

Tattoo expos in Hawaii are good for the economy and safe for the people

Jacob Hanks [alohatattoocompany@gmail.com]

Sent: Monday, March 19, 2012 8:03 AM

To: CPCtestimony

Categories: Red Category

To whom it may concern:

My name is Jacob Hanks and I support the new updated rules and regulations and a tattoo task force to monitor shops and expos but I oppose the ban of tattoo trade shows. I am a licensed artist in Hawaii and my family members have been tattooing in Hawaii since around 1986. I believe that a properly regulated and health department monitored tattoo expo would be beneficial to the economy of Hawaii. I think that there is absolutely no danger to the public as some others have stated. The true danger comes from the countless people who tattoo out of houses and buy their tattoo kits and supplies from the kiosks at the malls. Not properly trained professional tattooers who are monitored and are helping to create a positive and profitable event for the government and people of Hawaii. Thank you for your time. Aloha,

Jacob Hanks



LATE TESTIMONY



*House Committee on Consumer Protection & Commerce
Representative Robert N. Herkes, Chair
Representative Ryan I. Yamane, Vice Chair
Monday, March 19th 2012 2:00 PM
Hawaii State Capitol Room 325*

Support of SB 2398 S.D. 2

Dear Chair Herkes, Vice Chair Yamane, and members of the committee:

I am writing in support of SB 2398 S.D. 2 relating to tattoo artists and respectfully encourage you to support a tattoo task force to review the data and give evidence-based recommendations to the Department of Health on updating tattoo regulations.

Recently, researchers from the Centers for Disease Control and Prevention analyzed dozens of studies and concluded that tattoos from non-professionals carry a risk of transmitting hepatitis C. Closer to home, a case-controlled study found that if someone had a non-professional tattoo in Hawai'i, they were 9 times more likely to have hepatitis C than someone without a tattoo. Restricting sales to licensed tattoo artists only, adding a blood-borne pathogen training requirement and convening a task force to are great steps towards making tattooing safer in Hawaii.

The CHOW Project's mission is to prevent the transmission of HIV and other blood-borne pathogens such as hepatitis B and C among high-risk drug users in Hawaii. Hep Free Hawai'i is a coalition of more than twenty-five agencies whose mission is to reach out to Hawai'i's 'ohana to raise awareness and encourage active participation in the prevention, diagnosis and treatment of viral hepatitis and liver disease in Hawai'i. We feel strongly that the components of SB 2398 S.D. 2 will help support safer tattooing, with the proposed amendments and will decrease the potential transmission of viral hepatitis and other infections through tattooing.

Thank you for the opportunity to testify. Please support the convening of an expert task force to ensure Hawaii has the most comprehensive regulations to support the consumers of tattooing in Hawaii.

Heather Lusk
Acting Director, CHOW Project
Director, Hep Free Hawai'i
hlusk@chowproject.org

Transmission of Hepatitis C Virus Infection Through Tattooing and Piercing: A Critical Review

Rania A. Tohme and Scott D. Holmberg

Division of Viral Hepatitis, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention, Atlanta, Georgia

Tattoos and piercings are increasing, especially among youths, but the risk of hepatitis C virus (HCV) infection from these practices has not been adequately assessed and there are conflicting findings in the literature. We evaluated the risk of HCV infection from tattooing and piercing using the Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines. Studies that specified the venue of tattooing and/or piercing showed no definitive evidence for an increased risk of HCV infection when tattoos and piercings were received in professional parlors. However, the risk of HCV infection is significant, especially among high-risk groups (adjusted odds ratio, 2.0–3.6), when tattoos are applied in prison settings or by friends. Prevention interventions are needed to avoid the transmission of hepatitis C from tattooing and piercing in prisons, homes, and other potentially nonsterile settings. Youths also should be educated on the need to have tattoos and piercings performed under sterile conditions to avoid HCV infection.

Hepatitis C Virus (HCV) infection, which is primarily transmitted through percutaneous exposure to contaminated blood, affects approximately 3 million Americans and is the leading cause of liver cancer in the United States [1]. In 2009, an estimated 16 000 new HCV infections occurred in the United States [2]. Although injection drug use (IDU) was the main mode of transmission among patients with available risk factor information, approximately 20% of patients denied exposure to traditional risk factors, such as IDU or other parenteral exposure [2]. From 1994 through 2006, recent tattooing and piercing were reported by 6% and 5% of respondents, respectively, with acute HCV infection in the Sentinel County Surveillance

System [3]. However, more than two-thirds of these patients also reported exposure to other risk factors, including IDU, which prevented drawing sound conclusions about the actual mode of transmission in those cases [3].

Although the practice of tattooing and piercing has been present for thousands of years, the numbers of tattoos and piercings have been increasing during the past decade, particularly among youths [4–7]. A 2004 survey among persons aged 18–50 years in the United States found that 24% of respondents had at least 1 tattoo and 14% had ever had body piercings [4]. Because of conflicting findings reported in the literature regarding the risk of transmission of hepatitis C through tattooing and piercing, the Centers for Disease Control and Prevention receives multiple inquiries by health professionals and laypersons for information on that matter.

Because of the increase in the practice of tattooing and piercing and the interest of health professionals and the public, we conducted a review of the literature to present the best available data on the risk of HCV transmission through these 2 modes. The review is

Received 13 September 2011; accepted 6 December 2011.

Correspondence: Rania A. Tohme, MD, MPH, Division of Viral Hepatitis, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop G-37, Atlanta, GA 30333 (rtohme@cdc.gov).

Clinical Infectious Diseases

Published by Oxford University Press on behalf of the Infectious Diseases Society of America 2012.

DOI: 10.1093/cid/cir991

intended to inform recommendations to prevent and reduce the risk of HCV transmission.

METHODS

Study Identification

Articles addressing the transmission of HCV through tattooing and piercing were identified through a literature search using PubMed and Medline. The search was limited to articles published from 1994 through July 2011 in all languages. A combination of the Medical Subject Headings terms "hepatitis C," "HCV," "tattooing," "tattoo," and "piercing" was used to identify potentially relevant abstracts and articles. Relevant references cited in identified studies were also assessed for inclusion. Articles published in languages other than English and French were evaluated on the basis of information included in the English abstract only. Unpublished, non-peer-reviewed studies were not retrieved because of the questionable reliability of such reports. The first author (R. T.) performed the search and retrieved the articles. Both authors (R. T. and S. H.) evaluated the validity of inclusion of each article and agreed on the strength of evidence in each based on preset ratings (Table 1).

The literature search resulted in the retrieval of 293 published articles or abstracts on HCV infection that included information about tattooing and/or piercing exposure. However, 231 studies were excluded because they were review papers ($n = 47$), did not measure the risk of HCV infection through tattooing or piercing (ie, relied on descriptive statistics and did not include measures of association, such as odds ratios (ORs) and relative risk; $n = 163$), did not control for any HCV infection risk factor (eg, drug use, transfusion before 1992, hemodialysis, contact with blood from HCV-infected person, and number of sex partners) when assessing the risk ($n = 14$), were duplicate studies ($n = 4$), were editorials or author responses ($n = 2$), or relied on self-reported HCV infection ($n = 1$). Therefore, a total of 62 articles were eligible for inclusion.

Study Rating

We used the Meta-analysis of Observational Studies in Epidemiology and the Grades of Recommendation, Assessment, Development, and Evaluation guidelines to evaluate the quality of evidence [8, 9]. Table 1 summarizes the criteria used to evaluate and rate the strength of the evidence in each study. Final rating consisted of adding the rates in each category. Reports were evaluated on the basis of the study design, representativeness of the study population, adjustment for other HCV infection risk factors, and use of adequate laboratory testing methods for ascertainment of HCV infection. Cohort and case-control studies were given the highest rates, followed

Table 1. Rating Criteria Used to Assess the Strength of the Evidence for Hepatitis C Virus Transmission Through Tattooing and Piercing

Characteristic	Description of Study (Rating ^a)
Study design	Case series/report (1), cross-sectional (2), case-control (3), cohort (4)
Study population ^b	Hospital or clinic based (1), general population/surveillance (2)
Comparison population	Not representative (1), representative (2)
Outcome data	Prevalence (1), incidence (2)
Sample size	<100 cases for case-control or <2000 for cross-sectional studies (1), ≥100 cases for case-control or ≥2000 for cross-sectional studies (2)
Included and adjusted for confounders	Excluded IDU and transfusion (1), adjusted for IDU and transfusion (2)
Assessment of HCV infection	Serology only (1), serology and confirmatory RIBA or HCV RNA (2)
Specified venue of tattoo/piercing	No:(1), yes (2)

Abbreviations: HCV, hepatitis C virus; IDU, injection drug use; RIBA, recombinant immunoblot assay.

