

## **Report on Hand Hygiene Compliance in HSE Acute Hospitals Period 2, October 2011**

### **Executive summary**

- **Improving hand hygiene compliance by healthcare workers is a priority for the Health Service Executive (HSE). Measuring hand hygiene compliance using a standardised procedure and trained and validated auditors is critical to ensure that results are comparable over time. A standard operating procedure for measuring hand hygiene compliance was developed by the HSE Hand Hygiene Steering Group (Appendix 1)**
- **Acute hospitals were required to undertake a hand hygiene compliance audit biannually in seven randomly selected wards and observe 30 opportunities per ward**
- **The overall compliance for Period 2 was 79.6% which was over the target of 75% set by the HSE for 2011. Tables 2-5 summarises compliance by hospital. Caution should be used when interpreting these results as small differences between facilities may not be statistically significant. Likewise small differences in the results reported by the same facility in Period 1 and Period 2 may not be statistically significant**
- **The compliance for the different categories of healthcare worker was: nurses/midwives 83.5%, doctors 68.4%, auxiliary staff <sup>i</sup> 78.7% and other healthcare staff <sup>ii</sup> 84.6%**
- **The HSE has set a target of achieving > 90% compliance with hand hygiene by 2013. To achieve this, healthcare facilities should develop actions plans including education and training and re-audit to improve compliance**

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<sup>i</sup> Auxiliary includes healthcare assistants, porters, catering and household services

<sup>ii</sup> Other includes physiotherapists, radiologists, dieticians, social workers and pharmacists

## 1. Introduction

Hand hygiene is one of the most effective means of reducing healthcare associated infection (HCAI). However, compliance by healthcare workers with recommended hand hygiene frequencies and techniques has been reported as suboptimal.<sup>1,2</sup> Time constraints, skin integrity, inadequate physical resources (e.g. inadequate number of sinks) and absence of role models have been identified as barriers to compliance with hand hygiene.<sup>3</sup> Improved compliance has been reported following education,<sup>1</sup> introduction of alcohol gels/rubs,<sup>4</sup> audit and feedback,<sup>5</sup> and local promotion activities.

Measuring hand hygiene compliance by direct observation is described by the World Health Organisation (WHO) as the gold standard.<sup>6</sup> In 2009, a hand hygiene observational standard operating procedure (SOP) was developed by the Health Protection Surveillance Centre (HPSC) and Infection Protection Society and used in acute hospitals. Following an evaluation, a multidisciplinary steering group was established and a revised SOP was published in 2011 which can be accessed at <http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing/AuditTools/>

## 2. Method

The WHO methodology for undertaking hand hygiene observational audits was adopted. Healthcare workers were observed for their compliance against the WHO ‘5 moments of hand hygiene’ (Appendix 2). National workshops for training lead auditors were held in March and September 2011. Each auditor’s inter-rater reliability was assessed using the Kappa statistic.

For the national audit in October 2011 (Period 2), acute hospitals were 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.

Results were entered into a Microsoft Excel tool and forwarded to the HPSC for analysis. Audits undertaken in November 2011 were accepted for analysis. 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.

## Results

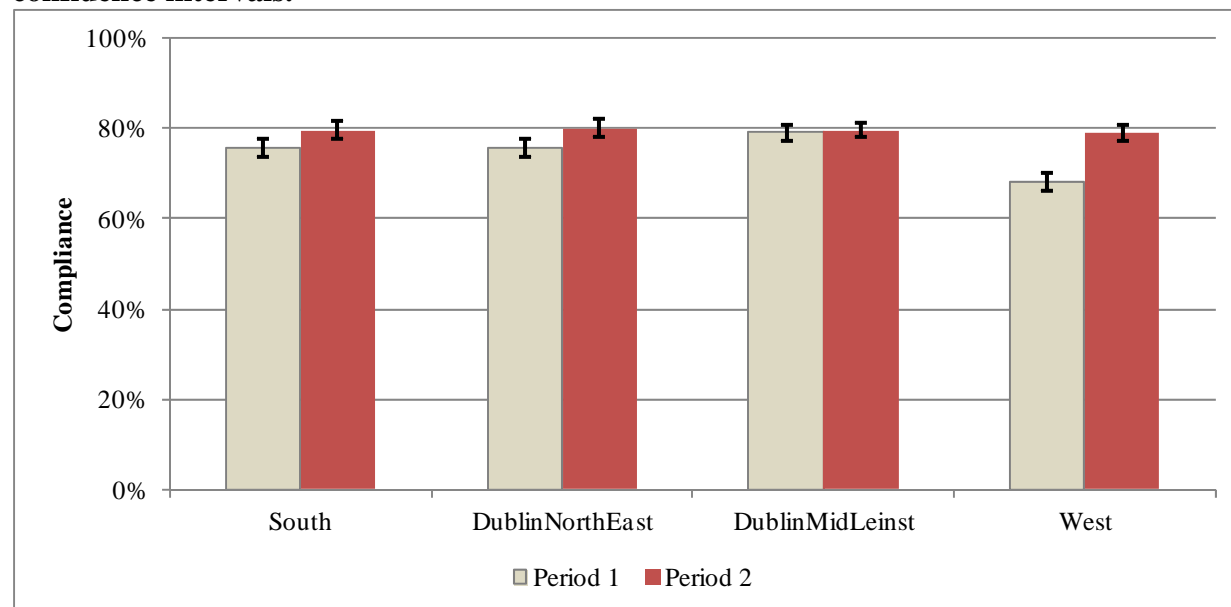
### 2.1 Overall Hand Hygiene Compliance in Acute Hospitals

