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Evaluating the effect of new hospital specialties on GP prescription costs

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Abstract

The aim of this paper is to examine whether the introduction of new hospital specialties contributed to an increase in GP prescription costs. New specialties were introduced in Dr Gray's hospital, Grampian, North-East Scotland in 1994. Data on prescription costs and volume for groups of drugs associated with the new specialties were obtained for all GP practices in Moray (study practices) and Kincardine and Deeside (control practices). Comparing the periods January–April in 1994 with 1995, and 1995 with 1996, an upward trend in GP prescription costs was detected for ulcer healing drugs and anti-depressants. The trend in Kincardine and Deeside also pointed to rising prescription costs, although to a lesser extent. The number of patients referred to the psychiatric and gynaecology specialties expanded after the introduction of these specialties at Dr Gray's. In conclusion, there is some evidence to support the proposition that the introduction of new specialties at Dr Gray's was associated with an increase in the growth of prescription costs within Moray. Further research should establish more clearly whether this is as a result of increased referrals by GPs or the prescribing of more expensive drugs by consultants. The results have implications for the setting of prescribing budgets. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

This study examines a practical situation where the introduction of new hospital specialties was regarded as the cause of an increase in GP prescription costs in a

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local district. It assesses whether these new services contributed to the cost increase. GP prescription costs in Scotland have been rising between 1994 and 1996 at an annual rate of about 8% [1]. For a government that is keen on controlling health care costs, it is crucial to unravel the many determinants of rising prescription costs.

Grampian is located in the North-East corner of Scotland and has a population of 493 760 [2]. Its main industries reflect its natural resources: oil and gas production, fishing, farming, and forestry. Moray is home to around 15% of Grampian's population, while a further 10% of the region's population lives in Kincardine and Deeside (the control area).

Within the district of Moray, prescription costs have substantially increased over the past few years with the result that they are now high relative to the Grampian region as a whole. This expansion in prescription costs could be attributed to a number of potential reasons, including an ageing population and a higher level of deprivation. Another possible reason was the enlargement in the number of specialties provided at Dr Gray's hospital, Moray, from April 1994 onwards. Dr Gray's has 222 beds and offers a range of specialties including surgery, psychiatry, gynaecology, ophthalmology, orthopaedics and paediatrics [3].

The link between rising prescription costs and the introduction of the new specialties at Dr Gray's may cover any of several underlying processes. The existence of a local hospital specialty may have provided added incentives to GPs to refer patients to hospital consultants as outpatients rather than treat them themselves. This would manifest itself in increased prescription volumes. Additionally, it is possible that consultants, through their greater levels of knowledge and expertise, prescribed state of the art drugs that tended to be more expensive and which GPs would not have prescribed. Alternatively, consultants could have increased the general utilisation of drugs specific to their specialties.

2. Methods

From 1st April 1994, three new specialties were introduced at Dr Gray's: gastroenterology, diabetes and gynaecology/obstetrics. A psychiatry specialty was established 1 year later. For each specialty, the drug types most likely to be initially prescribed by hospital consultants were identified using the British National Formulary in consultation with the Medical Prescribing Advisor at Grampian Health Board. These were ulcer healing drugs for gastroenterology (e.g. cimetidine, sucralfate, misoprostol, omeprazole), contraceptives for gynaecology/obstetrics (e.g. marvelon, neogest, eugynon), antidepressants for psychiatry (e.g. amoxapine, doxepin, phenelzine, citalopram, reboxetine) and all drugs associated with diabetes for the diabetes specialty (e.g. soluble insulin, tolazamide, glucagon).

A controlled study design was used. For each of the months January–April 1994, data were obtained from Grampian Health Board on total prescription costs and volume per 100 patients for selected drugs in each of 15 practices within Moray (total list size of 71 603 people). This information was also obtained for the corresponding periods in 1995 and 1996. For the psychiatry specialty established in

April 1995, data were collected on aggregate prescription costs and volume per 100 patients for January–April 1995 and 1996. As prescription volumes for the selected drugs were often measured in different units, a standardised measure of volume was used in the form of the number of items prescribed per 100 patients on the list of the practice concerned. Two sample paired student's *t*-tests were carried out at practice and aggregate level in order to examine the presence or absence of a statistically significant difference in mean prescription costs and volumes between corresponding periods in 1994 and 1995, and between 1995 and 1996.

These data were compared to similar data from all 11 practices within the district of Kincardine and Deeside (total list size of 55 537 people). In 1994, the population of this area was similar to that of Moray in terms of age, sex profile and level of economic prosperity. It seems reasonable to assume that any alterations in these factors in Moray over the time period examined would also have occurred in Kincardine and Deeside.

No changes in the level of services offered at Aberdeen Royal Infirmary occurred for the specialties being focused upon. This is the nearest hospital to which Kincardine and Deeside GPs can refer patients. Hence, a comparison between this area and Moray allows us to draw inferences as to the effect of the expansion at Dr Gray's on prescription costs as some of the other factors that may influence prescribing are being controlled for.

