



Report on Hand Hygiene Compliance in Acute Hospitals

Period 4, October 2012

Summary

- This report summarises the results of the fourth national hand hygiene audit in 44 acute hospitals (42 public and 2 private). Acute HSE hospitals are required to undertake biannual hand hygiene compliance audits in seven randomly selected wards and observe 30 opportunities per ward.
- The overall compliance for Period 4 was 84.3% (Table 1) which represents a significant increase from Period 3 (81.6%) though is less than the target of 85% for 2012. Tables 2-6 summarise compliance by hospital.
- The compliances for the different categories of healthcare worker were: nurses/midwives 88.7%, doctors 70.7%, auxiliary staff ⁱ 84.1% and 'other' healthcare staff ⁱⁱ 85.8%. This represents an improvement when compared with previous audits. (Table 7 and Figure 2).
- There was a significant increase in compliance in Period 4 with moments 2 (before clean and aseptic technique), 3 (after body fluid exposure), 4 (after touching the patient) and 5 (after touching patient's surroundings) (Table 8 and Figure 3).
- Alcohol hand rub accounted for 60.4% of hand hygiene actions in Period 4, an increase from Period 3 (58.7%).
- The HSE has set a target of achieving > 90% compliance with hand hygiene by 2013. To achieve this, healthcare facilities are advised to develop actions plans as outlined in the national standard operating procedure (SOP) including education and training and re-audit to improve compliance.

Key areas from this audit that should be targeted for improvement include:

- The need to improve hand hygiene by all healthcare workers, but specifically medical staff.
- The need to improve hand hygiene before a clean/aseptic procedure (moment 2).
- Promoting the advantages of alcohol handrubⁱⁱⁱ compared to soap and water. This should include facilitating ready access to alcohol hand rub at the point of care.
- The need to ensure that all acute hospitals have trained and validated hand hygiene auditors. Regular hand hygiene audits with feedback of results as per the national SOP are an essential component of improving hand hygiene compliance.
- General 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.

ⁱ Healthcare assistants, porters, catering and household services

ⁱⁱ Physiotherapists, radiologists, dieticians, social workers and pharmacists

ⁱⁱⁱ Includes alcohol hand gel or foam

Introduction & Methodology

Measuring hand hygiene compliance by direct observation is described by the World Health Organisation (WHO) as the gold standard.¹ The national hand hygiene SOP was published in 2011 by the national hand hygiene steering group.² This SOP outlines the WHO methodology which was adopted for undertaking hand hygiene observational audits. 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 210 opportunities per hospital. National workshops for training lead auditors are held biannually. Each auditor's inter-rater reliability is assessed using the Kappa statistic.^{3;4}

The results from the fourth national hand hygiene compliance audit in 42 HSE and two private hospitals are presented in this report. Comparisons are drawn with data from Periods 1 to 3 (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.

1. Results

1.1 Overall Hand Hygiene Compliance in Acute Hospitals, Period 4 - October 2012.

Results from 42 HSE hospitals were analysed, an increase from 36 hospitals in Period 1. In total, 8,799 opportunities for hand hygiene were observed; achieving an overall compliance of 84.3% (Table 1 and Figure 1). This represents an improvement from previous audits though is below the HSE target of 85% for 2012. The compliance in different HSE facilities ranged from 68.6% to 93.8% (Tables 1-5 and Figure 1). Compliance data from two private hospitals were submitted for publication in the national report in Period 4 (Table 6).

