Attachment 3 - Facility, Equipment, Storage and Security Checklist

Biospecimen storage

Self-audit/review assistance

- Undertake a sampling of SOPs for biospecimen storage conditions.
- Review storage temperature records.
- Undertake a sampling of stored biospecimens for temperatures required by SOPs.

1. **Tissue storage conditions** Y/N/NA

   The SOP manual defines the necessary storage conditions of the different biospecimens handled, all required records and policies, and a protocol for return of each biospecimen type to storage after issuance for use, as appropriate.

2. **Tissue storage temperature** Y/N/NA

   The records show that biospecimens were stored at the SOP/protocol-required temperature.

   Storage of biospecimens must be appropriate for the type of biospecimens and its means of preservation. Failure to adhere to requirements could result in a biospecimen not being suitable for the purpose for which it was intended.

Completed by: _____

Date: _____

Adapted from National Cancer Institute *NCI Best Practices for Biospecimen Resources Biorepository Checklist.*

Instruments and equipment

A variety of instruments and equipment are used to support the research biorepository. All instruments and equipment should be properly operated, maintained, serviced, and monitored to ensure proper performance. The procedures and schedules for instrument maintenance and function checks must be as thorough and as frequent as specified by the manufacturer. Examples of equipment include, but are not limited to centrifuges, microscopes, incubators, heat blocks, biological safety cabinets and fume hoods etc.

Self-audit/review assistance

- Undertake sampling of instrument policies and procedures and instrument maintenance logs and repair records.
- Review instrument records (promptly retrievable).
- Ensure all instruments (clean and well-maintained).
- Identify how frequently change solutions occur in the tissue processor and how the timeframe for changing solutions is determined
- Identify how cross-contamination of paraffin sections in the flotation bath is prevented.
- Identify the process when a notification of a freezer out of range is received.
- Identify how often the cryostat is decontaminated.

1. **Instrument/equipment function verification** Y/N/NA

   The operation of all instruments and equipment is verified upon installation and after major maintenance and repairs to ensure that they function as intended.

   Evidence of compliance:

   ✓ Written SOP for function verification

   ✓ Records of function verification

2. **Maintenance/function check performance** Y/N/NA

   Appropriate maintenance and function checks are performed and documented for all instruments (eg analysers) and equipment (eg centrifuges) following a defined schedule, at least as frequent as specified by the manufacturer, prior to operation.

   There must be a schedule and procedure at the instrument/equipment for appropriate function checks and maintenance. These may include (but are not limited to) cleaning, electronic, mechanical and operational checks. The SOP and schedule must be at least as thorough and as frequent as specified by the manufacturer.

Function checks should be designed to detect drift, instability, or malfunction, before the problem is allowed to affect test results.

Since some equipment have no standard frequency or extent for maintenance and function checks, each biorepository should establish a schedule that reasonably reflects the workload and specifications of its equipment.

3. **Availability of instrument and equipment service records** Y/N/NA

Instrument and equipment maintenance, function checks, service, and repair records (or copies) are available in a timely manner to, and usable by, the staff operating the equipment.

Effective utilisation of instruments and equipment by the technical staff depends upon the prompt availability of maintenance, repair, and service documentation (copies are acceptable). Research biorepository personnel are responsible for the reliability and proper function of their instruments and must have access to this information. Off-site storage, such as with centralised medical maintenance or computer files, is not precluded if the inspector is satisfied that the records can be promptly retrieved.

4. **Automated stainer** Y/N/NA

There is a schedule to change the solutions in automated stainers.

Solutions must be changed at intervals appropriate for the research biorepository's workload. Cleaning of the stainers should be documented when performed.

Evidence of compliance:

✓ Written procedure defining frequency of changing staining solutions

✓ QC records that document compliance with the procedure

5. **Incubator Quality Control (QC)** Y/N/NA

Incubators are monitored for temperature, CO_2 level, and humidity on each day of use.

The SOP manual must specify the allowable limits for each type of culture. Readings must be recorded each day that cultures are incubated. There must be documentation of corrective action if the allowable limits are exceeded.

Evidence of compliance:

✓ Instrument QC records

6. **Tissue processor solutions** Y/N/NA

Solutions are changed as needed. Tissue processor solutions must be changed at intervals appropriate for workload. The settings and solutions of shared processors must be checked before each use.

Evidence of compliance:

✓ Written procedures for a change of solutions based on usage

✓ QC records documented at defined frequency

7. **Tissue processing programs** Y/N/NA

Tissue processing programs are validated.

