RESISTANCE SURVEILLANCE
PROGRAMME

DATABASE
USER GUIDE

BSAC

BRITISH SOCIETY FOR
**ANTIMICROBIAL
CHEMOTHERAPY**

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1. INTRODUCTION

For more information about The British Society for Antimicrobial Chemotherapy (BSAC) Resistance Surveillance. Programme, including aims and objectives, please refer to **www.bsacsurv.org**.

2. THE PURPOSE OF THE USER GUIDE

1. To explain the structure of the current surveillance database and to describe step-by-step how to retrieve information successfully.

2. To explain the limitations of the current database and describe some common errors that may occur during searches.

3. CONTACT

If you would like more information about the BSAC Resistance Surveillance Project, including how to use the database; have identified an error within the databases or have suggestion for improvement, please contact the Project Co-ordinator within the British Society for Antimicrobial Chemotherapy:

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4. INSTRUCTIONS FOR USE

4.1   How to access the BSAC Resistance Surveillance Database

Both the bacteraemia and respiratory data can be found at the following web address: http://www.bsacsurv.org.

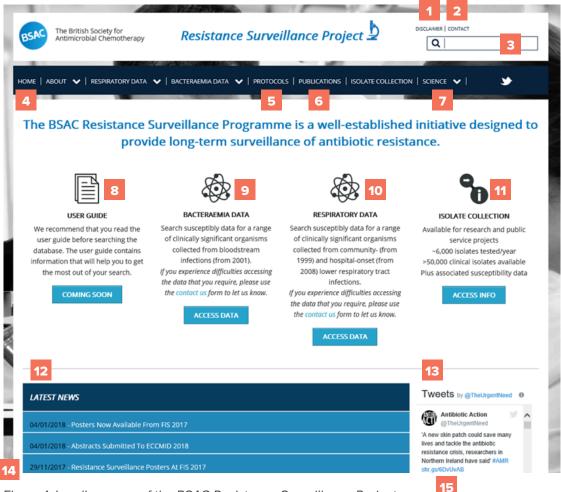The landing page of the BSAC Resistance Surveillance Project is shown in Figure 1.

Figure 1. Landing page of the BSAC Resistance Surveillance Project

4.2 Description of the landing page of BSAC Resistance Surveillance Project

A brief description of main functions available on the landing page of BSAC Resistance Surveillance Project is available in Table 1.

Table 1. Description of the landing page of BSAC Resistance Surveillance Project.

Location	Function	Description
1	Disclaimer	Information relating to the intended use, ownership, use of information, including data, from the website; how to cite the website, and publication of data can be found here.
2	Contact	The user is directed to a contact form that can be completed to access further information. You do need to leave the box ticked, otherwise the email won't send! At the moment, you won't receive an auto-email to say that your email has been received.
3	Search function	A search function to search content of the site. Be aware that this search function is basic. For instance, it will recognise the search term *Escherichia coli*, but it will not recognise *E. coli*; it will recognise the search term vancomycin but it will not recognise aminoglycoside.
4	About	Further information about the surveillance programme can be found here in terms of current/previous sponsors and participating laboratories.
5	Protocols	The most up-to-date laboratory protocols for both the programmes can be found here.
6	Publications	A list of peer-reviewed publications, posters and copies of oral presentations can be found here, in chronological order (most recent first).
7	Science	**Abbreviations:** A list of abbreviations use in the databases can be found here. **Antimicrobial agents:** the most common three letter abbreviations are used. Please note, these may not be the same as those used in some diagnostic labs. **Mechanisms of Resistance:** Are abbreviated as four letters. Currently, this list is not up-to-date e.g. carbapenem resistance mechanisms are not included. **Organisms:** Some two letter abbreviations are used. These may not be the same as those used in some diagnostic laboratories. **Definitions:** of breakpoint, isolates, and MICs can be found here. An explanation of summary types can be found here, including why some antimicrobial agents appear in the MIC summary but not in the SIR summary. How to cite use of the website and any changes to the data are also recorded here.
8	User Guide Icon	The most up-to-date version of the Database User Guide can be found here.
9	Bacteraemia Data Icon	Susceptibly data for a range of clinically significant organisms collected from bloodstream infections (from 2001) can be accessed from here.
10	Respiratory Data Icon	Susceptibly data for a range of clinically significant organisms collected from community- and hospital-onset lower respiratory tract infections can be accessed from here.
11	Request Isolate Icon	Information about the Isolate Collection and how to access the isolates can be found here.
12	Latest News	Latest news items are displayed here.
13	Tweets	Tweets from @TheUrgentNeed can be found here.
14	Current Sponsors Logos	The logos of the current sponsors of the programme are shown at the bottom of the landing page (logos not shown In Fig. 1). These do not link to the homepage of the corresponding sponsor.
15	Central Testing Laboratory Logo	This logo does not currently link to the homepage of the Central Testing Laboratory (logos not shown in Fig.1).

