

A study of appropriateness of acute geriatric admissions and an assessment of the Appropriateness Evaluation Protocol

ABSTRACT—We studied the appropriateness of admissions to our acute geriatric unit to determine whether they were clinically indicated and to test the Appropriateness Evaluation Protocol (AEP), an instrument previously validated for general hospital admissions. An admission is appropriate according to the AEP if at least 1 of its 16 criteria is met. At the next ward round, a consultant would judge, given the clinical details available on admission, whether the admission was appropriate, regardless of the AEP. All emergency admissions during a three week period were eligible. Of 186 admissions, 146 (78.5%) were available for analysis. The rates of inappropriateness according to consultants and AEP were 13% and 11% respectively. The AEP had a sensitivity of 97%, specificity of 63%, positive and negative predictive values of 95% and 75% respectively. The overall agreement between consultants and AEP was 92% ($\kappa = 0.62$). There are no data on the optimal level of appropriateness but our rate of 87% (89% using the AEP) appears favourable. This study also shows the AEP to be a suitable tool to monitor the appropriateness of acute geriatric admissions.

Appropriateness of hospital admissions has both clinical relevance and economic importance, not least because of the growing pressure for increased efficiency in the health service. Elderly patients are often perceived to be sources of inappropriate admissions although there are no data to support this. Elderly people often fail with non-specific symptoms such that the acute illness sometimes goes unrecognised. When admitted to non-geriatric wards, they may become erroneously labelled as 'bed blockers'. Ideally, such patients should be directly admitted under a geriatrician's care through an open access policy at the general practitioner's request. It is, however, important to monitor this process to ensure acute geriatric beds are being used appropriately. We studied emergency admissions to our acute geriatric unit to determine whether they were clinically indicated and to test the Appropriateness Evaluation Protocol (AEP), an instrument known to be valid and reliable in assessing the appropriateness of general hospital admissions.

P. TSANG, MRCP, Senior Registrar

M. P. SEVERS, FRCP, Professor of Geriatric Medicine
Department of Medicine for Elderly People, Queen Alexandra Hospital, Portsmouth

Subjects and methods

The acute unit is situated in a district general hospital (Queen Alexandra Hospital) in Portsmouth. The study was carried out over three weeks in May 1993 on seven acute geriatric wards. It is the consultants' policy that acute beds should be used where there is a clinical need for acute medical services. All emergency admissions during the study period were eligible. Emergency admissions were defined as those admitted within a day following referral from general practitioners, the accident and emergency department, consultant domiciliary visits, geriatric outpatient clinics, day hospitals and transfers from other departments.

The Appropriateness Evaluation Protocol (AEP)

The AEP is an instrument designed and tested in the United States [1,2,3] and found to be valid and reliable in assessing the appropriateness of a general hospital admission. We were interested in testing it for acute geriatric admissions. It lists 16 criteria relating to the severity of illness and the intensity of service provided on admission (Table 1). Although most of the criteria are self-explanatory, some needed clarification prior to the study to improve reliability but none were modified. An admission was judged appropriate according to the AEP if at least one criterion was met at the time of admission; if none were met, the admission was judged inappropriate according to the AEP.

The admitting doctor recorded all criteria met on admission together with the usual demographic data, source of referral, medical diagnoses and dates of admission and subsequent discharge or death. At the first ward-round after the admission, one of the six participating consultants would decide, on the basis of the clinical details available on admission, whether the admission was appropriate, regardless of the AEP. The consultant was blind to the AEP assessment.

Results

Of 186 admissions, 146 (78.5%) (F:M = 2:1) were available for analysis. Most patients (79%) were over the age of 75, with 34% being over 85 (age range 67–100). Mean age was 82 for female and 80 for male patients. General practitioners referred 64% and the accident and emergency department 23% of the emergency admissions.

