NHS SCOTLAND

National Therapeutic Indicators

2014/15

THERAPEUTICS BRANCH

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SCOTTISH GOVERNMENT

Acknowledgements

We would like to take the opportunity to acknowledge the following individuals and groups: Dr Simon Hurding and Mr Sean MacBride-Stewart who have been instrumental in the development of this National Therapeutics Indicators Baseline Report 2014-15.

Simon and Sean would also like to acknowledge the following groups for supporting them in this development: The Scottish Prescribing Advisors Association, Scottish Antimicrobial Prescribing Group and NHS NSS Information Services Division for assessing the proposed indicators.

Finally, the data analysis and report building would not have been possible without Kenny McGowan from the NHS Greater Glasgow and Clyde Prescribing Support Team and the Prescribing Team within NHS National Services Scotland Public Health Intelligence.

Thanks to all of the above for their time, patience and expertise.

Foreword

We are pleased to present the National Therapeutics Indicators Baseline Report for 2014-15, containing the data from the fourth quarter of the fiscal year 2013-14.

NHS Scotland has a history of delivering high quality care through its use of medication and remains committed to continual review and improvement in this area.

Boards should make use of this management information locally to identify areas for improvement and implement change to reduce unwarranted variation, waste and harm. NHS Scotland is striving for the goal of higher quality of care within an efficient environment: this report provides Boards with information towards the delivery of that agenda.

Colleagues should use the National Therapeutic Indicators to inform Board Prescribing Action Plans and consideration of the specific areas is recommended for the national focus approach.

We commend the information within this report to you.

Kind Regards

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7 October 2014

NATIONAL THERAPEUTIC INDICATORS 2014 to 2015

This report presents the third set of National Therapeutic Indicators (NTI) which are now developed and maintained by the Therapeutics Branch of the Scottish Government Pharmacy and Medicines department. The aim of the NTIs is to help continue to improve the quality, safety and efficiency of primary care prescribing. This work recognises the exceptional work already achieved by prescribers and NHS Board medicines management teams.

Therapeutic or prescribing indicators have been used increasingly by NHS Boards to inform the quality, safety and efficiency of prescribing over the last decade. Early work was promoted and supported by the Audit Scotland report: *Supporting prescribing in general practice* [1] [2] in 1999. Many of these early indicators are still in use today in one form or another. Audit Scotland's report: *Prescribing in general practice in Scotland* [3] (2013), supports the on-going use of the NTIs.

The Prescribing Information SysteM for Scotland (PRISMS) provides all of the data used for the NTIs. PRISMS is maintained by the Information Services Division (ISD) of NHS National Services Scotland (NSS) and allows access to the data collected by Practitioner Services Division (PSD), again within NSS, when processing each prescription dispensed. The resulting payment verification data is then accessed via PRISMS. Through time, considerable expertise has developed at interpreting these data for use as measures of prescribing quality, safety and efficiency.

The NTIs 2014-15 have been developed with on-going, detailed consultation with medicines management experts from all of the Scottish NHS Boards. Refinement of the indicators for 2014-15 has occurred primarily through discussion with the Scottish Prescribing Advisers Association (SPAA) executive. Consideration of the Welsh National Prescribing Indicators (2014-15) [4] and the English Key Therapeutics Topics (2014) [5] is important to confirm the value of the national prescribing indicators.

There remains the intention to use Prescribing Information System (PIS) data at some stage for the NTIs. This data set includes anonymised patient level data, which would allow more sophisticated indicators. For example comparative use of potentially higher risk combinations of medicines could be presented. PIS relies on prescriptions dispensed having a Community Health Index (CHI) number. Currently the percentage of dispensed prescriptions with a CHI number is not yet high enough to use the PIS data set for National Therapeutic Indicators.

The final list of twelve NTIs were presented as an advanced report to NHS Boards in order to inform Prescribing Action Plans for 2014-15. The early release was to ensure clear

[1] *Supporting prescribing in general practice – a progress report* June 2013 ISBN 1 304651 05 4
[2] *Supporting prescribing in general practice September 1999* ISBN 0 906206 72 3
[3] P*rescribing in general practice in Scotland* January 2013 ISBN 978 1 907916 86 1
[4] All Wales Medicines Strategy Group. National Prescribing Indicators (2014-15) January 2014
[5] NICE. Key therapeutics topics – *Medicines management options for local implementation* (2013)

understanding of the areas of national importance. The same approach will be used for the NTIs (2015-16).

This report provides the finalised list of twelve National Therapeutic Indicators. Comparison between the Scottish NHS Boards is based on the most current data, and each indicator is supported by an evidence based rationale. The indicators have been presented as Corporate Reports within PRISMS, enabling medicine management teams and prescribing advisers to monitor progress throughout 2014-15.

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Contents

Key for enclosed graphs:

- Median – dark grey bar
- Interquartile range – grey box
- Maximum and minimum – whiskers, unless greater than 1.5 of interquartile range
- Outliers – (°) values of greater than 1.5 but less than 3.0 of interquartile range
- Extreme outliers – (•) values of greater than 3.0 of interquartile range

1. Proton Pump Inhibitors

This NTI focuses on the overall prescribing of Proton Pump Inhibitors (PPI). The total volume of PPI is measured.

There is no current evidence suggesting improved efficacy of high-dose, high-cost PPIs when compared to low-dose, low-cost PPIs. There are increasing safety concerns about their chronic use, though the Medicines and Healthcare Products Regulatory Agency (MHRA) has not yet issued definitive safety advice on this matter. The considerable drivers to prescribe PPIs and the difficulties of withdrawing treatment once commenced are recognised. **The aim is to encourage use of PPIs at the lowest and most cost-effective dose and to minimise their inappropriate long-term prescription.**

PPIs inhibit gastric acid secretion by blocking the hydrogen-potassium adenosine triphosphatase enzyme system ('proton pump') of the gastric parietal cell. They are used to treat: peptic ulcers (gastric and duodenal); *Helicobacter pylori* eradication; dyspepsia and gastro-oesophageal reflux disease. A PPI should be considered for gastroprotection for patients at high risk of gastro-intestinal complications with a NSAID.[1]

The most common use of PPIs in primary care is the management of dyspepsia. Around 25 to 40% of adults in the general population have dyspepsia at any one time and it accounts for up to 5% of GP consultations.[2]

The best empirical anti-secretory drug for treating uninvestigated dyspepsia remains unclear. (Note that uninvestigated dyspepsia would include all patients with peptic ulcers; dyspepsia and gastro-oesophageal reflux). However a recent Cochrane review confirmed that proton pump inhibitors are the most effective anti-secretory drug for treating uninvestigated gastro-oesophageal reflux.[3]

Despite the development of key guidelines,[4] [5] the management of uninvestigated dyspepsia remains controversial. In the absence of '*red flag'* features, two management strategies are recommended: empirical PPI or '*Test and Treat'* for *H* pylori. SIGN 68 *Dyspepsia* currently only recommends the latter approach.

NICE CG17 recommends as-required low-dose PPI (omeprazole 20 mg capsule or lansoprazole 15mg capsule) for uninvestigated dyspepsia. This should be reviewed at least annually. Where patients have uninvestigated 'reflux-like' symptoms regular high-dose PPI (omeprazole 40 mg capsule or lansoprazole 30mg capsule) may be required until symptoms are controlled. Then, as-required low-dose PPI should be considered.

[1] Joint Formulary Committee. *British National Formulary.* Edition 65, March 2013
[2] Zagari RM, et al. *BMJ 2008*; **337**: a1400
[3] Van Pinxteren B, et al. *Cochrane Database of Systemic Reviews 2010,* Issue 11. Art. No. CD002095
[4] SIGN 68 Dyspepsia, March 2003 (Due for review in 2012 – overdue)
[5] NICE CG17 Dyspepsia, August 2004

Review of the spending trend on PPIs in Scotland shows that, despite a decrease in overall cost, the proportion spent on high cost PPIs is increasing. This is of concern when high cost PPIs offer no advantages over low cost equivalents.

The preference for as-required low-dose PPI with regular review is further reinforced by concerns around serious side effects. Chronic use of PPIs is associated with: community acquired pneumonia [1]; fragility fractures [2] and *Clostridium difficile* Infection (CDI).[3]

Manufacturing patency expiry in 2013 has resulted in more cost-effective versions of esomeprazole and rabeprazole, though their cost remains considerably higher than for first line agents.

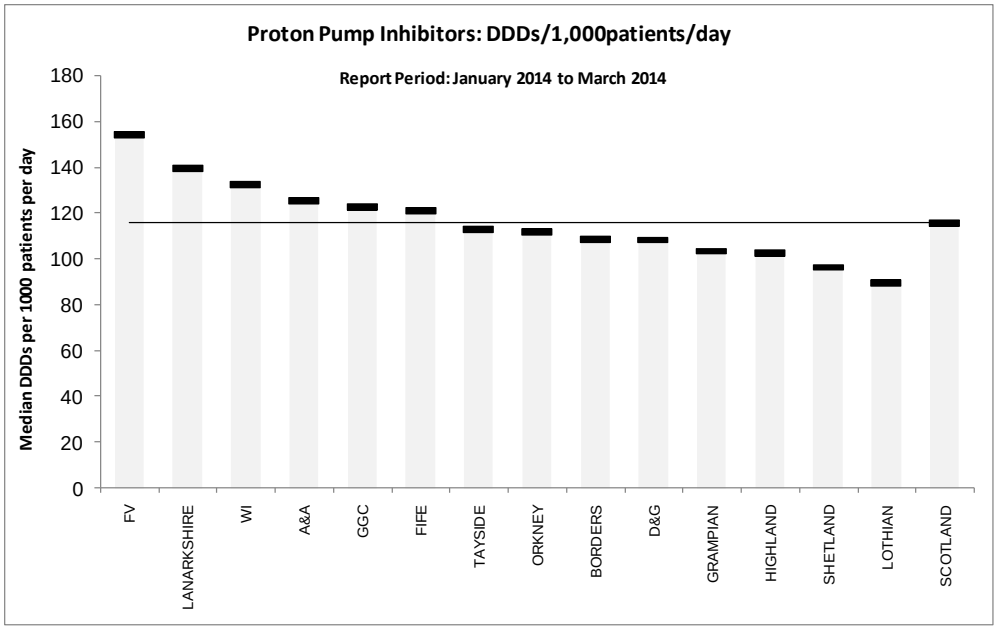
Patients prescribed PPIs should be reviewed at least annually and where appropriate continued use stopped. When it is not possible to stop the PPI then 'as-required low-dose' agent should be used when clinically possible.

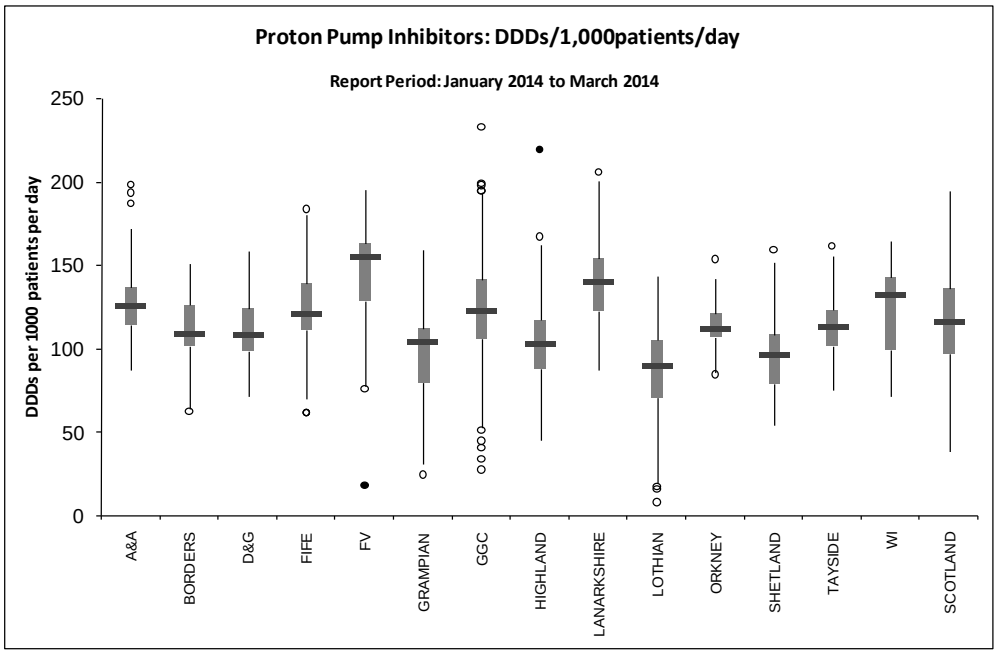
[1] Laheij RJF, et al. *JAMA 2004*; **292** (16): 1955-60
[2] Kahlili H, et al. *BMJ 2012*; **344**: e372
[3] Howell MD, et al. *Arch Intern Med* 2010; **170**(9): 784-790

Proton Pump Inhibitors: DDDs per 1,000 patients per day

This indicator remains unchanged from last year.

Chronic use of PPIs is associated with: community acquired pneumonia; fragility fractures and CDI. Patients prescribed PPIs should be reviewed at least annually and where appropriate continued use should be stopped. When it is not possible to stop the PPI then 'as required low-dose' agent should be used when clinically possible.



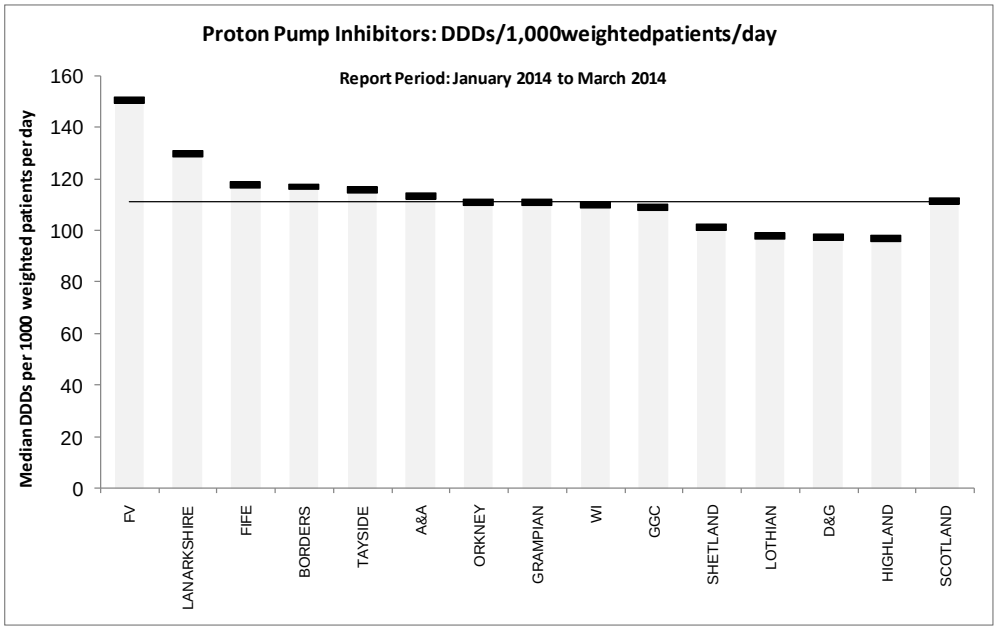


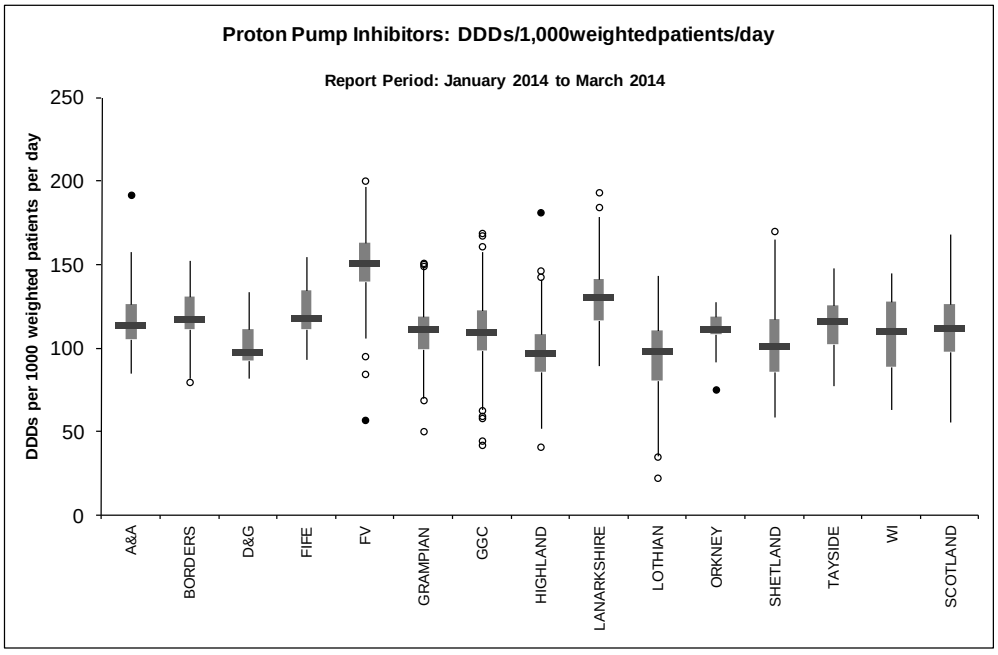
NB: An extreme outlier has not been plotted

Proton Pump Inhibitors: DDDs per 1,000 weighted patients per day

Within the NHS there are several methods used to account for the characteristics of the population that might influence the utilisation of that part of the service. For prescribing by GPs (primary care prescribing) characteristics of age, gender and morbidity are used to create weighted populations that reflect the overall prescribing need of the practice population.

