WA Family Law Pathways Network & Stopping Family Violence Twilight seminar 6th Feb 2018

Non-fatal strangulation in sexual assault: a study of clinical and assault characteristics highlighting the role of intimate partner violence

RR Zilkens • MA Phillips • MC Kelly• SA Mukhtar • JB Semmens • DA Smith

Dr Debbie Smith
Senior Medical Practitioner
Medical and Forensic Services SARC WA

SARC SEXUAL ASSAULT RESOURCE CENTRE

Curtin University

SARC respectfully acknowledges the Traditional Custodians of this land and we pay our respects to Elders, past and present.

Government of Western Australia
North Metropolitan Health Service

lotterywest

HealthyWA
healthywa.wa.gov.au

Copyright / Disclaimer

If anyone needs a break at anytime during the presentation, please feel free to take it.

Sexual Assault Resource Centre

Phone **6458 1828** to access **counselling**

SARC SEXUAL ASSAULT RESOURCE CENTRE

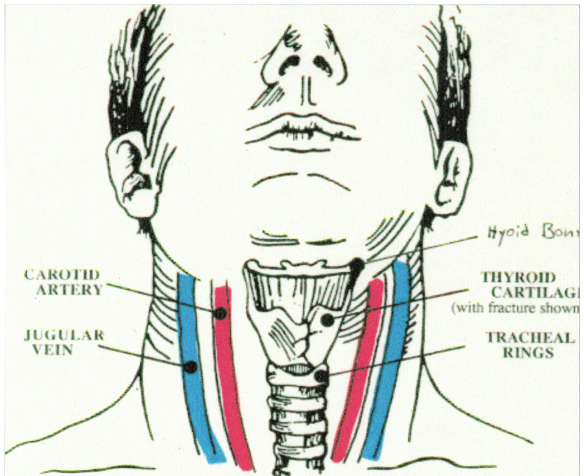
Presentation content

- Non-fatal strangulation – definition, types & mechanism of injury
- SARC Case history
- Medical, forensic & safety implications
- Prevalence
- SARC NFS study
  - prevalence in female sexual assault
  - demographic & assault risk factors
  - signs and symptoms
- Translation of research into clinical practice and next steps

What is Non-fatal strangulation?

- Surviving an episode of strangulation – NFS
- Mechanical asphyxia (lack of oxygen) – caused by direct neck pressure
- Compression & obstruction vital neck structures
- Deprivation of oxygenated blood to the brain

  → unconsciousness → death
- "strangled, choked, throttled, suffocated"



Types of Non-fatal strangulation

- Manual (one or two hands, forearm, choke-hold, sleeper-hold, lateral vascular neck restraint)

- Ligature

Causes of unconsciousness and death

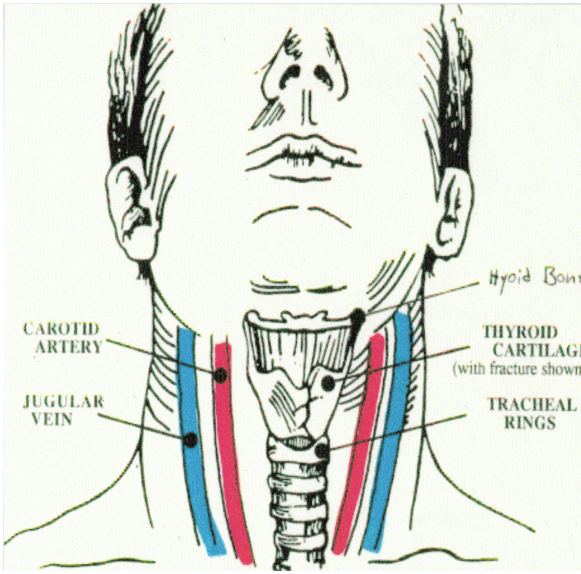
Cerebral anoxia (lack of oxygen):

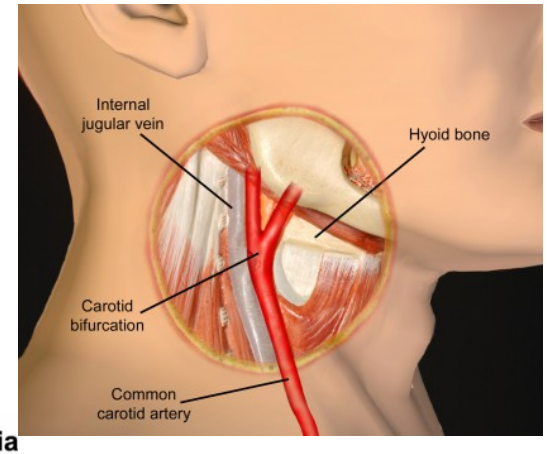
1. Occlusion of blood flow

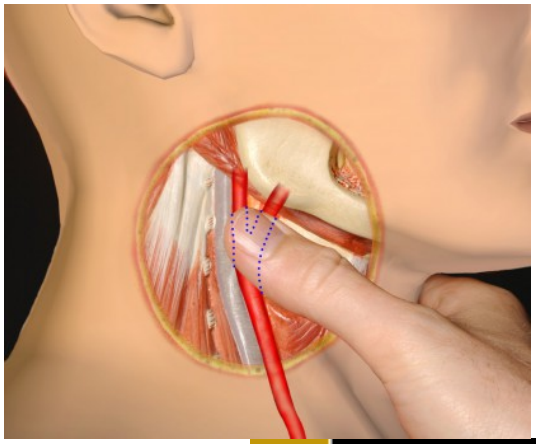
- Compression jugular veins ➡ venous congestion
- Direct compression of carotid arteries

2. Occlusion of airway

3. Stimulation of carotid sinus ➡ cardiac arrest

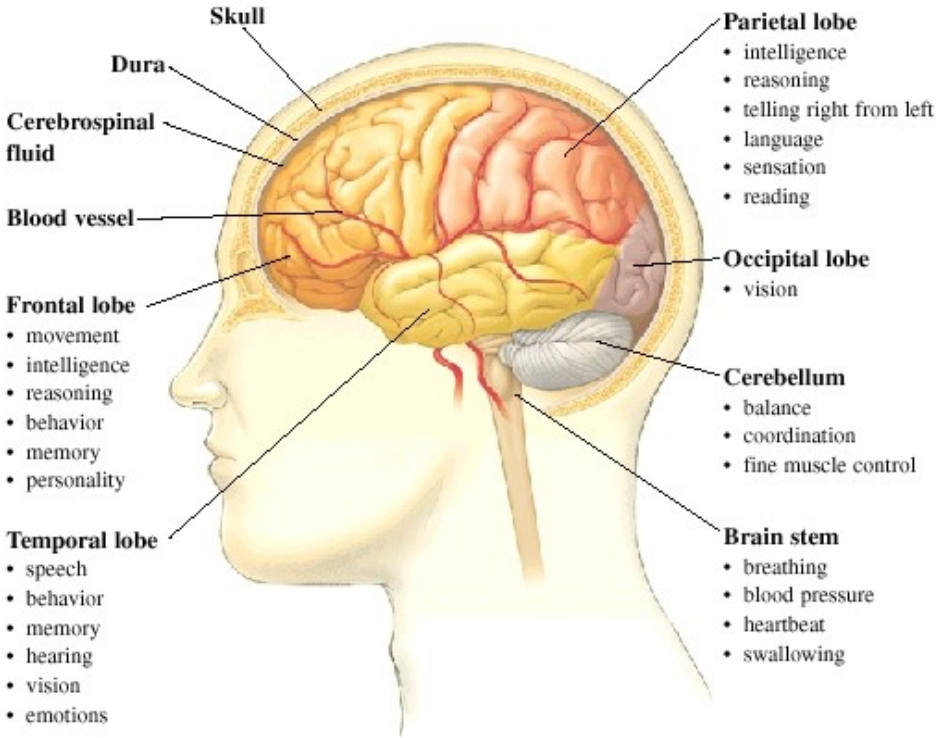






Symptoms of acute cerebral anoxic insult

- Visual changes
- Auditory changes
- Unconsciousness
- Loss of sphincter control (incontinence)
- Lack of memory
- Seizures

