

HAZARDOUS BIOLOGICAL AGENTS

MANAGING THE RISKS ON THE HEALTH CARE PREMISES





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INTRODUCTION

Micro-organisms are found virtually everywhere in the natural environment. Most of these are harmless to humans and do many important jobs. However, certain micro-organisms can cause disease and employees and other persons may be exposed to them as a result of work.

In healthcare institutions, patients come in on a daily basis suffering from various infectious diseases, thus spreading biological agents and exposing employees to them.

Section 8 of the Occupational Health and Safety Act, 85 of 1993 as amended, states that “Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees”.

Therefore, employers have a duty to make the work environment healthy and safe for their employees. The extent to which healthcare employees will be exposed to biological agents during the course of their work varies. Some will be directly exposed to infection, e.g. clinical and nursing employees caring for patients with TB. Others may be exposed to potential sources of infection, e.g. the porter who transports specimens from ward to laboratory, other general employees who remove medical waste or clean wards or surgeries.

DEFINITION OF BIOLOGICAL AGENTS

A biological agent is defined in the Regulations for Hazardous Biological Agents (HBAs) as: “any micro-organism, cell culture or human endoparasite, including any which have been genetically modified, which may cause an infection, allergy or toxicity, or otherwise create a hazard to human health”.

They are divided into 4 groups:

- Group 1 HBA are HBA's that are unlikely to cause human disease
- Group 2 HBA are HBA's that may cause human disease and be a hazard to exposed persons, which is unlikely to spread to the community and for which effective prophylaxis is usually available e.g. hepatitis B virus
- Group 3 HBA are HBA's that may cause severe human disease, which presents a serious hazard to exposed persons and which may present a risk of spreading to the community, but for which effective prophylaxis and treatment is available e.g. mycobacterium tuberculosis
- Group 4 HBA are HBA's that causes severe human disease and is a serious hazard to exposed persons and which may present a high risk of spreading to the community, but for which no effective prophylaxis and treatment is available e.g. ebola virus.

EMPLOYEES EXPOSURE TO HAZARDOUS BIOLOGICAL AGENTS

There are mainly four sources of infection in which employees might be exposed to biological agents at work:

- Blood and other body fluids e.g. saliva
- Human waste products such as faeces, urine and vomit
- Respiratory discharges such as coughs and sneezes
- Skin – direct contact.

DUTIES OF EMPLOYERS

An occupational health and safety management system is “a management system to direct and control an organisation with regard to occupational health and safety, i.e. achieving legal compliance and results in its employees through good practice that eliminates or minimises occupational risk and injury to workers”. Therefore, the legal responsibility for health and safety rests primarily with the employer. It is their responsibility to make sure that the organisation has the necessary management framework to ensure compliance with health and safety legislation. One aspect of this management system will be the control of exposure to hazardous substances, including biological agents. Thus, the employer must ensure that the following measures are in place as required by the Regulations for Hazardous Biological Agents.

RISK ASSESSMENT

An organisation's health and safety policy must set out how risks such as occupationally-acquired infection will be managed. For the management of infection risks to be successful, an understanding of how such risks are assessed and managed must be present at all levels – from managers to clinical, nursing and support staff.

A risk assessment is a means of determining the risk associated with work with a particular hazard in the workplace. It is mostly broken down into five steps:

- Hazard identification
- Deciding who is at risk from the hazard and how harm could arise
- Assessing how likely it is that harm will arise and whether existing precautions are adequate
- Making a record of findings, including the control measures selected and any action identified as necessary to reduce the risk of exposure further
- Reviewing and revising the assessment as necessary, especially if the nature of the work changes, new equipment that is used or something else suggests that it may no longer be valid, e.g. as a result of an incident.

Risk assessment should be conducted by a competent person. A competent person is someone who has sufficient training, experience and knowledge to do the required job. He/she must have an understanding of relevant statutory requirements and the hazards involved.

The risk assessment must be a living document and should reflect any changes in the work that is being done. It is also good practice to review the risk assessment from time to time to ensure that the controls being used are working and still appropriate.

IDENTIFYING THE HAZARD

The process of infection is like a chain – breaking a link in the chain at any point will control the risk of infection. When hazards are identified, links in the chain need to be found to help identify the best way to break the chain so as to find the best way to control the risk.



