

## Report on Recommended Cyberinfrastructure for a Tobacco Control Informatics Grid

### *Work Plan*

The proposed effort at NCSA, under the direction of Noshir Contractor, is to prepare a report that recommends the functional and technical cyberinfrastructure specification of a Tobacco Control Informatics Grid (toBIG) that links tobacco prevention and control data with researchers, practitioners, and resources into a single system that will advance tobacco control science beyond what is possible today. The toBIG cyberinfrastructure will consist of a vast array of distributed resources—computers, data stores, data sources, visual-analytic tools, document repositories, *etc.* Tobacco control scientists must be able to access and marshal those resources to solve the cutting-edge problems in this field. The toBIG cyberenvironment should provide the tobacco control scientific community with the integrated set of end-to-end tools and services needed to coordinate the use of these resources and to analyze, visualize, and model tobacco control systems of interest. These tools and services will include scientific applications, graphical user interfaces and portals for easy interaction with the applications, and workflow and collaboration software to support complex, collaborative projects.

The envisioned cyberinfrastructure will help the tobacco control scientific community : 1) identify core data elements, redundancies, and gaps in the knowledge base; 2) monitor the magnitude, distribution, and trends in the epidemic of tobacco use behavior and the population burden tobacco-related morbidity and mortality; 3) enable the planning, design, and implementation of effective tobacco prevention and control interventions; and 4) evaluate the impact and effectiveness of these interventions on public health. The report will be developed based on three activities carried out sequentially:

- (i) in-depth interviews with thought leaders, including the Network leads, to inventory the key constituents (data, people, and computing resources) within the tobacco control community
- (ii) engagement with the tobacco science community to “story-board” use-case scenarios of scientific challenges within the tobacco control community that can not be adequately addressed by the existing technological infrastructure; the challenges could include, but are not limited to, remote experiments, data access, data analysis and visualization, creating and executing models, collaborating and networking;
- (iii) development of a web-based prototype (with non-functional interfaces) to solicit feedback from a larger cross-section of the tobacco control community on the content and layout of an end-to-end ToBIG cyberinfrastructure.

The National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign is currently one of three National Science Foundation-supported national supercomputing centers that provide critical elements of the high-end *cyberinfrastructure* (computing, data storage, networking, and visualization resources and services) supporting the nation’s scientists and engineers. It is therefore exceptionally well positioned to work with the tobacco control science community to recommend appropriate applications of the newest hardware and software, virtual prototyping, visualization, networking, and data mining tools for tobacco research. Additionally, the proposed project will leverage NCSA’s current efforts with various scientific and engineering communities to develop end-to-end cyberinfrastructure prototypes (including ultra high-speed networks, high-resolution visualization environments, and toolkits for grid computing) to enable entire communities of users with a common scientific goal to use the TobIG through a common interface.

The project will draw upon the expertise of Tom Finholt (University of Michigan) who is collaborating with the Science of Networks in Communities (SONIC) Research Group at NCSA. The day to day execution of the project will be carried out by Dr. Hank Green, a post-doctoral researcher in SONIC/NCSA.