



## **Scottish Antimicrobial Prescribing Group**

### **Pilot of national audit tool for primary care management of commonly encountered infections**

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#### **Executive Summary**

This report contains a descriptive summary of aggregated and anonymised data from a sample of prescribers that participated in a pilot of a national audit tool for assessment of the qualitative aspects of primary care management of commonly encountered infections. The purpose of the report is to support SAPG and NHS board Antimicrobial Management Teams (AMT) by providing baseline data on the indication for of systemic antibiotics used for commonly encountered acute infections in primary care, to support identification of areas for quality improvement and educational activity in antimicrobial use at local and national level.

NHS board AMTs through liaison with medicines management teams were invited to identify prescribers to participate in the survey. Data on all consultation for infections was collected by prescribers for a one week period in February 2011. A standard data set was entered for each consultation via a screen produced with SCI-Gateway system. After details of each consultation were entered the information was transferred through electronic messaging to a database produced and held by NHS National Services Scotland.

A total of 99 prescribers from 55 GP practices across 13 NHS boards in Scotland submitted data. During the survey details for 1733 consultations were recorded. A total of 1205 antibiotics were prescribed for 1184 patients. In 549 (31.6%) of consultations no antibiotic was prescribed.

The results of the survey have indentified a number of areas of good practice and some areas for improvement. Key findings include;

The ten most frequently encountered infections accounted for 88% of all consultations. Upper respiratory tract infections (RTI) such as acute cough/bronchitis, pharyngitis/sore throat, otitis media and acute rhinosinusitis accounted for over 60% of all consultations.

Antibiotics were prescribed in nearly half of all consultations for throat infection and in over half for acute cough/bronchitis and acute rhinosinusitis. In over 73% of consultations for otitis media an antibiotic was used. Although it is welcome that the results show that in many consultations for RTI no antibiotic was prescribed there appears to be scope to further reduce the unnecessary use of antibiotics in these self limiting infections.

From a high level comparison of the use of antibiotics by infection there are no major areas of non compliance with HPA guidance which suggests that when a decision is taken to prescribe an antibiotic, the choice of treatment is generally in line with the template used for production of local prescribing policy.

The use of high risk antibiotics was low in this study. Co-amoxiclav accounted for 3.5%, cephalosporins 1.7% and ciprofloxacin 1.5% of all antibiotics prescribed in the survey. Reduction in the use of antibiotics associated with a higher risk of CDI has been an initial priority for SAPG. A benefit of the use of the HPA guidance as the basis for local policy development is that it restricts the use of high risk antibiotics. The low level of use of high risk antibiotics suggests that compliance with empirical prescribing policies has been successful in achieving this aim.

There is evidence that for many infections the prescribed duration of treatment is longer than the recommendations contained in the HPA guidance. This is an area for improvement and educational activity.

The results of this survey provide SAPG and AMTs with useful national baseline information on the quality of prescribing in a sample of primary care prescribers in Scotland. These results will be used to monitor changes in the key areas identified for improvement going forward.

## **Background**

SAPG was established in 2008 to co-ordinate a national antimicrobial stewardship programme to enhance the quality of prescribing and treatment of infection in Scotland. In 2009 SAPG adopted the Health Protection Agency (HPA) Management of Infection Guidance for Primary Care<sup>1</sup>. It was disseminated to NHS board Antimicrobial Management Teams (AMT) to support development of local prescribing policies for first line empirical treatment of infections commonly encountered in a primary care setting in Scotland. This evidence based guidance provided advice for prescribers on the drug, dose and duration of antibiotics in specific infections. The guidance aims to restrict the use of antibiotics such as co-amoxiclav, fluoroquinolones, and cephalosporins that are associated with a higher risk of CDI and to promote the use of narrow spectrum antibacterials to minimise the emergence of bacterial resistance in the community.

Eighty percent of antibiotics are prescribed in primary care and a reduction in unnecessary use of antibiotics is a priority for SAPG. The key area for reduction in antibiotic use is in the management of self-limiting respiratory

tract infections (RTI) as a quarter of the population will visit their GP with a RTI each year, resulting in 60% of all antibiotic prescribing in general practice<sup>2</sup>. There is evidence from randomised placebo-controlled trials that antibiotics have limited efficacy in treating a large proportion of respiratory tract infections in adults and children<sup>2</sup>.

