

The Sexual Assault Workflow: New Zealand's perspective using Quantiflier™ Trio, Yfiler™ Plus and Identifiler™ kits

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Background

Autosomal: Identifiler kit since 2008

Y STR: for over 10 years but Yfiler™ Plus kit since 2016

Quant: Quantifiler Trio since 2017

Other techniques available for sex assault cases if required:

- LMD

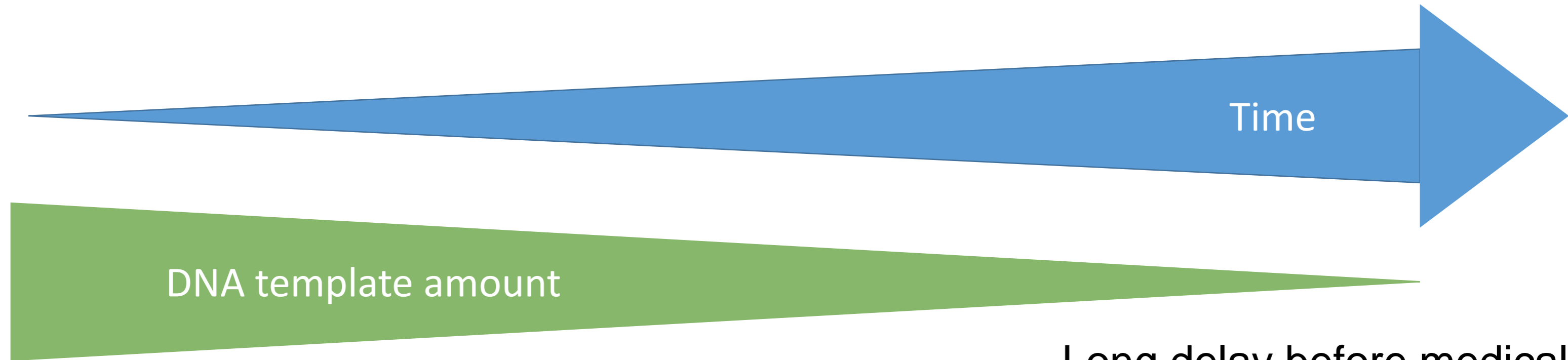
- mRNA

- mini STR

- LCN



Sexual Assault evidence types



Recent penile-vaginal
intercourse with ejaculation

Long delay before medical
examination taking place OR
where only brief touching or
grabbing may have occurred



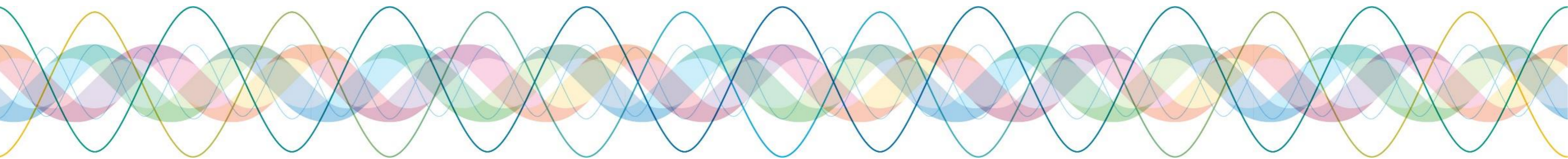
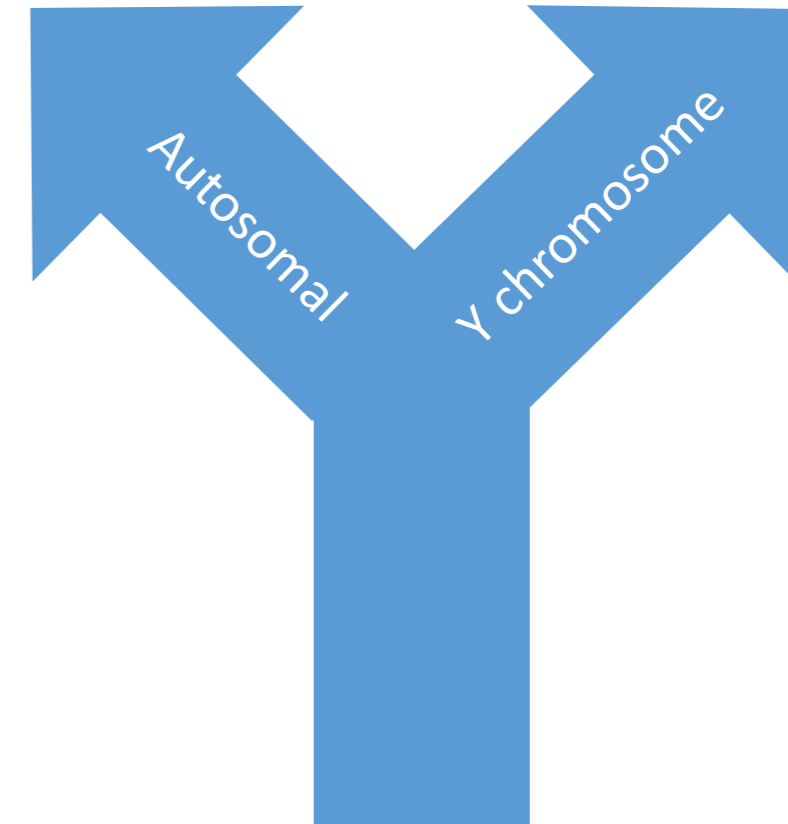
To Y or not to Y?

