Appendix

The basis for the formula, a = i + u(1– i), used to calculate non-neonatal, non-hospital (NNNH) circumcisions

Simplistically, one might presume that NNNH circumcisions could be calculated from the formula: a = i + u, in which *u* (unrecorded circumcisions) is the fraction of the entire birth cohort who receive NNNH circumcisions (and where i = circumcision prevalence in infancy as captured by NHDS data and *a* = circumcision prevalence from NHANES data for men and boys aged 14–59).

We contend, however, that this is a less useful way in which to model the problem. In our approach, we defined *u* as the NNNH-circumcised fraction of those who were capable of receiving NNNH circumcisions. If a child has been circumcised neonatally then he *cannot* receive an NNNH circumcision. (Note that circumcision revisions do not affect this analysis since we are only interested in ever-circumcised versus not circumcised.) It is therefore logical to define *u* in terms of the remaining (uncircumcised) boys.

To illustrate what we mean, let us consider a comparison between hypothetical cohorts of Jewish boys (virtually all circumcised neonatally) and a cohort of gentile boys (who, for the sake of this example, are virtually all not circumcised neonatally). (In this example, we will pretend for convenience that the Jewish bris counts as a neonatal hospital circumcision.) So let us assume that among the Jewish boys i = 0.99 and among the gentile boys i = 0.01. But we would expect *a* to be higher than *i* in each group, since a certain fraction of uncircumcised boys will require later circumcision for medical reasons. For convenience, we will posit that *a* = 0.991 in Jewish males and a = 0.10 in gentile males. So in our model, where *u* is the fraction of uncircumcised boys, *u* should be similar in each group. This seems a reasonable assumption to make in the absence of evidence of genetic associations with, say, phimosis. But in the simplistic model shown in the first paragraph above, *u* will be 90 times greater in gentile boys (i.e., 0.001 in Jews and 0.09 in gentiles).

From a mathematical perspective, it is also desirable to define the terms in such a way that the impossible cannot happen. In our model, since u is multiplied by $1 - i$, and both are proportions, the sum of the two can never exceed one. In other words, we can never predict that more than 100% of adults can be circumcised.

As should be appreciated from the explanation and example above, the simplistic formula shown in the first paragraph is a less useful way in which to model the problem and therefore for predicting the value of a. We trust that the explanation above will assist the reader in understanding the formula we developed for the calculations undertaken.