

**Identification of Victims of a Building Collapse
using Forensic DNA methodology**

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Introduction



- Disaster is an unexpected natural or man-made catastrophe causing significant damage, loss, devastation of human life and property or sometimes permanent change to the natural environment.
- Disaster can be in different forms e.g. Aeroplane crash, fire, flood, earthquakes, nuclear accident e.t.c
- The use of DNA in the identification of victims involved in a disaster is often required for conclusive identification even in a country with no DNA database of citizens.
- Other identification methodologies exist, such as fingerprint comparison and dental records can be used but these methods require existing records of the missing person.
- Visual identification is not considered sufficient or an accurate approach of identification in many cases.
- This presentation describes the role LSD&FC played to assist with the identification of victims of a recent building disasters.

Sample Collection

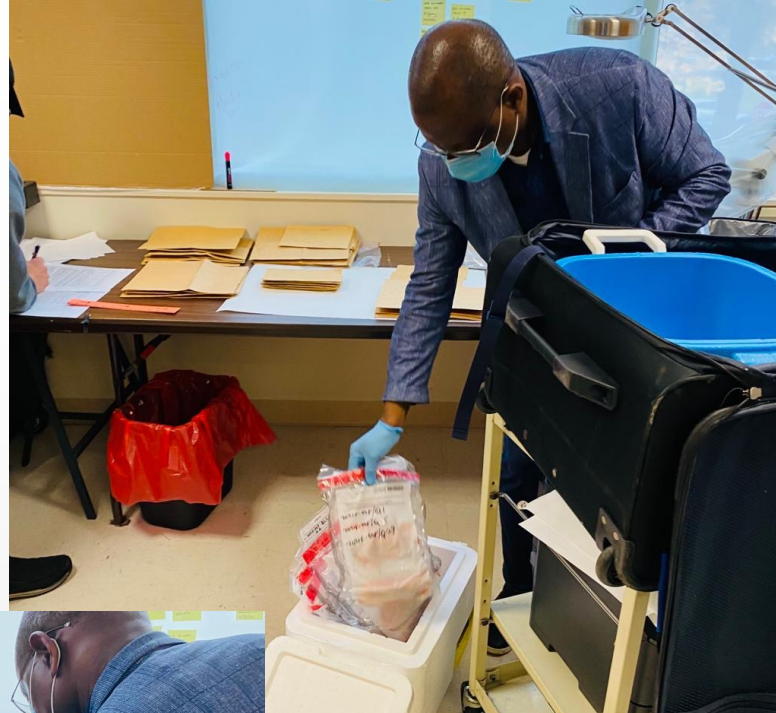
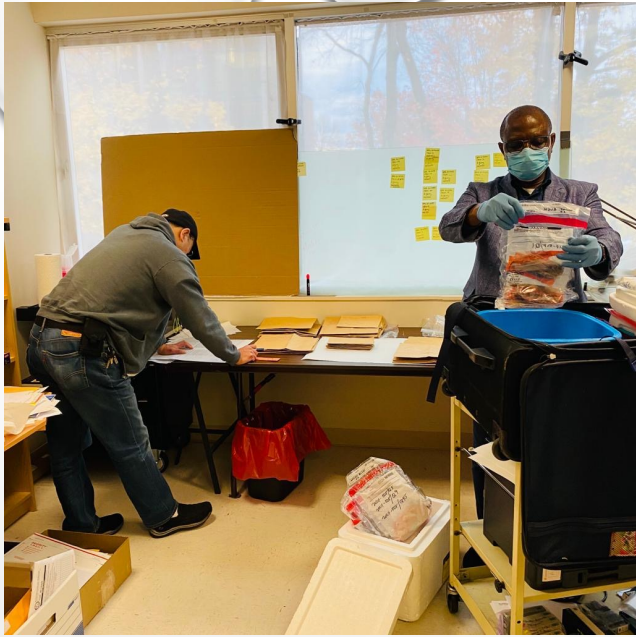


- First step was the establishment of an operational base. Staff mobilized to a base already established by MoH. Room was organized for use as a collection and temporary sample holding area.
- Necessary forms for proper documentation of both “reference” and “questioned” samples were created and all the samples collected were given unique numbers.
- The samples are collected using established standard operating procedure.
- Biological relatives of persons believed to be missing are invited to provide DNA that will be used as the reference for matching.
 - The preferred DNA reference is Parent-Child.
 - Reference DNA sample is collected using the sterile buccal swab.
- 85 reference DNA samples including personal items were collected.

Sample Collection

- The Medical Examiner's Office collected samples from the unidentified bodies at Autopsy.
- For DNA, we recommended that deep tissue and compact bone (e. g. femur) samples are collected from the victim's body.
- All samples were submitted to LSD&FC under chain-of-custody.
- A total of 57 unknown samples were submitted. This consisted of 52 samples from intact bodies and 5 body parts.
- Samples were stored in a freezer to prevent further degradation.
- All samples were shipped cold to ISO accredited partner forensic laboratory in the USA that serve as backup laboratories for LSD&FC as part of its continuity plan.

