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**MPII Enhancements Update**

Iman Muharam  
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## Outline

- Automated DNA IQ enhancements
- Testing results so far
- Outcome summary from external audit

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## Automated DNA IQ enhancements

1. Change syringes from 500 $\mu$ L to 1000 $\mu$ L
2. Change in off-deck lysis volume from 500 $\mu$ L to 300 $\mu$ L
3. Removal of liquid STORstar
4. Change of deck layout
5. Automated addition of DNA IQ Resin
6. Off-board mixing of DNA IQ Resin
7. Magnet changed from PKI to ABI
8. Electronic platemap changed for volumes & new steps
9. Risks considered with regards to droplets on side of tips
10. Changes reviewed


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## Change syringes

- Now using 1000 $\mu$ L syringes.
- Reduced number of draws and therefore longer lifetime.

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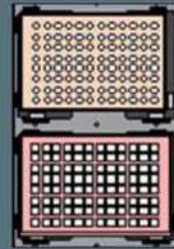
## Change in off-deck lysis volume

- Volume of extract in well/tube is reduced to minimise contamination risk during shaking/incubating.
- Translates also to a reduction in reagent usage.
- Minimal difference in yield (as found from QPS Tapelift Trial).

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## Removal of liquid STORstar

- Off-deck lysate was transferred into 96-DWP with aide of STORstar. DWP was sealed with adhesive film and stored.
- Removal of adhesive film was a contamination risk.
- Off-deck lysate now transferred into individual Nunc Bank-It tubes, then arranged using STORstar. Rack placed on MPII and lysate transfer into DWP by MPII.

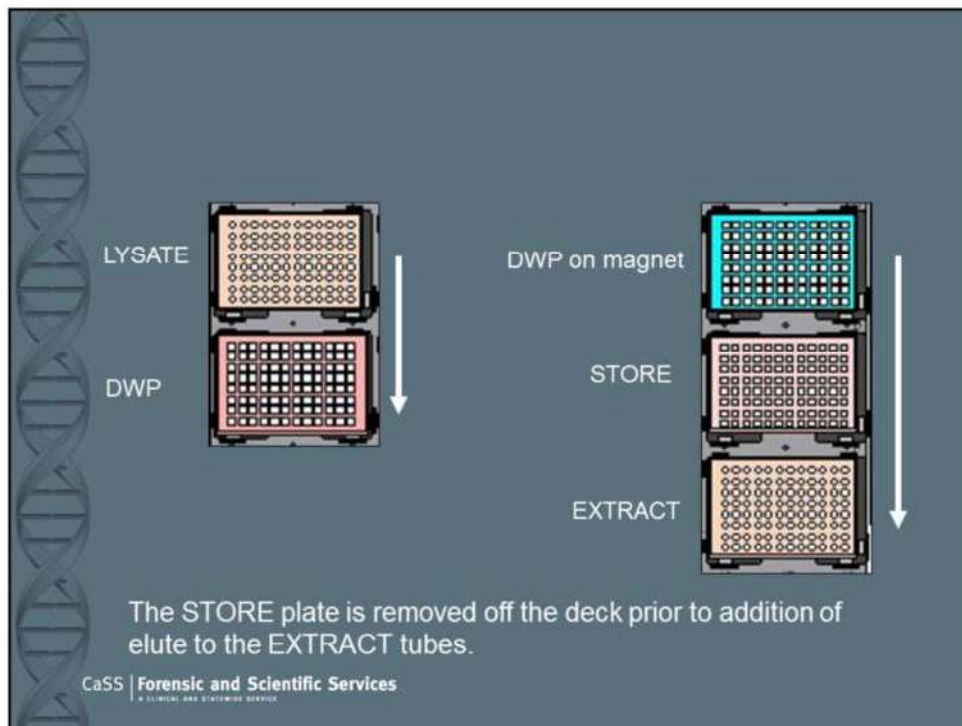


# Change in deck layout

v4.3

V6.1

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## Automated addition/mixing of resin