Case circumstances

- what happened?

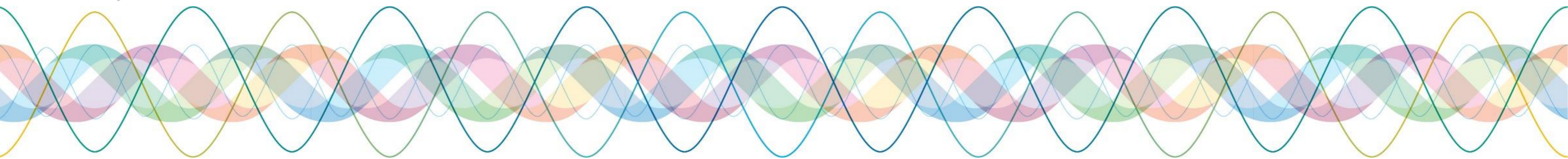
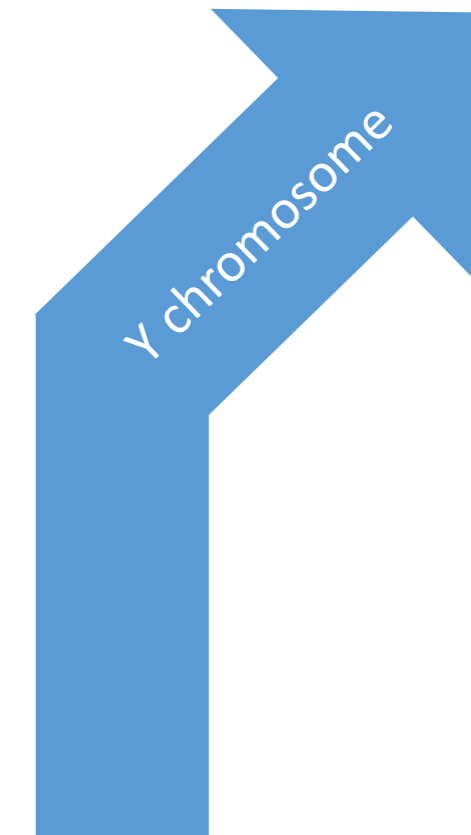
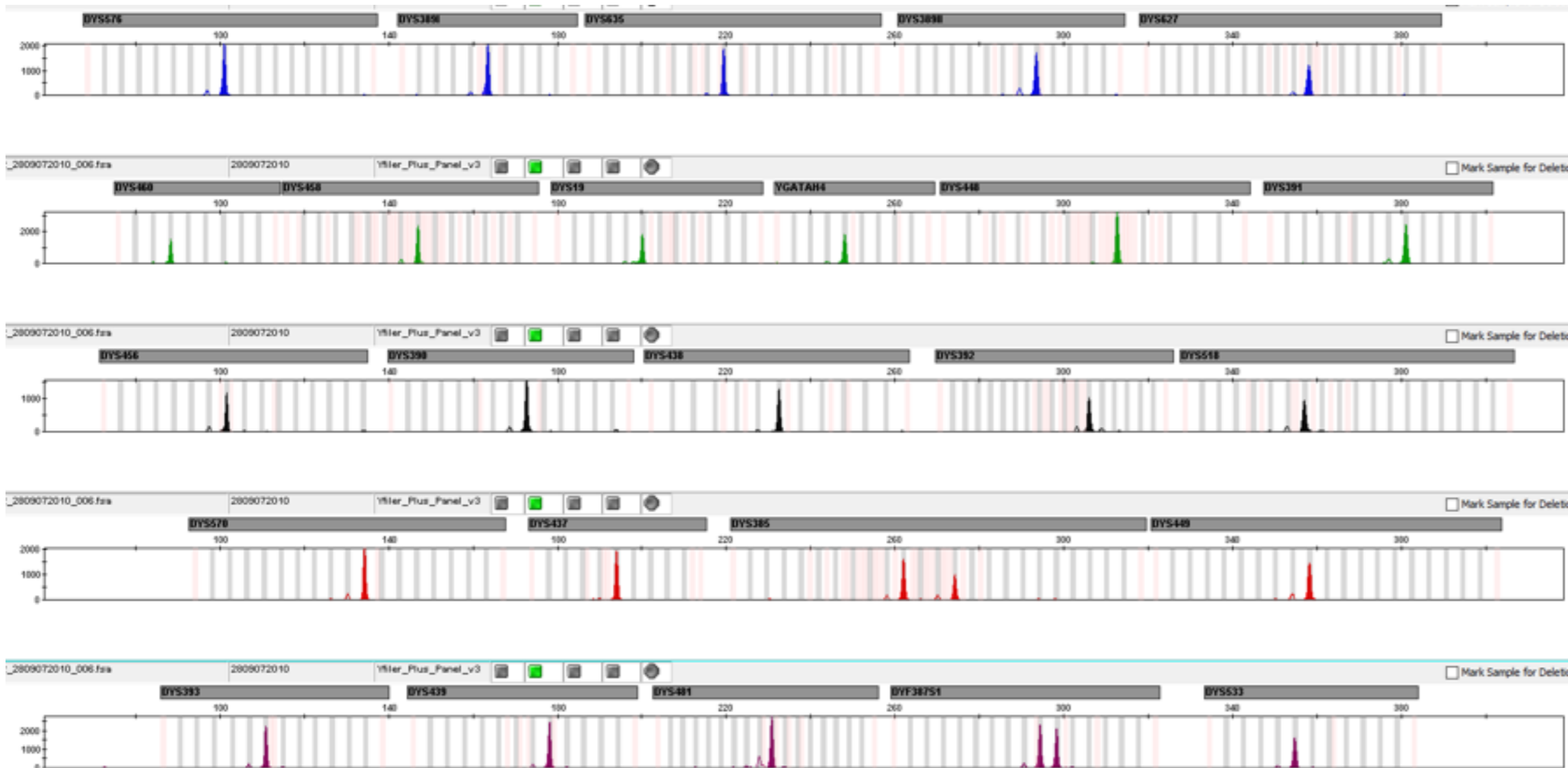
Initial screening tests

