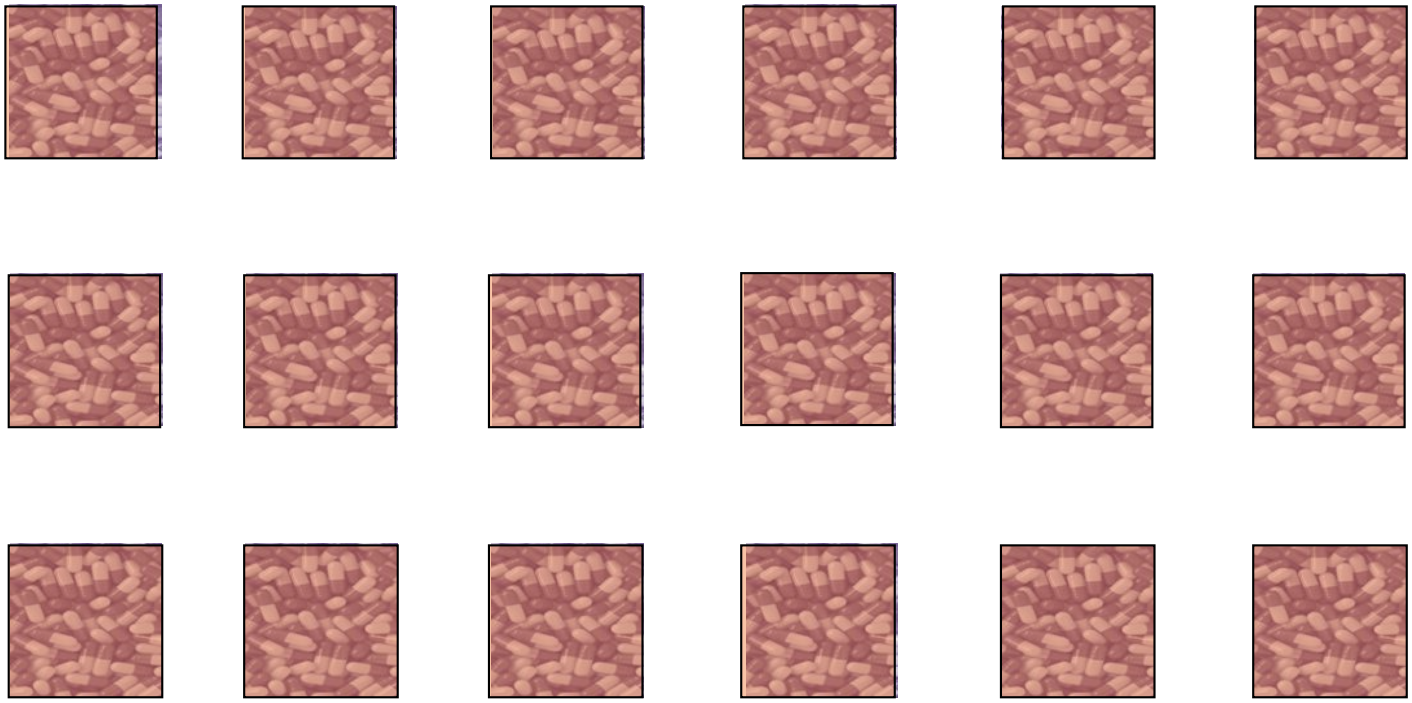
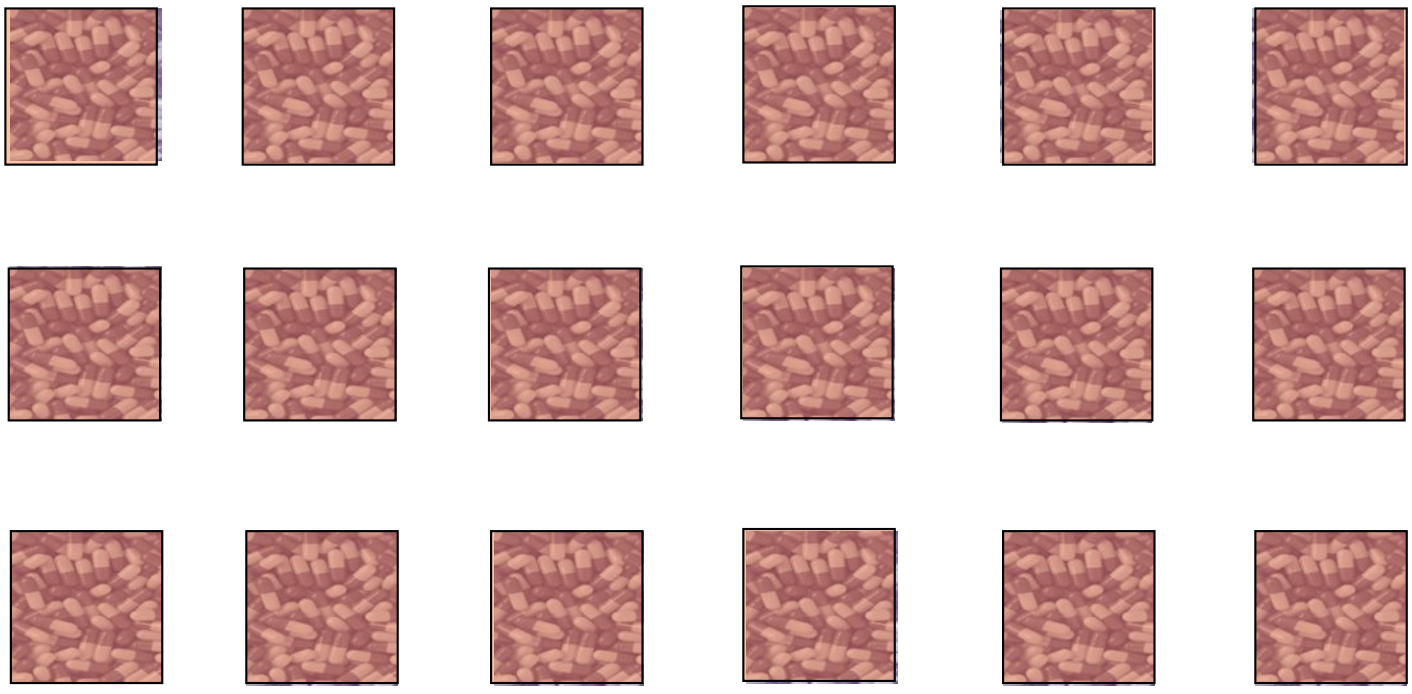
# Secondary Care National Therapeutic Indicators 2019/20





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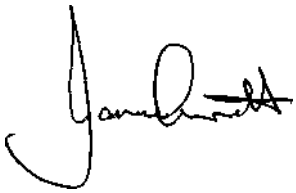
# Foreword

This is the second year in which National Therapeutic Indicators have been published for secondary care in Scotland. Over the last year, five indicators have been retired as it was felt that the performance against these indicators has consistently improved across Scotland. It is clear that these indicators sit against a background of quality improvement work across NHS Scotland and that the success of these measures is due to existing quality and efficiency structures. For example, the Effective Prescribing Programme Biologics Subgroup, Health Improvement Scotland, National Procurement, the Directors of Pharmacy Group and the National Acute Pharmacy Services Group have all worked collaboratively to ensure the timely introduction of biosimilar medicines into NHS Scotland. Of the biological medicines included in last year's report (infliximab, etanercept and rituximab) over 90% of issues are currently of the biosimilar preparations.

In future years, these indicators are likely to be available as a continuously updated dashboard, available on the Public Health Scotland website.[i] This dashboard will complement the National Therapeutic Indicators for primary care and all indicators will be accessible from a single place. An annual snapshot as provided by this report is unlikely to be repeated.

These indicators measure activity in specified therapeutic areas, and provide a comparison across hospitals and NHS Boards in Scotland. The intention is that this information is made available to NHS Boards to be used in quality improvement initiatives. As outlined in Realistic Medicine, patients can expect shared decision making between health professionals and patients, and a personalised approach to care, resulting in reducing harmful and wasteful care. In addition, collaborative work between health professionals will avoid duplication to provide a joined up care package that better meets a patient's needs and wishes. Making this information available will support the ethos of Realistic Medicine.

