Secondary Care National Therapeutic Indicators 2018/19

NHS SCOTLAND

The Scottish Government
Riaghaltas na h-Alba

Foreword

The use of prescription data to improve the quality, safety and efficiency of prescribing is well established in NHS Scotland. National Therapeutic Indicators (NTIs) were first introduced in 2012 using the Prescription Information System (PRISMS), a record of all claimed dispensing by community pharmacies. These NTIs are associated with demonstrable success in patient safety and medicines management. The Hospital Medicines Utilisation Database (HMUD) is a national dataset of medicines supplied within Secondary Care. We are pleased to present this first set of Secondary Care NTIs.

These indicators use prescribing data to provide a measure of activity in specified therapeutic areas, and a comparison across hospitals and Boards in Scotland: they are made available to Boards and clinicians for use in quality improvement initiatives. They are consistent with a number of national strategic aims, including those of *Realistic Medicine* and the Scottish Antimicrobial Prescribing Group. The delivery of this data complements that already available for Primary Care, and provides Boards with further opportunities to improve in both sectors as well as facilitating work on the primary/secondary care interface.

These first indicators will be added to over the coming year, in collaboration with a range of groups and individuals, and in particular with the National Acute Pharmacy Services Group. We will aim to broaden the range of indicators available in secondary care. As use of these indicators becomes established, they will be incorporated into a truly national set of indicators which includes indicators for both primary and secondary care, and encourages the development of indicators that are relevant to all parts of the NHS in Scotland.

Funding has been provided to Boards to support the implementation of Hospital Electronic Prescribing and Medicines Administration (HEPMA). When fully implemented, HEPMA will greatly increase the richness of prescribing data in secondary care, giving a better and more precise understanding of medicines use in different disease states and the potential to be linked with patient outcomes. A considerable amount of work will be required to deliver this, but NHS National Services Scotland are already engaging with Boards using HEPMA and other stakeholders to explore how this can best be achieved.

Best Wishes

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Introduction

In April 2012 the first set of National Therapeutic Indicators (NTIs) were introduced, identifying areas of variation where there was an opportunity to improve the quality of prescribing in primary care. NTIs and Additional Prescribing Measures (APMs) use prescription dispensing information to provide a measure of prescribing activity in specified therapeutic areas, and a comparison across Boards and GP practices within the Boards.

This is the first attempt to publish secondary care indicators for Scotland. This use of secondary care medicines utilisation data to assess variation in the use of medicines between hospitals is a recent innovation; these indicators should be regarded as early developmental work.

With the increased robustness and reporting capabilities of the Hospital Medicines Utilisation Database (HMUD), there is an opportunity for use of this data in secondary care to support and drive improvements in the quality of prescribing in this sector. HMUD provides measures of medicines supply (cost, quantity and DDDs)[1] at a hospital level, and allows comparison between hospitals and Boards across Scotland.

Additionally, there is potential to combine information from primary and secondary care datasets, to create whole system reports that can be used to provide intelligence relating to both primary and secondary care. NHS staff can access utilisation data relevant to their position by applying via the user access system.

There are three broad methods in which current data may be used to assess secondary care medicines use:

- Secondary care data may be extracted from HMUD to provide a Board level comparison of medicines utilisation across Scotland.
- Primary care data may be used to determine if there is significant variation in the use of medicines that are strongly influenced by secondary care activity.
- Primary and secondary care utilisation data may be combined to report on the total use of medicines.

These early hospital indicators are based on work developed by the All Wales Medicines Strategy Group, which first published secondary care prescribing indicators for Wales in 2016. Ideas have also been incorporated from the Hospital Pharmacy and Medicines Optimisation Project in England. Previous NTIs and APMs, the interim report of Lord Carter of Coles, and the HMUD development project have also influenced this report.

[1] DDDs – defined daily doses have been developed by the WHO to account for the strength and quantity of each medicinal product supplied to allow direct comparison between organisations/countries (https://www.whocc.no/ddd)

The following indicators are recommended by the National Acute Pharmacy Services Group and the Therapeutics Branch:

1. **Biosimilars**
    A. Biosimilar infliximab as a proportion of total infliximab use
    B. Biosimilar etanercept 50mg as proportion of all etanercept 50mg use
    C. Biosimilar rituximab as a proportion of all rituximab use (excludes subcutaneous preparations)

2. **Antibiotics**
    A. Total antibiotic use (DDDs) per 1000 occupied bed days
    B. Carbapenem use (DDDs) per 1000 occupied bed days
    C. Piperacillin / and tazobactam use (DDDs) per 1000 occupied bed days

3. **Insulin**
    A. Long-acting insulin analogues expressed as a percentage of all long acting insulin prescribed

4. **Corticosteroids**
    A. Prednisolone 5mg plain tablets as a proportion of all prednisolone oral preparations

Biosimilars

Background and evidence

Biological medicines are medicines that are made by, or derived from, a biological source, such as a bacterium, yeast or blood. They can consist of relatively simple molecules, such as human insulin or erythropoietin, or complex molecules such as monoclonal antibodies.

A biosimilar medicine is a biological medicine that is similar to another biological medicine which has already been made available. The exact structure of biosimilar medicines will vary depending on the manufacturing process. This is true for modifications to the manufacturing process of originator products, as it is for the development of biosimilar medicines. As biosimilar medicines are not the same molecule as the originator product, the standard approach to licensing of a generic medicine, where the medicine must demonstrate bioequivalence (that is the amount of the generic medicine that enters the systemic circulation must not differ significantly when given at the same dosage under similar conditions), is not sufficient for biosimilar medicines. For licensing in the European Union, the manufacturer of the biosimilar medicine must demonstrate that the medicine is similar to the original reference product, and does not have any meaningful differences from the original reference product in terms of quality, safety or efficacy.[i]

The continuing development of biological medicines, including biosimilar medicines, creates increased choice for patients and clinicians, increased commercial competition and decreases the cost of treatment. Biological medicines account for a significant expenditure within the NHS (approximately £174 million was spent on biological agents in NHS Scotland in 2016/2017).[ii] A number of these medicines have lost or will lose their patent protection within the coming years.

