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Mapping Skills and Competencies; Providing Access to Knowledge, Tools and Platforms; and Strengthening, Disseminating and Exploiting Success Outcomes for a Skilled Transatlantic eHealth Workforce

Case Study: eHealth Competency: An Essential Element in Patient Care and Improving Care Quality in Israel

Assuta Medical Centers, Israel

TITLE eHealth Competency: An Essential Element in Patient Care and Improving Care Quality in Israel

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ORGANIZATION

Assuta Medical Centers is the largest private hospital system in Israel with eight facilities across the country, including four private hospitals, specialization in elective surgery, high technology diagnostics, and oncology treatment. The system includes a day surgery center, a stand-alone imaging and gastroenterology center, an Ambulatory Care Center with multiple outpatient clinics, and a new public not-for-profit hospital which opened its doors in June 2017. Assuta also operates three mobile services, mobile resonance imaging (MRI) and two mobile mammography units. Assuta places a great deal of emphasis on quality of care and service and is Joint Commission International (JCI) accredited.

Assuta Digital

The Assuta Network is highly computerized and every aspect of its operation is supported by digital technology. The core of its clinical and medical information systems is a central electronic medical record (EMR) including computerized order and referral, with a closed loop (i.e. automatic transmission to and from) to the laboratory, imaging, medication management systems and interfaces with the operating room system and the ambulatory services system. The hospital administration system is digital, including the admission/transfer/discharge (ATD) system, finance, human resources, logistics, maintenance and transportation. There is a digital employee information system as well as public information systems geared towards patients and families. Mobile technology is increasingly used and nurses and doctors can view EMRs via their mobile phones. Patients have access to their diagnostic test results on a web-based platform.

BACKGROUND

Israel is one of the most advanced countries in the world especially when it comes to widespread implementation of eHealth at all levels of the healthcare system. It is at the forefront of Big Data Analytics due in large part to the early implementation of mandatory EMRs in all of the health plans in the mid-1990s, and thus the evolution of massive, comprehensive, longitudinal databases coupled with a drive for innovation—part of the culture of being a "start-up nation" (meaning that a nation of immigrants is a nation of entrepreneurs) [1]. One hundred percent of the physicians working with health plans (as salaried employees or independent contractors) were using EMRs by 1995. By 2000, the healthcare workforce working in or with health plans were using a central EMR. Simultaneously, the health plans computerized all of their administrative systems. In parallel, hospitals began to implement digital ATD systems,

computerize their operating systems and introduced EMR systems. Today, all Israeli hospitals are using EMRs and most, if not all, of their administrative and operating systems are computerized.

The healthcare workforce lives and works in this reality and working with digital systems is taken for granted. This is also reflected in the general population. All Israelis have access to their medical information via web portals and smart phones. Most Israelis are astonished to learn that this is not the case everywhere else in the world and are at a loss at understanding how healthcare systems can function without this. As such, the environment supports eHealth and people develop the skills they need to live within this environment.

STATUS/CURRENT DEVELOPMENTS

The main motivators at Assuta for process changes and associated skills and capabilities, including eHealth competencies, is the drive to improve the quality of care (as shared previously, Assuta has already achieved JCI accreditation). This drive requires on-going improvement in all areas including increasingly sophisticated use of digital systems and the drive for integrated care. Both of these, but particularly the latter, require improved communication and sharing of information – not only within each hospital and between the hospitals in the network, but with outside health and social care organizations as well. While all people working in the Assuta system are skilled EMR users, without which they are unable to function, as well as other relevant operating systems used to improve quality and integrated care. These systems demand new workforce skills, including data analytics and health information exchange (HIE).

ACTIVITIES/MEASURES

At Assuta, eHealth skills training, education and competencies are divided into three levels:

1. Basic skills and competencies for the daily use of Assuta's digital systems, both clinical and administrative, for direct patient care as well as for managing the organization and its services.
2. Intermediate skills and competencies for higher-level functions including monitoring, quality assurance, quality control, patient safety and data security.
3. Advanced skills and competencies for developing new eHealth tools, data analytics and research.

