Generic Report 2026

TECHNICAL MODULE IAPMD QAP 2026

Prepared by

Technical Module IAPMD QAP Organiser

TM26-1 : Processing, Sectioning and H&E Staining

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TM26-2 : Ziehl-Neelsen Stain

Registration and Acceptance Status of TM IAPMD QAP 2026

Registration for the TM IAPMD QAP 2026 programme was managed by Innovz Sdn. Bhd**.** A total of 23 Anatomic Pathology laboratories registered for participation; however, two laboratories subsequently withdrew due to financial constraints. Consequently, 21 laboratories participated in TM26-1, and 19 laboratories participated in TM26-2. Participating laboratories comprised 17 Ministry of Health Malaysia hospital laboratories, three university teaching hospital laboratories, and one private laboratory.

The programme comprised two modules: TM26-1 (tissue processing, sectioning, and Haematoxylin and Eosin staining) and TM26-2 (Ziehl–Neelsen staining). All participating laboratories submitted the required questionnaires and appropriate tissue specimens for the respective modules, with complete compliance to the requirements.

Instructions To Participants

Code	Exercise	Clinical Notes
TM26-1	Processing, Sectioning, Haematoxylin and Eosin (H&E) staining	• Tissue type: skin • Appropriate tissue section size
TM26-2	Ziehl-Neelsen staining	• Tissue type: known-positive control tissue block/ section

Participants were provided with detailed instructions before commencement of the external quality assessment (EQA) exercise. The programme comprised two modules: TM26-1 (Tissue Processing, Sectioning and Haematoxylin and Eosin Staining) and TM26-2 (Ziehl–Neelsen Staining). Both modules were required to be performed using formalin-fixed, paraffin-embedded (FFPE) tissue sections.

Participants were instructed to process the assessment specimens together with their routine laboratory workload to ensure that the submitted slides reflected their standard laboratory practice. They were also required to adhere strictly to the specified tissue type and dimensions outlined in the clinical notes provided for each exercise. To maintain anonymity throughout the assessment process, participants were advised not to affix labels or stickers containing institutional or organisational identifiers to the submitted slides.

Slide Labelling and Submission

Participants were required to label all submitted slides with their participant identification number and the appropriate exercise code, while ensuring that no institutional or organisational identifiers were displayed to maintain anonymity. Detailed examples of the required slide labelling were included in the exercise instructions circulated via email prior to the commencement of the assessment.

Questionnaires were submitted electronically via the designated Google Form. Slides were securely packaged, labelled *"Glass slides – For educational purposes only"***,** and submitted to the TM IAPMD QAP Office by the specified closing date. A dedicated programme email address (tmiapmd@gmail.com**)** was provided to facilitate technical enquiries throughout the assessment period.

Assessment Criteria

Submitted materials will be evaluated according to the following criteria:

Processing, Sectioning and H&E Staining (TM26-1)	Ziehl Neelsen Stain (TM26-2)
Processing and Sectioning 1. Preservation of overall tissue architecture, including nuclear and cytoplasmic detail. 2. Appropriate section thickness 3. Absence of sectioning artefacts (e.g., knife lines, chatter, compression, over-expansion). 4. Absence of air bubbles and excess mounting medium. 5. Absence of processing artefacts related to dehydration, clearing, and mounting. **H&E Staining** 1. Effective demonstration of nuclear features (nuclear membrane, nucleoli, chromatin pattern in vesicular and hyperchromatic nuclei). 2. Effective demonstration of non-nuclear components (e.g., cytoplasm, connective tissue fibres, skeletal and smooth muscle, erythrocytes where present). 3. Adequate contrast between haematoxylin & eosin. 4. Uniform staining quality across the entire slide. 5. Absence of contaminants.	1. Effective differential staining of acid-fast bacilli within the provided tissue section. 2. Acid-fast organisms are clearly visualised and readily identifiable against the background tissue. 3. Counterstain is appropriate, complementary, and does not obscure acid-fast organisms or relevant tissue structures. 4. Overall staining quality is suitable for diagnostic interpretation and reporting. 5. Uniformity of staining across the slide. 6. No significant artefacts related to processing, dehydration, clearing, mounting, or contamination.

Assessment result (Total mark out of 5):