The SAPG information workstream involves development of systems for the collection, analysis and reporting of information related to antimicrobial use and resistance in all healthcare settings. Standardised quantitative information on antibiotic use in primary care is accessible as standard prescribing indicator reports within the Prescribing Information System for Scotland (PRISMS)<sup>3</sup>. This data is generated as a result of the requirement to reimburse pharmacy and dispensing doctor contractors the cost of medicines supplied on NHS prescriptions. It does not contain any qualitative information for the prescription nor whether the treatment was prescribed in line with local NHS board prescribing policy.

## **Purpose**

To test the usefulness of a data collection tool in providing local clinicians, AMTs and SAPG with detailed qualitative information on primary care use of antibiotics used in the management of commonly encountered infections and to enable identification of areas for quality improvement of antibiotic use. This will complement existing quantitative information available via PRISMS.

The pilot tool will support local clinicians, AMTs and SAPG by;

- providing baseline data on the indication for prescription of systemic antibiotics for management of commonly encountered acute infections in primary care,
- supporting identification of areas for quality improvement at local and national level,
- supporting identification of areas for educational activity at local and national level.
- enabling GPs to view their own results and the national average,
- enabling GPs to undertake an assessment of actual prescribing decisions with local prescribing policy/guidance,

## **Method**

### Prescribers

Each AMT was asked to liaise with local medicines management teams to identify prescribers to participate in the survey. All participating prescribers were provided with information on the survey.

### Data Collection

Data was collected by participating prescribers over a single week between 31<sup>st</sup> January 2011 and 25<sup>th</sup> February 2011.

A standard data set was collected on all consultations for acute infections commonly encountered in primary care during the study week. Data on antibiotics for systemic use were collected. Data on use of antibiotics for prophylaxis and treatment of long term infections were excluded.

When a patient presented with symptoms of infection which did not result in the issue of a prescription details were still recorded. When a patient was prescribed a combination of two or more antibiotics for a single infection a single form was completed. When a patient presented with two or more possible infection sites a separate form was completed for each.

### Data Entry

Data entry for each consultation was input via a screen produced within SCI-Gateway system using binary, multiple choice options or drop down menus to eliminate the requirement for entry of free text. Prescribers who opted not to enter the data into the SCI-Gateway data collection tool during the consultation used a paper form to record the data for input at a later date.

After details of each consultation were entered into the SCI-Gateway system the information was transferred through electronic messaging to a database produced and held by NHS National Services Scotland (NSS).

All participating prescribers were provided with a guide on data collection and entry.

Appendix 1 shows the SCI-Gateway data collection tool and the paper form.

### Data Analysis

At the end of the data collection period data was exported from the database held by NSS. All participating prescribers received a report showing their own data. Data was aggregated and analysed using SPSS statistical software.

## **Results & Discussion**

### Description of respondents

A total of 99 prescribers from 55 GP practices (around 5% all practices in Scotland) across 13 NHS boards in Scotland submitted data during the survey. Further analysis will be undertaken to describe the participating practices.

### Overview of consultations

During the survey details for 1733 consultations were recorded (prescriber range 1 to 44 consultations). Only 16 (0.9%) consultations in pregnant women were reported. In 144 (8.3%) consultations the patient was reportedly allergic to penicillin

The most common method of consultation was a face to face consultation between the prescriber and the patient, which accounted for 87% of all consultations. The HPA guidance recommends that prescribing over the

telephone should be limited to exceptional cases. Telephone consultations accounted for 9% of all consultations. The remainder of consultations were reported as following receipt of laboratory data.

A total of 1205 antibiotics were prescribed for 1184 patients. In 549 (31.6%) consultations no antibiotic was prescribed.

Table 1 illustrates the indication for treatment in consultations that resulted in an antibiotic prescription. This shows that empirical treatment accounted for over 92% of all antibiotic use.

Indication	Number Consultations	% Total Consultations
Empirical, first line	960	81.1
Empirical, second or subsequent line	132	11.1
Microbiologically confirmed first agent	65	5.5
Microbiologically, second or subsequent line	19	1.6
Not known	8	0.7
Total	1184	

Table 1: Indication for treatment.

### Demographics of population

Table 2 illustrates the age breakdown for the consultations recorded. This shows that over half of all recorded consultations were in older children and working age adults who are generally fit and well.

