Appendix S2

Resources Organized by Domain

Intent of this supplemental document is to present resources organized by individual domains, in order to facilitate practical application and study of learning outcomes in each domain. Resource lists are expected to grow and change over time, as new literature is published and training approaches and learning outcomes evolve. For each domain, resources are presented in this order: books, articles, guidelines, and websites. Not all resource categories are presented for every domain. "Guideline" refers to guideline documents published by national or international organizations concerned with laboratory quality management (e.g., ASVCP, CLSI, ISO). A single resource may be applicable to, and therefore cited in, more than one domain.

Domain 1 General Quality Management Principles

Books

- Westgard JO. *Basic QC Practices Training in Statistical Quality Control for Medical Laboratories*. 4th ed. Madison, WI: Westgard QC; 2016.
- Westgard JO. *Basic Planning for Quality: Training in Analytical Quality Management for Healthcare Laboratories*. Madison, WI: Westgard QC, Inc.; 2000.

Articles

- Arnold JE, Camus MS, Freeman KP, et al. ASVCP guidelines: principles of quality assurance and standards for Veterinary Clinical Pathology (version 3.0). *Vet Clin Pathol*. 2019;48:542- 618. https://doi.org/10.1111/vcp.12810.

- Cook JR, Hooijberg EH, Freeman KP. Quality management for in-clinic laboratories: the total quality management system and quality plan. *J Amer Vet Med Assoc*. 2021;258:55-61. DOI:10.2460/javma.258.1.55.
- Flatland B, Freeman KP, Friedrichs KR, et al. ASVCP quality assurance guidelines: control of general analytical factors in veterinary laboratories. *Vet Clin Pathol*. 2010;39:264-277. doi:10.1111/j.1939-165X.2010.00251.x.
- Flatland B, Camus MS, Baral RM. Analytical quality goals—a review. *Vet Clin Pathol*. 2018;47:527-538. https://doi.org/10.1111/vcp.12649.
- Freeman KP, Bauer N, Jensen AL, Thoresen S. Introduction to ISO 15189: a blueprint for quality systems in veterinary laboratories. Vet Clin Pathol. 2006;35:157-171. doi/pdf/10.1111/j.1939-165X.2006.tb00109.x
- Freeman KP, Cook JR, Hooijberg EH. Quality Management for In-Clinic Laboratories: Standard operating procedures. J Amer Vet Med Assoc. 2021;258:477-481. https://doi.org/10.2460/javma.258.5.477.
- Hooijberg EH, Freeman KP, Cook JR. Quality Management for In-Clinic Laboratories: Facilities, instrumentation, health and safety, training, and improvement opportunities. J Amer Vet Med Assoc. 2021;258:273-278. DOI: 10.2460/javma.258.3.273.

Guidelines

- ISO 15189:2012. Medical Laboratories – Requirements for Quality and Competence. Geneva, Switzerland; International Organization for Standardization:2012.
- ISO 17025:2017. General Requirements for the Competence of Testing and Calibration Laboratories. Geneva, Switzerland; International Organization for Standardization:2017

Websites

- Conducting a clinical audit. Royal College of Pathologists, 2021. Available at https://www.rcpath.org/profession/patient-safety-and-quality-improvement/conducting-a-clinical-audit.html. Accessed August 16, 2022.

Domain 2: Basic Laboratory Statistics

Books

- Bland, M. *Introduction to Medical Statistics*. 4th ed. Oxford, United Kingdom: Oxford University Press; 2015.
- Good PI, Hardin JW. *Common Errors in Statistics (and How to Avoid Them)*. 4th ed. Hoboken, NJ: John Wiley & Sons; 2012.
- Motulsky H. *Intuitive Biostatistics: A Nonmathematical Guide to Statistical Thinking*. 2nd ed. New York, NY: Oxford University Press; 2010.
- Petrie A, Watson P. *Statistics for Veterinary and Animal Science*. 3rd ed. Hoboken, NJ: Wiley-Blackwell; 2013.
- Petrie A, Sabin C. *Medical Statistics at a Glance*. 4th ed. Hoboken, NJ: Wiley-Blackwell; 2019.
- Riegelman RK. *Studying a Study and Testing a Test*. 7th ed. Philadelphia, PA: Lippincott, Williams, and Wilkins; 2020.
- Westgard JO. *Six Sigma Quality Design and Control*. 2nd ed. Madison, WI: Westgard QC; 2006.
- Westgard JO. *Basic QC Practices Training in Statistical Quality Control for Medical Laboratories*. 4th ed. Madison, WI: Westgard QC; 2016.
- Westgard JO. *Basic Method Validation and Verification Training in Analytical Quality Management for Healthcare Laboratories*. 4th ed. Madison, WI: Westgard QC; 2020.