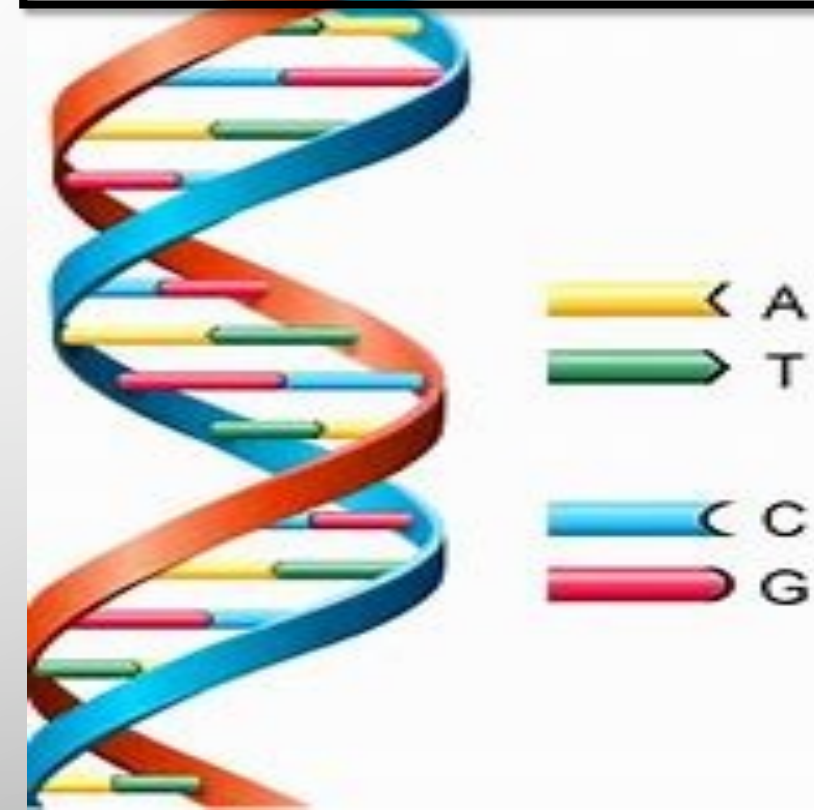
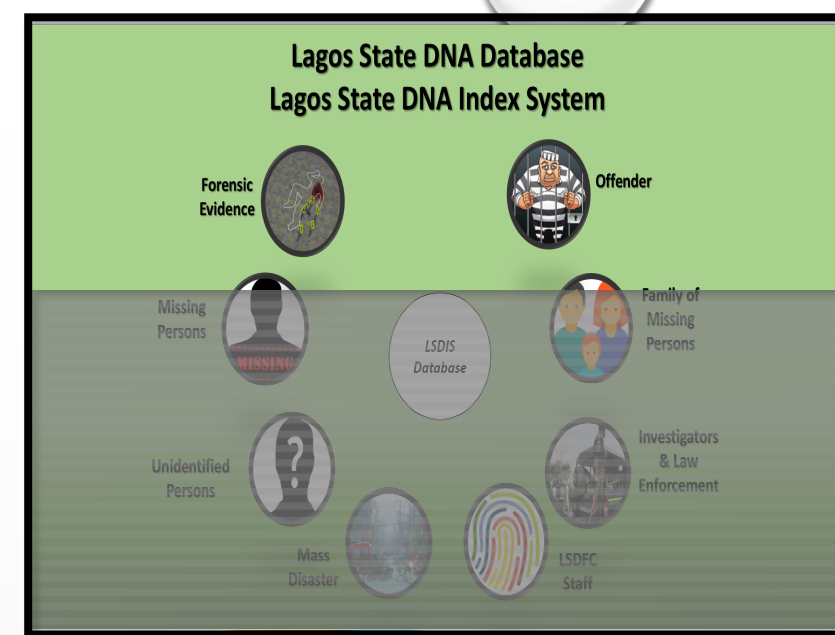
Sample Collection



Standard DNA Analysis

The use of DNA typing as a means of identifying victim involved in disaster involves the following scientific steps:

1. DNA profile from unknown samples.
2. DNA profile from either the relatives or personal belongings of the victim.
3. Matching of unknown profiles to the known profiles from alleged families using SmallPond™ software.
4. Statistics to determine the degree of matching between the DNA profile from the unknown and the DNA profile from the reference sample.
5. Manual verification of the matches.



Laboratory Analysis

- The question and reference samples were extracted independently.
- STR and Y-STR analysis was conducted.
- The STR kit (powerplex fusion) target 24 locations on the gene while the Y-STR kit target 22 locations.
- The amplicons were analyzed on the Genetic Analyzer.
- Appropriate controls were used throughout the analysis.

