created in KWIKSTAT can be output in standard ASCII format, and they can be directly read by dBASE III. Most of the graphical procedures are of high resolution and pixel-based.

KWIKSTAT is a menu-driven statistical analysis system for the IBM PC and compatibles. With KWIKSTAT you may read or create dBASE–III–type (DBF) files with as many as 128 variables. Missing values are supported, and you may perform an almost unlimited variety of transformations on the data. Data may also be entered from the keyboard or from any ASCII text file. Simple reports may be output using all of the data or subsets of the data. Extensive descriptive statistics and sophisticated graphical analyses such as histograms, box plots, scatterplots, and a three-dimensional bar chart are available. Statistical tests include t tests (equal and unequal variance), one-way analysis of variance (both independent and paired or repeated measure data), chi-squared analysis, Fisher's exact test, goodness of fit, simple and multiple linear regression, and survival analysis. Significance levels (p values) are calculated with each test. Multiple-comparison tests and box plot comparisons are available with the analysis-of-variance procedure. KWIKSTAT is used in university courses; it is an inexpensive way for college students to learn and own a program that they can use on the job. Quantity discounts are available.

KWIKSTAT requires an IBM PC or a compatible computer (including the new PS/2 series) with at least 256 K of memory and DOS 2.0 or higher. A CGA or compatible monitor is recommended (including monochrome graphics and EGA, PGA, and VGA monitors). A hard disk is required to run the entire program, but individual modules may be run from floppy disks.

A full KWIKSTAT package with registration is available for $39 postpaid, and a diskette pair with a short manual on disk is available for $16 postpaid, from Mission Technologies, P.O. Box 1169, Cedar Hill, Texas 75104, (214) 291-2115.

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PASS: A Quick and Easy Power and Sample-Size Calculation Program

PASS provides researchers with a simple, accurate means for calculating power and sample size without cumbersome tables and messy calculations. PASS is screen-oriented, making input fast and output easy to interpret. Its "user-friendliness" makes it ideal for researchers with little computer background, yet even experienced statisticians will find that it has substantial breadth.

PASS uses methods described by Lachin (1981), with some expansion for greater accuracy and flexibility. Calculations for the following experimental situations are available: one- and two-sample comparison of means and proportions (with or without paired observations), one- and two-sample comparison of correlation coefficients, and two-sample comparison of mean survival times (with or without specification of subject accrual time and/or trial length). PASS features fast, accurate computations and internal error routines to prevent needless program termination. High precision is aided by routines found in Maindonald (1984). PASS has been verified for accuracy by Fleiss (1973), Lachin (1981), Duffy (1984), and Snedecor and Cochran (1980), and it is presently being used professionally.

PASS is an executable BASIC program occupying 56 K of memory, and it is accompanied by documentation files that are accessed by PASS. It is designed for use on IBM PC/XT/AT computers and compatibles. The PASS diskette will be delivered upon receipt of a $75 check made out to Methodist Hospital of Indiana. Versions of PASS for both monochrome and color monitors will be included.

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Expected Mean Squares on MS–DOS

An interactive program for calculating the expected mean squares for balanced designs was developed for use on a Tektronix 4054 desktop computer (Engeman 1982). That program used BASIC string commands that did not translate well into other forms of BASIC, including that for MS–DOS machines. The program has since been rewritten to run on MS–DOS machines. Its output has also been expanded. The new version was written in BASIC on an AT&T PC 6300 and will run on most MS–DOS machines that support BASIC.

The theoretical expected mean squares are calculated from the analysis of variance (ANOVA) model; hence, data are not used. The user is asked by the program to input the details of the ANOVA model. The notation used when interacting with the program is that which is generally used to write design models for analyses of variance. The notation and calculation procedures are in Hicks (1973). The information requested from the user includes labels for the terms in the model and the appropriate subscripts, which indicate main effects, interactions, and nesting. The user is then asked to indicate for each subscript whether it is associated with a fixed or random effect. The user also specifies the range of values for each subscript. As this information is requested from the user, a simple example is presented and referred to throughout the program to help the user understand what is being requested. After the user has completed inputting the necessary information, a table of all input information is presented. The user is then given the option of making changes or correcting mistakes.