Articles

- Moore AR, Freman K. Reporting results with (un)certainty. *Vet Clin Pathol*. 2019;48:259-269. DOI: 10.1111/vcp.12735.
- Stöckl D, Dewitte K, Theinpont LM. Validity of linear regression in method comparison studies: is it limited by the statistical model or the quality of the analytical input data? *Clin Chem*. 1998;44:2340-2346. https://doi.org/10.1093/clinchem/44.11.2340.
- Westgard JO. Points of care in using statistics in method comparison studies. *Clin Chem*. 1998;44:2240-2242. https://doi.org/10.1093/clinchem/44.11.2240.

Websites

- ASVCP Quality Assurance and Laboratory Standards Guidelines. American Society for Veterinary Clinical Pathology. Available at: https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- BA-plotteR (Bland Altman plotter Shiny App). Goedhart J, Available at: https://huygens.science.uva.nl/BA-plotteR/. Accessed August 16, 2022.
- John Martin Bland. Bland MJ, 2020. Available at https://www-users.york.ac.uk/~mb55/index.html. Accessed August 16, 2022. *This website, compiled by Dr. Bland, contains links to various statistics resources.*
- Z Stats Lessons, on Westgard QC. Zady MF, 1999. Available at: https://www.westgard.com. (See Lessons → Z Stats → Basic Statistics) Accessed August 16, 2022.
    - Z Stats: Those #$%@! Statistics
    - Z-1: Aligning Attitudes Through Purpose
    - Z-2: An Organizer of Statistical Terms (Part I)

- Z-3: An Organizer of Statistical Terms (Part I)
- Z-4: Mean, Standard Deviation, and Coefficient of Variation
- Z-5: Sum of Squares, Variance, and the Standard Error of the Mean
- Z-6: Probability and the Standard Normal Distribution
- Z-7: Hypothesis Testing, Tests of Significance, and Confidence Intervals
- Z-8: Two-Sample and Directional Hypothesis Testing
- Z-9: Truth or Consequences for a Statistical Test of Significance
- Z-10: ANOVA
- Z-11: Confidence Intervals
- Z-12: Correlation and Simple Least Squares Regression
- Z-13: The Least Squares Regression Model
- Z-14: Estimating Analytical Errors Using Regression Statistics

---

Domain 3: Instrument Selection and Analytical Assessment

Books

- Westgard JO. *Basic Method Validation and Verification Training in Analytical Quality Management for Healthcare Laboratories*. 4th ed. WI: Westgard QC, Inc.; 2020.

Articles

- Arnold JE, Camus MS, Freeman KP, et al. ASVCP Guidelines: Principles of Quality Assurance and Standards for Veterinary Clinical Pathology (version 3.0). *Vet Clin Pathol*. 2019;48: 542-618. https://doi.org/10.1111/vcp.12810.

- Ferreira H, Freeman KP. Instrument comparison queries (letter). *Vet Clin Pathol*. 2009;38:274-276. https://doi.org/10.1111/j.1939-165X.2009.00170_2.x.
- Flatland B, Vap LM. Quality management recommendations for automated and manual in-house hematology of domestic animals. *Vet Clin North Am Small Anim Pract*. 2012;42:11-22. doi: 10.1016/j.cvsm.2011.09.004.
- Flatland B, Friedrichs KR, Klenner S. Differentiating between analytical and diagnostic performance evaluation with a focus on the method comparison study and identification of bias. *Vet Clin Pathol*. 2014; 43: 475-486. https://doi.org/10.1111/vcp.12199.
- Freeman KP, Flatland B. Studies of instrument/method comparison as part of validation for use in veterinary species (editorial). *Vet Clin Pathol*. 2017;46: 5-8. doi: 10.1111/vcp.12455.

