



National Public Health
Service for Wales
Gwasanaeth Iechyd Cyhoeddus
Cenedlaethol Cymru

NPHS Communicable Disease
Surveillance Centre

Orthopaedic Surgical Site Infection Report

January – December 2004
DRAFT 2

This report includes surgical site infection (SSI) related to the four core procedures performed by orthopaedic surgeons in Wales.

Data are included for trusts / hospitals from January 2004 – December 2004

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Introduction

In November 2002 the NHS Management Board in Wales agreed to adopt measures to reduce healthcare associated infections. The first step was to make orthopaedic surgical site infection surveillance mandatory in all Trusts in Wales performing joint replacement. A Welsh Health Circular (WHC (2003) 43) was issued to Chief Executives informing them of this.

Surgical site infections (SSI) are a substantial cause of mortality and morbidity among hospitalised patients. Studies on orthopaedic surgical site infections have shown them to result in considerable increases in lengths of stay, high re-hospitalisation rates, increased healthcare costs and significant reductions in health-related quality of life^{1,2}. Surveillance of orthopaedic SSI and participation in national surveillance schemes have previously been shown to contribute to significant reductions in SSI rates, by allowing units to recognise whether they have a problem and monitoring the affects of interventions introduced^{3,4}.

This is the second national report on surgical site infections (SSI) following orthopaedic procedures in Wales, since the surveillance was made mandatory in September 2003. The data presented here is a summary of information reported by 7 Trusts in Wales in the calendar year 2004.

The surveillance incorporates data collected by clinical teams and uses internationally agreed definitions⁵, allowing Welsh data to be compared with and be incorporated into other international databases, such as the HELICS⁶ European SSI database. The purpose of the surveillance is to assist Trusts in monitoring their infection rates so that risk can be assessed and communicated and variations from the expected mean recognised and investigated.

Results

Exclusions

Although some Trusts carry out surveillance on all orthopaedic procedures, this report is restricted to the surveillance of the 4 mandatory procedures:

- Arthroplasty of the hip
- Arthroplasty of the knee
- Hemiarthroplasty
- Internal fixation of trochanteric fractures of the femur (#NOF)

A total of 1311 questionnaires were received for the 4 mandatory procedures with procedure dates in 2004. 100 of these reports were not analysed because the question on whether the patient had an SSI had not been completed.

Table 1. Orthopaedic SSI questionnaires received and analysed in 2004

Procedure Category	No of questionnaires received	No of questionnaires analysed*
All mandatory procedures	1311	1211
Hip arthroplasty	553	527
Knee arthroplasty	493	453
Hemiarthroplasty	103	96
# NOF	162	135

*Questionnaires excluded if SSI question not completed Yes or No.

Completion Rates

The completion rates for the data items in the orthopaedic SSI questionnaire are detailed in Table 2 below. Procedure type, SSI and procedure date have not been included, since the 1211 procedures identified for Wales for 2004 were extracted on the basis of being a mandatory procedure, having a procedure date in 2004 and having the SSI field completed.

Table 2. Percentage completion of data items on the orthopaedic SSI questionnaires for 2004

Data Item	Expected	Present	% Completed
Admission date	1211	1201	99.2%
Age	1211	1205	99.5%
Anaesthesia Type	1211	1196 ¹	98.8%
Antibiotic prophylaxis	1211	1195	98.7%
Antibiotic route	1182	1171 ²	96.7%
Antibiotics continued	1182	903	76.4%
Antibiotic loaded cement	1211	1167	96.4%
ASA	1211	1192	98.4%
Clinician type	1211	1198	98.9%
Closure Time	1211	1163	96.0%
Consultant code	1211	1190	98.3%
Consultant present	571	563	98.6%
Criteria for diagnosing infection	38	34 ³	89.5%
Date of Death/Discharge	1211	1182	97.6%
Diagnosis	1211	1192 ⁴	98.4%
Incision Time	1211	1188	98.1%
Infection date	38	30	78.9%

Operation type (emergency/elective)	1211	1157	95.5%
Outcome	1211	1175	97.0%
Procedure Code	1211	1144	94.5%
Readmission	1211	1094	90.3%
Relationship of SSI to death	1	0	0
Sex	1211	1210	99.9%
Specific site of O/S infection	0	7	
SSI type	38	34	89.5%
Thromboprophylaxis	1211	1173	96.9%
Wound Class	1211	1201	99.2%

1. 15 records had no response in general, local or regional anaesthesia fields.
2. 11 records had no response in any of the 3 antibiotic route fields.
3. 4 records had no response in any of the criteria fields.
4. 19 records had no response in any of the 4 diagnosis fields.

1. General Demographics

This section gives information about the gender, age groups, procedures, SSIs and the type of SSI.

1.1 Incidence of SSI by Patient Age Group

Table 4. Orthopaedic Surgical Site Infections by Patient Age Group

Age Group	No. of Procedures*	No. of SSI	% SSI
<56	106	4	3.8
56-65	241	8	3.3
66-75	431	14	3.2
76+	427	12	2.8

*6 procedures have been excluded because patient age was not completed

Key Summary Points

- The majority of procedures were carried out on patients aged over 65.
- There was very little difference between the infection rates in different age groups.

1.2 Incidence of SSI by Patient Gender

Table 3. Orthopaedic Surgical Site Infections by Patient Gender

Procedure Category	Females		Males	
	No of procedures*	% SSI	No of procedures*	% SSI
All Procedures	702	3.3	508	3.0
Hip arthroplasty	294	2.4	232	1.7
Knee arthroplasty	239	2.9	214	1.7
Hemiarthroplasty	73	6.8	23	4.3
#NOF	96	4.2	39	7.7

*1 procedure has been excluded because patient gender was not completed

Key Summary Points

- The majority of procedures are carried out on female patients, overall and within each procedure type.
- Infection rates are higher in females for every procedure type other than #NOF.

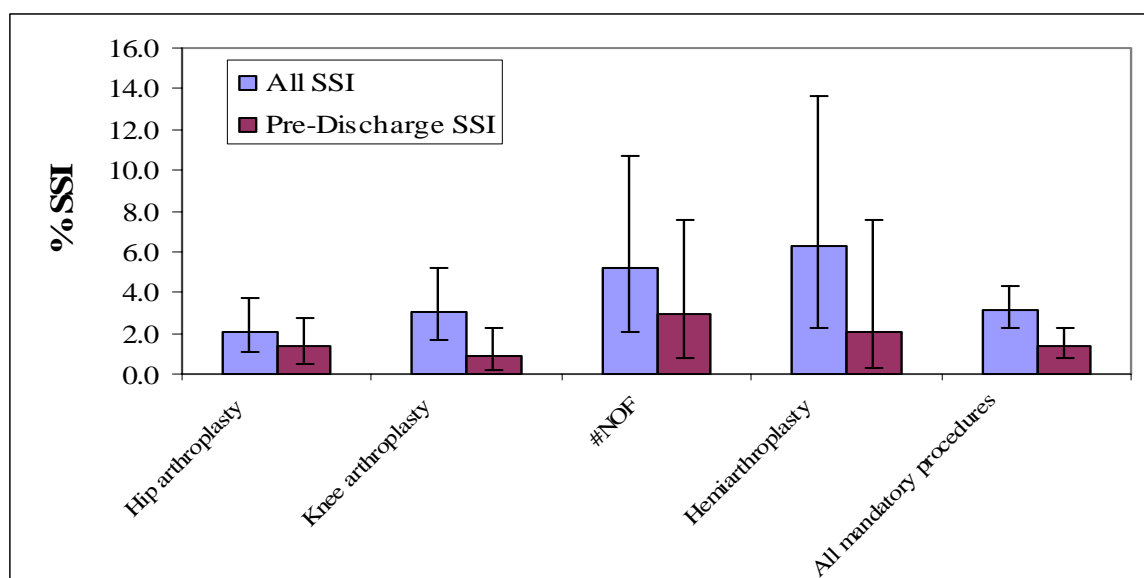
1.3 Incidence of SSI by Category of Surgical Procedure

There were 38 surgical site infections recorded in the 1211 analysable procedures. The crude SSI rate was 3.1%, which includes infections that occurred pre- and post-discharge from hospital. 55% of the infections were detected post-discharge. The crude pre-discharge SSI rate was 1.4%.