Best Wishes



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[i] https://www.isdscotland.org/Health-Topics/Prescribing-and-Medicines/Publications/2019-10-15/visualisation.asp

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# Introduction

The development of the Hospital Medicines Utilisation Database (HMUD) has made it possible to compare the use of medicines between hospitals and NHS Boards. HMUD provides aggregated measures of medicines supply (cost, quantity and Defined Daily Doses (DDDs)[ii]) at a hospital or NHS Board level. For medicines that are used more exclusively within hospitals, such as intravenous fluids, or where we are interested in use specifically within the hospital environment, such as antibiotics, then HMUD data is an invaluable tool for identifying variation in the use of medicines and making comparisons between Boards.

It is also recognised that prescribing behaviour in secondary care influences prescribing in primary care and in a number of therapeutic areas, the decision to initiate treatment or the choice of therapy rests almost exclusively with secondary care. Such treatments may continue to be mostly supplied through secondary care, for example depot antipsychotic injections, or the ongoing prescribing may be transferred almost entirely to primary care, for example insulins. In such cases primary and secondary care utilisation data can be combined to report on the total use across the health system. In the case of insulins, as almost all prescribing takes place in primary care, only primary care data is used to populate this report, but it is reasonable to assume much of this prescribing is initiated and adjusted by secondary care.

Hospitals and NHS Boards vary in size and so medicines use needs to be standardised to enable meaningful comparison. The data presented in this report is standardised in one of two ways:

- For medicines that are administered in hospitals and where we are interested in total use, then use is standardised per 1,000 occupied bed days, for example antibiotics.
- For medicines where we are interested in use relative to other, alternative treatments then use is reported as a percentage relative to all relevant treatments. This is the more widely used measure in this report. This type of analysis provides a comparison of the preference to use a particular medicine over and above other options but does not provide any indication of the amount of medicine used.

Population based rates of use are often utilised to allow comparisons but we have avoided these for the indicators in this report. Hospitals often do not serve a well defined geographic population. This is particularly so in larger NHS Boards where several hospitals

[ii] DDDs – defined daily doses are the assumed average maintenance dose per day for a drug used for its main indication in adults and have been developed by the WHO and enable aggregation of medicines consumption data across different drugs and populations. Drug utilization data presented in DDDs provide a useful estimate of consumption but are not an exact picture of actual use. DDDs provide a fixed unit of measurement independent of price, currencies, package size and strength enabling the analysis of trends in drug utilization and comparisons between population groups. (https://www.whocc.no/ddd)

may provide the same service or where hospitals may serve as tertiary referral centres for the populations from neighbouring Boards.

This report is published as an annual snapshot of activity against these indicators. These reports are available within HMUD and can be refreshed with new data each month or quarter. NHS staff can apply for HMUD access through the user access system.

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

1. **Biosimilars**
   - **A.** Biosimilar trastuzumab (quantity (vials)) as a proportion of total trastuzumab use (excludes subcutaneous preparations)
   - **B.** Biosimilar adalimumab (quantity (syringes)) as a proportion of all adalimumab use

2. **Antibiotics**
   - A. Total antibiotic use (DDDs) per 1,000 occupied bed days
   - B. Percentage of antibiotics (DDDs) issued as World Health Organisation (WHO) access list medicines

3. **Insulin**
   - A. The number of people with type 2 diabetes who use long-acting insulin analogues expressed as a percentage of the number of people with type 2 diabetes prescribed any long or intermediate acting insulin

4. **Mental Health**
   - A. Second generation depot antipsychotics (DDDs) issued as a percentage of all depot antipsychotics injections

5. **Safe use of intravenous fluid**
   - A. Large volume infusions (500mL or 1,000mL) issued as 0.9% sodium chloride (number of litres) (with or without electrolytes) as a percentage of the total volume of crystalloid fluid issued
   - B. Large volume infusions (500mL or 1,000mL) which contain supplemental potassium chloride (number of litres) as a percentage of the total volume of crystalloid fluid issued

# 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 is not sufficient for biosimilar medicines. 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.[1] In Scotland, all new medicines are routinely assessed for clinical and cost-effectiveness by the Scottish Medicines Consortium (SMC) followed by local consideration by Area Drugs and Therapeutic Committees (ADTCs). It is SMC policy that biosimilar medicines are 'out of remit' where the reference product has been accepted by SMC for the same indication(s) and in the same population.[2]

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 are a significant and growing cost within the NHS. Approximately £230 million was spent on biological agents in NHS Scotland in 2018, an increase of 15% compared with the previous 12 months.[3]

In the first edition of Secondary Care Therapeutic Indicators for Scotland three recently available biosimilar indicators were included; infliximab, etanercept and rituximab. After an initial lag, biosimilar use of these medicines was quickly adopted across Scotland. Since June 2018 the percentage of all three agents issued as biosimilar preparations has exceeded 90%. As biosimilars of these products are now extensively utilised in Scotland, these are no longer included in this national set of indicators. Boards can continue to assess their own utilisation of these medicines using the Hospital Medicines Utilisation Database (HMUD) standard reports. HMUD users can access these reports here.[iii]

[iii] https://www.bo.scot.nhs.uk/BOE/BI?startFolder=AcHY5_CwegNFsIkIkEIf08o&isCat=false

## Cost and savings

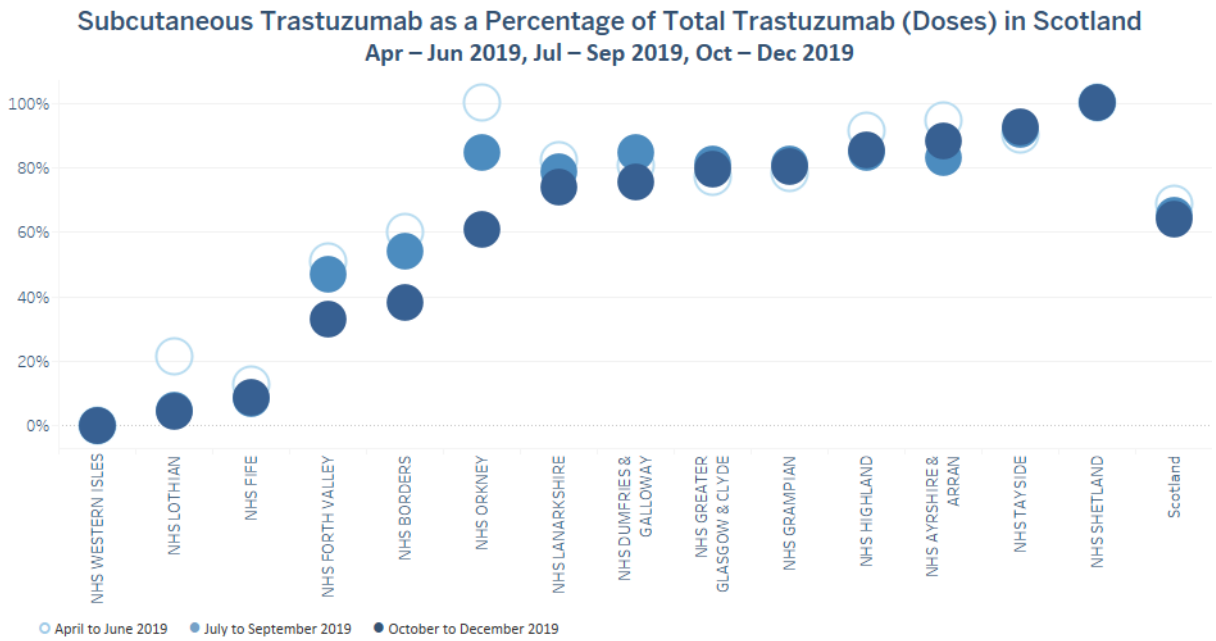
Biosimilars of two new medicines were launched in 2018; trastuzumab and adalimumab.

The total spend across Scotland in 2018 was over £15 million for trastuzumab and over £43 million for adalimumab.

## 1a: Trastuzumab

Trastuzumab is available as intravenous and subcutaneous formulations, although due to a formulation patent for the subcutaneous product, biosimilar trastuzumab is only currently available in the intravenous formulation. In 2018 just under £2 million was spent on the intravenous preparation. National Procurement anticipate that expenditure of between £600,000 and £900,000 per year could be avoided by switching the current use of intravenous trastuzumab to a biosimilar product despite the majority of patients in Scotland being treated with the subcutaneous preparation. In 2018, £13.5 million was spent on the branded subcutaneous product. Much greater savings could be achieved if patients were switched from subcutaneous trastuzumab to biosimilar intravenous trastuzumab.

