SIXTH STATEMENT OF HELEN GREGG

I, **Helen Gregg, Quality Manager,** of Queensland Health Forensic and Scientific Services – Forensic DNA Analysis, do solemnly and sincerely declare that:

1. I have previously:

   a. provided five statements in this Commission of Inquiry into Forensic DNA Testing in Queensland (**Commission of Inquiry**) dated 16 September 2022 in response to Notice 2022/12, 26 October 2022 in response to 2022/00294, 3 November 2022 to supplement my previous evidence and provide clarification in relation to some aspects of that evidence, 16 November 2022 in response to Notice 2022/00321 and 22 November 2022 in response to an email from the Commission of Inquiry dated 7 November 2022; and

   b. given oral evidence in the Commission of Inquiry on 4 October 2022.

2. On 29 November 2022 I was requested to provide a statement answering a number of questions as set out in Notice 2022/00341. My responses are as follows.

Context to My Responses

3. As part of FSS' response to the Commission of Inquiry a Taskforce has been established within Queensland Health to respond to issues raised during the Commission, including the implementation of recommendations arising from expert reports. I am not a part of this Taskforce.

4. I have knowledge of the laboratory's response to the expert report of Dr Kogios and Ms Baker because I was asked by Lara Keller to assist FDNA in a 'supervisory' managerial capacity. After the changes in senior leadership in FDNA, Lara Keller approached me as she had identified that the laboratory needed support and a sense of leadership. In this informal role, I have high-level managerial oversight of the FDNA team and I am working to encourage staff to continue to work together in the wake of the Commission of Inquiry.

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Recommendation 19 of Report of Heidi Baker and Dr Rebecca Kogios (Review of the current operations of the QHFSS DNA Analysis Unit, 28 October 2022).

1. Explain the current protocol for cleaning bone equipment other than bone crushing vials.

5. The current protocol for cleaning bone sampling equipment other than bone crushing vials has not been changed since it has been raised in the Commission of Inquiry.

2. Outline the validation of the current protocol for cleaning bone equipment other than bone crushing vials.

6. I do not believe there has been any specific validation of the current protocol for cleaning bone equipment other than bone crushing vials.

7. I understand that bone sampling equipment includes both unique utensils (e.g. saws and chisels) and more general equipment (e.g. forceps, scalpels and desks). I understand that the process for equipment other than bone crushing vials has been validated through Project#153.

8. Prior to the Commission of Inquiry, I was not aware that there was any concern regarding the validation of the protocol for cleaning unique bone sampling equipment. My oversight of any such concern is limited to a quality perspective only which is usually through the oversight of OQIs. Prior to the Commission of Inquiry, no OQIs had been raised in relation to the protocols for cleaning bone sampling equipment.

3. Explain what steps, if any, have been taken to validate any protocol for cleaning bone equipment on the specific equipment utilised, and with the current workflow methodology, to assess suitability.

9. At present, there have been no further steps taken to validate the protocol for cleaning bone sampling equipment.

10. All efforts have been directed to the process as described in my answer to Question 4.

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4. Provide an update to your statement dated 16 November 2022 explaining what steps, if any, have been taken to determine what protocol will be used by the laboratory for cleaning bone equipment other than bone crushing vials since that statement was signed.

11. As at the date of this statement, I understand that the laboratory has not processed any bone samples since my statement of 16 November 2022. Despite mention of a plane crash, in the annexures to that statement (see **HG-103** of that statement), the plane crash did not result in a DVI. Therefore, no bone work was required for that incident.

12. I understand that the FDNA team is currently in the process of considering whether a pause should be put on processing bone samples. I understand this consideration includes questioning whether a pause should apply to all bone-related work, or just the work as it relates to 'old' bones (i.e. not fresh bones because fresh samples produce high levels of DNA).

Broader strategy regarding bone casework

13. A majority of scientists within the laboratory have considered it urgently important to progress OQI 56724 (the **Bone OQI**). The Bone OQI was raised by Angelina Keller on 29 August 2022 with the assistance of Dr Kirsten Scott. The OQI relates to Angelina Keller's concerns about possible mixed profiles, which the OQI report states were identified on 17 June 2022 and related to samples processed in 2020. See **HG-132 OQI report and a screenshot of the OQI system showing details about its creation.**

14. The actioner of the OQI was originally set as Alison Lloyd, who asked that the OQI actioner be set to Angelina Keller because she has a better knowledge of the contamination concerns and DNA reporting (Alison being a member of the Evidence Recovery Team). To date, I understand that Angelina Keller is still the formal 'actioner' on the OQI record, but the OQI has primarily been progressed by efforts from Chelsea Savage and Kristina Morton. Kristina Morton is a member of the Evidence Recovery Team and also has appropriate knowledge of mortuary processes as she worked in that area for a number of years. She also has a 'quality' approach to investigating issues and

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determining root causes. Chelsea Savage is a member of the Quality and Projects Team, has experience in investigating mixed DNA profiles from reference samples (skills that are transferable to bones which should be single source – just like reference samples). Both Kristina Morton and Chelsea Savage are trained plate readers and have appropriate knowledge and experience to form an opinion as to whether a profile is single source (expressly no evidence of a mixture) mixed and to take into consideration other possibilities, including 'stutters', 'drop ins' and 'pullups'. Allison Lloyd (a trained reporter) has reviewed the current work (interpretations) of Chelsea and Kristina.

15. Dr Kirsten Scott and Allison Lloyd have been at the forefront of seeking to ensure that the Bone OQI is progressed in a timely manner. Kirsten Scott and Allison Lloyd have dedicated the time of two of their respective staff members, Chelsea Savage and Kristina Morton, to progressing the Bone OQI as a matter of priority. However, there has been some concerns about progressing the Bone OQI, including whether the laboratory should wait until the findings of the Commission of Inquiry are handed down. See **HG-133 Email trail re Bone OQI meeting in rescheduling and querying urgency.**

16. The Bone OQI has been a matter of priority because a number of the scientists in FDNA believe it is important to ascertain whether there is, in fact, an issue with obtaining mixed DNA profiles in bone samples. (In accordance with principles of empiricism and the scientific method,[1] the question of whether there is an issue of mixed profiles is to be determined by analysing data and reviewing the previous cases of concern). I understand that the importance of identifying what the cause of the mixed profiles is because this, in turn, will affect the priority which will be given to the validation of the bone equipment cleaning protocol.

17. I understand that the laboratory intends to carry out a validation of the bone equipment cleaning protocol because this is "good science". As identified by Dr Kogios and Ms Baker, it is "ideal" practice. If the Bone OQI reveals that there is an issue of

[1] See more generally, Scientific Method in *Salem Press Encyclopedia of Science, 2021*: attached as **Exhibit HG-134.**

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contamination (e.g. through mixed profiles), and that the contamination may be as a result of the cleaning protocol, the validation will be conducted as a matter of urgency.

18. As noted in my fourth statement at [97] there was a meeting scheduled for Monday 21 November to discuss the Bone OQI and bone processing. This meeting was postponed (see further below).

Meetings to discuss bone casework

19. The meeting scheduled for 21 November 2022 was to be run by Chelsea Savage and Kristina Morton. Invited to attend the meeting of 21 November 2022 was Angelina Keller, Rhys Parry, Matt Ford, Allison Lloyd, Kirsten Scott and myself. I understand the purpose of the meeting was for Chelsea Savage and Kristina Morton to discuss their findings in relation to a data review as part of progressing the Bone OQI. I understand that Angelina Keller and Rhys Parry were specifically invited to allow them the opportunity to contribute their knowledge to the OQI investigation and to ensure that they had an opportunity to raise questions/concerns, comment on the data review and/or propose further avenues for investigation. See, for example, an email from Kristina Morton dated 21 November 2022, where she outlined the intended actions of the meeting of Monday 21 November 2022. See **HG-135 Email re attendees at Friday bone OQI meeting.**

20. Another meeting was scheduled for Friday 25th November 2022. The invitation to this meeting was sent to a broader audience than the meeting of 21 November 2022. The broader audience included Rhys Parry, Angelina Keller, Jacqui Wilson, Ingrid Moeller, Kirsten Scott, Allison Lloyd, Luke Ryan, Sharon Johnstone, Kylie Rika, Paula Brisotto, Peter Culshaw, Matt Ford, Lara Keller and myself. The purpose of this meeting was to share with the management team the status of the Bone OQI, after incorporating any additional comments Angelina Keller and/or Rhys Parry might have had from the Monday 21 November meeting. See **HG-135 Email re attendees at Friday bone OQI meeting** and **HG-136 List of meeting invitees.**

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21. I include a working version of the power-point which was to be discussed at the meeting of 25 November as exhibit **HG-137 PowerPoint Presentation of OQI 56724 –Bone Investigation Data Analysis**. I stress that this is a draft version only, and that Chelsea Savage and Kristina Morton have not finalised the presentation. I understand that, at the time I received the presentation, they were waiting on Rhys Parry and Angelina Keller's input – see Kristina Morton's email of 21 November 2022 **HG-133 Email trail re Bone OQI meeting in rescheduling and querying urgency.**

22. The meetings of 21 November and 25 November had to be rescheduled because Angelina Keller was not in the office from Monday 21 November to Friday 25 November. I understand that it is important that Angelina Keller attends any Bone OQI meeting and is involved in any resolution, because she raised the Bone OQI and has raised concerns about mixed profiles in the Commission of Inquiry. Her potential input is therefore seen as being valued and important.

23. At the time of writing this statement, there is a meeting planned for Friday 2 December 2022 to discuss the bone casework. I understand Chelsea Savage and Kristina Morton will be presenting their data analysis at this meeting. I understand that the concept of having two separate meetings has been revised and now everything will be discussed at the one meeting on Friday 2 December.

5. At page 98-99 of your statement dated 16 November 2022, in an email dated 8 November 2022, Kristina Morton states "Chelsea and I are of the belief that the process change to bleach/ethanol is within an approved lab cleaning process that we use in ER and Analytical currently and therefore there would not be a need to cease processing." Explain:

a. what "approved lab cleaning process" Ms Morton is referring to and attach a copy of a validation of that process, if not previously provided to the Commission;

24. I am not in a position to comment on the process Kristina Morton was referring to.

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25. In the absence of any comment from Kristina Morton, I would assume it is the process in place which was based on Projects #148 and #153.

26. I note that being cc'd into this email is not a usual part of my role as Quality Manager. I believe I was cc'd into this email as part of providing high level managerial support to FDNA as explained above.

b. how this belief can be reconciled with the findings of Dr Kogios and Ms Baker, specifically paragraph [105] and recommendation 19 of their report.

27. I am not in a position to speak to Kristina Morton or Chelsea Savage's belief that the lab's cleaning process is appropriately validated. I would have to revert to their technical expertise to gain an understanding of the basis of their belief.

28. At a high level, my non-technical understanding is that there is a difference of opinion between the FDNA scientists as to whether it can be conclusively said that (1) bone samples are obtaining mixed profiles; and (2) that the bone cleaning protocol could be a cause of any contamination.

29. In relation to (1), I believe a difference in scientific opinion is reasonable and to be expected in the circumstances. Science relies on very intelligent people questioning things through a process of formulating hypotheses, testing those hypotheses and objectively examining and analysing the data. There are multiple ways people can approach a single question, and different lenses through which data can be examined (e.g. different data analysis methods and statistical techniques). In the highly technical field of DNA analysis this can legitimately result in scientists holding different opinions, including as to whether a profile is single source or mixed. I understand that Dr Kogios and Ms Baker spoke of this reality of DNA analysis in their oral evidence to the Commission of Inquiry. The fact that the laboratory is questioning and examining the concerns raised about suspected bone sample contamination (through progressing the Bone OQI) should not be seen as diminishing or disregarding these concerns. Rather, the progression of the Bone OQI should be seen as a thorough examination of the

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potential issue from an objective, scientific perspective. The progression of the OQI is in accordance with the quality system which I have implemented within FSS. This OQI system is an important tool for ensuring the quality of the procedures within the laboratory and for escalating quality concerns to me.

30. In relation to (2), this relates to the recommendation of Dr Kogios and Ms Baker with respect to the bone cleaning protocol. I am not in a position to comment on the technicalities of the validation. I am guided by the advice of the FDNA management team and the DNA Analysis scientists as to whether the current validation is appropriate.

31. However, from a high level, I understand that Dr Kogios and Ms Baker elaborated on their recommendation at [105] in their oral evidence. They suggested:

'[a validation of a the cleaning method in general] may be okay, but when you're finding examples of mixtures of DNA in your bone samples where you expect a single source of DNA, that should be a red flag just to go back and check those processes and any changes that have happened downstream of those'.

32. Therefore, I think it is appropriate that the laboratory is seeking to first establish whether there is an issue of mixed profiles before prioritising the validation of the bone equipment cleaning protocol.

All the facts and circumstances declared in my statement, are within my own knowledge and belief, except for the facts and circumstances declared from information only, and where applicable, my means of knowledge and sources of information are contained in this statement.

I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the *Oaths Act 1867*.

TAKEN AND DECLARED before me at Brisbane in the State of Queensland on 1 December 2022

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Helen Gregg

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SCHEDULE OF EXHIBITS

Exhibit	Name
HG-132	OQI report and a screenshot of the OQI system showing details about its creation.
HG-133	Email trail re Bone OQI meeting in rescheduling and querying urgency
HG-134	Scientific Method in *Salem Press Encyclopedia of Science, 2021*
HG-135	Email re attendees at Friday bone OQI meeting
HG-136	List of meeting invitees
HG-137	PowerPoint Presentation of OQI 56724 –Bone Investigation Data Analysis

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Witness

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56724 - Mixtures in Bones

Investigate | New Audit | Print Report | History

General | Investigation | Associations | Records | **Workflow**

Event	Event Description	Event Date	Updated By
Investigation	OOI investigated	24/10/2022 09:29:38	Helen GREGG
Assignment Accepted	Assignment was accepted	05/09/2022 11:05:57	Allison LLOYD
Assignment	New OQI created awaiting acceptance	29/08/2022 12:17:50	Angelina KELLER

Last Modified at 24/10/2022 9:29 AM by Helen GREGG. Created on 29/08/2022 12:17 PM by Angelina KELLER

Report for QIS OQI as of 1/12/2022 10:35:45 AM

Report for QIS OQI -

56724 Mixtures in Bones

OQI Details

Status	Investigation
Subject	Multiple cases involving bones have generated mixed DNA profiles.
Source of OQI	Internal Problem
Date Identified	17/06/2022

OQI Creator Contact Details

Creator	Angelina KELLER
Organisational Unit/s	Reporting 2
Service/s	Forensic and Scientific Service
Site Location/s	Coopers Plains

Investigator/Actioner Contact Details

Actioner	Allison LLOYD, Angelina KELLER
Organisational Unit/s	Reporting 2
Service/s	Forensic and Scientific Service
Site Location/s	Coopers Plains

Investigation Details

No Investigations found

Action Details

No Actions found

Task Details

No Tasks found

Follow-up And Approval

No Follow Up and Approval Information Available for this OQI

Associations

No Associations found

Records

No Records found

56724 Mixtures in Bones

RE: Bone OQI 56724 meeting actions

Allison Lloyd <[redacted]>
Tue 22/11/2022 9:16 AM
To: Kirsten Scott <[redacted]>;Kylie Rika <[redacted]>;Angelina Keller <[redacted]>;Chelsea Savage <[redacted]>;Rhys Parry <[redacted]>;Matt Ford <[redacted]>;Peter Culshaw <[redacted]>;Helen Gregg <[redacted]>;Kristina Morton <[redacted]>
Cc: Paula Brisotto <[redacted]>;Luke Ryan <[redacted]>

Hi all,

As this OQI and investigation is affecting Evidence Recovery processes, I have invested a staff member full time on the investigation of the source of mixtures in bones. This is at a time where examinations are increasing and we are starting to struggle to keep up given other needs of the Commission.

This issue was raised as a serious and urgent concern in a public forum and I believe it deserves urgency to investigate. I don't feel that narrowing down the source of the mixtures will prevent any of the COI recommendations from being able to be implemented, rather that it may well speed up the implementation of said recommendations.

Given the investment already into this OQI, I agree with Kirsten that this should progress sooner rather than later.

Thanks,
Allison

From: Kirsten Scott <[redacted]>
Sent: Tuesday, 22 November 2022 6:04 AM
To: Kylie Rika <[redacted]>; Angelina Keller <[redacted]>; Chelsea Savage <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kristina Morton <[redacted]>
Subject: RE: Bone OQI 56724 meeting actions

Morning All,

Given the seriousness with which this concern was raised, it needs a response of equal weight.
Yes this OQI is urgent.

With the concerns raised by Angelina over quality and processes impacting on bones, it needs to be addressed as priority.
We do not know when the next bone submission or DVI will occur, and it is my obligation to address this as a matter of urgency.
I have given all of Chelsea's time to address this issue, and I request that Angelina invests similarly.

Irrespective of the commissions finding we must complete the OQI investigation, lawyers can not do this for us.
The purpose of the OQI is to collect data, and determine if there is problem, and where the problem is (if applicable).
The OQI does not in itself change any process - it can however propose possible improvements for later action.
When the OQI is complete, any corrective or preventative actions (if required) can be sensitive to the commission's findings.

We have been working hard to find times that facilitate management team and all OQI participants and it is proving very difficult.
The appointment as sent was the only time all staff could attend in the next 2 weeks.
I do not think we can afford to not progress for a period >2 weeks.

Kirsten

From: Kylie Rika <[redacted]>
Sent: Monday, 21 November 2022 5:35 PM
To: Angelina Keller <[redacted]>; Chelsea Savage <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kirsten Scott <[redacted]>; Kristina Morton <[redacted]>
Subject: Fw: Bone OQI 56724 meeting actions

Hi all,

I have just spoken with Angelina and she will not be working for the rest of this week.

As Angelina's line manager, I just wanted to raise a couple of things.

Firstly, I see that we have a meeting on Friday to discuss bone mixture data. I think that it is essential for Angelina to be present at this meeting so respectfully request that the meeting be moved to a later date so she can be present.

Secondly, there seems to be some urgency around this OQI. Perhaps there are bone samples currently awaiting processing that I am not aware of, or some other reason for the urgency? If not, then I am reminded of Matt's comment in our extraction/elution volume meeting today of it being a "thought bubble" - in prep for whatever action we need to take when the COI recommendations come out. I am mindful of the fact that the COI may make findings and recommendations that will potentially impact on the body of work that needs to be done concerning bones and teeth. Given the work that Angelina has already done and continues to do in this space, and, her current workload being high (due to working on closing any active cases affected by these mixtures), she needs more time to help address the OQI, but also ensure that the way forward is not at odds with what might come from the COI recommendations. Can I therefore also respectfully request that some pressure be taken off Angelina in this space so that she can work through the issues thoroughly.

To enable me to manage Angelina's workload (and the rest of my team's workload) responsibly, can I also please ask that any tasks required of Angelina are sent through to me (or at least have me CC'd).

many thanks
Kylie

From: Angelina Keller <[redacted]>
Sent: Monday, 21 November 2022 9:29 AM
To: Kylie Rika <[redacted]>
Subject: FW: Bone OQI 56724 meeting actions

From: Kristina Morton <[redacted]>
Sent: Monday, 21 November 2022 9:27 AM
To: Chelsea Savage <[redacted]>; Angelina Keller <[redacted]>; Rhys Parry <[redacted]>
Cc: Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kirsten Scott <[redacted]>
Subject: Bone OQI 56724 meeting actions

Hi all,

Unfortunately we will have to cancel today's meeting as Angelina is not in the office. I just wanted to go over what the intended actions of today's meeting would have been so we can keep the ball rolling:

1. As per Chelsea's email last week, we have gone through all the profiles that Angelina flagged to us as a potential issue. Angelina and Rhys - this spreadsheet is saved to the OQI folder, so we'd still like you both to have a look at this and flag anything that is wrong or missing.

2. The ReCE's were ordered and processed last week, Chelsea and I are currently reading the plates and will input the results into the spreadsheet either today or tomorrow.

3. As discussed last week, I have sent an email off to Carol Church to get a literature review happening.

4. Angelina, could you provide the list of questions that you started to prepare, so that we can review/add to? That way we can ask Peter to speak with the other jurisdictions about bone processes and results ASAP.

5. Chelsea and I are also busy preparing a powerpoint presentation for the meeting on Friday, it would be great for you both to have a look at this over the next few days as well to make sure nothing is wrong or missed.

Angelina and Rhys was there anything additional that you had wanted to discuss today?

Thanks,
Kristina

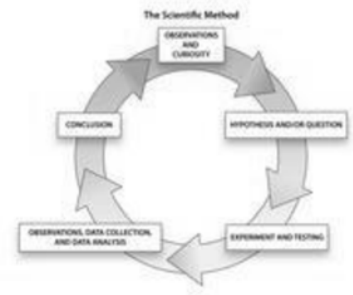
Kristina Morton
Scientist – Evidence Recovery Team
Forensic DNA Analysis, Forensic and Scientific Services
Prevention Division, Queensland Health
p [redacted]
e [redacted] w www.health.qld.gov.au/fss

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and emerging.

