



The Sir Charles Gairdner Hospital

Personal Radiation Monitoring Service

What to do if you suspect you have received a high dose

Please contact the Department of Medical Technology & Physics on (08) 9346 2866 if you suspect you have received a high dose or have any queries regarding your radiation dose.



Sir Charles Gairdner Hospital

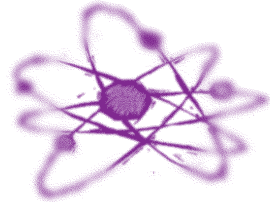
Department of Medical Technology and Physics



Department of Health

Ref:01175-05

The Department of Medical Technology & Physics (MT&P) provides a personal radiation monitoring service for Sir Charles Gairdner Hospital. State legislation requires all persons who may be exposed to ionising radiation during the course of their work to be monitored by an approved device.



The Sir Charles Gairdner Hospital Personal Radiation Monitoring Service (SCGH PRMS) provides a number of approved personal radiation monitoring options. These include:

- Films from Australian Radiation Services (Yellow and Blue)
- Thermoluminescence dosimeters (TLDs) from Australian Radiation Services
- Optically Stimulated Luminescence dosimeters (OSLs or Luxels) from Radiation-Wise
- Finger ring TLDs from Radiation-Wise

Australian Radiation Services (ARS) and Radiation-Wise are the Australian agents for the National Radiation Laboratory (NRL) (New Zealand) and Landauer Inc (USA), respectively.

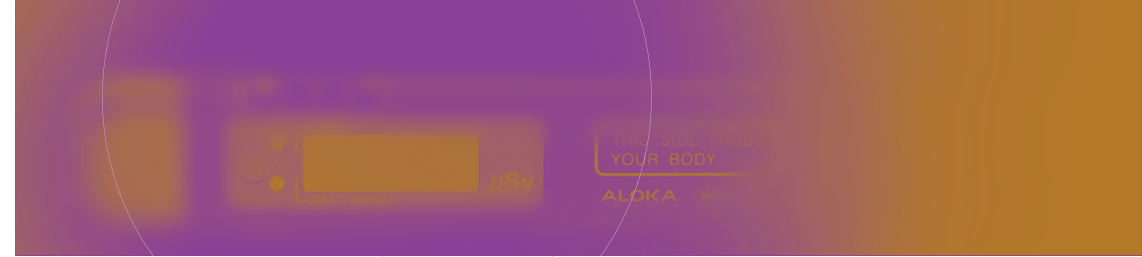
What do the results mean?

The dose on the report is an estimate of the wearer's exposure to radiation. This is called the effective dose and is measured in Sieverts (Sv). The effective dose takes into consideration the different types of radiation as well as the relative sensitivities of the different organs and tissue types. The calculation of your effective dose assumes that your whole body has been uniformly irradiated and the monitor has captured a proportionate amount.

The results of the films, TLDs and OSLs by NRL and Landauer are reported as a Deep Dose Equivalent (DDE) at a depth of 10 mm (Hp(10)) in millisieverts (mSv). These results are then used to estimate the whole body effective dose.

State legislation requires the whole body effective doses to be below 100 mSv for any 5 years and below 50 mSv for any one year. An average of 20 mSv per year is used as a guide and thus 1.67 mSv per month or 5 mSv per quarter is used as an upper limit per monitoring period. All doses above 0.5 mSv per month or 1.5 mSv per quarter require an investigation. You will be contacted by the Department of Medical Technology & Physics if we are notified of a high dose.

Your dose reports are sent from the supplier to MT&P and checked for any unusual doses. MT&P will then forward the dose reports to your department. Your dose reports are available via your Department Radiation Safety Officer. The current list of DRSOs is available through MT&P, or may be found in Appendix 1 of the SCGH Radiation Safety Manual available on the CHIPS website.





Returning monitors

Please ensure that there is at least one control with each batch of returned monitors. If there are late returns, please ensure that there is also a control for these. More controls can be requested if necessary. (Some departments require two controls. One control is sent with the first batch of returns and one control is kept for any late returns. The late returns are then sent back with the second control when they are all collected.) Please be aware that any late returns will mean the dose report will be consequently late. Contact Medical Technology & Physics for assistance.

Please ensure the correct *Issue Report* is enclosed with the returns. (You can check it is correct by matching the film code or barcode on the *Issue Report* to the ones on the films, TLDs or OSLs.)

If a person is on leave, changes name due to marriage or terminates their employment, please indicate this clearly on the *Variation Form*.

Personal radiation monitors MUST NOT be shared. In general, only one monitor is issued to each individual for their exclusive use. A monitor must not be used by anyone other than the person to whom it was issued.

