

## Hepatitis C Virus and Body Piercing

A report on infection control practices and knowledge of hepatitis C virus among body piercing practitioners in Victoria.

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The Department of a Human Services Ethics Committee provided ethics approval for the study.

**3. Glossary**

- BPE** - body piercing establishment
- BPP** - body piercing practitioner
- Burnet Institute** - Macfarlane Burnet Institute for Medical Research and Public Health
- Ear Piercing Guidelines** - Standards of Practice for Ear Piercing; pursuant to Part 6 of Health (Infectious Diseases) Regulations, 1990
- EHO** - environmental health officer
- HBV** - hepatitis B virus
- HCV** - hepatitis C virus
- HIV** - human immunodeficiency virus
- RNA** - ribose nucleic acid
- RT-PCR** - reverse transcription-polymerase chain reaction (RT-PCR)
- Tattooing and Body Piercing Guidelines** - Standards of Practice for

Tattooing and Body Piercing: Health pursuant to Part 6 of Health (Infectious Diseases) Regulations 1990

VIDRL - Victorian Infectious Diseases Reference Laboratory

#### 4. Introduction

The hepatitis C virus (HCV) is a major public health threat in Australia. The primary health concern with HCV infection is the development of chronic HCV that can lead to cirrhosis, liver failure and hepatocellular carcinoma. It is estimated over 200,000 Australians have been exposed to HCV (1% of the population), 134,000 are chronically infected, and that more than 10,000 new infections every year (1). The cost of HCV to the public health system and the community is enormous; recent estimates of the combined health related and social costs are \$74.6 million per annum (2). Improved monitoring, preventative and treatment programs need to be implemented to reduce morbidity and further spread of the virus.

HCV can be transmitted in any situation in which infected blood is transferred between individuals, but most commonly occurs when body is pierced. It is well recognised that within health care settings, HCV can be transmitted from client to staff, from staff to client and between clients. In addition HCV may be transmissible following contamination of equipment and other surfaces which come into contact with infected blood.

HCV RNA has been detected on various pieces of equipment used in parenteral procedures and on surfaces in the immediate environment. Italian researchers reported on the detection of HCV RNA by reverse transcription-polymerase chain reaction (RT-PCR) in dental surgeries. The study found extensive HCV contamination of dental surfaces and equipment after treatment of patients who were seropositive for HCV (3). Environmental and equipment contamination of HCV most likely arose from dispersion of aerosols of saliva and

blood during dental treatment; HCV has high average transmission efficiency (relative to HIV) and can be transmitted in tiny amounts of blood (4). More recently, research conducted at the Macfarlane Burnet Centre demonstrated that HCV RNA was detectable by RT-PCR on equipment - including syringe barrels, spoons, swabs and filters - used to inject illicit drugs (5). The results of these studies of dental surgeries and equipment used to inject illicit drugs suggest that HCV contamination is a distinct possibility in other practices that (potentially) involve the release of body fluids and blood into the environment or onto equipment.

#### *Body piercing*

Body piercing is a common practice; approximately 50% of all Victorians have at least one piercing, most frequently of one or both ears (6). In recent years, piercing of body parts other than the ears has markedly increased in popularity; in the current body-piercing trend, people are having their eyebrows and navels pierced as well as mucous membranes in the tongue and lips. Multi-use devices are used for many of these piercings, creating the potential for the spread of blood borne viruses. A survey in 1998 reported 31.5% of Australian had their ears pierced 6.7% had their body pierced in their lifetime (7). Body piercing was more common among the younger Australians particularly younger women with one in five women aged around 20 reporting body piercings. The figure declined to half this proportion in women only ten years older. One in eight younger men reported body piercings. The survey reported current injecting drug users are nine times more likely to have had their body pierced in the previous year compared with the general population (7). This is important when considering the high prevalence of HCV amongst injecting drug users.

Any procedure that involves piercing body or a mucous membrane carries potentially serious health complications.

Multi-use devices are used for many piercings creating the potential for the spread of blood borne viruses. Increased demand for piercing has induced new people to enter the industry, many of whom are not primarily trained as piercers. Some come from what might be described as a traditional and committed body piercing culture and only provide body piercing services, but many have a background in tattooing, and others are beauticians, and provide body piercing as a sideline. It is plausible that people who offer piercing as a secondary service are insufficiently aware of infection control procedures, increasing the possibility of virus transmission via body piercing.

### 5. Study Rationale

The increasing popularity of body piercing has led to concern about the increased risk of spread of blood borne viruses, in particular HCV. Many people have recently become involved in the industry but little is known about their level of training and their understanding of the risk associated with the spread of blood borne viruses. Therefore, the knowledge of body piercing practitioners about HCV and infection control needs to be assessed, along with the extent of HCV contamination in body piercing establishments.