^a Higher number indicates increased strength of evidence.

^b For studies not including blood donors or high-risk groups.

by cross-sectional studies. Case reports or case series were rated lowest, because the sample size from these types of studies is typically insufficient to quantify risk of HCV transmission. Studies that included incident cases of HCV infection; a sample size including at least 100 cases for case-control studies and 2000 individuals for cross-sectional studies (calculated considering a power of 80%, an α of 0.05, and an estimated OR of 2 and taking into account the variability in HCV infection and tattoo prevalence rates in different study populations); controlled for other hepatitis C risk factors, including mainly IDU and transfusion of blood or blood products; and confirmed HCV infection with recombinant immunoblot assay or nucleic acid testing were given additional rating.

Analysis

The magnitudes of the risk of HCV transmission through tattooing and piercing were presented as adjusted ORs (AORs) obtained by compiling AORs from studies that controlled for the most common routes of HCV transmission, particularly IDU. Because of the wide variability in the characteristics of study populations, we separately evaluated the risk of HCV infection from tattooing in the general population, blood donors, high-risk groups (ie, drug users, homeless persons, sex workers, and patients in sexually transmitted disease clinics), prisoners, and veterans. High-risk groups, prisoners, and veterans have been shown to have higher prevalence rates of IDU and HCV infection than the general population [1, 10–12], which

Table 2. Studies Assessing the Transmission of Hepatitis C Virus Through Tattooing in the General Population, by Study Design and Year of Study

Author(s)	Country (Years of Study)	Study Population	Sample Size	HCV Prevalence (%)	No. Tattooed (% HCV Infected)	Tattooing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Tattoo Was Done
Case-control studies							
Mariano et al 2004 [13]	Italy (1997–2002)	Surveillance data	598 acute HCV cases; 7221 acute HAV controls	...	38 cases; 101 controls	Yes; OR = 5.6 (2.8–11)	...
Hand & Vasquez 2005 [14]	US (2000–02)	Hospital sample	320 cases; 307 controls ^a	...	182 cases; 67 controls	Yes; OR = 2.9 (1.9–4.6)	Friends, relatives, prisons
Delarocque-Astagneau et al 2007 ^b [15]	France (1998–2001)	Hepatology clinics; blood donors	64 cases; 227 controls	...	8 cases; 8 controls	No; OR = 2.8 (.7–10.7)	...
Karmochkine et al 2006 [16]	France (1997–2001)	Cases from clinics; controls from telephone survey	450 cases; 757 controls	...	...	No	...
Lasher et al 2005 [17]	Hawaii (1998–99)	Cases from surveillance; controls from telephone directory	222 cases; 699 controls	...	Professional: 67 cases vs 62 controls; nonprofessional: 32 cases vs 13 controls	Yes; OR = 2.0 (1.1–3.7)	Risk for HCV infection was double if tattoo was done in nonprofessional compared with professional settings
Silverman et al 2000 [18]	US (n/a)	Hospital sample	106 cases; 106 controls	9.4%	106 (6.6%)	No	...
Balasekaran et al 1999 [19]	US (1995–96)	Clinics	58 cases; 58 controls	...	25 cases; 9 controls	Yes; OR = 5.9 (1.1–30.7)	Mainly by family/friends
Dubois et al 1997 [20]	France (1994)	Population-based	72 cases; 144 controls	1.05%	...	No	...
Sun et al 1999 [21]	Taiwan (1991–92)	Community-based	272 cases; 282 controls	...	7 cases; 3 controls	No; OR = 3.1 (.7–13.3)	...
Mele et al 1995 [22]	Italy (1985–93)	Acute surveillance	363 cases; 4879 HAV controls	...	6 cases; 16 controls	No; OR = 2.5 (.8–7.8)	...
Cross-sectional studies							
Hwang et al 2006 [23]	US (2000–01)	College students	5282	0.9%	1327 (1%)	Professional: OR = 0.8 (1.4–1.7); nonprofessional: OR = 3.5 (1.4–8.8)	Yes
Haley and Fisher 2001 [24]	US (1991–92)	Patients in spinal clinic	626	6.9%	113 (22.1%)	Yes; OR = 6.5 (2.9–14.8)	Commercial parlors
King et al 2009 [25]	France (2004)	National health insurance system	14 416	0.8%	1053 (5.3%)	Yes; OR = 2.4 (1.4–4.2)	...
Perez et al 2005 [26]	Puerto Rico (2001–02)	Community-based study	970	6.3%	120 (34.2%)	Yes; OR = 8.9 (1.7–44.7)	...
Nishioka et al 2002 [27]	Brazil (1998–2000)	Hospital-based	345	9.9%	182 (17.6%)	Yes; OR = 6.4 (1.3–31.8)	Mainly nonprofessional settings

could jeopardize analyses and conclusions. They were investigated with low-risk groups. In addition, when information was available in the study, we separately assessed the risk of transmission of HCV infection from tattooing and piercing performed in professional parlors (ie, commercial venues that are licensed and regulated by health authorities), compared with those performed in nonprofessional settings under potentially nonsterile conditions (eg, by friends, at home, or in prison).

RESULTS

Association Between HCV Infection and Tattooing in the General Population

Table 2 summarizes findings from studies in the general population. Of 10 case-control studies, 6 reported no increased risk of HCV infection from tattooing when they controlled for IDU and other risk behaviors [15, 16, 18, 20–22], and 2 studies reported a 2–3 times higher risk for HCV infection when the tattoo was received in nonprofessional settings [14, 17]. One hospital-based case-control study including 64 patients and 128 control subjects did not find a significant association between tattooing and HCV infection in univariate analysis and, thus, excluded tattooing from the multivariate model [32]. Of the few reports showing an association between tattooing and HCV infection, 1 study compared 598 patients with acute HCV infection with 7221 control subjects with acute hepatitis A virus infection [13]. Patients with acute hepatitis A virus infection were younger and lived in other geographic areas, compared with those with acute HCV infection, which might affect the validity of the findings. Another study recruited 58 patients and 58 control subjects from a gastroenterology clinic, which limited generalizability of its findings [19]. More important, 29% of the originally enrolled study population admitted IDU when questioned, and control subjects were not tested to confirm that they were not HCV infected. Moreover, tattooing was frequently performed by family members or friends using unhygienic techniques [19].

A cross-sectional study including >5000 college students in the United States revealed no risk of HCV infection when the tattoo was performed in a professional setting (AOR, 0.8; 95% confidence interval [CI], 0.4–1.7), whereas the risk was significant for tattoos performed in nonprofessional settings (AOR, 3.5; 95% CI, 1.4–8.8) [23]. Other large cross-sectional studies indicated an association between tattooing and HCV infection but did not specify venue of tattooing [25, 26, 29]. A cross-sectional hospital-based survey in Brazil showed an increased risk of HCV infection among persons having a tattoo; however, more than half of individuals received their tattoos in nonprofessional settings using nonsterile instruments [27]. Moreover, 26% of those who had a tattoo reported IDU, compared with 0% of those who did not have a tattoo [33].

Table 2 continued.

Author(s)	Country (Years of Study)	Study Population	Sample Size	HCV Prevalence (%)	No. Tattooed (% HCV Infected)	Tattooing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Tattoo Was Done
La Torre et al 2006 [28]	Italy (1995–2000)	Household contacts of HCV patients	259	8.9%	8 (25%)	No; OR = 7.7 (1.0–60.2)	...
Dominguez et al 2001 [29]	Spain (1996)	Community-based	2142	2.5%	1258 (2.3%)	Yes; OR = 6.2 (1.9–20.9)	...
Brusaferro et al 1999 [30]	Italy (1994–95)	Household contacts of HCV-infected persons	514	10.3%	20 (80%)	Yes; OR = 2.5 (1.1–5.6)	...
Campello et al 2002 [31]	Italy (1994–95)	Community-based	2776	3.3%	...	Males: OR = 3.2 (1.7–13.8), Females: OR = 2.6 (1.2–29.3); Total: OR = 4.2 (1.5–15.2)	...

Abbreviations: CI, confidence interval; HAV, hepatitis A virus; HCV, hepatitis C virus; OR, odds ratio.

