

# Regulation of Tattooing in Minneapolis and St. Paul, Minnesota: Tattooists' Attitudes and Relationship Between Regulation and Practice

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## SYNOPSIS

**Objective.** This study investigated tattooists' attitudes regarding government regulation and the relationship between existing tattooing regulation and tattooists' knowledge and practice of infection control.

**Methods.** Self-reported and observational data were collected in a cross-sectional study of professional tattooists. A written survey was used to investigate knowledge and practice of infection control and attitudes toward government regulation. Infection control practice was also examined through direct observation of tattooing. Rating scales were used to compare tattoo artists subject to local tattooing ordinances with those in areas without ordinances.

**Results.** Sixty-one tattooists (45 regulated, 16 unregulated) completed surveys and 25 (17 regulated, 8 unregulated) were observed. Attitudes toward regulation were generally positive. Most participants supported health department inspections and training requirements. The presence of local tattooing ordinances was not associated with tattooists' knowledge ( $p=0.53$ ), but was associated with self-reported practices ( $p=0.05$ ). A more positive attitude toward regulation was associated with the use of more self-reported infection control procedures ( $p<0.01$ ).

**Conclusions.** Tattoo artists in areas with local tattooing ordinances may implement more bloodborne pathogen precautions than those in areas without ordinances, despite working from a similar knowledge base. Tattooists most in need of improvement may be difficult to reach due to opposition to government intrusion. Federal guidelines, clarification of OSHA rules applying to tattooists, and statewide regulation are needed. Tattooists should be involved in the development of regulations.

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A growing number of state health departments in the United States require tattoo artists to implement bloodborne pathogen precautions. In 1979, only two state health departments regulated tattooing.<sup>1</sup> By 1998, 13 states had rules in place and three had rules pending.<sup>2</sup> Yet there is no literature on the impact of tattooing regulation on the infection control practices of tattooists.

Tattooing is a public health issue of increasing importance, given the potential for transmission of disease<sup>3-5</sup> and the growing popularity of the practice.<sup>6,7</sup> An understanding of the current status of infection control in tattooing is needed to evaluate the effectiveness of existing legislation, plan future legislation, and educate the public. In addition, information on tattooists' attitudes can help public health professionals develop effective approaches to working with tattoo artists.<sup>2</sup>

In a descriptive cross-sectional survey of 36 registered tattoo artists in Victoria, Australia, Goudey and Thompson found that most tattooists considered procedures required by law to be important or essential and the majority believed that they were in compliance with regulations.<sup>8</sup> All felt that new tattooists should have education in infection control and expressed a desire to protect themselves and their clients from disease. Yet many reported having needlestick injuries and less than half had received a full series of hepatitis B vaccine injections. In a follow-up study, Goudey and Thompson inspected 23 tattooing establishments and observed artists performing tattoos at 11 premises.<sup>9</sup> Of six tattooists observed re-using needles, none met Australian standards for both cleaning and sterilizing used needles.

In 1970, only one tattoo studio advertised in the Minneapolis and St. Paul yellow pages. By 2000 this number had grown to 42 (Figure 1). The state of Minnesota does not regulate tattooing; however, some

Minnesota cities and counties have local tattooing ordinances, resulting in a patchwork of government regulation. Ordinances generally include requirements for handwashing facilities, minimum autoclave settings, procedures for handling needles and inks, and proper waste management. Some prohibit tattooing a person with viral hepatitis, using a tattoo studio for living quarters, or tattooing a person under the influence of drugs or alcohol. Some jurisdictions regularly inspect tattoo studios, while others do so sporadically or not at all. In districts without ordinances, tattooists operate legally but without regulatory oversight.

A few tattooing organizations, such as the Alliance of Professional Tattooists (APT), offer infection control information and training to members. The extent of participation in such training and its impact are unknown.