Figure 1: Subcutaneous Trastuzumab

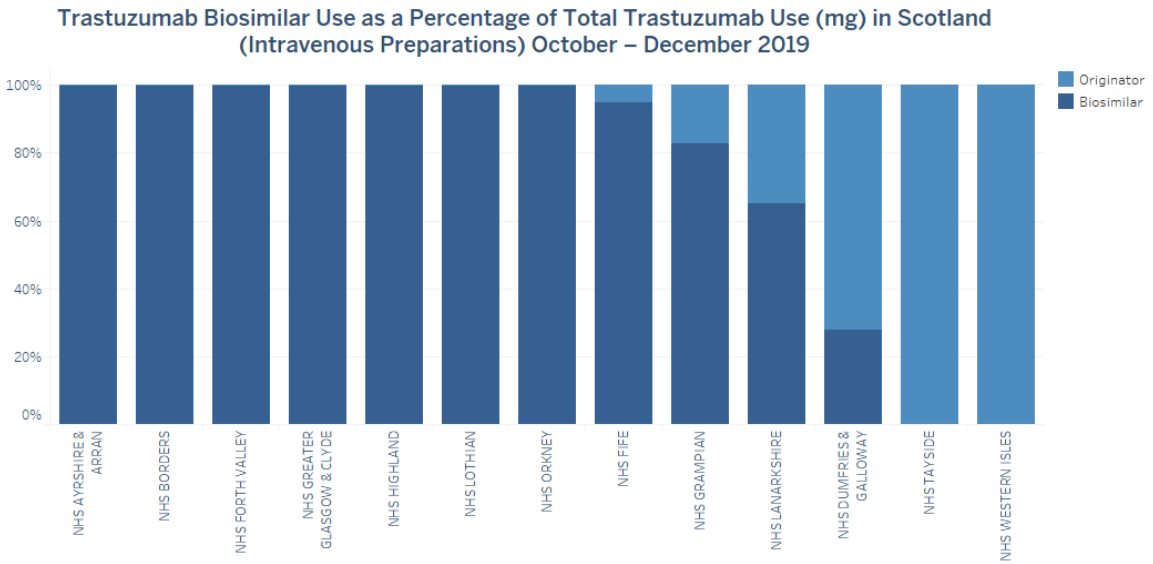



Such savings would need to be offset against the cost of bringing patients into healthcare settings for the administration of an intravenous infusion. Patients receiving subcutaneous trastuzumab usually attend the clinic for their treatment, but would need a much greater chair time if receiving an intravenous infusion. Service implications for Boards would need to be investigated and would require significant planning. Some Boards have begun to move more patients to intravenous trastuzumab as demonstrated by Figure 1.

An estimate of potential savings can be found in the economic evaluation and budget impact estimate for the introduction of biosimilar trastuzumab that was circulated to Boards by Heath Improvement Scotland in January 2018.[4]

Data 1a:

Figure 2: Biosimilar trastuzumab




Data source: HMUD

NHS Shetland used no intravenous trastuzumab in this period

HMUD users may view this data in more detail here.[iv]

[iv] https://www.bo.scot.nhs.uk/BOE/OpenDocument/opendoc/openDocument.jsp?sIDType=CUID&iDocID=AcdoZAKFIcJBuFyEjYjAL2A

Table 1: Biosimilar trastuzumab

| Trastuzumab Biosimilar Uptake (Intravenous Preparations) - October to December 2019 | | | |
|---|---|---|---|
| **NHS Board** | **Biosimilar Quantity (mg)** | **Originator Quantity (mg)** | **Biosimilar as % of Total IV Trastuzumab Use (mg)** |
| NHS AYRSHIRE & ARRAN | 11,850 | 0 | 100% |
| NHS BORDERS | 14,808 | 0 | 100% |
| NHS DUMFRIES & GALLOWAY | 4200 | 10,950 | 28% |
| NHS FIFE | 82,120 | 4,578 | 95% |
| NHS FORTH VALLEY | 55,752 | 0 | 100% |
| NHS GRAMPIAN | 31,416 | 6,615 | 83% |
| NHS GREATER GLASGOW & CLYDE | 97,233 | 0 | 100% |
| NHS HIGHLAND | 17,700 | 0 | 100% |
| NHS LANARKSHIRE | 24,600 | 13,200 | 65% |
| NHS LOTHIAN | 208,302 | 0 | 100% |
| NHS ORKNEY | 4389 | 0 | 100% |
| NHS SHETLAND | 0 | 0 | 0% |
| NHS TAYSIDE | 0 | 10,200 | 0% |
| NHS WESTERN ISLES | 0 | 1,800 | 0% |
| **Scotland** | **552,370** | **47,343** | **92%** |

## 1b: Adalimumab

In 2018 over £43 million was spent on adalimumab in NHS Scotland. A contract for biosimilar adalimumab came into effect on 1 December 2018. National Procurement anticipate that approximately £8 million per year could be avoided by the use of biosimilar adalimumab. It is expected that the majority of adalimumab will be issued as biosimilar products.

Adalimumab is predominantly issued via homecare providers. As NHS Borders and NHS Western Isles do not capture homecare issues in their HMUD monthly data submissions these boards have been excluded from this report.

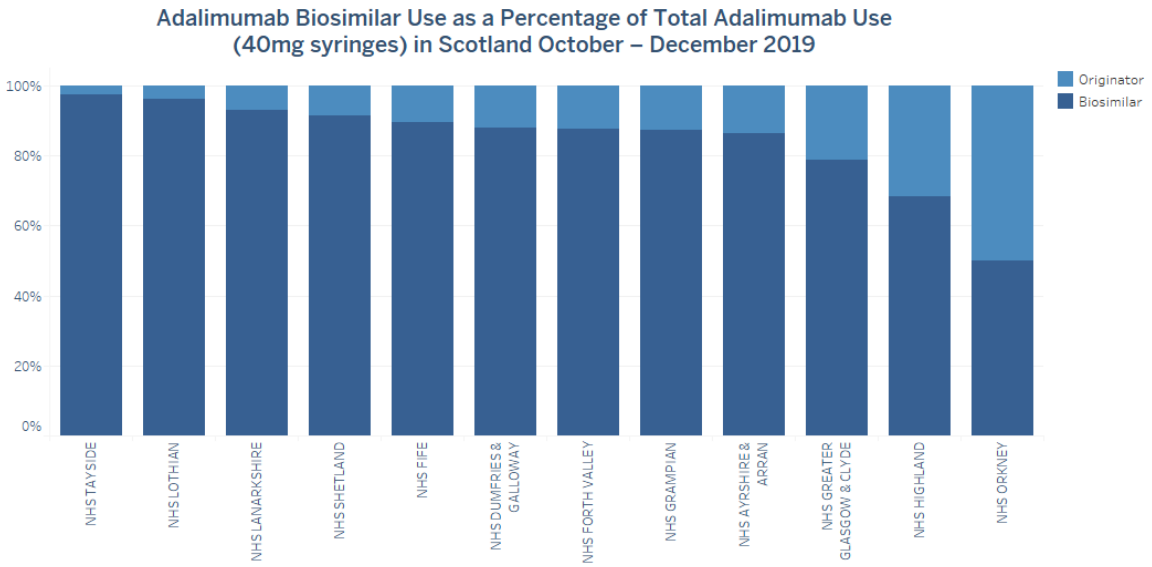
Boards are routinely supplied with data from National Procurement and Boards should refer to this when assessing adalimumab use. HMUD users in Boards which include homecare issues in their HMUD data submissions (all Boards except NHS Borders and Western Isles) should be able to view this information from January 2020. It should be noted that if Boards are comparing data in the National Procurement report against their own internal systems and/or HMUD there may be differences due to the differing data sources.

This report is based on the referring Health Board (that is, where the patient lives). Although some Boards may manage homecare medicines on behalf of other Boards, medicines utilisation is attributed to the Board where the patient resides.

The data below provides uptake information based on the 40mg presentation only. There is only one biosimilar brand available for the 20mg presentation (Amgevita®); as the sales data is less than 500 packs per annum this has not been included in this report. No biosimilars are available for the 80mg preparation; annual use is currently less than 50 packs and this is also not included in this report.

