

Original Paper

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Author for correspondence:

M. Perry, E-mail: Malorie.Perry@wales.nhs.uk

Need for improved public health protection of young people wanting body piercing: evidence from a look-back exercise at a piercing and tattooing premises with poor hygiene practices, Wales (UK) 2015

M. Perry¹, H. Lewis², D. Rh. Thomas¹, B. Mason¹ and G. Richardson³

¹Communicable Disease Surveillance Centre, Public Health Wales, Cardiff, Wales, UK; ²South East Wales Health Protection Team, Public Health Wales, Pontypool, Wales, UK and ³Aneurin Bevan University Health Board, Newport, Wales, UK

Abstract

Following a cluster of serious pseudomonas skin infections linked to a body piercing and tattooing premises, a look-back exercise was carried out to offer clients a screen for blood-borne viruses. Of those attending for screening 72% (581/809) had a piercing procedure in the premises of interest: 94 (16%) were under 16 years of age at the time of screening. The most common site of piercing was ear (34%), followed by nose (27%), nipple (21%) and navel (21%). A small number (<5) tested positive for hepatitis B and C, with no evidence this was linked to the premises. However, 36% (211/581) of clients reported a skin infection associated with their piercing. Using data from client forms, 36% provided a false age. Those aged under 16 years (OR 4.5, 95% CI 2.7–7.7) and those receiving a piercing at an intimate site (OR 2.1, 95% CI 1.3–3.6) were more likely to provide a false age. The findings from this exercise were used to support the drafting of the Public Health (Wales) Bill which proposed better regulation of piercing premises and the need to provide proof of being 18 years of age or over before having a piercing of an intimate site.

Introduction

Although body piercing has historically been associated with risk-taking behaviour it has become a common form of body modification in individuals from a variety of social backgrounds [1–4]. A 2008 survey estimated that 10% of the population of England aged 16 and over have at least one body piercing, with nearly 50% of women aged 16–24 having had a piercing at a site other than earlobe [5]. Reasons for adolescents wanting body piercing include uniqueness, self-expression, fashion, curiosity and aesthetic reasons [2, 6–8].

The relationship between body piercing and the transmission of blood-borne viruses is unclear, although a theoretical risk exists. It is a requirement in the UK to wait 4 months after having a body piercing before donating blood and additional checks are undertaken for potential donors having received a body piercing in the previous 4–12 months [9]. There is evidence of an association between body piercing and the transmission of hepatitis B and C [10, 11], although quantifying this risk is difficult as those that choose to have body piercings and tattoos often have other risk factors for blood-borne viruses [1, 12, 13]. The potential for transmission of HIV through body piercing is also poorly understood, although a possible case linked to body piercing has been documented [14]. Hepatitis B outbreaks had previously been associated with tattooing before stricter legislation was introduced [15].

In November 2014, several individuals with serious pseudomonas skin infections were admitted to the Royal Gwent Hospital in Newport, South Wales. There were no other links between the cases other than all having received a piercing procedure at the same premises. Environmental Health Officers identified deficiencies in infection control and swabs from two ultrasonic water baths and a washbasin in the treatment area at the premises were found to be positive for *Pseudomonas aeruginosa*. Following a risk assessment where the UK Advisory Panel for Healthcare Workers Infected with Bloodborne Viruses (UKAP) [16] were consulted, it was agreed to undertake a look-back exercise to offer clients of the premises a test for hepatitis B, hepatitis C and HIV.

Here we characterise a cohort attending a body piercing and tattooing premises in South Wales and assess their health risks. We further investigated age fabrication in younger clients to assess possible barriers to age-based consent, to inform the drafting of legislation to prohibit piercing of intimate body sites in those under 18 years of age.

