INNOVATIVE TECHNOLOGY SUPPORTING HEALTH EDUCATION

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MOTIVATION

- Preventive care at an early stage of child development has the potential of reducing, if not eliminating the possibility of developing chronic diseases that increase the cost of health care.
- Health education is an critical component of preventive care.
- Healthcare providers routinely offer health education.
- These educational and training materials require relatively large digital storage space and should be available using multiple computing devices.
- Sensor-based technology can now be used to measure the impact of health education on health outcome.

OBJECTIVE

- ✓ National University Community Research Institute (NUCRI) is engaged in developing myCHOIS or maternity and Child Health Obesity Informatics System as a health-IT solution to address the childhood obesity and related chronic diseases with a vision to offer it as a fully functional EHR
- ✓ Develop a grid portal to store, manage and share large amounts of distributed community health related data in a data grid for further analysis by the health researchers in a collaborative environment.
- ✓ Use of Mobile Technology to develop solutions
- ✓ Develop mobile application for collecting real-time streaming physiological data.

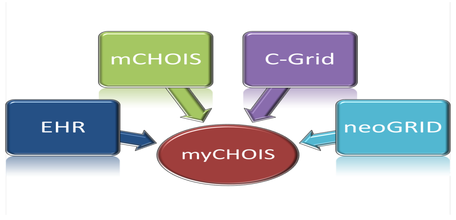

Figure 1. myCHOIS - Fully functional Electronic Health Records(EHR) supported by Cyberinfrastructure

BACKGROUND

- myCHOIS system has been developed using open source portal technology with three-tiered Open Grid Services Architecture
- Developed multiple mobile applications that can communicate with myCHOIS
- This system is now deployed for the School Health Program of the Illinois Department of Human Services (IDHS) after successful pilot testing. Its School Health Program monitors students health provided through 59 School-based Health Centers (SHCs) located throughout the State of Illinois.
- Developed and deployed a data-grid, termed C-Grid for storing and managing big data.

PROBLEM DESCRIPTION

- ✓ In 2010 alone, health related data from about 120,000 cases have been collected using myCHOIS.
- ✓ A significant number of educational events were conducted that ranged from intervention of obesity to prevention of sexually transmitted diseases.
- ✓ No tool was available to measure the impact of such health education and training.

SOLUTION

- myCHOIS as a health-IT solution
- C-Grid to store massive amounts of data
- Mobile applications to collect data at the point-of-care and real-time streaming physiological data
- A PHR system to collect personal health data

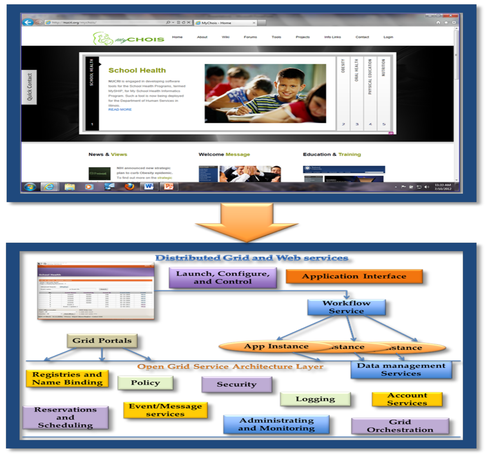

Figure 2. CI-supported myCHOIS or maternity and Child Health Obesity Informatics System

Figure 3. Client view of mCHOIS. Collecting data on BMI at the point-of care

Figure 4. Client view. Collecting data on training events at the point-of care

- The neoGRID is designed to offer a HPC-supported collaborative environment for the researchers from multidisciplinary scientific fields to gather data (such as, C-Grid and other data resources), and analyze using workflows developed by using various workflow management tools.

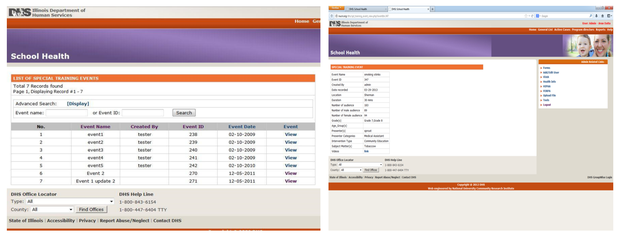

Figure 5. Data on the educational events in myCHOIS or maternity and Child Health Obesity Informatics System

C-GRID

- ✓ C-Grid, the Community Health Grid web portal, serves as a gateway for the collaborative institutions and organizations to utilize cyberinfrastructure supported XSEDE resources for data analysis and helps the users via ez-iRODS to create and manage "virtual data collection" that can be stored in heterogeneous data resources across distributed network

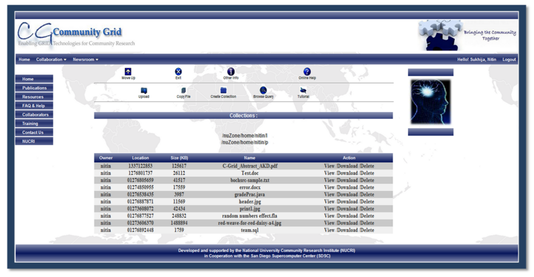

Figure 6. C-Grid or Community Grid Portal. Portal interface for viewing collections in C-Grid

- Remote management of this data grid is performed using iRODS, the Integrated Rule-Oriented Data System, which is a middleware developed by the Data Intensive Cyber Environments (DICE) research group, and collaborators

Figure 7. Health-IT infrastructure for collecting real-time streaming physiological data for patient monitoring

Figure 8. Client view. Collecting real-time streaming physiological data at the point-of care

- ✓ Android-based system has been developed. For iOS, development is in progress.
- Data collected using mobile applications can be used for health monitoring while data on educational training events can be saved for a longitudinal study.
- Video and other big data can be saved in C-Grid
- Mobile applications serve as a gateway to these two portals, myCHOIS (nucri.org/mychois) and PHR (nucri.org/healthychoices)

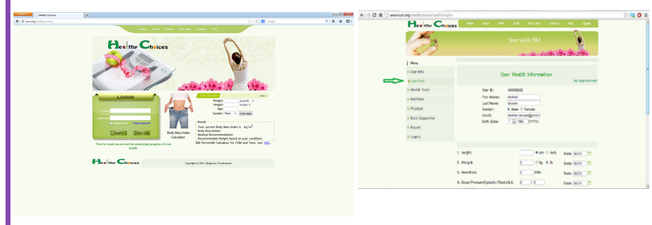

Figure 9. Health-IT infrastructure for collecting real-time streaming personal physiological data for patient monitoring

CONCLUSION

- Cyberinfrastructure-supported health-IT infrastructure has been developed and deployed for partner health organizations.
- This infrastructure aided by the mobile applications can be used for a longitudinal study to measure the impact of health education on an individual.

FUTURE WORK

In planning phase for a longitudinal study utilizing this infrastructure. This will include HIPAA and FERPA compliant surveys.

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