

Hand Hygiene Observations Protocol for Inpatient Acute Care

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Introduction

In Canada, approximately 1 in 12 patients who are admitted to a hospital acquire an infection because of time spent in the hospital (Mitchell et al., 2019). Increasing hand hygiene is essential in reducing the transmission of microorganisms and reducing hospital acquired infections (Pittet, Mourouga, Perneger, & Members of the Infection Control Program, 1999) (Allegranzi & Pittet, 2009) (Grayson et al., 2018). Monitoring hand hygiene compliance according to the 4 Moments for Hand Hygiene and offering healthcare providers feedback regarding compliance are considered essential elements of hand hygiene improvement initiatives. Alberta Health Services (AHS) uses the direct observation method to monitor the hand hygiene compliance of healthcare providers as recommended by the World Health Organization (World Health Organization, 2009) and the Canadian Patient Safety Institute (Canadian Patient Safety Institute, 2016).

AHS Infection Prevention and Control (IPC) worked with Crede Technologies Inc. to develop the Clean Hands Hygiene Pro System (Clean Hands System). The Clean Hands System is composed of an iPad application (app), paper tool and portal. The iPad app and paper tool are used to collect hand hygiene data. The portal is the database where the data are stored and where reports can be generated.

From 2011-2014, AHS IPC collected hand hygiene data between May and August and reported these results on an annual basis. In 2015, the AHS IPC Hand Hygiene Program was established with the hiring of coordinators and project managers for each of the five geographic zones. Starting in 2015/2016, AHS IPC collected hand hygiene data monthly, where possible, and reports on a quarterly and annual basis.

One of the roles of the coordinators and project managers within the AHS IPC Hand Hygiene Program was to establish targets for facilities and units on the minimum number of observations needed per fiscal quarter. Coordinators and project managers work towards these targets with site-based reviewers or frontline healthcare providers who collect hand hygiene observations. These site-based reviewers complete standardized provincial hand hygiene reviewer training and competency checks. The reviewers then use the Clean Hands System to perform hand hygiene reviews in various healthcare settings. Although provincial guidance was created for the minimum number of hand hygiene observations needed at each facility and unit per fiscal quarter, validation was not performed, and no processes were put in place to prevent facilities from over- or under-reporting. In addition, although site-based reviewers have systematically been granted access to the Clean Hands System since April 2018, there is no established provincial process to reevaluate site-based reviewers.

Like healthcare delivery, the reporting of hand hygiene compliance is multidimensional (see Figure 1). Data originate from multiple settings and involve various healthcare providers. In AHS, hand hygiene compliance reports include data collected from all five geographic zones. Within the Clean Hands System, the facilities within the zone have been categorized into seven different facility types. The facilities can have up to five different types of units, up to 26 different healthcare provider categories on each unit and up to four moments of hand hygiene for each healthcare provider. Each moment is captured as either compliant or not compliant.