Methods

Identifying clients at risk

Consent forms were obtained from the piercing and tattooing premises for clients attending the premises between August 2013 and February 2015. These records were entered into an Excel spreadsheet and dates of birth, full names and addresses were checked against the Welsh Demographic Service (WDS) online database and Welsh Patient Administration System (PAS) held by Aneurin Bevan University Health Board. As part of the look-back exercise, client records were assigned a green/amber/red 'index of certainty' as a measure of confidence in the validity of the clients' personal details obtained from the original consent form held by the piercing and tattooing premises. Records were assigned as 'green' where there was a match with the client list on full name, address and DOB (excluding year) in WDS, Welsh PAS or both. This was done manually to account for abbreviated or alternative spellings of names. Client records with no potential matches in the Welsh PAS or WDS were assigned as 'red' indicating a lack of confidence in the client record. The remaining 'amber' client records were examined in more detail and re-classified manually as 'red' or 'green' on a case-by-case basis. All 'green' clients were cross-checked with the clients' general practice to obtain the most up to date address

and ensure there was no clinical or ethical reason why the client should not be contacted. The validated clients resident in Wales were sent a letter inviting them to attend for a blood-borne virus screen. Where the client was under 16 years of age the letter was addressed to a parent/guardian. Social services also looked through the list so that any clients in their care could have their letter delivered by their key social worker. There was a press release and social media activity, asking people to call a helpline if they had attended the premises of interest even if they had not received a letter, as it was considered unlikely that the client list was exhaustive (Fig. 1) [17].

Prevalence of blood-borne virus

Clients were tested for hepatitis B surface antigen, hepatitis B core antibody, hepatitis C antibody and HIV antibody in an initial blood screen using Architect assay. If the test was confirmed reactive, a further blood test was completed using a combination of enzyme-linked immunosorbent assay and PCR methods to confirm the result. Clients who had a recent procedure at the premises were invited to return at 6 months post exposure to be tested for hepatitis B.

A questionnaire was completed for clients attending for screening by the nurse taking the blood sample. The

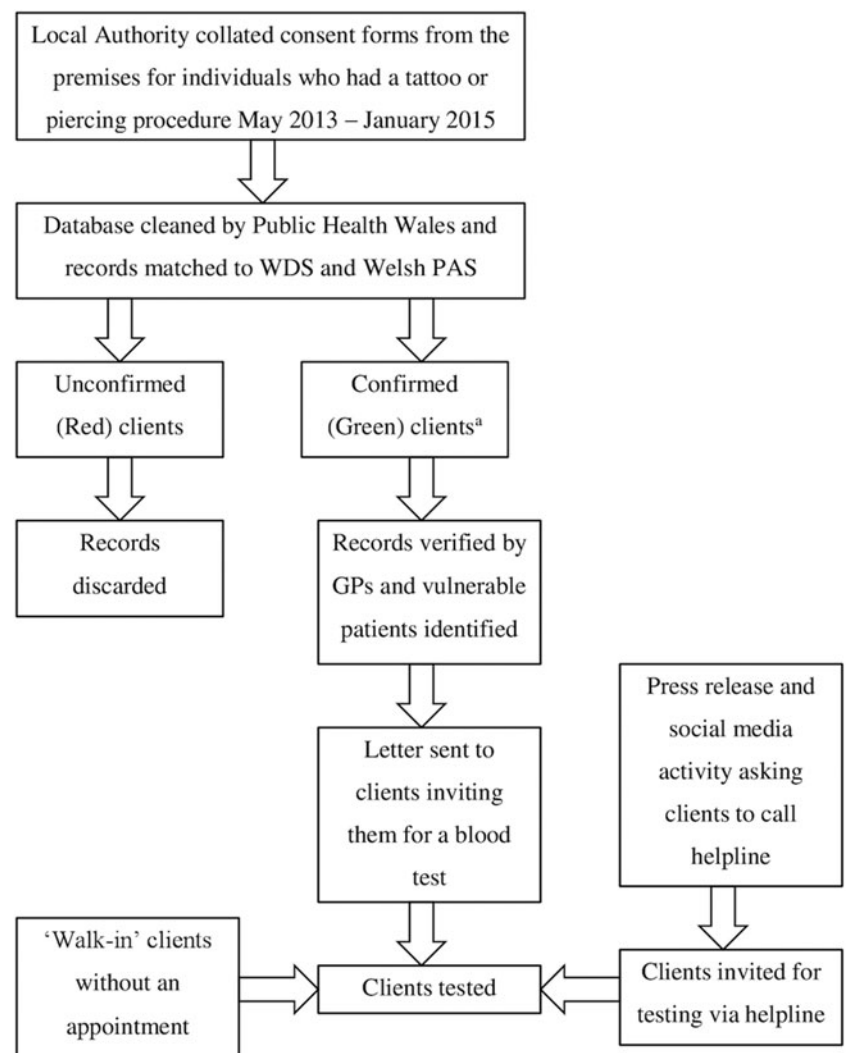


Fig. 1. Processes for identifying clients who had attended a piercing premises with insufficient hygiene practices in South Wales; 2013–2015. ^aAnalysis of age fabrication was completed using these data.

