Expert Opinion

Matrix models and STEPS: concluding remarks

Mike Scott, Mark Timoney, Jill Mairs, Grainne Crealey, Ibrahim Al Abaddi, Rob Brenninkmeijer, Rob Janknegt & James McElnay†
†*Queens University of Belfast, Clinical and Practice Research Group, School of Pharmacy, BT9 3BZ, UK*

This paper provides an overview of the use of matrix models within the context of Pharmacotherapy. It also discusses the application of these matrix models to the Safe Therapeutic Economic Pharmaceutical Selection (STEPS) approach used in Northern Ireland.

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1. Matrix models for drug selection

Matrix models are straightforward instruments to enhance policy making, in a transparent, rational way and can be widely used. Matrix literally means 'womb of the mother'. It has metaphoric qualities to support decision-making in a reproducible and transparent way and to offer guidance in complex and uncertain situations. Applied to pharmacotherapy, SOJA and InforMatrix are two matrix methods, which were developed by practitioners, and have been used in practice since the late eighties and early nineties of the last century.

In SOJA and/or InforMatrix manuscripts, the authors present the most suitable medicines within a class in a transparent way, based on clinically relevant selection criteria. This information is applied in matrix models by means of an interactive programme to enhance the selection of the most appropriate medicines in relation to efficacy, documented effects on clinically relevant end points, safety, tolerability and ease of use. Of course, there will always be debate about the relative importance of each selection criterion. Interactive workshops and internet tools are made available to overcome this limitation. This allows the user of the programme to assign his (or her) own relative weight to each criterion. If this is done in a session with a group, this also allows productive debate on the relative importance of the selection criteria.

The advantage of matrix models is that decisions are evidence-based and transparent, and can be applied efficiently. The major disadvantage is that a panel of experts or other users of these models sometimes have to judge the relative properties of each medicine in a manner that is more or less arbitrary. Any judgement on the relative pros and cons of medicines is, by definition, arbitrary, and is done on a timely basis. However, matrix models can support professionals to exchange information, personal experiences and views in a more structured way. To update the medicine-decision process, to make the process reproducible, and to compare the outcome with other decision- making units thus becomes very easy.

The combination of both methods allows optimal involvement of large numbers of physicians and pharmacists in the clinical selection process of the best medicines within a pharmacotherapeutic class. Another advantage of the use of matrix models is that a wide range of clinically relevant criteria are taken into consideration in the decision-making process, to prevent one-issue views on these matters. Many guidelines are mainly based on the criterion efficacy, or documented effects on clinically relevant end points, thereby neglecting practical aspects of the use of medicines. A good example of this is the preference for the combination

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penicillin + high dose intravenous erythromycin for severe, community acquired pneumonia. This combination is indeed effective (although there are few controlled studies to substantiate this), but is associated with significant toxicity, is poorly tolerated and has to be given as 7 daily infusions. In addition, this therapeutic choice shows a lot of drug interactions and is relatively expensive. Such a combination will not perform well during a matrix session.

2. Keeping the decision-making process objective

SOJA articles started as non-sponsored elements in the eighties. The practical use of matrix models was hampered because the productions were regarded as out-dated after some time. During the last 10 years, the matrix and editorial concept was developed by a more frequent, actualised, interactive and transparent approach, with internet and workshop tools. This activity has been developed (risk-bearing) by an electronic publishing company, Digitalis MX, Amsterdam, who also implement electronic guidelines and prescribing tools for general practitioners. Since the non-funded beginnings of SOJA articles, some productions are now supported on a non-exclusive basis. However, most productions are not sponsored by pharmaceutical companies, but through subscriptions from health insurance companies, pharmacotherapeutic audit meeting (PTAM) groups and some individual pharmacists. Generics are the winners in most cases, and no pharmaceutical company is interested in such productions. Some pharmaceutical companies, whose products come out well in the analysis (sometimes even as 2nd or 3rd in the ranking after a first-choice generic product) are interested in organising interactive sessions. Their educational grant is never accepted on an exclusive basis, and so any party can join such a sponsorship. All sessions are carried out in a non-promotional setting, and most of the time, these are not even organised and attended by sponsors. These sessions are moderated by an independent moderator to ensure correct use of the methodology. None of the companies have any direct influence on the contents of the manuscripts, but all companies are invited to send their comments concerning scientific correctness and completeness. The editorial process guarantees that the judgement of all studies is 'as independent as possible'. It is also apparent that (from an editorial perspective and from that of the end-users) the selection process and the quality of the interactive approach are more important than the relative outcome. By means of the interactive program, users may assign their own individual weight to each criterion, which stimulates concrete discussions on the relative importance of the various aspects of the drugs. One thereby becomes more aware of the rational arguments of treatment choices.