^a Confirmatory HCV testing done for 40 cases only.

^b Combined tattooing and piercing in 1 question.

Table 3. Studies Assessing the Transmission of Hepatitis C Virus Through Tattooing Among Blood Donors, by Study Design and Year of Study

Author(s)	Country (Years of Study)	Sample Size	HCV Prevalence (%)	No. Tattooed (% HCV Infected)	Tattooing Reported as a Risk Factor; Adjusted OR (95% CI)
Case-control studies					
Goldman et al 2009 [35]	Canada (2005–06)	88 cases; 349 controls	...	20 cases; 38 controls	Tattoo >10 years ago: OR = 5.43 (1.82–16.2); tattoo past decade: OR = 2.35 (.77–7.22)
O'Brien et al 2008 [36]	Canada (1993–94, 2005–06)	1993: 107 cases; 428 controls 2005: 77 cases; 308 controls	...	1993: 32 cases; 21 controls 2005: 16 cases; 34 controls	Overall OR = 3.8 (2.0–7.3); 1993: OR = 8.3 (2.8–24.5); 2005: OR = 2.9 (1.2–7.0)
Kerzman et al 2007 [37]	Israel (2001–02)	50 cases; 128 controls	...	13 cases; 10 controls	No; OR = 1.1 (.1–9.2)
Thaikruea et al 2004 [38]	Thailand (2001–02)	166 cases; 329 controls	...	...	No
Tanwandee et al 2006 [39]	Thailand (n/a)	435 cases; 894 controls	...	...	No
Delage et al 1999 [40]	Canada (1993–94)	267 cases; 1068 controls	...	97 cases; 60 controls	Yes; OR = 5.7 (2.5–13.0)
Brandao & Fuchs 2002 [41]	Brazil (1995–96)	178 cases; 356 controls	1.10%	27 cases; 15 controls	Yes; OR = 4.4 (1.6–11.9)
Alavian et al 2002 [42]	Iran (1996–98)	193 cases; 196 controls	...	22 cases; 4 controls	No
Murphy et al 2000 [43]	US (1994–95)	758 cases; 1039 controls	...	205 cases; 52 controls	No
Conry-Cantilena et al 1996 [44]	US (1991–94)	248 cases; 131 controls	...	52 cases; 5 controls	No
Neal et al 1994 [45]	UK (1991–92)	35 cases; 150 controls	...	6 cases; 11 controls	Yes; OR = 3.3 (1.2–8.7)
Shev et al 1995 [46]	Sweden (1990–92)	51 cases; 51 controls	...	19 cases; 3 controls	Yes
Cross-sectional studies					
Khin et al 2010 [47]	Myanmar (2005–07)	65 240	0.95%	408 (0.98%)	No

All studies adjusted for injection drug use and other risks for HCV acquisition. Abbreviations: CI, confidence interval; HCV, hepatitis C virus; OR, odds ratio.

Only one early (1991–1992) cross-sectional study conducted among a selected US population (minority, indigent, and orthopedic patients) indicated a potential risk of HCV transmission by tattooing in commercial parlors [24]. One case report suggested potential hepatitis C transmission by tattooing in commercial parlors from reuse of nondisposable tattooing needles that are not appropriately sterilized [34].

Association Between HCV Infection and Tattooing Among Blood Donors

Persons with certain high-risk behaviors are excluded from blood donation, and several countries require persons who have recently had a tattoo or body piercing to defer from blood donation for at least 6 months, leading to lower rates of risk behaviors in this population. All studies conducted among blood donors did not inquire about the venue of tattooing. As shown in Table 3, almost all studies of these low-risk

individuals that controlled for major HCV infection risk factors have not reported an increased risk for HCV infection from tattooing [37–39, 42–44, 47]. Case-control studies conducted in large samples of blood donors in the United States did not show an increased risk of HCV transmission from tattooing, but did report significant associations between tattooing and IDU [43, 44].

Some studies suggest that tattoos received before 1995 increased the risk of HCV infection, whereas those received after 2005 did not [35, 36, 40, 41, 45, 46]. However, none of the studies recruited patients with incident cases, limiting the ability to draw temporal causality. One study involving blood donors in Canada found that the odds of HCV infection from tattooing were much lower among blood donors in 2005 (AOR, 2.9; 95% CI, 1.2–7.0) than among blood donors in 1993 (AOR, 8.3; 95% CI, 2.8–24.5) [32]. However, the venue of tattooing was not specified.

Table 4. Studies Assessing the Transmission of Hepatitis C Virus Through Tattooing in Prisoners, High-Risk Groups, and Veterans, by Study Design and Year of Study

Author(s)	Country (Year of Study)	Study Sample	Sample Size	HCV Prevalence (%)	No. Tattooed (% HCV Infected)	Tattooing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Tattoo Was Done
Cohort studies							
Teutsch et al 2010 [48]	Australia (2005–09)	Prison	488	19% incidence rate: 31.6 per 100 person-years	354 (21.5%)	Yes; OR = 2.01 (1.01–4.01)	...
Butler et al 2004 [49]	Australia (1996–2001)	Prison	181	18% incidence rate: 7.1 per 100 person-years	52 (26.9%)	No	Mainly prison
Case-control studies							
Russell et al 2009 [50]	US (2001–04)	STD clinics	170 cases, 345 controls	3.4%	10% cases, 2.6% controls	No; OR = 1.87 (1.62–5.65)	Nonprofessional settings
Cross-sectional studies							
Kheirandish et al 2009 [51]	Iran (2006)	Male IDUs in detention	454	80%	125 (89%)	Yes; OR = 2.33 (1.05–5.17)	...
Coelho et al 2009 [52]	Brazil (2003)	Prison	333	8.7%	120 (19.2%)	Yes; OR = 3.2 (1.05–10.0)	...
Lai et al 2007 [53]	Taiwan (2004–05)	Amphetamine abusers in prison	285	22.5%	178 (28.7%)	Yes; OR = 2.97 (1.37–6.43)	...
Liao et al 2006 [54]	Taiwan (2004–05)	Non-drug abuse Prisoners	297	10.1%	117 (14.5%)	Yes; OR = 2.24 (1.03–4.88)	...
Babudieri et al 2005 [55]	Italy (2001–02)	Prison inmates	973	38.0%	463 (51.2%)	Yes; OR = 1.91 (1.26–2.91)	...
Bair et al 2005 [56]	US (2000–01)	Detention center	1002	2.0%	506 (3.6%)	No; OR = 1.90 (1.33–1.79)	...
Hellard et al 2007 [57]	Australia (2001)	Prisons	642	57.5%	449 (65.5%)	Yes; OR = 2.7 (1.4–5.2)	Prison
Murray et al 2003 [58]	US (1999–2001)	Incarcerated youths	305	2.0%	101 (2%)	No	Nonprofessional settings
Miller et al 2009 [59]	Australia (2005–07)	IDU	355	68.9%	201 (68%)	No	Multiple locations
Mehta et al 2010 ^a [60]	India (2005–06)	IDU	1158	55%	...	Yes; PR = 1.26 (1.14–1.41)	...
Samuel et al 2001 ^a [61]	US (1995–97)	IDU	945	82.2%	577 (84.8%)	Not in-prison/jail: OR = 1.7 (0.9–2.9); in prison/jail: OR = 3.4 (1.6–7.5)	Prisons, friends, relatives
Nurutdinova et al 2011 ^a [62]	US (1998–2004)	African American women who abuse substances	782	21.2%	210 (26.7%)	Yes; OR = 2.05 (1.15–3.66)	...
Gyarmathy et al 2002 ^a [63]	US (1996–2001)	Noninjection heroin users	483	26%	99 (18.2%)	Never injectors: OR = 2.2 (1.0–4.7); former injectors: OR = 3.5 (1.3–9.6)	...
Howe et al 2005 [64]	US (2000)	Noninjection drug users	722	3.9%	265 (4.5%)	Yes; OR = 3.6 (1.2–11.3)	Friends, relatives
Roy et al 2001 [65]	Montreal, Canada (1995–96)	Street youths	437	12.6%	247 (18.2%)	No; OR = 1.8 (1.9–3.6)	...