Scientific method.

Published in: Salem Press Encyclopedia of Science, 2021, Research Starters

The *scientific method* is the process by which scientists attempt to discover accurate and consistent new information about some aspect of the universe. An important advancement in science, the scientific method was designed to reduce errors and bias in scientific work by demonstrating the specific steps a researcher takes to reach a conclusion. These demonstrations allow the work to be scrutinized, retested, and expanded upon by other scientists. The scientific method requires observation, the formation of a hypothesis, experimentation, and a conclusion in which a successful hypothesis becomes a theory.



Scientific Method: The scientific method is a process which all scientists use to answer questions, explain phenomena, or experiment with known facts. © EBSCO

Development of the Scientific Method

In ancient times scientific knowledge was limited and scholars did not generally apply strict methods to their research. Religious beliefs, philosophies, opinions, and casual observations of nature led to many of the prevailing theories of the ancients. Only by the end of the medieval period, as scientific practices as well as technology and communication improved, did science become more advanced. During the Age of Enlightenment , a time when intellectualism flourished in Europe, scientists began studying not only the world around them but also the processes of scientific study itself.

In 1637, French scientist René Descartes published *Discourse on the Method of Rightly Conducting One's Reason and of Seeking Truth in the Sciences* in which he proposed changes in scientific attitudes. He believed that science should be a demonstrative process involving careful deductive reasoning and documentation rather than a purely mental exercise carried out in isolation. Other scientists, including Sir Isaac Newton and Sir Francis Bacon , also improved upon scientific approaches and techniques. These scientists endorsed an *empirical* approach, meaning they based their findings on observation and experience rather than on mere theories or reasoning, and supported Descartes's desire for more standardized methods in scientific research.

In time, scientists began following a universal investigative method designed to gather the most accurate and verifiable knowledge possible. This method, based on deductive

reasoning and empirical study , involved making observations, asking questions, and forming *hypotheses* (tentative explanations) about the world. These hypotheses would then be tested in thorough and carefully controlled experiments.

The scientists would document not only the findings of the experiments but also the experiments themselves. That way, other scientists who may doubt the validity of the results might replicate the experiments themselves. This safeguard was meant to reduce the effects of both scientist mistakes and ***bias*** , prejudice that might cause a scientist to consciously or unconsciously misrepresent his or her findings. It also helped to foster the idea of scientists as a community that shares and cooperates for mutual benefit, even across cultural or political lines.

The Scientific Method in Practice

The scientific method most commonly used today involves a number of steps to be completed in a sequence to derive the most accurate and verifiable results. Different scientists and different experiments may use slight deviations, but in general the steps of the modern scientific method are observation, hypothesis, experimentation, and conclusion.

Observation and Hypothesis

The first step of the scientific method is observation. This step is the most basic, often requiring only the senses and an open mind. The scientist simply takes note of some phenomenon or phenomena in the universe. This observation could be small and specifi (such as "a car does not start") or massive and wide reaching (such as "the matter that made the stars and planets must have originated somewhere").

Next, this observation must lead the scientist to some hypothesis to be further explored. The hypothesis may take many forms, from verbal statements to mathematical equations, but it should be testable. (Without a testable hypothesis, no experiments can be performed, and the scientific method cannot reach a valid end.) For the first example above, the scientist may hypothesize that the car is not starting because its battery is dead. For the second example, the scientist may hypothesize that all the matter in the universe originated eons ago as one tiny particle.

Experimentation

The hypothesis has little validity until it is tested through experimentation. The experiment stage is the most complex and variable step in the scientific method. The scientist must design an experiment to address the specific hypothesis and prove whether it is true. Experiments may take many forms, but they must be more than mere observations; they must include comprehensive tests with variables and some sort of measurements so the scientist can produce solid data.

Sometimes one or more scientists will run several experiments on a hypothesis to test different aspects of the concept or to reduce the possibility of mistakes in the data. No matter how much care scientists take, however, errors are always possible. Some errors in experimental findings are *random* (they can skew the results in any way) or *systematic* (they skew the results in only one way). Because of the pervasiveness of errors, the field of error analysis developed to understand and account for flawed results. Scientists should avoid errors whenever possible; if impossible, scientists should carefully document any shortcomings in their experiments.

Conclusion

After careful experimentation, the scientist should examine the resulting data and draw a conclusion, the final stage of the scientific method. The experiments may have failed to support the hypothesis. In that case, the scientist should either try new experiments or modify the hypothesis and start again.

If the experiments do succeed in supporting the hypothesis, then the scientist has succeeded in showing that the hypothesis is likely true. It is now a *theory* , or a propositio that explains some occurrence in nature. The scientist will most likely do further research into the theory to check whether it corresponds with existing theories. He or she should also publicize the theory so other scientists can replicate the experiment and verify the results if need be. Publicizing the theory also allows other scientists to share the knowledge and build upon it in their own work to create ever-greater discoveries for the benefit of humankind. The peer review system is one way in which research can be checked and validated by other experts in before publication.

A theory that has been supported by an extensive body of experimentation by a range of scientists over an extended period of time is generally accepted as fact by the scientific community, though few can be absolutely proven. An important aspect of the scientific method is that it allows for any theory to be changed or even disproven if new, contradictory evidence or data emerges, allowing science to continually progress and

adapt to new discoveries. Such adaptability does not mean that theories are pure guesswork, however; the scientific method ensures that accepted theories are based on the best experimentation and evidence available at any given time. A conclusion reached by the scientific method that is regarded as near-universal may be considered a scientific law (also called laws of nature), such as the first law of thermodynamics (conservation of energy), though even these may be modified. Unlike a theory, a law does not seek to explain why and observed phenomenon is true, it simply states that it holds true every time it is tested. Scientific theories and scientific laws are distinct concepts but both are based on fact as determined by the scientific method.

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Wudka, Jose. "What Is the 'Scientific Method'?" *Physics 7: Relativity and Cosmology.* University of California, Riverside, Department of Physics, 24 Sept. 1998. Web. 23 Dec. 2014. http://physics.ucr.edu/~wudka/Physics7/Notes_www/node6.html

Re: Bone OQI 56724: data available for review (prior to Fridays meeting)

Kirsten Scott <[redacted]>
Tue 29/11/2022 4:12 PM
To: Matt Ford <[redacted]>;Helen Gregg <[redacted]>;Luke Ryan <[redacted]>;Peter Culshaw <[redacted]>
Cc: Paula Brisotto <[redacted]>

Matt,

I totally agree.
I am always in favour of inclusive and open. There should be no reason to exclude what has been historically a key player.

Kirsten

Get Outlook for Android

From: Matt Ford <[redacted]>
Sent: Tuesday, November 29, 2022 3:30:38 PM
To: Kirsten Scott <[redacted]>; Helen Gregg <[redacted]>; Luke Ryan <[redacted]>; Peter Culshaw <[redacted]>
Cc: Paula Brisotto <[redacted]>
Subject: RE: Bone OQI 56724: data available for review (prior to Fridays meeting)

Kirsten

I could not see why not including Allan ? he may be able to help work out if any changes had impact to results and provide context.

Thanks
Matt

From: Kirsten Scott <[redacted]>
Sent: Tuesday, 29 November 2022 2:04 PM
To: Matt Ford <[redacted]>; Helen Gregg <[redacted]>; Luke Ryan <[redacted]>; Peter Culshaw <[redacted]>
Cc: Paula Brisotto <[redacted]>
Subject: FW: Bone OQI 56724: data available for review (prior to Fridays meeting)

Senior Managers,

Would you like to make any recommendation or decision on this?
Givens Allan's involvement in Bones in the commission this requires thought

Kirsten

From: Rhys Parry <[redacted]>
Sent: Tuesday, 29 November 2022 2:01 PM

To: Chelsea Savage <[redacted]>; Kirsten Scott <[redacted]>; Kylie Rika <[redacted]>; Angelina Keller <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kristina Morton <[redacted]>
Subject: RE: Bone OQI 56724: data available for review (prior to Fridays meeting)

Hi Chelsea

Given that the list of people in this meeting is already considerable, I think it should be limited to bone reporting staff, yourself and Kristina (as the OQI investigators) and essential managers.

Otherwise, I feel little may be achieved with so many attendees.

Thanks

From: Chelsea Savage <[redacted]>
Sent: Tuesday, 29 November 2022 11:45 AM
To: Kirsten Scott <[redacted]>; Kylie Rika <[redacted]>; Angelina Keller <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kristina Morton <[redacted]>
Subject: RE: Bone OQI 56724: data available for review (prior to Fridays meeting)

Morning all,

Regarding attendees to the meeting on Friday – so far we have included the Management team and the coronial reporters. I have been having a think about anyone else that may benefit from this meeting, and thought that because
Allan made the original changes to the cleaning procedure, he may be interested in coming along and seeing how this may have impacted bone processing. Please let me know if you have any issues regarding this, if not, we will add him to the appointment.

If anyone else can think of someone who would benefit from attending this meeting, then please let us know and we can add them in.

Thanks!
Chelsea

From: Kirsten Scott <[redacted]>
Sent: Tuesday, 29 November 2022 9:19 AM
To: Kylie Rika <[redacted]>; Angelina Keller <[redacted]>; Chelsea Savage <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kristina Morton <[redacted]>
Subject: Bone OQI 56724: data available for review (prior to Fridays meeting)

Morning All,

The data that Kristina and Chelsea have been preparing is available in a powerpoint presentation in this location:

I:\Adverse Events DNA Analysis\OQI 56724 – Bones

Angelina and Rhys if you have the time to look at this data and provide feedback/suggestions prior to Fridays meeting it would be appreciated.
It would be ideal if we can get all data and ideas together in one place for a holistic presentation to management team - on progress to date.

Kirsten

From: Kirsten Scott
Sent: Tuesday, 22 November 2022 6:04 AM
To: Kylie Rika <[redacted]>; Angelina Keller <[redacted]>; Chelsea Savage <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kristina Morton <[redacted]>
Subject: RE: Bone OQI 56724 meeting actions

Morning All,

Given the seriousness with which this concern was raised, it needs a response of equal weight.
Yes this OQI is urgent.

With the concerns raised by Angelina over quality and processes impacting on bones, it needs to be addressed as priority.
We do not know when the next bone submission or DVI will occur, and it is my obligation to address this as a matter of urgency.
I have given all of Chelsea's time to address this issue, and I request that Angelina invests similarly.

Irrespective of the commissions finding we must complete the OQI investigation, lawyers can not do this for us.
The purpose of the OQI is to collect data, and determine if there is problem, and where the problem is (if applicable).
The OQI does not in itself change any process - it can however propose possible improvements for later action.
When the OQI is complete, any corrective or preventative actions (if required) can be sensitive to the commission's findings.

We have been working hard to find times that facilitate management team and all OQI participants and it is proving very difficult.
The appointment as sent was the only time all staff could attend in the next 2 weeks.
I do not think we can afford to not progress for a period >2 weeks.

Kirsten

From: Kylie Rika <[redacted]>
Sent: Monday, 21 November 2022 5:35 PM
To: Angelina Keller <[redacted]>; Chelsea Savage <[redacted]>; Rhys Parry <[redacted]>; Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kirsten Scott <[redacted]>; Kristina Morton <[redacted]>
Subject: Fw: Bone OQI 56724 meeting actions

Hi all,

I have just spoken with Angelina and she will not be working for the rest of this week.

As Angelina's line manager, I just wanted to raise a couple of things.

Firstly, I see that we have a meeting on Friday to discuss bone mixture data. I think that it is essential for Angelina to be present at this meeting so respectfully request that the meeting be moved to a later date so she can be present.

Secondly, there seems to be some urgency around this OQI. Perhaps there are bone samples currently awaiting processing that I am not aware of, or some other reason for the urgency? If not, then I am reminded of Matt's comment in our extraction/elution volume meeting today of it being a "thought bubble" - in prep for whatever action we need to take when the COI recommendations come out. I am mindful of the fact that the COI may make findings and recommendations that will potentially impact on the body of work that needs to be done concerning bones and teeth. Given the work that Angelina has already done and continues to do in this space, and, her current workload being high (due to working on closing any active cases affected by these mixtures), she needs more time to help address the OQI, but also ensure that the way forward is not at odds with what might come from the COI recommendations. Can I therefore also respectfully request that some pressure be taken off Angelina in this space so that she can work through the issues thoroughly.

To enable me to manage Angelina's workload (and the rest of my team's workload) responsibly, can I also please ask that any tasks required of Angelina are sent through to me (or at least have me CC'd).

many thanks
Kylie

From: Angelina Keller <[redacted]>
Sent: Monday, 21 November 2022 9:29 AM
To: Kylie Rika <[redacted]>
Subject: FW: Bone OQI 56724 meeting actions

From: Kristina Morton <[redacted]>
Sent: Monday, 21 November 2022 9:27 AM
To: Chelsea Savage <[redacted]>; Angelina Keller <[redacted]>; Rhys Parry <[redacted]>
Cc: Matt Ford <[redacted]>; Peter Culshaw <[redacted]>; Helen Gregg <[redacted]>; Allison Lloyd <[redacted]>; Kirsten Scott <[redacted]>
Subject: Bone OQI 56724 meeting actions

Hi all,

Unfortunately we will have to cancel today's meeting as Angelina is not in the office. I just wanted to go over what the intended actions of today's meeting would have been so we can keep the ball rolling:

1. As per Chelsea's email last week, we have gone through all the profiles that Angelina flagged to us as a potential issue. Angelina and Rhys - this spreadsheet is saved to the OQI folder, so we'd still like you both to have a look at this and flag anything that is wrong or missing.

2. The ReCE's were ordered and processed last week, Chelsea and I are currently reading the plates and will input the results into the spreadsheet either today or tomorrow.

3. As discussed last week, I have sent an email off to Carol Church to get a literature review happening.

4. Angelina, could you provide the list of questions that you started to prepare, so that we can review/add to? That way we can ask Peter to speak with the other jurisdictions about bone processes and results ASAP.

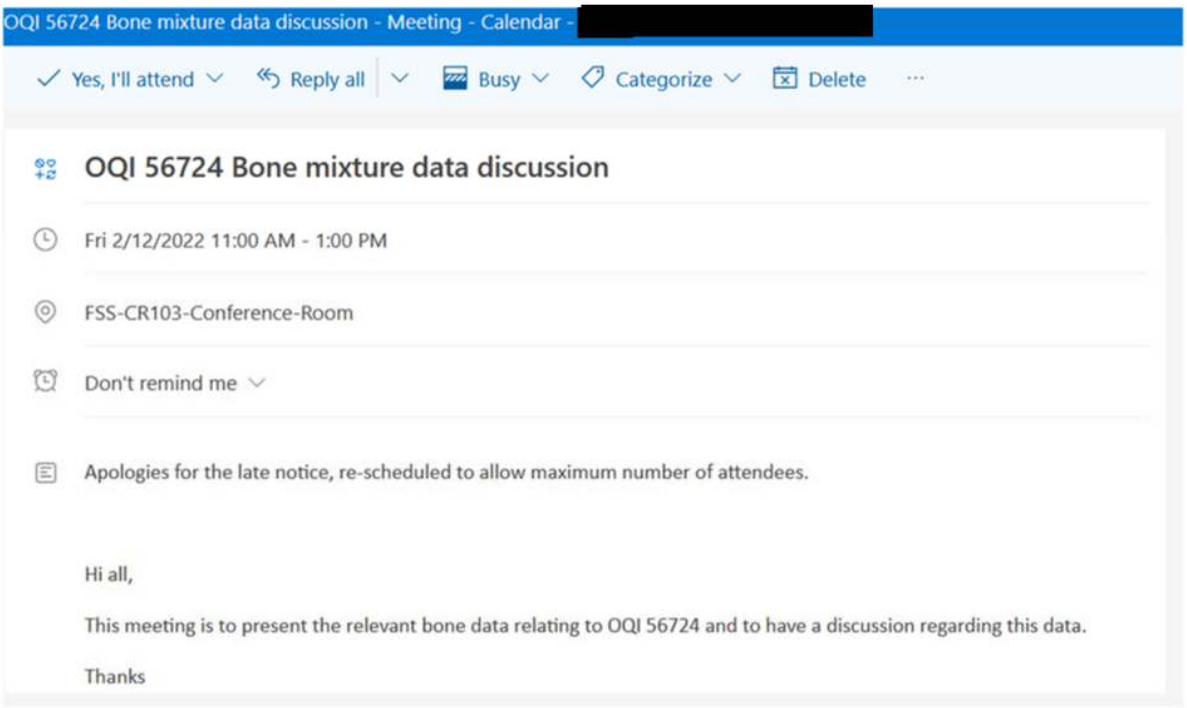
5. Chelsea and I are also busy preparing a powerpoint presentation for the meeting on Friday, it would be great for you both to have a look at this over the next few days as well to make sure nothing is wrong or missed.

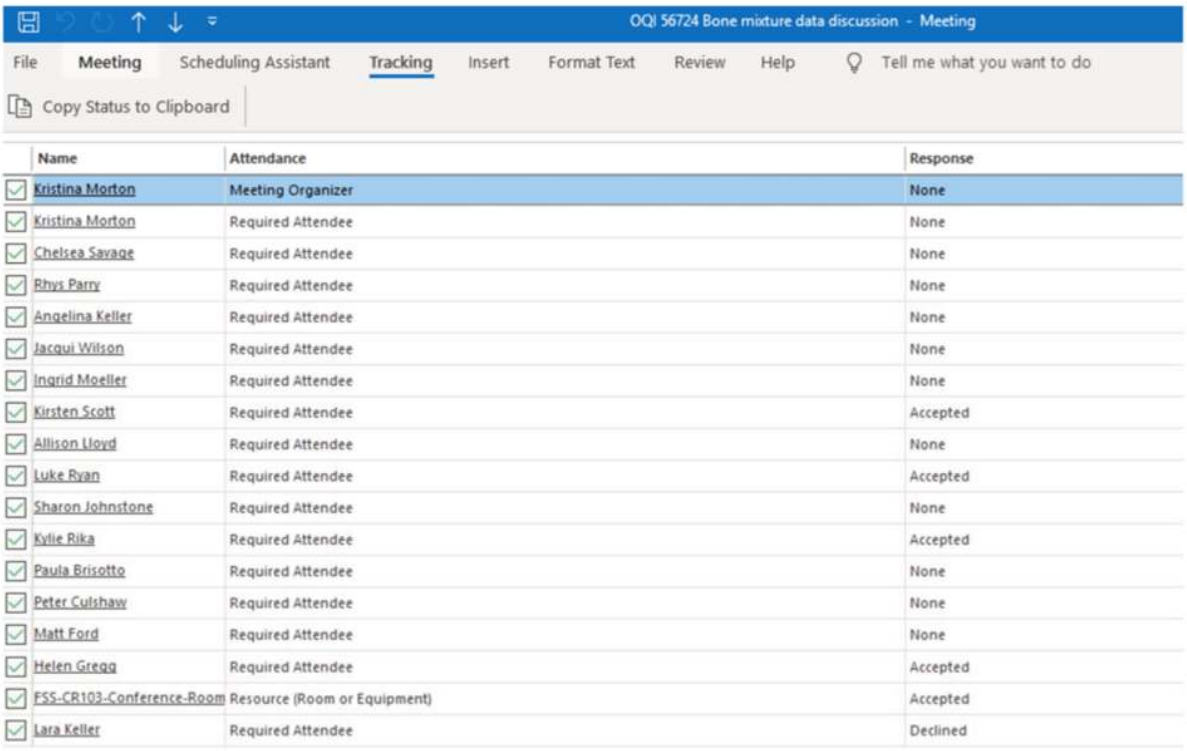
Angelina and Rhys was there anything additional that you had wanted to discuss today?

Thanks,
Kristina

Kristina Morton
Scientist – Evidence Recovery Team
Forensic DNA Analysis, Forensic and Scientific Services
Prevention Division, Queensland Health
p [redacted]
e [redacted] w www.health.qld.gov.au/fss

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and emerging.





