

Factors associated with inappropriate hospitalization days in internal medicine wards in Israel: a cross-national survey

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Abstract

Background. The high costs of health care mandate a quality control system that ensures efficient utilization of hospitalization days.

Objectives. To obtain a national estimate of the rate of inappropriate hospitalization days in medical wards and to identify the variables associated with inappropriateness.

Design. A 1-day cross-national survey.

Setting. A sample of internal medicine wards in all public hospitals in Israel.

Survey population. The survey population included all patients hospitalized in the ward for at least 24 hours on the survey day.

Instruments. We used an adapted version of the appropriateness evaluation protocol (AEP) (Gertman and Restuccia). Reviewers were final year medical students trained to work with the AEP. Final classification of inappropriate days was done by one of the senior investigators.

Outcome measure. Utilization of hospitalization days according to the AEP.

Results. A total of 1003 hospitalization days in 33 medical wards in 24 hospitals was surveyed. Of this, 182 (18.1%) of the days were found to be inappropriate. In multiple logistic regression analysis, variables significantly associated with inappropriate days were government versus other hospital ownership (OR, 1.51; CI, 1.15–1.96), diagnosis on admission of acute cardiac event versus other diagnosis (OR, 0.46; CI, 0.27–0.77), and period (first, second or final third) of the stay (OR, 1.61; CI, 1.29–2.03). In 62.6% of the 'inappropriate days', continuation of hospitalization was justified (72% were patients awaiting tests or consultation). In 6.7% of the total days surveyed, no justification for continuation of hospitalization was found.

Conclusion. The percentage of inappropriate days found in this study is similar to the means found in studies that were conducted in other countries. Awaiting procedures and consultation is a major cause of inappropriate days and may be an important target for intervention.

Keywords: admission diagnosis, hospital ownership, inappropriate hospitalization day, length of stay, medical wards, occupancy.

During 1995, an average yearly occupancy rate of over 110% was reported in internal medicine wards in 50% of the public hospitals in Israel [1]. Three years previously, occupancy at this level or more was reported in only 20% of the hospitals

[2]. The extent to which this increase is due to delays in the discharge of patients awaiting procedures or transfer to other appropriate institutional care is not clear. One way to reduce the costs of health care is to ensure efficient utilization of

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hospitalization days without jeopardizing the quality of care. Although maintaining a low level of inappropriate days is necessary in order to guarantee that efficiency is not achieved at the expense of quality of care [3], an optimum level cannot easily be defined.

Gertman and Restuccia's appropriateness evaluation protocol (AEP) has been used extensively during the last 10 years for hospital utilization review, both in its original form and in a modified version [3,4]. In the USA the AEP has been adopted by insurers and health administrators for the purpose of utilization review [3], while in some hospitals a software program applying the AEP day-of-care criteria to computerized patient data may be a useful instrument for concurrent review [5]. Between 1984 and 1995 44 national studies were carried out in Europe, of which 82% used an instrument derived from the original AEP for assessing inappropriate use of hospital care and characterizing its determinants [4].

In 1986, the AEP was translated into Hebrew and tested for its reliability in two Israeli hospitals [6,7]. Since then, it has been used sporadically in medical wards in four other hospitals [8,9]. The estimates for the rates of inappropriate hospitalization days derived from these studies indicate a range of between 8.3 and 32% [6–9]. In view of the growing burden in medical wards, and the fact that in Israel no national studies have been reported on the extent of and reasons for poor utilization of hospitalization time in medical wards, the Israel Ministry of Health initiated a project which addressed three issues: to determine a national estimate for inappropriate hospitalization days in medical wards; to determine the factors associated with inappropriate days; and to define the major reasons for inappropriate hospital stay. We wish to emphasize that the term 'inappropriate days' in the context of this study refers to days that were not fully utilized for the types of patient care that can only be provided in a hospital facility.

Methods

Design

The study was designed as a 1-day cross-national survey, carried out in two stages.

