



CDSC (NI)

***S. aureus* bacteraemia surveillance**

Quarterly feedback to Trusts
(New and legacy Trust formation)

Quarter ending September 2007

***S. aureus* bacteraemia surveillance**

Quarter: July – September 2007

Summary

- ❖ **There was no statistically significant change in rates compared to the previous quarter (Figure 1).**
- ❖ The Northern Ireland rate of *S. aureus* patient episodes has **risen slightly** compared with the previous quarter, from 0.28 to 0.33 (Figure 1, Table 1).
- ❖ The MRSA rate **increased** to 0.15 from 0.10 in the previous quarter (Figure 1; Table 2).
- ❖ The MSSA rate **remained** at 0.18 as in the previous quarter (Figure 1; Table 2).
- ❖ The overall percentage of all *S. aureus* patient episodes reported as MRSA was 44.7%, compared to 34.1% in the previous quarter (Table 2).
- ❖ The **lowest rate of all *S. aureus*** patient episodes per 1,000 occupied bed days was recorded for Green Park HSS Trust during this quarter (0.09, 2 episodes). The **highest rate of all *S. aureus*** was recorded for Mater Infirmorum Hospital HSS Trust (0.69, 17 episodes) (Table 1).
- ❖ The **lowest rate of MSSA** patient episodes per 1,000 occupied bed days was recorded for Sperrin Lakeland HSS Trust during this quarter (0.05, 1 episode). The **highest rate of MSSA** was recorded for Newry & Mourne HSS Trust (0.51, 8 episodes) (Table 1; Figure 2).
- ❖ The **lowest rate of MRSA** patient episodes per 1,000 occupied bed days was recorded for GreenPark HSS Trust during this quarter (0, 0 episodes). The **highest rate of MRSA** was recorded for Mater Infirmorum Hospital HSS Trust (0.32, 8 episodes) (Table 1; Figure 2).
- ❖ Trends in rates since reporting began in 2001 are shown for each new Trust and the legacy Trust configuration in the form of Statistical Process Control (SPC) charts in Appendix 1. SPC charts allow the distinction to be made between natural variation and “special cause variation” where something unusual may be occurring. Further details on SPC charts can be found in Appendix 2.
- ❖ For Northern Ireland as a whole, and for each new Trust, MRSA rates are fluctuating within normal parameters. Only one legacy Trust, Sperrin Lakeland, breached the warning limit this quarter.
- ❖ The results shown are of infections which have been identified by testing within a hospital. No distinction is made between where the infection was acquired, that is, from the hospital or the community.
- ❖ **For several of the Trusts, for which the patient source is known, a number of recent reports have been from patients in the Accident & Emergency department at the time of blood sampling. Although the actual source of infection may have been external to the testing Trust, these patients still count towards the Trust quarterly total.** Transferred patients and duplicates between Trusts (within a 14-day time period) are removed from the dataset as far as possible using the details reported as part of the usual laboratory reporting (CoSurv and EARSS where available). However, there is a potential for duplicates to be included.
- ❖ For definitions, please refer to appendix 2
- ❖ **Rate calculations are provisional for this quarter and may be subject to change.**
- ❖ **For July – September 2007 the data for Altnagelvin remains unvalidated.**

- ❖ **Bed day data was unavailable for the legacy Craigavon Hospital Group Trust therefore an estimated figure was determined by taking the average of bed day data from July-September 2004, 2005 and 2006.**
- ❖ **All unvalidated data or estimated averages presented in this report will be corrected for the next report when validated information is available. Therefore there may be a few changes between reports.**