Table 1. Appropriateness Evaluation Protocol criteria for appropriateness of admissions**A Severity of illness criteria**

- 1 Sudden onset of unconsciousness or disorientation
- 2 Pulse rate
 - (a) < 50 per minute
 - (b) > 140 per minute
- 3 Blood pressure
 - a) systolic < 90 or > 200mm Hg
 - b) diastolic < 60 or > 120mm Hg
- 4 Acute loss of sight or hearing
- 5 Acute loss of ability to move body part
- 6 Persistent fever > 37.8°C (100°F) orally for more than five days
- 7 Active bleeding
- 8 Severe electrolyte/blood gas abnormality (any of the following):
 - a) Na < 123 mmol/L—Na > 156 mmol/L
 - b) K < 2.5 mmol/L—K > 6.0 mmol/L
 - c) standard HCO₃ (unless chronically abnormal) < 20 mmol/L or > 36 mmol/L
 - d) arterial H⁺ < 35mmol/L or > 50 mmol/L
- 9 Electrocardiogram evidence of acute ischaemia
- 10 Wound dehiscence or evisceration

B Intensity of service

- 11 Intravenous medications and/or fluid replacement (does not include tube feedings)
- 12 Surgery or procedure scheduled within 24 hours requiring:
 - a) general or regional anaesthesia or
 - b) use of equipment, facilities available only in a hospital
- 13 Cardiac monitoring or vital sign monitoring at least every 2 hours
- 14 Chemotherapeutic agents that require continuous observation
- 15 Intramuscular antibiotics at least every eight hours
- 16 Intermittent or continuous respirator use

The rates of inappropriate admissions according to the consultants and AEP were 13% and 11% respectively. The AEP had a sensitivity of 97%, specificity of 63%, positive and negative predictive values of 95% and 75% respectively. The overall agreement between consultants and AEP was 92% ($\kappa = 0.62$).

Table 2 shows the details of admissions found to be inappropriate by either consultant, AEP or both. Although some of these patients' admissions would have been deemed appropriate in other acute geriatric units, (for example the two patients admitted for terminal care) they were here judged inappropriate as they were not in need of acute medical care but of pal-

liative care and would normally have been transferred to our palliative care ward as soon as possible (however, both patients died before this was possible). We adopted this approach to ensure that all potentially inappropriate admissions would be identified and may thus have been led to over-estimate the number of inappropriate admissions.

Seven admissions were deemed inappropriate because they did not require acute inpatient assessment or treatment. Two were patients with known carcinomatosis who were admitted with abdominal pain due to constipation (serum calcium was normal in both patients); two were admitted with mild dyspnoea due to newly diagnosed chronic obstructive airways disease/emphysema; one patient, referred with chest pain, had costochondritis; one ambulant patient with leg ulcers and cellulitis was managed with oral antibiotics. One patient admitted with recurrent episodes of biliary colic was awaiting outpatient abdominal ultrasound and surgical appointments; she was not ill on admission.

Of the AEP criteria met, four accounted for 75% (Table 3) and represented the commonest reasons for admission to our acute geriatric unit; five criteria were not met at all (A4, A10, B14, B15 and B16) and two of those (A10 and B14) could probably be omitted without compromising the validity and reliability of a modified AEP suitable for acute geriatric admissions.

Of the diagnoses recorded, all major systems were well represented: cardiovascular, neurological and musculoskeletal problems were most frequently encountered; also, a whole range of common conditions was present within each major system. The average overall length of stay of appropriate admissions was 13.3 days and of inappropriate admissions 7.7 days.

Discussion

No data are available on what the optimal level of appropriateness should be. It is neither possible nor desirable to achieve 100% as not only are some factors beyond the control of general practitioners and hospital staff, but more importantly, may reduce access to services when they would actually be appropriate. Total appropriateness is similar to running a hospital at 100% occupancy; efficiency is maximised at the expense of a longer wait for non-urgent admissions and lack of beds for some urgent admissions.

However, it should be possible to reduce inappropriateness without untoward consequences, with substantial savings and improved efficiency.