When weighted populations are used, in preference to the raw population figure, the variation in prescribing between practices is usually reduced indicating that a proportion of the variability between practices is due to the population characteristics. In this measure the variability has been reduced.





2. High Strength Inhaled Corticosteroids

This NTI focuses on the safety concerns regarding the inappropriate use of high strength corticosteroid inhalers and the importance of ensuring that the patient's steroid load is kept to the minimum effective level, whilst effectively treating symptoms. It is recognised that there is considerable benefit to appropriate standard dose use of Inhaled Corticosteroids (ICS) and that some patients will require treatment with high dose ICS.

The proportion of high strength corticosteroid inhalers prescribed compared with the total amount of inhalers prescribed for both asthma and chronic obstructive pulmonary disease (COPD) is measured.

Standard dose ICS* (200 to 800 micrograms/day in adults; >400 to 800 micrograms/day in children 5 to 12 years) can be prescribed for patients who respond only partially to standard doses with a long-acting $beta_2$ agonist more than twice a week, or if symptoms disturb sleep more than once a week, or if the patient has suffered exacerbations in the last two years requiring systemic corticosteroids or nebulised bronchodilator, (Step 2 BTS).[1] [2]

High dose ICS* (>800 to 2000 micrograms/day in adults; >400 to 800 micrograms/day in children 5 to 12 years) can be prescribed for patients who respond only partially to standard doses with a long-acting $beta_2$ agonist or another long-acting bronchodilator, (Step 4 BTS).[1] [2] High doses should be continued only if there is clear benefit over the lower dose.

The use of high dose ICS has increased in Scotland. This trend has clinical safety implications and presents the possibility that patients are being treated at inappropriately high doses, with the subsequent increased risk of serious side effects. In addition, it is not clear as to whether aggressive management of asthma is improving the quality of care.

It is recommended that all patients with high dose ICS carry a steroid card.

There are recognised potentially serious systemic side effects from ICS: the most concerning is adrenal suppression, but others include – growth failure, reduced bone density, cataracts and glaucoma, anxiety and depression, and diabetes mellitus.[1]
Marked adrenal suppression can occur with doses greater than 1,500 micrograms beclometasone per day (375 micrograms fluticasone per day in children).

Of particular concern is the use of high-dose ICS in children. A UK observational study found that high-dose ICS prescribing occurred in 5.6% of the under 5s and 10% of the 5 to 11 year olds.[3] In addition very high-dose ICS (>800 micrograms beclometasone or equivalent) were prescribed to 3.9% of the under 5s and 4.9% of the 5 to 11 year olds.

Current advice for children on ICS can be summarised.[1] [2]

- Regular growth monitoring (unreliable indicator of adrenal suppression)
- High-dose ICS should be used only under the care of a specialist paediatrician

[1] Joint Formulary Committee. *British National Formulary.* Edition 65. March 2013
[2] Sign/BTS British guideline on the management of asthma, May 2008 (revised May 2011)
[3] Thomas M et al. *Br J Gen Pract 2006*; 56: 788-90

- Adrenal insufficiency should be considered in any child with shock and/or reduced consciousness who is maintained on ICS

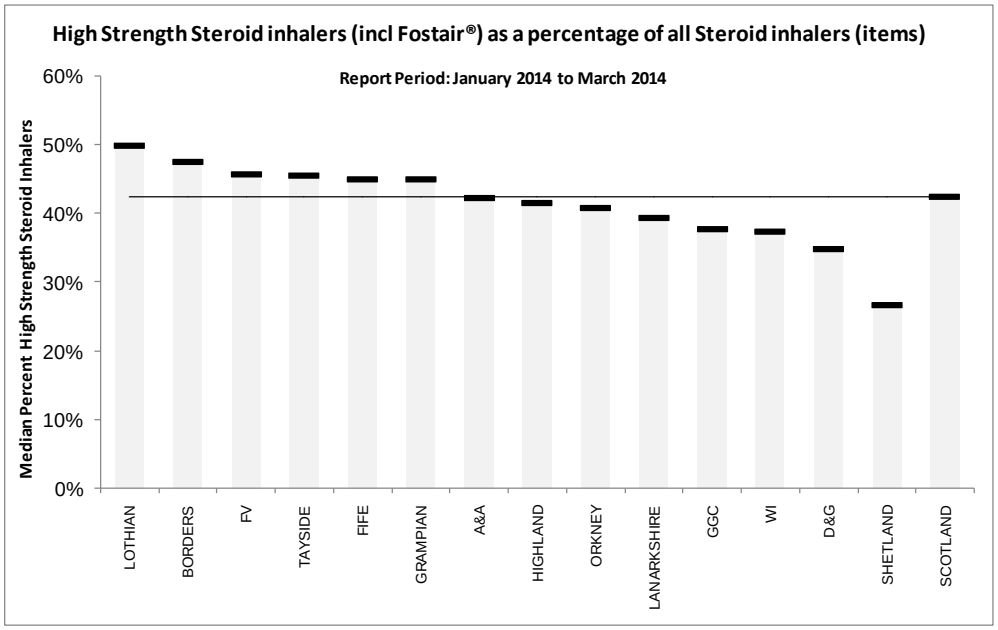
Patients should be maintained at the lowest possible dose of ICS. This is a dynamic process requiring **stepping down therapy.** Reductions in dose of ICS should be considered every three months, reducing the dose by 25 to 50% every time.[2]

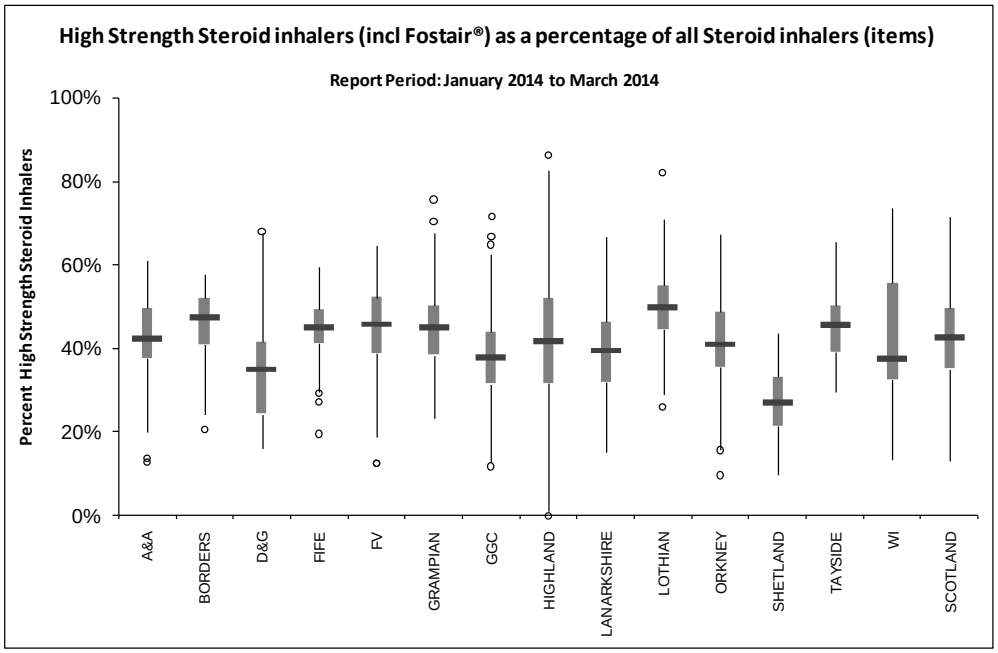
Two sets of data are presented. One includes Fostair® as a high strength ICS, the other excludes Fostair® as a high strength ICS.

High Strength Corticosteroid Inhalers: High Strength Corticosteroid Inhalers (including Fostair®) as a percentage of all corticosteroid inhalers (items)

This indicator remains unchanged from last year. There are safety concerns regarding the inappropriate use of high strength corticosteroid inhalers and the importance of ensuring that the patient's steroid load is kept to the minimum effective level, whilst effectively treating symptoms. It is recognised that there is considerable benefit to appropriate standard dose use of Inhaled Corticosteroids (ICS) and that some patients will require treatment with high dose ICS.

In May 2013, 70% of Fostair® prescribed in Scotland were prescribed as 4 or more puffs per day (generally "TWO inhalations twice daily") and as such would make Fostair® a high strength steroid inhaler.

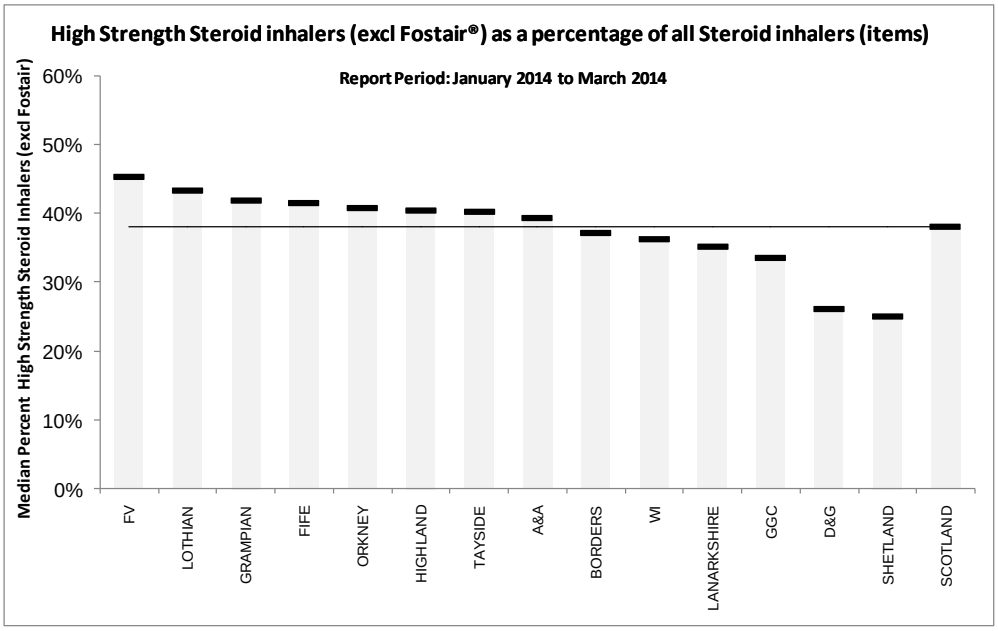


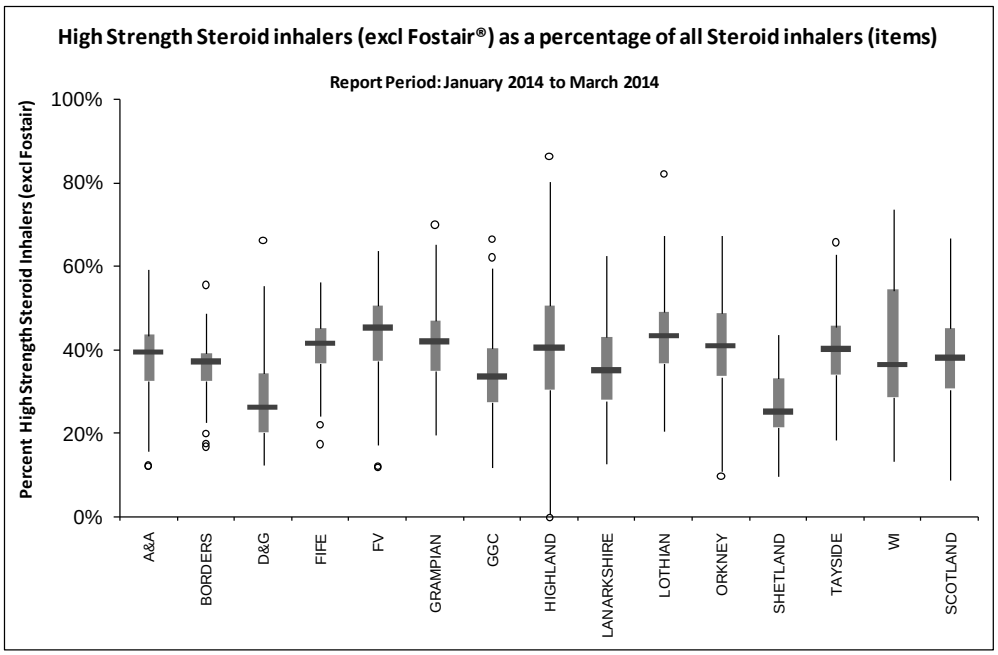


High Strength Corticosteroid Inhalers: High Strength Corticosteroid Inhalers (excluding Fostair®) as a percentage of all corticosteroid inhalers (items)

This indicator remains unchanged from last year. High strength inhaled steroids are those that deliver beclometasone & budesonide >800 micrograms; fluticasone >400 micrograms per day when used as recommended by manufacturers. The BTS/SIGN guidelines advise on equivalent doses of the different inhaled corticosteroids.

Individual Health Boards might not want to include Fostair® as high strength inhaled steroid. The proportion prescribed as 4 or more puffs per day in their region might not be as great as the national average of 70%.





3. Hypnotics

This NTI focuses on the use of benzodiazepines and 'Z drugs' (non-benzodiazepine hypnotics). Hypnotics and anxiolytics are a well-established subject for a therapeutic indicator and low use is a well-regarded marker for quality in prescribing.

Total volume of hypnotic and anxiolytic prescribed is measured for the indicator. It is recognised that differing drug-maintenance and drug-withdrawal policies between Boards can act as confounders to using this measure for comparative data.

Hypnotic use in all ages is clearly linked with tolerance, dependence, rebound insomnia and abuse. In the elderly population hypnotic use is also associated with falls, cognitive impairment and fatigue.[1]

Before a hypnotic is prescribed the cause of the insomnia should be established. It is important to realise that some patients have unrealistic sleep expectations and others underestimate their alcohol consumption, which may be the cause of the insomnia. Reassurance that this is a common problem is important as 30% of the population have insomnia at any one time.[2]

88% of cases are secondary and treatment of the underlying cause should be sought: depression and/or anxiety (50%); physical illness affecting sleep (43%); restless leg syndrome (22%); sleep apnoea (excessive daytime sleepiness) (9%); delayed sleep phase syndrome (2%).[3]

For primary insomnia, 30% of cases improve with 'sleep hygiene'. 'Bed-time restriction' has also shown to be a beneficial treatment.[2]

Hypnotics are not particularly effective for treating insomnia and have a high potential to cause harm. For 13 people taking a hypnotic for one week: 12 people's sleep would either improve or not irrespective of whether they had taken a hypnotic or a placebo and one person would experience sleep improvement (NNT13); two patients would experience an adverse event (NNH6).[4]

There is clear evidence demonstrating the link between benzodiazepine use and an increased risk of developing dementia.[5] This is a powerful argument to dissuade the use of these drugs by older (65 years and over) adults.

A Norwegian study found that taking a hypnotic increased the risk of having a road traffic accident four-fold.[6] This finding has been confirmed by a more recent French study.[7]

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[1] Joint Formulary Committee. *British National Formulary.* Edition 65, March 2013
[2] Faloon K et al. *BMJ2011;* **342:** d2899
[3] Arroll, et al. *BJGP2012;* ***62****: e99-e103(5)*
[4] Glass J et al. *BMJ2005;* **331:** 1169
[5] Billoti de Gage S, et al. *BMJ2012;* **345:** e6231
[6] Gustavsen I, et al. *Sleep Med2008;* **9:** 818-22
[7] Orriols L, et al. *Clinical Pharmacology and Therapeutics.* 2011; **89**(4): 595-601

Data from the USA show that there is an association between hip fracture rate and taking a benzodiazepine.[1] Short half-life benzodiazepines were no safer than long half-life benzodiazepines. The risk of hip fracture is highest in the first two weeks after starting a benzodiazepine.