questionnaire included: 'source of appointment', 'history of testing' for these three blood-borne viruses and whether or not they have been immunised for hepatitis B. Additional questions on risk factors associated with blood-borne viruses were also asked.

Skin infections associated with piercing

Clients attending for screening were asked to provide a full history of anybody piercing or tattooing procedures in the past 2 years, including 'date of procedure', 'premises location' and for body piercing, 'where on the body the piercing was located'. This was followed by the questions 'Have you had any skin infection following this [piercing/tattoo]?', 'If yes, did you contact your GP regarding this complaint?', and 'If yes, what did your GP advise?'. Questionnaires were entered into an Epidata (Odense Denmark, EpiData Association) database by two analysts. Differences between the proportion of under 18-year olds and those aged 18 years and over who reported visiting a healthcare professional following infection of their body piercing were compared using a two-sample test for differences between proportions.

Analysis of age fabrication

Data on self-reported age were available from the consent forms collected from the piercing/tattoo premises. The true age of the validated clients was calculated by subtracting true date of birth as recorded in WDS from date of the first recorded visit. The difference between true age and self-reported age at first recorded visit was described. Multivariate logistic regression was performed to determine the influence of age, gender and type of piercing (intimate or non-intimate) on the odds of providing a false age. For the purpose of this analysis, intimate piercing was defined as anus, breast (including the nipple and areola), buttock, natal cleft, penis (including the foreskin), perineum, pubic mound, scrotum, tongue or vulva. All sites are considered intimate, irrespective of gender. All calculations were carried out in Stata 13 (StataCorp LP, College Station, TX).

Ethics

Information in this paper was collected as part of an acute response to a serious public health incident. Research ethics approval was therefore not required.

Results

Description of clients at risk

In total, 1080 clients were identified who had attended the premises of interest for a piercing or tattooing procedure between August 2013 and February 2015. Six hundred and eighty-one (63%) of these were identified following validation of client records, 14 miscellaneous records were added at a later date including four individuals known to the local health protection team prior to the exercise and 333 (31%) were referred following a call to the Public Health Wales (PHW) helpline. Forty-four clients attended a screening session without an invite and source of referral was unknown for eight clients (Table 1).

In total, 809 (75%) clients attended for blood-borne virus screening (Table 1). Seventy-two per cent (581/809) of those attending for screening reported a piercing procedure at the

Table 1. Source of referral for known clients, and the proportion of those who attended for BBV screening, following a look-back exercise at a tattoo and piercing premises with insufficient hygiene practices in South Wales, 2015

Source of referral	Individuals known to health board	Number of those who attended for screening	
Invitation letter based on validated client records ^a	695	484	70%
Referred by PHW helpline	333	273	82%
Self-referred (walk-in)	44	44	-
Not known	8	8	-
Total	1080	809	75%

^aIncludes individuals who did not have a client record but were known to the local authority through a previous complaint.

premises of interest. Twenty-six per cent (210) had a tattoo at the premises but no piercing and piercing or tattoo was not recorded for 18 clients (2%) attending for screening. Of the 581 clients who had a body piercing, 511 (88%) were female, 69 (12%) male and gender was unknown for one client. The age of clients ranged from 2 to 52 years. In total, at the time of screening for those who had a body piercing, 94 clients (16%) were under 16 years of age, 264 (45%) were 16 or 17 years of age, 173 (30%) were between 18 and 25 years of age and 48 (8%) were over 25 years of age. Age at time of screening was unknown for two clients. The most common site of piercing was ear (34%), followed by nose (27%), nipple (21%) and navel (21%) (Fig. 2).

