

SAPG

Scottish Antimicrobial Prescribing  
Group

# Primary Care Prescribing Indicators

**Annual Report 2013-14**

Published October 2014

# **Contents**

<b>Executive summary</b>	<b>1</b>
<b>Introduction</b>	<b>2</b>
<b>Total use of antibacterials</b>	<b>3</b>
<b>Antibacterials associated with a higher risk of Clostridium difficile infection</b>	<b>6</b>
<b>Co-amoxiclav</b>	<b>8</b>
<b>Cephalosporins</b>	<b>10</b>
<b>Fluoroquinolones</b>	<b>12</b>
<b>Seasonal variation in use of fluoroquinolones</b>	<b>14</b>
<b>Recommended antibacterials</b>	<b>16</b>
<b>Urinary Tract Infections</b>	<b>18</b>
<b>Other Prescriber Types</b>	<b>21</b>
Nurse Prescribing	21
Dental Prescribing	21
<b>Frequency of use</b>	<b>24</b>
<b>Appendix 1 – Data Sources and Presentation</b>	<b>27</b>
Data source and definitions	27
Data presentation	27
<b>Appendix 2 – National Prescribing Indicators</b>	<b>29</b>

## List of Tables

<b>Table 1:</b> NHS Scotland use of antibacterials in primary care by NHS board, Items/1000/day, 2009-10 – 2013-14	4
<b>Table 2:</b> NHS Scotland number of practices achieving level three quality indicator by NHS board, Baseline (Jan-Mar 2013) to Year 1 (Jan-Mar 2014)	5
<b>Table 3:</b> NHS Scotland use of antibacterials associated with a higher risk of <i>Clostridium difficile</i> infection in primary care by NHS board, proportion of total items, 2009-10 – 2013-14	7
<b>Table 4:</b> NHS Scotland use of co-amoxiclav in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	9
<b>Table 5:</b> NHS Scotland use of cephalosporins in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	11
<b>Table 6:</b> NHS Scotland use of fluoroquinolones in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	13
<b>Table 7:</b> NHS Scotland use of antibacterials in primary care by NHS board, % seasonal variation of fluoroquinolones (Items) 2009-10 – 2013-14	15
<b>Table 8:</b> NHS Scotland use of recommended antibacterials in primary care by NHS board, proportion of total items, 2009-10 – 2013-14	17
<b>Table 9:</b> NHS Scotland use of 3 day trimethoprim in primary care by NHS board, proportion of all trimethoprim, 2010-11 – 2013-14	19
<b>Table 10:</b> NHS Scotland use of 3 day nitrofurantoin in primary care by NHS board, proportion of all nitrofurantoin, 2010-11 – 2013-14	20
<b>Table 11:</b> Nurse prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14	22
<b>Table 12:</b> Dental prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14	23
<b>Table 13:</b> Percentage of population receiving any antibacterial by NHS board, 2011-12 – 2013-14	25
<b>Table 14:</b> Vulnerable Age Groups, percentage of population receiving any antibacterial by NHS board, 0-4 and 75+ years, 2011-12 – 2013-14	26

## List of Figures

<b>Figure 1:</b> NHS Scotland use of antibacterials in primary care by NHS board, Items/1000/day, 2009-10 – 2013-14	4
<b>Figure 2:</b> NHS Scotland number of practices achieving level three quality indicator by NHS board, Baseline (Jan-Mar 2013) to Year 1 (Jan-Mar 2014)	5
<b>Figure 3:</b> NHS Scotland use of antibacterials associated with a higher risk of <i>Clostridium difficile</i> infection in primary care by NHS board, proportion of total items, 2009-10 – 2013-14	7
<b>Figure 4:</b> NHS Scotland use of co-amoxiclav in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	9
<b>Figure 5:</b> NHS Scotland use of cephalosporins in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	11
<b>Figure 6:</b> NHS Scotland use of fluoroquinolones in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14	13
<b>Figure 7:</b> Percentage of GP practices within each NHS board achieving <5% seasonal variation of fluoroquinolones (Items) 2013-14	15
<b>Figure 8:</b> NHS Scotland use of recommended antibacterials in primary care by NHS board, proportion of items, 2009-10 – 2013-14	17
<b>Figure 9:</b> NHS Scotland use of 3 day trimethoprim in primary care by NHS board, proportion of all trimethoprim, 2010-11 Q1 – 2013-14 Q4	19
<b>Figure 10:</b> NHS Scotland use of 3 day nitrofurantoin in primary care by NHS board, proportion of all nitrofurantoin, 2010-11 Q1 – 2013-14 Q4	20
<b>Figure 11:</b> Nurse prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14	22
<b>Figure 12:</b> Dental prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14	23
<b>Figure 13:</b> Percentage of population receiving any antibacterial by NHS board, 2011-12 – 2013-14	25

## Executive summary

This is the sixth annual report for the Scottish Antimicrobial Prescribing Group (SAPG). The report contains information on key national primary care antibacterial prescribing indicators. The purpose of this report is to support the work of Antimicrobial Management Teams (AMTs) in NHS boards and SAPG by enabling identification of areas for detailed local analysis and discussion with prescribers to support improvement in the quality of antimicrobial prescribing. This report is published by Information Services Division (ISD) and Health Protection Scotland (HPS) of NHS National Services Scotland (NSS).

The SAPG national prescribing indicators are accessible as standard reports within Prescribing Information System for Scotland (PRISMS). PRISMS is the web based application maintained by Information Services Division (ISD) giving access to prescribing information on all prescriptions dispensed in the community in Scotland. This report also includes some patient level analysis using Community Health Index numbers which are held within Prescribing Information System (PIS).

Key findings in 2013-14 include;

A decrease of 6.5% in the total number of prescriptions for antibacterials. This is equivalent to a decrease of 276,383 prescriptions in 2013-14.

Using prescribing data from Jan-Mar 2014, one year from the baseline, nine of 14 NHS boards met the level three quality indicator target of having at least 50% of practices at or below the baseline 25th percentile or made the minimum acceptable reduction. Overall, 57.5% of practices in Scotland achieved the target.

There were 44,173 (11.6%) fewer prescriptions for broad spectrum antibacterials associated with a higher risk of *Clostridium difficile* infection (CDI) in primary care in Scotland than in 2012-13. This is the fifth successive year in which a reduction has been observed. Reductions have been observed in 11 NHS boards.

The proportion of antibacterial prescribing by nurse prescribers increased by 0.5% in 2013-14 while the proportion of antibacterial prescribing by dentists increased by 0.1% in the same period. Together, nurse and dental prescribing made up 12.9% of all antibacterial prescribing.

The report illustrates the ongoing impact of initiatives to encourage compliance with evidenced based prescribing guidelines that promote use of recommended agents and restrict the use of broad spectrum antibacterials associated with a higher risk of CDI. It also illustrates initial progress toward reduction in unnecessary antibacterial use in primary care in Scotland.

## Introduction

Welcome to the sixth annual report for the Scottish Antimicrobial Prescribing Group (SAPG) published by Information Services Division (ISD) and Health Protection Scotland (HPS) of NHS National Services Scotland (NSS). This report contains information on key national primary care antibacterial prescribing indicators. The purpose of the report is to support the work of NHS board Antimicrobial Management Teams (AMTs) and is intended to enable AMTs to identify areas for detailed local analysis and discussion with prescribers to support improvement in prescribing practice. By highlighting patterns of change in the last twelve months the report is intended to support AMTs to monitor the impact of local and national interventions which aim to enhance the quality of antimicrobial prescribing in a primary care setting.

The national prescribing indicators are accessible as standard reports within Prescribing Information System for Scotland (PRISMS). PRISMS is a web based application maintained by Information Services Division (ISD) giving access to prescribing information on all prescriptions dispensed in the community in Scotland.

Community Health Index (CHI) numbers are now captured on most NHS prescriptions dispensed from community pharmacies in Scotland. This patient level information is available from the Prescribing Information Scotland (PIS) database which is maintained by ISD. PIS is available to NHS boards giving access to more detailed prescribing information than contained within PRISMS. Using patient level prescribing information, this report includes for the first time information on the frequency of prescribing to individuals. This information is also available as a standard report within PIS.

Further information on PRISMS and PIS can be found on the ISD website: <http://www.isdscotland.org/Health-Topics/Prescribing-and-Medicines/Prescribing-Datamarts/>. A full list of the national prescribing indicators available is shown in appendix 2.

## Total use of antibacterials

The development of antimicrobial resistance is a complex evolutionary process. It is accepted that the main driver for the development of resistance is exposure to antimicrobial agents and that resistance is greatest where use is greatest. There is evidence from systematic reviews and randomised controlled trials that antibacterials have limited efficacy in treating a large proportion of respiratory tract infections in adults and children. SAPG has identified reducing unnecessary use of antibacterials as a key aspect of antimicrobial stewardship in Scotland.

In June 2013 a level three quality indicator on total antibacterial use in primary care was introduced by the Scottish Government. This indicator aimed to provide an additional stimulus to reduce unnecessary antibacterial prescribing. The new indicator replaces the former primary care *Clostridium difficile* disease (CDI) HEAT target indicator (seasonal variation of fluoroquinolones  $\leq 5\%$ ).

The national quality indicator is that antibacterial use, expressed as number of items/1000/day in at least 50% of practices in each NHS board will be at or below the 25th percentile of Scottish practices (at baseline Jan-Mar 2013) or will have made the minimum acceptable reduction toward that level.

