Decision Support Paradigms for Prescribing in General Practice - Lessons from the PRODIGY Trials

AUTHORS

R C Sugden - Centre for Software Reliability, University of Newcastle upon Tyne, and I N Purves - Sowerby Unit for Primary Care Informatics, Department of Primary Health Care, University of Newcastle upon Tyne.

ABSTRACT

This paper describes two different paradigms used by the PRODIGY project to develop clinical prescribing decision support systems. The first system has been specified by the Sowerby Unit, instantiated by the 5 largest UK GP system suppliers and evaluated by 150 general practices. The second system has been specified to incorporate lessons learned from the first set of field trials, and will be ready for trials in the second quarter of 1997. The paper describes the two different paradigms used for decision support and the process of evaluating the systems via user trials.

1. BACKGROUND

1.1 The Need for Decision Support

The UK and the Netherlands have the most computerised general practices in the world. In both countries the systems have been supported by government sponsorship and have developed along a clinical as well as an administrative direction. Both countries are trying to dip their toes in the water and create software which aids clinical decision making. It is clear that with the exponential increase in the amount of information which is needed to practice, in conjunction with increasing patient expectations that some form of support is needed.

Paper-based reference works for prescribing are in use (e.g. the British National Formulary (BNF), but there are obviously problems in keeping paper-based systems up to date. Additionally, many doctors do not feel comfortable referring to these in front of patients, in case the apparent need to check facts may erode patient confidence in the doctor's expertise. Decision support integrated into the clinical computer system can be kept up to date more effectively, and used less obtrusively as part of the consultation. The ability to automatically adjust the advice according to particular patient circumstances, by reference to the stored electronic patient record, makes computer-based decision support potentially far superior to other means.

In the UK we have systems which can present guidelines in a simple or complex form (1)(Purves 1995). We also have systems which present information in a hypertext book form. It is true to say however that in the UK general practitioners have yet to make full use of the information available from these systems. In the Netherlands, the Prescriptor system (2)(ter Wee 1991) has been used for 5 years and has been found to be of great assistance to the general practitioners who use it.

1.2 The UK PRODIGY Project

The UK project is called PRODIGY (**P**rescribing **R**ati**O**nally with **D**ecision-support in **G**eneral-practice stud**Y**). The project aims to develop the UK prescribing guidelines and the computerised implementation. The main principles that this study is based on are that it is professionally driven and is rigorously evaluated. The project began in June 1995, and will continue into 1997 (see Table 1 - Project Milestones).

During 1995 the guidelines for the Prescriptor system were re-written by the English Medical Advisor Support Centre (MASC). They have been written using the best available evidence of prescribing efficacy and have been supplemented with pragmatic prescribing considerations. The clinical recommendations have been validated by an expert panel, consisting of the RCGP, GMSC, Royal Pharmaceutical Society and DoH advisors. Clinical recommendations are intended to be flexible and not be didactic policy statements.

As a stand alone package the Dutch Prescriptor product does not fit neatly into the UK market, so each of the major UK suppliers were approached and asked if they would like to be involved in a UK project of developing and assessing a prescribing decision support system for the UK. Five suppliers (AAH Meditel, EMIS, Genisyst, MCS, and VAMP) were selected from those suppliers wishing to take part.

Table 1 - Project Milestones

First system specification	July 95
Pre-intervention questionnaires	September 95
Intervention initiation meeting	October 95
First software installation	October 95
Software training	November 95
Preliminary intervention period	December 95
Main intervention	January 96 through March 96
Post-intervention questionnaires	April 96
Second system specification	July 96
Second software installation	January 97