Prevalence of blood-borne viruses

Of those with history of a piercing procedure at the premises five individuals tested positive for hepatitis B core antibody (0.9%, 95% CI 0.3–2.0) one of which was also surface antigen positive (0.2%, 95% CI 0.004–1.0), three clients tested positive for hepatitis C (0.5%, 95% CI 0.1–1.5) and no individuals tested positive for HIV.

Incidence of self-reported skin infection

Of the 579 individuals who answered the question on infection following their piercing procedure, 210 reported a subsequent skin infection, 36.3% (95% CI 32.3–40.3). The proportion of individuals reporting skin infection varied by age group, 28% of those under 16 at the time of screening reported a skin infection following their piercing compared to 38% of those age 16 years and over. Nineteen per cent 40/210 of those with self-reported infection, reported visiting a healthcare professional. Clients aged under 16 years at the time of screening were significantly less likely to seek medical attention following a skin infection (4% compared with 21% of those aged 16 years and over, $P=0.04$) (Fig. 3). The type of infection varied from mild irritation to severe hospitalisation. Including the cases that led to the look-back exercise, there were nine hospital admissions in total. All needed incision and drainage and some needed reconstructive surgery. The minimum stay in hospital was three nights and three cases were in hospital for more than ten nights. Seven of the nine cases (78%) were under 18 years of age, seven (78%) had severe infections following an ear cartilage piercing, one (11%) a cheek piercing and one (11%) a nipple piercing.

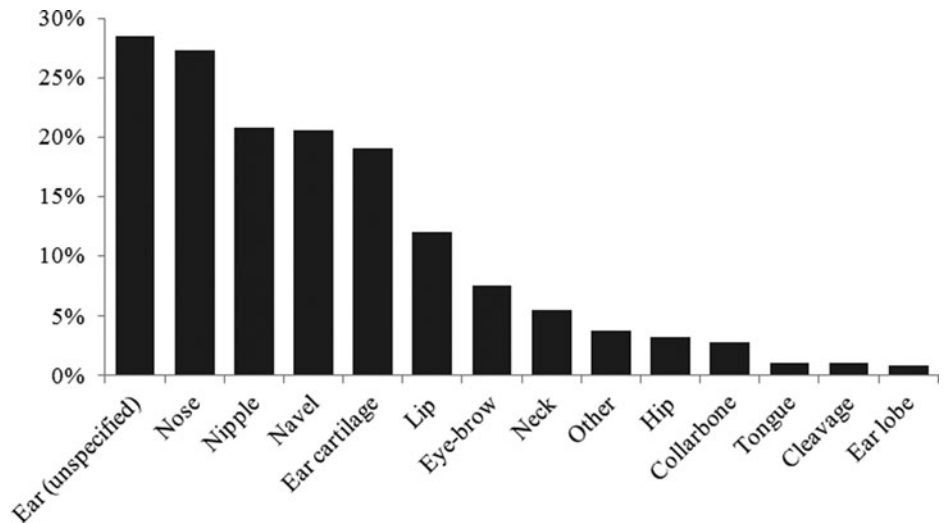


Fig. 2. Frequency of piercing sites in clients who attended a tattoo and piercing premises with insufficient hygiene practices in South Wales; 2015. ^aOther = Cheek, wrists, rib, back, genital, gum, under eye.

Age fabrication

In total, there were 681 individuals identified and validated from client records. Information on piercing procedure at first recorded visit was available for 409/681 (59%). Gender was known for all 409 individuals, 87% (354/409) were female. Information on age at first visit was available for 288 individuals. The modal and median age at first recorded visit was 16 years. Age ranged from 10 to 46 years. In those where age at first visit was known, 77% (221/288) were under 18.

Data on true age at first visit, age given at first recorded visit, gender and piercing site were available for 287 clients. In total, 184/287 (64%) clients gave their correct age at their first recorded visit for a piercing procedure. The proportion of individuals providing a false age varied by age group, 73% (35/48) of 15-year olds provided a false age. In the univariate analysis, individuals were more likely to provide a false age if they had an intimate piercing (OR 2.1, 95% CI 1.3–3.6), were under 16 (OR 4.5, 95% CI 2.7–7.7) or under 18 (OR 25.2, 95% CI 6.0–105.4) (Table 2). Individuals aged 15 years of age were 79 times (95% CI 16.9–367.6) more likely to provide a false age compared with individuals aged 18 years and over. The odds of giving a false age for those aged 15 years increased after controlling for gender and piercing type (OR 107.5, 95% CI 22.1–522.8).

