



Report on Hand Hygiene Compliance in Acute Hospitals

Sixth national hand hygiene audit, Period 6, October 2013

Summary

- This report outlines the results from 48 acute hospitals (42 public and 6 private) and should be reviewed by hospital management teams in conjunction with alcohol based hand rub surveillance reports, mandatory hand hygiene training reports & other healthcare associated infection (HCAI) indicators such as *C. difficile* infection & device-related infection surveillance.
- Key findings: Period 6
 - The overall compliance was 86.2% (Table 1). This has increased from Period 5 (85%) but did not reach the 2013 target of 90%. Tables 2-6 summarise compliance by hospital & HSE region.
 - Improvements in all staff categories compared to Period 5, with a significant increase among auxiliary (81.1% to 83.4%) and medical staff (73.4% to 76.3%). However, compliance in medical staff remains significantly lower than in other staff categories. Continued improvement in compliance with hand hygiene is essential, particularly among medical staff.
 - Compliance with moment 2 (before clean and aseptic technique) (83.9%) than in Periods 5 and 4 (84.9% and 86.1% respectively). While the decrease from Period 4 to Period 6 was not significant, improving compliance with moment 2 should be a key target as hand hygiene prior to clean/aseptic procedures is an essential part of prevention of HCAI.
 - The HSE has set a target of achieving a minimum of 90% compliance with hand hygiene by the end of 2013. The World Health Organisation (WHO) recommends a multimodal approach to improving hand hygiene compliance. This includes the following five areas:
 1. System change: This should include facilitating ready access to alcohol handrub at the point of care.
 2. Training and education: Hand hygiene education is mandatory at induction and *at least* every 2 years for all healthcare staff that interact with patients. This includes agency and temporary unless there is documentary evidence of equivalent training prior to commencing work. Hospitals should have a system of regular monitoring of the proportion of staff that have received hand hygiene training.
 3. Evaluation/audit and feedback: All acute hospitals should have hand hygiene auditors that are appropriately trained and validated. Hospitals should ensure that they have a local ward/unit based hand hygiene audit programme in addition to participation in the biannual national hand hygiene audit programme.
 4. Reminders in the work place: See www.hse.ie/go/handhygiene for hand hygiene videos & posters.
 5. Institutional safety climate: Visible support from senior management in embedding a culture of hand hygiene excellence. Hospital managers of facilities where compliance is less than 80% need to foster the correct conditions to allow for the required improvements in compliance to be made.

1. Introduction & Methodology

Measuring hand hygiene compliance by direct observation is described as the gold standard by the World Health Organisation (WHO).¹ The national hand hygiene SOP was published in 2011 by the national hand hygiene steering group.² This SOP outlines the methodology for undertaking hand hygiene observational audits, which was adopted from the WHO. Acute hospitals are required to measure healthcare worker compliance against 30 hand hygiene opportunities for each of the seven randomly selected wards in their facility, resulting in a total of 210 opportunities per hospital. National workshops for training lead auditors are held biannually. The inter-rater reliability of each auditor is assessed using the Kappa statistic.^{3;4}

The results from the sixth national hand hygiene compliance audit in 42 HSE and 6 private hospitals are presented in this report. Comparisons are drawn with data from Periods 1 to 5 (where applicable). For facilities that submitted more than the required 210 opportunities, the first 30 opportunities per ward were used for the analysis. Facilities that submitted less than 180 opportunities were not included in the analysis. Binomial exact 95% confidence intervals are presented.

While standardised hand hygiene auditor training and validation (with inter-rater reliability testing) should ensure that measurement of hand hygiene should be comparable, the results presented in this report have not been validated by external auditors. It is therefore possible that hand hygiene auditing may not have been performed in a comparable fashion in all hospitals. The limitations of auditing hand hygiene compliance by direct observation are outlined in Appendix 1.

