

Assessing the effectiveness of geriatric services: a proposed methodology

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This article presents an explicit and systematic methodology, adapted from the practices of the Canadian Task Force on the Periodic Health Examination, for assessing the effectiveness of geriatric services in managing specific diseases and disabilities. The five steps in the process are as follows: (1) the identification of target diseases and disabilities, (2) the development of a specific service model for each target condition, (3) the establishment of criteria that must be satisfied for service procedures to be considered effective, (4) a review of the evidence from published clinical research to determine whether service procedures meet the criteria and (5) the classification of recommendations based on the strength of the evidence. These methods can enhance scientific standards for assessing effectiveness by encouraging a systematic, comprehensive and objective evaluation of the evidence.

Cet article décrit une méthodologie explicite et systématique, adaptée à partir des pratiques du Groupe d'étude canadien sur l'examen médical périodique et visant à évaluer l'efficacité des services gériatriques par rapport au traitement de maladies et de déficiences spécifiques. Les cinq étapes du processus sont les suivantes : (1) l'identification des maladies et des déficiences cibles, (2) l'élaboration d'un modèle de services particulier à chaque affection cible, (3) l'établissement de critères qui doivent être satisfaits pour que les procédés de service soient considérés comme efficace, (4) un examen des données extraites de recherches cliniques publiées afin de déterminer si les procédés de service répondent aux critères et (5) le classement des recommandations selon la fiabilité des données. Ces méthodes peuvent améliorer les normes scientifiques pour évaluer l'efficacité en favorisant une évaluation systématique, exhaustive et objective des données.

Because resources are limited there is increasing concern about the effectiveness of geriatric medical and psychiatric services.^{1,2} The strongest evidence of effectiveness comes from well-designed, controlled trials of specific services, but relatively few have been conducted.³⁻⁷ Other types of evidence are more available in some instances but are difficult to merge with the findings from controlled trials. A methodology is needed to assess and combine evidence and to formulate recommendations that are linked to the strength of this evidence.

Such a methodology may be attainable through a modification of the analytic practices of the Canadian Task Force on the Periodic Health Examination.⁸⁻¹³ Established in 1976 to evaluate the effectiveness of the periodic medical check-up in preventing disease and promoting health, the task force developed a systematic approach to the evaluation of evidence: members identified 78 target diseases, evaluated the potential impact of preventive interventions on each and recommended useful practices. Already, modified versions of these methods

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have been used to assess the effectiveness of anti-thrombotic agents,¹⁴ the treatment of spinal disorders¹⁵ and the benefits of new technologies.¹⁶ This article proposes a version of the task force methodology to assess the effectiveness of geriatric services in managing specific diseases and disabilities.

The methodology

The proposed methodology has five steps: (1) the identification of target diseases and disabilities, (2) the development of a specific service model for each target condition, (3) the establishment of criteria that must be satisfied for service procedures to be considered effective, (4) a review of the evidence from published clinical research to determine whether service procedures meet the criteria and (5) the classification of recommendations based on the strength of the evidence.

Identification of target diseases and disabilities

The conditions targeted for service intervention are selected on the basis of their burden of illness, suffering and death.

Development of specific service models

The service model involves a series of procedures and clinical events that lead to an effect on a target condition. A useful tool for identifying and mapping out the relations between these procedures and events is an adaptation of the "causal pathway" proposed by Battista and Fletcher.¹⁷ The pathway illustrates the causal links that must occur for a given service to influence a target condition. For example, in the case of major depression the causal pathway in a geriatric psychiatry consultation service (Fig. 1) illustrates that the most direct evidence of

effectiveness would come from establishing causal link 5, studies demonstrating that medical and surgical inpatients with symptoms of depression that are detected, diagnosed and treated have a favourable outcome. In the absence of such evidence it would be possible to infer effectiveness by establishing causal links 3 and 4 or links 1, 2 and 3. The causal pathways for urinary incontinence in a geriatric outpatient service and for overmedication in a geriatric community service are illustrated in Figs. 2 and 3. As described, each causal pathway is specific to the service and target condition.

Clarification of the causal pathway indicates the type of evidence that must be examined in a complete evaluation of effectiveness. For example, in the case of major depression the causal pathway in the consultation service clarifies the need to evaluate three types of evidence: the ability of detection procedures to identify those inpatients with symptoms of depression, the ability of diagnostic procedures to identify cases of major depression and the ability of treatment procedures to achieve a favourable outcome.