4.3 Data Search Options

To access the search options, users need to click on the [Access Data] button. Data are presented separately for the bacteraemia and respiratory databases.

Drop-down boxes are used to search the bacteraemia and respiratory databases. In order to run a search, users are required to select variables from five options: organism, antimicrobial agent, country, summary type and season (Table 2) and click on the blue [Search Data] button.

Table 2. Searchable variables within the bacteraemia and respiratory databases.

Variable	Options	Limitation
Organism	Numerous options are offered and more than one selection can be made.	There are some omissions, such as *Raoultella* species, specific species of streptococci, whose identification has improved since the introduction of MALDI. There are some oddities, such as the ability to search for *S. pneumoniae* serotype 14 but not other serotypes.
Antimicrobial agent	Option to choose a single or multiple antimicrobial agents or 'All' is offered.	Uncheck the all box before selecting specific agents to search. There is no clear function to remove checked boxes at the start of a different search. As the list is long, it is not easy to see which boxes are checked. There is no 'sense' check to the combination of organisms and antimicrobial agents that can be selected. For instance, there is nothing to stop someone from selecting *E. coli* and vancomycin despite this being a nonsensical search. Abbreviations used are listed within a different tab but this is not necessarily intuitive (see Location 7, Figure 1).
Country	Options of UK, Ireland or 'All' is offered.	A breakdown into England, Scotland, Wales, Northern Ireland or Ireland is not available. This is to prevent misinterpretation of data due to the small number of isolates submitted from some countries compared with others.
Summary	Options of SIRSummary, MICSummary, Mechanisms, MICDistributions or Isolates is offered.	Summary types are explained within a different tab but this is not necessarily intuitive (see Location 7, Figure 1).
Season	Option of selecting single or multiple seasons or 'All' is offered.	Uncheck the "All" box before selecting specific agents to search. There is no clear function to remove checked boxes at the start of a different search. As the list is long, it is not easy to see which boxes are checked. Sometimes the same year will appear multiple times.

4.4 Data currently not searchable

Data that are collected by the surveillance programme but are not searchable currently are age, sex, care setting and infection onset (community/hospital), *S. pneumoniae* serotype.

It is not possible to search at a laboratory/hospital level or region location data.

Data that are not collected by the surveillance programme are listed below:

- Genotyping and clonal information
- Outbreak information
- Isolates from cystic fibrosis patients

5. DATA PRESENTATION

Currently the results of data searches are only presented in a tabulated form.

Summaries are presented separately by year.

Currently data cannot be downloaded or exported. Users need to create their own methods of recording data.

5.1 SIR Summary

The SIR Summary shows the number of samples which were susceptible (S), intermediate (I) and resistant (R) to each antimicrobial agent. The breakpoints are included to show the concentration of the agent which defines whether the sample is classified as susceptible or resistant (Figure 2).

Figure 2. Example of results presented in a SIR Summary format.

SIRSummary for E. faecium for 2016 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
127	van	4	4	92	72.4%	0	0%	35	27.6%	20.2%	36.3%

5.2 MIC Summary

The MIC Summary shows the minimum and maximum MICs from the isolates tested, the concentration that inhibited 50% of the isolates (MIC50) and the concentration that inhibited 90% of the isolates (MIC90) (Figure 3).

Figure 3. Example of results presented in a MIC Summary format.

MICSummary for E. faecium for 2016 from All Countries

Total	Antimicrobial	Minimum MIC	MIC50	MIC90	Maximum MIC
127	van	1	1	>= 256	>= 256

5.3 Mechanisms

This table shows the total number of isolates that were tested for each resistance mechanism and how many of those samples tested positive (Figure 4).

Figure 4. Example of results presented in a Mechanisms format.

Resistance Mechanisms for E. coli for 2016 from All Countries

Total	Mechanism	Negative		Positive		95% C.I. on the % positive	
		N	%	N	%	Lower	Upper
496	ESBL, all types	453	91.3	43	8.7	6.4%	11.6%
496	ESBL, CTX-M type	456	91.9	40	8.1	5.9%	10.9%

5.4 MIC distributions

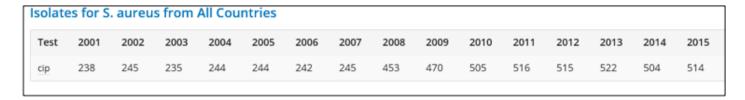The MIC distribution shows the number of isolates at each MIC value (Figure 5).