## Data 1b: Adalimumab

Figure 3: Biosimilar adalimumab




Data source: HMUD

Table 2: Biosimilar adalimumab

| Adalimumab Biosimilar Uptake October to December 2019 | | | |
|---|---|---|---|
| **NHS Board** | **Biosimilar quantity (syringes)** | **Originator quantity (syringes)** | **Percentage Biosimilar** |
| NHS AYRSHIRE & ARRAN | 2,006 | 316 | 86% |
| NHS DUMFRIES & GALLOWAY | 1036 | 141 | 88% |
| NHS FIFE | 2280 | 266 | 90% |
| NHS FORTH VALLEY | 1944 | 274 | 88% |
| NHS GRAMPIAN | 4698 | 692 | 87% |
| NHS GREATER GLASGOW & CLYDE | 8,662 | 2,350 | 79% |
| NHS HIGHLAND | 2,124 | 990 | 68% |
| NHS LANARKSHIRE | 5344 | 406 | 93% |
| NHS LOTHIAN | 6,881 | 283 | 96% |
| NHS ORKNEY | 8 | 8 | 50% |
| NHS SHETLAND | 86 | 8 | 91% |
| NHS TAYSIDE | 3644 | 96 | 97% |
| **Scotland** | **38,713** | **5830** | **87%** |

## Antibiotics

The Scottish Antimicrobial Prescribing Group (SAPG), in consultation with the Scottish Government, has revised the antimicrobial indicators for 2019 / 2020. The aim has been to simplify the measures and have targets that are aligned with national priorities.

SAPG have introduced a new measure of prescribing quality based on World Health Organisation (WHO)[5] work to produce a list of first line antibiotics that should be used to manage most common infectious diseases. This group includes antibiotics recommended as empiric, first or second choice treatment options for common infectious syndromes. First choices are usually narrow spectrum agents with positive benefit-to-risk ratios, and low resistance potential. NHS England has revised this list and SAPG have agreed to use this revised list as an indicator of antimicrobial prescribing quality. SAPG expects that over 60% of defined daily doses of antibiotics issued will be from this list by 2021.

Table 3: Access list medicines

| WHO Access group antibiotics (amended for use by NHS England) | | |
|---|---|---|
| Amoxicillin | Flucloxacillin | Phenoxymethylpenicillin |
| Ampicillin | Fosfomycin | Pivmecillinam |
| Benzathine Benzylpenicillin | Fusidic acid (as Sodium Fusidate) | Procaine Benzylpenicillin |
| Benzylpenicillin | Gentamicin | Tetracycline |
| Cotrimoxazole | Metronidazole | Trimethoprim |
| Doxycycline | Nitrofurantoin | |

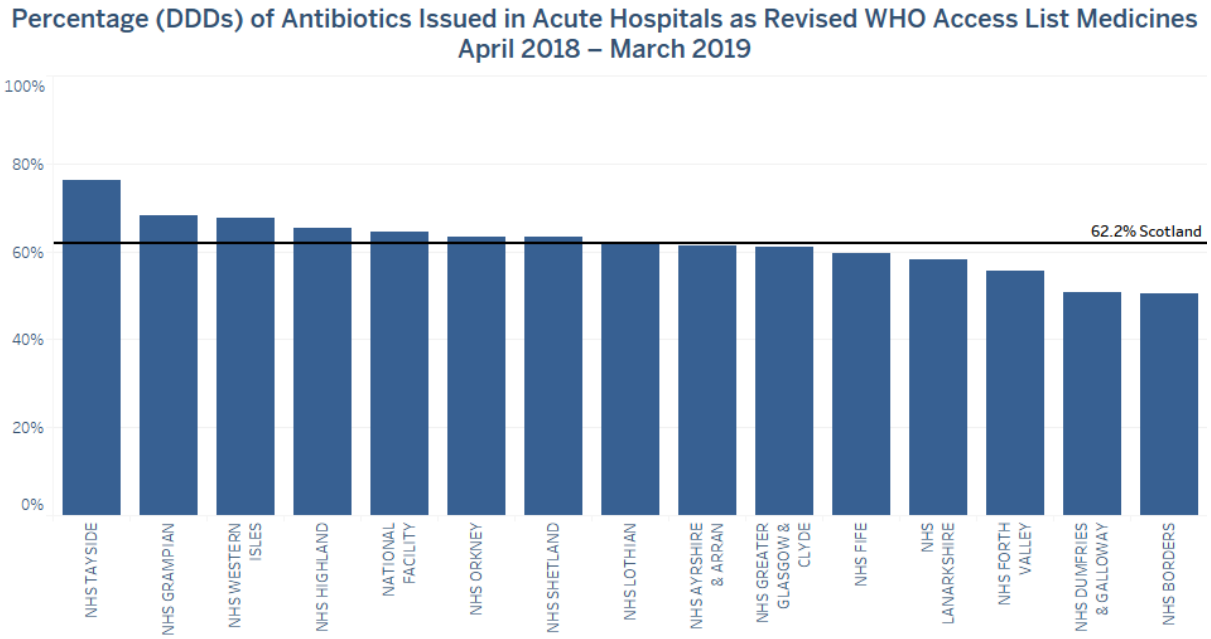
Seventeen percent[6] of all antibiotics (number of DDDs issued in 2018) are used in secondary care, which accounts for 48% of spending on antibiotics. This does not take into account the additional costs in terms of staff and peripheral equipment required to administer intravenous therapy. Many patients requiring inpatient treatment do not respond to first-line antibiotic treatment, or present with very severe infections requiring immediate and aggressive empirical treatment. Consequently, the antibiotics used in hospitals tend to be more expensive than those in primary care, particularly when intravenous treatment is needed.

Between 2014 and 2018, total antibiotic use in humans fell by 6.2%, largely driven by a 10.2% fall in the use of antibiotics in primary care. This has been offset by a 16% increase in the use of antibiotics in acute hospitals in the same period.[6] Although reducing antibiotic use is a key element of antimicrobial stewardship, SAPG recognise that antibiotics are vital for patients with, or at risk from, infection. Antibiotic use in hospital is a balance between obtaining the best clinical outcomes for patients and minimising harm to the person receiving antibiotics and to the population through development of drug resistant infections. In the initial report on Secondary Care National Therapeutic Indicators SAPG had

set a target to achieve a ≥1% reduction in total antibiotic use. In this report there is no target set.

## Data 2a:

Figure 4: Percentage access list medicines




Data source: Antimicrobial Use Dashboard

Table 4: Percentage access list medicines

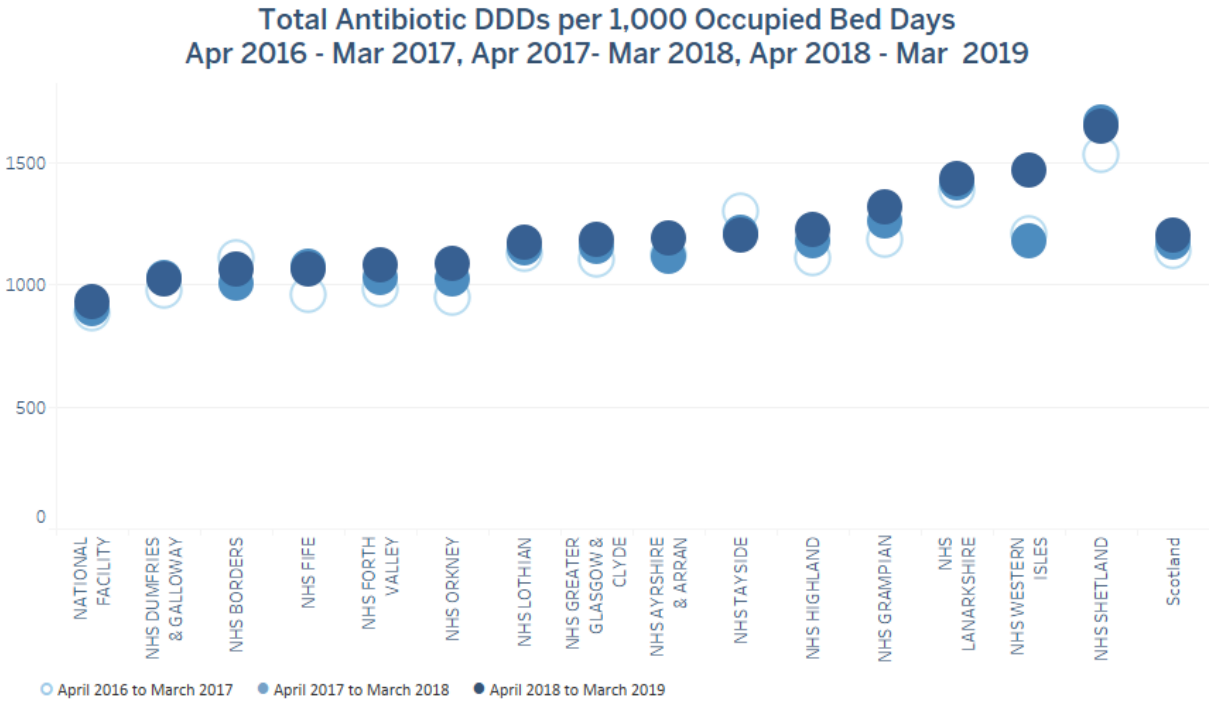
| Revised WHO Access List Medicines April 2018 – March 2019 | | | |
|---|---|---|---|
| **NHS Board** | **Access list DDDs** | **All Antibiotic DDDs** | **Percent of DDDs Issued as Access List Medicines** |
| NATIONAL FACILITY | 28,771 | 44,687 | 64% |
| NHS AYRSHIRE & ARRAN | 327,581 | 533,125 | 61% |
| NHS BORDERS | 66,646 | 132,189 | 50% |
| NHS DUMFRIES & GALLOWAY | 90,586 | 178,987 | 51% |
| NHS FIFE | 230,709 | 386,404 | 60% |
| NHS FORTH VALLEY | 198,356 | 357,279 | 56% |
| NHS GRAMPIAN | 479,555 | 702,539 | 68% |
| NHS GREATER GLASGOW & CLYDE | 1,213,582 | 1,984,921 | 61% |
| NHS HIGHLAND | 236,167 | 360,793 | 65% |
| NHS LANARKSHIRE | 470,031 | 809,828 | 58% |
| NHS LOTHIAN | 732,372 | 1,190,301 | 62% |
| NHS ORKNEY* | 10,223 | 16,171 | 63% |
| NHS SHETLAND | 10,284 | 16,276 | 63% |
| NHS TAYSIDE | 428,048 | 561,929 | 76% |
| NHS WESTERN ISLES | 28,092 | 41,490 | 68% |
| **SCOTLAND** | **4,551,005** | **7,316,920** | **62%** |