Establishment of outcome criteria of effectiveness

A valid assessment of the effectiveness of a service requires an examination of all important benefits and risks. Benefits may include reductions in rates of death and disability, in symptoms and in the need for institutional care and improvement in quality of life. The evidence of benefits under optimum conditions (efficacy) as opposed to the conditions of usual clinical practice (effectiveness) should be considered through an examination of factors related to patient and provider compliance and the constraints of the health care system. Adverse effects should include not only those associated

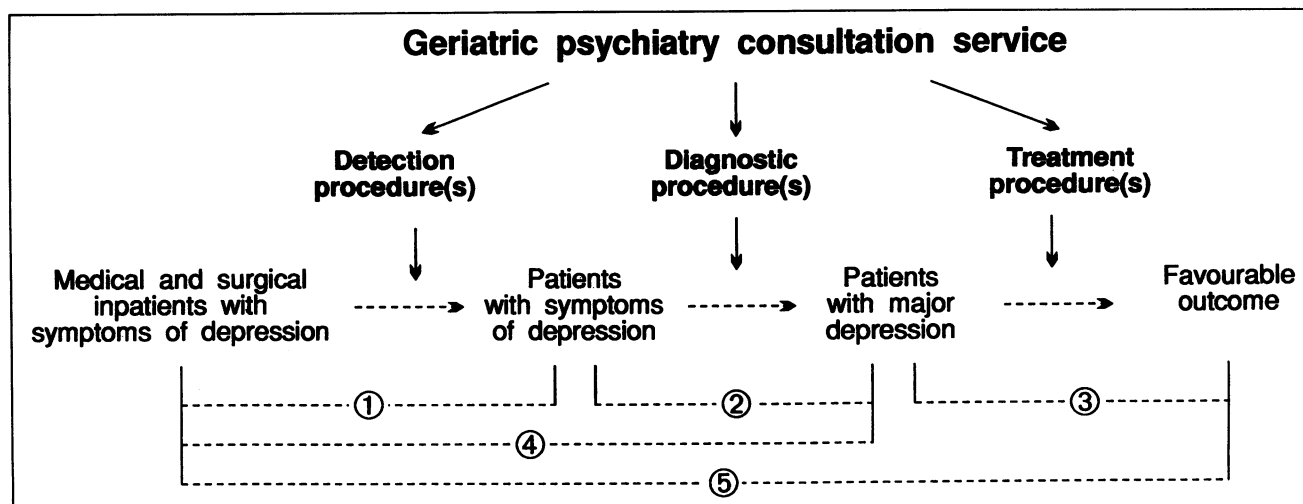


Fig. 1: Causal pathway for major depression in a geriatric psychiatry consultation service.

with treatment but also the impact of the results of detection and diagnostic procedures on patients (e.g., labelling) and on health care services (e.g., increased use).

Review of the evidence

Only after the outcome criteria of effectiveness have been identified is it possible to evaluate service procedures. Each selected causal link becomes the subject of a critical review involving systematic information retrieval, classification of study design and quality, synthesis of results, explanation of variability in results and classification of evidence.

Information retrieval: The retrieval process, well described in two recent articles,^{18,19} involves a search

of computer databases and bibliographies of review articles and standard texts, consultation with experts and the application of explicit criteria to study selection.

Classification of study design: Study design is classified according to categories adapted from those of the Canadian Task Force on the Periodic Health Examination⁸ (Table 1).

Classification of study quality: Because poorly designed experimental studies may provide weaker evidence than that of well-designed nonexperimental studies it is important to critically appraise design strengths and flaws. Guidelines for assessing the quality of different types of study have been described previously.²⁰⁻²⁵ A classification of study quality is proposed in Table 2. In some instances, only