Quantifiler Trio value important



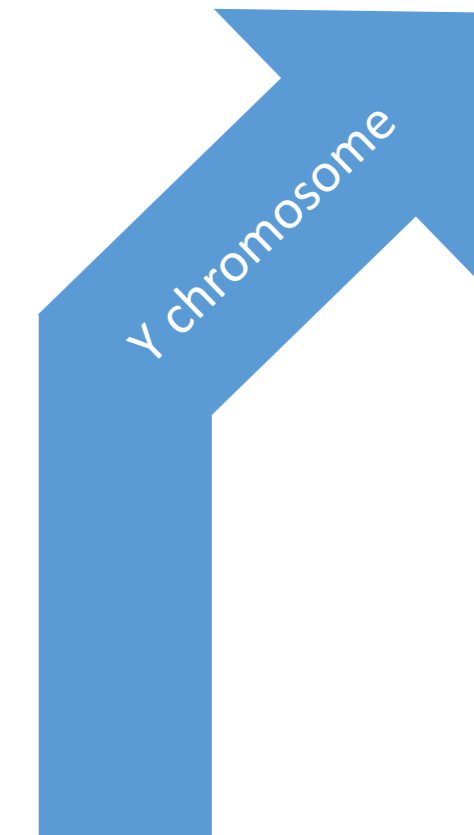
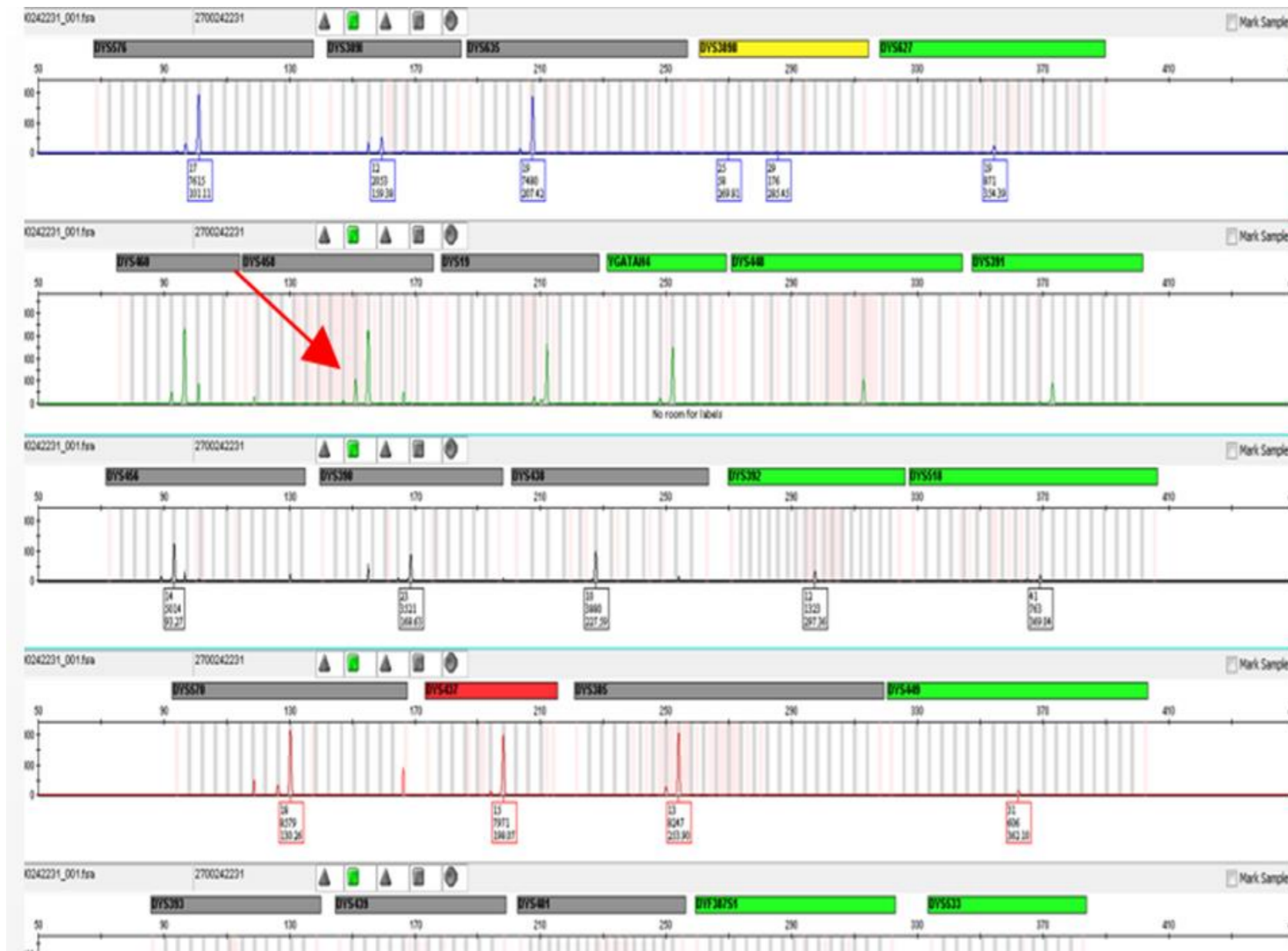
Yfiler Plus success