Name	Attendance	Response
Kristina Morton	Meeting Organizer	None
Kristina Morton	Required Attendee	None
Chelsea Savage	Required Attendee	None
Rhys Parry	Required Attendee	None
Angelina Keller	Required Attendee	None
Jacqui Wilson	Required Attendee	None
Ingrid Moeller	Required Attendee	None
Kirsten Scott	Required Attendee	Accepted
Allison Lloyd	Required Attendee	None
Luke Ryan	Required Attendee	Accepted
Sharon Johnstone	Required Attendee	None
Kylie Rika	Required Attendee	Accepted
Paula Brisotto	Required Attendee	None
Peter Culshaw	Required Attendee	None
Matt Ford	Required Attendee	None
Helen Gregg	Required Attendee	Accepted
FSS-CR103-Conference-Room	Resource (Room or Equipment)	Accepted
Lara Keller	Required Attendee	Declined

Forensic and Scientific Services

OQI 56724 – Bone Investigation Data Analysis

Chelsea Savage & Kristina Morton

Queensland Government

Parameters

- FDNA process changes for bone processing
  - **13/04/2018** – Project 192 – Transition from Organic bone extraction to extraction using the QIAsymphony SP (H&S chemical hazard and bone extraction efficiency).
  - **05/07/2019** – Cessation of Tergazyme (H&S chemical hazard).
  - **24/03/2020** – Supplementary reproducibility and repeatability report issued after further testing following recommendations after project 192.
  - **15/02/2021** – 3500 instrument implemented for all casework samples.

Parameters

- Samples investigated
  - Total of 25 cases were analysed as part of the OQI from 2019 to 2022. Bone and teeth only, excluding any flesh or hair.
    - » Note: One of these cases included a bone that was crushed prior to 2019, the bone powder was re-processed between 2019 and 2022.
    - » Note: Results that remain outstanding have been excluded.
  - 8 cases identified from 2019 to 2022 with the GMIDX comment of MIX and/or the result line of complex unsuitable.
  - First potential mixture case processed November 2020.

Parameters

- Change in bone tool cleaning
- Change in DNA extraction after R&R
- First possible mixture identified
- Change in CE instrument

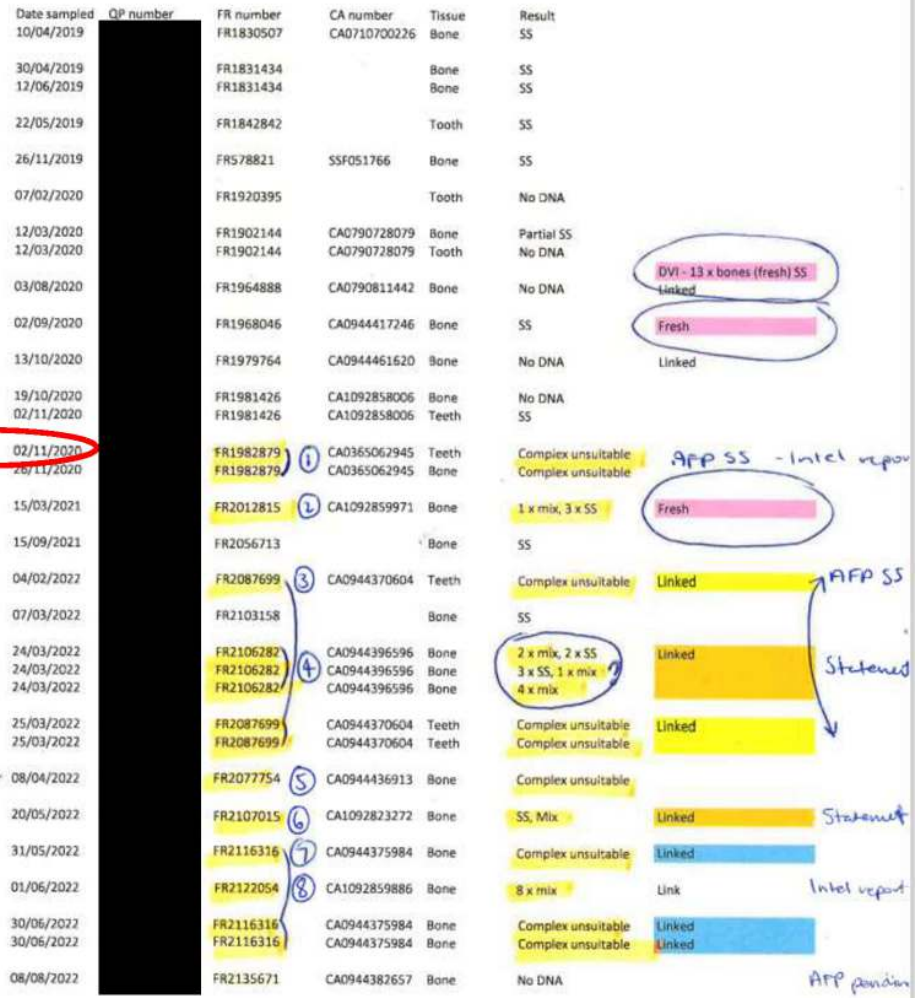
05/07/2019 - C

25/03/2020 - E

1st mixture case

15/02/2021 - CE

Note: The screenshot does not include all cases that were analysed, all cases that are missing were either SS or No DNA Detected. These were all prior to the 3500 implementation.



Date sampled	QP number	FR number	CA number	Tissue	Result	
10/04/2019	[redacted]	FR1830507	CA0710700226	Bone	SS	
30/04/2019		FR1831434		Bone	SS	
12/06/2019		FR1831434		Bone	SS	
22/05/2019		FR1842842		Tooth	SS	
26/11/2019		FR578821	SSF051766	Bone	SS	
07/02/2020		FR1920395		Tooth	No DNA	
12/03/2020		FR1902144	CA0790728079	Bone	Partial SS	
12/03/2020		FR1902144	CA0790728079	Tooth	No DNA	
03/08/2020		FR1964888	CA0790811442	Bone	No DNA	DVI - 13 x bones (fresh) SS Linked
02/09/2020		FR1968046	CA0944417246	Bone	SS	Fresh
13/10/2020		FR1979764	CA0944461620	Bone	No DNA	Linked
19/10/2020		FR1981426	CA1092858006	Bone	No DNA	
02/11/2020		FR1981426	CA1092858006	Teeth	SS	
02/11/2020		FR1982879 (1)	CA0365062945	Teeth	Complex unsuitable	AFP SS - Intel report
26/11/2020		FR1982879	CA0365062945	Bone	Complex unsuitable	
15/03/2021		FR2012815 (2)	CA1092859971	Bone	1 x mix, 3 x SS	Fresh
15/09/2021		FR2056713		Bone	SS	
04/02/2022		FR2087699 (3)	CA0944370604	Teeth	Complex unsuitable	Linked AFP SS
07/03/2022		FR2103158		Bone	SS	
24/03/2022		FR2106282 (4)	CA0944396596	Bone	2 x mix, 2 x SS	Linked Statement
24/03/2022		FR2106282	CA0944396596	Bone	3 x SS, 1 x mix	
24/03/2022		FR2106282	CA0944396596	Bone	4 x mix	
25/03/2022		FR2087699	CA0944370604	Teeth	Complex unsuitable	Linked
25/03/2022		FR2087699	CA0944370604	Teeth	Complex unsuitable	
08/04/2022		FR2077754 (5)	CA0944436913	Bone	Complex unsuitable	
20/05/2022		FR2107015 (6)	CA1092823272	Bone	SS, Mix	Linked Statement
31/05/2022		FR2116316 (7)	CA0944375984	Bone	Complex unsuitable	Linked
01/06/2022		FR2122054 (8)	CA1092859886	Bone	8 x mix	Link Intel report
30/06/2022		FR2116316	CA0944375984	Bone	Complex unsuitable	Linked
30/06/2022		FR2116316	CA0944375984	Bone	Complex unsuitable	Linked
08/08/2022		FR2135671	CA0944382657	Bone	No DNA	AFP partial

Case 1 – FR1982879 – Teeth and Bone

Case overview

- Pathologist and Anthropologist report:
  - Bones received were partial and showed extensive post mortem artefact limiting interpretation. Organic matter including dirt and tree roots with evidence of insect activity was adhered to the surfaces of the bones.
  - Features suggest that bones have been partially buried in wet soil
  - Age range given from Anthropological parameters
- Sent to AFP for missing persons program to examine, SS obtained from AFP.

Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

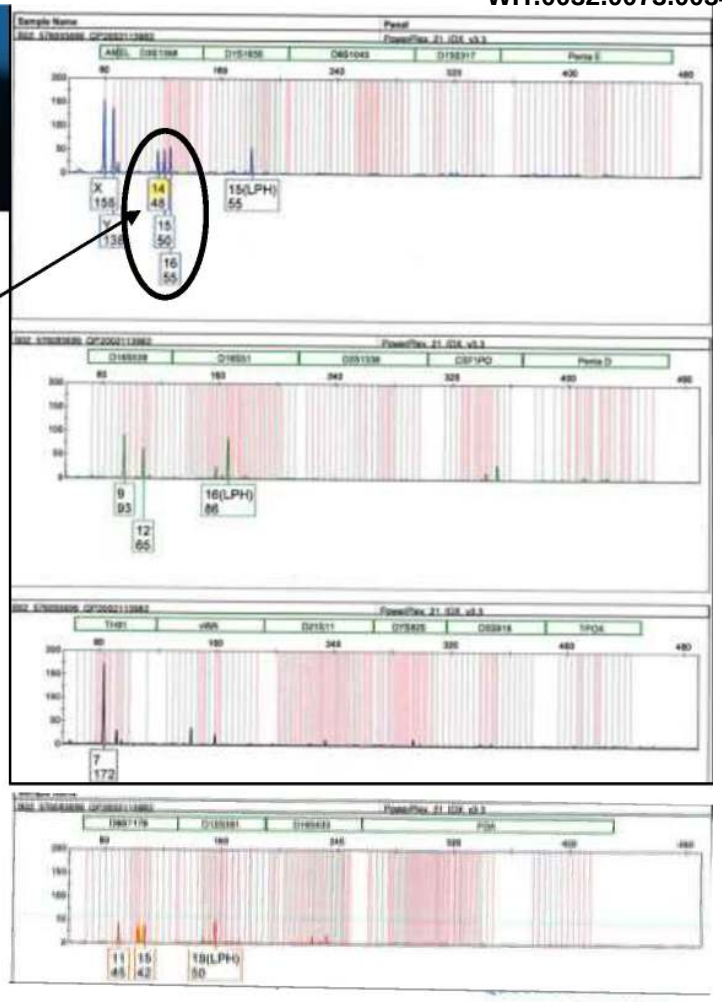
- Teeth processed 02/11/2020
- 4 aliquots taken, each sample was profiled and subsequently pooled to a single DNA profile.
- Bone processed 26/11/2020.
- 6 aliquots taken, each sample was profiled and subsequently pooled to a single DNA profile. All aliquots were processed initially on the 3130 and were ReCE'd on the 3500.
- Both the teeth and the bone were ReCE'd on the 3500 on 18/11/2022 as part of the OQI investigation.

Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

Teeth – pooled aliquots 1 to 4

- Extra peak@D3[14]
  - Is in stutter position. Threshold - 12.6%, actual – 96%.



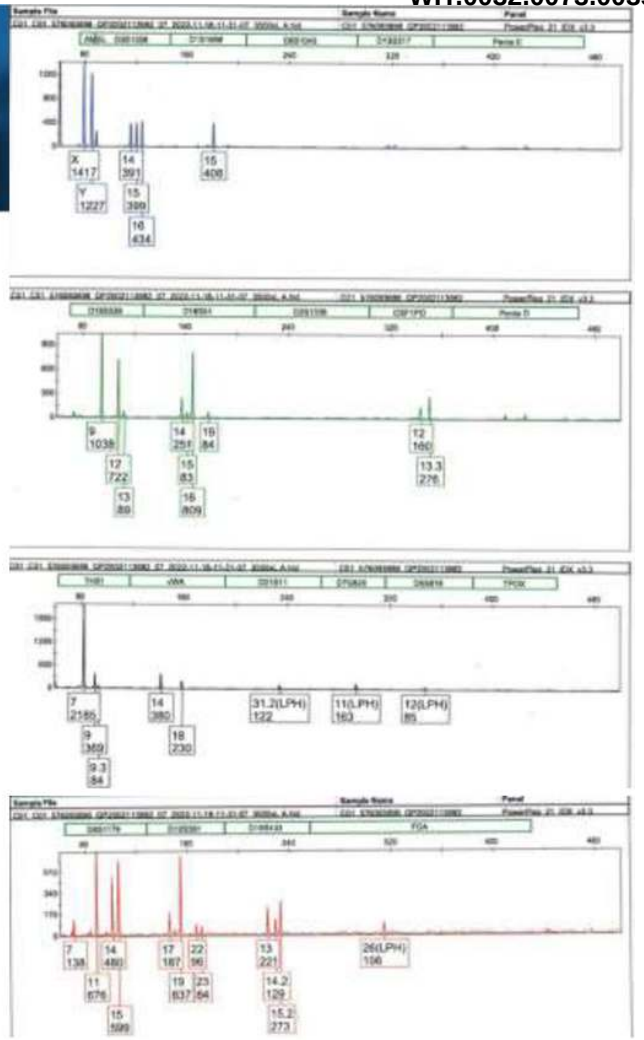
Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

Teeth – pooled aliquots 1 to 4

ReCE 18/11/2022

- Mixed profile observed



Case 1 – FR1982879 – Teeth and Bone

Summary - Tooth

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Teeth Pooled aliquot 1,2,3,4	2/11/2020	Yes	X,Y	14,15,16	15,0	0,0	0,0	0,0	9,12	16,0	0,0	0,0	0,0	7,0	0,0	0,0	0,0	0,0	0,0	11,15	19,0	0,0	0,0
ReCE of pooled barcode 18/11/2022		Yes	X,Y	14,15,16	15,0	0,0	0,0	0,0	9,12,13	14,16,19	0,0	12,13.3	0,0	7,9, 9.3	14,18	31.2,0	11,0	12,0	0,0	7,11,14,15	17,19,22, 23	13,14.2,15.2	26,0

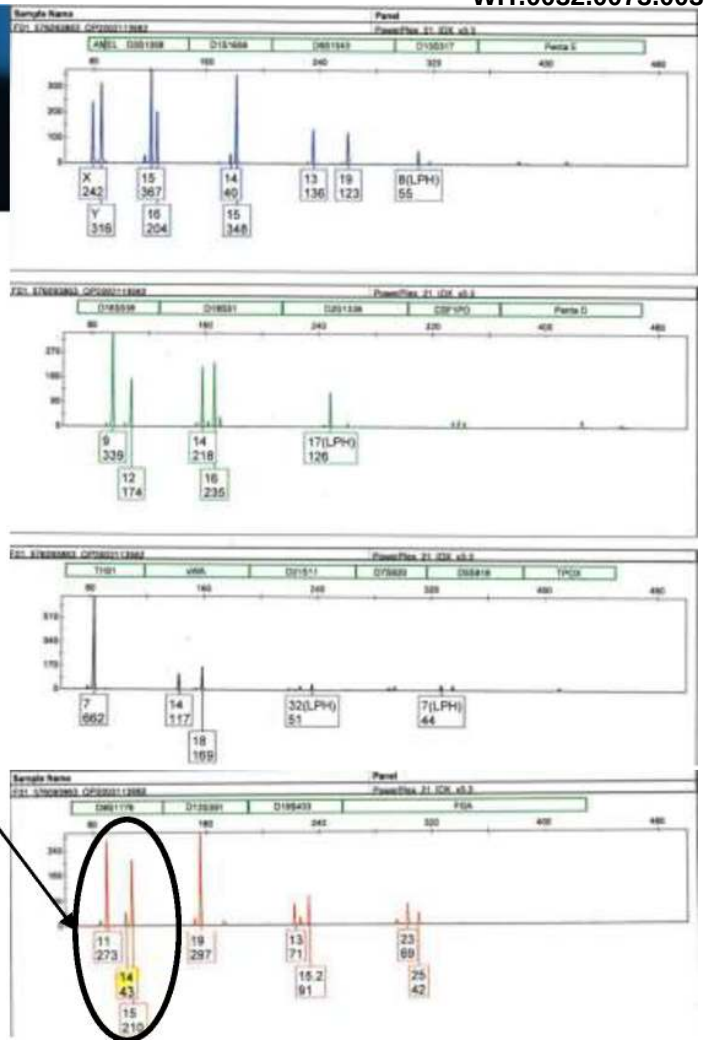
- Additional peaks seen on the ReCE (3500) compared to the amp (3130).
  - This was the only case that was flagged as a mixture that was processed prior to 3500 implementation.
- Quality search performed on extra peaks from ReCE, no matches.

Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

Bone 3130 – pooled aliquots 1 to 6

- Extra peak@D8[14]
  - Is in stutter position. Threshold - 12.6%, actual – 20%.



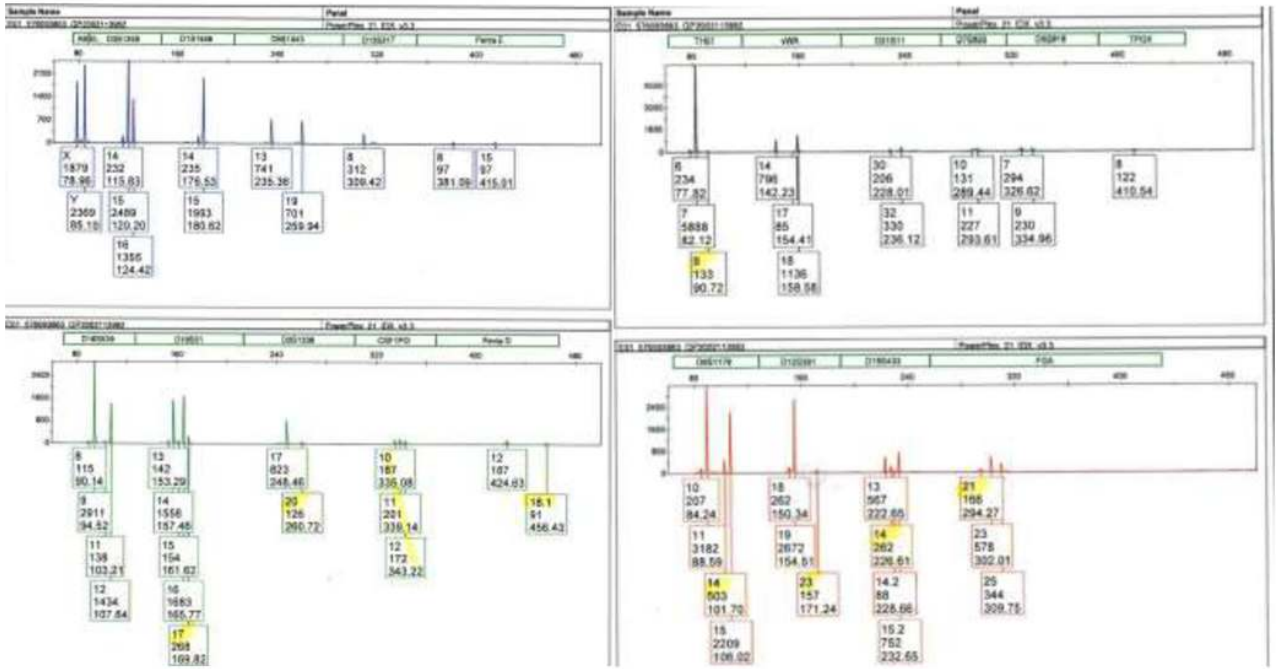
Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

Bone – pooled aliquots 1 to 6

ReCE 3500 (1st)

- Mixed profile observed



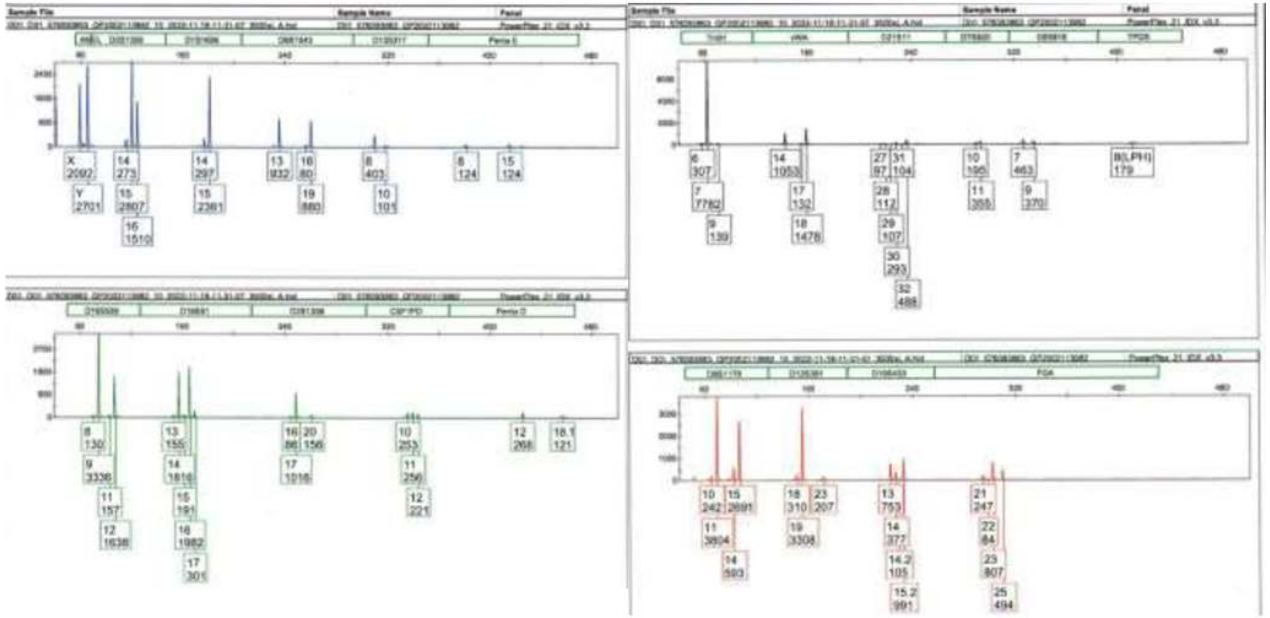
Case 1 – FR1982879 – Teeth and Bone

DNA testing overview

Bone – pooled aliquots 1 to 6

ReCE 18/11/2022

- Mixed profile observed



Case 1 – FR1982879 – Teeth and Bone

Summary - Bone

		Yes	X,Y	15,16	15,0	13,19	8,0	0,0	9,12	14,16	17,0	0,0	0,0	7,0	14,18	0,0	0,0	7,0	0,0	11,14,15	19,0	13,15.2	23,25
Bone Pooled aliquot 1,2,3,4,5,6	26/11/2020	Yes	X,Y	15,16	15,0	13,19	8,0	8,15	9,12	14,16,17	17,20	10,11,12	12,18.1	7,9	14,18	30,32	10,11	7,9	8,0	11,14,15	19,23	13,14,15.2	21,23,25
ReCE of pooled barcode 18/11/2022		Yes	X,Y	15,16	15,15	13,19	8,10	8,15	9,12	14,16,17	17,20	10,11,12	12,18.1	7,9	14,18	27,28,29, 30,31,32	10,11	7,9	8,0	11,14,15	19,23	13,14,15.2	21,23,25

- Additional peaks seen on both ReCE's which were not present on the amp (amp was on the 3130).
- Quality search performed on the additional peaks from both ReCE's, no matches.

