

Quality & Safety at Hadassah - A Progress Report

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Center for Quality & Safety

Chairman, Committee for Quality & Safety

Executive summary

In a third year of activity at both Hadassah hospitals, over 40 projects of quality & safety are being conducted, completed or on-going (in comparison to 30 projects, in year 2003). Projects have demonstrated improvements in specific domains and/or good performance in others. These include: introduction of devices for prevention of peri-operative clots in Neurosurgery; improved communication staff-family surrounding palliative care in General Internal Medicine; reliability of X-ray interpretations by junior physicians; improved information transfer of pathological reports by computer alerts; use of guidelines to reduce need for X-rays in ankle injuries; safer oral anticoagulation by improved instructions to patients & management of myocardial infarction. Other projects have shed light on deficiencies to be corrected. On-going institution-wide projects include systematic evaluation of drug mishaps, introduction of interactive learning software for orientation of new physicians, design of a website for patient information and facilitated dissemination of evidence-based practice. Other activities consist of workshops, presentations and publications at national and international platforms, including 23 abstracts presented at the 2004 meeting of the Israeli Society for Quality in Medicine.

In conclusion, diverse projects attempt to make healthcare at Hadassah more patient-centered, more evidence-based and more system-minded. Increasing accountability by department heads for quality and safety may be a key to further successes.

As described last year, the Center for Quality and Safety is a small team (a director, an epidemiologist, a data analyst and a secretary) coaching more than 40 students from the Faculty of Medicine doing, as an academic thesis, a project in quality in healthcare. In addition, the Committee for Quality & Safety, including nurses and pharmacists, oversees a variety of projects, such as medication safety and patient satisfaction. Following is a brief description of the most salient, recently or nearly completed and on-going projects.

Recently completed specific projects

- 1) Use of prophylaxis for postoperative venous thrombo-embolism in Neurosurgery. *The use of effective prophylaxis was markedly improved by the introduction of devices for intermittent pneumatic compression.*

Last year, we reported on a successful institution-wide quality improvement project on the prevention of post-operative venous thromboembolism (VTE). Neurosurgery presented a specific challenge. Patients undergoing neurosurgery are at increased risk of VTE (main risk factors include increased age, overweight, craniotomy, prolonged operation and malignancy). These patients are also at increased risk for cerebral bleeding when administered anticoagulants after surgery. An alternative to anticoagulants is intermittent pneumatic compression (IPC). In July 2003, Hadassah management decided to purchase 10 IPC devices, with 4 devices allocated to the Neurosurgery department at a cost of NIS 30,000. The device is a mobile IPC, manufactured by an Israeli company, and based on continuous enhanced circulation therapy system. The incidence of clinical VTE was monitored prospectively for patients hospitalized in Neurosurgery during the five months preceding and in the five months following the introduction of the devices. A number of treated patients who did not receive a device (due to non-availability) formed a second control group.

As shown in Figure 1, introduction of the IPC device was highly effective in preventing VTE in patients undergoing neurosurgery and also saved the costs of VTE treatment (over 100,000 NIS in the control including insertions of several vena cava filters and prolonged hospital stay). In the light of these results, Hadassah management authorized the purchase of additional IPC devices for these patients. This project demonstrates that quality can save costs.

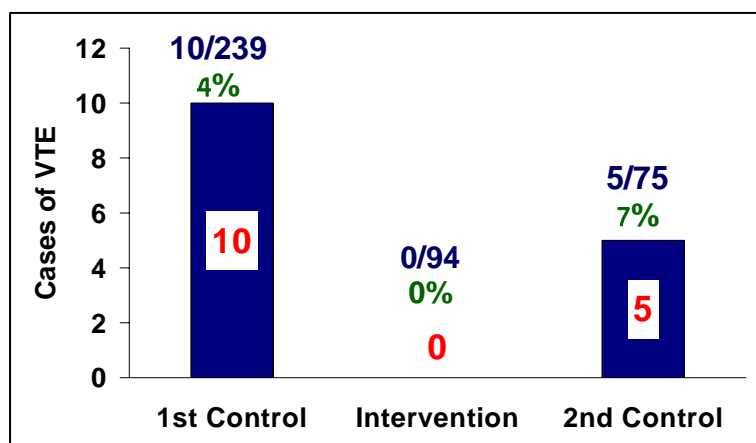


Figure 1: Cases of venous thrombo-embolism (VTE) were noticeably reduced by the intervention

2) Palliative care in General Internal Medicine. *A pilot project in the Department of Medicine at Mount Scopus demonstrated both the need and the feasibility of an improvement model.*