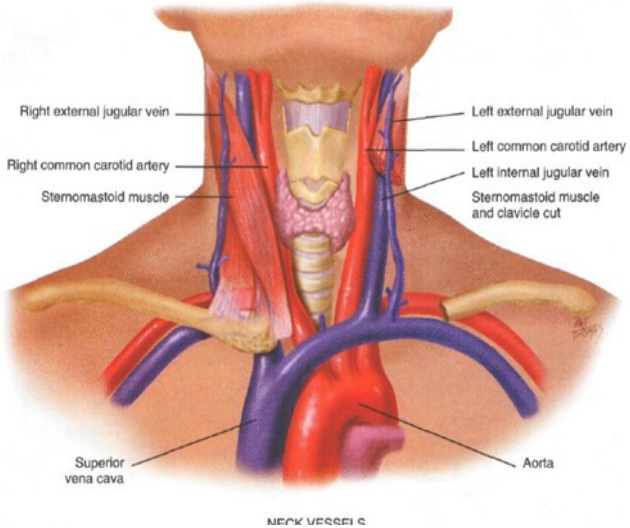


Occlusion of neck structures

1. Jugular veins – *4 psi or 207mmHg*

2. Carotid arteries – *11 psi or 569mmHg*

3. Airway occlusion – *34 psi or 1758mmHg*



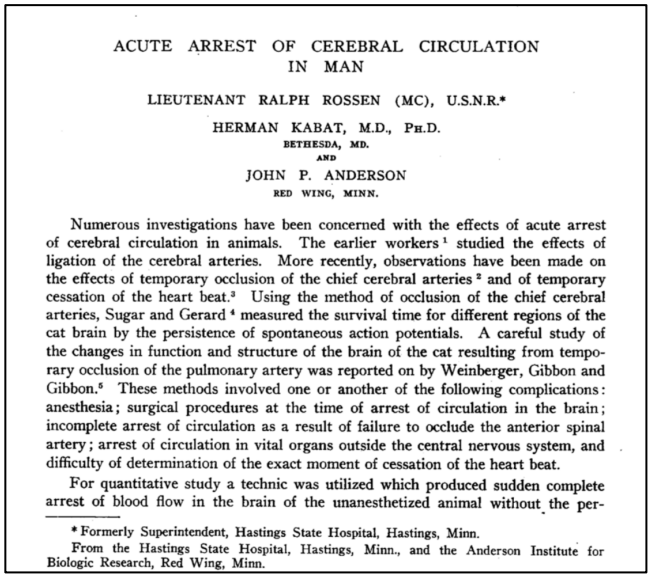
Examples of applied pressure:

- handgun trigger pull - *6 psi*
- opening of coke can – *20 psi*
- adult male hand shake – *80 to 100 psi*
- max adult male handshake – *160 to 180 psi*

Anoxic progression - limited literature:

Rossen Lieut R, Kabat H, Anderson JP, "Acute arrest of cerebral circulation in man". *Archives of Neurology & Psychiatry 1944 Vol. 50, 5.*

- 500 controlled strangulations
- 126 young male inmates
- 11 males with schizophrenia



ACUTE ARREST OF CEREBRAL CIRCULATION IN MAN

LIEUTENANT RALPH ROSSEN (MC), U.S.N.R.*
HERMAN KABAT, M.D., PH.D.
BETHESDA, MD.
AND
JOHN P. ANDERSON
RED WING, MINN.

Numerous investigations have been concerned with the effects of acute arrest of cerebral circulation in animals. The earlier workers [1] studied the effects of ligation of the cerebral arteries. More recently, observations have been made on the effects of temporary occlusion of the chief cerebral arteries [2] and of temporary cessation of the heart beat.[3] Using the method of occlusion of the chief cerebral arteries, Sugar and Gerard [4] measured the survival time for different regions of the cat brain by the persistence of spontaneous action potentials. A careful study of the changes in function and structure of the brain of the cat resulting from temporary occlusion of the pulmonary artery was reported on by Weinberger, Gibbon and Gibbon.[5] These methods involved one or another of the following complications: anesthesia; surgical procedures at the time of arrest of circulation in the brain; incomplete arrest of circulation as a result of failure to occlude the anterior spinal artery; arrest of circulation in vital organs outside the central nervous system, and difficulty of determination of the exact moment of cessation of the heart beat.

For quantitative study a technic was utilized which produced sudden complete arrest of blood flow in the brain of the unanesthetized animal without the per-

* Formerly Superintendent, Hastings State Hospital, Hastings, Minn.
From the Hastings State Hospital, Hastings, Minn., and the Anderson Institute for Biologic Research, Red Wing, Minn.

Ref 1. Rossen Lieut R, Kabat, H. & Anderson, J. Acute Arrest of Cerebral Circulation in Man. Archives Neurology and Psychiatry, 50 (5):510-528, 1944.

Anoxic progression - limited literature:

- Initial 10 secs – fixation of eyes, blurred vision, constriction of visual fields, LOC and anoxic convulsions
- Subjects could release pressure by removing finger; none did, "frozen", incapable of movement, "could not fight back".
- Unconscious 6.8 secs[1], 7-13 secs[2] (neuronal brain cell death)
- Loss bladder control 15+ secs[1], Loss bowel control 30+ secs,[1]
- Return of consciousness - dazed, confused, 'foolish smile', excitement, euphoria, no memory of what had occurred.

Ref 1. Rossen Lieut R, Kabat, H. & Anderson, J. Acute Arrest of Cerebral Circulation in Man. Archives Neurology and Psychiatry, 50 (5):510-528, 1944.
Ref 2. Sauvageau A et al. Agonal Sequences in 14 Filmed Hangings with comments on the role of the type of suspension, ischemic habituation, ethanol intoxication on timing of agonal responses. Forensic Med Pathol 32:104-107 (2011).

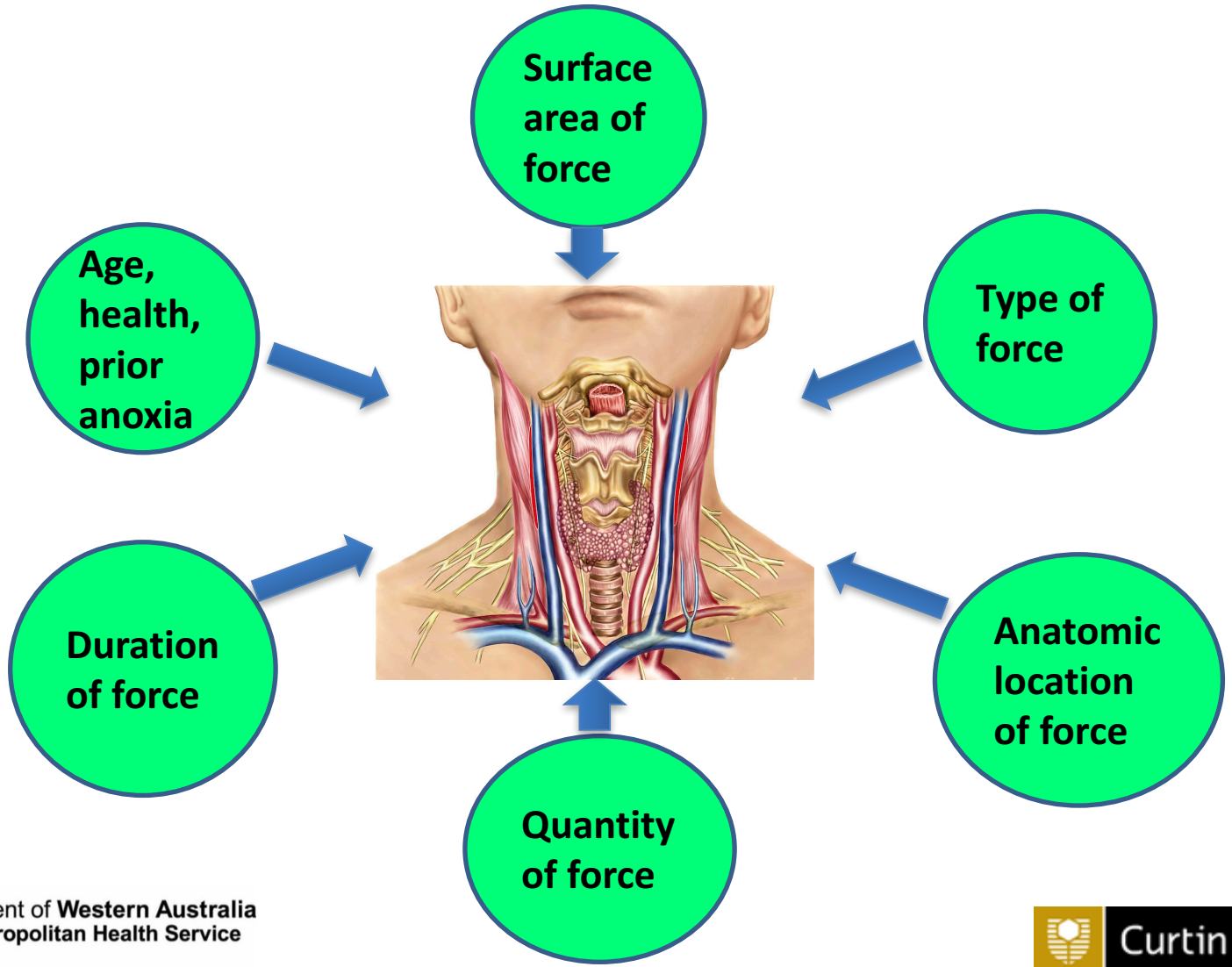
Anoxic progression - limited literature:

- No respiratory effort at 1 – 2.5 mins[2]
- Irreversible brain damage at ≥ 4 mins[3]
- Time to death not well established
- As more brain cells die, more difficult for brain to bounce back after oxygen deprivation due to strangulation

Ref 2. Sauvageau A et al. Agonal Sequences in 14 Filmed Hangings with comments on the role of the type of suspension, ischemic habituation, ethanol intoxication on timing of agonal responses. Forensic Med Pathol 32:104-107 (2011).
Ref 3. Saukko P, Knight B. *Knight's Forensic Pathology Fourth Edition*. Boca Raton, Florida, USA: CRC Press, Taylor and Francis Group; 2016.