*Orkney data is only for the month of April due to late submission of data file

## Data 2b:

This report highlights differences in the rate of antibiotic use in hospital inpatients.

Figure 5: Total antibiotic use




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[v]

[v] The WHO has announced nine alterations to antibiotics DDDs which will apply from January 2019. The changes affect the following antibiotics: ampicillin, amoxicillin (oral), amoxicillin (intravenous), temocillin, co-amoxiclav, cefepime, meropenem, ciprofloxacin, colistin. For consistency, this document has been prepared using the new WHO defined DDDs. It is expected that the HMUD database will be revised to use the new WHO defined DDDs in early 2020. Until that time HMUD users who run this report will find different DDD values to those presented in this document. Additionally this document uses occupied bed day values recorded in the ISD(S)1 database, which differs slightly from the values in HMUD.

Table 5: Total antibiotic use

| NHS Board | DDDs per 1000 Occupied Bed Days | | | Percentage change in use: 2018 compared with 2016 |
|---|---|---|---|---|
| | 2016/17 | 2017/18 | 2018/19 | |
| NATIONAL FACILITY | 885 | 899 | 928 | 4.8% |
| NHS AYRSHIRE & ARRAN | 1,121 | 1,112 | 1,189 | 6.1% |
| NHS BORDERS | 1,106 | 1,006 | 1,060 | -4.2% |
| NHS DUMFRIES & GALLOWAY | 975 | 1,027 | 1,021 | 4.7% |
| NHS FIFE | 960 | 1,076 | 1,063 | 10.7% |
| NHS FORTH VALLEY | 984 | 1,027 | 1,080 | 9.8% |
| NHS GRAMPIAN | 1,185 | 1,260 | 1,315 | 11.0% |
| NHS GREATER GLASGOW & CLYDE | 1,102 | 1,155 | 1,185 | 7.5% |
| NHS HIGHLAND | 1,111 | 1,176 | 1,226 | 10.3% |
| NHS LANARKSHIRE | 1,384 | 1,415 | 1,435 | 3.7% |
| NHS LOTHIAN | 1,124 | 1,151 | 1,173 | 4.4% |
| NHS ORKNEY* | 948 | 1,024 | 1,084 | 14.4% |
| NHS SHETLAND | 1,531 | 1,666 | 1,648 | 7.7% |
| NHS TAYSIDE | 1,302 | 1,211 | 1,204 | -7.6% |
| NHS WESTERN ISLES | 1,205 | 1,180 | 1,467 | 21.8% |
| **SCOTLAND** | **1,136** | **1,170** | **1,201** | **5.7%** |

# 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.[7] 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 ye ar of around £300,000.[8]

SIGN recommends a long-acting insulin analogue as an option for basal insulin therapy for adults with type 1 diabetes mellitus.[9] 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.

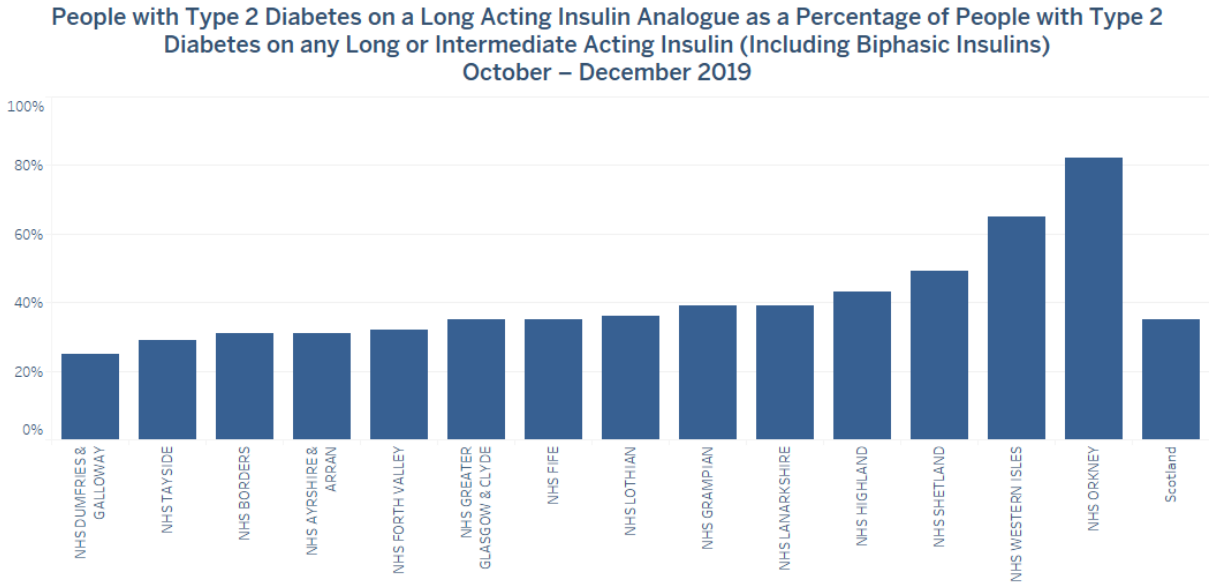
In 2018, approximately £21 million was spent on intermediate and long acting insulin in primary care in Scotland.[10] Of this, £11 million was spent on long acting insulin analogues. The majority of insulin prescribing is initiated by a specialist clinician within secondary care and therefore review 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 6).[11] This figure has remained consistently at this value. There is considerable variation across Scotland with a range from 25% in some boards up to 82% in others. If just one in four (25%) people with type 2 diabetes who use either a long or intermediate acting insulin used a long acting insulin analogue, it is estimated that a cost of £0.5 million per year could be avoided. The diabetes strategy group believe that this is a realistic but challenging ambition.

