

The LUCK study: Laxative Usage in patients with GP-diagnosed Constipation in the UK, within the general population and in pregnancy. An epidemiological study using the General Practice Research Database (GPRD)

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Abstract:

Background: Despite the high prevalence of constipation and its related public health implications, there is relatively little research available on the condition from large epidemiological studies. The aim of this study was to investigate the epidemiology of general practitioner (GP)-diagnosed constipation and the prescribing trends for laxatives in the UK, within the general population and during pregnancy.

Methods: A cohort study for the period from 2005 to 2009 was performed using the UK primary care database (General Practice Research Database), which contains information on over 3 million individuals.

Results: The prevalence of GP-diagnosed constipation ranged from 12 per 1000 persons in 2005 (0.012 per person year) to 12.8 per 1000 in 2009 (0.013 per person year). The prevalence was almost twice as high in women as in men, and was higher in older patients. In 2005 the most commonly prescribed laxatives were lactulose (37%), senna (26%), macrogol (19%), ispaghula (6%), docusate sodium (5%), bisacodyl (4%) and glycerol suppositories (2%). By 2009, this pattern had changed: macrogol (31%), lactulose (29%), senna (22%), ispaghula (5%), docusate sodium (6%), bisacodyl (3%) and glycerol suppositories (3%). In pregnancy, lactulose accounted for 81% of laxative use in 2005, falling to 64% by 2009. In contrast, macrogol use in pregnancy rose from 13% in 2005 to 32% in 2009.

Conclusions: GP-diagnosed constipation is common, accounting for a large number of consultations. Laxative prescribing trends have changed over the 5-year study period, prescriptions for macrogol becoming increasingly common and prescriptions for lactulose and senna less common. Macrogol also appears to have been replacing lactulose for treating constipation in pregnant women.

Keywords: constipation, general practice, General Practice Research Database, laxatives, pregnancy, primary care

Introduction

Constipation is one of the most prevalent gastrointestinal complaints, estimates of UK prevalence varying from 8.2% to 52% [Wald *et al.* 2010; National Horizon Scanning Centre, 2008; Klaschik *et al.* 2003]. Part of the reason for such disparate estimates is the difficulty in defining constipation, which varies between patients and healthcare professionals and between

studies. The NHS Clinical Knowledge Summary on constipation defines the condition as defaecation that is unsatisfactory, because of infrequent stools, difficult stool passage or seemingly incomplete defaecation [NHS Clinical Knowledge Summaries, 2010]. A study of 1055 factory workers in the UK in 1965 [Connell *et al.* 1965] found that 99% of the working population maintained a bowel frequency of between three

Ther Adv Gastroenterol

(2011) 4(6) 343–363

DOI: 10.1177/
1756283X11417483

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bowel movements per day and three per week. On the basis of this evidence, constipation is sometimes defined as a frequency of fewer than three bowel movements per week [Higgins and Johanson, 2004].

Another factor contributing to difficulty in estimating the prevalence of the condition is that it may occur chronically in patients, but it may also be a transient short-term condition. There are many causes of constipation: it may be due to a prolonged colon passage or defaecation disorder, another disease, medication such as opioid therapy, or factors such as diet, fluid intake, immobility and lack of exercise [Klaschik *et al.* 2003]. Pregnancy is also known to increase the risk of constipation. Bradley and colleagues estimated that, during pregnancy, one in four women experience constipation [Bradley *et al.* 2007].

Laxatives as a treatment for constipation are among the most widely used of all medications [Xing and Soffer, 2001]. These medicines are available over the counter from pharmacies as well as by prescription from a general practitioner (GP). There are four main types of laxative: bulk-forming agents; osmotic laxatives; stimulant laxatives; and lubricants. Bulk-forming agents, such as ispaghula husk, are organic polymers with various water-holding capacities: they increase the intraluminal volume by retaining water, which stimulates motility and speeds the transit of luminal contents through the colon. Stimulant laxatives, such as senna, stimulate intestinal motility and affect epithelial transport of water and electrolytes [Klaschik *et al.* 2003; Xing and Soffer, 2001].

Macrogol and lactulose are osmotic laxatives, although the latter also promotes bacterial fermentation. They are not absorbed during their transit through the bowel and the water that is bound to them remains within the stool, thus aiding the relief of constipation. Macrogol is the international non-proprietary name for polyethylene glycol and is available in two different types, 3350 and 4000. These numbers represent the average molecular weight of the polyethylene glycol. It can be formulated either with or without electrolytes, which are added in an attempt to rectify the electrolyte depletion that can occur in some patients. The addition of electrolytes has an adverse effect on the taste of the product, however, and this can affect patient compliance.

The laxatives most commonly prescribed by GPs are lactulose, macrogol, senna, ispaghula husk,

docusate sodium, bisacodyl and glycerol suppositories. In 2009, prescriptions for these products made up over 95% of all laxative prescriptions in England [NHS Information Centre, 2010]. However, there are no definitive treatment guidelines for constipation in adults and treatment of this condition may present many challenges, especially in pregnancy, in which there is an additional need to ensure the safety of treatments [Tytgat *et al.* 2003]. The NICE clinical guidelines on routine antenatal care give advice on managing common problems in pregnancy; the recommended treatment for constipation is a change in diet. No recommendations are given for treating constipation that is not improved by a change in diet [NICE Clinical Guidance, 2010].

The British National Formulary (BNF) recommends that, if diet and lifestyle changes do not control constipation in pregnancy, then moderate doses of poorly absorbed laxatives may be used; bulk-forming laxatives are recommended to be tried first, followed by an osmotic laxative such as lactulose, or a stimulant laxative such as senna if necessary [British National Formulary, 2010]. However, a consensus document on the use of laxatives in pregnancy has concluded that macrogols meets the criteria for the ideal laxative for use in pregnancy [Tytgat *et al.* 2003].

Despite the high prevalence of constipation in the UK and the related cost implications, the condition has not been widely studied in large patient groups. This study is the first investigation of constipation in the general population and in pregnancy, and also of the prescribing trends of laxatives within these patient groups, using the UK General Practice Research Database (GPRD).

Materials and methods

Study design

This was a cohort study designed to characterize the population of patients with GP-diagnosed constipation in each year between 2005 and 2009. A cohort of patients was extracted from the GPRD for each year. Patients were included in the study if they were aged 18 or older and had a diagnosis of constipation or faecal impaction within the study year, identified using a list of relevant READ codes (Appendix). The READ codes used were those for constipation, including constipation symptoms, chronic, acute and functional constipation, and faecal impaction.

Patients were included in the study only if their medical record met the acceptable standard of quality defined by the GPRD as being suitable for inclusion in research. For example, patients were required to have a valid registration date and a viable birth year. This ensured that patients with poor-quality or noncontiguous medical records were not included in the cohort. Only patients from practices that were up to standard were selected; such practices were those that had met the data quality criteria required by GPRD at the beginning of the study period. Patients were excluded if they were registered in a practice for which the latest data collection date was before the end of the study period, or if the patient transferred out of the practice before the end of the study year. This was to ensure that patient follow up was complete.

Therapies of interest were the seven most commonly prescribed laxatives: lactulose, macrogol, senna, ispaghula husk, docusate sodium, bisacodyl and glycerol. All available brands were included for each substance, and the therapies were identified using a list of codes (Appendix). Macrogol 3350 and macrogol 4000 were both included within the macrogol prescriptions.

Pregnancies can be identified within the longitudinal record of GPRD patients [Devine *et al.* 2010]. An algorithm was used to identify pregnancies, which combined pregnancy codes (Appendix) within the clinical details in GPRD with codes entered into the maternity module of the database. These codes were used to define a current ongoing pregnancy, and the patient records were examined for constipation diagnoses and laxative prescribing concurrent with the pregnancy.

The size of the study population was determined by the number of patients within the GPRD database with a diagnosis of constipation. A feasibility study showed that approximately 45,000 patients would be included in each year cohort. This number is large enough to give extremely precise estimates of the proportion of patients prescribed laxatives.

Data source

The GPRD is a database of longitudinal patient primary care records, containing anonymized data on demographics, diagnoses, referrals, prescribing and health outcomes for patients from almost 500 GP practices in the UK (over 3

million currently registered patients) [Jick *et al.* 1991]. The database contains approximately 6% of UK patients, and the geographical distribution is representative of the UK population [Garcia Rodriguez and Gutthann, 1998]. Validation studies have confirmed the high data quality and completeness of clinical records within the GPRD [Khan *et al.* 2010; Jick *et al.* 2003; Garcia Rodriguez and Gutthann, 1998]. A recent systematic literature review of studies using the GPRD reported that the median proportion of diagnoses correctly coded was 89% [Herrett *et al.* 2010]. The LUCK (Laxative Usage in patients with GP-diagnosed Constipation in the UK) study received approval from the Independent Scientific Advisory Committee at the Medicines and Healthcare products Regulatory Agency (Protocol number 10_078).