### 6. Study Aims

- To assess the current state of knowledge about HCV and infection control on the part of Victorian body piercing practitioners
- To determine the extent of HCV contamination of equipment and environmental surfaces within Victorian
- Where necessary, to use the results to make recommendations about updating of standards of practice for body piercing (Department of

Human Services, 1990) (8) with relation to prevention of HCV infection.

### 7. Methods

The study was a collaboration between the Macfarlane Burnet Institute for Medical Research and Public Health, the Australian Institute of Environmental Health (AIEH), and the Victorian Infectious Diseases Reference Laboratory (VIDRL).

Thirty-five body-piercing establishments (BPEs) were recruited. The owner or manager of each establishment answered a questionnaire about blood borne viruses, in particular HCV. Environmental swabs were collected from each premises.

#### *Selection of body piercing establishments*

Environmental Health Officers (EHOs) throughout Victoria were invited by the Australian Institute of Environmental Health to help with this study. In consultation with the relevant shire and city councils, the EHOs recruited BPEs from their area. The criteria for selection was the establishment had to perform body piercing and should include piercing body sites other than just the earlobe eg ear cartilage, nose, navel, genitals. Study investigators use random number generation to select BPEs within an area.

EHOs visited participating establishments with a letter of introduction from the investigators. Participants were given a plain language statement that outlined why the study was being performed, the study objectives and the study methodology. If the manager (or appropriate surrogate) agreed to participate in the study they were asked to give written informed consent to participate in the study, meaning they would complete the questionnaire and allow collection of the environmental specimens. BPEs received \$25 compensation for loss of income incurred as a result of participating in this study.

### **Questionnaire**

The EHO administered the questionnaire to the manager or owner of the BPE or his or her proxy.

The questionnaire collected the following information:

- Client throughput (average per day, number in past week and month)
  - types of piercing conducted and frequencies over time
  - frequencies of use of equipment
  - pre-processing procedures employed
  - practitioners' knowledge of HCV and BBV infection control
  - possession/availability of and familiarity with Standards of Practice for Tattooing and Body Piercing: Health pursuant to Part 6 of Health (Infectious Diseases) Regulations 1990 (Tattooing and Body Piercing Guidelines) (8).
- three workbenches; the "clean" preparation bench, the bench the practitioner uses when performing the piercing and the area where the worker places contaminated materials due for cleaning.
  - chairs used by the worker and the chair or bench of the person who was pierced.
  - two pieces of multi-use piercing equipment that had been reprocessed and two pieces of multi-use equipment that were due to be reprocessed.
  - two pieces of single-use piercing equipment before and after use.

Depending on the premises and the equipment used not all swabs were collected at all sites.

### **Swabbing Technique**

For each swab, the EHO used a sterile disposable Pasteur pipette to place 100ul of phosphate buffered saline on the surface to be swabbed. He or she then used a sterile dry swab to work the saline solution over the bench and absorb the solution and any contaminating virus particles. The tip of the swab was placed in a sterile container. The container was labelled with the code for the study site and the name of the equipment that was swabbed (eg. cleaned multi-use piercing equipment, contaminated multi-use piercing equipment, preparation bench, workbench, cleaning bench). Swabs were transported to VIDRL where PCR analysis was performed.

### **Testing of the environmental swabs**

All samples were tested for HCV RNA by the COBAS AMPLICOR HCV test (Roche Diagnostic Systems, Branchburg, NJ). In brief, swab tips were soaked and vortexed in 500 ul sterile saline and then 140 ul of eluate removed and processed by the protocol described for serum samples in the QIAGEN

Reprocessing of reusable equipment was defined as appropriate if it complied with the Tattooing and Body Piercing Guidelines. Manual cleaning followed by autoclaving is needed for instruments used during body piercing that are contaminated with blood (8).

Reprocessing of piercing guns was defined as appropriate if it complied with the Standards of Practice for Ear Piercing: pursuant to Part 6 of Health (Infectious Diseases) Regulations, 1990 (Ear Piercing Guidelines). The guidelines require manual cleaning of ear piercing guns followed by wiping their surfaces with wipes containing 70% isopropyl alcohol (9).

### **Collection of environmental swabs**

Up to ten environmental swabs were collected from each body-piercing establishment. Swabs were taken from the following items of piercing equipment and environmental surfaces:

QIAamp Viral RNA kit (QIAGEN, Australia). Any RNA present was eluted from the QIAGEN column in a final volume of 50 ul. To make the extraction procedure compatible with the COBAS AMPLICOR HCV test, a volume of 20 ul of the QIAGEN eluate was mixed with 180 ul of the HCV test specimen diluent after which the manufacturer's protocol was followed.