In the near future, a UK-specific SOJA website will be available. All correspondence with comments on the process can be directed to the e-mail address of the first author of the supplement, Robert Janknegt – r.janknegt@orbisconcern.nl. Based on received comments, specific adaptations and adjustments to the programme will be made in order to continuously improve the quality of the decision-making process.

3. STEPS

In the STEPS process in Northern Ireland, the use of matrix models in a clinical evaluation phase was extended to incorporate a pharmaceutical evaluation phase concentrating on safety, packaging and labelling aspects, and finally, a budget impact analysis. In the latter aspects, more attention is paid to the actual product presentations, pricing and suppliers. In the STEPS process, acquisition cost has not been taken into consideration during the pre-selection of medicines by means of matrix models. This ensures that the most appropriate medicines are pre-selected in the clinical phase, purely from a quality point of view. This is fundamental to the process, as the overall aim must always be about delivering optimal patient care, and this would concur completely with the objectives of all healthcare professionals, so ensuring comprehensive participation.

The clinical, pharmaceutical and economical processes within STEPS lead to the selection and procurement of rational, evidence-based, safe and cost-effective medicines within a comprehensive professional framework.

The STEPS programme has led to significant savings in drug expenditure for five therapeutic classes of medicines in Northern Ireland. The savings are estimated to be at least of the order of £10 per capita per year. In addition, the use of the same medicines from the same manufacturers, in both primary and secondary care, will help to reduce medication errors during hospital admission and discharge, as part of a comprehensive integrated medicines management strategy.

Extensive guidance is also provided to ensure optimal use of the selected medicines. This guidance will be incorporated into an electronic prescription system in the near future, which will aid significantly in the implementation of the STEPS process. The savings achieved with the STEPS process will (at least for the greater part) be reinvested in pharmaceutical care, such as new expensive treatment modalities or additional healthcare staff, that offer significant patient benefits, thereby optimising both patient care and use of available healthcare resources.

Optimal care requires individualised management and ongoing attention to relevant scientific and clinical information. Therefore, all matrix models are continuously updated, providing state-of-the-art information. The choices made in the STEPS project will account for 70% of (more or less routine) prescribing in certain therapy classes, leaving scope for the prescribing of other agents for patients who require them (based on their specific clinical need, as assessed by the relevant clinician). This aspect, again, ensures optimal patient care.

The advantages of the STEPS process are summarised below.

- Improved quality
  - rational and evidence based medicine selection
  - all physicians use the same medicines
  - dynamic process with continuous updates
- Better compliance
  - interactive decision support programmes
- Improved safety
  - rational medicine selection
  - the use of the same medicines and packaging in primary and secondary care
- Lower cost
  - considerable savings on drug expenditure
- Evidence
  - proven effectiveness in Northern Ireland.

The STEPS project is a unique example of a situation in which better quality care is provided, patient safety is improved and major cost savings are achieved.

Affiliation

Mike Scott[1] PhD, MCPP, FPSNI,
Mark Timoney[2] BPharm, Msc, PhD, MPSNI,
Jill Mairs[3] Bsc, Phd, MPA, MCIPS, MPSNI,
Grainne Crealey[4] BSc, Msc, PhD,
Ibrahim Al Abaddi[5],
Rob Brenninkmeijer[6] PharmD,
Rob Janknegt[7] PharmD, PhD &
James McElnay[†8,9] Bsc, PhD, FCPP, FPSNI
[†]Author for correspondence
[1]Head of Pharmacy and Medicines Management, Antrim Hospital, Northern Health and Social Care Trust, 45 Bush Road, Antrim BT41 2RL
[2]Senior Principal Pharmaceutical Officer, Room 4.6, Department of Health Social Services and Public Safety, Castle Buildings, Upper Newtownards Road, Belfast BT4 3SQ
[3]Regional Procurement Pharmacist Whiteabbey Hospital, Northern Health and Social Care Trust, Doagh Road, Newtownabbey
[4]Health Economist, Clinical Research Support Centre, Education and Research Centre, Royal Group of Hospitals Trust, Grosvenor Road, Belfast, Northern Ireland
[5]
[6]Pharmacist, Digitalis B.V., Amsterdam, The Netherlands
[7]Hospital Pharmacist, Clinical Pharmacologist, Maasland Ziekenhuis, Departments of Clinical Pharmacy and Toxicology, Sittard, The Netherlands
[8]Professor of Pharmacy Practice, Dean Faculty of Medicine and Health Life Sciences, Queens University of Belfast, Clinical and Practice Research Group, School of Pharmacy, BT9 3BZ, UK
Tel: +44 2890975177; Fax: +44 2890434454;
E-mail: j.mcelnay@qub.ac.uk