Case 1 – FR1982879 – Teeth and Bone

Summary

- Mixed profiles in teeth and bone samples, the extra peaks present in each sample are not consistent with each other. AFP produced a SS profile, this suggests the individuals true profile is not mixed.
- The ReCE's that were performed as part of the OQI investigation have eliminated the CE process as the main source of contamination.
- No re-amplifications have been performed on the extracts, contamination at the amplification stage cannot be excluded.
- No re-sampling of the bone or bone/tooth powder has been performed, contamination at the sampling and extraction processes cannot be excluded.
- AFP appear to have sampled the bone and not used the existing bone powder, resulting in a SS profile.
- Could be many sources of possible contamination including location/condition of the remains, but this is unlikely given the point above.

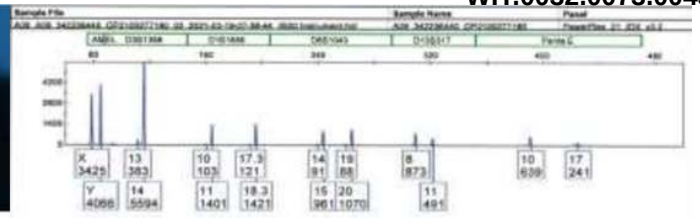
Case 2 – FR2012815 – Bone

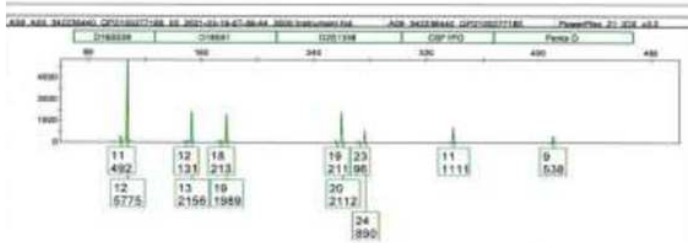
Case overview

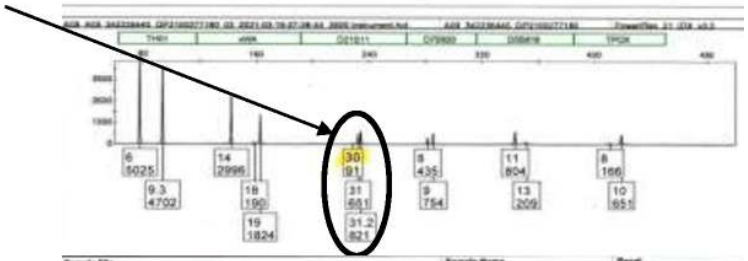
- Crocodile attack, reference sample received from son. Tissue and bones submitted.

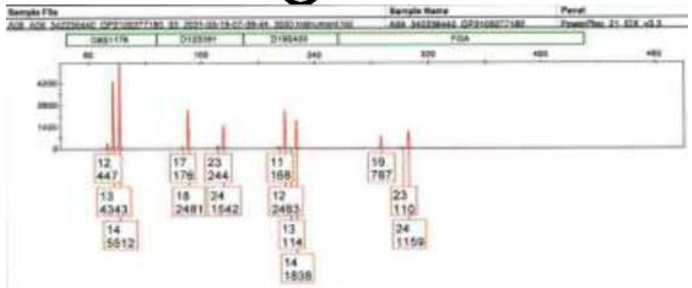
- Bone processed 15/03/2021
- 4 aliquots taken, each sample was profiled.
- Aliquots 2, 3 & 4 had single source profiles.
- Aliquot 1 was ReCE'd on 18/11/2022 as part of the OQI investigation.

Case 2 – FR2012815 – Bone









DNA testing overview

Aliquot 1

- Extra peak@D21[30]
  - Is in stutter position. Threshold - 13.4%, Actual - 14%

ReCE 18/11/2022

- Extra peak present on the ReCE
  - Threshold - 13.4%, Actual – 13.8%

Case 2 – FR2012815 – Bone

Summary

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Bone aliquot 2,3,4	15/03/2021	No	X,Y	14,14	11,18.3	15,20	8,11	10,17	12,12	13,19	20,24	11,11	9,9	6,9.3	14,19	31,31.2	8,9	11,13	8,10	13,14	18,24	12,14	19,24
Bone aliquot 1		Yes	X,Y	14,14	11,18.3	15,20	8,11	10,17	12,12	13,19	20,24	11,11	9,9	6,9.3	14,19	30,31,31.2	8,9	11,13	8,10	13,14	18,24	12,14	19,24
ReCE 18/11/2022		Yes	X,Y	14,14	11,18.3	15,20	8,11	10,17	12,12	13,19	20,24	11,11	9,9	6,9.3	14,19	30,31,31.2	8,9	11,13	8,10	13,14	18,24	12,14	19,24

- Additional peaks seen on the amp and ReCE for aliquot 1, this peak is in stutter position and is <1% above the threshold.
- A single extra peak in a reference sample would be reported under current processes.
- In a reference sample, a minor high stutter would be clicked off by a plate reader (notation added to FR) or be removed by the ref PDA staff member.

Case 3 – FR2087699 – Teeth

Case overview

- Skull found in mangrove/wetlands and appeared to have been at the location for some time as it was bare and buried face down in the mud.
- Probable dental identification determined to be from a MP but identification could not be established beyond doubt.
- Pathologist and Anthropologist report:
  - Skull shows post mortem artefact with surface exposure including green and brown discolouration, cracking and minor cortical exfoliation along weathered margins.
  - Organic matter adhered to surfaces and within the cavity.
  - Features are consistent with bones having been exposed to the elements.
  - Age estimation based on anthropological parameters.
  - Teeth were sampled only
  - Advice sought from ESR and AFP by QPS.
  - AFP generated a SS profile, **this profile was from a skull** (QHFSS did not sample a skull).

Case 3 – FR2087699 – Teeth

Case overview

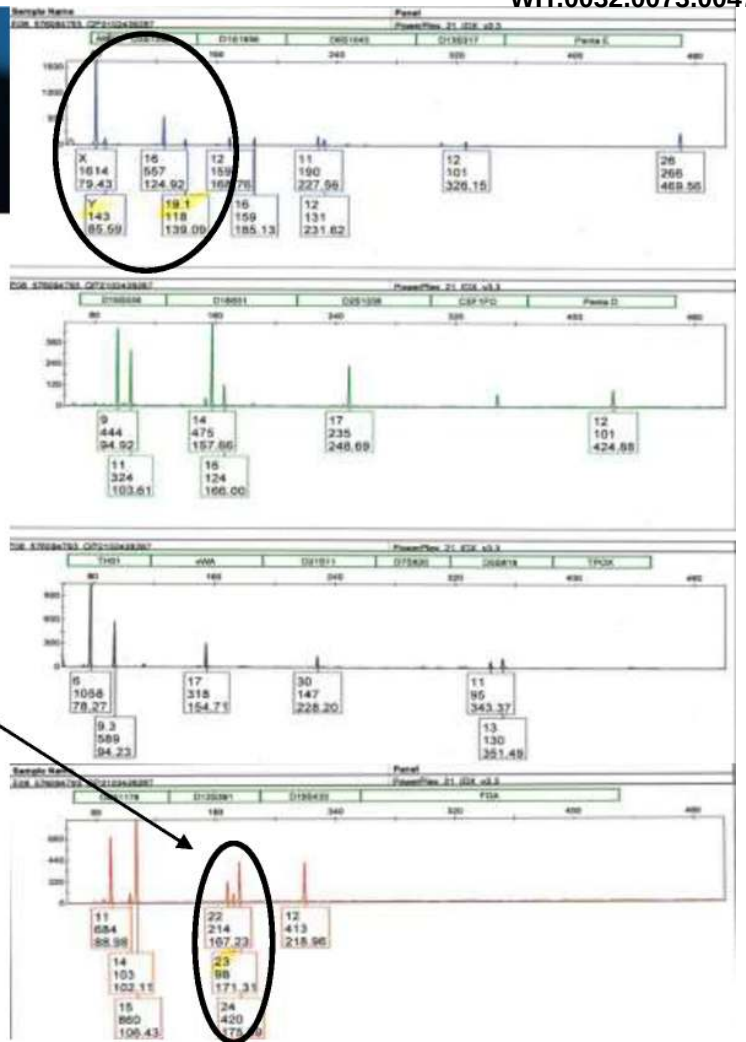
- 3 teeth submitted for analysis
- 2 teeth processed 04/02/2022
- 1 tooth processed 25/03/2022
- All teeth had 4 aliquots taken, each sample was profiled and subsequently pooled to a single DNA profile for each tooth.
- All pooled teeth samples were ReCE'd on 18/11/2022 as part of the OQI investigation.

Case 3 – FR2087699 – Teeth

DNA testing overview

Tooth 1

- 3 x extra peaks@AMEL[Y], D3[19.1] and D12[23].
  - Peak@D12[23] is in a combined stutter position. Threshold 18%, actual 23% and threshold 2.6%, actual 46%.



ReCE 18/11/2022

Extra peaks present on the ReCE

Case 3 – FR2087699 – Teeth

Summary – Tooth 1

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Pooled aliquot 1,2,3,4	4/02/2022	Yes	X,Y	16,19.1	12,16	11,12	12,0	26,0	9,11	14,16	17,0	0,0	12,0	6,9.3	17,0	30,0	0,0	11,13	0,0	11,15	22,23,24	12,0	0,0
ReCE of pooled barcode 18/11/2022		Yes	X,Y	16,19.1	12,16	11,12	12,0	26,0	9,11	14,16	17,0	0,0	12,0	6,9.3	17,0	30,0	0,0	11,13	0,0	11,15	22,23,24	12,0	0,0

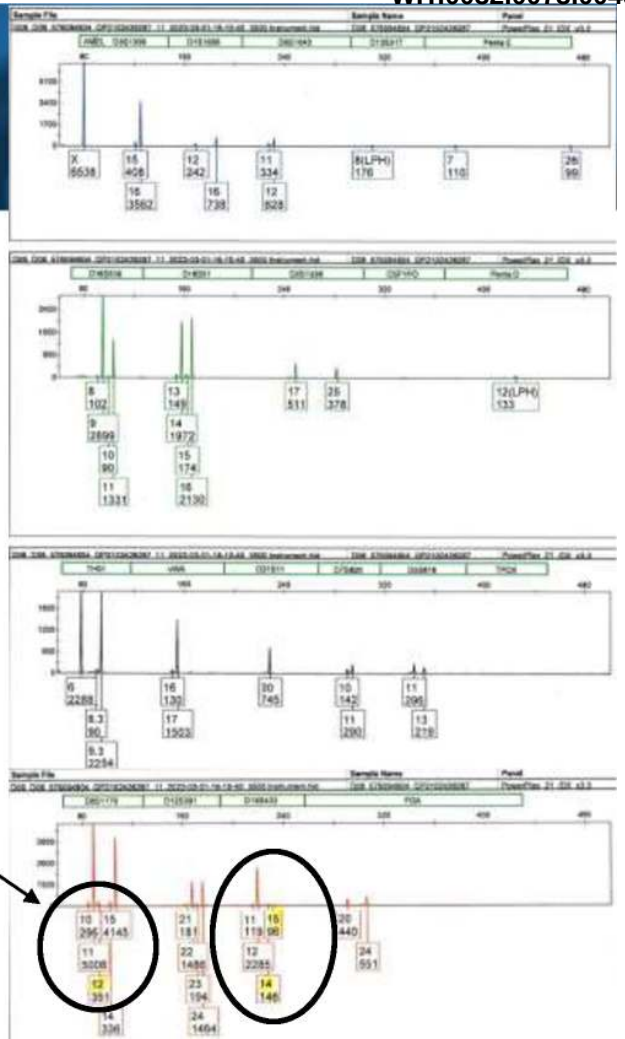
- Extra peak@Amel[Y] could suggest a second contributor
- Extra peak@D3[19.1]
- Extra peak@D12[23] is in stutter position

Case 3 – FR2087699 – Teeth

DNA testing overview

Tooth 2

- 3 x extra peaks@D8[12], D19[14,15]
  - Peak@D8[12] is in stutter position. Threshold 2.3%, actual 7%.



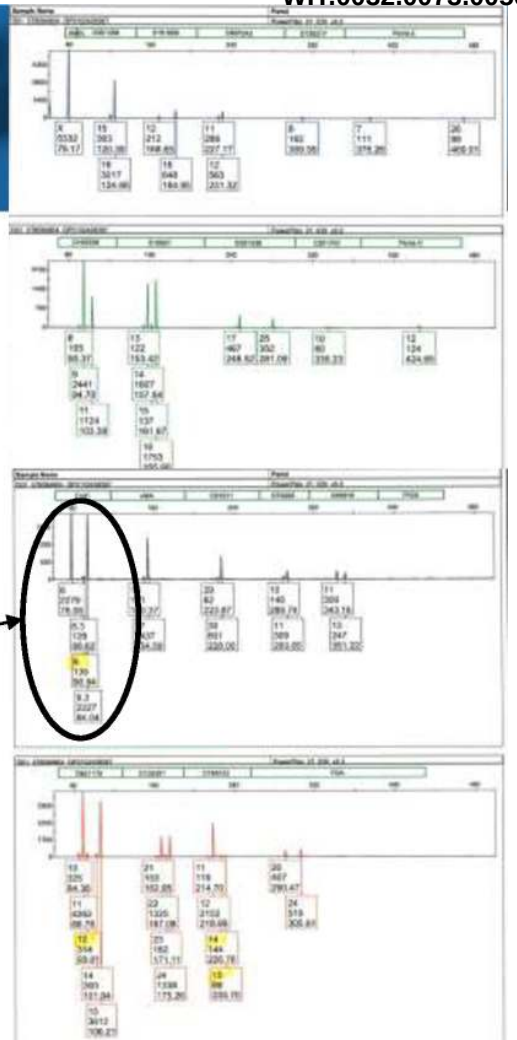
Case 3 – FR2087699 – Teeth

DNA testing overview

Tooth 2

ReCE 18/11/2022

- Extra peaks from amp also present on the ReCE
- Additional peak present@TH01[9]
  - This peak is also present on the amp above the LOR, ?plate reader clicked off.



Case 3 – FR2087699 – Teeth

Summary – Tooth 2

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Pooled aliquot 1,2,3,4	4/02/2022	Yes	X,X	16,16	12,16	11,12	8,0	7,26	9,11	14,16	17,25	0,0	12,0	6,9.3	17,17	30,30	10,11	11,13	0,0	11,12,15	22,24	12,14,15	20,24
ReCE of pooled barcode 18/11/2022		Yes	X,X	16,16	12,16	11,12	8,8	7,26	9,11	14,16	17,25	10,10	12,12	6,9,9.3	17,17	30,30	10,11	11,13	0,0	11,12,15	22,24	12,14,15	20,24

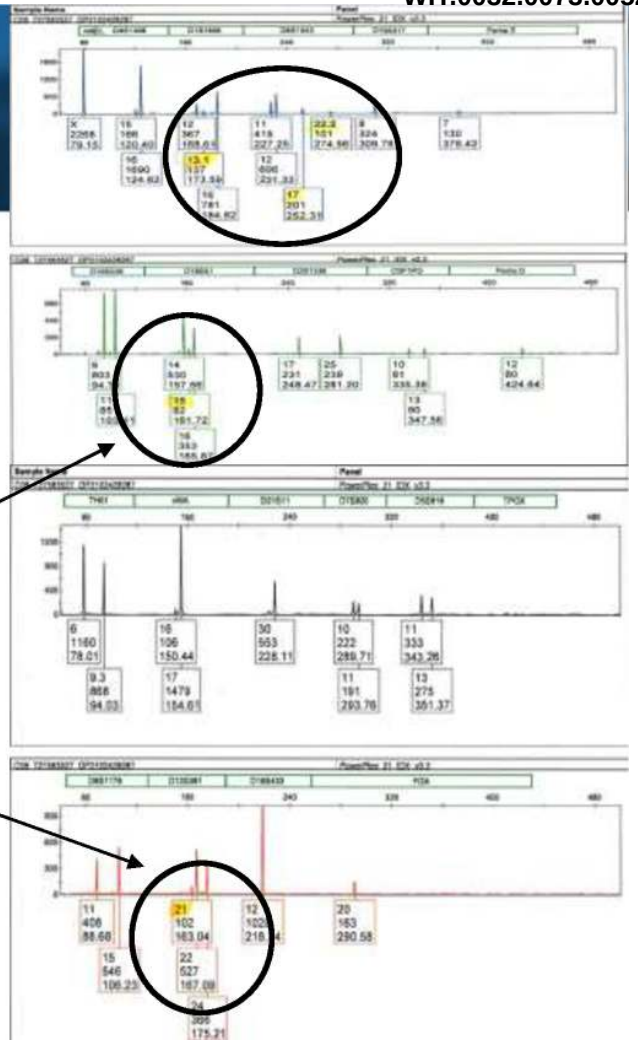
- 4 x extra peaks visible on amp and ReCE
- The 9@TH01 appears on the amp above the LOR. Possibility that the plate reader has removed.
- Extra peak@D8[12] is in a stutter position

Case 3 – FR2087699 – Teeth

DNA testing overview

Tooth 3

- 5 x extra peaks@D3[18.2], D1[13.1], D6[17,22.2], D18[15], D12[21]
  - Peak@D18[15] is in a combined stutter position. Threshold – 15.1%, actual – 23% and threshold 3.5%, actual 15%.
  - Peak@D12[21] is in stutter position. Threshold 18%, actual - 19.4%.