Results from 42 hospitals were analysed for Period 2, an increase from 36 hospitals in Period 1. In total, 8,765 opportunities for hand hygiene were observed; achieving an average compliance of 79.6% (Table 1 and Figure 1) which is above the HSE target of 75% for 2011. The compliance in different facilities ranged between 67.1% to 89.5% (Tables 2, 3, 4 and 5). A significant increase in compliance was observed in Period 2 compared to Period 1 in three HSE regions (South, Dublin North-East and West). The increased compliance reported in Period 2 by HSE-Dublin Mid-Leinster was not statistically significant when compared with Period 1.

**Table 1: Overall and by HSE region; hand hygiene compliance for Period 1 and 2.**

	Period 2					Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
HSE - South	1,679	1,338	79.7%	77.7%	81.6%	75.7%
HSE - Dublin North-East	1,868	1,497	80.1%	78.3%	81.9%	75.8%
HSE - Dublin Mid-Leinster	3,150	2,508	79.6%	78.2%	81.0%	79.1%
HSE - West	2,068	1,632	78.9%	77.1%	80.7%	68.3%
Overall	8,765	6,975	79.6%	78.7%	80.4%	74.7%

**Figure 1: Hand hygiene compliance by HSE region, for Period 1 and 2 including 95% confidence intervals.**



**Table 2: Hand hygiene compliance by individual acute hospitals in HSE – South for Period 1 and 2.**

	Period 2			Period 1		
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Bantry General Hospital	209	161	77.0%	70.7%	82.6%	69.0%
Cork University Hospital <sup>1</sup>						
Kerry General Hospital, Tralee	210	169	80.5%	74.5%	85.6%	82.4%
Mallow General Hospital	210	171	81.4%	75.5%	86.4%	77.1%
Mercy University Hospital, Cork	210	180	85.7%	80.2%	90.1%	76.2%
South Infirmary - Victoria University Hospital, Cork <sup>2</sup>	210	150	71.4%	64.8%	77.4%	
South Tipperary General Hospital, Clonmel	210	153	72.9%	66.3%	78.7%	71.9%
St Luke's General Hospital, Kilkenny <sup>3</sup>	210	180	85.7%	80.2%	90.1%	82.4%
Waterford Regional Hospital	210	174	82.9%	77.1%	87.7%	86.1%
Wexford General Hospital <sup>4</sup>						59.2%

**1** - No data for Period 1 and Period 2; **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 Period 1 and 2.**

	Period 2			Period 1		
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Beaumont Hospital <sup>1</sup>	188	149	79.3%	72.8%	84.8%	
Cappagh National Orthopaedic Hospital, Dublin	210	150	71.4%	64.8%	77.4%	75.6%
Cavan General Hospital	210	168	80.0%	73.9%	85.2%	69.5%
Connolly Hospital, Blanchardstown	210	180	85.7%	80.2%	90.1%	85.7%
Louth County Hospital, Dundalk	210	180	85.7%	80.2%	90.1%	91.9%
Mater Misericordiae University Hospital	210	154	73.3%	66.8%	79.2%	55.7%
Our Lady of Lourdes Hospital, Drogheda	210	167	79.5%	73.4%	84.8%	71.4%
Our Lady's Hospital, Navan	210	167	79.5%	73.4%	84.8%	78.1%
Rotunda Hospital	210	182	86.7%	81.3%	91.0%	78.6%