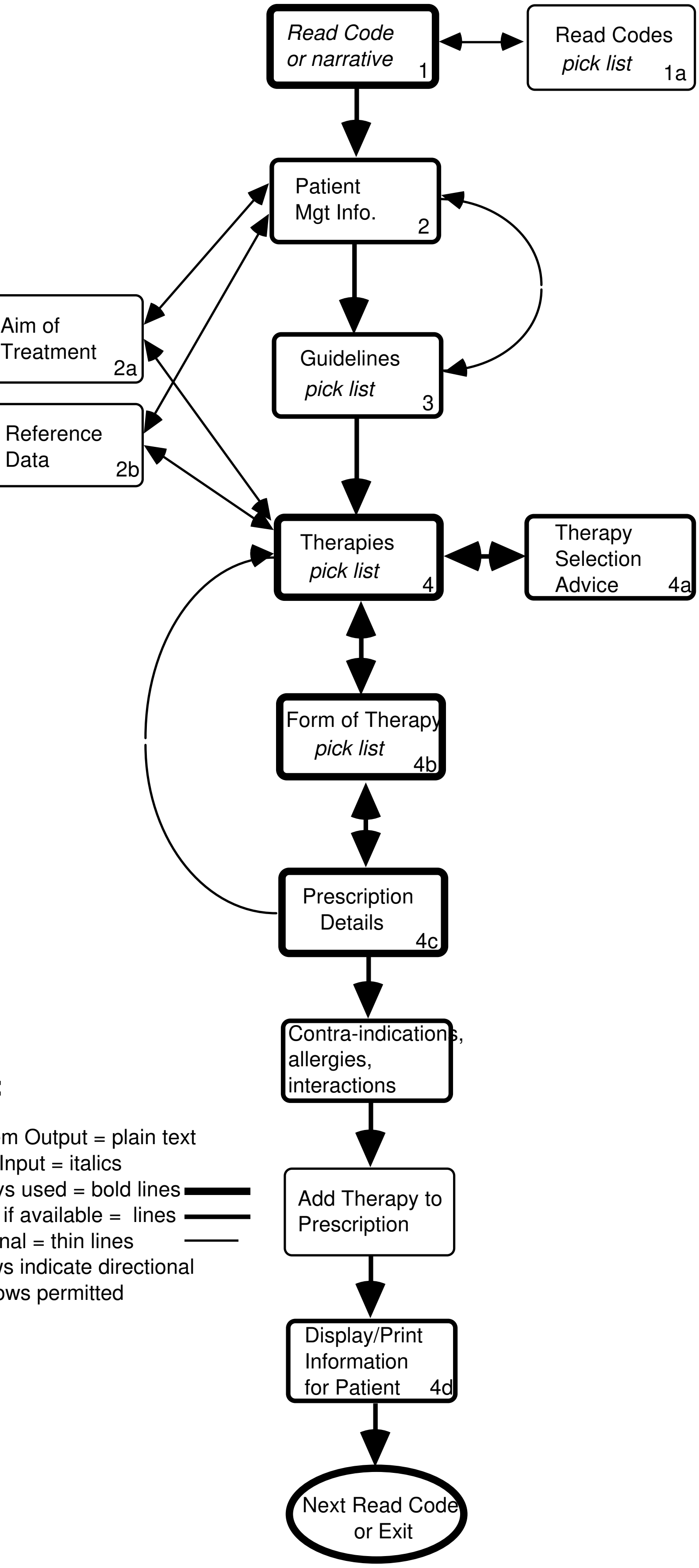
2. THE FIRST SYSTEM

The key decision support techniques used are a rulebase driven by patient characteristics (in the first instance only sex and age are used) and the structured presentation of options for treatment with advice texts to support the GP in deciding which options to choose. Evaluation of the first system (see below, Section 4 - Evaluation Methods) has indicated *inter alia* the need for a more complex rulebase and additional structuring of the text.

2.1 Access

This is at the point during normal system operation of the host software at which the GP would be making a decision on the management of a problem or adding a new drug to the prescription. It is assumed that at this point the GP has reached a diagnostic decision, and that a code for the diagnosis can be entered into the system. The PRODIGY project uses the Read Code classification system for diagnoses.

Fig. 1



Key:

System Output = plain text
User Input = *italics*
Always used = bold lines
Used if available = lines
Optional = thin lines
Arrows indicate directional
flows permitted

2.2 Normal User Interaction

Figure 1 shows a process model for the user interaction with the system. The remainder of this section gives an overview of the process.

Screen 1 - Select Read Diagnostic Code

A Read Diagnostic code will be entered by the GP. If the GP is not able to enter the correct Read Diagnostic code, the system offers assistance in selecting one. This is done by either offering the whole set of Read Diagnostic codes for selection, or by searching for sub-sets on the basis of a partial code or a partial narrative entered by the GP.

For example, if the GP enters a Read code of 'G301.', then as there is no clinical recommendation for 'G301.', but there is for 'G30..' the '.' character is treated as a 'wild card'. In this way lower level Read codes that do not have an associated ruleset lead to a higher-level (albeit less specific) ruleset. Alternatively, if the GP enters 'back', then all Read codes potentially relevant to conditions of the back are offered.

Using the Read Diagnostic code selected by the GP, the associated ruleset is activated.

Screen 2 - Patient Management Information

This shows Patient Management information in relation to the condition indicated by the Read Diagnostic code. This data is not always available, in which case this screen is not presented to the GP. Optionally available from this screen are data on the Aim of Treatment *(screen 2a)*, and (separately), reference data for the origin of the advice displayed *(screen 2b)*.

