Prescribing indicators for UK general practice: Delphi consultation study

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Abstract

Objectives To identify prescribing indicators based on prescribing analysis and cost (PACT) data that have face validity for measuring quality or cost minimisation.
Design Modified two round Delphi questionnaire requiring quantitative and qualitative answers.
Setting Health authorities in England.
Participants All health authority medical and pharmaceutical advisers in the first round and lead prescribing advisers for each health authority in the second round.
Main outcome measures Face validity (median rating of 7-9 on a nine point scale without disagreement) and reliability (rating 8 or 9) of indicators for assessing quality and cost minimisation.
Results Completed second round questionnaires were received from 79 respondents out of 99. The median rating was 7 for cost minimisation and 6 for quality, and in all except four cases individual respondents rated indicators significantly higher for cost than for quality. Of the 41 indicators tested, only seven were rated valid and reliable for cost minimisation and five for quality.
Conclusion The 12 indicators rated as valid by leading prescribing advisers had a narrow focus and would allow only a limited examination of prescribing at a general practice, primary care group, or health authority level.

Introduction

Quality of care within the NHS is a seminal focus of government policy. This focus on quality has driven the development of new organisational structures such as the National Institute for Clinical Excellence and the national performance framework to measure progress in six areas of health care.[1 2]

Prescribing indicators for general practice have been used in the NHS for over two decades[3] and are likely to have a central role in the clinical governance activities of many primary care groups.

Prescribing is a controversial area of quality assessment.[4] Previous research has highlighted the importance of critical approaches to prescribing,[4 5] defining and measuring the appropriateness of prescribing,[6–8] variations in prescribing across general practices,[9] adherence to standards,[10] and the role of prescribing analysis and cost (PACT) data in general practice.[11] Few validated quality indicators exist for prescribing in the public domain and "further research is needed into the development and use of indicators based on PACT."[4 5 9] The Prescribing Support Unit has developed a set of indicators based on PACT data. It advocates their use as a starting point when comparing the performance of health authorities or primary care groups with that of other authorities or groups or when comparing prescribing among general practices to identify outliers or those which are more likely to benefit from interventions to modify behaviour.

Anecdotal evidence suggests that prescribing indicators are more appropriately related to cost than quality, particularly at the practice level. We report the findings of a two round Delphi consultation[12 13] that sought to identify which of the most commonly used prescribing indicators in the United Kingdom are face valid and reliable as indicators of quality or cost minimisation.

Participants and methods

A list of 31 prescribing indicators was generated from two main sources: prescribing indicators with evidence of face validity in a previous Delphi consultation[5] and, most importantly, prescribing indicators used at the time of the survey by the Prescribing Support Unit.[3]

In May 1999 we sent the first questionnaire of a modified two round Delphi consultation to every pharmaceutical and medical adviser in England (n = 305). Respondents were asked to rate each indicator against two continuous 1 to 9 integer scales: "Is this indicator a useful measure of cost minimisation?" and "Is this indicator a useful measure of quality?" Respondents were also asked to state whether they currently used each indicator. The questionnaire invited respondents to comment on each of the 31 indicators. No indicators were discarded between rounds, but 10 indicators were added. The second round questionnaire therefore contained 82 ratings (41 each for cost minimisation and quality). Participants who were sent the second round questionnaire were given three types of feedback from the first round for each indicator included in both rounds: a frequency distribution of scores (on scales of 1 to 9), a median (face validity) score for both scales,

