# Forensic DNA Tools & Florida's Tracking Database

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# Topics

- Forensic DNA Tools
  - STR
  - Y-STR
  - Mitochondrial DNA
  - Unknown perpetrator
    - CODIS
    - Familial Searching
    - Genetic Genealogy
- Florida's Tracking Database

# FDLE Case Acceptance Policy

***Sexual Assault***

| |
|---|
| 1st Submission:<br>• 1 sexual assault evidence kit **(per FS 943.326 must be submitted within 30 days of the victim reporting)**<br>• 1 pair of underwear worn by victim at time of incident or immediately after (Underwear should be separated from other items of clothing prior to submission)<br>• 1 condom, if applicable |
| 2nd Submission: (if no probative results obtained from first submission)<br>• Limited to 5 items – Recommend victim's clothing worn at time of incident before additional clothing or bedding<br>• Contact a biology supervisor for a case consultation if additional evidence is needed |

- All kits submitted & tested
  - Except assaults not reported
- Kit testing must be completed within 120 days

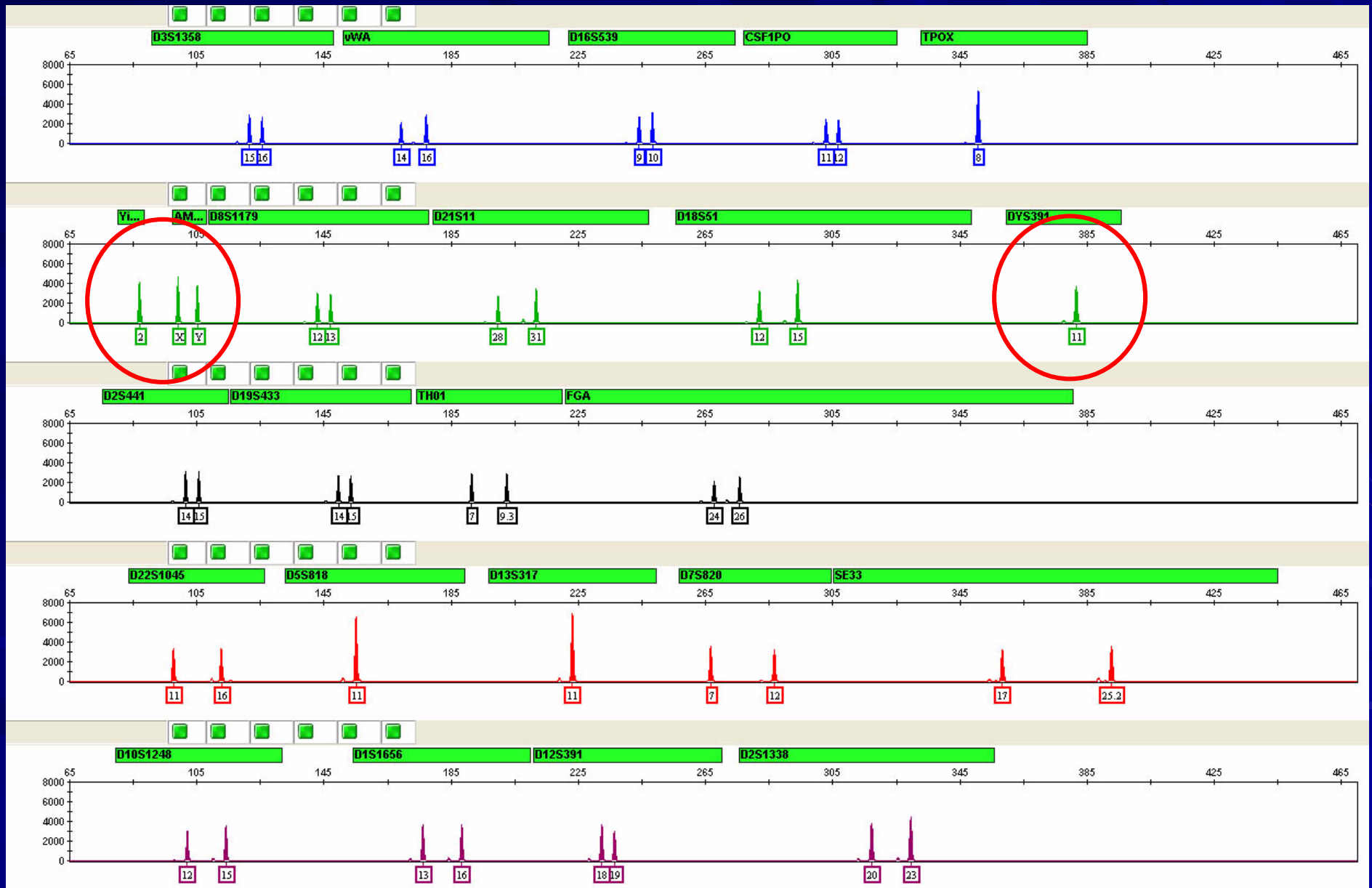
# STR DNA Testing

- Short Tandem Repeats
- Forensic and CODIS standard (late 90s)

- Multi-step process
  - Automation

- Globalfiler – Feb 2017
  - 21 STR + 2 gender markers + 1 Y-STR
  - 10 mini-STRs (degraded)
  - Very discriminating
  - More results/ more mixture

# STR DNA Profile – One male person



# STRmix

- Commercially available forensic software
  - https://www.strmix.com/
- Online Sept. 2017
- Only Globalfiler DNA results

- 2 Uses
  - Interprets mixtures (probabilistic genotyping)
  - Calculates the weights of DNA matches or inclusions - likelihood ratios (LR)

# Direct to DNA Approach

- 1 Swab per Orifice/ Sample from Underwear