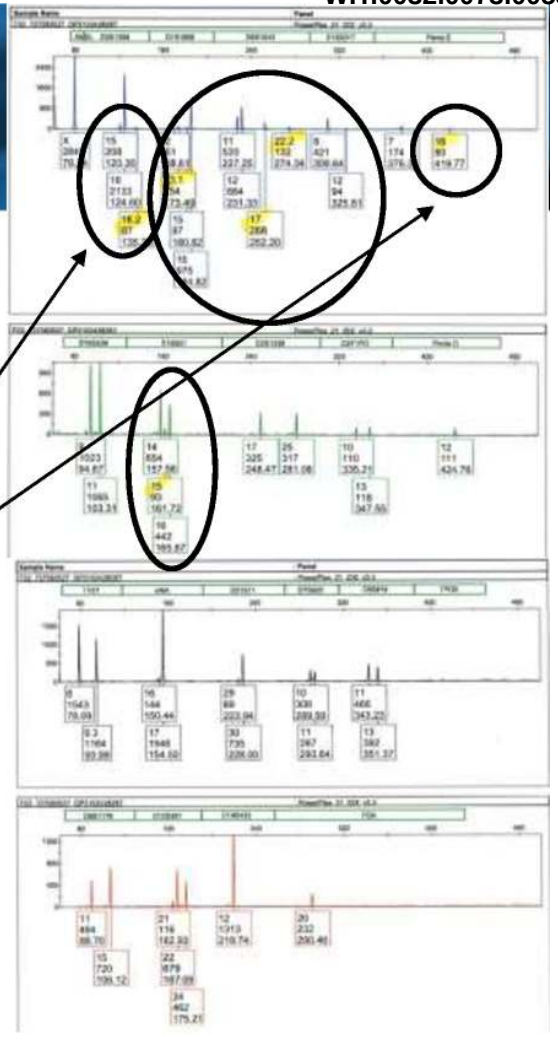
Case 3 – FR2087699 – Teeth

DNA testing overview

Tooth 3

ReCE 18/11/2022

- Extra peaks@D1[13.1], D6[17,22.2] and D18[15] from the amp are labelled on the ReCE
- 2 x additional peaks present on the ReCE that were not labelled on the amp – D3[18.2] and Penta E[16].
  - Both present on the amp above LOD but below LOR
- Extra peak on amp@D12[21] is in a stutter position and is no longer above threshold on the ReCE



Case 3 – FR2087699 – Teeth

Summary – Tooth 3

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Pooled aliquot 1,2,3,4	25/03/2022	Yes	X,X	16,0	12,13.1,16	11,12,17,22.2	8,0	7,0	9,11	14,15,16	17,25	10,13	12,12	6,9.3	17,17	30,30	10,11	11,13	0,0	11,15	21,22,24	12,12	20,20
ReCE of pooled barcode 18/11/2022		Yes	X,X	16,18.2	12,13.1,16	11,12,17,22.2	8,12	7,16	9,11	14,15,16	17,25	10,13	12,12	6,9.3	17,17	30,30	10,11	11,13	0,0	11,15	22,24	12,12	20,20

- 7 x extra peaks present
- Extra peak@D3[18.2] and Penta E[16] are present on the amp above LOD
- Extra peak@D18[15] and D12[21] are in stutter position. The peak at D12[21] is below stutter threshold on the ReCE

Case 3 – FR2087699 – Teeth

Summary

- Extra peaks are not consistent between the 3 x teeth – this suggests that the extra peaks are not due to a genetic abnormality.
- The ReCE's that were performed as part of the OQI investigation have eliminated the CE process as the main source of contamination.
- No re-amplifications have been performed on the extracts, contamination at the amplification stage cannot be excluded.
- No re-sampling of the tooth powder/s has been performed, contamination at the sampling and extraction processes cannot be excluded.
- AFP sampled a skull, resulting in a SS profile. This bone was not submitted to QHFSS.
- Could be many sources of possible contamination including location/condition of the remains or microbial contamination. This cannot be excluded as the sample used by the AFP was different.

Case 4 – FR2106282 – Bones

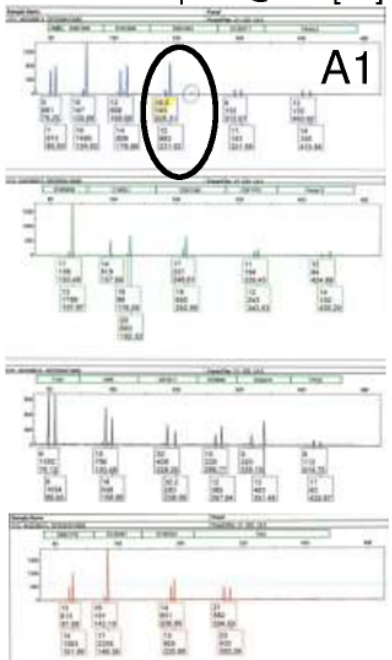
Case overview

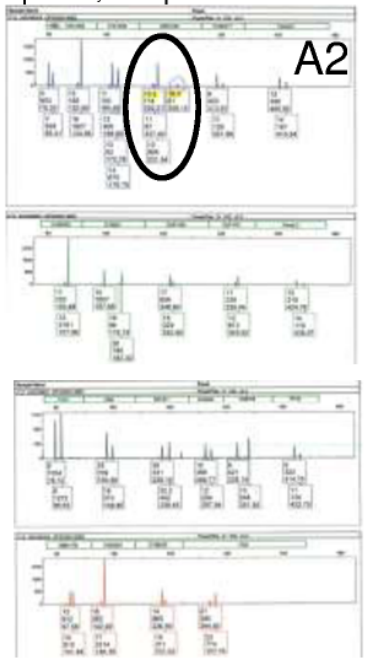
- Unnatural death (suicide)
- 2 months between last seen alive and remains found, during summer
- Remains located in heavy bushland, animal footprints were observed.
- QPS form 1 suggests that the area has had over 200mm of flooding in the past 2 weeks.
- First set of bones located (examined with an anthropologist) and a few days later the remaining bones were located nearby.
- All bones were noted to have features consistent with surface exposure.
- Ulna, Humerus and Radius bones were examined on 24/03/2022
- All aliquots for the ulna bone and aliquots 1 and 2 from the radius bone were ReCE'd on 18/11/2022 as part of the OQI investigation.

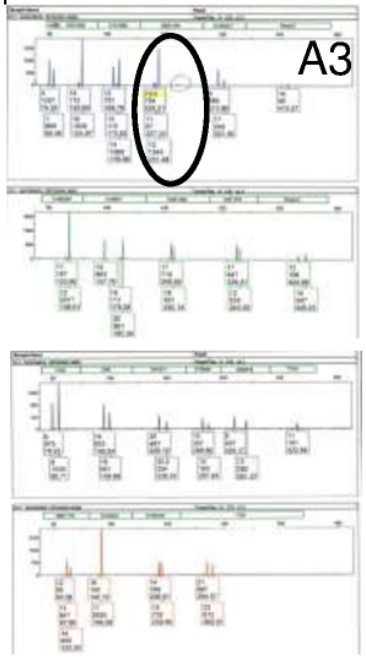
Case 4 – FR2106282 – Bones

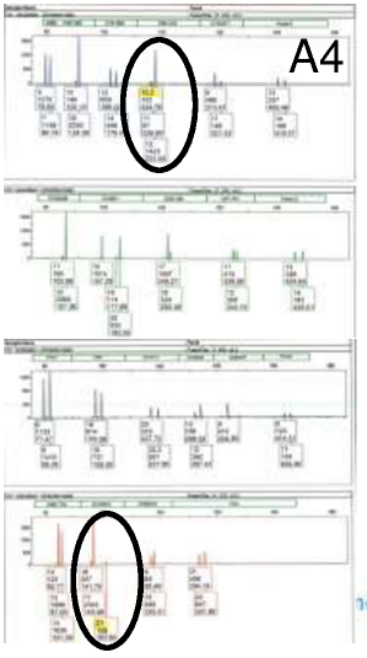
DNA testing overview – Ulna bone – 4 x aliquots

- Extra peaks@D6[10.2] in all aliquots
- Extra peak@D6[18.3], in aliquot 2 - unlabelled for aliquots 1, 2 & 4 but above LOD
- Extra peak@D12[21] in aliquot 4, not present on other aliquots









Case 4 – FR2106282 – Bones

Ulna

- All 4 aliquots were ReCE'd on 18/11/2022 as part of the OQI investigation.
- The ReCE's of aliquots 1-3 showed the same extra peaks as their respective amps
- The ReCE of aliquot 4 showed an extra peak@D8[7]. This peak is not on the amp and appears to be CE instrument injection artefact.

Case 4 – FR2106282 – Bones

Summary – Ulna bone

Bone barcode	Subsample number	Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
342236877 Ulna	342236913	Bone aliquot 1	24/03/2022	Yes	X,Y	16,16	12,14	**10.2,12**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
		ReCE 18/11/2022		Yes	X,Y	16,16	12,14	**10.2,12**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
	342236924	Bone aliquot 2	24/03/2022	Yes	X,Y	16,16	12,14	**10.2,12,18.3**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
		ReCE 18/11/2022			X,Y	16,16	12,14	**10.2,12,18.3**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,25
	342236990	Bone aliquot 3	24/03/2022	Yes	X,Y	16,16	12,14	**10.2,12**	9,11	14,0	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	11,11	13,14	17,17	14,15	23,21
		ReCE 18/11/2022			X,Y	16,16	12,14	**10.2,12**	9,11	0,0	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	11,11	13,14	17,17	14,15	25,21
	342236941	Bone aliquot 4	24/03/2022	Yes	X,Y	16,16	12,14	**10.2,12**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,9	9,11	13,14	**17,21**	14,15	21,23
		ReCE 18/11/2022			X,Y	16,16	12,14	**10.2,12**	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,9	9,11	**7,13,14**	**17,21**	14,15	21,23

- 2 x extra peaks@D6[10.2,18.3] present on all aliquots and ReCE's (some below LOR)
- 1 x peak@D12[21] only present in aliquot 4
- 1 x peak@D8[7] appears to be artefact

Case 4 – FR2106282 – Bones

Humerus

- 4 aliquots taken and profiled. 1 x DNA insufficient and 3 x SS
- All 4 aliquots sent for a microcon, returning 4 x SS profiles.

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Bone aliquot 1,2,3,4	24/03/2022	No	X,Y	16,16	12,14	12,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23

Case 4 – FR2106282 – Bones

DNA testing overview

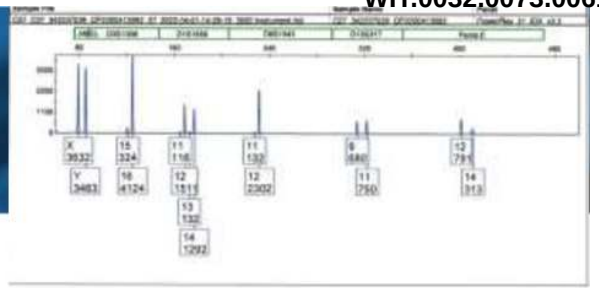
Radius bone – 4 x aliquots, all sent for microcon

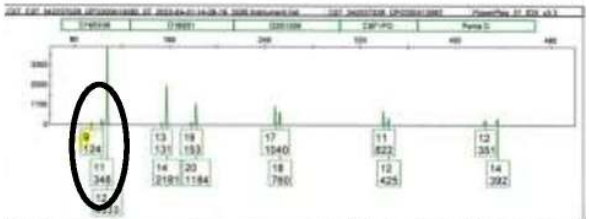
Aliquot 1

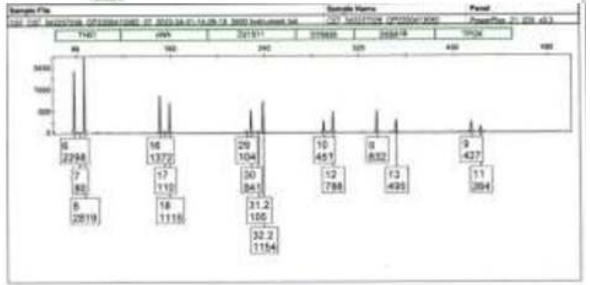
- 2 x extra peaks@D16[9] and D12[20]

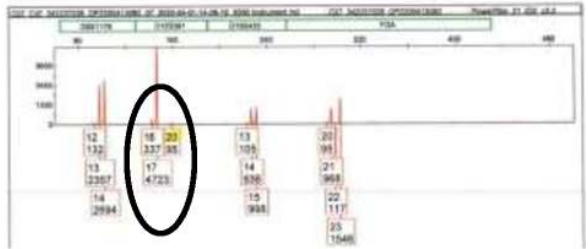
ReCE 18/11/2022

- Extra peaks from amp also present on the ReCE
  - D12[20] is not labelled on the ReCE but is above LOD









Case 4 – FR2106282 – Bones

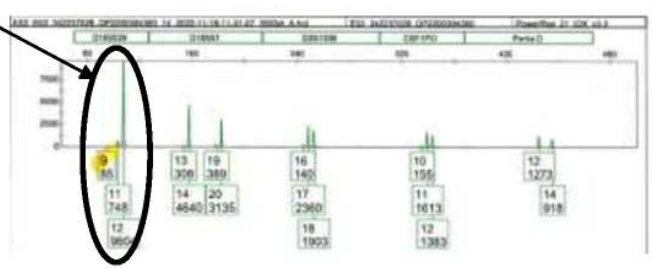
DNA testing overview

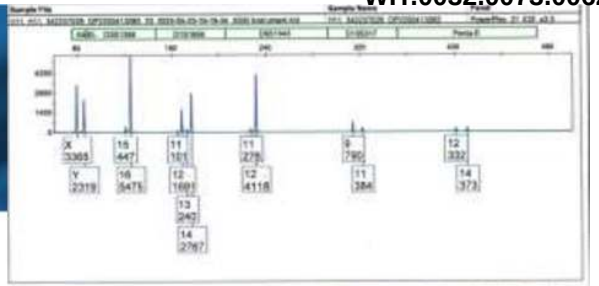
Aliquot 1 – Microcon

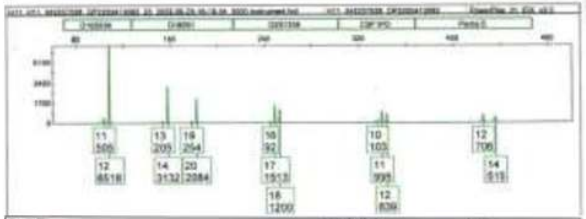
- 1 x extra peak@TH01[9.3]

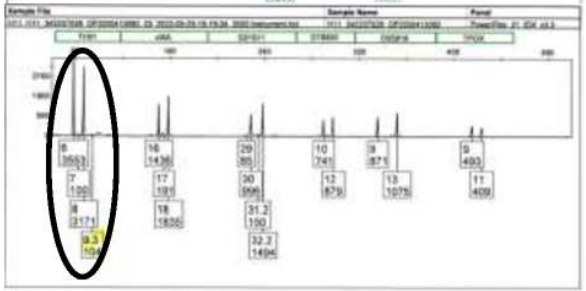
ReCE of microcon 18/11/2022

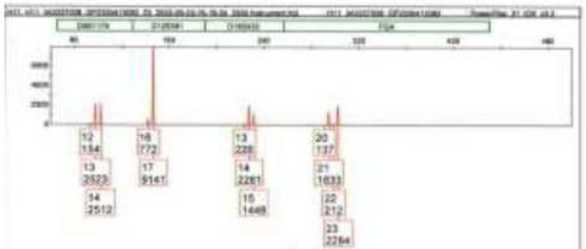
- Extra peak from microcon also present on the ReCE
- Additional extra peak@D16[9] present on the ReCE only, this peak is visible on the microcon but is above the LOD.











Case 4 – FR2106282 – Bones

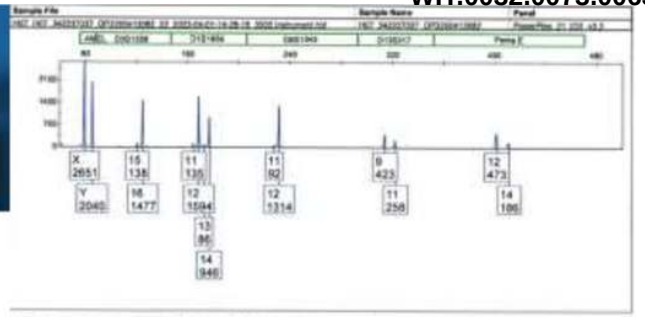
Aliquot 2

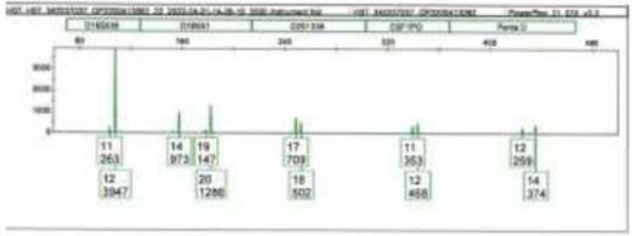
- 1 x extra peak@D12[20]
- Aliquot 2 was sent for microcon and produced a SS result.

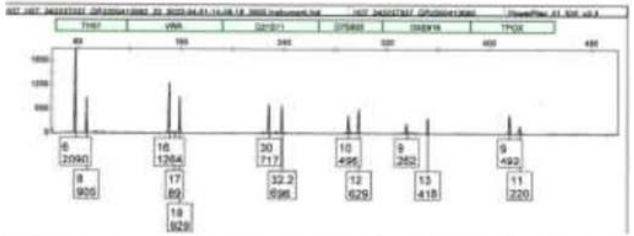
ReCE 18/11/2022

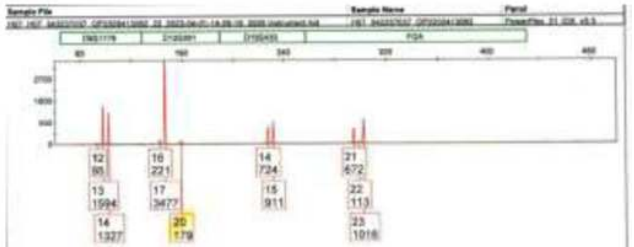
- Extra peak from the amp is also present on the ReCE

- **Aliquots 3 & 4**
- Amp and microcon's were SS.









Case 4 – FR2106282 – Bones

Summary – Radius bone

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Bone aliquot 3,4 (original and m'con)	24/03/2022	No	X,Y	16,16	12,14	12,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 1	24/03/2022	Yes	X,Y	16,16	12,14	12,12	9,11	12,14	9,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,20	14,15	21,23
ReCE 18/11/2022		Yes	X,Y	16,16	12,14	12,12	9,11	12,14	9,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 1 (mcon)	24/03/2022	Yes	X,Y	16,16	12,14	12,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8,9.3	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
ReCE 18/11/2022			X,Y	16,16	12,14	12,12	9,11	12,14	9,12	14,20	17,18	11,12	12,14	6,8,9.3	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 2	24/03/2022	Yes	X,Y	16,16	12,14	12,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,20	14,15	21,23
ReCE 18/11/2022		Yes	X,Y	16,16	12,14	12,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,20	14,15	21,23

- Extra peak@D16[9]
  - Present on aliquot 1 (amp and microcon), visible on aliquot 3 above LOD, not visible on aliquot 2 or aliquot 4.
- Extra peaks@TH01[9.3] in aliquot 1 of the on the microcon and microcon ReCE. Not present on the amp and amp ReCE. Visible in aliquot 2 above LOD. Not visible in aliquots 3 and 4.
- Extra peaks@D12[20] in aliquot 1 and 2. Not visible on aliquots 3 and 4.

Case 4 – FR2106282 – Bones

Summary

Ulna

- The extra peaks at D6 are consistent in all aliquots, this indicates that the contamination exists in the bone powder.
- The extra peak at D12 is only present in aliquot 4 only, indicating that the contamination could have been during analytical processing.
- The extra peak at D8 only appears in aliquot 4's ReCE, this can be attributed to artefact.

Humerus

- All aliquots were SS, indicating the individual does not have any genetic abnormalities.

Radius

- Contaminating peaks are present all present in more than 1 aliquot, possible drop out in the other aliquots. Due to the similarity in the extra peaks, this is indicative of a possible contamination at the sampling stage (mortuary or DNA).
- Cannot exclude possible contamination from location/condition of the remains or microbial contamination.
- Re-amplification of the extracts may not yield additional information based on the above conclusion.

Case 5 – FR2077754 – Bone

Case overview

- Remains found on banks of a creek, area is only accessible by boat on high tide.
- Anthropologist noted erosion to the femoral head and noted that 'wet sandy soils are not conducive to bone preservation' also the appearance of the bones are consistent with an extended duration of exposure to a damp and sandy burial environment.
- Age was estimated from anthropological parameters.
- Post mortem interval was estimated between tens and hundreds of years.
- Noted that the bones were brittle at the scene.

Case 5 – FR2077754 – Bone

DNA testing overview

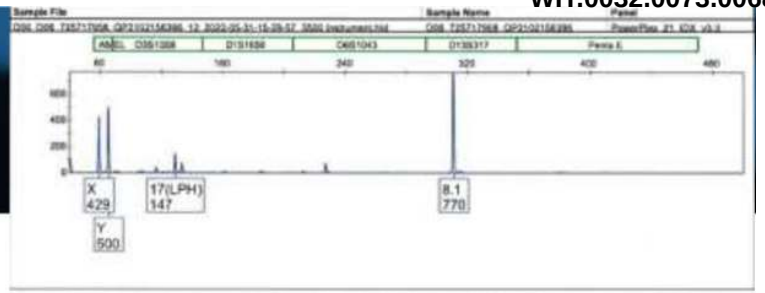
- Bone labelled '1' processed 08/04/2022
- 4 aliquots taken, each sample was profiled
- Aliquots 1, 2 and 4 were subsequently pooled to a single DNA profile.
- Additional aliquots were requested and subsequently 4 more aliquots from the original crush of bone were submitted for DNA analysis.
- Aliquots 5 to 8 were subsequently pooled to a single DNA profile.