Sensitive: 0.03ng male DNA



Yfiler Plus success

Mix of male and female DNA : 0.5ng male: 500ng female (1000x)



Why not do both: Y and autosomal

The combined power

To help confirm the number of male contributors

Multiple males involved

Different body fluids

Related males involved

Mass screens

Quantifiler Trio kit

Identifiler kit

Yfiler Pluskit

In lieu of a reference DNA sample from a person of interest



Case study 1 – combined power

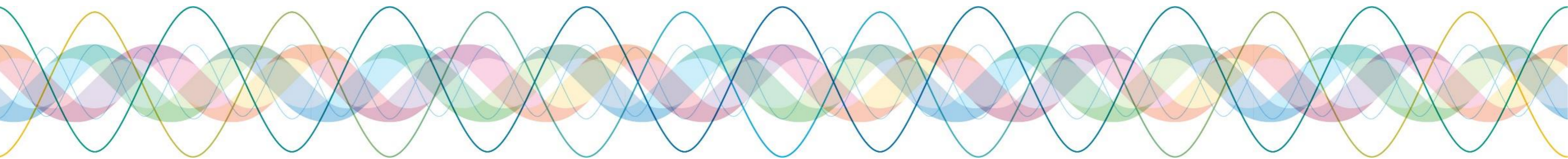
Sex assault:

Penile-vaginal penetration of complainant

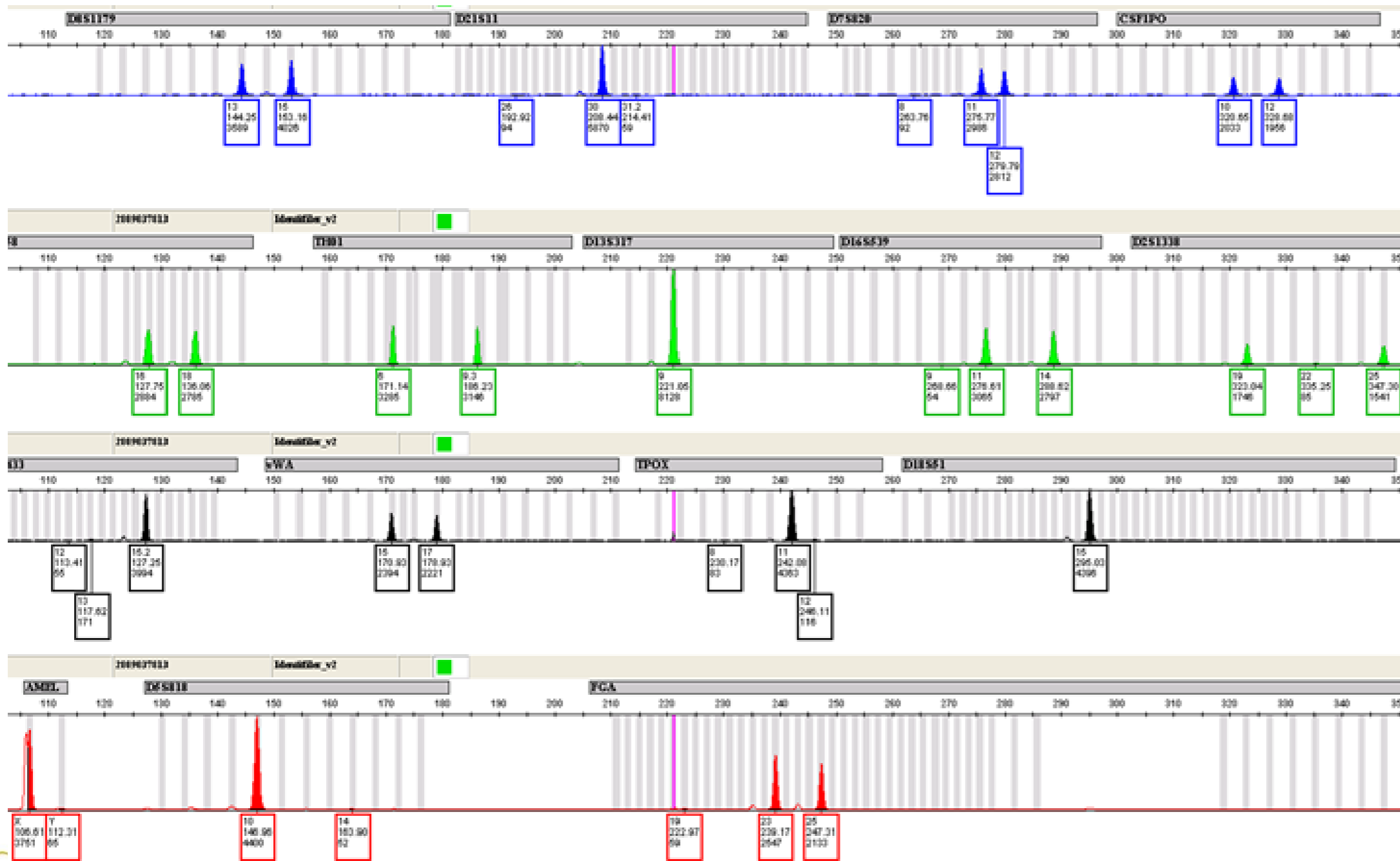
Unsure if ejaculation occurred

Quantifiler Trio result (ng/ μ L): SA(Total): 0.522, Y: 0.021

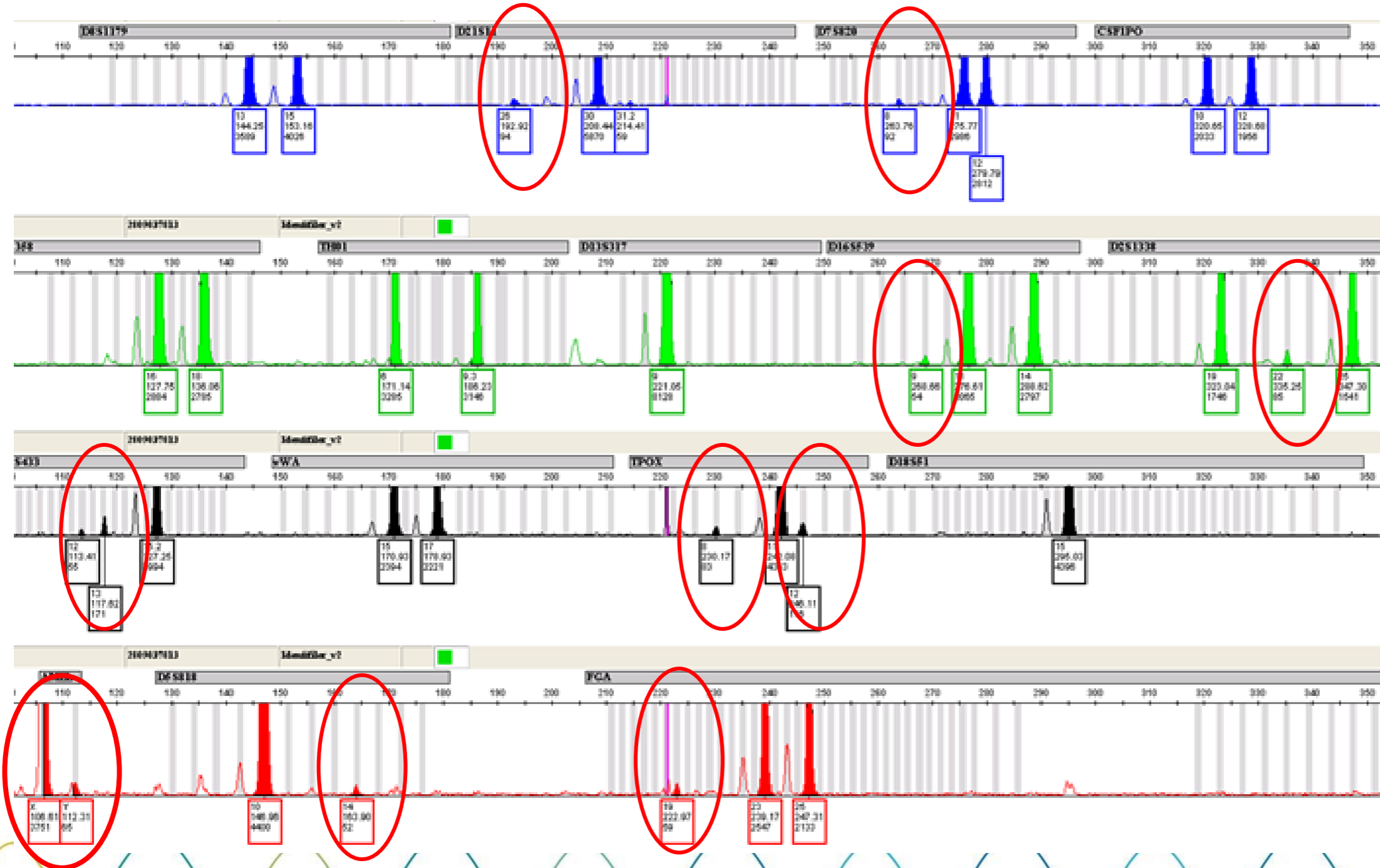