Domain 4: Quality Goals, Assay Development, and Analytical Validation

Books

- Flatland B. Quantitative diagnostic test validation. In: Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ (eds.). *Schalm's Veterinary Hematology*, 7th ed. Hoboken, NJ: John Wiley & Sons, Inc.;2022:1263-1272.
- Westgard, JO. *Basic Method Validation and Verification Training in Analytical Quality Management for Healthcare Laboratories*. 4th ed. WI: Westgard QC, Inc.; 2020.
- Westgard JO. *Basic QC Practices Training in Statistical Quality Control for Medical Laboratories*. 4th ed. Madison, WI: Westgard QC; 2016.

Articles

- Arnold JE, Camus MS, Freeman KP, et al. ASVCP Guidelines: Principles of Quality Assurance and Standards for Veterinary Clinical Pathology (version 3.0). *Vet Clin Pathol*, 2019;48: 542-618. https://doi.org/10.1111/vcp.12810.
- Flatland B, Friedrichs KR, Klenner S. Differentiating between analytical and diagnostic performance evaluation with a focus on the method comparison study and identification of bias. *Vet Clin Pathol*. 2014;43:475-486. https://doi.org/10.1111/vcp.12199
- Flatland B, Camus MS, Baral RM. Analytical quality goals—a review. *Vet Clin Pathol*. 2018;47:527-538. https://doi.org/10.1111/vcp.12649.
- Freeman KP, Flatland, B. Studies of instrument/method comparison as part of validation for use in veterinary species (editorial). *Vet. Clin. Pathol.* 46(1):5-8, 2017. doi: 10.1111/vcp.12455.
- Jensen AL, Kjelgaard-Hansen M. Method comparison in the clinical laboratory. *Vet Clin Pathol*. 2006;35:276-286. https://doi.org/10.1111/j.1939-165X.2006.tb00131.x
- Sandberg S, Fraser C, Horvath A, et al. Defining analytical performance specifications: Consensus Statement from the 1st Strategic Conference of the European Federation of Clinical Chemistry and Laboratory Medicine. *Clin Chem Lab Med*. 2015;53(6): 833-835. https://doi.org/10.1515/cclm-2015-0067

Domain 5: Statistical Quality Control (SQC), External Quality Assessment (EQA), and Proficiency Testing (PT)

Books

- Westgard JO. *Basic QC Practices Training in Statistical Quality Control for Medical Laboratories*. 4th ed. Madison, WI: Westgard QC; 2016.

- Westgard SA, Freeman KP. Total error and proficiency testing. In: Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ (eds.). *Schalm's Veterinary Hematology*, 7th ed. Hoboken, NJ: John Wiley & Sons, Inc.;2022:1255-1262.

Articles

- Camus MS, Flatland B, Freeman KP, Cruz Cardona JA. ASVCP quality assurance guidelines: external quality assessment and comparative testing for reference and in-clinic laboratories. *Vet Clin Pathol*. 2015;44:477-492. DOI: 10.1111/vcp.12299.
- Flatland B, Friedrichs KR, Klenner S. Differentiating between analytical and diagnostic performance evaluation with a focus on the method comparison study and identification of bias. *Vet Clin Pathol*. 2014;43:475-486. DOI: 10.1111/vcp.12199.
- Flatland B, Freeman KP. Repeat patient testing shows promise as a quality control method for veterinary hematology testing. *Vet Clin Pathol*. 2018;47:252-266. DOI: 10.1111/vcp.12593.
- Flatland B, Freeman KP. Repeat patient testing-based quality control shows promise for use in veterinary biochemistry testing. *Vet Clin Pathol*. 2020;49:590-606. DOI:10.1111/vcp.12921.
- Freeman KP. Cook JR, Hooijberg EH. Introduction to statistical quality control. *J Am Vet Med Assoc*. 2021;258:733-739. https://doi.org/10.2460/javma.258.7.733.
- Theodorsson E, Magnusson B, Leito I. Bias in clinical chemistry. *Bioanalysis*. 2014;6:2855-2876. DOI: 10.4155/BIO.14.249. *References cited in this paper include several review articles about bias and harmonization, for readers wanting additional resources on this topic.*

Websites

- Allowable total error worksheet. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at: https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.