Our rate of inappropriate admissions of 13% appears acceptable. A study of acute medical admissions in Birmingham [4] in the early 1960s found 13% to be inappropriate, and a similar study in Dundee in the '70s [5] found this to be 25%. Studies of hospital admissions (as a whole) in the United States, using the AEP, have found inappropriateness rates of 10–35%

Table 2. Details of admissions considered to be inappropriate by AEP only, consultants only or both

AEP	Consultants	Both
<ul style="list-style-type: none"> One frail chairbound patient with end stage rheumatoid arthritis with a large deep submandibular ulcer (with blood stained discharge) due to pressure necrosis from neck deformity. GP queried an eroding artery. Consultant thought admission for advice on further management was reasonable One patient with uncontrolled heart failure and non-insulin dependent diabetes mellitus who needed daily supervision and adjustment of oral therapy One patient with recurrent falls due to dementia and poor vision due to cataracts One patient with chest infection and constipation causing vomiting who was 'unable to cope at home' 	<ul style="list-style-type: none"> Two patients with fracture of fibula (A5) one of whom was already resident in a rest home One patient with a two week old below knee DVT (A5). GP could have managed conservatively at home Two patients referred for terminal care: one (A5, A1) with known end stage myeloma whose pneumonia was not treated; one with end stage mesothelioma (A8, B12) whose hyperkalaemia was not treated One patient living in a nursing home said to have acute confusion (A1) and a high BM stix reading. Confusion already explained by a recent stroke in hospital. No increase in confusion observed this time. Normal blood glucose on admission One patient living alone admitted with a soft tissue injury and reduced mobility (A5) following an accidental fall. Could have been managed at home with social support or on a rehabilitation ward 	<ul style="list-style-type: none"> Two patients who needed total nursing care from day one: one frail rest home patient with dementia and large sacral and heel ulcers who needed subcutaneous morphine infusion; one patient with severe osteoarthritis whose husband could no longer manage the hoist One mobile patient with vertebral collapse two weeks prior to admission whose pain could have been controlled at home One patient with a small apical pneumothorax who could have been discharged from the Accident and Emergency Department One patient referred because of dyspnoea whose heart failure was well controlled. No change in treatment was made and she was discharged 48 hours later Seven admissions who were judged not to have required acute inpatient assessment or treatment (see text)

A letter followed by a number, eg A5 denotes the AEP criterion fulfilled.

[6] and 12–28%, average 19% [7]. Our rate, using the AEP, was 11%.

There is a need to develop new tools to monitor the appropriateness of admissions. The AEP appears to be suitable and, as we have shown, is applicable to acute geriatric admissions. It is simple to administer and has been used reliably by non-medical staff with minimal training and under medical supervision [8]. It can be used retrospectively, concurrently and longitudinally.

Can we reduce inappropriate admissions?

Some of the inappropriate admissions in our study could have been prevented by offering either urgent outpatient or domiciliary visit assessments. Other patients could have been managed through day hospital attendance, a palliative care ward or on a rehabilitation ward. Greater availability of, and easier direct access to these services would help reduce inappropriate admissions. But some inappropriate admissions will still be unavoidable. They need to be identified early and effective discharge planned from the outset in conjunction with community and social services.

Table 3. The four commonest AEP criteria met

A1	Sudden onset of unconsciousness or disorientation
A5	Acute loss of ability to move body part
B11	Intravenous medications and/or fluid replacement
B13	Cardiac monitoring or vital sign monitoring at least every two hours

There is a clear need to monitor rates and patterns of inappropriate hospital admissions, not only locally but nationally. It is hoped that by taking steps to reduce them, substantial savings could be made and used to treat more patients in appropriate settings.

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Address for correspondence: Dr P Tsang, Department of Medicine for Elderly People, Queen Alexandra Hospital, Cosham, Portsmouth PO6 3LY.

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Edited by Gavin Spickett and Ian Lewin

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