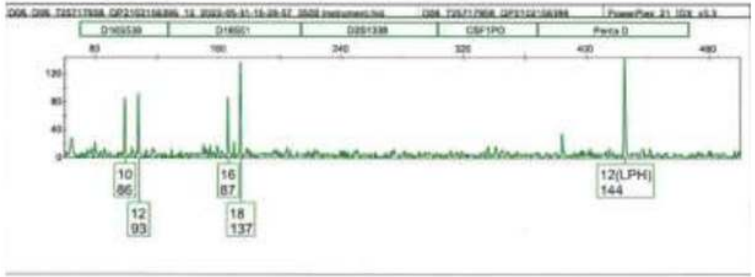
Case 5 – FR2077754 – Bone

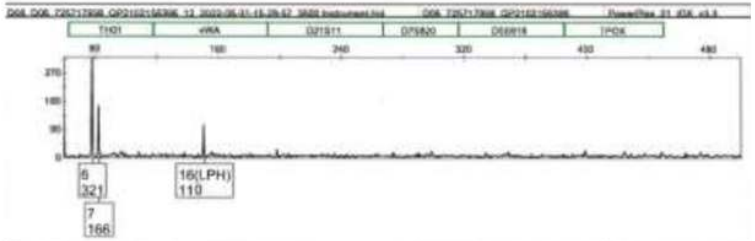
DNA testing overview

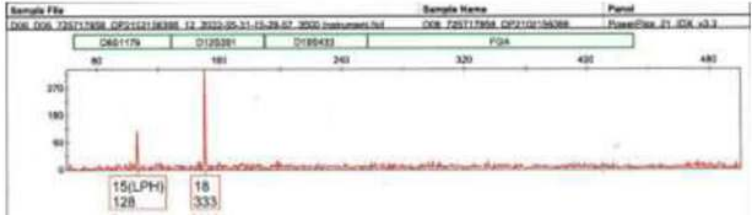
Aliquots 1, 2 and 4 (pooled)

- Partial single source profiles was observed







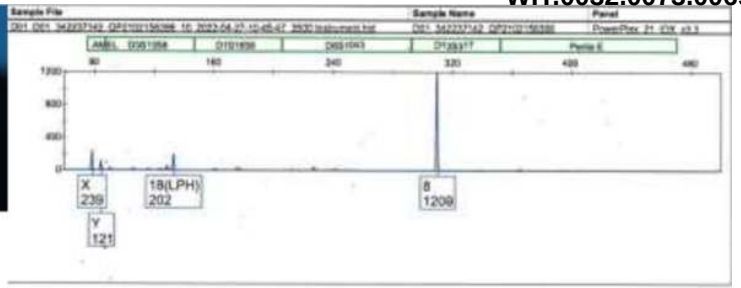


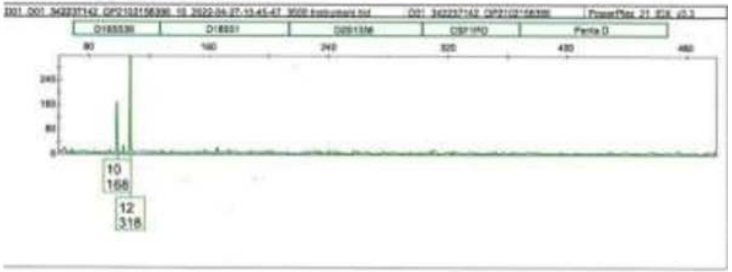
Case 5 – FR2077754 – Bone

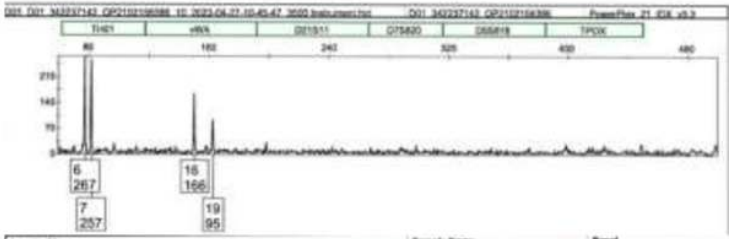
DNA testing overview

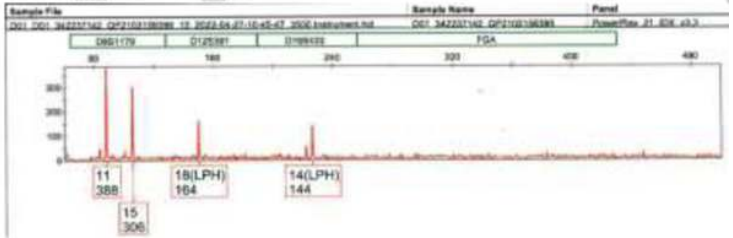
Aliquot 3

- Partial single source profile was observed







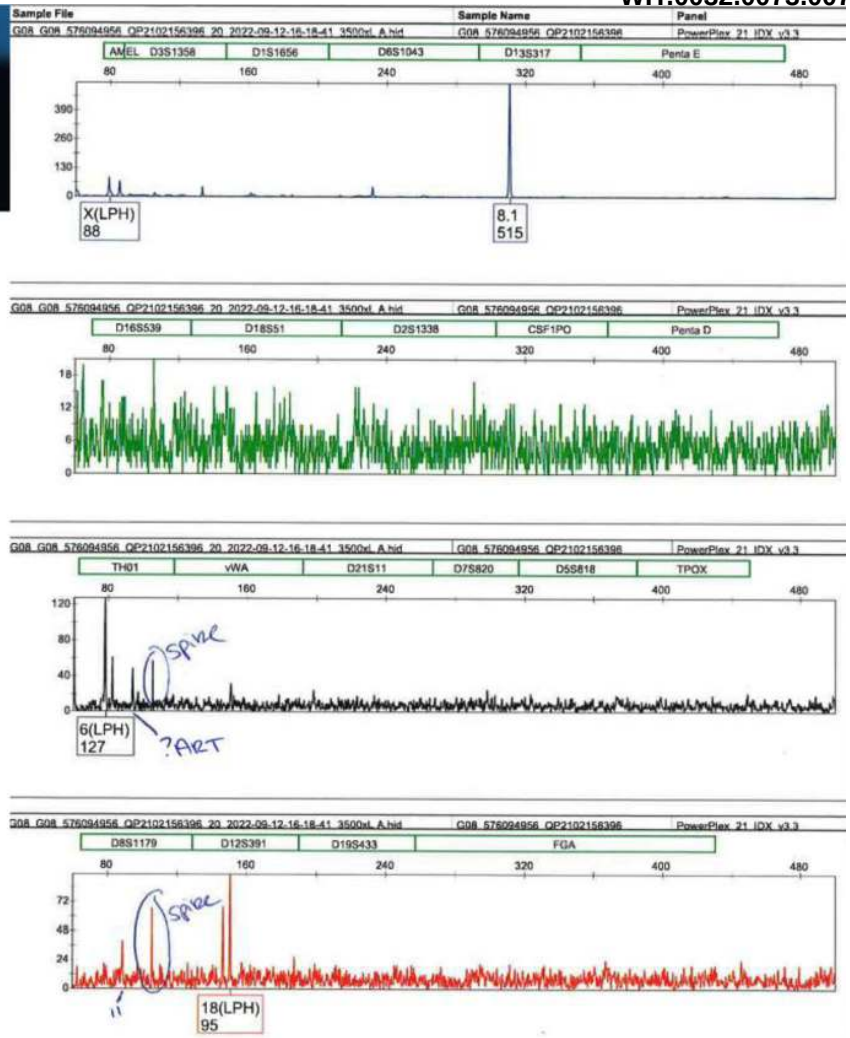


Case 5 – FR2077754 – Bone

DNA testing overview

Aliquots 5, 6, 7 & 8 (pooled)

- Partial single source profile was observed
- Possible unlabelled artefacts visible



Case 5 – FR2077754 – Bone

Summary

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Pooled aliquot 1,2,4	8/04/2022	No	X,Y	17,0	0,0	0,0	8.1,8.1	0,0	10,12	16,18	0,0	0,0	12,0	6,7	16,0	0,0	0,0	0,0	0,0	15,0	18,18	0,0	0,0
Aliquot 3		No	X,Y	18,0	0,0	0,0	8,8	0,0	10,12	0,0	0,0	0,0	0,0	6,7	16,19	0,0	0,0	0,0	0,0	11,15	18,0	14,0	0,0
Bone aliquot 5,6,7,8		No	X,0	0,0	0,0	0,0	8.1,8.1	0,0	0,0	0,0	0,0	0,0	0,0	6,0	0,0	0,0	0,0	0,0	0,0	0,0	18,0	0,0	0,0

- Profiles appear to be highly degraded
- Very partial SS profiles

Case 6 – FR2107015 – Bone

Case overview

- Linked to case 4 FR2106282.
- Unnatural death (suicide)
- Second set of bones located a few days after the first set, femur was examined for this FR number

DNA testing overview

- Bone processed 20/05/2022
- 4 aliquots taken, each sample was profiled
- Aliquots 1 and 3 were ReCE'd on 18/11/2022 as part of the OQI investigation.

Case 6 – FR2107015 – Bone

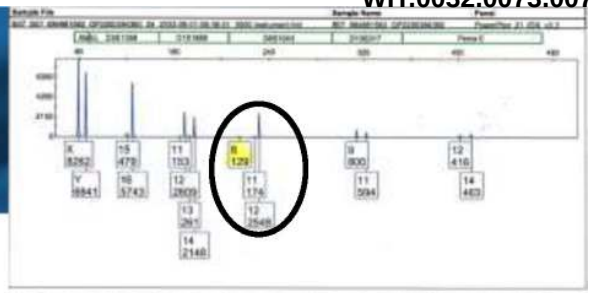
DNA testing overview

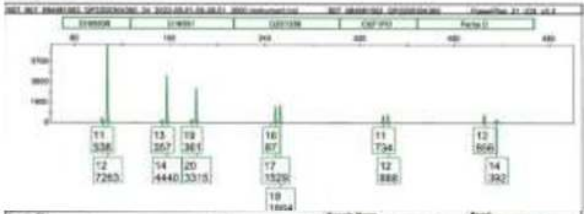
Aliquot 1

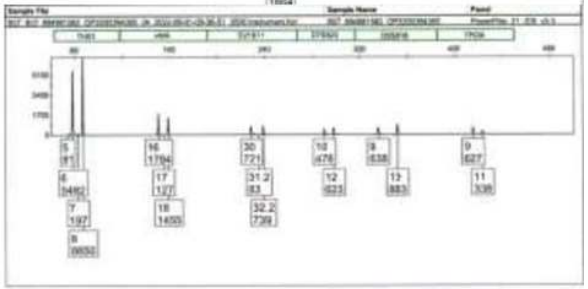
- Extra peak@D6[8]

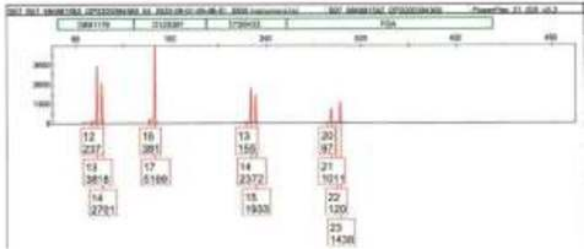
ReCE 18/11/2022

- Extra peak is present on ReCE









Case 6 – FR2107015 – Bone

DNA testing overview

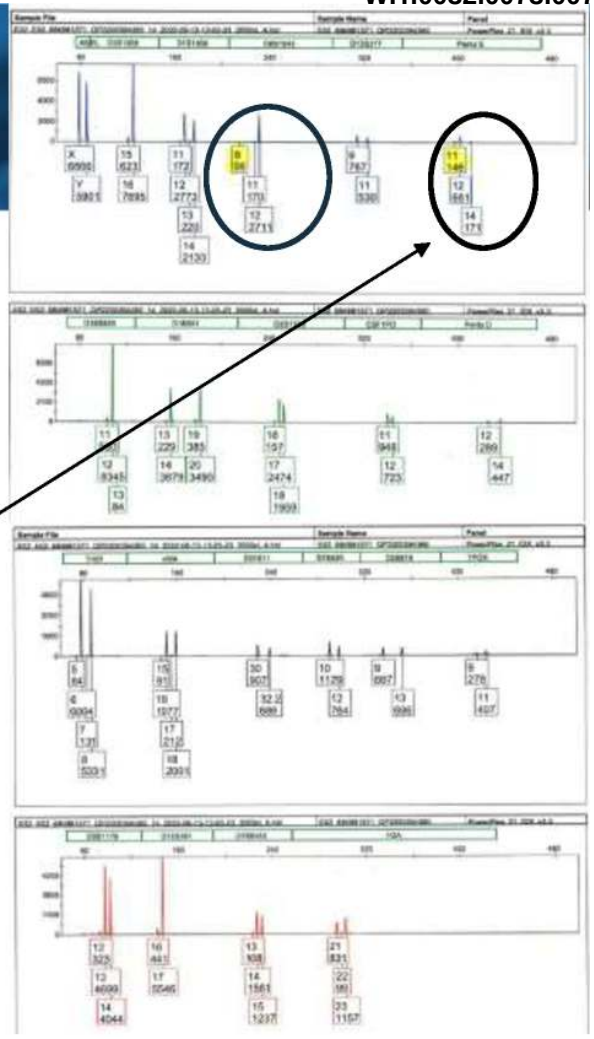
Aliquot 2

- Single source – broad peaks so a ReCE ordered

(ReCE appears to have been ordered three times in error)

ReCEs

- Extra peak@D6[8] present on ReCE 1 and 3
- Extra peak@Penta E[11] on ReCE 1,2 and 3
  - Is in stutter position. Threshold – 8.6%. Actual – 22%, 23%, 22%
- Both extra peaks are visible on the amp - below the LOR



Case 6 – FR2107015 – Bone

DNA testing overview

Aliquot 3

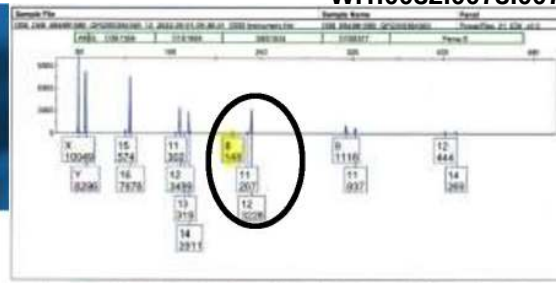
- Extra peak@D6[8]

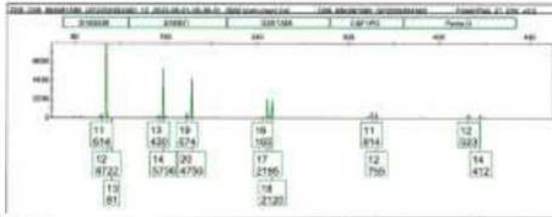
ReCE 18/11/2022

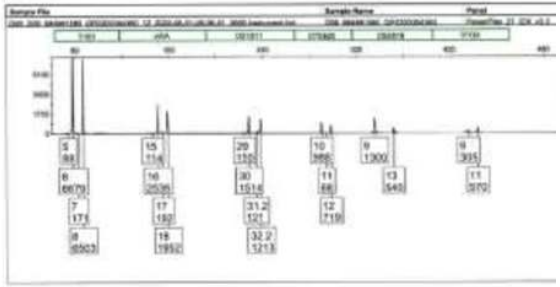
- Extra peak is present on ReCE

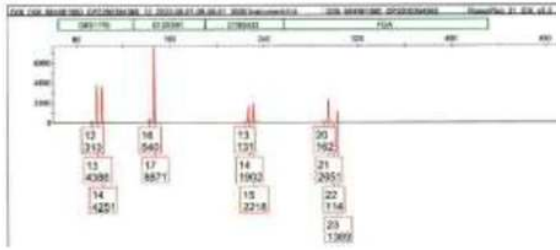
Aliquot 4

- Single source









Case 6 – FR2107015 – Bone

Summary

Description	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
ReCE 18/11/2022	Yes	X,Y	16,16	12,14	8,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 2	No	X,Y	16,16	12,14	12,12	9,11	12,0	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 2 ReCE 1	Yes	X,Y	15,16	12,14	8,12	9,11	11,12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 2 ReCE 2	Yes	X,Y	15,16	12,14	12,12	9,11	11,12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 2 ReCE 3	Yes	X,Y	15,16	12,14	8,12	9,11	11,12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 3	Yes	X,Y	16,16	12,14	8,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
ReCE 18/11/2022	Yes	X,Y	16,16	12,14	8,12	9,11	12,14	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23
Bone aliquot 4	No	X,Y	16,16	12,14	12,12	9,11	12,0	12,12	14,20	17,18	11,12	12,14	6,8	16,18	30,32.2	10,12	9,13	9,11	13,14	17,17	14,15	21,23

- Extra peak@D6[8]
  - Present on all aliquots (some below LOR but above LOD)
- Extra peak@Penta E[11] in Aliquot 2

Case 6 – FR2107015 – Bone

Summary

- The extra peak at D6 may be the individuals true profile, or may be due to some form of contamination during sampling (DNA or mortuary). Resampling the bone could help determine whether contamination occurred during sampling.
- This extra peak at Penta E is only present on the ReCE's. It is possible that during the first ReCE, contamination has occurred to the amp plate, resulting in all subsequent ReCE's showing the same extra peak. A re-amp would be required to confirm this theory.
- The humerus bone from case 4 (linked) produced a SS profile which indicates that extra peaks seen in this bone are not the true profile. Re-sampling of the bone could confirm this theory.

Case 7 – FR2116316 – 3 x bones

Case Overview

- Bones found on sand banks of a river, noted that the creek has been exposed to recent flooding with debris visible.
- One bone deemed animal and one human (tibia).
- Advice asked and given re testing through AFP or ESR.

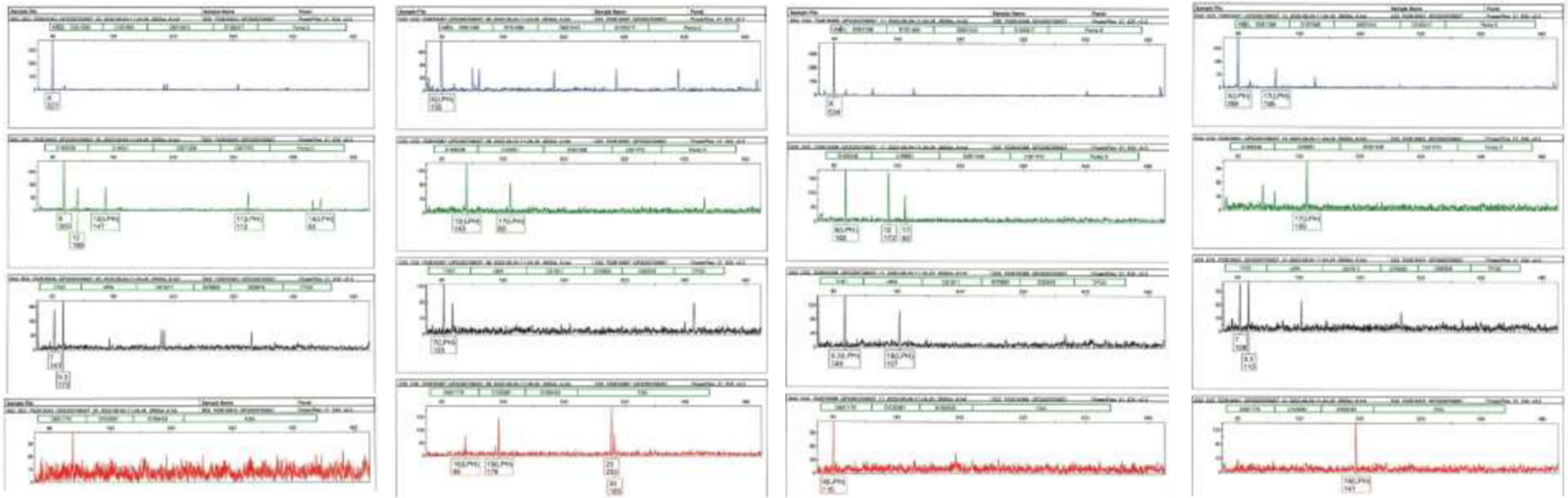
Case 7 – FR2116316 – 3 x bones

DNA testing overview

- Records suggest that the single long bone was cut into thirds and submitted to FDNA as 3 x bone samples
- First bone processed on 31/05/2022
- Second and third bone processed on 30/06/2022
- 4 x aliquots were taken from each of the 3 x bones – resulting in 12 profiles.
- All 3 x bones returned extremely partial single source profiles.