## Data 3a:

Figure 6: Insulin




Data for this indicator was obtained from the SCI diabetes database. SCI diabetes records the diagnosis for all diabetic 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 6: Insulin

| Use of Long-acting Insulin Analogues in Type 2 Diabetes Mellitus in Scotland October - December 2019 | | | |
|---|---|---|---|
| **NHS Board** | **Number of people with type 2 diabetes who receive an ANALOGUE insulin** | **Number of people with type 2 diabetes on ANY long or intermediate insulin (including biphasic insulins)** | **Percentage of those receiving any long or intermediate acting insulin who receive an ANALOGUE insulin** |
| NHS AYRSHIRE & ARRAN | 2645 | 828 | 31% |
| NHS BORDERS | 858 | 269 | 31% |
| NHS DUMFRIES & GALLOWAY | 1155 | 283 | 25% |
| NHS FIFE | 2418 | 835 | 35% |
| NHS FORTH VALLEY | 1682 | 544 | 32% |
| NHS GRAMPIAN | 2,820 | 1,107 | 39% |
| NHS GREATER GLASGOW AND CLYDE | 5,889 | 2,036 | 35% |
| NHS HIGHLAND | 2188 | 934 | 43% |
| NHS LANARKSHIRE | 3,751 | 1,478 | 39% |
| NHS LOTHIAN | 5,040 | 1,802 | 36% |
| NHS ORKNEY | 168 | 137 | 82% |
| NHS SHETLAND | 148 | 73 | 49% |
| NHS TAYSIDE | 3033 | 882 | 29% |
| NHS WESTERN ISLES | 205 | 133 | 65% |
| **Scotland** | **32,000** | **11,341** | **35%** |

This report is available in HMUD and is updated each quarter. HMUD users can view this report here.[vi]

Boards should consider using their own SCI diabetes data to establish that people with type 2 diabetes who are newly initiated on insulin are not being commenced on an analogue insulin. It is helpful that the diabetes Managed Clinical Networks (MCNs) are engaged in this assessment.

[vi] https://www.bo.scot.nhs.uk/BOE/OpenDocument/opendoc/openDocument.jsp?sIDType=CUID&iDocID=AYk_ynkO5DJArkH7wx5ARuc

# Depot Antipsychotics

## Background and evidence

Antipsychotic depot injections are commonly prescribed in mental health services. A systematic review of randomised controlled trials which compared depot with oral antipsychotics in schizophrenia reported that various depot formulations significantly reduced relapse rates, and also reduced drop-out due to inefficacy, when compared with oral treatment.[12] Consequently, their use is recommended in national guidance.[13]

First generation depot antipsychotic injections have been available in the UK since the 1970s. Second generation depot antipsychotic injections have been available since the introduction of Risperidal Consta® in 2002. Over the last six years, there has been a sustained rise in the proportion of second generation long acting antipsychotic injections.

Figure 7: Depot antipsychotic trend

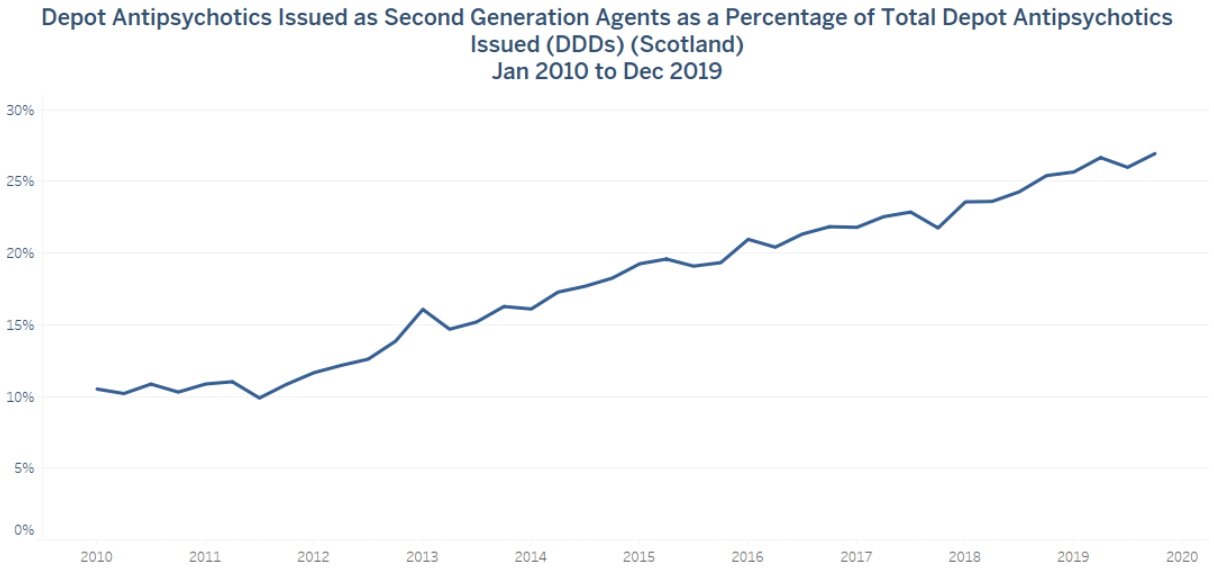



Figure 7 shows the trend to increased use of second generation antipsychotic depot injections across Scotland. HMUD users can view this information for their own Boards here.

A comparison of the effectiveness of depot antipsychotics in routine clinical practice found no long acting injection was superior in all outcomes measured.[14] McEvoy et al. compared the effectiveness of paliperidone (second generation depot antipsychotic) with haloperidol (first generation). They found no evidence that paliperidone was superior to haloperidol in terms of efficacy failure, but there was a difference in adverse effects. Paliperidone was associated with more weight gain and higher mean prolactin levels. Patients in the haloperidol group experienced greater increases in Barnes Akathisia Scale (BAS) global

scores and used medications to manage akathisia and parkinsonism more frequently. There was no statistically significant difference in the severity of abnormal involuntary movements and parkinsonism or in the incidence of tardive dyskinesia.[15]

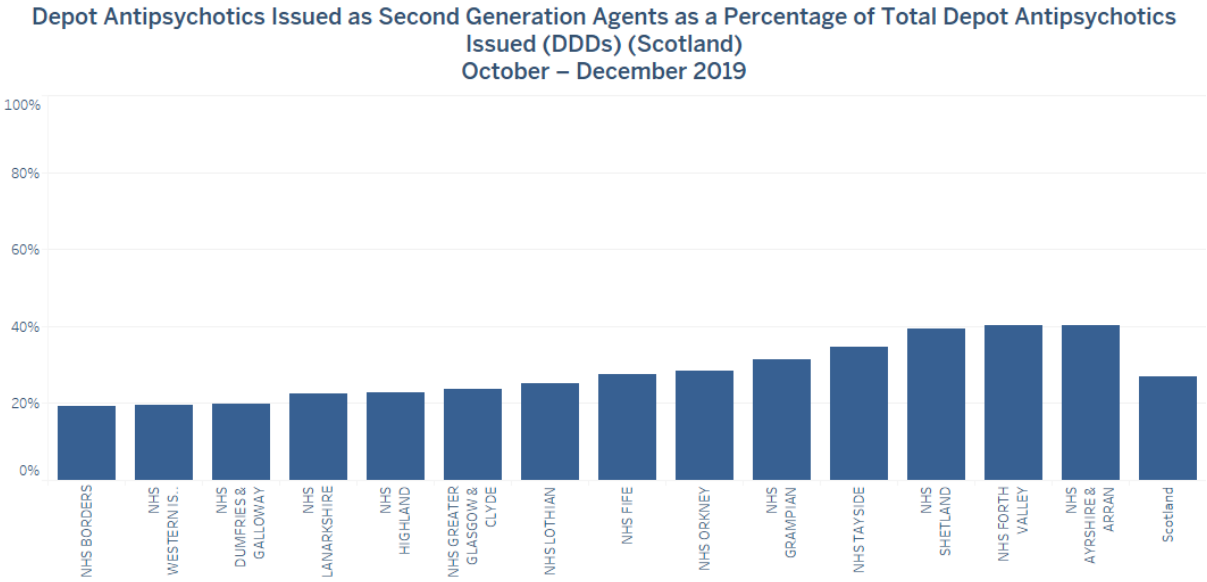
Consequently, first generation depot antipsychotics are regarded as equally effective and just as well tolerated as second generation agents. Acquisition costs are significantly lower for first generation agents and this should be considered when initiating treatment with a depot antipsychotic.

## Cost and savings

Preferential selection of a first generation depot antipsychotic agent for patients initiated on injectable therapy may slowly reduce the rate of use of second generation agents. Assuming patients start on zuclopenthixol in place of a second generation agent, a 5% reduction in the number of DDDs issued as second generation depot antipsychotics could avoid an expenditure of over £0.4 million annually across Scotland.