	Target	Candidate
Pond	Parent-Child	Unknowns
Kit	Promega - PowerPlex® Fusion	Promega - PowerPlex® Fusion
Specimen Id	R00A	Q35
Category	Unknown	Unknown

Source ID	-	-
Partial Profile	-	-
Mixture	No	No

Locus			Match Quality
Amelogenin	X	X,Y	Partial
D3S1358	16,17	16	Partial
D1S1656	14,17	14,17	Exact
D2S441	14	11,14	Partial
D10S1248	13,15	13,16	Partial
D13S317	11,12	12,13	Partial
Penta E	8,11	8,11	Exact
D16S539	10,11	10,11	Exact
D18S51	12,2,14	12,14	Partial
D2S1338	21,23	17,21	Partial
CSF1PO	11	11,13	Partial
Penta D	8,11	7,11	Partial
TH01	5,7	5,7	Exact
vWA	16,18	16,19	Partial
D21S11	27,30	28,30	Partial
D7S820	10,11	9,11	Partial
D5S818	11,12	11,12	Exact
TPOX	9,11	8,11	Partial
DYS391	NR	10	
D8S1179	14,15	15	Partial
D12S991	17,18	15,17	Partial
D19S433	12,2,15	13,15	Partial
FGA	22,25	22,23	Partial
D22S1045	14,15	107,15	Partial

Match Detail:

Loci with Exact Match: 5
 Search Program: SmallPond
 Maximum number of candidates to return from search: ALL
 Match Status: Parent-Child!

Matching

- SmallPond is a private DNA-profile matching technology. it allow you easily create and maintain a local database of STR DNA profile information.
- The victims DNA profiles were matched with their respective family members using Smallpond™ software.
- The Victims STR and the STR from the families were uploaded to designated ponds.
- SmallPond provides statistical values for the matches.
- All matches and statistical values were verified manually.

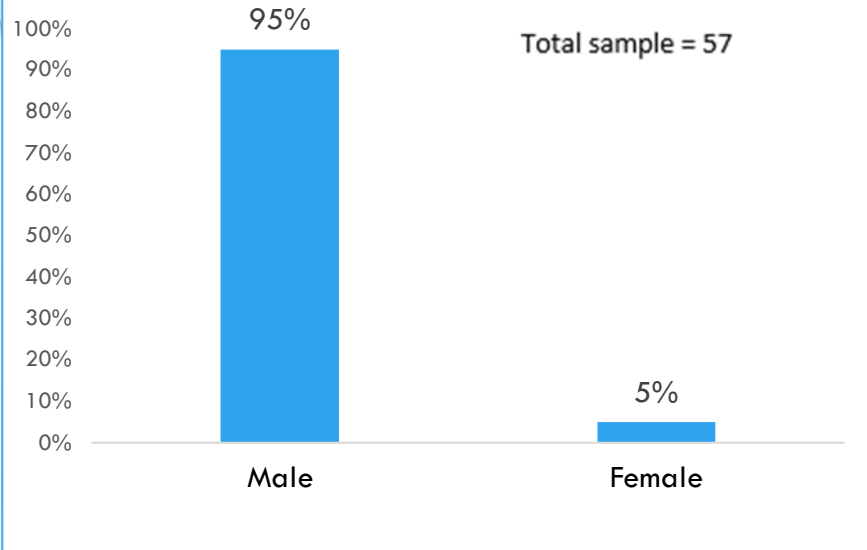
Challenges

- Presentation of non-biologically related family member.
- Unavailability of family representative.
- Communication barrier.
- Aggressiveness.
- Degraded tissue samples.
- Some of the generated question sample STR profile does not match any of the STRs from the family members.

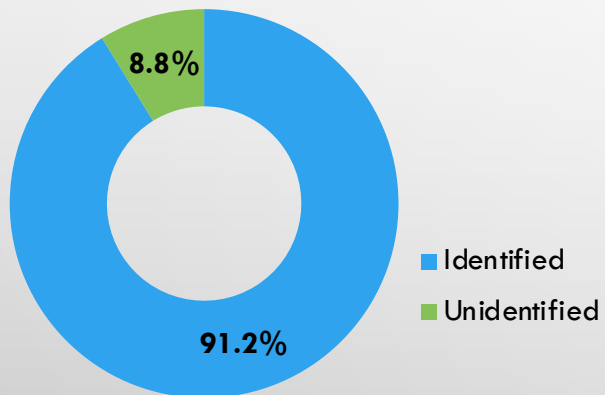
Conclusion

- DNA profile was generated from all the “questioned” and “reference” samples.
- LSD&FC successfully identified over 90% of the victims of the building collapse by matching the victims DNA profile to the DNA profile of their respective family member.
- All the body parts recovered were successfully matched to their respective parent body.

Gender of question samples collected



Question Samples Identification



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THANK YOU

QUESTIONS!