An optional feature implemented by some of the suppliers is to display this information only the first time it is encountered by a GP (i.e. on first use of this diagnostic code), and thereafter allow the user to suppress the display, whilst still offering to display it if required.

Screen 3 - Clinical Recommendations

This is a pick list of the available clinical recommendations for treatment of the condition (up to nine may be available). Clinical recommendations are typed by sex, and the system automatically selects recommendations that are appropriate for the patient. The GP will select one of these. If only one recommendation is available, then this screen will not be displayed, but the process moves immediately to the next step. It is possible, at the GP's request, to refer back to the Patient Management information displayed on the previous screen *(screen 2)*, and also the Aim and Reference data *(screens 2a and 2b)*.

Screen 4 - Therapies

This offers a choice of up to three therapies (i.e. drugs or patient advice leaflets). These are presented together with Therapy Selection Advice if available *(screen 4a)*. This advice may contain details of contra-indications, possible drug interactions, relative costs, and possible side effects, in narrative form. Aim and Reference data *(screens 2a and 2b)* are optionally available from this screen.

The GP then has the ability to 'explore' the possible therapies (e.g. by highlighting each in turn). Once this exploration activity commences, the different forms of the therapy which are available will be displayed *(screen 4b)*. The therapy forms offered will be dependent on age of patient. The GP also has the ability to explore these, upon which the dosage and other prescription details for each will be shown *(screen 4c)*. It is possible to explore the contents of screens 4b and 4c at will until the GP is ready to make a choice. It is also possible to recall the Therapy Selection Advice *(screen 4a)* if required.

The GP will then normally select one of the available therapy forms, exactly as indicated on the prescription details shown. Exceptionally, the GP will select ‘own choice’ at this point, and enter a drug which is not suggested by the PRODIGY system.

On selection of a specific therapy (or entry of the GP's own choice, overriding the therapies offered), the system checks for contra-indications, allergies, and possible drug interactions. In the first PRODIGY system it was decided to take advantage of the features already available within the host software to perform this function. However this can result in an inefficient and irritating post-hoc rejection of the choice already made by the GP, and thus the second system will apply these rules before presenting the therapy choices to the user.

Unless ‘own choice’ was selected, patient information text associated with the selected drug may then be displayed if available *(screen 4d)*. Where available, it is also printed out for the patient to accompany the drug selected.

The host software then places the prescription details onto the FP10 prescription form. Both prescribing of drugs and issue of patient advice texts are recorded on the patient record held in the host system.

2.3 Clinical Recommendation Modification

It is possible to modify the clinical recommendations either by re-issue of updated recommendations from a central source (via the host software supplier), or locally by user intervention. The ability to modify the rulebase locally was seen as highly important by the majority of GPs. The creation of editors which were usable by the average GP proved to be more difficult than building the decision support system itself, and it was not surprising that although just over 40% of GPs attempted to use the editor provided, many of these (almost 70%) rated it as difficult or incomprehensible.

3. APPLICATION BUILDING

The software requirement specification (SRS) was based on the Dutch experience with the Prescriptor system, and drafted by a team of three at the Sowerby Unit. The SRS was then refined in collaboration with the 5 largest UK GP system suppliers and implemented by them within their own products.

Due to the requirement to evaluate the system in 'typical' practices, the products within which the software was embedded were 'legacy systems', running on operating systems including Xenix, DOS, and even BOS. Hardware configurations were similarly varied, and the development environments ranged from early examples of 4GL's through C and assembler.

To be acceptable to users, it was decided that the PRODIGY module must be compatible with the existing GP system (‘host software’) either as an add-on, or integrated within it. It should not interfere with the existing functionality of the host software, and should be compatible with the pre-existing user interface standards of the host software where possible. For this reason, the software requirements specification (SRS) was expressed only in terms of functionality and data content, and the precise forms of interaction with the user (i.e. the GP) left open to discussion with each supplier.

Whatever the precise form of implementation, it was a core requirement to follow the process model described in section 2 above. This proved possible in all but one case, where the look and feel of a GUI implementation did not lend itself to such a rigorously structured approach, and the designers made it possible to access more than the minimum number of information sets from one screen.

Other implementation differences were mainly restricted to the selection of items from lists - either by cursor movement keys or by typing an item number, and navigation between screens - either by function keys or selection from menus. In all but one case (where a GUI implementation was rather incongruously grafted onto a text-based system), the user interactions were operationalised in a way that conformed to the look and feel of the host system. The intention throughout was not to assess the implementations according to some absolute standard of excellence, but to follow the maxim that 'whatever the user is familiar with will be most acceptable and most easily learned'.