Anoxic progression - limited literature:

- Dynamic – NFS potentially lethal force, potentially lethal outcome.



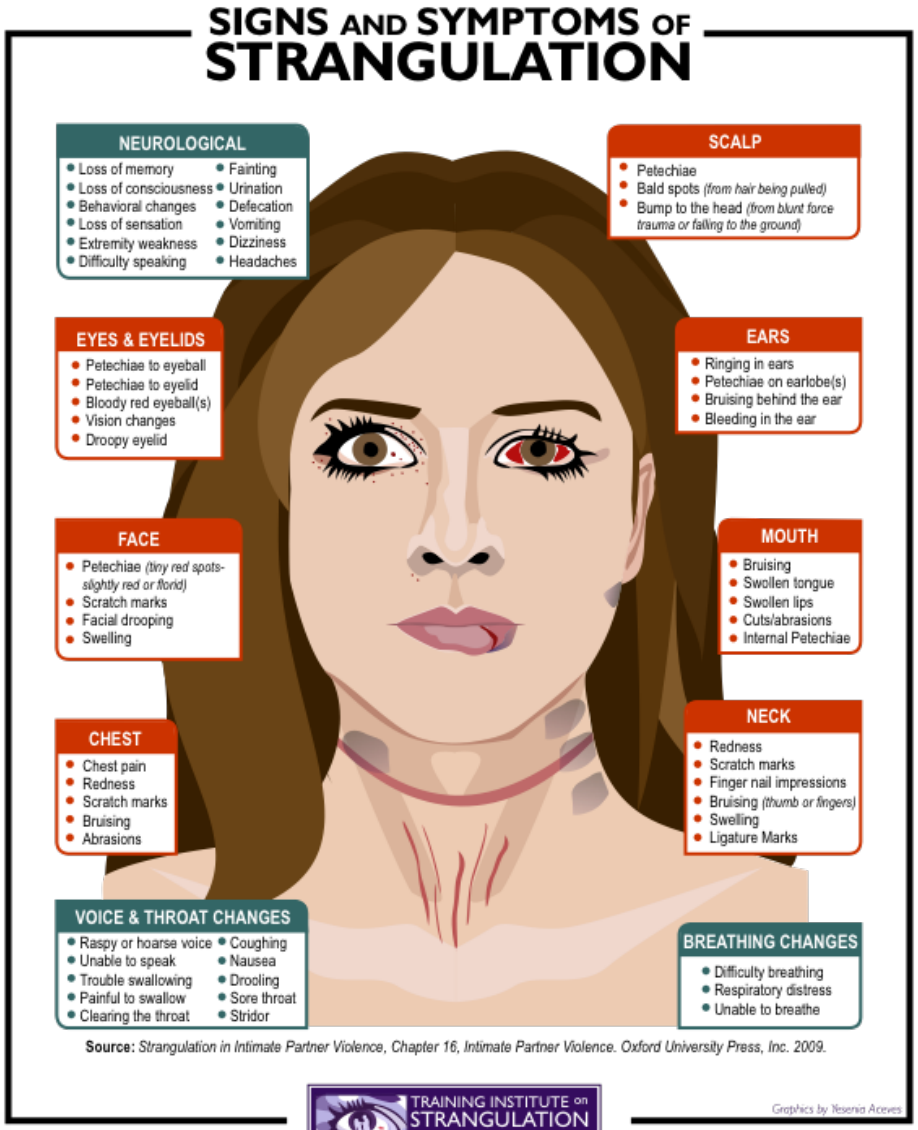
Non-fatal strangulation in intimate partner violence

- Asserting control, power of life and death over the victim.
- May indicate an ongoing pattern of abuse in the relationship. Females with IPV history, NFS prevalence 27%[4] to 68%[5]
- Can foreshadow escalating violence. Strangulation is frequently one of the last acts committed by a violent partner before homicide.

Ref 4. Glass et al 2008. 5. Wilbur et al 2013

Symptoms and Signs

- No signs in up to 50%[7]
- Non-fatal and fatal strangulation occur without any signs of visible external injury



A lack of visible external injury does not exclude non-fatal or fatal strangulation having occurred.

Ref 6, www.strangulationtraininginstitute.com
Ref 7, Strack et al, 2001.

Ref 6. SARC WA gratefully acknowledges Alliance for HOPE International for allowing us to reproduce, in part or in whole, the Signs and Symptoms of Strangulation. The document was accessed through the online Resource Library hosted by the Training Institute on Strangulation Prevention.

Medical Implications

- Physical & psychological sequelae transient/mild to severe/life threatening
- Injury to any of the neck soft tissues and structures:
  - carotid arteries with dissection, thrombosis & embolism,
  - jugular veins - thrombus
  - contusion or fracture of the larynx, hyoid bone, tracheal rings & thyroid cartilage, oedema, airway compromise, thyroid injury “storm”, vocal cord paralysis,
  - cervical spine injury
  - delayed anoxic encephalopathy, delayed cryptogenic strokes
- Increased frequency of physical and psychological symptoms (PTSD) with multiple episodes of NFS.

Medical Implications

- Physical signs may not appear for 24 to 36 hrs, risk of delayed oedema and airway compromise
- Late sequelae - aspiration pneumonia, carotid artery dissection or thrombosis, stroke, post-anoxic encephalopathy and post traumatic stress disorder
- Observation, specialty consult such as ENT/neuro review and investigations eg CT-angiogram, laryngoscopy, (LOC, incontinence, dyspnoea, facial or conjunctival petechiae, pain on swallowing, voice changes, significant soft tissue neck injury, pregnancy, intoxication, poor home observation).

Forensic Implications

- Legislative reforms with specific NFS offence - USA, Canada, New Zealand & Aust (Qld) (*Not Now, Not Ever: Putting an End to Domestic and Family Violence in Queensland)*

Forensic Implications

Jurisdiction	Legislation	Health Responses	Police Responses
Queensland	April 2016 NFS and suffocation became a separate criminal offence, max penalty 7 years jail. Offence not contingent on an intention to commit another offence, or on rendering the victim unconscious.	May be local/regional efforts to provide information and formal guidance to the health workforce regarding non-lethal strangulation. Eg Gold Coast Hospital and Health Service is reviewing how the health response to non-lethal strangulation may be incorporated into the integrated service response to DFV in their region. No consistent formal policy and practice reforms.	All states have clear operational procedures for police officers to guide responses to domestic and family violence, and most acknowledge strangulation as a risk factor for escalating levels of harm. To date no state has operational procedures specifically related to identifying, documenting and investigating strangulation in DFV cases. It is unknown if any state has an intention to develop such procedures/protocols.
New South Wales & Australia Capital Territory	Both jurisdictions define an offence if a person intentionally chokes or strangles another person so as to render the other unconscious or insensible. Requirement to render victim unconscious is unnecessarily exclusionary in many DFV prosecutions.		
Tasmania and Northern Territory	Both jurisdictions include crime of strangulation, but it is tethered to intention to commit a separate offence. Limitation to its applicability to non-lethal strangulation in cases of DFV.		
South Australia, Western Australia & Victoria	No offence specifically relates to NFS. Prosecute as general assault-related offences. Recent Royal Commission into DFV in Victoria no recommendations for reform in the area of strangulation in DFV.		

Forensic Implications

Jurisdiction	Legislation	Health Responses	Police Responses
New Zealand	April 2017 NFS - new stand alone, family violence criminal offence, maximum penalty 7 years.	Codes of practice on response to NFS for government agencies/service providers. Guidelines in place for assessment and management of NFS by health staff, discharge information and acute post-strangulation documentation form.	Resources for additional police to operationalise DFV legislative reform & NFS offence. Family violence policy guide identifying, documenting and responding to NFS in domestic and family violence situations
USA	17 states & federal jurisdiction- criminal laws specific to NFS in domestic & family violence. 25 states have laws directly addressing NFS in broader context.	Alaska, some counties eg San Diego - protocol for health staff in identifying, assessing & documenting NFS in DFV cases.	Alaska and number of counties have protocol for police in identifying, assessing and documenting cases of non-lethal strangulation in DFV cases.
Canada	NFS offence but linked to intent to render victim unconscious. Working Group on NFS determined not to create a separate offence. Recommended training health and criminal justice officers in identifying and responding to NFS.	Protocol for nurses, medical staff, crisis advocates. Training recommended for medical practitioners in documentation, investigation and prosecution of strangulation cases and best practice standards be developed.	Training to police and prosecution services recommended in investigation and prosecution of criminal offences.