To validate new processing programs, the research biorepository should run tissue samples of the same size, thickness and fixation in duplicate reagents on the processor(s) should be comparable (eg all fresh reagents). Process, embed, cut, and stain slides at the same time and evaluate the quality of the blocks (eg firmness, ease of cutting). The slides should be evaluated by the pathologist without knowledge of which processing program was used and graded on quality of section and staining. The new processing program must be of equal or better quality before being put into use.

This method may also be used to verify a routine processing program before putting a new processor into production.

Evidence of compliance:

✓ Written SOP for validation of new tissue processing programs

✓ QC records documenting validation

8. **Specific tissue processing programs** Y/N/NA

Specific tissue processing programs are available for different types and sizes of biospecimens.

To achieve acceptable results for diagnostic purposes, processing programs may be needed for different sizes and types of biospecimens. Biopsy biospecimens may be processed on a shorter schedule than larger biospecimens; large, dense or fatty biospecimens and brain biospecimens will not process adequately on a shorter schedule. A variety of processing programs should be used to achieve good processing results.

Evidence of compliance:

✓ Written SOP defining processing programs for various types and sizes of biospecimen tissues

9. **Paraffin bath and dispenser temperature** Y/N/NA

Paraffin baths and dispensers are controlled and maintained.

1. Instruments must be clean and well-maintained.

2. The temperature of the dispenser must be correct for the type of paraffin used.

3. Temperatures are checked regularly and recorded.

The frequency of checks must be determined by the Custodian and/or research biorepository manager.

Evidence of compliance:

✓ Documentation of frequency requirements

✓ Records of temperature checks

10. **Flotation baths** Y/N/NA

Flotation baths are clean and well-maintained, and there is a procedure for preventing cross-contamination of paraffin sections in the bath.

Of particular importance are periodic water changes or blotting of the water surface so that sections from one biospecimen block are not inadvertently carried over to another (so-called ‘floaters’ or ‘extraneous tissue’).

11. **Microtome maintenance** Y/N/NA

Microtomes are clean, well-maintained, properly lubricated, and without excessive play in the advance mechanism.

12. **Cryostat decontamination** Y/N/NA

There is a documented SOP for the decontamination of the cryostat at defined intervals and under defined circumstances, and decontamination records are evident.

The cryostat must be defrosted and decontaminated by wiping all exposed surfaces with tuberculocidal disinfectant. The cryostat should be at room temperature during decontamination unless otherwise specified by the manufacturer. This should be done at an interval appropriate for the institution; this must be weekly for instruments used daily. Trimmings and sections for tissue that accumulate inside the cryostat must be removed during decontamination. Although not a requirement, steel mesh gloves should be worn when changing knife blades.

Completed by: _____

Date: _____

Adapted from National Cancer Institute *NCI Best Practices for Biospecimen Resources Biorepository Checklist.*

Storage equipment

This section of storage equipment for a research biorepository should be based on the type of biospecimen(s) to be stored, the length of time in storage, and the intended use of the biospecimen(s).

Self-audit/review assistance

- Undertake a sampling of biospecimen storage SOPs and preventative and reactive maintenance procedures.
- Review records of storage container calibrations, a sampling of temperature monitoring records.
- Ensure there is adequate space for storage containers, active alarm systems in place, a walk-in storage environment and Liquid Nitrogen (LN_2) tanks, if applicable.
- Identify the process in the event of freezer breakdown.
- Identify the process to prevent overflow of storage containers.
- Identify if a significant loss of samples has been suffered, how this was addressed and what the corrective/preventative actions were that became policy as a result.

1. **Storage equipment calibration/calibration verification** Y/N/NA

   There is a SOP for calibration and calibration verification for all applicable storage equipment.

   The documentation of calibration and calibration verification includes:

   1. Date calibration was performed.

   2. Identity of person who ran the calibration.

   3. Documentation of results.

   4. Name of the device used against which instrument was calibrated.

   Evidence of compliance:

   ✓ Documentation of calibration/calibration verification OR manufacturers' certification of calibration

2. **Temperature set points** Y/N/NA

   High and low temperatures set-points have been established and documented that are appropriate for each storage environment.

   A best practice is to perform and record temperature mapping for each new freezer prior to being placed in service and periodically for freezers currently in service. The frequency of mapping is determined by the Custodian as well as the review of the data generated.

3. **Consistent temperature** Y/N/NA

There is evidence that all temperature-controlled storage units maintain the proper temperature throughout the unit.

On all temperature-controlled storage units, multiple point temperature readings should be taken on a periodic basis to ensure that a required temperature is maintained throughout. There must be documentation that such readings have been taken.

