

Appendix D

Glossary of Terms

Bioassay (biological assay): A statistical procedure for comparing the potency of two or more preparations via the biological response they produce in living subjects.

Blank contrast: In a slope-ratio assay, the contrast testing whether the fitted linear dose–response relation, extrapolated to zero dose, agrees with the response actually observed at the blank (zero) dose.

Carry-over effect: In a cross-over design, the residual effect of a treatment given in an earlier period that persists into a later period, potentially biasing within-subject treatment comparisons.

Combined regression contrast: In a parallel-line assay, the contrast estimating the common slope shared by the standard and test dose–response lines.

Condition of similarity: The requirement that a test preparation behave, over the tested dose range, exactly as some fixed dilution of the standard preparation — i.e., same mechanism, linear (or otherwise correctly specified) dose–response relationship, and parallel/common-intercept lines.

Dosage metameter: A transformation of the administered dose (e.g. log-dose, or dose raised to a power λ) chosen to linearize the dose–response relationship.

Direct assay: An assay in which the dose required to produce a specified response is observed directly on each subject.

ED50 / LD50: The median effective dose / median lethal dose — the dose producing a response (or death) in 50% of the subject population.

Fieller’s theorem: A method for constructing exact confidence/fiducial limits for the ratio of two (possibly correlated) normally distributed estimators, by inverting a quadratic inequality.

Fiducial limits: Interval estimates constructed via R. A. Fisher’s fiducial inference framework; in bioassay, most commonly obtained via Fieller’s theorem and, numerically, closely related to (though philosophically distinct from) frequentist confidence intervals.

Indirect assay: An assay in which dose is fixed by the experimenter and response is observed, in contrast to a direct assay.

Intersection contrast: In a slope-ratio assay, the contrast testing whether the two preparations’ individually-fitted (non-blank) regression lines share a common intercept.

Parallelism contrast: In a parallel-line assay, the contrast testing whether the standard and test preparations’ dose–response lines have the same slope.

Potency, relative: The ratio $\rho = d_S/d_T$ of doses of standard and test preparations that produce the same expected response.

Preparation contrast: In a parallel-line (or slope-ratio) assay, the contrast comparing the overall mean response level of the two preparations, ignoring dose.

Probit: The inverse of the standard normal CDF applied to a response proportion (traditionally with 5 added to avoid negative values), used to linearize quantal dose–response data.

Quantal assay: An assay in which the individual response is binary (e.g. alive/dead), analyzed via the proportion responding at each dose.

Slope-ratio assay: An indirect quantitative assay using a power dosage metameter, in which potency is estimated from the ratio of two regression slopes, typically requiring an explicit blank (zero) dose.

Tolerance: An individual subject's threshold dose at which a specified response occurs; the tolerance distribution across a population underlies both direct and quantal assay theory.

Washout period: In a cross-over design, the time interval between treatment periods during which no treatment is given, intended to allow any residual effect of the first treatment to dissipate before the second treatment period begins.

Welch–Satterthwaite approximation: A practical method for approximating the degrees of freedom of a t -like statistic when comparing two means with unequal, unknown variances (the modern computational implementation of the Behrens–Fisher–Sukhatme approach).