LATE TESTIMONY

Association Between HCV Infection and Tattooing Among High-Risk Groups

Table 4 summarizes the findings of studies that assessed the risk of HCV infection from tattooing in high-risk groups. Two cohort studies conducted among prisoners in Australia reported discrepant findings. The study that recruited a larger sample (n = 488) showed a significant association between tattooing and HCV infection [48]; the other study, which did not find such an association, recruited 181 prisoners, a smaller number, which might have limited the power to demonstrate statistical significance [49]. Although cohort studies followed up with prisoners over >4 years, the presence of tattooing was assessed during their lifetime and not necessarily during their time in prison; this hinders temporal linkage between tattooing and HCV infection [48, 49].

Results from cross-sectional studies involving incarcerated individuals have been inconsistent. Two studies conducted in the United States among incarcerated youths reported no increased risk of HCV infection among those who were tattooed, even if the tattoo was applied in a nonprofessional setting [56, 58]. However, several studies from other countries found a 2–3 times higher likelihood of HCV infection among prisoners who had a tattoo [51–55, 57]. Of note, approximately 90% of prisoners received tattoos in nonprofessional settings [57]. Case reports of acute HCV infection from tattooing in prison suggest that tattooing could be the source of infection [67–69]. One case report documented seroconversion in a prisoner after a negative hepatitis C test result, and tattooing in prison was the only risk factor during the incubation period [67].

Findings from cross-sectional studies involving injection drug users varied by country, duration of injection, and incarceration [59–61]. Although the risk of HCV infection increased by 3 times among injection drug users who had tattoos applied in prison or jail, the risk was not statistically significant if the tattoos were received outside prison or jail [61]. Current noninjecting heroin users who reported never injecting drugs did not have a significantly increased risk of HCV infection from tattooing, whereas former injectors who had a tattoo had 3 times higher risk of HCV infection [63]. Other studies involving noninjection drug users reported a 2–3 times higher risk of HCV infection among those who had a tattoo [62, 64], and 1 study specified that the tattoos were applied by friends or relatives [64].

Studies involving street youths and homeless persons did not find an association between HCV infection and tattoos [65, 70], with 57% of homeless persons reporting IDU and 41% of them having shared needles with others [70].

Tattoos are highly prevalent among soldiers. Almost 36% of soldiers in the US Army had at least 1 tattoo, and 76% experienced bleeding after the procedure, which might promote transmission of blood-borne infections [71]. Studies that

Table 4 continued.

Author(s)	Country (Year of Study)	Study Sample	Sample Size	HCV Prevalence (%)	No. Tattooed (% HCV Infected)	Tattooing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Tattoo Was Done
Zuniga et al 2006 ^b [66]	US (2001–03)	Veterans	2263	4.6%	681 (7.0%)	Yes; OR = 2.12 (1.28–3.49)	...
Dominitz et al 2005 [11]	US (1998–2000)	Veterans	1288	4.0%	247 (11.3%)	Yes; OR = 2.9 (1.4–5.8)	...
Briggs et al 2001 [12]	US (1998–99)	Veterans	1032	17.7%	256 (34.7%)	Yes; OR = 2.93 (1.70–5.08)	...

Abbreviations: CI, confidence interval; HCV, hepatitis C virus; IDU, injection drug user; OR, odds ratio; PR, prevalence ratio; STD, sexually transmitted disease.

^a Confirmatory HCV testing was not done.

^b Combined both tattoo and body piercing.

Table 5. Studies Assessing the Transmission of Hepatitis C Virus Through Piercing Among Different Study Populations

Author(s)	Country (Year of Study)	Study Sample	Sample Size	HCV Prevalence (%)	No. Pierced (% HCV Infected)	Piercing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Piercing Was Done
Cohort study							
Bruneau et al 2010 [72]	Canada (2004–08)	IDU	145	28%	17 (35%)	No; HR = 0.96 (1.3–2.7)	...
Case Control studies							
Mariano et al 2004 [13]	Italy (1997–2002)	Surveillance data	598 acute HCV cases; 7221 acute HAV controls	...	42 cases; 224 controls	Yes; OR = 2.4 (1.2–4.8)	...
Karmochkine et al 2006 [16]	France (1997–2001)	Cases from clinics; controls from telephone survey	450 cases; 757 controls	...	...	No	...
Lasher et al 2005 [17]	US (1998–99)	Cases from surveillance; controls from telephone directory	222 cases; 699 controls	...	13 cases; 14 controls	No; OR = 1.5 (1.4–1.6)	...
Balasekaran et al 1999 ^a [19]	US (1995–96)	Clinics	58 cases; 58 controls	...	Men: 7 cases; 5 controls; Women: 34 cases; 36 controls	No; Men: OR = 1.7 (1.4–7.0); Women: OR = 0.3 (0.03–3.2)	...
Mele et al 1995 ^a [22]	Italy (1985–93)	Acute surveillance	363 cases; 4879 HAV controls	...	12 cases; 74 controls	Yes; OR = 2.8 (1.3–5.8)	...
He et al 2011 ^a [73]	China (2006–07)	Blood donors	305 cases; 610 controls	0.53%	98 cases; 62 controls	Yes; OR = 7.3 (3.3–16.3)	...
Goldman et al 2009 [35]	Canada (2005–06)	Blood donors	88 cases; 349 controls	...	...	No	...
Kerzman et al 2007 [37]	Israel (2001–02)	Blood donors	50 cases; 128 controls	...	11 cases; 37 controls	No; OR = 0.8 (1.4–1.8)	...
Thaikruea et al 2004 [38]	Thailand (2001–02)	Blood donors	166 cases; 329 controls	...	49 cases; 35 controls	No	...
Tanwandee et al 2006 [39]	Thailand (n/a)	Blood donors	435 cases; 894 controls	...	...	No	...
Murphy et al 2000 [43]	US (1994–95)	Blood donors	758 cases; 1039 controls	...	425 cases; 416 controls	Yes; OR = 2.0 (1.1–3.7)	...
Conry-Cantilena et al 1996 ^a [44]	US (1991–94)	Blood donors	248 cases; 131 controls	...	42 cases; 0 controls	Yes (men): OR = ∞; No (women)	...
Neal et al 1994 [45]	UK (1991–92)	Blood donors	35 cases; 150 controls	...	23 cases; 71 controls (ear)	No; OR = 1.4 (1.7–2.9)	...
Cross-sectional studies							
Hwang et al 2006 [23]	US (2000–01)	College students	5282	0.9%	1108 (0.7%)	No; OR = 0.76 (1.36–1.62)	...
King et al 2009 [25]	France (2004)	National seroprevalence survey	14 416	0.8%	5398 (1.8%)	No	...

LATE TESTIMONY

Table 5 continued.

Author(s)	Country (Year of Study)	Study Sample	Sample Size	HCV Prevalence (%)	No. Pierced (% HCV Infected)	Piercing Reported as a Risk Factor; Adjusted OR (95% CI)	Location Where Piercing Was Done
Perez et al 2005 [26]	Puerto Rico (2001-02)	Community-based study	970	6.3%	247 (4.4%)	No	...
Khin et al 2010 [47]	Myanmar (2005-07)	Blood donors	65 240	0.95%	638 (0.31%)	No	...
Bair et al 2005 [56]	US (2000-01)	Detention center	1002	2.0%	506 (3.6%)	No	...
Murray et al 2003 [58]	US (1999-2001)	Newly incarcerated youths	305	2.0%	163 (3.10%)	No	Nonprofessional settings
Miller et al 2009 [59]	Australia (2005-07)	IDU	355	68.9%	117 (58.1%)	No	Multiple locations assessed
Roy et al 2001 [65]	Canada (1995-96)	Street youths	437	12.6%	342 (13.4%)	No	...
Dornnitz et al 2005 [11]	US (1998-2000)	Veterans	1288	4.0%	178 (12.9%)	No; OR = 2.2 (1.7-6.8) ^b	...

Abbreviations: CI, confidence interval; HAV, hepatitis A virus; HCV, hepatitis C virus; IDU, injection drug user; OR, odds ratio.

^a Ear piercing.

^b OR adjusted for IDU only.

recruited >1000 veterans and almost 3 times higher risk of HCV infection among veterans with a tattoo, compared with those who did not have a tattoo (Table 4) [11, 12, 66]. However, in all studies, the researchers did not inquire about the venue of tattooing.

Association Between HCV Infection and Piercing

Table 5 summarizes findings of studies that assessed the risk of HCV infection among those who reported having a body or ear piercing. The majority of studies did not distinguish between piercings received in professional settings from those received in nonprofessional settings. Only 5 of 23 studies reported an increased risk of HCV infection among persons with a piercing (AOR, 2.0-7.3) [13, 22, 43, 44, 73]. Of the 5, 2 were conducted among blood donors in the United States during the early 1990s [43, 44], with 1 study showing a significant association between ear piercing and HCV infection only among men and no association among women [44].

