

**FORENSICS IN BLOOM**

## DNA Analysis Findings From 4,038 Sexual Assault Kits: Using Data to Inform Practice

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### Retrospective, Collaborative Study

- **4,038 Cases:**
  - 2010 to 2016
  - Represents 78% of the population in Utah
  - All areas with SARTs
  - All cases over age of 14 years, fully completed exam with evidence collected, wanted to report to LE
- **241 Variables per case**

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Phase 1 – Victim and assault characteristics

Phase 2 – Sexual assault kit (SAK) submissions

Phase 3 – DNA analysis findings

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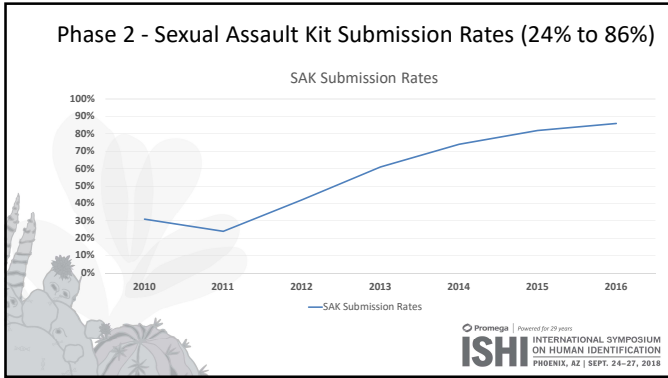
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- ### Phase 2 - Sexual Assault Kit Submission Rates
- Predictors of SAK submission:
    - Site or jurisdiction – sites ranged from 4% to 40% (2010 to 2013)
    - Patient bathed or showered following assault
- Promega | Powered for 29 years  
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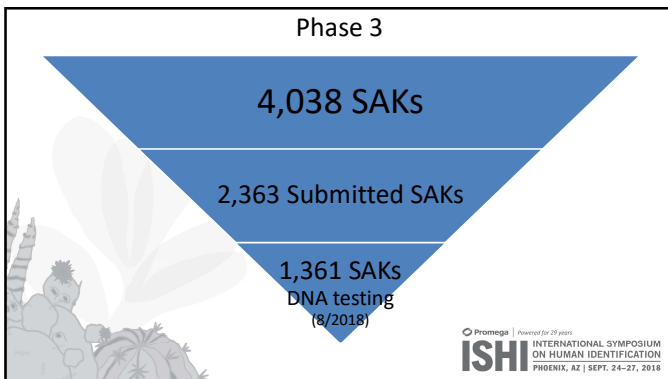
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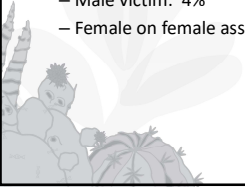
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### Phase 3

- Serology completed prior to DNA analysis: 36% of SAKs
- Quant Male DNA:
  - No: 12%
  - Yes, female victim: 84%
  - Male victim: 4%
  - Female on female assault: 0.2%



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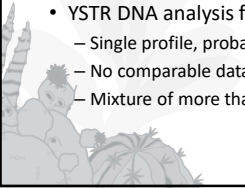
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### Phase 3

- STR DNA analysis findings (N=1,182 SAKs):
  - Single profile, probable suspect: 69%
  - No comparable data: 27%
  - Mixture of more than one foreign contributor: 4%
- YSTR DNA analysis findings (N=619 SAKs):
  - Single profile, probable suspect: 64%
  - No comparable data: 28%
  - Mixture of more than one foreign contributor: 7%



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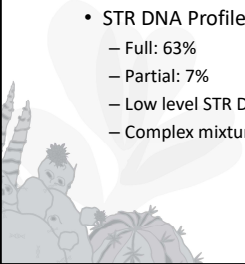
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### Phase 3

- STR DNA Profiles
  - Full: 63%
  - Partial: 7%
  - Low level STR DNA, no comparison: 28%
  - Complex mixture, no comparison: 2%



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**Phase 3**

- Uploaded CODIS Eligible Profiles
  - 58%
    - Denominator = SAKs with STR DNA testing (N = 1,182)
  - 35%
    - Denominator = SAKs with testing completed as of August 2018 (N = 1,952)



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- Swab locations most likely to yield probative STR DNA profile:
  - Single profile, probable suspect:
    - Cervical (96%)
    - Vaginal (93%)
    - Perianal (88%)
    - Body swabs (84%)
    - Rectal (83%)



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- Swab locations most likely to yield probative YSTR DNA profile:
  - Single profile, probable suspect:
    - Cervical (86%)
    - Body swab (85%)
    - Vaginal (84%)
    - Perianal (81%)
    - Rectal (75%)



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- Swab locations most likely to yield CODIS eligible DNA profile:
  - Single profile, probable suspect:
    - Vaginal (79%)
    - Cervical (77%)
    - Perianal (72%)
    - Rectal (69%)
    - Body swab (66%)




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- Variables associated with development of CODIS eligible profile:
  - Bivariable statistics ( $p < .05$ )
    - Gender (female)
    - Time between assault and exam
    - Strangled
    - Multiple suspect assault
    - Vagina penis contact
    - Mouth on genitals
    - Mouth on breasts
    - Mouth on other body parts
    - Ejaculation known to occur
    - Patient with genital injuries




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- Variables *NOT* associated with development of CODIS eligible DNA profile:
  - Site of evidence collection
  - Relationship between victim and suspect
  - Patient bathed or showered
  - Time between evidence collection and SAK submission ( $p = 0.917$ )
    - Lack of DNA degradation
    - Supports testing ALL unsubmitted SAKs




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- GEE Logistic Regression Model on development of CODIS eligible DNA profile (statistically significant predictors):
  - More likely to have a CODIS eligible profile developed:
    - Females: 40% more likely
    - Penis to vagina contact: 20% more likely
    - Known ejaculation occurred: 20% more likely
    - Mouth to breasts: 10% more likely
  - Less likely to have a CODIS eligible profile developed:
    - For every 24 hours that passes from assault to evidence collection, there is a 9% decrease in development of a CODIS eligible DNA profile.



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Consider implications on practice . . . .

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