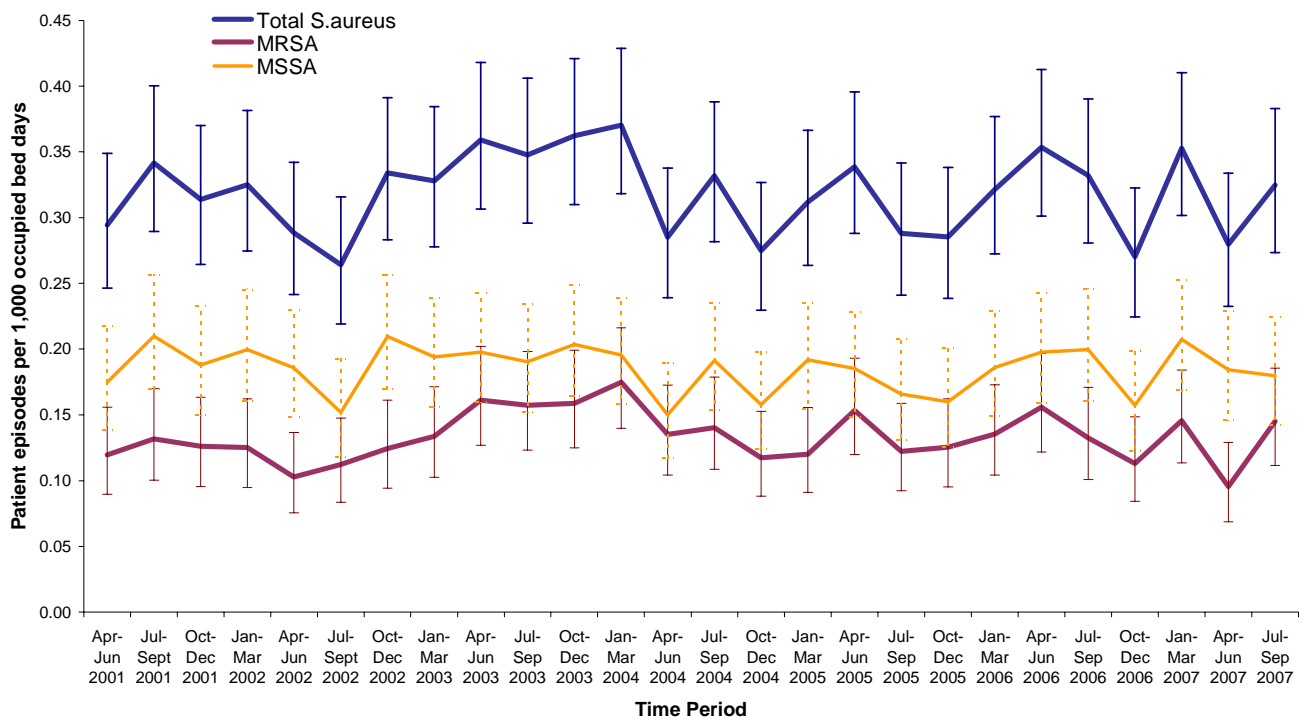


Figure 1: MSSA, MRSA and *S. aureus* patient episode rates in Northern Ireland by quarter, with 95% Confidence Intervals, April 2001 – September 2007

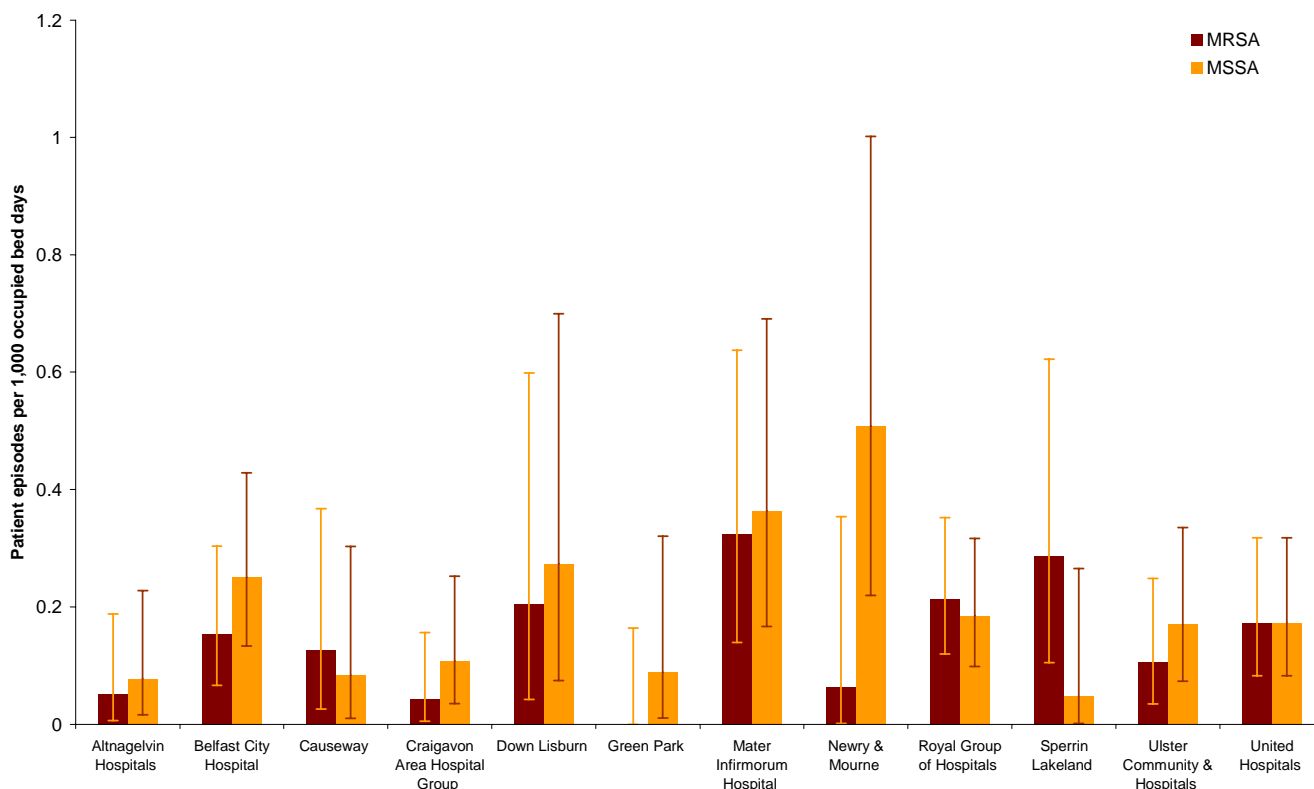


Figure 2: MSSA and MRSA patient episodes per 1,000 occupied bed days, with 95% Confidence Intervals, by Legacy Trust* July – September 2007

*Altnagelvin and Craigavon Area Hospital Group figures are provisional (see summary)

Table 1: *S. aureus* and MRSA patient episodes and rates for trusts, July – September 2007

Trust	Number of Patient episodes			Patient episodes per 1,000 occupied bed-days		
	MSSA	MRSA	All <i>S. aureus</i>	MSSA	MRSA	All <i>S. aureus</i>
Altnagelvin Hospitals	3	2	5	0.078	0.052	0.130
Belfast City Hospital	13	8	21	0.251	0.154	0.405
Causeway	2	3	5	0.084	0.126	0.210
Craigavon Area Hospital Group	5	2	7	0.108	0.043	0.151
Down Lisburn	4	3	7	0.273	0.205	0.478
Green Park	2	0	2	0.089	0.000	0.089
Mater Infirmerum Hospital	9	8	17	0.364	0.323	0.687
Newry & Mourne	8	1	9	0.508	0.064	0.572
Royal Group of Hospitals	13	15	28	0.185	0.214	0.399
Sperrin Lakeland	1	6	7	0.048	0.286	0.333
Ulster Community & Hospitals	8	5	13	0.170	0.106	0.276
United Hospitals	10	10	20	0.173	0.173	0.346
Northern Ireland	78	63	141	0.180	0.145	0.325