  - Sperm Portion and Non-Sperm Portion
- 1 Swab per Body Area – possible body fluid
- All Swabs – touch

- Female/Male Assaults
  - Quantify the samples for Male DNA (10/2015)
  - Total Human vs. Total Male DNA

- Female/Female & Male/Male Assaults
  - All samples proceed

# DNA Quantitation

| Sample ID | Screen By Quant | [Auto] ng/ul Small Target | [Y] ng/ul | M:F | Deg. Index | Dropped at Quant |
|---|---|---|---|---|---|---|
| Ex2.2sperm | x | 0.6208 | 0.0000 | | 0.80 | Yes |
| Ex2.3sperm | x | 0.0012 | 0.0000 | | 1.10 | Yes |
| Ex2.4sperm | x | 0.0004 | 0.0000 | | 1.12 | Yes |
| RBQsperm | x | 0.0000 | 0.0000 | | | Yes |
| Ex2.2epi | x | 6.3578 | 0.0000 | | 0.62 | Yes |
| Ex2.3epi | x | 0.0208 | 0.0002 | :97.222 | 1.27 | Yes |
| Ex2.4epi | x | 0.0508 | 0.0002 | 1:238.834 | 0.99 | Yes |
| RBQepi | x | 0.0000 | 0.0000 | | | Yes |
| Ex2.1 | | 0.6864 | 0.0001 | 1:5287.434 | 0.64 | |
| RBK | | 0.0000 | 0.0000 | | | |
| Ex1.2sperm | x | 0.0141 | 0.0213 | | 0.51 | No |
| Ex1.3sperm | x | 0.1576 | 0.1321 | | 0.55 | No |
| Ex1.4sperm | x | 0.0246 | 0.0271 | | 0.46 | No |
| Ex1.5sperm | x | 0.0073 | 0.0085 | | 0.40 | No |
| Ex1.6sperm | x | 0.0354 | 0.0458 | | 0.42 | No |
| Ex1.7sperm | x | 0.0259 | 0.0253 | | 0.60 | No |
| Ex1.8sperm | x | | | | | No |
| RBQsperm | x | 0.0000 | 0.0000 | | | No |
| Ex1.2epi | x | 14.2727 | 0.0037 | :3807.977 | 0.57 | No |
| Ex1.3epi | x | 19.4619 | 0.0071 | 1:2726.231 | 0.70 | |
| Ex1.4epi | x | 3.2629 | 0.0108 | 1:300.592 | 0.61 | |
| Ex1.5epi | x | 5.1053 | 0.0044 | 1:1168.836 | 0.62 | |
| Ex1.6epi | x | 0.0719 | 0.0166 | 1:3.342 | 1.15 | |
| Ex1.7epi | x | 5.2895 | 0.0216 | :243.861 | 0.86 | |
| Ex1.8epi | x | 0.0638 | 0.0000 | | 1.03 | No |
| RBQepi | x | 0.0000 | 0.0000 | | | No |
| Ex1.1 | | 3.2768 | 0.0001 | 1:26665.373 | 0.47 | |

