

dbMotion Case Study

Clalit Health Services | Rambam Medical Center | Sheba Medical Center HIE

Clalit Health Services Revolutionizes Patient Care with the Proven dbMotion™ Solution for a National-Scale Electronic Health Record (EHR)

Since 1999, Clalit Health Services, one of the world's largest healthcare organizations, has led the way in successfully developing a large-scale, cross-enterprise health information exchange (HIE). Clalit's HIE facilitates proactive, preventive care throughout the continuum of care and enables the application of sophisticated quality measures, while adhering to strict international privacy and security standards.

Scope Includes Major Governmental Hospitals

Clalit's national-scale system encompasses 16 hospitals (8100+ beds), 1300+ primary and specialty clinics, and 400 pharmacies. Over 70% of the Israeli population is served by the Clalit Health Services HIE. This groundbreaking initiative integrates two of Israel's largest independent governmental hospitals into the HIE – the 1000-bed Rambam Medical Center and the 1700-bed Sheba Medical Center. As such, Clalit's innovative application of technology and pioneering approach is being considered to be the "backbone" for implementing a nationwide healthcare information technology strategy.

Early Adopters of Technology and Policy

The Clalit/Rambam/Sheba health information exchange's (HIE) success demonstrates that implementing an HIE is a realistic goal – with the right technology, project, policies, and procedures. Clalit chose the dbMotion Solution, a function-rich service oriented architecture platform for health interoperability and intelligence. The solution addresses scalability, complexity, information ownership, security, and privacy – requirements that are inherent when working with a diverse array of healthcare organizations, regulations, and systems.

Key Project Successes

Critical to this implementation was the involvement of the teams from each healthcare provider: key stakeholders that were critical to caregiver buy-in and subsequent adoption, and user teams that defined the HIE's technical, clinical, and business objectives. Incremental implementation of this federated solution required minimal change management, did not disrupt existing clinical workflow and systems, and accelerated affiliate facility implementation.

Major Patient Care Advantages

The benefits to patients in terms of coordinated, comprehensive care across the continuum, faster and more accurate diagnoses, and shortened care cycles, as well as the improvements for physicians, have placed Clalit in a league of its own in terms of quality and efficiency of care.

“With 70% of the national population being cared for using the Clalit dbMotion Solution, this implementation exceeded our expectations for a national-scale HIE.”

*Orna Blondheim MD, CEO, Emek Medical Center,
A Clalit Health Services facility*

Clalit at a Glance

The Challenge

- Provide integrated care for millions of patients with no integrated patient information across the care continuum
- Caregiver and patient time wasted searching for information
- Proactive and preventative care limited due to lack of information
- 25+ disparate systems

The Solution

- dbMotion-based EHR operational in all Clalit primary care clinics and hospitals throughout the country and 2 independent government hospitals since 2004
- Integrates data from 16 hospitals (8100+ beds), 1300+ clinics, and 400 pharmacies
- Used by over 15,000 caregivers
- Federated approach that leverages existing systems and structures
- Timely, secure, patient-centric medical information provided to authorized caregivers at encounter site
- Scalable, flexible infrastructure

Outcomes

- Faster and more accurate diagnoses
- Reduction in medical errors
- Decline in duplicate testing and unnecessary procedures
- Shortened care cycles/reduced 1-day admissions
- Increased patient safety
- Enhanced care follow-up and management
- Better communication between caregivers
- More patient-facing time
- Improved ability to identify patient health trends
- Enhanced emergency response capabilities
- More proactive and preventative care

About Clalit Health Services

- One of the world's largest HMOs
- Annual budget \$5 billion
- Non-governmental and not-for-profit
- 27 million annual family practice visits
- 8.5 million annual specialist referrals
- 680,000 hospitalizations/5 million outpatient visits
- 35,000 employees/9,000 doctors

About the Clalit/Rambam/Sheba HIE

- Cares for over 70% of Israel's population
- Supports over 5 million patients
- Joint private and governmental initiative
- Rambam and Sheba implemented in 4-6 months
- One million transactions per month

The Challenge: Improving Network-Wide Patient Care by Leveraging Cross-Facility Patient Information

In 1999, Clalit Health Services, Israel's largest healthcare organization, and a national provider, envisioned a progressive care approach that would transform care for patients and caregivers. The objective was to provide caregivers, regardless of their location, access to all cross-enterprise patient information, both hospital and community care based. Caregivers were spending an inordinate amount of time tracking down essential patient information; at times, making decisions without all relevant information at the point of care. Clalit wanted to position caregivers to provide optimal care, to proactively and preventively treat patients as well as remove the burden from the patient of being the care facilitator, decision trigger, and postal carrier.