- Unsatisfactory < 2.5
- Borderline 2.5 - 2.9
- Satisfactory > 3

Questionnaire analysis of TM-26-1

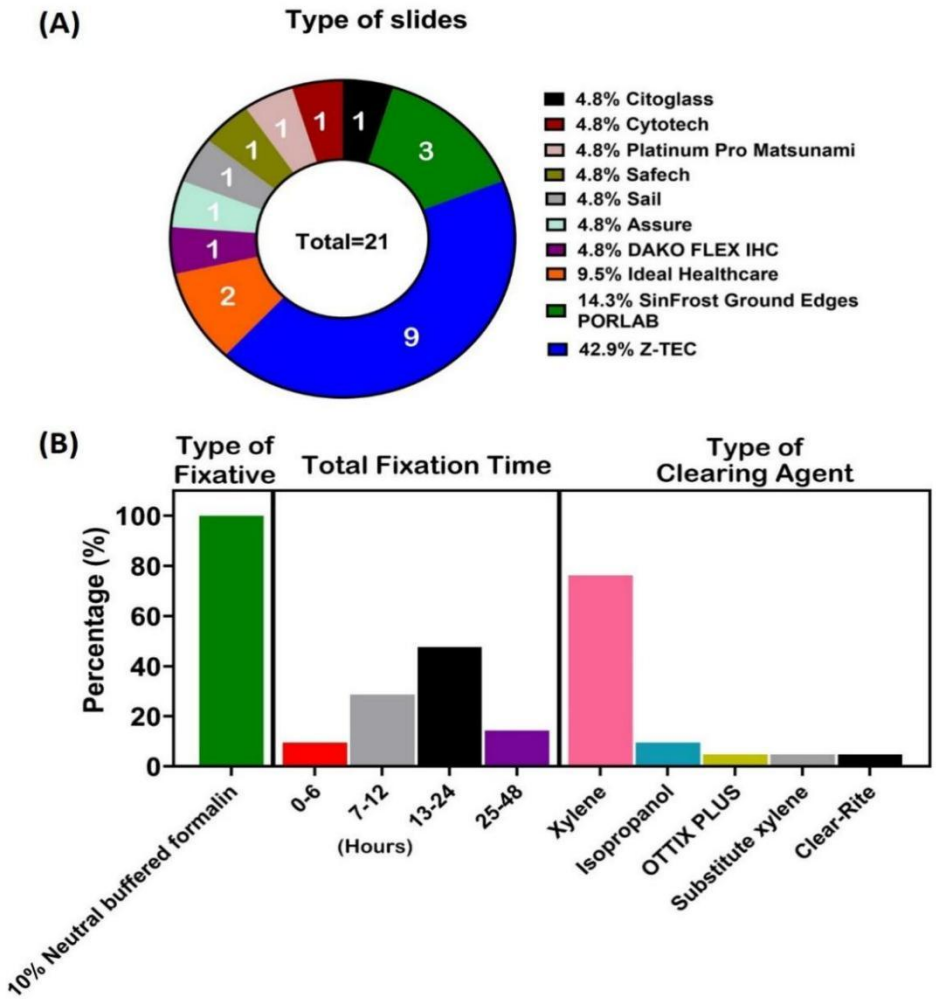

Figure 1: Responses to the Questionnaires on Type of Slides and Tissue Fixation Process.

Pie and bar charts showing the survey results from 21 laboratories comprising of (A) type of slides; (B) i) type of fixative applied; ii) total fixation time; and iii) type of clearing agent used.

Summary notes:

1. Z-TEC was the preferred glass slide brand, used by 42.9% of participating laboratories.
2. 10% neutral buffered formalin remained the standard fixative for tissue processing among most laboratories.
3. Most laboratories reported fixation durations of more than 13 hours before tissue processing.
4. Xylene continued to be the predominant clearing agent used during tissue processing.