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BMJ 2000;321:425–8

Table 1 Second round validity ratings for cost minimisation and quality

Cost ratings indicator (n=79)	Cost validity score	Quality ratings indicator (n=79)	Quality validity score
Generic prescribing rate (%)	8	% of antibiotic items contained in predefined list (health authority, primary care group, or practice formulary)	8
Potential generic savings as % of total drug expenditure	8	DDDs benzodiazepines/benzodiazepine STAR-PU (including zopiclone and zolpidem)	8
Antibiotic generic prescribing rate (%)	8	Ratio of co-trimoxazole items to trimethoprim items	8
β blocker generic prescribing rate (%)	8	Items/STAR-PU for antibiotics	8
% of total NIC of modified release NSAID preparations*	8	Ratio of bendrofluazide 2.5 mg items to all bendrofluazide items	8
NIC/DDD for ulcer healing drugs	8	% of NSAID items from ibuprofen, diclofenac, and naproxen	7
Overall prescribing cost/ASTRO-PU (excluding high cost and specialist drugs)	8	Ratio of compound diuretics items to all diuretic items	7
Cost/DDD of inhaled corticosteroids	7	% of antibiotic items in the practice's top 10 antibiotic items	7
Ratio of compound diuretics items to all diuretic items	7	No of items for appetite suppressants/patient	7
% of antibiotic items contained in predefined list (health authority, primary care group, or practice formulary)	7	No of items for cough suppressants or nasal decongestants/patient	7
Ratio of No of items for co-amoxiclav or 4-quinolones to No of items for all antibiotics	7	Ratio of No of items for co-amoxiclav or 4-quinolones to No of items for all antibiotics	7
Ratio of No of items for 4-quinolones to No of items for all antibiotics	7	Ratio of No of items for 4-quinolones to No of items for all antibiotics	7
NIC/item for antibiotics	7	No of items for peripheral and cerebral vasodilators/patient	7
% of total NIC on drugs of limited clinical value†	7	% of total NIC on drugs of limited clinical value†	7
% of total NIC on modified release preparations*	7	% of NSAID items from ibuprofen, indomethacin, diclofenac,, and naproxen	7
% of total NIC on brand named combination products‡	7	DDDs/STAR-PU for ulcer healing drugs	7
% of total NIC on combination products‡	7	DDDs/STAR-PU for oral NSAIDs	7
% of total NIC on compound analgesics‡	7	% of total NIC on compound analgesics‡	7
% of NSAID items from ibuprofen, indomethacin, diclofenac, and naproxen	7	% of total NIC on combination products‡	6
% of NSAID items from ibuprofen, diclofenac, and naproxen	7	% of total NIC on modified release preparations*	6
NIC/DDD for oral NSAIDs	7	% of total NIC of modified release NSAID preparations*	6
DDDs/STAR-PU for ulcer healing drugs	7	% of total NIC on brand named combination products‡	6
% of ulcer healing DDDs from proton pump inhibitors	7	DDDs inhaled corticosteroids/inhaled corticosteroid STAR-PU	6
NIC/month of hormone replacement therapy treatment	7	No (range) of antidepressants prescribed which comprise 80% of all antidepressant prescribing	6
Overall prescribing cost/ASTRO-PU	7	NIC/DDD for ulcer healing drugs	6
DDDs/STAR-PU for oral NSAIDs	6	% of ulcer healing DDDs from proton pump inhibitors	6
Items/STAR-PU for antibiotics	6	No of months of treatment of hormone replacement therapy/woman 45-64 years	6
% of antibiotic items in practice's top 10 antibiotic items	5	Items of lipid lowering drugs/patient aged 45-75	6
No of items for peripheral and cerebral vasodilators/patient	5	Antibiotic generic prescribing rate (%)	6
% of total NIC on SSRIs	5	Generic prescribing rate (%)	5
No (range) of antidepressants which comprise 80% of all antidepressant prescribing	5	Potential generic savings as % of total drug expenditure	5
No of items for cough suppressants or nasal decongestants/patient	4	β blocker generic prescribing rate (%)	5
DDDs benzodiazepines/benzodiazepine STAR-PU (including zopiclone and zolpidem)	3	Cost/DDD of inhaled corticosteroids	5
Items of lipid lowering drugs/patient aged 45-75 years	3	NIC/item for antibiotics	5
No of items for statins/1000 patients	3	NIC/DDD for oral NSAIDs	5
No of months of hormone replacement therapy/woman aged 45-64 years	3	Overall prescribing cost/ASTRO-PU	5
DDDs inhaled corticosteroids/inhaled corticosteroid STAR-PU	3	Overall prescribing cost/ASTRO-PU (excluding high cost and specialist drugs)	5
Ratio of bendrofluazide 2.5 mg items to all bendrofluazide items	2	No of items for statins/1000 patients	5
No of items for appetite suppressants/patient	2	Ratio of benzodiazepines to antidepressants	4
Ratio of benzodiazepines to antidepressants	2	% of total NIC on SSRIs	4
Ratio of co-trimoxazole items to trimethoprim items	1	NIC/month of hormone replacement therapy	4