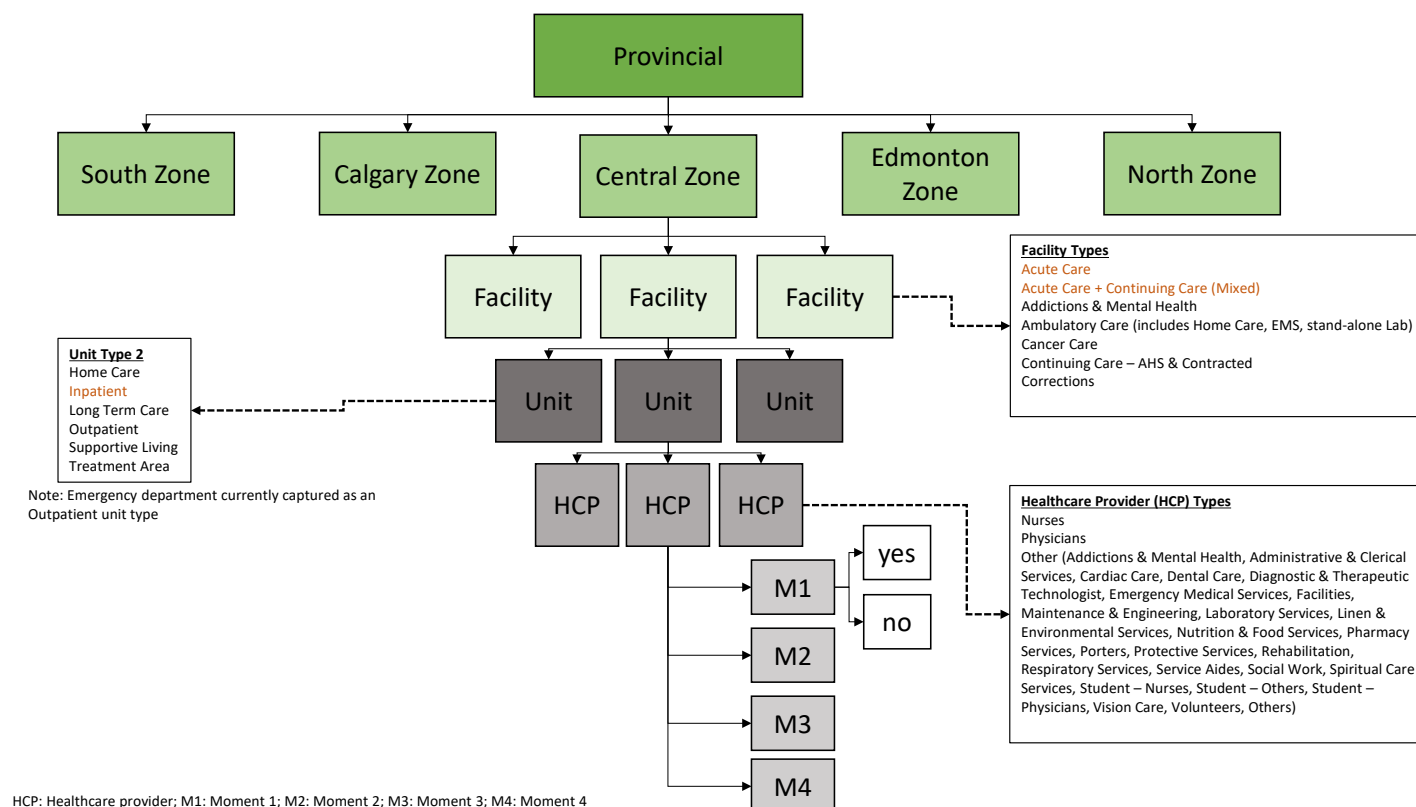


Figure 1: Components of hand hygiene data collection

Note: Facility types and unit types in red are proposed to be included in formal provincial reporting

Historically, all data collected and entered into the Clean Hands System were reported. There was no minimum data entry required or any limit as to the maximum number of observations that might be collected for any given healthcare provider, unit, or facility. As collecting poor quality data does not contribute to value or positive outcomes, (Porter, 2010), the aim of this protocol is to clarify what information will be formally reported provincially and establish minimum data entry standards for reporting.

Goal

Formally report hand hygiene compliance at a provincial level for all inpatient units of AHS acute and acute tertiary rehabilitation care facilities according to an established protocol. This protocol is supported by the Site-based Reviewer *Data Quality Follow-up Standard Operating Procedure (AHS 2024)* that outlines actions for the IPC coordinators and project managers at the end of each fiscal quarter.

Objectives

1. To determine the provincial, zonal and facility quarterly and annual hand hygiene compliance on inpatient units within AHS acute and acute tertiary rehabilitation care facilities.
2. To establish facility, zonal and provincial hand hygiene compliance for trend analysis over time on inpatient units within AHS acute and acute tertiary rehabilitation care facilities.

3. To use hand hygiene compliance results to develop and evaluate IPC interventions which support safer patient care on inpatient units within AHS acute and acute tertiary rehabilitation care facilities.

Case definition

From the Guide to Conduct Hand Hygiene Observations (Alberta Health Services Infection Prevention and Control, 2021), a hand hygiene moment (or indication) is defined as follows: AHS Hand Hygiene Policy outlines the four Moments for Hand Hygiene, which is based on the risk of microorganism transmission when a healthcare provider is interacting with a patient.

- Moment 1 – before contact with a patient or patient's environment
- Moment 2 – before a clean or aseptic procedure
- Moment 3 – after exposure or risk of exposure to blood and/or body fluids
- Moment 4 – after contact with a patient or patient's environment.

A Hand Hygiene observation (or opportunity) is a hand hygiene moment that was or was not performed by a healthcare provider but was required in accordance with the Four Moments for Hand Hygiene as per the AHS Hand Hygiene Policy (Infection Prevention and Control, 2025) and as seen through direct observation by a trained site-based reviewer. One hand hygiene opportunity can arise from multiple moments resulting in one-single act of hand hygiene being compliant for multiple hand hygiene moments.