'Z drugs' offer no therapeutic advantages over benzodiazepines. There are no significant differences in perceptions of efficacy or side-effects when patients' use and experiences of 'Z drugs' are compared with benzodiazepines.[2] Reported prescribing practices were often at variance with the licence for short-term use.

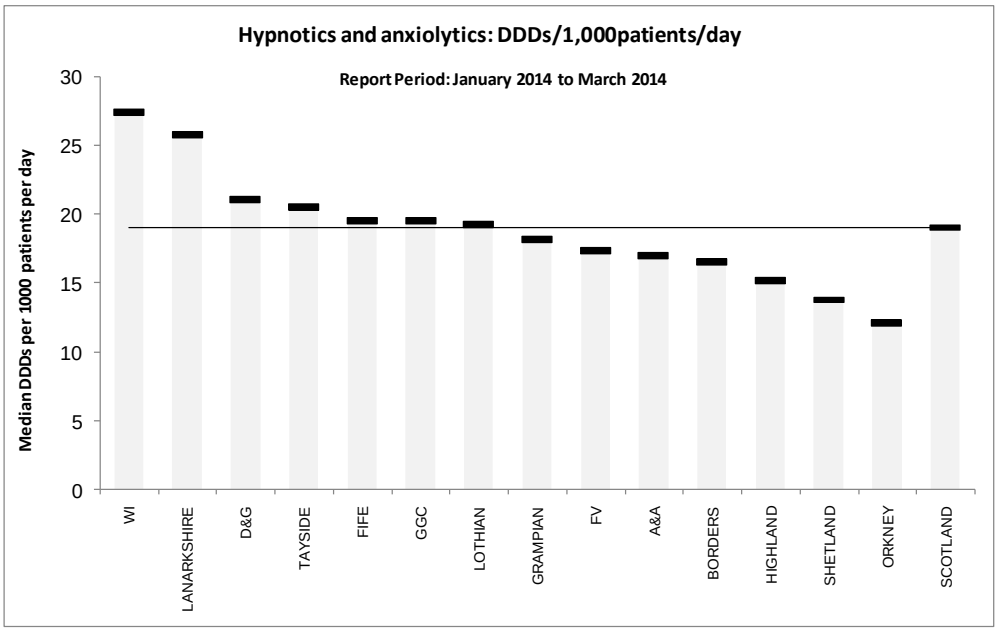
Hypnotics should not be prescribed indiscriminately and should be reserved for short courses in the acutely distressed. Tolerance to their effects develops within 3 to 14 days of continuous use. Withdrawal after long term use can cause rebound insomnia and withdrawal symptoms.

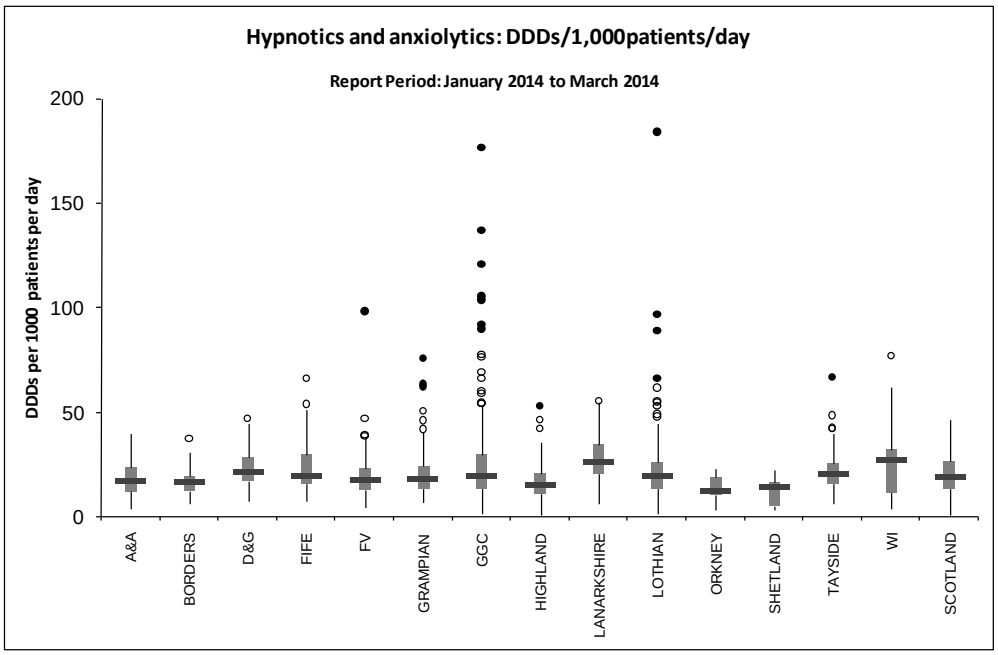
[1] Wagner AK, et al. *Arch Intem Med 2004*; **164:** 1567-72
[2] Siriwardena AN, et al. *BJGP 2008*; **58**: 417-22

Hypnotics and Anxiolytics: DDDs per 1,000 patients per day

This indicator remains unchanged from last year. Hypnotics and anxiolytics are a well-established subject for a therapeutic indicator and low use is a well-regarded marker for quality in prescribing.

Hypnotic use in all ages is clearly linked with tolerance, dependence, rebound insomnia and abuse. In the elderly population hypnotic use is also associated with falls, cognitive impairment and fatigue.

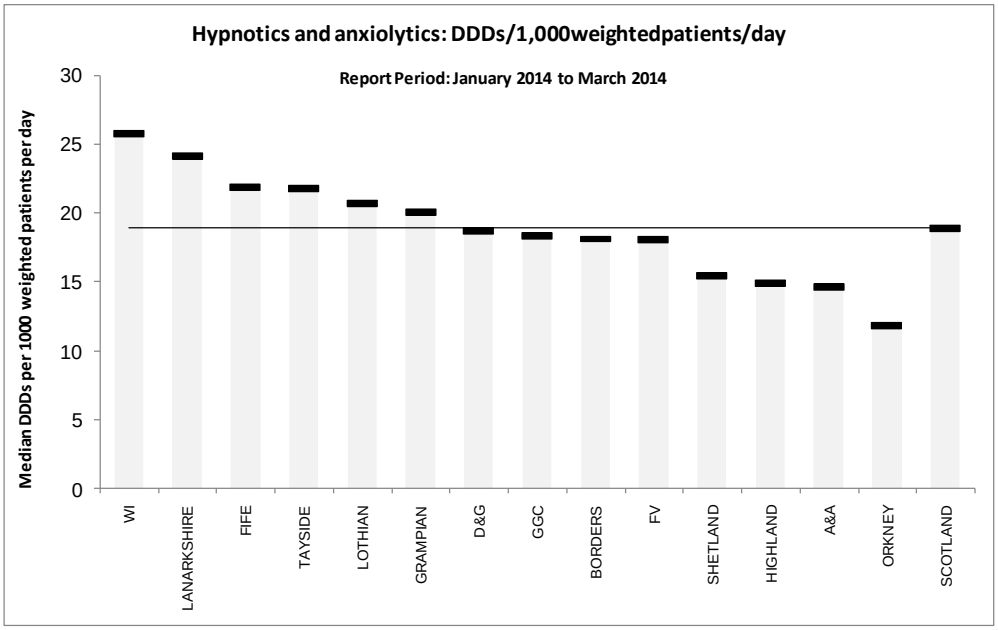


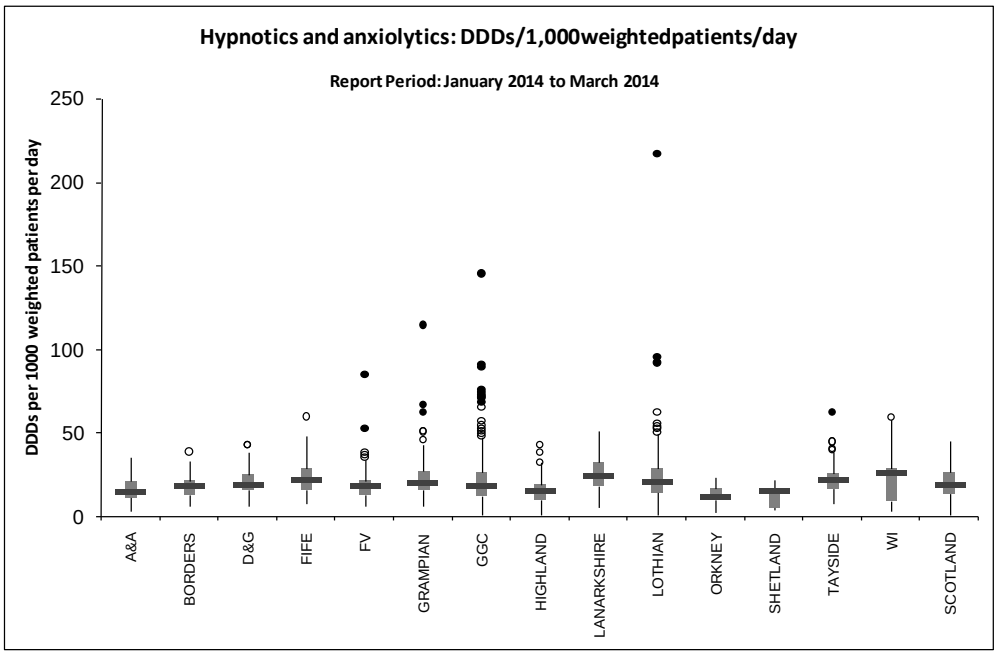


Hypnotics and Anxiolytics: DDDs per 1,000 weighted patients per day

Weighted populations reduce the variation in prescribing of hypnotics and anxiolytics indicating that a proportion of the variability between practices is due to the population characteristics accounted for in the weightings.

It is recognised that differing drug-maintenance and drug-withdrawal policies between Boards and this can act as confounders to using this measure for comparative data.





4. Opioid Analgesics

This NTI focusses on the use of opioid analgesics (BNF 4.7.2) in the management of chronic non-cancer pain.[1] This condition affects 18% of the population and presents a major clinical challenge. [2] It has a considerable potential impact on the quality of life. Most patients are managed in primary care and there is evidence of wide variation in clinical practice and resource provision. Best practice would include: assessment and planning of care; supported self-management; pharmacological management; psychological based interventions and physical therapies.

First-line pharmacological management is with paracetamol and /or non-steroidal anti-inflammatory drugs, but published data shows a continual increase in the volume of prescribed opioids to manage moderate to severe, chronic non-cancer pain. [3]

A 2009 Cochrane review compared opioid analgesics for chronic non-cancer pain (arthritis) with placebo or no treatment.[4] The results led to the conclusion that small to moderate beneficial effects are outweighed by large increase in the risk of adverse events:

- 35% improvement of pain with use of opioid
- 29% improvement in function with use of opioid
- 23% risk of side effects with use of opioid

In comparison with placebo:

- 31% improvement of pain with use of placebo
- 26% improvement in function with use of placebo
- 15% risk of side effects with use of placebo

A 2010 Cochrane review of long term use of opioids to manage chronic non-cancer pain concluded that the evidence for pain relief was weak and that the effect on quality of life or functional improvement was inconclusive. [5]

A 2013 BJGP paper demonstrates how the challenges of managing chronic pain are reflected in patient's experiences of the condition.[6] Common themes include:

- A struggle to maintain a sense of worth, while feeling misunderstood and not believed
- A diagnosis is highly valued
- Negotiation of the healthcare system is complex

The recommendation is to recognise that the patient with chronic non-cancer pain is someone who's life has deeply changed.

[1] Joint Formulary Committee. *British National Formulary.* Edition 67, September 2014
[2] SIGN 136 Chronic pain
[3] Freynhagen R, et al. BMJ 2013; 346:f2937
[4] Nuesch et al. *Cochrane Database Syst Rev* 2009;(40):CD003115
[5] Noble et al. *Cochrane Databse Syst Rev* 2010;(1):CD006605
[6] BJGP 2013:63:641

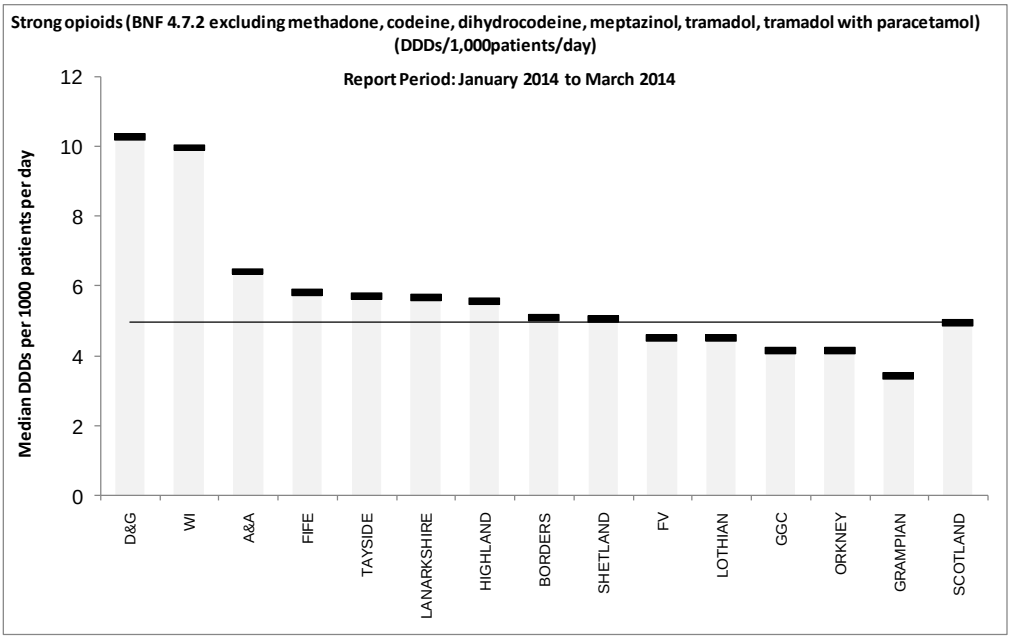
A 2013 BMJ paper suggests that we should adopt a novel approach to pharmacological management of chronic non-cancer pain based on a realistic assessment of the best external evidence, clinical experience and patient values and expectations.[1] The key concept is to recognise that individual response to analgesia is bimodal, so pain relief is either good (above 50%) or poor (below 15%). Responders should achieve good (above 50%) pain relief and improvements in fatigue, depression and sleep interference without side effects. Non-responders (below 15%) will be apparent after two to four weeks, and this outcome should result in stopping the medicine with the trial of an alternative.

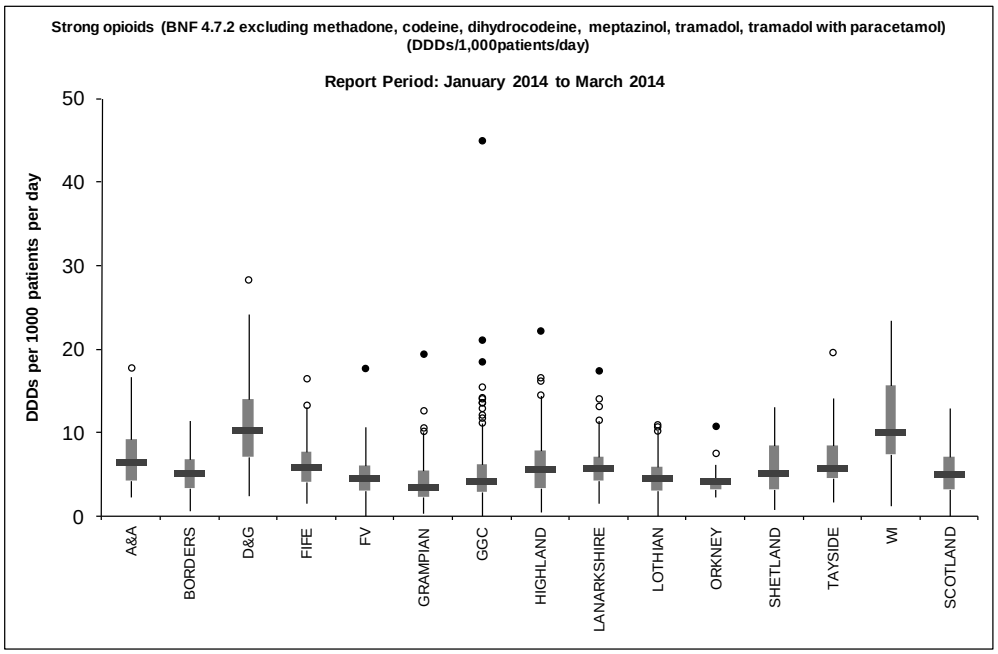
The standard way to assess medicine efficacy is to measure the average response of a population, as used in clinical trials. This approach does not work well in pain management due to the bimodal response discussed. Focussing on the individual response instead changes the standard medicine management approach. '*Clinically this means expecting failure, assessing pain, and understanding options for stopping and switching'* [7]*.* Individuals respond to different medicines in the same class and in different classes. This suggests that an extended formulary for management of chronic non-cancer pain is required. This should allow greater flexibility in identifying individual responders, the support to stop treatment for non-responders and may reduce our use of opioid analgesics.

