Health implications and counselling for paternity testing

MJ Kotze1, CL Scholtz1 and P Opperman2
Genecare Molecular Genetics (Pty) Ltd., Cape Town and 2 Pretoria

Correspondence to: Dr Maritha Kotze, PO Box 15743, Vlaeberg, 8018
Tel: 021 424 6504, Fax: 021 422 5539, E-mail: mk@genecare.co.za

SA Fam Pract 2006;48(1): 34

Introduction
Identification and parentage testing using DNA technology has become an important tool in both the legal and medical fields. It is used by the legal fraternity to resolve will and maintenance disputes, criminal investigations and immigration decisions. Identity testing in the clinical field involves twin studies, paternity determination after hospital mix-ups, as well as gamete and embryo identification after possible laboratory errors.1 When two baby boys were inadvertently exchanged at birth by hospital staff in a provincial hospital in South Africa in 2004, DNA testing of the mothers and babies was essential to make the correct matches.

In a study by researchers in Liverpool, performed in men and women wanting proof of paternity from testing as well as studies based on genetic health screening, it was found that rates of cases where a man was not the biological father of his child was on average one in 25, ranging from 1% in some studies to as much as 30%.2 Increasing paternity testing and use of DNA techniques in clinical and judicial procedures implies that paternal discrepancy will be identified increasingly.

Paternity test
Paternity testing is based on the fact that a child inherits half of his/her DNA from the mother and half from the father.3 The fundamental basis of paternity exclusion is that if there are a sufficient number of paternal “obligate” alleles (more than 2) absent from the DNA profile of the alleged father, this would provide evidence against paternity.

Currently, the most popular DNA technology used in paternity testing concerns short tandem repeat (STR) DNA markers which consist of short, repetitive DNA elements 3 to 7 base pairs in length. These highly polymorphic repeats are widely distributed throughout the human genome and are easily detected using polymerase chain reaction (PCR) technology. After amplification, the repeats are detected by computer at the laboratory.

Interpretation of results
In cases where the “obligate” paternal allele differs at only one or two loci, caution should be used in interpreting the results since a mutational event could have occurred. Interpretation of results is based on the finding that DNA markers present in the father’s genetic profile cannot be found in the profile of the child. However, since false inclusion is possible when the mother’s sample is not tested, analysis of all parties involved are preferred.

Legal implications
Establishing paternity may be easy enough with one quick genetic test, but issues around the number and relationship of the individuals being tested is not so simple. When paternity testing is requested without the knowledge or consent of both parents, the person requesting the test must be a legal custodian of the child. In other words the couple should still be married or custody provided to the father in a court case. For the results to stand up in court, the sample collection should preferably be done in the presence of a commissioner of oath and an affidavit provided which states that the correct procedure has been followed for sample collection and analysis of the samples. This approach is important as deliberate mislabelling of a specimen is possible; for instance in an attempt to avoid the obligations of paternity.

Conclusions
The cheek sample collection procedure is quick and painless and the paternity testing kit, containing the swabs and test request forms can be ordered online (www.genecare.co.za). Sample collection can be conducted at a clinic, the doctor’s consulting room, or in the comfort of the client’s home, provided that at least two witnesses are present and sign the test request form to verify that the origin and labelling of the specimens are correct. However, if the results are required to resolve legal disputes, the samples have to be taken in the presence of a commissioner of oath. DNA testing provides an accurate answer but no-one should have to deal with the results without any support. In our experience, explaining the results and how the test was performed in simple terms, can substantially release the stress experienced by those who have to cope with the outcome of a paternity test.

Acknowledgements
Emeritus Professor Peter H Beighton, University of Cape Town, is thanked for critical appraisal and comments on the manuscript.

References