- External quality assurance compliance checklists. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at: https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Glossary of QC Terms. Westgard JO, 2019. Available at https://westgard.com. (See Resources → Resources) Accessed August 16, 2022.

Domain 6: Non-statistical QC

Books

- Stirn M, Freeman KP. Quality management of hematology techniques. In: Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ (eds.). *Schalm's Veterinary Hematology*, 7th ed. Hoboken, NJ: John Wiley & Sons, Inc.;2022:1243-1254.

Articles

- Arnold JE, Camus MS, Freeman KP, et al. ASVCP Guidelines: Principles of quality assurance and standards for veterinary clinical pathology (version 3.0). *Vet Clin Pathol*. 2019;48:542-618. DOI: 10.1111/vcp.12810.
- Flatland B, Vap LM. Quality management recommendations for automated and manual in-house hematology of domestic animals. *Vet Clin North Am Small Anim Pract*. 2012;42:11-22. doi: 10.1016/j.cvsm.2011.09.004.
- Flatland B, Freeman KP, Vap LM, and Harr KE. ASVCP guidelines: quality assurance for point-of-care testing in veterinary medicine. *Vet Clin Pathol*. 2013;42:405-423. DOI:10.1111/vcp.12099.

- Freeman KP, Cook JR, Hooijberg EH. Quality Management for In-Clinic Laboratories: Standard operating procedures. J Amer Vet Med Assoc. 2021;258:477-481. https://doi.org/10.2460/javma.258.5.477.
- Hooijberg EH, Freeman KP, Cook JR. Quality Management for In-Clinic Laboratories: Facilities, instrumentation, health and safety, training, and improvement opportunities. J Amer Vet Med Assoc. 2021;258:273-278. doi: 10.2460/javma.258.3.273.

Domain 7: Tests Yielding Ordinal and Nominal Data (Qualitative Tests)

Books

- Pereira P. *Quality control of qualitative tests for medical laboratories*. Madison, WI: Westgard QC; 2019.
- Westgard JO. *Basic Method Validation and Verification Training in Analytical Quality Management for Healthcare Laboratories*. 4th ed. WI: Westgard QC, Inc.; 2020.

Articles

- Erb HN. Prior probability (the pretest best guess) affects predictive values of diagnostic tests. *Vet Clin Pathol*. 2011;40:154-158. DOI: 10.1111/j.1939-165X.2022.00315.x.
- Nordin G. Before defining a performance criteria we must agree on what a “qualitative test procedure” is. *Clin Chem Lab Med*. 2015;53:939-941. DOI: 10.1515/cclm-2015-0005.

Websites

- Basic validation of qualitative tests. Pereira P, 2016. Available at https://westgard.com. (See Lessons → Basic Method Validation) Accessed August 16, 2022.
- Probit analysis 1: Practical application to determine limit of detection. Westgard JO, Westgard SA, 2020. Available at https://westgard.com. (See Lessons → Basic Method Validation) Accessed August 16, 2022.
- Probit analysis 2: Practical application to determine limit of detection. Westgard JO, Westgard SA, 2020. Available at https://westgard.com. (See Lessons → Basic Method Validation) Accessed August 16, 2022.
- True or false? You can validate a qualitative method. Westgard JO, Westgard SA, 2021. Available at https://westgard.com. (See Lessons → Basic Method Validation) Accessed October 25, 2021.

Domain 8: Patient Data Interpretation Tools

Books

- Fraser CG. *Biological Variation: From Principles to Practice*. Washington, DC: AACC Press; 2001.
- Friedrichs KR, Jensen AL, Kjelgaard-Hansen M. Reference intervals and decision limits. In: Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ (eds.). *Schalm's Veterinary Hematology*, 7th ed. Hoboken, NJ: John Wiley & Sons, Inc.;2022:1273-1284.