Setting

A sample of internal medicine wards in all Israeli public hospitals was selected. The first stage of the study was conducted at the end of November 1995. In the second stage, carried out at the end of February 1996, we surveyed the hospitals that were not included in the first stage and some of the wards previously reviewed in order to measure possible associations with the season of the year and occupancy. The surveys were conducted on randomly chosen hospitalization days from Sunday to Wednesday in order to exclude the weekend (Friday and Saturday in Israel) and the day before it.

Survey population

The unit of analysis was the day that preceded the randomly chosen survey day for each patient; we called this the Index Day (I_xD). Wards that were in admission rotation during the I_xD were not included in the sample nor were small wards with a standard of beds below 30 unless this was the only medical ward in a hospital. In hospitals with more than two wards with a bed standard greater than 35, two wards were sampled. (Bed standard refers to the number of certified beds for that ward that is approved by the Ministry of Health at the end of each year.)

A patient was eligible to be included only if he/she was in the ward for at least 24 hours starting from the morning of the survey day. Patients who were discharged or died during the I_xD were excluded. In order to obtain an estimate for the rate of inappropriate hospital days of $\pm 3\%$ (based on a rate estimate of 20%) and with $\alpha = 0.05$, it was necessary to review 680 days. Since the average bed standard for a medical ward is 35 beds, we needed to review at least 20 wards at each stage in order to reach the desired sample size.

The AEP instrument

We used the adapted version of the original AEP as it was used previously in Israel, with several modifications [6]. A full description of the AEP was published in 1981 [10]. Briefly, the original AEP lists 27 objective criteria for judging the appropriateness of each day of hospitalization. If any criterion is met, a day is considered appropriate. The AEP protocol allows an 'override' option, enabling the reviewer to evaluate a hospitalization day as 'appropriate' in spite of failure to meet any of the criteria, or it may be classified as 'inappropriate' even if one or more of the criteria are met. If the hospitalization day is considered 'inappropriate', the reviewer must specify the reasons for the hospital stay for those patients who need continued acute hospitalization on medical grounds and for those patients who do not need it. Whatever the findings, the reason for the stay is to be specified.

In this survey we made the following modifications:

- the presence of three criteria in the nursing/life support service category could not be considered alone as an appropriate hospitalization day ('soft criteria', see Appendix);
- acute myocardial infarction occurring within 10 days of the I_xD was considered a criterion of appropriateness, as opposed to 14 days in the original protocol;
- in cases where the judgement of appropriate/inappropriate day had to be based only on the override option or 'soft criteria', a consistent and independent final classification was carried out by one trained physician, who reviewed all the forms;
- any documented wait for a procedure, consultation, test results, or other clinical reason justified continuation of the hospitalization. Reviewers did not evaluate whether some of these procedures could be done in an outpatient setting.

Data collection

Data were collected by final year medical students who were trained in two workshops which included a validity test at the end of the training period. The same students participated in both stages of the study and reviewed the same wards in cases where a repeat review was done. The main source of information for the AEP was the medical record and, when needed, a physician or nurse in the ward was asked for additional information. A list of all the patients hospitalized in the wards during the survey day and the I_xD, and the discharge dates for each patient were collected from all the hospitals. The occupancy rates for each day during the surveyed months for every medical ward in the hospital were obtained from the hospitals' administrators.

Statistical analysis

The χ^2 test was used to assess differences in the rates of appropriate and inappropriate hospitalization days across categorical data. Student's *t*-test was used to compare continuous data. A multiple logistic regression model was used to assess the independent association between inappropriate hospitalization day (the dependent variable) and the variables that were found to be associated with inappropriate days in univariate analysis.

Results

In both stages of the study, the combined hospitalization days of 1369 patients in 33 medical wards of 24 hospitals were surveyed. The reviewers were able to include 93% of the patients eligible for the survey. The medical records were the sole source of information for 88% of the hospitalization days. Additional information from physicians or nurses was required for the remaining days. Discharge dates were collected for 1050 (76%) of the patients. Occupancy data were obtained from 23 hospitals.