As increased prescription volumes may also be caused by increased numbers of referrals by GPs to the new specialties (i.e. GPs lowered their referral thresholds), we examined the number of outpatient referrals made by Moray GPs both before and after the expansion of services at Dr Gray's. However, outpatient referral data can only be obtained at specialty level. Hence, we considered referral patterns for psychiatry/mental health and gynaecology/obstetrics. There was little value in examining referral data for the two other specialties as they contain a significant number of drug classes in addition to the ones we selected.

Total prescription costs are the product of prescription volume and drug price and hence changes in total cost can be attributed to changes in either of these factors. If cost increases are associated with no changes in prescription volumes, consultants could be actively prescribing more expensive drugs without increasing prescription volume. Should consultants expand the utilisation of drugs specific to their specialties, we should expect to observe statistically significant rises in both prescription costs and volume.

If the introduction of new specialties at Dr Gray's has resulted in increased prescription costs, mean costs for 1995 should be statistically significantly higher than those of 1994. It is expected that prescription costs for Kincardine and Deeside may also rise because of a general upward trend in drug costs, but that this rise should not be as great as that in Moray. Additionally, there is no reason to expect that prescription costs will increase at a higher rate in Moray between 1995 and 1996 as compared to the control group.

3. Results

The tables presented in this paper report data at the aggregate level, although practice level data were also analysed and results discussed. A full summary of practice level results can be obtained from the authors on request.

3.1. Ulcer healing drugs

Table 1 presents aggregate data on prescription costs and volumes for ulcer healing drugs. The indices show the percentage change in volume and costs compared to the base year (1994). The evolution of the indices shows that the rise in prescription costs in Moray and Kincardine and Deeside were similar between 1994 and 1995. The rate of increase was slightly higher in Moray between 1995 and 1996. Cost increases in Moray between 1994 and 1995 were statistically significant, whereas in Kincardine and Deeside it was not. This suggests that with similar increases in volume, cost increases in Moray between 1994 and 1995 were as a result of consultants prescribing more expensive drugs.

These findings were similar at practice level. When comparing the periods January–April in each year for Moray, prescription costs were statistically significantly higher in 1995 for nine out of 15 practices and in 1996 for six practices. The control group exhibited a weaker, but still upward trend in prescription costs over the same periods. The growth in prescription volume was more pronounced within Moray in comparison with the control group between 1995 and 1996. Those practices for which prescription costs have risen also exhibited expanding prescrip-

Table 1
Prescription costs and volumes for ulcer healing drugs^a

Ulcer healing drugs	Before	After		<i>P</i> -value	
	1994	1995	1996	1994–1995	1995–1996
<i>Moray</i>					
Mean prescription costs	76.46	85.33	99.78	0.002	0.001
Index	100.00	112.00	130.00	–	–
Mean prescription volume	2.72	3.01	3.44	0.002	0.001
Index	100.00	111.00	126.00	–	–
<i>Kincardine and Deeside</i>					
Mean prescription costs	77.13	85.24	94.49	0.051	0.079
Index	100.00	111.00	123.00	–	–
Mean prescription volume	2.88	3.21	3.29	0.002	0.341
Index	100.00	111.00	114.00	–	–
<i>Comparison Moray — Kincardine and Deeside</i>		<i>P</i> -value			
Mean prescription costs	0.956	0.993	0.679	–	–
Mean prescription volume	0.701	0.661	0.737	–	–

^a Figures are expressed as prescription costs (£) and number of items prescribed per 100 patients.

Table 2
Prescription costs and volumes for drugs used in diabetes^a

Drugs used in diabetes	Before	After		P-value	
	1994	1995	1996	1994–1995	1995–1996
<i>Moray</i>					
Mean prescription costs	20.79	20.09	20.17	0.658	0.920
Index	100.00	97.00	97.00	–	–
Mean prescription volume	1.70	1.71	1.64	0.828	0.282
Index	100.00	100.00	96.00	–	–
<i>Kincardine and Deeside</i>					
Mean prescription costs	15.06	17.99	19.89	0.053	0.327
Index	100.00	119.00	132.00	–	–
Mean prescription volume	1.55	1.70	1.52	0.157	0.281
Index	100.00	110.00	98.00	–	–
<i>Comparison Moray — Kincardine and Deeside</i>		P-value			
Mean prescription costs	0.014	0.289	0.915	–	–
Mean prescription volume	0.445	0.959	0.645	–	–

^a Figures are expressed as prescription costs (£) and number of items prescribed per 100 patients.

tion volumes, which was hidden in the aggregate data. This seems to imply that consultants at Dr Gray's increased the quantities of drugs prescribed at a rate over and above the general upward trend.

3.2. Drugs used in diabetes

Aggregate results reported in Table 2 show no statistically significant effect on prescription costs and volumes for drugs used in diabetes.

At practice level, however, there was a statistically significant increase in prescription costs between January–April 1994 and 1995 for five out of 15 practices in Moray. Prescription volumes didn't change for any of the practices examined, suggesting the prescribing of more expensive drugs. Kincardine and Deeside exhibited a statistically significant upward trend in prescription costs, but not in volume. Comparing the same 4 month periods in 1995 with 1996, there were statistically significant falls in the drug volume for seven out of 15 practices within Moray, while there was no significant evidence of a change in costs. This trend was also present in Kincardine and Deeside. Therefore, the analysis of practice level data seems to indicate either that consultants have been prescribing more expensive drugs or that prices of relevant drugs have risen generally.

