SIMULATION STUDIES ON INCREMENTS OF THE TWO-SAMPLE LOGRANK SCORE TEST FOR
SURVIVAL TIME DATA, WITH APPLICATION TO GROUP SEQUENTIAL BOUNDARIES

Mitchell H. Gail

Biometry Branch, National Cancer Institute, Bethesda, Maryland

David L. DeMets

Mathematical and Applied Statistics Branch, National Heart, Lung
and Blood Institute, Bethesda, Maryland

Eric V. Slud

Department of Mathematics, University of Maryland, College Park, Md.

0.  SUMMARY

The performance of the logrank statistic, computed after successive
fixed numbers of deaths and applied to group sequential boundaries, is eval-
uated using simulation studies.  The group sequential boundaries investigated
include those proposed by Haybittle (1971), Pocock (1977), O'Brien and Fleming
(1979) and the fixed sample boundary.  The data indicate that a simple normal
model, based on the assumptions that the increments of the logrank score are
uncorrelated and homoscedastic with known variance, leads to reliable predic-
tions of size, power, and average number of groups examined, except when the
numbers at risk are very small, as in completely sequential entry.  When there
is a trend in the lifetime distribution, either in location or dispersion, the
size of some group sequential boundaries exceeds nominal levels slightly, where-
as the fixed sample logrank test is robust to such trends.  The assumptions that
the logrank increments are uncorrelated and homoscedastic with known variance
are also investigated.