Validation

Seventy-nine hospitalization days, randomly chosen from the medical records of 20 patients, were classified as appropriate or inappropriate by 13 reviewers; on average each reviewed 5 hospitalization days. Their reviews of these days were compared to the classifications of a trained physician (the criterion). All days classified as 'utilized' by the physician were also found as such by the reviewers (100% sensitivity). Of the days classified as inappropriate by the physician, 82% were classified as inappropriate by the reviewers (specificity).

There were no significant differences between the two stages of the study regarding the patients' demographic characteristics and patients' hospitalization data. Separate analysis of the 12 wards that received a repeat visit showed no association with the season of the year. In both stages of the study, the rates of inappropriate hospitalization days for these wards were not statistically different (17.9% versus 20.1%; $P = 0.443$). Therefore, for the statistical analyses we combined the data from both stages. For wards reviewed

Table 1 Distribution of the patients by diagnosis at time of admission ($n = 1003$)

Category of diagnosis on admission	%
Acute cardiac events ¹	30.8
Fever	11.6
Infections	9.1
Cerebral vascular accident (CVA)	7.7
Chronic obstructive pulmonary disease (COPD)	6.3
Congestive heart failure (CHF)	5.1
Malignancies	2.8
Electrolyte disturbances	2.7
High blood pressure	1.7
Syncope	1.9
Other diagnosis	20.8

¹ Includes myocardial infarction, unstable angina pectoris, acute ischaemic heart disease and atrial fibrillation.

twice only the first review was included. Thus the analysis presented here includes hospitalization days for 1003 patients in 33 internal medicine wards of 24 hospitals.

Population characteristics

Fifty-two per cent of the patients surveyed were males. The average age was 68 years with a standard deviation of 16.1 (the inter-quartile range was 60–80 years); 41% were patients older than 74 years. Of the patients admitted to hospital, 7.6% had come from nursing homes or other rehabilitation centres and 88% arrived from home. Mean length of stay (LOS) in the wards on the survey day was 6.7 days (SD = 8.5 days) and mean LOS from admission to discharge was 11.3 ± 10.3 days (not including 13 outliers >60 days). Table 1 shows the distribution of the surveyed population according to diagnosis on admission. The main reasons for hospitalization in the medical wards were acute cardiac events (30.1%), fever (11.7%), and infections (9.1%).

Inappropriate hospitalization days

Of the total hospitalization days 821 (81.9%) were found to be appropriate, 72.8% by implicit criteria (any of the AEP criteria excluding 'soft criteria' – see Appendix) and 9.1% by options (such as consistent chest pain on the I_xD without EKG evidence of ischaemia, rhythm disturbances etc.). Thus the average national rate of inappropriate days was 18.1% (SE = 3%). The rate of inappropriate days varied between wards and the range was 0–41%.

Variables associated with inappropriate hospitalization days

Diagnosis on admission

Figure 1 presents the rate of inappropriate days for each of the diagnostic categories. Low rates ($\leq 15\%$) were associated

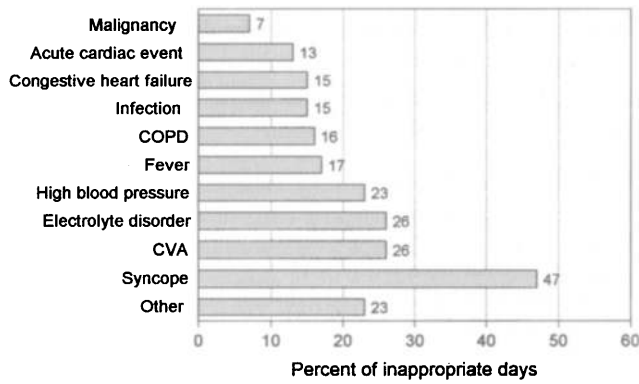


Figure 1 Per cent of hospitalization days classified as inappropriate by diagnostic category.

with malignancies, acute cardiac events, congestive heart failure. High rates ($\geq 26\%$) were associated with electrolyte disorders, CVA, and syncope.