Description of piercing sites

Using data from client forms the average number of piercings per visit ranged from 1.0 (under 13-year olds) to 1.3 (15, 16 and over 20-year olds). Piercing site varied with age. Ear cartilage was the most frequent piercing site in most age groups. In those aged under 13 years of age, the most frequently pierced sites were ear and navel. In 13-year olds, it was nose and navel. In 14 and 15-year olds, the sites were more widespread, the most frequently pierced sites were ear and nose. In those aged 16 and 17 years of age, ear and nipple piercing were the most frequent piercing sites (Table 3). For clients where piercing information was known, almost one-third (32%) had an intimate piercing. Seventy-five individuals (34%) under 18 years of age had an intimate piercing.

Discussion

A higher proportion of females attended for body piercing at this premises. These gender differences have been frequently reported in other studies that exclude or include earlobe piercing [6, 8, 18, 19]. People of a wide range of ages attended for body piercing and very young children were also taken to have their ears pierced. Piercing sites on the body varied, particularly in those aged 14

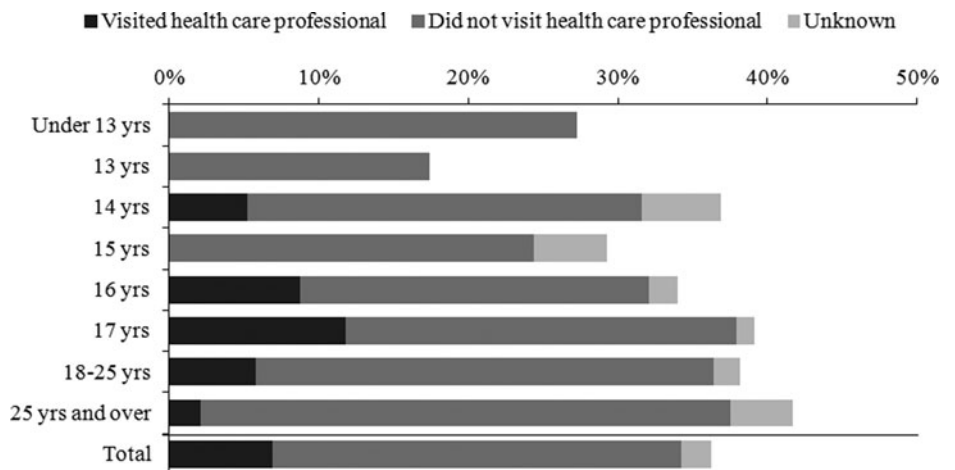


Fig. 3. Frequency of skin infection, by age group, following body piercing in clients who attended a tattoo and piercing premises with insufficient hygiene practices in South Wales; 2015.

Table 2. Odds of reporting a false age in clients who attended a tattoo and piercing premises with insufficient hygiene practices in South Wales; 2015

	False age given		Univariate analysis		Multivariate analysis	
	No	Yes	OR (95% CI)	P-value	OR (95% CI)	P-value
Sex						
Male	20	12	1		1	
Female	169	86	0.8 (0.4–1.8)	0.67	0.6 (0.2–1.5)	0.29
Intimate piercing						
No	140	56	1		1	
Yes	49	42	2.1 (1.3–3.6)	0.00	3.5 (1.7–6.9)	0.00
Under 16						
No	150	45	1			
Yes	39	53	4.5 (2.7–7.7)	0.00		
Under 18						
No	65	2	1			
Yes	124	96	25.2 (6–105.4)	0.00		
Age						
≥18	65	2	1		1	
17	28	23	26.7 (5.9–121.0)	0.00	20.4 (4.4–94.6)	0.00
16	57	20	11.4 (2.6–50.9)	0.00	10.7 (2.4–48.9)	0.00
15	14	34	78.9 (16.9–367.6)	0.00	107.5 (22.1–522.8)	0.00
14	10	11	35.8 (6.9–185.6)	0.00	47.9 (8.8–259.2)	0.00
13	7	3	13.9 (2.0–98.1)	0.01	23.1 (3.1–169.7)	0.00
<13	8	5	20.3 (3.4–122.5)	0.00	35.5 (5.6–226.3)	0.00