Table 5. Orthopaedic Surgical Site Infections by Category of Surgical Procedure

Procedure Category	No. procedures	No. SSI (All)	% SSI (95% CI)	No. Pre Dis SSI	% Pre Dis SSI
All mandatory procedures	1211	38	3.1 (2.2-4.3)	17	1.4 (0.8-2.3)
Hip arthroplasty	527	11	2.1 (1.0-3.7)	7	1.3 (0.5-2.7)
Knee arthroplasty	453	14	3.1 (1.7-5.2)	4	0.9 (0.2-2.3)
Hemiarthroplasty	96	6	6.3 (2.3-13.6)	2	2.0 (0.3-7.5)
#NOF	135	7	5.2 (2.1-10.7)	4	3.0 (0.8-7.6)

Figure 1. % SSI and % Pre-Discharge SSI by Procedure Type in Wales in 2004



Key Summary Points

- There were no significant differences between the rates of SSI in different procedure types.
- More than half the SSIs were identified post-discharge.
- Numbers of reports of hemiarthroplasty and #NOF procedures were small so data for these procedure types should be treated with caution.
- The pre-discharge rates of surgical site infection in Wales are comparable to those reported in the Pan Celtic data and for Scotland and Northern Ireland individually, where post-discharge surveillance was not undertaken (eg Hip prosthesis: Pan-Celtic⁷ = 1.8%; Scotland⁸ = 1.6%; Northern Ireland⁹ = 0.9%).

1.3.1 Incidence of SSI by Category of Surgical Procedure and OPCS Code

94% of the 1211 analysable questionnaires had an OPCS IV¹⁰ code completed. A description for each code is provided in the Appendix.

Table 6. Orthopaedic Surgical Site Infections by Category of Surgical Procedure and OPCS Code

Procedure category	No. records with codes	No. records with appropriate codes for the procedure type	No. without codes
Hemiarthroplasty	87	78	9
Hip arthroplasty	503	472	24
Knee arthroplasty	426	415	27
#NOF	128	58	7

Figure 2. No. of hemiarthroplasties, SSIs and % SSI by OPCS code in Wales in 2004

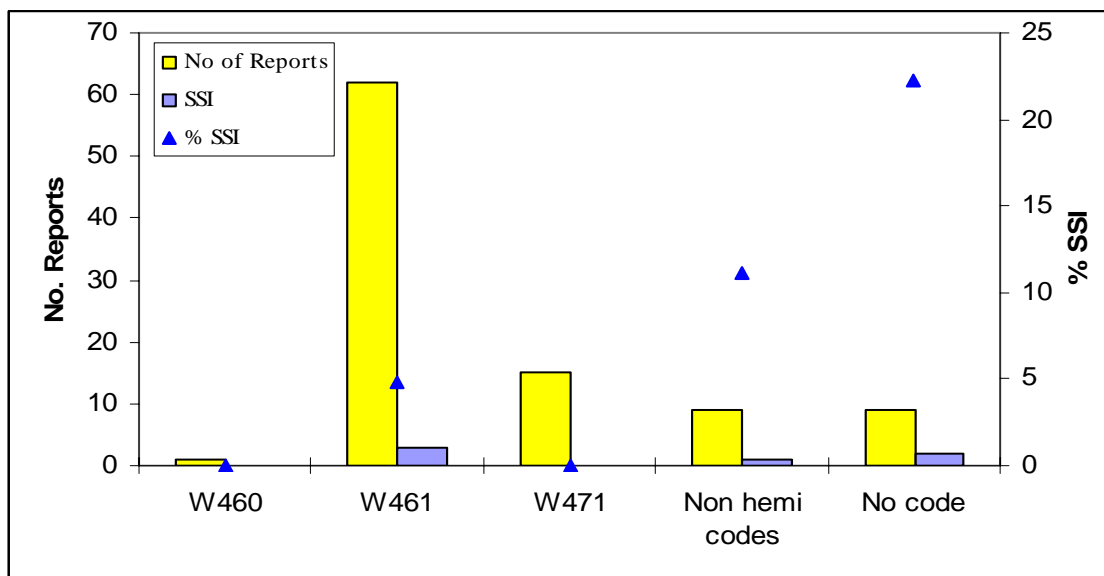


Figure 3. Reports of SSI following hip arthroplasty by OPCS code in Wales in 2004

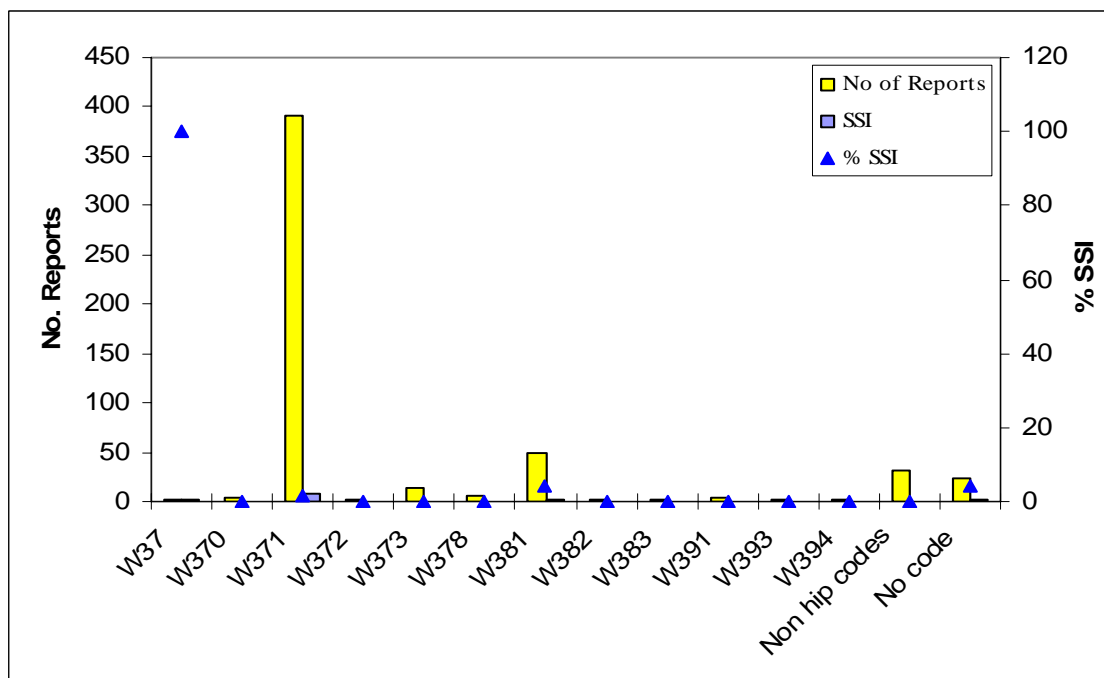


Figure 4. Reports of SSI following knee arthroplasty by OPCS code in Wales in 2004