The purpose of this study was to describe the relationship between tattooing regulation and tattooists' practice of infection control, to investigate tattooists' attitudes about government regulation, and to determine if there is an association between membership in a professional tattooing organization and infection control practices. The University of Minnesota Institutional Review Board approved this study and written consent was obtained from all participants.

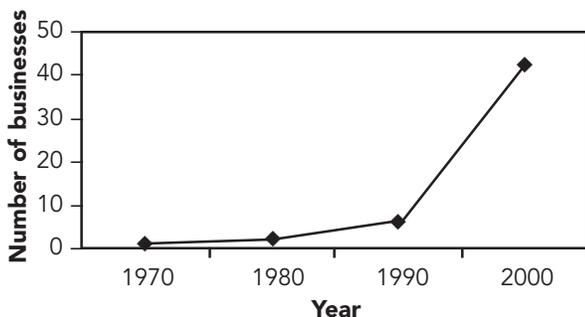
## METHODS

### Instruments

Using the same basic design described by Goudey and Thompson,<sup>8,9</sup> we gathered data through self-report and direct observation. We developed a self-administered written survey to gather demographic data, measure knowledge and attitudes, and determine infection control practices via self-report. This instrument contained several rating scales, each producing a corresponding score. Subjects' responses were averaged to produce the Attitude Toward Regulation Score. Possible scores ranged from 1.0, reflecting negative attitudes toward regulation, to 5.0, reflecting positive attitudes toward regulation. The Infection Control Knowledge Score was the percent of correct answers on 14 multiple-choice items measuring knowledge of bloodborne pathogen transmission and control. The Self-Reported Infection Control Practice Score was the percentage of 22 recommended infection control procedures the artist reported using.

A second data collection tool was a modified version of the observation checklist developed by Goudey and Thompson,<sup>9</sup> used for studio inspection and observation of tattooing. Two rating scales and corresponding scores were derived from items in this instrument.

**Figure 1. Number of tattooing businesses advertised in the Minneapolis/St. Paul yellow pages, 1970-2000**



The Studio Scale consisted of 13 items measuring quality of infection control facilities. Each business was assigned a Studio Score, representing the percent of recommended characteristics that were in place. The Observed Infection Control Practice Scale was comprised of 62 items intended to determine actual infection control practices of individual tattooists. The resulting score was the percent of recommended practices used during an observation period. Missing values were not included in either the denominators or numerators of any scores.

In selecting items for the two practice scores and Studio Score, we used Health Canada's tattooing standards,<sup>10</sup> the National Environmental Health Association's Body Art Model Code,<sup>11</sup> the Occupational Safety and Health Administration (OSHA) Final Rule on Occupational Exposure to Bloodborne Pathogens,<sup>12</sup> and recommendations from the Alliance of Professional Tattooists.<sup>13</sup>

### Sample

Individuals who applied tattoos to humans in businesses advertising tattooing services in the seven-county metropolitan area of Minneapolis and St. Paul, Minnesota, were eligible to participate. Beauticians who applied cosmetic tattoos in beauty parlor settings were excluded, as were three tattooists who participated in pre-testing. Subjects were recruited during unannounced visits to tattoo studios.

### Data collection and analysis

The questionnaires were administered first in an attempt to gain artists' trust before inviting them to participate in the observational phase of the study. The Principal Investigator (PI, current author MJR) visited each tattoo studio, recruited participants, and waited while the subject(s) completed the survey. In a few instances, an appointment was made for the PI to return later with the survey, and several studios required multiple visits to recruit all the resident tattooists. Upon receiving each completed survey, the PI asked if the subject would also be willing to be observed as part of the research study. Subjects who agreed were contacted by the PI at least three weeks later to schedule a time for observation. At the appointed time, a trained observer went to the tattoo studio and obtained written consent for observation from the tattooist and verbal permission from the tattoo client. The observer toured the facility and watched the tattooist prepare supplies and equipment for the tattoo, perform the tattoo, and clean up. The observer documented infection control procedures and facilities on the observation checklist during the entire

visit. One full tattoo procedure, from setup to cleanup, was observed for each participant, with one exception, which occurred when two tattooists shared responsibilities for a single tattoo. The observation period varied from approximately 30 minutes to three hours, depending on the size and complexity of the tattoo design. Information on tattooing ordinances was obtained through personal communication with city and county clerks, environmental health officers, and public health nurses.