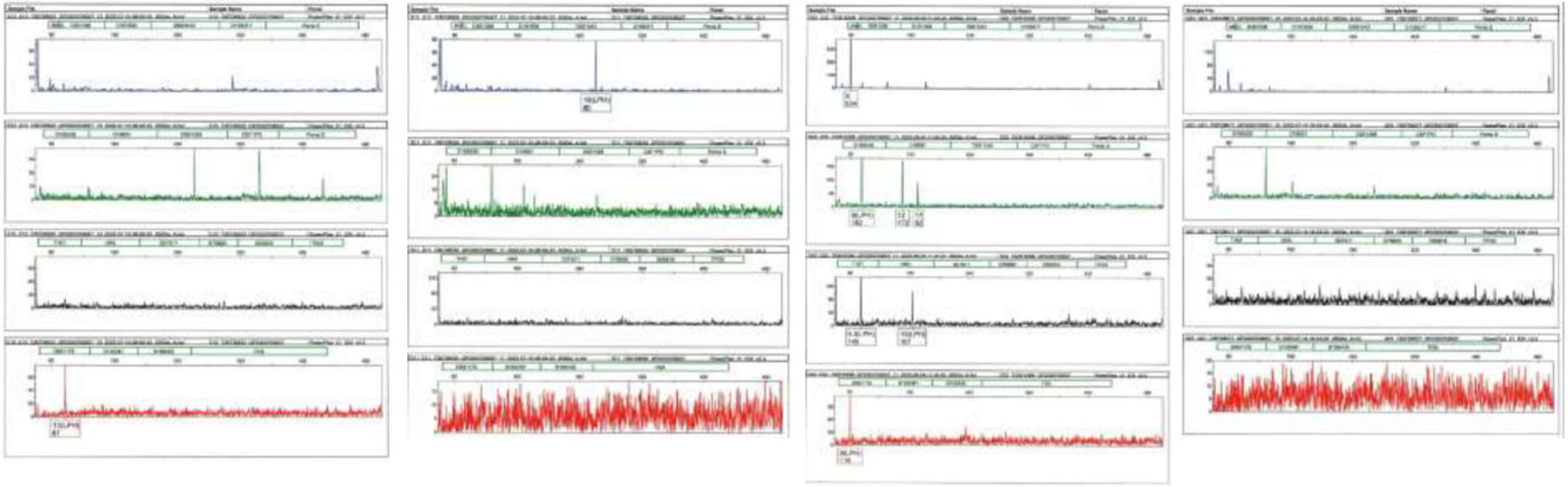
Case 7 – FR2116316 – 3 x bones

- Bone 1. Aliquots 1-4



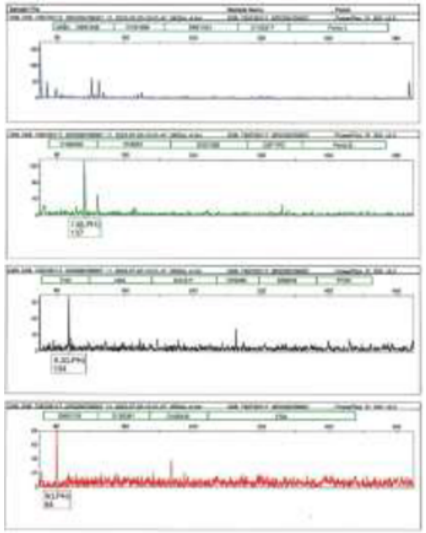
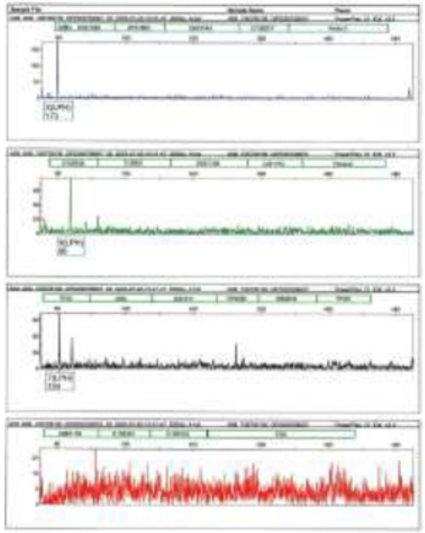
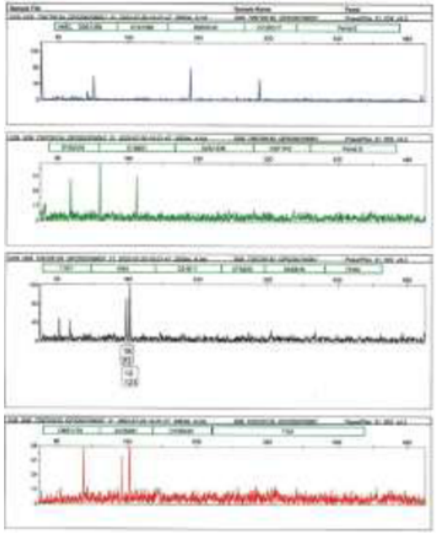
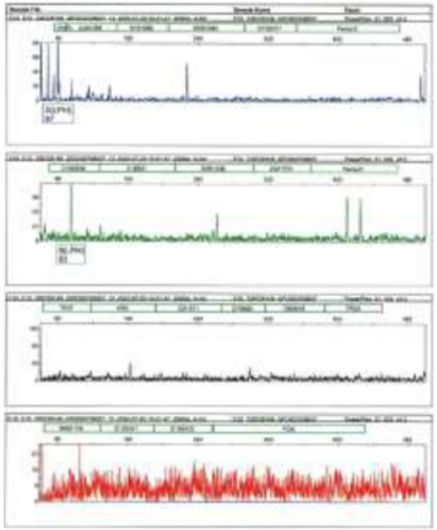
Case 7 – FR2116316 – 3 x bones

- Bone 2. Aliquots 1-4.



Case 7 – FR2116316 – 3 x bones

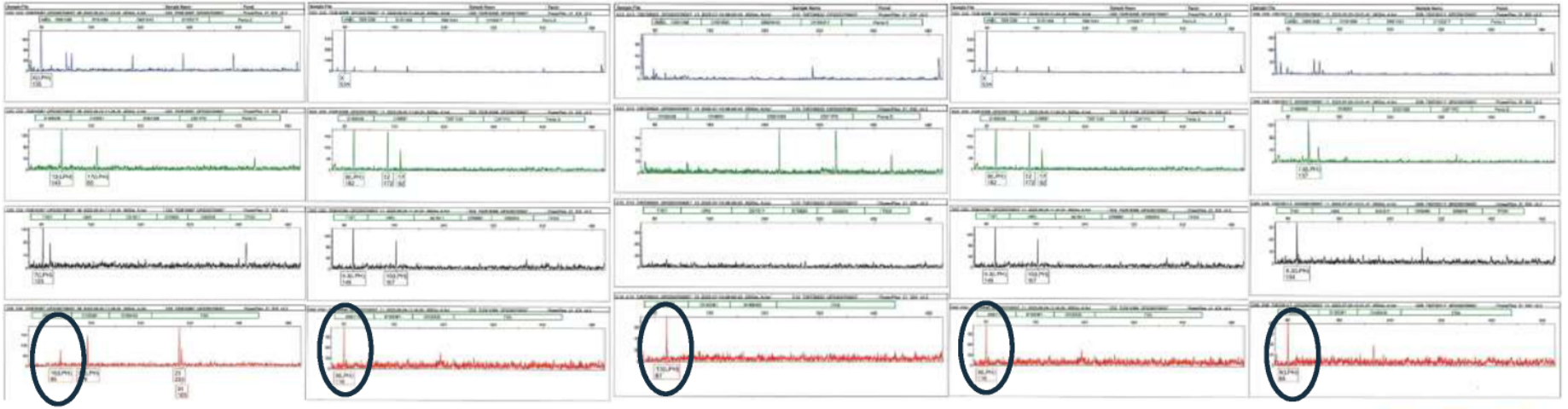
- Bone 3. Aliquots 1-4.

Case 7 – FR2116316 – 3 x bones

- All profiles appear single source (or NSD), however across the 12 profiles, D8 showed 3 different alleles

Bone 1 – Aliquot 2 | Bone 1 – Aliquot 3 | Bone 2 – Aliquot 1 | Bone 2 – Aliquot 3 | Bone 3 – Aliquot 1



Case 7 – FR2116316 – 3 x bones

Summary

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Bone aliquot 1	31/05/2022	No	X,X	0,0	0,0	0,0	0,0	0,0	9,13	12,0	0,0	11,0	14,0	7,9.3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bone aliquot 2		No	X,X	0,0	0,0	0,0	0,0	0,0	13,0	17,0	0,0	0,0	0,0	7,0	0,0	0,0	0,0	0,0	0,0	16,0	19,0	0,0	23,24
Bone aliquot 3		No	X,X	0,0	0,0	0,0	0,0	0,0	9,0	12,17	0,0	0,0	0,0	9.3,0	19,0	0,0	0,0	0,0	0,0	9,0	0,0	0,0	0,0
Bone aliquot 4		No	X,0	17,0	0,0	0,0	0,0	0,0	0,0	17,0	0,0	0,0	0,0	7,9.3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	16,0	0,0
Bone aliquot 1	30/06/2022	No	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,0	0,0	0,0	0,0
Bone aliquot 2		No	0,0	0,0	0,0	19,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bone aliquot 3		No	X,0	0,0	0,0	0,0	0,0	0,0	13,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,0	0,0	0,0	0,0
Bone aliquot 4		No	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bone aliquot 1	30/06/2022	No	0,0	0,0	0,0	0,0	0,0	0,0	13,0	0,0	0,0	0,0	0,0	9.3,0	0,0	0,0	0,0	0,0	0,0	9,0	0,0	0,0	0,0
Bone aliquot 2		No	X,0	0,0	0,0	0,0	0,0	0,0	9,0	0,0	0,0	0,0	0,0	7,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bone aliquot 3		No	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	18,19	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bone aliquot 4		No	X,0	0,0	0,0	0,0	0,0	0,0	9,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

- All profiles except for one were single source, the exception was NSD
- The only indication of a possible mixture across the 12 profiles was @D8 which showed 3 different alleles [9,13,16].

Case 7 – FR2116316 – 3 x bones

Summary

- The different peaks seen at D8 may be the individuals true profile, may be due to drop in or artefacts in a profile, or be caused by contamination.
- No ReCE's have been performed, contamination at the CE stage cannot be excluded.
- No re-amplifications have been performed on the extracts, contamination at the amplification stage cannot be excluded.
- No re-sampling of the tooth powder/s has been performed, contamination at the sampling and extraction processes cannot be excluded.

Case 8 – FR2122054 – Bone (Femur)

Case Overview

- Pathologist and Anthropologist report:
  - Bone located on a creek bank at the high tide mark, mixed with debris/vegetation etc.
  - The Pathologist report states that the bone surfaces showed marked blanched pallor, loss of surface greasiness, erosion of projected surfaces and sandy debris within the exposed marrow cavity.
  - The appearances were consistent with a period of many years since the time of death

Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

- Bone processed 01/06/2022
- 4 aliquots taken, each sample was profiled and then submitted for a microcon, returning a second result for each aliquot.
- Additional aliquots were requested and subsequently 4 more aliquots from the original crush of bone were submitted for DNA analysis.
- All aliquots except 6 and 8 were ReCE'd on 18/11/2022 as part of the OQI investigation.

Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

Aliquot 1

Amp

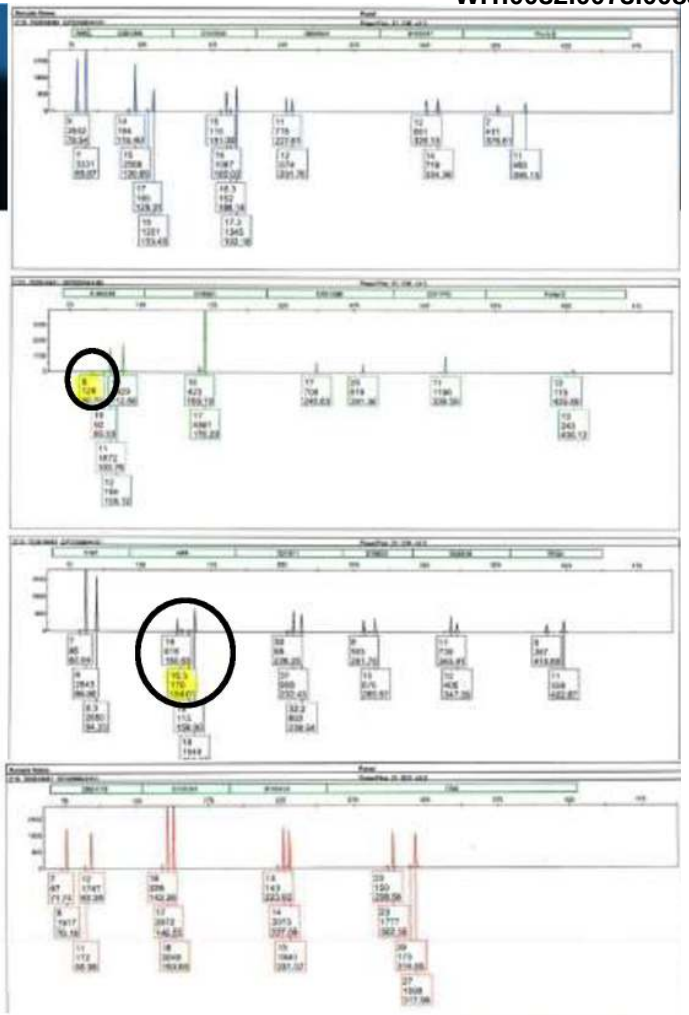
- Partial single source profile

Microcon

- Extra peak@D18[8]
  - Not visible on the amp
- Extra peak@vWA[16.3]
  - Visible above LOD on the amp

ReCE of Microcon 18/11/2022

- Extra peaks from m'con are present on ReCE



Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

Aliquot 2

Amp

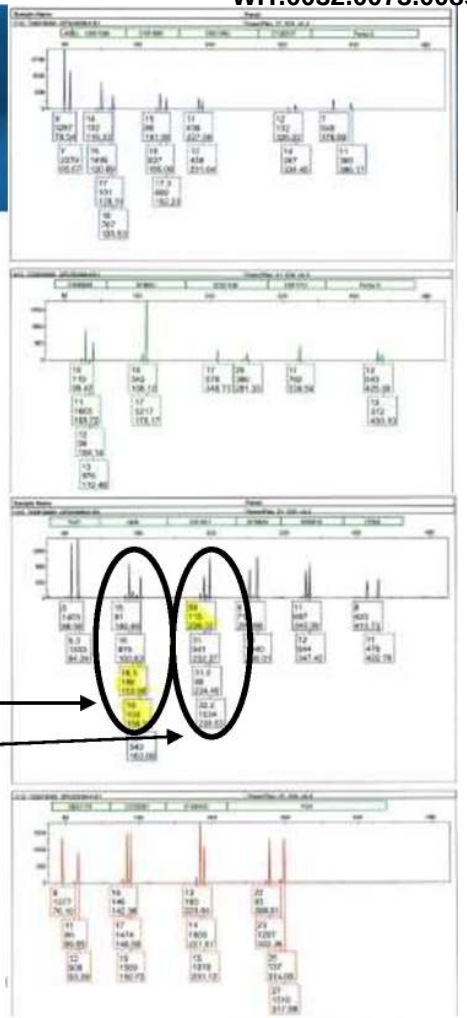
- Partial single source profile

Microcon

- Extra peaks@vWA[16.3] and [18]
  - 16.3 visible above LOD
  - 18 is in stutter position. Threshold 18%. Actual peak 19%
- Extra peak@D21[30]
  - In stutter position. Threshold 13.4%. Actual 21%.

ReCE of Microcon 18/11/2022

- Extra peaks from m'con are present on ReCE



Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

Aliquot 3

Amp

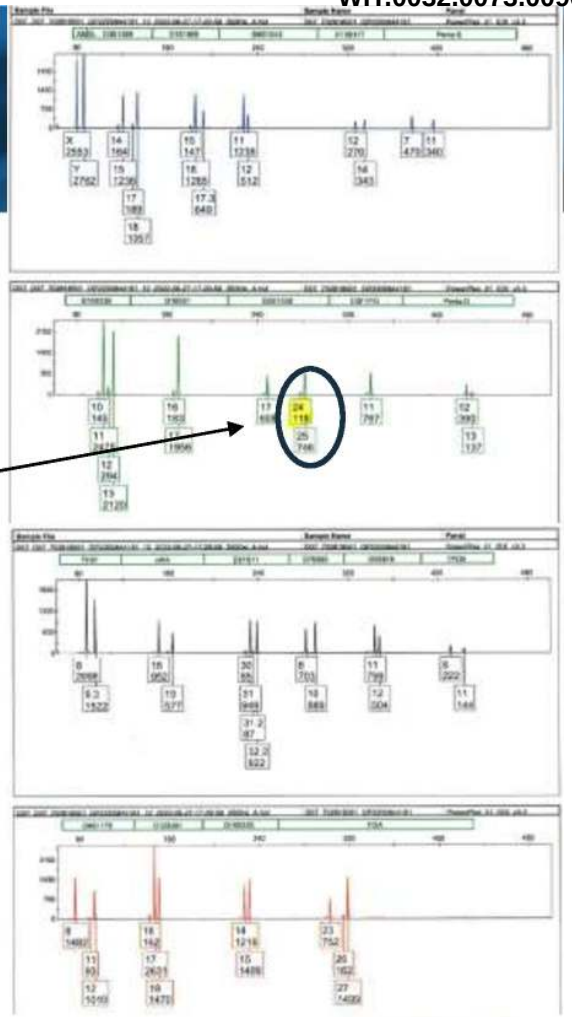
- Partial single source profile

Microcon

- Extra peak@D2[24]
  - Is in stutter position. Threshold 14%. Actual 15.8%.

ReCE of Microcon 18/11/2022

- Extra peak@D2[24] on microcon is present on the ReCE
- 2 x additional peaks present @D3[14,17]. Both are in stutter position and are just over threshold (less than 1% each).



Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

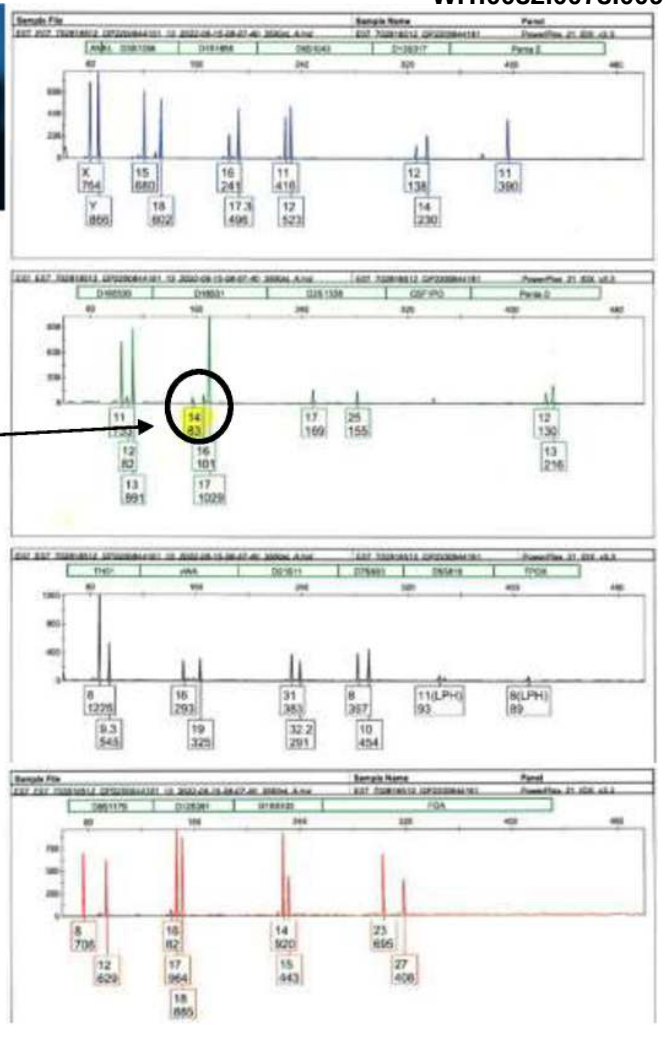
Aliquot 4

Amp

- Extra peak@D18[14]
  - Not visible on the microcon

ReCE of amp 18/11/2022

Extra peak from amp is present on ReCE



Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

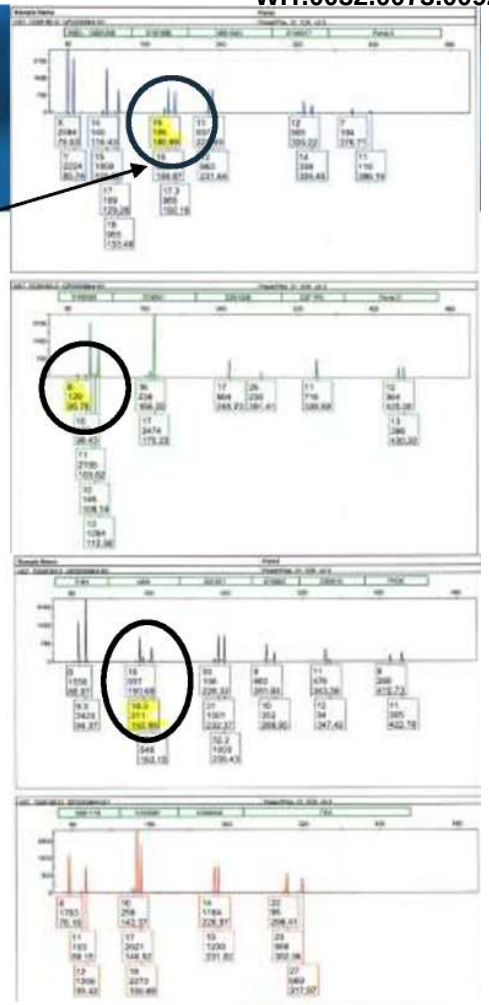
Aliquot 4

Microcon

- Extra peak@D1[15]
  - Is in a stutter position. Threshold 15.5%. Actual 20%.
- Extra peak@D16[8]
  - Not visible on the amp
- Extra peak@vWA[16.3]
  - Visible above LOD

ReCE of Microcon 18/11/2022

- Extra peaks from microcon are present on ReCE



Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

Aliquot 5

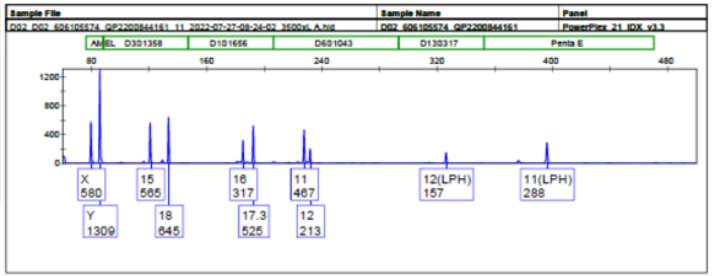
- Extra peak@D18[14]

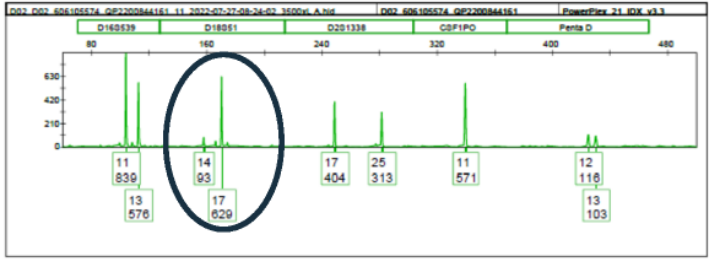
ReCE 18/11/2022

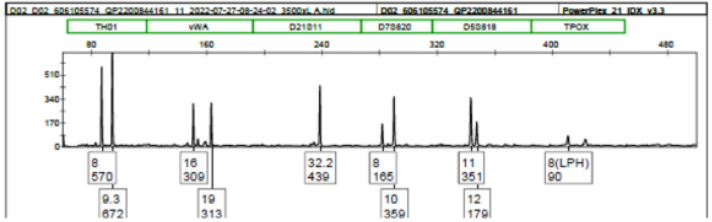
Extra peak is present on ReCE

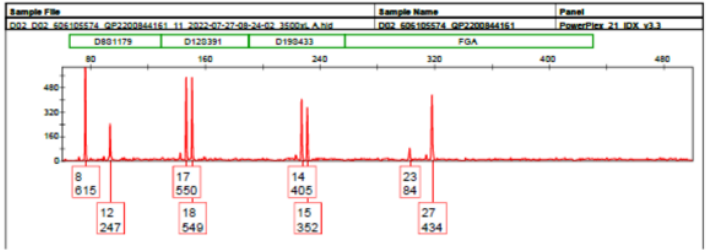
Aliquot 6

- Single Source









Case 8 – FR2122054 – Bone (Femur)

DNA testing overview

Aliquot 7

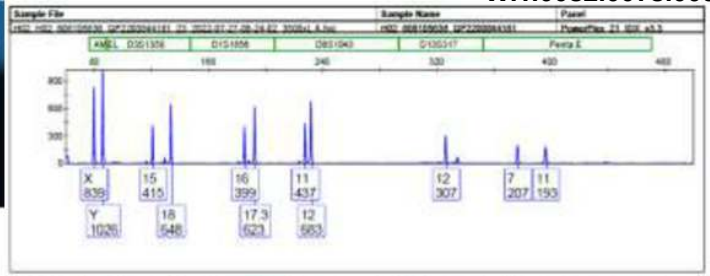
- Extra peak@D16[9]

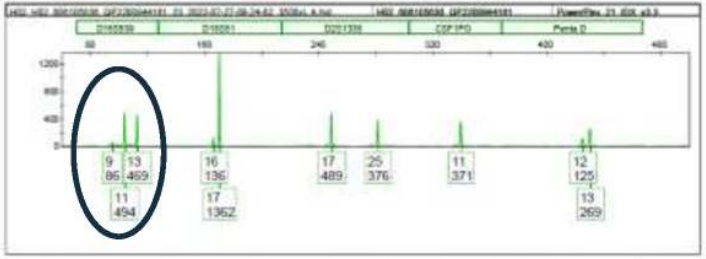
ReCE 18/11/2022

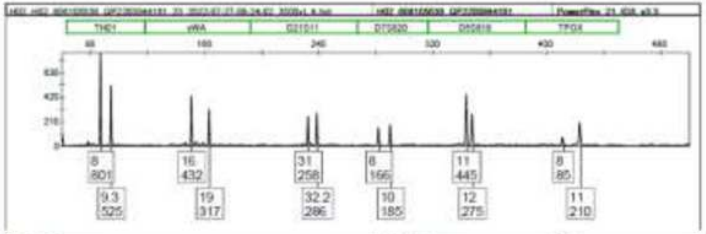
Extra peak is present on ReCE

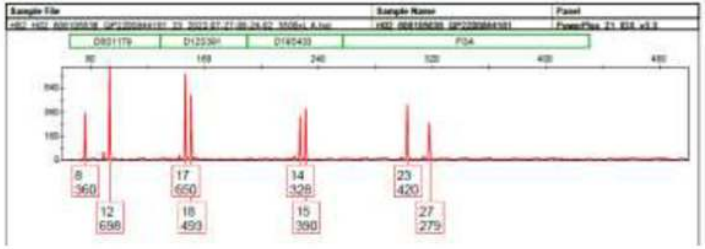
Aliquot 8

- Single Source









Case 8 – FR2122054 – Bone (Femur)

Summary

Description	Date sampled	Ext pks detected?	Amel	D3	D1	D6	D13	Penta E	D16	D18	D2	CSF	Penta D	TH01	vWA	D21	D7	D5	TPOX	D8	D12	D19	FGA
Bone aliquot 1	1/06/2022	No	X,Y	15,18	16,17.3	11,12	12,14	7,0	11,13	17,17	17,25	11,0	13,0	8,9.3	16,19	31,32.2	8,10	11,12	11,0	8,12	17,18	14,15	23,27
M'con		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	8,11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
ReCe of M'con 18/11/2022		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	8,11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
Bone aliquot 2		No	X,Y	15,18	16,17.3	11,12	12,14	7,11	11,13	17,17	25,0	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
M'con		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,18,19	30,31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
ReCe of M'con 18/11/2022		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,18,19	30,31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
Bone aliquot 3		No	X,Y	15,18	16,17.3	11,11	12,14	7,0	11,13	17,17	17,25	11,0	13,0	8,9.3	16,19	31,32.2	8,10	12,0	11,0	8,12	17,18	14,15	23,27
M'con		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	11,13	17,17	17,24,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
ReCe of M'con 18/11/2022		Yes	X,Y	14,15,17,18	16,17.3	11,12	12,14	7,11	11,13	17,17	17,24,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
Bone aliquot 4		Yes	X,Y	15,18	16,17.3	11,12	12,14	11,11	11,13	14,17	17,25	0,0	12,13	8,9.3	16,19	31,32.2	8,10	11,0	8,0	8,12	17,18	14,15	23,27
ReCe 18/11/2022		Yes	X,Y	15,18	16,17.3	11,12	12,14	11,11	11,13	14,17	17,25	0,0	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,0	8,12	17,18	14,15	23,27
M'con		Yes	X,Y	15,18	15,16,17.3	11,12	12,14	7,11	8,11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
ReCe of M'con 18/11/2022		Yes	X,Y	15,18	15,16,17.3	11,12	12,14	7,11	8,11,13	17,17	17,25	11,11	12,13	8,9.3	16,16.3,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
Bone aliquot 5		Yes	X,Y	15,18	16,17.3	11,12	12,0	11,0	11,13	14,17	17,25	11,11	12,13	8,9.3	16,19	32.2,32.2	8,10	11,12	8,0	8,12	17,18	14,15	23,27
ReCe 18/11/2022		Yes	X,Y	15,18	16,17.3	11,12	12,0	11,11	11,13	14,17	17,25	11,11	12,13	8,9.3	16,19	32.2,32.2	8,10	11,12	8,0	8,12	17,18	14,15	23,27
Bone aliquot 6		No	X,Y	15,18	16,17.3	11,12	12,14	7,0	11,13	17,17	17,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	11,0	8,12	17,18	14,15	23,27
Bone aliquot 7		Yes	X,Y	15,18	16,17.3	11,12	12,12	7,11	9,11,13	17,17	17,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
ReCe 18/11/2022		Yes	X,Y	15,18	16,17.3	11,12	12,14	7,11	9,11,13	17,17	17,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27
Bone aliquot 8		No	X,Y	15,18	16,17.3	11,12	12,14	0,0	11,13	17,17	17,25	11,11	12,13	8,9.3	16,19	31,32.2	8,10	11,12	8,11	8,12	17,18	14,15	23,27

- Additional peaks seen which are not consistent throughout all aliquots, some peaks are seen on a microcon only or the amp and not the microcon.
- Many possible causes for contamination including sampling (Mortuary or DNA) or analytical extraction/amplification processes.

Summary

Case #	Original Reported Result	Considerations after rework and case assessment	Thoughts	Possible source of contamination	Further investigations
Case 1	Complex unsuitable	MIX	Mixed profiles in teeth and bone samples, the extra peaks present in each sample are not consistent with each other. AFP produced a SS profile, this suggests the individuals true profile is not mixed (re-sampled bone). Contamination during CE can be excluded as the main source based on OQI ReCE results. Could be many sources of possible contamination including location of the remains (unlikely due to AFP's result) or either during sampling (DNA or mortuary) or during extraction/amplification processing.	Mortuary or DNA sampling (inc. cleaning), extraction/ amplification processes.	1. Re-amp 2. Re-sample tooth and bone powder 3. Re-crush bone
Case 2	1 x MIX, 3 x SS	SS	1 x extra peak in one the four aliquots on the amp and ReCE. It may be reasonable to associate this peak with stutter.	N/A	N/A
Case 3	Complex unsuitable	MIX	Extra peaks are not consistent between the 3 x teeth – this suggests that the extra peaks are not due to genetic abnormality. Unknown source of extra peaks. Contamination during CE can be excluded as the main source based on OQI ReCE results. Could be many sources of contamination including location/condition of the remains, microbial contamination, or contamination during sampling (DNA or mortuary) or during extraction/amplification processing.	Mortuary or DNA sampling (inc. cleaning), extraction/ amplification processes.	1. Re-amp 2. Re-sample tooth powder
Case 4	7 x MIX, 5 x SS	SS and MIX	Ulna: Mixed profiles and some peaks indicate that the contamination exists in the bone powder. Another peak indicates that the contamination could have been during analytical processing. Contamination during CE can be excluded as the main source based on OQI ReCE results. Humerus: All aliquots were SS, indicating the individual does not have any genetic abnormalities. Radius: Mixed profiles, contaminating peaks present in more than 1 aliquot, possible drop out in the other aliquots. Possible contamination at the sampling stage (mortuary or DNA). Cannot exclude contamination from location/condition of the remains or microbial contamination.	Ulna: Mortuary or DNA sampling (inc. cleaning), extraction/amplification processes. Humerus: N/A Radius: Mortuary or DNA sampling (inc. cleaning).	Ulna: 1. Re-sample bone 2. Re-amp aliquot 4 Humerus: N/A Radius: 1. Re-sample bone
Case 5	Complex unsuitable	SS*	Partial single source profiles which appear to be very degraded. Unlabelled artefacts are present.	N/A	1. Re-sample bone 2. Sample another piece of bone
Case 6	2 x MIX, 2 x SS	MIX	Extra peaks labelled and unlabelled seen in all aliquots, given case 4 which is linked produced a SS profile and the additional peak is not seen, it indicates this extra peak may not be the true profile of the deceased, possible contamination could have occurred during sampling (DNA or mortuary). Another additional peak was only observed in one aliquot on the ReCE's indicating that a contamination could have occurred during extraction/amplification processes.	Mortuary or DNA sampling (inc. cleaning), extraction/amplification processes.	1. Re-sample bone 2. Re-amp aliquot 2
Case 7	Complex unsuitable	SS	Possible mixture across 12 profiles where 3 different alleles were seen at one loci. This may be the individuals true profile, may be due to drop in or artefacts in a profile, or be caused by contamination at sampling (mortuary or DNA) or during extraction/amplification processing.	Mortuary or DNA sampling (inc. cleaning), extraction/amplification processes.	1. ReCE aliquots with peaks at D8
Case 8	MIX	MIX	Possible mixtures across 8 aliquots (4 with microcon's) resulting in 12 profiles. Extra peaks seen are not consistent across all aliquots and in some cases they are only present in the microcon. Contamination during CE can be excluded as the main source based on OQI ReCE results. Could be many sources of possible contamination including location of the remains or either during sampling (DNA or mortuary) or during extraction/amplification processing.	Mortuary or DNA sampling (inc. cleaning), extraction/amplification processes.	1. Re-sample bone

* Pending further investigation steps

Environmental Results

FR number	Barcode	Collected date	Collection site	Comment	AMEL	D3S1358	D1S1656	D6S1043	D13S317	PentaE	D16S539	D18S51	D2S1338	CSF1PO	PentaD	TH01	vWA	D21S11	D7S820	D5S818	TPOX	D8S1179	D12S391	D19S433	FGA
FR1801131	725670475	7/08/2019	Freezer mill bench	NOT OK PP	X,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1801131	725670486	7/08/2019	Scales	NOT OK PP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	18,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1801131	728419902	5/12/2019	Machine bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1801131	728419913	5/12/2019	Computer bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	724195697	5/02/2020	Chopping block	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	724195702	5/02/2020	Bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	648702820	9/04/2020	Handle of chisel	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	648702851	9/04/2020	Freezer mill bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	725674860	5/05/2020	Mouse	OK PP	X,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	725674874	5/05/2020	Computer bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	727396199	3/11/2020	Hood	NOT OK PP	X,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	18,0	0,0	0,0	22,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1901863	613687088	2/12/2020	Freezer mill bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1996344	724118991	3/08/2021	Preparation bench	OK PP	0,0	0,0	0,0	0,0	0,0	5,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1996344	724119004	3/08/2021	Computer bench	OK PP	Y,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	35,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR1996344	725270562	5/10/2021	Keyboard and mouse	NOT OK PP	X,X	16,17,18	11,12,15,16	10,11,12	10,13	11,16	8,9,12,13	13,14,16,17	17,18,22,23	9,10,11	10,14	6,9,3	15,16	28,29,30	6,8,9,10,11	12,13	10,11	13,14,15	18,3,19,9,22,23,24	13,14	18,19,21,22
FR1996344	725270871	5/10/2021	Handles of hammer and 2 x chisels	OK PP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	18,0	0,0	0,0
FR2086344	715585356	5/07/2022	Chisel thin edge	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	715585367	5/07/2022	Chisel thick edge	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	703326391	2/08/2022	Chisel thin edge	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	703326408	2/08/2022	Chisel thick edge	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	703326417	2/08/2022	Freezer mill bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	703326426	2/08/2022	Chopping block with deep groove	NOT OK PP	X,0	15,17	0,0	19,0	0,0	5,11	0,0	14,0	0,0	13,0	0,0	8,0	21,0	27,28	12,0	12,0	11,0	13,0	17,0	15,0	23,0
FR2086344	703326435	2/08/2022	Chopping block with scratches	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	703326453	2/08/2022	Chopping block grooved	OK PP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	24,0	0,0	0,0
FR2086344	1097164849	15/11/2022	Examination bench	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	1097164853	15/11/2022	Chisel	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	1097164868	15/11/2022	Forceps	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FR2086344	1097164876	15/11/2022	White chopping block	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
	1097126432		Additional control - chopping block	No DNA detected																					
	1097126421		Additional control - chisel handle	No DNA detected																					
	1097126366		Additional control - chisel tip	No DNA detected																					

- Overall the results from environmental monitoring in the bone laboratory are very good.
- All of these results are after the cleaning procedure was changed
- 2 x staff matches. First staff match is to a bone sampler. Second staff match is a to an ER staff member (does not sample bones).

Bone equipment control results

Case #	FR #	Bone #	Equipment Control #	Comment	AMEL	D3S1358	D1S1656	D6S1043	D13S317	PentaE	D16S539	D18S51	D2S1338	CSF1PO	PentaD	TH01	vWA	D21S11	D7S820	D5S818	TPOX	D8S1179	D12S391	D19S433	FGA
1	1982879	342236304	342236321	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342236310	342236376	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2	2012815	713490786	342236489	SS	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	6,12	0,0	0,0	0,0
3	2087699	342236661	342236684	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342236670	342236735	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		712968922	342237064	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
4	2106282	342236877	342236902	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342236888	342236957	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342236899	342237019	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
5	2077754	690714128	342237114	NSD	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
6	2107015	690717659	684981553	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
7	2116316	342237169	702816412*	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
			702816434*	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342237175	726728511	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
		342237186	726729089	OK	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
8	2122054	690713287	702818472	NSD	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

- Bone equipment controls are taken of the freezer mill components (inside cylinder, rod and bung ends) prior to loading the bone fragments into the freezer mill. This equipment goes through the dishwasher.
- Bone equipment control results for each of the bones discussed within this powerpoint are presented above.
- Only 1 control had alleles present (Case 2). These peaks were not present in the bone.
- 1 bone had 2 controls collected (case 7 – marked with *). The rod was discarded after collecting the first equipment control due to significant rusting. A second swab was collected from the new rod. No peaks present on either control.

Extra considerations

- Extra peaks within each case do not appear to originate from the previous bone that was processed. This includes multiple bones from the same case that were processed on the same day. This indicates that any possible contamination is unlikely to have occurred from the cleaning of the laboratory/instruments.
- Environmental DNA on the bone/tooth cannot be excluded as a possible source of contamination.
- The DNA profiles of those who perform bone sampling have been compared to the mixtures – no matches found

Extra considerations

- Literature review underway, currently 52 articles obtained from 3 of 7 topics/keywords
- Appears to be a substantial amount of research done on obtaining human DNA from bone/teeth samples, previous research in FDNA does not appear to have been performed.
- Note that project #233 is to investigate a new sampling (drilling) and extraction (demineralisation) method - currently on hold.
- Skeletal remains are one of the most complex biological materials to be studied from a degradation point of view.
- The scientific literature contains a growing body of research concerning bone degradation. On the other hand, the location and quality of DNA, and its degradation in the bone is still not fully understood.
- Bones exposed to the elements is divided into 3 parts: chemical degradation of organic bone material, chemical deterioration of bone minerals and invasion of microbes. These processes increase the likelihood of contamination with exogenous DNA and environmental contaminations and decrease the organic content of the bone resulting in lower yield of viable DNA.
- Research shows higher DNA yield from other skeletal elements including tarsal and carpal bones and the petrous portion of the temporal bone.
- Adequate cleaning of the surface of the bone is required, many methods are used including sanding/drilling of the outer surface, cleaning the surface using bleach and/or ethanol followed by adequate drying before

Moving forward (suggested steps from KJM and CKS)

- Further investigations into extra peaks to try and pinpoint cause
  - Order re-amps, resampling bone power, re-crush bone.
- Consider the risks involved with microcons and pooling of difficult samples
- Journals / other jurisdictions
- ReCE samples originally processed on the 3130
  - Select a handful of samples from the past 5/10 years and run these on the 3500.
  - Did the samples processed in 2019 (after the change in cleaning) have extra peaks that were unable to be detected on the 3130? Do samples prior to the change in cleaning also display extra peaks?
  - Help us gain a better understanding of compromised samples run on the 3500
- Investigate high quantification values of samples and their possible impact on cases that have extra peaks
- Mortuary staff – elimination database