The Scottish Medicines Consortium has stated that the managed introduction of biosimilar medicines into clinical practice in NHS Scotland is desirable.[iii] Two inhibitors of tumour necrosis factor alpha (infliximab and etanercept) are now available as biosimilar preparations, and a biosimilar of the anti-lymphocyte monoclonal antibody rituximab was introduced in the first half of 2017.

Cost and savings

The total spend across Scotland in the 2016/17 financial year was over £10 million for infliximab and over £14 million for etanercept. In January 2017, 84.5% of all infliximab was issued as a biosimilar product. By December 2017 this figure had increased to over 94%. In 2017, expenditure of £4.6 million was avoided by the use of biosimilar infliximab (figure 1).

In January 2017, 44% of all etanercept 50mg was issued as the biosimilar product. By December 2017, over 84% of etanercept 50mg used in Scotland were biosimilar preparations. In the 12 months to December 2017, a cost of £2.25 million was avoided by the use of biosimilar etanercept (figure 2).

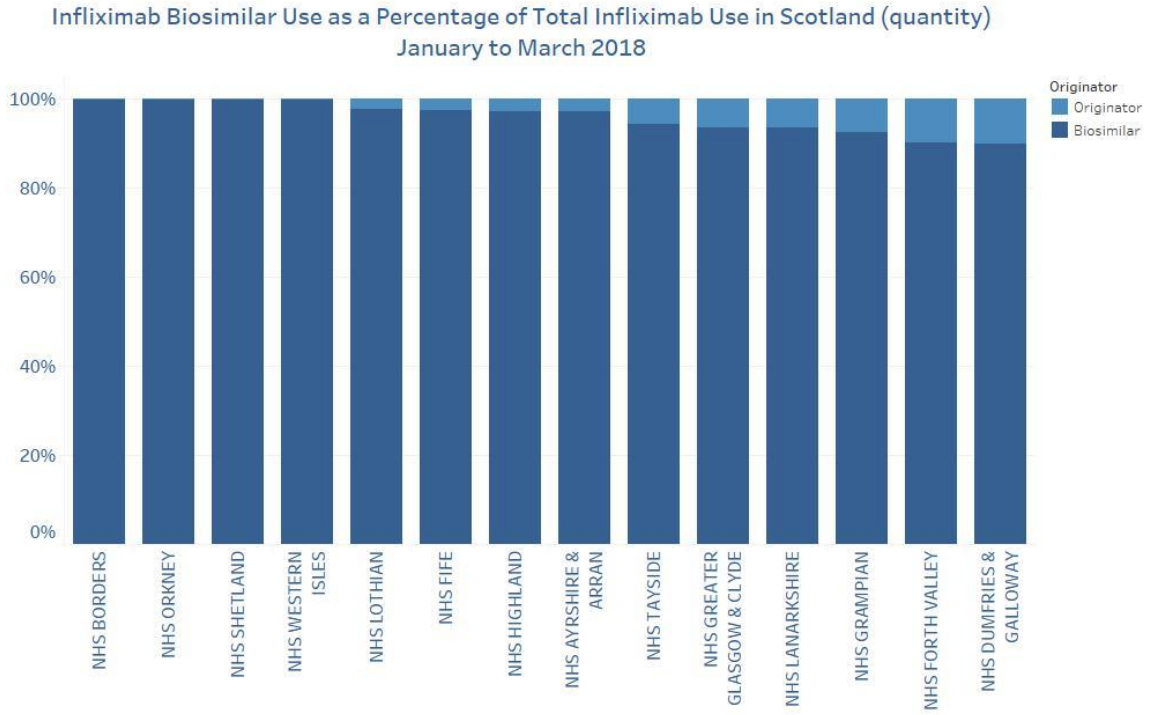
In March 2017 biosimilar rituximab became available to the NHS. Rituximab exists as intravenous and subcutaneous formulations, although due to a licence extension for the subcutaneous product, biosimilar rituximab is only currently available in the intravenous formulation. In the 2016/17 financial year almost £14 million was spent on rituximab in NHS Scotland, of which almost £11 million was on the intravenous preparation. The percentage of intravenous rituximab issued as biosimilar preparations has risen from 0.5% in April 2017 to 74% by December 2017. Over this period expenditure of over £0.8 million was avoided by the use of biosimilar rituximab (figure 3).

The use of biosimilar medicines in place of the reference biological medicine is associated with considerable cost savings. The appropriate use of biosimilars will drive greater competition and release cost efficiencies to support the treatment of an increasing number of patients and increase the uptake of new and innovative medicines.[2]

[2] As Boards are actively working to improve biosimilar use, the percentage of medicines supplied as biosimilars is rapidly changing. To address this, the biosimilar reports in this document use the most recent three months in HMUD (January to March 2018). Other reports in this document are for the calendar year 2017

Data - Infliximab

Figure 1: Infliximab



Quantity (number of vials) of 100mg infliximab mapped as biosimilar products (Inflectra® or Remsima®) as a percentage of the total number of infliximab 100mg vials. Infliximab is only available as one formulation (100mg vials). Data source: HMUD