ASTRO-PU=age sex temporary resident originated prescribing unit, DDD=defined daily dose, NIC=net ingredient cost, NSAID=non-steroidal anti-inflammatory drug, SSRI=selective serotonin reuptake inhibitor, STAR-PU=specific therapeutic groups age sex related prescribing unit.
*Modified release preparations: ibuprofen, diclofenac,, indomethacin, etodolac, flurbiprofen, ketoprofen, naproxen, tiaprofenic acid, propranolol, verapamil, isosorbide dinitrate, isosorbide mononitrate, salbutamol tablets.
†Drugs of limited clinical value (*British National Formulary* code): antidiarrhoeals (code 1.4), peripheral vasodilators (excluding thymoxamine) and cerebral vasodilators (2.6.4), cough preparations (excluding methadone and diamorphine) (3.9), systemic and topical nasal decongestants (3.10 and 12.2.2), appetite suppressants (4.5), bitters and tonics (9.7), topical antirheumatics (10.3.2), anti-infective preparations (excluding mupirocin and chlorhexidine/neomycin) (12.2.3), antiseptic lozenges and sprays (12.3.3), topical circulatory preparations (13.14).
‡Branded name combination products of following generic combination products: co-amilofruse, co-flumactone, furousemide (frusemide) and potassium chloride, bumetanide and potassium chloride, co-amilozide, triamterene and chlorthalidone, triamterene and benzthiazide, triamterene and furosemide (frusemide), triamterene and hydrochlorthiazide, bendrofluazide and potassium chloride, co-codamol 30/500 (codeine phosphate 30 mg and paracetamol 500 mg), paracetamol 500 mg and dihydrocodeine 20 mg.

and qualitative comments. Qualitative comments made during round one were transcribed and summarised.

After obtaining comments from a wide range of medical and pharmaceutical advisers (n = 154) in the first round, we used the second round to achieve consensus among respondents at the health authority level. Second round questionnaires were sent in July 1999 to the lead prescribing adviser at each health authority in England (n = 99). Respondents were asked to rate each indicator using the same method as in the first round.

We used a rating scale based on the RAND appropriateness method.[14] Indicators with an overall median rating of 7, 8, or 9 without disagreement were rated face valid; indicators rated with an overall median of 1-3 and 4-6 were rated as invalid and equivocal respectively. Disagreement was defined as 30% or more scores in both the bottom (1-3) and top (6-9) tertile.[15]

Indicators rated with an overall median of 8 and 9 were considered face valid and reliable.[16]

Scores were analysed by using SPSS with the Wilcoxon's z test to examine whether indicators were significantly more likely to be rated valid for cost or quality.

Results

Completed second round questionnaires were received from 79 respondents out of 99. The median rating was 7 for cost minimisation and 6 for quality. Table 1 shows that 17 indicators were rated higher for cost, 16 higher for quality, and eight were rated identically. Overall, there was no significant difference in ratings for cost or quality ($z = -0.76$, $P = 0.45$). However, in all except four cases individual respondents rated indicators significantly higher for cost than for quality.

No indicators were rated with an overall median of nine. Twenty five indicators were rated face valid for cost minimisation and 18 for quality. Of these, nine were rated valid for both (table 1). Although the remaining indicators were all rated as equivocal quality indicators, nine were rated as invalid for cost minimisation. No indicators were rated invalid for quality. Twelve indicators were rated reliable, seven for cost minimisation and five for quality.

Only two of the indicators rated valid and reliable for cost or quality in this study were currently being used by over 50% of the sample (table 2).

Table 2 Use of indicators rated valid and reliable to assess performance

	% use*
Cost	
Generic prescribing rate (%)	97%
Potential generic savings as % of total drug expenditure	NA
Antibiotic generic prescribing rate (%)	37%
β blocker generic prescribing rate (%)	17%
% of total NIC of modified release NSAID preparations	NA
NIC/DDD for ulcer healing drugs	23%
Overall prescribing cost/ASTRO-PU (excluding high cost and specialist drugs)	NA
Quality	
Ratio of bendrofluazide 2.5 mg items to all bendrofluazide items	55%
% of antibiotic items contained in predefined list (health authority, primary care group, or practice formulary)	NA
Items/STAR-PU for antibiotics	32%
DDDs benzodiazepines/benzodiazepine STAR-PU (including zopiclone and zolpidem)	32%
Ratio of co-trimoxazole items to trimethoprim items	13%

*Use calculated from data obtained in first round Delphi consultation. ASTRO-PU=age sex temporary resident originated prescribing unit, DDD=defined daily dose, NIC=net ingredient cost, NSAID=non-steroidal anti-inflammatory drug, STAR-PU=specific therapeutic groups age sex related prescribing unit, NA=not available (indicator not rated in first round)

Discussion

Our findings suggest that advisers responsible for managing prescribing in health authorities in England believe that prescribing indicators based on PACT at the population level are less valid for quality than for cost minimisation.

Thirty three of the 41 indicators rated in the second round were found to be face valid for either cost (n=25) or quality (n=18) or both (n=9). However, only 12 indicators were also rated reliable—seven for cost and five for quality. These 12 indicators have a narrow focus and will allow only a restricted assessment of prescribing—for example, four of the seven indicators for cost minimisation relate to generic prescribing. Hence, the results obtained with these indicators need to be interpreted carefully and their limitations explicitly acknowledged.