Palliative care, especially at the end of life, is becoming recognized as an important need for patients and families, both in the USA¹ and in Europe.² A pilot intervention related to 60 elderly patients with life threatening illness and impaired cognition: half of them were in a ward of internal medicine at Mt Scopus, where the intervention took place; the others were in a twin ward, serving as controls. The intervention consisted of staff-initiated meetings with relatives, first, to communicate information on patient's condition; second, to listen to their questions and to their preferences based on patient's prior wishes; and finally to attempt shared goals setting and decision making. After discharge or death, family's satisfaction from hospital care, measured by a questionnaire adapted from the literature, was found improved by the intervention, on most questions, as shown in Table 1 below.

Table 1: Family's Satisfaction Estimated by Low Frequency of Agreement with Negative Statements

Statement	Percent of relatives agreeing with statement (%)	
	Controls	Intervention
<i>I felt that the staff did not really consider my opinions</i>	60	13*
<i>I felt insufficiently involved in decision making</i>	57	23**
<i>It upset me that I did not know what was happening with regard to relative's treatment</i>	43	10**
<i>I did not receive enough explanation about alternatives</i>	57	20**
<i>Relative's problems were not explained clearly</i>	53	3*
<i>I felt uncomfortable with asking questions</i>	53	10*
<i>I was not asked to participate in making decisions</i>	60	17**
<i>I felt alone and without support</i>	43	17**
<i>I felt pressured to make decisions</i>	27	7**
<i>Doctors thought they had to provide every possible treatment</i>	57	67
<i>Relative underwent too many tests or treatments</i>	17	43
<i>The staff made decisions without consulting me</i>	43	37

* p<0.001 ** p<0.005 in favor of the intervention group (chi-square).

Thus, semi-structured communication with relatives, along simple guidelines,² appears to improve the perceived quality of care. Families, both needing and giving support, deserve special attention in end-of-life care. A multidisciplinary committee has been formed to design an intervention at the institutional level, applying and expanding the lessons from the above pilot project.

¹ Morrison RS, Meier DE. Palliative Care N Engl J Med 2004;350:2582-2590

² Fleck F. WHO wants more palliative care for Europeans. BMJ 2004;329(7460):248.

3) Reliability of X-ray interpretations by junior physicians. *Three projects tested the validity and reliability of X-ray interpretations given by radiology residents on duty, the basis for decisions about patients during evenings and at nights. In general, good validity was found for trauma, general surgery and pulmonary embolism in a sample of over 300 cases. .*

In trauma, X-ray diagnosis can be critical to the immediate management of the patient. Quality control in clinical imaging is new and required from us to develop tools to assess readings accuracy. Figure 2 below, shows the validity of X-ray interpretations by residents on duty, expressed as sensitivity, specificity, positive and negative predictive values, using as gold standard, the final interpretation of the same films by senior radiology specialists.

	<u>Sensitivity (%)</u>	<u>Specificity (%)</u>	<u>Positive predictive value (%)</u>	<u>Negative predictive value (%)</u>
Chest (n=54)	92 (65-100)	93 (82-98)	79 (52-94)	97 (88-100)
Neck (n=19)	100 (5-100)	100 (85-100)	100 (5-100)	100 (85-100)
Pelvis (n=27)	60 (18-93)	100 (87-100)	100 (37-100)	92 (75-99)
CT's (n=75)	94 (81-99)	95 (85-99)	94 (81-99)	95 (85-99)
mean & 95% CI (confidence interval)			kappa: 0.8-0.9	

Figure 2: Validity of X-ray interpretations in trauma

In most instances, the reading by the residents was accurate (validity parameters >90%) and corresponded to the interpretation later done by the radiology specialist (inter-observer variability coefficient kappa >0.8). In the case of pelvic X-rays, the sensitivity was found low (60%) and an intervention was done with the residents to improve the diagnostic capability.

In general surgery, the interpretation of abdominal CT by residents (often important in the decision to operate) was fair in comparison to the final reading by the specialist: as shown in Table 2, the variability was comparable to that observed between specialists themselves.

Table 2: Inter-observer variability for abdominal CT in surgery

N=60 (mean & 95% CI)	Inter-observer variability parameters	
	Percent agreement	Kappa coefficient
Resident vs. Specialist	77%	0.6 (0.4-0.8)
Specialist vs. Specialist	78%	0.6 (0.5-0.8)

Finally, the interpretation in the CT by radiology residents for the diagnosis of pulmonary embolism (where immediate decisions are to be made regarding anticoagulation) was found to be excellent, especially when compared to the consensus diagnosis by specialists (see Figure 3, below).