[1] Moore A, et al. *BMJ* 2013;346:f2690

Opioid analgesics: Strong opioids DDDs per 1,000 patients per day

This is a new indicator. Opioids are well established in the management of acute pain and pain associated with terminal illness. Opioids can provide symptomatic benefits in the short and medium term, for a variety of non-cancer pain conditions. However, repeated administration may cause problems of tolerance, dependence and addiction. The benefits must be balanced against the burdens of long-term use, as therapy for persistent pain may need to be continued for months or years.

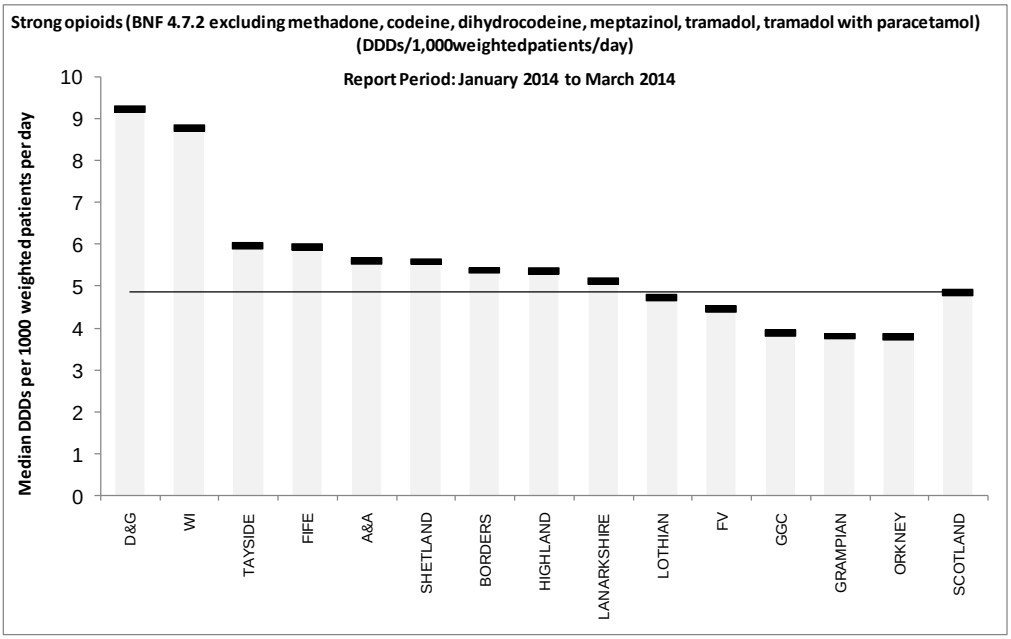


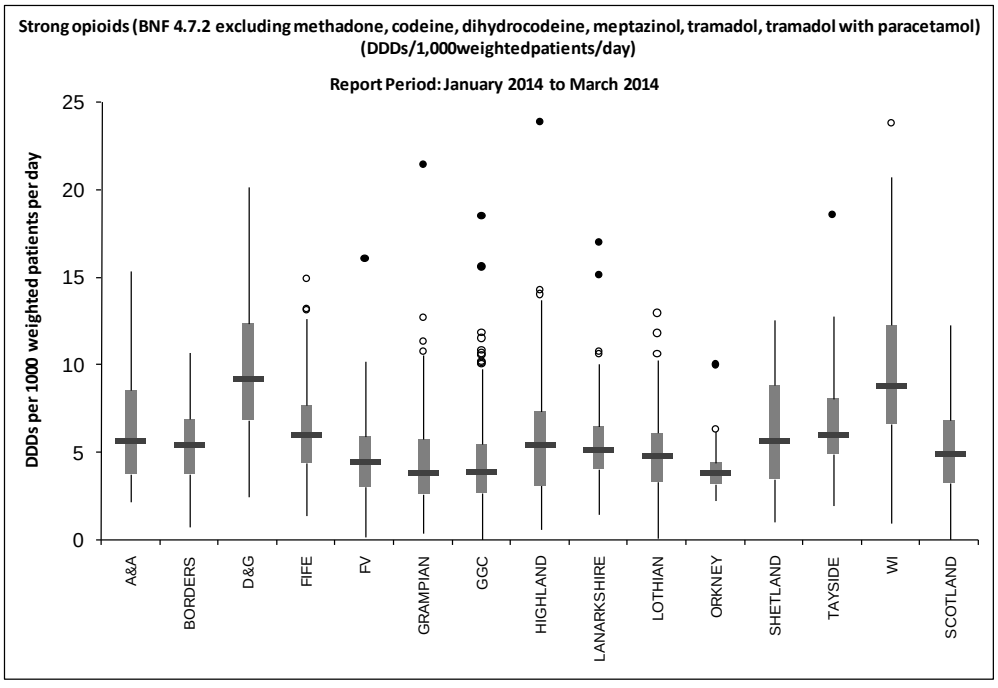


Opioid analgesics: Strong opioids DDDs per 1,000 weighted patients per day

Weighted populations reduce the variation in prescribing of strong opioids.

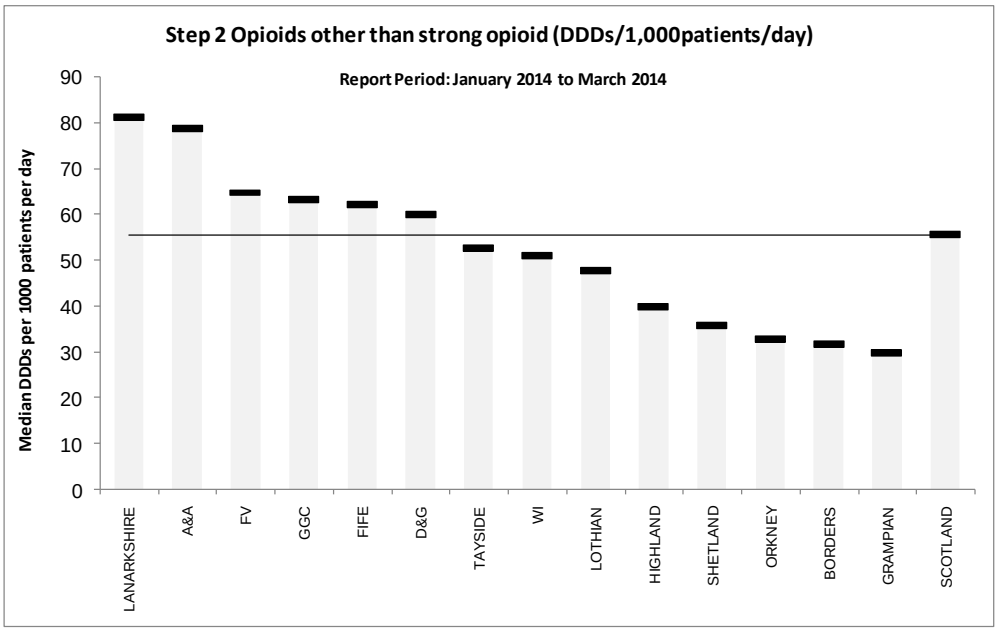
The BNF defines morphine, buprenorphine, dipipanone, diamorphine, alfentanil, fentail, remifentanil, methadone, oxycodone, papaveretum, pentazocine, pethidine, tapentadol, tramadol as strong opioids and codeine, dihydrocodeine and meptazinol as weak opioids. However, in clinical practice tramadol is not considered a strong opioid and, like the All Wales Medicines Strategy Group indicator for strong opioids, tramadol has been excluded from this measure.

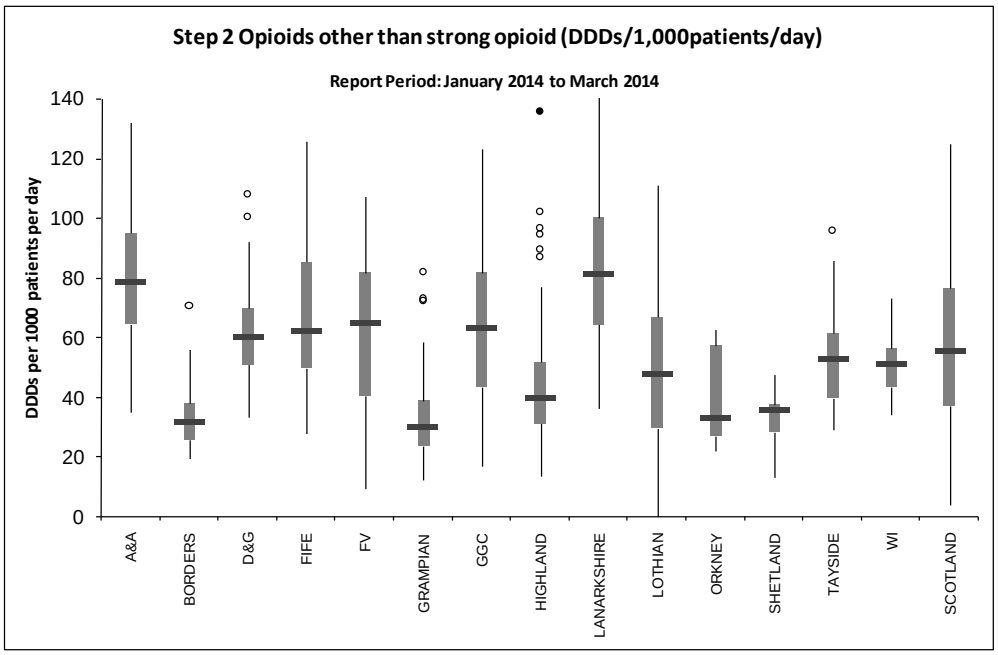




Opioid analgesics: Step 2 Opioids other than strong opioids DDDs per 1,000 patients per day

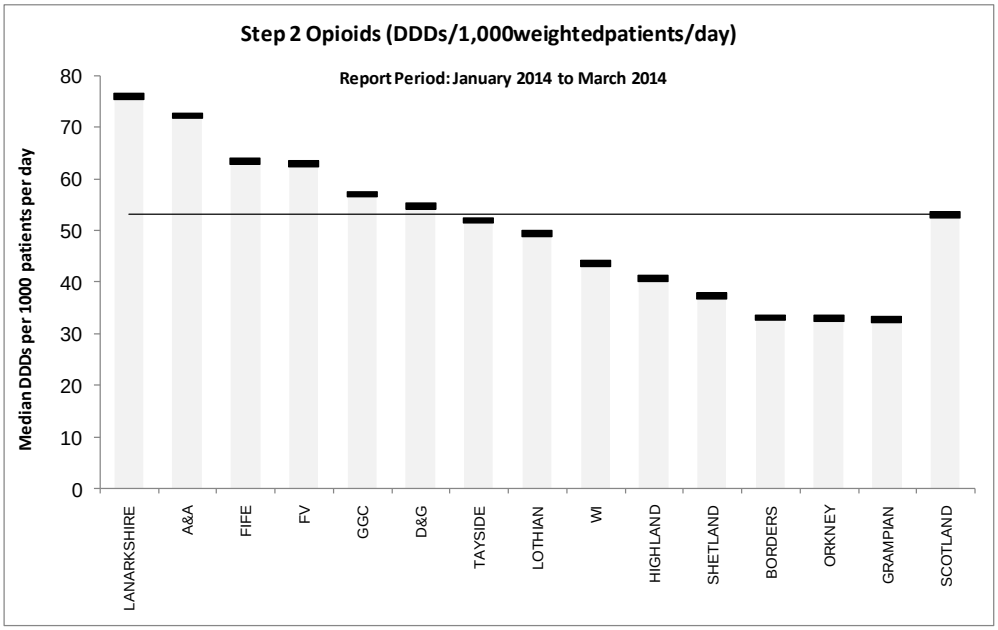
This is a new indicator. This indicator measures the volume of opioids used in the management of moderate pain. These include the high strength weak opioids (codeine, dihydrocodiene), tramadol, products that combine these drugs with paracetamol and meptazinol. Strong opioids are specifically measured separately. This indicator and the strong opioid indicator together measure the total prescribing of opioids for the management of pain.

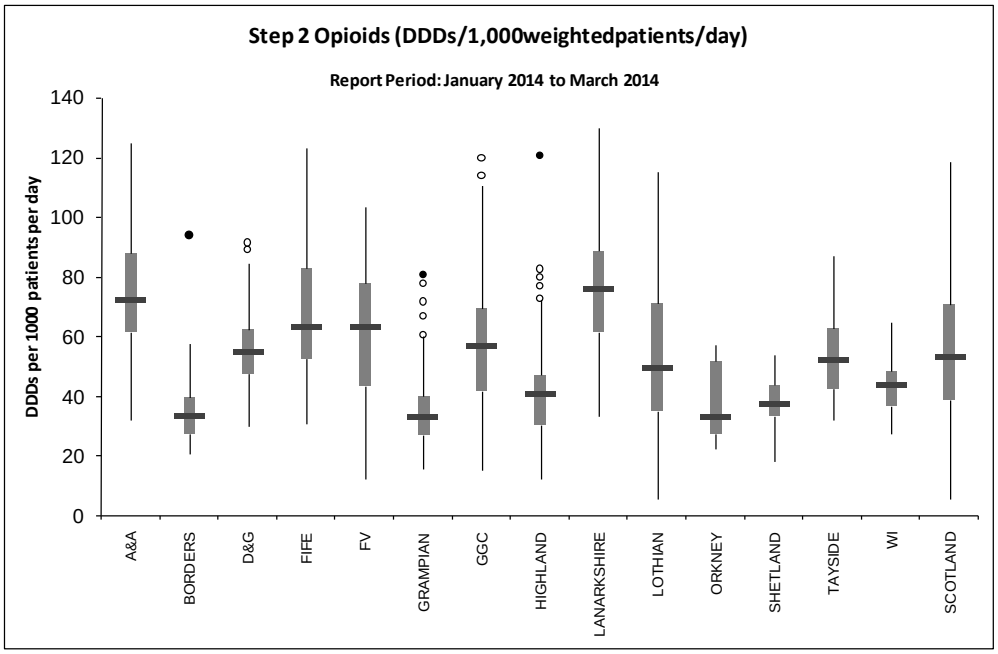




Opioid analgesics: Step 2 Opioids other than strong opioids DDDs per 1,000 weighted patients per day

DDDs for combination products calculated using WHO measures for co-codamol and using same methodology for co-dydramol products. For combination products of high strength weak opioids the contribution of paracetamol is ignored and the whole number of tablets or capsules necessary to provide the defined daily dose of the opioid in the combination is used to calculate the number of DDDs of the combination product. The DDD for dihydrocodeine is 150mg therefore 7 tablets of co-dydramol 20mg/500mg and 5 tablets of co-dydramol 30mg/500mg provide a single DDD.





5. Antibiotics

This indicator is proposed and supported by the Scottish Antimicrobial Prescribing Group (SAPG).[1] Reductions in overall use of antibiotics is a key part of improving antimicrobial stewardship. The aim is to reduce antimicrobial resistance and reduce health-care associated infections in a safe manner that does not put patients at risk.

Total volume of antibiotics is measured for the first antibiotic National Therapeutic Indicator.

There is evidence that antibiotic use in primary care drives bacterial antibiotic resistance for the individual and for the population.[2] [3] Higher levels of antibiotic resistance are associated with high use of antibiotics.[4]

The solution is not just to use fewer antibiotics:

'Our mission is not to prescribe as few antibiotics as possible, but to identify that small group of patients who really need antibiotic treatment and to explain, reassure and educate the large group of patients who don't.'[5]

There are many clinical areas where antibiotic use clearly benefits an individual patient and the associated risks are outweighed. For example, upper urinary tract infections (pyelonephritis), cellulitis and community acquired pneumonia, are all infections that should not be targeted for a reduction in antibiotic use as the risk to the individual of not treating is too great.