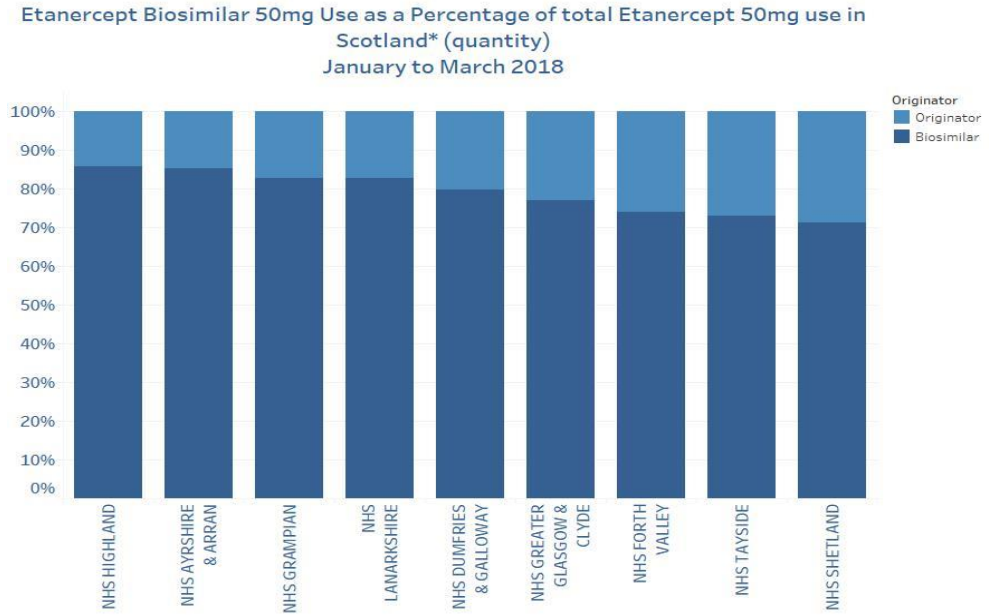
Table 1: Infliximab

Health Board Name	Quantity Originator	Biosimilar Quantity	Percentage issued as Biosimilar
NHS AYRSHIRE & ARRAN	14	492	97%
NHS BORDERS	0	113	100%
NHS DUMFRIES & GALLOWAY	33	297	90%
NHS FIFE	12	447	97%
NHS FORTH VALLEY	75	685	90%
NHS GRAMPIAN	81	993	92%
NHS GREATER GLASGOW & CLYDE	312	4608	94%
NHS HIGHLAND	33	1179	97%
NHS LANARKSHIRE	65	926	93%
NHS LOTHIAN	67	2941	98%
NHS ORKNEY	0	6	100%
NHS SHETLAND	0	46	100%
NHS TAYSIDE	56	924	94%
NHS WESTERN ISLES	0	8	100%
Scotland	**748**	**13663**	**95%**

Boards can view their own potential savings by viewing the HMUD Biosimilar Infliximab report

Data - Etanercept

Figure 2: Etanercept 50mg



Quantity (number of syringes or pens) of 50mg etanercept mapped as biosimilar product (Benepali®) as a percentage of the total quantity of etanercept issued. Data source: HMUD

*Some Boards do not capture homecare issues in their HMUD monthly data submissions. As etanercept is almost exclusively issued via homecare this report is unable to assess etanercept use in the following Boards: NHS Borders; NHS Lothian; NHS Western Isles; NHS Fife; NHS Orkney.

Table 2: Etanercept 50mg

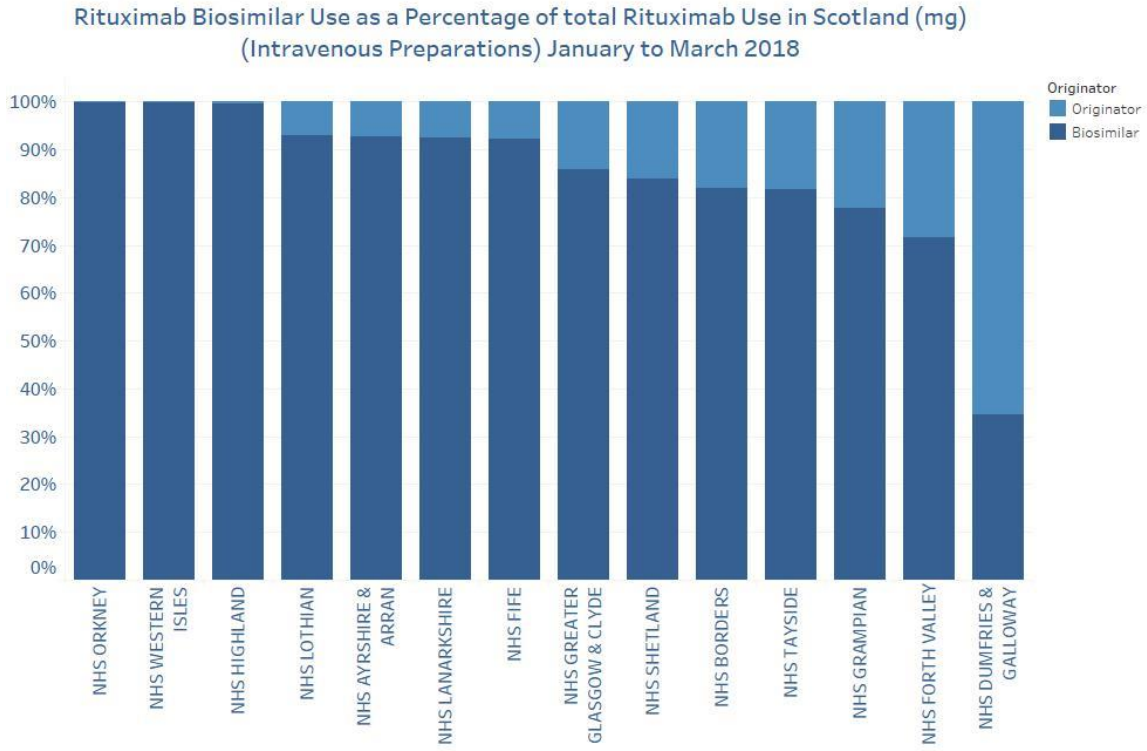
Health Board Name	Quantity Originator	Biosimilar Quantity	Percentage issued as Biosimilar
NHS AYRSHIRE & ARRAN	452	2597	85%
NHS BORDERS	no data	no data	no data
NHS DUMFRIES & GALLOWAY	188	740	80%
NHS FIFE	no data	no data	no data
NHS FORTH VALLEY	452	1288	74%
NHS GRAMPIAN	800	3861	83%
NHS GREATER GLASGOW & CLYDE	1858	6225	77%
NHS HIGHLAND	328	1980	86%
NHS LANARKSHIRE	816	3896	83%
NHS LOTHIAN	no data	no data	no data
NHS ORKNEY	no data	no data	no data
NHS SHETLAND	112	276	71%
NHS TAYSIDE	832	2248	73%
NHS WESTERN ISLES	no data	no data	no data
Scotland	**5838**	**23111**	**80%**

Boards can view their own potential savings by viewing the HMUD Biosimilar Etanercept report [3]

[3] HMUD users will need to be logged in to follow this link

Data - Rituximab

Figure 3: Intravenous Rituximab



Quantity (number of milligrams) of intravenous rituximab mapped as biosimilar product (Truxima®) as a percentage of the total quantity of intravenous rituximab. Data source: HMUD