Moreover, a number of cohort, case-control, and cross-sectional studies involving high-risk groups did not find significant associations between body piercing and HCV infection in univariate analysis and, thus, did not include this variable in the multivariable model [32, 48, 62, 64]. A cross-sectional study including >5000 college students in the United States did not reveal an increased risk of HCV infection among those with a body piercing [23]. Acute HCV infection occurred after ear piercing with a gun at a jeweler in an older French woman with no other identified risk factor [74]. Swapping body piercing jewelry was also reported as a potential source of HCV infection in another case report [75].

DISCUSSION

This article critically reviewed the literature for the risk of transmission of HCV infection through tattooing and piercing by distinguishing among different study populations and careful examination of potential study limitations. To date, there is no definitive evidence that such infections occur when sterile equipment is used. Of note, no outbreaks of HCV infection have been detected in the United States that originate from professional tattoo or piercing parlors. In addition, recent cohort and case-control studies including samples from the general population or blood donors in developed countries did not show an increased risk of HCV infection with body or ear piercing.

Although commercial parlors have not been implicated in HCV transmission, such transmission could occur at different stages of tattooing and piercing, from the reuse of nondisposable needles, inappropriate sterilization of equipment, or reuse of ink contaminated with blood from an infected person. Although data on survival of hepatitis C in tattooing or piercing

equipment are not available, survival of HCV ranges from a few days on inanimate surfaces to almost 1 month in propofol solutions [76–79]. Because of the potential risk of transmission of blood-borne pathogens through tattooing and piercing, the US Occupational Safety and Health Administration includes these practices in their blood-borne safety standards [80]. In addition, several countries and more than two-thirds of state health jurisdictions in the United States have additional regulations for tattoo and piercing parlors [81].

Although the majority of reviewed studies failed to report the venue of tattoo and/or piercing, studies that specified the location in the general population showed a significant increase in risk of HCV infection when the tattoo was done in non-professional settings [14, 17, 19, 23, 27]. In addition, the risk of HCV infection is significant among high-risk groups when nonsterile tattooing equipment is used, especially in unregulated settings, such as homes or prison (AOR, 2.0–3.6) [48, 57, 61, 64]. Although location of tattooing was not specified in all studies including prisoners, this population seems to be at increased risk of HCV infection from tattooing, according to the available data [48, 51–56]. Tattooing in prison is of particular concern because of the high prevalence of tattooing among incarcerated persons, reaching up to 40% in some studies [57, 82]. Tattooing in this setting typically is performed using non-sterile equipment, such as guitar strings, paper clips, or sewing needles, which are usually cleaned by heating or use of boiling water [82]. The strong association between tattoos received in prison and HCV infection may in part be confounded by other high-risk behaviors, such as IDU, or may be a consequence of an association between history of imprisonment and dangerous lifestyles. Prisoners with a history of IDU were 5 times more likely to have a tattoo and were significantly more likely to have acquired the tattoo in prison [57]. Qualitative studies might be helpful to identify successful techniques to prevent blood-borne viruses in prison environments and among high-risk groups [61].

A major limitation, common to all studies, was the reliance on self-reports for the ascertainment of IDU. Tattoos and drugs often coexist, and the risk of HCV infection among tattooed individuals consistently has been shown to be related to drug use [57, 59, 63, 65]. Of note, in one study, 67% of the participants who initially denied drug use at study entry subsequently admitted IDU or intranasal cocaine use [18]. In addition, almost all cohort and case-control studies did not recruit patients with incident cases of HCV infection and asked about ever having a tattoo or piercing, which hinders drawing temporal causal relationships between HCV infection and tattooing or piercing. Finally, most studies did not inquire about the venue of receipt of the tattoo or piercing. Therefore, future studies that inquire about tattooing and piercing need to specify the venue where they were received

to draw more scientifically sound conclusions about the association between HCV infection and those exposures.

Although our original objective was to conduct a meta-analysis, several of the studies that found no association between HCV infection and tattooing or piercing in the univariate analysis either did not include those exposures in the multivariable analysis or did not report the AOR. Therefore, pooling the results of studies with available ORs would be inappropriate and would lead to inaccurate and false conclusions. It is recommended that upcoming studies report AORs even if they are not significant to facilitate the conduct of meta-analyses in the future.

Despite these limitations, we could evaluate the quality of the evidence in each study. The findings emphasize the need to prevent hepatitis C transmission from use of unsterile tattooing and piercing equipment, especially in prisons. Because of the increasing prevalence of tattooing and piercings, particularly among youths, awareness campaigns should highlight the danger of such procedures in unregulated and potentially unsterile environments, such as homes and prisons. In addition, tattoo and piercing parlors need to be educated about and monitored for use of proper infection control procedures to avoid isolated cases of HCV infection and other infections.

Note

Potential conflicts of interest. All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

References

1. Armstrong GL, Wasley A, Simard EP, et al. The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. *Ann Intern Med* 2006; 144:705–14.
2. Centers for Disease Control and Prevention. Viral hepatitis surveillance—United States. 2009. Available at: <http://www.cdc.gov/hepatitis/Statistics/2009Surveillance/PDFs/2009HepSurveillanceRpt.pdf>. Accessed 6 September 2011.
3. Williams IT, Bell BP, Kuhnert W, Alter MJ. Incidence and transmission patterns of acute hepatitis C in the United States, 1982–2006. *Arch Intern Med* 2011; 171:242–8.
4. Laumann AE, Derick AJ. Tattoos and body piercings in the United States: a national data set. *J Am Acad Dermatol* 2006; 55:413–21.
5. Mayers LB, Chiffriller SH. Body art (body piercing and tattooing) among undergraduate university students: “then and now.” *J Adolesc Health* 2008; 42:201–3.
6. Carroll ST, Riffenburgh RH, Roberts TA, Myhre EB. Tattoos and body piercings as indicators of adolescent risk-taking behaviors. *Pediatrics* 2002; 109:1021–7.
7. Stieger S, Pietschnig J, Kastner CK, Voracek M, Swami V. Prevalence and acceptance of tattoos and piercings: a survey of young adults from the southern German-speaking area of central Europe. *Percept Mot Skills* 2010; 110:1065–74.
8. Stroup D, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting. *JAMA* 2000; 283:2008–12.