The unavoidable variation in implementations (both good and not so good!) plus some additional innovation from the suppliers (occasionally unauthorised) has significantly informed the project on user preferences and the importance of the user interface in delivering effective decision support.

4. EVALUATION METHODS

From the outset it was anticipated that this first cut of the system would not be entirely satisfactory, and a comprehensive evaluation programme was devised to assess the effectiveness and acceptability of the system. Formal and informal feedback from users was collated and analysed to assess which features of the system were proving helpful, and which were considered unhelpful or difficult to use. Feedback had to be classified into three categories: problems with the software (bugs), problems with the clinical content of the recommendations, and problems with the system philosophy. Each set was routed to the appropriate source of expertise for comment and action.

Analysis of computer logs of interactions of the software and of video sessions with the systems was compared with the analysis of user feedback already received by through questionnaires, letters, fax, phone calls and user focus group meetings. Comparison of user views and the results of the laboratory testing of the systems was used to verify the objectivity of the users comments, and to assist in distinguishing problems with the philosophy of the system from problems which were caused by implementation features unique to particular suppliers.

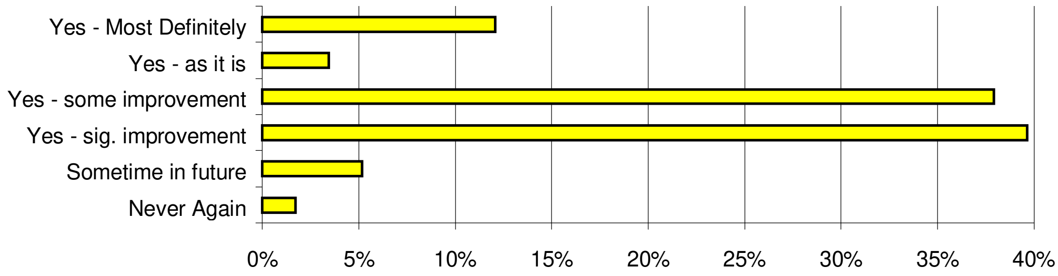
The evaluation methods used included:

- A national questionnaire of a randomised 10% sample of GP's to investigate general practitioners current expectations, feelings and fears about computer decision support, focusing especially on prescribing support.
- Dissemination meeting involving all 150 practices involved in the study, their suppliers, the NHS Executive, MASC, Digitalis, the review panel and the medical professions organisations (RCGP, GMSC, BMA, Royal Pharmaceutical Society).
- Joint technical meetings with the suppliers involved.
- Laboratory evaluation of the suppliers' instantiations of the software.
- Video evaluation of each of the suppliers software in real consultations using 5 GPs, (one from each supplier participating in the project). This involved qualitative and quantitative assessment on the impact on the consultation (3)(Scott 1996).
- Quantitative assessment of use of the clinical recommendations - using computerised logs of the usage of the clinical recommendations.
- Professional 'feelings' about the first system - identified using questionnaires, video observation and focus group methods as well as visits to practices.
- Patient 'feelings' about the first system - using questionnaires and video observation.

- Influence on prescribing - identified using analysis of the practices' PACT data; using a time series analysis technique comparing 12 months prior to the project with the intervention period.
- Investigation of the changes made to the clinical recommendations/or felt needed to be changed during the project - using computerised logs of the local changes made and focus group discussions.

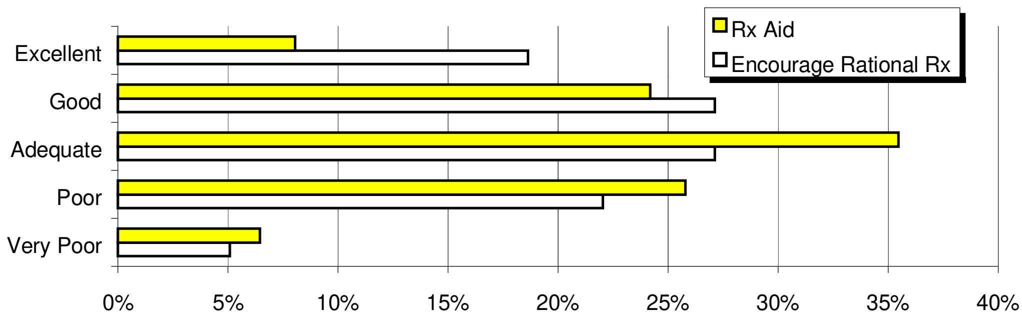
5. BENEFITS AND LESSONS IDENTIFIED

User feedback suggests that the concept of decision support for prescribing is welcomed, but that to be generally acceptable, the user interface and clinical recommendation structure and content must be improved. The reliability of some implementations of the software also caused considerable user dissatisfaction.