Table 2: MSSA, MRSA and total *S. aureus* rates per 1,000 occupied bed days and the percentage of *S. aureus* which were reported as MRSA in Northern Ireland, 2001-2007

Quarter	MSSA rate	MRSA rate	All <i>S. aureus</i> rate	% MRSA
Apr-Jun 2001	0.175	0.120	0.294	40.6
Jul-Sept 2001	0.210	0.132	0.342	38.6
Oct-Dec 2001	0.188	0.126	0.314	40.1
Jan-Mar 2002	0.200	0.125	0.325	38.5
Apr-Jun 2002	0.186	0.103	0.288	35.6
Jul-Sept 2002	0.152	0.112	0.264	42.5
Oct-Dec 2002	0.210	0.124	0.334	37.3
Jan-Mar 2003	0.194	0.134	0.328	40.8
Apr-Jun 2003	0.198	0.161	0.359	44.9
Jul-Sep 2003	0.190	0.157	0.348	45.3
Oct-Dec 2003	0.203	0.159	0.362	43.9
Jan-Mar 2004	0.195	0.175	0.370	47.2
Apr-Jun 2004	0.150	0.135	0.285	47.4
Jul-Sep 2004	0.191	0.140	0.332	42.3
Oct-Dec 2004	0.158	0.117	0.275	42.6
Jan-Mar 2005	0.192	0.120	0.312	38.5
Apr-Jun 2005	0.185	0.155	0.341	45.3
Jul-Sep 2005	0.166	0.122	0.290	42.4
Oct-Dec 2005	0.160	0.125	0.285	43.9
Jan-Mar 2006	0.186	0.135	0.321	42.1
Apr-Jun 2006	0.198	0.156	0.354	44.1
Jul-Sep 2006	0.200	0.132	0.332	39.9
Oct-Dec 2006	0.156	0.112	0.269	41.8
Jan-Mar 2007	0.207	0.146	0.353	41.3
Apr-Jun 2007	0.184	0.096	0.280	34.1
Jul-Sep 2007	0.180	0.145	0.325	44.7

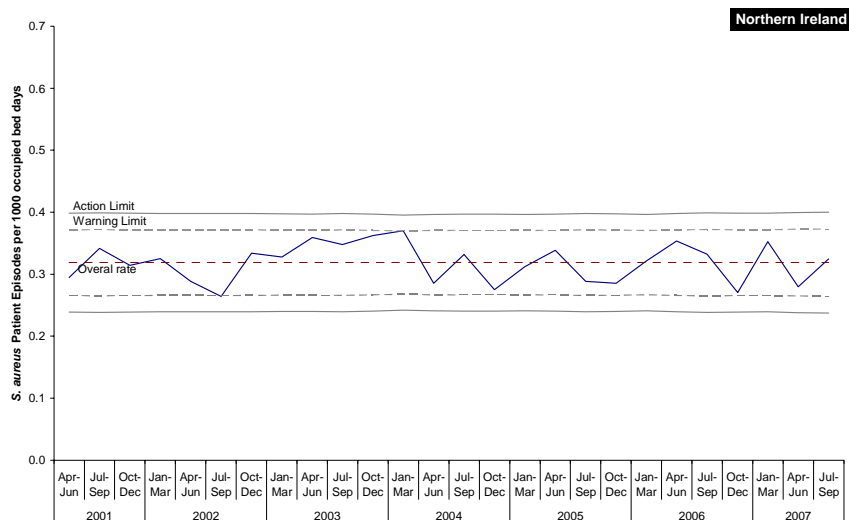


Figure 3a: Statistical Process control chart for quarterly **S.aureus** rates in Northern Ireland

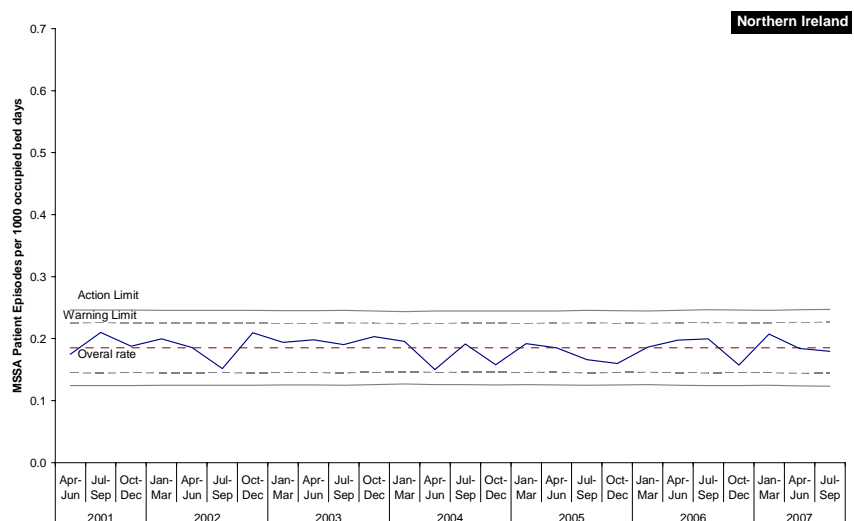


Figure 3b: Statistical Process control chart for quarterly **MSSA** rates in Northern Ireland