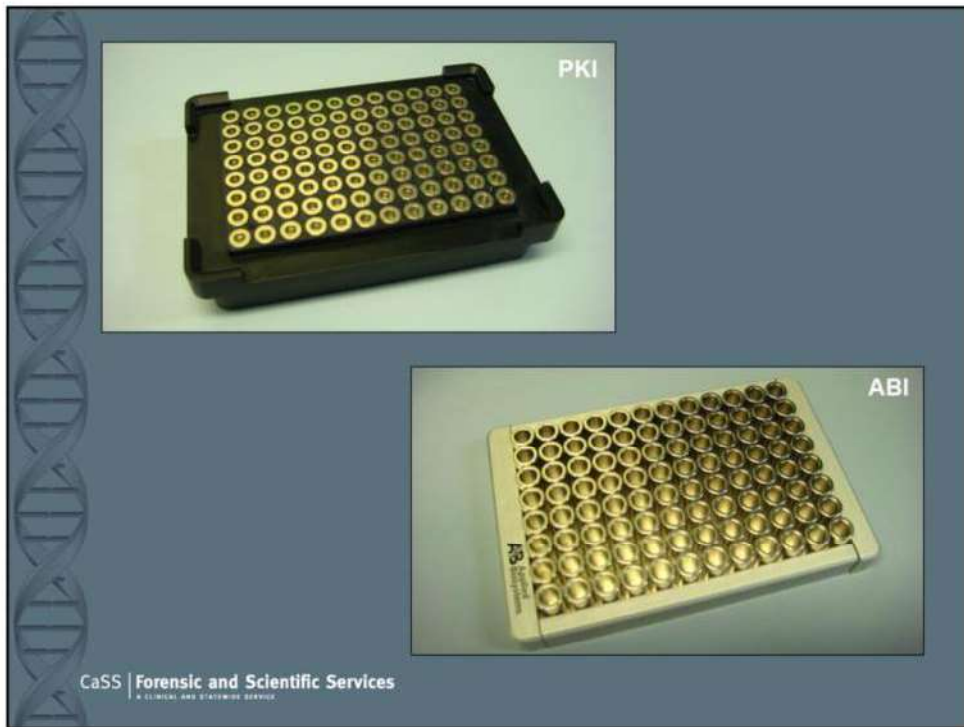
- Resin was added manually and then mixed by MP11.
- Resin now added by MP11, followed by addition of lysis buffer (no mixing).
- User intervention required: seal plate with septa mat and shake on MixMate at 1100rpm for 5mins followed by centrifugation at 3000rpm for 2mins to bring down any drops.
- Septa mat is removed and DWP returned to MP11.
- This mixing is KEY to improving the DNA recovery.




## Magnet changed

- PKI magnet had corners that required the user to “click in” the plate. If the plate is not straight, resin loss can occur.
- ABI magnet has no corners and the magnets are raised, so the plates sit better and no resin loss occurs.

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## Platemap changed

- Electronic platemap for MPlI has changed to reflect new pipetting volumes.
- The addition of the Nunc "lysate" rack from off-deck lysis meant the addition of 1 new column of information in the platemap.

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## Risks considered

- Static attraction of the tip causes some reagent types (e.g. lysis buffer) to adhere to the tip side.
- These are only reagents and the risk of sample contamination is very low.
- Pre-step, post-step and transport air gaps were optimised to make the pipetting cleaner.

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## Changes reviewed


- PerkinElmer National Liquid Handling Specialist was asked to review the automated program and provide comments for improvement.



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While observing the test, the problems were noted and then the modifications done and the DNA Analysis Team was advised to run the test again with the modifications. Actual extraction protocol liquids were used to completely mimic a “real” extraction run. With these modifications, the DNA iO extraction protocol is a sound, neat protocol.

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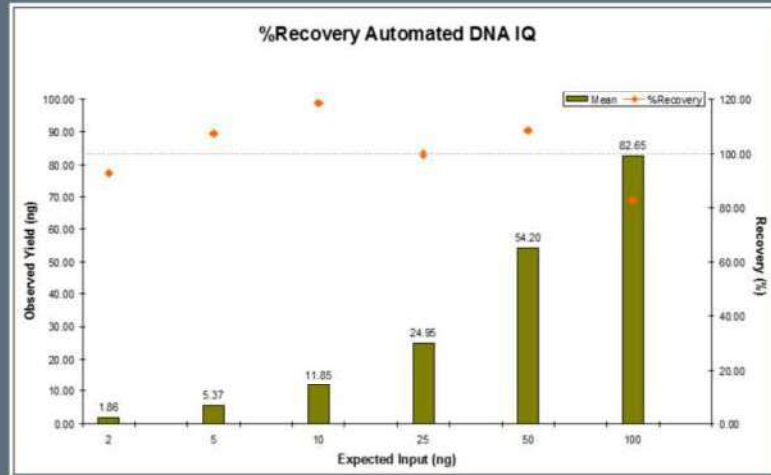