Articles

- Campora C, Freeman KP, Baral R. Clinical application of biological variation data to facilitate interpretation of canine and feline laboratory test results. *J Small Anim Pract*. 2017;59:3-9. DOI: 10.1111/jsap.12781.
- Geffré A, Friedrichs KR, Harr KE, Concordet D, Trumel C, Braun J. Reference values: a review. *Vet Clin Pathol*. 2009;38:288-298. DOI: 10.1111/j.1939-165X.2009.00179.x.
- Geffré A, Concordet D, Braun J, Trumel C. Reference Value Advisor: a new freeware set of macroinstructions to calculate reference intervals with Microsoft Excel. *Vet Clin Pathol*. 2011;40:107-112. DOI: 10.1111/j.1939-165X.2011.00287.x.
- Flatland B, Baral RM, Freeman KPF. Current and emerging concepts in biological and analytical variation applied in clinical practice. *J Vet Intern Med*. 2020;34:2691-2700. DOI: 10.1111/jvim.15029.
- Freeman KP, Baral RM, Dhand MK, Nielson SS, and Jensen AL. Recommendations for designing and conducting veterinary clinical pathology biologic variation studies. *Vet Clin Pathol*. 46: 211-220, 2017. doi/pdf/10.1111/vcp.12475.
- Friedrichs KR, Harr KE, Freeman KP, et al. ASVCP reference interval guidelines: determination of de novo reference intervals in veterinary species and other related topics. *Vet Clin Pathol*. 2012;41:441-453. doi: 10.1111/vcp.12006.
- Le Boedec, K. (2016), Sensitivity and specificity of normality tests and consequences on reference interval accuracy at small sample size: a computer-simulation study. *Vet Clin Pathol*, 45: 648-656. https://doi.org/10.1111/vcp.12390
- Le Boedec, K. Reference interval estimation of small sample sizes: A methodologic comparison using a computer-simulation study. *Vet Clin Pathol*. 2019; 48: 335– 346. https://doi.org/10.1111/vcp.12725

- Walton, R. Subject-based reference values: biological variation, individuality, and reference change values. *Vet Clin Pathol*. 2012;41:175-181. DOI:10.1111/j.1939-165X.2012.00414.x

Websites

- Basic template for data organization of RI manuscripts. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Checklist to set up and organize RI for manuscript writing. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Extended template for data organization of RI manuscripts. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Dispersion Calculator and Critical Number of Test Samples. Westgard JO, 2019. Available at https://www.westgard.com/dispersion-calculator-and-critical-number-of-test-samples.htm. Accessed August 16, 2022.
- Veterinary Biological Variation. Vet Biological Variation, 2015. Available at: https://www.vetbiologicalvariation.org. Accessed August 16, 2022.
- Your results may vary: the imprecision of medical measurements [RCV calculator]. British Medical Journal, 2020; 368:m149. Available at https://doi.org/10.1136/bmj.m149. Accessed August 16, 2022.

Domain 9: Clinical Validation of Tests, Diagnostic Performance Evaluation

Books

- Flatland B. Quantitative diagnostic test validation. In: Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ (eds.). *Schalm's Veterinary Hematology*, 7th ed. Hoboken, NJ: John Wiley & Sons, Inc.;2022:1263-1272.

Articles

- Bossyut PM, Reitsma JB, Bruns DE, et al. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. *Vet Clin Pathol*. 2007;36:8-12. https://doi.org/10.1111/j.1939-165X.2007.tb00175.x.
- Bossyut PM, Reitsma JB, Bruns DE, et al. STARD 2015: An updated list of essential items for reporting diagnostic accuracy studies. *Clin Chem*. 2015;61:1446-1452. DOI: 10.1373/clinchem.2015.246280.
- Erb HN. Prior probability (the pretest best guess) affects predictive values of diagnostic tests. *Vet Clin Pathol*. 2011;40:154-158. DOI: 10.1111/j.1939-165X.2022.00315.x.
- Flatland et al. ASVCP quality assurance guidelines: control of general analytical factors in veterinary laboratories. *Vet Clin Pathol*. 2010;39:264-277. doi:10.1111/j.1939-165X.2010.00251.x.
- Gardner IA, Greiner M. Receiver-operating characteristic curves and likelihood ratios: improvements over traditional methods for the evaluation and application of veterinary clinical pathology tests. *Vet Clin Pathol*. 2006;35:8-17. https://doi.org/10.1111/j.1939-165X.2006.tb00082.x.