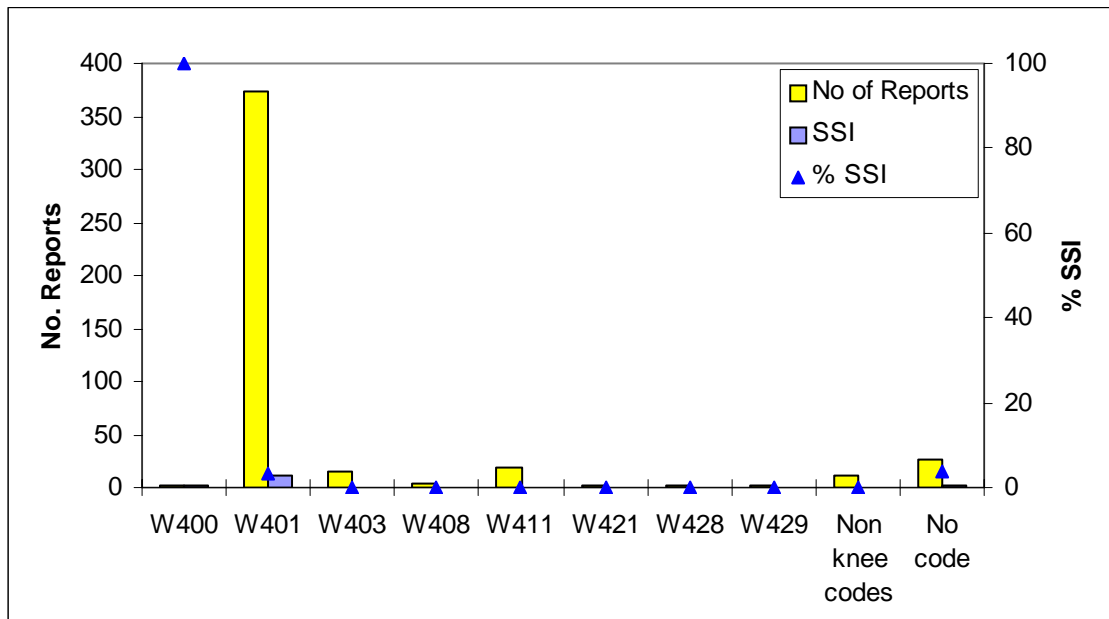
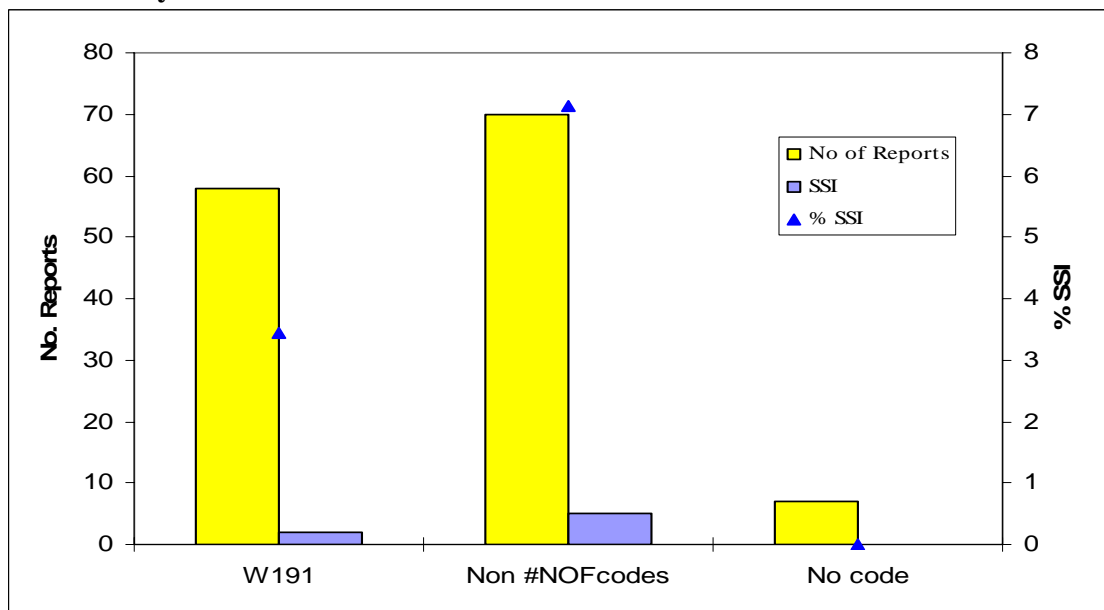


Figure 5. Reports of SSI following internal fixation of trochanteric fractures of the femur by OPCS code in Wales in 2004



Key Summary Points

- In many cases the OPCS code on the questionnaire did not match the procedure category selected. For this report, where they do not match, we have assumed that the procedure category is correct.
- For the #NOF codes, many of the OPCS codes provided were for fractures of bones other than the neck of the femur.
- Very few OPCS codes covering revision procedures were reported.
- No SSIs were recorded following revision procedures.

1.4 Incidence of SSI following Elective and Emergency Procedures

Table 7. Orthopaedic Surgical Site Infections in Elective and Emergency Surgical Procedures

Operation Type	No. Procedures	No. SSI	% SSI (95% CI)
Elective Procedures	957	26	2.7 (1.8-4.0)
Emergency Procedures	200	12	6.0 (3.1-10.5)

Key Summary Points

- The proportion of emergency procedures in Wales was higher than in the PanCeltic dataset (17.3% in Wales; 3.6% in PanCeltic⁷ data)
- There was no significant difference between the rates of SSI in elective and emergency procedures in Wales, whereas in the PanCeltic dataset the SSI rate for elective procedures was significantly lower.

1.5 Type of Surgical Site Infection

Three types of surgical site infection have been defined depending on whether the incisional site (superficial and deep infections) or other structures (organ/space infections) are involved. 34 of the 38 infections reported in Wales in 2004 had an infection type identified, but no organ/space infections were reported.

Table 8. Type of Surgical Site Infection by procedure category

Procedure Category	No. with type of SSI completed (total SSI)	Type of SSI	
		% Superficial	% Deep
All mandatory procedures	34 (38)	85	15
Hemiarthroplasty	4 (6)	75	25
Hip arthroplasty	11 (11)	82	18
Knee arthroplasty	13 (14)	85	15
#NOF	6 (7)	100	0

Key Summary Points

- Over 80% of the infections reported were of the superficial type.
- No organ/space infections were reported in 2004, however 6 infections reported as superficial (2), deep (3) or Not Specified (1), had a specific site of organ/space infection recorded. For the purposes of this report we have assumed that the SSI type was reported correctly.

2. Incidence of SSI by Patient Risk Index

Although the results are grouped by category of clinically similar procedures, they do not take into account factors that may influence the risk of infection. The American National Nosocomial Infections Surveillance (NNIS) system risk index¹¹ is the most widely used method internationally of risk adjusting surgical patients. The risk index uses three risk factors to score each patient from 0 to 3, namely the American Society of Anaesthesiologists (ASA) pre-operative assessment score, the wound classification and the duration of surgery. Sixty eight procedures have been excluded from the risk index analysis because one or more of the risk index component fields have not been completed and the risk index could therefore not be calculated.