Data analysis

Data were extracted using GPRD OnLine Data (GOLD) and analysed using SAS[®] (SAS Institute Inc, North Carolina, USA) software version 9.2.

The prevalence of GP-diagnosed constipation was calculated for each year from 2005 to 2009. The patient population was summarized for each year by comedications, comorbidities, age and sex. Prescribing trends for each product were summarized by product and by patient age and sex. Regional differences in prescribing trends were examined using the GPRD-defined regions of the UK. The number of prescriptions issued per patient was summarized by product and by patient age and sex. The prescribing trends of laxatives during pregnancy were examined similarly.

Results

Diagnoses of constipation in primary care

Within a population of 3.8 million patients in the GPRD, the prevalence of GP-diagnosed constipation ranged from 12 per 1000 persons in 2005 to 12.8 per 1000 persons in 2009. Overall, the prevalence in women was almost twice that in men; in 2009 the prevalence was 9.1 per 1000 people in men and 16.5 per 1000 people in women.

The prevalence of GP-diagnosed constipation increased with age, from 4.0 per 1000 in patients aged 18–29 years to 52.1 per 1000 in patients

aged over 75 in 2009. This pattern did not change during the 5-year study period. The prevalence of constipation in 2009 was higher in women than in men in the younger age groups, but higher in men than in women in patients over the age of 75 (Figure 1). There was a peak in prevalence amongst females aged between 30 and 44, possibly reflecting an increase in the risk of constipation during pregnancy or an increase in the likelihood of consulting a GP regarding constipation during pregnancy.

Between 2005 and 2009, the number of patients with GP-diagnosed constipation in the GPRD increased with increasing age in both male and female patients (Figure 2). In each age group

there were more female patients than male. Although there were more female patients than male among patients aged over 75, the prevalence of GP-diagnosed constipation was higher in males than in females in this age group, reflecting the higher number of female patients within this age group.

Table 1 shows the age and sex of patients with GP-diagnosed constipation. There were between 45,000 and 49,000 patients in the GPRD with a diagnosis of constipation in each study year, with an average age of between 61 and 63. A total of 65% of patients were female, and the average age and sex ratio of the patients remained constant during the 5-year study period.

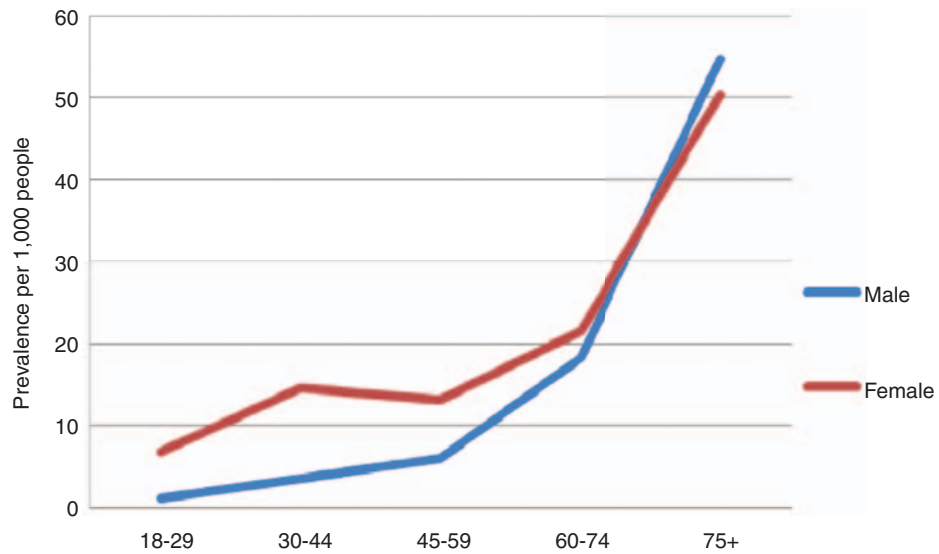


Figure 1. Prevalence of GP-diagnosed constipation in 2009 by age and sex.

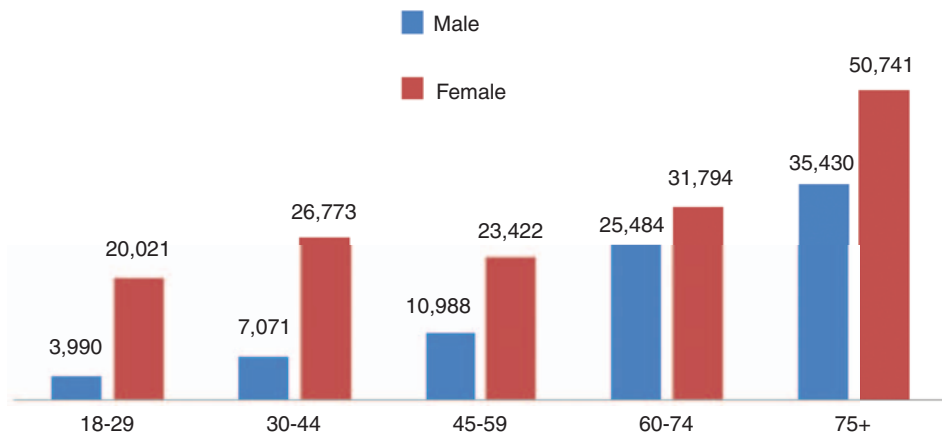


Figure 2. Number of patients with GP-diagnosed constipation by age and sex (2005–2009).

Table 1. Patients with a diagnosis of constipation between 2005 and 2009.

Patient characteristic	2005	2006	2007	2008	2009
Number of patients	47,196	46,653	45,395	47,718	48,752
Sex, % male	35	35	35	35	35
Age, years, mean (SD)	62.8 (20.9)	62.5 (21.1)	62.3 (21.1)	62.1 (21.1)	61.5 (21.1)

Table 2. Pregnant patients with a diagnosis of constipation in 2005 and 2009.

GP-diagnosed constipation in pregnancy	Number of patients	%	%	Age, years, mean (SD)	Mean number of prescriptions (SD)	History of GP-diagnosed constipation prior to pregnancy (%)
2009 cohort						
All pregnant women	1648	—		31.1 (7.1)	—	29.6
Treated with laxatives	729	44.2%		31.6 (7.4)	1.62 (1.4)	33.5
Macrogols	231		31.7%	33.0 (7.7)	1.46 (1.2)	—
Senna	90		12.3%	33.9 (8.4)	1.74 (2.0)	—
Lactulose	468		64.2%	30.9 (6.8)	1.45 (1.2)	—
Other laxatives						
Ispaghula	57		3.5%	31.9 (7.2)	1.47 (1.6)	
Docusate sodium	26		1.6%	35.0 (8.6)	2.00 (2.6)	
Bisacodyl	18		1.1%	34.8 (7.4)	1.72 (1.6)	
Glycerol	61		3.7%	32.1 (7.5)	1.19 (0.5)	
Not treated with laxatives	919	55.8%		31.4 (7.3)	—	26.6
2005 cohort						
All pregnant women	795	—		29.2 (6.0)	—	24.9
Treated with laxatives	263	33.1%		29.3 (5.7)	1.60 (1.1)	28.1
Macrogols	35		13.3%	29.4 (6.2)	1.32 (0.6)	—
Senna	39		14.8%	29.7 (5.2)	1.26 (0.6)	—
Lactulose	213		81.0%	29.1 (5.7)	1.27 (0.9)	—
Other laxatives						
Ispaghula	24		3.0%	30.0 (5.4)	1.13 (0.4)	
Docusate sodium	7		0.9%	24.3 (4.1)	1.14 (0.4)	
Bisacodyl	7		0.9%	24.1 (5.1)	1.14 (0.4)	
Glycerol	22		2.8%	28.8 (4.8)	1.00 (0.0)	
Not treated with laxatives	532	66.9%		29.2 (6.1)	—	23.3

There are a number of diagnostic codes for constipation; there are several general constipation codes and a number of more specific codes for the type of constipation. The code used to record constipation was examined for the cohorts of patients; however, although there are READ codes available for a GP to record the type of constipation with which a patient presents, it appears that these specific codes are not often used, and a general constipation code is used more commonly.

Opiate usage and cancer diagnoses were investigated in patients with a diagnosis of constipation, as opiate usage is known to cause constipation [Klaschik *et al.* 2003]. The cohort was examined

for any prescriptions for opioids within the year of interest. A total of 44% of patients in the 2009 cohort had a prescription for an opioid within 2009. This proportion was similar across the 5 study years.

