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Review article

## What is inappropriate hospital use for elderly people near the end of life? A systematic review

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### ABSTRACT

**Background:** Older people with advance chronic illness use hospital services repeatedly near the end of life. Some of these hospitalizations are considered inappropriate.

**Aim:** To investigate extent and causes of *inappropriate* hospital admission among older patients near the end of life.

**Methods:** English language publications in Medline, EMBASE, PubMed, Cochrane library, and the grey literature (January 1995–December 2016) covering community and nursing home residents aged ≥60 years admitted to hospital. Outcomes: measurements of inappropriateness. A 17-item quality score was estimated independently by two authors.

**Results:** The definition of 'Inappropriate admissions' near the end of life incorporated system factors, social and family factors. The prevalence of *inappropriate* admissions ranged widely depending largely on non-clinical reasons: poor availability of alternative sites of care or failure of preventive actions by other healthcare providers (1.7–67.0%); family requests (up to 10.5%); or too late an admission to be of benefit (1.7–35.0%). The widespread use of subjective parameters not routinely collected in practice, and the inclusion of non-clinical factors precluded the true estimation of *clinical inappropriateness*.

**Conclusions:** Clinical inappropriateness and system factors that preclude alternative community care must be measured separately. They are two very different justifications for hospital admissions, requiring different solutions. Society has a duty to ensure availability of community alternatives for the management of ambulatory-sensitive conditions and facilitate skilling of staff to manage the terminally ill in non-acute settings. Only then would the evaluation of local variations in clinically inappropriate admissions and inappropriate length of stay be possible to undertake.

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### 1. Introduction

The terms *inappropriate* or *non-beneficial* treatments have been widely used for at least two decades, and generically refer to aggressive or unnecessary interventions administered to older patients in hospital when there is no hope of recovery or improvement in survival or quality of life [1]. Examples range from administering CPR to a patient with a

do-not-resuscitate order [2] to admitting patients with limitations of treatment to intensive care [3] when poor outcome is anticipated [4]. Failure to recognise patients near the end-of-life often leads to: their admission to hospital and/or remaining in acute hospitals for longer than necessary [5]; anxiety/concern by patients/families [6]; the use of rapid response system resources for little or no impact on patient clinical state [7]; unnecessarily high costs of care [8]. Paradoxically, a proportion of these patients already have either do-not-resuscitate (DNR) [2] or do-not-hospitalize (DNH) orders [9] so no further benefit is expected to arise from continuing active treatment.

Measurements of *inappropriateness* first emerged in the 1980s when a standard approach to conceptualising it and investigating its causes was suggested. The Appropriateness Evaluation Protocol (AEP) was an attempt to quantify the concept and comprised 27 criteria relating to

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medical services, nursing care, life support services and patient condition to classify potentially inappropriate admissions and days of hospital use [5,9,10]. Factors contributing to inappropriateness include: legal pressures [11]; reimbursement policies influencing admission and treatment practices [12]; identified variations in care practices originating from patient demands and preferences for increased use of technology to save lives [13]; social circumstances such as living alone [14]; and absence of alternative services [6,15].

While the above factors contribute to *inappropriate* hospitalizations, their extent across different health systems has not been systematically evaluated. This review aims to collate and understand published definitions and magnitude of the problem. We evaluated explicit and measurable factors for inappropriate hospitalization in a practical way that can be used by clinicians to avoid or reduce unnecessary admissions to acute hospitals for our target group.

The specific objectives of this review are to examine:

1. How *inappropriate hospital admission* near the end of life is conceptualised and how this is measured.
2. The extent and causes of *inappropriate hospital admissions* of older people near the end of life.

The definition of 'end-of-life' varies across cultures and the interval can range from years with terminal illness to the last few days of life [16]. For the purpose of this study, the time interval is not the driving concept. A person near the end of life is of advanced age, is frail and at risk of injury; has an advance incurable chronic condition or co-existing diseases that put people at risk of an exacerbation leading to hospital transfer. By default, older nursing home residents are considered near the end of life.