The rate of inappropriate hospitalization days was significantly higher for patients who arrived at hospital from home compared with patients who were admitted from nursing homes or other rehabilitative centres (19% versus 6.6%; $P = 0.006$) as shown in Table 2.

Length of stay

The length of stay on the survey day was significantly positively associated with an increase in inappropriate days.

Mean LOS for inappropriate hospitalization days was 8.6 ± 12.2 days, compared with 6.1 ± 7.3 days for appropriate days ($P = 0.013$). Total LOS was not associated with inappropriate hospitalization days. The rate of inappropriate days increased from admission through discharge regardless of the total LOS (Table 2). The rate of inappropriate days in the first third of hospitalization (10.9%) was significantly lower than the rates in the second (15.8%) and the final third (26.2%) ($P = 0.001$).

Occupancy

Occupancy was calculated by dividing the actual number of occupied beds on the day reviewed with the officially accepted standard number of beds assigned as full occupancy in each ward. In one third of the surveyed wards occupancy on the day reviewed was above 110%. There was no significant difference between the rate of inappropriate days when occupancy was above 110% on the day reviewed compared with equal to or below 110%. The rates were 18.5% versus 17.5% respectively ($P = 0.625$). Since the occupancy rate on the day reviewed did not necessarily represent the average monthly occupancy rate, we examined the association between average occupancy rate of the surveyed month in the surveyed ward, and the rate of inappropriate hospitalization days. An inverse significant association was found between the rate of inappropriate days and the average occupancy rate in the surveyed month. The rate of inappropriate days when the monthly average occupancy rate was above 110% was higher (21.8%) compared with the rate when the monthly average

Table 2 Percentage of inappropriate days according to selected variables

Variable	<i>n</i> ¹	Inappropriate days (%)	<i>P</i> -value
Sex			
Male	518	17.9	0.859
Female	485	18.3	
Age group:			
≤ 45	100	20.0	0.844
46–64	231	18.6	
65–74	256	16.4	
≥ 75	416	18.5	
Origin of arrival:			
Home	885	19.3	0.006
Institution	76	6.6	
Tertile of stay reviewed:			
First	239	10.9	0.001
Second	330	15.8	
Third	286	26.2	
Occupancy: (on the I _x D)			
≤ 110%	733	18.4	0.403
> 110%	243	17.5	
Occupancy: (surveyed month)			
≤ 110%	590	15.3	0.013
> 110%	321	21.8	

¹The numbers do not always add up to 1003 due to missing data.

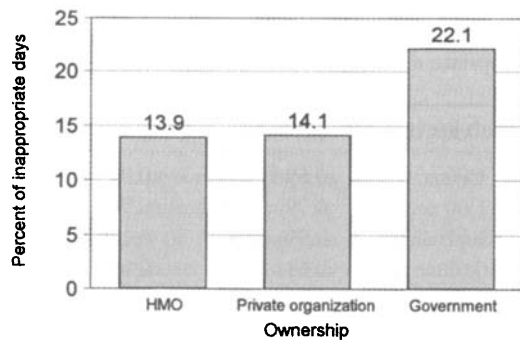


Figure 2 Per cent of hospitalization days classified as inappropriate by hospital ownership.

occupancy was equal to or below 110% (15.3%; $P = 0.001$) as demonstrated in Table 2. This significant association was observed in each stage of the study and also when examined separately in the 12 wards that were surveyed twice.

Hospital type

The sampled wards represent a distribution of all internal medicine wards in the country according to ownership. The highest rate of inappropriate days was found in government hospitals (22.1%) as shown in Figure 2. The rates of inappropriate hospitalization days in the hospitals owned by the general sickness fund and the biggest HMO in the country or in the hospitals financed by charitable or public organizations were similar (13.9% and 14.1% respectively, $P = 0.002$).

