



'Beyond reasonable doubt' or 'on the balance of probabilities' Laboratories and the legal system

Introduction (why all the fuss?)

In the current climate of accountability and litigation in Australia, laboratory staff are increasingly being called upon to justify their professional behaviour in court.

Laboratories receive and occasionally collect samples, perform tests and provide results which they are sometimes asked to interpret in a court of law. The intent of the test is usually, but not always, clear. The results may be used to determine the extent of commercial or regulatory compliance as part of dispute resolution, as evidence during prosecution, or in a formal enquiry

Samples may be collected for one purpose, (for example investigation of a food-borne disease outbreak under a Health Act¹) and then used for another (e.g. prosecution under a Food Act). This may lead to complications as the sample handling requirements may not be uniform across both areas.

Laboratories are, or should be, familiar with ensuring overt errors such as sample mix-up or cross contamination are avoided. They may be less familiar with ensuring that their work will withstand what is essentially forensic scrutiny. What follows is written by microbiologists, not lawyers, and is intended to generate thought and discussion surrounding the issues raised. The view is taken that, rather than grumble about the legal requirements, it is best to understand and accommodate them in day-to-day work procedures where feasible. If this is not possible, then this should be recognised and acknowledged at the outset.

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Some ways into court (there are many)

Regulatory/compliance testing

An adverse result classifying a product as being out of specification could cause a company to reject, destroy, rework or recall a product – all at great inconvenience and expense. Laboratories may be called on to defend their results, especially if the findings are unexpected, cause great inconvenience and expense or if duplicate sampling and testing elsewhere has led to discordant results.

Prosecution by authorities and coronial inquiries

Preparing for criminal cases is routine for forensic laboratories which regularly deal with blood and other samples for DNA testing and the like. This is not so with microbiology laboratory staff who may find they are increasingly involved in court as the desire to prosecute increases, for example under the Food Acts, or where bioterrorism is suspected.

The difficulties which may be encountered when there is doubt as to the quality and significance of laboratory reports are well illustrated by the doubts surrounding forensic results in *Chamberlain v R*², which are considered in detail by T R Morling in the 1987 Report of the Royal Commission of Enquiry into the resulting convictions.

Civil action

Successful class actions arising from food poisoning outbreaks in Australia, such as occurred following consumption of contaminated pork rolls, peanut butter, oysters and orange juice, to name but a few, have provided an impetus for many who claim to have suffered a loss to seek compensation in court.

It is all about evidence (laboratories as evidence factories)

The input (sample), process (testing) and output (report and opinion) may all become important pieces of evidence in court relating to the proof of the fact in question. What was found and what does it mean? For example, were Salmonella in the ready to eat food and did it make John sick? Scientific evidence is not a special category of evidence and, as with other evidence, must be relevant and otherwise admissible and it must be of sufficient weight with respect to the disputed fact(s).

Laboratory procedures must ensure that the evidence is more probative than prejudicial. This raises significant operational issues for the laboratory relating to for example: sample disposition, continuity (chain of custody and specimen integrity), defence of the test result as valid (where quality issues and laboratory procedures come to the fore), and preparedness of staff to deal with all this. Consider the life of a sample received for testing.

The sample becomes an exhibit (science in the trial)

If there is any possibility of a result being used in legal proceedings, it may be wise to consider from the outset under what



specific legal authority this might be possible. Should the sample be stored? Will it in fact become an exhibit (that is an object received in evidence when tendered by one of the parties to a case) and need to be produced in court as real (physical) evidence? How must it be handled to avoid contaminating further forensic investigations (for example fingerprint analysis if criminal intent). Suitability for retention for further testing may be in doubt but retention for purposes such as identification may be appropriate.

Testimonial evidence as to sample labelling, appearance and condition may be insufficient, so, if destructive testing is required, should some alternate real evidence such as a photograph be produced? Needless destruction would not be viewed kindly. Exhibits may need to be produced by the testing laboratory for others to review prior to any hearing³. This may be years after the event.

Continuity of evidence (are you sure that there has not been a mix-up?)

Continuity of evidence, i.e, a sound chain of custody with confidence in sample integrity, is critical, since, if there is any possibility that there has been a mix-up, then a result may properly be considered to be more prejudicial than probative and is thus inadmissible.

There are many questions that may be asked: Was the sample tested the same as the one collected? Has there been any change due to storage? Have unauthorised personnel had access to specimens and are the security arrangements of the premises adequate? Can you demonstrate that tampering was not possible? The chain of custody of the sample must document the handling of the sample (time, person, place) from the time of first collection. Policies and procedures that impact on sample handling and testing must be documented and the system must be audited to demonstrate and document adherence.

Will your process stand scrutiny (quality rules!)

The report is used by the court in relation to the disputed fact either as direct evidence (i.e. if accepted, then the fact is proven) or circumstantial evidence (there will always be doubt based on this alone) and it must withstand scrutiny. Choice of test, suitability of test, evidence of validation and proper performance are critical.

Procedures need to be clearly documented and followed and there must be documentation available to show that they have been followed. Internal QC records may need to be produced along with worksheets ensuring test acceptance criteria have been adhered to and that it is clear exactly who did what, when and what they decided. Results of participation of individual staff and the laboratory overall in Proficiency Testing Programmes may be led in evidence to show proficiency or otherwise.