However, 70% of antibiotics in primary care are used to treat self-limiting respiratory tract infections (acute sore throat, acute otitis media, acute rhinosinusitis and acute cough/bronchitis). The benefit of using antibiotics to treat these conditions in most patients is so marginal that it is outweighed by the risks to the individual and to society.[6]

The Scottish Antimicrobial Prescribing Group has produced a toolkit to aid the process of using fewer antibiotics to manage the self-limiting respiratory tract infections.[1]

The Public Health England (PHE) template has been formally adopted for use in Scotland and gives clear guidance on the subgroups of patients that may benefit from use of antibiotics.[7] This evidence will have been considered by all NHS Board Antimicrobial Management Teams (AMTs) when writing local antibiotic guidelines.

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[1] The SAPG, Scottish Medicines Consortium, Delta House, 50 West Nile Street, Glasgow, G1 2NP
[2] Costelloe C, et al. BR Med J 2010; **340**: c2096
[3] Priest P, et al. BR Med J 2001; **323**: 1037-41
[4] European Antimicrobial Resistant Surveillance System (EARSS). Interactive Database
[5] Verheij TJM, Br J Gen Pract. 2009; **59**(567): 716-7
[6] NICE CG69 Respiratory Tract Infections, July 2008
[7] HPA *Management of infection guidance for primary care for consultation & local adoption,* March 2010

The second antimicrobial NTI focuses on restricting the use of broad spectrum antibiotics. Use of the broad spectrum '4C antibiotics' (fluroquinolones, particularly ciprofloxacin, cephalosporins, co-amoxiclav and climamycin) is a well-recognised risk for CDI,[1] MRSA and resistant UTIs in secondary care.[2]

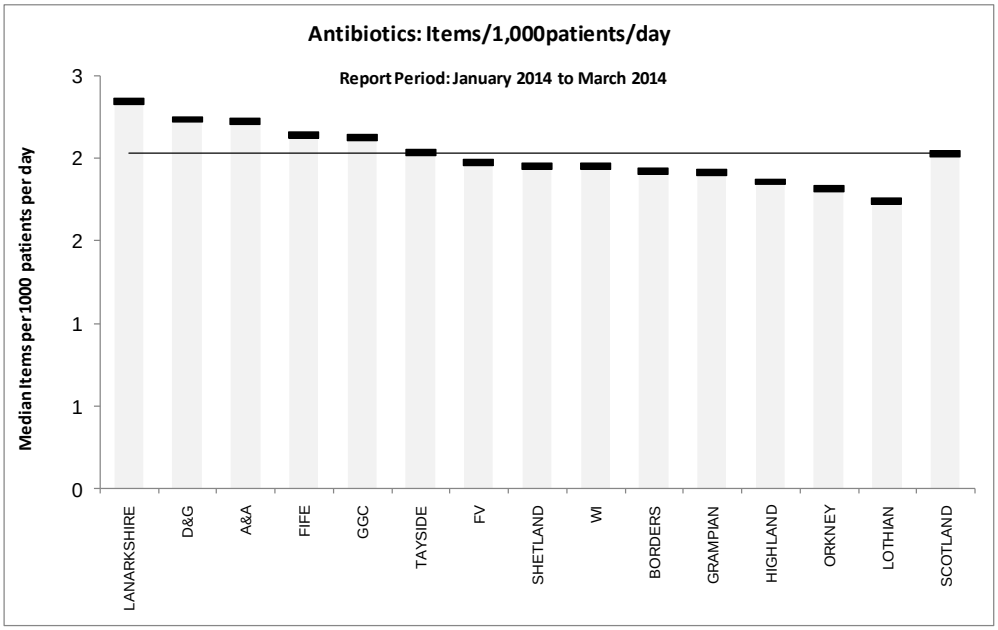
Evidence of the link between 4C antibiotics and CDI in primary care is emerging. The effect of restricting these agents in secondary care has been so profound that it makes sense to apply these same principles of antimicrobial stewardship throughout all sectors of healthcare. As the number of CDI cases in secondary care reduces, the proportion attributable to primary care is on the increase.

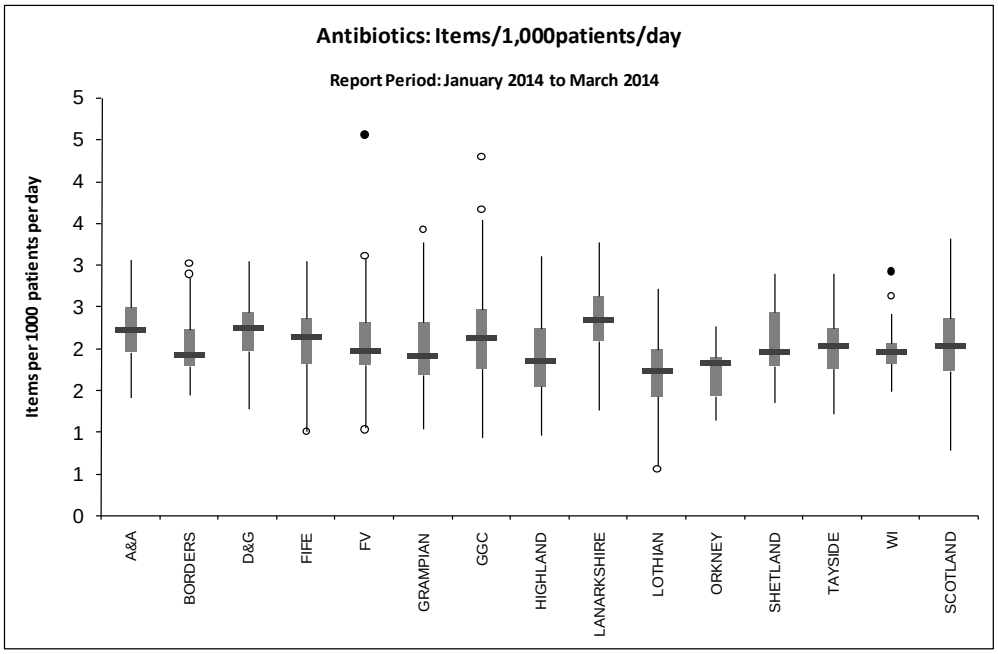
The antibiotic NTI encompass the key aims of antibiotic stewardship by promoting the reduction in overall use of antibiotics and restriction in the use of broad-spectrum antibiotics. NHS Boards are required by Audit Scotland to report on what they are doing to reduce antibiotic use in primary care. This approach is further supported by the introduction of a level 3 HEAT target to reduce total antibiotic use.

[1] Pepin J, et al. Clinical Infectious Diseases 2005; **41**(9): 1254-1260
[2] Davey P, et al. Emerging Infectious Diseases 2006; **12**(2): 211-216

Antibiotics: Total antibiotic script items per 1,000 patients per day

This indicator remains unchanged from last year. The Scottish Antimicrobial Prescribing Group (SAPG) agreed to use this NTI as a new national quality indicator for reduction of total antibiotic. It is now a key HAI Level 3 indicator. The measure will use January to March 2013 data as the baseline and to achieve the quality indicator, practices must either achieve a prescribing rate lower or equal to that of the Scottish 25th percentile or achieve an acceptable minimum reduction towards that level. The acceptable minimum level of reduction used in all of the NTIs is defined as a reduction in the number of items/1000 patients/day equivalent to one fifth of the national inter-quartile range.

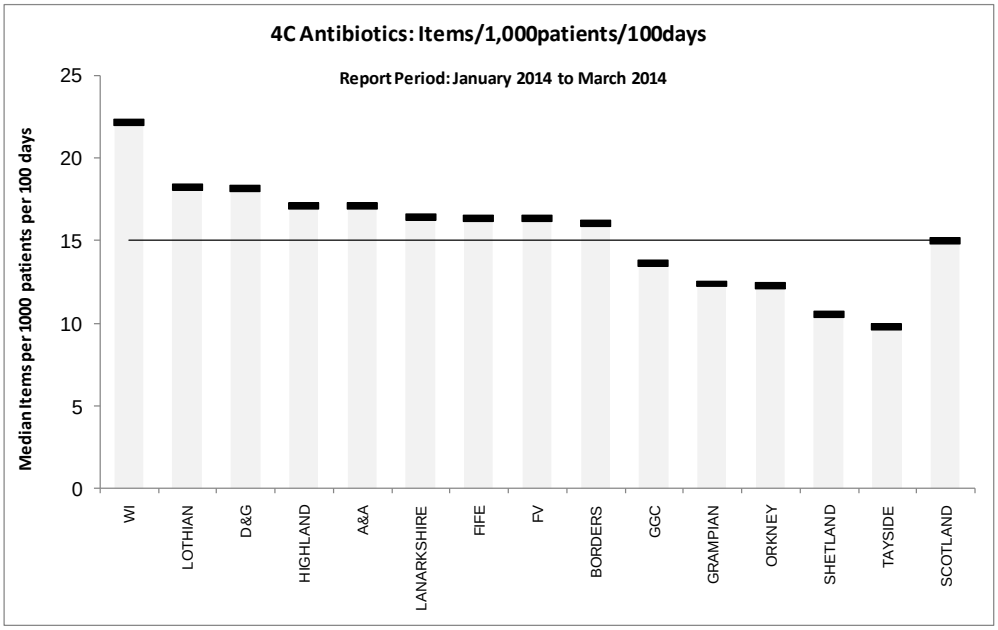


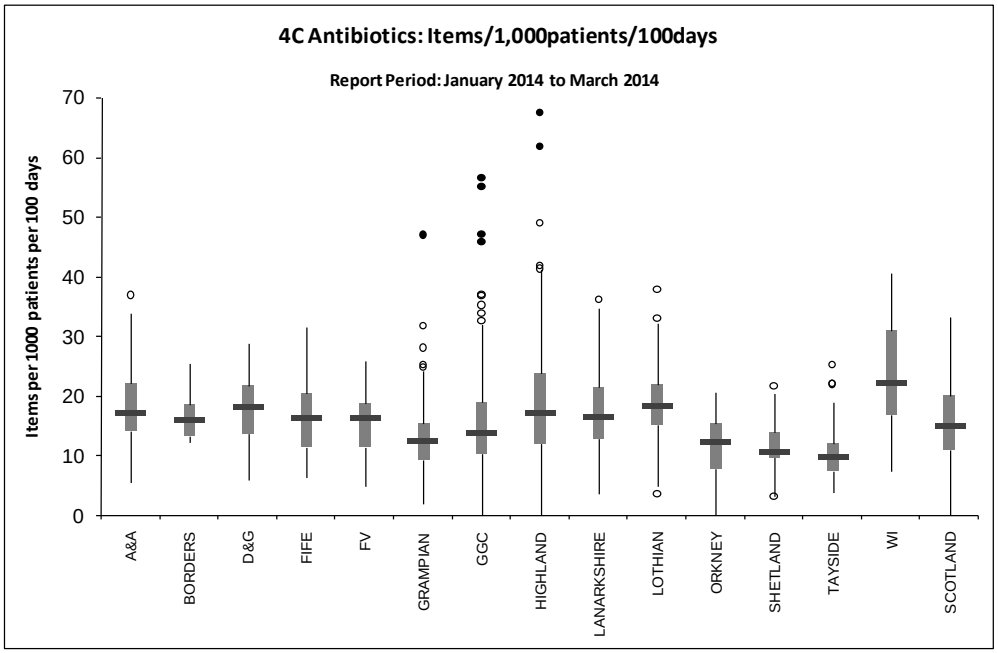


Antibiotics: 4C antibiotics script items per 1,000 patients per 100 days

This indicator is changed from last year. The 4C NTI from 2012-13 has been reintroduced.

Last year the three components of the 4Cs prescribed in primary care were measured separately. However, when practices were auditing their prescribing of a single component of the 4Cs some were struggling to identify sufficient numbers.





NB: An extreme outlier has not been plotted

6. Antidiabetic Drugs

This NTI has been developed with support from the national Diabetes Managed Clinical Network. The rationale for its use is that metformin remains the only hypoglycaemic agent for which we have clear positive patient orientated outcomes.[1]

In addition the importance of lipid lowering and blood pressure control over blood glucose control for type two diabetics is highlighted.

The proportion of metformin and sulphonylureas compared to the total antidiabetic drugs is measured.

Antidiabetic drugs should be used to augment the effect of diet and exercise, not replace it.[2]

Metformin is a biguanide that decreases gluconeogenesis and increases peripheral utilisation of glucose. It only works in the presence of endogenous insulin and so requires residual functioning pancreatic islet cells. Sulphonylureas augment insulin secretion and so also require residual pancreatic islet cell functioning. They uncommonly cause hypoglycaemia, which if occurs should be considered for treatment in hospital.

Pioglitazone is a thiazolidinedione that reduce peripheral insulin resistance. It should not be used in patients with heart failure.
The DPP4 (dipeptidylpeptidase-4) inhibitors ('gliptins'), increase insulin secretion and lower glucagon secretion.
The GLP-1 (glucagon-like-peptide-1) agonists increase insulin secretion, suppress glucagon secretion and slow gastric emptying.

The QOF HbA1c target has increased to 59mmol/L (7.5%). The *Cardiff UK GPRD Study* was a retrospective cohort study that showed a HbA1c of 59mmol/L (7.5%) was the lowest risk for all-cause mortality.[3] Increase above or decrease below this level is associated with an increased risk of all-cause mortality.

A recent meta-analysis looked at the effects of intensive glucose lowering on all-cause mortality, cardiovascular death and micro-vascular complications.[4] Intensive treatment had no significant effect on all-cause mortality or cardiovascular death, although risk of non-fatal myocardial infarction was reduced (NNT=117) as was the risk of developing microalbuminuria (NNT=32). However the risk of severe hypoglycaemia was doubled (NNH=15).

The result of this meta-analysis should also be put into the context of the relationship between reductions in cholesterol, blood pressure and HbA1c with improvements in coronary heart disease and cardiovascular outcomes.[5] It has been calculated that the

[1] Holman RR, et al. *N Engl J Med 2008*; **359**: 1577-89
[2] Joint Formulary Committee. *British National Formulary*. Edition 65. March 2013
[3] Boussageon R, et al. *BMJ2011;* **343:** d4169
[4] Yudkin JS, et al. *Diabetologia 2010;* **53:** 2079-85
[5] Preiss D, et al. *BMJ2011;* **343:** d4243

absolute reduction in cardiovascular events prevented by the different interventions per 1,000 patients per one year of treatment are:

- Lowering HbA1c by 1% = 3 events prevented
- Lowering LDL by 1 mmol/L = 8 events prevented
- Lowering BP by 10/5mmHg – 12 events prevented [1]

'the emphasis in type 2 diabetes should remain on tight control of lipids and blood pressure with reasonable but not exaggerated attempts to control glycaemia.'

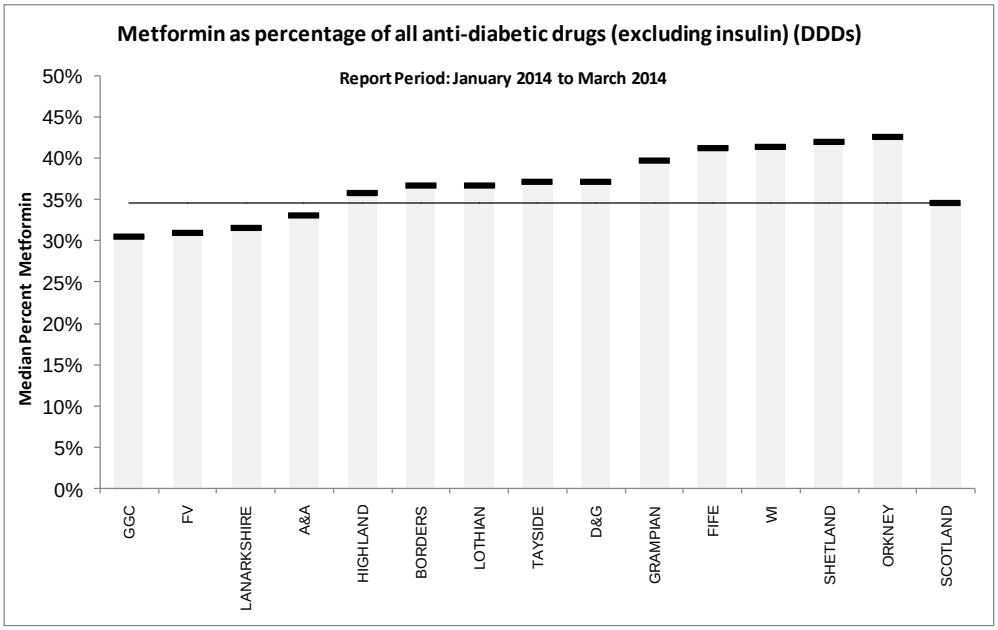
The management of type 2 diabetes should emphasise diet and increased activity. Lipid lowering and BP control should be managed optimally when such treatment is required. Metformin should be the first line agent followed by sulphonylureas. Pioglitazone, DPP4 inhibitors and GLP1 agonists should be considered as third line agents with unique merits and weaknesses, and in the context of the risks of intensive HbA1c lowering.