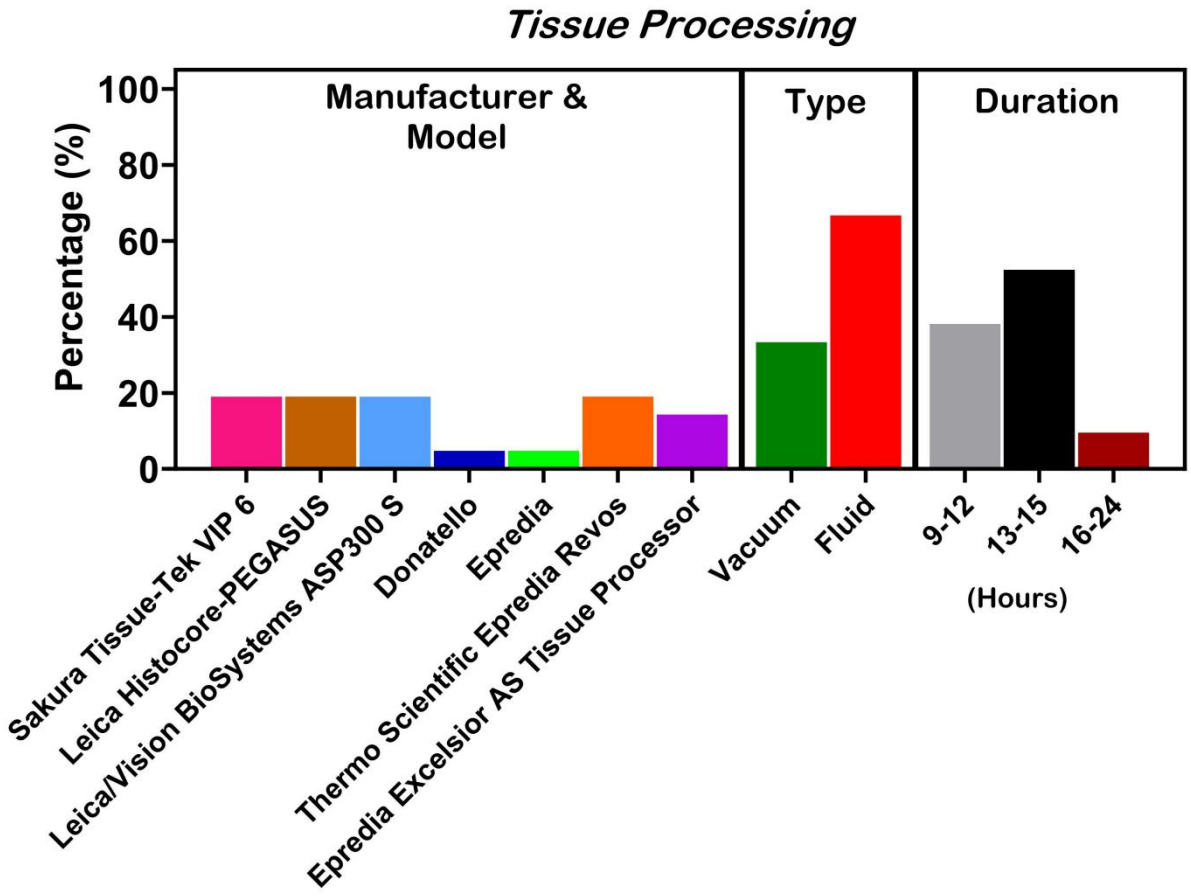

Figure 2: Responses to the Questionnaires on Tissue Processing

Bar charts showing the survey results from 21 laboratories comprising of (i) the model of tissue processors used; (ii) type and (iii) duration of tissue processing.

Summary Notes:

1. Four tissue processor models - the Sakura Tissue-Tek VIP 6**,** Leica Histocore PEGASUS**,** Leica/Vision BioSystems ASP300S, and Thermo Scientific Epredia Revos, were equally the most frequently used, each representing 19% of the participating laboratories.
2. The fluid transfer method was the predominant tissue processing technique, adopted by 66.7% of participating laboratories.
3. More than half of the participating laboratories processed tissues for 13–15 hours**.**

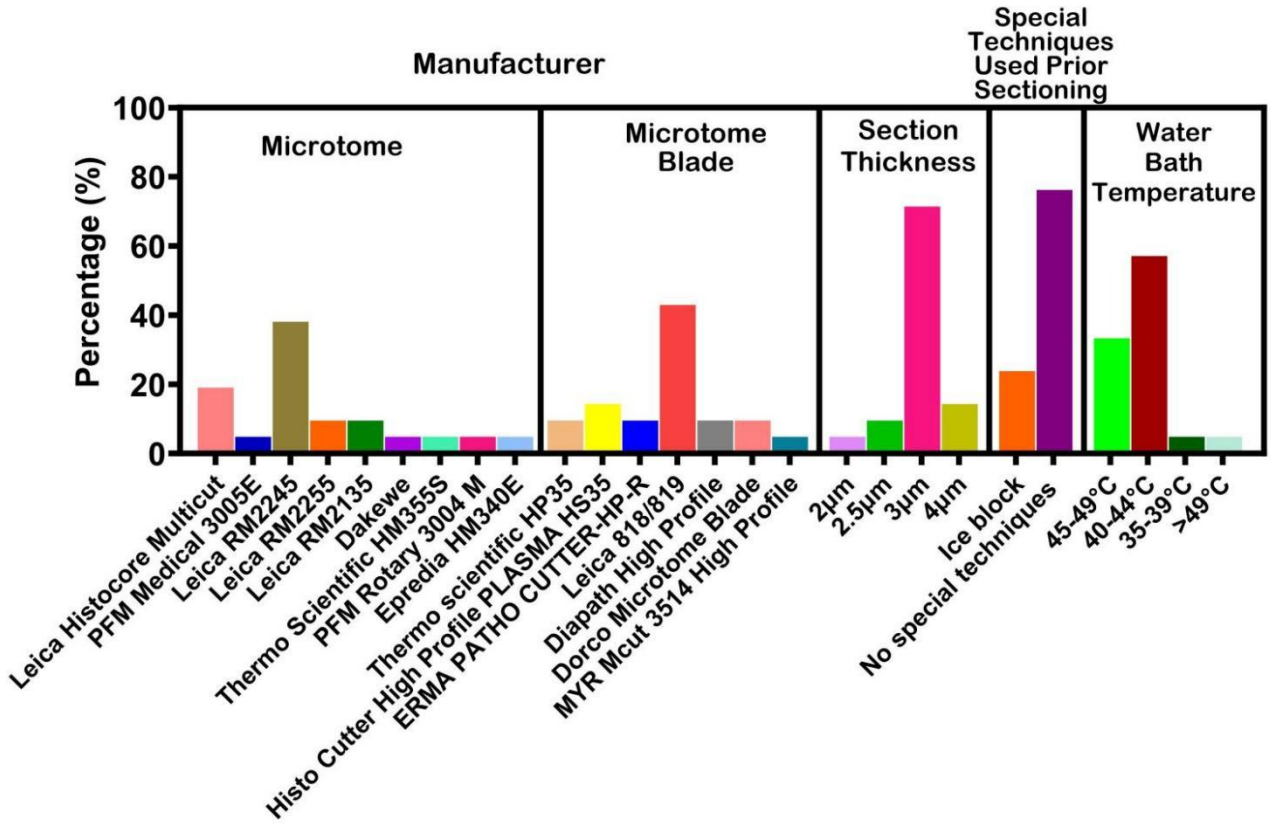

Figure 3: Responses to the Questionnaires on Tissue Sectioning

Bar charts illustrating the survey responses from 21 participating laboratories, showing (i) microtome model and microtome blade brand used; (ii) section thickness; (iii) special techniques employed prior to sectioning; and (iv) water bath temperature used during tissue fishing.

Summary Notes:

1. The Leica RM2245 was the most frequently used microtome model (38.1%**),** while the Leica 818/819 was the most commonly used microtome blade brand (42.9%).
2. A section thickness of 3 µm was the preferred choice among participating laboratories
3. The majority of laboratories (76.2%) did not employ any special techniques prior to tissue sectioning, while 23.8% used ice block treatment.
4. More than half of the participating laboratories (57.1%) maintained the water bath temperature between 40°C and 44°C during tissue fishing.