Table 3: Intravenous Rituximab

Health Board Name	Quantity Originator	Quantity Biosimilar	Percentage issued as Biosimilar
NHS AYRSHIRE & ARRAN	6000	75400	93%
NHS BORDERS	9600	43900	82%
NHS DUMFRIES & GALLOWAY	39900	21000	34%
NHS FIFE	5500	64900	92%
NHS FORTH VALLEY	14200	35700	72%
NHS GRAMPIAN	59301	206000	78%
NHS GREATER GLASGOW & CLYDE	40900	249900	86%
NHS HIGHLAND	300	63700	100%
NHS LANARKSHIRE	11600	144400	93%
NHS LOTHIAN	12000	157600	93%
NHS ORKNEY	0	7900	100%
NHS SHETLAND	1200	6300	84%
NHS TAYSIDE	12500	55500	82%
NHS WESTERN ISLES	0	9000	100%
Scotland	**213001**	**1141200**	**84%**

Boards can view their own potential savings by viewing the HMUD Biosimilar Rituximab report [4]

[4] HMUD users will need to be logged in to follow this link

Antibiotics

After consultation with Scottish Government, the Scottish Antimicrobial Prescribing Group has agreed three national hospital antibiotic prescribing quality indicators. These indicators are intended to support reduction in unnecessary hospital antibiotic use (including very broad spectrum antibiotic use). The indicators and associated targets are for acute hospitals to achieve ≥1% reduction in total antibiotic use expressed as DDDs per 1,000 occupied bed days (OBDs) (figure 4) and ≥1% reductions in piperacillin-tazobactam (figure 5) and carbapenem (figure 6) use (DDDs/1,000 OBDs) from the baseline of January to December 2015.

Carbapenems and piperacillin-tazobactam are very broad spectrum antibiotics. These are given as injections or infusion and are only available in hospitals. They are reserved for the most unwell patients, or patients with infections that cannot be treated with any other antibiotics. The development of resistance to these agents is concerning as there are very few other antibiotics that are likely to be effective. It is hoped that by limiting the use of these very broad spectrum antibiotics the development of resistance may be slowed.

These antibiotics are included on the list of alert antimicrobials for Scotland. Antimicrobials on this list undergo special monitoring within hospitals, and are usually prescribed in consultation with a microbiologist or specialist in infectious diseases.

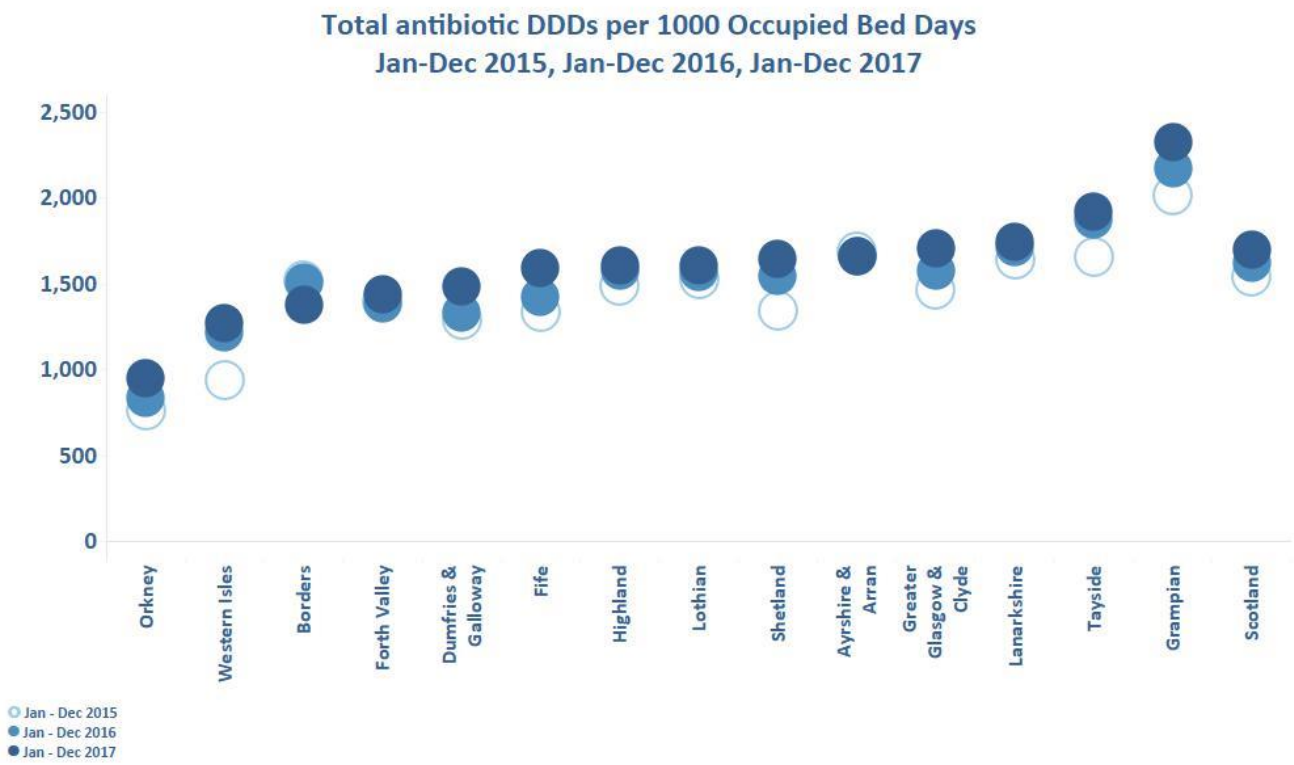
Many more patients receive antimicrobial therapy in primary care settings, under the care of their GP, than receive antimicrobials in hospital. Many patients requiring inpatient treatment do not respond to first line antibiotic treatment, or present with very severe infections requiring immediate and aggressive treatment with antibiotics. Consequently the antibiotics used in hospitals tend to be more expensive than those in primary care, particularly when intravenous treatment is needed. Although approximately 18% of all antibiotics (number of DDDs issued in 2017) are used in secondary care, this accounts for 44% of spending on antimicrobials. This does not take into account the additional costs in terms of staff and peripheral equipment required to administer intravenous therapy.

Reports have been set up to enable antimicrobial management teams to monitor antibiotic use against these targets. These indicators are designed so trends in antibiotic use within hospitals can be monitored and compared to use in 2015 and to their target.