Age	Number Consultations	% Total Consultations
0 to 12 years	406	23.4
13 to 64 years	939	54.2
65 years and older	388	22.4
Total	1733	

Table 2: Age of patient.

### Infection Type

Analysis of the number of consultations by recorded infection type is illustrated in Figure 1. The 10 most frequently encountered infections accounted for 88% of all consultations. Acute cough/bronchitis was the mostly commonly encountered infection and accounted for 571 (32.9%) consultations. Upper respiratory tract infections (RTI) such as acute cough/bronchitis, pharyngitis/sore throat, otitis media and acute rhinosinusitis accounted for over 60% of all consultations. This is similar to that quoted by NICE<sup>2</sup> and reinforces that the key area for reduction of clinically unnecessary antibiotics in Scotland may be achieved by changing health seeking behaviour and prescribing behaviour in these self limiting conditions.

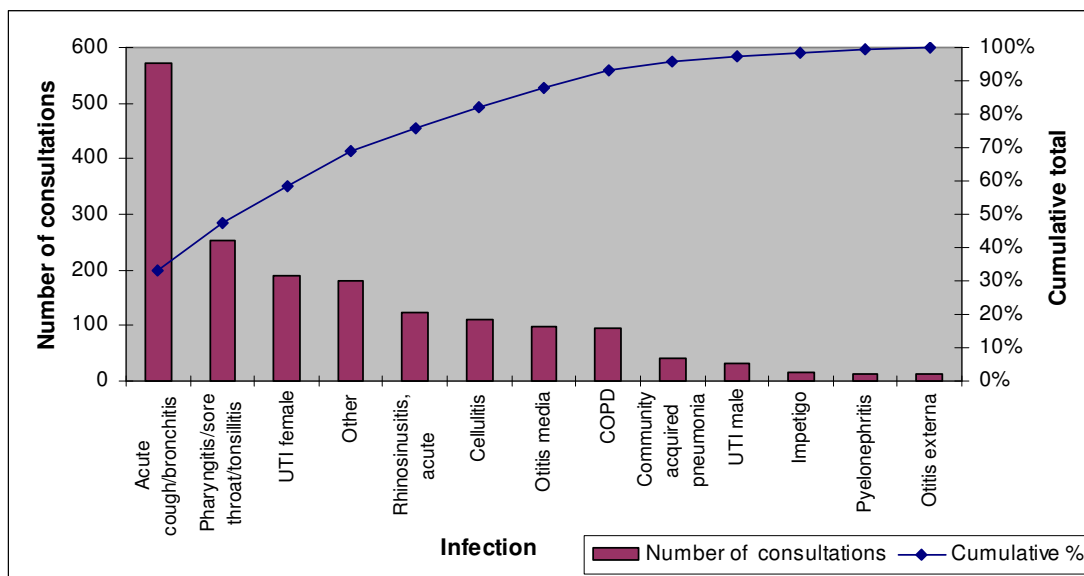


Figure 1: Number of consultation by type of infection.

### No prescribing strategy by infection

The HPA guidance advises that antibiotics should only be prescribed when there is likely to a clear clinical benefit and that a no antibiotic strategy should be considered for acute self limiting upper respiratory tract infections. Figure 2 illustrates the percentage of consultations for each infection where no antibiotic prescription was issued.