	<u>Sensitivity</u> (%)	<u>Specificity</u> (%)	<u>Positive predictive value</u> (%)	<u>Negative predictive value</u> (%)
Resident vs. Specialists (n=81)	93 (69-100)	98 (93-100)	93 (69-100)	98 (93-100)
Resident vs. Specialists Consensus (n=60)	100 (74-100)	100 (95-100)	100 (74-100)	100 (95-100)

Figure 3: Validity of X-ray interpretations for the CT diagnosis of pulmonary embolism (data are mean & 95% confidence intervals).

The overall conclusion from these observations is that the interpretation of X-rays by junior physicians is fairly reliable. Some type of habitual monitoring of the quality of X-ray reading might be worthwhile, as currently done in Pathology.

4) Quality of the informed consent before surgery in General Surgery. A large proportion of patients do not remember having heard about alternatives or complications. Deficiencies noted but corrective action yet to be devised.

Procedures to obtain consent must ensure that the patient understands his or her condition, as well as the risk and benefits of treatment, and its alternatives. Complex decisions such as surgery require a discussion of the uncertainties associated with the decision. While informed consent is a well-established practice, it often fails to meet its stated purpose: this topic was given high priority by the US Agency for Healthcare Research & Quality.³ To overcome the communication barriers of "health literacy", a simple method of determining whether a patient understands information regarding a procedure is to ask the patient to recount what he or she has been told. We conducted a survey on the quality of the informed consent in 178 patients admitted to the wards of General Surgery, in Ein Kerem, before and after an intervention to improve the process.

³ US Agency for Healthcare Research & Quality (AHRQ). Making Health Care Safer: A Critical Analysis of Patient Safety Practices. Full report at www.ahrq.gov/clinic/ptsafety

The overall satisfaction from the decision making about the surgery was high (see adjacent Table 3). Because overrating is common in general questions of satisfaction surveys, specific questions are more informative. To the question "Were the explanations clear", nearly 10% answered the explanations were partially clear (8%) or not clear at all (1%). Nearly 10% also said they would have liked more involvement in the decision making process, more time to think or that they did not feel at ease to ask questions. In only 15%, any written material had been given.

Table 3: Satisfaction about decision making in surgery (n=178)

Very satisfied	26%
Satisfied	63%
Somewhat satisfied	6%
Not so satisfied	5%
Not satisfied	0.6%

To the question "Were the dangers of the procedure explained to you?" 59% answered yes. Of those who answered no (41%), more than a third said they would have liked more information about the dangers (vs. 11% among those who were explained about risks). To the question "Were alternative options to the surgery explained to you?" only 22% replied yes. Patients were rarely (4%) asked to repeat the explanation given.

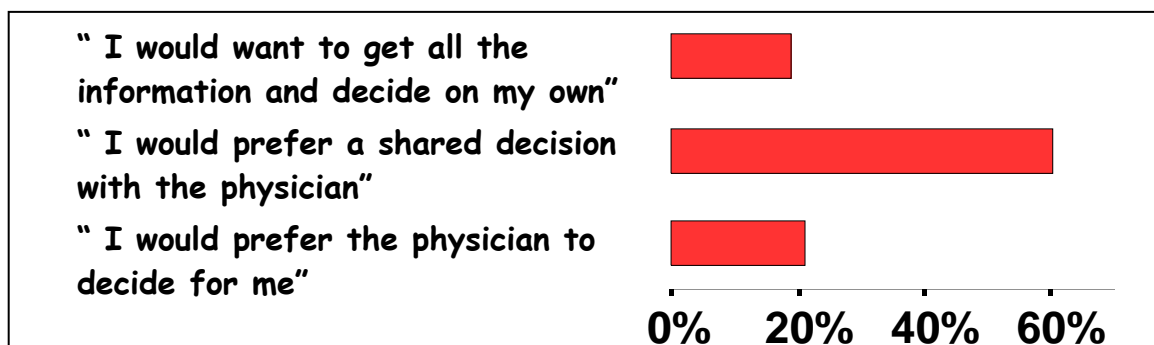


Figure 4: Diversity in preferred mode of decision making by patients

As shown in Figure 4, patients markedly differ in their preferred mode of decision making: while a majority favors shared decisions, nearly 20% would rather choose either autonomous or paternalistic styles of patient-physician communications. The implication of this finding is the need to introduce a patient-specific informed consent.⁴

The general conclusion from this project is similar to what was found last year in Obstetrics & Gynecology: there are deficiencies to be improved. By contrast, this time the intervention was not followed by improvement, possibly because the issue is not rated as important by surgeons.