During the course of 2017, there was a significant supply problem with piperacillin-tazobactam, resulting in notable restrictions placed on its use. This will have contributed to the reduction in DDDs seen in the most recent period.

Data - Total antibiotic use in acute hospitals

Figure 4: Total antibiotic use in acute hospitals



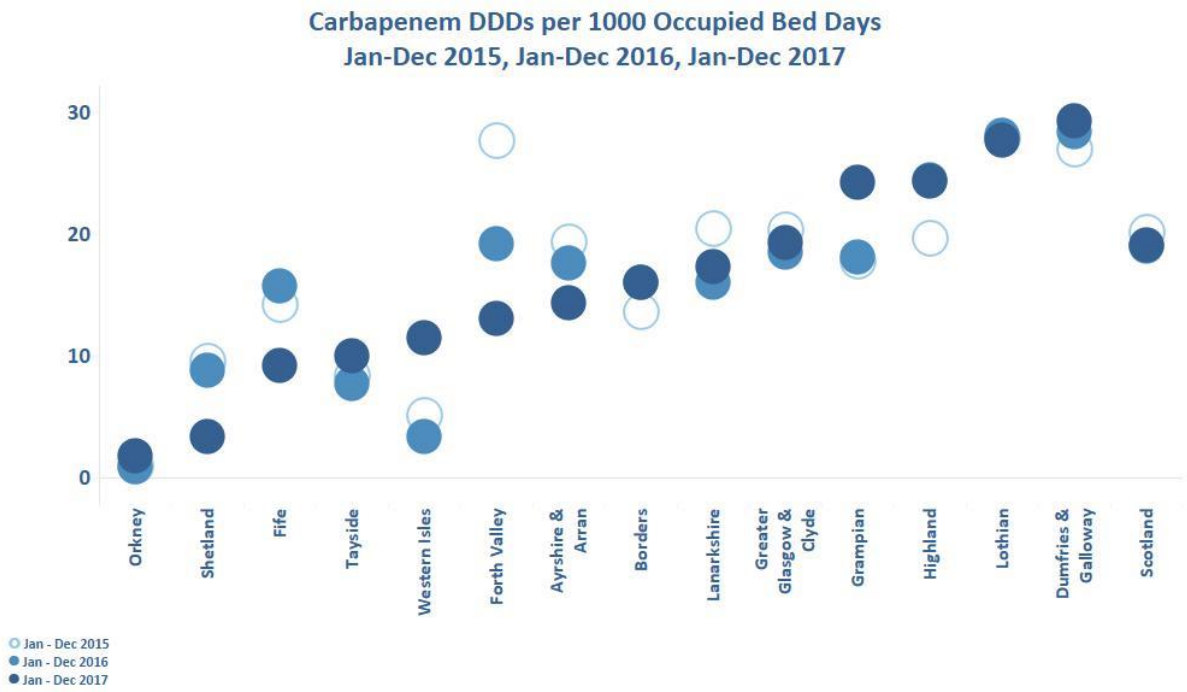
Number of DDDs issued from section 5.1 of the Legacy British National Formulary (BNF) (excluding sub-sections 5.1.9 and 5.1.10 but including streptomycin) per 1,000 occupied bed days. Source: SAPG Antimicrobial Use Dashboard

Table 4: Total antibiotic use in acute hospitals

Health board	DDDs per 1000 Occupied Bed Days			Percentage change in use:
	Jan- Dec 2015	Jan- Dec 2016	Jan- Dec 2017	2017 compared with 2015
NHS Ayrshire & Arran	1689	1660	1659	-1.76%
NHS Borders	1516	1504	1378	-9.10%
NHS Dumfries & Galloway	1287	1332	1486	15.40%
NHS Fife	1335	1422	1587	18.83%
NHS Forth Valley	1393	1381	1438	3.19%
NHS Grampian	2016	2173	2323	15.23%
NHS Greater Glasgow & Clyde	1462	1574	1706	16.70%
NHS Highland	1487	1571	1602	7.76%
NHS Lanarkshire	1640	1709	1746	6.48%
NHS Lothian	1522	1568	1602	5.25%
NHS Orkney	762	835	944	23.99%
NHS Shetland	1344	1541	1647	22.55%
NHS Tayside	1658	1877	1923	15.98%
NHS Western Isles	933	1215	1267	35.81%
Scotland	**1540**	**1618**	**1694**	**10.03%**

Data - Carbapenem

Figure 5: Carbapenem use in acute hospitals



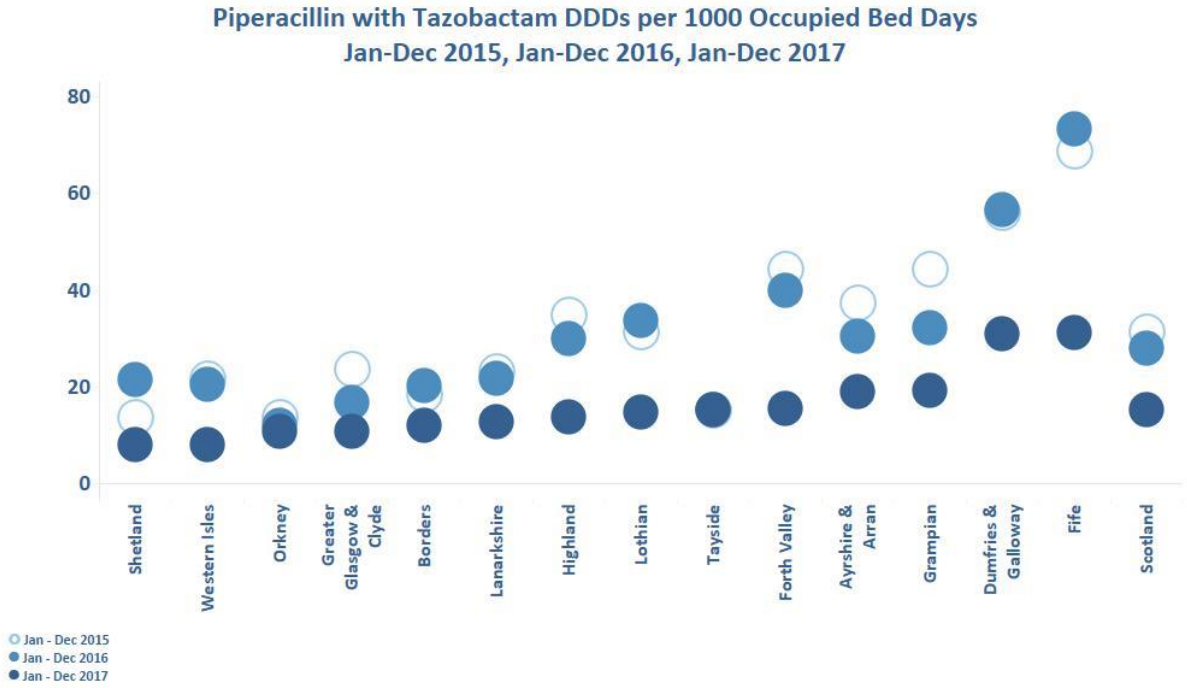
Number of DDDS issued where drug substance is: doripenem or ertapenem or imipenem + cilastatin or meropenem per 1,000 occupied bed days. Source: SAPG Antimicrobial Use Dashboard