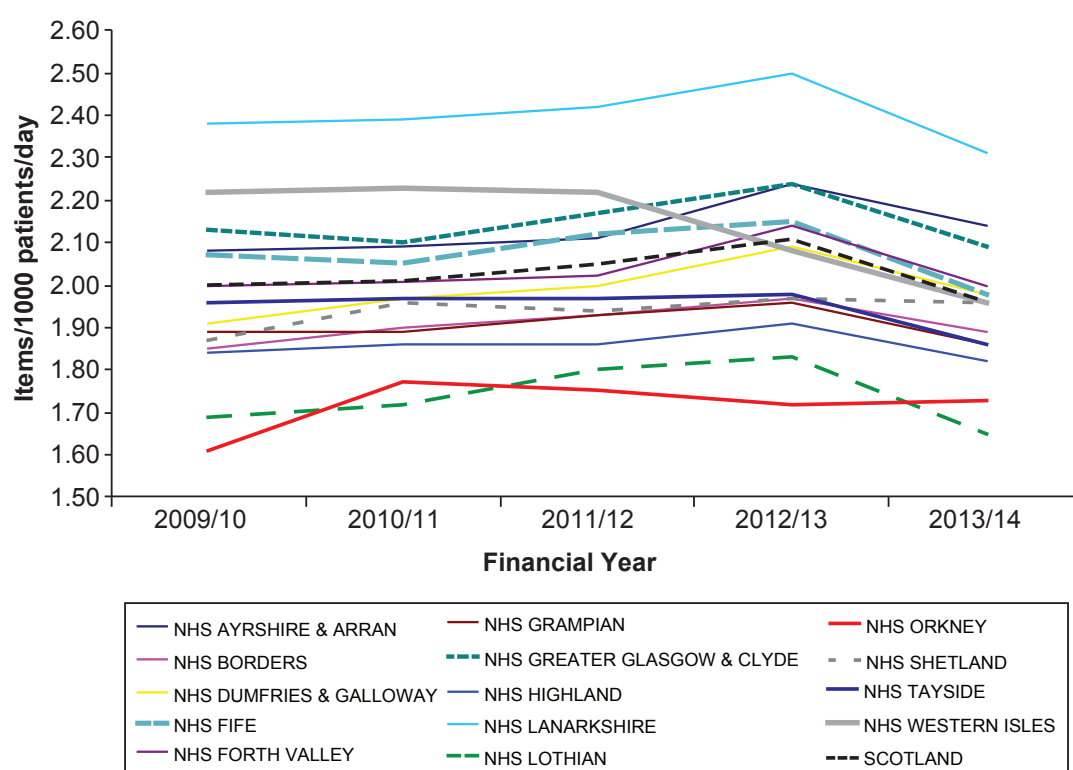
In 2013-14 there were 276,383 (6.5%) fewer prescriptions for systemic antibacterials in primary care in Scotland than in 2012-13, the rate of total antibacterial items dispensed decreased by 0.15 items/1000/day (7.1%) to 1.96. A reduction in prescribing was observed in almost all NHS boards in 2013-14. There is variation in the use of antibacterials across NHS boards. NHS Lothian had the lowest use at 1.65 items/1000/day while the highest was in NHS Lanarkshire at 2.31 items/1000/day (table 1, figure 1).

Using prescribing data from Jan-Mar 2014, one year from the baseline, nine NHS boards met the target of having at least 50% of practices at or below the baseline 25th percentile or made the minimum acceptable reduction. Overall, 57.5% of practices in Scotland achieved the level three quality indicator (table 2, figure 2).

**Table 1:** NHS Scotland use of antibacterials in primary care by NHS board, Items/1000/day, 2009-10 – 2013-14

Total antibacterials (Items/1000/day)	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	2.08	2.09	2.11	2.24	2.14
NHS Borders	1.85	1.90	1.93	1.97	1.89
NHS Dumfries & Galloway	1.91	1.97	2.00	2.09	1.98
NHS Fife	2.07	2.05	2.12	2.15	1.98
NHS Forth Valley	2.00	2.01	2.02	2.14	2.00
NHS Grampian	1.89	1.89	1.93	1.96	1.86
NHS Greater Glasgow & Clyde	2.13	2.10	2.17	2.24	2.09
NHS Highland	1.84	1.86	1.86	1.91	1.82
NHS Lanarkshire	2.38	2.39	2.42	2.50	2.31
NHS Lothian	1.69	1.72	1.80	1.83	1.65
NHS Orkney	1.61	1.77	1.75	1.72	1.73
NHS Shetland	1.87	1.96	1.94	1.97	1.96
NHS Tayside	1.96	1.97	1.97	1.98	1.86
NHS Western Isles	2.22	2.23	2.22	2.08	1.96
<b>SCOTLAND</b>	<b>2.00</b>	<b>2.01</b>	<b>2.05</b>	<b>2.11</b>	<b>1.96</b>

**Figure 1:** NHS Scotland use of antibacterials in primary care by NHS board, Items/1000/day, 2009-10 – 2013-14

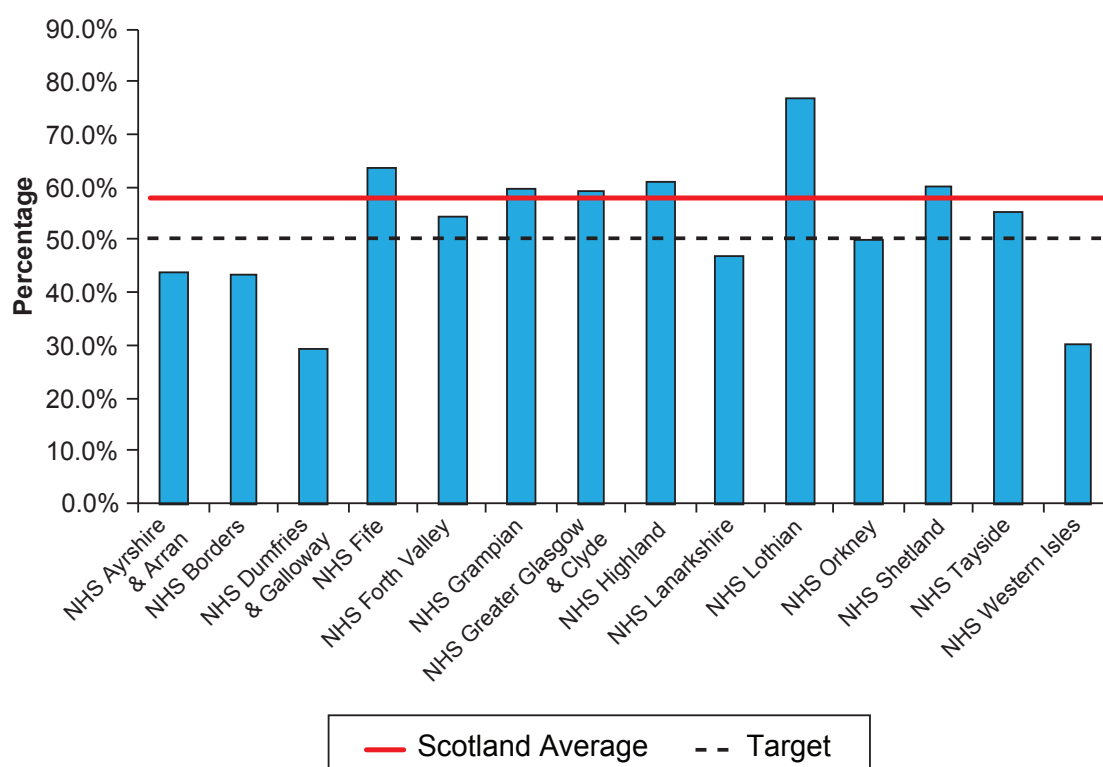




**Table 2:** NHS Scotland number of practices achieving level three quality indicator by NHS board, Baseline (Jan-Mar 2013) to Year 1 (Jan-Mar 2014)

NHS Board	Total number of practices	Practices achieving target	Practices making shift to target	% of all practices achieving or making shift
NHS AYRSHIRE & ARRAN	55	5	19	43.6%
NHS BORDERS	23	6	4	43.5%
NHS DUMFRIES & GALLOWAY	34	3	7	29.4%
NHS FIFE	58	14	23	63.8%
NHS FORTH VALLEY	57	14	17	54.4%
NHS GRAMPIAN	79	29	18	59.5%
NHS GREATER GLASGOW & CLYDE	261	75	79	59.0%
NHS HIGHLAND	100	43	18	61.0%
NHS LANARKSHIRE	96	7	38	46.9%
NHS Lothian	125	73	23	76.8%
NHS ORKNEY	10	5	0	50.0%
NHS SHETLAND	10	3	3	60.0%
NHS TAYSIDE	67	20	17	55.2%
NHS WESTERN ISLES	10	2	1	30.0%
<b>SCOTLAND</b>	<b>985</b>	<b>299</b>	<b>267</b>	<b>57.5%</b>

**Figure 2:** NHS Scotland number of practices achieving level three quality indicator by NHS board, Baseline (Jan-Mar 2013) to Year 1 (Jan-Mar 2014)



## Antibacterials associated with a higher risk of *Clostridium difficile* infection

---

Since its establishment in 2008, a key priority for SAPG has been the reduction in use of broad spectrum antibacterials that increase the risk of *Clostridium difficile* infection (CDI). AMTs have developed prescribing policies for first line empirical treatment of infections commonly encountered in primary care based on a national evidence based template. A benefit of this approach is that it restricts the use of high risk antibacterials.

In 2013-14 there were 44,173 (11.6%) fewer prescriptions for antibacterials associated with a higher risk of CDI in primary care in Scotland than in 2012-13. The rate of prescribing was 16.60 items/100,000/day in 2013-14 representing an 11.9% reduction from 2012-13. These reductions build on those observed in the previous years.