2. Results

2.1 Overall Hand Hygiene Compliance in Acute Hospitals, Period 6 – October 2013

Results from 42 HSE hospitals were analysed in Period 6, an increase from 36 hospitals in Period 1. In total, 8,876 opportunities for hand hygiene were observed with an overall compliance of 86.2% (Table 1 and Figure 1). The compliance is higher than in previous audits; however, it is lower than the HSE 2013 target of 90%. The compliance in different HSE facilities ranged from 69% to 98.1% (Tables 1-5 and Figure 1). Compliance data from 6 private hospitals were submitted for publication in the national report in Period 6 (Table 6).

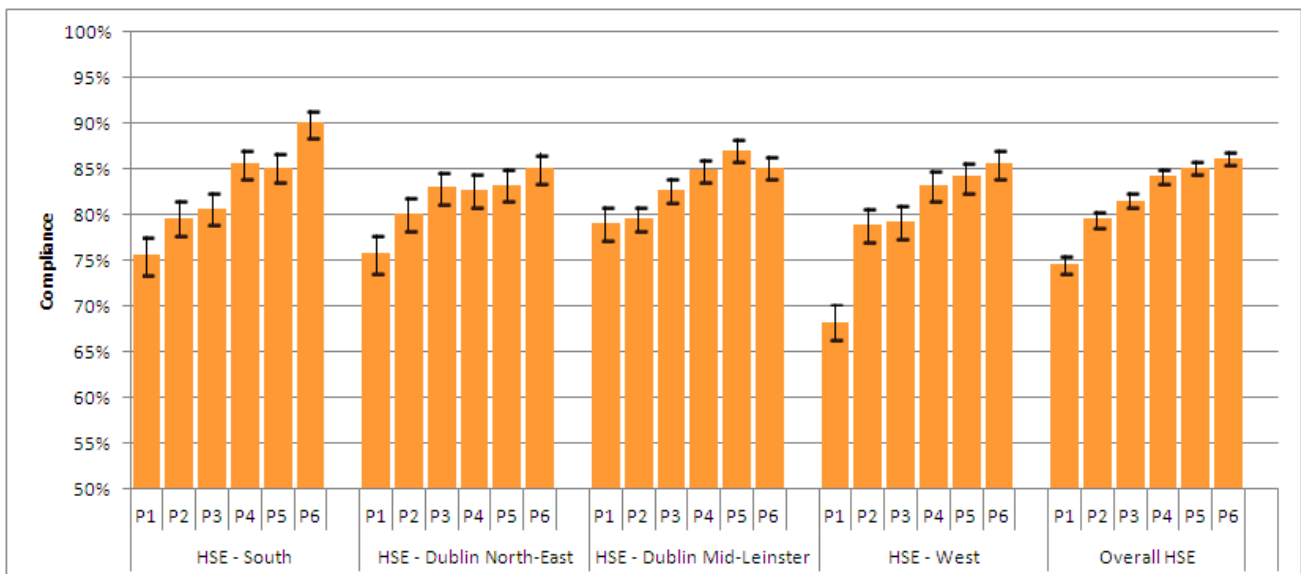


Figure 1: Hand hygiene compliance by HSE regions, for Periods 1-6 including 95% confidence intervals

Table 1: Hand hygiene compliance by HSE regions and overall compliance for Periods 1-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
HSE - South	1,671	1,505	90.1%	88.5%	91.5%	85.2%	85.7%	80.7%	79.7%	75.7%
HSE - Dublin North-East	1,868	1,589	85.1%	83.4%	86.7%	83.3%	82.8%	83.0%	80.1%	75.8%
HSE - Dublin Mid-Leinster	3,148	2,682	85.2%	83.9%	86.4%	87.1%	84.9%	82.7%	79.6%	79.1%
HSE - West	2,099	1,797	85.6%	84.0%	87.1%	84.2%	83.3%	79.3%	78.9%	68.3%
Overall HSE	8,786	7,573	86.2%	85.5%	86.9%	85.2%	84.3%	81.6%	79.6%	74.7%