Inclusion criteria

- While hand hygiene observations are performed in various healthcare settings within AHS, for hand hygiene observations to be eligible for inclusion in formal provincial reporting, they must be captured on an inpatient unit at an AHS acute or acute tertiary rehabilitation facility.

Exclusion criteria

- Hand hygiene observations collected at non-acute care facilities
- Hand hygiene observations collected at acute mental health facilities
- Hand hygiene observations collected on mental health units within acute care facilities and acute tertiary rehabilitation facilities
- Hand hygiene observations collected in ambulatory or outpatient areas in acute, acute tertiary rehabilitation or acute mental health facilities
- Hand hygiene observations collected at non-AHS sites, including Covenant health acute care sites
- For each acute care, inpatient unit, if hand hygiene observations are less than 25 in a quarter, those observations will be excluded from the facility, zone and provincial hand hygiene compliance calculations.

Note: In the Clean Hands System, inpatient units are defined as units providing inpatient services with available beds. This list is validated using information from Connect Care and AHS Analytics. Further details can be found in the Data Quality - Inpatient Units section in this protocol.

The Covenant Health IPC Hand Hygiene Program conducts hand hygiene observations during two defined time periods in spring and fall, using HandyAudit®. Ad hoc reviews may be performed but compliance reports are generated using the biannual data. This is different from the AHS IPC Hand Hygiene Program where observations are performed across the province on an ongoing basis, with quarterly reporting. Due to this and other differences in methodology AHS and Covenant Health data are not directly comparable.

Data collection and data entry

Products for collecting data

AHS uses the Clean Hands System for collecting hand hygiene reviews which consists of iPad application, paper tool, and portal. Provincially, reported hand hygiene moments are captured by trained site-based reviewers using the Clean Hands System paper tool and portal or iPad app. The data is manually entered into the portal when using the paper tool or automatically uploaded to the portal from the iPad.

Methods of collecting data

AHS applies direct observation for measuring hand hygiene adherence. The components of the measurement method are listed below.

What aspects to observe

The following information is captured for every hand hygiene opportunity.

- Reviewer ID
- Specifics about the review including:
 - Zone
 - Facility
 - Unit
 - Date and time.
- Specifics about the hand hygiene opportunity:
 - Healthcare provider category
 - Type of moment
 - Wash, ABHR, Miss
 - Comments about missed moment.

Combined moments

Hand hygiene moments may be combined if the healthcare provider's hands do not become contaminated after completing a task requiring hand hygiene and immediately before beginning the next task requiring hand hygiene. For example, if the healthcare provider performs hand hygiene after contact with a patient and does not touch anything to contaminate their hands before contact with the next patient, reviewers will record this as compliant for Moment 4 and Moment 1 even though the actual act of performing hand hygiene was only completed once.

Proportion of moments

Reviewers should prioritize observing Moments 2 and 3 during each review, as it is critical for infection control but easily overlooked. Project managers and coordinators will monitor the proportion of Moments 2 and 3 in each reporting cycle to validate the data.

Who to observe

Reviewers monitor and record hand hygiene compliance among healthcare providers, including professionals, staff, students, volunteers, and others associated with AHS. Patient hand hygiene is not currently monitored, despite its potential impact on patient infections.

Proportion of healthcare provider

Reviewers should gather data from various healthcare provider categories to ensure a comprehensive understanding of hand hygiene practices. Project managers and coordinators will oversee the proportion of healthcare provider categories to prevent data collection bias towards certain categories.

When and how frequently to observe

Unit managers have the authority to determine the schedule for routine hand hygiene reviews. It's strongly advised to conduct observations across weekdays, weekends, and holidays, covering all 24 hours, for a comprehensive assessment of hand hygiene practices. For instance, allocating half an hour per week for a quarterly report ensures a proportional representation of hand hygiene opportunities and sufficient data for accurate compliance estimation.

How many observations are needed?

The recommendation is that each inpatient unit should allocate half an hour per week regardless of unit size or service intensity. This ensures a proportional representation of hand hygiene opportunities and sufficient data for accurate compliance estimation. This recommendation is based on findings from the Time in Motion project completed in 2023. This is a shift in focus from attaining a certain minimum number of observations to maintaining a focus on the importance of hand hygiene as it relates to patient safety and support units in meeting IPC standards under Accreditation Canada related to hand hygiene. A byproduct of this is that most inpatient units will perform the minimum of 200 observations per fiscal quarter needed to achieve an accurate compliance estimation with a 5% margin of error ([Sample Size Calculator](#), 95% confidence interval, sample size 200, population size ≥ 1000 , population proportion 80%). While some smaller units or those with lower patient volume will not perform the minimum 200 observations per fiscal quarter these units will meet the minimum threshold of 25 observations for data to be included in reporting.