### Assay Validation

A sample of known HCV viral load (as determined by the quantitative Roche HCV MONITOR assay) was serially diluted to concentrations of 106, 105 and 104 copies/ml. Aliquots of 50 ul were dispensed onto plastic dishes in a biosafety cabinet and sampled with a swab at 0, 7, 24 and 48 hours. For the all time points, 100 ul of phosphate buffered saline was added to the sample spot and absorbed with the dry swab. Swabs were processed as outlined. HCV RNA was detected for all sample dilutions.

### Data Management

Data from the questionnaires were entered into an access database at the Macfarlane Burnet Institute, as were the results of the environmental swabs. The data were stored in a password secure computer database. Hard copies of the questionnaires were stored in a locked filing cabinet. No individual identifying data was attached to the questionnaires or the computer data set. Hard copy and computer copies of the data shall be stored for seven years at the MBI.

### Statistical analysis

Statistical analysis was performed using CIA and SPSS. The Chi square statistic or Fisher's Exact test was used to compare groups categorical data. The Mann-Whitney test was used to compare continuous non-parametric data.

## 8. Results

Body piercing establishments were recruited between July and October 2001. Thirty-five

body piercing establishments (BPEs) located in 12 metropolitan, rural and regional councils participated in the study (Table 1). Body piercing was the main activity for ten of the establishments. Tattooing (10), hairdressing (6), beautician (5), and chemists (4) were the major activities of 25 remaining establishments. The median period the establishments had been operating was 36 months (range 1 - 204).

**Table 1: Participating councils and the number of body-piercing establishments (BPEs) recruited from their area.**

Council	Number of *BPEs
Whittlesea	3
Port Phillip	4
Latrobe	1
Swan Hill	1
Frankston	3
Stonnington	4
Yarra	4
Cardinia	4
Casey	1
Melbourne	2
Geelong	3
Banyule	5

\*BPE - Body piercing establishment

The median number of piercings in the last week was 5.5 (range 0-80) and in the last month was 20 (2-360). The most common piercings performed by people who identified body piercing as their primary activity were navels, eyebrows and tongues. The most common piercing by those whose primary activity was not body piercing was earlobes followed by navels and tongues (Table 2).

### Use of piercing equipment

Practitioners used a variety of equipment to perform or assist them with their piercing. Single use needles were used, as were metal or plastic forceps or tongs, clamps, small pliers and guiding equipment. Guiding equipment consists of a small plastic or metal tube, through which the practitioner

**Table 2: Comparison of the mean number of piercings by body site performed at locations primarily identified as body piercers establishments compared with locations identified as tattooist, hairdressers beauticians and chemists.**

Site	Body piercing the main activity	Mean number of piercings	Mean Rank	Significance
Earlobe	No	204.85	15.05	P=0.60
	Yes	128.13	13.13	
Ear cartilage	No	86.84	11.13	P=0.002
	Yes	257.75	20.81	
Nose	No	85.13	9.59	P=0.003
	Yes	403.50	18.31	
Lips	No	54.47	8.87	P=0.001
	Yes	271.25	17.88	
Eyebrow	No	83.75	8.94	P<0.001
	Yes	546.63	19.63	
Tongue	No	149.33	8.70	P=0.001
	Yes	517.13	18.19	
Skin	No	36.80	5.60	P=0.35
	Yes	45.25	7.88	
Navel	No	192.28	10.61	P=0.003
	Yes	829.25	20.00	
Nipple	No	71.78	10.19	P<0.001
	Yes	480.00	20.94	
Male genitals	No	25.00	5.93	P=0.16
	Yes	63.43	9.07	
Female genitals	No	14.29	6.43	P=0.23
	Yes	51.38	9.38	

would pass the piercing needle. Some practitioners use piercing guns. The most common piercing guns used were Studex and Caflon brands.

Twenty practitioners reported using piercing guns. Of the practitioners who used piercing guns all used them on earlobes. Twelve of the 20 reported using piercing guns on ear cartilage and 6 reported using piercing guns on the nose. Piercing guns were not used at any other sites.

Twenty-nine practitioners used single-use needles for piercing on some occasions.

### Reprocessing of equipment

The reprocessing of forceps (or clamps or tongs) varied. Seven did not reprocess their

forceps as required by the Tattooing and Body Piercing Guidelines. One practitioner reported only manual cleaning, three only autoclaved, one manually cleaned and soaked the forceps in disinfectant and two soaked the forceps in disinfectant and sterilised them but did not manually clean them. All other practitioners manually cleaned and autoclaved the forceps with or without first soaking them in disinfectant. A similar pattern was apparent for reprocessing of guiding equipment used during piercing. One practitioner soaked the guiding equipment in disinfectant only, three only autoclaved and one soaked the equipment in disinfectant and autoclaved without manual cleaning.