Figure 5. Example of results presented in the MIC distributions format.

■ (blue)	The corresponding MICs should be read as >= tabulated value
■ (green)	The corresponding MICs should be read as <= tabulated value

MICDistributions for E. faecium from All Countries for 2016

MIC	van
0.12	0
0.25	0
0.5	0
1	75 / 59.1%
2	15 / 11.8%
4	2 / 1.6%
8	1 / 0.8%
16	0
32	0
64	0
128	0
256	34 / 26.8%
Total	127

5.5 Isolates

The Isolates summary shows the number of isolates tested against each antimicrobial agent (Figure 6).

Figure 6. Example of results presented in the Isolates summary format.

Isolates for S. aureus from All Countries

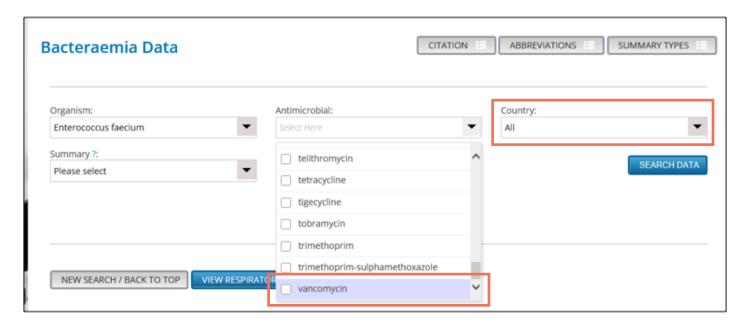| Test	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
cip	238	245	235	244	244	242	245	453	470	505	516	515	522	504	514

6. A WORKED EXAMPLE

a) How to search for all *E. faecium* with resistance to vancomycin, all years, all regions

1. Enter the bacteraemia database by clicking on the blue button labelled [Access Data] under the Bacteraemia Data Icon (Location 9, Figure 1).

2. From the drop down menu labelled Organism, select *Enterococcus faecium* by clicking in the empty box by the organism name.

3. Uncheck the "All" box in the drop down menu labelled Antimicrobial and scroll down the list and check the empty box next to the antimicrobial "Vancomycin".

4. Leave the Country variable as 'All'.

5. Select the SIR Summary option by highlighting the variable and click on the blue [Search Data] button.

6. Data are presented in a tabulated format and the user will need to create their own method of recording the data. Result for all years can be seen by scrolling down the page.

SIRSummary for E. faecium for 2016 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
127	van	4	4	92	72.4%	0	0%	35	27.6%	20.2%	36.3%

SIRSummary for E. faecium for 2015 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
104	van	4	4	70	67.3%	0	0%	34	32.7%	24.0%	42.7%

SIRSummary for E. faecium for 2014 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
115	van	4	4	78	67.8%	0	0%	37	32.2%	23.9%	41.6%

SIRSummary for E. faecium for 2013 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
112	van	4	4	75	67.0%	0	0.0%	37	33.0%	24.6%	42.6%

SIRSummary for E. faecium for 2012 from All Countries

Total	Antimicrobial	Breakpoints		Susceptible		Intermediate		Resistant		95% C.I. on the % Non-susceptible	
		S<=	R>	N	%	N	%	N	%	Lower	Upper
115	van	4	4	81	70.4%	0	0.0%	34	29.6%	21.6%	38.9%

7. COMMON PITFALLS AND LIMITATIONS OF THE CURRENT DATABASE

The bacteraemia and respiratory databases are separate and cannot be search simultaneously; therefore, it is not possible to search for all *E. coli* isolates collected regardless of the clinical syndrome.

7.1 Error messages

Results may not be presented for the following reasons:

- The organism selected has not been tested against the agent selected.

- The data is missing from the database.

- There are no breakpoints for the organism-antimicrobial agent combination selected (SIR summary). Please check the latest EUCAST breakpoints used by the website (http://www.bsacsurv.org/bacteraemia-data/breakpoints/ or http://www.bsacsurv.org/respiratory-data/breakpoints).

7.2 Changes to breakpoints

Data tables produced by the website may sometimes change. The most likely reason is that the breakpoints have changed, and therefore the percentage of isolates susceptible/intermediate/resistant has changed. Check the breakpoints link to see what breakpoints have been used at different times – the breakpoint tables are updated at least annually.

Occasionally, we also need to make corrections to the data. If you are concerned about an apparent change, you can contact the Resistance Surveillance Coordinator. Please say which organism, season and summary you are asking about, and which antimicrobial agents are involved.