From above it can be seen that although 16% overall are happy with the system as it is, 78% agree with the concept but would like some changes, giving 94% who think Prodigy is a concept worth developing.

Asked to rate Prodigy as a method of encouraging rational prescribing, 75% rated it as average or better than other methods they had used, and 68% rated it average or better in comparison with other prescribing aids they used. The following graph gives more detail.



A high proportion (89.7%) of GPs felt that the screen layouts and navigation between screens had slowed down their prescribing. Although 77.3% were reasonably happy with the overall screen layouts, only 10.3 % found it easy to move between screens, and only 41.6% felt the structuring of the information to be correct.

In contrast to the perception that PRODIGY slowed prescribing, initial analysis of video recordings of consultations indicates that consultations took less time with PRODIGY than without. Laboratory testing of the software also identified an overall reduction of key presses when using PRODIGY to issue a prescription, as opposed to host system functionality only, in most cases. This resulted in reducing the number of keystrokes by up to two thirds in extreme cases. In contrast one system increased the number of keystrokes required when PRODIGY was used. The table below (random order of suppliers) illustrates the variation accross the different implementations.

Table 2 - Keystrokes	**PRODIGY enabled**	**PRODIGY disabled**
'A'	10	30
'B'	14	11
'C'	19	24
'D'	10	20
'E'	23	24

The appropriateness of when the Prodigy system is triggered within a system was rated as less than adequate by 50% of GPs. The main complaint was that it was invoked too often. Qualitatively this seems to vary between acute and chronic problems, with acute problems (especially those frequently encountered) being an 'annoyance'.

Triggering via drug codes (as well as diagnostic codes) to inform them of alternatives to their own choice was favoured by 50% of GPs; 25% would not and 25% had no opinion.

Ease of searching for a particular diagnostic code was rated as adequate or better by 75% of GPs, and 72% rated the usefulness of diagnostic codes to reflect a diagnosis as adequate or better. One supplier tended to be rated more highly than the others. This may relate to differences between the versions of Read diagnostic codes used with PRODIGY and those used by the host system prior to the PRODIGY trial).

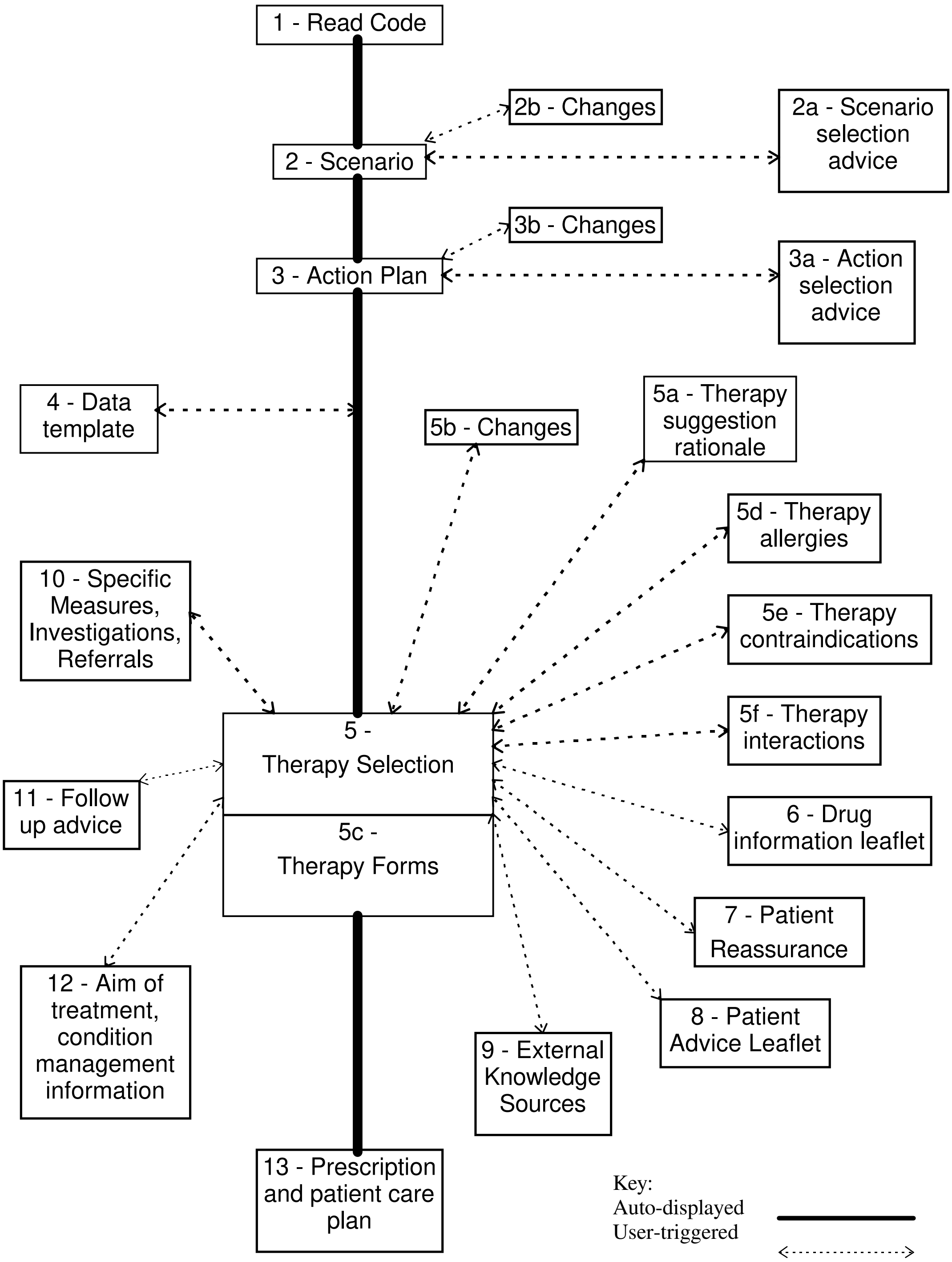
Objective evaluation of the prevalence of specific problems in GP consultations, using the extended code set from Prodigy and the MSGP 4 data indicates that the clinical recommendations cover 70% of problems encountered, and that the clinical recommendations cover 90% of new prescribing decision. However the majority of user responses indicated that the PRODIGY system was relevant to less than half of consultations (see Table 2 - Coverage).

