Submission to the Productivity Commission on Performance of Public and Private Hospital Systems

Healthcare Associated Infections in Western Australian Hospitals

Government of Western Australia
Department of Health

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This report has been prepared by the Healthcare Associated Infection Unit, Communicable Disease Control Directorate - Department of Health Western Australia.

The data presented was extracted from the HISWA database on August 3rd 2009.

The Healthcare Associated Infection Surveillance Western Australia (HISWA) program incorporates both private and public hospitals. The de-identified hospital data in this report has been made available to the Productivity Commission with the knowledge of the participating hospitals.

Attachments included with this submission:

1. Dailey L, van Gessel H, Peterson A. Two years of surgical site infection surveillance in Western Australia: analysing variation between hospitals. *Healthcare Infection 2009;14-51-60.*
2. Goggin L, van Gessel H, McCann R, Peterson A, Van Buynder P. Validation of surgical site infection surveillance in Perth, Western Australia. *Healthcare Infection 2009; 15: in press.*

This commentary accompanies healthcare-associated infection surveillance data provided by the Health Care Associated Infection Unit (HCAIU) to the Productivity

Commission. We take this opportunity to address issues pertaining to relative rates of hospital-acquired infections raised in the '*Productivity Commission Issues Paper'* and provide commentary for the data provided.

ISSUE 1: *What healthcare associated infections should the study compare between public and private hospitals? Why have you nominated these infections, and are there likely to be any limitations on the availability of accurate and comparable data?*

Ideally, such comparative outcome performance measures would be risk-adjusted, credible, timely, practical to collect, applicable to many or preferably most hospitals and collected by robust, standardised methods. In contrast to a limited focus on outcome measure, i.e. rates of infections, we would suggest that process measures such as hand hygiene compliance rates, compliance with surgical antibiotic prophylaxis, influenza staff vaccination rates and central line insertion and care protocols either individually or as a "bundle" better fulfill these criteria and support a focus on improving the systems of care provision that are in place at different hospitals. Patient risk factors do not have to be incorporated, which is a major advantage. These issues are discussed in a paper regarding guidelines for public reporting of infection rates in America. [1]

There are many process indicators endorsed by international organisations such as the National Quality Forum in the United States of America[2] that could be adapted for use within Australia. Some of these indicators are already included in WA hospital quality and safety programs. Western Australian (WA) hand hygiene compliance data will be available from a range of hospitals including private facilities in 2010.

However, as we understand this study will analyse existing Australian HAI data as described in the issues paper rather than generate new data, our response is constrained by this, and will be limited to indicators currently collected in WA within the HISWA surveillance program[3]. The other important note to make is that the prime purpose of the HISWA surveillance program is to support internal improvement, rather than performance comparison. This implies an emphasis on collecting data over time to monitor progress, and internal validity within a facility.

Data Submission
The following de-identified hospital level data is supplied for metropolitan private public and hospitals only:

1. Rate of surgical site infection following elective hip and knee arthroplasty
2. Rate of healthcare-associated Methicillin Resistant *Staphylococcus aureus* (MRSA) infection
3. Rate of healthcare-associated *Staphylococcus aureus* bacteraemia

Multiple private and public hospitals have submitted this data to HISWA, and it has been collected and classified using standardised surveillance methodology. The

[1] McKibben L, et al. American Journal for Infection Control, 2005; 33:217-26. http://www.cdc.gov/ncidod/hip/PublicReportingGuide.pdf
[2] http://www.qualityforum.org/Measures_List.aspx
[3] http://www.public.health.wa.gov.au/3/277/3/surveillance_hiswa.pm

limitations for each of these indicator groups and notes for interpretation of HISWA data are described.

Limitations and Notes for Interpretation

1. SSI rate following elective hip and knee arthroplasty

Although patient risk is incorporated into the National Healthcare Safety Network (NHSN) risk stratification method used by HISWA contributors, there are almost certainly key patient risk factors that are not incorporated into this method, and that systematically differ between patients having surgery at private and public hospitals.