Diagnoses of constipation during pregnancy

Within the cohorts of patients with GP-diagnosed constipation, 3296 female patients were identified as having a pregnancy during 2009, and 2291 patients were identified as having a pregnancy within 2005 (Table 2).

The average age of patients with GP-diagnosed constipation with a recorded pregnancy was 29.2 (SD 6.0) in 2005 and 31.1 (SD 7.1) in 2009.

In 2005, 25% of these patients had a recorded history of GP-diagnosed constipation prior to their pregnancy, and 29% of patients had prior GP-diagnosed constipation in 2009.

Laxative prescribing in primary care

Amongst the six medications studied, lactulose was the most commonly prescribed overall. The pattern of prescribing changed over the 5-year study period, however; the percentage of patients with GP-diagnosed constipation who were prescribed lactulose and senna decreased and the proportion prescribed macrogol increased (Figure 3). Between 2005 and 2009 macrogol moved from being the least prescribed of the three most common laxatives to the most commonly prescribed; 29% of patients received a prescription for macrogol in 2005 and 47% received one in 2009.

Table 3 summarizes the characteristics of patients with at least one prescription for macrogol, senna, lactulose, ispaghula, docusate sodium, bisacodyl or glycerol. Some patients had prescriptions for more than one substance; these patients were included in multiple groups.

Patients with a diagnosis of constipation but no prescription for a laxative were, on average, younger than patients prescribed laxatives: 56.6 years (SD 20.8) in 2009 compared with an overall average age of 61.5 (21.1). This is probably due to the fact that patients under the age of 60 pay a prescription charge in England, and laxatives

bought over the counter in a pharmacy are likely to be cheaper than this charge. Patients prescribed senna tended to be older [67.2 (19.6) in 2009], and this group of patients had a slightly higher proportion of males: 38% compared with 35% overall. Patients prescribed lactulose or other laxatives were, on average, younger than patients prescribed macrogol or senna: 62.2 (22.0) and 62.7 (20.4) compared with 64.5 (20.0) for macrogol and 67.2 (19.6) for senna.

Over 76% of patients within the constipation cohort were prescribed at least one of the three most common laxatives (macrogol, senna and lactulose) within the year of diagnosis. In 2009, 32% of patients were prescribed at least two of these three types of laxative during 2009 (Figure 4). The number of prescriptions each patient received in a year increased with age.

For the seven most commonly prescribed laxatives, the number of prescriptions each patient was prescribed within a 1-year period for the 2009 cohort of patients with GP-diagnosed constipation is summarized in Figure 5. Over 50% of patients who were prescribed each drug within 2009 received only one prescription. A total of 20% of patients prescribed senna were prescribed more than six prescriptions during 2009, compared with 10% of patients prescribed macrogol and 14% of those prescribed lactulose.

In 2009 within the GPRD, 48,752 patients were diagnosed with constipation (prevalence of

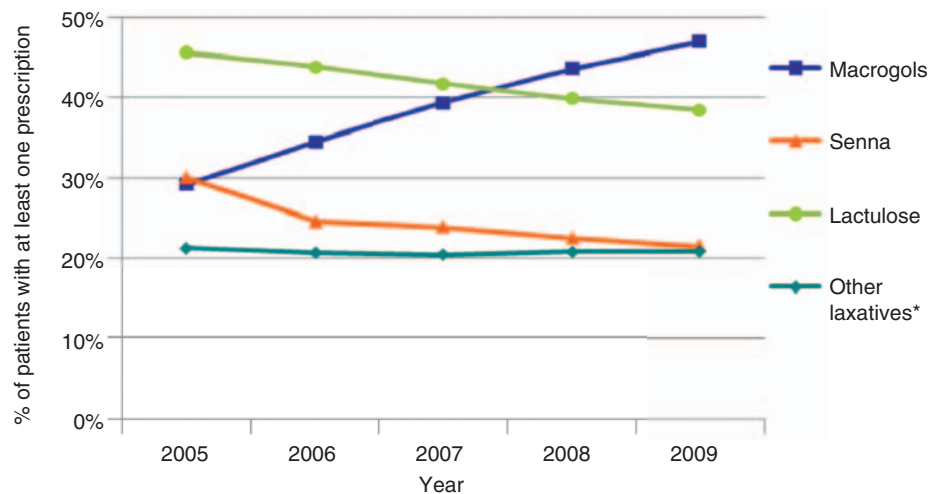
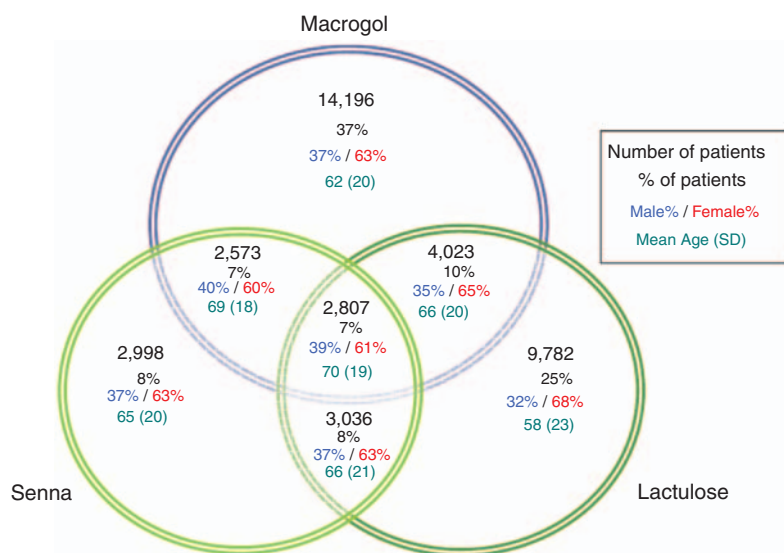


Figure 3. Percentage of constipation cohort prescribed each type of laxative. *Ispaghula, Docusate Sodium, Bisacodyl or Glycerol.

Table 3. Characteristics of patients by prescribed laxative.

Patients with a diagnosis of constipation between 2005 and 2009	Macrogol	Senna	Lactulose	Other laxatives*	Not treated with laxatives	Total
2009						
Number of patients	22,885	10,477	18,711	10,172	7427	48,752
Number of prescriptions	55,860	39,496	51,632	31,778		
Sex, males	37%	38%	34%	36%	34%	35%
Age, years, mean (SD)	64.5 (20.0)	67.2 (19.6)	62.2 (22.0)	62.7 (20.4)	56.6 (20.8)	61.5 (21.1)
2008						
Number of patients	20,819	10,733	19,030	9923	7755	47,718
Number of prescriptions	50,352	40,151	54,403	30,188		
Sex, males	37%	38%	35%	35%	33%	35%
Age, years, mean (SD)	65.5 (19.8)	67.8 (19.6)	63.0 (21.9)	63.4 (20.4)	55.6 (21.0)	62.1 (21.1)
2007						
Number of patients	17,846	10,854	18,946	9273	7786	45,395
Number of prescriptions	42,648	39,538	54,094	27,794		
Sex, males	37%	38%	36%	36%	33%	35%
Age, years, mean (SD)	65.8 (19.7)	67.8 (19.5)	63.7 (21.6)	63.7 (20.2)	56.0 (21.2)	62.3 (21.1)
2006						
Number of patients	16,078	11,461	20,435	9645	8547	46,653
Number of prescriptions	39,136	43,050	61,659	29,240		
Sex, males	37%	38%	35%	36%	33%	35%
Age, years, mean (SD)	66.2 (19.6)	68.0 (19.3)	64.2 (21.4)	63.9 (20.2)	55.8 (21.2)	62.5 (21.1)
2005						
Number of patients	13,751	14,178	21,509	10,023	9176	47,196
Number of prescriptions	33,949	46,359	64,737	31,169		
Sex, males	36%	34%	35%	36%	33%	35%
Age, years, mean (SD)	67.1 (19.0)	68.3 (19.3)	64.4 (21.3)	69.0 (19.9)	55.8 (21.0)	62.8 (20.9)

*Ispaghula, docusate sodium, bisacodyl or glycerol suppositories.

**Figure 4.** Number of patients with each combination of treatments within 2009.

0.13 per patient year). In this group of patients the total number of GP consultations in which constipation was diagnosed was 67,493. The average number of consultations per year that

included a diagnosis of constipation was 1.3 (SD 0.86) and 19% of patients consulted a GP about constipation at least twice during this 1-year period.

