

Diagnostic update

Updated reference intervals for IDEXX Reference Laboratories hematology results

Introduction

Clinical and Laboratory Standards Institute (CLSI) guidelines emphasize the periodic review and updating of reference intervals to ensure clinical relevance and accuracy. IDEXX is committed to providing clients with the most accurate and reliable results possible. To support this commitment, IDEXX has conducted a comprehensive reference interval study for canine and feline hematology specimens. Updating reference intervals is important to reflect changes in pet demographics over time, increased access to preventive care, and ongoing advancements in laboratory technology. This diagnostic update provides an overview of the reference interval study and subsequent result updates for the best interpretation of results provided by IDEXX Reference Laboratories. Changes will be made across reference labs beginning in July 2025.

How were reference intervals established for IDEXX Reference Laboratories hematology results?

Reference intervals are derived from a reference distribution and describe a specific population, for example, healthy adult dogs. Reference intervals are most accurate when based on reference interval studies performed using the same analyzer and reagents as those found in patient results. IDEXX biostatisticians and a cross-functional group of Key Opinion Leaders, including clinical pathologists and small animal internal medicine specialists evaluated data obtained from healthy populations of dogs and cats at participating veterinary practices. Adult dogs (1–7 years old) and cats (1–10 years old) were characterized as healthy based on history and physical examination. All animals had normal results on serum chemistry, total T₄, IDEXX 4Dx™ Plus testing for dogs, and FeLV/FIV testing for cats. Animals received no medications except routine heartworm and parasite preventives.

The statistical recommendations were compared to the populations of patient samples submitted to IDEXX reference laboratories. All hematology testing was performed at IDEXX Reference Laboratories. As such, these hematology reference intervals apply only to IDEXX Reference Laboratories testing. Updated reference intervals are summarized in Tables 1 and 2.

The updated reference intervals reflect a general population distribution. Individual variation and trends still need to be considered when evaluating patients. Potential differences may

be observed in certain breeds (e.g., Greyhound dogs, Abyssinian cats), as well as in pediatric or geriatric patients, pets with specific lifestyles, or those living in particular geographic regions.^{1–4} These factors should be considered when interpreting results in relation to published reference intervals.

While most blood parameter reference intervals have been updated slightly, the most notable changes are seen in platelets and hematocrit for dogs and cats. Based on rigorous, standardized methods to ensure accuracy, these updated reference intervals should reflect the true normal of the majority of the healthy dog and cat population as defined above, improving the interpretation of hematology results.

Table 1. Updated reference intervals for dogs.

Blood parameter	Current reference interval	New reference interval
RBC (x 10¹²/L)	5.4–8.7	5.84–8.95
Hematocrit (L/L)	0.38–0.57	0.41–0.60
Hemoglobin (g/L)	134–207	146–217
MCV (fL)	59–76	62–76
MCH (pg)	21.9–26.1	22.1–26.7
MCHC (g/L)	326.0–392.0	323.0–380.0
RDW	10.0–19.0	10.0–19.0
Reticulocytes (x 10³/μL)	10–110	21–140
Reticulocyte hemoglobin (pg)	24.5–31.8	23.8–28.3
WBC (x 10⁹/L)	4.9–17.6	5.8–16.2
Neutrophils (x 10⁹/L)	2.94–12.67	3.00–9.74
Lymphocytes (x 10⁹/L)	1.06–4.95	0.98–4.20
Monocytes (x 10⁹/L)	0.0–1.2	0.15–0.74
Eosinophils (x 10⁹/L)	0.0–1.5	0.14–1.93
Basophils (x 10⁹/L)	0–0.1	0–0.1
Platelets (x 10⁹/L)	143–448	120–412

Table 2. Updated reference intervals for cats.

Blood parameter	Current reference interval	New reference interval
RBC (x 10 ¹² /L)	7.1–11.5	6.50–11.53
Hematocrit (L/L)	0.29–0.45	0.31–0.51
Hemoglobin (g/L)	103–162	106–167
MCV (fL)	39.0–56.0	38–53
MCH (pg)	12.6–16.5	12.3–17.3
MCHC (g/L)	285.0–378.0	291.0–357.0
RDW	10.0–26.0	10.0–26.0
Reticulocytes (K/μL)	3.0–50.0	0–70
Reticulocyte hemoglobin (pg)	15.3–22.9	14.4–19.3
WBC (x 10 ⁹ /L)	3.9–19.0	3.9–19.0
Neutrophils (x 10 ⁹ /L)	2.6–15.2	2.6–15.2
Lymphocytes (x 10 ⁹ /L)	0.9–5.9	0.65–6.86
Monocytes (x 10 ⁹ /L)	0.0–0.5	0.04–0.47
Eosinophils (x 10 ⁹ /L)	0.0–2.2	0.21–1.21
Basophils (x 10 ⁹ /L)	0.0–0.1	0.0–0.1
Platelets (x 10 ⁹ /L)	155–641	100–440

Evaluating platelets using new reference intervals

When evaluating the platelet count of normal healthy adult dogs and cats, the distribution was found to be lower than current reference intervals. All dogs and cats were negative for common infectious diseases known to affect platelet counts. Specimens with platelet clumping identified on technician evaluation of blood film were excluded from statistical evaluation. However, it is possible that some specimens included platelet clumping that may have been present in the specimen performed by automated CBC but not seen on blood film evaluation. When evaluating the statistical results, clinical decision limits were considered before determining updated reference intervals.^{5,6} Changes to the reference interval should not replace clinical judgment or the evaluation for underlying disease by the attending veterinarian.

Evaluating hematocrit using new reference intervals

The updated hematocrit reference interval for cats and dogs reflect a more accurate understanding of normal in

today's population. The change accounts for improvements in preventive care, nutrition, and lab technology. If a value now falls just below the new lower limit, it may indicate early or mild anemia that was previously overlooked, allowing for earlier monitoring or intervention when clinically appropriate. For patients previously considered normal but now considered anemic, it's important to assess the full clinical picture, including clinical signs of anemia, comorbidities that contribute to anemia, such as chronic kidney disease, and trends in prior CBC results.

How will interpretation change with updated results?

Although the reference intervals for hematology parameters have been updated, the assay methodology and instrumentation remain unchanged. As a result, total cell counts and other quantitative results can be directly compared to those obtained prior to the reference interval update. This ensures continuity in patient monitoring while improving the clinical interpretation of results based on revised population-based reference intervals.

Results before and after the reference interval update may be displayed differently on VetConnect™ PLUS trending charts, as these charts identify the results in relation to the reference interval. For example, a dog with a platelet count of 130 K/μL may appear thrombocytopenic on the graphed results prior to the reference interval update, but normal following the update.

Greyhound specific reference intervals being added to Canada laboratory reports

Currently in Canada, hematology, chemistry and total T₄ results are shown with regular general canine reference intervals with no additional breed-related guidance. Greyhounds require different reference intervals for many common parameters. Providing standardized reporting with access to accurate Greyhound breed-specific information will lead to improved understanding of results and enhanced medical care. Please visit www.idexx.ca/greyhoundRI for breed-specific reference intervals in English and www.idexx.ca/fr/greyhoundRI in French.

Summary

IDEXX Reference Laboratories is updating hematology reference intervals to align with current population data and maintain the highest standard of care. Notable differences in CBC reference intervals include platelets and hematocrit in dogs and cats. This update ensures that reported results continue to support accurate, clinically relevant decision-making and provide the highest quality care for patients.

References

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