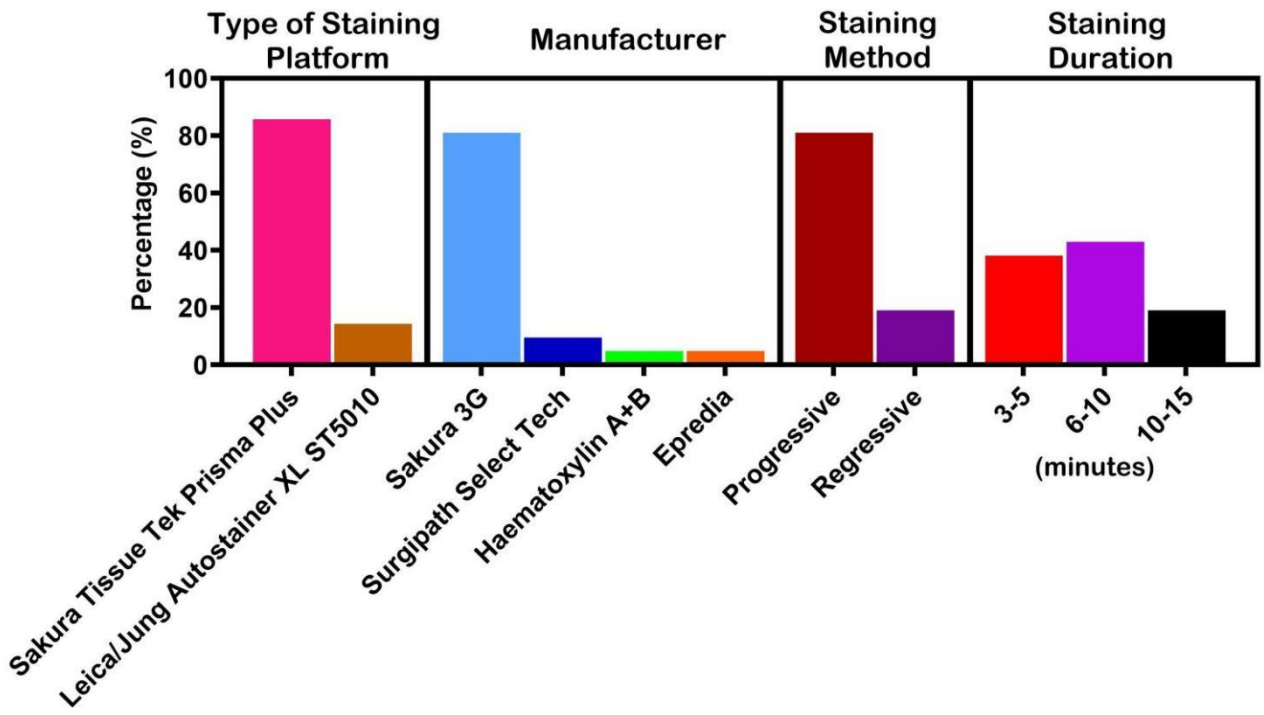

Figure 4: Responses to the Questionnaire on Haematoxylin in H&E Staining

Bar charts showing the survey results from 21 laboratories comprising of (i) type of staining platform; (ii) manufacturer of haematoxylin staining solution; (iii) staining method; and (iv) haematoxylin staining duration.

Summary Notes:

1. The Sakura Tissue-Tek Prisma Plus **(**85.7%**)** was the predominant staining platform, followed by the Leica/Jung Autostainer XL ST5010 **(**14.3%**).**
2. Sakura 3G was the most commonly used haematoxylin staining solution, accounting for 81.0% of reported usage.
3. The progressive staining method was the preferred approach for haematoxylin staining among participating laboratories.
4. The most commonly reported haematoxylin staining duration was 6–10 minutes**.**

