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Improving Health Outcomes and Reducing Costs with Video Conferencing Technology

With populations aging and chronic disease increasing worldwide, healthcare systems everywhere are grappling with how best to deliver high-quality care and manage costs. In Israel, studies conducted by Maccabi Healthcare Services, the nation's second largest HMO, revealed a close link between frequency of care delivery and health outcomes in patients with chronic conditions. Prompted by these results, Maccabi, in conjunction with the Gertner Institute, established the MOMA Video Conferencing Call Center for Chronic Conditions in July 2012. MOMA represents a new, technology-based service delivery model designed to minimize the number of hospitalizations and visits to specialty clinics by chronically ill patients. Based on an integrated, Electronic Medical Record (EMR)-centered, Health Information Technology (HIT) system, with a high level of connectivity among providers, patients and insurers, MOMA enhances the quality of care delivered, while reducing the cost of delivery. In its first full year of operation, this coordinated care solution resulted in savings of almost $888,000 or 4% relative to the overall Maccabi population.

Challenges

Reduce travel. Chronically ill and elderly patients are more likely to adhere to their care plans when in frequent contact with care providers, but these populations often find travel to clinics difficult.

Improve outcomes. Delivering care remotely, rather than requiring patients to visit a clinic every time help is needed, dramatically improves patients' quality of life by reducing wear and tear and saving time.

Reduce costs. Delivering frequent, in person, face-to-face care is neither feasible, nor cost effective. To contain costs, a technology-assisted method of care delivery is needed.

Solutions

Take the care to the patient. Through its integrated, coordinated care system, MOMA cost-effectively delivers remote care to patients where they are, when they need it.

Increase clinician/patient interaction. Adding video conferencing to the MOMA Call Center infrastructure increased the Center's cohort of patients to include those who can be treated effectively only through visual means (around 20% of chronically ill patients, such as diabetics, chronic heart failure (CHF) and stoma patients).

"The fundamental concept is to provide the patient with care where they are and when they need it. The goal is to take the care to the patient, rather than requiring the patient to come to us."

– Angela Irony
Director of MOMA,
Maccabi Health Services

During the two year period from 2011 to 2013, costs for patients in MOMA increased by just 8% compared to a 12% cost increase within the general Maccabi population

Impact

Improved clinical outcomes. An October 2013 evaluation of MOMA showed significant improvements in patient well-being. Patients reporting depression dropped from 24% before MOMA to 15% following MOMA intervention; the average number of days per week that patients maintained a healthy diet rose from 4.5 to 5.5; and 20% of patients who smoked quit with the support of MOMA. Diabetic patients showed an average Hba1c of 8.3 as opposed to a value of 8.7 in those patients outside of MOMA.

Reduction in hospitalization. In MOMA's first eighteen months of operation, the rate of hospitalization for members with CHF decreased by 4%. For those who were hospitalized, average length of stay declined by 33%.

Controlled costs. During the two year period from 2011 to 2013, costs for patients in MOMA populations (which are elderly and frail) increased by just 8% compared to a 12% cost increase within the general Maccabi population (which also includes young and healthy).

A Context for Change

Like most international healthcare systems, Israel's system is challenged by increasing costs and a growing shortage of practitioners. Low care plan compliance rates, particularly among elderly and/or chronically ill patients, and a lack of uniformity in treatment among practitioners contribute to the rise in costs in the form of recurring and unnecessary visits to hospitals and specialists.

At Maccabi, the elderly population (above 65 years of age) represents 26.3% of total direct costs but only 7.1% of the total HMO population.[1] Many of Maccabi's elderly patients are homebound, making travel to see specialists difficult. Other chronically ill patients, such as diabetics, are often of working age and are unwilling or unable to disrupt their daily schedules for clinic visits.

About Maccabi

Originally established in 1941 as an independent, mutual, not-for-profit health insurance fund, Maccabi Healthcare Services became an insurance contractor and provider of healthcare following the passage of the Israeli National Health Insurance Law in 1995. The organization pioneered connected care in Israel, investing early in technology that provides its members and physicians with a comprehensive, fully computerized health system. Maccabi's integrated system incorporates all elements of a patient's health record:

- ID numbers and demographic information for each member

- Physician visits including diagnoses and treatments

- Medication, prescriptions and purchases made at Maccabi pharmacies and 700 private pharmacies

- Diagnostic procedures and results: laboratory, pathology, genetic lab

- Visits to expert consultation clinics and paramedical centers

- Visits to outpatient hospital clinics

- Hospitalization

- Visits and treatment by support and paramedical services such as physiotherapy and occupational therapy

Since 1984, Maccabi has proactively invested in the development and maintenance of its Information and Communication Technologies (ICT) system. In partnership with physicians and a foundation of technology investments, Maccabi currently delivers a coordinated care solution to over 2 million members (25% of the Israeli market) and has an annual income of $2.6 billion USD.