Unrestricted air circulation within the unit reduces the potential for warmer or colder areas that may have detrimental effects on blood/component units without detection by the monitoring system. This requirement also applies to Liquid Nitrogen (LN_2) storage units.

A best practice is to perform and record temperature mapping for each new temperature controlled storage unit prior to being placed in service and periodically for freezers currently in service. The frequency of mapping is determined by the Custodian as well as the review of the data generated.

4. **Refrigerator/freezer temperature Quality Control (QC)** Y/N/NA

Refrigerator/freezer temperatures are checked and recorded daily.

Storage temperature of biospecimens must be appropriate for the type of tissue and its means of preservation. Failure to adhere to requirements could result in a unit not being suitable for the purpose for which it was intended.

This checklist requirement applies to refrigerators/freezers containing reagents or biological specimens. ‘Daily’ means every day (seven days per week, 52 weeks per year). The research biorepository must define the acceptable temperature ranges for these units. If temperature(s) are found to be outside of the acceptable range, the research biorepository must document appropriate corrective action, which may include evaluation of contents for adverse effects.

The two acceptable ways of recording temperatures are: 1) recording the numerical temperature, or 2) placing a mark on a graph that corresponds to a numerical temperature (either manually, or using a graphical recording device). If the records are manually obtained, the identity of the individual recording the temperature(s) must be documented (recording the initials of the individual is adequate).

The use of automated (including remote) temperature monitoring systems is acceptable, providing that biorepository personnel have ongoing immediate access to the temperature data, so that appropriate corrective action can be taken if a temperature is out of the acceptable range.

The functionality of the system must be documented daily.

5. **Walk-in storage criteria** Y/N/NA

Walk-in storage systems should have:

1. Dual compressors.

2. Internal safety release.

3. Non-slip floor covering.

4. Interior oxygen and CO_2 monitoring system, when required.

6. **Freezer preventative maintenance** Y/N/NA

There is a SOP for freezer preventative maintenance.

Regular preventive maintenance is required to keep units functioning properly. Routine cleaning and maintenance should be done by assigned employees according to a Preventive Maintenance Schedule. Actions should be targeted at elimination of the causes of equipment failure and unscheduled interruptions. This activity involves regular, routine cleaning, lubricating, testing, calibrating and adjusting, checking for wear and tear and eventually replacing components to avoid breakdown.

Evidence of compliance:

✓ Record of employees trained to perform preventive maintenance

✓ Results of all preventive maintenance will be recorded

7. **Emergency response plan** Y/N/NA

There is an emergency response plan if acceptable temperature ranges for refrigerators and/or freezers are exceeded.

8. **Biospecimen transfer procedure** Y/N/NA

There is a SOP for maintaining appropriate temperatures in the event of a system failure. There is a plan in place for transfer and back-up storage. For example, having 10% back-up storage containers would be considered best practices for each type of temperature-controlled unit should any one unit suffer an unrecoverable failure. Failure mode analysis should be performed to identify possible root causes of failure. Corrective actions should include service calls to providers for system repair, as applicable. Duration of failure should also be recorded, as well as any potential adverse effects to biospecimens.

Evidence of compliance:

✓ Temperature and alarm records

✓ Updated specimen location records

✓ Corrective action/preventative action documentation

If nitrogen in the liquid phase is used, the following requirements apply.

9. **Liquid nitrogen supplies** Y/N/NA

Adequate liquid nitrogen (LN_2) supplies are maintained onsite if LN_2 is used as refrigerant or coolant for a storage environment.

In general, vapour phase storage is the preferred method over storage in the liquid phase of nitrogen because vapour phase provides sufficiently low temperatures to maintain temperatures below the Tg (glass transition temperature). Storage in the vapour stage also avoids safety hazards inherent in liquid phase storage.

10. **Liquid nitrogen monitoring** Y/N/NA

LN_2 daily usage and LN_2 levels are monitored and documented for each storage container.

The interval for monitoring of usage must be based on the requirements of the instruments.

Evidence of compliance:

✓ Documentation of usage monitoring, as applicable

11. **Storage containers approval** Y/N/NA

All biospecimen storage containers have been approved for use under intended storage conditions.

NOTE: Refer to contact supplier specification sheet for valid use conditions.