Of the 20 practitioners that used piercing guns 14 did not follow the Ear Piercing Guidelines. Eight reported manual cleaning only, three soaked the gun in disinfectant only, and two only autoclaved without manual cleaning (Table 3).

**Table 3: Methods of cleaning piercing equipment**

	Needles (n=33)	Forceps (n=33)	Guiding Equipment (n=32)	Piercing gun (n=27)	Jewellery (n=30)
Single Use Disposable	29	0	0	0	3
Never Use	4	4	8	7	1
Cleaned manually	0	1	0	8	
Disinfect**	0	0	1	4	2
Autoclave	0	3	3	2	12
Clean*, disinfect**	0	1	0	4	1
Clean*, autoclave	0	10	9	1	2
Disinfect**, autoclave	0	2	1	0	3
Clean*, disinfect**, autoclave	0	12	10	1	5
Other	0	0	0	0	1

\*Clean - cleaned manually after use using water

\*\*Disinfect - soaked in disinfectant

All practitioners who used needles reported using single-use disposable needles.

### Disposal of Equipment

All 29 practitioners who used needles disposed of them in sharps containers. One practitioner reported disposing of bloodied swabs in a normal rubbish bin and 3 reported disposing of bloodied gloves in normal rubbish bins in contravention of the Tattooing and Piercing Guidelines. Seventeen practitioners reported disposing of used but non-bloodied swabs in normal rubbish bins and 15 reported disposing of used but non-bloodied gloves in normal rubbish bins. The guidelines state such material can be disposed of with the normal rubbish.

### Use of protective equipment

Only one practitioner did not comply with the Tattooing and Body Piercing Guidelines by piercing customers without using gloves. The other 34 practitioners used new gloves for each customer. The majority of practitioners never wore aprons or protective eyewear when piercing a customer. Four practitioners reported not wearing gloves when cleaning equipment. The majority did not wear an apron or protective eyewear when cleaning equipment as suggested in the guidelines.

### Training

Thirty-one practitioners had undertaken some form of body piercing training. The median length of training was 15 days and the mean length of training was 8.5 months. Of those who gave details, the shortest period of training was one hour and the longest period was 6 years. Of the four who reported no training, two reported many years of experience as body piercers before formal training was available. The other two practitioners who reported no training described hairdressing and pharmacy as their primary business and only performed ear piercing.

The most common forms of training reported were informal apprenticeships and private training courses (Table 4).

**Table 4: Training as body piercers**

	Number	Median (days)	Range (days)
Formal apprenticeship	3	122	6 - 240
Informal apprenticeship	15	120	1 - 2190
TAFE or university	2	190	20-360
Private body piercing course	15	3	1-15
Beautician course	3	1	1-14
Other	6	1	1-5
No training	4		

### Knowledge of hepatitis C virus

Knowledge of HCV was assessed by asking practitioners to answer true or false to a series of statements about HCV. All practitioners reported having heard about a disease called hepatitis and HCV specifically. Sixteen practitioners reported having knowingly pierced someone with hepatitis.

A lack of knowledge about how HCV is transmitted was apparent. Of particular concern was the fact that four practitioners did not know HCV could be contracted by sharing injecting drug equipment and five did not know HCV could be contracted from body piercing. Eight incorrectly stated it was possible to contract HCV by being coughed upon by an infected person and nine did not know if this was possible. Seven stated it was possible and eleven were unsure if HCV could be contracted from eating contaminated food. Thirty practitioners correctly said it was possible to contract HCV from body piercing, one said it was not possible and four did not know (Table 5).

Thirty-one practitioners correctly believed people with HCV could be infectious for years and 30 correctly stated people with HCV did not look ill. Twenty practitioners correctly stated people with HCV did not usually have yellow eyes and skin. Twenty-one practitioners were aware there was no vaccine available for HCV.

Despite the majority of practitioners being aware that people with HCV did not always look ill, 19 practitioners stated they performed extra cleaning before their next customer if they know the person they have

pierced is HCV positive. This response contradicts the universal precautions for blood and bodily substances. Two people said they would not pierce a person they knew to be HCV infected and another stated they would contact a medical doctor to gain information. (Table 5).