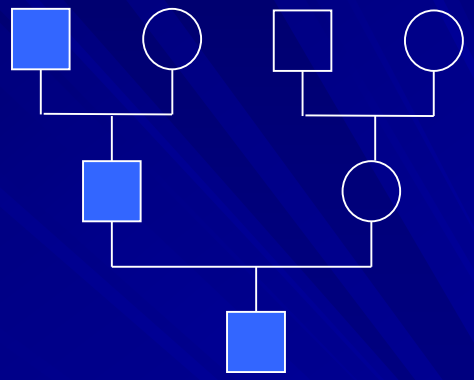
No male DNA

Plenty of male DNA

Ratio - Male to Female
Too much ♀ then Y-STR may be option

# Y-STR DNA Testing

- Males only
- All paternal relatives same
- Jacksonville & Tampa FDLE labs
- Specific case criteria
  - Sexual assault cases



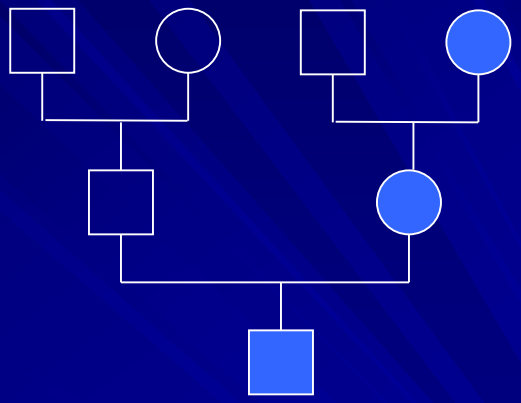
Y-Chromosome
(passed on only by sons)

- Limited CODIS capabilities
  (Missing persons)
  (Familial searching)

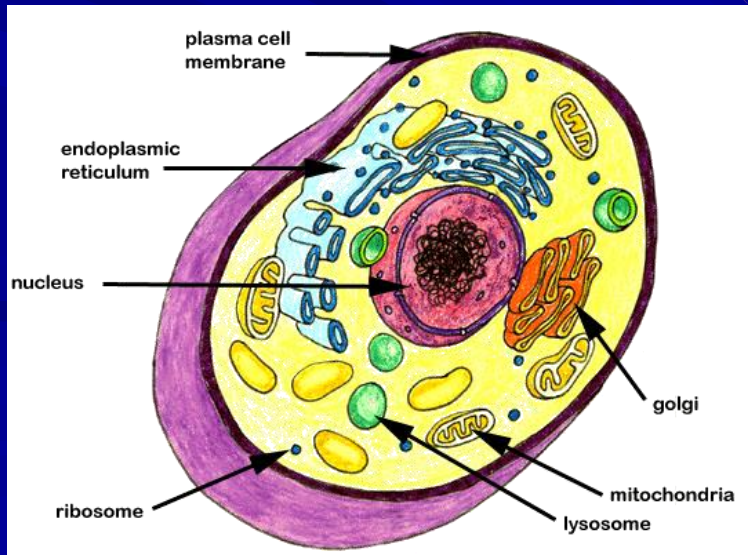
# Mitochondrial DNA Testing

- Not available at FDLE
- Inherited from mother only
- All maternal relatives same
- Single cell sensitivity
- Hair shafts/shed hair
  - Hair in child's genitals
- Not suitable for mixtures

- Limited CODIS Capabilities
  - Missing persons



Passed only by daughters



# Combined DNA Index System

- Created in 1990 by FBI
  - They make the rules for entry!
- Collection (Database) of DNA profiles
  - State mandated profiles (F.S. 943.325)
  - DNA Profiles from crime scene evidence
- Purpose: *to provide* *INVESTIGATIVE LEADS* *by linking unsolved cases to known individuals; unsolved cases to solved cases; and unsolved cases to unsolved cases*

https://www.fbi.gov/services/laboratory/biometric-analysis/codis

# DISC

- DNA Index of Special Concern
  - Sexual assaults, homicides, kidnapping, terrorism
- Contact lab – additional info needed

**Rapid DNA Searching**

- As an NDIS participating lab, FDLE is able to upload DNA profile information from crimes of special concern into the DISC (DNA Index of Special Concern) within CODIS, so that once Rapid DNA Technology is in place, these profiles will be searched immediately.
- The overall goal of the FBI's Rapid DNA Initiative is to immediately enroll qualifying arrestees in CODIS so every arrestee is searched against all unsolved crimes in CODIS within 24 hours.
- For consideration to search using Rapid DNA within the CODIS database, cases submitted involving **sexual assault, homicide, kidnapping, or terrorism** should include the Rapid DNA/Crimes of Special Concern Certification Form (available at https://www.flcjn.net/limsinfo.aspx) to assist the laboratory in collecting and documenting the information needed to meet FBI requirements.