* No Data Available

Table 2: Hand hygiene compliance by acute hospitals in HSE – South for Periods 1-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Bantry General Hospital	202	174	86.1%	80.6%	90.6%	83.8%	83.3%	82.4%	77.0%	69.0%
Cork University Hospital	*	*	*	*	*	*	*	*	*	*
Kerry General Hospital	210	186	88.6%	83.5%	92.5%	81.0%	81.0%	81.9%	80.5%	82.4%
Mallow General Hospital	210	191	91.0%	86.2%	94.5%	90.5%	87.1%	85.7%	81.4%	77.1%
Mercy University Hospital	210	204	97.1%	93.9%	98.9%	91.4%	91.4%	90.0%	85.7%	76.2%
South Infirmary - Victoria University Hospital, Cork	209	181	86.6%	81.2%	90.9%	85.2%	88.6%	80.5%	71.4%	*
South Tipperary General Hospital, Clonmel	210	189	90.0%	85.1%	93.7%	88.6%	84.3%	86.7%	72.9%	71.9%
St Luke's General Hospital, Kilkenny ¹	210	193	91.9%	87.4%	95.2%	87.6%	88.1%	71.4%	85.7%	82.4%
Waterford Regional Hospital	210	187	89.0%	84.0%	92.9%	87.1%	91.4%	77.6%	82.9%	86.1%
Wexford General Hospital	*	*	*	*	*	71.9%	75.6%	70.3%	*	59.2%

1 - Incorporating Kilcreene Orthopaedic Hospital; * No Data Available

Table 3: Hand hygiene compliance by acute hospitals in HSE – Dublin North-East for Periods 1-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Beaumont Hospital	195	161	82.6%	76.5%	87.6%	82.4%	86.2%	75.7%	79.3%	*
Cappagh National Orthopaedic Hospital, Dublin	203	188	92.6%	88.1%	95.8%	86.2%	87.6%	91.0%	71.4%	75.6%
Cavan General Hospital	210	169	80.5%	74.5%	85.6%	63.8%	*	74.3%	80.0%	69.5%
Connolly Hospital, Blanchardstown	210	193	91.9%	87.4%	95.2%	91.0%	80.5%	89.5%	85.7%	85.7%
Louth County Hospital, Dundalk	210	199	94.8%	90.8%	97.4%	89.5%	91.9%	90.0%	85.7%	91.9%
Mater Misericordiae University Hospital	210	157	74.8%	68.3%	80.5%	81.4%	79.0%	78.1%	73.3%	55.7%
Our Lady of Lourdes Hospital, Drogheda	210	165	78.6%	72.4%	83.9%	81.0%	68.6%	83.3%	79.5%	71.4%
Our Lady's Hospital, Navan	210	170	81.0%	75.0%	86.0%	87.5%	82.7%	81.8%	79.5%	78.1%
Rotunda Hospital	210	187	89.0%	84.0%	92.9%	87.6%	86.1%	83.3%	86.7%	78.6%

