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LETTER TO THE EDITOR

Comments on the review of low copy number testing

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Dear Sir,

A challenge to the reliability of low copy number (LCN) DNA profiling in the trial of Sean Hoey in Belfast Crown Court in Northern Ireland (*R v Hoey* [2007] NICC 49, 20 December, 2007) prompted the UK's new Forensic Science Regulator (Andrew Rennison) to commission a review of low template DNA profiling techniques. That review [2], conducted by Professor Brian Caddy (with the assistance of Dr. Adrian Linacre and Dr. Graham Taylor) was released on 12 April, 2008 and concluded that LCN DNA profiling is "robust" and "fit for purpose." Yet, the review accepts that the evidence presented in Sean Hoey's trial was insufficient to establish the validity of the technique. It also enumerates 21 recommendations for specific improvements that should be undertaken to improve the methodology, including such basic steps as the development of a consensus on the interpretation of test results and efforts to establish "best practices" for interpretation.

We believe the conclusions of the review are inconsistent with its recommendations in a number of respects. For example, it is difficult to see how a forensic technique could be deemed adequately validated for use in the courtroom when there is not yet a consensus on how its results should be interpreted. The review thus raises important issues about what it means for a forensic science technique to be validated. It also establishes grounds for concern about the way that LCN DNA test results have been interpreted in earlier cases.

We are concerned that the review team relied only on input regarding the merits of LCN approaches from organizations that are dedicated to promoting its use by law enforcement. Consultation with known critics of the technique (or even a review of their published works) would have provided the reviewers with a broader perspective of what work remains to be done before the approach can become generally accepted within the international scientific community. There are in fact things about LCN approaches upon which the reviewers and critics do agree. For instance, caution that "[p]ublicizing the potential of the application of LCN typing without describing its limitations may cause misunderstanding" [1] which is consistent with the review's recommendations 1, 3, and 13. But given the conclusion that "[t]he method cannot be used for exculpatory purposes" [1], the review's ultimate conclusion that LCN testing is "fit for purpose" leaves the important but unanswered question of "what *is* that purpose?"

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We agree with Budowle et al. [1] that limited application of LCN analysis (such as for the generation of investigative leads or for the typing of single-source samples where exogenous DNA can be removed) may be warranted at the present time. We also agree with the DNA Commission of the International Society of Forensic Genetics that concludes that there is "a significant need for continuing education and research into" LCN reporting [3]. However, the stochastic effects associated with small amounts of template (e.g., allelic dropout and drop-in, exaggerated peak height imbalance, and stutter) coupled with the diminished ability to ascertain the tissue source of DNA samples or how long they have been associated with an article dramatically reduce the weight that can be attached to the finding of an LCN DNA profile match. Given the acknowledged lack of consensus in interpretation (among other concerns) as well as the availability of viable alternative approaches such as mtDNA testing and mini-short tandem repeats (STRs), it is unlikely that LCN tests based on STR loci will be embraced by crime laboratories in the US or that such results would be deemed to be admissible if they were challenged. Superficial characterizations such as "robust" and "fit for purpose" are a denial of the serious scientific questions that remain about the reliability and validity of LCN testing and we hope that the recently published review is not the last word on this topic.

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