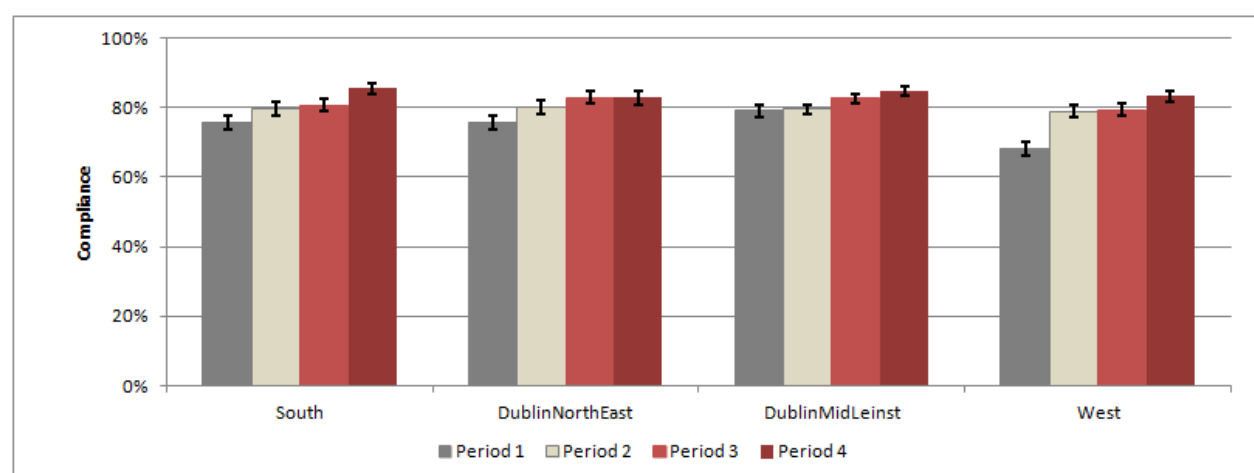


Figure 1: Hand hygiene compliance by HSE regions, for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012) including 95% confidence intervals

Table 1: Hand hygiene compliance by HSE regions and overall compliance for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
HSE - South	1,885	1,615	85.7%	84.0%	87.2%	80.7%	79.7%	75.7%
HSE - Dublin North-East	1,676	1,388	82.8%	80.9%	84.6%	83.0%	80.1%	75.8%
HSE - Dublin Mid-Leinster	3,145	2,669	84.9%	83.6%	86.1%	82.7%	79.6%	79.1%
HSE - West	2,073	1,727	83.3%	81.6%	84.9%	79.3%	78.9%	68.3%
Overall	8,779	7,399	84.3%	83.5%	85.0%	81.6%	79.6%	74.7%

Table 2: Hand hygiene compliance by individual acute hospitals in HSE – South for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Bantry General Hospital	210	175	83.3%	77.6%	88.1%	82.4%	77.0%	69.0%
Cork University Hospital ¹								
Kerry General Hospital, Tralee	210	170	81.0%	75.0%	86.0%	81.9%	80.5%	82.4%
Mallow General Hospital	210	183	87.1%	81.8%	91.4%	85.7%	81.4%	77.1%
Mercy University Hospital, Cork	210	192	91.4%	86.8%	94.8%	90.0%	85.7%	76.2%
South Infirmary - Victoria University Hospital, Cork ²	210	186	88.6%	83.5%	92.5%	80.5%	71.4%	
South Tipperary General Hospital, Clonmel	210	177	84.3%	78.6%	88.9%	86.7%	72.9%	71.9%
St Luke's General Hospital, Kilkenny ³	210	185	88.1%	82.9%	92.1%	71.4%	85.7%	82.4%
Waterford Regional Hospital	210	192	91.4%	86.8%	94.8%	77.6%	82.9%	86.1%
Wexford General Hospital ⁴	205	155	75.6%	69.1%	81.3%	70.3%		59.2%

1 - No data to date; 2 - No data for Period 1; 3 - Incorporating Kilcreene Orthopaedic Hospital; 4 - No data for Period 2

Table 3: Hand hygiene compliance by individual acute hospitals in HSE – Dublin North-East for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Beaumont Hospital ¹	210	181	86.2%	80.8%	90.6%	75.7%	79.3%	
Cappagh National Orthopaedic Hospital, Dublin	210	184	87.6%	82.4%	91.8%	91.0%	71.4%	75.6%
Cavan General Hospital ²						74.3%	80.0%	69.5%
Connolly Hospital, Blanchardstown	210	169	80.5%	74.5%	85.6%	89.5%	85.7%	85.7%
Louth County Hospital, Dundalk	210	193	91.9%	87.4%	95.2%	90.0%	85.7%	91.9%
Mater Misericordiae University Hospital	210	166	79.0%	72.9%	84.3%	78.1%	73.3%	55.7%
Our Lady of Lourdes Hospital, Drogheda	210	144	68.6%	61.8%	74.8%	83.3%	79.5%	71.4%
Our Lady's Hospital, Navan	208	172	82.7%	76.9%	87.6%	81.8%	79.5%	78.1%
Rotunda Hospital	208	179	86.1%	80.6%	90.5%	83.3%	86.7%	78.6%