⁴ Jonsen AR et al. Clinical Ethics: a practical approach to ethical decision in clinical medicine. 5th Ed, Mc Graw Hill, New York 2002, p.55

5) Improved information transfer of pathological reports such as after a visit in the Dermatology Clinic. *Deficiencies analyzed, corrective action devised, improvement noted.*

In the third year of this project, the percentage of patients who have had a biopsy at the Dermatology Clinic and who have received the report of the biopsy has increased from 90% in year 2001, to 96% in 2002 and 97% in 2003 ($p < 0.05$). The percentage of the reports positive for cancer which had failed to reach the patient at the time of the survey, was 4% in 2001 and decreased to 1% in 2002 and to 0% in 2003.

This improvement results from a combination of two interventions: (1) a clinic-based intervention (led by the head nurse, involving both physicians and patients); (2) an institution-wide intervention based on the design of a software sending alerts to the physician's computer whenever a pathology report is ready for a biopsy he or she had sent. If the alert is not read, it is forwarded to the head of the department. Over 80% of physicians are using this new modality and are satisfied with it.

6) Use of peri-operative beta-blockers prophylaxis for myocardial infarction. *No improvement noted.*

We prospectively monitored the perioperative use of β -blockers, before and after an intervention, along recommendations by the Agency of Healthcare Research and Quality.³ At baseline, over a period of 6 weeks, 602 patients underwent operations in general surgery, neurosurgery, urology, orthopedics or gynecology. Out of 75 patients who met criteria for β -blockers prophylactic use, none got this treatment.

An intervention included presentations of these results as well as current evidence and guidelines, at departmental meetings of anesthesiology & surgery. An institutional protocol for perioperative β -blockers use was developed with cardiologists, anesthesiologists and surgeons, approved by department heads. After the intervention, there was no change: over a period of 6 weeks, among 475 patients undergoing operations, 72 patients met criteria for β -blockers use and none got this treatment. We were surprised by this resilience to change: as presented last year, with a similar intervention, we observed an improvement in post-operative thromboprophylaxis. This problem has recently been reported & discussed in the literature.⁵ The surgeon thinks the issue is for cardiologists or internists (who do not see most patients) or for anesthesiologists (who see patients too late). For this "no-man's land" problem, we will need to design a system solution, such as a computer-based reminder.

⁵ Siddiqui AK, Ahmed S, Delbeau H, et al. Lack of physician concordance with guidelines on the perioperative use of β -blockers. *Arch Intern Med.* 2004;164:664-667.

7) Comparison of cardiac units (Ein Kerem & Mt. Scopus) in the management of myocardial infarction. Differences in management noted and discussed with medical teams and central management.

The objective of this project was to compare the quality of management for patients with acute myocardial infarction at both Hadassah hospitals, with particular reference to the differential on-site accessibility of services: coronary angiography is available only at Ein Kerem; cardiac rehabilitation is available only at Mt. Scopus. The survey was done over 6 months, during the year 2003, with a follow up period of 6 months after discharge, and included a number of widely accepted quality indices.

Table 4 shows the chosen initial treatment modality and its timing at both hospitals. If promptly used, both thrombolysis or angiography are effective; the latter option is being increasingly recommended as initial treatment (including referral of patients to a facility with capacity to perform an angiography, if not available on-site).⁶ As shown in Table 4, while most patients at Ein Kerem go to urgent angiography, at Mt. Scopus, less than a half of the patients are referred to this modality. The reverse is true for thrombolysis. For both sites, the delay from arrival to balloon treatment (angioplasty) is about 2 hours - slightly over recommended timing.⁶ At both sites, referral to cardiac rehabilitation is low and comparable to national average (around 15%).

Table 4: Treatment modalities and timing: number (N) and % of patients treated

	Mt Scopus	Ein Kerem	p-value
Referred to urgent angiography - N (%)	14 (44%)	37 (88%)	<0.001
Given thrombolysis - N (%)	18 (56%)	8 (18%)	
Time to balloon in hours (mean±SD)	2.65±0.9	1.98±2.6	<0.001
Referred to rehabilitation - N (%)	22 (35%)	16 (21%)	0.059

A further analysis of the time delays in the transfer of patients from Mt. Scopus to Ein Kerem is shown in Table 5. The longest delays occur at decision levels (time interval 1 and 5 in Table 5) and can be improved by better coordination between physicians, as agreed upon after data were discussed with medical teams.

