



# Recommendations for the collection of forensic specimens from complainants and suspects – the evidence

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## Toxicology samples (blood, urine and hair)

### General advice

Some drugs can adhere or 'stick' to plastic and therefore glass tubes are recommended for toxicological samples.

### Drug-facilitated crime

UNODC. (2011)

*Guidelines for the forensic analysis of drug facilitating sexual assault and other criminal acts*

Accessed 02/01/2019

### Detection times for drugs

Moffat AC., Osselson MD., Widdop B. & Watts J. Eds.  
*Clarke's Analysis of Drugs and Poisons. 4th ed*  
London, Pharmaceutical Press, 2011.

Baselt RC.

*Disposition of Toxic Drugs and Chemicals in Man, 11th ed*  
Biomedical Publications, Seal Beach, CA, 2017

### Urine collection up to 14 days in DFSA cases

Negrusz A., Moore C., Stockham TL., & Levy NA.  
*Elimination of 7-Aminoflunitrazepam and Flunitrazepam in urine after a Single Dose of Rohypnol®*  
*Journal of Forensic Sciences* 2000: 45(5): 1031-40

## Biological Samples

### Double gloving with changing of gloves with different body areas

Margiotta, G., Tasselli, G., Tommolini, F., Lancia, M., Massetti S., Carnevali, E.

*Risk of DNA transfer by gloves in forensic case work.*  
*Forensic Science International: Genetics Supplement Series* 2015: 5; e527-e529

(It is imperative to change gloves every time after touching items or surfaces, prior to touching the exhibit. It is desirable to wear multiple layers of gloves to avoid skin exposure during the changing of gloves.)

### Double swabbing

Sweet, D., Lorente, M., Valenzuela, A., Vilanueva, E.  
*An improved method to recover saliva for human skin: the double swab technique*

*J Forensic Sci* 1997: 42(2): 230-2

(Use of the double swab technique increased the recovery of saliva from human skin and therefore DNA evidence.)

Pang, BCM., & Cheung, BKK.

*Double swab technique for collecting touched evidence*  
*Legal Medicine* 2007: 9; 181-184

(The double swab technique improves the quality of the resulting DNA profiles.)

### Oral samples

Allard, J. E.

*The collection of data from findings in cases of sexual assault and the significance of spermatozoa on vaginal, anal and oral swabs*

*Sci. Justice* 1997: 37; 99– 108 (maximum persistence of sperm in the oral cavity recorded as 28-31 hours)

Nittis M., Franco M., Cochrane C.

*New oral cut-off time limits in NSW*

*Journal of Forensic and Legal Medicine* 2016: 44; 92-97  
(oral rinse and perioral (lip) swab recommended in cases of oral assault)

### Saliva on skin

Kenna J., Smyth M., McKenna L., Dockery C. & McDermott SD.  
*The recovery and persistence of salivary DNA on Human Skin*  
*J Forensic Sci.* 2011: 56; 1; 170-175

(showed persistence of salivary DNA up to 96 hours when not washed in 3 volunteers with saliva on their legs)

### Hair

Salter, M.T., Cook, R.

*Transfer of fibres to head hair, their persistence and retrieval*  
*Forensic Science International* 1996: 81; 2; 211–221  
(hair style and activity are major factors in affecting persistence; taping is more efficient than combing)

Exline, D.L., Smith, F.P., Drexler, S.G.

*Frequency of pubic hair transfer during sexual intercourse*  
*J Forensic Sci:* 1998; 43; 505-508

(important to collect pubic hair combings from the male suspects as well as from female victims, provided the time interval is not extreme)



## Fingernail swabbing

Dowlman EA., Martin NC., Foy MJ., Lochner T. & Neocleous T.  
*The prevalence of mixed DNA profiles on fingernails swabs*  
 Sci. Justice 2010: 50; 64-71  
 (looking at the persistence of DNA profiles after intimate contact)

Flanagan N. & McAlister C.  
*The transfer and persistence of DNA under the fingernails following digital penetration of the vagina*  
 For Sci International: Genetics 2011: 5; 479-483  
 (DNA profiles maybe obtained up to 18 hours post digital penetration)