Forensic Implications

- Specific NFS offence highlights safety risk
- Documentation signs & symptoms, photography, forensic sampling may assist criminal justice process
- Education to relevant services eg ED, police – screening, S&S, need for medical review, potential delayed lethality and safety implications.
- Lack of visible external injury does not exclude non-fatal or fatal strangulation having occurred.

Forensic Implications - documentation

Documentation Chart for Strangulation Cases

Symptoms and/or Internal Injury:

Breathing Changes	Voice Changes	Swallowing Changes	Behavioral Changes	OTHER
☐ Difficulty Breathing ☐ Hyperventilation ☐ Unable to breathe Other:	☐ Raspy voice ☐ Hoarse voice ☐ Coughing ☐ Unable to speak	☐ Trouble swallowing ☐ Painful to swallow ☐ Neck Pain ☐ Nausea /Vomiting ☐ Drooling	☐ Agitation ☐ Amnesia ☐ PTSD ☐ Hallucinations ☐ Combativeness	☐ Dizzy ☐ Headaches ☐ Fainted ☐ Urination ☐ Defecation

Use face & neck diagrams to mark visible injuries:

Face	Eyes & Eyelids	Nose	Ear	Mouth
☐ Red or flushed ☐ Pinpoint red spots (petechiae) ☐ Scratch marks	☐ Petechiae to **R** and/or **L** eyeball (circle one) ☐ Petechiae to **R** and/or **L** eyelid (circle one) ☐ Bloody red eyeball(s)	☐ Bloody nose ☐ Broken nose (ancillary finding) ☐ Petechiae	☐ Petechiae (external and/or ear canal) ☐ Bleeding from ear canal	☐ Bruising ☐ Swollen tongue ☐ Swollen lips ☐ Cuts/abrasions (ancillary finding)
Under Chin	**Chest**	**Shoulders**	**Neck**	**Head**
Redness ☐ Scratch marks ☐ Bruise(s) ☐ Abrasions	☐ Redness ☐ Scratch marks ☐ Bruise(s) ☐ Abrasions	☐ Redness ☐ Scratch marks ☐ Bruise(s) ☐ Abrasions	☐ Redness ☐ Scratch marks ☐ Finger nail impressions ☐ Bruise(s) ☐ Swelling ☐ Ligature mark	☐ Petechiae (on scalp) **Ancillary findings:** ☐ Hair pulled ☐ Bump ☐ Skull fracture ☐ Concussion

Questions to ASK: Method and/or Manner:

How and where was the victim strangled?

☐ One Hand (R or L) ☐ Two hands ☐ Forearm (R or L) ☐ Knee/Foot

☐ Ligature (Describe):_____

☐ How long? _____ seconds _____ minutes ☐ Also smothered?

☐ From 1 to 10, how hard was the suspect's grip? (Low): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 (high)

☐ From 1 to 10, how painful was it? (Low): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 (high)

☐ Multiple attempts:_____ ☐ Multiple methods:_____

Is the suspect **RIGHT** or **LEFT** handed? (Circle one)

What did the suspect say while he was strangling the victim, before and/or after?

Was she shaken simultaneously while being strangled? Straddled? Held against wall?

Was her head being pounded against wall, floor or ground?

What did the victim think was going to happen?

How or why did the suspect stop strangling her?

What was the suspect's demeanor?

Describe what suspect's face looked like during strangulation?

Describe Prior incidents of strangulation? Prior domestic violence? Prior threats?

MEDICAL RELEASE

To All Health Care Providers: Having been advised of my right to refuse, I hereby consent to the release of my medical/dental records related to this incident to law enforcement, the District Attorney's Office and/or the City Attorney's Office.

Signature:_____ Date:_____

© Training Institute on Strangulation Prevention: www.strangulationtraininginstitute.com

Future Safety Implications

- NFS by intimate partner is an independent predictive risk factor for future severe violence and homicide.
- >6x risk attempted homicide, 7.5x risk of homicide[4] (USA data)

The Journal of Emergency Medicine, Vol. 35, No. 3, pp. 329–335, 2008

0736-4679/08 $–see front matter

ELSEVIER

doi:10.1016/j.jemermed.2007.02.065

Violence: Recognition, Management and Prevention

NON-FATAL STRANGULATION IS AN IMPORTANT RISK FACTOR FOR HOMICIDE OF WOMEN

Nancy Glass, PHD, MPH, RN,* Kathryn Laughon, PHD, RN,† Jacquelyn Campbell, PHD, RN,* Carolyn Rebecca Block, PHD,‡ Ginger Hanson, MS,§ Phyllis W. Sharps, PHD, RN,* and Ellen Taliaferro, MD, FACEP‖

*School of Nursing, Johns Hopkins University, Baltimore, Maryland, †School of Nursing, University of Virginia, Charlottesville, Virginia, ‡Illinois Criminal Justice Information Authority, Chicago, Illinois, §School of Nursing, Oregon Health and Science University, Portland, Oregon, and ‖Health After Trauma Project, Creekside Communications, Half Moon Bay, California

Reprint Address: Nancy Glass, PHD, MPH, RN, School of Nursing, Johns Hopkins University, 525 N. Wolfe Street, Room 439, Baltimore, MD 21205

□ **Abstract—The purpose of this study was to examine non-fatal strangulation by an intimate partner as a risk factor for major assault, or attempted or completed homicide of women. A case control design was used to describe non-fatal strangulation among complete homicides and attempted homicides (n = 506) and abused controls (n = 427). Interviews of proxy respondents and survivors of attempted homicides were compared with data from abused controls. Data were derived using the Danger Assessment. Non-fatal strangulation was reported in 10% of abused controls, 45% of attempted homicides, and 43% of homicides. Prior non-fatal strangulation was associated with greater than six-fold odds (odds ratio [OR] 6.70, 95% confidence interval [CI] 3.91–11.49) of becoming an attempted homicide, and over seven-fold odds (OR 7.48, 95% CI 4.53–12.35) of becoming a completed homicide. These results show non-fatal strangulation as an important risk factor for homicide of women, underscoring the need to screen for non-fatal strangulation when assessing abused women in emergency department settings. © 2008 Elsevier Inc.**

□ **Keywords—intimate partner violence; strangulation; risk of homicide**

INTRODUCTION

The 1993 National Mortality Followback Survey of adults (22,957 decedents aged 15 years and older) shows that the percent dying from strangulation was much higher for women (11.8%) than for men (1.9%) overall and in every age group (men vs. women, respectively, 1.1% vs. 11.7% at age 18–24 years; 1.6% vs. 11.7% at age 25–39 years; 2.8% vs. 6.7% at age 40–64 years; and 7.0% vs. 33.0% at age 65 years or older). Although there is no information about the relationship of the victim and offender in the National Mortality Followback Survey, the findings provide the context to examine strangulation as a risk factor for intimate partner attempted and completed homicide of women (1).

There is little research specifically examining strangulation in the context of intimate partner violence (IPV) or homicide. The prevalence of strangulation as a form of IPV and a risk factor for attempted or completed homicide has not been established. Wilbur and colleagues in 2001 found that 68% of a convenience sample of 62 women presenting to a domestic violence advocacy pro-

Presented as a "work in progress" at the annual meeting of the Homicide Research Working Group, Ann Arbor, Michigan, in June 2004.

Points of view in this article do not necessarily represent the official position or policies of the U.S. Department of Justice.

RECEIVED: 18 February 2007;
ACCEPTED: 20 February 2007

Ref. 4. Glass N, Laughon K, Campbell J, Block CB, Hanson G, Sharps PW, Taliaferro E: Non-Fatal Strangulation is an Important Risk Factor for Homicide of Women. Violence: Recognition, Management and Prevention 35(No. 3): 329-335, 2008.

Future Safety Implications

- NFS by intimate partner in sexual assault – concurrent risk factors: forced sex, verbal threats to kill, abuse during pregnancy
- Screening for and identifying NFS is important for risk assessment & safety planning
- Communication about the level of identified risk

Future Safety Implications

NEWS

By the National Reporting Team's Dan Oakes

Updated Thu 21 Apr 2016, 10:12am

The murder of Melbourne woman Kelly Thompson, who was stabbed to death by her former partner, was preventable, the Victorian coroner has found.

Ms Thompson was killed in her Point Cook home, in Melbourne's west, by Wayne Wood in February 2014.

Wood then killed himself.

This morning Coroner Ian Gray found police made critical errors in the lead-up to Ms Thompson's death.

They included not noting Wood had tried to strangle Ms Thompson a month before her murder, and not sending a car to her house when her neighbour called police on the night of her death to say Wood was in the house.

Coroner Gray made six recommendations as part of his finding, including:

- Better information-sharing between Victoria Police, the courts and family violence services.
- That the victims of family violence be informed by police when the perpetrator is not charged for breaching the intervention order.

Wood killed Ms Thompson after months of threats and violence against her.