## Data 4a:

Figure 8: Depot antipsychotics




Data Source: HMUD and PRISMS

Table 7: Depot antipsychotic

| NHS Board | Depot antipsychotic utilisation: October to December 2019 Second Generation DDDs | Total Depot Antipsychotic DDDs | Percentage of DDDs Issued as Second Generation Agents |
|---|---|---|---|
| NHS AYRSHIRE & ARRAN | 24,393 | 60,413 | 40% |
| NHS BORDERS | 2,504 | 12,948 | 19% |
| NHS DUMFRIES & GALLOWAY | 4,960 | 25,197 | 20% |
| NHS FIFE | 20,383 | 74,196 | 27% |
| NHS FORTH VALLEY | 18,426 | 45,684 | 40% |
| NHS GRAMPIAN | 24,673 | 78,899 | 31% |
| NHS GREATER GLASGOW & CLYDE | 77,314 | 326,455 | 24% |
| NHS HIGHLAND | 11,915 | 52,386 | 23% |
| NHS LANARKSHIRE | 25,380 | 113,500 | 22% |
| NHS LOTHIAN | 45,163 | 178,686 | 25% |
| NHS ORKNEY | 1,528 | 5,378 | 28% |
| NHS SHETLAND | 1,123 | 2,854 | 39% |
| NHS TAYSIDE | 25,886 | 74,779 | 35% |
| NHS WESTERN ISLES | 1,116 | 5,687 | 20% |
| **Scotland** | **284,764** | **1,057,061** | **27%** |

## Safe Use of Intravenous Fluids

In 2013, NICE issued guidance on the use of intravenous fluid therapy in adults in hospital.[16] Since that time, a number of Boards have revised their intravenous fluids policies. The most important aspect of the revised fluids guidelines is to individualise the prescribing of maintenance fluids in terms of millilitres per kilogram per day. Due to the diverse nature of treatments and procedures offered in different hospitals and Health Boards, and the inability to differentiate between fluids used for routine maintenance and other uses of fluids (for example, fluid resuscitation, replacement of losses or medicines administration) it has not been possible to meaningfully assess the rates of fluid use between Health Boards.

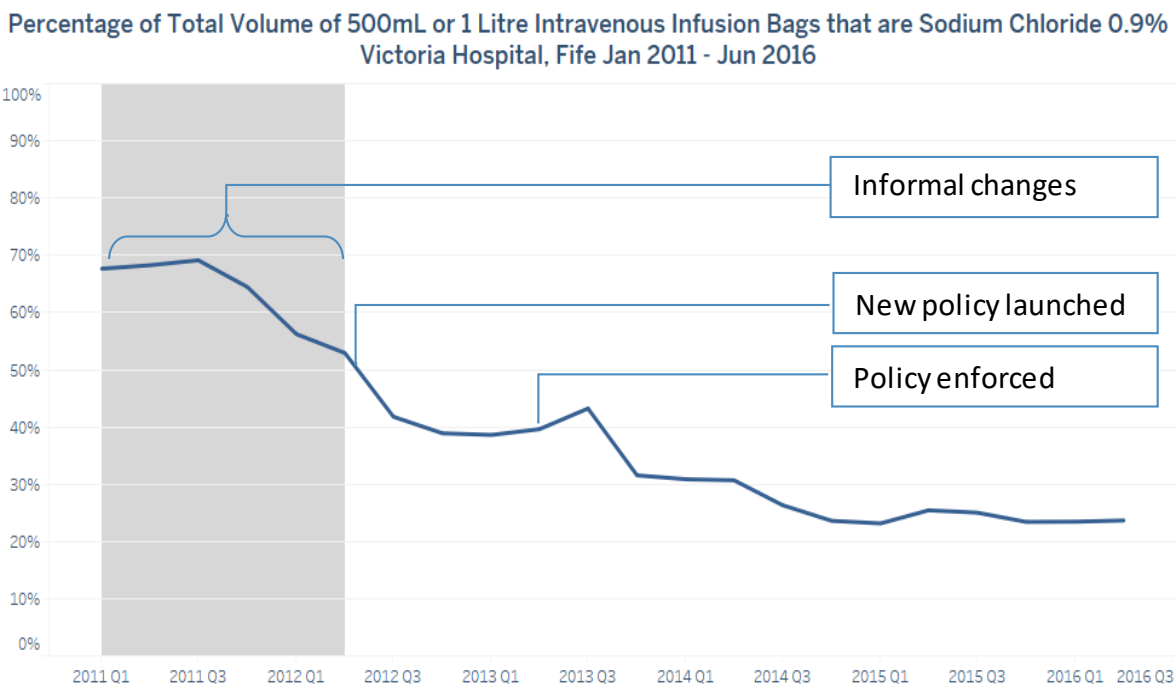
NICE estimate that as many as 1 in 5 patients on IV fluids and electrolytes suffer complications or morbidity due to their inappropriate administration.[16] In many instances this is due to the administration of an inappropriate volume of fluid. While it is not possible to estimate the number of patients receiving an inappropriate volume of fluids, it is possible to compare the use of electrolytes between hospitals and Boards. NICE recommend that solutions used for routine maintenance should contain approximately 1 mmol/kg/day of potassium and 1 mmol/kg/day sodium, as well as approximately 50–100 g/day of glucose.[16] NICE state that where serum potassium becomes low (falls below 3.0mmol/L) during or within 24 hours of stopping maintenance fluids this is likely to be due to infusion of fluids without adequate potassium provision.[16] Where a patient is receiving sodium chloride 0.9% and the sodium becomes high (rises above 155mmol/L) during or within 24 hours of stopping maintenance fluids this is likely to due to over infusion of sodium chloride.[16] Hyperchloraemia or acidaemia may also develop in these circumstances. Health Boards that have revised their fluid management policies are more likely to use fluids containing premixed potassium, and less likely to use intravenous infusions of sodium chloride 0.9%. The National Intravenous (IV) Fluid Improvement Programme regard higher use of potassium chloride and lower use of sodium chloride 0.9% as indicators of higher quality use of fluids in hospitals.

**Case study: the effect of a revision of fluid management policy on fluid use**

NHS Fife had been keen to revise their fluid management policies. From 2009 some senior clinicians within the Board adopted a new thinking about optimal fluid use. This led to a series of informal changes between 2009 and spring 2012. In Spring 2012 a new fluid management policy was adopted at the Victoria Hospital, Kirkcaldy. Many of the changes focused on ensuring that patients received the right amount of fluid. These included ensuring that prescribers specify the reason for fluid use (resuscitation, replacement or maintenance), ensuring that patients had their weight recorded on fluid charts, and that maintenance fluid doses were calculated on weight and ensuring that fluids were prescribed in millilitres per hour. At the same time the choice of fluids was

altered. The new policy advocated a balanced electrolyte solution (e.g. Hartmann's or Plasma-Lyte) for resuscitation and replacement fluids, and mixed dextrose saline (with potassium) for maintenance fluids. From February 2013 these changes were more robustly enforced following the publication of NICE fluid guidelines which reinforced these concepts, and fluids other than those recommended in the guidelines were no longer widely available on wards in the Victoria Hospital. In 2017 it was realised that using 1000mL bags was economically beneficial, as well as preventing unnecessary bag changes for maintenance fluids, so the use of 500mL bags for this purpose was stopped.

Figure 9: Sodium chloride use in Fife




These changes have had a number of effects that can be measured by monitored the use of fluids at Victoria Hospital. The amount of supplemental potassium used increased, the use of 1 litre infusion bags increased, and as can be seen here, the percentage of large volume infusion bags issued as sodium chloride fell by two thirds, in line with the NICE guidance.

