WHITE PAPER

Staff Turnover in Pathology Labs: How Digital Pathology Reduces Training Burden and Dependency on Key Personnel

Every pathology lab has at least one person whose departure would cause a service disruption. Usually more than one. The question for a lab manager is not whether staff will leave. The real question is whether the laboratory's workflows are robust enough to absorb that departure without creating a diagnostic crisis.

There is a specific category of operational risk that does not appear prominently in laboratory budget reviews or accreditation inspections, but that every experienced lab manager understands with uncomfortable clarity: key person dependency. The experienced histotechnologist whose knowledge of the accessioning system is not documented anywhere. The scanning operator who knows the workarounds for the instrument's quirks because they have been using it for seven years. The supervisor who manages case assembly for the MDT because no one else has learned the process. When any of these people leave, whether through retirement, resignation, or illness, the laboratory does not simply lose a resource. It loses tacit knowledge that cannot be rehired.

The pathology workforce context makes this risk immediate rather than theoretical. A systematic review of the global pathology workforce found structural pressures that are deepening: declining numbers in many regions, an ageing workforce concentrated in experienced senior roles, and insufficient training pipeline capacity to replace departing personnel at equivalent expertise levels (Walsh & Orsi, 2024). The laboratory manager's operational challenge is not managing a single departure event, it is managing an ongoing succession of departures in a context where the pool of experienced replacements is smaller than the pool of vacancies.

Digital pathology infrastructure does not solve the workforce shortage, but it does change what staff departures cost a laboratory. For labs that still rely on glass slide workflows dependent on individual expertise, the need to reduce that dependency is becoming increasingly urgent.

The Anatomy of Key Person Dependency in a Glass Slide Workflow

Manual glass slide workflows create concentrations of tacit knowledge that are structurally different from those in automated digital workflows. In a glass slide environment, experienced staff develop highly specific, largely undocumented competencies: the precise hand pressure required for optimal sectioning, the instrument-specific troubleshooting sequences for their particular microtome, the institutional conventions for case assembly that evolved informally over years, and the QC judgement that comes from having seen thousands of slides and learned to recognize suboptimal preparation before it reaches the pathologist.

A 2022 study examining pathologist workload, work distribution, and significant absences or departures (SADs) at regional hospital laboratories found that high individual workload and work maldistribution were associated with higher departure rates. This suggests that laboratories most reliant on specific individuals also tend to be the ones most at risk of losing them (Bonert et al., 2022). The concentration of institutional knowledge and the concentration of workload burden are not independent. They compound each other.

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The training implication is equally significant. When an experienced histotechnologist leaves a glass slide laboratory, the replacement cycle involves more than recruiting a new person, which may already take months in a constrained labor market. It also requires rebuilding the tacit knowledge that left with that employee. A study of pathology staff experiences during digital transformation found that the duration of training required for new staff was one of the most frequently cited operational concerns, and that the training burden per person was substantially higher in manual workflows than in digital ones (Koefoed-Nielsen et al., 2024).

The Operational Impact of Lab Staff Turnover in Pathology

13%-16%

Annual significant absence/departure rate

A published study of regional hospital pathology laboratories found significant absence or departure (SAD) rates of 13–16% per year among pathology staff. For a department of 20 staff, this represents 2–3 departures annually — each requiring knowledge transfer and training reinvestment. (Bonert et al., 2022)

What Digital Workflows Change About Staff Dependencies

A digital pathology workflow does not eliminate the need for skilled staff. It changes the distribution of where skill is required, what can be standardized, and what can be monitored and recovered when things go wrong. These are not minor improvements. For a lab manager focused on operational resilience in a workforce with annual turnover rates of 13–16%, they represent a fundamental change in how work is managed.

In a well-implemented digital workflow, a significant proportion of the tacit knowledge embedded in glass slide handling is replaced by automated, documented, and monitorable processes. Sample detection algorithms identify tissue position for scanning without requiring operator judgement. Automated QC systems flag focus issues and trigger rescan without requiring an experienced eye to catch suboptimal images. Barcoded case assembly is performed automatically by the LIS rather than by a technician who learned the institutional protocol informally. The Schwen et al. (2023) comprehensive review of lessons learned from lab digitization documented that accession error rates dropped from 6.3% to 0.5% on switching to digital workflows — reduction largely driven by the removal of manual identification steps that previously depended on institution-specific staff knowledge.

This shift has a specific operational implication for lab managers managing staff turnover: a new scanning operator trained on a digital workflow is not starting from scratch on years of tacit knowledge. They are being trained on a documented, standardized, automatable process. The training timeline is shorter. The competency threshold is more consistently verifiable. And the departure of one trained operator does not remove knowledge that the system itself cannot partially substitute for.