**Table 5: Practitioners' knowledge and understanding of HCV.**

	Yes	No	Unsure/ don't know
Heard about a disease called hepatitis?	35		
Heard about a disease called hepatitis C?	35		
Knowingly pierced anyone with hepatitis?	16	19	
Pierced anyone who had yellow jaundice?	0	31	3
Can contract hepatitis C by eating contaminated food	7	17	11
Can contract hepatitis C by sharing injecting drug equipment	31	0	4
Can contract hepatitis C from a blood transfusion	30	2	3
Can contract hepatitis C by being coughed on by a person with hepatitis C	8	18	3
Can contract hepatitis C during skin piercing	30	1	4
HCV can be found in the blood of an infected person	35	0	0
Hepatitis C can be infectious for many years	31	1	3
People with hepatitis C look sick	2	30	3
People with hepatitis C usually have yellow skin	5	20	10
If a customer is hepatitis C positive - do extra cleaning before the next customer	19	13	
Vaccine is available for hepatitis C	8	21	4
Aware of the Standard of Practice booklet	34		
Have a copy of the Standard of Practice booklet	33	2	
Have read the Standard of Practice Booklet	33	1	
Found the guidelines useful	29	5	
Did reading the guidelines change your work practices	12	21	

\*HCV - hepatitis C virus

### Standards of Practice for Tattooing and Body Piercing

Thirty-four practitioners were aware of the Tattooing and Body Piercing: Health

Guidelines. Thirty-three had a copy of the guidelines, of which 27 had read all of the guidelines and six had read part of the guidelines. Of the 33 who had read the guidelines 24 found it useful, four found part of it useful and five found it of no use. Twelve said that reading the guidelines had changed their work practices. The respondents gave several reasons why the guidelines were useful. Eleven said they improved their set up and cleaning procedures. Three stated the guidelines improved their own personal protection when performing piercing and two stated they improved the information they gave to their customers (Table 5).

### Impact of training and the primary activity of the body-piercing establishment.

We examined the relationship between practitioners working in and trained in establishments that reported the establishment's primary activity as body piercing or tattooing (Group 1) with those who had not been trained in a piercing establishment or who worked in establishments where the primary activity was otherwise (chemists, hairdressers, beauticians etc) (Group 2). We compared piercing equipment used by the groups, the cleaning and disposal of equipment and the knowledge and understanding of HCV.

### Use and cleaning of equipment

Sixteen practitioners in Group 1 used needles to pierce customers compared with 13 practitioners in Group 2 ( $p=0.022$ ). Only four practitioners in Group 1 ever used piercing guns compared with 15 practitioners in Group 2 ( $p=0.001$ ). All practitioners who used needles in both groups disposed of the needle into a sharps container.

One of the four practitioners in Group 1 who used a piercing gun, used the gun to pierce ear cartilage compared with eleven out of 15 practitioners in Group 2 ( $p =$

0.117) who used piercing guns. Two out of four practitioners in group 1 used the piercing gun to pierce the nose compared with four out of 15 in Group 2 ( $p=0.57$ ).

Three out of 16 practitioners in Group 1 did not clean the forceps as recommended in the Tattooing and Body Piercing Guidelines compared with four out of 13 in Group 2 ( $p=0.68$ ). Four out of 16 practitioners in Group 1 did not clean their guiding equipment as recommended in the Tattooing and Body Piercing Guidelines compared with four out of ten in Group 2 ( $p=0.37$ ).

#### **Disposal of equipment and materials**

Disposal of used gloves and swabs varied between Group 1 and Group 2. All 16 practitioners in Group 1 disposed of their bloodied gloves and swabs in a contaminated materials container. One practitioner from Group 2 disposed of their bloodied swabs in the normal rubbish and three disposed of their bloodied gloves in the

normal rubbish. Neither of these findings was statistically significant. Twelve practitioners out of 16 in Group 1 compared with five of 18 practitioners in Group 2 disposed of used but not bloodied swabs in the contaminated materials bin; the remaining practitioners disposed of the used non-bloodied swabs in a normal rubbish bin ( $p=0.015$ ). Thirteen of the 16 practitioners in Group 1 compared with five of 17 practitioners in Group 2 disposed of used gloves in the contaminated materials bin; the remaining disposed of used non-bloodied gloves in a normal rubbish bin ( $p=0.005$ ) (Table 6).

#### **Use of protective equipment**

All practitioners reported wearing gloves when piercing a customer except for one practitioner in Group 2. Approximately equal percentages in Groups 1 and 2 always wore aprons and protective eye equipment. All Group 1 respondents reported they always wore gloves when cleaning the equipment compared with Group 2 where 12 of 16

**Table 6. Comparison of practitioners working primarily working as body piercers or tattooist and trained as such (Group 1) compared with non-primary activity practitioners (Group 2).**