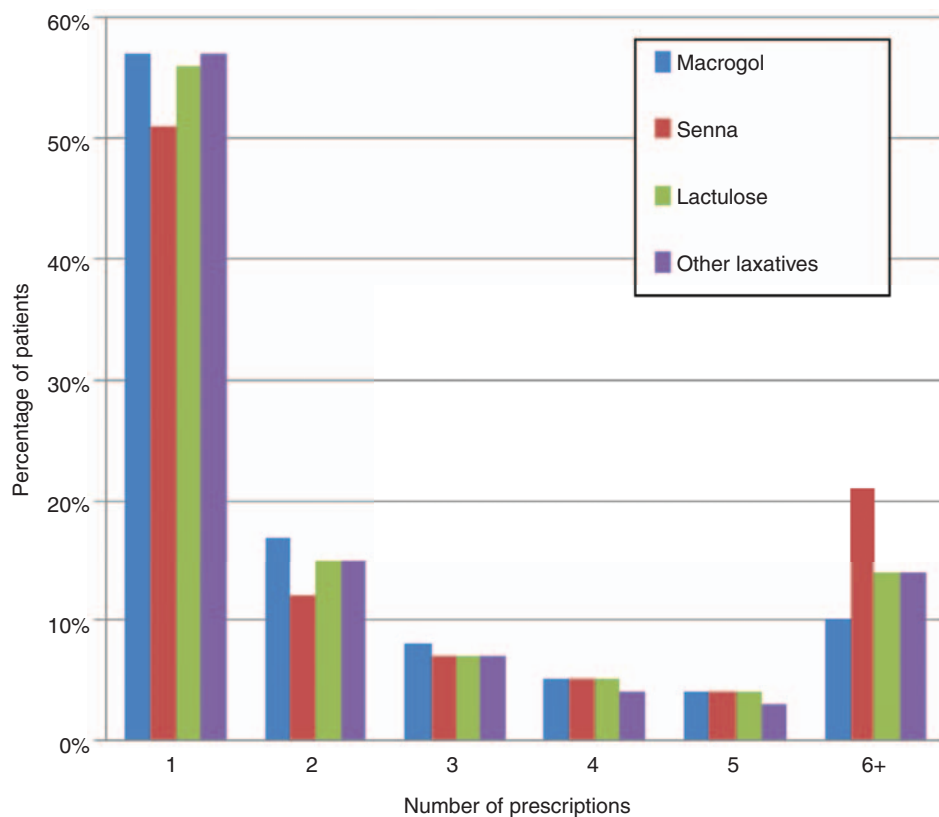


Figure 5. Number of patients by number of prescriptions in 2009.

The prescribing trends for the three most common laxatives within the cohort of patients with GP-diagnosed constipation were examined by UK region. There was a shift in prescribing from senna and lactulose to macrogol across all regions of the UK, with the biggest shift in the south-east, south central and south-east coast of England. In these areas macrogol was the most commonly prescribed laxative by 2009.

Laxative prescribing in pregnancy

Table 2 shows laxative prescribing in pregnant patients in 2005 and 2009. In 2005, 33% of pregnant patients with GP-diagnosed constipation were prescribed laxatives, rising to 44% in 2009. Lactulose was the laxative most commonly prescribed in pregnancy, but the percentage of laxative-treated patients prescribed lactulose dropped from 81% in 2005 to 64% in 2009. The percentage of pregnant patients treated with laxatives who were prescribed macrogols rose from 13% in 2005 to 32% in 2009. Patients treated with laxatives during pregnancy were more likely to have consulted a GP regarding constipation prior to their pregnancy than

patients who were not treated with laxatives during their pregnancy (in 2009, 34% of those treated compared with 27% of those not treated).

Discussion

The prevalence of GP-diagnosed constipation has remained constant over the 5-year study period. The prevalence figures produced in this study are likely to be a considerable underestimate of the actual prevalence of constipation in the UK. This is because constipation can be a relatively minor complaint for which patients can self-medicate with a change in diet or can buy over-the-counter medications from a pharmacy.

The prevalence of GP-diagnosed constipation was found to be higher in female patients in all age groups under 75, but in patients aged over 75 the prevalence was higher in males. This may reflect a lower frequency of GP visits in general amongst younger males or an actual lower prevalence of constipation in men under the age of 75.

A high proportion of patients in this cohort had a record of opioid use, suggesting the possibility of

medication-induced constipation in these patients. GPs prescribing opiates are aware that these agents can cause constipation, so may coprescribe laxatives or be more likely to inquire during their consultations whether the patient is constipated. Constipation in these patients could also be more severe or chronic than in patients not being prescribed opiates, which would mean that these patients are more likely to mention it to the GP.

There are other medications that are known to cause constipation, such as anticholinergic agents, tricyclic antidepressants, calcium channel blockers, diuretic drugs and NSAIDs, which were not investigated in this study. Further studies are needed to fully explain the proportion of medication-induced constipation within the GP-diagnosed constipation cohort.

Age is another factor that affects whether a patient consults a GP or a pharmacist. In both male and female patients the prevalence of GP-diagnosed constipation in patients aged 75 and older was much higher than the prevalence in younger patients. The results of this study suggest that older patients are either more likely to suffer from constipation or more likely to consult their GP if they do suffer from constipation, as the number of diagnoses and prescriptions was higher in the older age groups. Older patients would be likely to suffer from more comorbidities than younger patients and may therefore consult their GP more, and may therefore be more likely to mention constipation symptoms within a consultation. It is also possible that younger patients may prefer to visit a pharmacy for minor illness.

It is likely that patients with more severe and more chronic cases of constipation would be those more likely to be consulting a GP, although it was not possible to conclude this from this study as the diagnostic codes for constipation do not specify severity.

The trend in prescribing of laxatives by GPs to patients diagnosed with constipation has changed during the 5-year study period. The use of senna and lactulose products has decreased, while prescriptions for macrogol have increased steadily. Macrogol is now the most commonly prescribed laxative to patients with GP-diagnosed constipation in the UK. This pattern is also reflected in pregnant women; the proportion of patients

prescribed macrogols for constipation in pregnancy has increased and the proportion prescribed lactulose and other laxatives has decreased.

The results of this study indicate that the most common laxatives prescribed in pregnancy are lactulose and macrogols, with lactulose being replaced by macrogols in the 5-year study period, reflecting the trend in the general population. The database does not allow us to examine the reasons GPs may have had for preferentially prescribing macrogols, so more research is needed to establish whether this might be due to their experience suggesting that macrogol is more effective, or to a perception that macrogol is a safer product because of its mode of action.

There are no definitive guidelines on laxative prescribing in pregnancy, but the BNF suggests that if laxatives are required in pregnancy, bulk-forming laxatives should be tried first, followed by an osmotic laxative such as lactulose, followed by a stimulant such as senna if needed. Although the BNF suggests lactulose as the osmotic laxative to be prescribed, the results of this study suggest that GPs are increasingly confident in prescribing macrogols in pregnancy, and that therefore this advice is perhaps outdated. This is in line with the Summary of Product Characteristics for Macrogol 4000, which states that the product is suitable for use in pregnancy.

In 2009 there were approximately 67,000 GP consultations in which constipation was discussed and diagnosed. Although these consultations may also have been used to discuss other conditions, the condition still represents a significant use of GP resources. Projecting these figures up to the whole UK population, it is estimated that there are over one million GP consultations regarding constipation every year.

Acknowledgements

The authors would like to thank Dr Jas Kalsi for medical input into the writing up of the study, and Lindsay Vye and Eryl Lloyd for continued support of the study.

Funding

The study was funded by Boehringer Ingelheim Ltd.

Conflict of interest statement

SL and ACES are employees of Boehringer Ingelheim. PJW has served as an advisory board member or received research funding from the following pharmaceutical companies: Novartis Pharmaceuticals, GlaxoSmithKline, Solvay Pharmaceuticals, Rotta Research, Proctor and Gamble, Danone Research, Astellas Pharma, Ironwood Pharmaceuticals, Sucampo Pharmaceuticals, Almirall Pharma, Movetis UK, Norgine and Chr Hansen. PJW has acted as a paid consultant to Boehringer Ingelheim but received no payment for his contribution to this article. JSOD is chair of the Primary Care Society for Gastroenterology, which is funded by the following pharmaceutical companies: Danone, Norgine, Shire, Reckitt Benckiser, Warner Chilcott, Yalkult, ProBio and Puricore. JSOD has contributed to advisory boards for Astra Zeneca, Danone and Shire. He has not received payment for his contribution to this article.

Ethical approval

The protocol for this study received approval from the Independent Scientific Advisory Committee at the Medicines and Healthcare products Regulatory Agency (Protocol number 10_078).