PHOTO: The coroner found police made critical errors in the lead up to Ms Thompson's death. (Supplied)

RELATED STORY: Constable failed to act upon neighbour's call on night of Kelly Thompson's murder, inquest hears

RELATED STORY: Police 'did not check' details of intervention order before woman's murder, inquest told

RELATED STORY: Kelly Thompson inquest: Man who murdered former partner flagged killing in advance

MAP: Point Cook 3030

Prevalence

- **Fatal** Strangulation or suffocation 2002 to 2012 (Aust) cause of death in

  - 8% of *all* homicides

  - 14% of *all intimate partner* homicides (75% of victims female)[8]

- Past history of NFS in 43% of completed homicides by intimate partner[4]

Ref 4. Glass et al 2008. Ref 8. Aust.Inst Criminology, national homicide monitoring program. 2015.

Prevalence - NFS

- North America/Europe data
  - NFS by intimate partner: lifetime prevalence 3.0% - 9.7%[9]
  - Females with IPV history, NFS prevalence 27%[4] to 68%[5]
- No Australian data on NFS prevalence

Ref 4. Glass et al 2008. Ref 5. Wilbur et al 2013. Ref 9. Sorenson et al 2014.

SARC study

- Cross-sectional study, Jan 2009 – Mar 2015

Contents lists available at ScienceDirect

Journal of Forensic and Legal Medicine

journal homepage: www.elsevier.com/locate/jflm

Research paper

Non-fatal strangulation in sexual assault: A study of clinical and assault characteristics highlighting the role of intimate partner violence

Renate R. Zilkens [a], Maureen A. Phillips [a, b], Maire C. Kelly [b], S. Aqif Mukhtar [a], James B. Semmens [a], Debbie A. Smith [b, *]

[a] Centre for Population Health Research, Faculty of Health Sciences, Curtin University, Perth, Western Australia, Australia
[b] Sexual Assault Resource Centre, King Edward Memorial Hospital, Subiaco, Western Australia, Australia

ARTICLE INFO

Article history:
Received 16 March 2016
Received in revised form
22 June 2016
Accepted 22 June 2016
Available online 24 June 2016

Keywords:
Non-fatal strangulation
Sexual assault
Intimate partner violence
Domestic violence
Forensic medicine

ABSTRACT

Objective: To describe the prevalence, risk factors, signs and symptoms of non-fatal strangulation (NFS) in women referred to a Sexual Assault Resource Centre (SARC) following recent sexual assault.
Methods: A cross-sectional study using data routinely collected at time of forensic examination of women (age ≥ 13 years) referred to the Western Australian SARC between Jan-2009 and Mar-2015 alleging a recent sexual assault. Data on demographics, assault characteristics and forensic findings were available.
Results: A total of 1064 women were included in the study; 79 (7.4%) alleged NFS during the sexual assault. The prevalence of NFS varied significantly by age-group and assailant type. Of women aged 30–39 years 15.1% gave a history of NFS compared to less than 8.2% in all other age groups. Of women assaulted by an intimate partner, 22.5% gave a history of NFS compared to less than 6% of women assaulted by other assailant types. Of all sexual assaults with NFS, intimate partners were the assailant in 58.2% of cases, whereas in sexual assault cases without NFS, intimate partners were the assailant in 15.9% of cases. Odds of NFS were 8.4 times higher in women sexually assaulted by an intimate partner compared to women assaulted by an acquaintance/friend and 4.9 times higher compared to women assaulted by a stranger. When considering both age and assailant type the highest proportion of NFS (33.9%) was in women aged 30–39 years sexually assaulted by an intimate partner. Other factors associated with NFS during sexual assault included deprivation of liberty, verbal threats, being assaulted in the woman's home and use of additional blunt force. External physical signs of NFS were absent in 49.4% of all NFS sexual assault cases.
Conclusions: This study identifies and quantifies NFS risk factors in female sexual assault and highlights the strong association with intimate partner sexual assault. Greater awareness of NFS in sexual assault should lead to improvement in medical screening, forensic management and safety risk assessment by sexual assault and domestic violence services, emergency departments and police.

1. Introduction

Strangulation is a form of mechanical asphyxia caused by direct pressure on the neck by one or two hands (manual strangulation), a constricting band (ligature strangulation) or arm (sleeperhold or chokehold).[1,2] It may result in obstruction of the great veins and carotid arteries, stimulation of carotid sinus baroreceptors and airway obstruction.[1,2] Injuries sustained depend on force, duration and method and death may result.[3,4] Non-fatal strangulation (NFS) refers to those surviving an episode of strangulation.

The clinical and forensic importance of NFS has been under-recognised.[5,6] European and North American lifetime prevalence for NFS by an intimate partner is estimated to range from 3.0% to

* Corresponding author. Sexual Assault Resource Centre, PO Box 842, Subiaco, Western Australia, 6904, Australia.
E-mail addresses: r.zilkens@curtin.edu.au (R.R. Zilkens), Maureen.Phillips@health.wa.gov.au (M.A. Phillips), Maire.Kelly@health.wa.gov.au (M.C. Kelly), Aqif.Mukhtar@curtin.edu.au (S.A. Mukhtar), James.Semmens@curtin.edu.au (J.B. Semmens), Debbie.Smith@health.wa.gov.au (D.A. Smith).

http://dx.doi.org/10.1016/j.jflm.2016.06.005
1752-928X/

Government of Western Australia
North Metropolitan Health Service

Curtin University

Aims

- Prevalence of NFS in sexual assault
- Risk factors for NFS
  - patient demographics
  - assault characteristics
- Clinical features
  - signs
  - symptoms

Methods

- NFS: manual (hands, chokehold/sleeperhold) & ligature
- Standard SARC sexual assault examination protocol
- Treating clinician entered history & examination data into SARC medical forensic clinical information system
- Specific signs & symptoms related to NFS extracted by clinician chart review

Selection of Study Participants

Total population of women ≥13yrs referred to SARC following alleged recent sexual assault between Jan 2009 & Mar 2016

N = 1755

Excluded from Study (n = 691)

- No consent for research (n=95)
- Solely indecent assault (n=35)
- Time to examination > 10 days (n=70)
- No memory of assailant type (n=101)
- No consent for physical exam (n=373)
- Report deemed fallacious (n=17)

Included in Study

(**n = 1064**)

Results

Total Study Participants

(n = 1064)

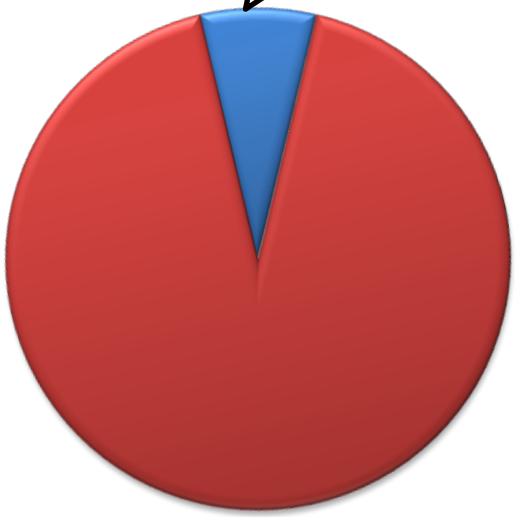
Non Fatal Strangulation NO

(n = 985)

Non Fatal Strangulation YES

(n = 79)

Prevalence of NFS in Sexual Assault 7.4%



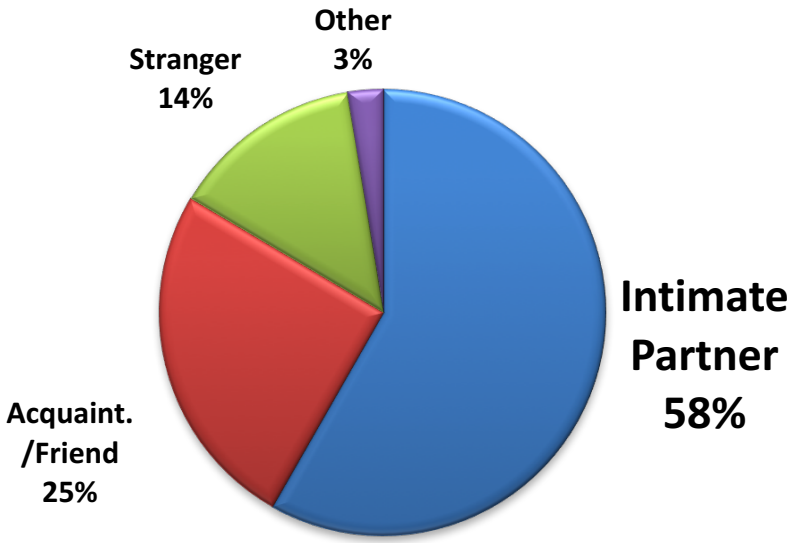
Results

Demographic & Assault Characteristics Associated with NFS in Sexual Assault

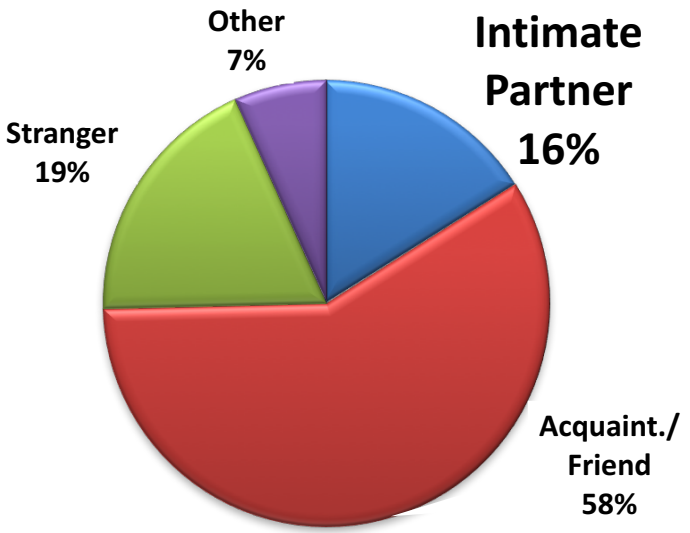
- Type of assailant
- Age of patient
- Deprivation of liberty
- Verbal threats
- Blunt force
- Assault location (patient's home)