Websites

- BSAVA Lab Method Performance Verification Help Tool. British Small Animal Veterinary Association, 2021. Available at: https://www.bsavalibrary.com/content/book/10.22233/9781910443989. Accessed August 16, 2022..

- Westgard QC Essays, Lessons, and Calculators (various – see list below). Westgard JO, Westgard SA, 2019. Available at: https://www.westgard.com. Accessed August 16, 2022.

  Recommended Westgard essays and lessons

  - In 2007, Method Validation Skills Are Still Vital (January 2007)
  - Surpassing Six Sigma (October 2008)
  - We Need More Data, More Data, and More Data (May 2011)
  - Allowable Total Error and the Brain-to-Brain Loop (December 2011)
  - COVID-19 Serology Testing Strategy: Confirm Positive Results (May 2020)

  Recommended Westgard calculators, worksheets, and downloads

  (Listed alphabetically)

  - Control Limit Calculator
  - Dispersion Calculator and Critical Number of Test Samples
  - Linear Data Plotter
  - Method Decision Calculator
  - Normalized OPSpecs Calculator
  - Paired Data Calculator

- QC Calculator
- QC Plotter
- QC Simulator
- QC Checker
- Quality Control Grid Calculator
- Reportable Range Calculator: Quantifying Errors
- Reportable Range Calculator: Recording Results
- SD Calculator
- Six Sigma Calculators (various)

Domain 10: Microscopic Evaluation

Books

- Abramowitz M. *Microscope Basics and Beyond, Volume 1*. Mellville, NY: Olympus America Inc., Scientific Instrument Group; 2003.
- Anderson KL, Gwynn A, Wood CA, et.al. Sample Collection. In: Sharkey LC, Radin MJ, and Seelig D, eds. *Veterinary Cytology*. Hoboken, NJ: Wiley Blackwell; 2020:3-11.
- Flatland B. Quality management recommendations for veterinary diagnostic cytopathology services. In: Raskin RE, Meyer D, eds. *Canine and Feline Cytology: A Color Atlas and Interpretation Guide*, 4th edition. St. Louis, MO: Elsevier; 2022:706-711.
- Pantanowitz, L. Quality Assurance in Cytology. In: Sharkey LC, Radin MJ, and Seelig D, eds. *Veterinary Cytology*. Hoboken, NJ: Wiley Blackwell; 2020:43-46.
- Tvedten H. Routine Stains and Automated Stainers. In: Sharkey LC, Radin MJ, and Seelig D, eds. *Veterinary Cytology*. Hoboken, NJ: Wiley Blackwell; 2020:12-17.

Articles

- Bertram CA, Gurtner C, Dettwiler M, et. Al. Validation of Digital Microscopy Compared With Light Microscopy for the Diagnosis of Canine Cutaneous Tumors. *Vet Pathol*. 2018;55:490-500. doi: 10.1177/0300985818755254.
- Blanchet CJK, Fish EJ, Miller AG, Snyder LA, Labadie JD, Avery PR. Evaluation of Region of Interest Digital Cytology Compared to Light Microscopy for Veterinary Medicine. *Vet Pathol*. 2019;56:725-731. doi:10.1177/0300985819846874.
- Chandra A, Cross P, Denton K, et al. The BSCC Code of Practice – exfoliative cytopathology (excluding gynaecological cytopathology). *Cytopathology*. 2009;20:211-223. DOI:10.1111/j.1365-2303.2009.00679.x.
- Evans AJ, Brown RW, Bui MM, et al. Validating whole slide imaging systems for diagnostic purposes in pathology: guideline update from the College of American Pathologists in collaboration with the American Society for Clinical Pathology and the Association for Pathology Informatics. *Arch Pathol Lab Med*. 2021; (early view). DOI: 10.5858/arpa.2020-0723-CP.
- Farahani N, Parwani AV, Pantanowitz L. Whole slide imaging in pathology: advantages, limitations, and emerging perspectives. *Pathol Lab Med Int*. 2015:7 23–33. https://doi.org/10.2147/PLMI.S59826.
- Flatland B, Vap LM. Quality management recommendations for automated and manual in-house hematology of domestic animals. *Vet Clin North Am Small Anim Pract*. 2012;42:11-22. doi: 10.1016/j.cvsm.2011.09.004.
- García-Rojo M. International clinical guidelines for the adoption of digital pathology: A review of technical aspects. *Pathobiology*. 2016;83:99-109. DOI: 10.1159/000441192.