9. Atkins D, Best D, Briss PA, et al. (GRADE) Working Group. Grading quality of evidence and strength of recommendations. *BMJ* 2004; 328:1490-4.
10. Vescio MF, Longo B, Babudieri S, et al. Correlates of hepatitis C virus seropositivity in prison inmates: a meta-analysis. *J Epidemiol Community Health* 2008; 62:305-13.
11. Dominitz JA, Boyko EJ, Koepsell TD, Heagerty PJ, Maynard C, Sporleder JL. VA Cooperative Study Group 488. Elevated prevalence of hepatitis C infection in users of United States veterans medical centers. *Hepatology* 2005; 41:88-96.
12. Briggs ME, Baker C, Hall R, et al. Prevalence and risk factors for hepatitis C virus infection at an urban veterans administration medical center. *Hepatology* 2001; 34:1200-5.
13. Mariano A, Mele A, Tosti ME, et al. Role of beauty treatment in the spread of parenterally transmitted hepatitis viruses in Italy. *J Med Virol* 2004; 74:216-20.
14. Hand WL, Vasquez Y. Risk factors for hepatitis C on the Texas-Mexico border. *Am J Gastroenterol* 2005; 100:2180-5.
15. Delarocque-Astagneau E, Pillonel J, De Valk H, Perra A, Laperche S, Desenclos JC. An incident case-control study of modes of hepatitis C virus transmission in France. *Ann Epidemiol* 2007; 17:755-62.
16. Karmochkine M, Carrat F, Dos Santos O, Cacoub P, Raguin G. for the GERMIVIC Study Group. A case-control study of risk factors for hepatitis C infection in patients with unexplained routes of infection. *J Viral Hepat* 2006; 13:775-82.
17. Lasher LE, Elm JL, Hoang Q, et al. A case control investigation of hepatitis C risk factors in Hawaii. *Hawaii Med J* 2005; 64:296-304.
18. Silverman AL, Sekhon JS, Saginaw SJ, Wiedbrauk D, Balasubramaniam M, Gordon SC. Tattoo application is not associated with an increased risk for chronic viral hepatitis. *Am J Gastroenterol* 2000; 95:1312-5.
19. Balasekaran R, Bulterys M, Jamal MM, et al. A case-control study of risk factors for sporadic hepatitis C virus infection in the southwestern United States. *Am J Gastroenterol* 1999; 94:1341-6.
20. Dubois F, Desenclos JC, Mariotte N, Goudeau A. The Collaborative Study Group. Hepatitis C in a French population-based survey, 1994: seroprevalence, frequency of viremia, genotype distribution, and risk factors. *Hepatology* 1997; 25:1490-6.
21. Sun CA, Chen HC, Lu CF, et al. Transmission of hepatitis C virus in Taiwan: prevalence and risk factors based on a nationwide survey. *J Med Virol* 1999; 59:290-6.
22. Mele A, Corona R, Tosti ME, et al. Beauty treatments and risk of parenterally transmitted hepatitis: results from the hepatitis surveillance system in Italy. *Scand J Infect Dis* 1995; 27:441-4.
23. Hwang LY, Kramer JR, Troisi C, et al. Relationship of cosmetic procedures and drug use to hepatitis C and hepatitis B virus infections in a low-risk population. *Hepatology* 2006; 44:341-51.
24. Haley RW, Fisher RP. Commercial tattooing as a potentially important source of hepatitis C infection: clinical epidemiology of 626 consecutive patients unaware of their hepatitis C serologic status. *Medicine* 2001; 80:134-51.
25. King LA, Le Strat Y, Meffre C, Delarocque-Astagneau E, Desenclos JC. Assessment and proposal of a new combination of screening criteria for hepatitis C in France. *Eur J Public Health* 2009; 19:527-33.
26. Perez CM, Suarez E, Torres EA, Roman K, Colon V. Seroprevalence of hepatitis C virus and associated risk behaviors: a population-based study in San Juan, Puerto Rico. *Int J Epidemiol* 2005; 34:593-9.
27. Nishioka S de A, Gyorkos TW, Joseph L, Collet JP, Maclean JD. Tattooing and risk for transfusion-transmitted diseases: the role of the type, number and design of the tattoos, and the conditions in which they were performed. *Epidemiol Infect* 2002; 128:63-71.
28. La Torre G, Miele L, Mannocci A, et al. Correlates of HCV seropositivity among familial contacts of HCV infected patients. *BMC Public Health* 2006; 6:237.
29. Dominguez A, Bruguera M, Vidal J, Plans P, Salleras L. Community-based seroepidemiological survey of HCV infection in Catalonia, Spain. *J Med Virol* 2001; 65:688-93.
30. Brusaferrero S, Barbone F, Andriani P, et al. A study on the role of the family and other risk factors in HCV transmission. *Eur J Epidemiol* 1999; 15:125-32.
31. Campello C, Poli A, Dal Molin G, Bezossi-Valentini F. Seroprevalence, viremia and genotype distribution of hepatitis C virus: a community-based population study in northern Italy. *Infection* 2002; 30:7-12.
32. Kim YS, Ahn YO, Kim DW. A case-control study on the risk factors of hepatitis C virus infection among Koreans. *J Korean Med Sci* 1996; 11:38-43.
33. Nishioka S de A, Gyorkos TW, Joseph L, Collet JP, Maclean JD. Tattooing and transfusion-transmitted diseases in Brazil: a hospital-based cross-sectional matched study. *Eur J Epidemiol* 2003; 18: 441-9.
34. Sun DX, Zhang FG, Geng YQ, Xi DS. Hepatitis C transmission by cosmetic tattooing in women. *Lancet* 1996; 347:541.
35. Goldman M, Xi G, Yi QL, Fan W, O'Brien SF. Reassessment of deferrals for tattooing and piercing. *Transfusion* 2009; 49:648-54.
36. O'Brien SF, Fan W, Xi G, et al. Declining hepatitis C rates in first time blood donors: insight from surveillance and case-control risk factor studies. *Transfusion* 2008; 48:902-9.
37. Kerzman H, Green MS, Shinar E. Risk factors for hepatitis C virus infection among blood donors in Israel: a case-control study between native Israelis and immigrants from the former Soviet Union. *Transfusion* 2007; 47:1189-96.
38. Thaikruea L, Thongsawat S, Maneekarn N, Netski D, Thomas DL, Nelson KE. Risk factors for hepatitis C virus infection among blood donors in northern Thailand. *Transfusion* 2004; 44:1433-40.
39. Tanwandee T, Piratvisuth T, Phornphutkul K, Mairiang P, Permpikul P, Poovorawan Y. Risk factors of hepatitis C virus infection in blood donors in Thailand: a multicenter case-control study. *J Med Assoc Thai* 2006; 89(Suppl 5):S79-83.
40. Delage G, Infante-Rivard C, Chiavetta JA, Willems B, Pi D, Fast M. Risk factors for acquisition of hepatitis C virus infection in blood donors: results of a case-control study. *Gastroenterology* 1999; 116: 893-9.
41. Brandao AB, Fuchs SC. Risk factors for hepatitis C virus infection among blood donors in southern Brazil: a case-control study. *BMC Gastroenterol* 2002; 2:18.
42. Alavian SM, Gholami B, Masarrat S. Hepatitis C risk factors in Iranian volunteer blood donors: a case-control study. *J Gastroenterol Hepatol* 2002; 17:1092-7.
43. Murphy EL, Bryzman SM, Glynn SA, et al. Risk factors for hepatitis C virus infection in United States blood donors. *Hepatology* 2000; 31: 756-62.
44. Conry-Cantilena C, VanRaden M, Gibble J, et al. Routes of infection, viremia, and liver disease in blood donors found to have hepatitis C virus infection. *N Engl J Med* 1996; 334:1691-6.
45. Neal KR, Jones DA, Killey D, James V. Risk factors for hepatitis C virus infection. A case-control study of blood donors in the Trent region (UK). *Epidemiol Infect* 1994; 112:595-601.
46. Shev S, Hermodsson S, Lindholm A, Malm E, Widell A, Norkrans G. Risk factor exposure among hepatitis C virus RNA positive Swedish blood donors—the role of parenteral and sexual transmission. *Scand J Infect Dis* 1995; 27:99-104.
47. Khin M, Oo SS, Oo KM, Shimono K, Koide N, Okada S. Prevalence and factors associated with hepatitis C virus infection among Myanmar blood donors. *Acta Med Okayama* 2010; 64:317-21.
48. Teutsch S, Luciani F, Scheuer N, et al. Incidence of primary hepatitis C infection and risk factors for transmission in an Australian prisoner cohort. *BMC Public Health* 2010; 10:633.
49. Butler T, Kariminia A, Levy M, Kaldor J. Prisoners are at risk for hepatitis C transmission. *Eur J Epidemiol* 2004; 19:1119-22.
50. Russell M, Chen MJ, Nochajski TH, Testa M, Zimmerman SJ, Hughes PS. Risky sexual behavior, bleeding caused by intimate partner violence, and hepatitis C virus infection in patients of a sexually transmitted disease clinic. *Am J Public Health* 2009; 99:S173-9.