Basic Skills and Competencies

Assuta's Human Resources (HR) Division encompasses a Training and Organizational Development (OD) department that serves all employees including clinicians at every level, and all service, administrative and management staff. Given Assuta System's high level of digitalization, eHealth education and training are integral and essential components within the system.

The fundamental approach of the Training and OD Department is based on the principles of adapting the learning process to the variety of groups that work in Assuta, including spoken languages (Israel is very much a melting pot with a high degree of immigration from other countries resulting in many employees whose mother tongue is not Hebrew). Different ages also need to be accommodated, as younger people are typically more comfortable with digital technologies, along with a myriad of approaches for adult education. Thus, the emphasis is not only on what must be learned, but that learning is actualized. Increasingly, the learning platform within Assuta is personalized, individualized, digitally supported, and geared to the comfort and convenience of the employee.

Assuta's basic training and education is divided into four types:

1. **Basic Orientation and Learning**: This occurs at the point of entry into the organization. Every employee participates in an orientation course teaching them about all aspects of the organization and its systems, including values, operating procedures and digital systems. Training takes place in classrooms, one-on-one tutoring and electronically. The digital systems training uses all training methods, with the bulk occurring on a tutorial basis and via on-the-job training. This is particularly true concerning the digital systems that the employee must use in order to perform his/her job. While the employee learns about the overall EMR, for example, in a classroom setting, they learn how to use it guided by a tutor, with backup by a support center. The Information and Communication Technology (ICT) department maintains a list of super-users with strong eHealth skills that they make available to the clinical departments when they request support with teaching, refreshing, implementing or upgrading a digital system.

2. **Required courses (on-going)**: There are specific courses and workshops required for all employees with the main focus centred on core organizational values such as respecting your fellow man, patients, patient's family and friends, or other staff members; professionalism and regulations, such as ethics, data security, and patient safety. At Assuta, eHealth courses are taught, as a rule, by leading clinical experts who have a special interest in a given eHealth innovation or a change in the existing digital system, rather than by technical IT staff. The clinical experts are better able to explain the "why" from a functional/clinical perspective, providing staff with a deeper understanding and thus greater motivation to adopt change. A significant number of the required courses (in many areas, not only ICT) are available electronically. Employees can take them when it is convenient for them; final course assessments are used to demonstrate material mastery with a minimum passing score required. All e-courses are tailored to each sector as well as for specific. Assuta's COMPASS System contains all online courses; at the entry point to the system, the employee accesses a matrix that shows all required courses relative to his/her professional sector. The vast majority of regulatory courses, including those in ICT, are e-courses. A structured training process that includes courses manuals and mentoring accompanies changes in existing systems or introduction of new digital systems. In some cases, selected employees receive intensive training as super-users and are deployed throughout the organization to provide guidance and support to other staff members throughout their learning processes.

3. **Personalized training and education for specific employee needs**: At Assuta, there is a very structured process for performance evaluations; a structured questionnaire is used as the basis for dialogue between the manager and each staff member. There is also a dedicated section to identify the need for training and development in personal skills, professional skills, infrastructure and digital skills. Performance assessments results are analysed to determine training priorities. These assessments serve as the basis for discussions between the training department and senior managers to determine the training agenda for the coming year on an organizational-wide level. Digital systems training, particularly the clinical systems, is supported by training manuals, short films and videos. The COMPASS system's training portal contains a complete list of all of the training courses available within the organization, as well as those offered by outside companies. Thus, an individualized learning plan can be structured to fit individual employee needs.

4. **Elective training and education**: Employees may feel that they want to broaden or expand their knowledge and/or skills for any number of reasons, such as personal satisfaction or career advancement. Here again, the Training Portal can be accessed to inform employees about the offerings available throughout the organization. Assuta offers employees the opportunity for advanced

academic education in many areas, including ICT, in addition to participation in professional conferences in Israel and abroad.