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Appendix

Medical Codes

Constipation codes

Medical Code	Number of clinical events	READ code	Term
1028	635856	19C..00	Constipation
2004	609583	19C..11	Constipation symptom
5803	183861	J520z00	Constipation NOS
1709	36286	J520.00	Constipation - functional
10687	6428	J503100	Faecal impaction
20450	5381	19CZ.00	Constipation NOS
6364	2352	J520100	Chronic constipation with overflow
23641	819	J520000	Acute constipation
25797	815	J520200	Chronic constipation without overflow
26022	580	J520300	Drug induced constipation
15939	213	E264500	Psychogenic constipation
24180	150	J520y00	Other specified constipation

Pregnancy Codes

Current pregnancy codes		
medcode	readcode	readterm
127	62..00	Patient pregnant
6184	ZV22.00	[V]Normal pregnancy
5709	62..13	Pregnancy care
3030	4654	Urine pregnancy test positive
5044	13H7.00	Unwanted pregnancy
4536	621..11	Pregnancy confirmed
13165	621..00	Patient currently pregnant
1771	L182.00	Anaemia during pregnancy, childbirth and the puerperium
6715	6219	Patient ? pregnant
10306	Z22C314	Weeks pregnant
5778	67A..00	Pregnancy advice
9408	L10y.11	Bleeding in early pregnancy
49519	Z229.00	Observation of position of pregnancy
1668	L182500	Iron deficiency anaemia of pregnancy
14899	621Z.00	Patient pregnant NOS
15567	6218	Pregnant -unplanned-not wanted
1130	L210.00	Twin pregnancy
29631	6222	Antenatal care: 2nd pregnancy
15033	ZV61900	[V]Other unwanted pregnancy
7517	621C.00	Unplanned pregnancy
1357	L210100	Twin pregnancy - delivered
2638	L1...00	Pregnancy complications
3766	L10..00	Haemorrhage in early pregnancy
3191	L16y500	Abdominal pain in pregnancy
20240	6216	Pregnant - planned
10185	L13..00	Excessive pregnancy vomiting
9754	Z22A400	Early stage of pregnancy
29593	6223	Antenatal care: 3rd pregnancy
14925	L10z.00	Early pregnancy haemorrhage NOS
10775	8B74.00	Iron supplement in pregnancy
3421	L12z300	Unspecified hypertension in preg/childb/puerp - not deliv
16215	6211	Pregnant - urine test confirms
11760	L13z.00	Unspecified pregnancy vomiting
16611	ZV22300	[V]Pregnant state, incidental
12890	Z227.00	Confirmation of pregnancy

(continued)

Continued

Current pregnancy codes		
medcode	readcode	readterm
12837	7F2B100	Ultrasound monitoring of early pregnancy
15318	6214	Pregnant - on history
18500	Z22D100	Viable pregnancy
14842	6217	Pregnant - unplanned - wanted
14994	6174	Pregnant, sheath failure
13672	8HHf.00	Refer to early pregnancy unit
16775	L16E.00	Pregnancy pruritus
36903	67AZ.00	Pregnancy advice NOS
13968	584D.00	Antenatal ultrasound confirms intra-uterine pregnancy
6649	L166800	Urinary tract infection complicating pregnancy
22193	Z229100	Intrauterine pregnancy
35158	Z225.00	Normal pregnancy
67975	L166.00	Genitourinary tract infections in pregnancy
1850	7F06012	Shirodkar suture in pregnancy
22183	957..11	Prescription exempt form-preg
21119	L182300	Anaemia during pregnancy - baby not yet delivered
10184	67A3.00	Pregnancy smoking advice
13759	445..00	Serum pregnancy test (B-HCG)
5693	L16A.00	Glycosuria during pregnancy
23495	L265.00	Small-for-dates fetus in pregnancy
61835	L161z00	Oedema or excessive weight gain in pregnancy NOS
10205	ZG9..00	Advice relating to pregnancy and fertility
15338	621A.00	Pregnancy unplanned ? wanted
37701	Z22A.00	Observation of pattern of pregnancy
53685	L410500	Varicose veins of legs in pregnancy
43140	67A2.00	Diet in pregnancy advice
21849	L031.00	Tubal pregnancy
30365	Z22AA00	Wanted pregnancy
15061	L13..12	Hyperemesis of pregnancy
17947	62a..00	Pregnancy review
26286	L18A000	Cholestasis of pregnancy
20439	L123.00	Transient hypertension of pregnancy
9986	Z212.11	Pregnancy care
23421	615C.00	IUD failure - pregnant
14644	L166z11	UTI - urinary tract infection in pregnancy
35912	ZV22200	[V]Pregnancy confirmed
25131	Z22AD11	Reported conception - pregnancy
28103	Z22A300	Concealed pregnancy
15433	L21..00	Multiple pregnancy
30618	Z22AB00	Unplanned pregnancy
26201	Z22AC00	Pregnancy with uncertain dates
35859	67A5.00	Pregnancy alcohol advice
20197	L211.00	Triplet pregnancy
14877	621B.00	Pregnant - ? planned
3029	L166500	Infections of kidney in pregnancy
41122	L10zz00	Early pregnancy haemorrhage NOS
15418	L166300	Genitourinary tract infection in pregnancy - not delivered
46270	ZV22z00	[V]Unspecified pregnant state
51298	6215	Pregnant - on abdom. palpation
36006	L16z.00	Pregnancy complication NOS
10278	L180800	Diabetes mellitus arising in pregnancy
2602	L166.11	Cystitis of pregnancy
10261	L2..00	Risk factors in pregnancy
37693	13Hd.00	Teenage pregnancy
2937	L175.11	Rubella contact in pregnancy
97034	67AE.00	Folic acid advice in first trimester of pregnancy
24603	L10y.00	Other haemorrhage in early pregnancy
15634	L166z00	Genitourinary tract infection in pregnancy NOS
29692	615C.11	Pregnant, IUD failure

(continued)

Continued

Current pregnancy codes		
medcode	readcode	readterm
38882	L123600	Transient hypertension of pregnancy
20118	620..12	Static weight gain pregnancy
25254	Z21..00	Care relating to reproduction and pregnancy
28107	L161.00	Oedema or excessive weight gain in pregnancy no hypertension
50421	Z22A900	Unwanted pregnancy
39117	L126500	Eclampsia in pregnancy
14651	13H8.00	Illegitimate pregnancy
29205	4453	Serum pregnancy test positive
48552	L010.11	Anembryonic pregnancy
42614	Z22..00	Pregnancy observations
32975	6166	Pregnant, diaphragm failure
29746	8B75.00	Vitamin supplement - pregnancy
35592	6213	Pregnant - V.E. confirms
35509	624..00	A/N care: precious pregnancy
65834	ZV23200	[V]Pregnancy with history of abortion
23438	L2z..00	Risk factors in pregnancy NOS
27451	L166000	Genitourinary tract infection in pregnancy unspecified
45965	Z22C311	Pregnancy duration
50058	135Z.00	Pregnancy benefit NOS
38346	ZV22000	[V]First normal pregnancy supervision
33708	L182100	Anaemia during pregnancy - baby delivered
34173	L12B.00	Proteinuric hypertension of pregnancy
41587	L210z00	Twin pregnancy NOS
30351	67A6.00	Drugs in pregnancy advice
12521	L161.11	Excessive weight gain in pregnancy
22557	Z22B100	Single pregnancy
31162	L165.00	Asymptomatic bacteriuria in pregnancy
15065	8B7..11	Pregnancy vitamin/iron prophyl
22215	Z22A200	High risk pregnancy
44729	L031000	Fallopian tube pregnancy
32493	Z22AD00	Presentation of pregnancy
26866	L2y..00	Other specified risk factors in pregnancy
27740	L16..00	Other pregnancy complication NEC
35646	L123z00	Transient hypertension of pregnancy NOS
45729	Z22D.00	Observation of viability of pregnancy
52583	L168.00	Fatigue during pregnancy
23334	L162.11	Albuminuria in pregnancy without hypertension
29786	L416600	Haemorrhoids in pregnancy
42015	L16y.00	Other pregnancy complications
30817	6212	Pregnant - blood test confirms
44057	ZV23111	[V]Pregnancy with history of hydatidiform mole
23751	L266.00	Large-for-dates fetus in pregnancy
40978	Z22A700	Surrogate pregnancy
49884	6761	Diabetic pre-pregnancy counselling
56451	L13zz00	Unspecified pregnancy vomiting NOS
6580	ZV23800	[V]Supervision of high-risk pregnancy due to social problems
38771	Lyu2200	[X]Other venous complications in pregnancy
18258	L167.00	Liver disorder in pregnancy
10173	Z23D200	Pregnant abdomen observation
33441	L511.00	Maternal care for viable fetus in abdominal pregnancy
46577	66AX.00	Diabetes: shared care in pregnancy - diabetol and obstet
24063	6207.00	Pregnancy prolonged - 41 weeks
23373	L150.00	Post-term pregnancy
54942	L123100	Transient hypertension of pregnancy - delivered
21196	ZV23.00	[V]High-risk pregnancy supervision
27980	L166700	Infections of the genital tract in pregnancy
36235	67A4.00	Pregnancy exercise advice
49855	Q015100	Fetus or neonate affected by twin pregnancy
34639	L180100	Diabetes mellitus during pregnancy - baby delivered