Data analysis was carried out with SAS<sup>®</sup> Version 8.0.<sup>14</sup> All variables were analyzed descriptively. The Attitude Toward Regulation Scale was evaluated for internal consistency with Cronbach's coefficient alpha. The general linear mixed model was used for inferential analyses of artist-level data to account for correlated observations due to cluster sampling of individuals within studios.

## RESULTS

### Subjects

Seventy-five tattooists at 32 businesses met inclusion criteria and all were invited to participate. Sixty-one tattooists (81%) from 29 shops completed written surveys. Of these, 45 worked in districts with local tattooing ordinances (regulated tattooists), and 16 in districts without ordinances (unregulated tattooists). The mean age of participants was 32 years, and the mean number of years of tattooing experience was 10. Almost half (43%) were tattoo studio owners, 37% worked as private contractors in a studio, and 10% were employees. The most frequently reported method for learning both tattooing and infection control was from other tattooists. Only 21% ( $n=13$ ) were members of a tattooing organization. One third ( $n=22$ ) had a history of dirty needlestick exposure, while half ( $n=32$ ) reported having received at least three doses of hepatitis B vaccine (Table 1).

Twenty-five participants and the 15 different businesses they represented were inspected. Seventeen of the observed artists were regulated tattooists, and eight were unregulated. Recruitment was higher in unregulated areas: of all eligible unregulated tattooists, 100% completed surveys and 50% were observed; of regulated tattooists, 76% completed surveys and 29% were observed.

There were no statistically significant differences between participants and non-participants in age, gender, or number of years of tattooing experience. Subjects who completed both the survey and observation phases did not differ from those who completed only the survey in age, gender, or years of experience, ei-

**Table 1. Tattooists' backgrounds, relationships to business, immunization and needlestick histories**

Survey item	Response	n(percent)
Ever did an apprenticeship	Yes	40(66)
	No	21(34)
Methods of learning to tattoo (categories not exclusive)	Self-taught	44(72)
	Read a book	29(48)
	From other tattooists	53(87)
	Workshops or seminars	18(30)
Methods of learning about infection control (categories not exclusive)	From other artists	50(82)
	From a book	41(67)
	From tattooing magazines	31(51)
	Course in infection control	17(28)
	From a health official	35(57)
	From the internet	8(13)
Member of a professional tattooing organization	Yes	13(21)
	No	48(79)
Relationship to the business	Owner	26(43)
	Private contractor	22(37)
	Employee	6(10)
	Other	6(10)
History of dirty needlestick exposure	Yes	22(37)
	No	37(63)
Hepatitis B vaccination history	None	14(24)
	1 or 2 doses	7(12)
	3 or more doses	32(54)
	Can't recall	6(10)

NOTE: Totals vary due to missing data and percentages may not add to 100 due to rounding or because multiple responses were allowed for some questions.

ther overall or by regulation status (Table 2). In addition, there were no differences between survey-only and survey-plus-observation participants in Attitude Toward Regulation Scores ( $p=0.20$ ), Infection Control Knowledge Scores ( $p=0.23$ ), or Self-Reported Infection Control Practice Scores ( $p=0.73$ ).

#### Attitudes toward government regulation

Attitudes regarding regulation of tattooing were generally positive. Almost all participants ( $n=57$ ) agreed that health departments should inspect tattoo studios. Three quarters ( $n=45$ ) believed that only professional tattooists should be allowed to buy tattooing equipment, and almost as many ( $n=43$ ) supported mandatory infection control training for tattooists (Table 3).