- Horobin RW. How Romanowsky stains work and why they remain valuable - including a proposed universal Romanowsky staining mechanism and a rational troubleshooting scheme. *Biotech Histochem*. 2011;86:36-51. doi: 10.3109/10520295.2010.515491.
- Kocjan G, Chandra A, Cross P, et al. BSCC Code of Practice – fine needle aspiration cytology. *Cytopathology.* 2009;20:283-296. DOI:10.1111/j.1365-2303.2009.00709.x
- Moore AR. Preparation of Cytology Samples, Tricks of the Trade. In: *Vet Clin Small Anin Pract*. 2017;47:1-16. https://doi.org/10.1016/j.cvsm.2016.07.001.
- Nishat R, Ramachandra S, Behura SS, et. Al. Digital Cytopathology. *J Oral Maxillofac Pathol*. 2017;21:99-106. doi: 10.4103/0973-029X.203767
- Stokes, BO. Principles of Cytocentrifugation. *Lab Med*. 2004;35:434-437. https://doi.org/10.1309/FTT59GWKDWH69FB0.
- Wilbur DC. Digital Cytology: Current State of the Art and Prospects for the Future. *Acta Cytol*. 2011;55:227–238. doi: 10.1159/000324734.

Guidelines

- Arnold JE, Camus MS, Freeman KP, et al. ASVCP guidelines: principles of quality assurance and standards for Veterinary Clinical Pathology (version 3.0). *Vet Clin Pathol*. 2019;48:542-618. https://doi.org/10.1111/vcp.12810.
- Gunn-Christie RG, Flatland B, Friedrichs KR, et al. ASVCP quality assurance guidelines: control of preanalytical, analytical, and post-analytical factors for urinalysis, cytology, and clinical chemistry in veterinary laboratories. *Vet Clin Pathol*. 2012;41:18-26. DOI:10.1111/j.1939-165X.2012.00412.x.
- CLSI POCT 10-A2. Physician and Nonphysician Provider-Performed Microscopy Testing; Approved Guideline, 2nd Edition. Wayne, PA; Clinical and Laboratory Standards Institiute:2011.

- ISO 15189:2012. Medical Laboratories – Requirements for Quality and Competence. Geneva, Switzerland; International Organization for Standardization:2012.
- Standards2Quality. Guidelines for quality management in pathology professional practices. Version 2. Path2Quality. Toronto, Ontario, Canada; Ontario Medical Association Section on Laboratory Medicine and the Ontario Association of Pathologists:2013.

Websites

- Routine microscope care and adjustments (multiple guides available). Olympus, Available at https://www.olympus-lifescience.com/en/landing/microscope-maintenance/. Accessed August 16, 2022. Recommended guides include:
    - Microscope Cleaning and Maintenance
    - Köhler Illumination for Upright Microscopes
- Solid Tissue Cytology – Hints to Avoid Poor Quality Samples. Thomas J, Scott M, Stickle J, Swenson C, Lucidi C, 2021. https://cvm.msu.edu/vdl/client-education/newsletter/fall-2020/solid-tissue-cytology-hints-to-avoid-poor-quality-samples. Accessed August 16, 2022.