TRANSMISSION

To become infected, the micro-organism has to get from the source into the host by some means. Most micro-organisms usually have a particular route of entry, but in some cases infection can occur by more than one route. Infection at work can occur via:

- Putting contaminated hands and fingers into the mouth, nose or eyes
- Breathing in infectious aerosols/droplets from the air, e.g. respiratory discharges such as coughs and sneezes, contaminated dust
- Splashes of blood and other body fluids into the eye and other mucous membranes, such as the nose and the mouth
- Broken skin if it comes into direct contact with the micro-organism (or something contaminated by micro-organisms)
- A skin penetrating injury, e.g. via a contaminated needle or other sharp object.

HOST

Unbroken skin and the lining of the mouth, throat, gut and airways all serve to provide a barrier to infection. The cells of these linings and the substances they produce are the body's first line of defence. If a micro-organism does manage to cross this barrier, the next line of defence is the immune system. Whether or not an infection occurs, depends on the outcome of a contest between the micro-organism and the immune system. The outward signs and symptoms of disease such as fevers or rashes are a result of this contest.

Some people may be more susceptible to infection than others, e.g. those with reduced immunity because of a pre-existing illness. Therefore, an employer needs to check this before employees start work, to make sure that they are protected.





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ASSESSING THE RISKS

For the purpose of an assessment, it might be easier to break the work down into discrete activities like, changing of a dressing, administering injections or disposal of waste. The following should be considered in particular:

- Where the work will be carried out, e.g. in an isolation room or in the general ward environment
- Whether the work:
 - » could create airborne particles, e.g. splashes or aerosols
 - » will require the use of sharps
- Who will be carrying out the work
- Whether others (those not actually doing the work) could be affected by the work, e.g. visitors, cleaners, maintenance workers
- Whether the work is routine or carried out infrequently – this will have implications for the information, instruction, training and supervision given to those carrying out the work.

CONTROLLING THE RISKS

The next stage is for an employer to consider how likely it is that each biological hazard can cause harm and to determine what measures need to be taken to reduce the risk. The primary purpose of the legislation is to prevent exposure to hazardous agents, but if this cannot be achieved, then exposure needs to be managed.

Unlike some chemicals, there are no exposure limits for micro-organisms. Therefore, the control measures need to take into account the following:

- Micro-organisms can grow and multiply
- Infection could be caused by exposure to only few micro-organisms.

The general hierarchy of controls need to be considered first as follows:

- Controlling exposure at source, e.g. having a clinical waste policy which ensures safe collection, storage, transport and final disposal of such waste
- Designing and using appropriate work processes, systems and engineering control and providing and using suitable work equipment and materials, e.g. preparing a hand washing policy and providing appropriate facilities for employees to use
- Providing suitable PPE in addition to the above, e.g. using gloves where there's potential exposure to blood.

Where the possibility exists for patients to be infected with Group 3 and 4 biological agents, the need for additional control measures should be considered.

ADDITIONAL MEASURES

SUPPLEMENTARY CONTROLS

Negative pressure rooms should be used when caring for patients infected with respiratory diseases such as tuberculosis, SARS or avian flu.

Additional controls may be required when employees carry out certain exposure-prone procedures with infectious patients, e.g. sputum induction in infectious TB cases. For an example, filtering respirators (not surgical masks) should be used when carrying out procedures that give rise to infectious aerosols.

SECURITY AND ACCESS

The main principle of isolation is to control the spread of infection by separating the infected patient from others. To reduce such contact, it is better to locate isolation areas/ rooms away from the main thoroughfares, e.g. at the end of the ward area. If there is insufficient space to house patients in isolation rooms on an individual basis, e.g. during an outbreak, patients with the same infection as a cohort, could be located in small bays.

Access to patients with infectious diseases should be limited by having dedicated staff authorised to take care of the patients. Employers need to make sure that those who access the patient room/area e.g. visitors and cleaning staff, know about the hazards posed by the infection and the control measures in place, e.g. washing of hands. They should also be provided with appropriate protective equipment.

The movement of infectious patients outside of isolation areas should be restricted. If movement is required, e.g. for specialist treatment, a risk assessment should be carried out on the process and appropriate controls put in place.

Contaminated waste from infectious disease patients is likely to contain hazardous biological agents, therefore, should remain in the room/area in an appropriately labelled container until it can be removed safely.