Table 3. Frequency of piercing site, by age group, in clients who attended a tattoo and piercing premises with insufficient hygiene practices in South Wales; 2015^a

Age group	<13	13	14	15	16	17	18–20	>20	Unknown
Total individuals (n)	13	10	21	48	78	51	28	39	121
Total piercings (n)	13	12	26	60	100	63	33	52	161
Average piercings per visit	1.0	1.2	1.2	1.3	1.3	1.2	1.2	1.3	1.3
Ear cartilage	38%	17%	31%	37%	27%	17%	33%	46%	22%
Nipple	–	–	12%	15%	25%	44%	30%	8%	18%
Nose	8%	33%	23%	20%	13%	13%	6%	15%	27%
Navel	54%	33%	12%	10%	10%	5%	12%	6%	10%
Lip	–	8%	8%	5%	4%	5%	12%	10%	8%
Ear unspecified	–	8%	4%	5%	5%	2%	3%	2%	4%
Tongue	–	–	4%	3%	5%	3%	–	6%	5%
Neck	–	–	4%	3%	5%	5%	–	–	2%
Hip	–	–	4%	–	1%	2%	–	4%	1%
Other ^b	–	–	–	2%	2%	–	–	2%	1%
Ear lobe	–	–	–	–	1%	3%	–	–	1%
Collarbone	–	–	–	–	2%	2%	–	2%	0%
Eye-brow	–	–	–	–	–	–	3%	–	2%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

^aData from client lists found at the premises, includes age and piercings received as at first recorded visit. Average is arithmetic mean.^bOther = Cheek, wrist, cleavage, genital.

and 15 years of age, and approximately one-third of those aged under 18 years of age had a piercing at an intimate site.

A small number of individuals tested positive for hepatitis B and C, it was not known whether these were linked to the premises of interest, as all of these individuals had other risk factors. However, we identified a high level of self-reported skin infection following body piercing.

The increased risk of skin infection following body piercing at this particular premises is difficult to estimate, as there is a lack of data on background incidence of skin infection. There have been a number of studies looking at dermatological complications following body piercing, with frequently reported complications including oedema, bleeding, keloid scarring and infection [20–24]. Perichondritis incidence has increased with increasing popularity of piercing of the upper ear [25, 26]. Self-reported history of complications relating to body piercing as reported in cross-sectional studies ranges from 9% to 31%, although rates will inevitably vary depending on how many piercings an individual has had [5, 6, 18]. Infectious complications may occur due to poor technique or inadequate after care, and depending on the site of the piercing can take many months to heal [22]. The cluster of pseudomonas skin infections that led to this look-back exercise was identified as all cases were seen at the same hospital in Newport, South Wales. Clusters of pseudomonas skin infection following body piercing have occurred elsewhere. In 2016, a number of pseudomonas skin infections following body piercing in England were linked to a cleansing solution [27]. We recommend that infection following piercing or tattooing should be added to the list of notifiable conditions so that future clusters can be identified more rapidly [28].

We saw the highest rate of self-reported skin infection in those aged over 25 years, but those under 16 years of age were significantly less likely to seek medical advice. Four individuals attending for screening as part of this look-back exercise were referred for further treatment for infected piercings, one of which was advised to go straight to the accident and emergency department. Younger children may be more prone to complications due to being unable to care for their pierced site [29]. Body piercing can result in serious complications, reports include a fatal case of toxic shock syndrome as a result of home nipple piercing, Fournier's gangrene leading to septicaemia and DIC following male genital piercing, Ludwig's angina, and a number of reported cases of infective endocarditis following oral piercing [30–33]. There is a need for improved regulatory powers for the enforcement of hygiene measures in body piercing premises and for clients of all ages to be better informed on the risks associated with body piercing, including when and where to seek medical advice.

Hygiene practices in the premises were questionable and those attending for screening were aware of this from the publicity of the look-back exercise so may have been more likely to come forward. Individuals were asked whether they recalled having a skin infection following the piercing procedure and interpretation of infection may have varied between clients. Some individuals may have had trauma to the piercing site or a reaction to the materials in the piercing ornament which was recorded as infection, especially if they went on to mention symptoms such as mild irritation. This may have led to an overestimate of skin infection following body piercing at this premises. Detailed descriptions of symptoms were not routinely collected in this study and more work needs to be done to quantify the incidence of skin infection following body piercing in the UK.