Data entry

Each reviewer is responsible for the entry of their hand hygiene data into the Clean Hands System within 48 hours of data collection. It is expected that the minimum data set is collected and entered or uploaded into the Clean Hands System in a timely manner. As a recommendation to prevent data loss, data should be uploaded into the Clean Hands System at the closure of review completed using the iPad app or as soon as possible after a review using the paper tool.

Rate calculations

Hand hygiene compliance

The smallest reporting unit is an inpatient unit. The hand hygiene observations collected typically represent a small percentage (<1%) of all hand hygiene opportunities in each fiscal quarter. Assuming the sample is representative of the overall population, the observed compliance can be generalized to estimate the compliance for all hand hygiene opportunities in that unit during the reporting period. The compliance is calculated using the formula below. For units with fewer than 25 observations, compliance will be reported as "Insufficient Observations (ISO)" to avoid reporting a potentially misleading compliance.

Measure	Calculations
Hand Hygiene Compliance	$\frac{\text{Number of compliant hand hygiene observations}}{\text{Number of compliant and non-compliant hand hygiene observations}} \times 100\%$

Aggregated hand hygiene compliance

To mitigate bias towards units or facilities that collect more observations, the estimated number of hand hygiene opportunities is used as a weighting factor when calculating aggregate hand hygiene compliance at the site, zone, and provincial levels. The formula for aggregated compliance is as follows. Units with fewer than 25 observations are excluded from the aggregated compliance calculation to maintain accuracy.

Measure	Calculations
Aggregate Hand Hygiene Compliance	$\frac{\sum (\text{observed compliance rate} \times \text{hand hygiene opportunities in unit})}{\sum (\text{hand hygiene opportunities in unit})} \times 100\%$

The number of hand hygiene opportunities is estimated using data from the HOW2 Benchmark Study (Steed et al., 2011), which examined hospital hand hygiene opportunities and their distribution. The study provides the following estimates:

- Large teaching hospitals
 - Intensive care unit: 179 opportunities per patient-day
 - Other inpatient units: 72 opportunities per patient-day.
- Small community hospitals
 - Intensive care unit: 70 opportunities per patient-day
 - Other inpatient units: 30 opportunities per patient-day.

Refer to [Appendix A](#) for the complete list of large facilities (defined as facilities that have 10,000 or more patient days per quarter) and intensive care units.

Reporting

Communication and dissemination of surveillance data are an integral part of surveillance, to inform IPC practice within AHS facilities and provide support for interventions that improve the quality of patient care delivered. Responsibility for compiling, reporting, and disseminating data and reports is shared between provincial IPC Surveillance and Standards and the provincial IPC program.

Formal reports are generated routinely (usually quarterly and annually) using reconciled and validated data. The formal hand hygiene reports contain information at the provincial level and are presented to the provincial IPC Surveillance, Evaluation, Quality Improvement and Research Committee for approval. This protocol and its accompanying reports align with where provincial IPC surveillance is conducted, meaning inpatient acute care units will have hand hygiene compliance where surveillance for various provincial surveillance initiatives is conducted (e.g. *C. difficile* infection). These reports will show hand hygiene compliance for inpatient acute care units with color coded results so that it is easier to see areas which are not collecting enough observations or are well below target compliance.

Operational reports may be created by local infection control professionals or users of the Clean Hands System and may or may not consist of reconciled and validated data, as they are often created with real-time, as-is, data. Data generated from local reports will not match formally reported data, for reasons outlined in this protocol.

Data quality

The purpose of evaluating the quality of data is to check that hand hygiene compliance is being monitored efficiently and effectively. The evaluation should involve the assessment of the program (i.e. protocol and reports) and system (i.e. Clean Hands System) attributes, including relevance, simplicity, flexibility, data quality, acceptability, consistency, representativeness, timeliness and stability.

A standardized approach is used to reconcile and validate the data provincially. The first component of data reconciliation and validation of data in the Clean Hands System ensures that facilities and units are added to the system in a way that supports valid quality data that can be used for reporting. A validation step to confirm that all units included in provincial reporting have acute care beds assigned to them. The second component confirms that data collectors are consistently trained to enter valid hand hygiene observations, as per the Guide to Conduct Hand Hygiene Observations (Alberta Health Services Infection Prevention and Control, 2021) and as per the Site-based Reviewer *Data Quality Follow-up Standard Operating Procedure (2024)*.