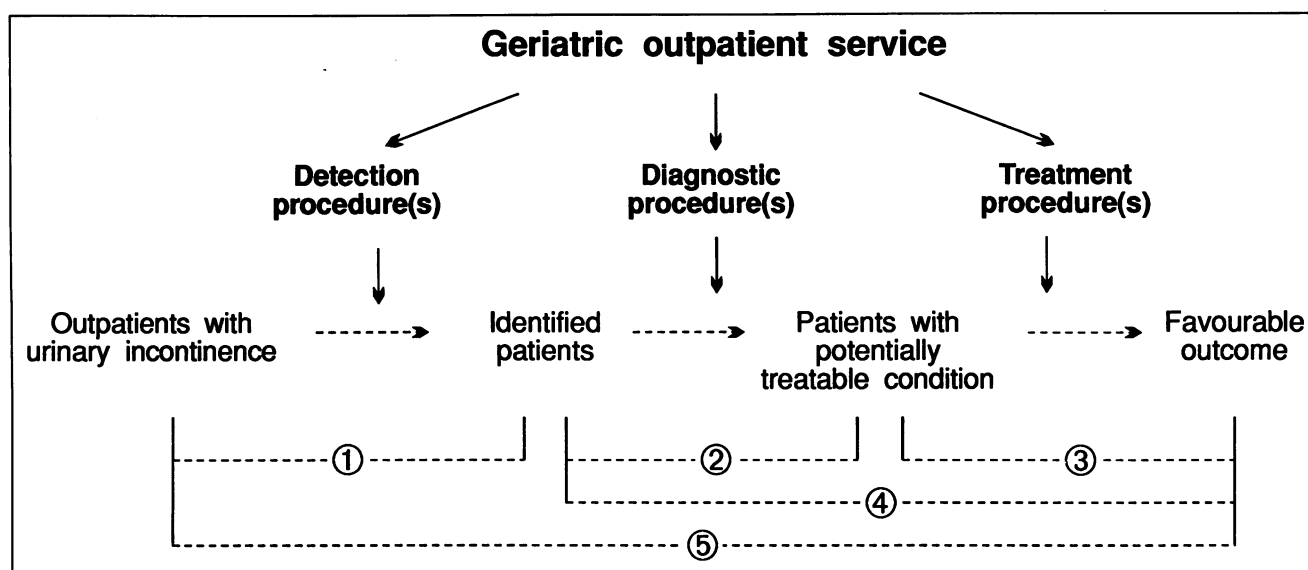


Fig. 2: Causal pathway for urinary incontinence in a geriatric outpatient service.

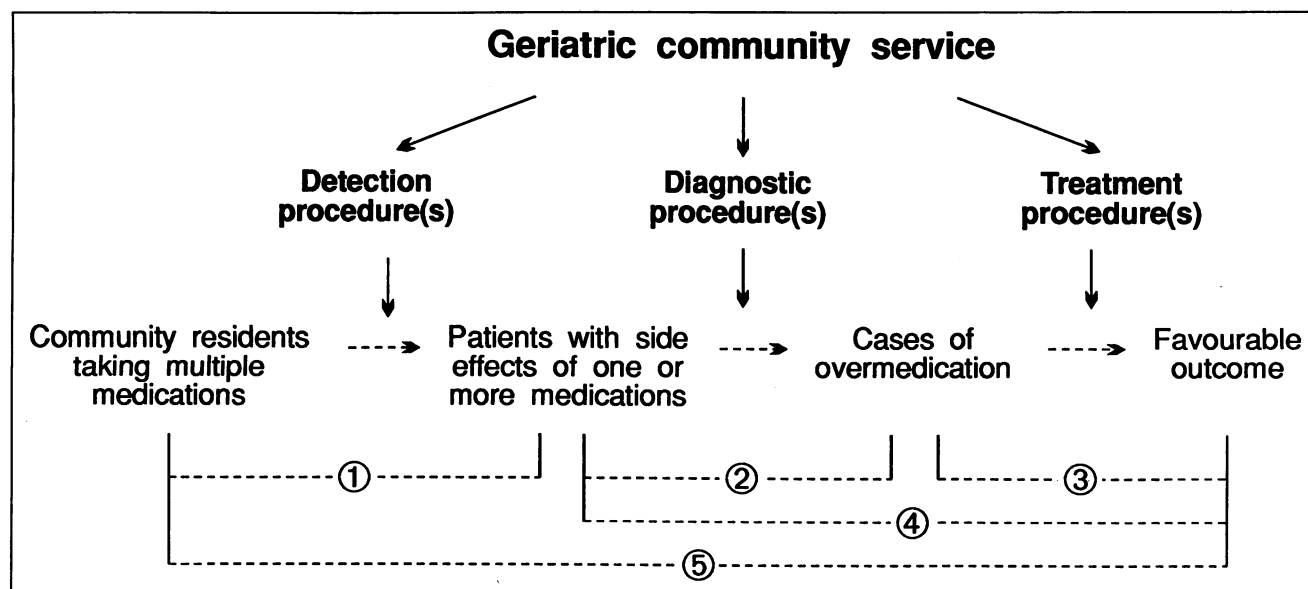


Fig. 3: Causal pathway for overmedication in a geriatric community service.

the results of studies above a specified quality threshold (e.g., b-1) would be considered for analysis.

Synthesis of results: The principal features of studies related to each selected causal link are synthesized in a table for easy identification of important patterns in the results. Each table should summarize study design, study quality, sample size, sample characteristics, interventions, measures and results.¹⁸

Meta-analysis may be used to synthesize the results in some cases. According to Streiner²⁶ this set of techniques takes into account the sample sizes, the levels of statistical significance and the sizes of the effects in different studies; it can also be used to combine the results of trials with small samples that individually show no significant differences between treated and untreated groups. Even meta-analysis, however, can be influenced by the thoroughness of study retrieval, the homogeneity of patients and treatments, the quality of study design, the number of outcomes measured and the handling of significant variance in effect sizes.

Explanation of variability in results: Important differences in results may be explained by an examination of differences in the principal study components: trial design, sample selection, sample size, interventions and outcome measures.