# Familial Searching

- Unsolved violent crimes
- Not a CODIS search
- Software designed for this purpose
- Identify male parent, child or full-sibling
  - But it might not!

- Arkansas, California, Colorado, Florida, Michigan, Texas, Utah, Virginia, Wisconsin, and Wyoming

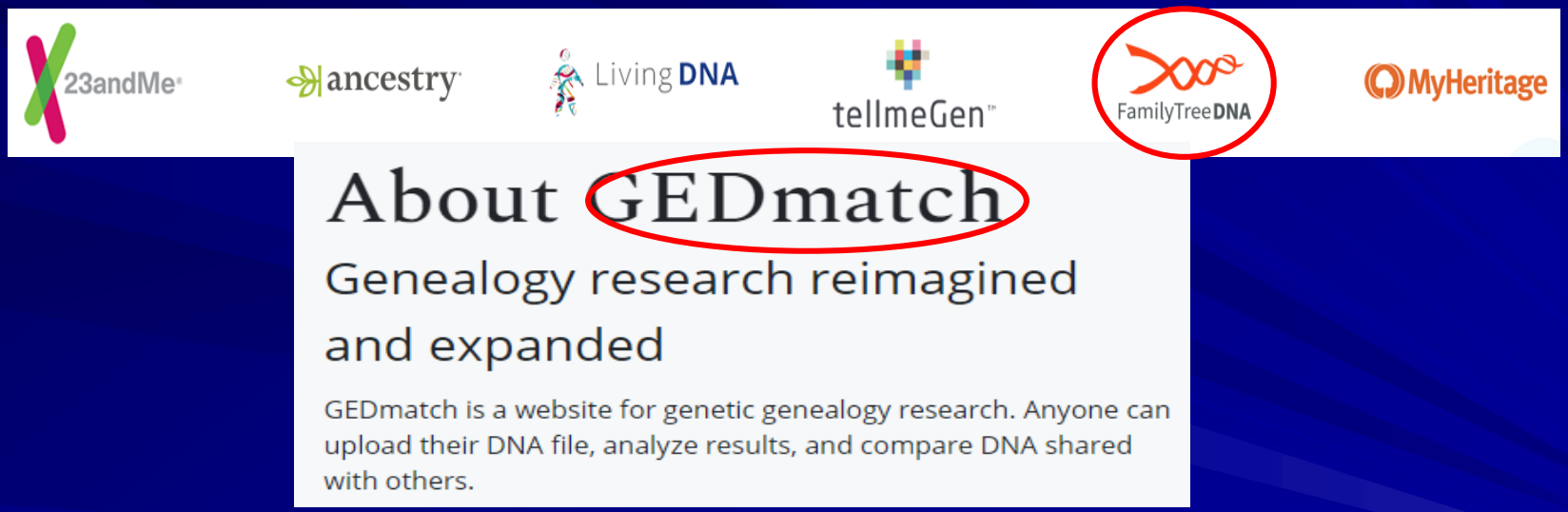
# Local Success

## Man accused in 'serial' sexual offenses was a school football volunteer, certified nursing assistant

Young was arrested for sexual battery, false imprisonment and attempted sexual battery.