(continued)

Continued

Current pregnancy codes		
medcode	readcode	readterm
37048	6282	A/N care:10yrs+since last preg
36394	L16C.00	Pregnancy induced oedema + proteinuria without hypertension
52048	Z22AB11	Accidental pregnancy
38022	Z22CF00	Date symptom of pregnancy first noted
50512	L031z00	Tubal pregnancy NOS
25501	Z22A100	Low risk pregnancy
16017	L166100	Genitourinary tract infection in pregnancy - delivered
30302	7F...12	Pregnancy operations
12230	L263900	Maternal care for fetal tachycardia during pregnancy
65555	L132.00	Late vomiting of pregnancy
34938	L212.00	Quadruplet pregnancy
38556	67A7.00	Pregnancy dental advice
45413	L263A11	Maternal care for reduced fetal heart rate during pregnancy
35514	624Z.00	A/N care: precious preg. NOS
40633	Z22A600	Teenage pregnancy
41033	Z22C511	EDC - Estimated date of conception
23831	ZV22y00	[V]Other specified pregnant state
40964	L192.00	Continuing preg after intrauterine death one fetus or more
54866	L030.00	Abdominal pregnancy
55338	L123000	Transient hypertension of pregnancy unspecified
32950	L03y100	Cornual pregnancy
25872	L16yz00	Other pregnancy complication NOS
46082	K5Cz.11	Habitual aborter-not pregnant
49559	L180300	Diabetes mellitus during pregnancy - baby not yet delivered
70993	L16Az00	Glycosuria during pregnancy NOS
24170	L15..00	Prolonged or post-term pregnancy
26055	L263A00	Maternal care for fetal bradycardia during pregnancy
39359	L385.00	Failed or difficult intubation during pregnancy
40357	L2D..00	Retained intrauterine contraceptive device in pregnancy
47608	L177.00	Infections of bladder in pregnancy
53097	Z22C313	Duration of pregnancy
61301	L10y000	Other haemorrhage in early pregnancy unspecified
20623	ZV4J000	[V]Problems related to unwanted pregnancy
50440	Z22A500	Biochemical pregnancy
27833	L13y.00	Other pregnancy vomiting
49407	L2B..00	Low weight gain in pregnancy
53167	L188300	Abnormal GTT during pregnancy - baby not yet delivered
54107	L10z000	Early pregnancy haemorrhage NOS unspecified
37038	Z23D100	Girth of pregnant abdomen
53849	L16y000	Other pregnancy complication unspecified
37348	Lyu2500	[X]Other specified pregnancy-related conditions
43000	L16D.00	Excessive weight gain in pregnancy
59276	L032.00	Ovarian pregnancy
60345	M240500	Alopecia of pregnancy
61284	L210200	Twin pregnancy with antenatal problem
23995	L15..11	Post-term pregnancy
46009	Q0...00	Fetus/neonate affected by maternal problem unrelated to preg
41625	L13yz00	Other pregnancy vomiting NOS
54577	L210000	Twin pregnancy unspecified
47080	L162.00	Unspecified renal disease in pregnancy
48534	ZV23100	[V]Pregnancy with history of trophoblastic disease
52221	L03y000	Cervical pregnancy
53921	L161000	Oedema or excessive weight gain in pregnancy, unspecified
56252	ZV22100	[V]Other normal pregnancy supervision
52685	ZV23000	[V]Pregnancy with history of infertility
63344	Z22C500	Estimated date of conception
68004	Q01..00	Fetus/neonate affected by maternal complication of pregnancy
24944	L163300	Pregnancy care of habitual aborter
36421	L167z00	Liver disorder in pregnancy NOS

(continued)

Continued

Current pregnancy codes		
medcode	readcode	readterm
38312	L162.12	Nephropathy NOS in pregnancy without hypertension
55730	ZV22.11	[V]Supervision of normal pregnancy
59634	L411512	Vaginal varices in pregnancy
64366	L412500	Superficial thrombophlebitis in pregnancy
26852	ZV23400	[V]Pregnancy with other poor obstetric history
65783	L030000	Delivery of viable fetus in abdominal pregnancy
69327	L10yz00	Other haemorrhage in early pregnancy NOS
41504	L13y000	Other pregnancy vomiting unspecified
48304	L10z200	Early pregnancy haemorrhage NOS - not delivered
61408	L120300	Benign essential hypertension in preg/childb/puerp-not deliv
64247	Z235.00	Observation of shape of pregnant abdomen
25230	9Ea2.00	Less 24 wk involv risk injury physic/mentl health preg woman
58142	L16A000	Glycosuria during pregnancy unspecified
59588	L411500	Genital varices in pregnancy
61563	L161300	Oedema or excessive weight gain in pregnancy - not delivered
72835	Q01z.00	Fetus/neonate affected by maternal complic pregnancy NOS
96757	L411513	Vulval varices in pregnancy
56953	Z235400	Pendulous pregnant abdomen
64292	L16y300	Other pregnancy complication - not delivered
53661	L13z200	Unspecified pregnancy vomiting - not delivered
64125	L09yz00	Other specified complication NOS follow abortive pregnancy
64523	L091z00	Delayed/excess haemorrhage NOS following abortive pregnancy
65256	L164.00	Peripheral neuritis in pregnancy
67098	L183300	Drug dependence during pregnancy - baby not yet delivered
67863	Z22B.00	Observation of quantity of pregnancy
69722	ZV23z00	[V]Unspecified high-risk pregnancy
73559	L13z000	Unspecified pregnancy vomiting unspecified
43344	ZV61800	[V]Illegitimate pregnancy
44734	6208.00	Pregnancy prolonged - 42 weeks
49502	L228.00	Multiple pregnancy with malpresentation
53490	L178.00	Infections of urethra in pregnancy
54677	L167200	Liver disorder in pregnancy - not delivered
55618	ZV23600	[V]Supervisn/pregnancy wth history insufficnt antenatal care
73917	L10y200	Other haemorrhage in early pregnancy - not delivered
44770	L191.00	Continuing pregnancy after abortion of one fetus or more
59313	Z22BA00	Contin pregnancy after intrauterine death of sibling fetus
63751	L16A300	Glycosuria during pregnancy - not delivered
64099	L168000	Fatigue during pregnancy unspecified
66649	L41z500	Venous complication of pregnancy, unspecified
69011	L132000	Late pregnancy vomiting unspecified
71730	L123300	Transient hypertension of pregnancy - not delivered
73455	Q015200	Fetus or neonate affected by triplet pregnancy
94804	67AB.00	Preg. prescription exempt adv.
37573	Z22B900	Continuing pregnancy after abortion of sibling fetus
41959	L171300	Maternal gonorrhoea in pregnancy - baby not yet delivered
60309	Q0y..00	Maternal problems unrelated preg affecting fetus/neonate OS
61935	L185.11	Congenital heart disease in pregnancy
67164	L18z300	Medical condition NOS in pregnancy - baby not yet delivered
68694	Z22C.00	Observation of measures of pregnancy
69815	62H3.00	Rh screen - 1st preg. sample
72883	Lyu2100	[X]Other vomiting complicating pregnancy
73914	L412511	Thrombophlebitis of legs in pregnancy
91254	Z235200	Rounded pregnant abdomen
21467	L03y200	Membranous pregnancy
29623	62H4.00	Rh screen - 2nd preg. sample
35855	L15z.00	Prolonged pregnancy NOS
40825	Z22B800	Undiagnosed multiple pregnancy
54701	ZV23y00	[V]Other specified high-risk pregnancy
55889	L175300	Maternal rubella during pregnancy - baby not yet delivered

(continued)