For example, diabetic control, obesity and cigarette smoking are among known risk factors for SSI that are not modifiable by hospitals and are not specifically incorporated into NHSN risk stratification. In addition, operator characteristics are only partially incorporated into this risk stratification. If an operation is particularly long, this will result in an elevated risk score, but operator experience or annual volume is not, and both are associated with SSI rates. Public hospitals, to fulfill their important training role, have higher use of less-experienced operators, again elevating underlying SSI risk for public hospitals. Procedure volume has been associated with SSI risk – units performing more of a type of procedure have lower infection rates for the same patient risk group. With restricted capacity of many public hospitals to perform elective surgery, the majority of this surgery now occurs in private hospitals in WA, often with surgeons who perform a highly specialised narrow spectrum of surgery. The public hospital surgical unit in general, performs a wider range of types of surgery, less elective surgery and fewer of each type of procedure than a specialised private hospital unit. Thus, systematic variation in operator / surgeon characteristics also needs to be considered. A recently published paper by Dailey, van Gessel and Peterson analyses the variation in SSI rates in WA in more detail and is attached to this submission.

The other consideration when using rates to compare private and public hospital performance is whether or not the surveillance system has validated data collection and classification methods. A paper by Goggin, van Gessel, McCann, Peterson and Van Buynder (in press) is attached that explains a validation study of SSI data recently undertaken by the HCAIU, and involving public and private hospitals. This found that the variation in SSI rates was not due to variation in case detection and classification but was a real reflection of varying SSI rates in WA hospitals. Similar validation should be performed in a robust manner by other surveillance programs if data is to be compared.

In summary, we believe that the SSI data presented by HCAIU for WA hospitals demonstrates real variation in SSI rate. SSI rates that are risk-adjusted using NHSN stratification *do not* account for systematic differences in patient, operator and unit characteristics that raise the inherent or underlying SSI risk of public hospitals. They are subject to bias, and while useful, must be interpreted with this understanding.

2. Rate of Methicillin Resistant *Staphylococcus aureus* (MRSA) healthcare-associated infection

This measures the risk of a patient acquiring an infection due to MRSA as a result of a healthcare stay or procedure. This rate will depend on both the risk of a healthcare-associated infection (which varies according to case mix as well as aspects of the quality of care provided); and the risk of that infection being due to MRSA (which reflects endemic MRSA rates in the patient population and the risk of acquiring MRSA in the hospital). Comparison must therefore be made considering differences in case mix and MRSA rates in the admitted patient population before associating differences in rates to variation in the quality of care provided. Public hospitals may have both a more complex patient case mix with an inherently higher risk of developing an HAI and a higher prevalence of MRSA carriage on admission to hospital.

3. Rate of healthcare-associated *Staphylococcus aureus* bacteraemia

The risk of an individual patient acquiring a *Staphylococcus aureus* bacteraemia is related to their underlying medical condition, complexity of care and the invasive procedures they are subject too, as well as the quality of care provided. This should be considered when comparing rates between private and public hospitals.

ISSUE 2: *What, if any, views do you have about using data from the ACHS Clinical Indicator Program to analyse rates of hospital-acquired infections? What suggestions do you have to address any concerns you may have?*

Many WA facilities that contribute data to HISWA, also submit appropriate data elements to ACHS CIP, and HISWA supports this by providing hospital data in the appropriate format for submission. However, ACHS CIP data is not risk adjusted, surveillance methods are not specified or standardised, technical support for interpretation is minimal and the data is not subject to external validation. While these are not necessarily limitations within the context of individual facilities using these indicators to support internal improvement, their use is *not* credible to compare performance of hospitals or jurisdictions.

ISSUE 3: *What, if any, other data sources do you recommend to compare the rate of hospital-acquired infections between the public and private hospital systems? What are their strengths and weaknesses?*

WA researchers have used administrative data to generate SSI rates, but this work has not been incorporated into routine work practices or infection control surveillance programs[4]. This has the value of being less resource intensive than conventional prospective infection control based surveillance as used by HISWA. Use of coded data doesn't overcome concerns relating to risk adjustment and reasons for higher SSI rates at public hospitals as discussed earlier. Validation of its use in multiple private and public hospitals would be necessary to ensure it does indeed credibly reflect SSI rates of individual institutions.