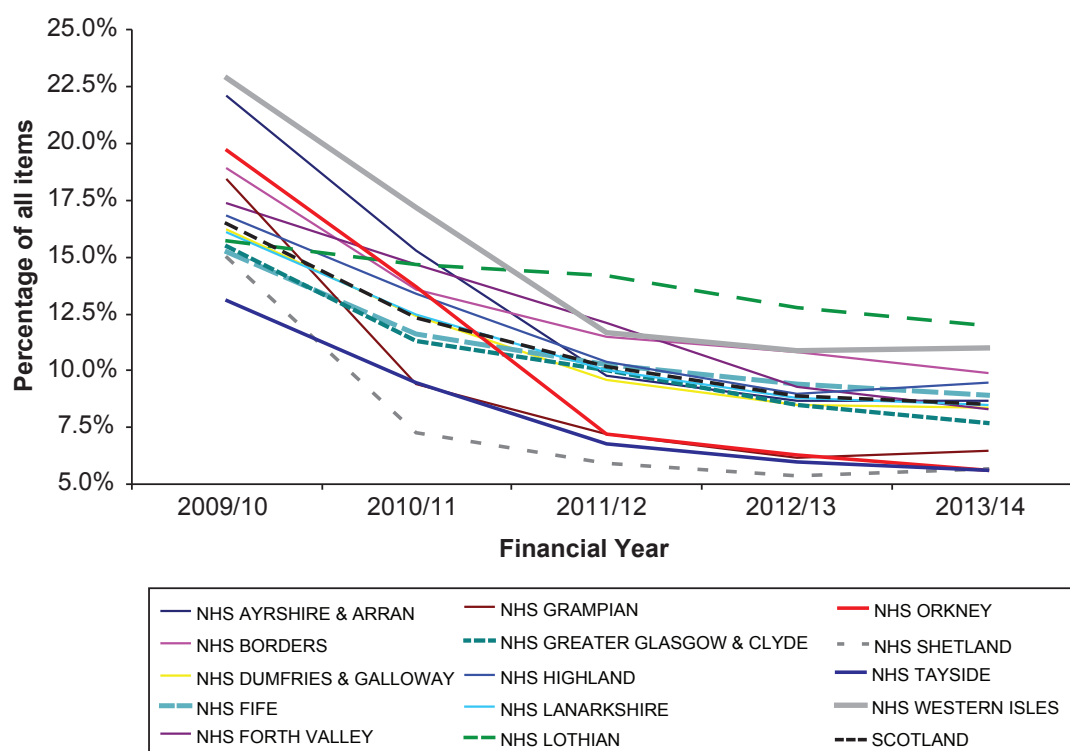
In 2013-14 antibacterials associated with a higher risk of CDI accounted for 8.5% of total use of antibacterials and continue the downward trend observed in previous years. There has been a reduction in the use of high risk antibacterials as a proportion of overall use in many NHS boards (table 3, figure 3). NHS Orkney and NHS Tayside had the lowest proportional use at 5.6% of overall use while NHS Lothian had the highest at 12.0%.

CDI remains a national clinical priority; the continued reduction in 2013-14 in the use of high risk broad spectrum antibacterials is a key finding and shows the ongoing positive impact AMTs and SAPG are having on the quality of antibacterial prescribing in Scotland.

**Table 3:** NHS Scotland use of antibacterials associated with a higher risk of *Clostridium difficile* infection in primary care by NHS board, proportion of total items, 2009-10 – 2013-14

4C Items as % of all agents	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	22.1%	15.3%	9.8%	8.7%	8.7%
NHS Borders	18.9%	13.6%	11.5%	10.8%	9.9%
NHS Dumfries & Galloway	16.2%	12.4%	9.6%	8.5%	8.4%
NHS Fife	15.2%	11.6%	10.3%	9.4%	8.9%
NHS Forth Valley	17.4%	14.7%	12.1%	9.3%	8.3%
NHS Grampian	18.4%	9.4%	7.2%	6.2%	6.5%
NHS Greater Glasgow & Clyde	15.5%	11.3%	10.0%	8.5%	7.7%
NHS Highland	16.8%	13.4%	10.4%	9.0%	9.5%
NHS Lanarkshire	16.1%	12.5%	10.0%	8.8%	8.5%
NHS Lothian	15.7%	14.7%	14.2%	12.8%	12.0%
NHS Orkney	19.7%	13.7%	7.2%	6.3%	5.6%
NHS Shetland	15.0%	7.3%	5.9%	5.4%	5.7%
NHS Tayside	13.1%	9.5%	6.8%	6.0%	5.6%
NHS Western Isles	22.9%	17.2%	11.7%	10.9%	11.0%
<b>SCOTLAND</b>	<b>16.5%</b>	<b>12.3%</b>	<b>10.2%</b>	<b>8.9%</b>	<b>8.5%</b>

**Figure 3:** NHS Scotland use of antibacterials associated with a higher risk of *Clostridium difficile* infection in primary care by NHS board, proportion of total items, 2009-10 – 2013-14



## Co-amoxiclav

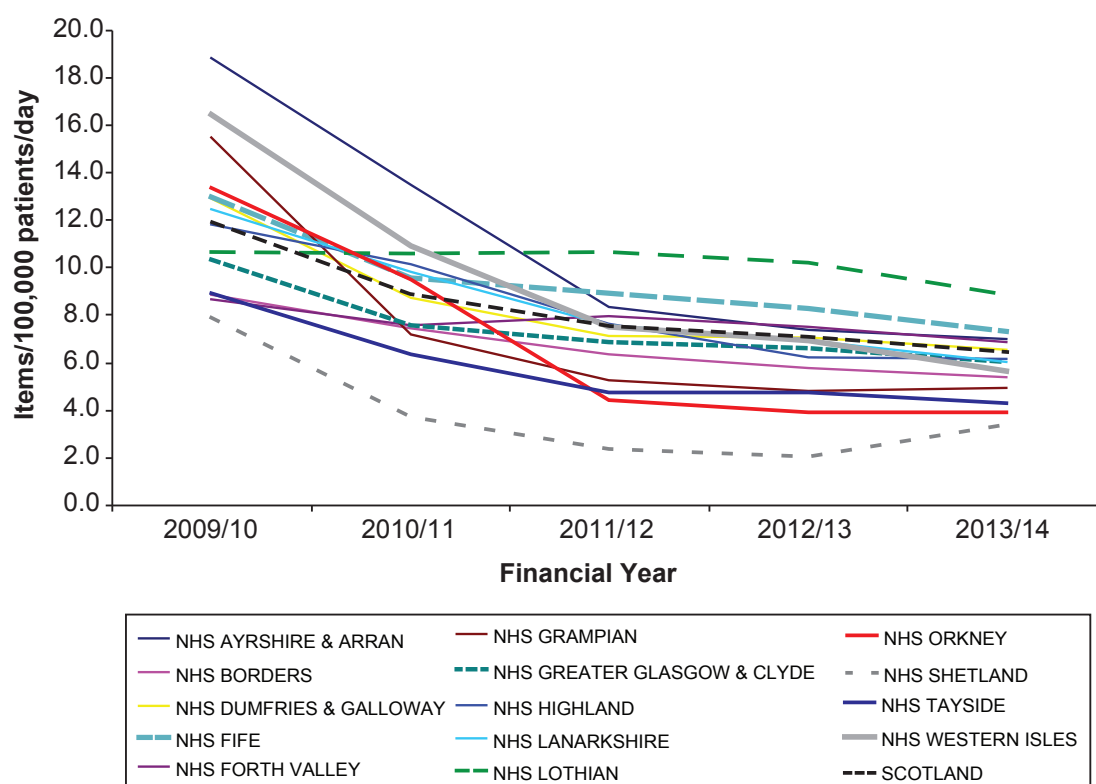
In 2013-14 co-amoxiclav accounted for 38.7% of use of antibacterial items associated with a higher risk of CDI. There were 12,431 (8.7%) fewer prescriptions for co-amoxiclav dispensed in primary care in Scotland than in 2012-13. This builds on the reduction observed in previous years.

The number of co-amoxiclav items/100,000/day decreased by 0.64 (9.1%) to 6.43. This decrease was observed in 11 NHS Boards with NHS Shetland recording the lowest rate at 3.39 items/100,000/day, while NHS Lothian observed the highest at 8.86 (table 4, figure 4).

**Table 4:** NHS Scotland use of co-amoxiclav in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14

Co-amoxiclav (Items/100,000/day)	2009/10	2010/11	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	18.86	13.49	8.35	7.39	6.99
NHS BORDERS	8.85	7.44	6.37	5.78	5.37
NHS DUMFRIES & GALLOWAY	12.93	8.74	7.15	7.07	6.53
NHS FIFE	12.99	9.55	8.92	8.28	7.29
NHS FORTH VALLEY	8.67	7.57	7.96	7.52	6.88
NHS GRAMPIAN	15.47	7.16	5.26	4.82	4.94
NHS GREATER GLASGOW & CLYDE	10.36	7.61	6.88	6.63	6.06
NHS HIGHLAND	11.81	10.17	7.65	6.23	6.13
NHS LANARKSHIRE	12.49	9.86	7.55	6.96	6.04
NHS Lothian	10.70	10.62	10.68	10.21	8.86
NHS ORKNEY	13.40	9.5	4.42	3.91	3.94
NHS SHETLAND	7.87	3.71	2.37	2.02	3.39
NHS TAYSIDE	8.90	6.38	4.72	4.76	4.28
NHS WESTERN ISLES	16.45	10.91	7.49	6.91	5.62
<b>SCOTLAND</b>	<b>11.91</b>	<b>8.92</b>	<b>7.55</b>	<b>7.07</b>	<b>6.43</b>

**Figure 4:** NHS Scotland use of co-amoxiclav in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14



## Cephalosporins

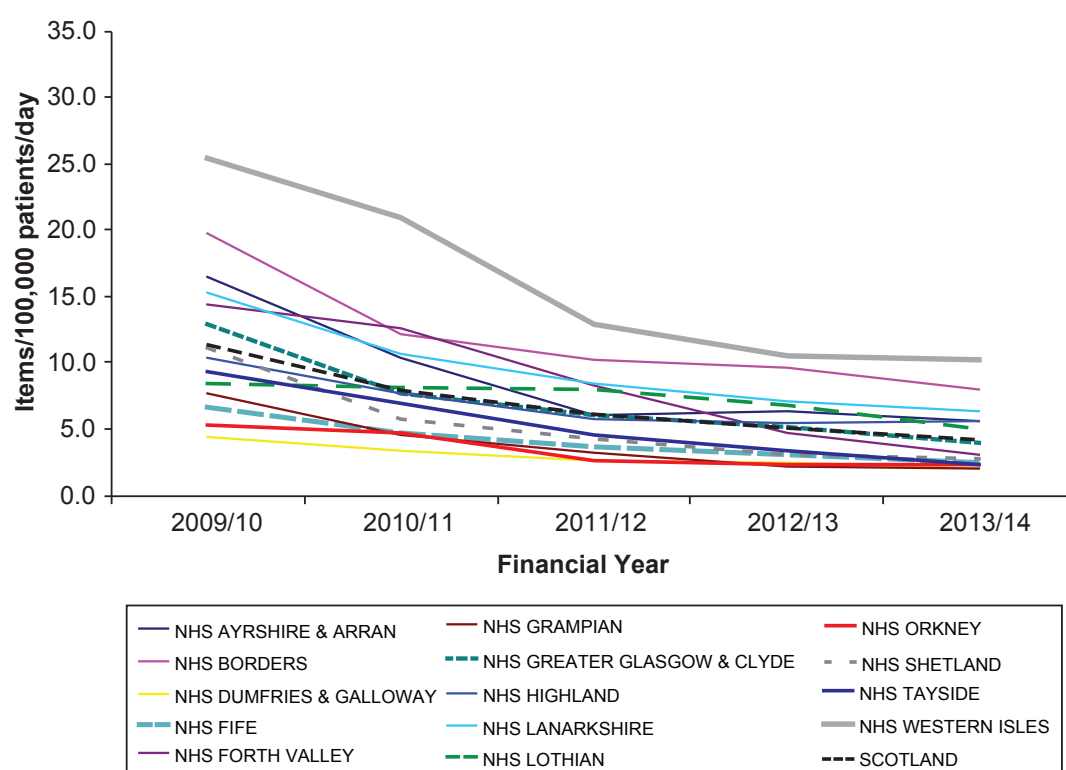
In 2013-14 cephalosporins accounted for 25.2% of use of antibacterial items associated with a higher risk of CDI with cefalexin accounting for 90.6% of all cephalosporin items. In 2013-14 there were 19,187 (18.4%) fewer prescriptions for cephalosporins dispensed in primary care in Scotland than in 2012-13. This builds on the reduction observed in previous years.

