

INTRAINSTITUTIONAL TRANSPORTATION OF BIOLOGICAL MATERIALS: STANDARDIZATION OF THE PROCEDURE USING A PLAYFUL TOOL

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Abstract: The intra-institutional transport of biological material between laboratories within the same institution is a common practice, but is often carried out inappropriately, posing risks to the safety of employees, passers-by and the environment. Unlike interinstitutional transport, this activity is not regulated, and the lack of procedures and specific cases for this purpose in the Brazilian market exacerbates the challenges. In this context, the standardization of both the procedure and the isothermal cases becomes essential to guarantee the safety and quality of transport. The Biosafety Advisory Department of the Fiocruz Immunobiological Technology Institute developed a Standard Operating Procedure (SOP) accompanied by a playful booklet to promote employee adherence to bioprotective measures. The SOP covers everything from safely packaging the material in primary packaging to disinfecting the isothermal case after each transport. Highlights include the use of watertight secondary packaging, impact-resistant suitcases capable of maintaining temperature, and the mandatory use of PPE during cleaning and decontamination of the materials used. The use of playful tools, such as the booklet, proves to be an effective strategy for training and awareness, increasing employees' understanding and adherence to biosafety practices. In addition to the SOP and the booklet, the distribution of these materials was extended to laboratories, reaching a greater number of employees compared to traditional training methods. The initiative seeks to ensure people's safety, preserve the environment and guarantee the integrity of biological material during intra-institutional transport.

Keywords: Transport of biological material, intra-institutional, biosafety, playful tool.

INTRODUCTION

The intra-institutional transport of biological material is that carried out between laboratories of the same institution, located in the same building or campus. This type of transport is frequently carried out in health institutions, laboratories and universities, using isothermal suitcases not specific for this procedure. In these locations, a wide variety of biological materials are transported, including pathogenic agents capable of causing serious illnesses, thus constituting a risky activity. Despite being an activity considered critical, it is not a regulated procedure, unlike what happens with interinstitutional transport (carried out between areas/institutions located on different campuses, where it is necessary to use public roads), which has several related regulations and regulations, varying according to the mode of transport carried out (air, land or water).

Often the transport of these biological materials is carried out inappropriately and depending on what is transported, in the event of some type of accident, it may expose employees and passers-by in an extra-laboratory environment, where they are not using PPE and there is no biological containment. Furthermore, there is a deficiency in the Brazilian market for purchasing suitcases manufactured specifically for this purpose, which makes it even more difficult to carry out this transport in an adequate and safe manner.

For this reason, the standardization of this procedure, as well as the isothermal case used for transport, becomes essential to guarantee the safety of people, the environment and the quality of the material transported. With this aim, the Biosafety Advisory (ASBIO) of the Fiocruz Immunobiological Technology Institute developed a Standard Operating Procedure, using a playful tool (booklet) in order to achieve greater employee compliance

when carrying out intra-institutional transport of biological materials.

PROCEDURE

The SOP was prepared and subsequently the booklet was prepared, based on the procedure information, as shown below.

- Pack the material in primary packaging, preferably watertight and made of plastic material, avoiding fragile materials, such as glass. If the packaging is not leak-proof, it must be sealed to avoid possible spills. Adhesive tape or Parafilm® can be used for this purpose.
- To avoid damage to the packaging itself and changes to the material transported, it is important to wrap the primary packaging(s) in bubble wrap or other impact-dampening material, especially when using multiple primary packagings.
- Carefully place the primary packaging in a watertight secondary packaging (for example: canister or bag) containing sufficient absorbent material to absorb the entire content of the material present in the primary packaging in the event of a spill.
- Disinfect the external surface of the secondary packaging with a disinfectant substance.
- The secondary packaging (canister or bag) must be placed in a rigid external packaging (isothermal case), which must be made of material resistant to falls and impacts, with smooth surfaces, and material that facilitates cleaning and disinfection (e.g. polypropylene). The lid must have an efficient lock to prevent it from opening in the event of a fall. It must also have the capacity to maintain temperature (isotherm), obtained with the injection of insulating

material (polyurethane foam) between the internal and external coverings of the body and packaging lid, be easy to clean, marked with a label containing the international Biohazard Symbol.