Table 2 - Coverage	**no response**	**less than 25%**	**25% up to 50%**	**50% up to 75%**	**over 75%**
What percentage of your consultations are covered by the PRODIGY clinical recommendations?	6 (6.7%)	29 (34.9%)	31 (37.4%)	22 (26.5%)	1 (1.2%)

The treatment information was found to be of some use by 72.8% of GPs. Of those that were dissatisfied the main complaint was that the level of information was inadequate.

The drug information was considered to be of some use by 71.6% of GPs (with some variation in response dependent on supplier). The main complaint of those dissatisfied being that the drug information was too basic.

Fig 2. - User interaction model of the second system



6. THE SECOND SYSTEM

In the first system, drug prescribing could only be accessed by viewing the whole clinical recommendation for treatment, and so frequently accessed recommendations become repetitive and frustrating obstacles to prescribing. The second system has been designed to minimise the keyboard interaction needed to reach a prescribing decision, whilst incorporating more comprehensive decision support functionality.

Decision support for prescribing will now route the user direct to the prescription details of the most suitable drugs, based on a more comprehensive rulebase of patient characteristics including contraindications, allergies, interactions with other drugs prescribed, and the established preferences of the individual GP. It will also be possible to make multiple selections of therapies for the same condition in one pass, (e.g. triple therapy in Duodenal Ulcer) and to select patient advice sheets in combination with drug therapies. Only when the user requests it will the system offer information about the evidence basis of the recommendation and the information used in consensus decision making. Advice texts will also respect the difference between common and uncommon problems, with additional information depth available for uncommon problems.

To facilitate user comfort with the decision support advice offered by the system, a browse mode and a print mode to allow discussion of advice texts off-line have been added as well as a consultation/prescribing mode. Reporting features have been introduced to allow users to quickly obtain feedback on the influence of PRODIGY on their prescribing habits.

Similarly, a feature to analyse prescribing patterns will be implemented and used (when presenting therapy options) to indicate which is the most frequently chosen, to speed the process of selection for ‘typical’ cases (by highlighting an item or offering a default menu choice). If a GP changes his/her prescribing habits, then it may be irritating to have to wait for the new preferred choice to be indicated, so there will be a means of resetting the list manually.

Ordering the list of choices by practice preference can also be implemented, although care must be taken not to shift the order of therapies too often, which would be very irritating for the users. This would remind the GP of the practice preference if different from individual choice. We are aware of the inferred ranking attached to the ordering of lists (even when this is not intended), and evaluation of the second system will attempt to quantify this effect by comparing choices made against list position.