Results NFS & Assailant Types

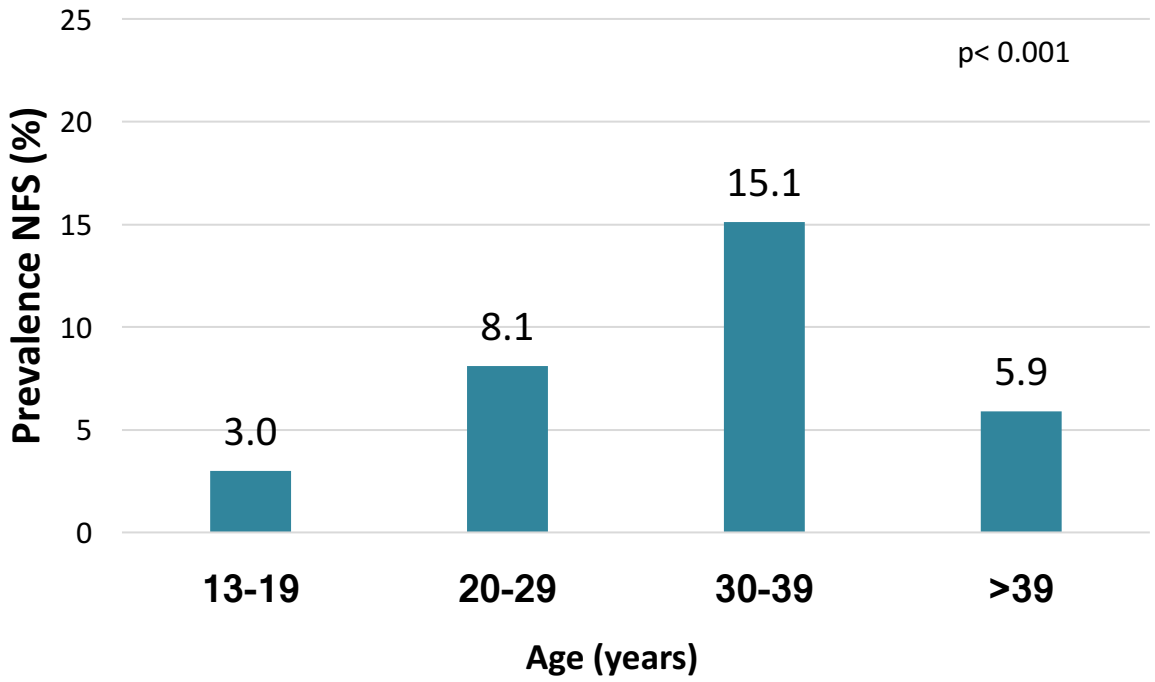
NFS Present (n=79)



NFS Absent (n= 985)

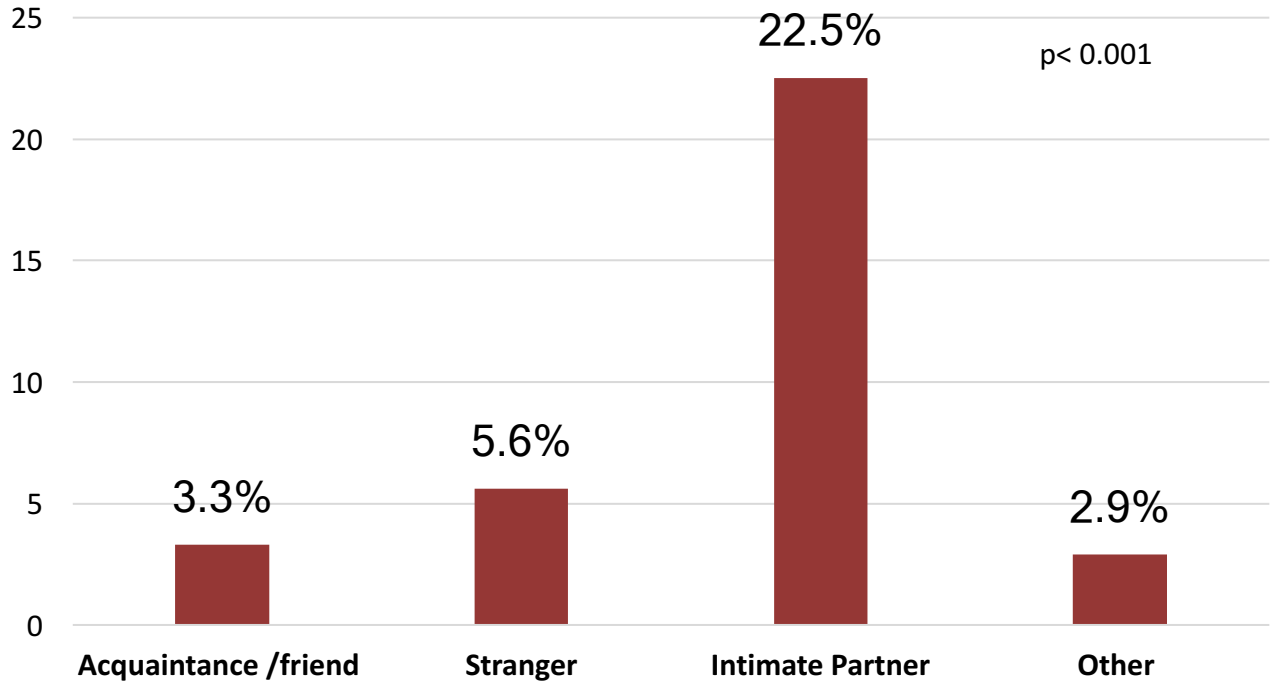


Results Prevalence of NFS by Patient's Age



p = p-value for chi-square test for independence

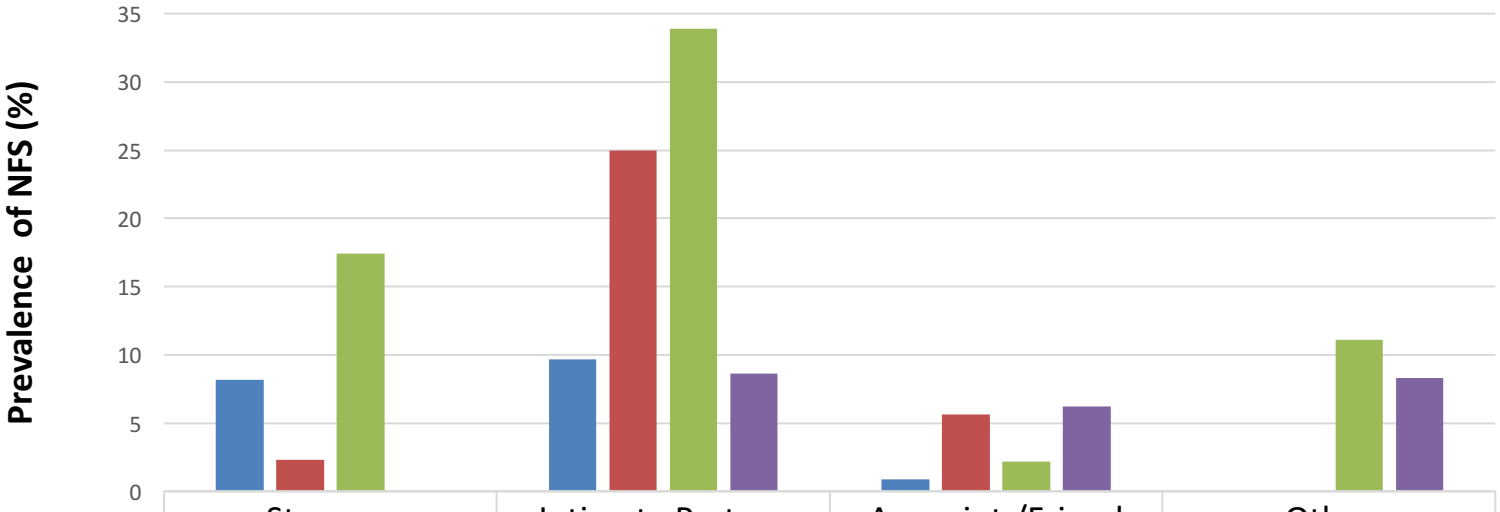
Results Prevalence of NFS by Assailant Type



p = p-value for chi-square test for independence

- NFS in close to ¼ (23%) of all intimate partner sexual assaults(46/204)
- Odds of NFS - 8.4x more likely if sexual assault by IP vs acquaintance
- Odds of NFS - 4.9x more likely if sexual assault by IP vs stranger