The digital workflow changes what ‘doing more’ requires. When the system carries more of the process knowledge, each person needs to carry less of it. As a result, the laboratory becomes less vulnerable when experienced employees leave.

The Training Burden Calculation

Lab managers assessing the cost of staff turnover often focus on the direct costs: lab technician recruitment advertising, agency fees, interview time, and the salary of a new employee during their unproductive initial period. The indirect costs include the training hours experienced staff spend supervising new colleagues, the quality risks that arise during competency development, and the operational disruption that occurs while institutional knowledge is rebuilt.

Published operational data from the Schwen et al. (2023) review estimated that scanner evaluation for a digitization project required approximately six weeks of technician time and 40 hours each of senior scientist and pathologist time. That is the upfront training investment for the transition itself. Unlike the ongoing training burden associated with repeated staff turnover in a manual workflow, this is largely a one-time investment. Once a digital workflow is established, onboarding a new scanning operator against a documented,

standardized protocol represents a substantially lower training investment than onboarding a new histotechnologist into a manual glass slide workflow with all its institution-specific tacit knowledge.

A qualitative implementation study at a Danish pathology department found that the shift to digital pathology changed the nature of onboarding: staff described that the structured, process-driven nature of digital scanning — compared to the implicit, expertise-dependent nature of manual glass slide preparation — made training more consistent and less dependent on the specific knowledge of the trainer (Koefoed-Nielsen et al., 2024). This is the training resilience characteristic that directly addresses the lab manager's key-person dependency problem.

Digital Pathology as a Lab Staff Retention and Recruitment Tool

Staff turnover is not only a training cost problem, it is a retention problem with causes that lab managers can influence. A consistent finding in qualitative studies is that the nature of the work contributes to attrition. Repetitive tasks, physical demands, and the increased potential for errors in manual workflows can all play a role in employee dissatisfaction. A 2024 qualitative study of clinical staff experiences before and during digital pathology implementation found that staff across multiple roles expressed positive expectations for digital pathology's impact on their working experience: a reduction in the repetitive physical tasks of manual slide management and an increase in engagement with more technically interesting aspects of the digital workflow (Koefoed-Nielsen et al., 2024).

Separately, the Schwen et al. (2023) review explicitly identified laboratory technology infrastructure as a factor in attracting innovative faculty and staff. The review noted that in a competitive labor market, the quality of workplace technology can directly influence recruitment outcomes. A laboratory that is still operating a manual glass slide workflow is not simply behind the technology curve. It may also be placing itself at a disadvantage when competing for experienced staff.

Lab Workflow Resilience: What the Risk Table Actually Looks Like

For a lab manager, the practical question is: which specific staffing risks does a digital workflow mitigate, and which does it replace with new risks? The published evidence allows a structured comparison:

Staffing Risk (Glass Slide Workflow)	Digital Pathology Mitigation
Manual QC depends on experienced staff judgement. One departure removes institutional QC knowledge.	Automated focal map rescan (Epredia E1000 Dx Digital Pathology Solution) and QC flagging reduce reliance on individual QC expertise.
Case assembly protocols are often undocumented. New staff must learn informally from departing colleagues.	LIS-integrated digital case assembly is documented, process-driven, and reproducible regardless of who executes it.
Archival slide retrieval and file management requires knowledge of local filing systems built over years.	WSI digital archive with LIS integration makes all prior slides instantly accessible to any trained user without institutional memory.
High workload concentration on experienced staff increases departure risk precisely where knowledge concentration is highest.	Digital workflow automation reduces workload per person on logistics tasks, redistributing capacity to higher-skill work.
Training a new histotechnologist in manual glass slide protocols is slow and highly supervisor-dependent.	Standardized digital scanning protocols have shorter, more verifiable training timelines, reducing turnover cost.

The Infrastructure Choice Matters: Not All Digital Scanners Are Equal

The resilience benefits described above depend on a digital pathology scanner that actually reduces workflow intervention requirements rather than replacing manual glass slide complexity with manual digital complexity. A scanner with a high rescan rate can create a new form of operator-dependent workflow because staff must frequently identify and reprocess suboptimal slides.

The E1000 Dx Digital Pathology Solution is the first FDA-cleared digital pathology system with an automated focal map rescan that triggers automatically when out-of-focus areas are detected, without requiring manual operator intervention. (US FDA, 2025). In the context of staff turnover risk, this capability is directly relevant: the QC function that in a manual workflow depends on an experienced operator's eye is here automated and documented. The published comparative analysis of all six FDA-cleared platforms confirmed that the E1000 Dx Digital Pathology Solution has the lowest rescan rate of any cleared system (Kuhlman et al., 2025). For a lab manager building workflow resilience against staff turnover, the scanner with the lowest operator-dependent QC requirement is the platform that reduces key-person risk most effectively.