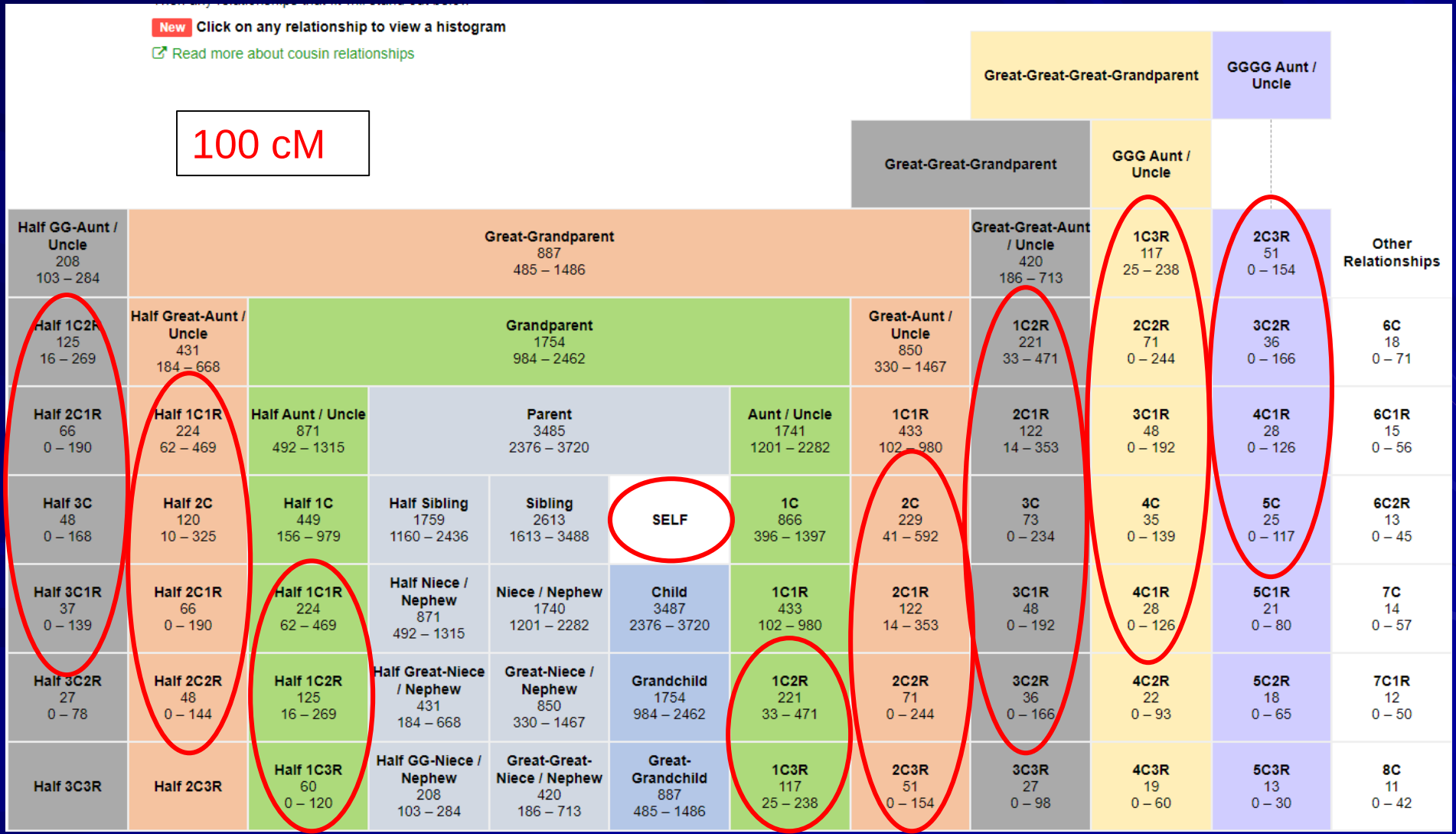
# Genetic Genealogy

- Single-nucleotide polymorphisms (SNPs)
- Hundreds of thousands of locations tested




- Measuring shared amounts of DNA
  - Passed down via common ancestors
- Search may produce a possible relative

# Shared DNA (centimorgan)

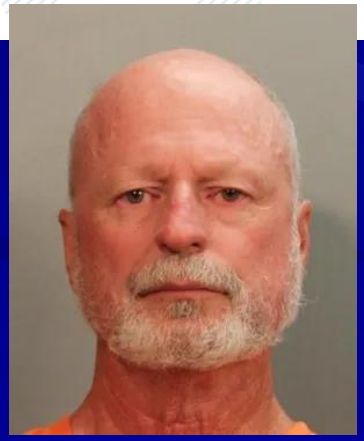


# Local Success

CRIME

## Retired JSO homicide detective, ex-wife arrested in 1999 Jacksonville cold case murder

Former Jacksonville Sheriff's Office homicide detective William Baer was arrested Thursday in the brutal 1999 murder of Saad Kawaf.