The remainder of this section gives an overview of the process. These have been labelled ‘Screen 1’, etc., but this is not intended that all dialogues will use all of the steps described, nor that each step should be a separate screen. It should be possible to access any of the steps at any stage in the process, except where insufficient information about the condition has been entered to make it possible to present the appropriate information. See also the ‘Notes to screen descriptions’, below.

Screen 1 - Select Read Diagnostic Code

A Read Diagnostic code will be entered. If the GP is not able to enter the correct Read Diagnostic code, the system should offer assistance in selecting one by browsing or matching of terms. Using the Read Diagnostic Code selected, the process proceeds via scenario/action plan selection direct to the appropriate clinical recommendation.

Screen 2 - Scenario Selection

This is a pick list of possible scenarios for the condition (the number of scenarios will vary). The GP will select one of these. If only one scenario is available, then this step should not be displayed, but the process skip to the next step.

Scenarios consist of intuitive patterns (to the GP) in the management of the problem and relevant co-morbidity that may affect therapy choice. An associated rulebase is available which indicates co-morbidities which may be present on the patient record. If one of these is found, the relevant scenario will be automatically indicated/highlighted. There is some future potential to extend this rulebase to include other patient characteristics, although caution must be exercised as experience shows that it cannot be assumed that the patient record is either accurate, complete, or up to date.

Screen 2a - Scenario Selection Advice

This presents advice on the recognition of the different scenarios. See notes 1 & 2.

Screen 2b - Scenario Selection Advice Changes

This presents a summary of significant changes to the advice that have been issued in recent updates of the clinical recommendations. See notes 1 & 2.

Screen 3 - Action Plan Selection

This is a pick list of the available clinical recommendations for treatment of the condition (the number of clinical recommendations may vary between one and nine). The GP will select one of these. If only one recommendation is available, then this step should be skipped.

Screen 3a - Action Plan Selection Advice

This presents advice on the most appropriate action plan. See notes 1 & 2.

Screen 3b - Action Plan Selection Advice Changes

This presents a summary of significant changes to the advice that have been issued in recent updates of the clinical recommendations. See notes 1 & 2.

Note: although there is a logical distinction between ‘scenario’ (complicating factors in the principal diagnosis), and ‘action plan’ (alternative approaches to treatment), in practice we have found no situations where there would be a multiple choice for both for any one condition. For this reason, the user will not be made aware of the distinction, and the screes labelled ‘2’ and ‘3’ will be indistinguishable.

Screen 4 - Data Template

This is designed to prompt the input of specific information which should be collected for patients with certain conditions. See notes 1 & 2. It is intended to develop this concept to support the decision-making process, but there are a number of problems of overlap with features of the various host systems which make this difficult.

Screen 5 - Therapy Suggestion

This offers a choice of between zero and five therapies (i.e. drugs) plus a patient advice leaflet and a patient reassurance text. Combination therapies will be presented in the same list as single therapies, each combined therapy appearing as a single entry. The therapies shown are screened to exclude inappropriate therapies on grounds of age and sex. Therapies for which there are contra-indications, allergies, or possible drug interactions which may apply in the case of this patient will be clearly marked in some way in the list, e.g. by placing ‘C’, ‘A’, or ‘I’ next to the therapy. Details of these can be accessed by selecting the appropriate option *(screens 5d,5e, or 5f).*

The GP will have the ability to 'explore' the possible therapies (e.g. by highlighting each in turn). As each of the possible therapies is explored, the different forms of the therapy which are available will be automatically displayed *(screen 5c)*.

Exceptionally, the GP will select 'other' at this point, in which case it will be possible to browse a complete list of drug therapies from which to choose (i.e. from the drug database used by the host software), or to enter prescription details in the same format as is used to present them in the therapy form screen.

Screen 5a - Therapy Suggestion Rationale

This presents the rationale behind the therapy choices offered. The rationale will include comments on: efficacy, relative costs, possible side effects, etc. The value of simply reassuring the patient, and issuing advice leaflets instead of/as well as drug therapies will be included in this text. See notes 1 & 2.

Screen 5b - Therapy Selection Advice Changes

This presents a summary of significant changes to the advice that have been issued in recent updates of the clinical recommendations. See notes 1 & 2.

Screen 5c - Therapy Forms

This offers a choice of between one and five forms of the selected therapy. The therapy forms offered will be dependent on the age of the patient. The full prescription details for each will be shown, including dosage and instructions for use. It will be possible to explore the selections offered at will until the GP is ready to make a choice. The GP will then select one or more of the available therapies, which will be added to the prescription draft. Where combination therapies are selected, the 'therapy forms' for each should be displayed in turn.

