

CANADIAN Healthcare Technology

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Partners HealthCare builds 'next generation' EMPI

New system permits fast changes and additions to be made, and offers a deeper level of detail.

BY STEVE FLAMMINI

BOSTON – Agility really matters in the current healthcare environment, where systems need to be deployed quickly, to an ever-increasing number of organizations. Partners Healthcare Systems, Inc. (PHS) recognized that its 10-year-old Enterprise Master Patient Index (EMPI) application couldn't provide the scalability and flexibility needed to manage more than three million patient identities across a growing number of business units.

As a result, PHS decided to create an application that would provide the flexibility and manageability needed to support clinical systems initiatives throughout a constantly growing Integrated Delivery Network (IDN). One year after the new EMPI system was rolled out, the decision to build it in-house on the CACHÉ post-relational database from InterSystems Corporation has proven to be a sound one. Processing more than 100,000 transactions daily, the EMPI application runs 24x7 and delivers the high levels of scalability and performance demanded by an IDN that is expanding throughout the state of Massachusetts.

Boston-based Partners HealthCare (www.partners.org) is an integrated

health system founded by Brigham and Women's Hospital and Massachusetts General Hospital in 1994. In addition to its two academic medical centers, the Partners system also includes community hospitals, specialty hospitals, community health centers, a physician network, home health and long-term care services, and other health-related entities. Partners is one of the nation's leading biomedical research organizations and a principal teaching affiliate of Harvard Medical

School. Partners HealthCare is a non-profit organization.

Multiple Drivers Behind EMPI Development Decision: The capabilities to support high scale and high transaction volumes were critical design criteria, but they were not the only reason for our approach to constructing the EMPI on the CACHÉ platform. There was also the requirement to provide high levels of customization and responsiveness in a rapidly changing business climate. This enterprise development approach relies on developing agile software applications with reusable components.

Partners' technical and administrative staff had a decade's worth of history with a commercial legacy EMPI, and had gained a clear understanding of how limitations with that system hampered their productivity. The development team took all of the lessons learned over the life of that system, identified all of the new capabilities desired, and the results were the specifications for a new "dream system".

CACHÉ has enjoyed a long, successful history at PHS and its various institutions, and it was clear that the technology relied upon so heavily in its advanced clinical systems would be an ideal fit for a next generation EMPI.

While PHS recognized that regional and national initiatives could ultimately hold some promise in



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providing patient identity and matching services, it understood that a robust enterprise-class solution would be essential to its continued success, even as it will continue to monitor these initiatives.

From Concept to Reality: A team of four full-time employees were dedicated to building the new EMPI application. Consultants were recruited on an as-needed basis, and commercial software components were integrated with the system, when appropriate. For example, Initiate software from Initiate Systems, Inc. was selected for its Patient ID matching algorithms, and Business Objects' Crystal Reports is used for customized reporting.

The system went live in 3Q05 and has eliminated many pain points associated with the legacy application, while also providing the functionality needed as Partners continues its push to deploy advanced clinical systems.

The pace of that growth illustrates one reason why a new system was an absolute necessity. In late 2003, when the new system was initially conceived, EMPI daily transaction volume was about 40,000 transactions. Currently, the system is processing more than 100,000 transactions each day, and growth continues as new physician offices, clinical practices and hospitals use the systems at PHS to help provide patient care.

Delivering Major Operational Benefits: Applying the lessons learned over more than 10 years of administering an EMPI at an IDN, the development team built an application that has greatly simplified the customization process, resulting in a much higher level of responsiveness to the organization.

With the legacy system, for example, it was necessary to maintain a shadow database, optimized for patient lookup in sup-

port of clinical systems. As a result, enhancements such as adding new data elements had to be done twice. In addition, customizations had often been so cumbersome that it proved necessary to call in the database vendor to implement custom fixes. It was often time-consuming and costly to make basic changes to the system. The design of the new EMPI system, in contrast, makes it easy to manage processes such as adding information

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from a new provider site – a necessity for an IDN that is growing constantly.

Based on experience with the previous EMPI application, the team also focused on providing a level of detailed information that enables EMPI coordinators to ensure higher levels of accuracy in patient identification and to drill down to data to create new reports to meet fast-changing information requirements.

Demographics were only accessible at a very high level with the legacy system. If, for example, a researcher wanted to know how many patients had been to multiple sites within the IDN, it was possible to get a total count of those patients, but there was no way to find out whether the patient visits had happened two decades ago or just yesterday. Now, researchers can easily learn when and why the patient visited a provider site, which makes it possible to analyze the reasons for a patient traveling to multiple providers for healthcare delivery. And, the reports generated by the new

system are provided online, eliminating the paperwork burden that typically surrounds EMPI operations.

Another major impact on the day-to-day work of the EMPI coordinators is that the new system makes it easy to tune matching algorithms to provide maximum accuracy in the critical patient identification process. When matching patient IDs at pediatric sites, for example, it can be a major challenge to be certain that enough data (name, gender, date of birth, phone number, etc.) is available to avoid false matches for siblings while also minimizing the need to manually examine patient records to ensure accurate patient identification.

With the massive amount of information flowing into the EMPI application from dozens of sites, analysis of changing data patterns is ongoing. Based on that analysis, information thresholds can be appropriately adjusted so that challenges such as those involved with sibling identification can be successfully addressed.

Benefits While enhancements are planned for the future, the EMPI system is already viewed by end-users as an unqualified success. The technology investment was significant. Capital and operating costs, including all personnel costs and purchases of packaged software components, are estimated at \$1.5 million. However, the CACHÉ-based EMPI application has provided major benefits, including fast time-to-delivery for critical patient identification, the high performance and flexibility needed to extend across our IDN, and the agility needed to position Partners for evolution in access to national and regional identity repositories.

Most important, the EMPI system will support continued improvements in information accuracy and in the quality of care delivery.

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