Document Title: Pipetting

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Summary of Amendments

Version Number	Modification:
v2.0	**Risk Assessment in Appendix removed** **Reference added to RAC/RD/TBR/021 in Key Related Documents**
V1.0	**New SOP**

Key related documents:	Trust Policy DN001 Document Control Procedures Risk Assessment RAC/RD/TBR/021

Key Points of this Document

1 Purpose and Contents

a. To ensure accuracy and precision pipettes must be handled with care and maintained regularly.

b. Air displacement pipetting is highly accurate for standard pipetting applications. However, conditions, such as atmospheric pressure as well as the specific gravity and viscosity of the solution, may affect the performance of air displacement pipettes.

2 Roles & Responsibilities

a. A pipette use should only be performed by individuals fully trained by a competent member of the R and D team.

b. Following a period of supervision (depending on the individual needs of the trainee) there will be an informal assessment.

3 Policy

a. This SOP is mandatory and, as per the Trust's Information Governance and Records Management framework, non-compliance with it may result in disciplinary procedures.

4 Procedure

a. Types of Pipettes

1. Gilson and similar models

Most common pipette used in most applications.

Figure 1:

2. Disposable/Transfer Pipette- Pasteur Pipettes

This is the most basic type of pipette; and can be used for rough measurements only. Always use a new pipette and dispose of it after use either in a biohazard bin or a sharps bin.

- Aspirate liquid at a 90-degree angle.
- Dispense at a 45-degree angle.
- Touch off to make sure all the liquid is dispensed.

3. Finnpipette C1/pipette boy and similar model

Serological pipettes are used in cell and tissue culture applications and in general laboratory liquid dosage, when over one ml volumes are pipetted. Serological pipettes are made of glass or polystyrene. Plastic, disposable pipettes are useful in applications where sterility is

a requirement. The speed of both aspiration and dispensing can be adjusted separately to work with a variety of liquids. A pump or a pipette controller is used to draw up liquid. Measure solution from the bottom of the meniscus, the crescent-shaped surface of the liquid that is visible in the pipette.

Figure 2

b. Pipette Tips

1. There are both standard and multi-purpose tips for the use of laboratory applications with varying performance requirements ranging from very high accuracy to reagent dispensing with greater tolerance. Sterile standard tips are available for applications demanding the highest level of purity from pathological microorganisms.
2. Tips may also have filters which are used when processing samples for molecular work.
3. Make sure to use the correct size tip for the pipette you are using. Tips come in different sizes to accommodate the difference ranges of volumes the pipette is used for.
4. To fit a disposable pipette tip, hold the micropipette in one hand, lower the pipette into the tip, and use a slight twisting movement to seat the tip firmly on the tip holder of the micropipette to ensure an air-tight seal.
5. To manually fit a disposable tip, hold the pipette in one hand and use a slight twisting movement to seat the tip firmly on the shaft of the micropipette and to ensure an air-tight seal.
6. To avoid touching contaminated tips, hold the pipette over the waste container and press the tip ejector push-button. Eject the used tip and store the pipette in an upright position.

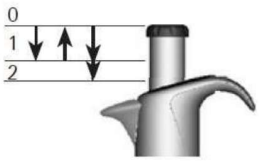
7. To protect your pipette, avoid tapping the tip onto the pipette like a hammer. Tips are available in TIPACK racks for easy mounting
8. Always eject used tips. The residual liquid can damage your pipette.

c. Adjusting the volume for a Gilson pipette

1. Check the volume range on the top of the thumbwheel before adjusting to the desired volume within these parameters. The volume is set by turning the thumbwheel or the push-button. The push-button makes it easier and quicker to set volumes, especially when wearing gloves. The thumb wheel may be turned to slowly reach the required setting.
2. To avoid internal damage to your pipette, never attempt to force the volume setting beyond the limits. If the dial is difficult to move, you may have reached the limit. Check before twisting further. If a number is displayed in red the pipette is out of range.

d. Pipetting technique- Forward pipetting

Figure 4



1. Fit the tip onto the pipette tip cone.
2. Press the operating button to the first stop.
3. Place the tip just under the surface of the liquid (2-3mm) and smoothly release the operating button up to the starting position.
4. Wait one second.
5. Carefully withdraw the tip from the liquid, touching against the edge of the container to remove excess from the outside of the tip.

e. Cleaning of the outer surface of the pipette

1. Remove Tip-Holder and Tip-ejector.
2. Keep the tip-ejector button depressed and grip the top of the tip-ejector with the other hand.
3. Gently rotate the tip-ejector counter-clockwise and separate its connector from the operating rod.
4. Pull the tip-ejector away from the body of the pipette.
5. Wipe the tip ejector with a soft-cloth or lint-free tissue lightly coated in 70% alcohol solution.

6. Wipe all exposed surfaces of the body, button, operating rod, and tip holder with a soft-cloth or lint-free tissue lightly coated with the alcohol solution.
7. Remove all scuff and wear marks.
8. Remove build up in concave surfaces.
9. If the pipette is very dirty, a brush with soft plastic bristles may be used.
10. Refit the tip ejector and allow the pipette to dry.
11. Wipe outer surfaces with a soft-cloth or lint-free tissue lightly coated with the 70% alcohol solution to remove any remaining residue from cleaning.
12. Allow time for alcohol to evaporate.

f. Testing performance

If you are worried about the accuracy of the pipette, use distilled water and weigh out the total volume it dispenses. Repeat this 10 times to get an average. If the pipette is not measuring accurate volumes, please inform a member of staff so the pipette can be taken out of use until recalibrated.

4.2 Servicing

a. Pipettes in use should be serviced every 2 years.

b. Pipettes need to be decontaminated/ cleaned with 70% alcohol or a clinell wipe. A DN418 Decontamination form (or service company specific form) must be filled in to give to the engineer. Include a list of pipettes (make and model) that require servicing.

c. All tips that being used for the pipettes must be provided to complete calibration.

d. Electronic pipettes must be charged prior to servicing.

5 Health and Safety using a Pipette

5.1 COSHH

a. Staff members need to read all COSHH forms relating to chemicals used to clean centrifuge These include: Clinell wipes and or 70% alcohol.

6 Risk Management / Liability / Monitoring & Audit

a. The R&D SOP Committee will ensure that this SOP and any future changes to this document are adequately disseminated.

b. The R&D Department will monitor adherence to this SOP via the routine audit and monitoring of individual clinical trials and the Trust's auditors will monitor this SOP as part of their audit of Research Governance. From time to time, the SOP may also be inspected by external regulatory agencies (e.g. Care Quality Commission, Medicines and Healthcare Regulatory Agency).

c. In exceptional circumstances it might be necessary to deviate from this SOP for which written approval of the Senior R&D Manager should be gained before any action is taken. SOP deviations should be recorded including details of alternative procedures followed and filed in the Investigator and Sponsor Master File.

d. The Research and Development Directorate is responsible for the ratification of this procedure.

Further Document Information

Approved by: *Management/Clinical Directorate Group*	Research and Development Directorate
Approval date: *(this version)*	Current approved version date
Ratified by Board of Directors/ Committee of the Board of Directors:	STET
Date:	N/A
This document supports: *Standards and legislation*	Medicines for Human Use (Clinical Trials) Regulations 2004 and all associated amendments. UK Policy Framework for Health and Social Care Research (2023)

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Groups	Disability	Race	Gender	Age	Sexual orientation	Religious & belief	Other
Yes/No	NO	NO	NO	NO	NO	NO	NO
Positive/Negative							

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