The number of cephalosporin items/100,000/day decreased in 2013-14 by 0.96 (18.7%) to 4.18. Reductions were observed in 12 NHS Boards with NHS Dumfries & Galloway reporting the lowest rate at 1.98 and NHS Western Isles the highest at 10.28 items/100,000/day (table 5, figure 5).

**Table 5:** NHS Scotland use of cephalosporins in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14

Cephalosporins (Items/100,000/day)	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	16.44	10.39	6.07	6.33	5.62
NHS Borders	19.75	12.15	10.20	9.61	7.96
NHS Dumfries & Galloway	4.41	3.33	2.65	2.50	1.98
NHS Fife	6.67	4.78	3.61	3.10	2.47
NHS Forth Valley	14.40	12.55	8.24	4.66	3.06
NHS Grampian	7.72	4.53	3.16	2.19	2.05
NHS Greater Glasgow & Clyde	12.96	7.64	6.12	5.17	3.97
NHS Highland	10.35	7.72	5.80	5.45	5.63
NHS Lanarkshire	15.22	10.72	8.38	7.09	6.30
NHS Lothian	8.43	8.07	7.99	6.81	5.07
NHS Orkney	5.32	4.64	2.65	2.31	2.34
NHS Shetland	11.10	5.78	4.29	3.05	2.78
NHS Tayside	9.30	6.97	4.51	3.33	2.38
NHS Western Isles	25.35	20.99	12.90	10.56	10.28
<b>SCOTLAND</b>	<b>11.34</b>	<b>7.97</b>	<b>6.16</b>	<b>5.14</b>	<b>4.18</b>

**Figure 5:** NHS Scotland use of cephalosporins in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14



## Fluoroquinolones

In 2013-14 fluoroquinolones accounted for 34.5% of use of antibacterial items associated with a higher risk of CDI. Ciprofloxacin, the most commonly prescribed fluoroquinolone, accounted for 88.6% of all fluoroquinolone items. In 2013-14 there were 12,757 (9.9%) fewer prescriptions for fluoroquinolones dispensed in primary care in Scotland than in 2012-13. This builds on the reduction observed in previous years.

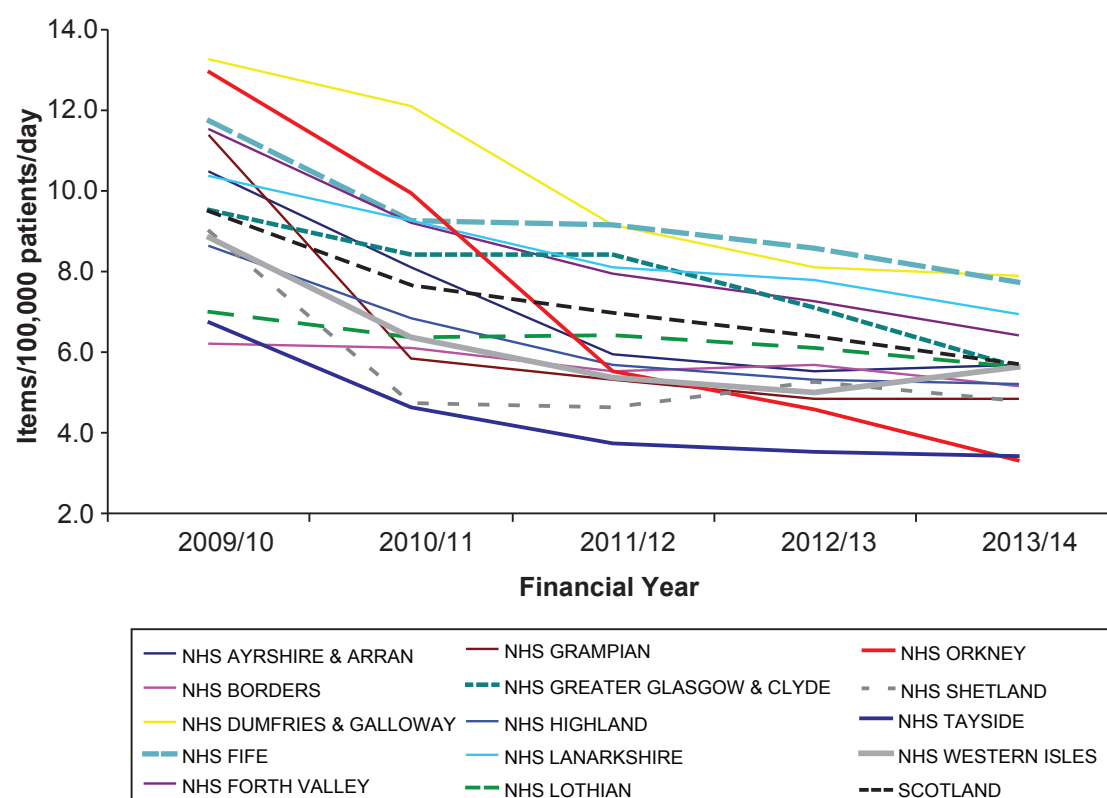
The number of fluoroquinolone items/100,000/day decreased in 2013-14 by 0.65 (10.2%) to 5.73. Reductions were observed in 12 NHS Boards with NHS Dumfries & Galloway reporting the highest rate at 7.90 and NHS Orkney the lowest at 3.34 (table 6, figure 6).



**Table 6:** NHS Scotland use of fluoroquinolones in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14

Fluoroquinolones (Items/100,000/day)	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	10.46	8.08	5.97	5.54	5.70
NHS Borders	6.19	6.13	5.53	5.70	5.16
NHS Dumfries & Galloway	13.22	12.09	9.14	8.12	7.90
NHS Fife	11.71	9.26	9.15	8.58	7.71
NHS Forth Valley	11.51	9.21	7.93	7.28	6.40
NHS Grampian	11.37	5.87	5.30	4.86	4.84
NHS Greater Glasgow & Clyde	9.53	8.42	8.39	7.12	5.66
NHS Highland	8.65	6.82	5.70	5.33	5.24
NHS Lanarkshire	10.37	9.25	8.09	7.76	6.95
NHS Lothian	7.00	6.36	6.42	6.13	5.64
NHS Orkney	12.95	9.94	5.52	4.61	3.34
NHS Shetland	8.99	4.74	4.66	5.28	4.81
NHS Tayside	6.72	4.64	3.75	3.51	3.43
NHS Western Isles	8.81	6.35	5.39	4.99	5.61
<b>SCOTLAND</b>	<b>9.51</b>	<b>7.65</b>	<b>6.99</b>	<b>6.38</b>	<b>5.73</b>

**Figure 6:** NHS Scotland use of fluoroquinolones in primary care by NHS board, Items/100,000/day, 2009-10 – 2013-14



## Seasonal variation in use of fluoroquinolones

Seasonal variation is defined as the difference in use during the winter (October to March) relative to use in the preceding summer (April to September). In the winter more respiratory tract infections are seen but many are caused by viruses which are self-limiting and do not require treatment with an antibacterial. Excess use of fluoroquinolones in the winter suggests inappropriate use for respiratory infections.

Until June 2013, seasonal variation in fluoroquinolones was used as a national antimicrobial prescribing indicator to support achievement of the HEAT target for reduction in CDI. A target was set which required no more than a 5% seasonal variation in the use of fluoroquinolones.

From June 2013, SAPG has agreed that the seasonal variation of fluoroquinolones target should be replaced by a new level three quality indicator on total antibacterial use but advised AMTs to continue to monitor seasonal variation of fluoroquinolones use and to focus interventions at those practices with seasonal variation above 5%.

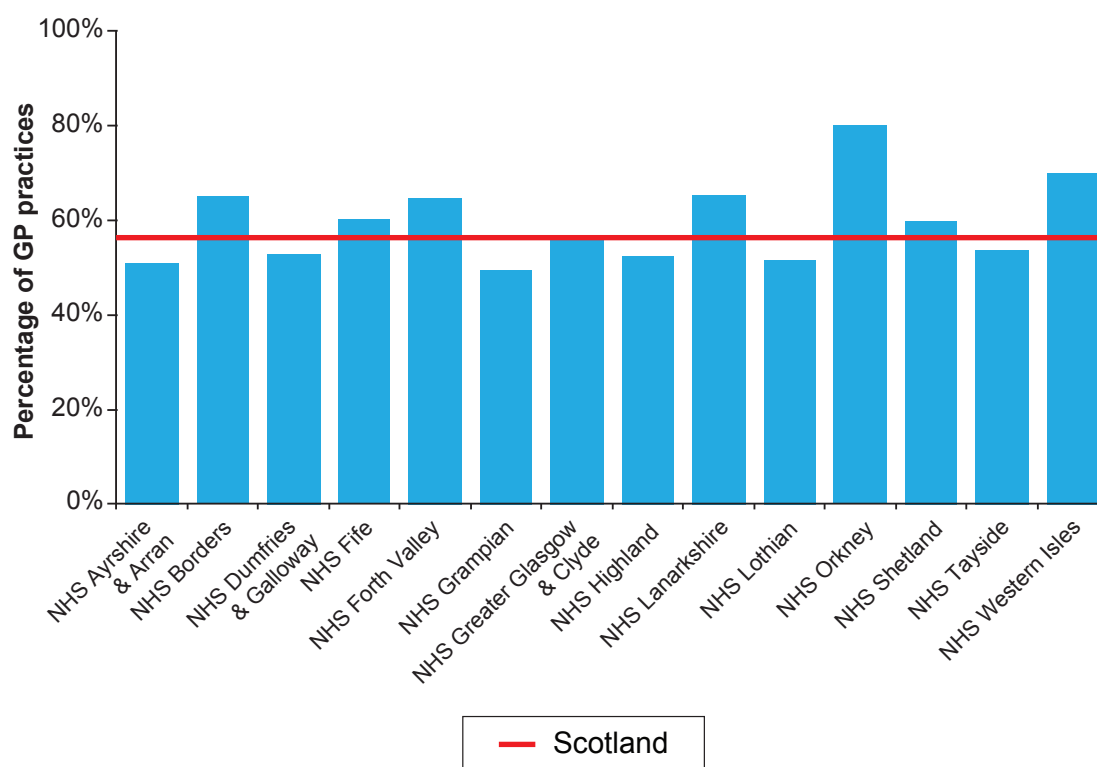
Table 7 illustrates the percentage seasonal variation of fluoroquinolone use (in items) by NHS board in primary care. In 2013-14, 11 NHS boards were below the target. A negative seasonal variation means there was lower use in the winter compared to the preceding summer.