DISINFECTION AND DISPOSAL PROCEDURES

The disinfection policy should address both routine and emergency disinfection and also the cleaning/disinfection of equipment that will be required before re-use by another patient. The policy should also indicate the type of disinfectants that are to be used and the circumstances in which it is to be used. It should also include the in-use concentration (unless supplied ready for use) and contact time.

Floors should be smooth, slip resistant and seamless for easy cleaning. Ideally the flooring should be coved to the walls to allow easy cleaning. Walls should also be smooth and impervious.



INFORMATION AND TRAINING

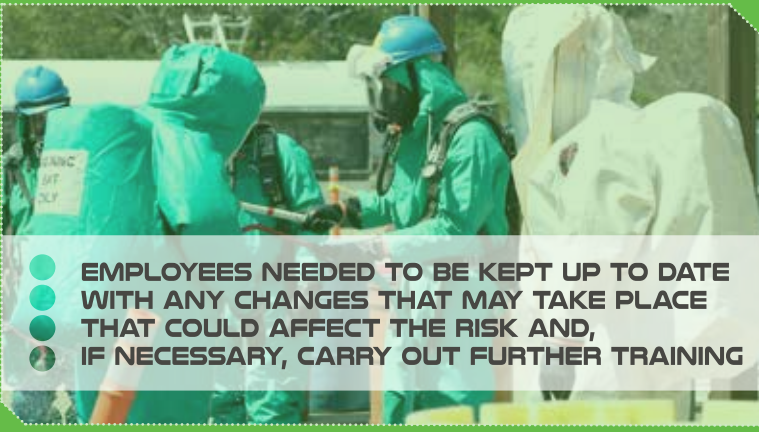
It is the duty of the employers to ensure that before an employee is exposed or may be exposed to an HBA in the workplace, that he/she is adequately and comprehensively informed and trained with regard to the following:

- The contents and scope of the Hazardous Biological Agents Regulations
- The potential risks to health as a result of the exposure
- The measures taken by the employer to protect employees against any risk of being exposed
- The importance of good housekeeping at the workplace and personal hygiene requirements
- The precautions to be taken by an employee to protect him/herself against the health risks associated with the exposure, including the wearing of protective equipment;
- The necessity of medical surveillance
- Safe working procedures regarding the use, handling, storage and labelling of HBA at the workplace
- The procedures to be followed in case of an emergency involving HBAs e.g. during spillage, and the decontamination and disinfecting of contaminated areas

The employer need to ensure that employees are kept up to date with any changes that may take place that could affect the risk and, if necessary, carry out further training

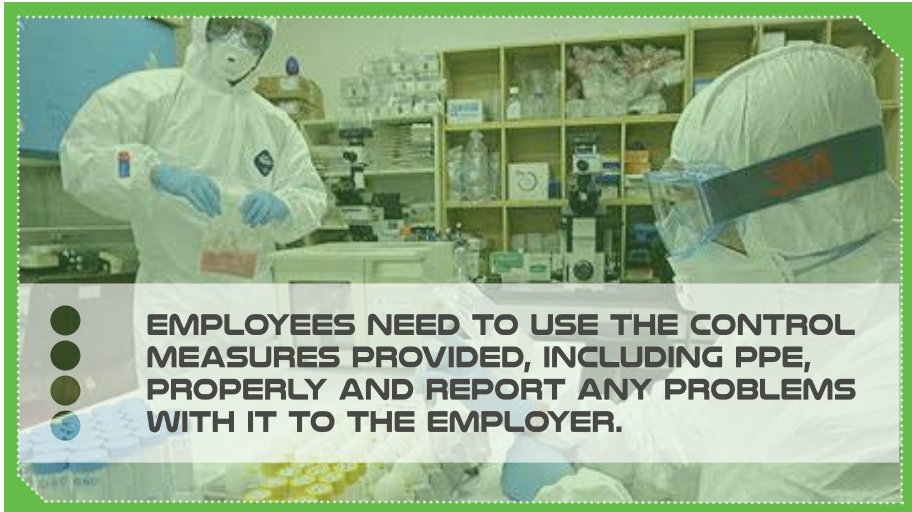
The Act requires that the Health and Safety Representatives and Health and Safety Committees need to be consulted about health and safety matters. This includes:

- Information about the risks and the control measures that are in place
- Changes to the work that may affect employee health and safety
- Arrangements for getting competent help
- Plans for health and safety training.