Completed by: _____

Date: _____

Adapted from National Cancer Institute *NCI Best Practices for Biospecimen Resources Biorepository Checklist.*

Temperature monitoring and alarms

Self-audit/review assistance

- Review records of traceability to relevant standards and undertake sampling of temperature logs, records of alarm trigger response, alarm system testing records and active alarm systems in place.
- Identify availability of emergency power supply.
- Review SOPs for the trigging of storage container alarms, contingency plans if the alarm system fails and process if a unit cannot maintain appropriate temperature.
- Select a storage container that has had a temperature failure and follow the process from notification to response and final corrective action.

1. **Thermometer** Y/N/NA

   An appropriate thermometric standard device of known accuracy is available.

   Thermometers should be present on all temperature-controlled instruments and environments and checked daily. Thermometric standard devices should be recalibrated or recertified prior to the date of expiration of the guarantee of calibration; documentation of recalibration/certification should be maintained for review.

2. **Non-certified thermometers** Y/N/NA

   All non-certified thermometers in use are checked against an appropriate thermometric standard device before initial use.

3. **Temperature checks** Y/N/NA

   Temperatures are checked and recorded on each day of use, specifying the unit and location for all temperature dependent instruments and equipment.

   Controlled-temperature devices used must have temperatures recorded at least daily for units that are within the prescribed temperature range, and at least every 15 minutes if outside of that range. The two acceptable ways of recording temperatures are 1) recording the numerical temperature, or 2) placing a mark on a graph that corresponds to a numerical temperature (either manually, or using a graphical recording device). The identity of the individual recording the temperature(s) must be documented (recording the initials of the individual is adequate). The use of automated (including remote) temperature monitoring systems is acceptable, providing that biorepository personnel have ongoing immediate access to the temperature data, so that appropriate corrective action can be taken if a temperature is out of the acceptable range. The functionality of the system must be documented daily.

4. **Alarm response time** Y/N/NA

Temperature limits for the alarm are established with consideration for anticipated response time.

5. **Storage temperature deviation SOP** Y/N/NA

There are documented procedures to follow if there are deviations in the storage temperature limits, with an impact assessment when required.

Specific SOPs must be documented and understood by personnel regarding handling biological specimens if storage temperature limits cannot be maintained. The primary concern is the preservation of the biospecimen. If there is a failure, arrangements must be made for service, and for alternative storage.

6. **Emergency power supply** Y/N/NA

Temperature controlled storage equipment have an emergency power supply.

7. **Storage unit alarms** Y/N/NA

There is an audible alarm for each component storage unit, the alarm is continuously monitored 24 hours per day (in the research biorepository or remote), and the response system to an alarm has been validated.

The research biorepository should be able to demonstrate how this system works, and that there is a process to ensure a timely response to an alarm.

Evidence of Compliance:

✓ Written procedure defining criteria for monitoring alarms

✓ Records of response time to the alarm

8. **Alarm system checks** Y/N/NA

Alarm systems functionality is tested (eg alarm triggers, ability to communicate, etc) at specified periodic intervals (no less frequently than quarterly) and results recorded.

Freezer alarms should be tested without taking biospecimens outside their acceptable range. Some ways to perform this testing may include: 1) electronic manipulation of freezer set points to trigger the alarm system, 2) warming or cooling the probe using external measures that do not affect the operating temperature at which the specimens are held, and other acceptable processes.

9. **Alarm sensors to trigger action needed** Y/N/NA

Alarms are adjusted to be triggered before the temperature falls outside the acceptable temperature range.

The research biorepository defines the acceptable range for biospecimen storage.

Evidence of compliance:

✓ Records of trigger temperatures during alarm checks

✓ Records of corrective action, when appropriate

10. **Power failure back-up** Y/N/NA

The alarms will continue to function if the power is interrupted.

Alarm systems must continue to function during a power failure. This may be accomplished by having the alarm on a separate circuit, installing battery power back-up, or having a power failure alarm.

11. **Off-site notification process** Y/N/NA

If the monitoring system allows for off-site notification, there is a:

1. Trained person on-call (24/7) to respond to alarm conditions

2. List of phone numbers or alternate means of contact for trained personnel in case the on-call person fails to respond

12. **Back-up alarm Quality Control (QC)** Y/N/NA

There is a back-up alarm system in place with documentation of regular testing.

13. **Alarm system monitoring**

There is a mechanism for monitoring the alarm system.

14. **Alarm system contingency plan**

There is a contingency plan in place for monitoring if the alarm system fails.

Downtime SOPs should exist and staff should be trained on these procedures. This contingency procedure should be periodically tested.

Completed by: _____

Date: _____

Adapted from National Cancer Institute *NCI Best Practices for Biospecimen Resources* *Biorepository Checklist.*