

EURADOS recommendations to deal with the COVID-19 pandemic

These recommendations are issued as a guide for the operation of Individual Monitoring Services (IMS), Calibration Laboratories and other stakeholders involved in dosimetry during the current COVID-19 pandemic. It is recognized that the situation is different for each country. It is also recognized that the situation will evolve at different rates for these stakeholders over the next few months. Regardless of these EURADOS recommendations, the relevant national requirements will always need to be respected and followed.

General Guidance

General national and WHO rules and recommendations must be followed to decrease the possibilities of contamination with COVID-19.

- Priority should always be the protection of the dosimetry laboratory staff against the risk of infection with the coronavirus. Thus staff working in the laboratories, should be able to respect the distancing rules to colleagues and customers as well as following the advised hygiene measures.
 - Wash your hands frequently, using soap and water or alcohol-based hand rub, even if hands are not visibly dirty.
 - As far as it is compatible with the activities performed, staff shall keep a distance of at least 1 m from each other and from customers.
 - Avoid touching eyes, nose and mouth and practise respiratory hygiene: when coughing or sneezing, mouth and nose shall be covered with tissue, which shall be disposed of at the nearest waste receptacle after use.
- Personal Protective Equipment and information on their proper use should be available to the staff (e.g. via display of posters).
- Where practicable, surface cleaning with alcohol-based disinfectant solution and wipes should be performed on all items returned by customers, to minimize risk of virus transmission through contaminated surfaces.
- Anyone who is displaying symptoms of COVID-19 or who lives with someone who has symptoms, should not be involved in performing laboratory calibration services.

Proper communication with the customers and the decision-makers at institutional/local/national level must be guaranteed.

Some dosimetry services can be regarded as essential. Measures must be taken such that these services will not be interrupted, e.g.:

- Nuclear emergencies: response and measurements (bioassays, whole body counting, environmental monitoring, personal dosimetry, ...) in case of nuclear emergencies,
- Potential significant exposure: personal dosimetry for ongoing professional activities with potential high exposures to ionising radiation, e.g. imaging departments in hospitals, nuclear reactor workers, isotope production etc.

- Activities related to the response to the COVID-19 pandemic.

The definition of “essential” is for the appropriate stakeholders to determine, i.e. the employers/customers, IMS and the regulatory authorities. The definition will also depend on the circumstances.

For such essential services it must be assured that 1- sufficient qualified staff will always be available and 2- supplies and shipment will be available. The following arrangements can be made:

- The option of reducing the number of samples/persons measured should be explored.
- Alternate staff in the lab to avoid possible contamination of the whole team,
- Make increasing use of work from home for some staff so that their risk of becoming infected is lower and the risk of them infecting other staff is reduced,
- Adapt the open time of the lab and the working time of the staff if the previous measures cannot be applied or are not sufficient
- Transport must be available to ensure samples and doseimeters should be able to reach the laboratory,
- For consumables required (nitrogen...), supplies should be sufficient in case of longer delivery times.
- In the supplier process, precautionary measures to avoid the transfer of the virus (such as contactless transfer of goods and temporarily quarantining of goods) should be considered. The supply chain of some materials required for the analysis (e.g. chemicals or liquid nitrogen) might become restricted during this period: increasing storage and establishing contacts with several vendors should be considered.

Research activities cannot be considered as essential services and the following recommendations can be made:

- High priority research should be continued if the protective measures can be applied
- All experiments deemed to be non-essential should be postponed, unless the necessary precautionary measures can be maintained
- Working from home should be encouraged as much as practically possible, e.g. modelling research. If laboratory work is performed, data analysis and write-up should be performed at home.

Calibration, Maintenance and Quality Assurance

- The schedules for all routine calibration, maintenance and quality assurance and control procedures should be reviewed. Essential tasks that cannot be postponed, e.g. key regulatory requirements, shall be maintained as far as reasonably practicable. Tasks that may be considered for postponement after risk assessment, for example, are those which are scheduled at regular intervals: e.g., annual or 18-month APD/EPD calibrations where these doseimeters are automatically checked before they can be issued for any working session.

- Exception records may be used to document any justified deviation from existing work procedures in a quality management system.
- If needed, a negotiation with the accreditation body can be undertaken for a relaxation of the accreditation criteria. This must be done on a solid scientific basis, without penalizing the traceability and the quality of the service in general.

External Dosimetry

Amendments to IMS Service Schedules:

- Prioritization
 - It is essential that the Individual Monitoring Services (IMS) contact the client organisations to prioritise essential and urgent measurements over those that could tolerate delays.
- Monitoring Period
 - Capacity must be maintained for urgent measurements, but routine monitoring periods may be extended to up to a maximum of six months unless there is an identified risk that radiation fields may increase rapidly and unpredictably to serious levels.
 - Six months is an appropriate maximum monitoring period taking into consideration the known fading characteristics of the passive integrating dosimetry systems in common use. The associated increase of uncertainty is considered acceptable with respect to the requirements of international and national performance standards for personal dosimeters.
 - It must be realised that the detection limit can change for extended monitoring periods.
 - The natural background radiation must be appropriately subtracted from the dosimeter indication. For extended monitoring periods, the use of specific client or location values may be preferred over the use of an average value, such as a national average.
 - Extension of the monitoring period can further be supported by an exposure history and knowledge of the workplace.
 - A longer monitoring period will provide improved flexibility for dosimeter distribution to clients and processing at reduced staff levels.
 - Agreement on the change of the monitoring period must be made with the customers and the legislator, and this should be documented
- Suitable arrangements for dosimeter transport between IMS and user locations must be established in case routine postal or courier services are disrupted.