## Testing results so far

- 1 efficiency plate
- 3 soccerball plates
- 1 checkerboard plate
- 1 zebra stripe plate
- 96-sample plate – in progress
- The combination of these plates provide crucial information

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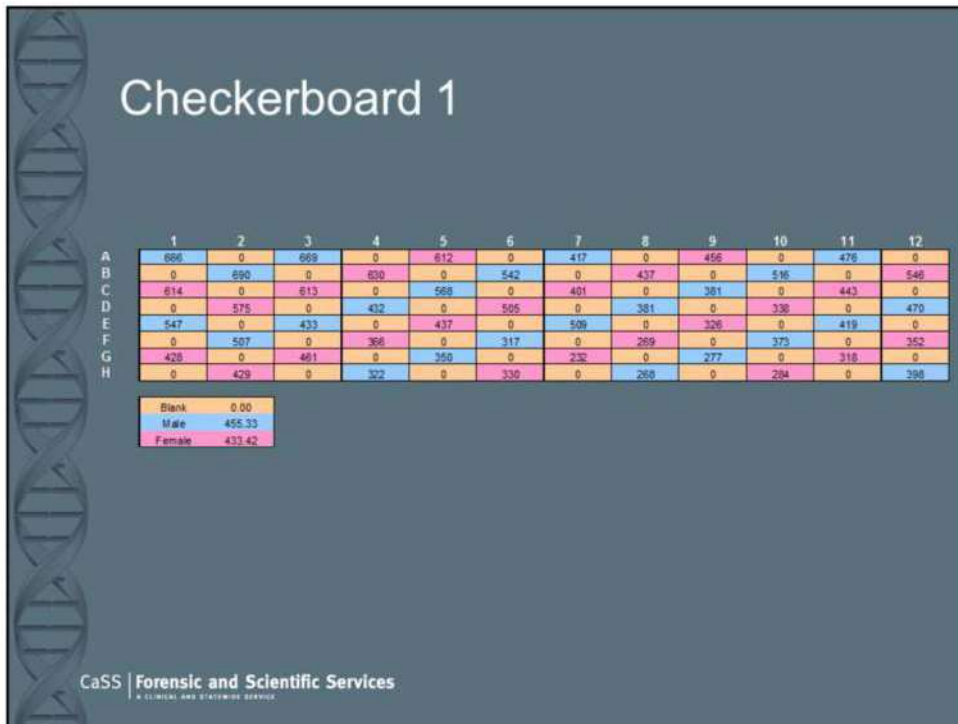
# Efficiency



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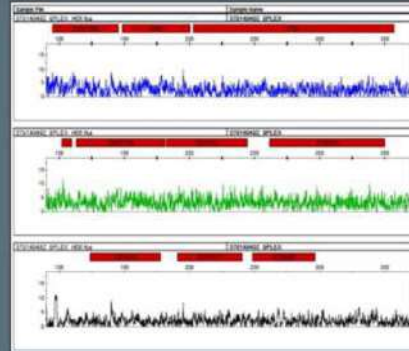






## Septa mat


- Septa mat positions where wells contained Promega Human Male Genomic DNA were swabbed, and the swab extracted using manual DNA IQ.
- All quants were undetermined and amps were NSD.
- Indicates that mixing using MixMate does not cause splashing onto the top of the wells.





## External audit

- Assoc. Prof Theo Sloots and David Whiley
- They will write a summary report of their observations.
  - The adhesive seal that we had used on the off-deck lysis plate was a problem. This process is no longer in the current version of DNA IQ.
  - The MP II and current version of the automated DNA IQ is OK.
  - Commended us on our environmental monitoring and monthly cleaning regimes.
  - Commended us on our thorough approach to identifying and diagnosing the problems.
  - We're "ahead of the pack" and learning lessons that nobody else has come across yet.



## Conclusion

- Enhancements have been made to the MP II. These changes have been tested and approved by a PerkinElmer LHS.
- The changes have caused an increase in efficiency and recovery of DNA.
- Anti-contamination checks have been run and results are as expected.
- Feedback from external auditors were very positive.

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