Independent contracted providers, comprised mainly of 4,000 primary care physicians and specialists, provide most services. Physician-provided care is supplemented by 300 senior consultants, who are hospital department heads, 250 diagnostic institutes, 700 private pharmacies and both public and private hospitals. These contracted services are complemented by over 600 salaried physicians and Maccabi-owned services including a centralized laboratory system, a tele-radiology system, telemedicine services (both diagnostic and care delivery), specialty clinics, a chain of 53 pharmacies and a private hospital network.

When studies highlighted the close link between frequency of care delivery and health outcomes, Maccabi concluded that implementing a system of remote care delivery had the potential to both improve health outcomes and reduce costs.

Establishing the MOMA Video Conferencing Call Center

As a leader for 30 years in healthcare IT investment, Maccabi had prior experience with service delivery models based on mobile technologies, centers of excellence and call centers. Building on this knowledge, Maccabi concluded that adding a video conference center to its call center infrastructure would provide an opportunity to increase the level of clinician/patient interaction without a corresponding increase in costs. Video conferencing would make it easier for existing members to interact with clinicians regularly. In addition, having video capabilities would enable the center to add to its patient cohort those patients who could be treated effectively only through visual means. **Approximately 20% of chronically ill patients, typically diabetics, CHF or stoma patients, must be seen by clinicians to ascertain appropriate care delivery.**

The MOMA Video Conferencing Call Center opened in July 2012 with a capacity of 10,000 patients. The Center's primary goal is to deliver care to patients with diabetes (for the first three to six months to help them adjust), cardiac heart failure (CHF), chronic obstructive pulmonary diseases (COPD-respiratory) and stoma care. It also aims to help patients with chronic and complex wounds, elderly and frail homebound patients, and those requiring follow up after chemotherapy. **Currently, 20% of Center patients have either chronic wounds or diabetes – conditions that must be seen by clinicians to be treated.**

How MOMA Works

MOMA coordinates care among over 94 clinicians and 900 general practitioners (75% of all Maccabi GPs). The Center is staffed by registered nurses with a minimum of three years experience with complex chronic clients.

> MOMA provides patients with Avaya* Flare-enabled tablets, free of charge. These tablets run the Android* operating system and are based on the Intel® Atom™ processor.

A Maccabi technician delivers the tablet to the patient and sets it up to work with the patient's existing Wi-Fi and broadband communication. The tablets are locked down so they can be used only for video conferencing with MOMA. This ensures that they are easy to use.

> **Values of video support**
>
> - Overall health assessment
> - Wound inspection
> - Patient instruction with use of blood pressure cuff
> - Guidance on glucose injection

"The user interface is almost nothing," says Dr. Galit Kaufman, Director of Nursing. "Patients just need to move an icon and that's it – they're connected to the call center. It gives us a very simple solution, which was important because it can be hard for elderly people to use technology. We wanted to make it as simple as possible – flip a button and it works."

In the Call Center, the nurse uses a computer fitted with a camera. Patients who call in can choose to use video or voice only. On the screen, the nurse can see the patient and medical records at

> "The Intel technology-based tablets are very easy to work with. We came to the conclusion that this technology will be successful if it supports, not replaces, human interaction. Video conferencing is the next best thing to being there. It supports the personal nature of the interaction between the nurse and the patient, and contributes to the quality of care clinically. Having a lot of contact creates a lot of motivation."
>
> – Dr Galit Kaufman R.N.PHD
> Director, Department of Nursing Services Urgent and Online Medical Centers

the same time. Using the camera, the nurse is able to assess how healthy the patient looks, inspect wounds if necessary, offer guidance on glucose injections (for diabetics) and instruct a patient on using a blood pressure cuff.

While it is reassuring for patients to know they can get care whenever they need it, 90% of calls are initiated by the Center. The Call Center system integrates information from the electronic health record, advises nurses on which patients to call and helps to prioritize the calls. Because data is captured in a single system, nurses can see if a patient was hospitalized yesterday, for example, and can call the patient for an update.