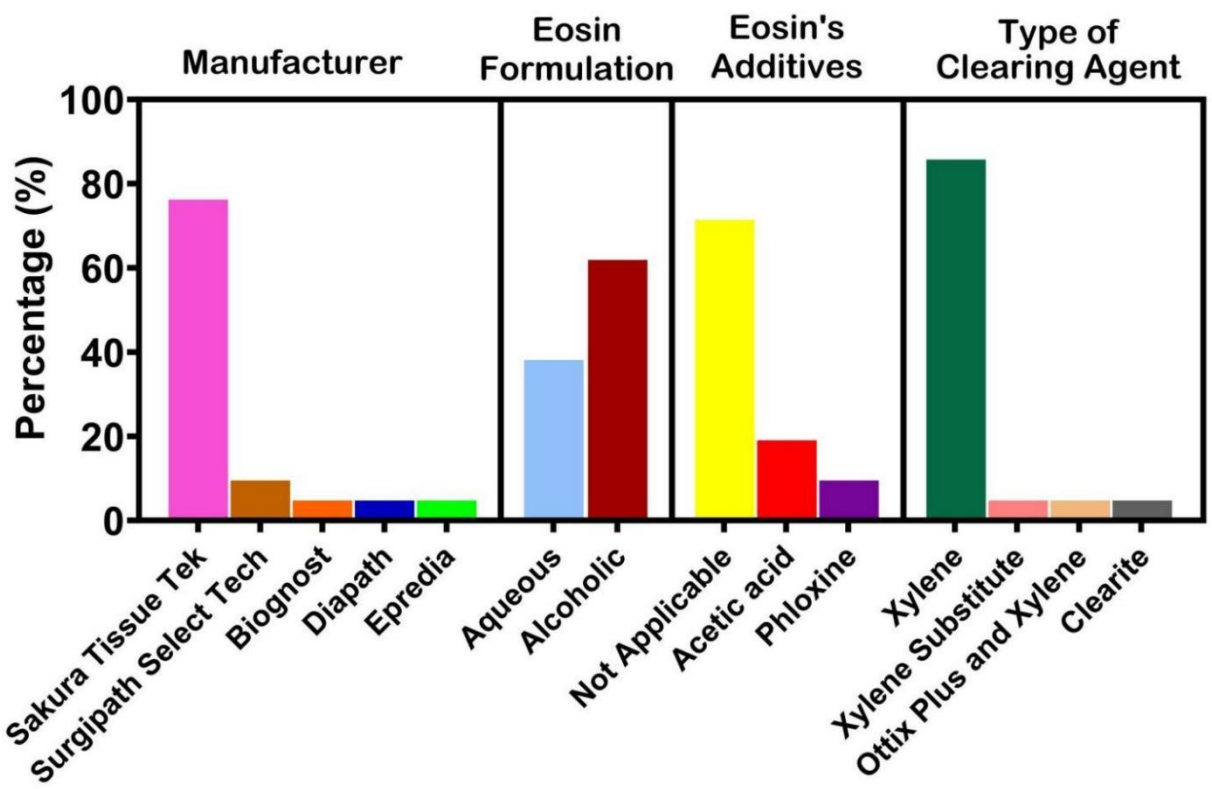

Figure 5: Responses to the Questionnaire on Eosin in H&E Staining

Bar charts showing the survey results from 21 laboratories comprising of (i) manufacturer of eosin staining solution; (ii) eosin formulation; (iii) eosin's additive; and (iv) type of clearing agent used.

Summary Notes:

1. Sakura Tissue-Tek was the most commonly used manufacturer of eosin staining solution, accounting for 76.2% of reported usage.
2. Alcohol-based eosin formulations were preferred over aqueous formulations.
3. Most participating laboratories (71.4%) did not use eosin additives; the remainder used acetic acid or phloxine**.**
4. Xylene was the preferred clearing agent for H&E staining.

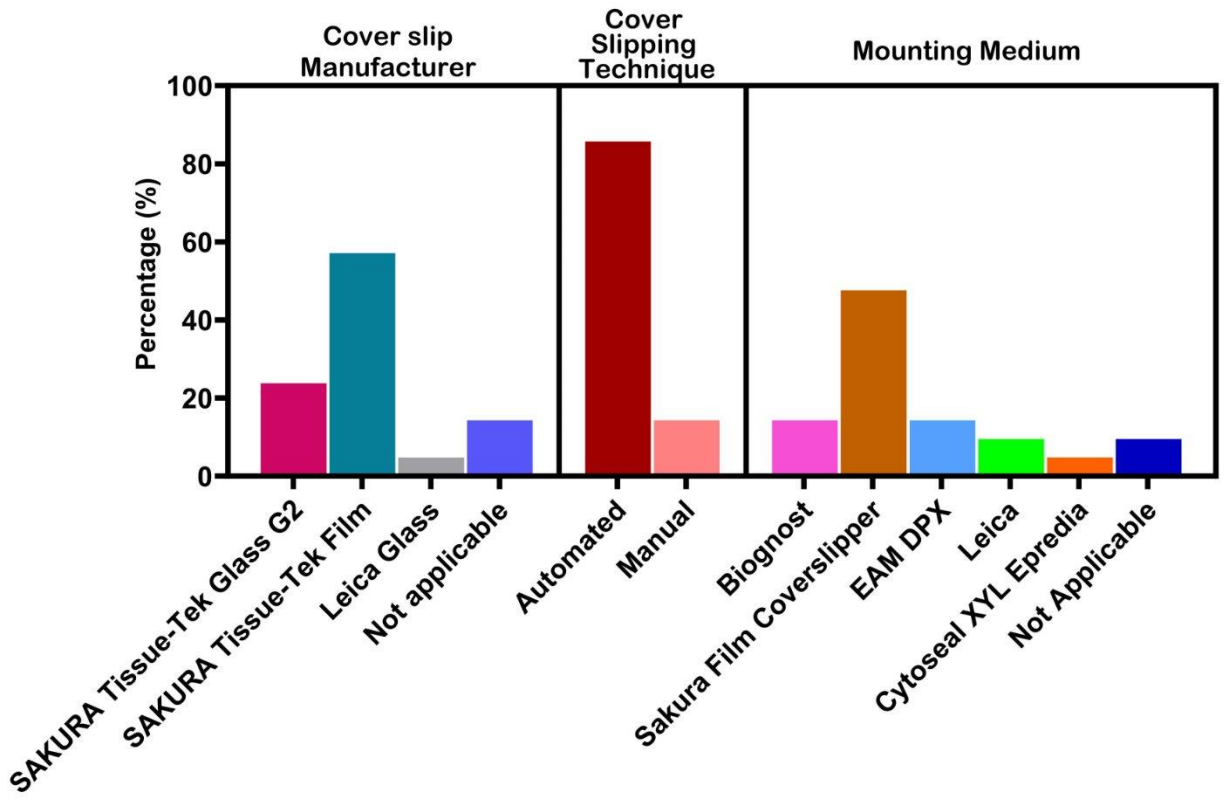

Figure 6: Responses to the Questionnaire on Slide Mounting

Bar charts illustrating the survey responses from 21 participating laboratories, showing: (i) coverslip manufacturer; (ii) coverslipping technique; and (iii) mounting medium/system used.