Mean Attitude Toward Regulation Score (coefficient alpha 0.79) was 3.9 (standard deviation [SD] 0.92), with a range of 1.2 to 5.0. Items were coded so that 1.0

represented strong opposition to and 5.0 represented strong support for regulation. There were no statistically significant associations between Attitude Toward Regulation Score and age, gender, or educational level. Those who were members of professional tattooing organizations had more positive attitudes toward government regulation (mean score 4.5) than those who were not members (mean score 3.8,  $p$ -value for difference  $<0.01$ ). There was no difference in Attitude Toward Regulation Scores between regulated and unregulated tattooists ( $p=0.68$ , Figure 2).

#### Infection control knowledge and practices

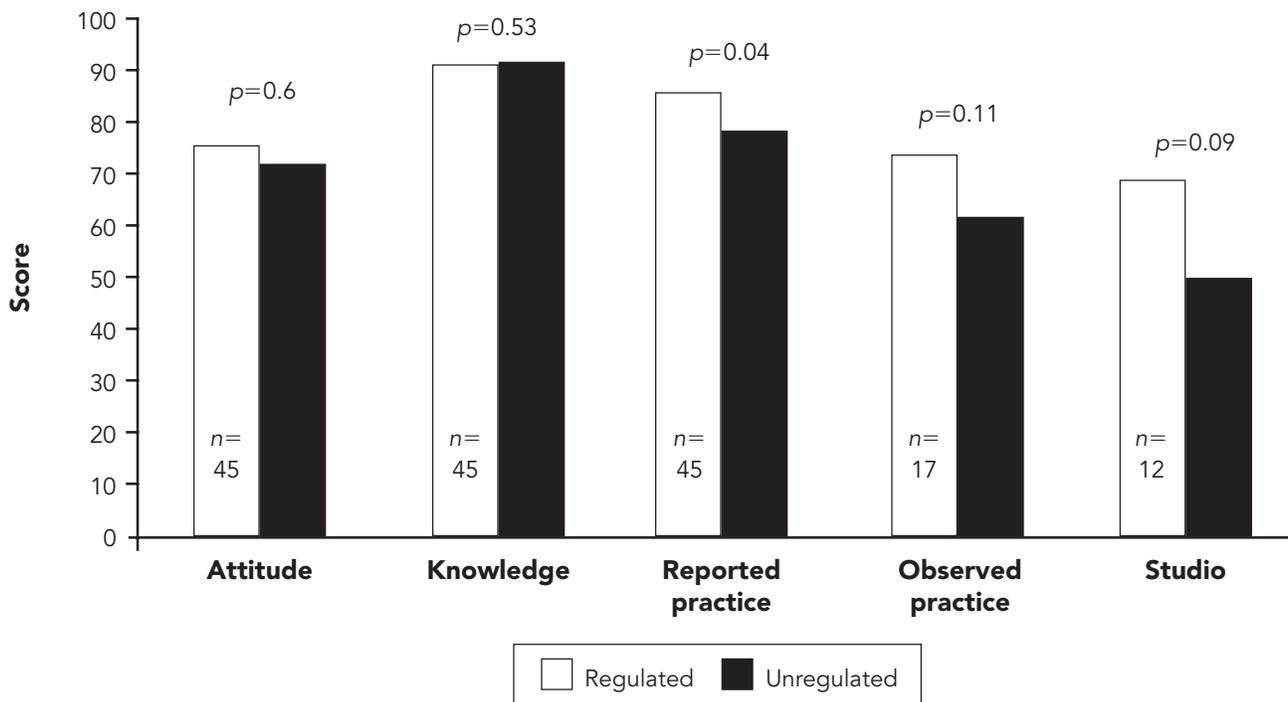
The mean Infection Control Knowledge Score was 90% (SD 9.3) and scores ranged from 64% to 100%. There was no statistically significant difference in Infection Control Knowledge Scores between tattooists in regulated districts and those in unregulated dis-