* No Data Available

Table 4: Hand hygiene compliance by acute hospitals in HSE – Dublin Mid-Leinster for Periods 1-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Children's University Hospital, Temple Street	210	145	69.0%	62.3%	75.2%	77.6%	77.6%	75.7%	83.3%	*
Coombe Women's Hospital	210	192	91.4%	86.8%	94.8%	89.8%	89.8%	80.9%	82.4%	83.3%
Midland Regional Hospital Mullingar	210	150	71.4%	64.8%	77.4%	76.7%	76.7%	75.2%	75.7%	74.3%
Midland Regional Hospital Portlaoise	210	173	82.4%	76.5%	87.3%	87.1%	87.1%	79.0%	70.5%	72.9%
Midland Regional Hospital Tullamore	210	180	85.7%	80.2%	90.1%	71.9%	71.9%	80.0%	67.1%	75.7%
Naas General Hospital	210	200	95.2%	91.4%	97.7%	92.4%	92.4%	85.2%	78.1%	*
National Maternity Hospital, Hollis Street	210	180	85.7%	80.2%	90.1%	94.3%	94.3%	89.5%	72.4%	*
Our Lady's Hospital for Sick Children, Crumlin ¹	210	206	98.1%	95.2%	99.5%	93.3%	93.3%	88.6%	86.7%	*
Royal Victoria Eye & Ear Hospital, Dublin ²	208	173	83.2%	77.4%	88.0%	91.0%	91.0%	86.2%	78.1%	76.2%
St Columcille's Hospital, Loughlinstown	210	172	81.9%	76.0%	86.9%	86.2%	86.2%	82.9%	73.8%	74.8%
St James's Hospital	210	190	90.5%	85.7%	94.1%	83.3%	83.3%	90.9%	87.6%	85.7%
St Luke's Hospital, Dublin	210	196	93.3%	89.1%	96.3%	91.9%	91.9%	85.7%	86.7%	79.5%
St Michael's Hospital, Dun Laoghaire	210	189	90.0%	85.1%	93.7%	89.0%	89.0%	85.9%	81.4%	83.3%
St Vincent's University Hospital	210	189	90.0%	85.1%	93.7%	91.0%	91.0%	82.9%	89.5%	85.7%
Tallaght Hospital	210	147	70.0%	63.3%	76.1%	80.0%	80.0%	72.4%	81.0%	*

* No Data Available

Table 5: Hand hygiene compliance by acute hospitals in HSE – West for Periods 1-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Galway University Hospitals	210	183	87.1%	81.8%	91.4%	89.5%	86.7%	83.3%	76.7%	54.8%
Letterkenny General Hospital	210	188	89.5%	84.6%	93.3%	92.4%	79.0%	76.6%	77.6%	65.2%
Mayo General Hospital, Castlebar	210	182	86.7%	81.3%	91.0%	83.8%	82.2%	76.2%	69.4%	61.9%
Mid-Western Regional Hospital, Ennis ¹	*	*	*	*	*	87.6%	93.8%	89.9%	88.5%	72.7%
Mid-Western Regional Hospital, Nenagh ¹	*	*	*	*	*	81.9%	85.2%	86.7%	79.0%	79.0%
Mid-Western Regional Hospitals ¹	*	*	*	*	*	83.8%	82.4%	77.6%	83.8%	78.1%
Portiuncula Hospital, Ballinasloe	210	170	81.0%	75.0%	86.0%	76.2%	78.6%	73.3%	70.5%	56.7%
Roscommon County Hospital	210	165	78.6%	72.4%	83.9%	83.5%	85.0%	73.3%	72.2%	63.6%
Sligo General Hospital	210	177	84.3%	78.6%	88.9%	84.8%	76.2%	75.5%	89.0%	79.5%
St John's Hospital, Limerick	209	179	85.6%	80.1%	90.1%	78.1%	84.3%	82.4%	81.4%	71.2%
UL Hospitals Maternal and Child Health Directorate ¹	210	186	88.6%	83.5%	92.5%	*	*	*	*	*
UL Hospitals Medicine Directorate ¹	210	181	86.2%	80.8%	90.6%	*	*	*	*	*
UL Hospitals Peri-Operative Directorate ¹	210	186	88.6%	83.5%	92.5%	*	*	*	*	*

1: The Mid Western Regional Hospitals in Limerick, Ennis and Nenagh are reporting data from three directorates within the University of Limerick (UL) Hospitals which reflects the new governance structures in these facilities

Table 6: Hand hygiene compliance by individual acute private hospitals for Periods 3-6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Blackrock Clinic	204	192	94.1%	90.0%	96.9%	95.2%	89.6%	88.1%	*	*
Bon Secours Hospital, Cork	210	199	94.8%	90.8%	97.4%	90.5%	*	*	*	*
Bon Secours Hospital, Galway	210	190	90.5%	85.7%	94.1%	90.0%	*	*	*	*
Bon Secours Hospital, Glasnevin	210	200	95.2%	91.4%	97.7%	93.3%	*	*	*	*
Bon Secours Hospital, Tralee	210	195	92.9%	88.5%	95.9%	94.8%	*	*	*	*
Mater Private Hospital	210	195	92.9%	88.5%	95.9%	94.3%	94.3%	94.8%	*	*

* No Data Available

2.2 Hand Hygiene Compliance by Healthcare Worker Category in HSE Facilities

The compliance for the different categories of healthcare workers in Period 6 was 90.4% in nurses/midwives 76.3 % in doctors, 83.4% in auxiliary staffⁱ and 86.5% in ‘other’ⁱⁱ healthcare staff (Figure 2 and Table 7). When compared with Period 5, a significant increase in compliance was reported for medical and auxiliary staff.