Screen 5d - Therapy Allergies

This presents advice on possible allergies which may be triggered by the therapy currently selected. See notes 1 & 2.

Screen 5e - Therapy Contra-indications

This presents advice on contra-indications and possible side effects for the therapy currently selected. Where the patient record indicates that these may apply, this information should be shown in addition to the standard text. See notes 1 & 2.

Screen 5f - Therapy Interactions

This presents advice on possible drug interactions for the therapy currently selected. Where the patient has already been prescribed a drug which may cause an interaction, this information should be shown in addition to the standard text. See notes 1 & 2.

Screen 6 - Drug Information Leaflet

This presents the text of a patient information leaflet which, where available, may be printed to accompany the therapy selected. See notes 1 & 2.

Screen 7 - Patient Reassurance Text

This is a suggestion to the GP on suitable reassurance which may be given in this case. It can be viewed by the GP to use in issuing condition-specific reassurance to the patient. It may be used instead of prescribing, or as well as prescribing. See notes 1, 2 & 3.

Screen 8 - Patient Advice Leaflet

This leaflet can be printed to give to the patient as an alternative to the suggested therapies, or in addition to them. Preferably, it will be printed on plain paper on a printer in the surgery, but if this is not practicable then it will be printed on the right hand side of the FP10 prescription form. It is possible for the GP to add to the leaflet or to amend or delete any of the existing text on the leaflet at this point. See notes 1, 2 & 3.

Screen 9 - External Knowledge Sources

From here it possible to access external knowledge sources - for example eBNF.

Screen 10 - Specific Measures, Investigations and Referrals

This presents advice on specific measures which should be taken for patients with this condition. Examples of this include reminders to conduct specific tests, or reminders to warn the patient not to drive, etc. See notes 1 & 2.

Screen 11 - Follow-up Advice

This presents advice on specific follow-up measures which should be taken for patients with this condition and/or using this therapy. See notes 1 & 2.

Screen 12 - Condition Management, Aim of Treatment

This shows information on the management of the condition indicated by the Read Diagnostic code, and a description of the aim of the treatment. See notes 1 & 2.

Screen 13 - Prescription and Patient Care Plan

After making treatment decisions on all conditions presented by the patient in this consultation, it is possible to review all therapy selections, patient advice leaflets and drug information leaflets selected before finally printing them and recording them on the patient record.

Notes to Screen Descriptions

1 Not presented automatically, but available on request by means of a suitable trigger
2 This data will not always be available, in which case the trigger to display it is not presented
3 The text may be used to refer the GP to a set of pre-printed graphics or other material which may be available to accompany the clinical recommendations

7 CONCLUSIONS

The conclusions reached after evaluation of the first system which were considered most significant for the software design are as follows:

- decision support for drug prescribing per se is welcomed, even for common illnesses, providing it speeds up the consultation process rather than hinders it.
- Application of rules to check for contra-indications, allergies, and possible drug interactions should be applied before presenting therapy choices.
- the user interface has a significant effect on the user acceptance of the decision support system.
- text advice presented as part of the decision support process should be highly structured to enable rapid recognition of key points
- decisions on whether to present text advice automatically or on request should be based on three factors: the expertise of the user, the importance of the advice in terms of patient health, and the novelty of the information
- Presenting information on the rationale underpinning the prescribing decision in common illnesses is not generally welcomed, except as a training aid.
- decision support and associated advice texts are not available on some conditions rarely encountered, which is when it is most needed.
- the level of information available on complex illnesses is not always adequate.

The second system has now been specified to incorporate the lessons learned from field trials of the first system, and will be ready for trials in the second quarter of 1997.

8 ACKNOWLEDGMENTS

The PRODIGY project is funded by the UK NHS Executive (PC1). The Project Leader for the project is Mike Sowerby of the NHS Executive.

9 REFERENCES

1. Purves, I.N.: Computerised Guidelines in Primary Health Care: Reflections and Implications. In: Health Telematics for Clinical Guidelines and Protocols. (Eds: Gordon, C.; Christensen, J.P.) (Technology and Informatics, 16.) (1995), IOS Press, Amsterdam, 57-74.

2. ter Wee, R.J.M., van der Kleijn, E., Brenninkmeijer, R.F., Holmberg, N.: Development of an electronic prescription processing option: an aid for general practice. British Journal of General Practice (1991), 41, 151-154.

3. Scott, D., Purves, I.N., Beaumont R.: Computers in the GP's Surgery. In: Contemporary Ergonomics. (Ed: Robertson, S.A.) (1996), Taylor and Francis, London, 397-402.

ERROR: undefined
OFFENDING COMMAND: M

STACK:

0