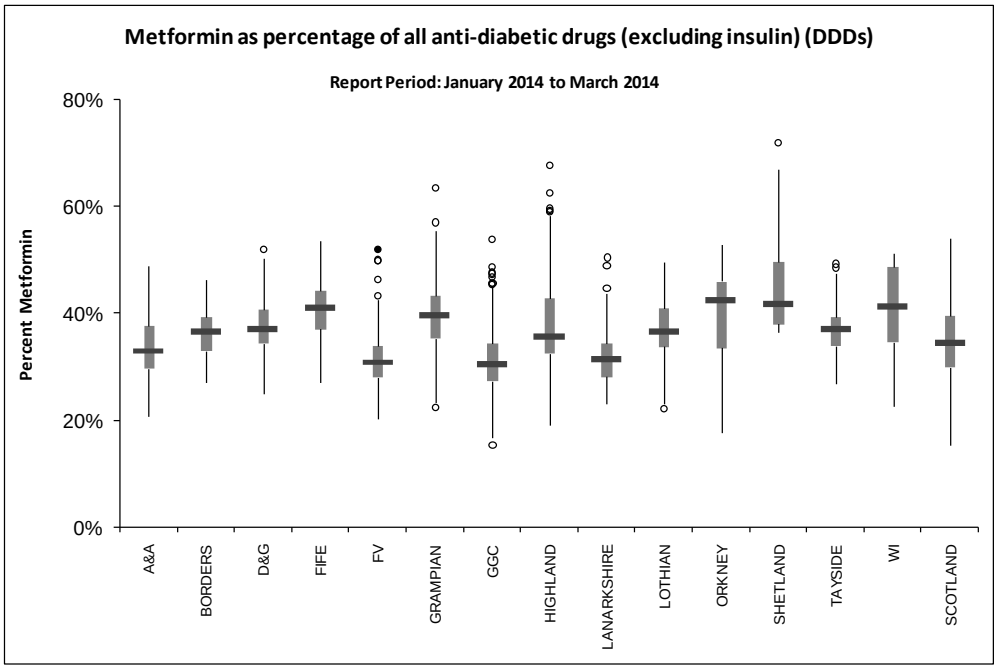
[1] Opie LH. *Lancet 2011;* **378**(9713): 103

Antidiabetic Drugs: Metformin as percentage of all anti-diabetic drugs (DDDs)

The management of type 2 diabetes should emphasise diet and increased activity. Lipid lowering and BP control should be managed optimally when such treatment is required. Metformin should be the first line agent followed by sulphonylureas. Pioglitazone, DPP4 inhibitors and GLP1 agents should be considered as third line agents with unique merits and weaknesses, and in the context of the risks of intensive HbA1c lowering.

This measure has been altered to only measure the recommended first line Antidiabetic drug – metformin.





7. NSAIDS including Cox-2 inhibitors

This NTI looks at the use of Non-Steroidal Anti-inflammatory Drugs (NSAIDS) in the management of acute and chronic non-cancer pain. NSAIDs reduce the production of prostaglandins by inhibiting the enzyme cyclo-oxygenase.[1] They vary in their selectivity for inhibiting different types of cyclo-oxygenase. This and a number of other factors influences their susceptibility to produce gastrointestinal effects.

As described in the section on the use of opioids in the management of chronic non-cancer pain, the use of NSAIDs is likely to be most successful when focussing on individual response. A responder can be defined as someone who experiences good (>50%) pain reduction and improvements in fatigue, depression and sleep disturbance without side effects.[2] Best practice for the management of chronic non-cancer pain includes: assessment and planning of care; supported self-management; pharmacological management; psychological based interventions and physical therapies.[3]

In a Cochrane systematic analysis on the use of NSAIDs to manage low back pain, twenty-eight trials (42%) were considered high quality.[4] NSAIDs improve pain relief and function when compared to placebo, but at the cost of significantly more side effects. There is moderate evidence that NSAIDs are more effective than paracetamol, but again with increased risk of side effects. There is moderate evidence that NSAIDs are not more effective than other drugs for acute low-back pain.

60% of people respond to any NSAID, and so a first-line agent should be selected with minimal risk of side effect. This will usually be ibuprofen or naproxen. Responders experience pain relief soon after taking the first dose, and full analgesic effect will usually be obtained within a week. Individual dose titration by responders, to balance pain relief with tolerable side effects, is likely to produce a better result, as demonstrated by patient directed titration in the management of fibromyalgia with pregabalin.[5] It should be noted that full anti-inflammatory effect with an NSAID will not be apparent for three weeks of regular treatment.

Non-responders to first-line NSAIDs may respond better to an alternative one. This possibility is not currently reflected in evidence-based clinical guidelines where the trend is to recommend a limited list of medicines, based on the assumption of a class effect, despite important differences in pharmacokinetics or drug interactions.

Gastrointestinal (GI) adverse effects with NSAIDs are well established. Greatest risk of serious upper GI events are with non-selective NSAIDS and those with a long half-life, including modified release preparations. Highest risk is with piroxicam, followed by naproxen, whereas COX-2 inhibitors are associated with the lowest risk.

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[1] BNF 67 accessed 12.09.14
[2] Moore at al. *BMJ* 2013;346:f2690
[3] SIGN 136
[4] Roelofs PD et al. *Cochrane Database of Systematic reviews* 2008, issue1
[5] Crofford LJ et al. *Pain* 2008;136:419-31

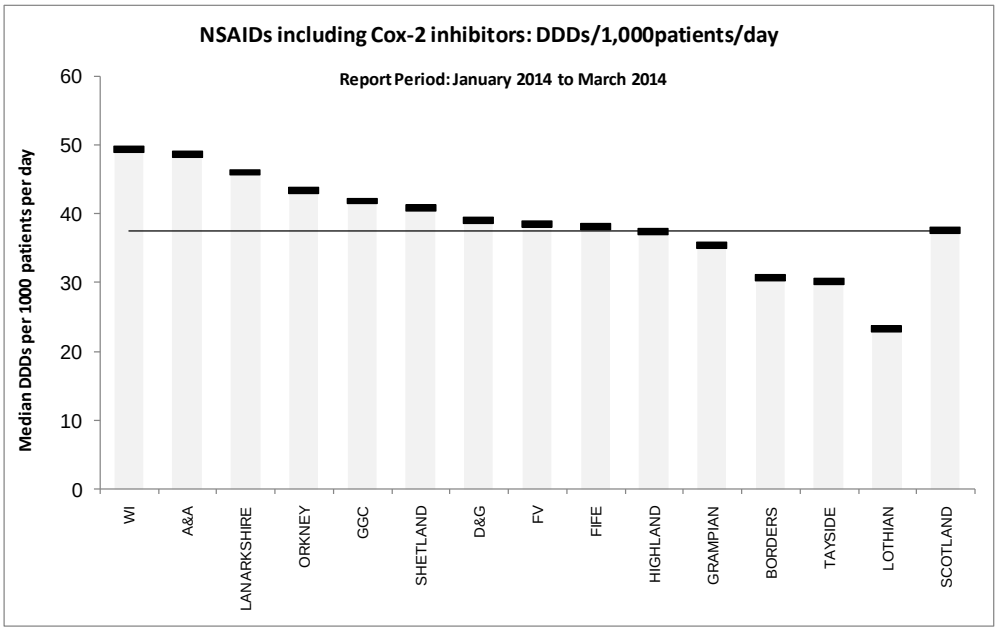
The GI adverse effects of NSAIDs should now be viewed in the context of the vascular adverse effects.[1] Major vascular events are increased by a third with the use of diclofenac, celecoxib, entoricoxib and parecoxib. This means an increase of three, mostly major coronary events, per 1,000 patients treated with the NSAID for twelve months. Diclofenac and the COX2- inhibitors are now contraindicated in patients with ischaemic heart disease, cerebrovascular disease, peripheral arterial disease and heart failure.

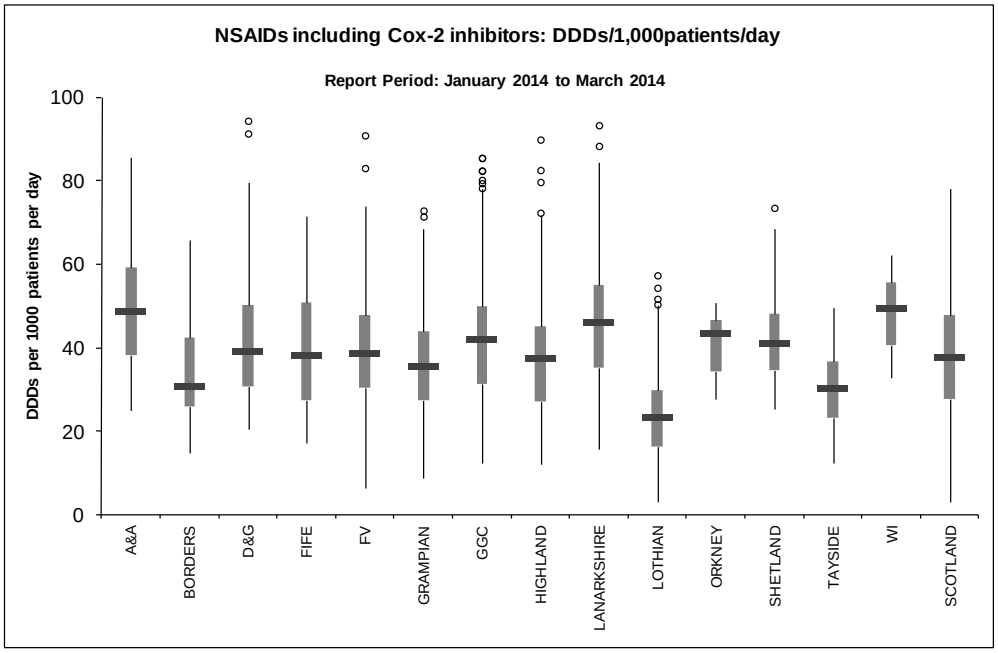
Shifting the focus of the use of NSAIDs to individual patient response is likely to improve outcomes that patients consider worthwhile. With such a model, the non-responders to first-line agents would require the choice from a wider range of NSAIDs than currently recommended by clinical guidelines or drug formularies. In addition patient lead dose titration is likely to lead to a better balance between pain relief and no, or tolerable, side effects.

[1] Bhala N, et al. *Lancet* 2013;382(9894):769-79

NSAIDS including Cox-2 inhibitors: DDDs per 1,000 patients per day

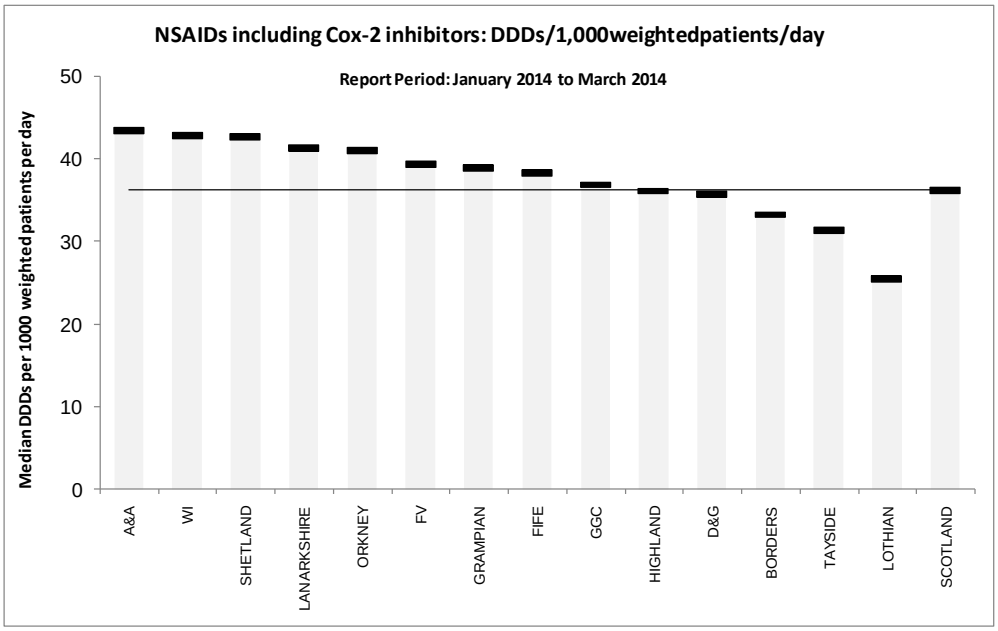
This is a new indicator. There is overwhelming evidence to reduce prescribing of NSAIDs, especially in the elderly, due to the risk of GI, cardiovascular and renal complications.

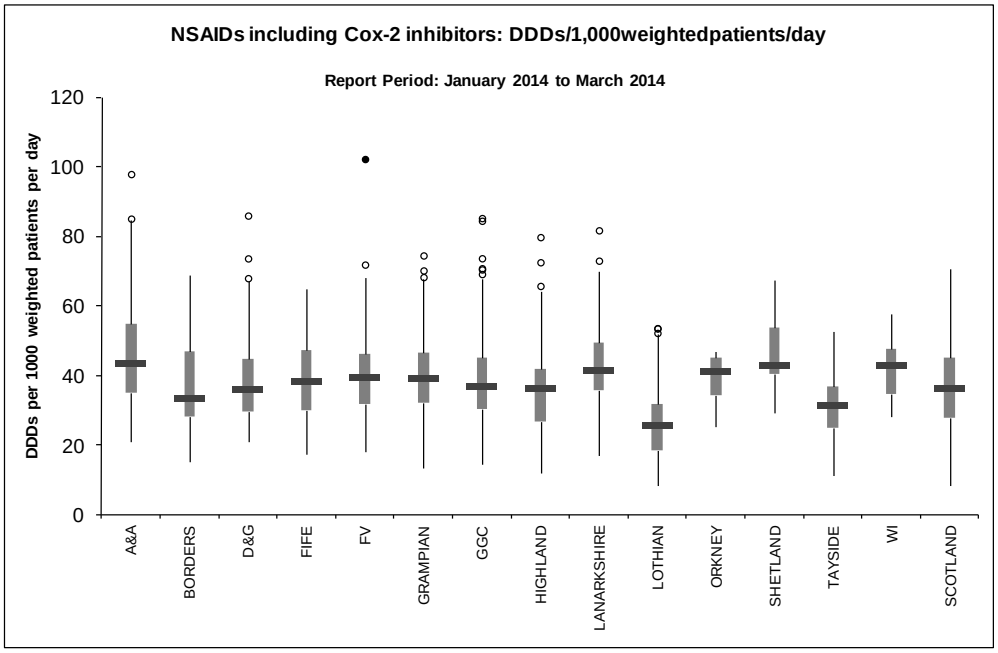




NSAIDs including Cox-2 inhibitors: DDDs per 1,000 weighted patients per day

As expected, weighted populations reduce the observed variation in the prescribing of NSAIDs.