		Group 1*	Group 2**	Odds ratio (CI) (P value) ***
Wear gloves when piercing	Never		1	
	Always	16	18	$p = 0.1$
Wear aprons when piercing	Not always/never	13	15	$1.2 (0.2 - 6.7)$
	Always	3	3	$p = 1.0$
Wear eye protection when piercing	Not always/never	11	15	$2.27 (0.45 - 11.59)$
	Always	5	3	$p = 0.43$
Wear gloves when cleaning instruments	Not always/never		6	
	Always	14	12	$p = 0.024$
Wear protective eye wear when cleaning instruments	Not always/never	8	15	$5.6 (0.91 - 34.57)$
	Always	6	2	$p = 0.1$
Disposal of bloodied swabs	Cont. materials bin*	16	12	
	Normal rubbish bin		1	$p = 0.26$
Disposal of bloodied gloves	Cont. materials bin*	16	11	
	Normal rubbish bin		3	$p = 0.09$
Disposal of used/non bloodied swabs	Cont. materials bin*	12	5	$0.13 (0.03 - 0.50)$
	Normal rubbish bin	4	13	$p = 0.015$
Disposal of used/non bloodied gloves	Cont. materials bin*	13	5	$0.10 (0.02 - 0.49)$
	Normal rubbish bin	3	12	$p = 0.005$

\*Group 1 - primary activity is body piercing or tattooing and had apprenticeship training

\*\*Group 2 - untrained body piercer or tattooist or primary activity of establishment not body piercing or tattooing

\*\*\*Significant differences between groups shown in bold

respondents reported always wearing gloves ( $p = 0.024$ ). Eight of the 14 respondents in Group 1 always or sometimes used protective eyewear when cleaning equipment compared with two of 17 respondents in Group 2 ( $p = 0.018$ ) (Table 6).

### **Knowledge and understanding of hepatitis C virus**

There were differences in the two groups' knowledge and understanding of HCV. All 16 practitioners in Group 1 were aware that HCV could be contracted by body piercing or by sharing injecting drug equipment. Five of the nineteen in Group 2 did not know that HCV could be contracted through body piercing ( $p = 0.049$ ) and four did not know that HCV could be contracted using contaminated injecting drug equipment ( $p = 0.11$ ) (Table 7). A similar percentage of practitioners in both groups 1 and 2 stated it were possible to contract HCV by eating contaminated food or being coughed upon.

Practitioners in Group 1 were more likely to pierce a person known to have hepatitis ( $p = 0.012$ ) but not when they had yellow jaundice ( $p = 0.57$ ). All 16 practitioners in Group 1 were aware that people infected with HCV could be infectious for many years; four of the 19 practitioners in Group 2

did not know this was possible. 15 out of 16 practitioners in Group 1 and 15 out of 19 practitioners in Group 2 said that people with HCV did not look sick. Interestingly eleven of Group 2 either did not know or thought people with HCV usually had yellow eyes and skin compared with only 4 practitioners from Group 1 ( $p = 0.05$ ). Eight of 15 practitioners in Group 1 and 11 of 17 practitioners in Group 2 said they would do extra cleaning before the next customer if they knew someone was HCV infected. Three did not respond (Table 7). This practice of "extra cleaning" goes against universal precautions, which are that all blood and body substances should be considered as infectious and that routine cleaning must be adequate to ensure a safe environment.

There was no difference between the two groups in regards to having an awareness of the Standards for Tattooing and Body Piercing, in having a copy at the premises or in having read all or some of the standard.

### **Environmental Swabs**

Three hundred and twenty-three environmental swabs were collected from preparation, work and clean up benches,

**Table 7: Comparison of knowledge and understanding of HCV in practitioners who primarily work as body piercers or tattooists and have been trained (Group 1) compared with non-primary activity practitioners (Group 2).**

		Group 1*	Group 2**	Odds ratio (CI) P value***
Knowingly pierced someone with hepatitis	No	5	14	6.16 (1.41 - 26.78) $p = 0.012$
	Yes	11	5	
Contract hepatitis C by sharing injecting drug equipment	No#	0	4	$p = 0.11$
	Yes	16	15	
Contract hepatitis C during skin piercing	No#	0	5	$p = 0.049$
	Yes	16	14	
Hepatitis C can be infectious for many years	No#	0	4	$p = 0.11$ 0.24 (0.06 - 1.04)
	Yes	16	15	
People with hepatitis C have yellow eyes/skin	No	12	8	$p = 0.087$ 0.62 (0.15 - 2.58)
	Yes#	4	11	
Extra cleaning after piercing someone with hepatitis C	No	7	6	$p = 0.51$
	Yes	8	11	

\*Group 1 - primary activity is body piercing or tattooing and had apprenticeship training

\*\*Group 2 - untrained body piercer or tattooist or primary activity of establishment not body piercing or tattooing

\*\*\*Significant differences between groups shown in bold

# includes people who stated they did not know or were unsure.

clean and used multi-use equipment, practitioners' chairs, and the clients' chairs or benches of 35 establishments (Table 8). EHOs occasionally swabbed sharps containers, infectious waste bins, disinfectant bottles and hand wash basins. HCV RNA was not detected on any swabs.