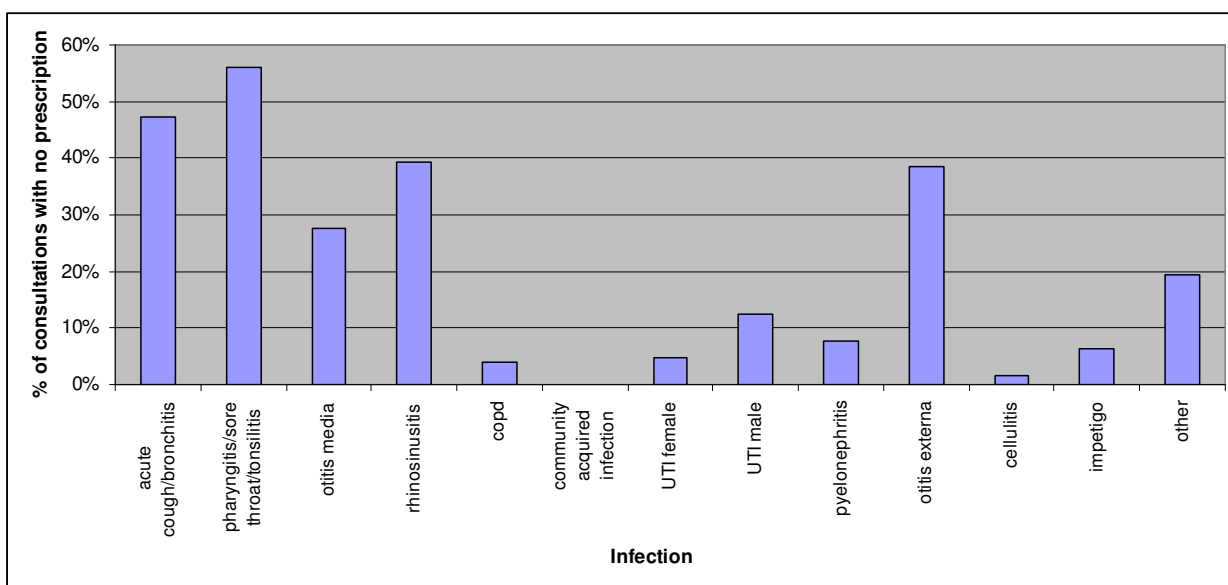


Figure 2: Percentage of consultations where no prescription given by type of infection.

The results show antibiotics were prescribed in nearly half of all consultations for throat infection and in over half for acute cough/bronchitis and acute rhinosinusitis. In over 73% of consultations for otitis media an antibiotic was used. Although it is welcome that the results show that in many consultations

for RTI no antibiotic was prescribed there appears to be scope to further reduce the unnecessary use of antibiotics in these self limiting infections.

### Delayed prescription strategy

A delayed prescription strategy is recommended in the HPA guidance as an option for acute self-limiting upper RTI. Table 3 illustrates the proportion of all consultations for RTI where a delayed prescription was issued. The results show that participating prescribers do not use this strategy to reduce unnecessary antibiotic use to a great extent.

Infection	% consultations
Acute cough/bronchitis	5.6
Pharyngitis/sore throat/tonsillitis	5.1
Otitis media	12.2
Rhinosinusitis, acute	6.6

Table 3: use of delayed prescriptions in upper respiratory tract infections.

### Antibiotic Use by infection

The aim of the HPA guidance is to provide recommendations for the empirical treatment of common infections to promote safe, effective and economic use of antibiotics and to minimise the emergence of bacterial resistance. Over 80% of antibiotics used in this study were for first line empirical treatment. From a high level review comparing the recommendations of the HPA guidance against the data on antibiotic prescribing observed in this study (Table 3-5) no major areas of non compliance with the HPA guidance were identified. This suggests that when participating prescribers make a decision to prescribe an antibiotic it is generally in line with HPA guidance.

	Acute cough/bronchitis	Pharyngitis/sore throat/tonsillitis	Otitis media	Rhinosinusitis acute	COPD	Community acquired pneumonia
Amoxicillin	69.9%	6.3%	81.7%	52.7%	59.6%	54.8%
Azithromycin	-	-	1.4%	-	-	-
Cefaclor	0.7%	-	-	-	-	-
Cefalexin	2.0%	-	1.4%	-	-	-
Cefradine	-	-	-	-	-	2.4%
Cefuroxime	-	-	-	1.4%	-	-
Ciprofloxacin	0.7%	-	1.4%	-	1.1%	2.4%
Clarithromycin	12.6%	5.4%	2.8%	6.8%	14.9%	23.8%
Co-amoxiclav	0.7%	-	7.0%	-	4.3%	4.8%
Doxycycline	4.6%	0.9%	-	37.8%	17.0%	7.1%
Erythromycin	8.3%	12.5%	2.8%	1.4%	1.1%	4.8%
Flucloxacillin	-	-	-	-	-	-
Metronidazole	-	-	-	-	-	-
Nitrofurantoin	-	-	-	-	-	-
Phenoxymethylpenicillin	-	75.0%	1.4%	-	-	-
Trimethoprim	-	-	-	-	1.1%	-
Other	0.7%	-	-	-	1.1%	-

Table 3: antibiotic use (excluding a no prescription strategy) for each of the recorded infection types