Table 9 gives the proportion of records scoring 1 for each of the components of the risk index. Table 10 shows the numbers of records falling into each risk index category for all mandatory orthopaedic procedures. Figure 6 shows the percentage SSI by risk index for the different procedure categories. Because there were so few procedures with a risk index of 2 or 3 and no infections occurred in procedures of these categories, risk index 2 and 3 have not been included in the graphs.

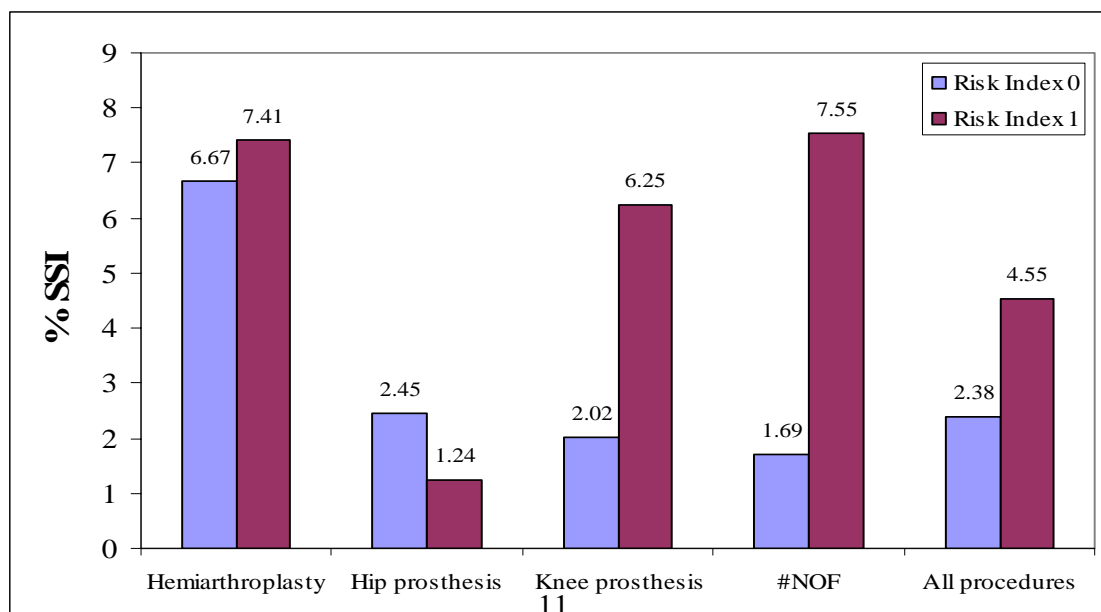
Table 9. Proportion of procedures scoring 1 for each of the components making up the NNIS system risk index

Risk Factor	Proportion of Procedures scoring 1
ASA of 3,4,5	30.3
Wound class Contaminated or Dirty/Infected	0.4
Duration of surgery over T value	10.0

Table 10. Surgical Site Infections by Patient Risk Index for all mandatory orthopaedic procedures in Wales in 2004

Patient Risk Index	Number of Procedures*	Number of SSI	% SSI (95% CI)
0	713	17	2.4 (1.4-3.8)
1	396	18	4.5 (2.7-7.2)
2/3	35	0	0

Figure 6. % SSI by procedure category in procedures with a Risk Index of 0 and 1 in Wales in 2004



Key Summary Points

- Other than hemiarthroplasties, the majority of patients were in the lowest risk category for infection: 62% of all records, 68% of knee arthroplasties, 65% of hip arthroplasties and 51% of #NOF procedures had risk classifications of 0, compared with only 35% of hemiarthroplasties.
- SSI rates were higher for patients with a risk index of 1 compared with those with a risk index of 0, other than for hip arthroplasties, but these differences were not significant.
- Numbers of patients in the higher risk index categories (2 and 3) are very small at the present time and no infections have been reported. Further data collection is required before meaningful analysis of these categories can take place.

3. Incidence of SSI by Grade of Surgeon

The grade of surgeon (clinician type) performing the operation was completed in 99% (1198/1211) of analysable questionnaires in Wales in 2004. Table 11 gives the numbers of procedures carried out by each surgeon grade and the numbers of SSIs. Table 12 gives this information by orthopaedic procedure category. All surgeon grades except SHO include locums. Figures 6 and 7 compare rates of SSI for consultants and junior surgeon grades by patient risk index and by procedure type. The Junior Surgeon Grades category is an aggregate of the results for staff grades, associate specialists, SPRs and SHOs. In Table 13, the affect of a surgeon's presence in the theatre is examined, when surgery is performed by a junior surgeon grade.

Table 11. Surgical Site Infections by grade of surgeon performing mandatory orthopaedic procedures in Wales in 2004

Surgeon Grade	Number of procedures	Number of SSI	% SSI	95% CI
Consultant	627	23	3.7	2.3 – 5.5
Junior Surgeon Grades	571	15	2.6	1.5 – 4.3
Staff Grade	237	7	3.0	1.2 – 6.1
Associate specialist	228	8	3.5	1.5 – 6.9
SPR	91	0	0	
SHO	15	0	0	

Table 12. Surgical Site Infections by grade of surgeon by category of orthopaedic procedure in Wales in 2004

Surgeon Grade	No of Procedures (% SSI)			#NOF
	Hemiarthroplasty	Hip Prosthesis	Knee Prosthesis	
Consultant	12 (16.7)	339 (2.7)	244 (3.7)	32 (9.4)
Junior Surgeon Grades	82 (4.9)	185 (1.1)	205 (2.4)	99 (4.0)
Staff Grade	42 (7.1)	56 (0)	103 (1.9)	36 (5.6)
Associate specialist	20 (5.0)	105 (1.9)	72 (4.2)	31 (6.5)
SPR	16 (0)	23 (0)	27 (0)	25 (0)
SHO	4 (0)	1 (0)	3 (0)	7 (0)

Figure 7. Percentage SSI in orthopaedic procedures performed by consultants and junior surgeon grades by patient risk index in Wales in 2004

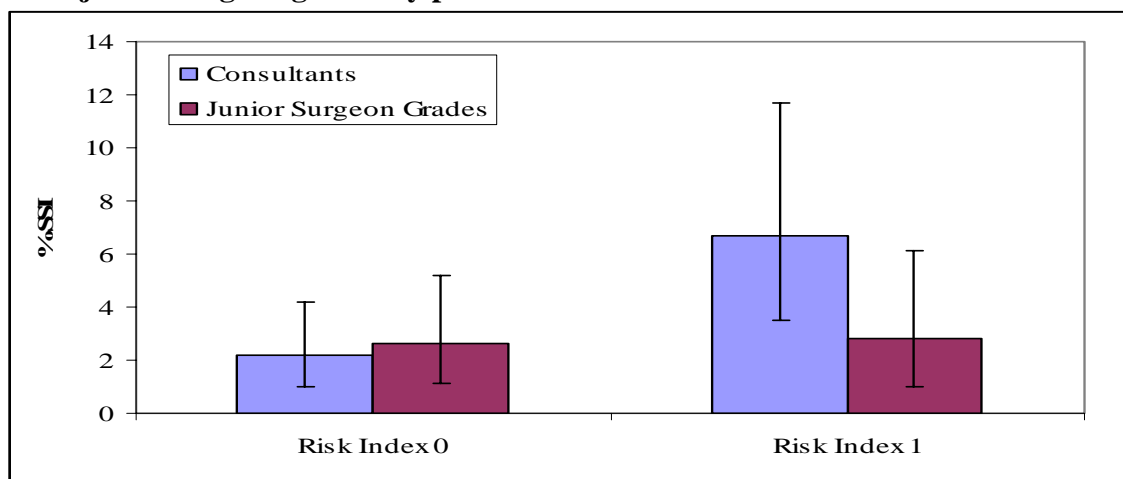


Figure 8. Percentage SSI in orthopaedic procedures performed by consultants and junior surgeon grades by procedure category in Wales in 2004