Personnel Safety

- A comprehensive risk assessment shall be carried out (and a formal written procedure prepared and issued) to reduce the transmission of COVID-19 to laboratory personnel and monitored individuals. Appropriate training will be provided for all staff.
- It is recommended that a delay of at least 3 days is introduced before opening all dosemeter consignments. Where practicable, surface wipes with alcohol-based disinfectant solution should be performed on all items returned by clients, such as active personal dosimeters or personal dosimetry badges. However, it is recognised that wiping all dosimeters might be impracticable for some large scale IMS which use automated handling equipment for dosemeter processing. When performing disinfection of dosimeters, laboratory personnel shall wear protective gloves. All wipes, gloves and any other cleaning materials shall be discarded after use in a closed bin.

Internal dosimetry

In-vivo Measurements

- Close contact between operator and the person that is measured cannot be avoided, especially when positioning detectors for partial body counting. Rules of hygiene should be followed (e.g. washing and disinfecting hands) before the measurement. Protective equipment, such as facemasks, should be worn by both. For the staff a higher level of protection (such as FFP3 masks) should be used, as these persons have a higher number of contacts.
- If in-vitro methods are available and feasible these may be preferred to minimize direct contacts.
- Disinfection of the chair/bed and the measuring chamber after each measurement should be performed. Time for ventilation of the room should be allowed between the measurements.
- This extra time needs to be taken into account in the scheduling of the lab's operations. The number of measurements performed per day might need to be reduced to allow the time for these extra requirements.
- Measurements should be prioritized. Routine measurements could be postponed, while measurements after incidents with suspected intakes of radionuclides should be performed, especially if large doses are expected. As criterion for "large" dose recording or investigation levels (ISO 20553) might be used. The duration of the postponement of the measurements affects the minimum detectable doses of the monitoring programme. It depends on the radionuclides monitored and the monitoring intervals. Consultation with the RPO (Radiation Protection Officer) and the customer is required to establish the changes in the monitoring, which should be documented.
- Work history and the postponed measurements at later times might be used to estimate doses
- Nitrogen supply for HPGe-detectors might be affected. If the supplies are reduced electrically cooled detectors might be used, otherwise for most of radionuclides it is

possible to switch to measurements using Scintillators, when available. Proper calibration of the equipment needs to be established.

In-vitro Measurements

- Bioassay samples are biological materials and are already handled taking into account the biohazard. However, a possible risk of corona virus transfer must be taken into consideration.
- If possible, the collection of excreta samples should be continued. A reasonably large number of containers for sampling should be prepared and provided by the dosimetry service. Pre-treatment (e.g. adding acid to urine samples) could be done at the workplace of the persons if the bioassay laboratory is not available. Instructions and materials for this should be provided by the dosimetry service. Samples should be stored in a fridge until further treatment.
- Supply of chemicals required for the analysis might be reduced. Alternative separation techniques, which do not use the missing chemicals should be investigated.

Missed/Skipped Measurements

- Routine in-vivo measurements could be postponed. Some workplaces might also be in a mode of reduced operations and might not require the strict routine monitoring regime. In-vivo measurements after incidents with suspected intakes of radionuclides should be performed. Clients and services should develop criteria to define such incidents.
- For long-lived nuclides, the sampling of excreta should be continued, to allow for later treatment and measurement. For short-lived nuclides immediate treatment and measurement of the samples should be considered.
- Availability of public transport (for in-vivo customers) and shipment services (for bioassay monitoring) might be reduced and needs to be considered in the planning of the monitoring.
- If possible, it should be guaranteed that intakes corresponding to $E(50) \geq 1$ mSv are detected. Postponement of routine measurements and restricting only to urgent/emergency measurements is possible, but this will affect the minimum detectable dose and the accuracy of the dose estimate.
- The effect of prolonging the monitoring intervals on the dose assessments should be investigated and documented by the services. Customers should be informed by the service.

Calibration laboratories

Some Calibration services can be regarded as essential. Measures must be taken such that these services will not be interrupted, e.g.:

- Calibrations for the healthcare sector, especially where there are critical healthcare operations that use ionizing radiation. This is of particular concern for new medical

facilities that have been set up as part of the COVID-19 response. e.g. imaging departments in hospitals

The definition of “essential” is for the appropriate stakeholders to determine, i.e. the employers/customers, calibration laboratories and the regulatory authorities. The definition will also depend on the circumstances.

During the transition from a regime of strict lockdown to a progressive relaxation of the containment measures, the following actions can be considered:

- Do not allow customers to be present during the calibrations.
- Define a dedicated area for goods delivery.
- Consider the instrument as potentially virus contaminated, handle with gloves and clean it with sterilizing wipes.
- Give precedence to customers from the medical sector or other areas particularly important during the pandemic.
- Assist customers needing scientific support to manage at best any interruption of the calibration service. This should be done mainly in terms of identification of situations where the validity of the calibration certificate can be extended without penalizing the quality of the measurements.
- If extended calibration periods are to be used:
 - They must be accompanied by the user ensuring that enhanced function checks are performed on instruments that have passed their normal regulatory calibration test date. These should be documented and if appropriate check sources should be used.
 - For fixed point monitoring, users should check for either what the instrument recorded last time, or what they expect at that position, so poor performance of the instrument can be suspected.
 - In novel measurement situations, dual measurements could be performed, using pairs of instruments, ideally of the same type.