- The signage (label) on the isothermal case must be filled in with information about the material to be transported, the laboratory of origin and the person responsible.
- Before leaving the laboratory, disinfect the external surface of the case with a disinfectant substance.
- After each transport, the case must be cleaned and decontaminated with an appropriate disinfectant agent, respecting the associated action time.
- To clean and decontaminate the case, as well as pack the material, appropriate personal protective equipment (PPE) must be used, such as: water-repellent coat or overalls, gloves, mask, closed-toe shoes, among others, varying according to with the laboratory's biosafety level (NB) and risk class of the biological agent/material.
- When receiving biological material from another laboratory, open the secondary packaging (canister/pot or bag) in a biological safety cabinet.
- If large volumes of biological material are transported (above 10L), appropriate triple packaging and an environmental emergency kit must be provided in case of accidental spillage, which must accompany the material throughout the route.

In addition to carrying out face-to-face training for employees from different areas of the Institute, booklets were distributed to laboratories, thus covering a greater number of employees.

DISCUSSION AND CONCLUSION

The use of playful tools, as successfully described in the literature in other training related to biosafety, represents an effective alternative to the current training carried out in institutions, allowing greater understanding and dissemination of information and greater employee adherence to the procedure and good biosafety practices.

The observation that the practice of transporting biological materials, although critical, remains devoid of specific regulation, contrasting with the rigor present in interinstitutional transport, instigates a broader reflection on regulatory gaps that directly impact the safety and integrity of intrainstitutional transport.

Improper handling of this transport highlights a vulnerability, susceptible to incidents and accidents that can not only affect the safety of employees directly involved, but can also reverberate in non-laboratory environments, exposing passersby to inadvertent biological risks. The scarcity of suitable cases on the national market also increases the difficulties inherent in safely carrying out this procedure.

The development of a Standard Operating Procedure (SOP) combined with a playful

tool stands out as a factor of innovation in this challenging context. The standardization of the procedure and the introduction of isothermal cases specifically designed for this purpose appear not only as corrective measures, but to mitigate risks, protect employees, preserve the environment and safeguard the quality of the biological material transported.

However, it is important to recognize that the journey towards a greater biosafety culture is an ongoing process, requiring constant reviews, adaptations to scientific and regulatory developments, as well as the dissemination of knowledge. This specific case can help similar institutions in implementing this procedure and ensuring greater adherence by their employees. Ultimately, the discussion raised goes beyond the specific scope of intra-institutional transport, echoing the importance of systemic and innovative approaches to face complex challenges in the incessant search for safety and quality in laboratory practices.

AGRADECIMENTO

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REFERENCES

BRASIL. Agência Nacional de Vigilância Sanitária - ANVISA. Manual de vigilância sanitária sobre o transporte de material biológico humano para fins de diagnóstico clínico. Brasília, DF, 2015.

BRASIL. Agência Nacional de Vigilância Sanitária - ANVISA. Segurança do paciente em serviços de saúde: limpeza e desinfecção de superfícies. Brasília, DF, 2010.

BRASIL. Ministério da Saúde - MS. Classificação de Risco dos Agentes Biológicos. 3ª edição. Brasília, DF, 2021.

BRASIL. Ministério da Saúde - MS. Diretrizes Gerais para o Trabalho em Contenção com Agentes Biológicos. Brasília, DF, 2010.

National Institutes of Health. Biosafety in Microbiological and Biomedical Laboratories. 6th edition. 2020.

SUIÇA. World Health Organization - WHO. Guidance on regulations for the transport of infectious substances. Geneva - edição vigente.



Figure1. Cover of the Intrainstitutional Transport Booklet.

Transporte de Material Biológico Intrainstitucional
(Dentro do Campus-Fiocruz/Bio-Manguinhos)

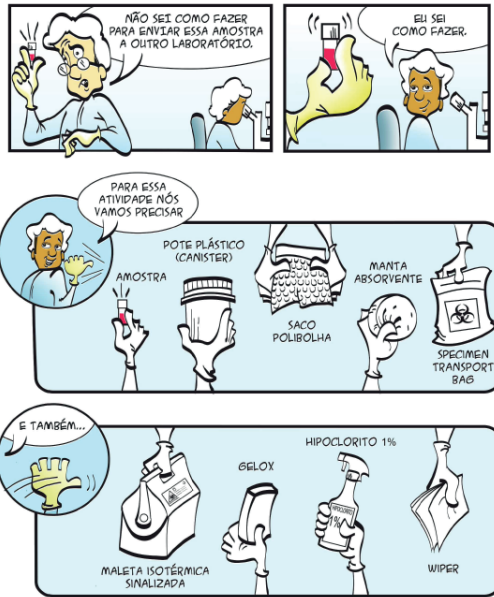


Figure 2. Booklet page 1.