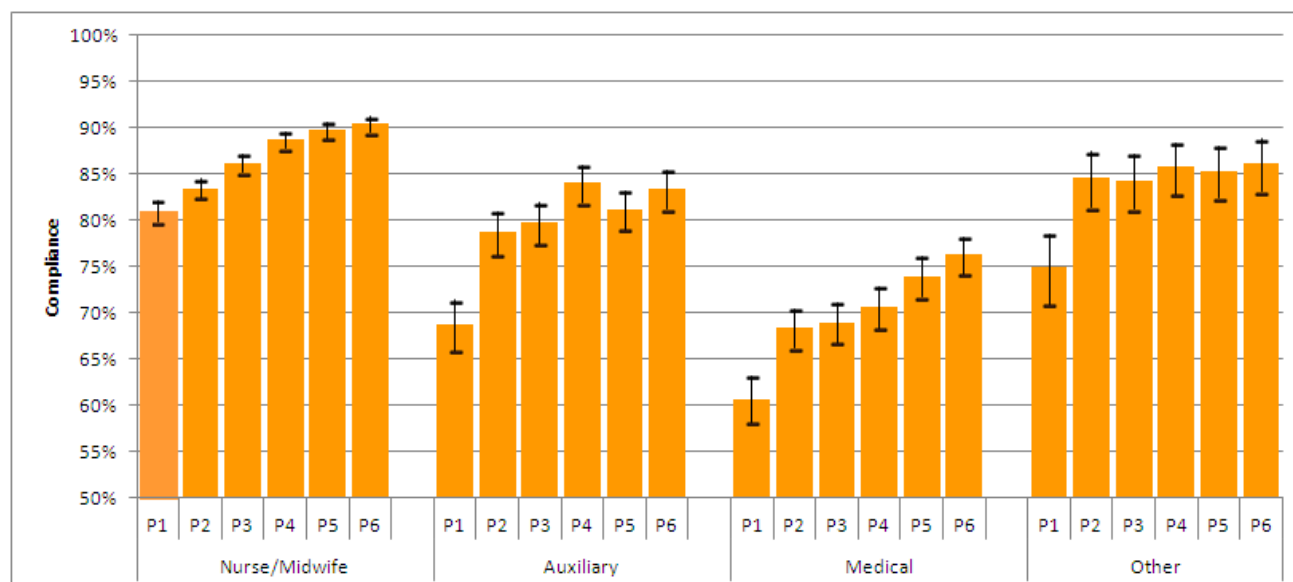


Figure 2: Hand hygiene compliance by healthcare worker category for Periods 1-6 including 95% confidence intervals

Table 7: Hand hygiene compliance by healthcare worker category for Periods 1 – 6

	Period 6					Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Nurse/Midwife	5,147	4,651	90.4%	89.5%	91.2%	89.8%	88.7%	86.2%	83.5%	81.0%
Auxiliary	1,227	1,023	83.4%	81.2%	85.4%	81.2%	84.1%	79.8%	78.7%	68.7%
Medical	1,812	1,382	76.3%	74.2%	78.2%	73.9%	70.7%	69.0%	68.4%	60.7%
Other	600	517	86.2%	83.1%	88.8%	85.4%	85.8%	84.3%	84.6%	74.9%

2.3 Compliance with the Five Moments of Hand Hygiene in HSE Facilities

Hand hygiene compliance with the ‘Five Moments for Hand Hygiene’ is outlined in Table 8 and Figure 3. When compared with Periods 4 and 5, there was a continued decrease in compliance with moment 2 (before clean and aseptic technique); however, this decrease is not statistically significant. Increased compliance was reported for moment 1 (before touching a patient), moment 4 (after touching a patient) and moment 5 (after touching patient surroundings).