Intermediate Skills and Competencies
All managers are taught to use the business intelligence (BI) system in their professional area. In addition, Clinical Managers are taught the necessary skills to perform monitoring and quality control for all aspects of patient care at the department level, the individual clinician level and the patient level. Assuta has developed a digitally supported quality assurance system for both physicians and nurses to aid performance evaluation relative to quality objectives on an ongoing basis and in real time. A good example of this is the Nursing Quality Assurance (QA) System. Assuta's nursing leadership developed a series of quality indicators to measure nursing staff performance. Nursing performance is measured on an ongoing basis, and the data is automatically extracted from the EMR. The head nurses are responsible for monitoring nursing performance quality on their ward. In order to do this, the head nurse needs the necessary skills and competencies to use the digital QA system. In addition to competencies needed to use the system, they must also understand processes and how to collect and interpret data. The head nurse must also learn how to make decisions based on data to improve performance. Motivation is a critical factor and is an essential training component. In order to succeed in improving care quality, the head nurse also needs to be able to communicate with staff effectively and explain the meaning of tables and graphs and how they relate to their daily performance when caring for patients.

Training the nurse managers in system use is performed in three ways:
1. Involving them in the system design that they will be expected to use.
2. Teaching the overall system in a group-oriented classroom.
3. Providing tutoring on a one-on-one basis as needed or requested.

Based on our experience, using eLearning to teach nurses how to use eHealth systems has not proven to be the most effective approach. We continue to rely predominantly on teaching eHealth competencies in a group learning setting and one-to-one tutoring. This may change as the younger generation enters the workforce, but today's workforce still tends to prefer face-to-face training.

Advanced Skills and Competencies
Advanced skills and competencies, such as how to develop eHealth systems internally, are taught in external courses. However, the most effective learning is done on the job, motivated by the position's demands. For example, the Director of Nursing QA who developed, implemented and continuously updates the Assuta Nursing QA system, took courses outside of Assuta and developed all of the rest of her skills and competencies on the job. Other clinicians in similar positions in the hospital undergo the same process. In Israel, doctors, nurses and other health professionals are taught basic and intermediate eHealth skills as part of their academic training, but these are quickly forgotten if not used. The need for training in informatics is increasingly apparent and courses in eHealth have been included in the curriculum for all medical and nursing students as well as students in the other health professions.

Research and Data Analytics
Another increasingly important eHealth competency is the ability to perform digitally supported research and database research, or data analytics. This is gaining momentum at Assuta as today, the ability to design database for research purposes, on-going management and patient care improvement, are considered advanced skills. Those who have developed competencies act as advisors to others in defining their

queries, and in many cases, act as a conduit. Increasing numbers of professional staff perceive the need for data analytics and research to effectively do their jobs. This is creating positive pressure in the organization for skill development and easier database access. A significant amount of research is already routinely being performed. Assuta publishes a professional journal – *AMR: Assuta Medical Report* – dedicated to articles on research performed at Assuta, much of which requires the use of eHealth systems. Example article titles are: *Prediction of mortality and myocardial infarction in patients with stable ischemic heart disease using myocardial perfusion imaging, Developing a computerized tool for enforcement and monitoring a right prophylactic antibiotic treatment before surgery in Assuta, Disturbed flow in arteriovenous fistula for hemodialysis* and *Quality measures in nursing*.

CHANGES

Assuta functions in a rapidly changing environment that demands changes in processes and technologies, requiring new skills for interprofessional staff members at all levels of the organization. This has clear implications for our approach to providing training and education. A research-based, time-tested guideline for developing managers (supported predominantly by studies at the Center for Creative Leadership by McCall, Lombardo, and Morrison [2-8]) says that you need to have three types of learning experiences, using a 70-20-10 ratio: 70 percent from job-related experiences, 20 percent from interactions with others, and 10 percent from formal educational events. Assuta's Training and OD Department has adopted the *70/20/10 Model* in order to improve performance, striving to achieve the following balance:

1. 70% from challenging assignments (on the job) including learning through investigation, simulations, ongoing feedback and self–evaluation
2. 20% from developmental relationships (mentoring and tutoring)
3. 10% from coursework and training (including e-learning)

As the need for medical and nursing informatics (NI) has become increasingly apparent, courses are being offered in these areas throughout Israel and Assuta is encouraging and supporting staff participation. The current program for nurses teach skills include the following courses: Medical Informatics, EHR/EMR, common errors in working with electronic records, system architecture, data standards – Systematized Nomenclature of Medicine—Clinical Terms (SNOMED-CT), Logical Observation Identifiers Names and Codes (LOINC), International Classification for Nursing Practice (ICNP), Health Level-7 (HL7), network storage cloud computing, data base design, data security, cyber, anonymity and privacy, search engines and human engineering.

Assuta is rapidly moving down the path of evolving its analytics capabilities. It has passed beyond the stage of classic BI (that identifies "what happened") and data discovery analysis (that answers "why") and is moving toward predictive analysis and using data analytics to help make decisions. As this area expands, skills and competencies are being developed, but these are only a part of the picture. The structure of the databases must be constantly upgraded in order to make them more easily accessible. We are planning to restructure our database in the coming year and this will act as a catalyst for broadening the development of the more advanced user skills.

RESULTS

The Medical and Nursing QA Systems are good examples of how increasing advanced and intermediate skill development have resulted in improved patient care. The results of advanced eHealth skills at Assuta is

demonstrated in the design and ongoing maintenance of the Nursing Q System. *Figure 1* shows a screen from the system on one of the quality measures:
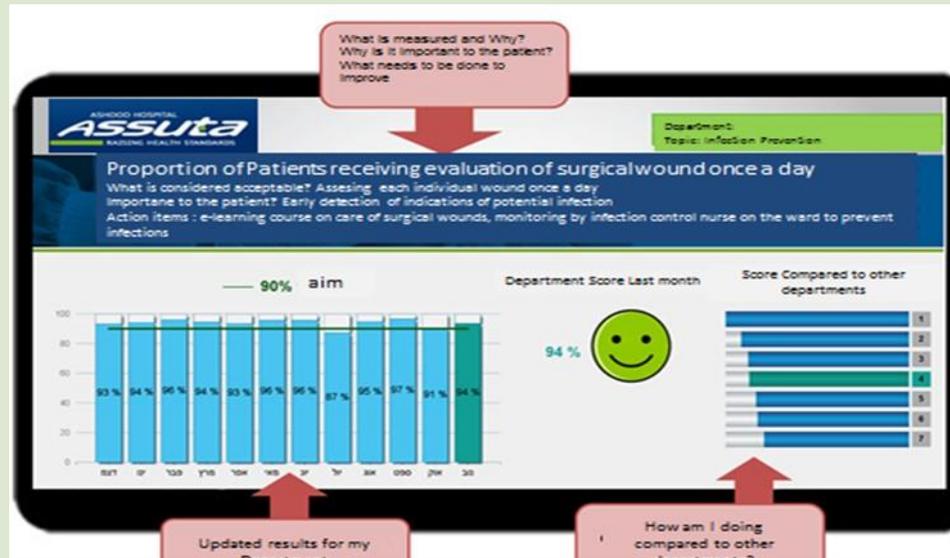
Figure 1: Screenshot of quality measures in nursing at Assuta

This system was implemented in 2015, and the article was published in the Assuta Medical Report, *Quality measures in nursing*, which describes the Nursing QA system's preliminary results, which shows significant improvement achieved in nursing care measures.

Assuta underwent its most recent JCI evaluation in the spring of 2017, received high marks on all quality criteria and accreditation was renewed.