Female to male DNA ratio: ~24:1



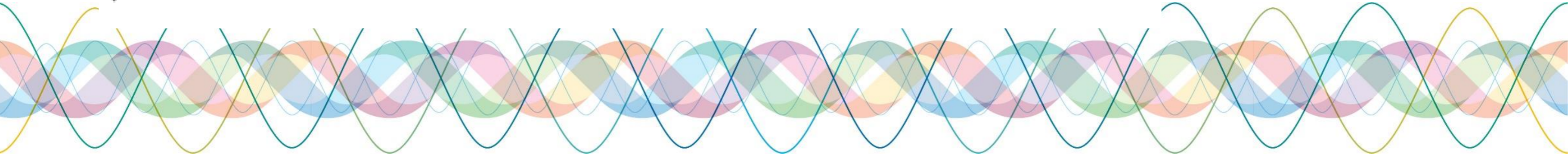
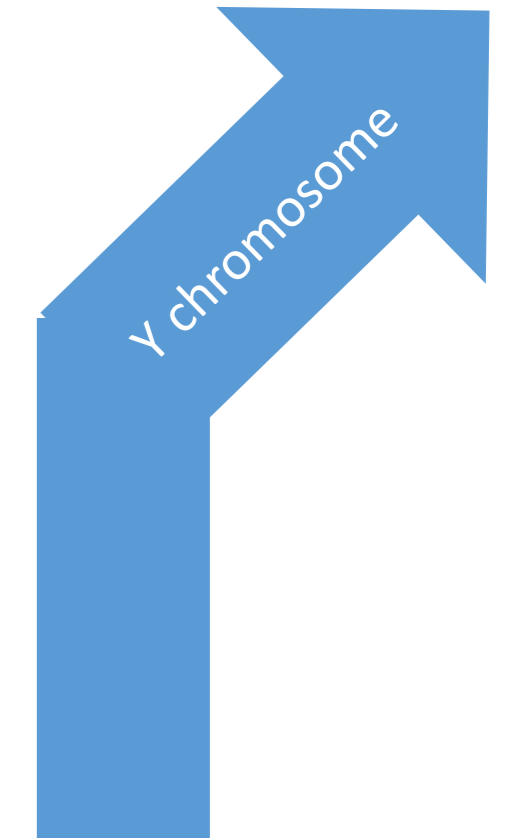
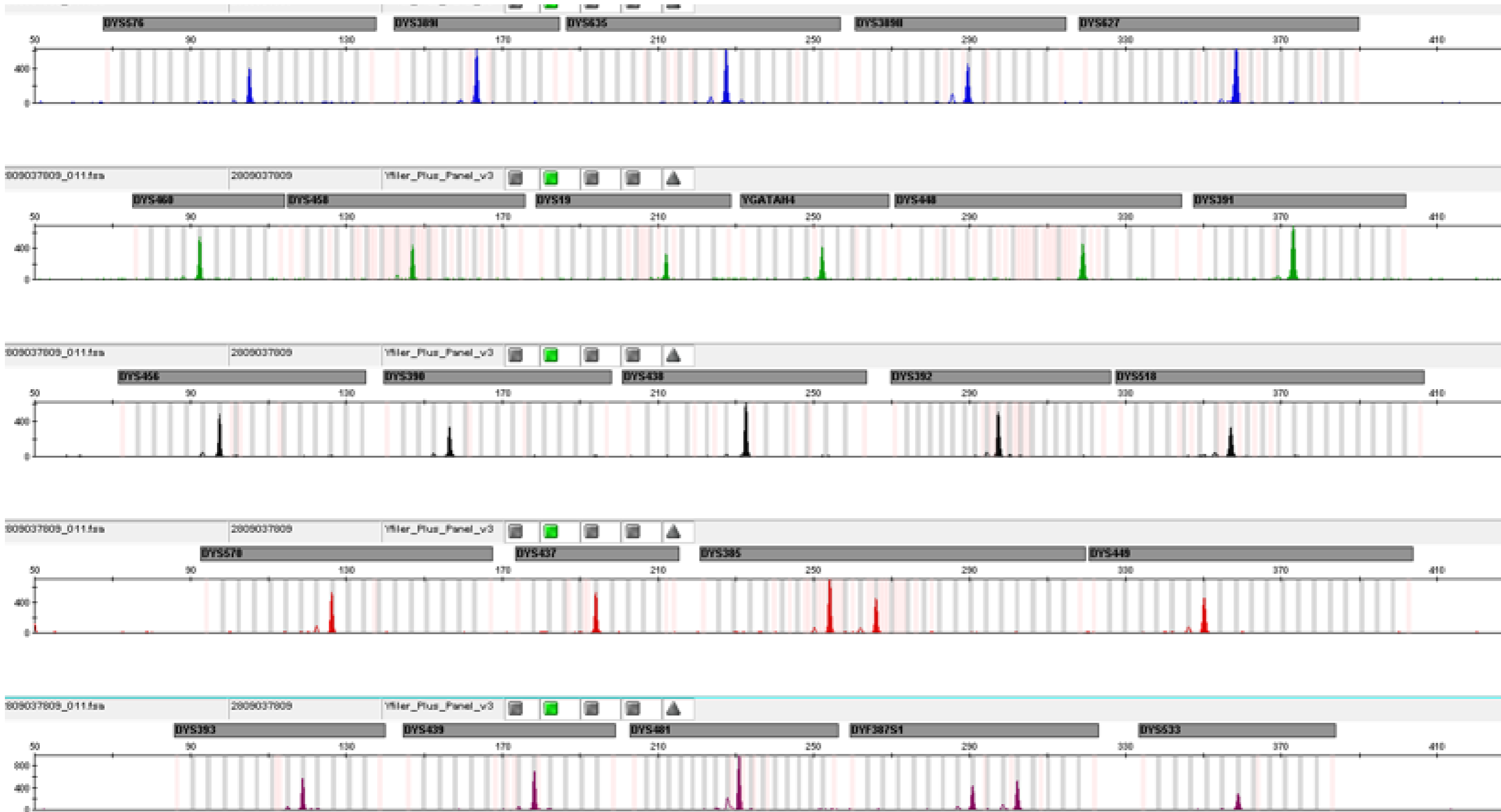
Case study 1 – combined power