MOMA Technology

MOMA is integrated with regional specialist centers (for example, for cardiology), and uses an electronic health record that is shared between the nurses in the Call Center, the specialist physicians and 800 primary care physicians.

Here we need a component architecture to cover the elements of the center:

- Robotic Survey
- Call Centre
- Task Management System
- Clinical Protocols
- Video Calls

The major strength of the Maccabi system is its seamless interoperability. There is a very high level of connectivity between different technology systems in use. **These systems have been developed to minimize dependency on any particular technology vendor, enabling relatively simple integration |of new vendors as required.**

Maccabi employs a modular, secured and flexible solution to facilitate a rich and customizable feature list for both members and physicians. The core technological component of this solution is the enterprise service bus that allows the sharing and retrieving of medical data automatically. Built under SOA (Service Oriented Architecture) design principles, the service bus allows lab results, medical imaging, doctors' EMR, hospital EMR and other medical information to be transferred using industry standards in many of the implementations.
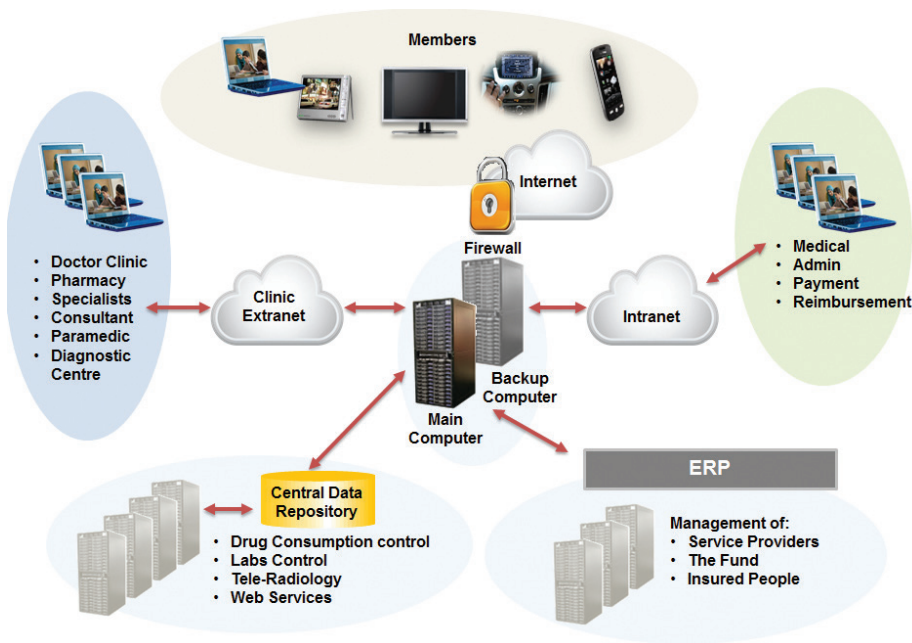

Figure 1: Maccabi Technical Architecture. Members, physicians and Maccabi support staff are interconnected and share data securely over VPN and through firewalls.
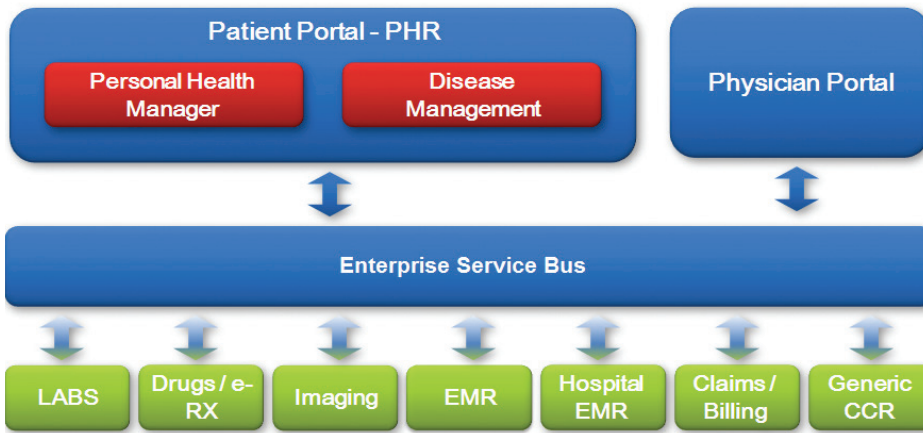
Figure 2: Maccabi Application Architecture. The enterprise service bus enables patient (member) and physician web portals to access clinical data securely.

