Central American Open Source Software conference (Estelí, Nicaragua), at a CDC-hosted OpenMRS meeting (Guatemala City, Guatemala) in June, at the OpenROSA meeting for mobile technologies for health (Dar es Salaam, Tanzania) in July, and at the 1st Annual Latin American Open Source Health Informatics meeting (Lima, Perú) in October.

In 2009, articles about our work were published in: *Emerging Infectious Diseases* in March ("Prevalence and seasonality of influenza-like illness in a pediatric cohort in Nicaragua"), *PLoS Biology* in July ("From construction workers to architects: Developing scientific research capacity in low-income countries"), *American Journal of Epidemiology* in July ("The Nicaraguan Pediatric Dengue Cohort Study: Study design, methods, use of information technology, and extension to other infectious diseases"), *American Journal of Tropical Medicine and Hygiene* in August ("Improvement in hospital indicators after changes in dengue case management in Nicaragua"), and *PLoS Medicine* in October ("Molecular Genomic Approaches to Infectious Diseases in Resource-Limited Settings"). Finally, an article titled "Trends in patterns of dengue transmission over four years of a pediatric cohort study in Nicaragua" is in press in the *Journal of Infectious Diseases.*

In addition, SSI was nominated for a Gates Global Health Award by the School of Public Health at the University of California, Berkeley and a Carlos Slim Award in Health that recognizes outstanding people and institutions committed to improving the health of the Latin American and Caribbean population.

OPEN ACCESS Freely available online PLoS BIOLOGY

Community Page

From Construction Workers to Architects: Developing Scientific Research Capacity in Low-Income Countries

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Just a dozen years ago, the largest problem in tackling diseases that disproportionately affect the global South was the lack of resources available to identify and combat them. Now, as a result of the extraordinary rise in philanthropy and public giving, more funds than ever before are being directed toward pressing health issues that ravage the world's poor. However, several factors may prevent this "bubble" of generosity from realizing major improvements in global health. Not only are substantial amounts of aid being diverted from their ultimate goals by bureaucratic barriers and corruption [1], but most funds come with strings attached and must be spent according to donors' priorities, politics, and values. Many projects are planned, managed, and implemented in large part from the "North" with cooperation of local personnel and agencies. Because these projects pursue largely donor-driven agendas, they tend to reflect the donors' interests rather than those of the recipients, with two major consequences—investments in local health infrastructure and capacity building are not prioritized, and diseases and issues that are the focus of a temporary spotlight often garner the most attention and funds.

The large amounts of funds pouring into poor countries to target a few specific diseases have left programs that address traditional health indicators—such as maternal and child health and vaccination coverage—underfunded and understaffed [2], leading to a severe deterioration in overall health capacities despite increased funding. Moreover, not many global health programs include a serious investment in developing local capacity. There are relatively few examples where local infrastructure and talent are strengthened as a primary objective of the programs. Community-based organizations that train and support teachers and health care workers and offer microfinance programs to help communities meet their own needs should be highlighted (http://www.heac.net).

Research is a major driver of social and technological innovation that can lead to health and equity improvements through a knowledge-to-action process. Recognizing the need for building research capacity, health, science, and technology ministers and delegations from 60 countries attended the Global Ministerial Forum on Research for Health in Bamako, Mali in November 2008 (http://www.bamako2008.org) and drafted the Bamako Call to Action, which included a paradigm shift in global health policy. The countries agreed that at least 2% of national expenditures in health and at least 5% of development aid for the health sector would be committed to strengthening research and research capacity. The document reflects a new level of attention and a firm commitment to working with development agencies to ensure that funds are used for comprehensive health system and health research strengthening and not only for isolated projects, in keeping with the 10-year-old statement by the World Health Organization (WHO) Global Forum for Health Research that "strengthening research capacity in developing countries is one of the most effective and sustainable ways of advancing health and development in these countries and of helping correct the 10/90 Gap in health research"—referring to the fact that only 10% of health research funds are applied to the health problems of 90% of the world's population (http://www.globalforumhealth.org) [3]. How then to build research capacity in the developing world? As highlighted by an African participant at the Bamako conference, "It needs political commitment, national research strategies, budget lines, skills development, people asking nationally relevant questions, the capacity for countries to generate their own knowledge, the ability to use external knowledge, and a culture of enquiry" [4].