Inpatient units

In the Clean Hands System, inpatient units will be matched with the Connect Care unit list and the inpatient units list with patient-days from AHS Analytics every quarter. Adjustments will be made for units that cannot be matched. If a unit in the Clean Hands System has patient-day data but is not classified as an inpatient unit, its unit type will be updated to inpatient in the system. For inpatient units with available patient-days that are not listed in the Clean Hands System, discussions will be held with the IPC project manager to determine whether they should be added to the system.

Following the end of each quarter, units with potential issues will be reviewed internally by IPC project managers and coordinators for further investigation as per the *Site-based Reviewer Data Quality Follow-up Standard Operating Procedure (2024)* and improvements made where applicable.

Possible issues could include:

- Inpatient units with no observations
- Inpatient units collecting fewer than 25 observations
- Inpatient units with 100% compliance
- Inpatient units with compliance below 70%
- Inpatient units collecting observations only on Moment 1 and/or 4
- Inpatient units collecting observations on only a single healthcare provider group.

Site-based reviewers

Site-based reviewers are the primary hand hygiene data collectors, although a small proportion of hand hygiene data is also collected by IPC coordinators and project managers. Since April 2018, all acute care site-based reviewers in acute care settings obtain access to the Clean Hands System after completing a standardized acute care competency check. Prior to April 2018, there was no standardized process to assess knowledge acquisition after hand hygiene training was completed.

To enhance data quality and consistency, site-based reviewers with potential issues will be identified through internal checks at the end of each fiscal quarter. IPC Project managers and coordinators will be provided with lists to take appropriate action to improve data quality as per the *Site-based Reviewer Data Quality Follow-up Standard Operating Procedure (AHS 2024)*.

The possible issues include:

- Reviewers who did not collect observations
- Reviewers who collected observations less than 25 observations
- Reviewers with distribution of moment out of range
- Reviews with 15 or more observations on a single healthcare provider
- Reviewers who collected observations only on moment 1 and/or 4
- Observations with “Other HCP” selected
- Reviewers with compliance > 95% for all their reviews
- Reviewers who collected observations only on a single healthcare provider group such as nurses, physicians, or others
- Reviews with 100 or more observations
- Reviews with discrepancies in notes 1-06 and 4-06
- Reviews with free text comments instead of canned comments.
- Observations with comments that are not consistent with the moment for hand hygiene selected
- Observations with canned comments for “ABHR” or “WASH” as these comments should only appear for “MISS”.

Protocol revision history

Date	Details

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Appendix A: List of large facilities* and intensive care units (ICU)

Large hospitals (>10,000 patient-days/year)	
Zone	Facility
South	Chinook Regional Hospital
	Medicine Hat Regional Hospital
Calgary	Alberta Children's Hospital
	Foothills Medical Centre
	Peter Lougheed Centre
	Rockyview General Hospital
	South Health Campus
Central	Red Deer Regional Hospital Centre
Edmonton	Glenrose Rehabilitation Hospital
	Mazankowski Alberta Heart Institute
	Royal Alexandra Hospital
	Stollery Children's Hospital
	Sturgeon Community Hospital
	University of Alberta Hospital
North	Grande Prairie Regional Hospital

Facilities with Intensive Care Units (ICUs)		
Zone	Facility	Unit
South	Chinook Regional Hospital	ICU
	Medicine Hat Regional Hospital	ICU
Calgary	Alberta Children's Hospital	PICU
	Foothills Medical Centre	Unit-94
		ICU
		CVICU
	Peter Lougheed Centre	Unit-28
	Rockyview General Hospital	ICU

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Facilities with Intensive Care Units (ICUs)		
Zone	Facility	Unit
	South Health Campus	ICU
Central	Red Deer Regional Hospital Centre	ICU
Edmonton	Mazankowski Alberta Heart Institute	Unit-3A7/3A8
		Unit-5A7
		Unit-6A8
	Royal Alexandra Hospital	Unit-DICU
	Stollery Children's Hospital	Unit-3A2 (PICU)
		Unit-6A7
	Sturgeon Community Hospital	NU-29 CCU/ICU
	University of Alberta Hospital	Unit-3C3/3C4
		Unit-3C2
		Unit-4A4
North	Grande Prairie Regional Hospital	ICU
	Northern Lights Regional Health Centre	ICU