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| **BSL-2 Audit Checklist**  This completed form is part of a comprehensive risk assessment conducted prior to research using agents requiring BSL2 containment. The Laboratory Safety Specialist will carry out a risk assessment in consultation with lab supervisors, principal investigators (PIs), lab instructors, or the persons in charge of the lab space.  Information in this form is based on the [Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th Edition](https://www.cdc.gov/labs/BMBL.html). Check the appropriate response for each statement and please comment on any “No” or “N/A” responses. | | Text  Description automatically generated with medium confidence | | | | |
| **Building:** |  | **Site Visit Performed by:** | | | |  |
| **Laboratory #:** |  | **Title:** | | | |  |
| **PI:** |  | **Date:** | | | |  |
| **Department:** |  |  | | | |  |
| **Safety Representee:** |  |  | | | |  |
| **General** | | | | | | |
| **Reference** | **Statement** | **Response** | | | **Comments** | |
| **Yes** | **No** | **N/A** |
| **A** | **Standard Microbiological Practices** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, Section A1 | The laboratory supervisor enforces the institutional policies that control safety in and access to the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A2 | The laboratory supervisor ensures that laboratory personnel receive appropriate training regarding their duties, potential hazards, manipulations of infectious agents, necessary precautions to minimize exposures, and hazard/exposure evaluation procedures (e.g., physical hazards, splashes, aerosolization) and that appropriate records are maintained. Personnel receive annual updates and additional training when equipment, procedures, or policies change. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A2 | All persons entering the facility are advised of the potential hazards, are instructed on the appropriate safeguards, and read and follow instructions on practices and procedures. An institutional policy regarding visitor training, occupational health requirements, and safety communication is considered. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A3 | Personal health status may affect an individual’s susceptibility to infection and ability to receive available immunizations or prophylactic interventions. Therefore, all personnel, and particularly those of reproductive age and/or those having conditions that may predispose them to increased risk for infection (e.g., organ transplant, medical immunosuppressive agents), are provided information regarding immune competence and susceptibility to infectious agents.  Individuals having such conditions are encouraged to self-identify to the institution’s healthcare provider for appropriate counseling and guidance. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A4 | A [Biosafety Manual](https://www.cmich.edu/offices-departments/office-research-graduate-studies/office-of-laboratory-and-field-safety/biological-safety/biosafety-manual) specific to the facility is prepared or adopted in consultation with the facility director and appropriate safety professionals. The safety manual is available, accessible, and periodically reviewed and updated as necessary. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A4-a | The Biosafety Manual contains sufficient information to describe the biosafety and containment procedures for the organisms and biological materials in use, appropriate agent-specific decontamination methods, and the work performed. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A4-b | The Biosafety Manual contains or references protocols for emergency situations, including exposures, medical emergencies, facility malfunctions, and other potential emergencies. Training in emergency response procedures is provided to emergency response personnel and other responsible staff according to institutional policies. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A5 | A [sign](https://www.cmich.edu/offices-departments/office-research-graduate-studies/office-of-laboratory-and-field-safety/biological-safety/postings-and-signage) incorporating the universal biohazard symbol is posted at the entrance to the laboratory when infectious materials are present. Posted information includes: the laboratory’s Biosafety Level, the supervisor’s or other responsible personnel’s name and telephone number, PPE requirements, general occupational health requirements (e.g., immunizations, respiratory protection), and required procedures for entering and exiting the laboratory. Agent information is posted in accordance with the institutional policy. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A6 | Long hair is restrained so that it cannot contact hands, specimens, containers, or equipment. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A7 | Gloves are worn to protect hands from exposure to hazardous materials. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A7-a | Glove selection is based on an appropriate risk assessment. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A7-b | Gloves are not worn outside the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A7-c | Change gloves when contaminated, glove integrity is compromised, or when otherwise necessary. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A7-d | Do not wash or reuse disposable gloves and dispose of used gloves with other contaminated laboratory waste. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A8 | Gloves and other PPE are removed in a manner that minimizes personal contamination and transfer of infectious materials outside of the areas where infectious materials and/or animals are housed or manipulated. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A9 | Persons wash their hands after working with potentially hazardous materials and before leaving the laboratory |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A10 | Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption are not permitted in laboratory areas. Food is stored outside the laboratory area. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A11 | Mouth pipetting is prohibited. Mechanical pipetting devices are used. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12 | Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware are developed, implemented, and followed; policies are consistent with applicable state, federal, and local requirements. Whenever practical, laboratory supervisors adopt improved engineering and work practice controls that reduce risk of sharps injuries. |  |  |  |  | |