**Table 2. Comparison of subjects by participation level and regulation status**

		Survey only (n=36)	Survey + observation (n=25)	p-value for association
Mean age	Regulated	32.6	30.4	0.58
	Unregulated	33.1	29.8	
Mean years of tattooing experience	Regulated	9.7	8.4	0.23
	Unregulated	14.4	8.4	
Percent male	Regulated	85.6	82.3	0.57
	Unregulated	87.5	100	

tricts ( $p=0.53$ , Figure 2). The overall mean Self-Reported Infection Control Practice Score was 83% (SD 10.4) and scores ranged from 50% to 100%. Self-Reported Infection Control Practice Scores were higher ( $p=0.04$ ) in regulated tattooists (mean 85%;  $n=45$ ) than in unregulated tattooists (mean 77%;  $n=16$ ). Self-Reported Infection Control Practice Scores were positively associated with Attitude Toward Regulation Scores ( $R=0.46$ ;  $p<0.01$ ), but were not associated with membership in a professional tattooing organization

( $p=0.36$ ). Observed Infection Control Practice Scores ranged from 45% to 84% with an overall mean of 71%. Observed Infection Control Practice Scores were not associated with tattooing organization membership ( $p=0.39$ ) or Attitude Toward Regulation Score ( $p=0.07$ ). The mean Observed Infection Control Practice Score was 73% for regulated tattooists ( $n=17$ ) and 61% for unregulated tattooists ( $n=8$ ;  $p=0.11$ , Figure 2). Detailed results of individual items used in the scales are reported elsewhere.<sup>15</sup>

**Figure 2. Mean scores by regulatory status, with p-values for differences between regulated and unregulated tattooists**

NOTE: The Attitude Toward Regulation Score has been converted to a scale of 0 to 100 for comparison purposes.

**Table 3. Tattooists' attitudes toward government regulation**

Survey item	Agree strongly n(percent)	Agree somewhat n(percent)	Neither agree nor disagree n(percent)	Disagree somewhat n(percent)	Disagree strongly n(percent)
The Health Department should inspect all tattoo studios.	53(87)	4(7)	2(3)	1(2)	1(2)
Having a certificate of inspection from a Health Department could (or does) help my business.	37(61)	16(26)	8(13)	0(0)	0(0)
Tattooists should be required by law to have formal training in infection control.	26(43)	17(28)	11(18)	1(2)	5(8)
Only professional tattooists should be allowed to buy tattooing equipment.	34(56)	11(18)	3(5)	5(8)	8(13)
When the government regulates tattooing, it takes away the excitement of it	1(2)	3(5)	20(34)	6(10)	29(49)
The main reason governments want to regulate tattooing is so they can tax us.	3(5)	8(13)	16(27)	8(13)	25(42)
It should be illegal to tattoo anyone under 18 years of age.	27(44)	10(16)	10(16)	7(11)	7(11)
It should be illegal to tattoo someone who is under the influence of drugs or alcohol.	38(62)	7(11)	7(11)	7(11)	2(3)
It should be illegal to tattoo people with bloodborne diseases such as hepatitis B.	14(23)	11(18)	12(20)	8(13)	15(25)
It should be illegal for someone with a bloodborne disease to work as a tattooist.	15(25)	9(15)	6(10)	15(25)	15(25)

NOTE: Totals vary due to missing data. Cumulative percentages may not equal 100 due to rounding.

### Studio characteristics

Fifteen shops were inspected. In six (21%) of the 29 studios surveyed, participants reported having written plans for needlestick exposure—22% of regulated and 17% of unregulated shops. Fifteen studios were inspected. Half of the inspected studios ( $n=8$ ) had walls and floors that were clean and in good repair. Animals were present in two shops (13%), including dogs and uncaged birds. In no shop did the owner provide hepatitis B immunizations to staff.