Figure 7 illustrates the proportion of GP practices within each NHS board with less than 5% seasonal variation of fluoroquinolones in 2013-14.

**Table 7:** NHS Scotland use of antibacterials in primary by NHS board, % seasonal variation of fluoroquinolones (Items) 2009-10 – 2013-14

% Seasonal Variation	2009/10	2010/11	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	12.0	-20.3	-8.4	8.7	6.2
NHS BORDERS	7.1	-2.4	-3.8	-1.3	-7.2
NHS DUMFRIES & GALLOWAY	-6.6	2.8	-13.6	-8.2	2.4
NHS FIFE	-6.8	-5.5	0.3	-5.6	-3.1
NHS FORTH VALLEY	-11.7	-5.5	6.9	-15.0	-0.3
NHS GRAMPIAN	-22.3	-7.7	-3.2	4.9	9.8
NHS GREATER GLASGOW & CLYDE	0.6	3.5	6.2	-13.3	1.5
NHS HIGHLAND	-5.4	-10.7	-4.7	3.0	4.1
NHS LANARKSHIRE	6.0	-0.2	-5.0	-0.4	-5.2
NHS Lothian	-0.9	2.0	1.9	-2.1	4.9
NHS ORKNEY	21.9	-36.3	-12.2	-17.9	-5.3
NHS SHETLAND	-2.1	-47.1	20.5	-12.8	25.3
NHS TAYSIDE	-25.3	-6.5	-2.8	1.2	-0.2
NHS WESTERN ISLES	15.0	-17.0	6.9	2.9	-2.8

**Figure 7:** Percentage of GP practices within each NHS board achieving <5% seasonal variation of fluoroquinolones (Items) 2013-14



## Recommended antibacterials

This indicator presents the use of antibacterials recommended, in the national evidence based guidance template supported by SAPG, as first line empirical treatment in commonly encountered infections in primary care. It includes a group of narrow spectrum antibacterials; amoxicillin, clarithromycin, doxycycline, erythromycin, flucloxacillin, nitrofurantoin, phenoxymethylpenicillin and trimethoprim.

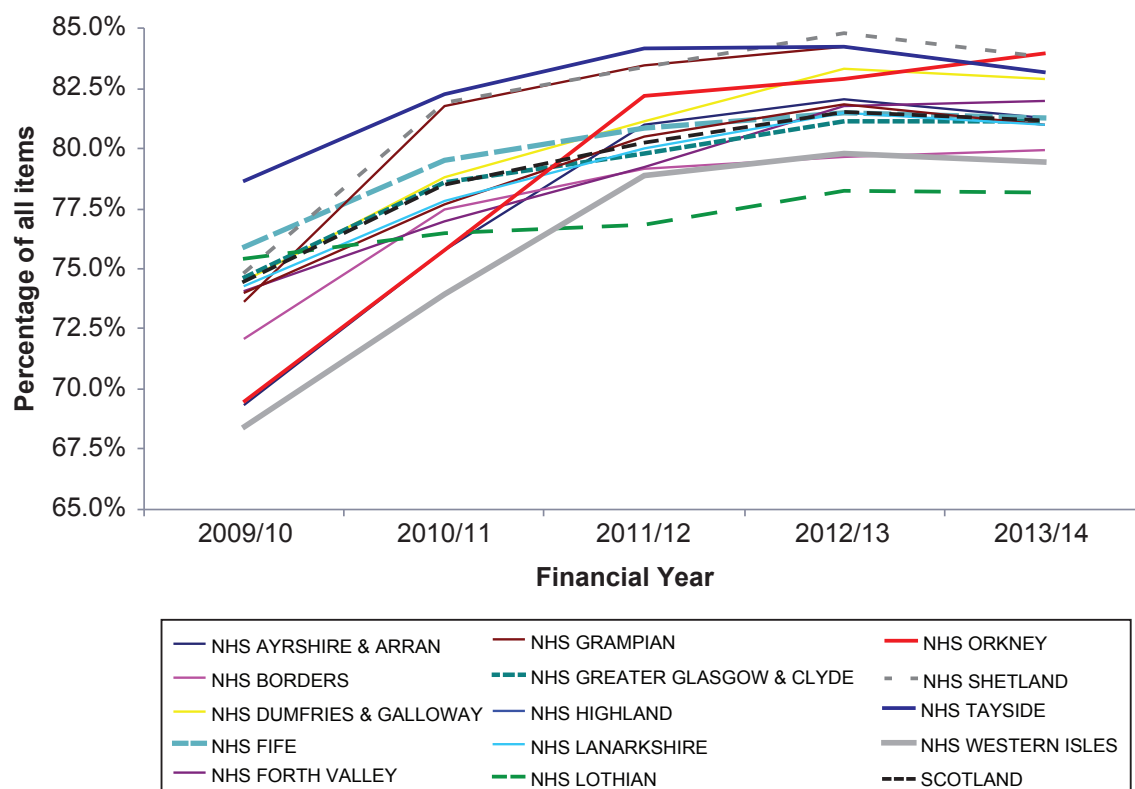
In 2013-14 there were 239,519 (6.9%) less prescriptions for recommended antibacterials in primary care in Scotland than in 2012-13. The use of recommended agents accounted for 81.2% of all antibacterial items across Scotland in 2013-14, similar to the proportion observed in 2012-13. Figure 8 and table 8 illustrate the number of recommended antibacterial items as a proportion of total antibacterial use in primary care by NHS board.

NHS Orkney had the largest proportion of recommended antibacterials in 2013-14 representing 83.9% of all antibacterial prescribing, while NHS Lothian had the lowest at 78.2%.

**Table 8:** NHS Scotland use of recommended antibacterials in primary care by NHS board, proportion of total items, 2009-10 – 2013-14

Recommended agents as % of all agents	2009/10	2010/11	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	69.4%	75.8%	81.0%	82.0%	81.2%
NHS BORDERS	72.1%	77.5%	79.1%	79.7%	79.9%
NHS DUMFRIES & GALLOWAY	74.5%	78.8%	81.1%	83.3%	82.9%
NHS FIFE	75.9%	79.5%	80.8%	81.5%	81.3%
NHS FORTH VALLEY	74.1%	77.0%	79.2%	81.8%	81.9%
NHS GRAMPIAN	73.6%	81.8%	83.5%	84.3%	83.2%
NHS GREATER GLASGOW & CLYDE	74.7%	78.6%	79.8%	81.2%	81.1%
NHS HIGHLAND	74.0%	77.7%	80.5%	81.8%	81.0%
NHS LANARKSHIRE	74.3%	77.8%	80.0%	81.5%	81.0%
NHS Lothian	75.4%	76.5%	76.9%	78.2%	78.2%
NHS ORKNEY	69.5%	75.7%	82.2%	82.9%	83.9%
NHS SHETLAND	74.8%	81.9%	83.4%	84.8%	83.8%
NHS TAYSIDE	78.6%	82.3%	84.2%	84.2%	83.2%
NHS WESTERN ISLES	68.5%	73.9%	78.9%	79.8%	79.5%
<b>SCOTLAND</b>	<b>74.4%</b>	<b>78.5%</b>	<b>80.3%</b>	<b>81.5%</b>	<b>81.2%</b>

**Figure 8:** NHS Scotland use of recommended antibacterials in primary care by NHS board, proportion of items, 2009-10 – 2013-14



## Urinary Tract Infections

Urinary Tract Infections (UTI) are a common reason for consultation with a GP and after respiratory infections are the second most common indication for empirical antibacterial use in primary care. National guidelines state that non-pregnant women of all ages with signs and symptoms of acute lower UTI should be treated empirically with trimethoprim or nitrofurantoin for three days. The number of items with a three day duration as a proportion of total items of trimethoprim and nitrofurantoin may be a useful measure of prescribing quality in UTI in adult females aged  $\geq 16$  years.