Multivariate analysis

The results of the multiple logistic model are shown in Table 3. The strongest association was found between the part of the hospitalization reviewed and the number of inappropriate hospitalization days. The odds of a day reviewed in the second part of the hospitalization being inappropriate was 1.61 times greater than a day reviewed in the first part (95% CI, 1.29–2.03; $P < 0.001$). The rate of inappropriate days was higher for government-owned hospitals compared with hospitals under other ownership (OR, 1.51; 95% CI, 1.15–1.96; $P = 0.003$). Diagnosis at admission was also associated with the number of inappropriate days. Compared with the diagnostic category 'other', acute cardiac events (OR, 0.46; CI, 0.27–0.77; $P = 0.003$) and cases with congestive heart failure (OR, 0.36; CI, 0.13–0.98; $P = 0.046$) were associated with fewer inappropriate days.

Reasons for inappropriate stay

In 141 days (62.6%) of the days judged to be inappropriate a continuation of hospitalization was found to be justified. The reasons were as follows: awaiting procedures (57%); awaiting test results (16.6%); awaiting consultation (15.2%); awaiting procedure in operating room (6.6%); and requiring observation (4.6%). In 6.8% of the total days surveyed, no justification for continuation of the hospitalization was found. Of these, 55% were patients who no longer needed acute

inpatient care, and 45% were patients waiting for other institutional care such as rehabilitation or long-term nursing care.

Discussion

The national estimate of inappropriate hospitalization days in medical wards, based on this study, is 18.1% (range 0–41%). Considerable differences in the rate of inappropriate days were found between hospitals and between wards within hospitals. Other studies that have used the AEP for the same purposes, also describe great variation between wards and hospitals [7,9,11]. In a cross-sectional study carried out in 1986, the rates found in medical wards ranged from 8.4 to 27.2% [7]. An average rate (range 8.9–24.2%) was detected in five medical wards in two hospitals during the year 1992. In the same year, average rates of between 13.3 and 32% were found in a cross-sectional study in all internal medicine wards of two additional hospitals [9]. Different rates have been reported in studies carried out in other countries. Switzerland had low rates for internal medicine wards and reported a range of 4.8–14.4% [11]. In Italy an average rate of 21% was found in internal medicine wards [12], while in the USA an average rate of 30.5% was reported in similar wards [13].

Although differences between studies can reflect true differences in the rates of inappropriate days of hospitalization, methodological differences must be taken into account. These include the sampling methods [14], modification of the AEP, and the options used to justify a hospitalization day, case-mix [15], and the quality of the medical records [17], all of which impose difficulties where comparisons of rates are concerned. The average estimate for the rate of inappropriate hospitalization days found in this survey may be unstable since a single random day was surveyed. However, the fact that similar rates were found in both stages of the survey and in the wards surveyed twice increases our confidence in the validity of the estimates. It is possible that the rates found in this survey may be overestimated due to selection bias. In a cross-sectional study there is a greater probability of sampling patients whose stay in the ward is longer, and inappropriate days were associated with longer stays on the surveyed day. Misclassification bias is possible since the 13 reviewers who participated in the survey may have erroneously classified a day as inappropriate when no explicit criteria were found, while the patient's condition still justifies the hospitalization day. To reduce the possibility of such bias, final classification was carried out by one reviewer.

Factors associated with inappropriate days

In this study, the variable that exhibited the strongest association with inappropriate hospitalization days is the part of the hospitalization stay reviewed regardless of total LOS. This finding is consistent with other studies [13–16]. For example, in a study carried out by Ramos-Cuadra *et al.* [15] the odds of finding an inappropriate day if the review was

Table 3 Adjusted odds ratio for the association between selected independent variables and appropriateness of stay in multiple regression analysis (inappropriate day = 1, appropriate = 0)