**Table 8: The number of environmental swabs collected and the type of swabs taken.**

Site of swabs	Number
Preparation bench	39
Work bench*	38
Cleaning area bench	37
Chair - body piercer	23
Chair/bench - customer	43
Clean multi-use piercing equipment	40
Contaminated multi-use piercing equipment	22
Clean single-use piercing equipment	31
Contaminated single-use piercing equipment	11
Piercing gun	24
Other	15

*35 premises were studied. Some premises had multiple swabs taken from certain sites.*

## 9. Discussion

Body piercing has become popular in Victoria and Australia with increasing social acceptance over the past decade. At the same time several studies have reported body piercing as a risk factor for contracting a hepatitis and HIV (10) (11). It has also been reported that body piercing is more common amongst injecting drug users (7), who are highly likely to be infected with HCV. For this reason it is important to that people working in the body piercing industry understand the issues and risk surrounding the spread of blood borne viruses.

A study was performed to ascertain if there was evidence of contamination of HCV in BPEs in Victoria and simultaneously measure practitioners' knowledge of HCV and infection control. The results of this study confirm that body piercing practitioners' have a limited understanding of infection control and their knowledge of HCV and the risk factors leading to its

spread are poor. This is despite all practitioners being aware of the Tattooing and Body Piercing: Guidelines and the majority having read part or all of the guidelines. The study reveals that training for body piercers is varied and often very limited and that some practitioners receiving no training in infection control procedures.

### *Use of piercing guns*

Confusion surrounds the appropriate use of piercing guns with the study results suggesting that guns are not being used correctly. There are no specific recommendations in the Ear Piercing Guidelines but it is generally accepted that the piercing guns can be used to pierce earlobes. Controversy surrounds what other sites can be pierced with a piercing gun. The literature provided by manufacturers of the two most commonly used piercing guns varies in regards to the piercing of ear cartilage. One manufacture states that piercing of the ear cartilage is possible but inadvisable (12). The other states special care must be taken when piercing the cartilage but the instructions in the booklet are ambiguous. Practitioners are advised "do not pierce through the curled "edge" of the ear" but following sentence says "when piercing the cartilage around the edge of the ear...". The illustration provided in the manual indicating what area of the cartilage can be pierced is not particularly instructive (13).

Twelve of the 19 practitioners who used guns pierced the ear cartilage and six practitioners used guns to pierce the nose. The confusion in the instructions combined with the overall lack of training of many practitioners suggests customers are at risk of having an inappropriate piercing performed. It is important that clear guidelines be developed about the use of piercing guns.

### *Reprocessing of equipment*

The study revealed a frequent lack of adherence to the Tattooing and Body

Piercing: Guidelines, 1990 with respect to reprocessing of equipment such as forceps and clamps and guiding equipment. Instruments that are contaminated with blood require manual cleaning followed by sterilising. The only method of sterilising considered appropriate is autoclaving (8). The most common mistake was practitioners did not manually clean the instruments before sterilising them. Unless an instrument has been manually cleaned the effectiveness of the sterilisation process cannot be guaranteed.

Inappropriate or inadequate reprocessing of ear piercing guns was also common. The Ear Piercing Guidelines advise that piercing guns must be cleaned after each use by thorough scrubbing with detergent and then all surfaces of the gun should then be cleansed with wipes containing 70% isopropyl alcohol swabs and allowed to dry (9). It is of concern that the literature provided to practitioners by the manufacturers of the two commonly used piercing guns does not give clear instructions as to how to reprocess the guns. One gives no specific instructions but discusses the relevant by-laws of the Local Government Act in the UK (12). The other advises practitioners to cleanse the area of the clasp retainer by wiping it with a cotton ball or swab moistened with alcohol or an ear care solution (14) (13).

#### ***Disposal of materials***

The Tattooing and Body Piercing Guidelines require different methods of disposal for infectious and non-infectious waste. Infectious waste should be placed in an infectious waste bin and non-infectious waste can be placed in a normal refuse bin (8). A few practitioners disposed of obviously bloodied material incorrectly into a normal refuse bin in contradiction to the guidelines. Some practitioners disposed of used but non-bloodied swabs and gloves into an infectious waste bin; this was more likely to occur with practitioners in Group 1 (practitioners for whom piercing was their

primary activity) compared with Group 2. Use of the contaminated materials bin is unnecessary from an infection control and health perspective and also leads to an additional cost to the practitioner.

#### ***Use of protective equipment***

All but one practitioner reported wearing gloves when piercing; a surprising number did not always wear a protective apron or eyewear, which puts the practitioner at risk if there is a blood splash during piercing. There was no significant difference in use of protective wear between Group 1 and Group 2. A number of practitioners did not use adequate protective equipment to reduce the risk their own risk of infection when cleaning piercing equipment. The guidelines recommend the practitioner wear heavy-duty rubber gloves when washing contaminated instruments and that care should be taken to prevent penetration of the skin or splashing of the mucous membranes such as eyes (8). The guidelines for ear piercing do not make a recommendation regarding use of protective clothing when cleaning piercing guns but it would be reasonable to wear gloves because of the potential for blood to contaminate equipment.