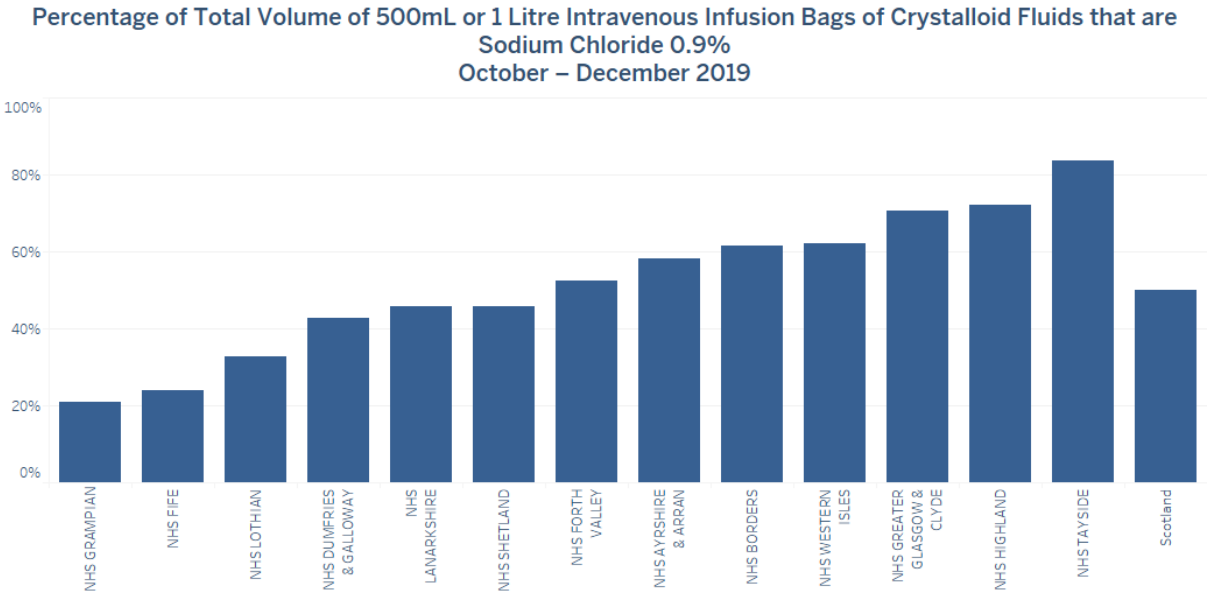
This indicator assesses the use of fluids for routine maintenance. Adults requiring routine maintenance would usually require between 1200mL to 2400mL of fluids per day. Because of the volumes administered, these would usually be administered as large volume infusion bags containing 500mL or 1 litre of fluid. Smaller bag sizes (50mL, 100mL or 250mL) are more likely to be used for medicines administration or fluid resuscitation. Therefore, only large volume infusion bags are included in this analysis. It should be recognised that some

alternative uses of fluids (for example some medicines administration and fluids used to replace losses) will be included in this analysis.

Unfortunately, two hospitals, Balfour hospital in Orkney and the Golden Jubilee National Hospital, do not record intravenous fluids through their pharmacy stock management systems. It has not been possible include these hospitals in this analysis.

## Data 5a:

Figure 10: Sodium Chloride



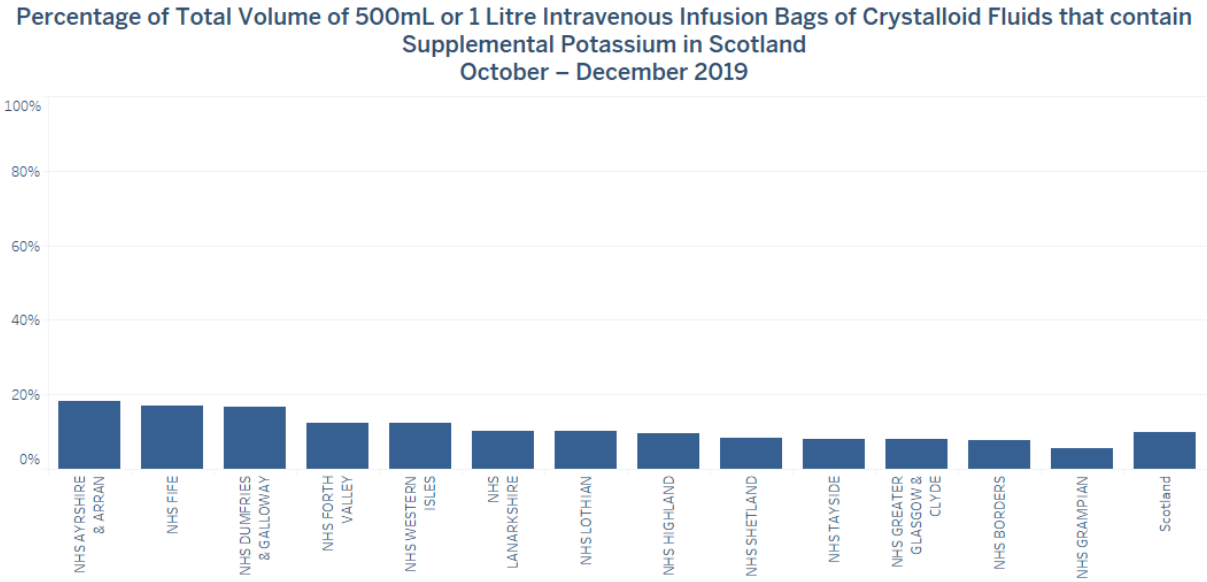

Data source: HMUD

Table 8: Sodium Chloride

| Large volume (500mL or 1 Litre) Sodium Chloride Use: October to December 2019 | | | |
|---|---|---|---|
| **NHS Board** | **Total Volume NaCl 0.9% (Litres)** | **Total Volume Crystalloid (Litres)** | **Percentage of Crystalloids issued as NaCl 0.9%** |
| NHS AYRSHIRE & ARRAN | 10,931 | 18,748 | 58% |
| NHS BORDERS | 2,570 | 4,181 | 61% |
| NHS DUMFRIES & GALLOWAY | 2,880 | 6,763 | 43% |
| NHS FIFE | 4,618 | 19,290 | 24% |
| NHS FORTH VALLEY | 5,147 | 9,821 | 52% |
| NHS GRAMPIAN | 7,527 | 35,764 | 21% |
| NHS GREATER GLASGOW & CLYDE | 69,542 | 98,464 | 71% |
| NHS HIGHLAND | 5,695 | 7,898 | 72% |
| NHS LANARKSHIRE | 24,392 | 53,291 | 46% |
| NHS LOTHIAN | 25,517 | 77,792 | 33% |
| NHS SHETLAND | 760 | 1,658 | 46% |
| NHS TAYSIDE | 18,944 | 22,635 | 84% |
| NHS WESTERN ISLES | 545.5 | 880 | 62% |
| **Scotland** | **179,067** | **357,182** | **50%** |

## Data 5b:

Figure 11: Potassium




Data source: HMUD

Table 9: Potassium

| Potassium Supplementation in large volume (500mL or 1 Litre) fluids: October to December 2019 | | | |
|---|---|---|---|
| NHS Board | Potassium Volume (Litres) | Total Volume Crystalloid (Litres) | Percentage of Total Volume that contains Potassium |
| NHS AYRSHIRE & ARRAN | 5,827 | 31,945 | 18% |
| NHS BORDERS | 650.5 | 8,326 | 8% |
| NHS DUMFRIES & GALLOWAY | 2,048 | 12,217 | 17% |
| NHS FIFE | 3,273 | 19,438 | 17% |
| NHS FORTH VALLEY | 2,334 | 18,949 | 12% |
| NHS GRAMPIAN | 2,025 | 36,167 | 6% |
| NHS GREATER GLASGOW & CLYDE | 12,078 | 153,028 | 8% |
| NHS HIGHLAND | 1,593 | 16,626 | 10% |
| NHS LANARKSHIRE | 5,521 | 53,681 | 10% |
| NHS LOTHIAN | 8,144 | 79,681 | 10% |
| NHS SHETLAND | 141 | 1,668 | 8% |
| NHS TAYSIDE | 2,510 | 31,590 | 8% |
| NHS WESTERN ISLES | 208 | 1,702 | 12% |
| **Scotland** | **46,351** | **465,014** | **10%** |

Data notes:
Large volume isotonic crystalloid fluids are those with a:
HMUD BNF description of "parenteral preparations for fluid and electrolyte imbalance" and include the term 500mL or 1 Litre (descriptions containing the terms: Glucose 10%, sodium bicarbonate, water, Sodium Chloride 1.8%, Sodium Chloride 2.7%, Sodium Chloride 3%, Sodium Chloride 5% or albumin are excluded)
or
HMUD BNF description of "intravenous nutrition" and include the term 500mL or 1 Litre and the term glucose 5 or Plasma-Lyte (descriptions containing the term glucose 50 are excluded).

Sodium chloride 0.9% is fluids where sodium chloride is the principle osmotic substance, and therefore also includes fluids with supplemental electrolytes (potassium or magnesium) (glucose/sodium chloride mixtures are excluded).

Supplemental potassium is defined as a fluid containing the word potassium in the HMUD product description, and in practice means fluids that contain 0.15% potassium or greater (balanced salt solutions, such as Hartmann's solution or Plasma-Lyte, which generally contain less than 5mmol per 500mL are excluded)

Only products with a valid dm+d (Dictionary of Medicines and Devices) code are included in the analysis. [https://applications.nhsbsa.nhs.uk/DMDBrowser/DMDBrowser.do]

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