Variable	Odds ratio	95% C.I.	P-value
Sex (male = 0; female = 1)	1.00	0.69–1.41	0.995
Age (years)	1.00	0.99–1.01	0.968
Average monthly occupancy rate (%)	1.01	0.99–1.03	0.125
Origin of arrival (home = 1; institution = 0)	0.67	0.37–1.22	0.190
The period of stay reviewed (0,1,2) (for every advanced third)	1.61	1.29–2.03	<0.001
Hospital ownership (government = 1; other = 0)	1.51	1.15–1.96	0.003
Admission diagnosis ¹			
Malignancies (0,1)	0.27	0.59–1.22	0.088
Acute cardiac events (0,1)	0.46	0.27–0.77	0.003
Congestive heart failure (0,1)	0.36	0.13–0.98	0.046
Electrolyte disturbances (0,1)	0.77	0.26–2.27	0.635
Fever (0,1)	0.78	0.41–1.49	0.461
Syncope (0,1)	1.88	0.52–6.75	0.335
Cerebral vascular accident (CVA) (0,1)	1.24	0.61–2.52	0.554
Infections (0,1)	0.73	0.36–1.49	0.383
Chronic obstructive pulmonary disease (0,1)	0.62	0.27–1.47	0.256
High blood pressure (0,1)	1.33	0.39–4.59	0.649

¹The Admission diagnosis category 'other' was selected as the reference group.

carried out in the third part of the stay was 4.2 (range 2.2–7.8) times greater than for a day reviewed in the first part of the hospitalization stay. Restuccia *et al.* found that the effects of total LOS and the part of the stay in which the day was reviewed were independent of each other, and that each is significantly associated with inappropriate days of hospitalization [13]. Our findings do not support any association between total LOS and inappropriate days but clearly show that as the hospitalization progresses the chance of inappropriate days increases.

A statistically significant positive association was found between the average monthly occupancy rate and the rate of inappropriate hospitalization days. No association was found between occupancy rate in the I₂D and inappropriate days. In another study in Israel, in 1995, there was an inverse association between occupancy rate and inappropriate hospitalization days [9]. Occupancy below 95% was associated with higher rates of inappropriate days. The authors speculated that there is an incentive to prolong hospitalization when there is no full occupancy in order to maximize profits in a system where payment is per day. However, in that study the definition of occupancy took into account both the standard number of beds and the size of the working team, and it was carried out during the summer season when low occupancy rates are commonly observed.

Obviously it is not possible to conclude from this study that the association between the average monthly occupancy rate and inappropriate days is causative. Our study was carried out during the autumn–winter season and occupancy below 95% on the I₂D wards was observed in only seven wards. It may be that wards with high levels of occupancy become inefficient in the sense that there are delays in ordering and

executing procedures and consultations. This may prolong the last part of the patient's stay in the ward and, as a result, lead to a higher rate of inappropriate stay.

The present study shows that the diagnosis at admission is associated with the rate of inappropriate days. In spite of the fact that the AEP was intended to be a diagnosis-independent instrument, there are still some criteria which relate directly to diagnosis. In addition, the reviewers' use of the options is not entirely diagnosis-free. Another study in Israel also found an association between hospitalization diagnosis and inappropriate days [8]. High rates were associated with neurologic disturbances (17–25%) in contrast to the low rate which was associated with acute myocardial infarction (0%) or congestive heart failure (CHF) (8.1–9.9%). In Spain, investigators used the AEP in retrospective studies for evaluating the rates of and the reasons for inappropriate admission and hospitalization stay associated with specific diagnosis-related groups (DRG) [17,18]. They found large differences in rates of unnecessary stay for fundamentally therapeutic cases (for example, chronic obstructive pulmonary disease) compared with those with more severe diagnostic components (for example, pulmonary neoplasm). The rates for inappropriate days were 15.5% versus 40% respectively [17]. The fact that diagnosis at admission was found to be an independent factor that predicts inappropriate stay in these wards may suggest that further investigation and special attention is needed for certain diagnostic groups regarding the processes of hospitalization.

Our study did not show any association between patients' demographic characteristics and inappropriate hospitalization. Studies in the USA showed that age above 65 years is associated with inappropriate hospitalization days [13], while

in Israel this was found to be associated with the age-group below 45 years [7,8].