Oz C. & Zamir A.  
*An Evaluation of the Relevance of Routine DNA Typing of Fingernail Clippings for Forensic Casework*  
 Journal of Forensic Science 2000: 45(1):158-160  
 (clippings from 6 volunteers did not reveal donor profile – hence swabbing might be more effective)

Lederer, T., Betz P. & Seidl S.  
*DNA analysis of fingernail debris using different multiplex systems: a case report*  
 Int J Legal Med 2001: 114(4-5): 263-6  
 (showed that a victim's DNA might be accessed from fingernail scrapings from an assailant (using a small plastic spatula) two days after an assault and after the assailant had admitted to washing his hands several times)

Foran D., Hebda L., Doran A.  
*Trace DNA from Fingernails: Increasing the Success Rate of Widely Collected Forensic Evidence December 2015*  
 Accessed 05/01/2016  
 (double swabbing of nails best in the living)

## Female genitalia

Davies A. & Wilson E.  
*The Persistence of Seminal Constituents in the Human Vagina*  
 Forensic Science 1974:3: 45-55  
 (spermatozoa found up to 3 days post intercourse and occasionally up to 6 days)

Graves H. C. B., Sensabaugh G. F. & Blake E. T.  
*Postcoital detection of a male-specific semen protein: application to the investigation of rape*  
 N. Engl. J. Med. 1985: 312; 338-340  
 (spermatozoa isolated from endocervix 17 days after intercourse)

Astrup B.S., Thomsen J.L., Lauritsen J., Ravn P.  
*Detection of spermatozoa following consensual sexual intercourse*  
 Forensic Science International 2012: 221; 137-141  
 (spermatozoa best recovered from the posterior fornix)

Wilson, E. M.  
*A comparison of the persistence of seminal constituents in the human vagina and cervix*  
 Police Surg. 1982: 22; 44-45  
 (more chance of finding spermatozoa on cervical rather than vaginal swabs)

Owers R., McDonald A., Montgomerie H., & Morse C.  
*A casework study comparing success rates and expectations of detecting male DNA using two different Y-STR multiplexes on vaginal swabs in sexual assault investigations where no semen has been detected*  
 Forensic Science International: Genetics 2018: 37: 1-5  
 (demonstrates the value of using more recently developed Y-STR multiplexes to detect male DNA on vaginal swabs in sexual assault investigations where no semen has been detected)

Hanson EK. & Ballantyne J.  
*A Y-short tandem repeat specific DNA enhancement strategy to aid the analysis of late reported (≥6 days) sexual assault cases*  
 Med Sci Law 2014; 54: 4: 209-218  
 (semen donor Y-STR profiles found in post-coital samples collected 6-9 days after intercourse)

Sween, Kayla R., Quarino, Lawrence A., Kishbaugh, Janine M.  
*Detection of Male DNA in the Vaginal Cavity After Digital Penetration Using Y-Chromosome Short Tandem Repeats*  
 Journal of Forensic Nursing 2015; 11: 1: 33-40  
 (viable possibility exists that probative Y-STR profiles can be obtained from vaginal swabs taken from subjects exposed to digital penetration at time intervals up to 72 hours post penetration)

Speck P. & Ballantyne J.  
*Post-coital DNA Recovery Study*  
 NIJ, Washington, DC, March 2015  
 Accessed 21/12/2015  
 (provides strong pilot data to collect samples in females from the cervix and posterior fornix through their first menses for forensic laboratory analysis)

Ballantyne J.  
*DNA Profiling of the Semen Donor in Extended Interval Post-Coital Samples*  
 NIJ, Washington DC, June 2012  
 Accessed 14/06/2016  
 (using a combination of novel methods to selectively enhance male DNA fractions the ability to obtain male donor profiles in extended interval post-coital samples collected 6 to 9 days after intercourse was demonstrated)



## Paediatrics

Christian C., Lavelle J., DeJong A., Loisselle J., Brenner L. & Joffe M.

