

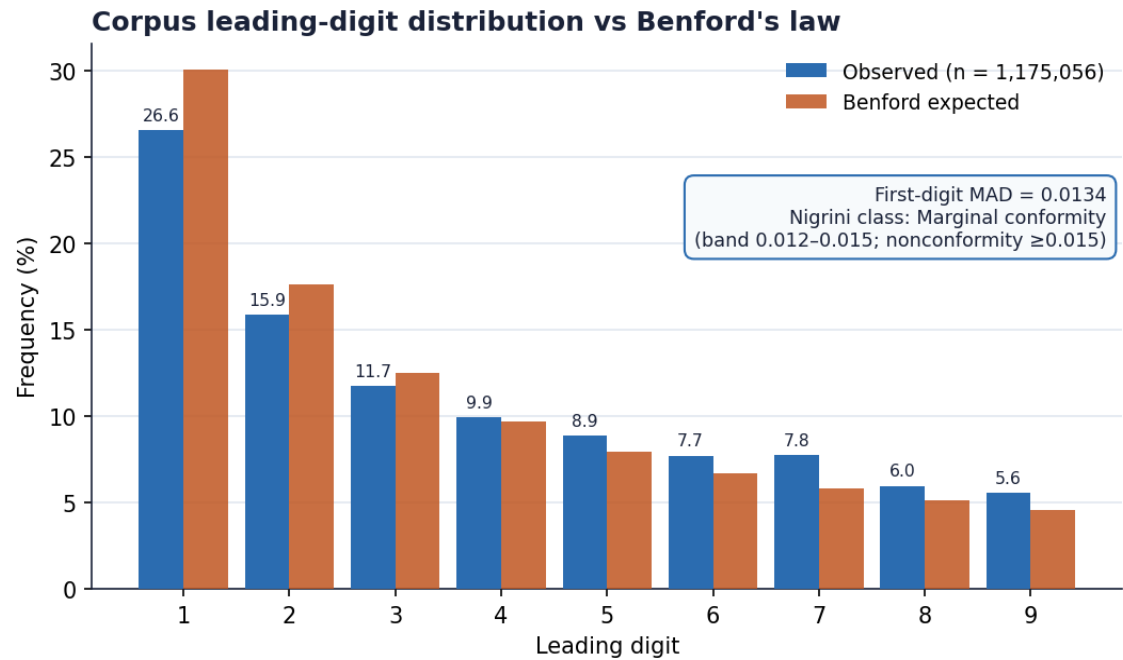
# Benford Screening of 1.2 Million Meta-Analytic Values Finds No Corpus-Level Digit Anomaly

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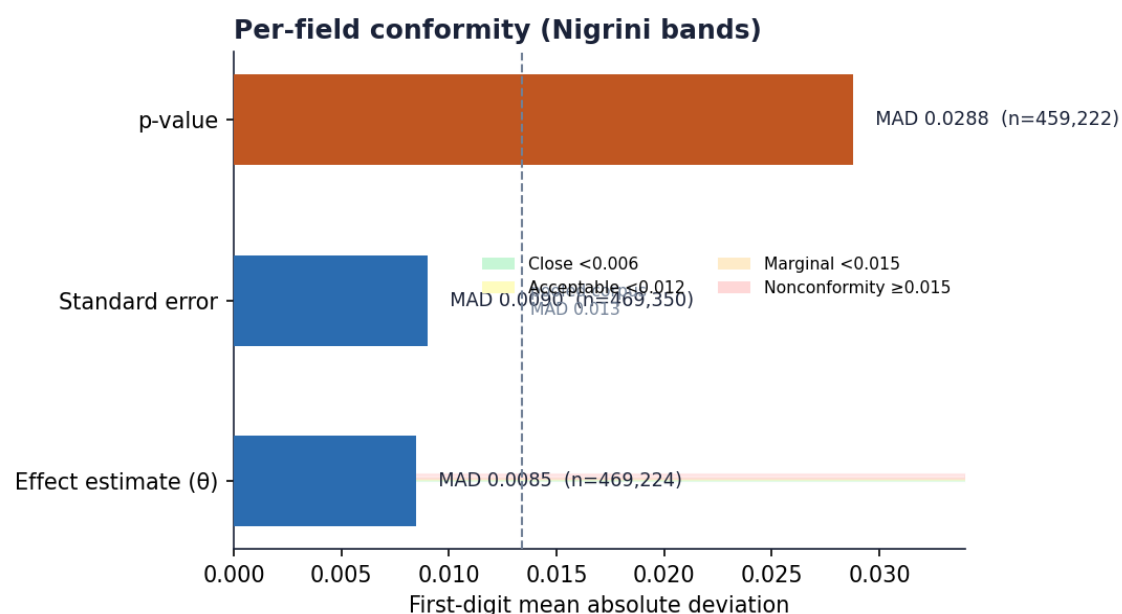
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**Primary estimand:** first-digit mean absolute deviation (MAD) · **Type:** methods

Do the numerical outputs of large-scale meta-analytic workflows follow Benford's law, or do they show corpus-level anomalies that might signal data-integrity concerns? We extracted leading digits from 1,175,056 values — point estimates, standard errors, and p-values — across the Pairwise70 corpus of 403 Cochrane review specifications. Digit frequencies were compared with Benford expectations using the Nigrini mean absolute deviation, chi-squared testing, and mantissa-arc uniformity, per field and pooled. The corpus first-digit mean absolute deviation was 0.013 (95% CI 0.013–0.014), within Nigrini's marginal-conformity band, although the million-value sample made the omnibus chi-squared and mantissa tests reject uniformity. Effect-estimate and standard-error fields conformed (MAD  $\approx$  0.009), p-values deviated as expected for a bounded quantity, and no review exceeded the critical threshold after Bonferroni correction. At corpus level these Cochrane outputs show no digit anomaly suggesting systematic fabrication or computational distortion in the meaningful effect-size and precision quantities. Benford screening is indirect and cannot detect fabrication that deliberately preserves expected digit frequencies.



**Figure 1.** Corpus leading-digit distribution (n = 1,175,056) vs Benford's law. First-digit MAD = 0.0134 (Nigrini marginal conformity).



**Figure 2.** Per-field first-digit conformity. Effect estimates and standard errors conform; p-values deviate as expected for a bounded quantity.

## References

1. Nigrini MJ. Benford's Law: Applications for Forensic Accounting, Auditing, and Fraud Detection. Hoboken, NJ: John Wiley & Sons; 2012.
2. Cochrane Database of Systematic Reviews (CDSR). London: The Cochrane Collaboration / John Wiley & Sons. Source of the Pairwise70 specification corpus.

## Statements

**Funding:** None. **Competing interests:** None declared.

**Data availability:** No patient-level data; publicly available aggregate records (Pairwise70 / Cochrane CDSR specifications). Code: <https://github.com/mahmood726-cyber/benfordma>

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