

Standard Practice for Rating-Scale Measures Relevant to the Electronic Health Record¹

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1. Scope

1.1 This standard addresses the identification of data elements from the EHR definitions in Guide E 1384 that have ordinal scale value sets and which can be further defined to have scale-free measurement properties. It is applicable to data recorded for the Electronic Health Record and its paper counterparts. It is also applicable to abstracted data from the patient record that originates from these same data elements. It is applicable to identifying the location within the EHR where the observed measurements shall be stored and what is the meaning of the stored data. It does not address either the uses or the interpretations of the stored measurements.

2. Referenced Documents

2.1 ASTM Standards:

- E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods²
- E 456 Terminology Related to Quality and Statistics²
- E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method²
- E 1169 Guide for Conducting Ruggedness Tests²
- E 1384 Guide for Content and Structure of the Computer-Based Patient Record³

3. Terminology

3.1 *Definitions*—Full definitions and discussion of Scale-Free Measurement Terms are given in Annex A1.

3.2 Definitions of Terms Specific to This Standard:

- 3.2.1 *adaptive measurement*—advantage of measurement to account for missing data.
- 3.2.2 *additivity*—rating scale adherence to associativity and commutability.
- 3.2.3 *bias analysis*—investigation of considerations relative to subject or area of performance.
- 3.2.4 *calibration*—process of establishing additivity and reproducibility of a data set.

3.2.5 *concatenation*—process of measurement uses enumerated physical unit quantities equal to the magnitude of the measured item.

3.2.6 *construct*—name of the conceptual domain measured.

3.2.7 *convergence*—closing of the differences in sequential measure estimates.

3.2.8 *counting*—basic activity upon which measurement is based and utilizes enumeration.

3.2.9 *data*—observation made in such a way that they lead to generalization.

3.2.10 *data quality/ statistical consistency/ model fit*—establishment of whether the measuring instrument is affected by the object of measurement.

3.2.11 *determinism*—measurement model that requires counts to be sufficient for reproducing the pattern of the responses over the length of the instrument.

3.2.12 *dimensionality*—property of having multiple components of a measured value.

3.2.13 *equality/coccalibration*—process of ensuring that different instruments measure the same property.

3.2.14 *error*—uncertainty of measured properties.

3.2.15 *estimation algorithms*—mathematical specification of an observational framework.

3.2.16 *incommensurable/commensurable*—measure value of the same quantity does/does not depend upon rating/responses of the rating construct and does not/does remain constant.

3.2.17 *instrument*—sensing device having a defined scale.

3.2.18 *intra and inter-laboratory testing*—variability testing using the same setting/measure/operator as opposed to different setting/measure/operators.

3.2.19 *item response/latent trait theory*—analytic models that forego prescriptive parameter separation, sufficiency and scale and sample free data standards for additional descriptive parameters.

3.2.20 *items/item-bank*—part of survey statements/test questions for adaptive administration.

3.2.21 *levels of measurement*—nature of scale of measurement.

3.2.22 *logit*—scale unit using logarithms of odds ratios. ($P/1-P$).

¹ This practice is under the jurisdiction of ASTM Committee E31 on Healthcare Informatics and is the direct responsibility of Subcommittee E31.19 on Electronic Health Record Content and Structure.

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² *Annual Book of ASTM Standards*, Vol. 14.02.

³ *Annual Book of ASTM Standards*, Vol. 14.01.