**1** - No data for Period 1.

**Table 4: Hand hygiene compliance by individual acute hospitals in HSE – Dublin Mid-Leinster for Period 1 and 2.**

	Period 2				Period 1	
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Adelaide & Meath & National Children's Hospital, Tallaght <sup>1</sup>	210	170	81.0%	75.0%	86.0%	
Children's University Hospital, Temple Street <sup>1</sup>	210	175	83.3%	77.6%	88.1%	
Coombe Women's Hospital	210	173	82.4%	76.5%	87.3%	83.3%
Midland Regional Hospital Mullingar	210	159	75.7%	69.3%	81.4%	74.3%
Midland Regional Hospital Portlaoise	210	148	70.5%	63.8%	76.6%	72.9%
Midland Regional Hospital Tullamore	210	141	67.1%	60.3%	73.5%	75.7%
Naas General Hospital <sup>1</sup>	210	164	78.1%	71.9%	83.5%	
National Maternity Hospital, Holles Street <sup>1</sup>	210	152	72.4%	65.8%	78.3%	
Our Lady's Hospital for Sick Children, Crumlin <sup>1</sup>	210	182	86.7%	81.3%	91.0%	
Royal Victoria Eye & Ear Hospital, Dublin	210	164	78.1%	71.9%	83.5%	76.2%
St Columcille's Hospital, Loughlinstown	210	155	73.8%	67.3%	79.6%	74.8%
St James's Hospital	210	184	87.6%	82.4%	91.8%	85.7%
St Luke's Hospital, Dublin	210	182	86.7%	81.3%	91.0%	79.5%
St Michael's Hospital, Dun Laoghaire	210	171	81.4%	75.5%	86.4%	83.3%
St Vincent's University Hospital	210	188	89.5%	84.6%	93.3%	85.7%

1 - No data for Period 1.

**Table 5: Hand hygiene compliance by individual acute hospitals in HSE – West for Period 1 and 2.**

	Period 2				Period 1	
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Galway University Hospitals <sup>1</sup>	210	161	76.7%	70.4%	82.2%	54.8%
Letterkenny General Hospital	210	163	77.6%	71.4%	83.1%	65.2%
Mayo General Hospital, Castlebar	209	145	69.4%	62.6%	75.6%	61.9%
Mid-Western Regional Hospital Ennis	209	185	88.5%	83.4%	92.5%	72.7%
Mid-Western Regional Hospital Nenagh	210	166	79.0%	72.9%	84.3%	79.0%
Mid-Western Regional Hospitals <sup>2</sup>	210	176	83.8%	78.1%	88.5%	78.1%
Portlincula Hospital, Ballinasloe	210	148	70.5%	63.8%	76.6%	56.7%
Roscommon County Hospital	180	130	72.2%	65.1%	78.6%	63.6%
Sligo General Hospital	210	187	89.0%	84.0%	92.9%	79.5%
St John's Hospital, Limerick	210	171	81.4%	75.5%	86.4%	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.

## 2.2 Hand Hygiene Compliance by Healthcare Worker Category

In Period 2 compliance for different categories of healthcare workers varied from 68.4% for medical to 84.6% for the 'Other' category (primarily allied health professionals) (Table 6, Figure 2). The 'Auxiliary' healthcare worker category (includes healthcare assistants, porters, catering and household services) compliance was 78.7% which was lower than compliance among nurses/midwives at 83.5%. A significant increase in compliance by all categories of staff was observed in Period 2 when compared to Period 1.