To accomplish these goals, Clalit needed to implement a comprehensive electronic health record that could integrate patient care data from 25 heterogeneous technologies and legacy systems, including systems outside the healthcare enterprise. Clalit and its partner government hospitals, which now serve over 5 million patients across 16 hospitals, 1300+ community clinics, and 400 pharmacies, established a number of key objectives for the initiative:

- A **minimal data set** of all basic medical information, defined by caregivers, that would be viewable on one screen, to immediately prompt the care cycle
- **Drill-down ability** into detailed data for rapid diagnosis, saving time within the "window of care"
- A **decentralized structure** in which all information remains in originating systems in existing formats, eliminating the need for both a central database and the replacement of existing disparate operational systems
- **Patient-centric and "virtual" patient information**, generated for specific caregiver view, but disappearing following the query
- Strict **security and privacy** adhering to Israeli privacy laws and international security compliance standards, such as HIPAA and HL7
- **Performance** that meets strict minimum time requirements for data collection and display
- **Scalability, flexibility, and robustness** that would easily accommodate user, site, and operational growth, with a high degree of user flexibility
- **No single point of failure** to ensure reliability
- **Ease and speed of implementation**
- **Minimal caregiver training and minimum support staff**



The Solution: An Electronic Health Record on a National Scale

Using the dbMotion™ Solution, a platform for health interoperability and intelligence, Clalit implemented an innovative, state-of-the-art clinical data exchange. The solution accomplished the mission of providing full patient medical information at every point of care in real time – from all Clalit facilities. The EHR is a fully integrated, structured record, not just a collection of medical facts or a re-creation of the paper chart.

The system sources information from the 25 core Clalit systems, such as registration, laboratory, and pharmacy, but did not require changes to these source systems and structures. Because the solution maintained the integrity of the source information and avoided expensive and time-consuming system replacement, it facilitated buy-in and acceptance of information sharing.

System Use

The HIE serves over 15,000 caregivers. The workflow-integrated, intuitive user interface, developed in conjunction with user teams, has allowed painless and easy adoption of the system with minimal need for formal training. This use is mirrored throughout all healthcare facilities – acute and community care.

Subject to strict permissions and privacy authorizations, the system enables Clalit to coordinate care between treatment professionals without disrupting the continuum of care. The longitudinal electronic health record is part of Clalit's routine provision of care. It accompanies the patient throughout his/her life, in any Clalit-affiliated facility.

“The Clalit HIE provides comprehensive, cross-enterprise patient information at any point of care and at any time, which helps ensure better healthcare at every point of care.”

*Yehiel Gepner, Chief Information Officer
Clalit Health Services*

If You Build It...

What started out as a Clalit initiative quickly expanded beyond Clalit's planned scope. Rambam Medical Center, a 1000-bed government hospital in northern Israel, and Sheba Medical Center, a 1900-bed tertiary-care facility in the central part of the country, were compelled by the benefits the Clalit network offered their patients and caregivers. These medical centers joined the network, providing a more robust information platform for patient care.

Effective Project Structure

In addition to serving as a reference system for other countries to establish this nation-wide HIE project is an international benchmark for a successful implementation. Key executive stakeholders, serving as the steering committee, were actively involved and committed to the project. The Clalit Chief Medical Officer played a pivotal leadership role. User teams from across the medical disciplines, including primary caregivers and community clinics, were established to define functionality and promote facility adoption. The legal and medical ethics committees defined strict rules for cross-enterprise information access, security, privacy, and access monitoring.

The effectiveness of the project along with dbMotion's scalability and flexibility enabled Rambam and Sheba to integrate their data with the EHR within 4 to 6 months.



The Technical Solution

The Clalit-dbMotion web-based, service oriented architecture (SOA) features federated dbMotion “nodes” connected to Clalit’s clinical and demographic best-of-breed systems. Queries are performed asynchronously in real-time across the entire set of local repositories. Responses are integrated and presented to the caregiver on-demand, as a unified, integrated patient record.

This process happens within three seconds; the record is displayed for viewing only and “evaporates” afterwards, therefore referred to as the “virtual patient record.” This approach ensures that the patient medical information viewed is the most up-to-date.

In the federated architecture every entity participating in a network individually manages its security policy, vocabularies, data policy, and other parameters. Data exchange between network participants is based on individual agreements as to what information is exchanged and how. All the information in the network remains under its original ownership, which addresses legal and political issues that often arise during the establishment of an interoperability network and EHR.