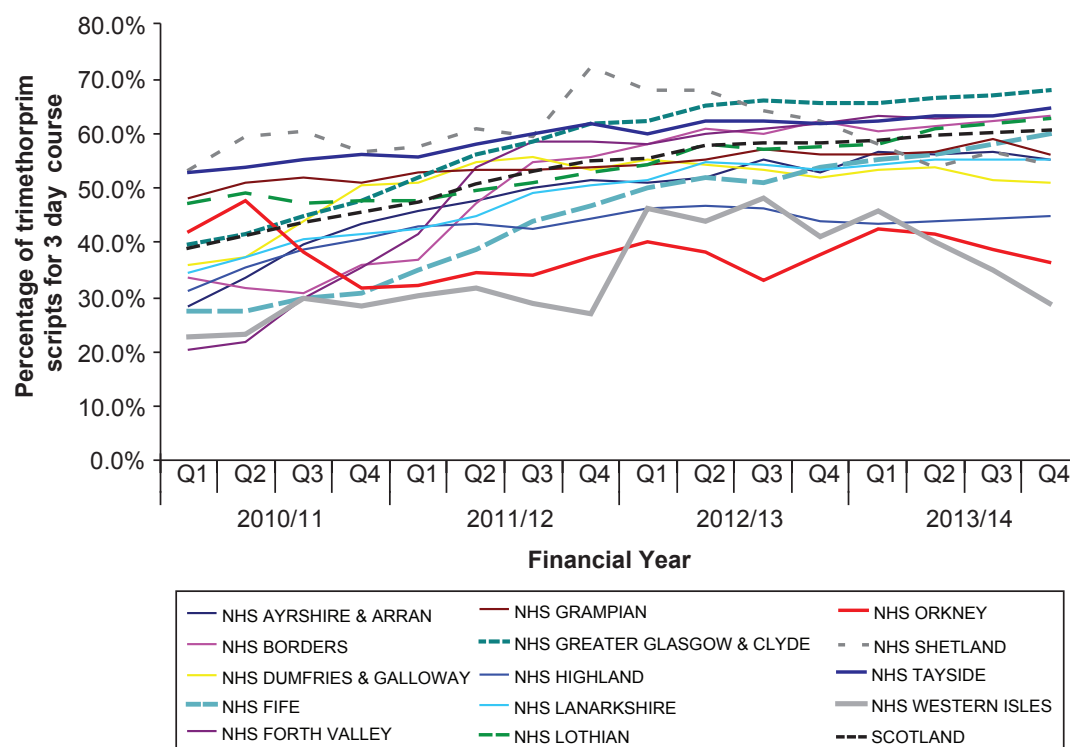
Table 9 and figure 9 illustrate the use of three day trimethoprim in NHS boards as a proportion of all trimethoprim items dispensed for adult females. In 2013-14, the use of three day duration trimethoprim as a proportion of all trimethoprim use increased by 2.4% from 2012-13. Three day courses represented 60.0% of all trimethoprim items in 2013-14 although there is variation between NHS boards. NHS Greater Glasgow & Clyde had the highest proportional use at 66.8%, while NHS Western Isles had the lowest at 38.1%.

Table 10 and figure 10 illustrate the use of three day nitrofurantoin as a proportion of all nitrofurantoin items dispensed for adult females. Use of three day nitrofurantoin as a proportion of all nitrofurantoin items has increased by 4.5% from 2012-13 to 2013-14. Three day courses represented 29.3% of all nitrofurantoin items for adult females. There is variation between NHS boards. NHS Forth Valley had the highest proportional use at 48.4% while NHS Orkney had the lowest at 8.8%.

**Table 9:** NHS Scotland use of 3 day trimethoprim in primary care by NHS board, proportion of all trimethoprim, 2010-11 – 2013-14. CHI capture rates for trimethoprim, Scotland 2010-11 - 2013-14 88% (NHS Board range 83% - 92%)

3 day trimethoprim as a % of all trimethoprim	2010/11	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	36.6%	48.9%	52.9%	56.2%
NHS BORDERS	32.9%	49.1%	60.2%	61.9%
NHS DUMFRIES & GALLOWAY	42.0%	53.8%	53.7%	52.5%
NHS FIFE	29.0%	41.5%	51.7%	57.3%
NHS FORTH VALLEY	27.0%	53.4%	60.2%	63.5%
NHS GRAMPIAN	50.5%	53.2%	55.7%	57.0%
NHS GREATER GLASGOW & CLYDE	43.4%	57.2%	64.6%	66.8%
NHS HIGHLAND	36.7%	43.3%	45.9%	44.2%
NHS LANARKSHIRE	38.5%	46.8%	53.6%	55.0%
NHS Lothian	47.9%	50.4%	56.7%	61.0%
NHS ORKNEY	39.9%	34.5%	37.2%	39.8%
NHS SHETLAND	57.7%	62.1%	65.6%	55.7%
NHS TAYSIDE	54.6%	59.0%	61.5%	63.3%
NHS WESTERN ISLES	25.9%	29.5%	45.2%	38.1%
<b>SCOTLAND</b>	<b>42.3%</b>	<b>51.7%</b>	<b>57.6%</b>	<b>60.0%</b>

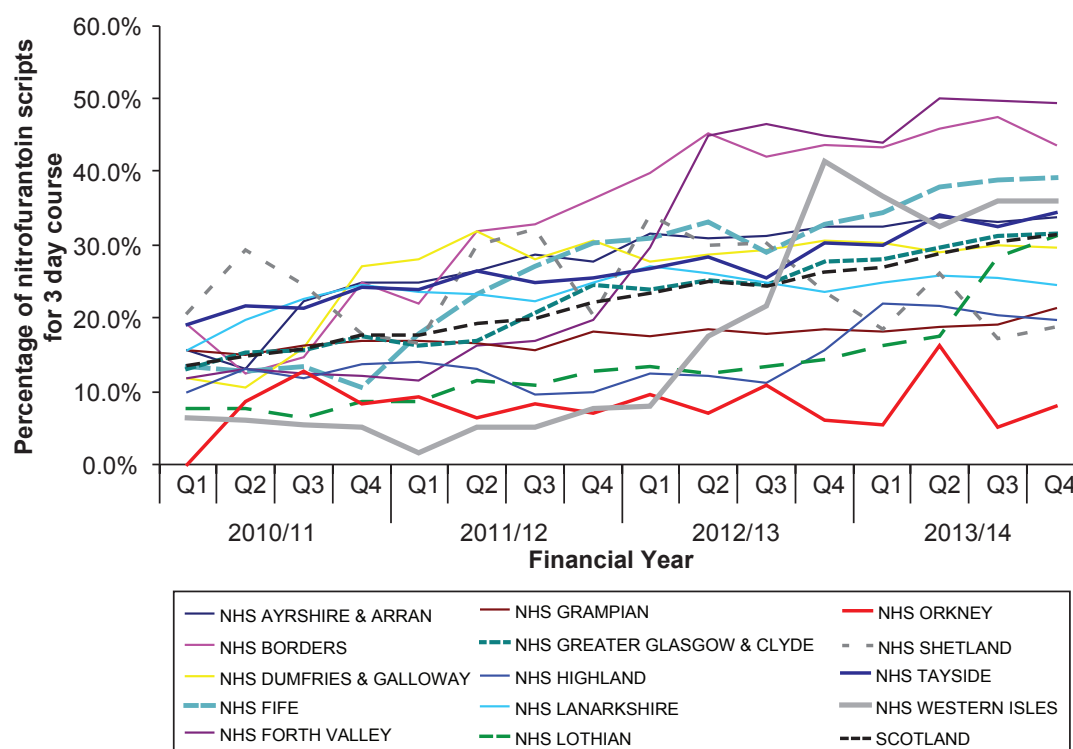
**Figure 9:** NHS Scotland use of 3 day trimethoprim in primary care by NHS board, proportion of all trimethoprim, 2010-11 Q1 – 2013-14 Q4. CHI capture rates for trimethoprim, Scotland 2010-11 - 2013-14 88% (NHS Board range 83% - 92%)



**Table 10:** NHS Scotland use of 3 day nitrofurantoin in primary care by NHS board, proportion of all nitrofurantoin, 2010-11 – 2013-14. CHI capture rates for Nitrofurantoin, Scotland 2010-11 - 2013-14 92% (NHS Board range 88% - 95%)

3 day nitrofurantoin as a % of all nitrofurantoin	2010/11	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	19.8%	27.1%	31.4%	33.2%
NHS BORDERS	18.1%	31.0%	42.8%	45.1%
NHS DUMFRIES & GALLOWAY	16.8%	29.8%	29.1%	29.7%
NHS FIFE	12.5%	24.6%	31.5%	37.6%
NHS FORTH VALLEY	12.4%	16.3%	42.5%	48.4%
NHS GRAMPIAN	16.0%	16.8%	18.1%	19.3%
NHS GREATER GLASGOW & CLYDE	15.4%	19.9%	25.4%	30.2%
NHS HIGHLAND	12.2%	11.6%	12.7%	21.1%
NHS LANARKSHIRE	21.2%	23.5%	25.4%	25.2%
NHS Lothian	7.7%	11.1%	13.5%	23.7%
NHS ORKNEY	8.5%	7.7%	8.2%	8.8%
NHS SHETLAND	23.4%	25.2%	29.6%	20.2%
NHS TAYSIDE	21.8%	25.3%	27.7%	32.7%
NHS WESTERN ISLES	5.7%	5.1%	21.0%	35.1%
<b>SCOTLAND</b>	<b>15.6%</b>	<b>20.0%</b>	<b>24.8%</b>	<b>29.3%</b>

**Figure 10:** NHS Scotland use of 3 day nitrofurantoin in primary care by NHS board, proportion of all nitrofurantoin, 2010-11 Q1 – 2013-14 Q4. CHI capture rates for Nitrofurantoin, Scotland 2010-11 - 2013-14 92% (NHS Board range 88% - 95%)





## Other Prescriber Types

### Nurse Prescribing

In 2006, changes in prescribing legislation were introduced which allowed appropriately qualified nurse prescribers to prescribe any licensed medicine for any medical condition which they are competent to treat.

There has been a steady increase in the number of antibacterials being prescribed by nurses in Scotland. In 2013-14, there were 177,130 antibacterial items, written by nurse prescribers, dispensed which accounted for 4.4% of all antibacterials dispensed.

There was wide variation in nurse prescribing as a proportion of all antibacterial prescribing across NHS boards which may reflect differences in the number of nurse prescribers and the configuration of service delivery within primary care. Most NHS boards saw an increase in nurse prescribing rates in 2013-14 compared with 2012-13 (table 11, figure 11).

### Dental Prescribing

Dental practitioners in Scotland can prescribe on NHS prescriptions from a limited set of medicines which include a range of 14 antibacterials.