- Procedimento para acondicionar a amostra:

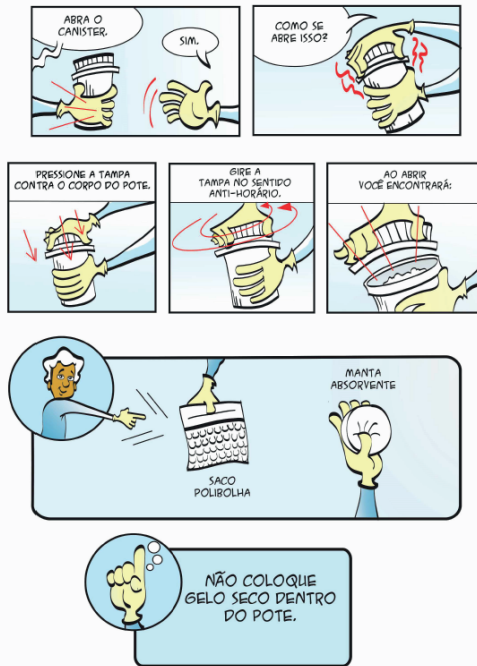


Figure 3. Booklet page 2.



Figure 4. Booklet page 3.

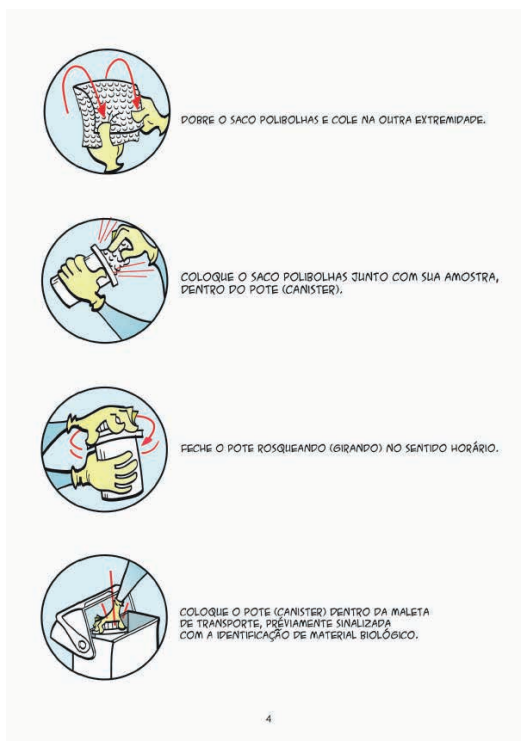


Figure 5. Booklet page 4.



- DESCONTAMINAÇÃO DA MALETA.



PODEÁ SER UTILIZADO NO PROCESSO DE DESCONTAMINAÇÃO HIPOCLORITO A 1% E WIPER.



APLIQUE O HIPOCLORITO NO WIPER, OU NA PRÓPRIA MALETA E DEIXAR ABIR POR 15 MINUTOS.



APÓS A LIMPEZA, DESCARTE O WIPER NA LIXEIRA DE RESÍDUO INECTANTE.

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Figure 6. Booklet page 5



- PARA REALIZAR A LIMPEZA E DESCONTAMINAÇÃO DA MALETA, BEM COMO O ACONDICIONAMENTO DO MATERIAL, UTILIZE O "EPI" ADEQUADO: JALECO OU MACACÃO, LUVAS, MÁSCARAS, TOUCA, SAPATOS FECHADOS ETC...



- AO RECEBER MATERIAL BIOLÓGICO DE OUTRO LABORATÓRIO, ABRIR A EMBALAGEM SECUNDÁRIA (CANISTER) DENTRO DA CABINE DE SEGURANÇA BIOLÓGICA.