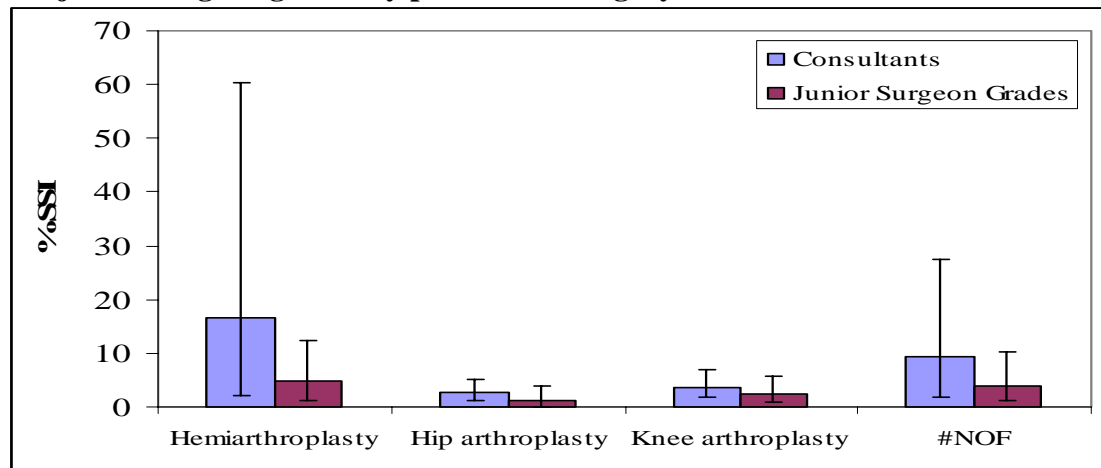


Table 12. Surgical Site Infections by consultant presence in Wales in 2004

	No. procedures	No. SSI	% SSI (95% CI)
Procedures not performed by consultant surgeons	571	15	2.6 (1.5-4.3)
Procedures not performed by consultant but consultant present in theatre	234	4	1.7 (0.5-4.4)
Procedures not performed by consultant and consultant not present in theatre	331	11	3.3 (1.7-6.0)

NB 6 procedures did not record whether a consultant was present.

Key Summary Points

- Just over 50% of all procedures were carried out by Consultant surgeons.
- There were no significant differences between the rates of infection in procedures carried out by consultants and junior surgeon grades.
- There were no significant differences in the rates of infection when consultants were present in the theatre or not, in procedures carried out by non-consultant surgeons.

4. Duration of Procedure

The duration of surgery is used to calculate the patient risk index. Each surgical category has been assigned a T-value; procedures that take longer than the T-value for that procedure are assigned a point towards their risk index total. The T-values are calculated as the 75th percentile of duration of the surgical procedure, based on surgeon performance in the United States¹¹. For all the mandatory orthopaedic procedures, the T-value is 2 hours. It would be expected that 25% of the procedures should lie above the T-value, but in Wales only 10% of procedures took longer than the T value. The durations of procedure categories in Wales are given in Table 13 and durations of procedures with specific OPCS codes are given in Table 14.

Table 13. Duration of Procedure Categories in Minutes and proportion over T value

Procedure Category	Number with Procedure start and end times	Mean	Median	Range	Proportion > T-value	75 th Percentile of Welsh data (minutes)
Hemiarthroplasty	87	59	50	10 - 150	5%	75
Hip arthroplasty	508	96	90	15 - 340	12%	109
Knee arthroplasty	443	88	85	5 - 256	7%	100
#NOF	124	65	57	10 - 245	9%	87

Table 14. Duration in minutes of most frequently reported OPCS codes for each procedure category and the proportion over T value

Procedure Category	Procedure Code	No. with Procedure start and end times	Mean	Median	Range	Proportion > T-value	75 th Percentile of Welsh data (minutes)
Hemiarthroplasty	W461	57	61	53	10 - 150	5%	78
Hip arthroplasty	W371	376	94	91	15 - 199	9%	105
Knee arthroplasty	W401	365	87	85	35 - 210	7%	99
#NOF	W191	54	53	48	19 - 145	6%	60

Key Summary Points

- As found in the Pan Celtic aggregate data⁷, Welsh surgeons performed operations in a shorter time than their US counterparts, therefore US derived T-values are not representative of surgery here.
- UK T-values need to be produced for procedures performed by UK surgeons, as this will have a substantial bearing on SSI rates stratified by risk.

5. Durations of Stay

5.1 Pre-operative length of stay

The pre-operative length of stay is the number of days from date of admission to hospital to the date of procedure. The pre-operative lengths of stay by procedure category are given in Table 15 and a comparison of the pre-operative lengths of stay for procedures that resulted in an SSI and those that did not are given in Table 16.

Table 15. Pre-operative length of stay for orthopaedic procedures by procedure category in Wales in 2004

Procedure	Pre-operative Length of Stay	No. Procedures (%)
All procedures	0-1 days	1084 (90.4)
	2-3 days	67 (5.6)
	4+ days	48 (4.0)
Hemiarthroplasty	0-1 days	72 (77.4)
	2-3 days	12 (12.9)
	4+ days	9 (9.7)
Hip arthroplasty	0-1 days	489 (93.1)
	2-3 days	18 (3.4)
	4+ days	18 (3.4)
Knee arthroplasty	0-1 days	434 (96.2)
	2-3 days	10 (2.2)
	4+ days	7 (1.6)
#NOF	0-1 days	89 (68.5)
	2-3 days	27 (20.8)
	4+ days	14 (10.8)

Table 16. Pre-operative length of stay for patients with and without an SSI following orthopaedic procedures in Wales in 2004.

	Admission to Procedure (days)		
	Mean	Median	Range
All patients	2	1	0 - 214
Patients without SSI	2	1	0 - 214
Patients with SSI	1	1	0 - 8

Key Summary Points

- 90% of patients who underwent one of the 4 mandatory orthopaedic surveillance procedures were in hospital 1 day or less before they had their surgery.
- There were differences in the pre-operative lengths of stay by procedure category, with hemiarthroplasty and #NOF patients in hospital longer before they received surgery.
- There were no differences in the median pre-operative length of stay between patients who developed an SSI and those that did not.

5.2 Total length of stay

The total length of stay is the number of days from date of admission to hospital to the date of discharge or death. The pre-operative lengths of stay by procedure category are given in Figure 9 and a comparison of the pre-operative lengths of stay for procedures that resulted in an SSI and those that did not are given in Table 17.