[4] Cadwallader HL, Toohey M, Linton S, Dyson A, Riley TV. *A comparison of two methods for identifying surgical site infections following orthopaedic surgery*. J Hosp Infect 2001; 48: 261–266

Surgical Site Infection following hip and knee arthroplasty 2006 to 2008

Risk Index 'All' = those hospitals performing less than 100 procedures per year who do not risk stratify

Hospital	Type	Year	Risk Index	SSI	Procedures	Rate (per 100 procedures)	Type	Year	Risk	SSI	Procedures	Rate (per 100 procedures)
Public 6	Hip	2006	All	0	0	0.00	Knee	2006	All	0	0	0.00
		2007	All	0	12	0.00		2007	All	0	13	0.00
		2008	All	0	45	0.00		2008	All	1	82	1.22
Public 1	Hip	2006	Risk 0	2	29	6.90	Knee	2006	Risk 0	1	85	1.18
			Risk 1	0	14	0.00			Risk 1	1	37	2.70
			Risk 2	0	0	0.00			Risk 2	0	1	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	0	33	0.00		2007	Risk 0	1	85	1.18
			Risk 1	0	15	0.00			Risk 1	1	28	3.57
			Risk 2	0	1	0.00			Risk 2	0	1	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	1	27	3.70		2008	Risk 0	4	45	8.89
			Risk 1	2	10	20.00			Risk 1	3	25	12.00
			Risk 2	0	0	0.00			Risk 2	0	1	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
Public 3	Hip	2006	Risk 0	3	101	2.97	Knee	2006	Risk 0	3	157	1.91
			Risk 1	5	46	10.87			Risk 1	4	55	7.27
			Risk 2	2	13	15.38			Risk 2	0	6	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	2	74	2.70		2007	Risk 0	3	142	2.11
			Risk 1	2	45	4.44			Risk 1	4	71	5.63
			Risk 2	1	6	16.67			Risk 2	1	9	11.11
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	5	127	3.94		2008	Risk 0	0	150	0.00
			Risk 1	2	48	4.17			Risk 1	4	81	4.94
			Risk 2	0	5	0.00			Risk 2	0	8	0.00
			Risk 3	0	0	0.00			Risk 3	1	2	50.00

Hospital	Type	Year	Risk Index	SSI	Procedures	Rate (per 100 procedures)	Type	Year	Risk	SSI	Procedures	Rate (per 100 procedures)
Public 9	Hip	2006	Risk 0	4	121	3.31	Knee	2006	Risk 0	2	143	1.40
			Risk 1	3	85	3.53			Risk 1	2	93	2.15
			Risk 2	4	17	23.53			Risk 2	3	19	15.79
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	2	132	1.52		2007	Risk 0	1	174	0.57
			Risk 1	3	94	3.19			Risk 1	4	130	3.08
			Risk 2	1	23	4.35			Risk 2	1	17	5.88
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	0	97	0.00		2008	Risk 0	2	119	1.68
			Risk 1	1	80	1.25			Risk 1	1	104	0.96
			Risk 2	1	20	5.00			Risk 2	0	27	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
Public 10	Hip	2006	Risk 0	1	91	1.10	Knee	2006	Risk 0	4	116	3.45
			Risk 1	4	71	5.63			Risk 1	1	65	1.54
			Risk 2	0	7	0.00			Risk 2	1	11	9.09
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	0	61	0.00		2007	Risk 0	4	74	5.41
			Risk 1	0	52	0.00			Risk 1	2	49	4.08
			Risk 2	1	10	10.00			Risk 2	0	9	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	0	60	0.00		2008	Risk 0	0	57	0.00
			Risk 1	0	46	0.00			Risk 1	3	57	5.26
			Risk 2	1	11	9.09			Risk 2	1	12	8.33
			Risk 3	0	0	0.00			Risk 3	0	0	0.00