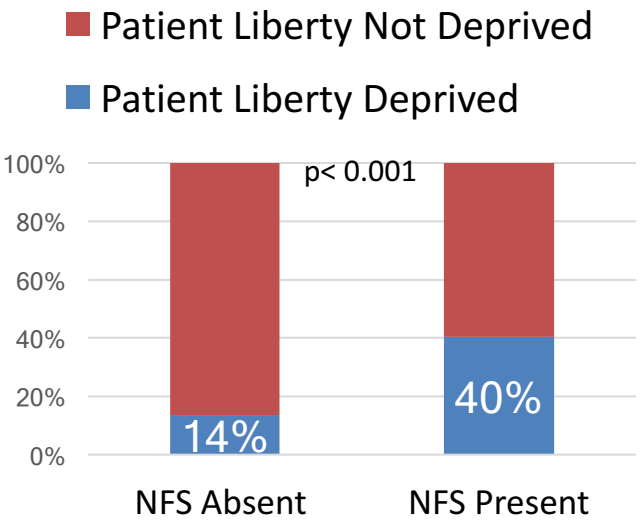
Results Prevalence of NFS Stratified by Age & Assailant Type

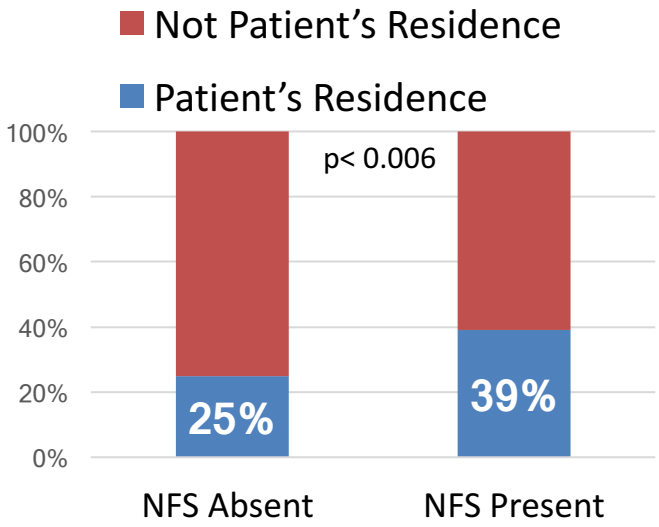


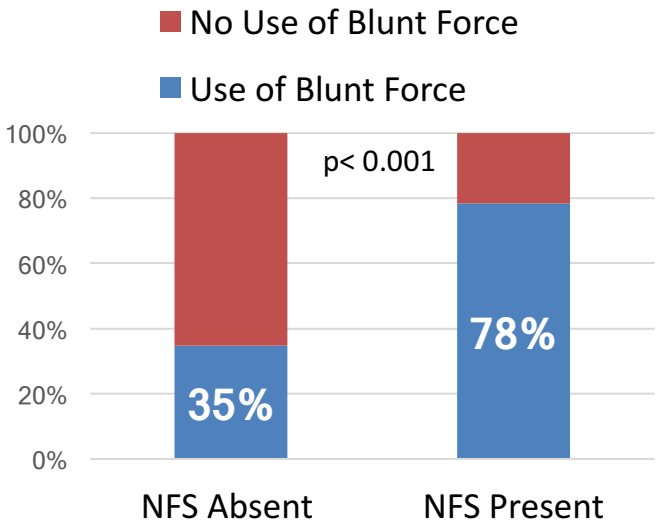
	Stranger	Intimate Partner	Acquaint./Friend	Other
13-19	8.2	9.7	0.9	0.0
20-29	2.3	25.0	5.6	0.0
30-39	17.4	33.9	2.2	11.1
>39	0.0	8.6	6.2	8.3