	UTI female	UTI male	Pyelonephritis
Amoxicillin	7.8%	7.1%	-
Azithromycin	-	-	-
Cefaclor	-	-	-
Cefalexin	2.8%	-	16.7%
Cefradine	0.6%	-	-
Cefuroxime	-	-	-
Ciprofloxacin	2.8%	7.1%	33.3%
Clarithromycin	1.1%	-	-
Co-amoxiclav	1.1%	-	8.3%
Doxycycline	-	-	-
Erythromycin	-	-	-
Flucloxacillin	-	-	-
Metronidazole	-	-	-
Nitrofurantoin	25.1%	17.9%	8.3%
Phenoxymethylpenicillin	-	-	-
Trimethoprim	57.5%	64.3%	33.3%
Other	1.1%	3.6%	-

Table 4: Antibiotic use (excluding a no prescription strategy) for each of the recorded infection types

	Otitis externa	Cellulitis	Impetigo	Other
Amoxicillin	12.5%	1.7%	-	12.8%
Azithromycin	-	-	-	2.0%
Cefaclor	-	-	-	-
Cefalexin	-	-	-	0.7%
Cefradine	-	-	-	-
Cefuroxime	-	-	-	0.7%
Ciprofloxacin	-	-	-	1.3%
Clarithromycin	-	4.2%	6.7%	7.4%
Co-amoxiclav	12.5%	5.9%	-	12.1%
Doxycycline	-	1.7%	-	4.7%
Erythromycin	-	2.5%	-	2.0%
Flucloxacillin	12.5%	67.2%	86.7%	26.8%
Metronidazole	-	0.8%	-	11.4%
Nitrofurantoin	-	-	-	0.7%
Phenoxymethylpenicillin	-	10.9%	-	3.4%
Trimethoprim	-	-	-	6.0%
Other	62.5%	5.0%	6.7%	8.1%

Table 5: Antibiotic use (excluding a no prescription strategy) for each of the recorded infection types

### High risk antibiotics by infection site

The use of high risk antibiotics was low in this study. Co-amoxiclav accounted for 3.5%, cephalosporins 1.7% and ciprofloxacin 1.5% of all antibiotics prescribed in the survey. Reduction in the use of antibiotics associated with a higher risk of CDI has been an initial priority for SAPG. A benefit of the use of the HPA guidance as the basis for local policy development is that it restricts the use of high risk antibiotics. The low level of use of high risk antibiotics suggests that compliance with empirical prescribing policies has been successful in achieving this aim.

Figure 2 illustrates the use of antibiotics associated with a higher risk by recorded infection type.

