

Sample Preparation & Processing

Why a specialist approach is essential when it comes to moving samples

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If your laboratory deals with samples and specimens, it is essential that your team has a clear understanding of the optimal conditions for storage.

A change in temperature, exposure to daylight or a sudden physical impact can all potentially jeopardise the integrity of a sample, posing a risk to the research it is being used for. As many samples are kept in small volumes, even short periods of time outside these conditions can cause irreparable damage.

One of the greatest risks to samples occurs when they are being transported to another location. And it is not just long-distance laboratory relocations that pose a challenge for research staff. The integrity of samples could be compromised simply by being taken to another lab in the same building if they are not kept in consistent conditions at all times.

Many laboratory samples must be kept within a specific temperature range, and all parties involved in moving them from one location to another must understand this and help formulate a plan to ensure they remain at the right temperature throughout.

While some samples and specimens only need to be kept at ambient or room temperature, others need to be preserved at lower temperatures. This could involve refrigeration or being kept in either a domestic freezer (-20°C) or a cryogenic freezer (-80°C).

Samples do not respond well to thermal shock, and constant monitoring is needed if samples are being transported, regardless of the distance they are being taken. On even a short move from one laboratory to another, within the same building or campus, there is the possibility that a frozen sample might thaw without anyone noticing, particularly if they are stored in small volumes. This could cause the sample to become damaged or unstable and potentially impact the accuracy of results if it is then used for testing or research purposes.

Using a specialist laboratory relocations company to transport samples and specimens is one way of mitigating these risks and minimising the chance of any items becoming compromised, contaminated, or damaged. When moving any samples, extensive planning is needed to ascertain exactly what the risk factors for each one is.

Where temperature conditions are important, thought must be given to how these will be kept consistent at every stage of the sample's journey from one location to another. In some cases, this can be solved by moving samples and specimens within a refrigerator or freezer and specialist vehicles can be used which allow laboratory appliances to be plugged in and operating while in transit.

Where keeping samples in their original freezer or refrigerator is not practical, suitable insulated containers must be used and dry ice or liquid nitrogen can be used to create the right conditions for samples and specimens which must be kept at very low temperatures. Packaging systems should be precisely pre-conditioned to achieve the correct temperature range before any samples or materials are loaded ready for transportation.

Evidence must also be collected to show that the correct conditions were maintained, both for the research team's peace of mind and to satisfy the demands of quality departments,



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as well as adhering to any relevant regulations. Using a temperature data logger to accurately measure the temperature the samples are being transported in will allow you to monitor the conditions throughout the move and quickly identify any problems as and when they happen.

It will also produce a stream of data that can be kept as evidence if needed. It is important to start using the temperature logger before you begin the process of actually moving the samples. For example, during a move scheduled to start at 10am and estimated to last until 3pm, it would be wise to get the temperature logger running at 9.30am and keep it recording data until everything is in place in the new location.

With photosensitive samples which must be protected from daylight, it is essential that the moving process is planned to minimise the risk of any exposure and that the containers used are suitable for the purpose.

In some cases, samples will need to be kept in strict temperature conditions and will also degrade in daylight. Any relocation company working on a laboratory move should have a detailed conversation with the customer to understand the unique requirements and challenges involved in the process.

Any labelling should include detailed information of any risks posed if someone is exposed to the sample or specimen. If it is a biological agent, this could be an infection risk, and this should be clearly indicated on containers and packaging. If any hazardous materials are involved in your move, a dangerous goods safety advisor (DGSA) must be consulted so they can check that all regulations are being adhered to at every stage.

Plans should be drawn up for each type of sample with a site visit to understand the complexities and identify any potential obstacles in transporting it from its original location to its final destination. Careful handling is also important as physical shock or sudden impact can also compromise the integrity of some samples. Once your samples have reached their destination, it is also vital that care is taken to properly dispose of any specimen transport bags once they have been emptied.

Planning, continuity and evidence are all key elements of any laboratory relocation, regardless of distance. An audit log – a detailed set of chronological records – should

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be kept to demonstrate everything that has happened as part of the relocation process, including any events which could have an impact on the integrity or stability of any samples or specimens.

This audit log or trail can play an important part in making sure that no samples are misplaced or confused for another. Taking time to ensure all samples are correctly labelled before they are moved will help make sure the records kept are accurate and that everything ends up exactly where it needs to be.

There may also be chain of custody procedures to follow. A chain of custody documents the journey of a sample from the point it is accepted by the laboratory right up until its eventual disposal. A successful chain of custody safeguards the validity of the results of any testing and is considered essential for results that could form a part of any court proceedings, for example, a drug or alcohol test or legal DNA testing.

If any sample is compromised and not kept in optimal conditions, it is likely it would have to be thrown away and the process would have to start again. Depending on the type of sample, this could be a very time-consuming and expensive issue and could cause major delays in any research.

Earlier in my career, I worked in research myself and experienced issues with samples being delivered to my laboratory using a standard courier. I have personal experience of important samples which needed to be kept refrigerated being left on a reception desk so, by the time they reached me, there was no option but to dispose of them as they had been compromised.

When choosing a company to transport your samples from one location to another, it is important to find out whether they have experience in laboratory relocations. Does the

team which will be moving the samples understand the complexities involved and will they be using validated temperature-controlled solutions which meet GxP compliance standards?

How long will any specialist packaging be validated for and what steps will they be taking to monitor conditions in-transit and collect any data needed for auditing purposes? The systems used by Aport are validated for up to 220 hours and are designed with the specific relocation project in mind. Where relocations involve another country, cross-hemisphere IATA compliant packaging is used to overcome any ambient temperature challenges.

If the samples are to be transported by vehicle, it is essential to find out how the journey itself will be monitored as any unexpected delays could cause issues. At Aport, we address this issue by using road vehicles that are fitted with tracking devices. This allows us to continually track the progress of materials and collect data for auditing purposes.

International relocations pose the additional challenge of securing customs clearance, so your items are not held up by border control. Consulting an expert on the paperwork required for each country your samples will pass through is important. Incorrect or incomplete paperwork can lead to delays and financial penalties and could prevent your samples from making it to their destination at all.

Although it may be tempting to move samples and specimens yourself in a bid to save time and money, this can be a false economy if the integrity of materials ends up being compromised or your organisation faces penalties for not adhering to regulations. Taking time to understand the complexities involved in the movement of any laboratory samples and consulting an expert can help you avoid serious difficulties in the future.