ⁱ Healthcare assistants, porters, catering and household services

ⁱⁱ Physiotherapists, radiologists, dieticians, social workers and pharmacists

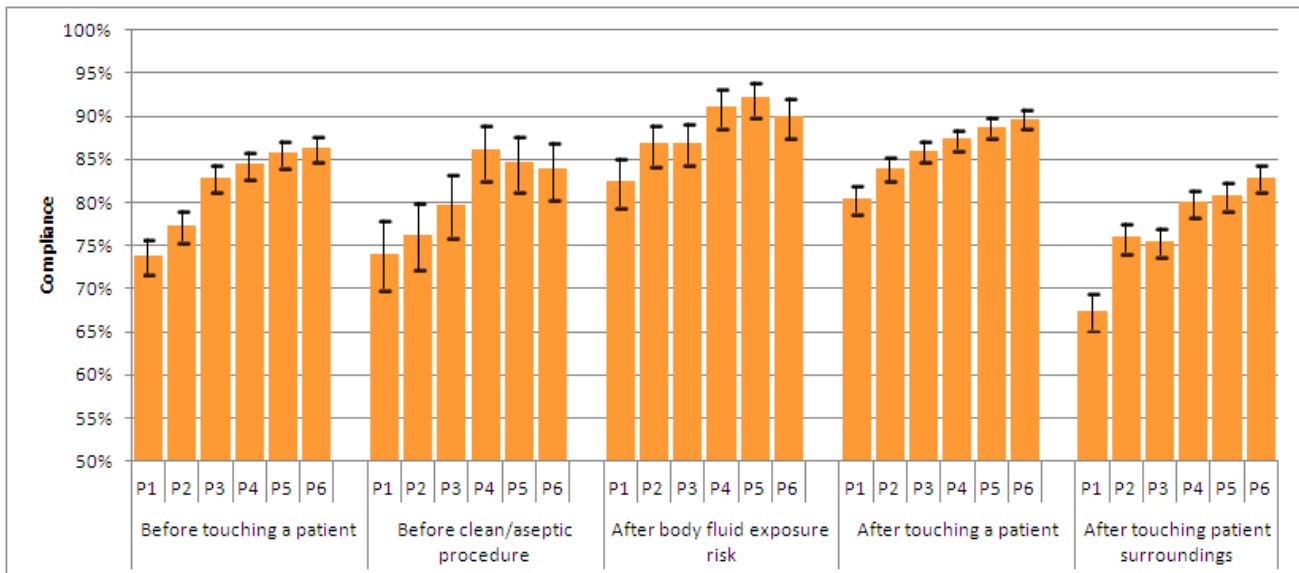


Figure 3: Hand hygiene compliance by the WHO 5 moments for Periods 1-6 including 95% confidence intervals

Table 8: Hand hygiene compliance by the WHO 5 moments for Periods 1-6

	Period 6			Period 5	Period 4	Period 3	Period 2	Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance	Percent Compliance
Before touching a patient	2,335	2,014	86.3%	85.8%	84.4%	82.9%	77.4%	73.8%
Before clean/aseptic procedure	497	417	83.9%	84.9%	86.1%	79.8%	76.2%	74.1%
After body fluid exposure risk	713	642	90.0%	92.0%	91.1%	86.9%	86.8%	82.5%
After touching a patient	3,286	2,949	89.7%	88.4%	87.4%	86.0%	83.9%	80.4%
After touching patient surroundings	2,595	2,151	82.9%	80.5%	80.0%	75.5%	76.0%	67.4%

Note: More than one moment may be observed per hand hygiene opportunity

2.4 Type of Hand Hygiene Agent Used By Healthcare Workers

Of the total hand hygiene opportunities observed in Period 6, 86.2% (7,573) were compliant. Alcohol hand Rub (AHR) was the method used for hand hygiene for 66.7% (5,048) of hand hygiene actions compared to 64% in Period 5. Further information on AHR consumption in acute hospitals can be accessed [here](#).