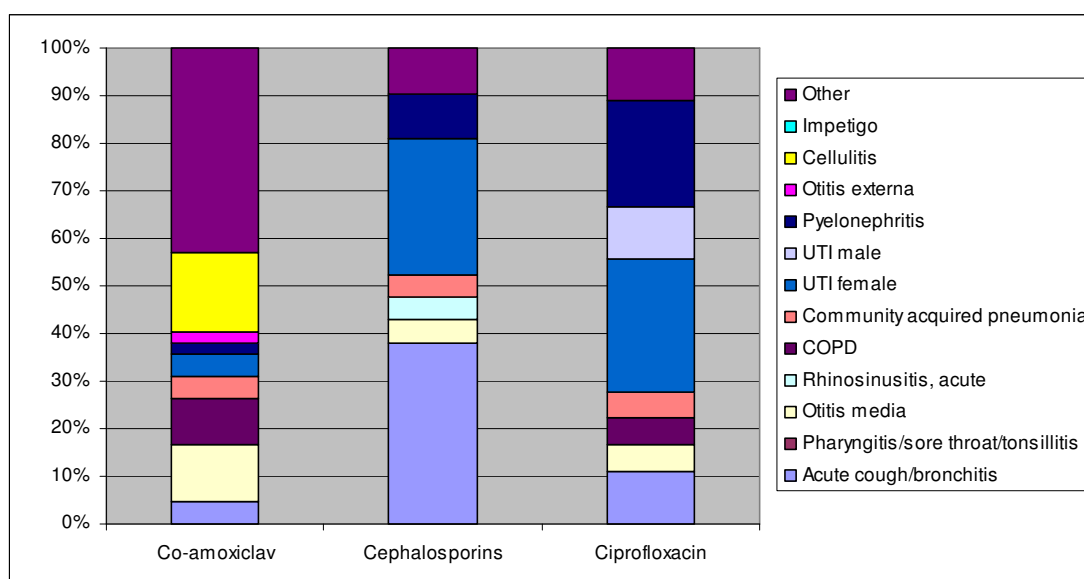


Figure 3: Use of high risk antibiotics by infection type

This shows that acute cough (38.1%) and UTI in females (28.6%) were the most common infections treated with cephalosporins. Cephalosporins are not recommended in HPA guidance for routine treatment of these infections. Of the ciprofloxacin used the main infection types were UTI in females (27.8%), pyelonephritis (22.2%), UTI in males (11.1%) and acute cough/bronchitis (11.1%). Cellulitis accounted for 16.7% of co-amoxiclav use and infections classed as other accounted for over 40% co-amoxiclav use.

### Duration of treatment

The duration of treatment for each of the infection types is illustrated in table 4.

	3 days	5 days	7 days	10 days	>10 days	other	not known
Acute cough/bronchitis	-	33.1%	66.2%	0.7%	-	-	-
Pharyngitis/sore throat/tonsillitis	-	12.5%	73.2%	14.3%	-	-	-
Otitis media	-	49.3%	47.9%	-	2.8%	-	-
Rhinosinusitis, acute	-	20.3%	71.6%	2.7%	2.7%	-	2.7%
COPD	-	19.1%	74.5%	4.3%	1.1%	-	1.1%
Community acquired pneumonia	-	4.8%	88.1%	4.8%	2.4%	-	-
UTI female	41.3%	31.8%	26.3%	0.6%	-	-	-
UTI male	3.6%	25.0%	53.6%	-	17.9%	-	-
Pyelonephritis	-	8.3%	75.0%	-	16.7%	-	-
Otitis externa	-	25.0%	50.0%	25.0%	-	-	-
Cellulitis	-	5.9%	88.2%	3.4%	2.5%	-	-
Impetigo	-	26.7%	66.7%	6.7%	-	-	-
Other	0.7%	8.1%	69.1%	7.4%	10.7%	3.4%	0.7%

Table 4: Duration of treatment for infection types.

The HPA guidance recommends duration of treatment for specific infections. The results show that for most infections a duration of 7 days was recorded. This is not in line with HPA guidance for many infections.

The HPA guidance recommends a 3 day course for treatment of uncomplicated UTI in females but this was prescribed in only 41.3% of cases. When antibiotics are indicated for a throat infection a 10 day duration is required but here only 14.3% of cases had such a duration. There is also evidence that the prescribed courses are of a longer duration than recommended by HPA guidance in treatment of acute cough/bronchitis, otitis media and exacerbation of COPD.

## **Conclusion**

The results have provided valuable baseline qualitative baseline information on use of systemic antibacterials in a sample of prescribers across Scotland.

The results indicate that empirical first line treatment accounts for over 80% of antibiotics used in the survey. There is a high level of compliance with HPA guidance on choice of antibiotic for empirical treatment of commonly encountered infections. The results show low use of antibiotics associated with a high risk of CDI.

An area for improvement is to reduce further the use of antibacterials for consultations for self limiting infections such as acute cough/bronchitis, sore throat/pharyngitis/tonsillitis, otitis media and acute rhinosinusitis which together accounted over 60% of all consultations and where antibiotics offer little or no clinical benefit in most cases. This study reinforces the SAPG plan to consider the recommendation to Scottish Government Healthcare Associated Infection Task Force the introduction of a defined target on the number of prescriptions issued in primary care in Scotland.

Improved compliance with HPA guidance on duration of treatment is a further area for improvement. In many infections the recorded duration was greater than that recommended by evidenced based guidance.

## **Limitations of study**

This survey although containing a 5% sample of GP practices in Scotland was a self selected cohort following a request for participants by AMTs. It is possible there will be selection bias in that prescribers with an interest in optimisation of antibiotic prescribing will have participated to a greater extent. Therefore the results may not be generalisable to the wider population of GPs in Scotland.

## **Next steps**

There are plans to seek the views of participants on the drivers for participating and on the method for data collection and input. These views will inform further discussion within SAPG in the future.