Hospital	Type	Year	Risk Index	SSI	Procedures	Rate (per 100 procedures)	Type	Year	Risk	SSI	Procedures	Rate (per 100 procedures)
Private 6	Hip	2006	All	0	0	0.00	Knee	2006	All	0	0	0.00
		2007	All	0	21	0.00		2007	All	0	41	0.00
		2008	All	0	72	0.00		2008	All	4	173	2.31
Private 3	Hip	2006	Risk 0	1	57	1.75	Knee	2006	Risk 0	0	51	0.00
			Risk 1	6	62	9.68			Risk 1	2	70	2.86
			Risk 2	0	11	0.00			Risk 2	0	13	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	1	58	1.72		2007	Risk 0	0	45	0.00
			Risk 1	3	55	5.45			Risk 1	2	104	1.92
			Risk 2	0	7	0.00			Risk 2	1	15	6.67
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	4	71	5.63		2008	Risk 0	10	102	9.80
			Risk 1	7	83	8.43			Risk 1	2	52	3.85
			Risk 2	1	9	11.11			Risk 2	1	2	50.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
Private 5	Hip	2006	Risk 0	1	34	2.94	Knee	2006	Risk 0	1	65	1.54
			Risk 1	0	35	0.00			Risk 1	1	45	2.22
			Risk 2	0	8	0.00			Risk 2	0	6	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	0	64	0.00		2007	Risk 0	0	107	0.00
			Risk 1	0	45	0.00			Risk 1	0	50	0.00
			Risk 2	0	6	0.00			Risk 2	0	23	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	0	44	0.00		2008	Risk 0	1	94	1.06
			Risk 1	2	61	3.28			Risk 1	2	84	2.38
			Risk 2	2	18	11.11			Risk 2	0	13	0.00
			Risk 3	0	1	0.00			Risk 3	0	0	0.00

Hospital	Type	Year	Risk Index	SSI	Procedures	Rate (per 100 procedures)	Type	Year	Risk	SSI	Procedures	Rate (per 100 procedures)
Private 8	Hip	2006	Risk 0	5	360	1.39	Knee	2006	Risk 0	5	344	1.45
			Risk 1	3	72	4.17			Risk 1	1	74	1.35
			Risk 2	0	3	0.00			Risk 2	0	3	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	1	329	0.30		2007	Risk 0	0	405	0.00
			Risk 1	4	76	5.26			Risk 1	4	96	4.17
			Risk 2	1	2	50.00			Risk 2	1	3	33.33
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	3	363	0.83		2008	Risk 0	7	456	1.54
			Risk 1	2	87	2.30			Risk 1	2	129	1.55
			Risk 2	1	7	14.29			Risk 2	0	8	0.00
			Risk 3	0	0	0.00			Risk 3	0	1	0.00
Private 9	Hip	2006	Risk 0	4	302	1.32	Knee	2006	Risk 0	2	301	0.66
			Risk 1	3	114	2.63			Risk 1	2	94	2.13
			Risk 2	0	8	0.00			Risk 2	0	3	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2007	Risk 0	0	328	0.00		2007	Risk 0	2	310	0.65
			Risk 1	2	121	1.65			Risk 1	1	115	0.87
			Risk 2	0	7	0.00			Risk 2	0	7	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00
		2008	Risk 0	1	336	0.30		2008	Risk 0	4	335	1.19
			Risk 1	1	127	0.79			Risk 1	5	129	3.88
			Risk 2	0	11	0.00			Risk 2	0	5	0.00
			Risk 3	0	0	0.00			Risk 3	0	0	0.00

