

## Moments for hand hygiene in Material and Sterilization Center

*Momentos para higienizar as mãos em Centro de Material e Esterilização*  
*Momentos para higienizar las manos en el Centro de Material y Esterilización*

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### ABSTRACT

**Objective:** to characterize the moments when there is a need for hand hygiene (HH) by employees who work in Material and Sterilization Center (MSC). **Method:** we conducted a descriptive cross-sectional study in the MSC of a large hospital, from July to November 2012, in Goiânia, state of Goiás, Brazil. Data obtained through observation of workers, following a previously evaluated and tested checklist. **Results:** to the dirty area, standardized moments of HH were enough. In the clean area, "Extra moments with indication" for HH, resulting from the work process, such as: after disinfecting benches, after verification and inventory of consigned products, before assembling boxes/trays, before loading and unloading the autoclave, before handling and distributing health care products, among others, were necessary. **Conclusion:** the moments of HH in the dirty area coincide with indications of the clinical practice; and, in the clean area, characteristic moments of the work process were captured.

**Descriptors:** Infection Control; Nursing Care; Hospital Nursing Service; Sterilization; Hand Washing.

### RESUMO

**Objetivo:** caracterizar os momentos nos quais há necessidade de higienização das mãos (HM) por trabalhadores que atuam em Centro de Material e Esterilização (CME). **Método:** foi realizado um estudo transversal, descritivo, no CME de um hospital de grande porte, de julho a novembro de 2012, em Goiânia - GO. Dados obtidos por observação dos trabalhadores, seguindo *check list*, previamente avaliado e testado. **Resultados:** para a área suja, momentos de HM padronizados foram suficientes. Na área limpa, foram necessários "Momentos adicionais com indicação" para HM, apreendidos do processo de trabalho como: após desinfecção de bancadas, após conferência e registro de material consignado, antes de montar caixas/bandejas, antes de carregar e descarregar a autoclave, antes de manusear e distribuir os produtos para saúde, entre outros. **Conclusão:** os momentos de HM na área suja coincidem com indicações da prática clínica; e, na área limpa, apreenderam-se momentos característicos do processo de trabalho.

**Descritores:** Controle de Infecções; Cuidados de Enfermagem; Serviço Hospitalar de Enfermagem; Esterilização; Lavagem de Mãos.

### RESUMEN

**Objetivo:** caracterizar los momentos en los cuales los trabajadores del Centro de Material y Esterilización (CME) necesitan higienizar las manos (HM). **Método:** se llevó a cabo un estudio transversal, descriptivo, en el CME de un hospital de gran porte, de julio hasta noviembre de 2012, en la ciudad de Goiânia, Brasil. Se obtuvieron los datos por observación de los trabajadores, siguiendo una lista de control, previamente evaluada y probada. **Resultados:** para el área sucia, fueron suficientes los momentos de HM estandarizados. En el área limpia fueron necesarios "Momentos adicionales con indicación" para HM, apreendidos del proceso de trabajo: tras la desinfección de las mesas de trabajo, tras la conferencia y el registro de material consignado, antes de montar las cajas/bandejas, antes de la carga y descarga del autoclave, antes de manipular y de distribuir los productos para

salud, entre otros. **Conclusión:** los momentos de HM en el área sucia coincidieron con las indicaciones de la práctica clínica, y en el área limpia se aprehendieron momentos característicos del proceso de trabajo.

**Descriptores:** Control de Infecciones; Atención en Enfermería; Servicio Hospitalario de Enfermería; Esterilización; Lavado de Manos.

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## INTRODUCTION

The scientific evidence shows an association between the adherence to hand hygiene and the reduction of endemic infection rates related to health care, and this measure is characterized by the Centers for Disease Control and Prevention in the category IA, i.e. recommended for implementation and strongly based on well-designed experimental, clinical or observational studies<sup>(1)</sup>.

National and international guides have situations in which hand hygiene is required, and there are variations between them, however there are consensuses, such as: before starting work shift and after finishing it, before putting on the gloves and after removing them, when hands are visibly dirty, among others<sup>(1-2)</sup>.

In 2009, the World Health Organization released a Guideline recommending five moments for hand hygiene, considering the physical presence of users: before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient, and after touching patient surroundings<sup>(3)</sup>.