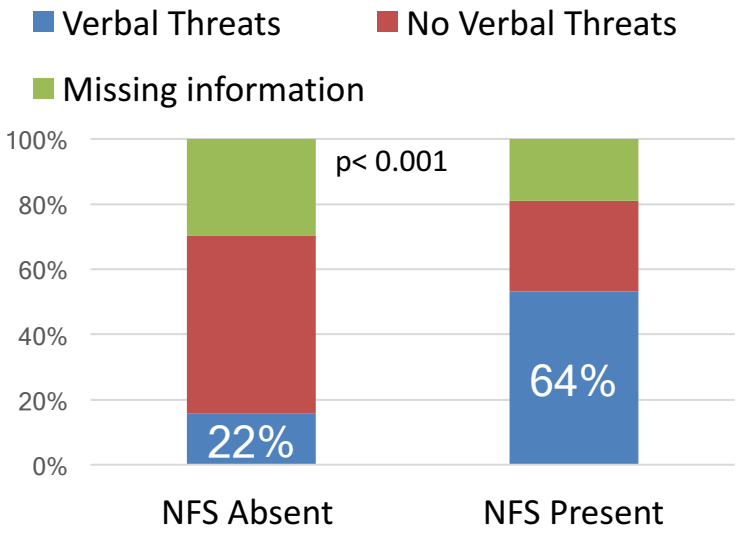
Results

Other factors associated with NFS



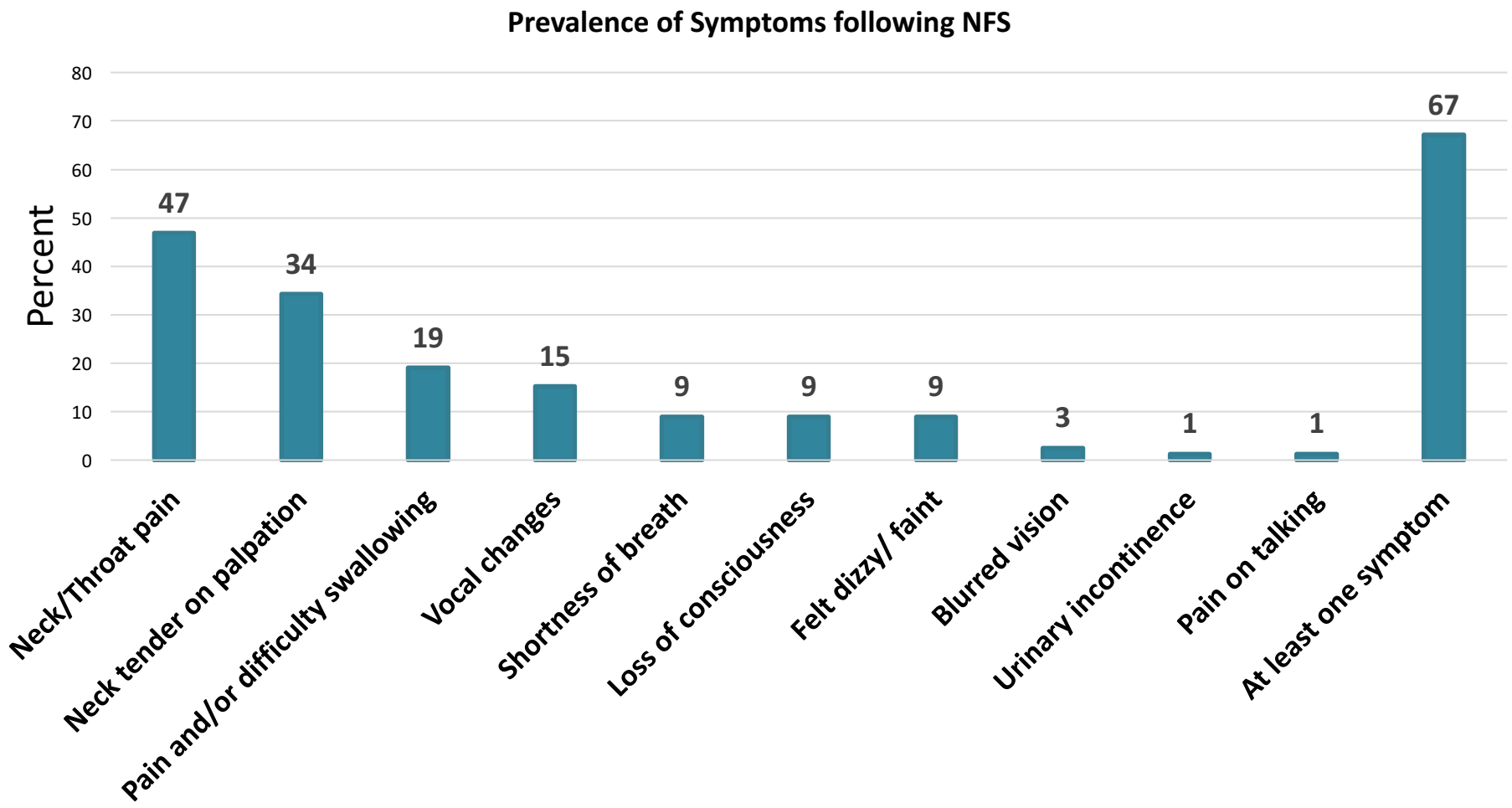




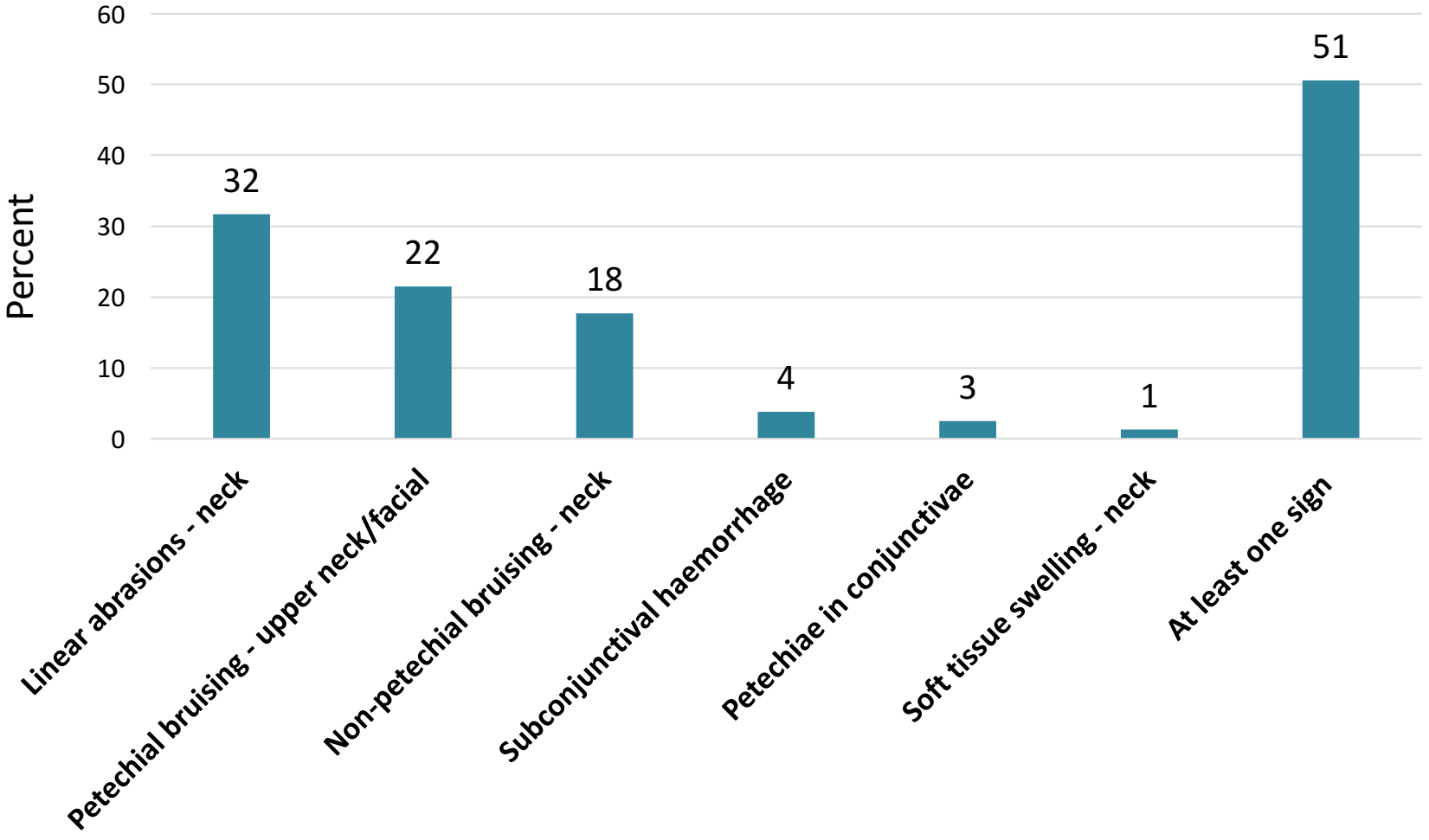


p = p-value for chi-square test for independence

Results Symptoms in NFS



Results Signs in NFS



Key Findings

- Prevalence NFS in sexual assault 7.4%
- Close to a quarter (23%) of all sexual assaults by an intimate partner involved NFS.
- Highest risk of NFS was in 30-39 yr olds, sexually assaulted by intimate partner (1 in 3 assaults included NFS).
- Risk factors for NFS: age, assailant type, deprivation of liberty, verbal threats, additional blunt force, location woman's own home
- External physical signs absent in 49%

Considerations for translation of SARC study into clinical practice

- Screen for NFS in sexual assaults – triage, police
- Checklist for symptoms & signs
- Take home patient info sheet if discharged
- Identifying NFS as “red flag” important for risk assessment & safety planning, homicide prevention
- NFS in WA – criminal justice outcomes and ?law reform

Further study

- Studies small sample sizes, unrepresentative populations, little Australian data,
- Need for further studies to develop evidence based approaches and consistent medical assessment and screening protocols.
- Morbidity and mortality follow-up, stroke and NFS,
- NFS in WA and criminal justice outcomes
- NFS requires coordinated medical, forensic, police, legal and safety response.

Future?

Bio-markers of ischemic brain injury/damage

Still in infancy

- Phosphorylated neurofilament H
- S100B protein
- Neuron-specific enolase (NSE)
- Brain specific creatine kinase
- Brain lactate

Summary

Broad international consensus NFS in domestic and family violence ;

- Serious act violence, physical & psychological sequelae,
- May have few or no physical signs,
- Indicator of increasing severity of DFV,
- Significant risk factor for future homicide.

Research and policy response;

- Legislative reform (aim of improving justice response, also raised awareness, identification, treatment of health needs, risk assessment and better forensic responses).
- Coordinated response – medical, forensic, legal, safety

References

1. Rossen Lieut R, Kabat, H. & Anderson, J. Acute Arrest of Cerebral Circulation in Man. Archives Neurology and Psychiatry, 50 (5):510-528, 1944.
2. Sauvageau A et al. Agonal Sequences in 14 Filmed Hangings with comments on the role of the type of suspension, ischemic habituation, ethanol intoxication on timing of agonal responses. Forensic Med Pathol 32:104-107 (2011).
3. Saukko P, Knight B. *Knight's Forensic Pathology Fourth Edition*. Boca Raton, Florida, USA: CRC Press, Taylor and Francis Group; 2016.
4. Glass N, Laughon K, Campbell J, Block CB, Hanson G, Sharps PW, Taliaferro E: Non-Fatal Strangulation is an Important Risk Factor for Homicide of Women. Violence: Recognition, Management and Prevention 35(No,. 3): 329-335, 2008.
5. Wilbur L, Higley M, Hatfield J, Surprenant Z, Taliaferro E, Smith DJ, Paolo A: Survey Results of Women Who Have Been Strangled While in an Abusive Relationship. J Emergency Med 21(3):297-302, Oct. 2001Green, W.M. (2013).
6. Signs and Symptoms of Strangulation. The document was accessed through the online Resource Library hosted by the Training Institute on Strangulation Prevention https://www.strangulationtraininginstitute.com/

References

7. Strack GB, McClane GE, Hawley D. A review of 300 attempted strangulation cases. Part I: criminal legal issues. *J Emerg Med* 2001;**21**(3):303-9.
8. http://www.aic.gov.au/publications/current Domestic/family homicide in Australia Research in practice no. 38, Cussen & Bryant ISSN 1836-9111 Canberra: Aust Inst Criminology, May 2015
9. Sorenson, S. B., Joshi, M., & Sivitz, E. (2014). A Systematic Review of the Epidemiology of Nonfatal Strangulation, a Human Rights and Health Concern. 104(11), e54-e61. DOI: 10.2105/AJPH.2014.302191

Acknowledgements

1. Doctors at SARC WA
2. Ms Rae Cummins Administrative Assistant, SARC Medical Forensic Service
3. Staff at the Centre for Population Health Research, Curtin University
4. Lotterywest WA

Government of Western Australia
North Metropolitan Health Service

lotterywest

Curtin University

Thank You

Any questions?

Debbie.Smith@health.wa.gov.au

Government of Western Australia
North Metropolitan Health Service
SARC SEXUAL ASSAULT RESOURCE CENTRE
lotterywest
Curtin University