Continued

Current pregnancy codes		
medcode	readcode	readterm
57059	L187300	Orthopaedic disorder in pregnancy - baby not yet delivered
61466	Z22A211	HRP - High risk pregnancy
62358	L167000	Liver disorder in pregnancy unspecified
66390	Q0z..00	Maternal problem unrelated preg affecting fetus/neonate NOS
69599	L21y.00	Other multiple pregnancy
69686	L417000	Cerebral venous thrombosis in pregnancy
91888	L181300	Thyroid dysfunction in pregnancy - baby not yet delivered
93895	Z22B500	Quintuplet pregnancy
94473	L211z00	Triplet pregnancy NOS
99247	L13y200	Other pregnancy vomiting - not delivered
49193	67A7.11	Care of teeth advice -in preg.
51956	L212200	Quadrupelet pregnancy with antenatal problem
54293	Q015.00	Fetus or neonate affected by multiple pregnancy
54938	L162000	Unspecified renal disease in pregnancy unspecified
59650	Z235300	Transversely enlarged pregnant abdomen
60877	L263800	Maternal care for fetal decelerations during pregnancy
61576	L211000	Triplet pregnancy unspecified
64500	L183.11	Pregnancy and drug dependence
66594	L186.11	Heart disease during pregnancy
67698	L150000	Post-term pregnancy unspecified
67893	L2C..00	Malnutrition in pregnancy
72014	L212z00	Quadrupelet pregnancy NOS
72019	L132200	Late pregnancy vomiting - not delivered
73727	L168z00	Fatigue during pregnancy NOS
92579	L162.13	Uraemia in pregnancy without hypertension
93303	ZV22400	[V]Supervision of other normal pregnancy
96743	L122300	Other pre-exist hypertension in preg/childb/puerp-not deliv
97349	L121300	Renal hypertension in preg/childbirth/puerp - not delivered
99237	L411511	Perineal varices in pregnancy
99980	L168300	Fatigue during pregnancy - not delivered
37163	L150z00	Post-term pregnancy NOS
67728	L150200	Post-term pregnancy - not delivered

Therapy Codes

Macrogols

Product code	Number of events	Product	Substance
5201	1132924	MOVICOL sachets [NORGINE]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
6581	108523	macrogol compound npf oral powder 13.8g	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
6599	76211	MOVICOL PAEDIATRIC PLAIN oral powder [NORGINE]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
6119	11695	MOVICOL HALF oral powder [NORGINE]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
10069	11380	IDROLAX powder 10g [SCHWARZ]	macrogol 4000
38390	6906	LAXIDO ORANGE oral powder [GALEN]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
10237	5952	macrogol compound npf half strength sugar free oral powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
10261	3805	macrogol npf oral powder 10g	macrogol 4000

(continued)

Macrogols

Product code	Number of events	Product	Substance
10125	1767	macrogol 4000 powder 10 g	macrogol 4000
35443	1608	MOVICOL PLAIN sachets [NORGINE]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
39532	658	MOVICOL CHOCOLATE sachets [NORGINE]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
39660	283	macrogol compound npf oral powder 13.7 g	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
40791	264	macrogol compound npf sugar free oral powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
12915	246	macrogol with sodium sulphate + electrolytes powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride/ sodium sulphate
7030	209	polyethylene glycol with electrolytes oral powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
39734	175	LAXIDO NATURAL oral powder [GALEN]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
39702	152	macrogol compound npf oral powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
41776	3	MOLAXOLE powder for oral solution [MEDA]	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride
30905	2	GOLYTELY powder	potassium chloride/macrogol 3350/ sodium bicarbonate/sodium chloride/ sodium sulphate

Senna

Product code	Number of events	Product	Substance	Formulation	BNF
52	2455687	senna tablets 7.5 mg	sennoside	tablets	Stimulant laxatives
2494	295499	MANEVAC granules [HFA]	senna fruit/ ispaghula husk	granules	Bulk-forming laxatives/ Stimulant laxatives
1858	219088	senna syrup 7.5 mg/5 ml	sennoside	syrup	Stimulant laxatives
7105	81606	senna oral solution 7.5 mg/5 ml	sennoside	oral solution	Stimulant laxatives
3672	36598	SENOKOT syrup 7.5 mg/5 ml [RECKITT B]	sennoside	syrup	Stimulant laxatives
6034	20106	ispaghula husk with senna fruits granules 54.2% + 12.4%	senna fruit/ ispaghula husk	granules	Bulk-forming laxatives/ Stimulant laxatives
5897	14995	senna tablets 15 mg	sennoside	tablets	Stimulant laxatives
5210	9743	senna granules	sennoside	granules	Stimulant laxatives
6324	8689	SENOKOT granules [RECKITT B]	sennoside	granules	Stimulant laxatives
14215	4312	SENOKOT syrup [RECKITT B]	sennoside	syrup	Stimulant laxatives
171	1708	SENOKOT tablets [RECKITT B]	sennoside	tablets	Stimulant laxatives
9890	1479	senna tablets 12 mg	sennoside	tablets	Stimulant laxatives
17587	666	sennosides-total elixir	senna leaf	elixir	Stimulant laxatives
16030	612	senna chewable tablet 15 mg	sennoside	chewable tablet	Stimulant laxatives
14292	507	SENOKOT HI-FIBRE ORANGE granules [RECKITT B]	ispaghula husk	granules	Bulk-forming laxatives

(continued)

Senna

Product code	Number of events	Product	Substance	Formulation	BNF
5987	378	CALIFIG SYRUP OF FIGS elixir [MERCK CONS]	senna leaf	elixir	Stimulant laxatives
28003	369	SENNA tablets 7.5 mg [ACTAVIS]	sennoside	tablets	Stimulant laxatives
35847	329	SENNOKOT DUAL RELIEF tablets [RECKITT B]	aloes (aloe)/ taraxacum (dandelion root)/cascara/ senna leaf/ fennel seed	tablets	Stimulant laxatives/Herbal remedy
28122	283	SENNA tablets 7.5 mg [TEVA]	sennoside	tablets	Stimulant laxatives
20452	116	SENNOKOT HI-FIBRE LEMON granules [RECKITT B]	ispaghula husk	granules	Bulk-forming laxatives
28831	107	SENNOKOT MAX STRENGTH tablets 15 mg [RECKITT B]	sennoside	tablets	Stimulant laxatives
16150	63	SENNOKOT PHARMACY syrup [RECKITT B]	sennoside	syrup	Stimulant laxatives
14143	50	EX-LAX SENNA pill [NOVARTIS]	sennoside	pill	Stimulant laxatives
20747	44	SENNOKOT			Unknown
21570	43	EX-LAX SENNA tablets 15 mg [NOVARTIS]	sennoside	tablets	Stimulant laxatives
23084	42	senna with cascara tablets 32 mg + 130 mg	cascara/senna leaf	tablets	Stimulant laxatives
41565	22	SENNA tablets [FAMILY H]	sennoside	tablets	Stimulant laxatives
15181	12	NYLAX WITH SENNA tablets [RECKITT B]	sennoside	tablets	Stimulant laxatives
33700	10	SENNA tablets 7.5 mg [HILLCROSS]	sennoside	tablets	Stimulant laxatives
22303	7	SENNA FRUIT 12.4%/ISPAGHULA SEED 54.2%			Unknown
10287	6	X-PREP liquid [NAPP]	senna leaf	liquid	Stimulant laxatives
16484	5	SENNOKOT DIRECT RELIEF suppository 4 g [RECKITT B]	glycerol	suppository	Stimulant laxatives
30150	2	SURE-LAX SENNA chewable tablet 15 mg [POTTER'S]	sennoside	chewable tablet	Stimulant laxatives
28836	1	AGIOLAX granules [RADIOL]	senna fruit/ ispaghula husk	granules	Bulk-forming laxatives/ Stimulant laxatives
31988	1	NYLAX tablets [CROOKES]	bisacodyl/phe-nolphthalein/ senna	tablets	Stimulant laxatives
32858	1	SENNA tablets 7.5 mg [ASPAR]	sennoside	tablets	Stimulant laxatives
36256	1	SENNA			Unknown
39230	1	DUAL LAX EXTRA STRONG tablets [LANE]	aloin/cascara extract/senna leaf	tablets	Stimulant laxatives