- EMPLOYEES NEEDED TO BE KEPT UP TO DATE
- WITH ANY CHANGES THAT MAY TAKE PLACE
- THAT COULD AFFECT THE RISK AND,
- IF NECESSARY, CARRY OUT FURTHER TRAINING

Other people who may be affected by the work, e.g. maintenance staff or external contractors, should also receive sufficient and appropriate information, instruction and training about the hazards they may encounter. They should also be appropriately supervised while carrying out their work.



USE AND MAINTENANCE OF CONTROLS

Employees need to use the control measures provided, including PPE, properly and report any problems to the employer. The employer needs to take all reasonable steps to make sure that the control measures are used, which is why they need to provide information and training.

Any equipment provided for use at work must be:

- Suitable for intended use
- Safe for use, maintained in a safe condition and inspected regularly to ensure that it remains safe for use
- Is used only by people who have received adequate information, instruction and training
- Accompanied by suitable safety measures, e.g. protective devices, markings and warnings.

If any engineering controls, including respiratory protective equipment are used to control exposure, they need to be kept in an efficient working order and good repair. Regular examination and testing of controls need to be carried out at intervals not exceeding 24 months or as directed by the manufacturer.

Any non-disposable PPE, e.g. laboratory coats, aprons, must be stored in appropriate facilities when not in use. If PPE has been contaminated by biological agents, it must be removed safely before leaving the workplace and kept apart from uncontaminated PPE. It should be cleaned and decontaminated by an organisation approved or accredited to do so by legislation.

All contaminated personal protective clothing issued shall be cleaned and handled in accordance with the following procedure or as advised by an expert:

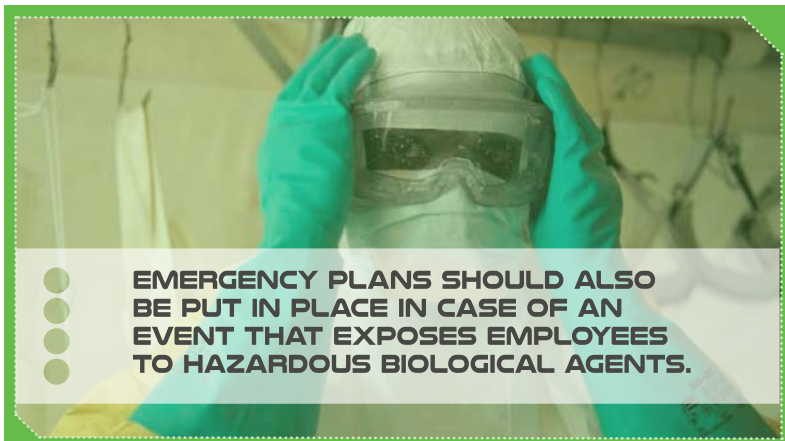
- Where such clothing is cleaned on the premises of the employer, care shall be taken to prevent contamination during handling, transporting and cleaning
- Where the clothing is sent off the premises to a contractor for cleaning purposes, the clothing shall be placed in impermeable, tightly sealed colour coded containers, and such container shall be clearly identified with a bio-hazard label
- The contractor must be fully informed of the requirements of the Hazardous Biological Agents regulations and the precautions regarding the handling of contaminated clothing.

HANDLING INCIDENTS/EMERGENCY PLANNING

It is the requirement in terms of section 24(1)(a) of the Occupational Health and Safety Act, for the employer to give notice within seven days of any incident that has occurred to the Provincial Chief Director in the form of WCL 1 or WCL 2.

Any registered medical practitioner shall within 14 days of the examination or treatment of a person for a disease contemplated in section 25 of the Act, give notice thereof to the Chief Inspector and the employer in the form of WCL22.