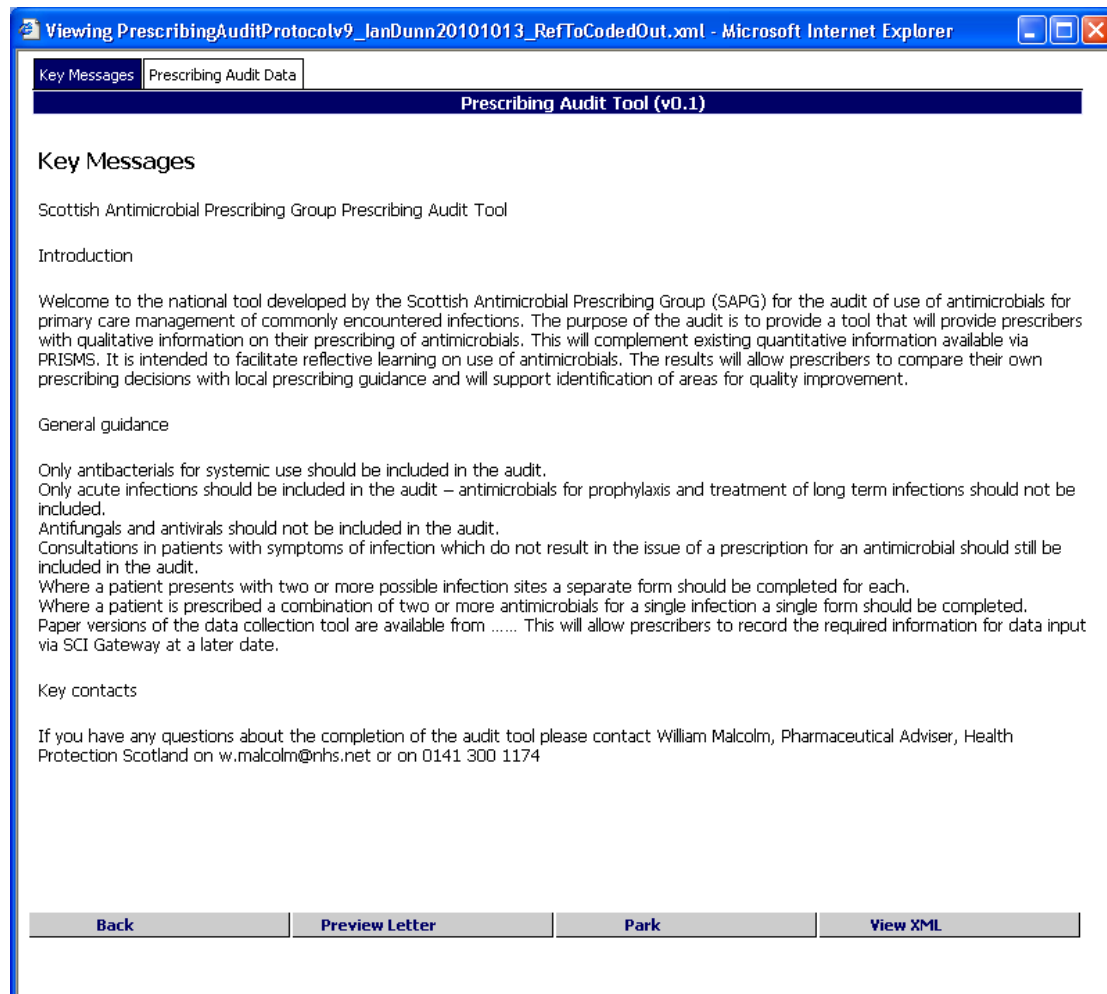
SAPG are invited to consider whether there is utility in repeating this audit on a regular basis. It should be noted that there may be resource implications to support IT developments for data input and analysis.

## **References**

1. Health Protection Agency. Management of Infection Guidance for Primary Care for consultation and local adaptation (2010). Available at [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1279888711402](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1279888711402)
2. NICE 69: Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care, 2008  
<http://www.nice.org.uk/nicemedia/pdf/CG69FullGuidelineAppendices.pdf>
- 3 Scottish Antimicrobial Prescribing Group. Primary care prescribing indicators annual report 2009/10. Available at <http://www.isdscotland.org/isd/6125.html>

## Appendix 1 - Screen shots of the SCI Gateway data collection tool.

This shows the Key Messages section of the SCI Gateway data collection tool. It is intended to provide the background about why the audit is being undertaken and includes general guidance on the use of the audit.