Choice of suitable equipment, knowledge of which equipment has been used and records of its maintenance and calibration are critical – as recently discovered with respect to the Victorian speed cameras. Calibration should take into account compliance with the *National Measurement Act 1960* (Cth) with respect to traceability to a recognised standard.

What are the implications for staff? (what might they be asked to do?)

Individual staff members must be trained and proficient – documentary evidence of this may be required. Credibility of staff as witnesses may well become an issue and staff likely to appear in court need to ensure that they have sufficient court exposure and training. Recognition as an analyst is advantageous. This will be problematic for those infrequently called.

Laboratory staff may be required to give testimonial evidence and relate the facts as they experienced them (e.g. *“I received the sample from the courier who I know as...”*). Hearsay is often not

sufficient – for example, *“Bill told me the he saw the courier drop the sample off and I then booked it in”* is not the same as Bill himself describing what happened.

Exceptions are made to this hearsay rule – for example when the laboratory scientist is asked to give ‘opinion evidence’ as an expert witness. This opinion evidence may enter into the realms of assessing what ‘might be possible’, thus involving statistical and epidemiological expertise (fully explored in the asbestos related case *Seltsam Pty Ltd v McGuinness*^{4,5}).

Proof may be facilitated by legislation allowing, for example, certificates of analysis (such as in the jurisdictional *Food Acts and Evidence Act 1995* (Cth)) but the court may be persuaded to go beyond the certificate and still call those who produced the result as witnesses.

It does really happen (are you next?)

In *R v Sing* (2002) 54 NSWLR 31, which was a criminal trial, two expert witnesses gave evidence of sample analysis where they had supervised others to carry out the relevant tests. The persons who carried out the tests were not called despite there being no apparent difficulty in calling them. Hodgson JA (with whom Levine J and Howie J agreed, stated (paragraph 34):

I think there is substance in the... complaint that to admit evidence... without the evidence from the persons who actually carried out the procedures... and indeed without any evidence that there was any difficulty in calling these persons, involved unfair prejudice... It may be that these persons would have no recollection of exactly what they did and would have to rely on records; but that is not generally sufficient justification for not calling, in a criminal prosecution, a witness involved directly in a significant part of the prosecution case.

Such a view makes the laboratory results inadmissible.

His Honour went on (para 35):

There is an obligation on the



prosecution to call all available witnesses of events alleged to constitute the offence and of essential parts of the prosecution case... I think this does extend to witnesses such as those in this case dealing with important links to the prosecution case... I do not think the matter of the correct carrying out of testing procedures should normally be proved, over objection, merely by evidence of the existence of procedures and the giving of instructions, and otherwise left to interference.

And in relation to not having called the people who actually did the work (para 38) *"I think this was a serious gap in the prosecution case"*. Howie J also noted (para 46) that the failure to call the laboratory staff who did the work denied the court the opportunity *"to test that part of the case before the jury"* i.e. cross examine the laboratory staff.

This case could be seen to have great significance and has been both cited⁶ and considered⁷ in subsequent New South Wales cases and may prove persuasive in other jurisdictions.

The view that under certain circumstances failure to call the people who actually did the work may be seen as unfair prejudice may help explain why, in a recent case involving a single food item and a single person, 14 people were subpoenaed to give evidence (from MDU PHL). Those subpoenaed included everyone who had anything to do with the sample from specimen reception staff through to those performing the testing to those reporting it.

Wood J, writing extra judicially⁸, notes that the decision in *R v Sing* is of considerable practical importance and supports the approach to a wide calling of staff to court, as above. This principle has been extended beyond the DNA cases and indeed may lead to many more laboratory bench staff being called to appear in court.

Conclusion

In Australia, accreditation with the National Association of Testing

Laboratories (NATA) is considered the entry level for laboratories wishing to provide testing services to other organisations. This accreditation is under-pinned by peer assessment of laboratories against AS ISO/IEC 17025 General requirements for the competence and calibration of laboratories and regular inter-laboratory proficiency test programmes.

Forensic laboratories are structured and accredited to deal with all the issues raised in this article. Currently forensic accreditation does not cover microbiological testing, nor can biological or medical testing in a microbiology laboratory be accredited to a forensic standard. This unsatisfactory situation of a lack of a capacity for forensic accreditation of microbiological testing is currently under review.

It may be worth pondering the above when next handling a specimen, recording (or not!) a test step on a

worksheet or signing a critical report which may relate to evidence for a fact to be proven in court. *"Can I and my records withstand scrutiny attesting to the truth of the report"* – if the answer is Yes, that is excellent, but if No, much needs to be done.

References

1. Acts between jurisdictions will differ in detail but the principles will generally be consistent.
2. *Chamberlain v R* [No2] (1983) 153 CLR 521.
3. For example the *Magistrates' Court Act* (1989) (Vic) Section 1A Prehearing Disclosure (2) *"... the defendant may at least 10 days before the mentioned date ... give notice in writing to the informant that the defendant requires ... (c) access to the exhibits to inspect them"*.
4. *Selsam Pty Ltd v McGuiness* [2000] NSWCA 29.
5. Goldring J. An introduction to statistical evidence. *Australian Bar Review* 2003; 23: 239 – a judge of a district court of New South Wales considers these issues in some detail.
6. *R v Cheney* [2004] NSWSC 104.
7. *Roach v Page* (No.11) [2003] NSWSC 907 para 74 e&g.
8. Wood JRT. Forensic sciences from the judicial perspective. *Australian Bar Review* 2003; 23:137.

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