There may be bias in the age of those who attended for screening. It has not been possible to compare the age distribution of those attending for screening to the age distribution as at the time of piercing, using data from client forms. This is because the exact date of piercing was not known for all those who attended for screening, the date of body piercing could have been up to 2 years prior to the blood-borne virus screen.

Given the increasing popularity, body piercing represents an emerging public health risk and the need for stricter hygiene and licensing controls in the UK has been discussed for a number of years [34]. Despite there being no legal age limit for body piercing in Wales, we have shown that many individuals were willing to fabricate their age to receive a procedure, even more so if they were requesting an intimate piercing. This could have been due to fear of being turned away, as local councils can issue recommendations on age limits or premises may have their own rules for piercing [35]. Further qualitative work would be necessary to understand younger client's motives for providing a false age. Piercing intimate areas in minors is a safeguarding breach and individuals performing body piercing should be required to hold a licence to ensure they are sufficiently trained. The findings from this exercise were used to support the drafting of the Public Health (Wales) Bill which proposed better regulation of piercing premises and the need to provide documented proof of being over 18 years of age before having a piercing in an intimate site. The Public Health (Wales) Bill, which was passed in July 2017, requires individuals performing body piercing and other special procedures to be licensed and demonstrate knowledge of infection control, hygiene and first aid [36]. In an industry that has been poorly regulated we hope that changes in policy will help protect both the clients and those who perform body piercing.

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Author contributions. MP, HL and DT wrote the manuscript. MP and DT performed the analysis. BM and GR provided comments and oversaw the look-back exercise.

Conflicts of interest. None.

References

1. Carroll ST *et al.* (2002) Tattoos and body piercings as indicators of adolescent risk-taking behaviour. *Pediatrics* **109**, 1021–1027.
2. Armstrong ML *et al.* (2004) Contemporary college students and body piercing. *Journal of Adolescent Health* **35**, 58–61.
3. Roberts TA, Auinger P and Ryan SA (2004) Body piercing and high-risk behaviour in adolescents. *Journal of Adolescent Health* **34**, 224–229.