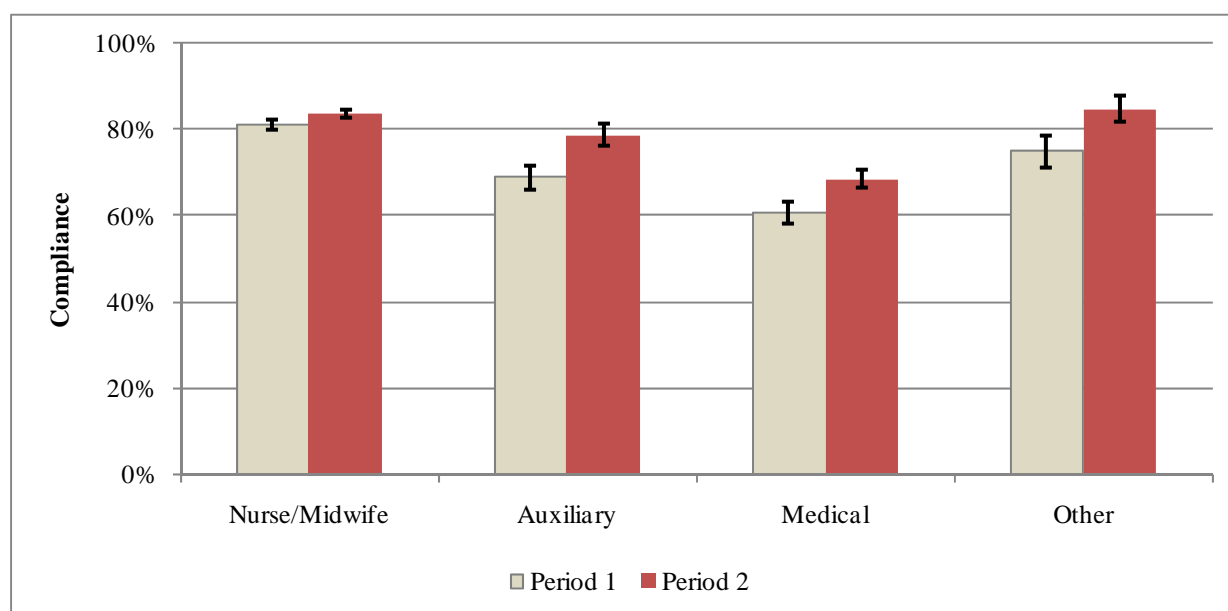
**Table 6: Hand hygiene compliance by healthcare worker category for Period 1 and 2.**

	Period 2					Period 1
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Nurse/Midwife	5,004	4,179	83.5%	82.5%	84.5%	81.0%
Auxiliary	1,225	964	78.7%	76.3%	81.0%	68.8%
Medical	1,932	1,321	68.4%	66.2%	70.4%	60.7%
Other	603	510	84.6%	81.4%	87.4%	74.9%

*Note: ‘Auxiliary’ includes healthcare assistants, porters, catering and household services.*

*‘Other’ includes physiotherapists, radiologists, dieticians, social workers and pharmacists.*

**Figure 2: Hand hygiene compliance by healthcare worker category for Period 1 and 2 including 95% confidence intervals.**



*Note: ‘Auxiliary’ includes healthcare assistants, porters, catering and household services.*

*‘Other’ includes physiotherapists, radiologists, dieticians, social workers and pharmacists.*

### 2.3 Compliance with the Five Moments of Hand Hygiene

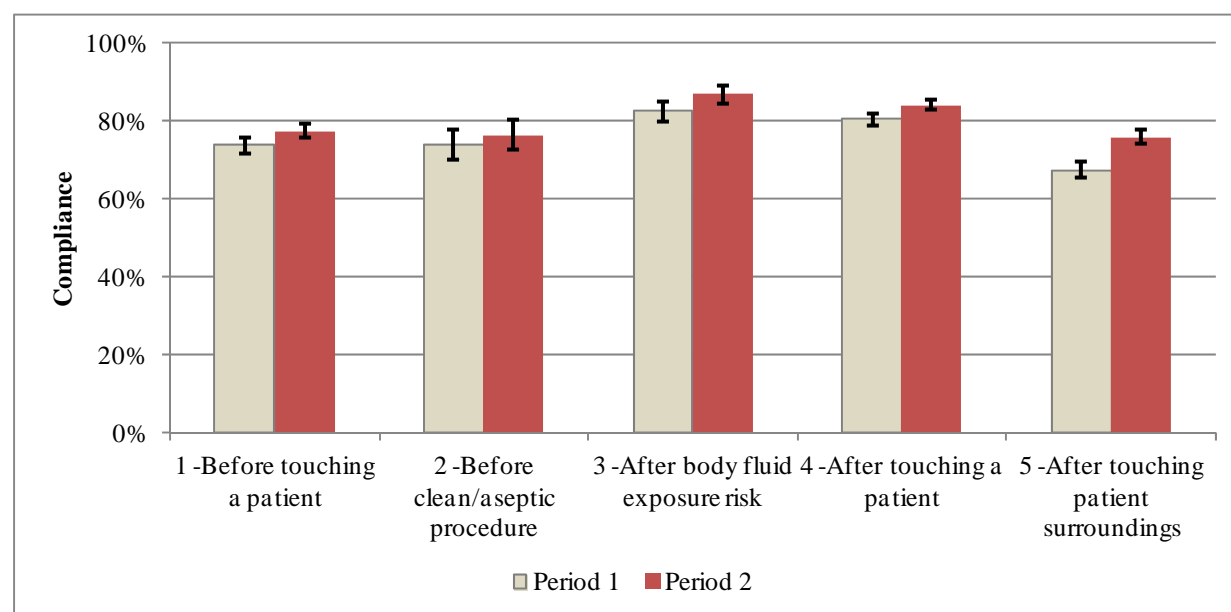
Compliance with hand hygiene can be divided into the five WHO moments (see Appendix 2). In Period 2 compliance for moment 5 (after touching patient surroundings) was 76%, the lowest compared with compliance for moment 3 (after body fluid exposure risk) at 86.8%. Compliance for moment 4 (after touching a patient) and moment 2 (before clean/aseptic procedure) was 83.9% and 76.2% respectively (Table 7 and Figure 3). A significant increase in compliance for moments 1, 3, 4 and 5 was observed in Period 2 when compared to Period 1. The increased compliance reported for moment 2 was not statistically significant.