Web Services

Prior to the emergence of web and mobile platforms, Maccabi relied on applications created for client/server platforms. In this model, Maccabi had determined how data and applications should be combined and delivered to client computers and had established mature models for optimal distribution and processing of data. In recent years, as web and mobile platforms became increasingly capable of not just consuming but interacting with data, Maccabi determined that a Service Oriented Architecture (SOA) was needed to empower patients and physicians with a richer experience.

Maccabi's transition from client server to web-based and cloud architectures is built on a solid foundation of tried and tested business processes coupled with well-managed data. Maccabi now delivers applications via web services and a platform that combines security, reliability, scalability and interoperability. **The approach that Maccabi has taken positions the organization well to take advantage of future technology developments to further lower the cost of service delivery, while increasing reliability in a secure environment.**

Business Value of MOMA

Since the MOMA Video Conference Call Center became fully operational in 2012, the Center has demonstrated an impressive ability to control costs.

An analysis undertaken between Jan 2012 and December 2013 compared hospitalization trends of 1,210 MOMA members with CHF to 995 potential patients. At the beginning of the period, both groups experienced hospitalization rates around 20%. Within a month, however, hospitalization was down by 3% for MOMA members – a rate decrease that leveled out at an average of 4% over the two year period. In addition, MOMA members who were hospitalized saw a 33% reduction in their length of stay, from 1.5 days to 1 day.

While healthcare costs are rising across all service delivery channels, MOMA is making a real difference in keeping those increases under control. From 2011 to 2013, costs within the general Maccabi population rose an average of 55%. For patients participating in MOMA during this period, costs rose only 17%, actually decreasing for CHF and Home Care patients. Specifically for patients with long term conditions, costs within the general Maccabi population rose 48% from 2011 to 2013 (from $6,006 to $8,882), while MOMA costs rose only 8% (from $7,293 to $7,857).

"The MOMA video conferencing facility increases staff productivity, improves quality of patient care, enhances patient and clinician satisfaction and improves patient safety. Increased use of drugs and doctor visits combined with reductions in hospital admissions have resulted in 4% of savings relative to the overall Maccabi population in the first year of operation, with the expectation of increased improvements in years to come."

– Dr. Nurit Friedman
Director, Department of Evaluation and Research

TABLE 1. SUMMARY OF DATA

	AVG. COST 2013	AVG. COST 2011	% INCREASE
MOMA	$7,857.22	$7,293.41	8%
General Population	$8,882.68	$6,006.73	48%
Maccabi Average	$1,201.73	$1,075.15	12%

Return on Investment

Gertner Institute and Maccabi invested $3,000,000 in building the physical infrastructure to host the MOMA Video Conferencing Call Center. Current operating costs are in the region of $3,100,000 per annum.

In its first full year of operation, the Center saved almost $888,000 or 4% relative to the general Maccabi population. The goal (in order to achieve parity with operating costs) is 15%. Indicators suggest that this goal will be achieved in a relatively short timeframe as the capacity exists to deliver greater savings without incurring additional costs.

Of total savings realized to date, 20% ($177,000) is attributable to MOMA's adoption of video conferencing technology. By increasing MOMA's patient population and range of available services, video conferencing has expanded the Center's potential significantly.

With time and experience, MOMA staff are recognizing and implementing changes that optimize service delivery while controlling associated costs. This evolution suggests strongly that savings will increase in future years.

Evaluating Results

The increased frequency and improved quality of clinician/patient interactions enabled by video conferencing has led to improvements in both health outcomes and patient satisfaction at the Center. With additional education and support from clinicians, patients feel more empowered to cope with their diseases and are more motivated to adhere to prescribed care plans. **Surveys indicate that patient satisfaction with MOMA nurse treatment is very high – over 85%.**

Video conferencing also has impacted workflow and productivity positively. The ability to access a patient's full electronic health record while visually interacting with the patient makes for more informed, timely, efficient decision making on the part of clinicians. The integrated nature of the MOMA system minimizes the potential for errors by enabling clear, up-to-date communication between nurses, doctors, consultants and specialist departments. MOMA clinicians report that they feel more effective and enjoy a more satisfying sense of teamwork with video conferencing.

With the adoption of video conferencing technology, MOMA has improved clinical outcomes for patients, increased productivity and job satisfaction for staff and reduced costs for Maccabi Health Services. MOMA represents a model of care delivery well suited to meeting today's most pressing health care challenges.