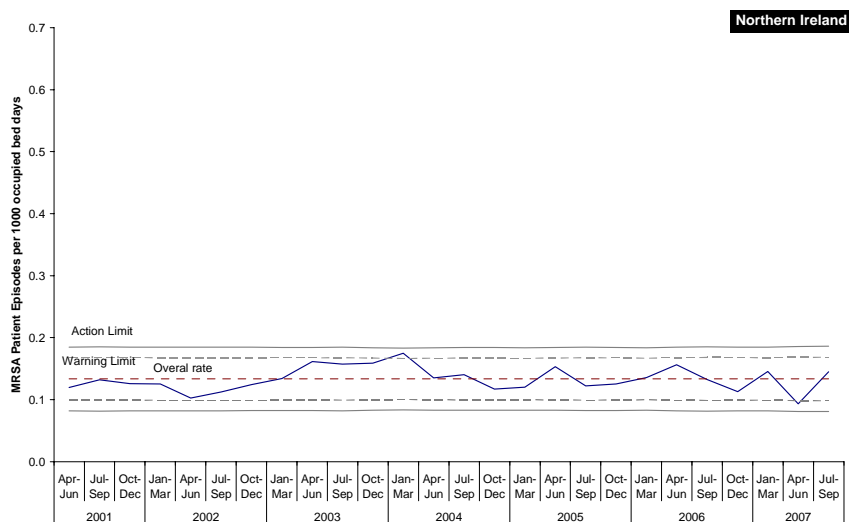
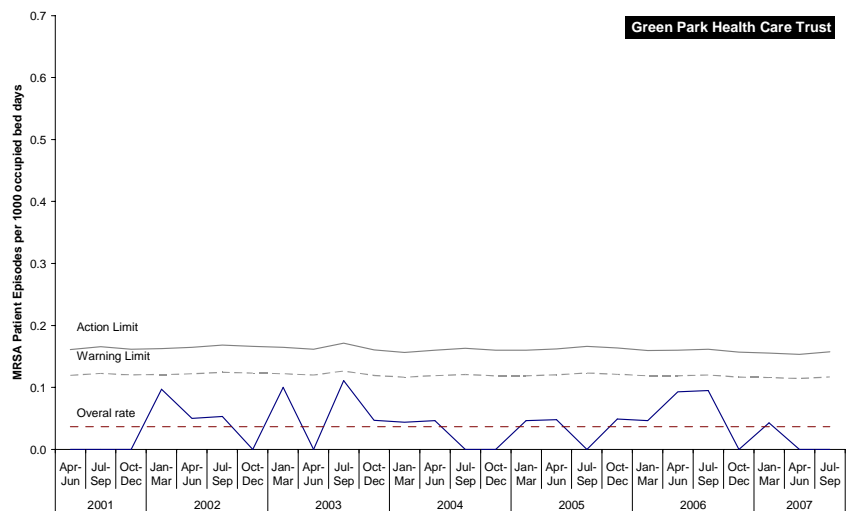
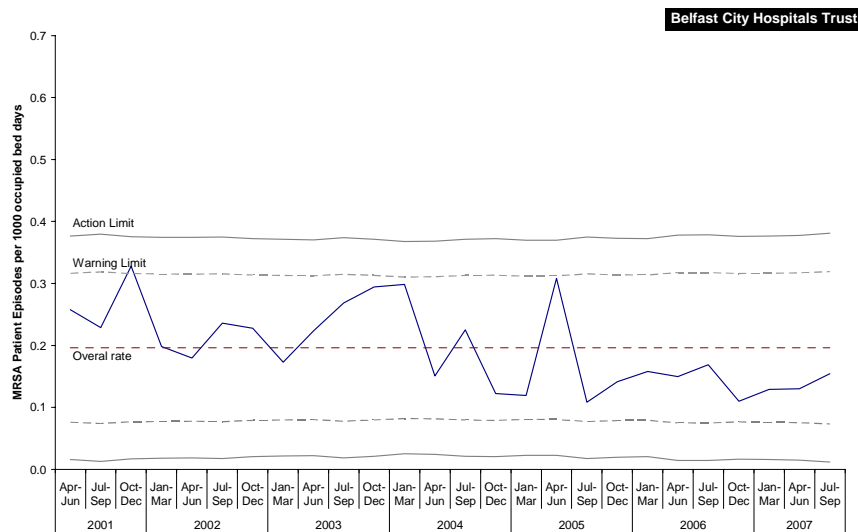
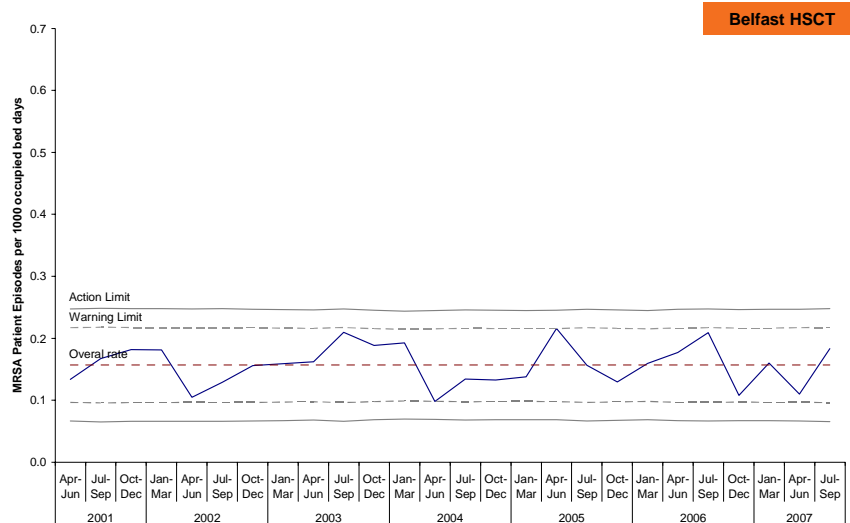
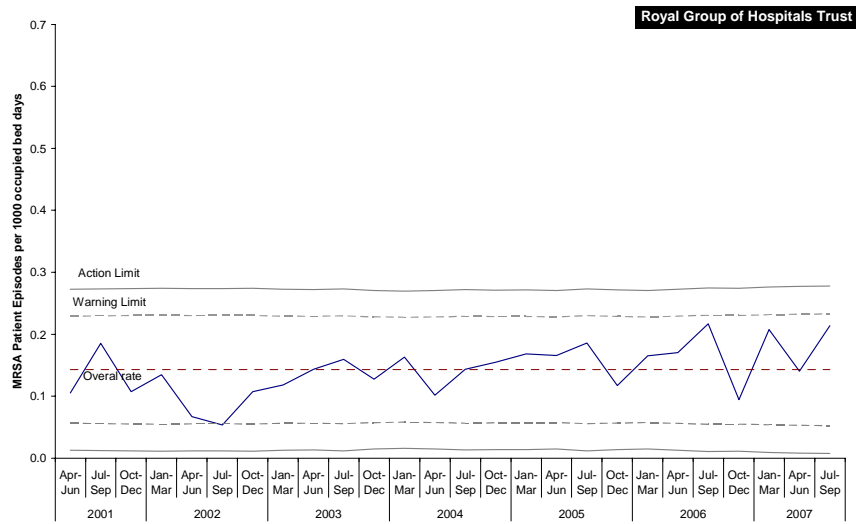
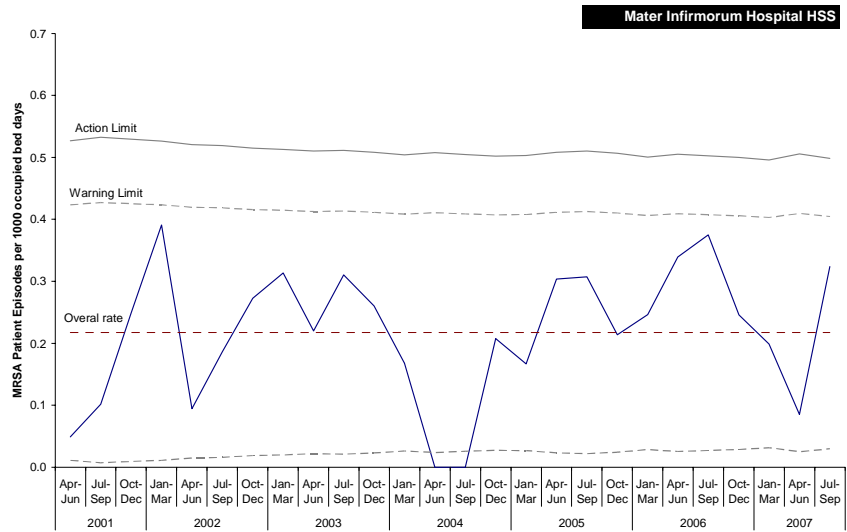