Domain 11: Point-of-Care Testing (POCT)

Articles

- Bell R, Harr K, Rishniw M, Pion P. Survey of point-of-care instrumentation, analysis, and quality assurance in veterinary practice. *Vet Clin Pathol*. 2014;43:185-92. doi: 10.1111/vcp.12142.
- Cook JR, Hooijberg E, Freeman KP. Quality management for in-clinic laboratories: the total quality management system and quality plan. *J Am Vet Med Assoc*. 2021;258:55-61. doi: 10.2460/javma.258.1.55.

- Flatland B, Vap LM. Quality management recommendations for automated and manual in-house hematology of domestic animals. *Vet Clin North Am Small Anim Pract*. 2012;42:11-22. doi: 10.1016/j.cvsm.2011.09.004.
- Flatland B, Weiser G. The elephant in the room (and how to lead it out): In-clinic laboratory quality challenges. *J Am Anim Hosp Assoc*. 2014;50:375-82. doi: 10.5326/JAAHA-MS-6231.
- Freeman KP, Cook JR, Hooijberg EH. Introduction to statistical quality control. *J Am Vet Med Assoc*. 2021;258:733-739. https://doi.org/10.2460/javma.258.7.733
- Freeman KP, Cook JR, Hooijberg EH. Quality management for in-clinic laboratories: standard operating procedures. *J Am Vet Med Assoc*. 2021;258:477–481. https://doi.org/10.2460/javma.258.5.477
- Hooijberg EH, Freeman KP, Cook JR. Quality management for in-clinic laboratories: Facilities, instrumentation, health and safety, training, and improvement opportunities. *J Am Vet Med Assoc*. 2021;258:273-278. doi: 10.2460/javma.258.3.273.
- Hooijberg EH, Freeman KP, Cook JR. Quality management for in-clinic laboratories: equipment maintenance and instrument performance. J Am Vet Med Assoc 2021;258:725–731. https://doi.org/10.2460/javma.258.7.725.
- Lester S, Harr KE, Rishniw M, Pion P. Current quality assurance concepts and considerations for quality control of in-clinic biochemistry testing. *J Am Vet Med Assoc*. 2013;242:182-92. doi: 10.2460/javma.242.2.182.
- Rishniw M, Pion P, Maher T. The quality of veterinary in-clinic and reference laboratory biochemical testing. *Vet Clin Pathol*. 2012;41:92-109. doi: 10.1111/j.1939-165X.2011.00386.x.
- Rishniw M, Pion P. Evaluation of performance of veterinary in-clinic hematology analyzers. *Vet Clin Pathol*. 2016;45:604-614. doi: 10.1111/vcp.12398.

- Weiser MG, Thrall MA. Quality control recommendations and procedures for in-clinic laboratories. *Vet Clin North Am Small Anim Pract*. 2007;37:237-44. doi: 10.1016/j.cvsm.2006.11.006.

Guidelines

- Flatland B, Freeman KP, Vap LM, Kendal KE. ASVCP guidelines: quality assurance for point-of-care testing in veterinary medicine. *Vet Clin Pathol*. 2013;42 :405–423. doi:10.1111/vcp.12099
- Gerber KL, Freeman KP. ASVCP guidelines: quality assurance for portable blood glucose meter (glucometer) use in veterinary medicine. *Vet Clin Pathol*. 2016;45:10–27. doi:10.1111/vcp.12310.

Websites

- AAHA Standards of Accreditation. American Animal Hospital Association (AAHA), 2021. Available at https://www.aaha.org/accreditation--membership/aaha-standards/. Accessed August 16, 2022. *Note that membership is required for access*.
- Point-of-care testing checklist. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at: https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Point-of-care example forms and logs. ASVCP Quality Assurance and Laboratory Standards Guidelines. Available at: https://www.asvcp.org/page/QALS_Guidelines. Accessed August 16, 2022.
- Which Accreditation is Right for Your Practice and How to Apply. Royal College of Veterinary Surgeons (RCVS), 2021. Available at https://www.rcvs.org.uk/setting-standards/practice-standards-scheme/which-accreditation-is-right-for-your-practice-and-how-to-apply/. Accessed August 16, 2022.