The best way for wealthy countries to invest in global health is to train young researchers in low-income countries and link them to the global medical, scientific, and public health communities. Although the Fogarty International Center of the United States National Institutes of Health has been a key player in helping build the capacity of researchers abroad, having funded approximately 5,000 scientists in low- and medium-income countries by supporting local investigator-led training and research programs, much more must be done, as nearly 40,000 developing-country researchers are needed to fill the current gap (http://www.fic.nih.gov/news/publications/global_health_matters/ghmnov-dec2008.pdf). Although brain drain from low- and middle-income countries occurs as many potential scientific leaders end up in the developed world, it can be reversed by harnessing the power of the scientific diaspora [5]. If each one of the approximately 1.5 million foreign-born

The Community Page is a forum for organizations and societies to highlight their efforts to enhance the dissemination and value of scientific knowledge.

Citation: Coloma J, Harris E (2009) From Construction Workers to Architects: Developing Scientific Research Capacity in Low-Income Countries. PLoS Biol 7(7): e1000156. doi:10.1371/journal.pbio.1000156

Academic Editor: Sarah Rowland-Jones, Weatherall Institute of Molecular Medicine, United Kingdom

Published July 21, 2009

Abbreviations: EDCTP, European and Developing Countries Clinical Trials Partnership; HIT, health information technology; ICT, information and communication technologies; SSI, Sustainable Sciences Institute.

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First page of the PLoS Biology article

ICT for Health Program.....

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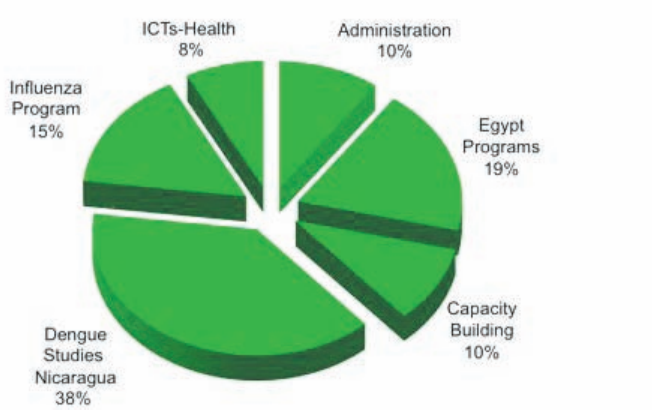
information for preventive care. In a continuing collaboration between SSI, the National Reference and Diagnostic Laboratory of the Nicaraguan Ministry of Health, the computer science department of the Universidad Centroamericana in Managua, and technical advisors from the international open source software community, we are near completion of a laboratory information management system that includes sample reception, management, processing and reporting tools that will provide a single web-based database platform with the ability to be linked to patient medical records and the National Epidemiology and Surveillance reporting system. Beyond our hands-on work with various eHealth tools in the Managua Solutions Laboratory, ICT for Health Program Coordinator, Heather Zornetzer, and Director of Informatics, William Avilés, have continued to actively engage in the eHealth community in the Americas as well as in Africa and Asia to strengthen networks of South-South connections. In an exciting development, SSI co-coordinated the 1st Latin American Open Source Health Informatics Meeting (IMeCA 2009) in Lima, Perú, on October 26-31 (see 'Capacity-Building Program Supports Scientists in Latin America'). The goals of the 1st IMeCA meeting were to create a collaborative community in the region to focus on investing in efficient, accessible, and cost-effective information and communication technologies to streamline health service delivery, improve health system efficiency, improve health outcomes and prevent diseases in limited-resource settings. Based on a very successful first gathering of participants from 11 Latin American countries, IMeCA will continue to be guided by SSI's ICT team and collaborators at Partners in Health (Boston) into 2010, when the 2nd meeting and associated workshops will be held in Central America to focus on mHealth informatics tools. We expect the ICT for Health Program at SSI to continue to engage and support the international open source health informatics community over the next year. We are thrilled to be involved in this exciting area at such a critical time in the global conversation about the value of eHealth solutions.

Board and Team Update

Our Board of Directors and team saw some changes this year. After eleven years, we said goodbye to founding Board Member Christine Rousseau. Over the years, Christine has worked on many different projects. Most recently, she co-developed and taught a workshop on bioinformatics and worked on HIV- related projects within SSI. We are grateful to Christine for her hard work and dedication and wish her all the best in her job at the Bill and Melinda Gates Foundation. We also welcomed Mohamed Abdel Mohsen to our team. A native Egyptian and Assistant Specialist at the University of California, San Francisco, Mohamed joined us as our Egypt Program Coordinator.

2009-10 Operational Budget

Total Budget: $ 1,120,000



Sustainable Sciences Institute

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And the many doctors, nurses, lab technicians, drivers and administrative assistants who participate in our work.

SSI News Editor: Mohamed Abdel-Mohsen, Marlon Buitrago, Josefina Coloma, Aubree Gordon, Eva Harris, Sonia Noboa, Kara Nygaard, Maria Elena Peñaranda, Kate Standish, Adil Ed Wakil, Martine Zoer, and Heather Zornetzer.
Thanks to all who contributed!