OUTLOOK/LESSONS LEARNT
Assuta has prioritized educating and training its workforce in basic eHealth skills and competencies, as staff members must have this knowledge to work within the system. eLearning is an important tool for acquiring this knowledge, although there is still heavy reliance on one-to-one, face-to-face learning. Considerable progress has been made in providing the middle management staff with intermediate eHealth competencies and this is an area, which will continue to grow and expand. Assuta is at the beginning of the journey for the provision of education and training in advanced eHealth skills. While there are courses in advanced skills offered by outside agencies and academic centers, Israel still lags behind in formal training and education in medical informatics. There is currently no academic degree program available in Israel focused on medical informatics, and most of the people in this sector who hold positions in healthcare organizations have either received their degrees abroad or have obtain this necessary knowledge and skills from taking specific courses or learning on the job. However, this is rapidly changing as advanced discussions about offering academic degree programs in medical informatics are taking shape. The Ministry of Health (MoH) is becoming proactive in developing guidelines for implementing new technologies, including eHealth, in clinical practice. In the meantime, Assuta will continue to provide education and training, both in-house as well as by outside organizations, in intermediate and advanced eHealth skills and competencies.

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Case Study Checklists

Checklist of eHealth topics (competencies)	Apply? Yes/No	Describe how topic applies to your organization/case study
Role of "Peopleware": human factors, awareness, satisfaction and acceptance of health IT, usability measurements, evaluation of health IT, communication, leadership, change management, ethics and IT and similar topics	*Yes*	*Acceptance of health IT is not an issue. It has been an integral part of the system for more than two decades. Health IT systems are evaluated, improved and upgraded on an ongoing basis, with usability being a major commitment. One of the reasons for the successful system-wide implementation of health IT is that systems have been designed collaboratively with users from the outset.*
Role of inter-professional approaches: inter-professional versus mono-professional training and learning activities. What subjects lend themselves to inter-professional vs. mono-professional classes, learning environments and similar topics	*Yes*	*Training in eHealth, as well as training in general, is professionally specific especially when it comes to basic and intermediate skills. Advanced skills lend themselves to interprofessional learning environments, as areas such as research and integrated care are interprofessional by nature.*
Role of healthcare data sciences: data and information acquisition including documentation, data quality, data, information	*Yes*	*Clear examples of this are given in the case study. It is clear that the healthcare data sciences are an essential part of QA systems*

and knowledge management, data analysis and statistics, clinical decision making instruments, reporting and similar topics		as well as the overall BI systems in all aspects of the organization's operations.
Fusion of medical technology & informatics: software as a device, smart devices, automatic data acquisition via devices, risk and safety management	*Yes*	*Assuta is an optimum environment new medical devices pilots requiring an essential necessity for fusion. There is fusion on a routine basis in systems such as the Radiology Information System, the Laboratory Information System, etc.*
Role of process and workflow management: clinical and administrative processes, information continuity and information logistics, management of processes, workflow management systems and similar topics	*Yes*	*These are all an essential part of the daily operation of a healthcare organization in which all of its processes are digital. The digital systems have been designed to support processes and workflow and are an essential part of them*
Role of ethics, legal and data protection issues: ethics and IT, legal requirements, data protection and information self-determination, data safety and similar topics	*Yes*	*All of these are essential and are taught. The ICT Division has a data security department and all of these issues are taught to employees and are refreshed on an ongoing basis. As mentioned in the case study, there are eLearning courses on all of these subjects.*
Role of learning and teaching: learning techniques ("learn how to learn"), learning and teaching styles (online, blended, face-to-face), learning management, information management for learning and teaching and similar topics	*Yes*	*Described in detail in the case study. Assuta is using the 70-20-10 approach with blended teaching styles.*
Role of management related topics in health informatics and IT: principles of management, strategic management, stakeholder and change management, leadership, financial management, risk management, quality and safety management, resource planning and management and similar topics	*Yes*	*These topics are not taught as part of the routine courses in Assuta, but are taught as part of academic programs and workshops in which management staff participate. Assuta has established a School for Professionalism which provides workshops and courses in some of these areas. For example, there is now a new course for all employees on "Positive Thinking".*