NÃO ESQUEÇA DE PREENCHER AS INFORMAÇÕES DA ETIQUETA.

6

Figure 7. Booklet page 6.

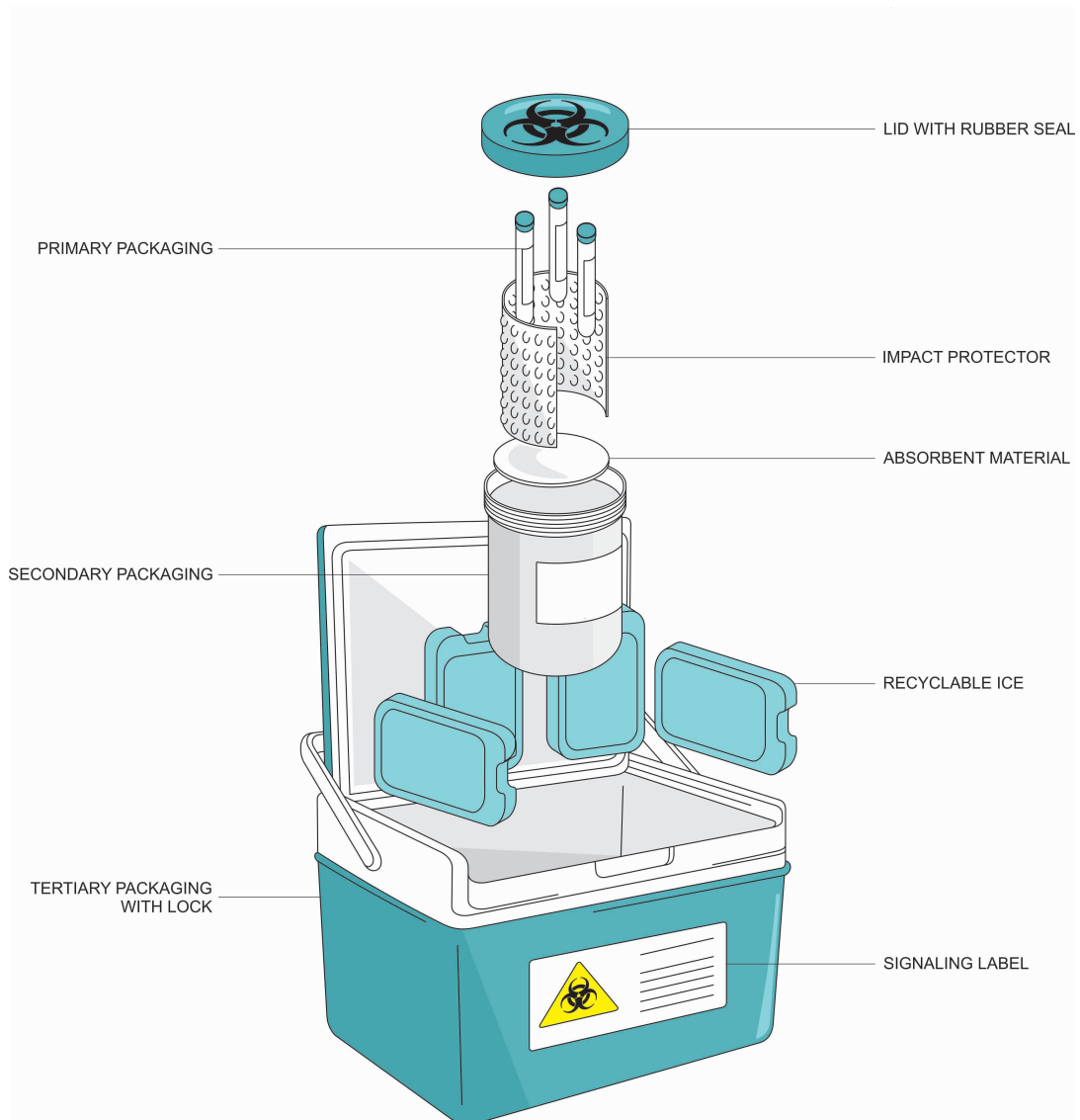


Figure 8. Schematic drawing of the standardized suitcase with canister as secondary packaging.