Nevertheless, the adherence to hand hygiene still remains a challenge in many scenarios of health care, and the topic has been discussed widely in the health services. However, in the context of the Material and Sterilization Center, unit responsible for storing and cleaning of Health Care Products, the concern does not seem to be the same. In an integrative review of the literature, aiming to identify the scientific literature published by March 2010 on hand hygiene in Material and Sterilization Center, publications presenting this issue as the main focus were not found<sup>(4)</sup>.

The Material and Sterilization Center is a functional unit for the processing of health care products and quality control of its stages. It provides technical support to health services and is in the charge of a nurse<sup>(5-6)</sup>.

The need for hand hygiene in this unit is assumed for different reasons. In the dirty area, it is directly related to the health of workers; and, in the clean area, it aims at protecting the users, because the hands of the Material and Sterilization Center's workers can be vehicles for transfer of microorganisms to health care products, at the time of their preparation for sterilization and handling of sterilized products<sup>(7)</sup>. It is noteworthy that the sterilization processes are recommended considering a controlled bioburden<sup>(6,8)</sup> and hands cannot increase the final burden obtained in the cleaning step.

Thus, the following research questions emerged: Are the indicators for hand hygiene in the clinical practice applicable and sufficient in the context of the work in MSC? What are the moments in which hand hygiene would be needed in this unit? The answers to these questions may contribute to the construction and subsequent validation of hand hygiene

indicators specifically for this unit and, therefore, for the work management of the nursing staff that compose it.

## OBJECTIVE

To characterize the moments when there is a need for hand hygiene by employees who work in a Material and Sterilization Center.

## METHOD

### Ethical aspects

The conduct of the study is in compliance with national and international ethical standards in research involving humans, and was approved by the Research Ethics Committee of the Hospital where the study was conducted.

After the observation period, the individuals observed were informed, individually, on the objectives of the study and invited to participate. Those who accepted signed an Informed Consent Form. The deletion of data in the event of refusal was provided.

### Design, study location and period

Descriptive cross-sectional study conducted in a Material and Sterilization Center of a large teaching hospital in Goiânia, Goiás, Brazil, from July to October 2012.

### Population and inclusion and exclusion criteria

Workers and interns who worked in the Material and Sterilization Center, field of study, participated in the study.

We included workers and interns who met the criteria: perform the processing steps of health care products with saturated steam under pressure, in morning and afternoon shifts. And, excluding those who were on vacation or leave during the study period, they only worked at night and/or in the chemical disinfection unit.

### Study protocol

Data was collected through structured, direct and non-participating observation, guided by a checklist containing possible moments for hand hygiene, which was built according to national and international recommendations for this practice in health services and theoretical bases on processing health care products<sup>(2-3,9-10)</sup>. Five specialists participated in the study evaluation, they all had experience in working in Material and Sterilization Center, two with PhD degrees and three with Master's degrees. These received the study in advance, and its completion was carried out during meeting with all evaluators and researchers.

The physical structure of the Material and Sterilization Center, site of the study, was divided in: dirty area for the cleaning

process of products; clean area, where health care products are dried, inspected, prepared and packed to be sterilized; and storage and distribution area, where health care products, after the sterilization process, are stored and distributed.

The moments indicated for hand hygiene were divided into: “moments with pre-established indication” and “additional moments with indication”.

In “moments with pre-established indication” hand hygiene indications<sup>(1-2)</sup> that are applicable to the Material and Sterilization Center were considered: beginning and end of the work shift, when entering and leaving the unit, before putting on the gloves and after removing them. The adherence record to hand hygiene in the moments with pre-established indication was made in accordance with the frequency during the study period.

For “additional moments with indication”, two ways for collecting data were planned: 1) record of the opportunities when hand hygiene would be needed to complete the work in the processing steps of health care products, regardless of whether or not there is an adherence; and 2) record of the activities carried out by the workers after washing their hands.

Aiming at the observation scope in the clean area, two strategies were adopted: a researcher was positioned in each sector of this area seeking to capture the activities performed and their relation to the need for hand hygiene, as well as to record the moments of use of alcohol-based hand sanitizer and activities subsequently performed. Another researcher remained, during the same period, near the only sink to access the preparation, folding and sterilization access to record what activities the workers performed after hand washing with soap and water. The focus of this observation was the identification of the activity performed after hand washing. A single observer recorded it in the storage sector in view of the size of the area and its separation by physical barrier.