**Table 7: Hand hygiene compliance by the WHO 5 moments for Period 1 and 2.**

	Period 2				Period 1	
	Hand Hygiene Opportunities	Hand Hygiene Actions	Percent Compliance	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Percent Compliance
Moment 1	2,277	1,762	77.4%	75.6%	79.1%	73.8%
Moment 2	501	382	76.2%	72.3%	79.9%	74.1%
Moment 3	850	738	86.8%	84.4%	89.0%	82.5%
Moment 4	3,252	2,730	83.9%	82.6%	85.2%	80.4%
Moment 5	2,576	1,957	76.0%	74.3%	77.6%	67.4%

*Moment 1: Before touching a patient; Moment 2: Before clean/aseptic procedure; Moment 3: After body fluid exposure risk; Moment 4: After touching a patient; Moment 5: After touching patient surroundings*

**Figure 3: Hand hygiene compliance by the WHO 5 moments for Period 1 and 2 including 95% confidence intervals.**



### 3. Limitations of Auditing Hand Hygiene with Direct Observation

The results may not be reflective of healthcare worker compliance at all times. Compliance with hand hygiene is measured by 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 wears off 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's knowledge and awareness of hand hygiene.

The sample size per hospital (210 opportunities) has a margin of error of 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.

#### **4. Discussion**

The results from the second national hand hygiene compliance audit in 42 acute hospitals are presented in this report and comparisons are drawn with data from Period 1. The overall compliance was 79.6% which is above the HSE target of 75% for 2011 and has increased from 74.7% in Period 1.<sup>7</sup> However, the HSE has set a target of achieving greater than 90% compliance by 2013. There are many factors that can contribute to improving healthcare workers hand hygiene compliance including improved infrastructure (e.g. access to alcohol gel at the point of care), increased awareness through education, audit and feedback, support from senior management/clinicians and an informed patient population.<sup>6;8</sup> 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.<sup>9</sup>

The 'Other' staff group (primarily allied health professionals) and nurses/midwives achieved the highest compliance (84.6% and 83.5% respectively) with medical staff (68.4%) and the 'Auxiliary' group (78.7%) reporting lower compliance. The WHO 5 moments of hand hygiene define when healthcare workers should wash their hands when undertaking care at the bedside. Moment 3 (after body fluid exposure risk) and moment 4 (after touching a patient) achieved the highest compliance (86.8% and 83.9% respectively), with moment 5 achieving the lowest at 76%. Healthcare workers compliance with moments 3 and 4 have been consistently reported as higher compared to moments 1, 2 and 5.<sup>7;10;11</sup> While the reason for this has not been fully explained, it may be that healthcare workers perceive their hands to be at greater risk of being contaminated after contact with body fluids and patients. Determining compliance by the '5 moments of hand hygiene' and by staff categories allows facilities to target educational and promotional activities where most needed to improve patient safety.



## **Conclusions and Recommendations**

The average hand hygiene compliance by healthcare workers is broadly comparable with other countries and has increased from Period 1; however improving compliance must be a priority. 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 (85% in 2012). 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. 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.

Hospital hand hygiene programmes must be supported by senior hospital managers and clinical leaders to ensure implementation of national and international best practice hand hygiene guidelines. Hand hygiene auditing is resource intensive and provision of those resources must remain a priority.

Improving hand hygiene compliance to greater than 90% by 2013 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.

National annual hand hygiene promotional activities should be put in place to coincide with WHO Hand Hygiene Day on May 5<sup>th</sup> to support the promotional activities at individual facility/service level.