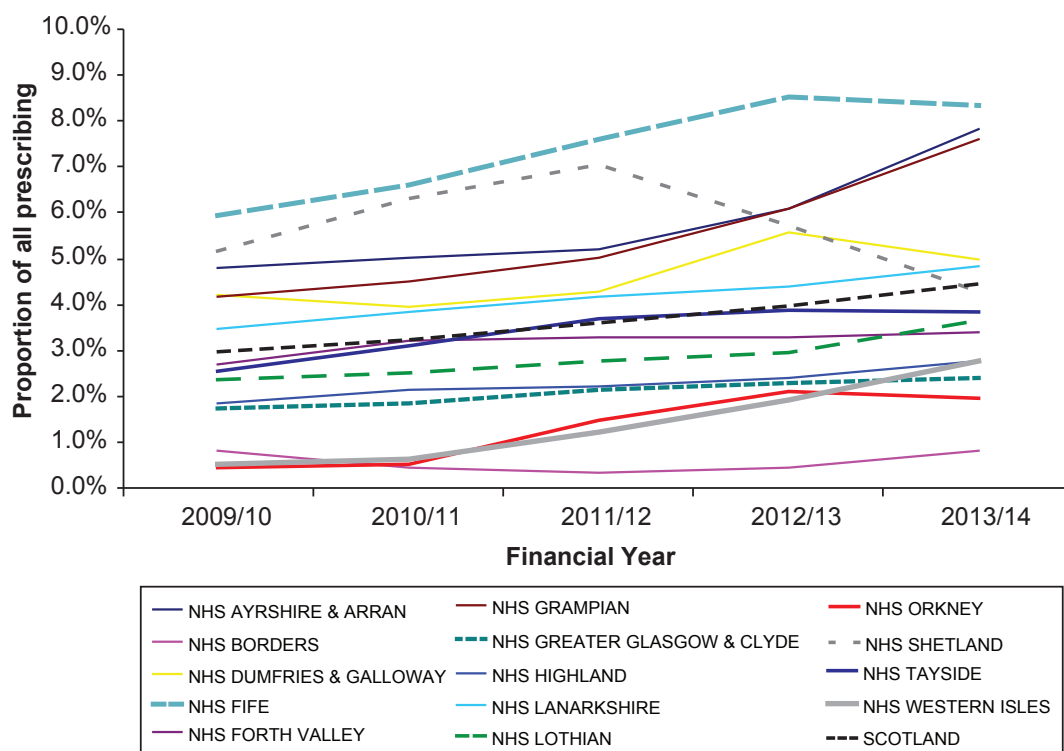
There had been a steady increase in the number of antibacterials being prescribed by dentists in Scotland up to 2012-13. However, in 2013-14, there were 388,919 items written by dentists dispensed in Scotland, a decrease of 5.5% on last year. Dental prescribing accounted for 8.9% of all antibacterials dispensed in Scotland in 2013-14, an increase of 0.1% from 2012-13.

There was wide variation in dental prescribing across NHS boards. The extent to which this reflects access to NHS dental services is unknown. There was an equal split between NHS boards observing an increase and those observing a decrease in dental prescribing as a proportion of all prescribing in 2013-14 (table 12, figure 12).

**Table 11:** Nurse prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14

Nurse antibacterial prescribing as % of all prescribing	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	4.8%	5.0%	5.2%	6.1%	7.8%
NHS Borders	0.8%	0.5%	0.3%	0.5%	0.8%
NHS Dumfries & Galloway	4.2%	4.0%	4.3%	5.6%	5.0%
NHS Fife	5.9%	6.6%	7.6%	8.5%	8.3%
NHS Forth Valley	2.7%	3.2%	3.3%	3.3%	3.4%
NHS Grampian	4.2%	4.5%	5.0%	6.1%	7.6%
NHS Greater Glasgow & Clyde	1.7%	1.9%	2.2%	2.3%	2.4%
NHS Highland	1.9%	2.1%	2.2%	2.4%	2.8%
NHS Lanarkshire	3.5%	3.8%	4.2%	4.4%	4.8%
NHS Lothian	2.4%	2.5%	2.8%	3.0%	3.6%
NHS Orkney	0.4%	0.5%	1.5%	2.1%	2.0%
NHS Shetland	5.2%	6.3%	7.1%	5.7%	4.3%
NHS Tayside	2.6%	3.1%	3.7%	3.9%	3.8%
NHS Western Isles	0.5%	0.6%	1.2%	1.9%	2.8%
<b>SCOTLAND</b>	<b>3.0%</b>	<b>3.2%</b>	<b>3.6%</b>	<b>4.0%</b>	<b>4.4%</b>

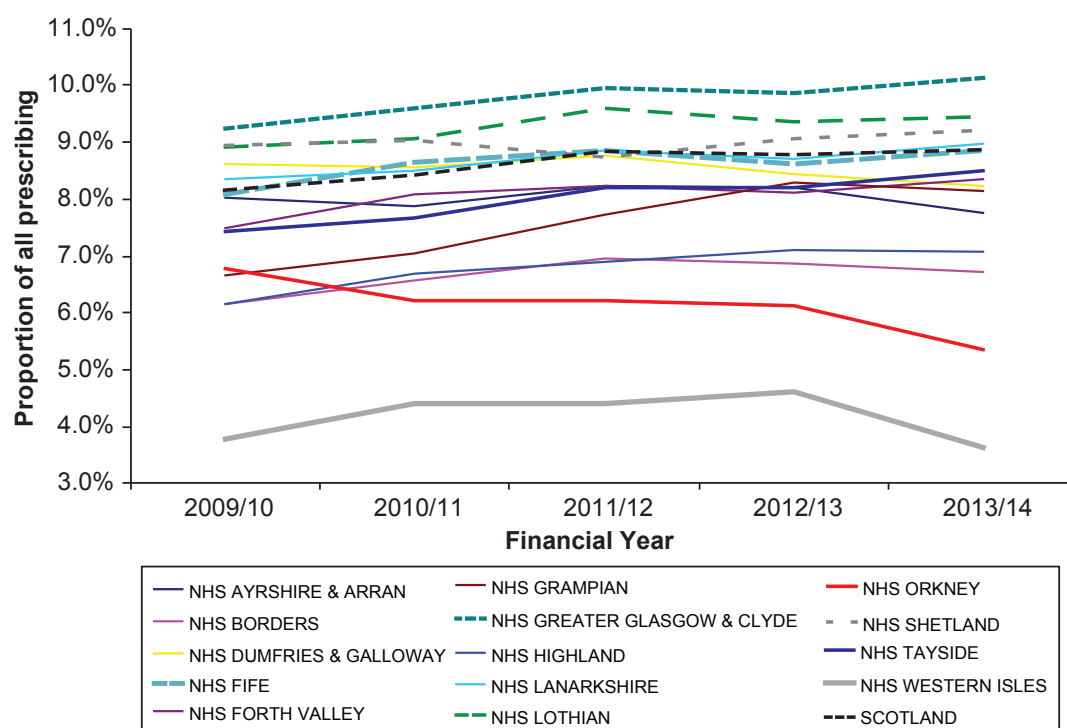
**Figure 11:** Nurse prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14



**Table 12:** Dental prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14

Dental antibacterial prescribing as a % of all prescribing	2009/10	2010/11	2011/12	2012/13	2013/14
NHS Ayrshire & Arran	8.0%	7.9%	8.2%	8.2%	7.8%
NHS Borders	6.2%	6.6%	6.9%	6.9%	6.7%
NHS Dumfries & Galloway	8.6%	8.5%	8.8%	8.4%	8.2%
NHS Fife	8.1%	8.7%	8.8%	8.6%	8.8%
NHS Forth Valley	7.5%	8.1%	8.2%	8.1%	8.4%
NHS Grampian	6.7%	7.0%	7.7%	8.3%	8.2%
NHS Greater Glasgow & Clyde	9.2%	9.6%	10.0%	9.9%	10.1%
NHS Highland	6.2%	6.7%	6.9%	7.1%	7.1%
NHS Lanarkshire	8.4%	8.5%	8.9%	8.7%	9.0%
NHS Lothian	8.9%	9.1%	9.6%	9.4%	9.4%
NHS Orkney	6.8%	6.2%	6.2%	6.1%	5.3%
NHS Shetland	8.9%	9.0%	8.7%	9.1%	9.2%
NHS Tayside	7.4%	7.7%	8.2%	8.2%	8.5%
NHS Western Isles	3.8%	4.4%	4.4%	4.6%	3.6%
<b>SCOTLAND</b>	<b>8.2%</b>	<b>8.4%</b>	<b>8.8%</b>	<b>8.8%</b>	<b>8.9%</b>

**Figure 12:** Dental prescribing of antibacterials in Scotland by NHS board, proportion of all prescribing, 2009-10 – 2013-14



## Frequency of use

The percentage of the population receiving at least one antibacterial item per year is a good indication of how likely patients are to receive an antibacterial prescription. In 2013-14, 29.6% of people in Scotland received at least one antibacterial item. This is a reduction of 1.9% from 2012-13. A reduction was observed in 13 NHS Health Boards with only NHS Orkney observing an increase (0.9%). There is wide variation between NHS Boards. NHS Lanarkshire had the highest percentage of the board population receiving an antibacterial at 34.6% while NHS Shetland had the lowest at 25.5% (table 13, figure 13).

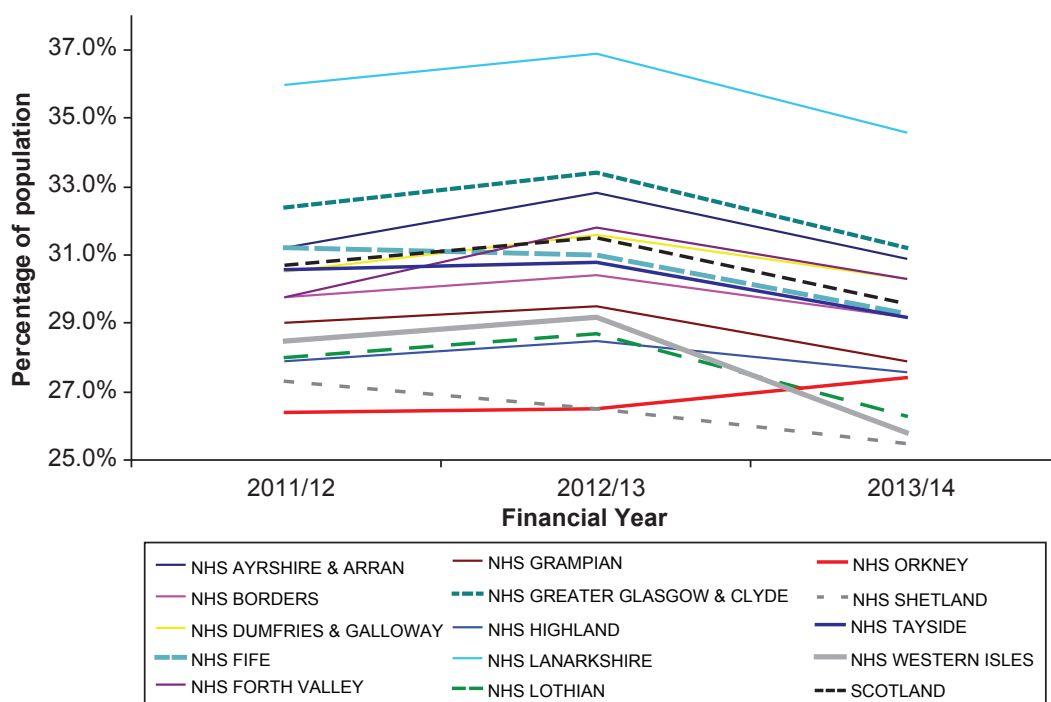
There are vulnerable age groups who are more likely to be prescribed an antibacterial. In 2013-14, 38.2% of 0-4 year olds received an antibacterial, 8.6% higher than for all age groups. In the 75+ age group, 46.4% received an antibacterial in 2013-14, 16.8% higher than all age groups (table 14).