PACT data make some, but by no means all, aspects of prescribing measurable. Three important decisions have to be made when collecting data on prescribing indicators. Firstly, what is the intended unit of analysis (for example, practice population, all individuals with a given condition, an individual)? Secondly, who is going to collect the data (health authorities, primary care groups, individual practices)? Thirdly, what are the resources required for data collection (patients' medical records or PACT)? Prescribing indicators can be used for various purposes, and it is vital for quality assessment that this purpose is made explicit.[17] The validity of any type of indicator is related to its intended purpose. Additional resources are needed to produce and collect data for indicators relating to individual patients rather than populations and for indicators requiring examination of individual patients' records rather than PACT data.[7 18]

Use of indicators

Our findings suggest three further caveats for people engaged in quality assessment or improvement, including primary care groups in the United Kingdom. Firstly, indicators are not measures of poor performance. Rather, they identify potential problems that may require investigation by other methods, usually audit. Secondly, it is important to be clear about what the indicators are intended to measure and what conclusions can be claimed from their use. Thirdly, for indicators to be useful for quality assessment or improvement, consistent and comparable data must be available across the relevant healthcare organisations.

Prescribing indicators at the population level, such as those examined here, can never be robust enough to give any more than an absolute rather than relative measure of performance. However, our findings

What is already known on this topic

Indicators based on PACT data have been developed to allow comparison of prescribing behaviour between health authorities, primary care groups, and general practices

Little is known about the way that PACT based indicators are used in practice

What this study adds

Some PACT based indicators are currently viewed as measures of quality

Consensus about the validity of PACT based indicators was low: five of 41 were judged to be valid for quality and seven for cost minimisation

These indicators have a narrow focus and allow only limited examination of prescribing

provide a starting point for developing a common set of prescribing indicators.

We thank Clive Jackson, director of the National Prescribing Centre, for help with sending out the questionnaire and the respondents who took part in the Delphi consultation.

Contributors: The study was devised by SMC, JAC, and DR. SMC and JAC did the Delphi consultation and analysed the data. All three authors wrote the paper, with SMC as the principal author. SMC and JAC are the guarantors.

Funding: This project was funded out of National Primary Care Research and Development Centre core funding from the Department of Health. The Prescribing Support Unit is funded by the Department of Health.

Competing interests. None declared.

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(Accepted 25 May 2000)

My most unfortunate experience

Eating a manchineel "beach apple"

Last year I went on holiday with a non-medical friend to the Caribbean island of Tobago. On the first morning we found one of those idyllic deserted beaches, exactly as described in the brochure: white sand, swaying palms, turquoise sea. While searching for exotic shells and coral fragments, I saw some green fruits among the scattered coconuts and mangoes lying on the beach. They were round, the size of a tangerine, and had apparently fallen from a large tree with a silvery bole and oblique based leaves.

DAN SKEAN

I rashly took a bite from this fruit and found it pleasantly sweet. My friend also partook (at my suggestion). Moments later we noticed a strange peppery feeling in our mouths, which gradually progressed to a burning, tearing sensation and tightness of the throat. The symptoms worsened over a couple of hours until we could barely swallow solid food because of the excruciating pain and the feeling of a huge obstructing pharyngeal lump. Sadly, the pain was exacerbated by most alcoholic beverages, although mildly appeased by pina coladas, but more so by milk alone.

Over the next eight hours our oral symptoms slowly began to subside, but our cervical lymph nodes became very tender and easily palpable. Recounting our experience to the locals elicited frank horror and incredulity, such was the fruit's poisonous reputation.

On reviewing the literature it is clear that we had sampled the fruit of the manchineel plant, commonly known as "beach apple," *Hippomane mancinella* in the euphorbiaceae family.[1] It occurs along coastal beaches of the West Indies and Central America, where its dense thickets are often cultivated to provide a windbreak.

The manchineel tree can cause severe medical problems. The milky sap causes blistering, burns, and inflammation when in contact with the skin, mucous membranes, and conjunctivae.[2 3] Smoke from the burning wood may injure the eyes. Contact dermatitis from this species is commonly observed in the Caribbean and Central American coastland. Various studies on the active principles of the manchineel tree have shown tigliane phorbol esters to be the likely cause of the severe reactions.[4]

In our case swallowing just a tiny amount of the juice from the fruit had clearly resulted in oral and oesophageal ulceration and severe oedema. Drainage of the toxin to regional lymph nodes had presumably caused the subsequent cervical pain.

We found our experience frightening, and with the increasing availability of package Caribbean holidays we think that attention should be drawn to the potentially serious hazard of this fruit. Perhaps few adults (especially a medically qualified one) would be foolish enough to try eating an unknown fruit found on a foreign beach, but children would be highly likely to do so, especially when they find it to smell and taste sweet, resembling a ripe plum.

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