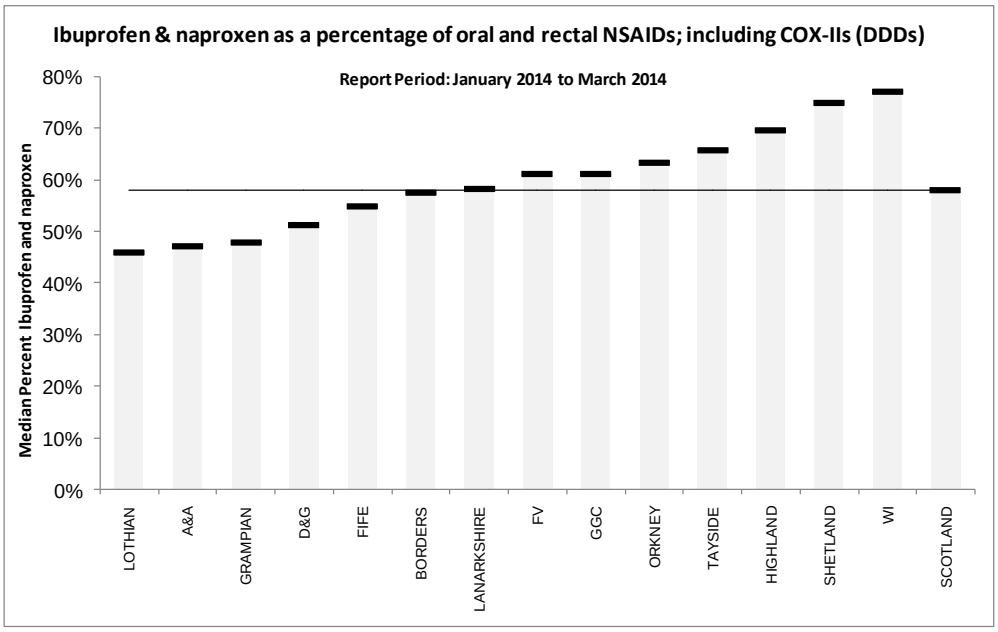


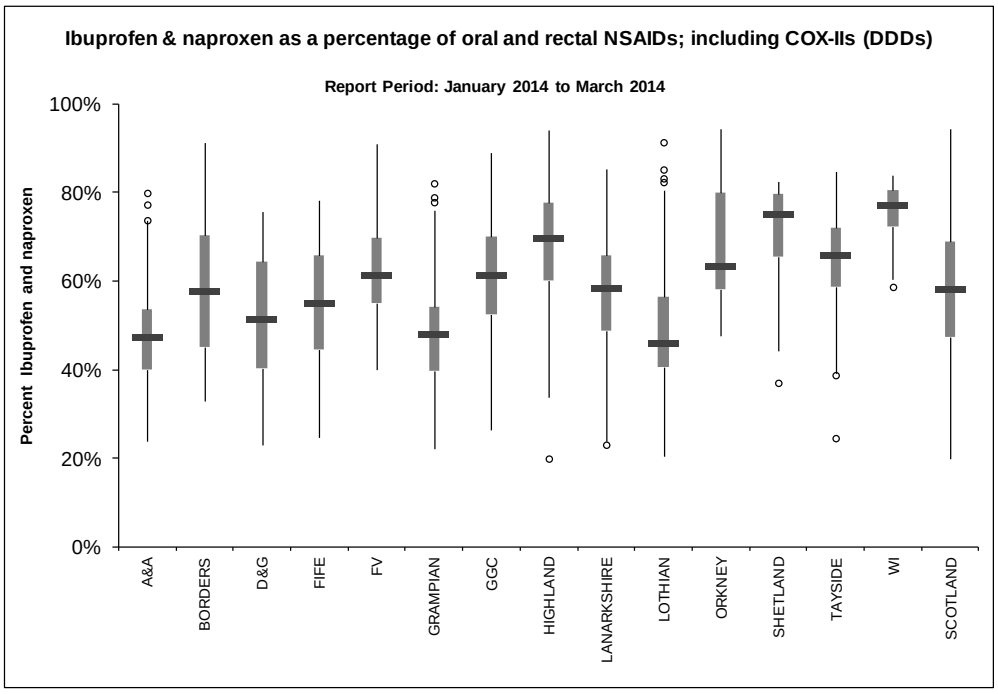


NSAIDs including Cox-2 inhibitors: Iburprofen and naproxen as a percentage of all NSAIDs (DDDs)

This is a new indicator. The MHRA has issued warnings on the increased risk of renal failure and thrombotic events associated with the use of NSAIDs, COX-2 inhibitors, diclofenac and ibuprofen 2.4g daily are associated with an increased risk of thrombotic events.

Low dose ibuprofen and naproxen are considered to have the most favourable thrombotic cardiovascular safety profile.





8. Antimicrobial Wound Dressings

This NTI focuses on the use of antimicrobial wound dressings. The use of antimicrobial dressings has increased rapidly in recent years and accounts for a quarter of wound dressings spend. This is despite the fact that the clinical and economic advice for the use of these agents remains poor.

This therapeutic indicator recognises that prescribing in this area is often nurse-led and highlights the need to engage nurses in the quality agenda. Support from the nursing profession at all levels will be required if change is to be achieved.

The proportion of antimicrobial dressings compared with total dressings prescribed is measured.

Spreading infection at the wound site requires treatment with systemic antibiotics.[1] An antimicrobial dressing may reduce the level of bacteria at the wound surface but will not eliminate a spreading infection. If used, there should be regular review of the efficacy of an antimicrobial wound dressing and it should be stopped after two weeks if there is limited or no benefit.

A recent Cochrane Review looked at the use of topical silver for preventing wound infection.[2] This review identified 26 trials comparing silver-containing products (dressings and creams) against products that did not contain silver. Most of the studies were small and of poor quality. The authors concluded that there was little evidence to support the use of silver-containing dressings or creams as generally these treatments did not promote wound healing or prevent wound infections.

Another recent Cochrane Review looked at the use of topical silver for treating infected wounds.[3] Three randomised controlled trials (RCTs) assessing the effectiveness of topical silver in the treatment of contaminated and infected acute or chronic wounds were identified. The review found that silver-containing foam dressings did not result in faster healing after up to four weeks of follow-up.

The VULCAN study was a non-blinded RCT and cost-effective analysis undertaken in the UK.[4] Patients (213) with venous leg ulcers (not necessarily infected) were randomised to silver or non-silver non-antimicrobial, low adherence dressings beneath compression. There was no difference between the groups in the proportion of patients achieving complete healing at 12 weeks, 6 months (RR 1.34; 95% CI 0.88 to 2.03) or at 12 months (RR 1.03; 95% CI 0.51 to 2.08). The authors concluded that there was little to support the use of silver dressings in the treatment of venous leg ulcers, and that the least expensive inert dressings beneath compression therapy should be used as standard care.

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[1] Joint Formulary Committee. *British National Formulary.* Edition 65, September 2013
[2] Storm-Versloot MN, et al. *Cochrane Database of Systemic Reviews 2010,* Issue 3. Art. No: CD006478
[3] Vermeulen H, et al. *Cochrane Database of Systemic Reviews 2007*, Issue 1. Art. No: CD005486
[4] Michaels JA, et al. *Br J Surg 2009;* **96**: 1147-56

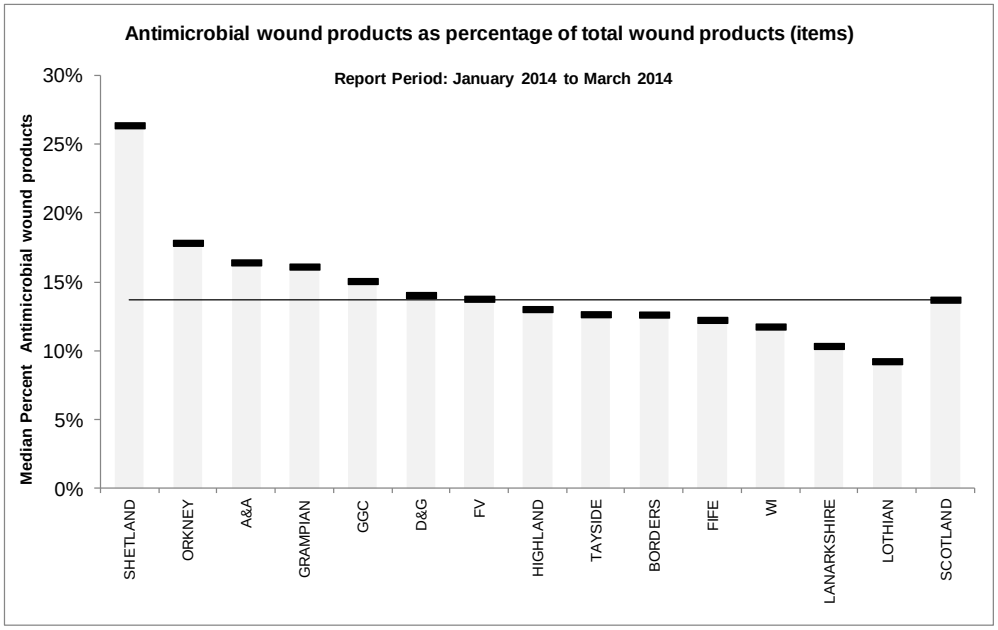
Healthcare Improvement Scotland has recommended that, *Given the lack of clinical and cost effective evidence to support or refute the use of silver dressings to either prevent wound infection or completely heal wounds, it is suggested that their continued use should be supported only in the context of local research and audit examining their effectiveness in these key endpoints.*[1]

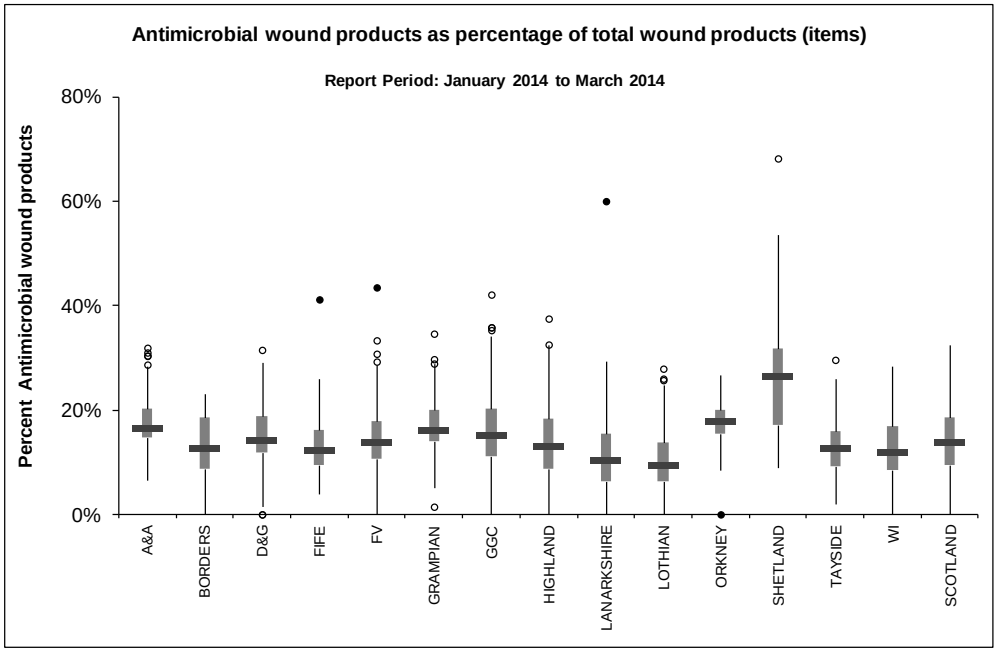
Antimicrobial wound dressings have a role to play in managing localised infection only in exceptional circumstances. Current prescribing data strongly suggests that these products are often used inappropriately. The poor evidence base should be recognised by all clinicians using these products. Only short-term use is recommended and clinical effect should be regularly reviewed.

[1] Healthcare Improvement Scotland. Advice statement 001/13, January 2013

Antimicrobial Wound Products: Antimicrobial wound products as percentage of total wound products (script items)

Antimicrobial wound dressings have a role to play in managing localised infection only in exceptional circumstances. Current prescribing data strongly suggests that these products are often used inappropriately. The poor evidence base should be recognised by all clinicians using these products. Only short-term use is recommended and clinical effect should be regularly reviewed.





9. Appendix 1 – Tables of data

9.1 Proton Pump Inhibitors

Proton Pump Inhibitors: DDDs/1,000patients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	87.45	113.96	125.73	137.11	197.98
NHS BORDERS	62.35	101.28	108.80	126.14	150.71
NHS DUMFRIES & GALLOWAY	71.52	98.62	108.42	124.19	158.85
NHS FIFE	61.31	111.31	121.00	138.92	183.37
NHS FORTH VALLEY	18.15	128.65	154.38	162.79	195.22
NHS GRAMPIAN	24.38	79.90	103.56	112.29	158.88
NHS GREATER GLASGOW & CLYDE	27.31	105.67	122.72	140.96	459.92
NHS HIGHLAND	45.40	87.71	102.71	117.54	218.79
NHS LANARKSHIRE	87.07	122.67	139.80	153.95	205.54
NHS LOTHIAN	7.79	70.85	89.69	104.92	143.52
NHS ORKNEY	84.50	107.10	111.81	121.12	153.44
NHS SHETLAND	54.19	78.89	96.47	108.06	158.90
NHS TAYSIDE	74.96	101.56	113.12	123.00	161.41
NHS WESTERN ISLES	71.63	99.04	132.56	142.85	164.39
SCOTLAND		96.92	115.70	135.88	

Proton Pump Inhibitors: DDDs/1,000weightedpatients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	85.19	105.23	113.38	126.19	191.75
NHS BORDERS	79.71	111.16	117.05	130.69	152.80
NHS DUMFRIES & GALLOWAY	82.18	92.79	97.45	111.50	133.73
NHS FIFE	92.88	111.13	117.75	134.30	154.88
NHS FORTH VALLEY	57.00	139.99	150.84	162.73	200.24
NHS GRAMPIAN	50.25	99.25	111.07	118.91	150.99
NHS GREATER GLASGOW & CLYDE	42.04	98.59	109.06	122.35	168.88
NHS HIGHLAND	40.94	85.63	96.89	108.00	181.29
NHS LANARKSHIRE	89.15	116.46	130.08	141.27	193.26
NHS LOTHIAN	22.36	80.63	97.81	110.57	143.29
NHS ORKNEY	75.21	108.21	111.09	119.12	127.71
NHS SHETLAND	59.01	85.80	101.15	117.58	170.07
NHS TAYSIDE	77.68	102.06	115.87	125.56	148.21
NHS WESTERN ISLES	63.42	88.51	109.99	127.61	144.95
SCOTLAND		97.75	111.42	125.93	

9.2 High Strength Steroid inhalers

High Strength Steroid inhalers (incl Fostair®) as a percentage of all Steroid inhalers (items)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	12.84%	37.67%	42.19%	49.51%	60.93%
NHS BORDERS	20.42%	40.85%	47.47%	52.08%	57.68%
NHS DUMFRIES & GALLOWAY	16.09%	24.18%	34.84%	41.53%	67.84%
NHS FIFE	19.29%	41.24%	45.00%	49.16%	59.49%
NHS FORTH VALLEY	12.31%	38.74%	45.76%	52.11%	64.46%
NHS GRAMPIAN	23.18%	38.30%	44.97%	50.06%	75.41%
NHS GREATER GLASGOW & CLYDE	11.81%	31.44%	37.77%	43.84%	71.35%
NHS HIGHLAND	0.00%	31.46%	41.54%	51.86%	86.05%
NHS LANARKSHIRE	15.21%	31.86%	39.36%	46.18%	66.63%
NHS LOTHIAN	25.78%	44.54%	49.86%	55.07%	81.82%
NHS ORKNEY	9.68%	35.42%	40.89%	48.61%	67.35%
NHS SHETLAND	9.68%	21.46%	26.78%	33.03%	43.75%
NHS TAYSIDE	29.63%	39.07%	45.59%	50.22%	65.54%
NHS WESTERN ISLES	13.45%	32.39%	37.33%	55.69%	73.53%
SCOTLAND		35.03%	42.51%	49.62%	

High Strength Steroid inhalers (excl Fostair®) as a percentage of all Steroid inhalers (items)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	12.16%	32.39%	39.39%	43.44%	59.12%
NHS BORDERS	16.78%	32.49%	37.12%	39.03%	55.49%
NHS DUMFRIES & GALLOWAY	12.36%	20.18%	26.16%	34.24%	66.08%
NHS FIFE	17.32%	36.58%	41.49%	44.95%	56.06%
NHS FORTH VALLEY	11.88%	37.19%	45.27%	50.45%	63.72%
NHS GRAMPIAN	19.55%	34.91%	41.98%	46.99%	69.79%
NHS GREATER GLASGOW & CLYDE	11.81%	27.37%	33.59%	40.20%	66.22%
NHS HIGHLAND	0.00%	30.48%	40.53%	50.40%	86.05%
NHS LANARKSHIRE	12.80%	27.78%	35.11%	42.92%	62.58%
NHS LOTHIAN	20.40%	36.70%	43.28%	48.93%	81.82%
NHS ORKNEY	9.68%	33.55%	40.89%	48.61%	67.35%
NHS SHETLAND	9.68%	21.46%	25.10%	33.03%	43.75%
NHS TAYSIDE	18.31%	34.00%	40.23%	45.54%	65.54%
NHS WESTERN ISLES	13.45%	28.55%	36.36%	54.23%	73.53%
SCOTLAND		30.49%	38.03%	44.96%	