2. Methicillin Resistant *Staphylococcus aureus* (MRSA) healthcare associated infection (inpatient events only)

Hospital	Year	No. of MRSA HAI	Beddays	Rate (per 10,000 beddays)
Public 1	2006	4	43296	0.92
	2007	2	41200	0.49
	2008	4	43630	0.92
Public 2	2006	3	23402	1.28
	2007	0	22810	0.00
	2008	2	23967	0.83
Public 11	2006	2	44233	0.45
	2007	0	43066	0.00
	2008	1	45011	0.22
Public 3	2006	8	138500	0.58
	2007	9	137386	0.66
	2008	18	146567	1.23
Public 4	2006	9	74959	1.20
	2007	10	78623	1.27
	2008	4	78290	0.51
Public 6	2006	9	40507	2.22
	2007	4	41861	0.96
	2008	6	43159	1.39
Public 5	2006	0	2826	0.00
	2007	0	4202	0.00
	2008	2	4524	4.42
Public 7	2006	3	52000	0.58
	2007	1	56444	0.18
	2008	3	52933	0.57
Public 8	2006	2	14912	1.34
	2007	2	15897	1.26
	2008	0	17712	0.00
Public 9	2006	36	243395	1.48
	2007	36	259310	1.39
	2008	42	271946	1.54
Public 10	2006	24	158433	1.51
	2007	16	174597	0.92
	2008	33	168151	1.96
Private 2	2006	9	118790	0.76
	2007	9	110315	0.82
	2008	11	111406	0.99
Private 3	2006	12	96807	1.24
	2007	5	99048	0.50
	2008	6	101903	0.59
Private 4	2006	N/A	N/A	N/A
	2007	N/A	N/A	N/A
	2008	3	11975	2.51
Private 5	2006	3	32976	0.91
	2007	3	44115	0.68
	2008	3	41746	0.72
Private 6	2006	0	27515	0.00
	2007	0	37850	0.00
	2008	4	35901	1.11
Private 7	2006	0	4309	0.00
	2007	0	3433	0.00
	2008	1	3496	2.86
Private 8	2006	13	80348	1.62
	2007	4	82456	0.49
	2008	6	82509	0.73
Private 9	2006	3	104586	0.29
	2007	1	112732	0.09
	2008	7	117961	0.59

3. Healthcare associated *Staphylococcus aureus* bloodstream infection (SABSI) (Inpatient events only)

Hospital	Year	No. of SABSI	Beddays	Rate (per 10,000 beddays)
Public 1	2006	N/A	N/A	N/A
	2007	0	41200	0.00
	2008	2	43630	0.46
Public 2	2006	N/A	N/A	N/A
	2007	2	22810	0.88
	2008	1	23967	0.42
Public 3	2006	N/A	N/A	N/A
	2007	6	137386	0.44
	2008	20	146567	1.36
Public 4	2006	N/A	N/A	N/A
	2007	2	78623	0.25
	2008	3	78290	0.38
Public 5	2006	N/A	N/A	N/A
	2007	0	4202	0.00
	2008	0	4524	0.00
Public 6	2006	N/A	N/A	N/A
	2007	0	41861	0.00
	2008	1	43159	0.23
Public 7	2006	N/A	N/A	N/A
	2007	0	56444	0.00
	2008	3	52933	0.57
Public 8	2006	N/A	N/A	N/A
	2007	0	15897	0.00
	2008	0	17712	0.00
Public 9	2006	N/A	N/A	N/A
	2007	11	259310	0.42
	2008	38	271946	1.40
Public 10	2006	N/A	N/A	N/A
	2007	3	174597	0.17
	2008	27	168151	1.61
Public 11	2006	N/A	N/A	N/A
	2007	0	43066	0.00
	2008	0	45011	0.00
Private 1	2006	N/A	N/A	N/A
	2007	0	18040	0.00
	2008	0	14721	0.00
Private 2	2006	N/A	N/A	N/A
	2007	2	110315	0.18
	2008	12	111406	1.08
Private 3	2006	N/A	N/A	N/A
	2007	1	99048	0.10
	2008	2	101903	0.20
Private 4	2006	N/A	N/A	N/A
	2007	N/A	N/A	N/A
	2008	0	11975	0.00
Private 5	2006	N/A	N/A	N/A
	2007	0	44115	0.00
	2008	2	41746	0.48
Private 6	2006	N/A	N/A	N/A
	2007	0	37850	0.00
	2008	3	35901	0.84
Private 7	2006	N/A	N/A	N/A
	2007	0	3433	0.00
	2008	0	3496	0.00
Private 8	2006	N/A	N/A	N/A
	2007	1	82456	0.12
	2008	6	82509	0.73
Private 9	2006	N/A	N/A	N/A
	2007	0	112732	0.00
	2008	4	117961	0.34