## 2. Methods

We conducted a review of the English language medical literature in Medline, EMBASE, PubMed, and CAB extracts for publications between January 1995 and December 2016 to observe any time changes in perception or extent of the problem. Our focus was on older patients aged  $\geq 60$  years hospitalized near the end of life. We searched the following combination of terms in the abstract, title or as a keyword, limited to the English language literature: ['Inappropriate' or 'disproportionate' or 'cost[ly]' or 'futility'] AND ['hospital' or 'hospitalization'] AND ['cancer' or 'chronic heart failure' or 'chronic kidney disease' or 'chronic liver disease' or 'stroke' or 'chronic obstructive pulmonary disease'] AND ['advanced' or 'terminal' or 'life-limiting' or 'death' or 'dying']. Other conditions such as dementia were neither targeted nor excluded. Literature searches were mainly conducted by one author (JCHK) trained by a university medical librarian, with single database cross-searching by another (MCM); manual searches of reference lists were conducted by three co-authors (JCHK, MCM, KH). A sample search is available in Appendix 1. A validation of the online search was conducted that found the initial searches were too broad before the concept of *inappropriateness* became clearer. Hence additional manual reference and literature searches proved useful.

All study types except case series were eligible for inclusion if they addressed our research questions. We covered articles identifying objective or subjective definitions of "inappropriate hospitalization" anytime in the last year of life, and/or reporting estimates of inappropriate hospitalizations for older sub-populations.

Exclusion criteria: Qualitative research, studies with a focus on opinion, inappropriateness of re-admissions following complications, studies covering all adults if outcomes for old age were not specified, or if indicators were not reported separately for the older sub-groups in larger studies.

Eligibility assessments based on abstracts and quality/bias appraisal were conducted independently by two authors (JCHK and MCM). A 17-item quality score, adapted from Kmet et al. [17], where items were assigned single points and studies with random samples, larger samples and presence of comparison groups weighted more highly (Appendix

2). A modification to Kmet's list was required for more specific quality assessment, although quality scores were not used as a criterion for exclusion.

### 2.1. Synthesis

Definitions and their corresponding indicators reported by eligible studies are summarized in tables without attempt to conduct statistical analyses. In deciding on the relevance and operational feasibility of reported definitions, we examined the indicators against the following criteria: objective or subjective; items routinely available in the clinical setting; role of clinical severity; whether care was feasible elsewhere (non-acute hospital setting); and whether social or non-medical causes were incorporated.

Meta-analyses was not possible due to heterogeneity of definitions, incompleteness of numeric estimates and absence of measures of distribution (generally no ranges, standard deviations or 95% confidence intervals were reported). In reporting results we adhered to the PRISMA guidelines [18].

## 3. Results

Sixteen quantitative studies (nine retrospective clinical record reviews, three cross-sectional surveys and four prospective studies) met the criteria for inclusion as classifying treatment of the elderly as *inappropriate* (Fig. 1). Ten studies focused on nursing home residents and six targeted community dwellers or other hospital patients.

The sixteen eligible studies covered 491,697 older adults in five countries: England (6 studies), the USA (3), Canada (2), and one each from Australia, New Zealand, Northern Ireland, Belgium and Norway. Subjects near the end of life were older patients who died in hospital [19–23], patients with palliative care [24,25] acute or rehabilitation needs [26], nursing home residents within months or days of death [27,28], or older people with complex care needs perceived as inappropriately seeking emergency services [29–34]. Patients' mean or median age was 80 years and above in seven studies, over 70 in three, over 60 in two, and not reported in another three but these were included due to participants being nursing home residents or reporting results for older age groups (Table 1). Study sample sizes ranged widely from 49 to 474,829 (median 274), and study quality was high with half the studies scoring  $\geq 12$  out of 17 maximum possible points, and only three scoring below 10.

Eight of the 16 studies presented objectively measureable criteria for inappropriateness, based largely on disease severity from routinely collected clinical data (Table 2). The remaining eight were grounded on subjective expert skill or judgment to determine inappropriateness based on a list of clinical and social parameters. The most frequently reported reasons for inappropriateness were: the presenting complaint could be treated in a community setting (e.g. hospice); or the low level of severity did not warrant a hospital admission (8 studies of community-based populations and 6 nursing home-based). One definition of inappropriateness was diagnosis-independent [29] but incorporated the services received for medical conditions. Many definitions also incorporated social or health system factors such as availability of community services to enable home stay and living arrangements. Definitions were based on routinely available data in only 6 studies as well as on new data collection and subjective judgment in the remainder.

In establishing the objective extent of the problem of *inappropriate* admissions, studies usually reported proportions in specific categories without additional statistical information on the spread of distribution or comparisons, hence precluding meta-analysis. The range of *inappropriate* admissions, based on feasibility of receiving care in lower level facilities rather than a hospital was 1.7–67.0% for nursing home residents (Table 3) and 18.0–55.3% for non-institutionalised older people (Table 4). For nursing home residents hospitalization was deemed avoidable when actions in the aged care facility may have prevented

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