Table 5: Carbapenem use in acute hospitals

Health board	DDDs per 1000 Occupied Bed Days			Percentage change in use:
	Jan- Dec 2015	Jan- Dec 2016	Jan- Dec 2017	2017 compared with 2015
NHS Ayrshire & Arran	19	18	14	-25.84%
NHS Borders	14	16	16	17.89%
NHS Dumfries & Galloway	27	29	29	8.61%
NHS Fife	14	16	9	-35.04%
NHS Forth Valley	28	19	13	-52.86%
NHS Grampian	18	18	24	36.95%
NHS Greater Glasgow & Clyde	20	19	19	-4.99%
NHS Highland	20	25	24	24.02%
NHS Lanarkshire	20	16	17	-15.08%
NHS Lothian	28	28	28	-0.24%
NHS Orkney	1	1	2	90.12%
NHS Shetland	10	9	3	-64.53%
NHS Tayside	8	8	10	19.39%
NHS Western Isles	5	3	12	126.67%
Scotland	**20**	**19**	**19**	**-4.88%**

Data - Piperacillin with Tazobactam

Figure 6: Piperacillin with Tazobactam use in acute hospitals



Number of DDDs issued where drug substance is: piperacillin + tazobactam per 1,000 occupied bed days.
Source: SAPG Antimicrobial Use Dashboard

Table 6: Piperacillin with tazobactam use in acute hospitals

Health board	DDDs per 1000 Occupied Bed Days			Percentage change in use:
	Jan- Dec 2015	Jan- Dec 2016	Jan- Dec 2017	2017 compared with 2015
NHS Ayrshire & Arran	37	30	19	-48.84%
NHS Borders	18	20	12	-34.94%
NHS Dumfries & Galloway	56	57	31	-44.76%
NHS Fife	69	73	31	-54.59%
NHS Forth Valley	44	40	15	-65.05%
NHS Grampian	44	32	19	-56.60%
NHS Greater Glasgow & Clyde	24	17	11	-54.59%
NHS Highland	35	30	14	-60.78%
NHS Lanarkshire	23	22	13	-45.04%
NHS Lothian	31	34	15	-53.15%
NHS Orkney	14	12	11	-21.89%
NHS Shetland	14	21	8	-42.35%
NHS Tayside	15	15	15	0.29%
NHS Western Isles	22	20	8	-63.04%
Scotland	**31**	**28**	**15**	-51.64%

Insulin

Background and evidence

The Scottish Intercollegiate Guidelines Network (SIGN) guidance on pharmacological management of glycaemic control in people with type 2 diabetes recommends that when oral agents no longer provide effective glucose control, injectable therapy can be introduced. Where the body mass index is less than 30 this should be with insulin. Human isophane insulin is recommended as the first choice regimen. Long-acting insulin analogues should not be considered unless the patient experiences recurrent episodes of hypoglycaemia or requires assistance with insulin injection.[iv] For most people with type 2 diabetes, long-acting insulin analogues offer no significant benefit over human isophane insulin, and are more expensive. The rates of symptomatic and nocturnal hypoglycaemia are lower for analogue insulins, but at an incremental cost per quality adjusted life year of around £300,000.[v]

SIGN recommends a long-acting insulin analogue as an option for basal insulin therapy for adults with type 1 diabetes mellitus.[vi] As prescribing data cannot reliably differentiate between long-acting insulin analogues prescribed for type 1 and type 2 diabetes, SCI Diabetes data has been use to prepare this indicator.

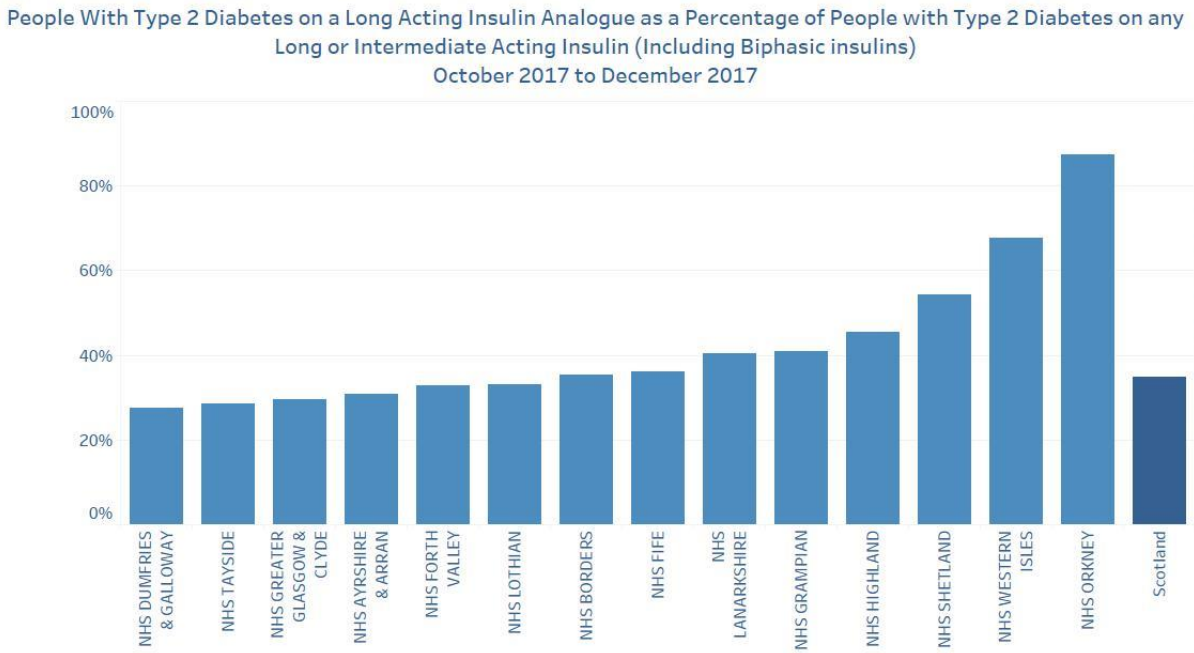
In 2017, over £21 million was spent on intermediate and long acting insulins in NHSScotland.[vii] Of this £11 million was spent on long acting insulin analogues. The majority of insulin prescribing is initiated by a specialist clinician within secondary care and therefore review of hospital prescribing practice will affect the primary care prescribing trend. Prescribing will usually continue in the primary care setting and it is therefore important to consider data for both primary and secondary care. Further guidance can be found in Quality Prescribing for Diabetes: A Guide for Improvement.