Summary Notes:

1. SAKURA Tissue-Tek Film was the most commonly used coverslip, accounting for 57.1% of participating laboratories.
2. Automated coverslipping was employed by the majority of laboratories (85.7%)
3. The Sakura Film Coverslipper system was the most commonly used mounting method (47.6%), while EAM DPX was the most frequently used conventional mounting medium (14.3%).

Figure 7: Technical Assessment of Tissue Processing and H&E Staining Quality

Pie charts illustrating the technical assessment results for tissue processing, sectioning, and H&E staining quality from 21 participating laboratories.

Summary Notes:

1. All participating laboratories achieved satisfactory scores for tissue processing and sectioning, with scores ranging from 3.3 to 4.4.
2. All participating laboratories also achieved satisfactory scores for H&E staining quality, with scores ranging from 3.1 to 4.5.

Questionnaire analysis of TM26-2

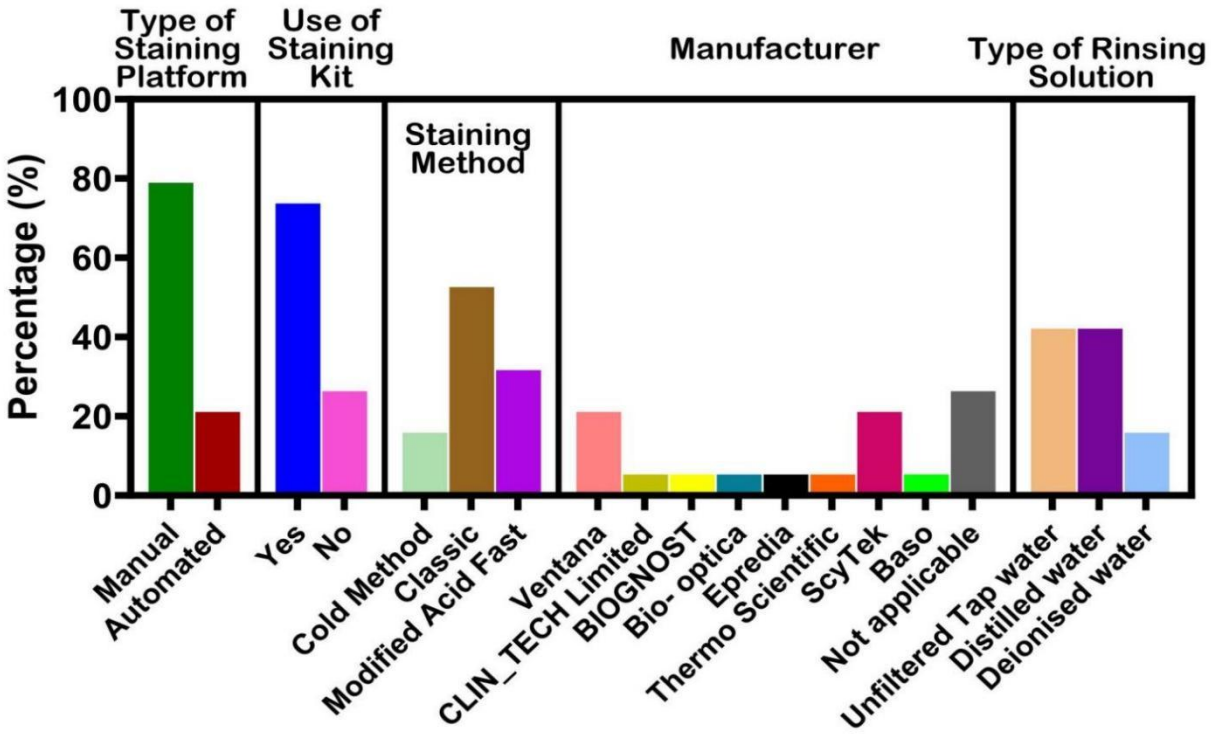

Figure 8: Responses to the Questionnaire on Ziehl–Neelsen Staining

Bar charts illustrating the survey responses from 19 participating laboratories, showing: (i) staining platform; (ii) use of a staining kit; (iii) staining method; (iv) manufacturer of the staining kit; and (v) rinsing solution used.

Summary Notes:

1. Manual Ziehl–Neelsen staining was the predominant method, performed by 78.9% of participating laboratories, while 21.1% used automated staining platforms.
2. The majority of participating laboratories (73.7%) used commercial staining kits for Ziehl–Neelsen staining.
3. The classic Ziehl–Neelsen method was the most commonly used staining technique, adopted by 52.6% of participating laboratories.
4. Distilled water and unfiltered tap water were equally the most commonly used rinsing solutions, each reported by 42.1% of participating laboratories.