*Forensic Evidence Findings in Prepubertal Victims of Sexual Assault*

Pediatrics 2000; 106(1): 100-104

(medical records of 273 children under the age of 10 were reviewed. All children had forensic evidence collected within 44 hours of an alleged sexual assault. No swabs taken from the child's body were positive for blood after 13 hours or sperm/semens after 9 hours)

Giardet R., Bolton K., Lahoti S., Mowbray H., Giardino A., Isaac R., Arnold W., Mead B & Paes N.

*Collection of Forensic Evidence from Paediatric victims of sexual assault 2011*

Paediatrics 2011; 128; 2

(body samples should be considered for children beyond 24 hours although the yield is limited)

## Penile

Please note that collective experience from forensic scientists in the UK has shown that positive results of female DNA on penile swabs can be obtained after 48 hours.

Cina S.J., Collins K. A., Pettenati M. J. & Fitts M.

*Isolation and identification of female DNA on post-coital penile swabs*

Am. J. Forensic Med. Pathol. 2000; 21; 97-100

(female DNA profiles obtained on penile swabs up to 24 hours post coitus)

Farmen RKB., Haukeli I., Ruoff P., Froyland E.

*Assessing the presence of female DNA on post-coital penile swabs: Relevance to the investigation of sexual assault*

Journal of Forensic and Legal Medicine 2012; 19; 386-389

(female DNA was recovered on all post-coital penile swabs taken at 5-24 hours; volunteer study)

## Anal

Wilson GM. & Allard JE.

*Spermatozoa – their persistence after sexual intercourse*

For Sci Int 1982; 19; 135-154

(maximum recorded interval between the act of anal intercourse and the identification on a rectal swab is 96 hours)

Janisch S., Meyer H., Germerott T., Albrecht U., Schultz Y. & Debertin A.

*Analysis of clinical forensic examination reports on sexual assault*

Int J Legal Med 2010; 124(3); 227-35

(found that only 7 anal swabs out of 37 (18.9%) were positive for sperm, when taken within 24 hours of assault)

Tucker S., Ledray LE., & Werner JS.

*Sexual Assault Evidence Collection*

Wisconsin Medical Journal 1990; 89(7); 407-411

(1007 sexual assault examination laboratory results were reviewed in 1990. Of the 210 cases with anal involvement, sperm was only found in 4 cases (2%). These exams were completed within 4 hours of rape)

## Time since intercourse

Dziak R., Parker L., Collins V. & Johnston S.

*Providing Evidence Based Opinions on Time Since Intercourse (TSI) Based on Body Fluid Testing Results of Internal Samples*

Canadian Society of Forensic Science Journal 2011;

44; 2; 59 to 69

Accessed 21/12/2015

Owers R., Davidson G., McDonald A., Morgan R., O'Rourke P.

*Time since intercourse (TSI) data from a large-scale casework study of penile-vaginal penetration allegations using Sperm Elution.™*

Forensic Science International 2018; 288:10-13

(TSI data is significantly affected by the sperm recovery method used. Using Sperm Elution improves the amount of spermatozoa recovered from vaginal swabs and the length of time to detect spermatozoa on swabs).

## Urine for DNA (in exceptional circumstances)

Smith D.A., Webb L.G., Fennell A.I., Nathan E.A., Bassindale C.A., Phillips M.A.

*Early evidence kits in sexual assault: an observational study of spermatozoa detection in urine and other forensic specimens*

Forensic Science, Medicine, and Pathology. 2014;10: 3: 336-343

(the first void urine from an early evidence kit can be analysed for spermatozoa (within 20 hours) prior to testing for toxicology)

Joki-Erkkila M., Tuomisto S., Seppala M., Huhtala H., Ahola A., Karhunen P.

*Urine specimen collection following consensual intercourse – A forensic evidence collection method for Y-DNA and spermatozoa*

Journal of Forensic and Legal Medicine 2016;37:50-54

(urine specimen may be useful (up to 24 hours) for detection of Y-DNA and spermatozoa following penile-vaginal penetration)