## **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

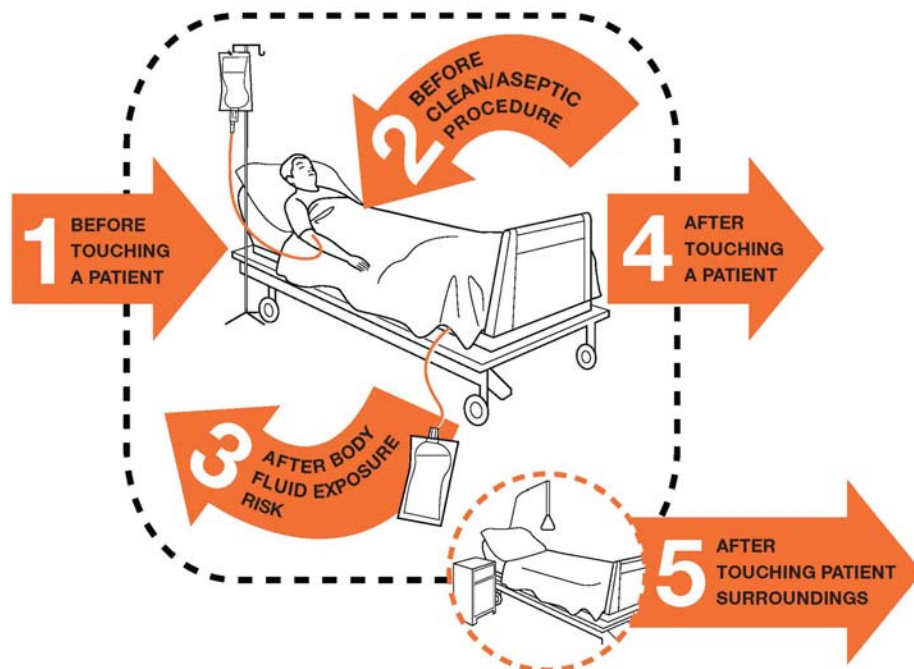
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## **Appendix 1: Membership of the Hand Hygiene Steering Group**

- Dr Michael Mulhern: Consultant Microbiologist, Letterkenny General Hospital (Chair)
- Ms. Michelle Bergin: Infection Prevention and Control Nurse, Midland Regional Hospital Tullamore; representing the Infection Prevention Society
- Ms Sheila Donlon: Infection Control Manager Health Protection Surveillance Centre
- Dr Susan FitzGerald: Consultant Microbiologist, St Vincent's University and St. Columcille's Hospitals; representing the Irish Society of Clinical Microbiologists
- Dr Fidelma Fitzpatrick: RCPI /HSE HCAI clinical lead and Consultant Microbiologist, Beaumont Hospital & HPSC
- Ms Maire Flynn: Infection Prevention and Control Nurse, Kerry Community Services; Representing the Infection Prevention Society
- Dr. Aliya Khan: SpR in Clinical Microbiology, Beaumont Hospital, Dublin
- Mr. Ajay Oza: Surveillance Scientist, Health Protection Surveillance Centre
- Ms Mary Francis Reilly: Director. NMPDU, Merlin Park, Regional Hospital, Galway; Office of the Nursing Director
- Ms Maura Smiddy: Lecturer, Dept Epidemiology and Public Health, University College Cork

## Appendix 2: WHO 5 Moments of Hand Hygiene

# Your 5 Moments for Hand Hygiene



<b>1</b>	<b>BEFORE TOUCHING A PATIENT</b>	<b>WHEN?</b>	Clean your hands before touching a patient when approaching him/her.
		<b>WHY?</b>	To protect the patient against harmful germs carried on your hands.
<b>2</b>	<b>BEFORE CLEAN/ASEPTIC PROCEDURE</b>	<b>WHEN?</b>	Clean your hands immediately before performing a clean/aseptic procedure.
		<b>WHY?</b>	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
<b>3</b>	<b>AFTER BODY FLUID EXPOSURE RISK</b>	<b>WHEN?</b>	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		<b>WHY?</b>	To protect yourself and the health-care environment from harmful patient germs.
<b>4</b>	<b>AFTER TOUCHING A PATIENT</b>	<b>WHEN?</b>	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		<b>WHY?</b>	To protect yourself and the health-care environment from harmful patient germs.
<b>5</b>	<b>AFTER TOUCHING PATIENT SURROUNDINGS</b>	<b>WHEN?</b>	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		<b>WHY?</b>	To protect yourself and the health-care environment from harmful patient germs.



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