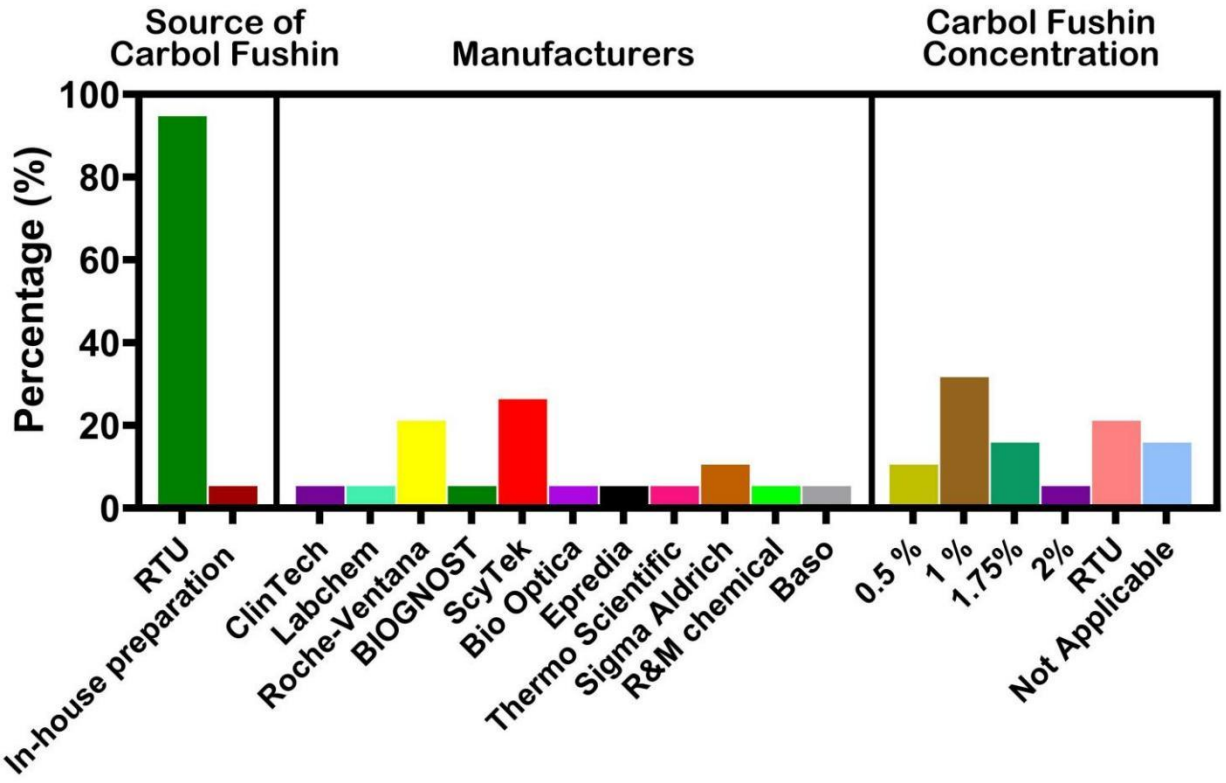

Figure 9. Responses to the Questionnaire on Reagents Used in Ziehl–Neelsen Staining

Bar charts showing the survey results from 19 laboratories comprising of (i) source of Carbol Fushin; (ii) manufacturer of Carbol Fushin used; and (iii) Carbol Fushin concentration.

Summary Notes:

1. The majority of participating laboratories (94.7**%**) used ready-to-use (RTU) carbol fuchsin for Ziehl–Neelsen staining.
2. The two most commonly used manufacturers of carbol fuchsin were ScyTek (26.3**%**) and Roche-Ventana (21.1%).
3. A 1% carbol fuchsin concentration was the most frequently used (31.6%), followed by RTU formulations (21.1%) and 1.75% carbol fuchsin (15.8%).