Table 5: Transfer times from Mt. Scopus (MS) to Ein Kerem (EK) in minutes		
Time interval	Median [range]	Mean ± SD
1. From ER arrival to ambulance call	35 [4-314]	76 ± 87
2. From ambulance call to arrival at MS	16 [3-22]	15 ± 6
3. From ambulance arrival to departure to EK	16 [10-45]	20 ± 6
4. Drive from MS to EK	15 [13-19]	15 ± 1
5. From arrival at EK to treatment	36 [20-60]	39 ± 14

⁶ Jacobs, Alice K. Primary Angioplasty for Acute Myocardial Infarction -- Is It Worth the Wait? N Engl J Med 2003 349: 798-800

Figure 5 summarizes the overall performance of Hadassah on a number of quality indicators for management of acute myocardial infarction: the percentage of patients receiving aspirin, beta-blockers (BB) and angiotensin converting enzyme inhibitor (ACEI) within 24 h and at discharge, as well as the median timing for thrombolysis or angioplasty (PTCA) in comparison to published USA data for 2001 (JAMA 2003; 289:305). Only a limited portion of the "league" table is reproduced in the figure, with US national average at bottom line "Median". The conclusion is that the quality performance at Hadassah is generally good in comparison to US practice. Not shown, in-hospital mortality, readmission rate, re-infarction rates and 6 months mortality were also found comparable to reported data elsewhere.

State	Average State Ranks		Quality Indicators							
	1998-1999	2000-2001	Acute Myocardial Infarction							
			Aspirin 24 h	Aspirin Disch	BB 24 h	BB Disch	ACEI in AMI	Smoking	Thrombolysis, min	PTCA, min
Alabama	46	42	80 (2)	87 (1)	58 (3)	78 (18)	69 (6)	38 (4)	35 (-18)	100 (1)
Alaska	22	33	82 (-5)	86 (-10)	78 (-1)	67 (-6)	100 (18)	61 (24)	57 (3)	90 (-13)
Arizona	25	29	84 (-3)	84 (-2)	65 (2)	84 (16)	69 (1)	32 (-21)	55 (-3)	103 (-4)
Arkansas	50	48	78 (3)	84 (6)	50 (-5)	57 (-6)	69 (12)	39 (15)	37 (-5)	109 (15)
California	39	44	87 (2)	86 (2)	66 (6)	66 (-2)	70 (4)	31 (-10)	77 (41)	146 (39)
Colorado	9	7	92 (6)	93 (3)	75 (10)	92 (16)	82 (8)	53 (6)	51 (13)	121 (42)
Connecticut	6	9	89 (-3)	86 (-5)	78 (10)	83 (8)	80 (6)	39 (-2)	39 (2)	101 (-7)
Delaware	12	14	88 (2)	96 (10)	69 (7)	84 (12)	82 (10)	33 (-37)	28 (-22)	67
District of Columbia	31	37	87 (-10)	91 (8)	69 (-5)	85 (-7)	78 (5)	39 (12)		177 (127)
Massachusetts	4	15	87 (0)	86 (-2)	82 (9)	88 (-4)	72 (-7)	45 (1)	45 (4)	135
New Hampshire	1	1	92 (4)	93 (2)	86 (11)	89 (-1)	87 (6)	36 (-13)	35 (-14)	260 (159)
New Jersey	41	43	76 (-1)	65 (-10)	61 (-4)	68 (-1)	64 (4)	31 (-7)	47 (3)	128 (10)
New Mexico	32	36	89 (4)	89 (2)	65 (12)	74 (12)	67 (-10)	53 (3)	43 (6)	94 (-46)
New York	30	24	84 (1)	84 (3)	81 (14)	85 (12)	76 (1)	36 (-13)	44 (-9)	100 (6)
Median			85 (3)	86 (2)	69 (6)	79 (7)	74 (4)	43 (3)	45 (4)	107 (-19)
Hadassah			89%	90%	50%	83%	69%		44'	102'

Figure 5: Hadassah performance on quality indicators for the management of acute myocardial infarction, in comparison to national US data

All these quality indicators and the need for improvement in some areas (timings, use of beta-blockers, referral to cardiac rehabilitation) were discussed with medical teams and central management. The question of the worth of opening an additional coronary angiography suite at Mt. Scopus was discussed in depth and the option deferred, in part because of the literature data showing excellent results with rapid referral to another site (where angiography is available) and the data presented above showing the feasibility of shortening delays by better coordination between Mt. Scopus and Ein Kerem cardiology teams.