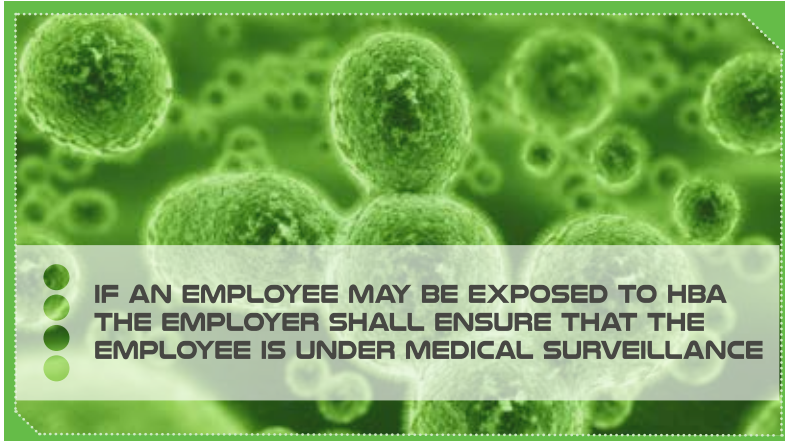
A record of all incidents shall be kept by the employer in the form of Annexure 1 of the General Administrative Regulations, for a period of three years. The record shall be open for inspection by an inspector and also be made available to the Health and Safety Committee to ensure that necessary actions are implemented to prevent the recurrence of such incidents.



**EMERGENCY PLANS SHOULD ALSO
BE PUT IN PLACE IN CASE OF AN
EVENT THAT EXPOSES EMPLOYEES
TO HAZARDOUS BIOLOGICAL AGENTS.**

Emergency plans should also be put in place in case of an event that exposes employees to hazardous biological agents. Emergency plans need to include:

- The foreseeable types of incidents, accidents or emergencies that might occur
- The role, responsibilities and authority of individuals during an emergency
- The safety equipment and PPE to be used
- Arrangements and liaison with emergency services
- First aid facilities
- Procedures for cleaning up and disposal of waste.



MEDICAL SURVEILLANCE

An employer shall ensure that an employee is under medical surveillance if:

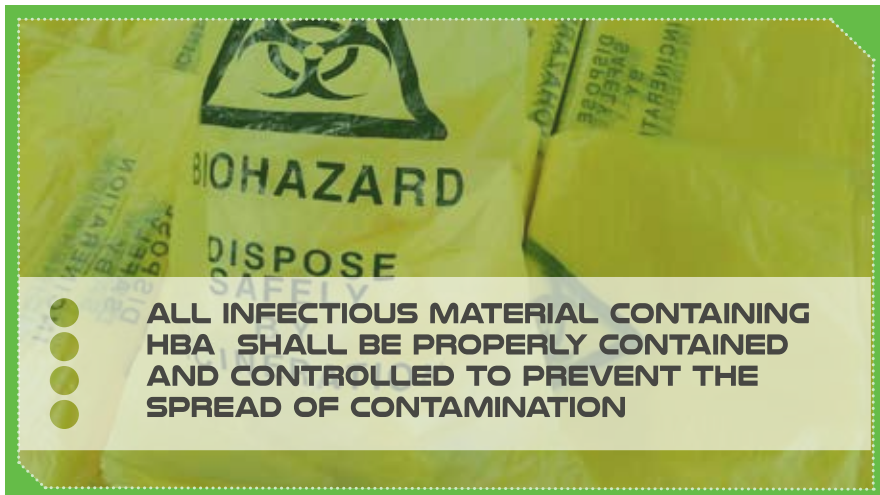
- The results of the risk assessment indicate that an employee may be exposed to HBA
- The exposure of the employee to any HBA hazardous to his or her health is such that an identifiable disease or adverse effect to his or her health may be related to the exposure
- An occupational health practitioner recommends that the relevant employee should be under medical surveillance.

The initial evaluation should comprise of the following:

- An evaluation of the employee's medical and occupational history
- A physical examination
- Any biological tests or other appropriate medical tests or any other essential examination that in the opinion of the occupational health practitioner is desirable in order to enable the practitioner to do a proper evaluation.

LABELLING, PACKAGING, TRANSPORTING AND STORAGE

- All infectious material containing HBA in storage, in transit or being distributed shall be properly contained and controlled to prevent the spread of contamination from the workplace
- The colour-coded containers in which HBA are transported shall be clearly marked with a bio-hazard sign and other relevant warning signs identifying the contents
- The driver is trained on the transportation of waste containing hazardous biological agents and what procedure to follow in case of an emergency.



DISPOSAL OF WASTE CONTAINING HBAS

- It is the duty of the employer to ensure that there are written procedures in place for the decontamination and disinfection that is to be implemented when required
- All fixtures and equipment including vehicles, re-usable containers and covers which have been in contact with HBA-containing-material are disinfected and decontaminated after use in such a way that it does not cause hazards inside or outside the premises concerned
- All employees involved in the collection, transport and disposal of HBA waste and who may be exposed to that waste are provided with suitable personal protective equipment
- Use only certified waste disposal organisations.