3.3. Contraceptives

The changes in the indices presented in Table 3 indicate that prescription costs and volumes for contraceptives in the control group closely follow those for Moray.

Table 3
Prescription costs and volumes for contraceptives^a

Contraceptives	Before	After		P-value	
	1994	1995	1996	1994–1995	1995–1996
<i>Moray</i>					
Mean prescription costs	14.52	14.67	9.81	0.876	0.001
Index	100.00	101.00	68.00	–	–
Mean prescription volume	1.38	1.39	1.50	0.742	0.034
Index	100.00	100.00	109.00	–	–
<i>Kincardine and Deeside</i>					
Mean prescription costs	9.29	10.01	7.15	0.237	0.001
Index	100.00	108.00	77.00	–	–
Mean prescription volume	1.47	1.44	1.59	0.783	0.068
Index	100.00	98.00	108.00	–	–
<i>Comparison Moray — Kincardine and Deeside</i>		<i>P-value</i>			
Mean prescription costs	0.199	0.143	0.248	–	–
Mean prescription volume	0.589	0.652	0.426	–	–

^a Figures are expressed as prescription costs (£) and number of items prescribed per 100 patients.

Comparing the periods January–April 1994 and 1995 within Moray at practice level, a statistically significant rise in prescription costs was observed in ten out of 15 practices. In Kincardine and Deeside eight out of 11 practices showed rising prescription costs. No consistent evidence was detected of expanding prescription volumes in either area. Hence, it can be concluded that a general rise in the price of contraceptive drugs occurred. This result is consistent with the fact that more expensive third generation contraceptives were introduced over this period.

Significant decreases in prescription costs for eight out of 15 practices within Moray when comparing 1995 and 1996 were also present within Kincardine and Deeside. There was also a slight upward trend in the volume of drugs prescribed. The drop in volume and costs between 1995 and 1996 at aggregate and practice level can be traced to the contraceptive pill scare that took place over this period and that resulted in a switch back to the cheaper second generation drugs.

3.4. Anti-depressant drugs

Table 4 shows that, within Moray and within Kincardine and Deeside, a statistically significant upward trend in both costs and volume of prescriptions was observed in the 4 month periods in 1995 and 1996. This was more pronounced in Moray and could be explained by high referral rates and the prescribing of more expensive drugs.

At practice level, increasing prescription costs can only partly be attributed to rising prescription volumes as the number of statistically significant cost increases (13 out of 16 practices in Moray) was greater than the number of statistically

Table 4
Prescription costs and volumes for anti-depressant drugs^a

Anti-depressant drugs	Before	After	<i>P</i> -value
	1995	1996	1995–1996
<i>Moray</i>			
Mean prescription costs	33.83	51.09	0.001
Index	100.00	151.00	–
Mean prescription volume	2.40	2.82	0.004
Index	100.00	117.00	–
<i>Kincardine and Deeside</i>			
Mean prescription costs	16.58	20.34	0.014
Index	100.00	123.00	–
Mean prescription volume	1.62	1.78	0.042
Index	100.00	110.00	–
<i>Comparison Moray — Kincardine and Deeside</i>			
	<i>P</i> -value		
Mean prescription costs	0.001	0.001	–
Mean prescription volume	0.004	0.001	–

^a Figures are expressed as prescription costs (£) and number of items prescribed per 100 patients.

significant increases in volume (six practices). This perhaps indicates that new consultants at Dr Gray's were prescribing more expensive drugs such as SSRIs.

3.5. Outpatient referrals

In order to determine whether increased prescription volume was caused by increased GP referrals, we examined the referral pattern in Moray. For gynaecology, referral rates rose by 1.39 per 1000 patients between 1994 and 1995 and by 1.05 between 1995 and 1996. For psychiatry/mental health, a decrease of 0.26 was noted between 1994 and 1995, while referral rates increased by 0.46 between 1995 and 1996. These aggregate results seem to confirm our hypothesis that rising referral rates over time explain increasing prescription volumes in Moray.

4. Conclusion

This study has found some evidence that the introduction of new specialties at Dr Gray's may have led to increases in GP prescription costs for ulcer healing drugs and anti-depressants. No differences were detected for diabetic drugs or contraceptives.

Generally, it was difficult to attribute increases in drug costs to either increasing volumes (which may reflect increasing GP referrals) or the prescribing of more expensive drugs by consultants, or increases in drug prices. However, for ulcer healing drugs, there was some evidence that the latter two explanations were the cause. For anti-depressants, all three factors may have been operating.

Further research should focus more carefully on the reasons for such increases. If the main reason is increased numbers of GP referrals, then drug budgets should not be adjusted because cost increases are the result of GP decision-making. If consultants are prescribing an increased volume or more expensive drugs, this should be accounted for when setting drug budgets. GPs and hospital doctors should adhere to the same formularies and agree on the same level of generic prescribing, if these issues are to be resolved.

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Further Reading

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