Response Summary

Automated DNA Extraction Survey

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The following is a summary of these responses along with comments and extrapolated observations that are not obvious from the responses themselves. As a follow-up to this survey I will be calling all respondents in due course to discuss the survey in more detail. A full list of the evaluations being carried out is available on the NGRL (Wessex) website (http://www.ngrl.org.uk/Wessex/evaluation.htm)

1. ***What type of DNA extraction do you currently use for the majority of samples?***

Manual in house	9
Manual commercial kit	4
Semi-automated (eg Whatman)	3
Fully automated	2

Notes: One lab was using two different systems (Promega wizard and Qiagen MW1).

2. ***Please indicate which aspects of DNA extraction you would most like to IMPROVE by introduction of an automated system.***

	Most important		Least important	No response
Speed of extraction	1	8	7	1
Cost of extraction	7	6	3	1
Sample tracking	3	4	8	2
Reliability (failure rate)	5	0	10	2
DNA quality	5	2	9	1
Happy with current system*	4	0	0	

Clearly different labs have different priorities for their extraction protocols. Of the 17 labs 4 (24%) stated they were [reasonably] happy with their current method. These included one fully automated system (Gentra), one lab with very low sample throughput (<10 see question 3) using phenol/chloroform, and one lab performing PCR direct from blood (genotyping only). On verbal communication with respondents a key consideration here was “hands on time”. Another issue raised was improving uniformity of DNA quality between labs.

3. ***What DAILY throughput of samples do you expect your extraction procedure to cope with?***

<10	3
10-100	14
>100	0

The majority of labs placed themselves in the mid-range in terms of sample throughput. In general this throughput was approximately 20 samples per day. Some labs have expressed a desire to accommodate sporadic increases in throughput to cope with specific projects (e.g. providing an extraction service to external institutions). Of the three labs with low sample throughput only one was happy with their current extraction protocol (see question 2)

4. ***What batch size would you consider to be the most useful?***

12	13
48	4
96	0

5. ***What type of container would you like to store DNA in?***

Tubes	17
Plates	0
Other	0

6. ***Considering only extractions you would expect an automated system to deal with, what percentage would fall into the following categories?***

	>10%	<10%	none	No response
EDTA Blood	16	0	0	1
LiHEP Blood	1	12	3	1
Mouth brush	2	10	4	1
Tissue samples	1	9	6	1
Paraffin blocks	0	8	8	1
Amniotic Fluid	2	6	8	1
Cell culture	1	7	8	1
CVS	0	8	8	1

In most cases EDTA blood samples were by far the most commonly handled. However, a high degree of flexibility was required. Most labs required the automated system to cope with a wide variety of sample types (on average five of the above).

7. ***For what percentage of extractions would the following yields be sufficient?***

	>10%	<10%	none
<5ug DNA	7	7	3
5ug to 100ug DNA	9	8	0
>100ug DNA	5	4	8

This question revealed no real consensus on required yields between labs although in terms of samples a yield of 5ug to 100ug DNA was the most widely acceptable. Considerations regarding the type of test required (e.g. Southern blotting) and storage requirements were prevalent. Some labs are already batching samples according to yield requirements on the basis of the referral.

8. ***Would you consider using a low volume extraction protocol (200-1000ul blood, yield ≤30ug DNA)?***

Yes	13
No	4

9. ***Assuming the whole process was totally automated, would it be acceptable to mix multiple extractions from a single sample in situations where a large quantity of DNA is required***

Yes	11
No	6

Some reservations regarding cross contamination were raised. Nine labs responded yes to both questions 8 and 9 (i.e. low volume extraction would be considered with multiple extractions from a single sample where higher a yield was required). Four labs would consider a low volume extraction but not multiple extractions from a single sample and two labs thought multiple extractions from a single sample could be considered but a low volume extraction protocol would not. These two questions along with total yield requirements will constitute one of the major decisions in selecting an appropriate automated DNA extraction system.

10. How strongly do you feel about the following statements?

	Essential	Useful	Not required
Sample tracking should be by bar-code	8	8	1
The automated protocol should work directly from the incoming blood sample tube	4	13	0
The automated protocol should elute extracted DNA directly into the storage vessel.	11	6	0
All DNAs should be quantified/equilibrated on completion of extraction.	4	12	1

Only three labs felt it was essential that sample processing be completely automated (i.e. no manual tube transfers). These three labs also considered bar-coded sample tracking to be essential. In general the remaining labs considered a pre-process manual tube transfer to be more acceptable than a post processing manual tube transfer. Most labs considered bar-coded sample tracking to be [at least] useful and almost half thought this was essential. Although most labs thought that DNA quantification/equilibration was useful most did not consider it to be essential.

11. How much bench/floor space would you be able to allocate to an automated DNA extraction system?

<2m	6
2-4m	10
>4m	1

12. How much would you be prepared to pay for an automated DNA extraction system?

<£50K	3
£50K-£100K	11
>£100K	3

13. What do you think is a reasonable cost per extraction?

<£1	4
£1-£5	10
>£5	3

This question was intended to reflect consumable cost only but this was not clear in the questionnaire. On communication with different labs it is clear that this has been interpreted differently by different respondents. As a very rough guide automated extraction protocols cost approximately £1 per ml blood.

Questions 11 to 13 are clearly dependent on what is achieved for the money/space and this point was raised by several labs.