Niche practice and rubbery numbers. With Dr Randolph Baral

Show notes

Randolph's publications: https://www.researchgate.net/profile/Randolph-Baral

Randolph's website all about variation, for a deep dive: http://vetbiologicalvariation.org/further-information-committee-members

The day job: https://www.catvet.com.au And an article about what we've discussed:

Received: 26 May 2020 | Accepted: 25 September 2020
DOI: 10.1111/jvim.15929

Journal of Veterinary Internal Medicine Open Access
ACVIM American College of Veterinary Internal Medicine

REVIEW

Current and emerging concepts in biological and analytical variation applied in clinical practice

Bente Flatland[1] | **Randolph M. Baral**[2] | **Kathleen P. Freeman**[3]

[1]Department of Biomedical and Diagnostic Sciences, College of Veterinary Medicine, University of Tennessee, Knoxville, Tennessee

[2]Paddington Cat Hospital, Paddington, New South Wales, Australia

[3]Syn Laboratories – Veterinary Pathology Group (VPG), Torrance-Diamond Diagnostic Laboratories, University of Exeter, The Innovation Centre, Exeter, UK

Correspondence
Bente Flatland, Department of Biomedical and Diagnostic Sciences College of Veterinary Medicine A205 2407 River Drive Knoxville, TN 37996.
Email: bflatlan@utk.edu

Abstract

A single laboratory result actually represents a range of possible values, and a given laboratory result is impacted not just by the presence or absence of disease, but also by biological variation of the measurand in question and analytical variation of the equipment used to make the measurement. Biological variation refers to variability in measurand concentration or activity around a homeostatic set point. Knowledge of biological and analytical variation can be used to facilitate interpretation of patient clinicopathologic data and is particularly useful for interpreting serial patient data and data at or near reference limits or clinical decision thresholds. Understanding how biological and analytical variation impact laboratory results is of increasing importance, because veterinarians evaluate serial data from individual patients, interpret data from multiple testing sites, and use expert consensus guidelines that include decision thresholds for clinicopathologic data interpretation. The purpose of our report is to review current and emerging concepts in biological and analytical variation and discuss how biological and analytical variation data can be used to facilitate clinicopathologic data interpretation. Inclusion of veterinary clinical pathologists having expertise in laboratory quality management and biological variation on research teams and veterinary practice guideline development teams is recommended, to ensure that various considerations for clinicopathologic data interpretation are addressed.

KEYWORDS
critical difference, dispersion, homeostatic set point, individuality, individualized reference interval, reference change value

1 | INTRODUCTION

Biological variation (BV) refers to variability in measurand concentration or activity around a homeostatic set point (HSP). Variability is a result of innate physiological factors and may or may not exhibit daily, monthly, or seasonal biological rhythms.[1] Fluctuation around HSPs is assumed to be random, and BV is represented mathematically by coefficients of variation (CV) calculated from BV study data.[2]

Abbreviations: BV, biological variation; CD, critical difference; CV, coefficient of variation; CV_A, analytical variability; analytical coefficient of variation; CV_G, between-individual biological variation; CV_I, within-individual biological variation; Dev, deviation; HSP, homeostatic set point; II, index of individuality; iRI, individualized reference interval; pRI, population-based reference interval; QCM, quality control material; RCV, reference change value.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.
© 2020 The Authors. *Journal of Veterinary Internal Medicine* published by Wiley Periodicals LLC on behalf of American College of Veterinary Internal Medicine.