When to change them over

For people who change their monitors on a monthly basis, the monitors should be changed on the first of every month. For quarterly cycles, the monitors should be changed on the first of January, April, July or October. Any variations on the change dates should be clearly written on the *Issue Report*.

How to enrol new users on the service or request alterations

Please use the *Variation Form* and fax it through to MT&P as soon as possible. For changes to take effect in your next issue, the form must be faxed to us before the 4th of the preceding month. (eg. You would like a film for Joe Bloggs for the beginning of March. Please fax to us the *Variation Form* before the 4th of February)

Spares

MT&P stock a number of spare films, TLDs and OSLs in case you need them for new staff members or if someone loses their monitor. If you need a film, TLD or OSL immediately, you can fax a *Request for Spare Monitors Form* to MT&P and we will arrange for a spare to be sent to you ASAP. Please indicate whether you would like to permanently add the user to your regular issues on the form.



Who should be monitored?

The Western Australian Radiation Safety Regulations state that an approved personal radiation monitoring device must be worn by all persons who may be exposed to ionising radiation during their work and have the potential to exceed the relevant regulatory limits. Exceptions may be permitted by the Radiological Council.

Within SCGH the decision as to which staff are required to wear personal radiation safety monitors is made by MT&P, in collaboration with the staff members. The SCGH Radiation Safety Officer is ultimately responsible for these decisions.

Please contact MT&P if you believe you should be wearing a personal radiation monitor but have not been issued with one.

Persons issued with a monitoring device are required to wear it whenever they are likely to be exposed to ionising radiation during the course of their work.



What are films, TLDs and OSLs and how do they work?

Ionising radiation produces a chemical change in the photographic film in a similar way in which light does. Chemical processing makes these changes visible as areas of darkness. The higher the radiation dose a film has received, the darker it will be. Film badges are particularly sensitive to high ambient temperatures, humidity and have a reduced stability over extended periods.

The yellow film badges which are supplied by ARS have a minimum reportable dose of 0.05 mSv and are suitable for persons exposed to X-rays with energies between 15 and 180 keV.

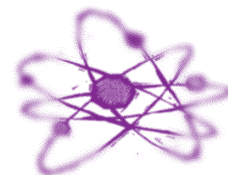
The blue film badges which are supplied by ARS have a minimum reportable dose of 0.15 mSv and are suitable for persons exposed to photons from X-ray units or materials with energies above 180 keV and beta particles with energies above 500 keV.

TLD crystals absorb ionising radiation, which is converted to light and released by the crystal when it is heated up to several hundred degrees. The emitted light is directly proportional to the accumulated absorbed dose of the wearer.

The TLD badges which are supplied by ARS have a minimum reportable dose of 0.03 mSv and are suitable for people exposed to photons with energies above 10 keV and beta particles with energies above 500 keV. They are relatively unaffected by long-term storage and do not suffer serious effects from environments with high ambient temperatures or humidity.

OSLs are similar to TLDs except the release of the light is stimulated by a laser instead of heat.

The OSLs supplied by Landauer (Luxel+) have a minimum reportable dose of 0.01 mSv and are suitable for people exposed to photons from X-ray units or materials with energies between 5 keV and 40 MeV or beta particles between 150 keV to 10 MeV. They are waterproof, relatively unaffected by long-term storage, and do not suffer serious effects from environments with high ambient temperatures or humidity.



Where to wear the monitors

The monitors should be worn where they will record the maximum exposure which might be received by the organs that are more sensitive to radiation. Since most of these organs are between your waist and chest, monitors should be worn in either of these positions.

In situations when protective aprons are worn, the monitoring device should be worn under the apron. Where collar doses are also monitored, the monitor should be worn above the protective aprons at collar level.

There may be some circumstances where the wearing of the monitor at waist level is inappropriate and if there is any doubt, please contact the Department of Medical Technology & Physics on (08) 9346 2866.

Precautions in their use

- Do not leave the monitors in an area where they could be exposed to ionising radiation while not being worn.
- Films and TLDs will be ruined if soaked in water. In this case, a replacement should be requested immediately. OSLs are waterproof provided the plastic blister package has not been damaged.
- Extreme heat, direct sunlight and chemical vapours should be avoided as these can all damage the personal radiation monitors.
- Ensure that your films, TLDs and OSLs are correctly placed in the holder. You should wear the monitor so that they are facing away from the body.
- Deliberately tampering or exposing your radiation monitor is illegal.
- All monitors are recycled by the supplier and thus lost monitors incur a fee.
- If any of the metal filters are loose, they should be replaced immediately. Contact Medical Technology & Physics on (08) 9346 2866 to arrange a replacement.