8) Use of simple guidelines to reduce need for X-rays in ankle injuries. *These guidelines were found easy to implement, while reducing X-rays and waiting times.*

The Ottawa ankle rules is a clinical decision aid highly accurate at excluding ankle fractures after sprain injury and designed to avoid unnecessary radiography.⁷ Dr. Stalnikowicz, Head of the Emergency Room (ER) at Mt. Scopus implemented the rules in 30 cases of ankle injury and the results compared with a control group of 60 cases of ankle injury treated by current practice. The use of X-ray was reduced from 92% in controls to 30% and the average waiting time in the ER was reduced from 98 to 58 min ($p < 0.002$). Follow-up of patients show that no fracture had been missed, as reported in the literature.⁷ A more general implementation of these rules can now be considered, as it might save each year 2500 unnecessary radiations, over 300 000 NIS and over 3000 hrs of waiting at the ER's of both hospitals.

Nearly completed projects

9) Surveillance of peri-operative antibiotic prophylaxis. A brief course of antibiotics, administered by infusion just before surgery to reduce infection, should be timed so that a bactericidal concentration is present in serum and tissues by the time the skin is incised. This practice is now standard of care and recommended by professional societies. A survey of antibiotic prophylaxis at Hadassah before common operations shows that the timing of administration or duration of prophylaxis is inappropriate in approximately 50% of cases. Potential solutions, to be discussed with medical teams after the data are finalized, are shifting the administration to the responsibility of Anesthesiology and computer support system.

10) Improved instructions, including options for self-monitoring and self-management, for patients being discharged on oral anticoagulation. The intermediate results show an improvement in the percentage of patients on the target INR from 40% to 60% ($p < 0.001$): all patients knew their targets (as opposed to 40% in controls); all patients knew the main complications from anticoagulation (as opposed to very few in controls); 90% of patients were very satisfied from the instructions which included a brochure, rulers & a software for promoting self-management and empowerment.

⁷ Bachmann LM, Kolb E, Koller MT, Steurer J, ter Riet G. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ* 2003;326(7386):417.

Major on-going projects

11) Drug errors monitoring

The Quality and Safety Committee has a subcommittee for the prevention of medication errors, headed by Ms. Nurit Porat, with multi-disciplinary members (physicians, nurses and pharmacists). The committee meets regularly for a systematic review of reported mistakes involving medications. Root cause analysis is conducted in non-judgmental way to determine potentially preventable elements. Last year, a software was developed and made available to all members, in order to help analyze data, and identify patterns and common problems (see Figure 6, below).

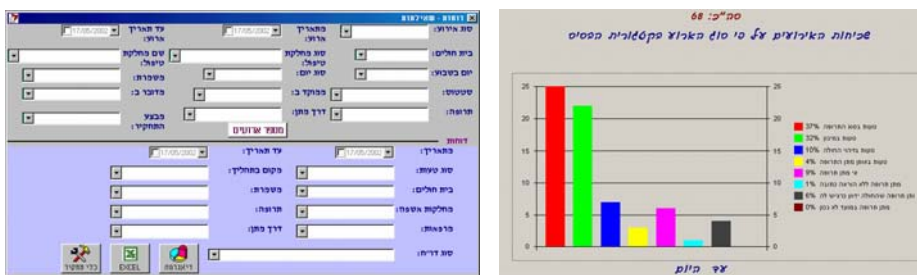


Figure 6: Screens from software for medication errors: data entry (left panel) and analysis (right panel)

After thorough discussion, the main conclusions on how to prevent the next error are published on periodical leaflets distributed throughout the clinical departments (see Figure 7 below), on Hadassah website and also sent to the Ministry of Health to warn other institutions about the potential error.



Figure 7: Two examples of leaflets describing specific medication errors or adverse effects and to prevent them.

On some occasions, the mistake was caused by poor labeling or misleading inscription on the drug package. Following Hadassah Safety Committee's advice, the Ministry of Health has given instructions to a drug company to improve the lettering (see Figure 8).

Another important conclusion from recurrent mistakes has been the recognition of the need for a formal orientation to every new physician at Hadassah on basic procedures related to physicians' drug orders, as detailed on the next paragraph.



Figure 8: New lettering on drug package (left compared to old on the right) following our advice to the Ministry of Health & to the drug company

12) Orientation to new physicians.

Because of the need to train new physicians at Hadassah about recommended routines for drug orders, we developed an interactive learning software (with technical help from Ness®) starting with basic principles (see Figure 9) and then covering a variety of simple advices, based both on the literature and the experience of the committee on medications errors and ending with other general, non-medication procedures related to daily work (for instance, under which conditions, a physician may order physical restraints for a patient).