3. Conclusions

The overall compliance of 86.2% did not reach the HSE 2013 target of 90%, but has increased from 85% in Period 5.⁵ The compliance rate reported for medical staff (76.3%) represents a significant increase compared with Period 5 (73.4%), although compliance in this group is still significantly lower than the other staff categories. The highest reported compliance was in nurses/midwives and the 'other' staff group (primarily allied health professionals) (91.4% and 86.2% respectively).

The WHO's 'Five Moments for Hand Hygiene' define when healthcare workers should clean their hands when undertaking care at the bedside. In common with the previous five audits, moments 3 (after body fluid exposure risk) and 4 (after touching a patient) achieved the highest compliance (90% and 89.7% respectively). When compared to Period 4, a decrease in compliance for moment 2 (before a clean/aseptic procedure) was reported in Periods 5 and 6 (86.1%, 84.9% and 83.9% respectively), although this decrease is not statistically significant. Clean and aseptic procedures pose a critical infection risk to patients; therefore it

is vital that facilities continue to target education and training to increase compliance with moment 2. Determining compliance by the 'Five Moments for Hand Hygiene' and by staff categories allows facilities to target educational and promotional activities where they are most needed to improve patient safety.

AHR was the preferred method used for hand hygiene for 66.7% of hand hygiene actions. This is consistent with international best practice as AHR is faster, more effective at reducing bacterial counts and kinder to skin compared to plain or antiseptic soap and water.¹ However, the WHO recommends that AHR should be used for 80% of hand hygiene actions.⁶ In addition to the AHR data in this report, overall AHR consumption data from public acute hospitals is published biannually by HPSC.⁷ The overall AHR consumption data represents the total volume of AHR delivered or dispensed to wards, clinics and other hospital areas per quarter, excluding that used for pre-operative surgical hand hygiene. Measurement of hospital-level consumption of AHR, expressed as volume used per 1,000 bed-days, has been shown to correlate with overall hand hygiene activity in hospitals.¹ Facilities should review the data available from both reports to target education and training and to inform staff of the advantages of AHR over hand washing.

There are many factors that can contribute to improving the compliance of healthcare workers with hand hygiene, including improved infrastructure, increased awareness through education, audit and feedback, support from senior management/clinicians and an informed patient population.^{1,8} A multimodal strategy is recommended by the WHO to improve hand hygiene compliance which includes system change, training and education, evaluation and feedback, and institutional safety.⁹

4. Recommendations

Improving hand hygiene compliance in acute hospitals will require commitment from all HSE staff and consideration should be given to implementing the WHO multimodal strategy in all facilities.⁹

Key areas highlighted in Period 6 audit that should be targeted for improvement within a multimodal strategy include:

- **System change:** Hospitals should promote the advantages of alcohol handrubⁱⁱⁱ compared to soap and water. This should include providing ready access to alcohol hand rub at the point of care.
- **Training and education:**
 - Hand hygiene education is mandatory for all healthcare staff that interact with patients at induction and *at least* every 2 years. Agency and temporary staff need to be included in this programme, unless there is documentary evidence that they have received equivalent training prior to commencing work. Hospital should have a system of regular monitoring of the proportion of staff that have received hand hygiene training
 - Hand hygiene education should continue to focus on medical staff (but not to the exclusion of other groups) and the advantages of using alcohol handrub compared to soap and water.
 - Hand hygiene before a clean/aseptic procedure (moment 2) needs to improve. Inadequate hand hygiene before these procedures can result in HCAI with potential morbidity and mortality.