1 - No data for Period 1; 2 - No data for Period 4

Table 4: Hand hygiene compliance by individual acute hospitals in HSE – Dublin Mid-Leinster for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Children's University Hospital, Temple Street ¹	210	154	73.3%	66.8%	79.2%	75.7%	83.3%	
Coombe Women's Hospital	210	177	84.3%	78.6%	88.9%	80.9%	82.4%	83.3%
Midland Regional Hospital Mullingar	210	184	87.6%	82.4%	91.8%	75.2%	75.7%	74.3%
Midland Regional Hospital Portlaoise	210	171	81.4%	75.5%	86.4%	79.0%	70.5%	72.9%
Midland Regional Hospital Tullamore	210	172	81.9%	76.0%	86.9%	80.0%	67.1%	75.7%
Naas General Hospital	210	190	90.5%	85.7%	94.1%	85.2%	78.1%	
National Maternity Hospital, Holles Street ¹	210	180	85.7%	80.2%	90.1%	89.5%	72.4%	
Our Lady's Hospital for Sick Children, Crumlin ¹	209	194	92.8%	88.4%	95.9%	88.6%	86.7%	
Royal Victoria Eye & Ear Hospital, Dublin ¹	208	179	86.1%	80.6%	90.5%	86.2%	78.1%	76.2%
St Columcille's Hospital, Loughlinstown	210	179	85.2%	79.7%	89.7%	82.9%	73.8%	74.8%
St James's Hospital	210	177	84.3%	78.6%	88.9%	90.9%	87.6%	85.7%
St Luke's Hospital, Dublin	210	178	84.8%	79.2%	89.3%	85.7%	86.7%	79.5%
St Michael's Hospital, Dun Laoghaire	208	177	85.1%	79.5%	89.6%	85.9%	81.4%	83.3%
St Vincent's University Hospital	210	183	87.1%	81.8%	91.4%	82.9%	89.5%	85.7%
Tallaght Hospital ¹	210	174	82.9%	77.1%	87.7%	72.4%	81.0%	

1 - No data for Period 1

Table 5: Hand hygiene compliance by individual acute hospitals in HSE – West for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Galway University Hospitals ¹	210	182	86.7%	81.3%	91.0%	83.3%	76.7%	54.8%
Letterkenny General Hospital	210	166	79.0%	72.9%	84.3%	76.6%	77.6%	65.2%
Mayo General Hospital, Castlebar	208	171	82.2%	76.3%	87.2%	76.2%	69.4%	61.9%
Mid-Western Regional Hospital Ennis	208	195	93.8%	89.5%	96.6%	89.9%	88.5%	72.7%
Mid-Western Regional Hospital Nenagh	210	179	85.2%	79.7%	89.7%	86.7%	79.0%	79.0%
Mid-Western Regional Hospitals ²	210	173	82.4%	76.5%	87.3%	77.6%	83.8%	78.1%
Portiuncula Hospital, Ballinasloe	210	165	78.6%	72.4%	83.9%	73.3%	70.5%	56.7%
Roscommon County Hospital	187	159	85.0%	79.1%	89.8%	73.3%	72.2%	63.6%
Sligo General Hospital	210	160	76.2%	69.8%	81.8%	75.5%	89.0%	79.5%
St John's Hospital, Limerick	210	177	84.3%	78.6%	88.9%	82.4%	81.4%	71.2%

1 -Incorporating Merlin Park Regional Hospital, Galway; 2 -Incorporating Limerick Regional, Maternity and Croom Orthopaedic Hospitals; compliance in Period 1 applies to Limerick Regional Hospital only. No data from Limerick Maternity or Croom Orthopaedic Hospitals in Period 1.

Table 6: Hand hygiene compliance by individual acute private hospitals for Period 3 (June/July 2012) and 4 (October 2012)

	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
Blackrock Clinic ¹	182	163	89.6%	84.2%	93.6%	88.1%		
Mater Private ¹	210	198	94.3%	90.2%	97.0%	94.8%		

1 - No data from private hospitals prior to Period 3

2.2 Hand Hygiene Compliance by Healthcare Worker Category in HSE Facilities

The compliance for the different categories of healthcare workers in Period 4 was: nurses/midwives 88.7%, doctors 70.7 %, auxiliary staff ^{iv} 84.1% and 'other'^v healthcare staff 85.8% (Table 7 and Figure 2). When compared with Period 3, an increase in compliance was reported for all staff categories.