Figure 3c: Statistical Process control chart for quarterly **MRSA** rates in Northern Ireland

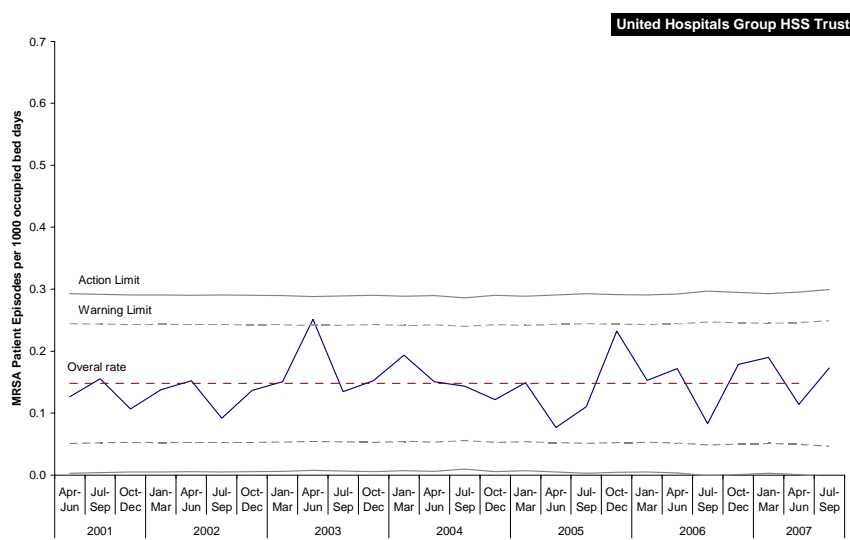
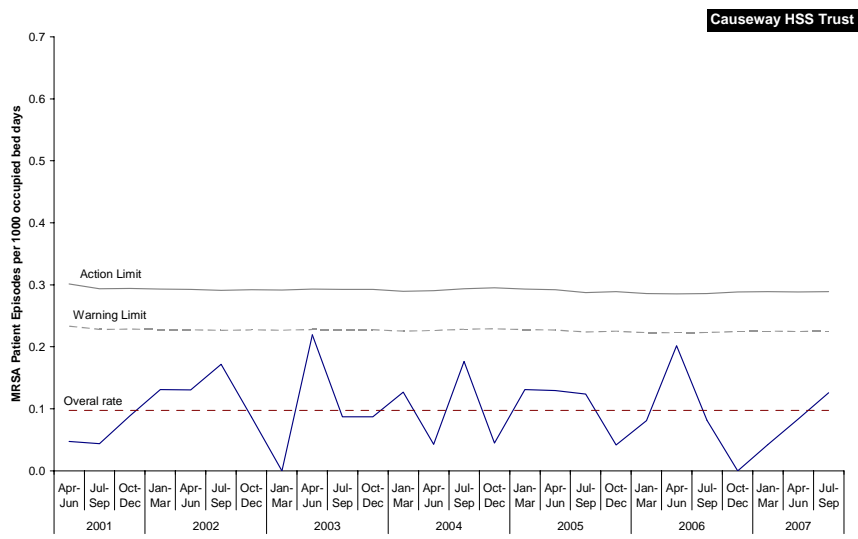
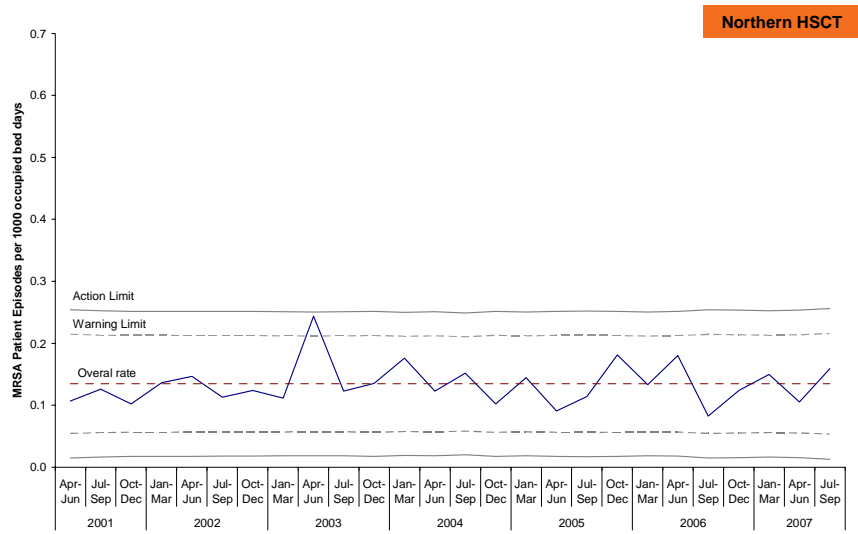
Appendix 1: Trends in MRSA rates by trust (both old and new) and quarter (2001-2007)