Figure 9 Basic rules for prescribing in learning software

The e-learning software will be on the internet (address below) and every new physician will have to run the exercises and pass a build-in short test before getting authorization to continue working.

<http://www.hadassah.org.il/MDorientation>

In the software, cases are presented to the physician who is asked to decide for best answer. For instance (see adjacent Figure 10), "Would you OK this order for Augmentin?"

to a patient allergic to Penicillin (Augmentin is a Penicillin derivative). If the physician replies yes, the software explains the mistake - which, in fact, has happened on several occasions in recent years at Hadassah.

אתה כעת בתפקיד הרופא המבצע, האם ניתן לבצע את הטיפול על-פי ההוראה?

מס' רישומה: 098789 שם המשפחה: ספקט דוסם המרטינו: יאסי שם האב: יעקב שנת הלידה: 1965	רגישות לתרופות: PENICILLIN - J קלויס	הסתדרות מריצנות הרסה בני החיים התגוננים/מטופלים של הרסה - וריסולם																		
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Figure 10 Screen from software asking: "Would you approve this prescription?"

The software introduces the physician to write orders on the new order form (see Figure 10), re-designed according to human engineering principles (by Prof. Donchin and Ms Porat, in collaboration with the Technion, the Israel Institute of Technology).

The software deals with most commonly encountered problems in physician's orders. For instance, as shown in Figure 11, errors which could easily be prevented by clear and readable orders.

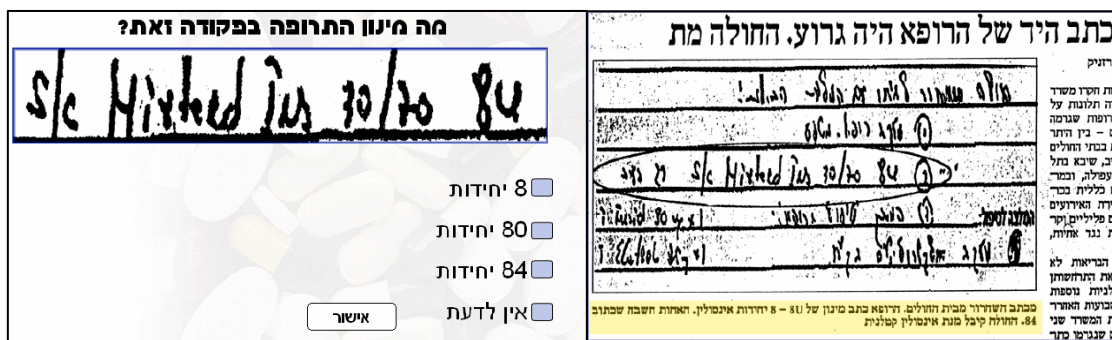


Figure 11: On the left panel, question: "What is the medication dosage in this order?" [Is it 8 u (for units) of Mixtard Insulin or 84 units?]. After the physician answers, the screen (right panel) shows a real newspaper headline: "The physician's handwriting was poor. The patient died." and explains: the fatal overdose of insulin could have been prevented by clear capital letter writing and by avoiding abbreviation u for unit, as it may be read as 4 (recommendation also published now in US)

13) Record and control of critical timings in the emergency room (ER).

A new project has been launched in response to requests by ER department heads from Ein Kerem and Mt. Scopus, to measure critical timings, as delays are causing overburden in an already busy ER, leading to a vicious cycle of overcrowding, poor service and further delays. Following a pilot project, presented last year, in the Pediatric ER in Ein Kerem, delays in turn-over were recorded for other departments. As shown in Table 6, delays are long and not only due to near saturation of bed occupancy. Data will be periodically discussed with department heads.

Table 6: Time delays (hrs) in ER between decision to hospitalize and admission to department and bed occupancy rate (March 2004, Ein Kerem)

	n	Mean (median)	90 th percentile	Range	Occupancy
Orthopedics	105	4.2 (3.3)	7.9	0.2-18.5	106%
Gen. Surgery	123	7.5 (4.5)	17.0	0-40.9	104%
Int. Med. A	145	7.1 (4.4)	19.7	0.4-42.2	98%
Int. Med. B	146	6.9 (4.4)	14.6	0.3-54.7	101%
Int. Med. G	140	7.7 (4.9)	17.8	0.3-35.1	106%
Gynecology	133	6.6 (5.5)	16.2	0-23.4	97%
Pediatrics	151	10.3 (8.1)	21.5	0-37.2	127%

Additional current projects

14) Facilitated dissemination of evidence-based practice by introduction of Harvard-based "UpToDate" (see Figure 12) now accessible directly from all Hadassah computers.