9.3 Hypnotics

Hypnotics and anxiolytics: DDDs/1,000patients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	3.57	11.91	17.00	23.37	39.89
NHS BORDERS	5.91	12.22	16.58	19.66	37.05
NHS DUMFRIES & GALLOWAY	7.26	17.12	21.07	28.20	46.97
NHS FIFE	7.55	15.70	19.53	29.82	65.86
NHS FORTH VALLEY	4.22	12.63	17.37	22.87	98.08
NHS GRAMPIAN	6.73	13.57	18.18	24.22	75.40
NHS GREATER GLASGOW & CLYDE	1.16	13.20	19.52	29.32	176.54
NHS HIGHLAND	1.02	10.71	15.16	20.59	52.72
NHS LANARKSHIRE	6.21	20.55	25.85	34.14	55.23
NHS LOTHIAN	1.24	13.59	19.27	25.94	183.93
NHS ORKNEY	3.02	10.52	12.09	18.87	23.00
NHS SHETLAND	2.99	5.12	13.78	16.26	22.53
NHS TAYSIDE	6.23	16.05	20.54	25.45	66.63
NHS WESTERN ISLES	3.94	11.60	27.46	31.78	76.85
SCOTLAND		13.53	19.05	26.66	

Hypnotics and anxiolytics: DDDs/1,000weightedpatients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	3.21	11.56	14.65	21.12	35.41
NHS BORDERS	6.41	12.88	18.15	21.16	38.66
NHS DUMFRIES & GALLOWAY	6.36	16.07	18.74	25.13	42.84
NHS FIFE	7.41	16.11	21.92	28.87	59.62
NHS FORTH VALLEY	5.95	13.30	18.09	21.48	84.93
NHS GRAMPIAN	6.54	16.04	20.10	26.90	114.30
NHS GREATER GLASGOW & CLYDE	1.30	12.58	18.38	26.43	145.14
NHS HIGHLAND	0.87	10.13	14.91	19.02	42.60
NHS LANARKSHIRE	5.35	18.12	24.18	32.39	51.48
NHS LOTHIAN	0.76	14.45	20.72	28.69	216.52
NHS ORKNEY	2.79	10.19	11.86	16.96	23.66
NHS SHETLAND	3.68	5.42	15.48	16.35	22.32
NHS TAYSIDE	7.77	16.70	21.80	25.48	62.03
NHS WESTERN ISLES	3.48	9.32	25.79	28.67	59.32
SCOTLAND		13.46	18.93	26.20	

9.4 Opioid analgesics

Strong opioids (BNF 4.7.2 excluding methadone, codeine, dihydrocodeine, meptazinol, tramadol, tramadol with paracetamol) (DDDs/1,000patients/day)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	2.26	4.27	6.42	9.23	17.80
NHS BORDERS	0.58	3.40	5.09	6.77	11.41
NHS DUMFRIES & GALLOWAY	2.51	7.15	10.29	13.95	28.34
NHS FIFE	1.57	4.12	5.83	7.73	16.51
NHS FORTH VALLEY	0.05	3.03	4.52	6.07	17.74
NHS GRAMPIAN	0.34	2.30	3.42	5.40	19.45
NHS GREATER GLASGOW & CLYDE	0.00	2.91	4.16	6.20	45.00
NHS HIGHLAND	0.54	3.34	5.58	7.78	22.23
NHS LANARKSHIRE	1.59	4.26	5.66	7.14	17.45
NHS LOTHIAN	0.09	2.98	4.51	5.87	10.99
NHS ORKNEY	2.36	3.19	4.14	4.42	10.81
NHS SHETLAND	0.84	3.23	5.05	8.50	13.05
NHS TAYSIDE	1.68	4.57	5.72	8.43	19.65
NHS WESTERN ISLES	1.19	7.44	9.98	15.61	23.38
SCOTLAND		3.22	4.96	7.13	

Strong opioids (BNF 4.7.2 excluding methadone, codeine, dihydrocodeine, meptazinol, tramadol, tramadol with paracetamol) (DDDs/1,000weightedpatients/day)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	2.20	3.74	5.62	8.59	15.33
NHS BORDERS	0.74	3.75	5.38	6.89	10.73
NHS DUMFRIES & GALLOWAY	2.44	6.80	9.23	12.36	20.13
NHS FIFE	1.36	4.37	5.95	7.69	14.93
NHS FORTH VALLEY	0.16	3.04	4.46	5.91	16.04
NHS GRAMPIAN	0.42	2.60	3.82	5.79	21.43
NHS GREATER GLASGOW & CLYDE	0.00	2.64	3.88	5.48	18.48
NHS HIGHLAND	0.62	3.10	5.37	7.34	23.87
NHS LANARKSHIRE	1.45	4.05	5.14	6.45	17.01
NHS LOTHIAN	0.13	3.29	4.74	6.10	12.94
NHS ORKNEY	2.27	3.20	3.80	4.41	9.99
NHS SHETLAND	1.03	3.43	5.59	8.83	12.59
NHS TAYSIDE	1.95	4.92	5.96	8.06	18.58
NHS WESTERN ISLES	0.99	6.62	8.78	12.28	23.78
SCOTLAND		3.24	4.87	6.86	

Step 2 Opioids other than strong opioid (DDDs/1,000patients/day)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	35.98	64.32	78.81	95.14	145.30
NHS BORDERS	16.61	25.96	31.71	37.74	70.67
NHS DUMFRIES & GALLOWAY	26.87	51.08	60.01	69.90	107.81
NHS FIFE	18.77	49.87	62.30	85.22	145.82
NHS FORTH VALLEY	3.92	40.54	64.79	81.74	108.00
NHS GRAMPIAN	11.93	23.59	29.84	38.75	81.99
NHS GREATER GLASGOW & CLYDE	12.15	43.50	63.31	81.79	147.87
NHS HIGHLAND	11.24	31.33	39.82	51.76	135.74
NHS LANARKSHIRE	35.53	64.55	81.24	100.28	161.63
NHS LOTHIAN	1.95	29.40	47.75	66.79	116.75
NHS ORKNEY	23.02	27.20	32.89	57.36	68.66
NHS SHETLAND	17.18	28.48	35.83	37.66	50.53
NHS TAYSIDE	28.68	39.61	52.70	61.58	95.70
NHS WESTERN ISLES	31.22	43.31	51.01	56.59	63.79
SCOTLAND		37.02	55.62	76.67	

Step 2 Opioids (DDDs/1,000weightedpatients/day)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	31.94	61.40	72.21	88.08	124.80
NHS BORDERS	20.63	27.33	33.27	39.45	93.90
NHS DUMFRIES & GALLOWAY	30.08	47.71	54.72	62.40	91.35
NHS FIFE	30.66	52.73	63.32	82.82	123.12
NHS FORTH VALLEY	12.32	43.40	62.98	77.95	103.31
NHS GRAMPIAN	15.50	26.95	32.90	40.25	80.61
NHS GREATER GLASGOW & CLYDE	15.14	41.62	57.05	69.29	119.71
NHS HIGHLAND	12.26	30.20	40.85	47.14	120.53
NHS LANARKSHIRE	33.28	61.67	75.93	88.92	151.98
NHS LOTHIAN	5.59	35.11	49.44	71.05	115.27
NHS ORKNEY	22.23	27.49	33.10	51.83	57.15
NHS SHETLAND	18.04	33.25	37.54	43.97	53.81
NHS TAYSIDE	31.99	42.66	52.02	62.65	87.01
NHS WESTERN ISLES	27.64	36.74	43.70	48.24	64.87
SCOTLAND		38.61	53.15	70.61	

9.5 Antibiotics

Antibiotics: Items/1,000patients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	1.42	1.96	2.22	2.50	3.06
NHS BORDERS	1.45	1.79	1.92	2.22	3.02
NHS DUMFRIES & GALLOWAY	1.27	1.97	2.24	2.43	3.05
NHS FIFE	1.00	1.82	2.14	2.36	3.05
NHS FORTH VALLEY	1.03	1.81	1.98	2.32	4.55
NHS GRAMPIAN	1.04	1.68	1.91	2.32	3.42
NHS GREATER GLASGOW & CLYDE	0.93	1.76	2.13	2.47	8.60
NHS HIGHLAND	0.97	1.55	1.86	2.24	3.11
NHS LANARKSHIRE	1.27	2.08	2.35	2.63	3.28
NHS LOTHIAN	0.55	1.43	1.74	1.98	2.72
NHS ORKNEY	1.14	1.43	1.82	1.90	2.27
NHS SHETLAND	1.35	1.79	1.95	2.44	2.90
NHS TAYSIDE	1.23	1.76	2.03	2.25	2.90
NHS WESTERN ISLES	1.50	1.82	1.95	2.06	2.92
SCOTLAND		1.73	2.03	2.36	

4C Antibiotics: Items/1,000patients/100days	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	5.44	14.16	17.11	22.04	36.84
NHS BORDERS	12.30	13.34	16.08	18.46	25.46
NHS DUMFRIES & GALLOWAY	5.86	13.71	18.16	21.69	28.89
NHS FIFE	6.40	11.46	16.34	20.37	31.51
NHS FORTH VALLEY	4.90	11.44	16.33	18.74	25.97
NHS GRAMPIAN	1.97	9.38	12.41	15.35	46.90
NHS GREATER GLASGOW & CLYDE	0.00	10.26	13.66	18.93	56.56
NHS HIGHLAND	0.00	12.13	17.13	23.78	86.30
NHS LANARKSHIRE	3.64	12.79	16.45	21.56	36.14
NHS LOTHIAN	3.61	15.12	18.24	21.99	37.81
NHS ORKNEY	0.00	7.78	12.33	15.31	20.67
NHS SHETLAND	3.13	9.68	10.56	13.95	21.67
NHS TAYSIDE	3.84	7.51	9.82	12.07	25.25
NHS WESTERN ISLES	7.48	16.80	22.14	30.96	40.58
SCOTLAND		11.09	15.03	19.94	

9.6 Antidiabetic Drugs

Metformin as percentage of all anti-diabetic drugs (excluding insulin) (DDDs)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	20.84%	29.80%	33.06%	37.67%	48.90%
NHS BORDERS	27.18%	33.04%	36.68%	39.35%	46.38%
NHS DUMFRIES & GALLOWAY	25.03%	34.42%	37.22%	40.83%	52.02%
NHS FIFE	27.25%	37.15%	41.23%	44.39%	53.63%
NHS FORTH VALLEY	20.37%	28.13%	30.95%	33.91%	52.09%
NHS GRAMPIAN	22.49%	35.41%	39.69%	43.45%	63.47%
NHS GREATER GLASGOW & CLYDE	15.44%	27.47%	30.57%	34.48%	53.87%
NHS HIGHLAND	19.10%	32.59%	35.84%	42.91%	67.78%
NHS LANARKSHIRE	23.09%	28.24%	31.62%	34.50%	50.51%
NHS LOTHIAN	22.25%	33.89%	36.80%	41.02%	49.67%
NHS ORKNEY	17.71%	33.66%	42.63%	46.09%	52.85%
NHS SHETLAND	36.63%	38.10%	41.95%	49.72%	71.92%
NHS TAYSIDE	26.98%	34.01%	37.12%	39.43%	49.42%
NHS WESTERN ISLES	22.83%	34.69%	41.40%	48.76%	51.24%
SCOTLAND		29.95%	34.54%	39.65%	

9.7 NSAIDs including Cox-2 inhibitors

NSAIDs including Cox-2 inhibitors: DDDs/1,000patients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	25.09	38.29	48.55	59.32	85.52
NHS BORDERS	14.68	25.85	30.75	42.43	65.90
NHS DUMFRIES & GALLOWAY	20.50	30.68	39.10	50.28	94.34
NHS FIFE	17.11	27.28	38.21	50.86	71.42
NHS FORTH VALLEY	6.32	30.36	38.47	47.79	90.84
NHS GRAMPIAN	8.83	27.28	35.46	43.83	72.84
NHS GREATER GLASGOW & CLYDE	12.36	31.16	41.84	49.88	85.46
NHS HIGHLAND	12.19	27.17	37.46	44.98	89.83
NHS LANARKSHIRE	15.74	35.33	45.99	54.90	93.28
NHS LOTHIAN	2.98	16.41	23.35	29.93	57.34
NHS ORKNEY	27.76	34.17	43.40	46.57	50.84
NHS SHETLAND	25.42	34.64	40.92	48.23	73.50
NHS TAYSIDE	12.52	23.06	30.27	36.61	49.47
NHS WESTERN ISLES	32.67	40.62	49.35	55.52	62.08
SCOTLAND		27.67	37.59	47.82	

NSAIDs including Cox-2 inhibitors: DDDs/1,000weightedpatients/day	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	20.90	34.88	43.52	54.79	97.89
NHS BORDERS	15.17	28.04	33.34	46.94	68.77
NHS DUMFRIES & GALLOWAY	21.00	29.67	35.84	44.68	85.96
NHS FIFE	17.55	29.92	38.40	47.15	64.82
NHS FORTH VALLEY	17.99	31.69	39.43	46.31	102.22
NHS GRAMPIAN	13.39	32.27	38.98	46.43	74.50
NHS GREATER GLASGOW & CLYDE	14.36	30.27	36.95	45.29	85.24
NHS HIGHLAND	12.10	26.70	36.18	41.72	79.77
NHS LANARKSHIRE	17.22	35.62	41.39	49.34	81.73
NHS LOTHIAN	8.54	18.54	25.54	31.87	53.62
NHS ORKNEY	25.17	34.18	41.15	45.04	46.97
NHS SHETLAND	29.37	40.32	42.76	53.71	67.52
NHS TAYSIDE	11.37	24.98	31.45	36.98	52.83
NHS WESTERN ISLES	28.11	34.64	42.88	47.52	57.64
SCOTLAND		28.01	36.27	45.05	

Ibuprofen & naproxen as a percentage of oral and rectal NSAIDs; including COX-IIs (DDDs)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	23.80%	40.06%	47.21%	53.51%	79.92%
NHS BORDERS	32.80%	45.17%	57.57%	70.32%	91.38%
NHS DUMFRIES & GALLOWAY	22.91%	40.25%	51.21%	64.48%	75.79%
NHS FIFE	24.63%	44.68%	54.94%	65.91%	78.32%
NHS FORTH VALLEY	40.12%	55.00%	61.16%	69.80%	90.96%
NHS GRAMPIAN	22.14%	39.59%	47.93%	54.10%	82.10%
NHS GREATER GLASGOW & CLYDE	26.44%	52.51%	61.25%	70.05%	88.95%
NHS HIGHLAND	19.91%	60.16%	69.57%	77.73%	94.23%
NHS LANARKSHIRE	23.05%	48.92%	58.36%	65.69%	85.22%
NHS LOTHIAN	20.53%	40.52%	45.92%	56.54%	91.37%
NHS ORKNEY	47.75%	58.17%	63.33%	80.01%	94.34%
NHS SHETLAND	37.03%	65.52%	74.96%	79.72%	82.38%
NHS TAYSIDE	24.53%	58.79%	65.73%	71.90%	84.91%
NHS WESTERN ISLES	58.69%	72.38%	77.03%	80.41%	83.91%
SCOTLAND		47.46%	58.14%	68.79%	

9.8 Antimicrobial Wound Dressings

Antimicrobial wound products as percentage of total wound products (items)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
NHS AYRSHIRE & ARRAN	6.67%	14.68%	16.43%	20.15%	31.91%
NHS BORDERS	0.00%	8.71%	12.64%	18.62%	23.21%
NHS DUMFRIES & GALLOWAY	0.00%	11.92%	14.07%	18.80%	31.51%
NHS FIFE	3.94%	9.36%	12.26%	16.05%	41.18%
NHS FORTH VALLEY	0.00%	10.71%	13.79%	17.89%	43.48%
NHS GRAMPIAN	1.47%	13.99%	16.13%	19.91%	34.62%
NHS GREATER GLASGOW & CLYDE	0.00%	11.11%	15.08%	20.32%	42.11%
NHS HIGHLAND	0.00%	8.82%	13.04%	18.27%	37.50%
NHS LANARKSHIRE	0.00%	6.27%	10.37%	15.54%	60.00%
NHS LOTHIAN	0.00%	6.31%	9.26%	13.70%	27.91%
NHS ORKNEY	0.00%	15.35%	17.85%	20.00%	26.67%
NHS SHETLAND	8.89%	17.21%	26.39%	31.76%	68.18%
NHS TAYSIDE	1.94%	9.20%	12.67%	15.92%	29.60%
NHS WESTERN ISLES	0.00%	8.44%	11.78%	16.98%	28.48%
SCOTLAND		9.43%	13.73%	18.60%	