The screenshot shows a web browser window titled "Viewing PrescribingAuditProtocolv9\_JanDunn20101013\_RefToCodedOut.xml - Microsoft Internet Explorer". The browser displays the "Key Messages" section of the "Prescribing Audit Tool (v0.1)". The page content includes the following sections:

- Key Messages**
- Scottish Antimicrobial Prescribing Group Prescribing Audit Tool
- Introduction
- Welcome to the national tool developed by the Scottish Antimicrobial Prescribing Group (SAPG) for the audit of use of antimicrobials for primary care management of commonly encountered infections. The purpose of the audit is to provide a tool that will provide prescribers with qualitative information on their prescribing of antimicrobials. This will complement existing quantitative information available via PRISMS. It is intended to facilitate reflective learning on use of antimicrobials. The results will allow prescribers to compare their own prescribing decisions with local prescribing guidance and will support identification of areas for quality improvement.
- General guidance
- Only antibacterials for systemic use should be included in the audit.
- Only acute infections should be included in the audit – antimicrobials for prophylaxis and treatment of long term infections should not be included.
- Antifungals and antivirals should not be included in the audit.
- Consultations in patients with symptoms of infection which do not result in the issue of a prescription for an antimicrobial should still be included in the audit.
- Where a patient presents with two or more possible infection sites a separate form should be completed for each.
- Where a patient is prescribed a combination of two or more antimicrobials for a single infection a single form should be completed.
- Paper versions of the data collection tool are available from ..... This will allow prescribers to record the required information for data input via SCI Gateway at a later date.
- Key contacts
- If you have any questions about the completion of the audit tool please contact William Malcolm, Pharmaceutical Adviser, Health Protection Scotland on w.malcolm@nhs.net or on 0141 300 1174

At the bottom of the page, there are four navigation buttons: **Back**, **Preview Letter**, **Park**, and **View XML**.

This shows the data collection screen. Although shown here as two separate screens it will appear as a single screen within SCI-Gateway.

The screenshot displays the 'Prescribing Audit Tool (v0.1)' interface. It is divided into sections for 'Infection', 'Antimicrobial 1', and 'Antimicrobial 2'. Each section contains various input fields, including dropdown menus and radio buttons. Callout boxes provide instructions for these fields:

- Site of infection:\***: A dropdown menu. Callout: "Prescribers will use a drop down to select from one of 13 sites of infection".
- Antimicrobial prescribed:\***: A dropdown menu. Callout: "Using drop down select antimicrobial prescribed From 19 options".
- Duration of treatment:\***: A dropdown menu. Callout: "Using drop down select duration of treatment from 6 options".
- Delayed prescription :\***: Radio buttons for 'No', 'Yes', and 'No antimicrobial prescribed'. Callout: "For URTI select whether a delayed prescription was used".
- Indication for treatment:\***: A dropdown menu. Callout: "Using drop down select Indication – whether empirical or follow lab confirmation".
- Method of prescribing:\***: A dropdown menu. Callout: "Using drop down select Whether following face to face consultation or lab confirmation".
- Antimicrobial 2 - enter details if 2 antimicrobials prescribed for the same infection site**: A section with its own set of fields. Callout: "Use this section to enter details if a second antimicrobial is used for the same infection site".

At the bottom of the form, there are buttons for 'Back', 'Preview Letter', 'Park', and 'View XML'.

Viewing PrescribingAuditProtocolv9\_JanDunn20101013\_RefToCodedOut.xml - Microsoft Internet Explorer

Key Messages Prescribing Audit Data

**Prescribing Audit Tool (v0.1)**

Indication for treatment: \* Only 1 antimicrobial prescribed, or none

Method of prescribing: \* Only 1 antimicrobial prescribed, or none

**Patient Demographics**

Patient age group: \*
   
 0 to 12 years
   
 13 to 64 years
   
 65 years or over

Pregnant\*
   
 Yes
   
 No

Penicillin allergy\*
   
 Yes
   
 No

**Prescriber**

GP Practice TEST REFERRER CENTRE (XXXX)
   
 GP Dr. A Referrer

**Administration**

Date Reported\* 03-Nov-2010
   
 Audit Type\* Prescribing Audit
   
 Nature of Request\* (Not Specified)
   
 Priority\* Routine

Back Preview Letter Park View XML

Enter age band of patient and whether they are pregnant or allergic to penicillin

SCI Gateway system will automatically detect and complete the GP practice details. Prescribers will select their name from drop down menu

These are system tools and will be populated with defaults and will not need to be changed