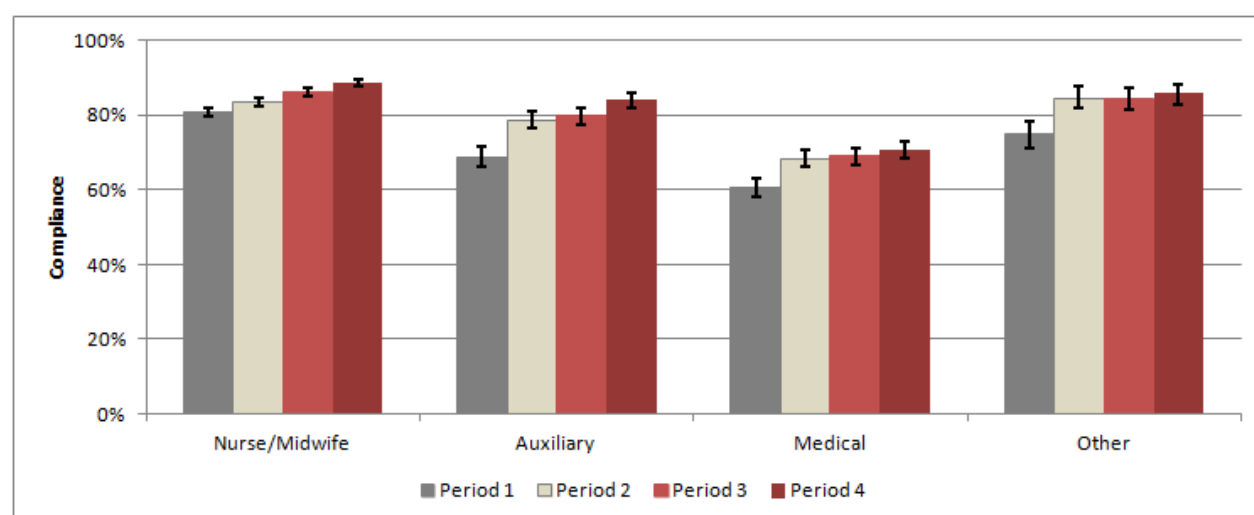


Figure 2: Hand hygiene compliance by healthcare worker category for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012) including 95% confidence intervals

Table 7: Hand hygiene compliance by healthcare worker category for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Nurse/Midwife	5,112	4,536	88.7%	87.8%	89.6%	86.2%	83.5%	81.0%
Auxiliary	1,298	1,091	84.1%	81.9%	86.0%	79.8%	78.7%	68.8%
Medical	1,721	1,216	70.7%	68.4%	72.8%	69.0%	68.4%	60.7%
Other	648	556	85.8%	82.9%	88.4%	84.3%	84.6%	74.9%

^{iv} Healthcare assistants, porters, catering and household services

^v Physiotherapists, radiologists, dieticians, social workers and pharmacists

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 previous audits, there was a significant increase in compliance in Period 4 with moments 2 (before clean and aseptic technique), 3 (after body fluid exposure), 4 (after touching a patient) and 5 (after touching patient's surroundings).

