Complementary Programs

The RBHS strategic plan will support the development of four complementary programs. These complementary programs focus on areas that, while relatively strong, are not of sufficient strength currently to have the potential to be among the best in the nation within the next five years. However, they are essential for the growth and development of RBHS as well as the success of signature and emerging programs throughout RBHS. Each is critical to the RBHS mission more broadly.

Informatics

Computational- and big data-enabled research is a vital central theme cutting across the national research and education agenda in all areas of biological, health, and life sciences, and it is critically important that RBHS specifically and Rutgers more broadly build core competency in this area. Considerable interest in this area exists across the university, which is leading this initiative. More than 60 faculty members currently receive NIH funding for research in informatics or related areas. Additional faculty members receive extramural funding from other sources to support their work in these areas.

To be internationally competitive and to ensure the success of RBHS signature programs, as well as other emerging programs, it is critical that Rutgers develop and implement a bold strategic vision for an advanced cyberinfrastructure (ACI) ecosystem. This vision must address the needs of RBHS and provide researchers with essential computing and data handling capabilities and expertise, and students with necessary exposure and training. Given the large and growing volumes and variety of data associated with each of the designated signature areas (cancer, environmental and occupational health, infection and inflammation, neuroscience, and community health and health systems), as well as the growing number of modalities that are actively gathered as part of these investigations, access to adequate computational and data analytics resources as well as related cross-disciplinary expertise is a dominating challenge for these undertakings. To continue to propel these programs forward, it is essential that Rutgers establish the requisite cyber-infrastructure, with necessary computing, storage, and networking resources and associated expertise that will allow reliable and timely processing of data and its transformation into knowledge to accelerate advances in research, educational, and clinical practices in each of the signature programs.

A strategic investment – comparable to those being made by peer institutions – is needed to drive innovation, improve research capabilities and productivity, enhance faculty competitiveness, and address limitations in existing capabilities and critical gaps. Identified gaps within RBHS and across Rutgers span four key dimensions: administrative structures for multidisciplinary research; personnel and expertise in computation and data; ACI; and student education and training in the use and assembly of big data.

Addressing ACI ecosystem needs is an important element for Rutgers' strategic plan; RBHS plans must align accordingly. Specific recommendations include:

- establishing a Rutgers-wide office for research cyberinfrastructure;
- creating a balanced ACI at Rutgers;
- recruiting faculty with systems and computational expertise and biomedical informatics expertise; and
- establishing multidisciplinary research and educational structures.

In the short term (six months), a leader for the RBHS program will be selected in collaboration with Rutgers-wide ACI strategic planning. Additional efforts in the first six months will include a focus on understanding ACI (computer, data, communication, expertise, education/training) requirements and priorities from the stakeholders across Rutgers. This will be accomplished, in part, with the organization

of a one-time workshop for all investigators either utilizing or planning to utilize big data in their research. The intent would be to share information, including successes and failures, establish lines of communication across Rutgers, and create opportunities for collaboration and the development of grant proposals in support of the RBHS signature programs. Finally, existing best practices should also be investigated and important features adopted for use at Rutgers. These efforts should align with the ongoing Rutgers-wide ACI strategic planning efforts.

In the near or intermediate term (one to three years), activities should include establishing key structures for research and education that can support multidisciplinary computational and data-enabled science, as well as deploying the ACI core that can support immediate research/education needs. An overarching Rutgers-wide coordination and management structure in the form of the Office of Research Cyberinfrastructure should be established. *Over the longer term (three to five years)*, mechanisms for ensuring sustained investments in ACI and its seamless integration into all aspects of research and education within RBHS and across Rutgers should be developed. Mechanisms for oversight and adaptation/correction should also be established.

The overarching metric of ACI success will be its ability to effectively support the research and education mission within RBHS and across Rutgers. Specifically the metric should address the following questions:

- Does the ACI provide the appropriate capabilities for enabling transformative research and innovation?
- How effectively does it support education and training?
- How effectively and easily can users (researchers, educators, students, practitioners, etc.) use the ACI as a research and training platform?
- How does ACI allow research to be competitive with peers?

The metric will leverage more standard analytical tools such as user and usage measures, publications and citations, and grant funding.