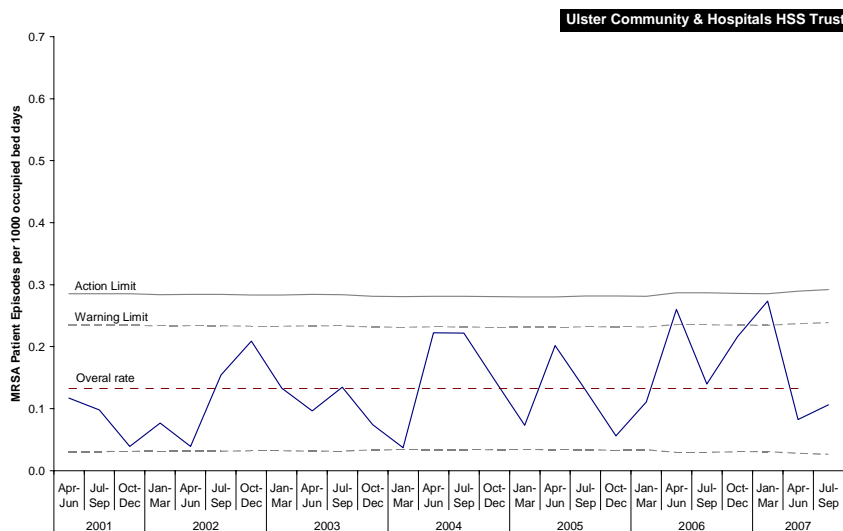
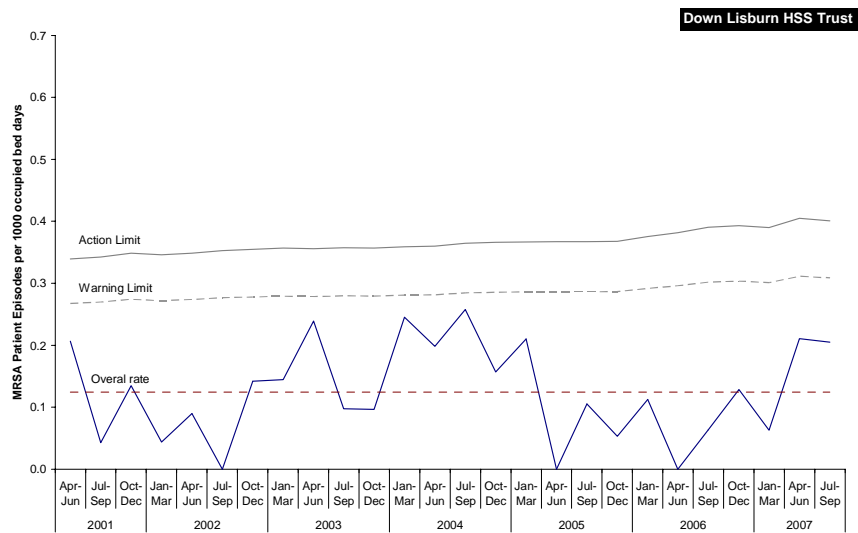
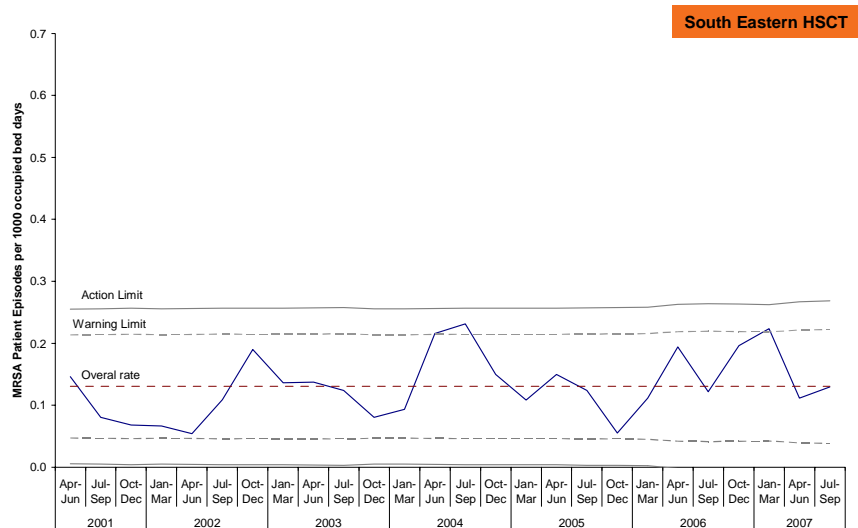
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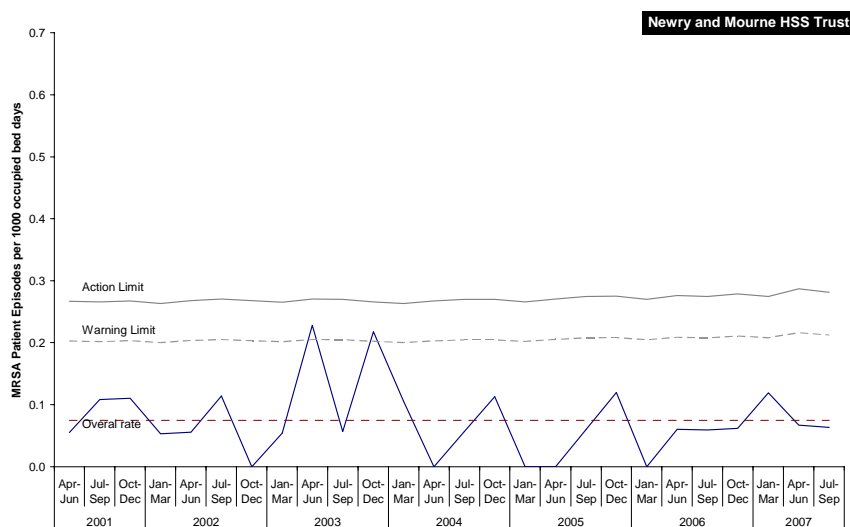
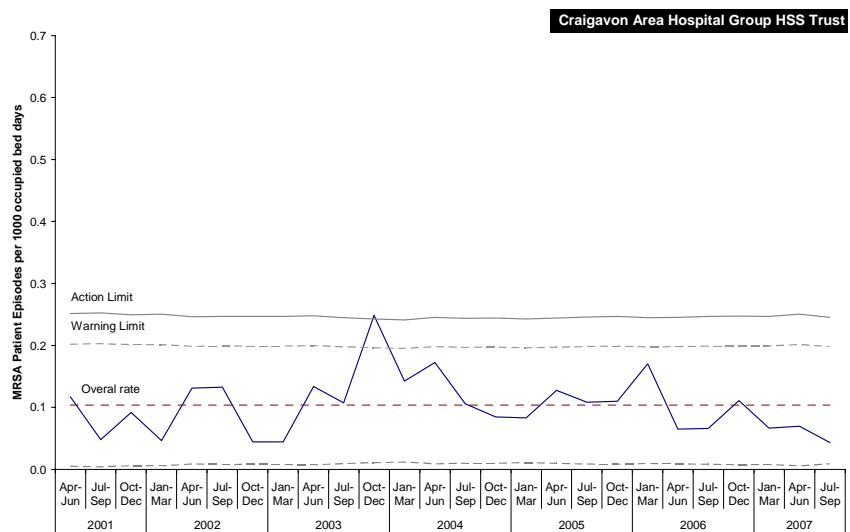
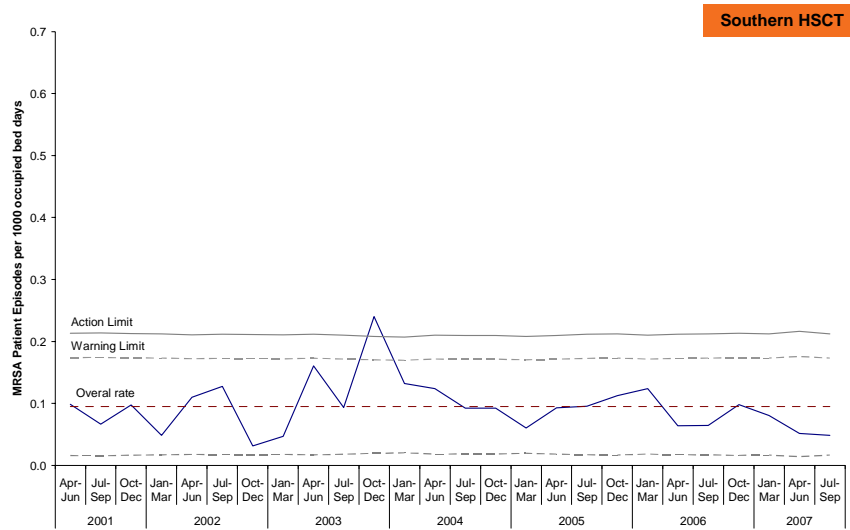