Health Canada<sup>10</sup> recommends that tattoo studios have a separate room dedicated to cleaning contaminated equipment. Only six of the 15 inspected studios (40%) had such a room. It is also recommended that the cleaning area should be divided into clean and dirty regions to prevent cross-contamination. Nine studios (60%) had this arrangement. Two studios (13%)

contained evidence of eating or drinking and three (20%) had evidence of smoking in the areas used to clean dirty equipment. Three studios (20%) had no approved sharps containers anywhere on the premises. The overall mean Studio Score was 64% and scores ranged from 25% to 92%. The mean Studio Score was 68% ( $n=12$ ) in regulated districts and 49% ( $n=3$ ) in unregulated districts ( $p=0.09$ ).

### DISCUSSION

This study demonstrates that health departments' growing interest in tattooing is justified. Although tattooists appear relatively knowledgeable about infection control and implement many precautions, there is room for improvement. Changes are needed in regions with and without existing ordinances.

OSHA's bloodborne pathogen standard applies to employees at risk for blood exposure. However, OSHA's lengthy list of examples of job classifications with potential for occupational exposure does not include tattooing.<sup>16</sup> In addition, OSHA rules technically apply only to individuals considered employees, which made up only 10% of tattooists in this study. Many participants who worked as private contractors expressed the perception that this relationship exempted the studio owner from OSHA rules. However, the legitimacy of the contractor relationship in these circumstances is unclear (Personal communication, Alden Hoffman, Minnesota Department of Labor and Industry, October 12, 1999).

There was strong support for health department oversight of tattooing and other regulations such as training requirements and restricting access to tattooing equipment. Attitudes toward regulation were strongly associated with tattooists' self-reported practices—those with more positive attitudes had higher practice scores. Therefore, tattooists most in need of improvement may be hardest to reach due to their opposition to government intervention.

Although not conclusive, the data suggest that tattooists in areas with local tattooing ordinances implement more infection control procedures than those in areas without such laws. Since Infection Control Knowledge Scores did not differ significantly between regulated and unregulated areas, tattooists appear to be working from a similar knowledge base. The higher Self-Reported Infection Control Practice Scores and Observed Infection Control Practice Scores in regulated areas suggest that knowledge may be more fully operationalized in areas with ordinances. However, we observed breaches of infection control both in areas with and without local ordinances and inspections. Regulation may be less effective when there is a patchwork of different regulations rather than a single set of standards.

More training in infection control is warranted for tattooists. Many participants expressed a desire for additional training and most believed training should be mandatory. Few participants belonged to professional tattooing organizations, so these groups may not be an effective means of disseminating education widely. A diverse strategy is needed to reach all tattooists, including providing education through formal channels such as tattooing magazines and tattooing conventions, as well as through informal channels such as tattooists' social networks and "shoeleather" outreach.

The stereotype of tattooists as anti-establishment is clearly not universally true. Most subjects welcomed

regulation, and several expressed the opinion that it would protect them and their families from diseases and eliminate amateur tattooists.

### Limitations

The Self-Reported Infection Control Practice, Observed Infection Control Practice, and Studio Scores were calculated without weighting procedures by relative importance. Therefore, higher scores might not necessarily correspond to better overall practices than lower scores. In addition, the study instruments have not been thoroughly validated. Recruitment was high for the written survey phase, but the small sample for the observation phase resulted in limited power. Self-selection bias, the Hawthorne effect, and prevarication may have occurred. Enforcement of ordinances was not examined, the current purpose being simply to determine the association between the existence of ordinances and infection control practices.

### Recommendations

Tattooing enjoys continuing popularity and thus additional research and policy attention is warranted. The U.S. should follow Canada's lead in developing national tattooing standards, and states without regulations should consider adopting tattooing rules. In addition, OSHA should add tattooists to its list of workers with potential occupational exposure to bloodborne pathogens and should clarify the application of OSHA rules to private contractors. Districts with existing ordinances should evaluate the effectiveness of enforcement activities. Jurisdictions considering regulations should recruit the participation of tattoo artists from the earliest stages. This approach will increase the likelihood that the new laws are sensible, workable, and supported by the tattooing community.

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