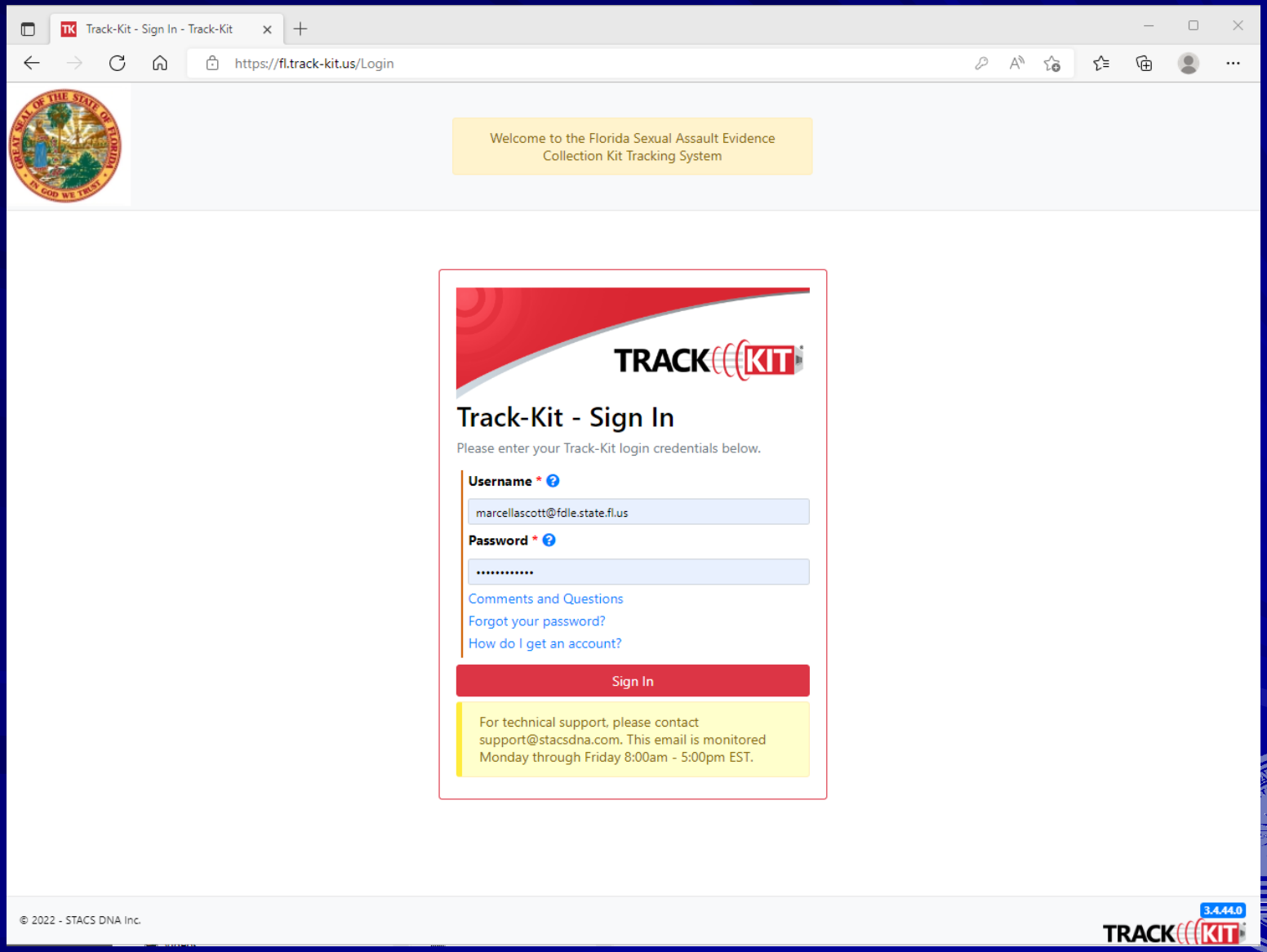
# Florida Statute 943.326

- July 1, 2021

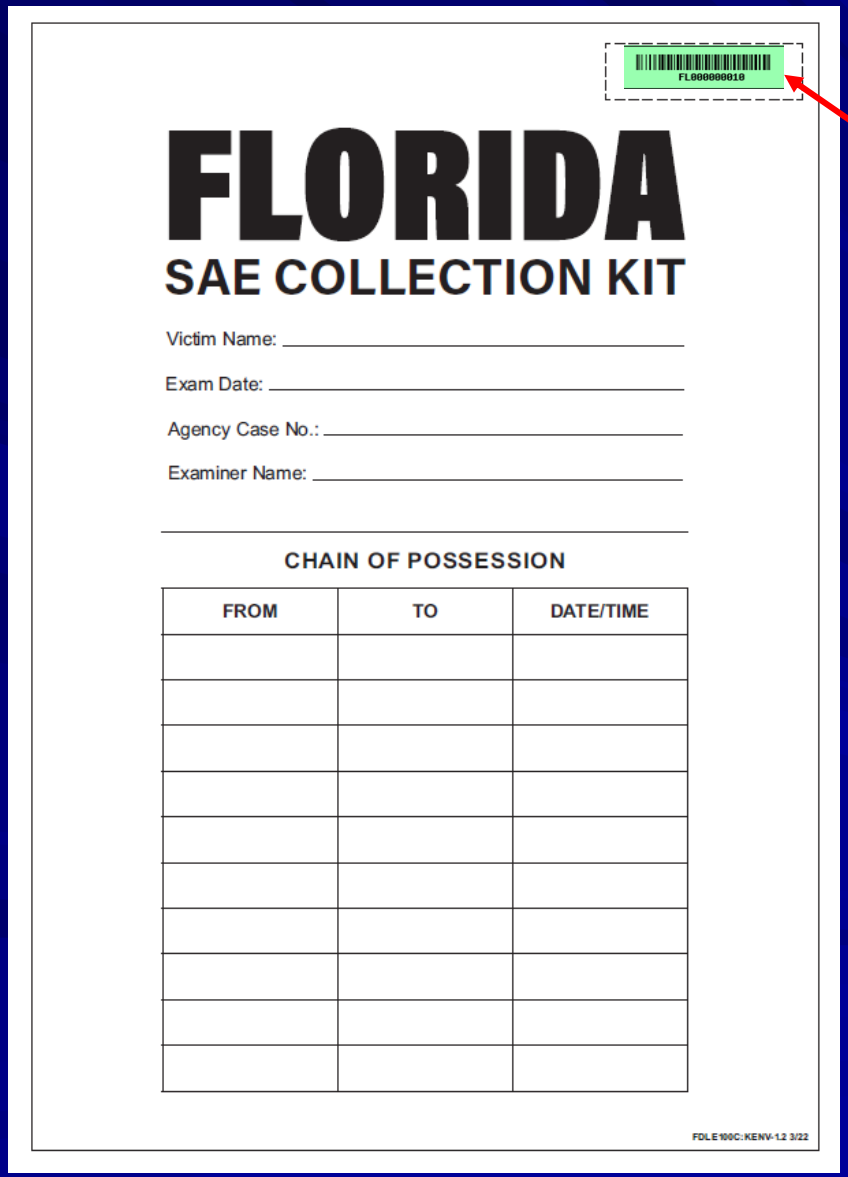
FDLE shall, no later than **July 1, 2023**, **create and maintain a statewide database to track the location, processing status, and storage of each sexual offense evidence kit** collected after the implementation of the database that is accessible to law enforcement agencies and alleged victims. The database shall track the status of the kits from the collection site throughout the criminal justice process, including the **initial collection at medical facilities, inventory and storage by law enforcement agencies or crime laboratories, analysis at crime laboratories, and storage or destruction after completion of analysis**.

FDLE ensures that **each alleged victim is notified of the existence of the database** and provided with instructions on how to access it, and entitled to access to **tracking information**, **testing status**, and **any DNA matches** to a person deemed by investigators to be a suspect or person of interest. Notification of a DNA match may be **delayed for up to 180 days** if such notification would, in the opinion of investigators, negatively affect the investigation.

# Florida Track-Kit™



# NEW Statewide Kits




- Tracking Barcode

# Florida SAE Collection Kit

- Used by all counties
  - FDLE billed
- Barcoded for Tracking
- Survivor Access Card
  - in the kit

