

Melbourne Health accelerates cancer research through collaboration and IBM Information on Demand.

Overview

■ Challenge

Compare individual treatment plans to improve overall patient outcomes

■ Solution

An informatics model that integrates data across heterogeneous sources to drive collaboration among organizations and expansion to new research areas

■ Key Benefits

Won 17 million AUD in project grants; won 2.2 million AUD in research grants; drove significant new insights into the diagnosis and treatment of illnesses; increased statistical accuracy of research through a four-fold increase in sample sizes



Can genetic biomarkers give insight into a patient's response to a particular drug? Do colorectal cancer patients with diabetes have a higher rate of recurrence? What is the best treatment plan for post-surgical cancer patients?

As medical researchers explore issues like these, they face significant obstacles as the data they need is often spread across scores of disparate databases. However, through an innovative informatics management initiative, Melbourne Health, a major public health provider in Victoria, Australia, is fast overcoming this challenge to help researchers transform research and care practices.

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– Marianne Hibbert, Ph.D., Project Director, BioGrid Australia

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—Robert Merriel, Director, Business Development, Melbourne Health

Melbourne Health delivers comprehensive acute, sub-acute and community-based health care programs as well as internationally recognized research and education. The organization serves a population of nearly 1 million people in Melbourne’s northern and western metropolitan region and provides specialist services to all Victorians.

“One of our goals is to foster research that enhances patient care, challenges clinical practice and promotes innovative health service delivery,” explains Marianne Hibbert, Ph.D., Project Director, BioGrid Australia, a national molecular medicine informatics initiative. “To do so, we help our clinicians make better use of data.”

Previously, each time physicians launched a new study, they created a new database. With information maintained in discrete silos within each facility, there was no way for clinicians to easily correlate data across multiple different studies. This made it difficult to assess outcomes for different treatment protocols or analyze how multiple illnesses may affect patients.

Additionally, because individual physicians only followed a limited number of patients—usually less than 250 people—it was difficult for researchers to obtain the level of statistical power required to validate study results.

Providing researchers with relevant information at their fingertips

To help clinicians derive greater value from existing data, Melbourne Health led a collaboration of medical research organizations to launch BioGrid Australia. This award-winning program, which has gained the organization more than 17 million AUD in project grants, enables clinical researchers to access data from disparate databases across multiple disease types at multiple institutions.

Data from more than 80,000 patients and 25 million records from up to 25 years of research is now available to authorized clinicians. The data is located in a virtual repository that can be linked with publically available research and genetic profiling data.

As a result, researchers can correlate information from a variety of sources—population-based health records, clinical research, disease sub-specialties, gene expression, protein expression and genotypes—to gain greater insight into the efficacy of current treatments and study how different treatments might affect different people.

To meet regulatory, privacy and ethics standards, any data that can identify a patient is removed, and researchers must undergo a rigorous approval process prior to receiving access to the system.

Achieving greater accuracy and insight

The BioGrid project has enabled staff to increase the sample size of research studies—from less than 250 patients to more than 1,000 patients—and thus increase the statistical power of findings. This is driving significant new insights.

For example, one study published by Melbourne Health physicians in *Cancer Epidemiology* showed that colorectal cancer patients with diabetes were 1.5 times more likely to experience a recurrence of cancer at a different site in the colon than non-diabetes patients.

“Our researchers can stratify collaborative research data in a way that was impossible before,” says Robert Merriel, Director, Business Development, Melbourne Health. “We’ve obtained 2.2 million AUD in research grants from Australian health organizations as a result and published numerous articles that wouldn’t have been possible before.”

A secure platform for integrating information

To achieve this success, Melbourne Health called on IBM Global Business Services to design an information model that would:

- *Support a large amount of data including genetic images, biospecimen data and clinical data.*
- *Enable the integration of data across a heterogeneous environment that included a variety of databases, such as IBM DB2, Microsoft® SQL Server and Oracle 9i.*
- *Ensure the adherence to ethics, privacy and regulatory standards.*
- *Support the intellectual property rights of each facility.*

Technology solutions from five vendors were evaluated and IBM Information Management solutions were ultimately selected.

Key Components

Software

- IBM Information Server
 - IBM WebSphere® Federation Server
 - IBM WebSphere DataStage
 - IBM WebSphere Business Glossary
- IBM DB2® Warehouse
- IBM DB2 Query Patroller
- IBM Rational® Data Architect

Servers

- IBM System x™

Services

- IBM Global Business Services
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IBM Information Server—including IBM WebSphere DataStage, IBM WebSphere Federation Server and IBM WebSphere Business Glossary—provides the core toolset to help Melbourne Health integrate information through the BioGrid project.

For example, DataStage enables the collection, integration and transformation of Melbourne Health’s disparate data into a single research repository at its own facility. Other institutions participating in the BioGrid project may use IBM DB2 Warehouse or other tools to perform these tasks. The consolidated repositories enable each BioGrid site facility to maintain ownership and control of the data. To maintain patient privacy, only clinical and research data held in the repository at each facility is allowed to be federated. Any information that could identify a specific patient is omitted.

WebSphere Federation Server, running on an IBM System x platform, provides authorized researchers with virtualized access to these local research repositories as if they were a single source. Approximately 2,000 research queries are processed each month through the WebSphere Federation Server engine.

WebSphere Business Glossary enables the understanding of BioGrid data for community collaboration by allowing staff to create, manage and share information about the types of research and data that is available with researchers worldwide. Researchers can browse the categories of data available by description and understand the technical composition of those structures.

A significant amount of data describing more than 25 databases, 1,000 tables and 10,000 business terms are managed by WebSphere Business Glossary.

Currently two administrators are responsible for the glossary, in addition to the project director. The annotations are supplied by the six BioGrid data managers in consultation with the data owners. In the near future, the organization plans to train data owners to annotate their glossary terms online.

“With WebSphere Business Glossary, we can advertise the type of research data we have without having to share any of the data,” says Merriel. “Already, nearly 1,000 searches are conducted each month through this system.”

IBM DB2 Query Patroller helps staff track queries for regulatory and governance requirements. The software also enables database administrators to monitor the types of requests researchers input and place a query on hold if it will slow the system.

Finally, IBM Rational Data Architect enables database administrators to quickly replicate database structures when needed so that researchers can begin their studies without unnecessary delays.

“Fundamental to the BioGrid project is that each health facility can continue to use the database technology, database design and server platforms of its choice,” explains Merriel. “IBM software tools, such as IBM Information Server and Rational Data Architect, give us the flexibility to deliver on this promise.”

A new era of understanding

At Melbourne Health, improving the flow of information among clinicians and researchers will ultimately usher in a new era in the diagnosis and treatment of illnesses. Case in point: Melbourne Health clinical researchers leveraged data in BioGrid to develop a tool that would help clinicians select the best drug regimen for epilepsy patients. The tool has been so successful that the organization has patented it and is now working with a molecular diagnostic company to sell the product commercially to other health centers.

“With the BioGrid project and IBM Information Management solutions, we’re in a better position to translate research findings into clinical practice,” concludes Hibbert.

For more information

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For more information on Melbourne

Health visit:

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Software Group
Route 100
Somers, NY 10589
U.S.A.

Produced in the United States of America
03-08

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