Figure 9. Proportion of patients in hospital by days post surgery for orthopaedic procedures in Wales in 2004

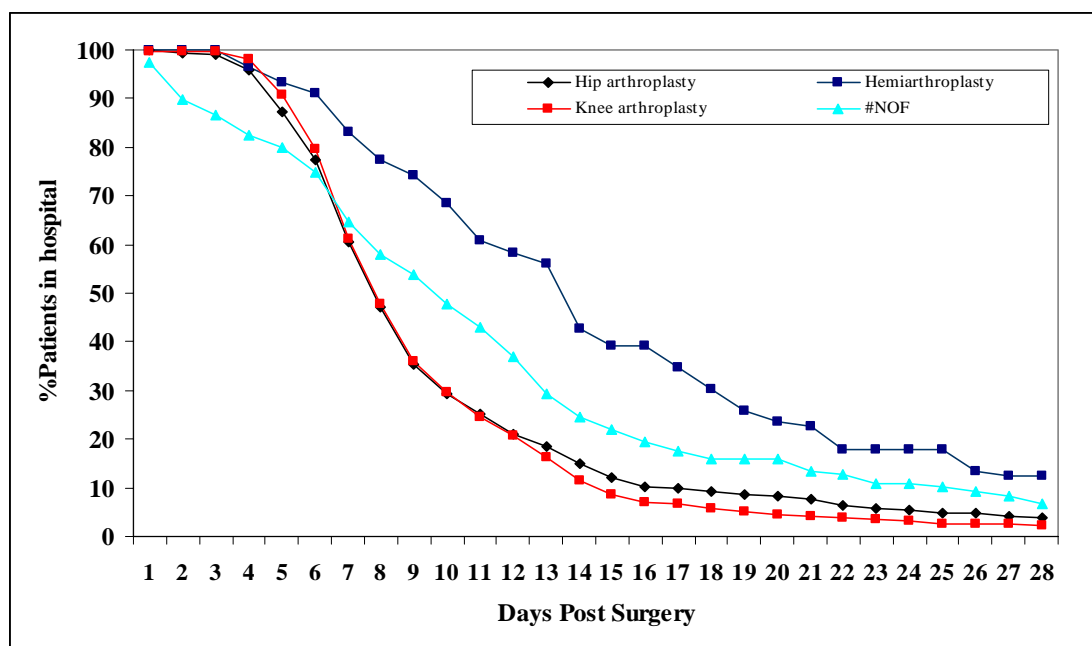


Table 17. Total length of stay for patients with and without an SSI following orthopaedic procedures in Wales in 2004

	Admission to Discharge (days)		
	Mean	Median	Range
All patients	11	9	1 - 231
Patients without SSI	11	9	1 - 231
Patients with SSI	15	11	2 - 56
Patients with SSI pre-discharge	23	13	2 - 56

Key Summary Points

- Approximately 80% of hip/knee prosthesis patients in Wales in 2004 were discharged from hospital 13 days after admission; 80% of #NOF patients were discharged 16 days after admission and 80% of hemiarthroplasty patients were discharged 22 days after admission.
- Lengths of stay for hip/ knee prosthesis and hemiarthroplasty patients were longer in Wales than in the Pan Celtic dataset (80% discharged at 10 days for hip/knee prosthesis and 20 days for hemmiarthroplasties)⁷.
- The median total length of stay for patients who developed a pre-discharge SSI was 4 days longer than for those that did not.

5.3 Post-operative length of stay

The post-operative length of stay is the number of days from the date of procedure to the date of discharge or death. The post-operative lengths of stay for procedures that resulted in an SSI and those that did not, stratified by risk index are given in Table 18.

Table 18. Post-operative length of stay for patients with and without an SSI following orthopaedic procedures in Wales in 2004.

		Procedure to Discharge (days)		
		Mean	Median	Range
All Procedures	All patients (n = 1181)	10	7	0 - 167
	Patients without SSI (n=1144)	10	7	0 - 167
	Patients with SSI (n=37)	14	10	1 - 55
	Patients with SSI pre-discharge (n=16)	21	12	1 - 55
Risk Index 0	All patients (n=697)	9	7	0 - 167
	Patients without SSI (n=681)	9	7	0 - 167
	Patients with SSI (n=16)	12	11	1 - 50
	Patients with SSI pre-discharge (n=7)	16	11	1 - 50
Risk Index 1	All patients (n=385)	11	8	1 - 84
	Patients without SSI (n=367)	11	8	1 - 84
	Patients with SSI (n=18)	14	8	4 - 55
	Patients with SSI pre-discharge (n=8)	22	15	7 - 55

Key Summary Points

- In all procedures, the median length of post-operative stay for patients who developed a SSI during the hospital admission was 5 days longer than for those that did not.
- In patients with no pre-disposing risk factors for the development of a SSI ie risk index of 0, the median length of post-operative stay for patients who developed a SSI during the hospital admission was 4 days longer than for those that did not.
- Infection data was only based on 38 records and should therefore be treated with caution.

5.4 Onset of Infection

Figure 10 details the number of days from the date of the orthopaedic procedure to the onset of infection. Tables 19 and 20 give the median numbers of days from admission date to onset of infection and procedure date to onset of infection.

Figure 10. Number of days from procedure date to onset of surgical site infection following orthopaedic procedures in Wales in 2004

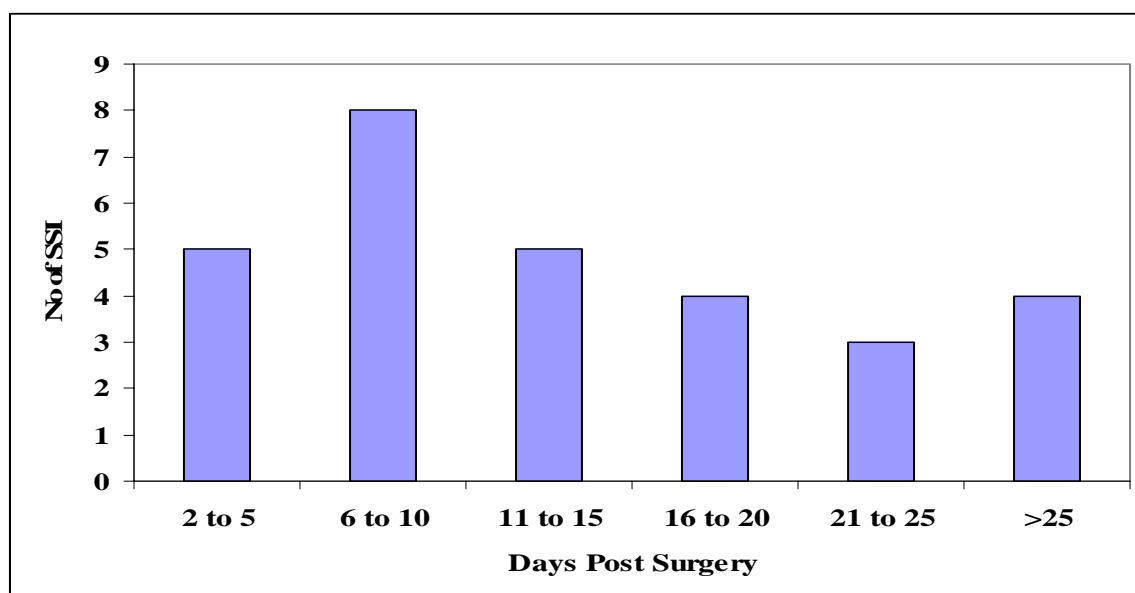


Table 19. Number of days from date of hospital admission to onset of surgical site infection in patients with an SSI following orthopaedic procedures in Wales in 2004

	Admission to Infection (days)		
	Mean	Median	Range
All patients with SSI	21	13	3 - 168
Patients with SSI pre-discharge	10	9	3 - 26
Patients with SSI post-discharge	31	19	7 - 168

Table 20. Number of days from date of procedure to onset of surgical site infection in patients with an SSI following orthopaedic procedures in Wales in 2004

	Procedure to Infection (days)		
	Mean	Median	Range
All patients with SSI	19	12	2 - 167
Patients with SSI pre-discharge	8	7	2 - 21
Patients with SSI post-discharge	30	18	6 - 167

Key Summary Points

- The median number of days from procedure to onset of infection was 12, whereas the median length of stay for all patients following surgery is 7 days. Post-discharge surveillance is therefore essential to identify infections.
- Infection data was only based on 38 records and should therefore be treated with caution.