Lactulose

Product code	Number of events	Product	Substance	Formulation	BNF
12	4051008	lactulose solution 3.35 g/5 ml	lactulose	solution	Osmotic laxatives
4613	1614999	lactulose solution 3.1–3.7 g/5 ml	lactulose	solution	Osmotic laxatives
4695	43057	lactulose solution (flavoured) 3.35 g/5 ml	lactulose	solution (flavoured)	Osmotic laxatives
5010	12193	lactulose sachets 10 g	lactulose	sachets	Osmotic laxatives
9489	8814	LACTUGAL solution [INTRAPHARM]	lactulose	solution	Osmotic laxatives
19524	8187	LACTULOSE			Unknown
16088	6669	LACTULOSE solution 3.1–3.7 g/5 ml [IVAX]	lactulose	solution	Osmotic laxatives
28877	1856	LACTULOSE solution 3.1–3.7 g/5 ml [TEVA]	lactulose	solution	Osmotic laxatives
9650	1222	DUPHALAC DRY powder 10 g [SOLVAY]	lactulose	powder	Osmotic laxatives
34015	1221	LACTULOSE solution 3.1–3.7 g/5 ml [BERK]	lactulose	solution	Osmotic laxatives
18423	488	REGULOSE solution [NOVARTIS]	lactulose	solution	Osmotic laxatives
8911	313	DUPHALAC solution [SOLVAY]	lactulose	solution	Osmotic laxatives
34055	141	LACTULOSE solution 3.1–3.7 g/5 ml [HILLCROSS]	lactulose	solution	Osmotic laxatives
27708	35	LACTULOSE solution 3.1–3.7 g/5 ml [GEN (UK)]	lactulose	solution	Osmotic laxatives
4559	12	LEMLAX solution 3.28 g/5 ml [CO-PHARMA]	lactulose	solution	Osmotic laxatives
33678	6	LACTULOSE solution 3.1–3.7 g/5 ml [KENT]	lactulose	solution	Osmotic laxatives
41638	6	LACTULOSE solution 3.1–3.7 g/5 ml [SOLVAY]	lactulose	solution	Osmotic laxatives
26590	5	LAXOSE solution [BERK]	lactulose	solution	Osmotic laxatives
32598	5	LACTULOSE solution 3.1–3.7 g/5 ml [SANDOZ]	lactulose	solution	Osmotic laxatives
34360	3	LACTULOSE solution 3.1–3.7 g/5 ml [NOVARTIS]	lactulose	solution	Osmotic laxatives

Ispaghula

Product code	Number of events	Product	Substance	Formulation	BNF
1227	719146	ispaghula husk gluten-free sugar-free effervescent granules	ispaghula husk	sugar-free effervescent granules	Bulk-forming laxatives
2337	74909	ispaghula husk gluten-free sugar free powder 3.4 g	ispaghula husk	sugar free powder	Bulk-forming laxatives
6430	60013	ispaghula husk gluten-free sugar free powder 3.5 g	ispaghula husk	sugar free powder	Bulk-forming laxatives
5598	47783	mebeverine hydrochloride with ispaghula husk sachets 135 mg + 3.5 g	ispaghula husk/ mebeverine hydrochloride	sachets	Bulk-forming laxatives/Other antispasmodics
6034	21204	ispaghula husk with senna fruits granules 54.2% + 12.4%	senna fruit/ ispaghula husk	granules	Bulk-forming laxatives/Stimulant laxatives
2582	19004	ispaghula husk gluten-free sugar free effervescent powder 3.6 g	ispaghula husk	sugar free effervescent powder	Bulk-forming laxatives
6851	15952	ispaghula husk gluten-free sugar free granules	ispaghula husk	sugar free granules	Bulk-forming laxatives
8559	8400	ISPAGHULA HUSK 90 % GRA			Unknown
14618	3254	ispaghula husk gluten-free sugar-free effervescent granules	ispaghula husk	sugar-free effervescent granules	Bulk-forming laxatives
1655	2649	ISPAGHULA HUSK 66 % GRA			Unknown
13171	1949	ispaghula husk gluten-free granules	ispaghula husk	granules	Bulk-forming laxatives
11124	851	ispaghula husk gluten-free powder 3.4 g	ispaghula husk	powder	Bulk-forming laxatives
11243	308	ispaghula husk gluten-free sugar free effervescent powder 6 g	ispaghula husk	sugar free effervescent powder	Bulk-forming laxatives

(continued)

Ispaghula

Product code	Number of events	Product	Substance	Formulation	BNF
25032	34	ISPAGHULA HUSK EFFERVESCENT SACHET			Unknown
34800	32	ISPAGHULA HUSK GLUTEN-FREE sugar free effervescent powder 3.5g [HILLCROSS]	ispaghula husk	sugar free effervescent powder	Bulk-forming laxatives
22303	7	SENNA FRUIT 12.4%/ISPAGHULA SEED 54.2%			Unknown
37647	7	ispaghula husk with lactobacillus and bifidobacteria oral powder	ispaghula husk/ lactobacillus acidophilus/		
bifidobacterium bifidum	oral powder	Bulk-forming laxatives/ Unlicensed product			
24523	6	ISPAGHULA HUSK ORANGE SACHET			Unknown
20683	4	ISPAGHULA HUSK SACHET			Unknown
25637	4	ISPAGHULA HUSK			Unknown
29829	1	ISPAGHULA HUSK MICRONISED + DEXTROSE			Unknown

Docusate Sodium

Product code	Number of events	Product	Substance	Formulation	BNF
2468	417366	docusate sodium capsules 100 mg	docusate sodium	capsules	Stimulant laxatives/ Faecal softeners
5215	16627	docusate sodium sugar free oral solution 50 mg/5 ml	docusate sodium	sugar free oral solution	Stimulant laxatives/ Faecal softeners
3558	14562	docusate sodium sugar free paediatric oral solution 12.5 mg/5 ml	docusate sodium	sugar free paediatric oral solution	Stimulant laxatives/ Faecal softeners
2699	7880	docusate sodium tablets 100 mg	docusate sodium	tablets	Stimulant laxatives
9510	3942	docusate sodium ear drops 0.5%	docusate sodium	ear drops	Removal of ear wax
17989	408	docusate sodium enema 120 mg	docusate sodium	enema	Stimulant laxatives
13999	214	docusate sodium with glycerol enema 90 mg + 3.78 g/5 ml	docusate sodium	enema	Stimulant laxatives
24073	69	docusate sodium ear drops 5%	docusate sodium	ear drops	Removal of ear wax
15002	37	docusate sodium with glycerol ear drops	docusate sodium/ glycerol	ear drops	Removal of ear wax
24109	36	docusate sodium with sorbitol enema	docusate sodium/ sorbitol	enema	Faecal softeners
23668	34	DOCUSATE SODIUM			Unknown
21613	8	DOCUSATE SODIUM			Unknown
22260	4	docusate sodium and bisacodyl tablets	bisacodyl/docusate sodium	tablets	Stimulant laxatives
28791	3	DOCUSATE SODIUM S/F ORAL			Unknown

Bisacodyl

Product code	Number of events	Product	Substance	Formulation	BNF
2451	400750	bisacodyl enteric coated tablets 5 mg	bisacodyl	Oral	Stimulant laxatives
2771	99721	bisacodyl suppository 10 mg	bisacodyl	Rectal	Stimulant laxatives
2770	22219	bisacodyl paediatric suppository 5 mg	bisacodyl	Rectal	Stimulant laxatives
11565	1300	bisacodyl rectal solution 2.74 mg/ml	bisacodyl	Rectal	Stimulant laxatives/Unlicensed medicinal product (specials)
12012	954	BISACODYL 10 MG TAB			Unknown
34016	219	BISACODYL tablets 5 mg [CELLTECH]	bisacodyl	Oral	Stimulant laxatives
33799	155	BISACODYL tablets 5 mg [HILLCROSS]	bisacodyl	Oral	Stimulant laxatives
12079	66	bisacodyl with dioctyl sodium sulphosuccinate tablets	bisacodyl/docusate sodium	Oral	Stimulant laxatives
36071	27	BISACODYL suppository 10 mg [DANIEL]	bisacodyl	Rectal	Stimulant laxatives
34772	16	BISACODYL tablets 5 mg [APS]	bisacodyl	Oral	Stimulant laxatives
32322	6	BISACODYL suppository 10 mg [HILLCROSS]	bisacodyl	Rectal	Stimulant laxatives
34027	6	BISACODYL tablets 5 mg [IVAX]	bisacodyl	Oral	Stimulant laxatives
33798	5	BISACODYL tablets 5 mg [ACTAVIS]	bisacodyl	Oral	Stimulant laxatives
22260	4	docusate sodium and bisacodyl tablets	bisacodyl/docusate sodium	Oral	Stimulant laxatives
38425	3	BISACODYL suppository 10 mg [CELLTECH]	bisacodyl	Rectal	Stimulant laxatives
27532	2	BISACODYL			Unknown
34352	1	BISACODYL enteric coated tablets 5 mg [SOVEREIGN]	bisacodyl	Oral	Stimulant laxatives
41685	1	BISACODYL suppository 10 mg [MARTINDALE]	bisacodyl	Rectal	Stimulant laxatives

Glycerol

Product code	Number of events	Product	Substance	Formulation	BNF
4364	131673	glycerol suppository 4 g	glycerol	Rectal	Stimulant laxatives
2989	43410	glycerol suppository 1 g	glycerol	Rectal	Stimulant laxatives
3160	17494	glycerol suppository 2 g	glycerol	Rectal	Stimulant laxatives
13999	214	docusate sodium with glycerol enema 90 mg + 3.78 g/5 ml	docusate sodium	Rectal	Stimulant laxatives
41730	15	GLYCEROL suppository 4 g [MARTINDALE]	glycerol	Rectal	Stimulant laxatives