The output consists of the table of input information and the expected mean squares for each term in the model. The user has the option to change a subscript from fixed to random or vice versa and recalculate the expected mean squares.

The program is available from us as a listing. Alternatively, those interested may send us a 5¼-inch diskette, which will be returned with the program on it. Although the program is highly interactive and includes an example in the displayed text, documentation is also available and will be included with the listing or disk. There is no charge.

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A Relative Survival Analysis Package

A computer-program package has been developed for survival analyses for chronic diseases using either patient data or aggregate data. The package produces standard life-tables as well as the annual and cumulative relative survival ratio (the major feature). The relative survival ratio is the ratio of the observed survival rate to the expected survival rate in the general population with the same age, sex, and calendar birth-date as the patient group. This quantity is used to adjust for the effects of mortality attributable to the competing risks of death. The package allows the user to produce life tables and plots of survival for subsets of the patient group, which can be defined by as many as five variables. The package contains three alternative methods of estimating the relative survival ratios and two ways of estimating the expectation of life for the patients (Hakulinen and Abeywickrama 1985).

The package allows these subgroups to be tested for differences in survival by five different methods (Hakulinen, Tenkanen, Abeywickrama, and Paivarinta 1987). The modeling of the hazard function as a combination of additive terms (the expected hazard) and multiplicative terms (the prognostic factors) can be achieved by using the GLIM statistical package. The package produces a data file that contains the patient data and the expected probabilities of survival and is read and analyzed by the supplied GLIM macro (Hakulinen and Tenkanen 1987).

Users must provide the patient data file, the general-population mortality-rate data file, and parameter files to define the input files, the analyses required, and the output required. The package consists of 3,000 lines of FORTRAN code.

The package requires an IBM microcomputer or a compatable computer with a hard disk, an 8087 or 80287 coprocessor, and 640 K of RAM. It is provided on two floppy disks (320 K) with a test data set of 3,246 records. The package is also available for the VAX computer using the VMS operating system and is provided on tape. A 33-page manual and future updates are supplied. The cost is $100 for academic users and $200 for nonacademic users. The microcomputer version may be obtained from the first author. The VAX version is available from both authors.

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NCSS–Graphics: An Advanced Statistical Graphics Package for MS–DOS Microcomputers

NCSS–Graphics is an MS–DOS graphics program that adds many of the latest statistical graphics techniques to the NCSS system. The program includes one-, two-, three-, and multi-dimensional plots.

One-dimensional graphics routines include regular or notched box plots and density traces.

Two-dimensional graphics routines include regular scatterplots, up to tenth-order polynomials, least squares line and confidence limits, lowess smooth curves, brushing, multiple plots per screen (including "Draftsman's Display"), "Casement Display," decomposition (polynomial and residuals) display, and sunflower plots. With brushing, you may interactively select points to be highlighted or omitted. As many as 100 plots per screen may be displayed.

Three-dimensional graphics routines include presentation-style plots as well as real-time point cloud rotation. The first type displays data points, axis projection lines, and grid lines in the standard three-dimensional format. The axis projections may be lines or spikes. It allows discrete variables to be displayed as ridges. A regression plane may be displayed along with lines representing the size of the residuals. The plot may be rotated.

The second three-dimensional plot type is the spinning point cloud. The direction of the spin is controlled by the cursor-control keys. Using a cursor-controlled selection box (brush), you can select various points and change their color or shape. As many as nine of these three-dimensional point clouds may be displayed at once. A fourth variable may be displayed as the symbol of color of the point. To improve your orientation, the axes or a surrounding cube may be displayed.

Four high-dimensional graphics routines are included. These are the star plot, Andrew's function plots, Chernoff faces, and parallel