Case study 1 – combined power



Case study 1 – combined power



Case study 2 – combined power

Sex assault:

Two male offenders, female complainant

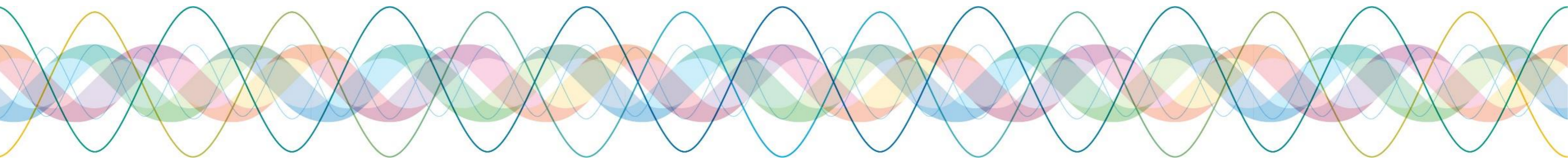
Oral–vulval contact by one offender

- gave the complainant his hooded sweatshirt to wear

Penile penetration by other offender – no ejaculation

- Left his t-shirt behind at the scene

Complainant had previous consensual sex with husband



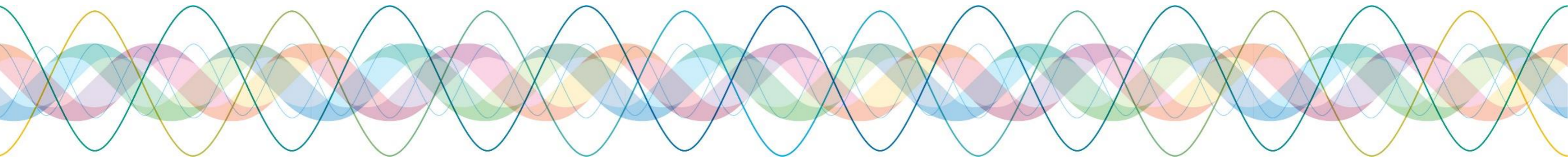
Case study 2 – combined power

Sex assault:

Autosomal results:

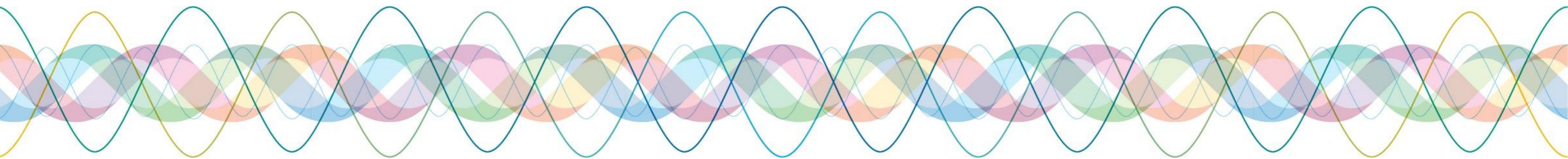
- vulval swabs: mix of complainant and the first offender
- hooded sweatshirt: mix of complainant and both offenders
- t-shirt: profile of second offender

Vaginal swab processed via Yfiler Plus kit



Case study 2 – combined power

Sample	Fraction	DYS576	DYS389i	DYS635	DYS389ii	DYS627	DYS460	DYS458	DYS19	YGATAH4	DYS448	DYS391	DYS456	DYS390	DYS438	DYS392	DYS518	DYS570	DYS437	DYS385	DYS449	DYS393	DYS439	DYS481	DYF387S1	DYS533	Quant (ng/uL)	Conclusion
Vaginal swab	Epithelial	18	12	23	28	24	9	15, (16)		12	19	10	15	24	10	13	35	15	14	12, 13, 16	31	13	13, (14)	24	40, 40	12	SA 79.32200, Y 0.09700	Major corresponds to Offender 2 (Minor not suitable for comparison)
Vaginal swab	Sperm	17	12			22	10		14	12	19	11		23	12		39	18	16		29	13		21	35, 0	12	SA 0.00500, Y 0.00600	Partial profile corresponds to Husband



Case study 3 – combined power

Attempted sex assault:

Hand over mouth of girl in bed

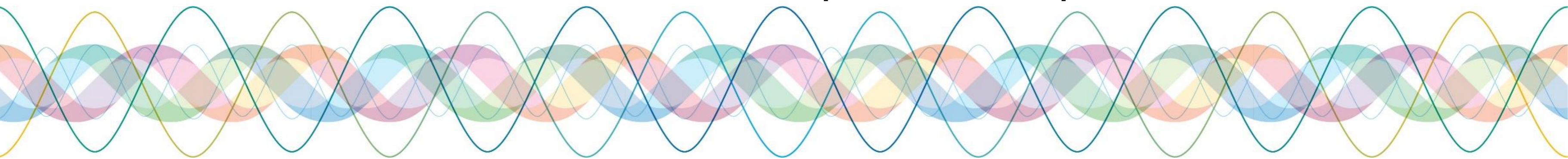
Offender disturbed and fled through window