51. Kheirandish P, SeyedAlmoghaybi SA, Jahani MR, et al. Prevalence and correlates of hepatitis C infection among male injection drug users in detention, Tehran, Iran. *J Urban Health* 2009; 86:902–8.
52. Coelho HC, de Olivera SA, Miguel JC, et al. Predictive markers for hepatitis C virus infection among Brazilian inmates. *Rev Soc Bras Med Trop* 2009; 42:369–72.
53. Lai SW, Chang WL, Peng CY, Liao KF. Viral hepatitis among male amphetamine-inhaling abusers. *Intern Med J* 2007; 37:472–7.
54. Liao KF, Lai SW, Chang WL, Hsu NY. Screening for viral hepatitis among male non-drug-abuse prisoners. *Scand J Gastroenterol* 2006; 41:969–73.
55. Babudieri S, Longo B, Sarmati L, et al. Correlates of HIV, HBV, and HCV infections in a prison inmate population: results from a multi-centre study in Italy. *J Med Virol* 2005; 76:311–7.
56. Bair RM, Baillargeon JG, Kelly PJ, et al. Prevalence and risk factors for hepatitis C virus infection among adolescents in detention. *Arch Pediatr Adolesc Med* 2005; 159:1015–8.
57. Hellard ME, Aitken CK, Hocking JS. Tattooing in prisons—not such a pretty picture. *Am J Infect Control* 2007; 35:477–80.
58. Murray KF, Richardson LP, Morishima C, Owens JWM, Gretch DR. Prevalence of hepatitis C virus infection and risk factors in an incarcerated juvenile population: a pilot study. *Pediatrics* 2003; 111:153–7.
59. Miller ER, Hellard ME, Bowden S, Bharadwaj M, Aitken CK. Markers and risk factors for HCV, HBV and HIV in a network of injecting drug users in Melbourne, Australia. *J Infect* 2009; 58:375–82.
60. Mehta SH, Vogt SL, Srikrishnan AK, et al. Epidemiology of hepatitis C virus infection and liver disease among injection drug users (IDUs) in Chennai, India. *Ind J Med Res* 2010; 132:706–14.
61. Samuel MC, Doherty PM, Bulterys M, Jenison SA. Association between heroin use, needle sharing and tattoos received in prison with hepatitis B and C positivity among street-recruited injecting drug users in New Mexico, USA. *Epidemiol Infect* 2001; 127:475–84.
62. Nurutdinova D, Abdallah AB, Bradford S, O’Leary CC, Cottler LB. Risk factors associated with hepatitis C among female substance users enrolled in community-based HIV prevention studies. *BMC Res Notes* 2011; 4:126.
63. Gyarmathy VA, Neaigus A, Miller M, Friedman SR, Des Jarlais DC. Risk correlates of prevalent HIV, hepatitis B virus, and hepatitis C virus infections among noninjecting heroin users. *J Acquir Immune Defic Syndr* 2002; 30:448–56.
64. Howe CJ, Fuller CM, Ompad DC, et al. Association of sex, hygiene and drug equipment sharing with hepatitis C virus infection among non-injecting drug users in New York City. *Drug Alcohol Depend* 2005; 79:389–95.
65. Roy E, Haley N, Leclerc P, Boivin JF, Cedras L, Vincelette J. Risk factors for hepatitis C virus infection among street youths. *CMAJ* 2001; 165: 557–60.
66. Zuniga IA, Chen JJ, Lane DS, Allmer J, Jimenez-Lucho VE. Analysis of hepatitis C screening program for US veterans. *Epidemiol Infect* 2006; 134:249–57.
67. Tsang TH, Horowitz E, Vugia DC. Transmission of hepatitis C through tattooing in a United States prison. *Am J Gastroenterol* 2001; 96: 1304–5.
68. Post JJ, Dolan KA, Whybin LR, Carter IW, Haber PS, Lloyd AR. Acute hepatitis C virus infection in an Australian prison inmate: tattooing as a possible transmission route. *Med J Aust* 2001; 174:183–4.
69. Thompson SC, Hernberger F, Wale E, Crofts N. Hepatitis C transmission through tattooing: a case report. *Aust N Z J Public Health* 1996; 20:317–8.
70. Sherriff LC, Mayon-White RT. A survey of hepatitis C prevalence amongst the homeless community of Oxford. *J Public Health Med* 2003; 25:358–61.
71. Armstrong ML, Murphy KP, Sallee A, Watson MG. Tattooed army soldiers: examining the incidence, behavior, and risk. *Mil Med* 2000; 165:135–41.
72. Bruneau J, Daniel M, Kestens Y, Abrahamowicz M, Zang G. Availability of body art facilities and body art piercing do not predict hepatitis C acquisition among injection drug users in Montreal, Canada: results from a cohort study. *Int J Drug Policy* 2010; 21:477–84.
73. He Y, Zhang J, Zhong L, et al. Prevalence of and risk factors for hepatitis C virus infection among blood donors in Chengdu, China. *J Med Virol* 2011; 83:616–21.
74. Grasset D, Borderes C, Escudie L, et al. Le piercing des oreilles responsable d’une contamination par le virus de l’hépatite C [Hepatitis C virus from ear piercing]. *Gastroenterol Clin Biol* 2004; 28:501–8.
75. Daniel AR, Sheha T. Transmission of hepatitis C through swapping body jewelry. *Pediatrics* 2005; 116:1264–5.
76. Paintsil E, He H, Peters C, Lindenbach BD, Heimer R. Survival of hepatitis C virus in syringes: implication for transmission among injection drug users. *J Infect Dis* 2010; 202:984–90.
77. Kamili S, Krawczynski K, McCaustland K, Li X, Alter MJ. Infectivity of hepatitis C virus in plasma after drying and storing at room temperature. *Infect Control Hosp Epidemiol* 2007; 28:519–24.
78. Doerrbecker J, Friesland M, Ciesek S, et al. Inactivation and survival of hepatitis C virus on inanimate surfaces. *J Infect Dis* 2011; 204: 1830–8.
79. Steinman E, Ciesek S, Friesland M, Erichsen TJ, Pietschmann T. Prolonged survival of hepatitis C virus in the anesthetic propofol. *Clin Infect Dis* 2011; 53:963–4.
80. Occupational Safety and Health Administration (OSHA). Occupational safety and health standard: bloodborne pathogens. Available at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051. Accessed 28 November 2011.
81. Armstrong ML. Tattooing, body piercing, and permanent cosmetics: a historical and current view of state regulations, with continuing concerns. *J Environ Health* 2005; 67:38–43.
82. Strang J, Heuston J, Whiteley C, et al. Is prison tattooing a risk behaviour for HIV and other viruses? Results from a national survey of prisoners in England and Wales. *Criminal Behav Ment Health* 2000; 10:60–6.

LATE TESTIMONY

PETER GELLATLY
PO BOX 88377
HONOLULU, HI 96830

March 18, 2012

Representative Robert Herkes, Chair
Committee on Consumer Protection and Commerce
House of Representatives
State of Hawaii

Re: SB2398 SD2 HD1 STRONG SUPPORT

Dear Representative Herkes and Committee Members,

I have lived in Hawaii since the early 1970s, and in the ensuing decades the tattooing industry has matured from a late, late night Chinatown adventure tour to a mainstream business form affecting thousands of local residents. Once upon a time, the Mike Malone-applied tattoo on my forearm raised eyes in the business community. Now the tattoos on my wife and daughters are matched by those sported by their friends.

The bill before you today promotes the common-sense regulation of this industry. By state statute, local tattoo artists adhere to rigid standards of health and safety. However, the same cannot be guaranteed of tattoo artists traveling here for trade shows. This presents a health hazard. The solution is the application of the same standards to all tattoo artists, whether they are here for a four-day convention or a lifetime.

In its opposition to SB2398, the Department of Health cites an existing statute that is not being applied and an AG statement that merely begs the question. This is quite disingenuous. It also notes that it does not know how to do what is being requested of it, which I would suggest is a dangerous position for the Department to take.

I am requesting that this bill be passed and would further urge that the inadequacies of the Department of Health be addressed via a task force comprising experts in the field.

Thank you very much.

aloha,

Peter Gellatly

ph 808.542.8880
pgellatly@mac.com

LATE TESTIMONY

Testimony on S.B. 2398 SD2 HD1 CPC 3/19/2012 2:00: PM

Conference room:325

Testifier position: Support

Testifier will be present: No

Submitted by : Dawn Gomes

Dear CPC Committee Members,

The bill before your committee is an important step in healthily regulating an industry that has been neglected of updated safety concerns and consumer protection, due to the lack of insight and resources available by our Hawaii Department of Health.

I would like to suggest that S.B.2398 have wording placed in the bill to require the Department of Health to work with a task force consisting of professionals in the industry to develop responsible conditions for the public safety over health concerns regarding trade shows, before being allowed in Hawaii.

Sincerely yours,

Dawn Gomes

Hawaii Tattoo Trade Shows

anna salvador [eltonnme@yahoo.com]

Sent: Monday, March 19, 2012 9:59 AM

To: CPCtestimony

Categories: Red Category

I SUPPORT TATTOO TRADE SHOWS IN HAWAII

I SUPPORT TATTOO TRADE SHOWS IN HAWAI'I

LATE TESTIMONY

Toni Pasion [tonipasion@yahoo.com]

Sent: Monday, March 19, 2012 10:06 AM

To: CPCtestimony

Categories: Red Category

Do not let ignorance overcome ancient cultural tradition. Ignorance does not allow the growth of a person and of a people. Education and allowing people to share a passion collectively promotes progression. Let us grow as a people. Allow Hawai'i to strengthen their culture. Allow celebration of an art. Allow and encourage an attempt to bring people together, not only Hawai'ians, but people who truly have a passion and admiration of tattoo artistry.