| 1. **BMBL:** A12 | **Precautions are always taken with sharp items. These include:** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-a | Plasticware is substituted for glassware whenever possible. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-b | Use of needles and syringes or other sharp instruments is limited in the laboratory and is restricted to situations where there is no alternative (e.g., parenteral injection, blood collection, or aspiration of fluids from laboratory animals or diaphragm bottles). Active or passive needle- based safety devices are to be used whenever possible. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-b-i | Uncapping of needles is performed in such a manner to reduce the potential for recoil causing an accidental needlestick. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-b-ii | Needles are not bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-b-iii | If absolutely necessary to remove a needle from a syringe (e.g., to prevent lysing blood cells) or recap a needle (e.g., loading syringes in one room and injecting animals in another), a hands-free device or comparable safety procedure must be used (e.g., a needle remover on a sharps container, the use of forceps to hold the cap when recapping a needle). |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-b-iv | Used, disposable needles and syringes are carefully placed in puncture-resistant containers used for sharps disposal immediately after use. The sharps disposal container is located as close to the point of use as possible. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-c | Non-disposable sharps are placed in a hard-walled container for transport to a processing area for decontamination, preferably by autoclaving. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A12-d | Broken glassware is not handled directly. Instead, it is removed using a brush and dustpan, tongs, or forceps. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A13 | Perform all procedures to minimize the creation of splashes and/or aerosols. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A14 | Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant. Spills involving infectious materials are contained, decontaminated, and cleaned up by staff who are properly trained and equipped to work with infectious material. A spill procedure is developed and posted within the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A15 | Decontaminate all cultures, stocks, and other potentially infectious materials before disposal using an effective method, consistent with applicable institutional, local, and state requirements. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A15 | **Depending on where the decontamination will be performed, the following methods should be used prior to transport:** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A15-a | Materials to be decontaminated outside of the immediate laboratory are placed in a durable, leak-proof container and secured for transport. For infectious materials, the outer surface of the container is disinfected prior to moving materials and the transport container has a universal biohazard label. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A15-b | Materials to be removed from the facility for decontamination are packed in accordance with applicable local, state, and federal regulations. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A16 | An effective integrated pest management program is implemented. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, A17 | Animals and plants not associated with the work being performed are not permitted in the laboratory |  |  |  |  | |
| **B** | **Special Practices** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B1 | Access to the laboratory is controlled when work is being conducted. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B2 | The laboratory supervisor is responsible for ensuring that laboratory personnel demonstrate proficiency in standard microbiological practices and techniques for working with agents requiring BSL-2 containment. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B3 | Laboratory personnel are provided medical surveillance, as appropriate, and offered available immunizations for agents handled or potentially present in the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B4 | **Properly maintained BSCs or other physical containment devices are used, when possible, whenever:** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B4-a | Procedures with a potential for creating infectious aerosols or splashes are conducted. These include pipetting, centrifuging, grinding, blending, shaking, mixing, sonicating, opening containers of infectious materials, inoculating animals intranasally, and harvesting infected tissues from animals or eggs. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B4-b | High concentrations or large volumes of infectious agents are used. Such materials may be centrifuged in the open laboratory using sealed rotors or centrifuge safety cups with loading and unloading of the rotors and centrifuge safety cups in the BSC or another containment device. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B4-c | If it is not possible to perform a procedure within a BSC or other physical containment device, a combination of appropriate personal protective equipment and administrative controls are used, based on a risk assessment. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B5 | Laboratory equipment is decontaminated routinely and in accordance with manufacturer's instructions (if applicable); after spills, splashes, or other potential contamination; and before repair, maintenance, or removal from the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B6 | A method for decontaminating all laboratory waste is available (e.g., autoclave, chemical disinfection, incineration, or other validated decontamination method). |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, B7 | Incidents that may result in exposure to infectious materials are immediately evaluated per institutional policies. All such incidents are reported to the laboratory supervisor and any other personnel designated by the institution. Appropriate records are maintained. |  |  |  |  | |