Two samples tested via Yfiler Plus kit:

same haplotype – corresponded to suspect

Same two samples tested via Identifiler kit:

two different males – did not correspond to suspect



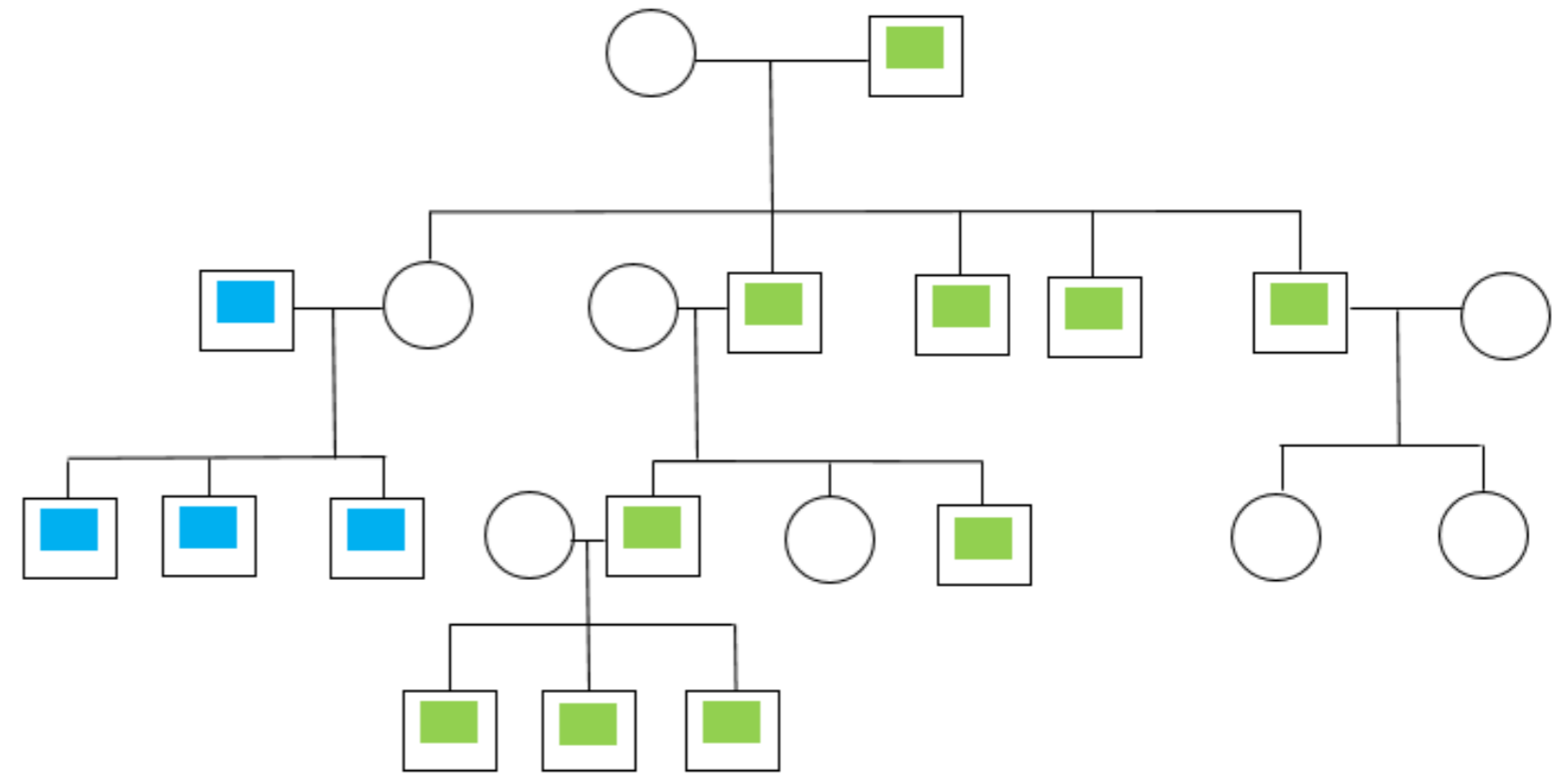
Mass screens – combined power



Serious high profile
sexual assault cases

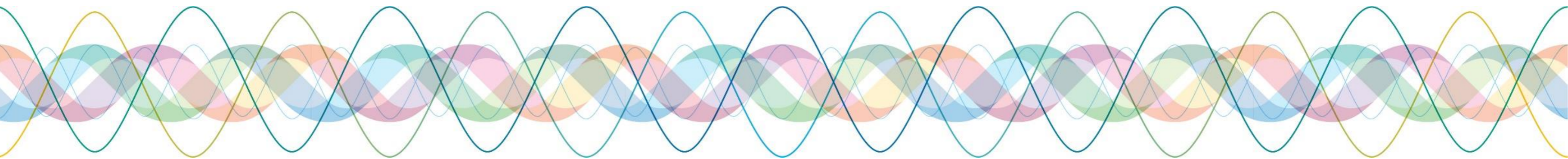
Autosomal profile available for
comparison

- no matches against Databank

Process via Y STR to get a
Y profile available for comparison



-  Paternally related males in "Family 1"
-  Paternally related males in "Family 2"



Acknowledgments



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