This response was submitted to the consultation held by the Nuffield Council on Bioethics on the Forensic use of bioinformation: ethical issues between November 2006 to January 2007. The views expressed are solely those of the respondent(s) and not those of the Council.

A P Dawid

List of questions

5. The evidential value of bioinformation

a. *What should be done to ensure that police, legal professionals, witnesses and jury members have sufficient understanding of any forensic bioinformation relevant to their participation in the criminal justice system?*

The conceptual and methodological bases for interpreting such information are subtle and complex, and in particular involve non-trivial understandings and applications of probability and statistical argument. A major difficulty is that even the existence of such subtleties is scarcely appreciated by lay people – instead there is a prevalent attitude that any fool can understand statistics. An example of this was when, having submitted expert reports to the court in the first Sally Clark appeal, I and another expert statistical witness were not allowed to present oral testimony to the Court of Appeal, on the grounds that "it was hardly rocket science" and would "only be argumentative". The written judgment showed that the Court had failed to grasp the relevant statistical issues --- and moreover had failed to grasp that it had failed to grasp them. The first major hurdle will therefore be to work towards removing such utterly misplaced confidence, and allowing an unprejudiced hearing to those who understand the issues. Initiatives should also be undertaken to provide suitable training to judges, police investigators, *etc*., to make them aware of the most fundamental issues (such as the "Prosecutor's Fallacy"; the role and use of base rates and likelihoods; the problems of interpreting "matches" obtained by a database search; the synthesis of identification and other evidence in a case, ...), so that they will at least know when expert advice is needed. The Royal Statistical Society has established a working party on "Statistics and the Law", engaging professionals from both sides, which is, I believe, considering such initiatives.

I am attaching two papers of mine that discuss and analyse these conceptual difficulties in more detail. STATISTICS AND THE LAW is a general overview, being the text of a lecture I delivered at Darwin College Cambridge on 27 February 2004; this will be appearing in the book of the Darwin College series on "Evidence". COMMENT ON STOCKMARR'S "LIKELIHOOD RATIOS FOR EVALUATING DNA EVIDENCE, WHEN THE SUSPECT IS FOUND THROUGH A DATABASE SEARCH" has been published in revised form in *Biometrics*, 2001; vol. **57**, 976-980. This paper demonstrates that the conceptual issues of making due allowance for having obtained a match through a database search are far from trivial.

b. *How much other evidence should be required before a defendant can be convicted in a case with a declared DNA match? Should a DNA match ever be taken to be sufficient to prove guilt in the absence of other evidence?*

DNA evidence can be extremely strong, and in principle there is no reason why it could not be used to convict, even in the absence of other evidence. However the above cautions about the appropriate use and interpretation of such evidence must be scrupulously heeded. It will also be essential to establish beyond any reasonable doubt any asserted links between samples and sources, as well as to take account of possible biasing effects such degradation of samples or laboratory error.

It is perhaps not widely understood that in cases revolving around familial relationships, such as disputed paternity, or identification when only relatives of the suspect have been typed, the discriminatory power of DNA profiling is generally very very much weaker than it is for direct matching of samples from a crime scene and a suspect. In such a case great care must be taken to perform appropriate analyses, and not to overstate the strength of the evidence.