LATE TESTIMONY

"I FULLY SUPPORT TATTOO TRADE SHOWS IN HAWAII"

Maka Ani [animo74@gmail.com]

Sent: Monday, March 19, 2012 10:24 AM

To: CPCtestimony

Categories: Red Category

Aloha,

I am writing in support of a tattoo expo in Hawaii. Tattoo is a culture in Hawaii, shouldn't we be supporting it? What happen to "Made in Hawaii"? Tattoo is an expression of art like Hula is, can we support it the same way? Our ancestors would!

Mahalo Nui Loa,

Maka Ani

LATE TESTIMONY

I support tattoo trade shows in Hawaii!

A-Young Kim [tranquility14353@hotmail.com]

Sent: Monday, March 19, 2012 10:25 AM

To: CPCtestimony

Categories: Red Category

From: postmaster@mail.hotmail.com
To: tranquility14353@hotmail.com
Date: Mon, 19 Mar 2012 13:24:14 -0700
Subject: Delivery Status Notification (Failure)

This is an automatically generated Delivery Status Notification.

Delivery to the following recipients failed.

cpctestimony@capitol.hawaii.go

--Forwarded Message Attachment--

From: tranquility14353@hotmail.com
To: cpctestimony@capitol.hawaii.go
Subject: I support tattoo trade shows in Hawaii.
Date: Mon, 19 Mar 2012 10:24:13 -1000

To whom it may concern,

My name is A Young Kim and I just eanted to let you know that doing this tattoo expo is an excellent idea!

Mahalo,

A-Young Kim

LATE TESTIMONY

RE: Tattoo Trade Shows

Megan Ortiz [meganmarieortiz@hotmail.com]

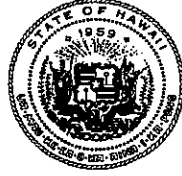
Sent: Monday, March 19, 2012 10:31 AM**To:** CPCtestimony**Categories:** Red Category

Hello,

I'm emailing in regards to the recent objections to having a tattoo trade show in Hawaii. I think it's honestly quite senseless to blame this protest on health and safety. Tattoo trade shows are completely sterile and safe. It's not a high-risk situation. &This is coming from someone who has been a part of tattoo trade shows and conventions in Las Vegas for several years. Hawaii is a beautiful state that I love, full of incredibly talented artists. From the dawn of time Hawaii has been known for Polynesian and tribal body art. You should be proud of the fact that people want to travel from around the world to celebrate your local talent and tattoo culture. &Speaking as someone who used to work as a travel agent whose job specifically entailed handling the housing for businesses and artists featured at conventions, I'd have to say it's an ignorant decision to choose to deny your local economy all the extra money that would be coming in via hotel stays, tourist attractions, food, etc. (from both patrons and artists featured in the trade show). No one is forcing anyone to go to the trade show if they don't want to or if they don't agree with the idea of tattoos. The bottom line is that tattoos are a forever-uprising part of culture and it's undeniable. Tattoos aren't going anywhere. It would be more honorable to just accept that and move onto more pressing issues. Please consider putting an end to this objection. Hawaii is the most wonderful place in the world and has always been a place that I've been proud of in regards to their stance on civil rights/marine welfare/environmental issues, etc. I'd hate to see you guys take an inappropriate and discriminative stance on something as simple as body art.

Sincerely,
Megan Marie Ortiz

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

Committee on Consumer Protection & Commerce

S.B. 2398, S.D. 2, H.D. 1, RELATING TO TATTOO ARTISTS

Testimony of Loretta J. Fuddy, A.C.S.W., M.P.H.
Director of Health

March 19, 2012
2:00 p.m.

- 1 **Department's Position:** The department opposes this bill.
- 2 **Fiscal Implications:** This bill will require substantial resources that the department currently
3 does not have.
- 4 **Purpose and Justification:** This bill would require resources and expertise currently unavailable to the
5 department. This bill requests the department to regulate and control the sale of tattoo supplies to
6 minors, unlicensed tattoo artists, and unlicensed tattoo shops. This would be very difficult to
7 accomplish without substantial resources, as enforcement of these sales would require "under cover"
8 purchases by the department along with tracking and enforcing internet sales of these items in Hawaii.
9 The sale of tattoo supplies has no direct impact on communicable disease transmission, and the
10 prohibition or regulating of such sales should belong with local law enforcement, and not with the
11 Department of Health.

-
- 12 This bill is also confusing and may conflict with the current interpretation of Hawaii
13 Administrative Rules (HAR) Chapter 17, Tattoo Artists, and Hawaii Revised Statutes (HRS) Part XXX.
14 Tattoo Artists, which allows for tattoo conventions and trade shows. This bill does not contain a

LATE TESTIMONY

S.B. 2398, S.D. 2, H.D. 1

Page 2 of 2

1 definition of "trade show", which would make the bill difficult if not impossible to enforce.

2 The creation, administration and grading of a blood borne pathogen exam would require
3 additional resources. The department feels that this additional test is unnecessary, as the current State of
4 Hawaii tattoo artist license exam is comprised mostly of questions related to preventing the spread of
5 blood borne pathogens. The department does not have the expertise to create new professional licensing
6 exams, and should not be in the business of professional and vocational licensing, as other departments
7 already exist to handle this State function.

8 Monitoring of a tattoo trade show may cost the Department of Health over \$1,000 a day over a
9 period of up to 14 days to pay enough Sanitarians to monitor a large event. This may cost the
10 department up to \$14,000 for each event, not including the time and effort to conduct special tattoo
11 license exams prior to any such event. The deletion of the \$500 non-refundable permit fee for a
12 temporary tattoo event presently allowed in statutes would further burden the department financially.

13 The department may require additional resources to support a new "task force" and does not see
14 the need for any task force. The department believes any proposed changes in the regulation of a
15 particular industry should be done through the rule-making process rather than the legislative process to
16 avoid legal conflicts. Hawaii Revised Statutes, §321-10 and §321-13 gives the authority to the DOH to
17 regulate tattoo artists. Hawaii Administrative Rules Chapter 17, Tattoo Artists regulates the shops and
18 the profession of tattooing. HRS Part XXX, Tattoo Artists was created legislatively in 2009 to regulate
19 certain aspects of tattoo artists and tattoo shops.

20 Thank you for the opportunity to testify.

TATTOO TRADE SHOWS HAWAII

Sierra Cabasag [scabasag33@yahoo.com]

Sent: Monday, March 19, 2012 11:18 AM

To: CPCtestimony

Categories: Red Category

Dear Sir/Madame,

I am in full support for Tattoo Trade Shows here in the islands.
The art and form of tattoing is of huge impact in our culture and a part of rich history here in the islands.
I'd appreciate if you may grant them to go forward with the Pacific Ink & Art Expo come August
2012!!!

Much Mahalo and respect for your time and consideration.

Sincerely,
Sierra Cabasag

LATE TESTIMONY

Tattoo support

ry4moshuptrine@gmail.com [ry4moshuptrine@gmail.com]

Sent: Monday, March 19, 2012 12:04 PM

To: CPCtestimony

Categories: Red Category

Aloha,

Both my fiancee & I wholly SUPPORT a trade show in Hawaii. We were excited to see that someone is finally trying to put one together. For years, we have gotten tattoos at many different shops & "safety" was NEVER a concern of ours. THIS trade show will be FOR the people TO LEARN about safety & how compliant the shops ARE!!! It will also be to showcase the beautiful art of tattooing AND to keep most cultures alive through the history of tattooing!!! Please allow the trade to become a reality!!!

Mahalo,
Ryan & Mona

I SUPPORT TATTOO TRADE SHOWS IN HAWAII

LATE TESTIMONY

Maijala, Theron A [Theron.A.Maijala@boeing.com]

Sent: Monday, March 19, 2012 1:27 PM

To: CPCtestimony

I want you to know that I fully support a trade show in what IS art. I am of Hawaiian decent, born in honolulu and raised in the mainland. It disturbs me that a group of people that are not from Hawaii is trying to shut down a properly organized event to expose the hawaiian art of tattooing to the mainstream media. It sounds very familiar to the oppression that the hawaiian people suffered with the intergration of other races into the Islands. This is something that greatly disturbs me. Please continue to allow an event that can bring people together based on an art and better yet focusing on a lost Hawaiian art.

Theron Maijala
Employee Development Specialist
Learning, Training and Development
425-404-0042
theron.a.maijala@boeing.com