CONTACT DETAILS

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Gauteng Provincial Office

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Limpopo Provincial Office

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Mpumalanga Provincial Office

Telephone Number(s): (013) 655 8700 Fax Number(s): (013) 690 2622

North West Provincial Office

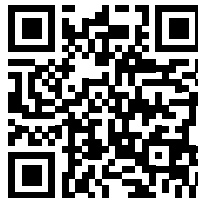
Telephone Number(s): (018) 387 8100 Fax Number(s): (018) 384 2745

Northern Cape Provincial Office

Telephone Number(s): (053) 838 1500 Fax Number(s): (053) 832 4798

Western Cape Provincial Office

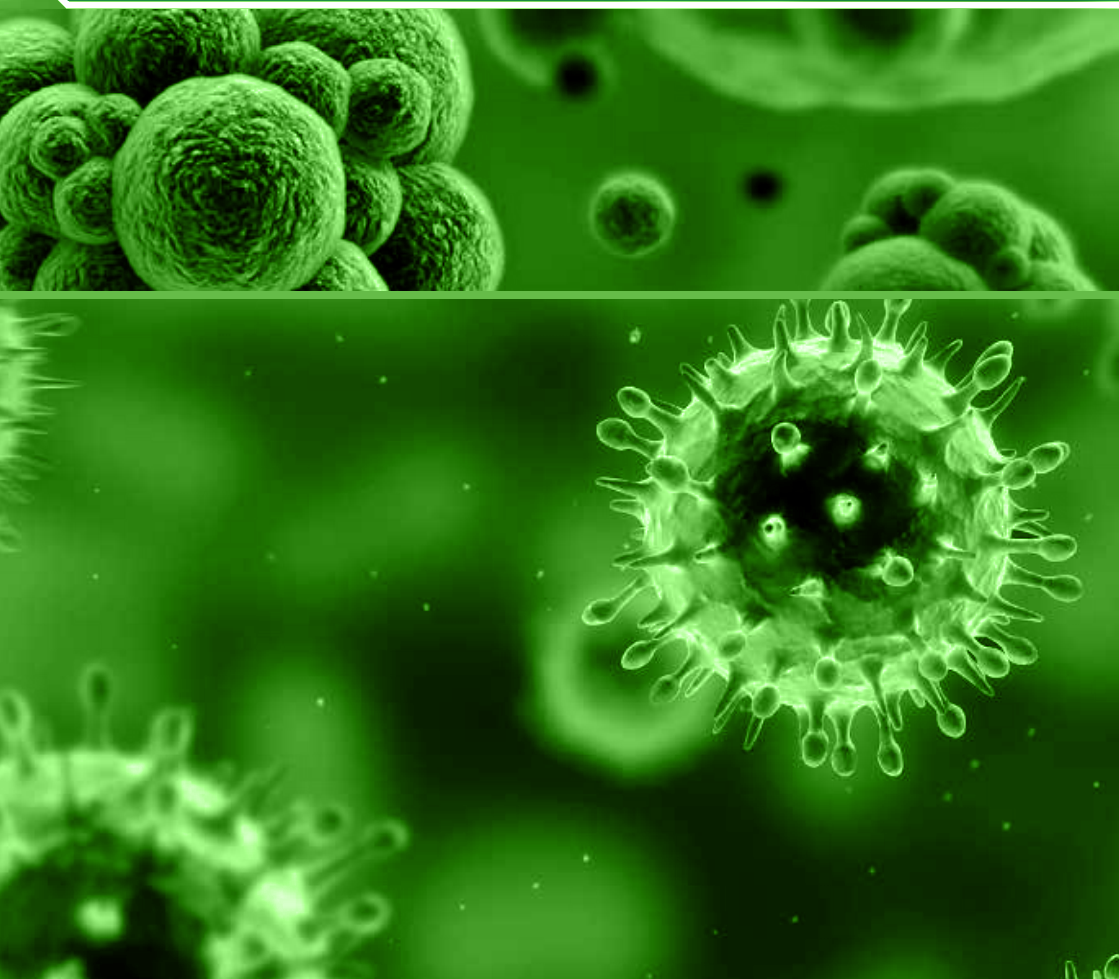
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CONTACT DETAILS: LABOUR CENTRES

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