#### ***Knowledge and understanding of HCV***

Practitioners knowledge and understanding of the spread of HCV was less than optimal; of particular concern was the fact that five of the 35 practitioners were unaware or uncertain as to whether HCV could be transmitted through body piercing. Practitioners in Group 2 appeared to have less understanding and knowledge of the virus and be less likely to follow the guidelines in regards to cleaning equipment compared to practitioners in Group 1. Nevertheless, even the "primary piercers" group had significant deficits in their understanding of HCV and universal precautions when dealing with blood product.

Inadequate understanding of infection

control procedures was common. A major concern was many practitioners did not understand the concept of universal blood and body fluid precautions. Under universal precautions blood and certain body fluids of all patients are considered potentially infectious for HIV, hepatitis B, HCV and other blood borne pathogens (15) (16).

Practitioners from both groups stated they would do extra cleaning after piercing someone who told them they were infected with HCV, despite the majority of practitioners being aware that many people infected with HCV did not look sick. This suggests practitioners were not confident that their normal infection control procedures were adequate. Two explanations for this are practitioners were aware of lapses in their infection control procedures or they did not understand that if correct procedures are followed the risk of viral transmission is extremely small. Training in the concept and implementation of universal precautions is required.

#### **Environmental swabs**

Although the environmental swabs were all negative for HCV RNA, the possibility of environmental contamination with the HCV should not be discounted. A dozen or fewer swabs were taken at each establishment and on only one occasion; these limitations, plus the fact that only around 1% of the Victorian population is likely to be infected with the HCV, means the probability of detecting any HCV RNA was always low. Also it is possible that practitioners took extra cleaning precautions before environmental health officers visited their premises.

#### **10. Main Conclusions**

The results of our study are disturbing because they reveal a lack of training and knowledge amongst Victorian body piercing practitioners in regards to the spread of blood borne viruses, in particular HCV. Our results also show that many Victorian body piercers' have inadequate procedures for reprocessing piercing equipment.

Practitioners working in establishments that perform body piercing as a secondary activity appear to have less understanding and knowledge of the virus compared to practitioners for whom piercing or tattooing is a primary activity. They were less likely to follow the body piercing and ear piercing standards for reprocessing equipment and disposing of waste. Nevertheless, the "primary piercer" group also had significant deficits in their understanding of HCV and the concept of universal precautions.

The study's demonstration of body piercing practitioners' limited understanding of how HCV is transmitted, inadequate knowledge of universal precautions, and failure to follow standards of practice is a grave concern. There is potential for HCV to be spread through body piercing in Victoria unless improvements are made to the regulation of this industry and training of practitioners.

#### **11. Recommendations**

All people who perform body piercing, regardless of whether it is the primary activity of the work place, should

1. Undertake certified infection control training. This may be part of a body piercing training course or be stand-alone course in infection control. If infection control training is incorporated into a body-piercing course it must be a dedicated and compulsory section of the course. This course should involve:
  - Information about the major blood borne viruses, including modes of transmission, natural history, and interpretation of test results
  - Information about the risk and management of wound infections
  - Universal precautions for prevention of blood-borne virus transmission

- Methods of reprocessing equipment
- Methods of disposal of equipment
- Use of protective equipment
- Guidelines of Practice for Tattooing and Body Piercing, and for Ear Piercing.

Practitioners who only use piercing guns to pierce earlobes (such as occurs at a number of chemists and beauticians) should be required to undertake a one day training course (as well as the infection control course) on the use of piercing guns.

Practitioners who pierce other body sites should be required to undertake a minimum of a five-day training course in body piercing.

It is not the role of the reporting group to determine the length of the infection control course but the five and six-day courses offered in Victoria in HIV test counselling is a reasonable guide to length of such courses. Practitioners should be required to undertake a (shorter) refresher course every three years.

2. Undertake a certified body-piercing course. The course should cover:

- The appropriate use of piercing equipment, including piercing guns
- Information on the type and positions of piercing and the potential short term and long term health issues associated with piercing at specific sites.
- Information of the jewellery used in piercing and the type of jewellery suitable for specific sites.
- Information about the risk and management of wound infections

3. All body piercing establishments and or practices shall be registered/renewed with local government council as the responsible approving authority.

4. It shall be mandatory that the proprietor of every body piercing/practice shall be required to provide the following information upon registration/renewal of registration to the responsible approving authority

- The names of all body piercing practitioners (together with copies of certificates or statements of attainment against the proscribed competencies) whom are engaged within the establishment to undertake body piercing practices to the public.

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