The observation was carried out from July to October 2012, in six shifts in each MSC area (1. Purge; 2. Preparation; 3. Packaging; 4. Folding and Sterilization; 5. Storage Area), i.e. three morning and three afternoon periods for six uninterrupted hours, totaling 180 hours.

**Analysis of the results and statistics**

For the analysis, we used the Statistical Package for Social Science program, version 17.0, and single frequency measurements.

**RESULTS**

Out of the 34 individuals observed, 33 agreed to participate. Out of them, 28 were nursing workers (05 nurses, 20 technicians, 03 auxiliaries), three interns (undergraduate students) and two without studies in the area of health.

The adherence to hand hygiene in “moments with pre-established indication”, considered in accordance with the frequency of these opportunities in the study period, is shown in Table 1.

Box 1 records the opportunities taking place during the observation period; and, according to the observer’s assessment, taking into account the work process in the unit, the hand hygiene would be needed in the clean area, regardless of whether or not there is adherence.

**Table 1 –** Adherence to hand hygiene by moments with pre-established indication among workers of all areas of a Material and Sterilization Center of a large hospital, Goiânia, Goiás, Brazil, 2012

Moments for hand hygiene with pre-established indication	n	%
Access to the unit (n = 254)		
When entering	71	27.9
When leaving	51	20.1
Use of gloves (n = 109)		
Before putting them on	14	12.8
After removing them	65	59.6
Work shift (n = 96)		
Start	62	64.6
End	33	34.4

**Box 1 –** “Additional moments indicated to hand hygiene” extracted from the work process in the clean area of a Material and Sterilization Center, Goiânia, Goiás, Brazil, 2012

Clean Area/Storage	
After administrative activities (use of telephone, computer and minute books)	After registering unit’s productivity
After disinfecting benches	After biological indicator incubation
Before assembling boxes and trays	After disposing biological indicator
After verification and inventory of consigned products	Before preparing Bowie and Dick test
After registering contaminated health care products received from consuming units*	Before wearing protective clothing (private uniform, cap, mask and shoe covers)
Before handling packages and health care products	After wearing protective clothing (shoe covers)
Before packaging health care products (boxes, outfit)	Before storing processed health care products
Before folding outfit	Before removing the load from the autoclave
Before receiving laundry outfit	Before handling health care products processed (look for a health care product or change places to clean the shelf)
Before loading the autoclave with health care products	Before distributing health care products to units

Note: \*Activity usually performed in the dirty area of the Material and Sterilization Center, however, in the hospital under study, there was not an anteroom for receiving, checking and registering contaminated health care products. For this activity, they appointed a worker of the clean area, who did it in the hallway near the reception window and sometimes wore gloves, sometimes not.

We often observed that, for the same moment in the clean area, sometimes the worker was required to perform hand hygiene, sometimes not, depending on the activity that preceded it or that would be carried out later.

It was possible to identify (280 times) activities employees performed after having washed their hands (Table 2).

**Table 2** – Activities performed subsequent to hand hygiene (N = 280) by personnel in the clean area of a Material and Sterilization Center of a large hospital, Goiânia, Goiás, Brazil, 2012

Activities performed after hand hygiene	n	%
Pack Health care Products	75	26.7
Leave the unit	64	22.8
Administrative activities (phone, computer, papers)	53	18.9
Handle packages	29	10.3
Put on gloves	16	5.7
Assemble boxes/trays	15	5.3
Prepare and pack outfit (surgical drapes, medical gowns)	08	2.8
Handle processed health care products	07	2.4
Receive health care products/outfit	05	1.9
Load the autoclave with health care products	03	1.2
Open the autoclave door	03	1.2
Disinfection of benches	01	0.4
Prepare Bowie and Dick test	01	0.4
Total	280	100.0

## DISCUSSION

Among the individuals, we observed two workers without specific training in the nursing field, a fact that contradicts the principles of quality expected from a Material and Sterilization Center<sup>(6)</sup> and shows the maintenance of a reality observed in the same municipality for almost a decade<sup>(11)</sup>. The labor of these workers characterizes an act of non-compliance with the professional nursing practice law<sup>(12)</sup>.