4. **Forbes GB** (2001) College students with tattoos and piercings: motives, family experiences, personality factors, and perception by others. *Psychological Reports* **89**, 774–786.
5. **Bone A et al.** (2008) Body piercing in England: a survey of piercing at sites other than earlobe. *British Medical Journal* **336**, 1426–1428.
6. **Quaranta A et al.** (2011) Body piercing and tattoos: a survey on young adults' knowledge of the risks and practices in body art. *BMC Public Health* **11**, 774.
7. **Caliendo C, Armstrong ML and Roberts AE** (2005) Self-reported characteristics of women and men with intimate body piercings. *Journal of Advanced Nursing* **49**, 474–484.
8. **Majori S et al.** (2013) Piercing and tattooing in high school students of Veneto region: prevalence and perception of infectious related risk. *Journal of Preventive Medicine and Hygiene* **54**, 17–23.
9. **NHS Blood and Transplant (UK)** (2016) Health and Travel. NHS (UK). Available at <https://my.blood.co.uk/knowledgebase/Index/P> (Accessed 16 August 2016).
10. **Yang S et al.** (2015) Transmission of hepatitis B and C virus infection through body piercing: a systematic review and meta analysis. *Medicine (Baltimore)* **94**, e1893.
11. **Tohme RA and Holmberg SD** (2012) Transmission of hepatitis C virus infection through tattooing and piercing: a critical review. *Clinical Infectious Diseases* **54**, 1167–1178.
12. **Deschesnes M, Finès P and Demers S** (2006) Are tattooing and body piercing indicators of risk-taking behaviours among high school students? *Journal of Adolescence* **29**, 379–393.
13. **Hwang L-Y et al.** (2006) Relationship of cosmetic procedures and drug use to hepatitis C and hepatitis B virus infections in a low-risk population. *Hepatology* **44**, 341–351.
14. **Puhatch D, Mileno M and Rich JD** (1983) Possible transmission of human immunodeficiency virus type 1 from body piercing. *Clinical Infectious Diseases* **10**, 43–44.
15. **Limentani AE et al.** (1979) An outbreak of hepatitis B from tattooing. *Lancet* **2**, 86–88.
16. **UK Advisory Panel for Healthcare Workers Infected with Bloodborne Viruses (UKAP)**. Terms of reference. Available at <https://www.gov.uk/government/groups/uk-advisory-panel-for-healthcare-workers-infected-with-bloodborne-viruses> (Accessed 21 April 2017).
17. **Aneurin Bevan University Health Board (Wales)** (2016) *The Technical Report of A Blood-Borne Virus Look-Back Exercise Related to A Body Piercing and Tattooing Studio in Newport*. South Wales: Aneurin Bevan University Health Board.
18. **Mayers LB et al.** (2002) Prevalence of body art (body piercing and tattooing) in university undergraduates and incidence of medical complications. *Mayo Clinic Proceedings* **77**, 29–34.
19. **Deschesnes M, Demers S and Finès P** (2006) Prevalence and characteristics of body piercing and tattooing among high school students. *Canadian Journal of Public Health* **97**, 325–329.
20. **Tweeten SS and Rickman LS** (1998) Infectious complications of body piercing. *Clinical Infectious Diseases* **26**, 735–740.
21. **Meltzer DI** (2005) Complications of body piercing. *American Family Physician* **72**, 2029–2034.
22. **Stirn A** (2003) Body piercing: medical consequences and psychological motivations. *Lancet* **361**, 1205–1215.
23. **Koenig LM and Carnes M** (1999) Body piercing. Medical concerns with cutting-edge fashion. *Journal of General Internal Medicine* **14**, 379–385.
24. **Levin L and Zadik Y** (2007) Oral piercing: complications and side effects. *American Journal of Dentistry* **20**, 340–344.
25. **Rowshan HH et al.** (2008) *Pseudomonas aeruginosa* infection of the auricular cartilage caused by 'high ear piercing': a case report and review of the literature. *Journal of Oral and Maxillofacial Surgery* **66**, 543–546.
26. **Hanif J et al.** (2001) Lesson of the week: 'high' ear piercing and the rising incidence of perichondritis of the pinna. *British Medical Journal* **322**, 9067.
27. **Public Health England** (2016) Warning over infection that may be linked to piercing product. Available at <https://www.gov.uk/government/news/warning-over-infection-linked-to-an-aftercare-spray-for-piercings> (Accessed 21 April 2017).
28. **Public Health England** (2010) Notifiable diseases and causative organisms: how to report. Available at <https://www.gov.uk/guidance/notifiable-diseases-and-causative-organisms-how-to-report> (Accessed 21 April 2017).
29. **Macgregor DM** (2001) The risks of body piercing in children. *Scottish Medical Journal* **46**, 9–10.
30. **Yu CH, Minnema BJ and Gold WL** (2010) Bacterial infections complicating tongue piercing. *Canadian Journal of Infectious Diseases and Medical Microbiology* **21**, e70e4.
31. **Bader MS, Hamodat M and Hutchinson J** (2007) A fatal case of *Staphylococcus aureus*: associated toxic shock syndrome following nipple piercing. *Scandinavian Journal of Infectious Diseases* **39**, 741–743.
32. **Wright J** (1995) Modifying the body: piercing and tattoos. *Nursing Standard* **10**, 27–30.
33. **Ekelius L** (2004) Fournier's gangrene after genital piercing. *Scandinavian Journal of Infectious Diseases* **26**, 610–612.
34. **Jordan N and Finlay F** (2003) Body piercing of young children. *Lancet* **361**, 2250.
35. **Smith L. Regulation of tattooing and body piercing businesses. House of Commons: Science and environment section.** 2010:SN/SC/5079. Available at <http://researchbriefings.files.parliament.uk/documents/SN05079/SN05079.pdf> (Accessed 21 April 2017).
36. **Welsh Government** (2017) *Public Health (Wales) Act*. Available at http://www.legislation.gov.uk/anaw/2017/2/pdfs/anaw_20170002_en.pdf (Accessed 15 September 2017).