replace, sound pathophysiological considerations. Clinical chemistry is not only an analytical discipline. There is also inter alia a responsibility that, in general, assays are planned with respect to the patients' medical and biochemical situation, and that the values are interpreted in the light of changes resulting from adaptation mechanisms in disease—a responsibility shared with our colleagues and collaborators in the clinical disciplines.

References

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Why Not Use the Standard Deviation Index as a Common Scale for Data Quantification?

To the Editor:

Several hundred tests with numerical results are run daily in some clinical laboratories, as well as special tests referred to outside organizations. Because more tests are expected to come into existence in response to various needs, a rapid increase in the total number is inevitable. For basic ones, it is necessary to memorize approximate figures for normal values, which are used in assessing the results. Naturally, it is impossible to memorize all normal values, and one may well resort to whatever system is available for dealing with this problem.

Normal values differ according to the method of determination and the unit used. As an example of the latter, a serum calcium concentration of 100 mg/L is equivalent to 5 mEq/L and 2.5 mmol/L. In the case of enzymes, differences in reported values and normal reference intervals are more marked, causing great confusion, because results depend on the matrix, the buffer solution used, the temperature, and various other conditions. Nevertheless, technically caused variations in values within each institution have markedly decreased as a result of use of various modern analyzers, although values may differ according to the device and the standard serum used.

Even within the same institution, it often is impossible to follow cases over a long period on the basis of the same criteria, because results of a test change markedly when one method, reagent, or device is replaced by another.

Although this situation is considered inevitable and acceptable in laboratories, such discrepancies are troublesome for those who use these data clinically, so there is a strong desire to have a common method for data quantification that is applicable to all tests, if possible, and that will not be influenced by methodological conditions such as the principle, unit, device, and standard.

Of the various methods proposed and tried for this purpose, I consider the standard deviation index (SDI) most suitable. This system is already in use as a criterion for indicating the accuracy of interlaboratory programs sponsored by the College of American Pathologists. Specifically, the target value (m) adopted for all participating institutions, its standard deviation (SD), and the test value (x) for a particular institution are obtained for the same item and method, and the SDI for that institution is calculated by the following equation:

\[ \text{SDI} = \frac{(x - m)}{SD} \]

The SDI indicates how large the difference is between \( x \) and \( m \), expressed in SD units. Use of the SDI obviates all of the above-mentioned methodological effects, and the degree of deviation of the value for each institution from \( m \) is clearly shown in terms of the same criterion.

When values for a test in a healthy population are collected, the mean value \( m \) and its SD are calculated after appropriate mathematical transformation to produce a normal distribution curve, and the subject's value \( x \) is then expressed in terms of the SDI. For all items, this index has a mean value of 0 (corresponding to the value \( m \) of the item), and all normal values fall within the range of \(-2 \) to \(+2 \), on the basis of which the value of \( x \) is judged.

Advantages of this method are:
- Because the normal values for all test items are identical, it is not necessary to memorize and indicate the value for each item, as in current practice.
- Values are not subject to changes in determination conditions, and if past values are similarly converted, long-term changes in the same item can be followed up by the same criteria.
- When multiple items from different laboratory fields, such as blood glucose and leukocytes, are simultaneously determined on the same subject, mutual numerical comparison and calculation among the values is simple and easy.
- The method is convenient to use to indicate an overall pattern, by plotting values for multiple tests on the same diagram with the same scales to show the degree of deviation of each test from normal.

In using SDI, we have found it to be particularly advantageous in (a) diagrammatic presentation of laboratory results, (b) dynamic indication of results in color for each specified interval, and (c) quantitative automatic interpretation of pathophysiological conditions (1–3).

On the other hand, data are measured in relative values in this indication, so it is inappropriate for focusing attention on differences among districts or laboratories.

References

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Quality-Control Materials for Use with Monitors of Blood Glucose: "Reflowx II" (Boehringer Mannheim) and "Sugar-Chex" (Streck Laboratories) Controls

To the Editor:

We previously (1) cautioned care