Cost and savings

Across Scotland 35% of people with type 2 diabetes who use either a long or intermediate acting insulin, use a long acting insulin analogue (figure 7). If this figure could be reduced so that just one in four (25%) of these people used a long acting insulin analogue, and replace their insulin treatment with the most commonly used isophane insulin, it is estimated that a cost of £580,000 per year could be avoided.

Data - Insulin

Figure 7: Insulin



Data for this indicator was obtained from the SCI diabetes database. SCI diabetes records the diagnosis for all patients, and this allowed analysis of just the population with type 2 diabetes. People with type 2 diabetes on a long or intermediate acting insulin were identified if they had received a prescription in the last year.

Table 7: Insulin

Health Board Name	Number of people with type 2 diabetes on ANY long or intermediate insulin (including biphasic insulins)	Number and (%) of people with type 2 diabetes on a long or intermediate acting ANALOGUE insulin
Ayrshire & Arran	2646	814 (31)
Borders	868	306 (35)
Dumfries & Galloway	1100	303 (28)
Fife	2596	936 (36)
Forth Valley	1654	541 (33)
Grampian	2902	1187 (41)
Greater Glasgow and Clyde	5937	1753 (30)
Highland	2164	984 (45)
Lanarkshire	3722	1504 (40)
Lothian	5105	1691 (33)
Orkney	176	154 (88)
Shetland	153	83 (54)
Tayside	3025	865 (29)
Western Isles	211	143 (68)
SCOTLAND	**32259**	**11264 (35)**

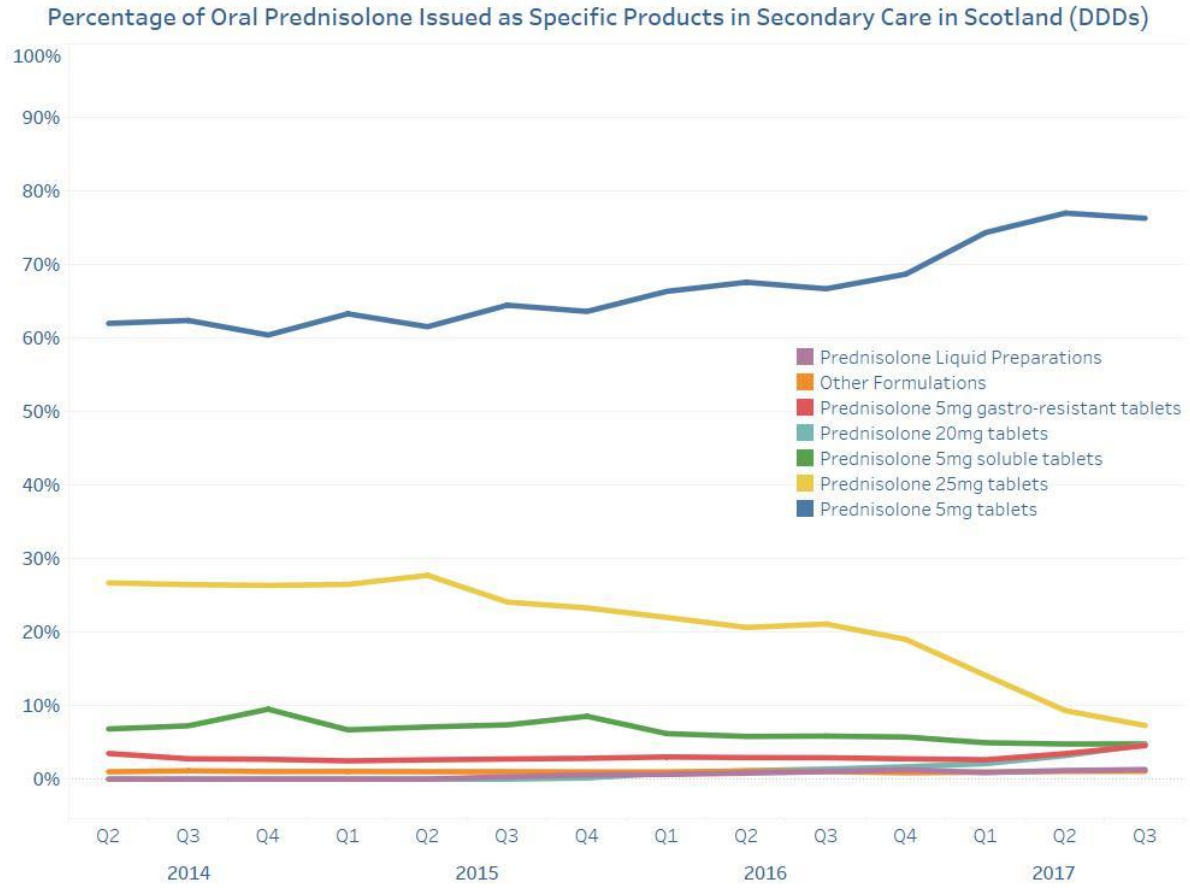
Prednisolone

Background and evidence

Prednisolone is a corticosteroid used to reduce inflammation in a wide range of conditions. In June 2015, the interim Review of Operational Productivity in NHS Providers highlighted that considerable savings could be made by reducing the use of costly soluble prednisolone preparations. Oral prednisolone is available as a number of different preparations. The most cost effective way to administer prednisolone is as 5mg plain tablets. Tablets of other strengths, soluble tablets and liquids are considerably more costly (approximately eighty times the price for an equivalent dose of some formulations).[viii]