Role of technology: information and communication systems, telemedicine, telematics, assistive technologies, mHealth, life-cycle-management including systems development/engineering	*Yes*	*All of these technologies are in used at Assuta today and expanding the use of mHealth for both clinicians and patients is a particular focus for ongoing development.*
Role of consumers and populations: consumer health informatics, public health informatics	Yes	*This is an increasingly important developing area. Patients in Israel, however, are quite advanced in this area. As explained in the case study, they have had access to their own medical information as well as public health information via web-based portals (and now in mobile devices) since the beginning of the 2000s.*
Role of Research: information management in research, data analytics	*Yes*	*Explained in detail in the case study. Assuta does research and is using data analytics for research as well as ongoing QA.*
Role of interoperability: systems integration, IT standards, terminologies and classifications	*yes*	*This is an inherent part of the internal Assuta systems. Interoperability is now an even greater challenge in the integration and interfaces with outside organizations as a part of the drive to achieve seamless integrated care for patients across the health care continuum.*

Checklist of eHealth topics (gaps and deficiencies)

Teaching the teachers: Are there any activities in your organisation to teach health IT/eHealth to teachers in healthcare?

Not in the usual sense. Assuta is a healthcare delivery organization. The closest we comes to this is teaching leading clinicians in order to enable them to teach others.

Supporting participatory design and acceptance testing/research: Are there any educational activities to teach or practice participatory design?

Yes.

Are there any activities including research in user acceptance testing and satisfaction measurement?

Not formally. There is a great deal of on-going informal feedback from users and new systems, such as the QA System being designed collaboratively.

Integrating eHealth/health informatics into traditional curricula: Are there any activities to include eHealth/health informatics into traditional curricula of physicians, nurses and other health professionals with direct patient care?

Yes – in all medical schools as well as academic programs for nursing and other healthcare professionals.

Motivating clinicians and managers: Are there any incentives and opportunities for clinicians and healthcare managers to acquire and update digital eHealth/health informatics skills and knowledge?

Yes – in order to do their jobs effectively, many receive bonuses and career advancement opportunities.

Engaging women: Are there any activities to attract female students in eHealth/health informatics or employ female health IT staff?

This is not an issue in Israel. In Assuta, as in the rest of Israel, women are a significant proportion of staff (at least half) in all areas of health IT.

Adjusting job descriptions and enable continuing education: Are there any activities to adjust job descriptions, e.g., for clinicians, that include health informatics competencies (also proper use of health IT/eHealth systems) and are there activities to support staff updating and upgrading their health IT related skills and knowledge? This topic is mainly related to provider organisation and also to IT vendors.

Yes. Described in detail in the case study.

Updating teaching and learning material: Are there any activities to ensure that the material is up-to-date and of high quality?

Yes - both the Training and Organizational Development Department as well as the ICT Division constantly update teaching and training materials.

Availability of courses including electronic courses: Are there any additional activities to improve the availability of courses such as implementation of new courses, new course formats that recognise previous experiences/training in particular for continuing education?

Yes

Informal caregivers: Are there any educational activities to teach health IT usage to informal caregivers, e.g. for assistive technologies?

Not in Assuta yet, except on a pilot basis. We have two projects that are geared to teaching informal caregivers.

Shortage of health informatics specialists: Are there any programmes to attract health informatics specialists?

There is a shortage of HI specialists and a great demand. We are therefore seeing an increasing number of courses being offered.

eHealth Budget: Does your organization, area or region have a dedicated budget set aside for eHealth/health informatics training, education or workforce development initiatives?

Yes

eHealth Specialty Areas: Does your organization address any of these speciality settings/areas of training or outreach for eHealth education or workforce development: ambulatory care, social medicine, geriatric/ageing medicine, rehabilitation?

As Assuta is a healthcare delivery organization, it must train our workforce in all areas relevant to the services they offers. For example, Assuta has implemented INTERRAI (an international computerized geriatric assessment program) for assessing all patients 70+ scheduled for elective surgery. The results of this assessment provide algorithm-based recommendation for preoperative, inpatient and post discharge care.