There has been a 3.9% decrease in the percentage of 0-4 year olds receiving an antibacterial since 2012-13, while a 0.8% decrease was observed in the 75+ age group in the same period. Wide variation exists between NHS Boards. For the 0-4 years group NHS Lanarkshire had the highest percentage of the population receiving an antibacterial at 48.3% whereas NHS Western Isles had the lowest at 24.4%. For those in the 75+ age group, NHS Lanarkshire had the highest with 50.0% of the population and NHS Shetland the lowest at 39.5%. There was less variation between Boards in the older population (table 14).

**Table 13:** Percentage of population receiving any antibacterial by NHS board, 2011-12 – 2013-14. CHI capture rates for all antibacterials, Scotland 2011-12 – 2013-14 90.4% (NHS Board range 80.5% – 95.0%)

% of population receiving an antibacterial	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	31.2%	32.8%	30.9%
NHS BORDERS	29.8%	30.4%	29.2%
NHS DUMFRIES & GALLOWAY	30.5%	31.6%	30.3%
NHS FIFE	31.2%	31.0%	29.3%
NHS FORTH VALLEY	29.8%	31.8%	30.3%
NHS GRAMPIAN	29.0%	29.5%	27.9%
NHS GREATER GLASGOW & CLYDE	32.4%	33.4%	31.2%
NHS HIGHLAND	27.9%	28.5%	27.6%
NHS LANARKSHIRE	36.0%	36.9%	34.6%
NHS Lothian	28.0%	28.7%	26.3%
NHS ORKNEY	26.4%	26.5%	27.4%
NHS SHETLAND	27.3%	26.5%	25.5%
NHS TAYSIDE	30.6%	30.8%	29.2%
NHS WESTERN ISLES	28.5%	29.2%	25.8%
<b>SCOTLAND</b>	<b>30.7%</b>	<b>31.5%</b>	<b>29.6%</b>

**Figure 13:** Percentage of population receiving any antibacterial by NHS board, 2011-12 – 2013-14. CHI capture rates for all antibacterials, Scotland 2011-12 – 2013-14 90.4% (NHS Board range 80.5% – 95.0%)



**Table 14:** Vulnerable Age Groups, percentage of population receiving- any antibacterial by NHS board, 0-4 and 75+ years, 2011-12 – 2013-14. CHI capture rates for all antibacterials, Scotland 2011-12 – 2013-14 90.4% (NHS Board range 80.5% – 95.0%)

% of population receiving an antibacterial	0-4 years			75+ years		
	2011/12	2012/13	2013/14	2011/12	2012/13	2013/14
NHS AYRSHIRE & ARRAN	41.2%	43.4%	39.0%	45.0%	46.8%	46.5%
NHS BORDERS	37.8%	36.7%	34.6%	42.3%	42.9%	43.8%
NHS DUMFRIES & GALLOWAY	38.2%	38.8%	36.0%	44.8%	46.1%	44.9%
NHS FIFE	42.8%	40.2%	37.4%	44.1%	45.0%	45.1%
NHS FORTH VALLEY	37.0%	41.2%	37.1%	44.0%	46.4%	45.9%
NHS GRAMPIAN	39.4%	38.8%	35.0%	46.2%	47.3%	46.8%
NHS GREATER GLASGOW & CLYDE	46.8%	47.3%	42.6%	47.9%	49.4%	48.2%
NHS HIGHLAND	32.6%	32.6%	30.4%	42.6%	43.3%	44.0%
NHS LANARKSHIRE	51.5%	52.5%	48.3%	49.2%	51.0%	50.0%
NHS Lothian	37.6%	37.9%	33.6%	45.9%	47.2%	45.8%
NHS ORKNEY	28.0%	26.7%	27.7%	40.5%	41.6%	44.0%
NHS SHETLAND	37.3%	34.5%	33.7%	45.1%	42.0%	39.5%
NHS TAYSIDE	39.1%	38.2%	36.4%	45.8%	46.4%	45.3%
NHS WESTERN ISLES	29.0%	28.2%	24.4%	46.0%	47.2%	42.7%
<b>SCOTLAND</b>	<b>41.8%</b>	<b>42.1%</b>	<b>38.2%</b>	<b>45.9%</b>	<b>47.2%</b>	<b>46.4%</b>

# Appendix 1 – Data Sources and Presentation

---

## Data source and definitions

### Data sources

Data on use of systemic antibacterials comes from a database of all NHS prescriptions written by general practitioners, dentists, nurses and community pharmacists which are dispensed in the community in Scotland. The information is supplied to ISD by Practitioner and Counter Fraud Services (P&CFS) of NSS who are responsible for the processing and pricing of all prescriptions dispensed in Scotland. This database is known as Prescribing Information Scotland (PIS), a rich database which includes patient level information. PRISMS is a subset of PIS containing prescribing information from April 2004 but excludes patient level data.

### Items

The primary measure of antibacterial use in Scotland presented in this report is the number of items. This refers to the number of times an antibacterial appears on a prescription.

## Data presentation

### Items/1000 patients/day

This indicator presents use of antibacterials in NHS boards over a given period of time expressed as the number of times an antibacterial has been dispensed. The normal convention to allow comparison between areas with a different population is to present the number of items per 1000 patients per day. Where numbers are small, the number of items per 100,000 patients per day has been used. Unless otherwise stated, antibacterial use data excludes dental prescriptions.

### Proportional Use

This indicator presents use as a proportion of all prescribing e.g. four C antibacterials as a proportion of all antibacterials prescribed or nurse prescribing as a proportion of all prescribers.

### Seasonal variation of fluoroquinolone use

This indicator presents the difference in the use of fluoroquinolones in items in the winter (October to March) compared to the preceding summer (April to September). Publications in previous years have reported this measure in terms of defined daily doses (DDD), however, from the 2012-13 report this measure is reported in terms of number of items.

## National Therapeutic Indicators (NTI)

Recent increases in antibacterial use in primary care have led to the establishment of a new healthcare associated infection level three quality indicator intended to reduce the pressure for selection of antimicrobial resistance and other forms of ecological damage associated with antibacterial use.

The national quality indicator uses the methodology developed for National Therapeutic Indicators (NTI) developed by the Scottish Government. The quality indicator being introduced in 2013-14 is that antibiotic use, expressed in items/1000/day, in at least 50% of practices within each NHS board will be at or below the 25th percentile of Scottish practices or will have made an acceptable move towards that level.

## Urinary Tract Infections

Course duration was estimated based on dispensed quantity and BNF guidelines. For trimethoprim, a three day course was assumed if six (200mg) tablets were dispensed. For nitrofurantoin, a three day course was assumed if 12 (50mg) tablets were dispensed. All items assumed to be for prophylaxis were excluded from the analysis.

## Interpretation of data

The use of antibacterials should normally reflect prescribing policies, guidelines or formularies for each NHS board. When interpreting the graphs it is important to note that the y axis scales vary between graphs and care is needed in interpretation. On each trend graph a line has been included to show data at Scotland level.

## Community Health Index (CHI) numbers

Measures which involve the use of CHI numbers are presented from 2010/11 at the earliest as the CHI capture rates before this point are inconsistent. CHI capture rates may vary by NHS board or by prescription item, when interpreting results consideration should be given to the completeness of CHI and any confounding effect this may have. CHI rates are reported where appropriate.



## Appendix 2 – National Prescribing Indicators

List of all measures (available at NHS board, CHP and GP practice levels)	Data System	DDD/1000/day	Items/1000/day	DDD/Item	Proportion of total (Items)	Proportion of total (DDDs)	Proportion of population	Number of patients	Seasonal Variation (Items)	Seasonal Variation (DDDs)
Seasonal variation of fluoroquinolone use	PRISMS								x	x
Total antibacterial use	PRISMS	x	x	x	x	x			x	x
Recommended antibacterials -use	PRISMS	x	x		x	x				
Antibacterials associated with a higher risk of Clostridium difficile infection – total use	PRISMS	x	x		x	x				
Total penicillin use	PRISMS	x	x	x						
Amoxicillin use	PRISMS	x	x	x						
Flucloxacillin use	PRISMS	x	x	x						
Phenoxymethylpenicillin use	PRISMS	x	x	x						
Co-amoxiclav use	PRISMS	x	x	x						
Total tetracycline use	PRISMS	x	x	x						
Doxycycline use	PRISMS	x	x	x						
Total macrolide use	PRISMS	x	x	x						
Trimethoprim use	PRISMS	x	x	x						
Co-trimoxazole use	PRISMS	x	x	x						
Total fluoroquinolone use	PRISMS	x	x	x						
Ciprofloxacin use	PRISMS	x	x	x						
Nitrofurantoin use	PRISMS	x	x	x						
Clindamycin use	PRISMS	x	x	x						
Nurse prescribing	PRISMS	x	x		x	x				
Dental prescribing	PRISMS	x	x		x	x				
Frequency of use	PIS						x	x		
Urinary tract infections	PIS				x					
Prescribing by age	PIS	x	x				x	x		