Among the “moments with pre-established indication” for hand hygiene, only two reached levels over 50.0%, with higher adherence rates to moments “beginning of the work shift” (64.6%) and “after removing gloves” (59.6%). The opportunity “beginning of the work shift” diverges from the results of studies in other units<sup>(13-14)</sup>, because we did not find studies developed in Material and Sterilization Center that had lower levels, while the opportunity “after removing gloves” was similar to another study<sup>(15)</sup> and can have been influenced by the discomfort caused by talcum powder on hands after using gloves.

Regarding the opportunities for hand hygiene, which were extracted from the work process in the clean area of MSC (Box 1), among these, it is considered that some can be standardized for that area, as they always require prior hand hygiene, such as: “after cleaning benches”, “before receiving laundry outfit”, “before loading the autoclave”, with health care

products”, “after disposing biological indicator”, “after registering unit’s productivity”, “after verification and inventory of consigned products”, “after administrative activities”, “before removing the load from the autoclave”. The standardization of these moments as hand hygiene indicators for clean area lacks, however, a validation process.

The fact that a same “additional moment with indication” sometimes requires hand hygiene, sometime not, in the work process in the clean area of the Material and Sterilization Center, indicates that, for this area, only pre-established hygiene indicators — as in the case of the five moments recommended by the World Health Organization for clinical practice<sup>(3)</sup> — will not be enough. It is inferred that, in addition to the pre-established moments previously discussed, it is important to determine regular time intervals so that employees can wash their hands.

In this area of the Material and Sterilization Center, a worker often performs the same task for long periods of time. For example, when appointed for packaging sector, he/she will perform this function subsequently for hours in different health care products, but he/she cannot do it all the time without washing his/her hands, since it is known that the reduction of the transient microbiota obtained by hand hygiene is not maintained indefinitely and the natural recolonization process will happen gradually<sup>(1)</sup>. A starting point for determining the indicator could be the time interval required for the complete recolonization of transient microbiota, which will depend on factors such as the type of product used and the time spent for hand hygiene<sup>(1)</sup>. In addition, further studies will be necessary to determine whether there are differences in the recolonization of transient microbiota between the activities described in Box 1 and other variables that can influence, such as room temperature.

An important fact identified in this study was that all activities carried out by the workers, following the hand hygiene, were opportunities observed as “moments with pre-established indication” or “additional moments with indication” where the hand hygiene was necessary. This finding contributes to the understanding that it was possible to capture a variety of opportunities for hand hygiene in the Material and Sterilization Center under study.

### Study limitations and contributions to the field of nursing and health

The study shows the reality of a Material and Sterilization Center and its results cannot be extrapolated; however, an awareness to hand hygiene in this unit is expected, which is related to the safety of both workers and users; and it aims to stimulate its debate and study, since discussion was limited by the lack of studies in this area.

The development of indicators for hand hygiene in the context of the Material and Sterilization Center is considered of utmost importance and, in this sense, this study comprises the step that precedes the validation of indicators. The results presented in this document show its relevance and originality of the topic, contributing to the building of knowledge that involves the prevention of Health care-Associated Infections and the health of the nursing worker who works in Material and Sterilization Center.

## CONCLUSION

The moments for hand hygiene standardized according to national and international guides (when entering and leaving the unit, before putting on gloves and after removing them, beginning and end of the work shift) were sufficient to include the activities carried out in the dirty area of the Material and Sterilization Center.

For the clean area, only those moments already standardized for hand hygiene were not sufficient to provide a safe practice. "Additional moments with indication" for hand hygiene were captured: after administrative activities; after disinfecting benches; after verification and inventory of consigned products; after registering contaminated health care products received from consuming units; after registering unit's productivity; after biological indicator incubation; after disposing biological

indicator; after wearing protective clothing (shoe covers); before assembling boxes and trays; before packaging health care products; before handling packages and health care products; before folding outfit; before receiving laundry outfit; before loading the autoclave; before preparing Bowie and Dick test; before wearing protective clothing; before storing processed health care products; before removing the load from the autoclave; before handling and distributing processed health care products. Thus, we expanded the opportunities for hand hygiene.

In addition, it must be considered that a worker can, over a long period of time, perform the same activity. Thus, it is assumed that there is a need for standardization of regular time intervals so that employees can wash their hands; and these two possibilities can be alternatives for a safe and proper practice of hand hygiene in the clean area in Material and Sterilization Center. However, it requires investigation for setting this time interval.

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