Classification of evidence: On the basis of information already synthesized, evidence for each selected causal link is classified according to the rules of

evidence adopted by the Canadian Task Force on the Periodic Health Examination (Table 3).

Classification of recommendations

The classification of a recommendation (Table 4) for each specific service model involves consideration of the level of evidence of the causal link(s) selected; guidelines for linking recommendations to these levels, adapted from those of Battista and Fletcher,¹⁷ are outlined in Table 5. Usually a class A recommendation would require positive levels of evidence — I or II-1. However, levels I to II-3 might be sufficient if the study results were remarkably consistent, the burden of suffering caused by the disease or disability was great or the service evaluated was particularly attractive or inexpensive. A class C recommendation would be made if the evidence was mixed or inadequate. In the case of a class C recommendation there would be several additional considerations: (a) to minimize the harm caused by

Table 1: Classification of study design^a

R	Randomized controlled trial
NR	Nonrandomized controlled trial
C	Cohort or case-control analytic study
U	Uncontrolled trial
O	Opinions of respected authorities

Table 2: Classification of study quality

a	Has no important methodologic flaws undermining the validity of the results
b-1	Has important methodologic flaws probably not undermining the validity of the results
b-2	Has important methodologic flaws probably undermining the validity of the results
c	Has important methodologic flaws undermining the validity of the results

Table 3: Classification of the evidence of effectiveness^a

I	Evidence obtained from at least one properly randomized controlled trial
II-1*	Evidence obtained from well-designed controlled trials without randomization
II-2	Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group
II-3	Evidence obtained from comparisons between times or places with or without the intervention
III	Opinions of respected authorities (based on clinical experience), descriptive studies and reports of expert committees

*Before 1984 the Canadian Task Force on the Periodic Health Examination^a used a four-point scale that did not include the current category II-1.

Table 4: Classification of recommendations^a

A	Strong evidence of effectiveness
B	Fair evidence of effectiveness
C	Weak evidence of effectiveness but may be implemented or continued on other grounds
D	Fair evidence of ineffectiveness
E	Strong evidence of ineffectiveness

Table 5: Guidelines for linking levels of evidence to graded recommendations

Level of evidence	Direction of studies' results, grade		
	All positive	Mixed	All negative
I to II-1	A	C	E
I to II-3	B	C	D
III	C	C	—

adding or withdrawing a service, (b) to minimize costs, (c) to avoid major changes to accepted practices without strong evidence, (d) to focus on conditions with a high burden of suffering and (e) to focus on high-risk groups.⁸

Discussion

Most geriatric medical and psychiatric services involve one or more professionals applying multiple procedures to better the health and function of elderly patients. The methodology outlined here provides these professionals with a tool to critically review the evidence of the impact of their activities on specific conditions.

This methodology is applied to service procedures and models, not to patients. Nothing prevents the health care professional from considering the complex interplay of physical, functional, emotional and social factors in individual cases. A knowledge of which procedures are effective for which conditions, however, can only improve care.

The methodology not only classifies service models but also identifies the service procedures needing improvement. For example, one of the causal links in the consultation service (Fig. 2) involves the detection of elderly medical and surgical inpatients with symptoms of depression (link 1). These symptoms are overlooked by attending physicians in up to 90% of cases.²⁷ Thus, an effective service would require a sensitive and specific screening procedure.

Effective service models that involve similar procedures may be grouped in geriatric-service packages to increase efficiency. For example, depression and delirium are common undetected disorders among elderly medical and surgical inpatients.^{27,28} If effective service models can be found for both conditions and the models have systematic screening procedures, then one screening procedure to detect both disorders could be part of a depression-delirium package. Eventually the use of packages might be related to special characteristics of elderly populations (e.g., patients on medical and surgical wards and residents of nursing homes).

To date, trials of geriatric services have involved comprehensive services in which different mixes of patients received different mixes of interventions. The results are difficult to apply, because it is not clear which patients with which conditions responded to which interventions.^{3,29} Such information can come only from trials of services for specific diseases and disabilities or from the approach outlined in this paper.

The technique has potential limitations. First, the process of grading recommendations on the basis of evidence from a series of causal links requires

considerable judgement. Second, there is no explicit formula for integrating data on compliance, costs or the burden of suffering into the process of making recommendations. Nevertheless, the technique can enhance scientific standards for assessing the effectiveness of geriatric medical and psychiatric services by encouraging a systematic, comprehensive and objective evaluation of the evidence. More sophisticated assessment technologies can be used when they become available.

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Conferences

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Du 30 mai au 3 juin 1993 : XVII^e Congrès de l'Association internationale pour la prévention du suicide (Congrès conjoint de l'Association canadienne pour la prévention du suicide et de l'Association québécoise de suicidologie organisé avec la collaboration de Suicide-Action Montréal)

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