With over 4.5 million transactions per month between hospital and community users, comprehensive patient information includes:

- Hospitalization
- Diagnosis
- Outpatient visits
- Clinic visits
- Medication
- Laboratory results
- Imaging
- Pathology reports
- Procedures
- Surgery
- Emergency encounters
- Sensitivities/Allergies
- Main complaints
- GP encounters
- Blood pressure
- Planned discharge
- Messaging

The security approach complies firmly with the legal and ethical guidelines set out by the providers and oversight agencies. A strict authentication framework is used. Security authorization is defined based both on caregiver role and access rules, ensuring that only approved information is transferred to the caregiver. Silent login is used to consolidate and simplify access.

A full tracking log monitors and reports all transactions for administrative management. Clalit earned ISO 17799 certification for best practices in information security management.

Outcomes: Quality, Proactive and Preventive Care

The HIE has proven to be very successful in providing integrated medical information directly to the caregiver at the point of care. Clalit has extensively streamlined its healthcare practices and provided significant clinical and business benefits through the availability of a cross-enterprise medical record. These benefits are shared by Clalit’s partners, Rambam and Sheba Medical Centers.

With over 70% of the population served by the Clalit/Rambam/Sheba national-scale health information exchange, the success serves as an example for healthcare policy makers and information technology organizations for national EHR adoption.

Patient Care Results

Clalit and its partner organizations have achieved new levels of performance in terms of patient care, efficiency, and other measurable benefits, including:

- Faster and more accurate diagnoses
- Reduction in duplicate testing/procedures
- Shorter care cycles
- Dramatic improvement in caregiver-patient dialogue
- Increased patient safety
- Easy access to critical medical history – i.e. allergies, medications, hospitalizations, etc. for timely and effective decision-making
- Ease of follow-up and management of the care process
- Better communication between caregivers
- More patient-facing time and less time chasing paper
- The ability to identify patient health trends, including abnormal behavior, health risks, and inefficient use of medical services
- Enhanced emergency response capabilities
- Improvements in providing proactive and preventive care

Quality Management

The system has enabled the wide use of medical protocols and medical quality *key performance indicators* (KPIs), including monitoring populations requiring future medical action and/or intervention by both doctors and clinics. KPIs have been applied in all aspects of healthcare delivery management, including: billing, customer satisfaction, chronic illness monitoring, logistics, appointments, and prescriptions. In addition, the system has facilitated discharge planning from the Clalit/Rambam/Sheba hospitals to Clalit primary care community clinics.

Proactive Case Management

In the patient-centric continuum of care, patient transitions between clinic and hospital settings are managed more closely. For example, real-time reports for community-based physicians of their currently hospitalized patients (inpatient or emergency) and patients with current outpatient appointments are presented via the EHR. Physicians are encouraged to communicate with the hospital staff for proactive and preventive medical care as well as effective case management using the system messaging feature. When the patient is discharged and returned to the care of the community clinic, the physician can access hospitalization results for seamless transition to ambulatory care.

The Clalit/Rambam/Sheba HIE leverages innovative, progressive technology to support emerging requirements in a demanding healthcare environment.

What's Next: Strategic Expansion

Clalit's goals are to continue to expand the system into a broader nation-wide network. Initiatives include:

- Integrating additional governmental and private hospitals into the HIE
- Continuing to support a comprehensive longitudinal patient record
- Adding more medical data sources and specialized integrated clinical views
- Continuing to leverage the EHR to meet the continuously growing demands for advanced healthcare provision
- Creating new applications and services, such as smart messaging and alerts, to meet the enterprise's evolving needs and pursuit of medical excellence
- Upgrading to semantic interoperability to transform and harmonize data for advanced decision-making
- Implementing technological advances for patient control of, and access to, medical information



About dbMotion

dbMotion is an innovative provider of health interoperability and intelligence solutions. It develops and markets the dbMotion™ Solution, a proven SOA-based platform that enables healthcare organizations and health information exchanges (HIEs) to meaningfully integrate and leverage their information assets, driving improvements in the quality, safety and efficiency of patient care. This approach transforms care through the creation of a virtual patient record by logically connecting a group of care providers and organizations without requiring the replacement of existing information systems. By providing ubiquitous access to integrated patient information the solution connects care settings and bridges gaps that often exist between inpatient/acute care and community care, empowering clinicians and demonstrating a compelling return on investment (ROI). This robust solution is field-proven having been implemented in some of the world's most demanding healthcare IT environments since 2001.