APPENDIX E1

Infant's risk of HIV infection at 3 months of age

Infant A is 3 months of age, with a CD4/CD8 ratio of 1.00. By using the logistic regression model, the calculated risk for HIV infection is as follows: $e^w/(1 + e^W)$, where

$$w = -1.4434 \times 1.00 + 1.5912,$$

so that the estimated risk of HIV infection is 54%, and this infant would be deemed at high risk of HIV infection. Assuming the pretest probability of HIV infection is 17% (ie, the HIV prevalence for the P^2C^2 HIV cohort), then a CD4/CD8 value of 1.00 is 32.2 (likelihood ratio for a positive test result) times as likely to occur in an HIV-infected infant as opposed to an infant without HIV, and the posttest probability of HIV infection is 87%.

Likelihood ratios of greater than 10 generate large changes from pretest to posttest probability. Likelihood ratios of 5 to 10 generate moderate shifts in pretest to posttest probability. A CD4/CD8 ratio of 1.60 or less is indicative of an important shift in pretest to posttest probability of HIV.

Infant B is 3 months of age, with a CD4/CD8 ratio of 3.00. By using the logistic regression model, the calculated risk for HIV infection is as follows: $e^w/(1 + e^w)$, where

$$w = -1.4434 \times 3.00 + 1.5912,$$

so that the estimated risk of HIV infection is 6%, and this infant would be deemed at low risk of HIV infection.

Infant C is 3 months of age, with a CD4/CD8 ratio of 2.00. By using the logistic regression model, the calculated risk for HIV infection is as follows: $e^w/(1 + e^w)$, where

$$w = -1.4434 \times 2.00 + 1.5912,$$

so that the estimated risk of HIV infection is 21%. The likelihood ratio of a positive test result is 3.2 with a posttest probability of 40%, suggesting a potentially important shift in the probability of HIV.

In summary, if the estimated HIV risk is greater than 30% (assuming HIV prevalence in the population is about 17%), then treatment could be considered; this would be any 3-month-old infant with a CD4/CD8 ratio of around 1.60 or less (infant A with a CD4/CD8 ratio of 1.00 is an example, and the posttest probability of HIV is 87%). If the estimated risk were less than 10%, then we would not treat (infant B with a CD4/CD8 ratio of 3.00). Finally, estimated risks of between 10% and 30% would fall in the indeterminate range (infant C with a CD4/CD8 ratio of 2.00), but with the posttest probability being 40%, this infant could be considered for treatment.

Clinical decision criteria are also formulated in terms of risk. We defined the risk of HIV infection between 10% and 30% (CD4/CD8 ratio, >1.70 and <2.62) as being in the indeterminate range.