Conclusion: Resilience Is an Infrastructure Decision

Staff turnover in pathology laboratories is not a problem that training programs alone can solve. It is a structural challenge affecting a workforce that is aging, understaffed, and often dependent on knowledge concentrated in a small number of experienced individuals. The laboratory that continues to build its workflows on glass slide protocols dependent on individual expertise is not simply accepting that risk. It is increasing its exposure to that risk every year that passes without a structural change in workflow design.

Digital pathology infrastructure does not make departures painless. It makes them recoverable. That is the resilience case for the lab manager who is doing more with less and needs their laboratory to remain functional regardless of which members of their team are present on any given day.

Lab Staff Retention, Training & Recruitment: Key Takeaways for Lab Managers

1. Key-person dependency is a structural feature of glass slide workflows, not a personnel management failure. Manual glass slide protocols concentrate institutional knowledge in individuals; digital workflows embed more of that knowledge into standardized, documented processes that are less vulnerable to employee turnover.

2. Pathology laboratory significant absence and departure rates run at 13–16% annually in published studies. For a 20-person department, this is 2–3 departures per year. The training and knowledge-transfer cost of each departure in a manual workflow is substantially higher than in a digital one. (Bonert et al., 2022)

3. Digital workflows reduce training time and increase training consistency. Published studies describe digital scanning protocols as more standardized and less trainer-dependent than manual glass slide preparation. As a result, new staff can often reach competency faster and more consistently. (Koefoed-Nielsen et al., 2024)

4. Technology infrastructure is a retention and recruitment factor. The Schwen et al. (2023) review explicitly identifies modern laboratory technology as an important factor in attracting and retaining skilled staff. A lab operating manual glass slide workflows is at a disadvantage in the labor market for histotechnologists.

5. Scanner automation quality directly affects operator dependency. A scanner with automated QC rescan capability — specifically, one that does not require manual operator identification of suboptimal scans — reduces the key-person risk in scan quality management. The E1000 Dx's Digital Pathology Solution's automated focal map rescan is the only such system in the FDA-cleared field. (US FDA, 2025)

References

1. Walsh, E., & Orsi, N. (2024). The current troubled state of the global pathology workforce: A concise review. Diagnostic Pathology, 19, 63. https://doi.org/10.1186/s13000-024-01590-2
2. Bonert, M., Zafar, U., Maung, R., El-Shinnawy, I., Naqvi, A., & Finley, C. (2022). Pathologist workload, work distribution and significant absences or departures at a regional hospital laboratory. PLOS ONE, 17(3), e0265905. https://doi.org/10.1371/journal.pone.0265905
3. Koefoed-Nielsen, H., Kidholm, K., Frederiksen, M. H., & Mikkelsen, M. L. N. (2024). Expectations and experiences among clinical staff regarding implementation of digital pathology: A qualitative study at two departments of pathology. Journal of Imaging Informatics in Medicine, 37(5), 2500–2512. https://doi.org/10.1007/s10278-024-01087-w
4. Schwen, L. O., Kiehl, T. R., Carvalho, R., Zerbe, N., & Homeyer, A. (2023). Digitization of pathology labs: A review of lessons learned. Laboratory Investigation, 103(11), 100244. https://doi.org/10.1016/j.labinv.2023.100244
5. US Food and Drug Administration. (2025). 510(k) premarket notification K241717: Epredia E1000 Dx Digital Pathology Solution. FDA CDRH. https://www.accessdata.fda.gov/cdrh_docs/reviews/K241717.pdf
6. Kuhlman, B., & Bedi, R. (2025). Comparative analysis of FDA-cleared whole slide imaging systems for primary diagnosis. International Journal of Pathology and Clinical Research, 11(1), 165. https://clinmedjournals.org/articles/ijpcr/international-journal-of-pathology-and-clinical-research-ijpcr-11-165.pdf
7. Munari, E., Zamboni, G., Cecchini, M. J., Zamo, A., Sommaggio, M., & Brunelli, M. (2024). Pathology in motion: Automation from specimen to report. Annals of Diagnostic Pathology. https://doi.org/10.1016/j.anndiagpath.2024.152406
8. Bruce, A., Goodsell, J., Sayers, T., Allen, S., Hooper, A., Murphy, D., & Sheridan, C. (2024). Transforming diagnostics: The implementation of digital pathology in clinical laboratories. Histopathology, 85(1), 4–13. https://doi.org/10.1111/his.15178
9. Hanna, M. G., Reuter, V. E., Samboy, J., England, C., Corsale, L., Fine, S. W., Klimstra, D. S., & Travis, W. D. (2020). Implementation of digital pathology offers clinical and operational increase in efficiency and cost savings. Archives of Pathology & Laboratory Medicine, 143(12), 1545–1555. https://doi.org/10.5858/arpa.2018-0514-O

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