A review of utilisation in Scotland indicated that additional saving could be achieved by examining all solid dose prednisolone preparations issued. Since 2015 the proportion of solid oral prednisolone issued as 5 mg plain tablets has increased from 64% to 78% (figure 8).[ix] In 2017, this has avoided over £160,000 in expenditure by reductions in the use of more costly 25mg tablets and 5mg soluble tablets. However this saving opportunity has been offset by the introduction of new preparations, mainly 20mg tablets and prednisolone liquids. The net saving in the year to December 2017 is a little over £88,000.

Figure 8: Change in use of oral prednisolone



Number of DDDs issued as each preparation as a percentage of the total number of DDDs issued for all oral prednisolone preparations. Data source: HMUD

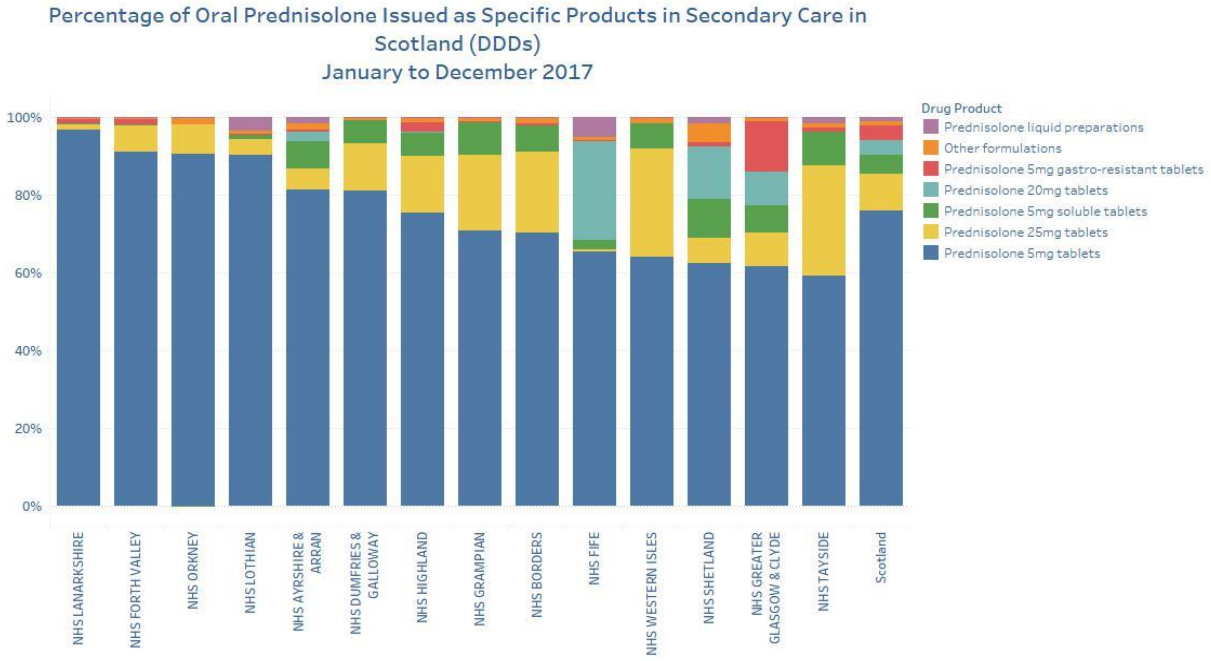
Despite this improvement, there remains a difference in the use of 5mg plain prednisolone tablets between Boards (figure 9). The best performing Boards have further reduced their use of more costly prednisolone preparations.

Cost and savings

It is estimated that if all Boards reduced their use of more costly prednisolone preparations to that of the lower quartile of Boards additional annual savings of approximately £360,000 could be achieved. This would largely be due to reductions in the use of soluble prednisolone tablets.

Data - Prednisolone

Figure 9: Prednisolone



Number of DDDs issued of each preparation as a percentage of the total number of DDDs issued of all oral prednisolone preparations, by Health Board. Data source: HMUD

Table 8: Prednisolone

Health Board Name	Liquid Preparations	Other Formulations	Prednisolone 20mg tablets	Prednisolone 25mg tablets	Prednisolone 5mg gastro-resistant tablets	Prednisolone 5mg soluble tablets	Prednisolone 5mg tablets
NHS AYRSHIRE & ARRAN	2%	2%	2%	5%	1%	7%	81%
NHS BORDERS	0%	2%	0%	21%	0%	7%	70%
NHS DUMFRIES & GALLOWAY	0%	1%	0%	12%	0%	6%	81%
NHS FIFE	5%	1%	25%	0%	0%	3%	65%
NHS FORTH VALLEY	0%	1%	0%	7%	1%	0%	91%
NHS GRAMPIAN	0%	1%	0%	19%	0%	8%	71%
NHS GREATER GLASGOW & CLYDE	0%	1%	9%	9%	13%	7%	62%
NHS HIGHLAND	0%	1%	0%	14%	2%	6%	75%
NHS LANARKSHIRE	0%	1%	0%	1%	1%	0%	97%
NHS LOTHIAN	4%	1%	0%	4%	0%	1%	90%
NHS ORKNEY	0%	2%	0%	8%	0%	0%	90%
NHS SHETLAND	2%	5%	14%	6%	1%	10%	62%
NHS TAYSIDE	2%	1%	0%	28%	1%	9%	59%
NHS WESTERN ISLES	0%	2%	0%	28%	0%	7%	64%
Scotland	**1%**	**1%**	**4%**	**9%**	**4%**	**5%**	**76%**

Boards can view their own potential savings by viewing the HMUD Prednisolone Predicted Savings report [5]

[5] HMUD users will need to be logged in to follow this link

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