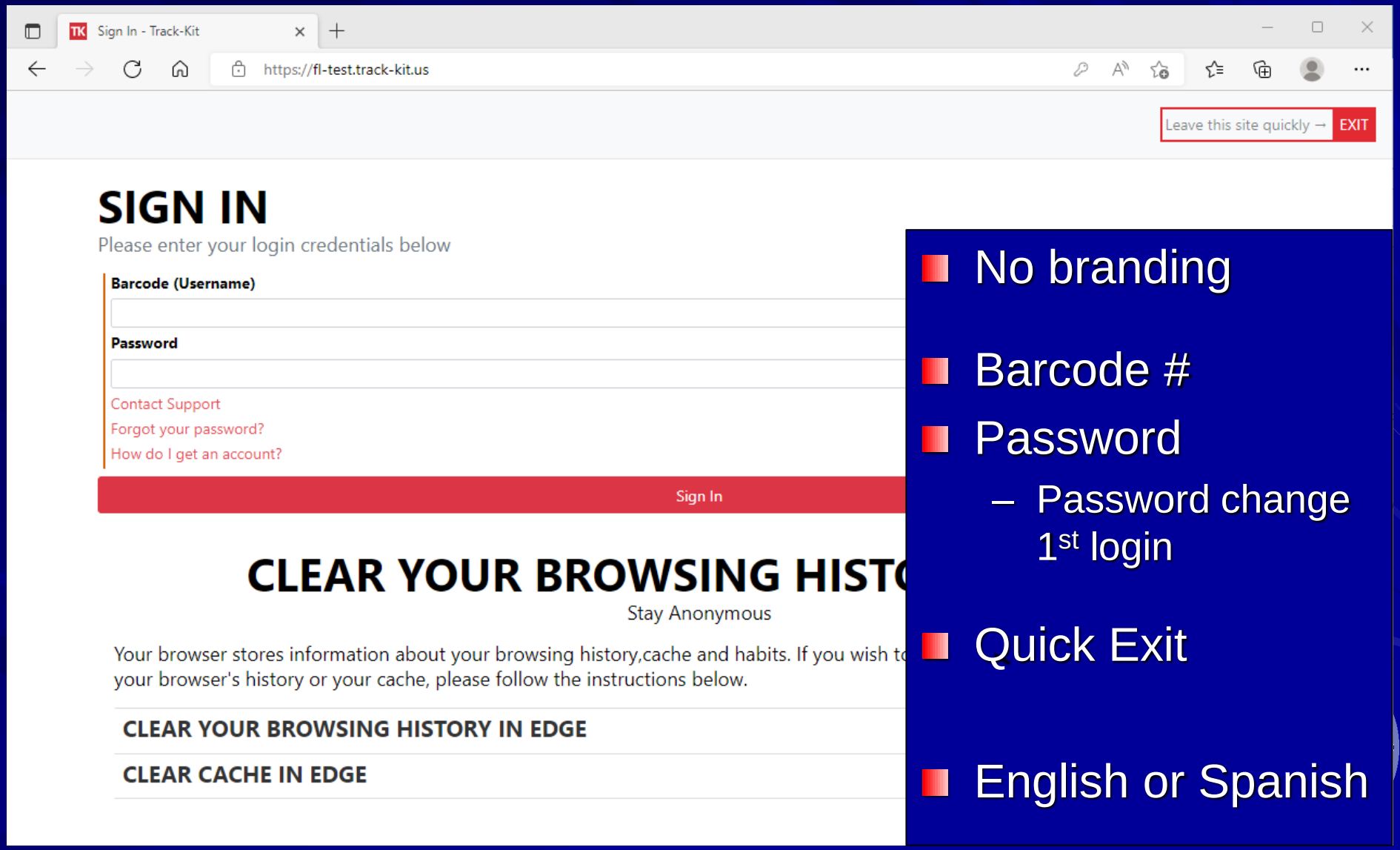
Florida Statute 943.326 addresses sexual assault evidence kits. · If you report to law enforcement and consent to testing, your kit must be submitted to the laboratory within 30 days, and tested within 120 days. · The back of this card provides a log-in to a secure kit tracking database. You are entitled access to tracking information, testing status, and notification of DNA matches to a person deemed by investigators to be a suspect or person of interest. · Notification of a DNA match may be delayed by investigators up to 180 days if it would negatively affect the investigation. · Additional resources are provided at the database website.

URL: fl.track-kit.us

Username: FL000000251
(el nombre de usuario)

Password: Fswm@(F6NPz
(la contraseña)

# Survivor Portal Login Page




- No branding
- Barcode #
- Password
  - Password change 1st login
- Quick Exit
- English or Spanish

Disclaimer: FDLE doesn't recommend any private laboratory.

# Thank you!


Track-Kit™ Policy Center

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