6. Incidence of SSI by Trust

Tables 21 to 25 compare the overall SSI rate and the pre-discharge SSI rates in different Trusts in Wales for the different categories of orthopaedic procedure. The Trust number used matches the survey number on the questionnaires, other than for Trust 9, which incorporates survey numbers 9 and 12.

Table 21. Incidence of SSI and pre-discharge SSI following orthopaedic procedures in Wales in 2004 by Trust

Trust number	No. Procedures	% with post-discharge update	No. SSI	No. pre-discharge SSI	% SSI (95% CI)	% pre-discharge SSI (95% CI)
9	292	98%	14	5	4.8 (2.6-8.0)	1.7 (0.6-4.0)
10	25	24%	0	0	0	0
11	306	42%	10	4	3.3 (1.6-6.0)	1.3 (0.4-3.3)
25	117	13%	2	2	1.7 (0.2-6.2)	1.7 (0.2-6.2)
34	67	79%	2	0	3.0 (0.4-10.8)	0
38	235	0	6	6	2.6 (0.9-5.6)	2.6 (0.9-5.6)
39	169	64%	4	0	2.4 (0.6-6.1)	0

Table 22. Incidence of SSI and pre-discharge SSI following hemiarthroplasty procedures in Wales in 2004 by Trust

Trust number	No. Procedures	% with post-discharge update	No. SSI	No. pre-discharge SSI	% SSI	% pre-discharge SSI
9	4	100	0	0	0	0
10	0	0	0	0	0	0
11	45	82	3	3	6.7	0
25	10	0	1	1	10.0	10.0
34	4	100	0	0	0	0
38	18	0	1	1	5.6	5.6
39	15	73	1	0	6.7	0

Table 23. Incidence of SSI and pre-discharge SSI following hip arthroplasty procedures in Wales in 2004 by Trust

Trust number	No. Procedures	% with post-discharge update	No. SSI	No. pre-discharge SSI	% SSI	% pre-discharge SSI
9	138	97	6	4	4.3	2.9
10	13	23	0	0	0	0
11	121	26	1	1	0.8	0.8
25	55	18	1	1	1.8	1.8
34	36	78	1	0	2.8	0
38	86	0	1	1	1.2	1.2
39	78	60	1	0	1.7	0

Table 24. Incidence of SSI and pre-discharge SSI following knee arthroplasty procedures in Wales in 2004 by Trust

Trust number	No. Procedures	% with post-discharge update	No. SSI	No. pre-discharge SSI	% SSI	% pre-discharge SSI
9	149	98	8	1	5.4	0.7
10	12	25	0	0	0	0
11	85	33	2	2	2.4	2.4
25	50	10	0	0	0	0
34	14	71	1	0	7.1	0
38	73	0	1	1	1.4	1.4
39	70	66	2	0	2.9	0

Table 25. Incidence of SSI and pre-discharge SSI following internal fixation of trochanteric fractures of the femur procedures in Wales in 2004 by Trust

Trust number	No. Procedures	% with post-discharge update	No. SSI	No. pre-discharge SSI	% SSI	% pre-discharge SSI
9	1	100	0	0	0	0
10	0	0	0	0	0	0
11	55	56	4	1	7.3	1.8
25	2	0	0	0	0	0
34	13	85	0	0	0	0
38	58	0	3	3	5.2	5.2
39	4	100	0	0	0	0

Key Summary Points

- Trusts are following up patients for varying amounts of time, with some not doing any post-discharge surveillance. Comparisons between trusts should therefore be carried out with caution.
- For some Trusts, numbers of procedures reported are still small, particularly when broken down by procedure category. Longer term data collection is required before we can have confidence in these rates.

7. Incidence of SSI over time

Two years of surveillance data is now available on SSI following orthopaedic procedures in Wales. Figure 11 compares the overall rates for 2003 and 2004. Table 26 compares the numbers of reports by procedure category for 2003 and 2004.

Figure 11. Procedures, SSIs and % SSI (95% CI) reported for orthopaedic procedures in Wales in 2003 and 2004

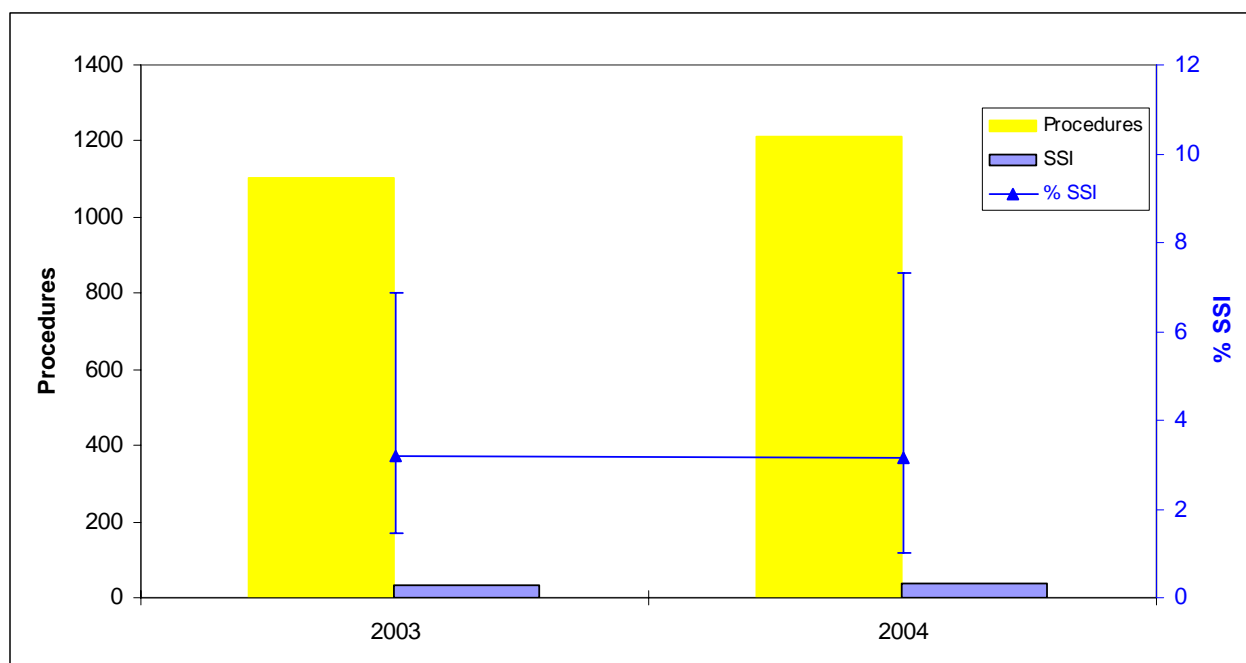


Table 26. Procedures, SSIs and % SSI (95% CI) by procedure category in Wales in 2003 and 2004

Procedure Category	Year	No. Procedures	No. SSI	% SSI
All Procedures	2004	1211	38	3.1
	2003	1101	35	3.2
Hemiarthroplasty	2004	96	6	6.3
	2003	52	3	5.8
Hip arthroplasty	2004	527	11	2.1
	2003	472	17	3.6
Knee arthroplasty	2004	453	14	3.1
	2003	370	11	3.0
#NOF	2004	135	7	5.2
	2003	207	4	1.9

Key Summary Point

- There are no significant differences between the rates of infection reported in 2003 and 2004.