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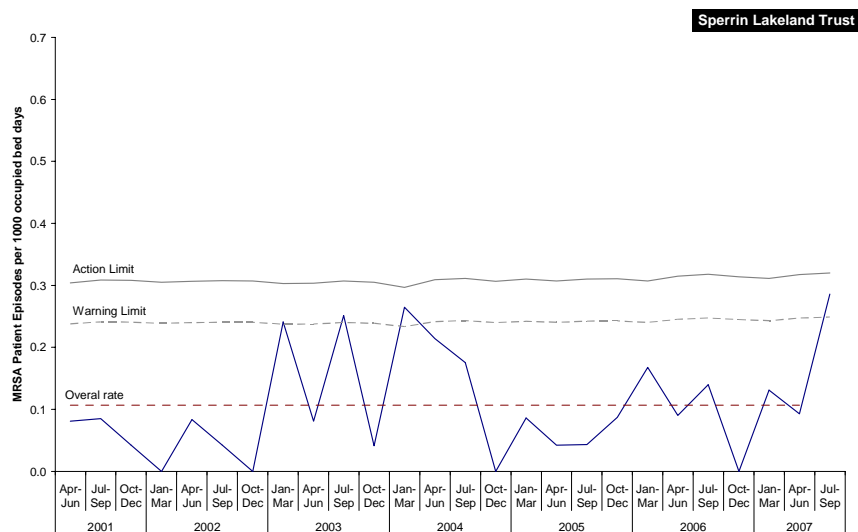
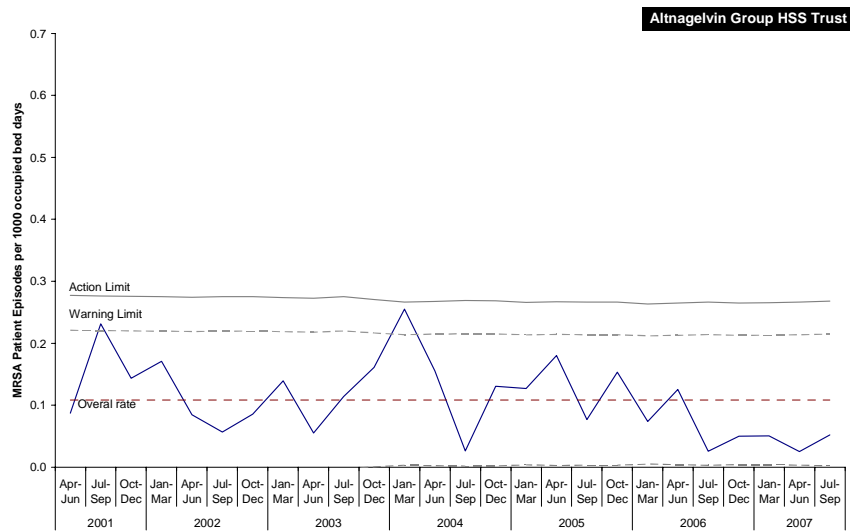
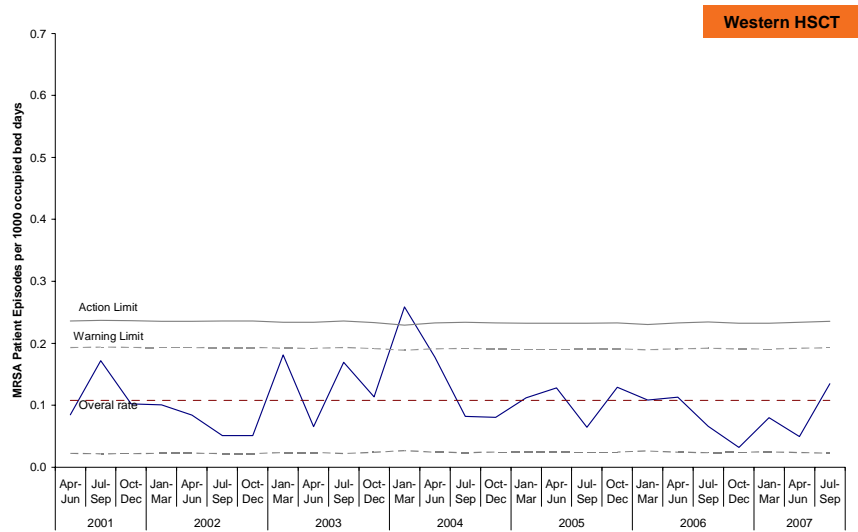
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Appendix 2: Notes and Definitions