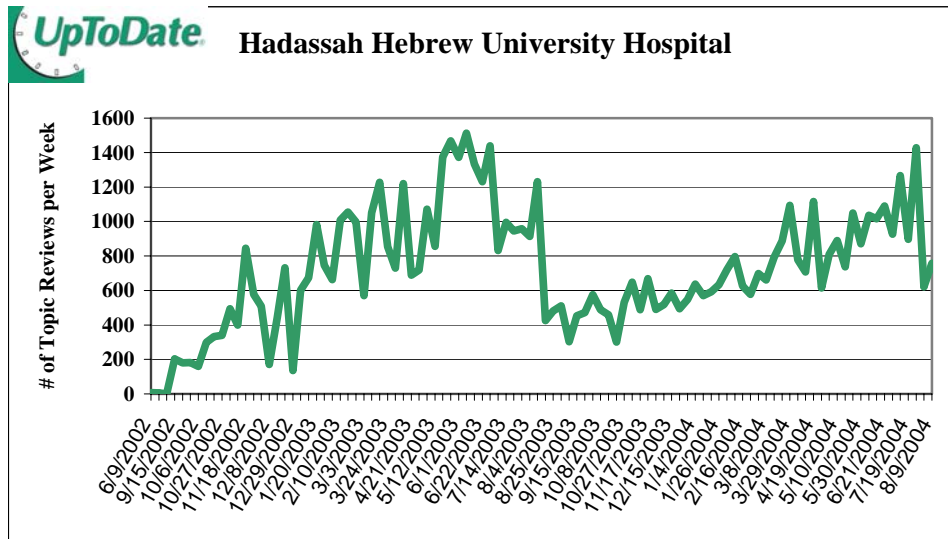


Figure 12: Utilization of database "UpToDate" as number of topics reviewed weekly at both Hadassah hospitals

15) Computerized physician order entry (CPOE). The basis for CPOE is being developed by a multi-disciplinary committee and in accordance to quality and safety principles.

16) Involvement of students in quality projects: students from the Faculty of Medicine have continued to join many of the above-mentioned projects with enthusiasm. These students could, in the long run, lead to a paradigm shift towards patient-centered and evidence-based medicine at Hadassah and at other healthcare institutions in Israel.

17) Design of clinical guidelines for invasive cardiology and cardiac surgery with monitoring of their implementation.

18) Improved partnership of patients sent for coronary angiography and increased referral to cardiac rehabilitation.

19) Control and reduction of complications following coronary angiography.

20) Application of statistical process control in surgery: construction of a prospective database of performance indicators in cardiac surgery for adults and for children.

21) Improved patient instructions at discharge after hip fracture surgery.

22) Adherence to anticoagulation instructions at discharge from orthopedics.

- 23) Pain management in the ER at Ein Kerem.
- 24) Patient involvement for better use of urine cultures in ER (Mt. Scopus).
- 25) Reduction of abuse of laboratory tests in ER (both hospitals).
- 26) Reliability of fetal weight in pregnancy, as estimated by residents, specialists and ultrasound.
- 27) Improving the reliability of fetal monitoring interpretation during labor.
- 28) Implementation of anticoagulation guideline after delivery for high-risk women.
- 29) Patient satisfaction at outpatient clinics.
- 30) Construction of a website for patient information
- 31) Assessment of contribution from medical clowns in pediatrics.
- 32) Development of guidelines for gastrostomy placement in the elderly.
- 33) Analysis of end-of-life care by ward physicians.
- 34) Quality of weaning from ventilation support outside the intensive care units.
- 35) Attitudes, knowledge and behavior related to healthy lifestyles among medical students at the end of their studies: a measure of education in health promotion by teachers at the Hadassah-Hebrew University.
- 36) Two projects dealing with quality of care in primary clinics outside Hadassah.
- 37) Two projects of decision analysis dealing with daily practice problems: at what threshold of clinical suspicion for appendicitis should you operate? Utility of elective cesarean section for non-medical indication (woman's preference).

Further activities include workshops for students and staff as well as presentations of projects at several major institutions outside Jerusalem. This year, Hadassah presented no less than 23 abstracts at the meeting of the Israeli Society for Quality in Medicine. The activity promotes interest at national and even international levels.

In conclusion, diverse projects attempt to make healthcare at Hadassah more patient-centered, more evidence-based and more system-minded. While in some areas, noticeable improvements have been achieved, in others, increasing accountability by department heads for quality and safety may be a key to further successes.