ⁱⁱⁱ Includes alcohol hand gel or foam

- **Evaluation/audit and feedback:**
 - All hospitals should ensure that they have a trained lead auditor to perform hand hygiene audits in a standardised fashion to enable comparisons within the hospital to be made over time.
 - Hospitals should ensure that a hand hygiene training and audit programme is in place and that an action plan is developed for each ward/unit in which the hand hygiene compliance is less than the nationally set target (90% in 2013). Regular hand hygiene audits with feedback of results in line with the national SOP are an essential component of improving hand hygiene compliance.
 - Hospitals should ensure that they have a local ward/unit based hand hygiene audit programme in addition to participation in the biannual national hand hygiene audit programme.
 - Hand hygiene compliance should be monitored on a regular basis and results fed back to all hospital staff and presented at unit, directorate and senior management team meetings.

- **Reminders in the work place:** This includes posters, screensavers etc. See www.hse.ie/go/handhygiene for hand hygiene leaflets, videos & posters.

- **Institutional safety climate:** Visible support from senior management in embedding a culture of hand hygiene excellence is key. Hospital managers of facilities where compliance is less than 80% need to foster the correct conditions to allow for the required improvements in compliance to be made.

Acknowledgements

We would like to acknowledge the commitment of the hand hygiene auditors in each hospital without whom this report would not be possible.

References

- (1) World Health Organisation. WHO Guidelines on Hand Hygiene in Healthcare. 2009: Accessed 12-5-2010. <http://www.who.int/gpsc/5may/tools/en/index.html>
- (2) Health Protection Surveillance Centre IPS. Hand hygiene observation audit tool: Standard operating procedure. 2011: Accessed 22/02/2013. <http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing/AuditTools/>
- (3) Donner A RMA. Sample size requirements for interval estimation of the Kappa statistic for interobserver agreement studies with a binary outcome and multiple raters. *The International Journal of Biostatistics* 2010; 6(1):1-11.
- (4) Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and sample size requirements. *Phys Ther* 2005; 85(3):257-268.
- (5) Health Protection Surveillance Centre. Report on hand hygiene compliance for Period 5 in HSE acute hospitals: Period 5. 2012: Accessed 10-1-2014. <http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing/HandHygieneAudit/HandHygieneAuditResults/>
- (6) World Health Organisation. Hand hygiene self-assessment framework. 2010: Accessed 10-10-2012. http://www.who.int/gpsc/country_work/hhsa_framework.pdf
- (7) Health Protection Surveillance Centre. Alcohol handrub consumption surveillance quarterly reports. 2013: Accessed 25-2-2013. <http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing/AlcoholHandRubConsumptionSurveillance/QuarterlyReports/>
- (8) Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Infection Control Programme. Lancet* 2000; 356(9238):1307-1312.
- (9) World Health Organisation. A guide to the implementation of the WHO multi-model hand hygiene improvement strategy. 2009: http://www.who.int/gpsc/5may/Guide_to_Implementation.pdf

Appendix 1: Limitations of Auditing Hand Hygiene with Direct Observation

The results as presented may not be reflective of healthcare worker compliance at all times. Compliance with hand hygiene is measured by trained, validated auditors observing healthcare workers undertaking patient care. It is well recognised that workers will change their behaviour if aware that they are being observed (Hawthorne effect). However, it is also known that this effect diminishes over time and that healthcare workers under observation may not be aware (due to the many competing demands on their attention) of the presence of the auditor. In addition, the purpose of auditing is to improve practice, therefore any action that improves compliance increases patient safety. Auditors are requested to give immediate feedback to ward staff following an audit, thereby increasing awareness and knowledge of hand hygiene.

All auditors measured compliance in the facility in which they work; therefore there may be an element of bias in the results. This risk of bias should be balanced by the benefits of increasing local staff knowledge and awareness of hand hygiene.

The sample size per hospital (210 opportunities) has a margin of error of nearly 7%. A larger sample size would provide proportions with a narrower margin of error especially at ward level. However, hand hygiene auditing is very labour intensive and without dedicated auditors, the time allocated must be balanced against other service needs.

The duration of, and the technique for hand hygiene, which are important elements of good practice were not measured as a mandatory component of this audit in line with the WHO protocol.