Statistical Process Control charts:

The Statistical Process Control (SPC) chart is now commonly used for the reporting of MRSA rates throughout the UK. SPC charts assume that rates within a Trust will be largely similar over time. They present the occurrence of *S. aureus* bacteraemias in a Trust in relation to what would be expected, based upon the mean rate for the Trust and calculated statistical process control limits.

The mean for each Trust has been calculated using the data from all quarters since April 2001. Control limits, derived from plus or minus 2 or 3 standard deviations from the mean, represent the range of variation in rates that might be expected to occur due to chance alone.

The warning limit is set at two standard deviations from the mean, whilst the action limit is set at three standard deviations from the mean. The limits vary slightly every quarter because of the varying occupancy in the hospitals within each trust.

Control limits were set up by using the following formulae:

$$\text{Warning Limit} = M \pm 2 \sqrt{\frac{E_i}{(N_i)^2}} \quad \text{Action Limit} = M \pm 3 \sqrt{\frac{E_i}{(N_i)^2}}$$

Where M is the Mean, Ni is the number of Occupied Bed-days per quarter and Ei is the expected number of reports calculated as $E_i = M \times N_i$

SPC charts allow the distinction to be made between natural variation and “special cause variation”, where something unusual is occurring in a Trust. If any of the following criteria are met then there is said to be “special cause variation” which should to be investigated, as this could not statistically have occurred by chance alone:

- 1 value above the upper action limit, or below the lower action limit
- 3 consecutive values between the upper warning limit and upper action limit (or between lower limits)
- 8 consecutive values on the same side of the mean (either above or below)
- Any 12 of 14 consecutive values on the same side of the mean (either above or below)
- 8 consecutive values either increasing or decreasing

Trust Activity is defined as the number of occupied beds (from KH03A return) and is used to calculate a rate per 1,000 occupied bed days. KH03A data is obtained from DHSSPSNI on a quarterly basis.

The number of patient episodes is defined as the total number of patients from whom blood culture set(s) collected during the quarter grew *S aureus*. If repeat specimens were collected from a single patient, and the patient was considered to have had two episodes of bacteraemia, then they should be counted as two patients. As an arbitrary measure, if positive blood culture sets are collected more than 14 days apart, they should be considered as reflecting different episodes.