| **C** | **Safety Equipment (Primary Barriers and Personal Protective Equipment)** | | | | | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,C1 | Protective laboratory coats, gowns, or uniforms designated for laboratory use are worn while working with hazardous materials and removed before leaving for non-laboratory areas (e.g., cafeteria, library, and administrative offices). |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, C1 | Protective clothing is disposed of appropriately or deposited for laundering by the institution. Laboratory clothing is not taken home. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,C2 | Eye protection and face protection (e.g., safety glasses, goggles, mask, face shield or other splatter guard) are used for manipulations or activities that may result in splashes or sprays of infectious or other hazardous materials. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,C2 | Eye protection and face protection are disposed of with other contaminated laboratory waste or decontaminated after use. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, C3 | The risk assessment considers whether respiratory protection is needed for the work with hazardous materials. If needed, relevant staff are enrolled in a properly constituted respiratory protection program. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,C4 | In circumstances where research animals are present in the laboratory, the risk assessment considers appropriate eye, face, and respiratory protection, as well as potential animal allergens. |  |  |  |  | |
| **D** | **Laboratory Facilities (Secondary Barriers)** | | | | | |
| 1. **BMBL**: Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D1 | Laboratory doors are self-closing and have locks in accordance with the institutional policies. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D2 | Laboratories have a sink for handwashing. It should be located near the exit door. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D3 | An eyewash station is readily available in the laboratory and activated weekly. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D4 | The laboratory is designed so that it can be easily cleaned. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D4-a | Laboratory does not have carpets and rugs. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D4-b | Spaces between benches, cabinets, and equipment are accessible for cleaning. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D5 | Laboratory furniture can support anticipated loads and uses. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D5-a | Benchtops are impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D5-b | Chairs used in laboratory work are covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D6 | Laboratory windows that open to the exterior are not recommended. However, if a laboratory does have windows that open to the exterior, they are fitted with screens. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D7 | Illumination is adequate for all activities and avoids reflections and glare that could impede vision. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D8 | Vacuum lines in use are protected with liquid disinfectant traps and in-line HEPA filters or their equivalent. Filters are replaced, as needed, or are on a replacement schedule determined by a risk assessment. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D9 | There are no specific requirements for ventilation systems. However, the planning of new facilities considers mechanical ventilation systems that provide an inward flow of air without recirculation to spaces outside of the laboratory. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D10 | [BSCs](https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/office-of-research-compliance/ibc/primary-containment-for-biohazards-selection-installation-and-use-of-biological-safety-cabinets-2nd-edition312409d8-596a-4dab-8cca-a046f84c24c0.pdf?Status=Master&sfvrsn=8b395a58_3/) and other primary containment barrier systems are installed and operated in a manner to ensure their effectiveness. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D10-a | [BSCs](https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/office-of-research-compliance/ibc/primary-containment-for-biohazards-selection-installation-and-use-of-biological-safety-cabinets-2nd-edition312409d8-596a-4dab-8cca-a046f84c24c0.pdf?Status=Master&sfvrsn=8b395a58_3/) are installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations. BSCs are located away from doors, windows that can be opened, heavily traveled laboratory areas, and other possible airflow disruptions.  If [BSCs](https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/office-of-research-compliance/ibc/primary-containment-for-biohazards-selection-installation-and-use-of-biological-safety-cabinets-2nd-edition312409d8-596a-4dab-8cca-a046f84c24c0.pdf?Status=Master&sfvrsn=8b395a58_3/) are moved, they must be recertified and tested before use continues. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2,D10-b | [BSCs](https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/office-of-research-compliance/ibc/primary-containment-for-biohazards-selection-installation-and-use-of-biological-safety-cabinets-2nd-edition312409d8-596a-4dab-8cca-a046f84c24c0.pdf?Status=Master&sfvrsn=8b395a58_3/) can be connected to the laboratory exhaust system by either a canopy connection (Class IIA only) or directly exhausted to the outside through a hard connection (Class IIB, IIC, or III).  Class IIA or IIC BSC exhaust can be safely recirculated back into the laboratory environment if no volatile toxic chemicals are used in the cabinet. |  |  |  |  | |
| 1. **BMBL:** Section IV—Laboratory Biosafety Level Criteria, Biosafety Level 2, D10-c | [BSCs](https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/office-of-research-compliance/ibc/primary-containment-for-biohazards-selection-installation-and-use-of-biological-safety-cabinets-2nd-edition312409d8-596a-4dab-8cca-a046f84c24c0.pdf?Status=Master&sfvrsn=8b395a58_3/) are certified at least annually to ensure correct performance. |  |  |  |  | |

Agents Involved (check all that apply)

Human Derived Materials

Bloodborne pathogens

Recombinant DNA

Viral Vectors

Biological toxin

Infectious or Pathogenic Agent

Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(specify)

Personal Protective Equipment Used

Nitrile Gloves Lab coat Shoe/Head covers

Safety Glasses Safety Goggles Face shield

Respiratory Protection\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(specify)

Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (specify)

Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Biosafety Program Use Only:*

Date Received\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reviewed by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Follow-up:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reported to:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Attached Documents:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_