Reasons for inappropriate hospitalization days

In 62% of the inappropriate days, a continuation of hospitalization was justified, mainly in the case of patients awaiting procedures or consultations. A similar proportion (68%) of inappropriate days, where continuation of hospitalization was in fact justified, was found in another study in Israel [8]. Rishpon *et al.* [7] found that in a university teaching hospital, 70% of inappropriate days were explained by patients waiting for procedures or consultations, while in community hospitals the main reason for inappropriate days was waiting for discharge (50%). In Portugal, in only 25% of the inappropriate days was continuation of hospitalization found to be justified [17], while in the USA it was found to be justified for 46% of the days [14]. In all of these studies, the decisions about whether continuation of hospitalization was justified or not, was subjective and was based on the reviewers' evaluation [8,12,13]. In this study the reviewers did not evaluate whether some of the procedures could be performed as an ambulatory service but simply accepted the physicians' opinions. Had this additional evaluation been done, it is possible that the proportion of patients who no longer needed acute in-patient care but remained in hospital awaiting discharge and out-patient follow-up, would be higher.

Conclusions

Awaiting procedures and consultations is a major cause of inappropriate hospitalization days in medical wards. Hospital administrators and department heads should find ways to accelerate the performance of procedures as well as to encourage utilization of ambulatory services whenever possible. Since the implementation of the National Health Insurance Law in January 1995, some organizational changes have occurred, in particular the granting of administrative autonomy to both insurers and hospitals. In the effort to control costs, we can expect that procedures for evaluating the utilization of hospital resources will be further developed, and will move on to the implementation stage. Therefore it is important that insurers, administrators and physicians apply an accepted tool, such as the AEP, based on an algorithm that defines when it is appropriate to discharge a patient and to continue the provision of care in out-patient services without jeopardizing the quality of care delivered to the patient. Consistent and long-term use of this instrument can locate sources of inefficiency and evaluate the impact of correcting measures.

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Appendix

Items included in the AEP in the Israeli cross-national study

A. Medical services

1. Procedure in operating room that day (including cardiac catheterization and angiography).
2. Scheduled for procedure in operating room the next day requiring consultation or evaluation.
3. Twenty-four hours after procedure in operating room.
4. Biopsy of internal organ, thoracentesis or paracentesis, invasive CNS diagnostic procedure that day.
5. Any test requiring strict dietary control for the duration of the diet.
6. New or experimental treatment requiring frequent dose adjustment under direct medical supervision.
7. Close medical monitoring by doctor at least three times daily (must be documented in record).

B. Nursing/life support services

8. Respiratory care – intermittent or continuous respirator use and/or inhalation therapy (chest PT, IPPB) at least three times daily.
9. Parenteral therapy – intermittent or continuous i.v. fluid

- with any supplementation (electrolytes, protein, medication).
10. Continuous vital sign monitoring at least every 30 minutes for at least 4 hours.
 11. *Intramuscular and/or subcutaneous injections at least twice daily.
 12. *Intake and output measurement.
 13. Major surgical wound and drainage care (chest tube, tube, haemovacs, Penrose drains).
 14. *Close medical monitoring by nurse at least three times daily, under doctor's orders.

C. Patient's condition

Within 24 hours on or before day of review

15. Inability to void or move bowels (past 24 hours) not attributable to neurologic disorders.

Within 48 hours on or before day of review

16. Blood and blood products transfusion.
17. Ventricular fibrillation or EKG evidence of acute ischaemia, as stated in progress note or in EKG report.
18. Fever $\geq 38^{\circ}\text{C}$ rectally (or 37.7°C per orally) if patient was admitted for reason other than fever.
19. Coma (for at least 1 hour).
20. Acute confusional state.
21. Acute haematologic disorders, significant neutropaenia, anaemia, thrombocytosis, yielding signs or symptoms.
22. Progressive acute neurologic difficulties (such as CVA).

Within 10 days before day of review

23. Occurrence of a documented new acute myocardial infarction.

*'Soft criteria' which could not be considered alone as appropriate hospitalization day.