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Editorial

A new version of the STOPP-START criteria, a new step towards improving drug prescription in older patients

Inappropriate drug prescription is a common concern in geriatric medicine. A drug is usually considered inappropriate when it has an unfavourable risk–benefit ratio – specially when a safer or more effective alternative exists for the same condition –, is used for a longer duration or at higher doses than recommended, is not cost-effective, or scientific evidence does not support its use [1]. Omission of medically indicated drugs without solid reasons can also be considered inappropriate [2].

Older patients are especially vulnerable to inappropriate prescription, and its prevalence has repeatedly been shown to be highest in older patients. Many elements play a role in this increased prevalence: age related pharmacokinetic and pharmacodynamic changes; higher rates of multimorbidity and polypharmacy in old age; low adherence by patients to complex drug prescriptions; physical or mental disability; poor evidence on the effects of medications due to exclusion of frail or multimorbid older subjects from clinical research; and lack of education of practitioners regarding poor choice of drugs and management of polypharmacy. Interaction of physicians with patients may trigger inappropriate prescription for several reasons, including the need to please the patient, a feeling of being forced to prescribe, the tension between prescribing experience and prescribing guidelines as well as prescriber fear [3]. The immediate consequence of inappropriate prescription is an increase in adverse drug events and adverse drug reactions [4], and impaired health outcomes, i.e. increased number of hospital admissions [5], more visits to the emergency department [4,6], impaired quality of life [4] and higher health care costs [7].

The first set of criteria designed specifically for the identification of potentially inappropriate prescription in older people were the Beers criteria, developed in the United States [8]. These were explicit criteria, based on published evidence and expert consensus, and could, in theory, be used to easily review any older patient's prescription medicines and enable the prescriber to spot potential problems. Dr Beers deserves considerable credit for his criteria, as they represent the first well-organised list of common errors of prescribing in older people. However, Beers criteria – including the regular updated versions that followed – had a limited value in Europe, as they listed drugs that are not used in this continent, did not include several important instances of potential problems (e.g. drug–drug interactions or drug class duplication); and took no account of prescribing omission errors. However, the most important criticism that can be levelled at Beers criteria is that no intervention based on the criteria has been shown to improve medication appropriateness or to reduce adverse outcomes [9].

The STOPP-START criteria were a European initiative, launched and led by geriatricians from Cork (Ireland) and promoted by the European Union Geriatric Medicine Society through its Pharmacology Working Group [10]. These new explicit criteria, published in 2008, were intended to capture common and important instances of potentially inappropriate prescription, were organised according to physiological systems, considered some geriatric syndromes (falls), included duplicate drug class prescription, and were the first to address prescribing omissions in older people [9,10]. They were shown to be reliable [11], allowing for comparisons between different countries [12]. STOPP-START criteria also proved to be superior in the identification of drugs causing actual adverse events than Beers criteria [13] and better than usual pharmaceutical care [14]. New instruments for the purpose of prescription optimization, based on the STOPP criteria, are being developed for clinical use currently [15].

As evidence changes, all explicit criteria need regular updates and renewed expert consensus to maintain their validity. Beers criteria were last updated in 2012 [16], and a new edition of the STOPP-START criteria have been very recently published [17]. These have been prepared using a Delphi consensus with 19 European experts in geriatric prescription, and retain the same organisation according to physiological systems as well as the dichotomy into STOPP (potentially inappropriate medications) and START (potential prescription omissions) lists. The number of criteria has been increased from 65 to 87 STOPP criteria and from 22 to 35 START criteria. The former include now some general criteria and a list of drugs to monitor in older patients with renal insufficiency; the latter have included vaccination. A thorough review of the literature supporting each criterion has also triggered changes in the recommendations on anticoagulants, antiplatelet, antihypertensive and antiresorptive drugs, among others. Advances in the most widely used explicit instruments may be an important step forward [18].

The ultimate aim of identifying inappropriate prescription is not to improve prescriptions, but to improve clinical outcomes. STOPP-START criteria have shown their value in detecting potentially inappropriate medications and potential prescription omissions in most health care settings and in many different countries. However, prospective randomized controlled trials exploring the effect of interventions based on STOPP-START criteria on important health outcomes are still few. This is imperative before strong recommendations on widespread implementation of explicit criteria within comprehensive geriatric assessment can be made. The fact that STOPP criteria are linked to most adverse outcomes [19], and interventions seem to be able to

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significantly change prescription [20] makes STOPP criteria-based approaches promising. For instance, we have recently shown in a randomized controlled trial that an educational intervention based on STOPP-START criteria in nursing home physicians can improve clinical outcomes (delirium, falls) and reduce hospital admissions and visits to the emergency department [21]. A recent randomized trial in a long-term care geriatric facility in Israel showed that implementation of STOPP-START criteria could reduce the number of falls and costs [22]. A before-after study found some improvements in health related quality of life after reducing the number of potentially inappropriate drugs using STOPP-START criteria and the Garfinkel algorithm [23].

Increased evidence is making newer explicit criteria lists to detect potentially inappropriate medication longer and more complex. In an era of computer-assisted medicine, it is not surprising that computer programs are being used increasingly to improve prescription, in an effort to reduce the number of inappropriate medications [24]. The new STOPP-START criteria are already being used in an ambitious European funded multicenter project, called SENATOR (Development and clinical trials of a new Software ENgine for the Assessment & optimization of drug and non-drug Therapy in Older persons, www.senator-project.eu). The aim of the multicenter, randomized controlled trial that is central to the SENATOR project is to develop a highly-powered and efficient software engine capable of individually screening the clinical status and pharmacological and non-pharmacological therapy of older people with multimorbidity in the acute hospital care setting in order to define optimal drug therapy and reduce the risk of adverse drug reactions, hospitalization and death.

Awareness of the need to optimize drug prescriptions and do no harm is growing among geriatricians, pharmacists and other professionals who regularly prescribe for older patients. Improvement of prescribing quality and incorporation of better instruments that facilitate avoidance of inappropriate medications in comprehensive geriatric assessment may allow us, as clinicians, to go back to one of the main principles of Medicine: first, do no harm (*primum non nocere*).

Disclosure of interest

The authors are researchers involved in the SENATOR project mentioned in the text. They declare that they have no other conflicts of interest.

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