8. Comparative Results

Table 27 displays the pre-discharge orthopaedic SSI rates in Wales by risk index broken down into the American NNIS procedure categories. The NNIS procedure categories combine data for hip arthroplasties and hemiarthroplasties and only categories with more than 100 procedures are shown. Welsh rates are compared with Pan Celtic, American and English SSI rates.

NNIS Procedure Category	Risk Index	No. Procedures in Wales	Wales pre-discharge SSI Rate	PanCeltic SSI Rate ⁷	American SSI Rate ¹²	English SSI Rate ¹³
Hip prosthesis/ Hemiarthroplasty	0	349	1.4	1.4	0.9	2.3
	1	209	1.4	2.9	1.7	4.0
Knee prosthesis	0	297	1.7	1.4	0.9	1.5
	1	128	3.9	3.6	1.3	2.0

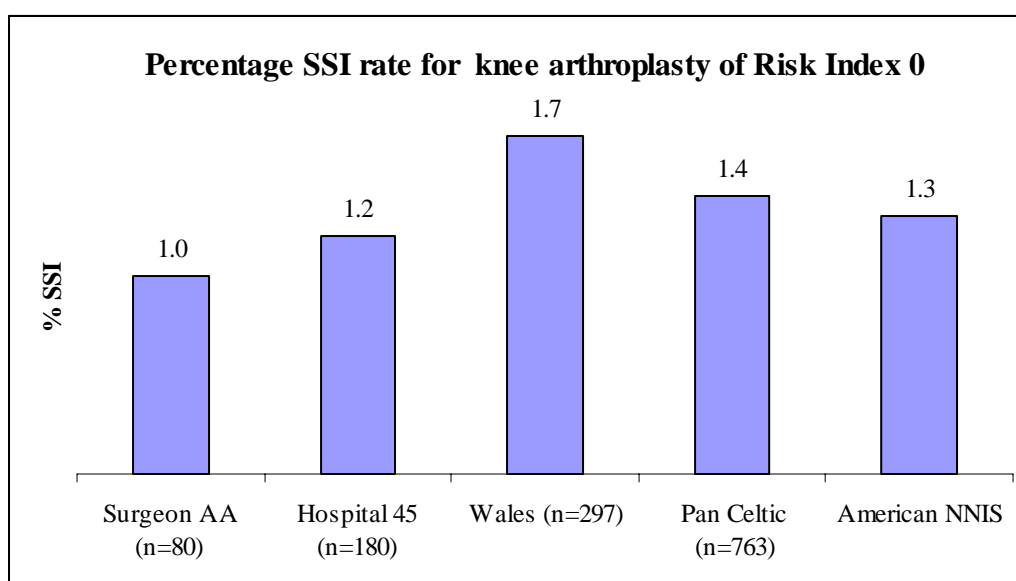
9. Conclusions

The Welsh orthopaedic surgical site infection surveillance scheme provides surgical teams with risk-adjusted measures of performance over time for the four mandatory surveillance procedures.

Overall rates of infection should be interpreted with caution since at this relatively early stage of surveillance for some of the Trusts, there are still concerns about the reliability of the surveillance, in terms of completing and returning data for all the required procedures. Examination of the PEDW data shows that a considerable proportion of the mandatory orthopaedic procedures have not been captured via the surveillance scheme. Those sites with higher form returns will have a disproportionate influence on the overall figures. Additionally not all trusts in Wales carrying out orthopaedic procedures contributed data in 2004, but more are contributing data in 2005. There are also differences between sites in the degree of post-discharge surveillance undertaken, which obviously has a major impact on their infection rates. Primary data collection should take place for 30 days post surgery, unless an implantable device was placed in the patient, in which case surveillance should continue for 1 year. Although included in the mandatory data set, it has taken Trusts varying amounts of time to set up their post-discharge surveillance, therefore differences currently exist between them. Despite these drawbacks, results for 2004 are consistent with those found in 2003 and are similar to those described for other orthopaedic SSI surveillance schemes.

This all-Wales report should be used in conjunction with surgeon specific reports, hospital/Trust specific reports, as well as alongside the Pan Celtic report and reports from SSI schemes in other countries. The surveillance co-ordinator at your hospital, who has access to the data for your hospital, can provide surgeons with individual rates and hospital specific rates. An example of how an individual surgeon may use comparative data is given below:

Figure X. Surgeon AA SSI rates for knee prosthesis with risk index of 0, compared to rates for hospital, country, Pan Celtic collaboration and American NNIS



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12. Appendix

Orthopaedic OPCS IV Codes¹⁰.

OPCS IV Code	PROCEDURE	DESCRIPTION
W19	PRIMARY OPEN REDUCTION OF FRACTURE OF BONE AND INTRAMEDULLARY FIXATION	
W191		Primary open reduction of fracture of neck of femur and open fixation using pin and plate
W37	TOTAL PROSTHETIC REPLACEMENT OF HIP JOINT USING	
W370		Conversion from previous cemented total prosthetic replacement of hip
W371		Primary total prosthetic replacement of hip joint using cement
W372		Conversion to total prosthetic replacement of hip joint using cement
W373		Revision of total prosthetic replacement of hip joint using cement
W378		Other specified
W38	TOTAL PROSTHETIC REPLACEMENT OF HIP JOINT NOT	
W381		Primary total prosthetic replacement of hip joint not using cement
W382		Conversion to total prosthetic replacement of hip joint not using cement
W383		Revision of total prosthetic replacement of hip joint not using cement
W39	OTHER TOTAL PROSTHETIC REPLACEMENT OF HIP JOINT	
W390		Conversion from previous total prosthetic replacement of hip joint nec
W391		Primary total prosthetic replacement of hip joint nec
W393		Revision of total prosthetic replacement of hip joint nec
W394		Attention to total prosthetic replacement of hip joint nec
W40	TOTAL PROSTHETIC REPLACEMENT OF KNEE JOINT USING	
W400		Conversion from previous cemented total prosthetic replacement of knee joint
W401		Primary total prosthetic replacement of knee joint using cement

W403		Revision of total prosthetic replacement of knee joint using cement
W408		Other specified
W41	TOTAL PROSTHETIC REPLACEMENT OF KNEE JOINT NOT	
W411		Primary total prosthetic replacement of knee joint not using cement
W42	OTHER TOTAL PROSTHETIC REPLACEMENT OF KNEE JOINT	
W421		Primary total prosthetic replacement of knee joint nec
W428		Other specified
W429		Unspecified