Name_____
I will adhere to the Hopkins code of academic ethics.
**Signature**_____
Lecture Section (please check one):
( ) **Diener-West**   ( ) **McGready**

Biostatistics 140.623
Third Term, 2013-2014
Quiz 2
March 4, 2014

A recent study[1] compared outcomes between HIV-infected children *randomly assigned* to either **continue** or **stop** prophylaxis therapy after receiving at least 96 weeks of anti-retroviral therapy. Below are the **Kaplan-Meier survival curve estimates** ($\hat{S}(t)$) of time after randomization to *either* first hospitalization or death for the two groups.
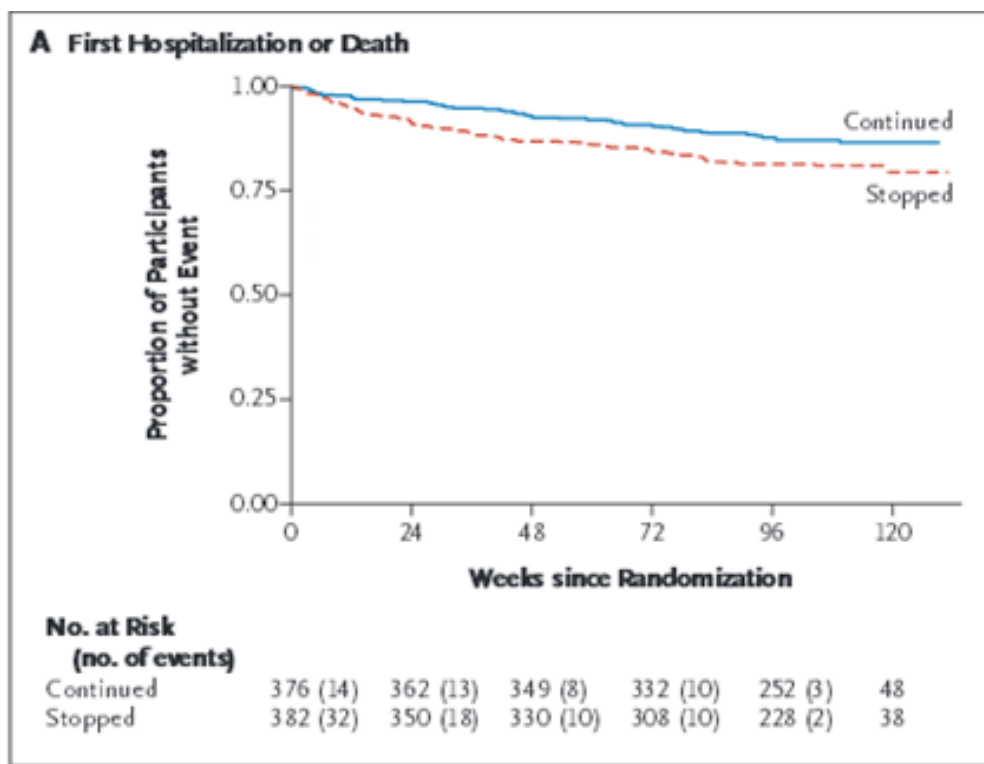
1. Approximately what is the estimated proportion of children in the "**Stopped**" group who had been either hospitalized or had died *within* 24 weeks after randomization into the study? (*Circle only one response*).

   a) 10%
   b) 90%
   c) 2%
   d) 98%
   e) 25%

[1] Bwakura-Dangarembiz M, et al. A Randomized Trial of Prolonged Co-trimoxazole in HIV-Infected Children in Africa (2014). *New England Journal of Medicine* 370 (1):41-53.

2. The p-value given by the **log rank test** comparing the two survival curves is 0.007. Assuming a significance level (alpha) of 0.05, one can conclude that the observed differences in the Kaplan-Meier curves between the two groups are: (*Circle only one response*).

   a) *Relatively likely* if there is **no difference** in survival over the study follow-up period (at the population level) for the two randomization groups.
   b) *Relatively likely* if there is a scientifically important difference in survival over the study follow-up period (at the population level) for the two randomization groups.
   c) *Relatively unlikely* if there is **no difference** in survival over the study follow-up period (at the population level) for the two randomization groups.
   d) *Relatively unlikely* if there is a scientifically important difference in survival over the study follow-up period (at the population level) for the two randomization groups.
   e) Reflecting a 0.7% chance that the null hypothesis of no survival difference is true.

3. What can be inferred about the **estimated hazard ratio (HR)** of first hospitalization or death for the children randomized to the "**Continued**" group compared to children randomized to the "**Stopped**" group? (*Circle only one response*).
   a) HR =0
   b) HR = 1
   c) HR > 1
   d) HR <1
   e) It is not possible to estimate this from the information given.

4. Three-hundred seventy-six (376) children were randomized to the "**Continued**" group, and 48 (13%) children were still at risk of hospitalization or death at 120 weeks. However, the corresponding Kaplan-Meier curve estimate at 120 weeks for this group is approximately 90%. How can this have happened? (*Circle only one response*).

   a) Some of the observations in the "Continued" group were censored prior to 120 weeks.
   b) The researchers estimated the Kaplan-Meier curve using only the data on patients who were hospitalized or died during the 120 weeks after randomization.
   c) The researchers estimated the Kaplan-Meier curve using only the data on patients who were not censored during the 120 weeks after randomization.
   d) The Kaplan-Meier estimate at 120 weeks is the risk of surviving beyond 120 weeks among only those who were at risk of having the event at 120 weeks.
   e) The hazard of hospitalization or death for the children in the "Continued" group was assumed to be constant over time.

5. How does the Kaplan-Meier approach to estimating the survival function utilize information from censored observations? (*Circle only one response*).
   a) It drops all censored observations from the sample before the curve is estimated.
   b) It uses the censored observations when considering who is "at risk" of an event at each given time in the follow-up period.
   c) It treats the censoring times as event times.
   d) It treats the event times as censoring times.
   e) It assumes that all censored observations have the event by the end of follow-up.