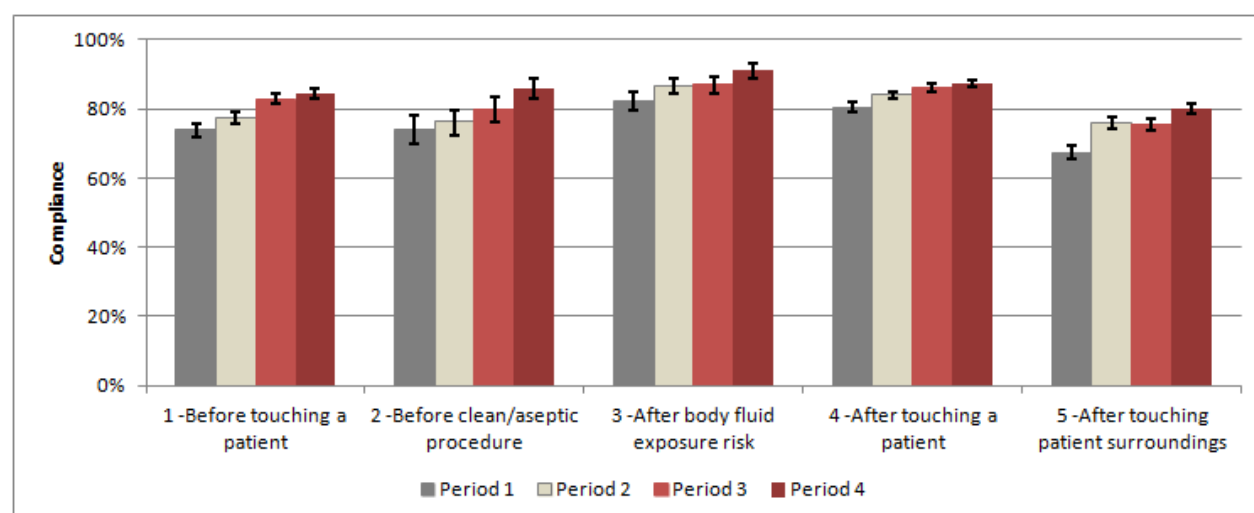


Figure 3: Hand hygiene compliance by the WHO 5 moments for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012) including 95% confidence intervals

Table 8: Hand hygiene compliance by the WHO 5 moments for Periods 1 (June 2011), 2 (October 2011), 3 (June/July 2012) and 4 (October 2012)

	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
Before touching a patient	2,295	1,937	84.4%	82.9%	85.9%	82.9%	77.4%	73.8%
Before clean/aseptic procedure	503	433	86.1%	82.7%	89.0%	79.8%	76.2%	74.1%
After body fluid exposure risk	718	654	91.1%	88.8%	93.1%	86.9%	86.8%	82.5%
After touching a patient	3,322	2,903	87.4%	86.2%	88.5%	86.0%	83.9%	80.4%
After touching patient surroundings	2,610	2,086	79.9%	78.3%	81.4%	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 4, 84.3% (7,399) were compliant. Alcohol hand rub at 60.4% (4,469) was the preferred method for hand hygiene, an increase from 58.7% in Period 3. Inadequate access to alcohol handrub at the point of care and a lack of awareness of the benefits of hand rub compared to soap and water may contribute to the high level of hand washing reported.

2. 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.

3. Conclusions

The overall compliance was 84.3% which is below the HSE target of 85% for 2012 but has increased from 81.6% in Period 3.⁵ When compared with Period 3, an increase in compliance was reported for all staff categories. Nurse/Midwives and the 'other' staff group (primarily allied health professionals) achieved the highest compliances (88.7% and 85.8% respectively) with medical staff (70.7%) recording lower compliance.

The WHO's 'Five Moments for Hand Hygiene' define when healthcare workers should decontaminate their hands when undertaking care at the bedside. In common with the previous three audits, moments 3 (after body fluid exposure risk) and 4 (after touching a patient) achieved the highest compliances (91.1% and 87.4% respectively). Compliance for moment 2 (before a clean/aseptic procedure) at 86.1% significantly increased compared to Period 3 (79.8%), however as these procedures pose a critical infectious risk to patients, it is important that facilities continue to target education and training to further increase compliance. 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.

Alcohol handrub (AHR) was the preferred method used for hand hygiene for 60.4% 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 healthcare workers hand hygiene compliance 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 including 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 multi-model strategy in all facilities.⁹

Key areas highlighted in Period 4 audit that should be targeted for improvement include:

- 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).
- Hand hygiene compliance should be monitored on a regular basis and results fed back widely to all hospital staff and presented at senior management team meetings.
- Hand hygiene before a clean/aseptic procedure (moment 2) was 86.1% during Period 4, but needs to improve. Inadequate hand hygiene before these procedures can result in healthcare-acquired infection and potential morbidity and mortality.
- On the basis of the results of the previous three audits, hand hygiene education should focus on medical staff (but not to the exclusion of other groups) and the advantages of using alcohol handrub compared to soap and water.
- 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.

Acknowledgements

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

Reference List

- (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 3 in HSE acute hospitals: Period 3. 2012: Accessed 1-2-2013. <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, Mouroug 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