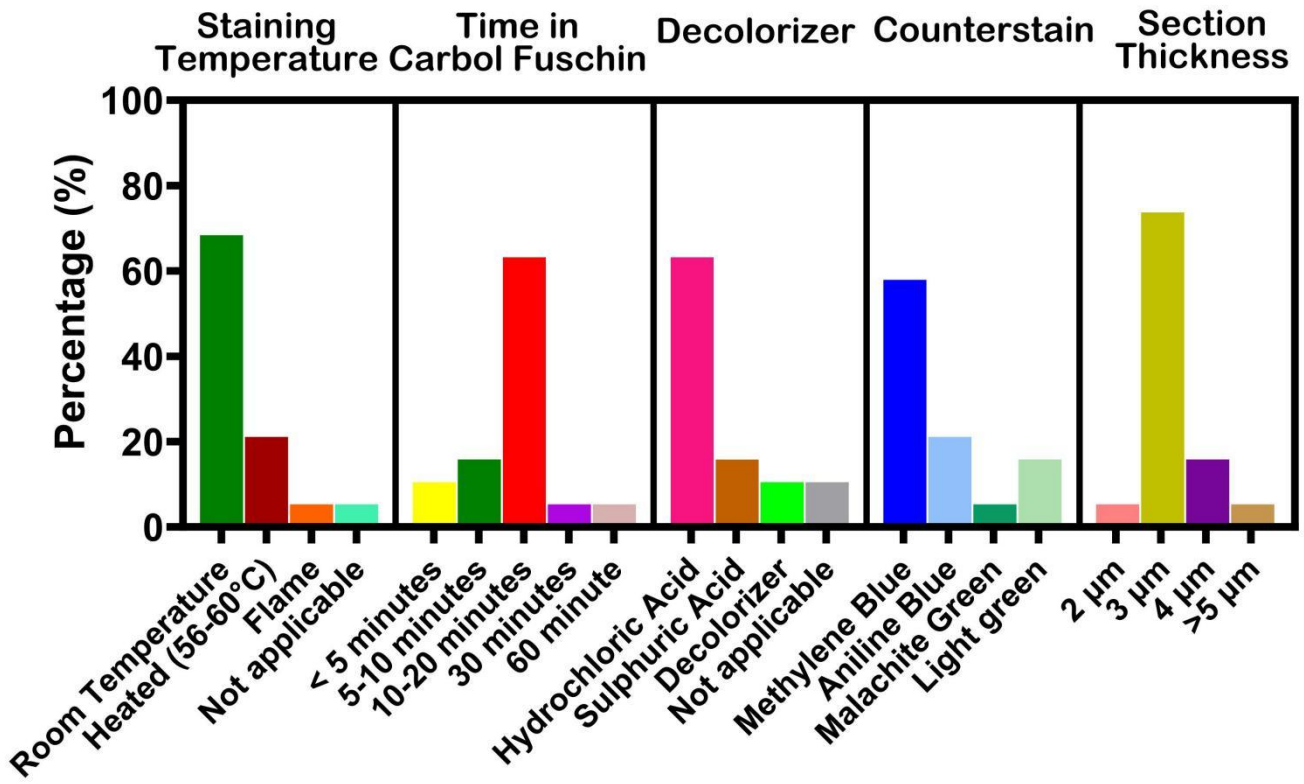

Figure 10: Responses to the Questionnaire on Ziehl–Neelsen Staining Parameters

Bar charts illustrating the survey responses from 19 participating laboratories, showing**:** (i) staining temperature; (ii) carbol fuchsin staining duration; (iii) decolourising agent used; (iv) counterstain used; and (v) tissue section thickness.

Summary Notes:

1. Room temperature was the predominant staining condition (68.4%) among participating laboratories. Nevertheless, slides prepared using the heated Ziehl–Neelsen method generally demonstrated superior acid-fast bacilli staining intensity and contrast during technical assessment.
2. The majority of participating laboratories (63.2%) stained sections in carbol fuchsin for 10–20 minutes**.**
3. Hydrochloric acid was the most commonly used decolourising agent, employed by 63.2% of participating laboratories.
4. Methylene blue was the preferred counterstain, used by 57.9% of participating laboratories**.**
5. A section thickness of 3 µm was the most commonly used (73.7%), while relatively few laboratories used 4 µm or other section thicknesses.

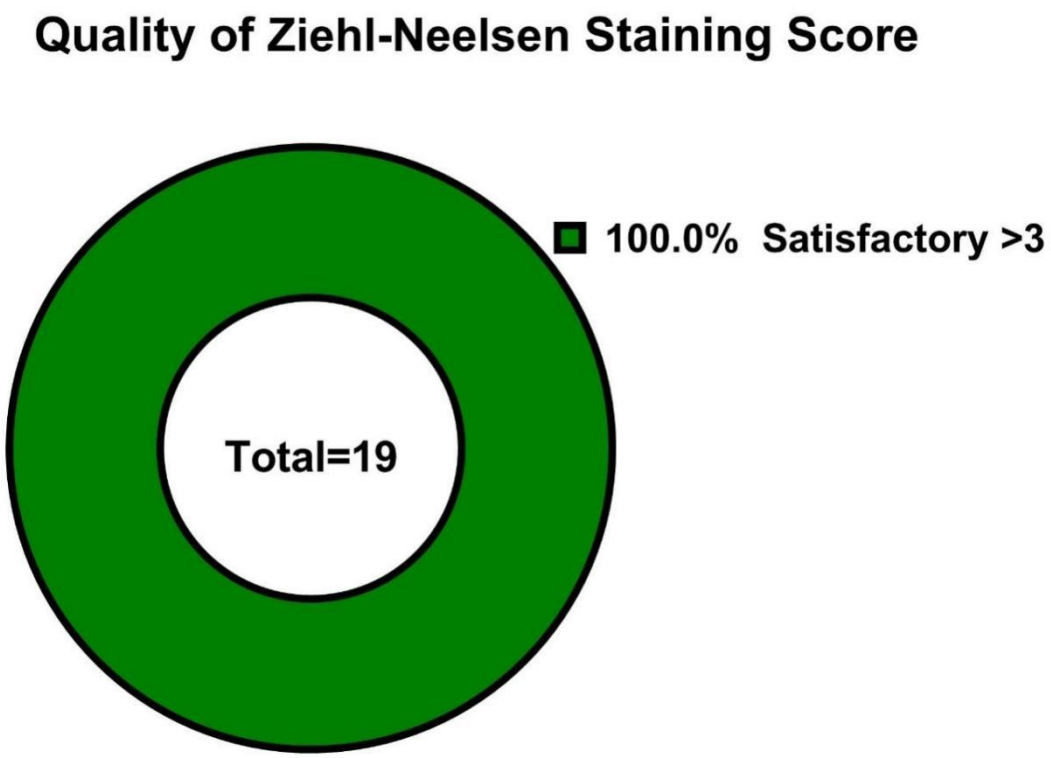

Figure 10: Technical Assessment of Ziehl–Neelsen Staining Quality

Pie chart illustrating the technical assessment results for Ziehl–Neelsen staining quality from 19 participating laboratories.

Summary Notes:

Overall, all participating laboratories met the satisfactory performance criteria for Ziehl–Neelsen staining, with no laboratory falling within the borderline or unsatisfactory categories.