

JANUARY 2018

MEAT-PACKING PADS AS TATTOO DRESSINGS

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Primary inquiry: Is there evidence for or against the use of clean vs. sterile dressings in the care of tattoos?

Disclaimer: The information provided here is for the purpose of addressing a specific inquiry related to an environmental health issue. This is not a comprehensive evidence review and has not been subjected to peer review. The information offered here does not supersede federal, provincial or local guidance or regulations, and/or the advice of a medical professional (where applicable).

Background

During a recent convention on body modification and tattoos in Vancouver, BC, an environmental health officer noticed that tattoo artists at the event were using meat-packing pads as dressings on new tattoos. The meat-packing pads, which are commonly used to absorb liquids from food products packaged in grocery stores, are highly absorbent, non-adherent, and cost approximately \$0.15 per pad.^a Because the pads are used to package food, they are assumed to be “clean,” but are not sterile, although this distinction may not be clear to all clients. Meat-packing pads are preferred by some tattoo artists due to both cost and performance characteristics. Keeping a new tattoo clean and moist (neither too wet nor too dry) is necessary to prevent infection and/or excessive scabbing or peeling that will damage the tattoo. As explained to the EHO, meat-packing pads are preferred for their ability to keep the new tattoo suitably moist. Alternatively, some tattoo artists may use plastic food wrap laid directly on the skin. In practice, the use of these non-sterile dressings on new tattoos does not appear to be resulting in increased infections, based on the lack of complaints to tattoo artists.



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NCCEH approached the question using the following multi-pronged approach:

- A rapid review of academic and NCCEH resources regarding tattoo and infection risks and related information;
- A rapid review of academic sources regarding the use of clean vs. sterile dressings in wound care, including both tattoos and other types of wounds in medical or other health settings (e.g., surgical wounds, chronic wounds);
- Expert consultation with medical and industry professionals regarding the use of sterile vs. clean dressings on new tattoos specifically, and in other types of wounds. It has been noted that non-sterile dressings such as plastic wrap, sanitary pads, and diapers are sometimes used in first aid and home wound care;
- A grey literature search for wound care recommendations from public health agencies, specifically regarding the use of sterile vs. non-sterile dressings (sanitary pads, diapers), as well as a review of guidelines on the use of clean vs. sterile dressings for tattooing in other jurisdictions.

^a<http://www.eikondevice.com/product/ultra-zap-uz90-pads-black-package-1000>

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Tattoos and Infection Risk

A search for academic literature providing data on adverse outcomes from a tattoo returned relatively few hits (please see Appendix A for a detailed search strategy). A previous survey in the US reported that 3.2% of tattoo recipients experienced an infection, whereas 3.8% and 21.2% experienced localized pain or itchiness, respectively, at one month after receiving a tattoo.¹ A full review of the infection risks associated with tattooing is beyond the scope of this document. However, the NCCEH previously produced a review of PSE-related infection risks that provides useful background on the types of infections associated with tattooing. Briefly, tattoo infection risks include both bloodborne diseases, such as hepatitis and HIV, as well as the risk of infection from pathogens dispersed in the environment, such as methicillin-resistant *Staphylococcus aureus*, *Streptococcus pyogenes*, and *Pseudomonas aeruginosa*.² The literature also presents numerous tattoo-associated *Mycobacterium* infections thought to have derived from the use of non-sterile tap water to dilute inks, as well as the sale of inks contaminated at the source.^{2,3} Tattooing also carries non-infection-related risks, such as the potential for allergic reactions and/or exposure to potentially toxic constituents (heavy metals) within some inks.^{4,5}

Table 1 presents the steps of the tattooing process and examples of the factors contributing to (or mitigating) infection risk at each step. As shown in the table, both clean and sterile articles are used during tattooing. Based on the Spaulding classification,^b instruments that penetrate the skin are deemed “critical,” in that they confer a high risk of causing infection if contaminated, and thus are required to be sterile.⁸ Although dressings are not considered instruments, they might be looked upon as semi-critical items, requiring high-level disinfection (but not sterilization), as they contact but do not penetrate non-intact skin. However, unlike other clean articles and instruments that might be used in a tattooing procedure, dressings remain in close contact with non-intact skin for at least several hours, which may increase the risk of infection if the article were to be contaminated. This unknown—whether a contaminated dressing is “highly” likely to cause an infection or not—is critical to deciding whether tattoo dressings should be sterile or merely clean.

Table 1. Sample steps of the tattooing process, associated risks, and action taken to mitigate risk. For further information on the distinction between cleaning, disinfection, and sterilization, please see Fong and Barn 2012. The procedure described here may differ between artists and requirements may differ between jurisdictions. This table is not intended to comprehensively identify all risks and mitigating actions associated with tattooing.

Step in the Tattooing Process	Examples of Associated Risks	Examples of Mitigating Actions
Tattooist washes hands and dons gloves.	Improper handwashing and/or gloving technique may result in cross-contamination. Gloves are clean, but not sterile.	Hand hygiene is a key component of infection control training. Gloves (and all clean materials) should be stored in a way that keeps them clean.
Work station is cleaned and disinfected to create an aseptic environment.	Furniture and work surfaces may harbour pathogens from previous clients as well as opportunistic pathogens ubiquitous in the environment.	After treatment with an appropriate disinfectant, surfaces are covered with plastic food wrap and clean absorbent material as additional precautions.
Materials are dispensed into single-use, clean containers: petroleum jelly, ink, paper towel, wipes, lotions, creams, etc.	Contamination of stock materials, or use of contaminated materials. Non-sterile water used to dilute inks may introduce pathogens. Sealed ink products may have been previously contaminated. ⁹	Materials should be dispensed without contaminating stock bottles; e.g., use of single-use applicators; ink dispensed into disposable ink caps; leftovers discarded. Inks can be diluted using sterile water, rather than tap water.

^bThe Spaulding approach classifies instruments used in a medical (or PSE) environment based on whether they enter sterile tissue or the vascular system (critical instruments requiring sterilization), contact mucus membranes or non-intact skin (semi-critical items requiring high-level disinfection), or contact only intact skin but not mucus membranes (non-critical items requiring intermediate- or low-level disinfection).^{6,7}

Step in the Tattooing Process	Examples of Associated Risks	Examples of Mitigating Actions
Prepare tattooing machine.	<p>Needle and tube have direct contact with broken skin, and pose greatest risk of introducing pathogens to the body.</p> <p>Cross-contamination between non-sterilizable equipment and components that touch broken skin.</p>	<p>Sterile, single-use needles and tubes now common.</p> <p>Sterile packaging opened in front of the client for reassurance.</p> <p>Needles capped with protective (non-sterile) rubber tip.</p> <p>Single-use plastic covers are used to cover equipment that cannot easily be disinfected.</p>
Prepare antiseptic soap wash.	<p>Tap, distilled, or sterile water may be used.</p> <p>Reusable bottles may have been contaminated during previous sessions.</p>	<p>Reusable bottles can be covered in single-use plastic covers.</p> <p>Bottles wiped down with disinfectant between clients.</p>
Tattooist washes hands and dons gloves.	See above	See above
Area to be tattooed is shaved (if client has not already done so) and cleaned thoroughly with antiseptic soap.	<p>Human skin harbours numerous opportunistic pathogens that could lead to disease if introduced into broken skin, whether via tattooing or accidental cuts caused by sharp-edged instruments.</p> <p>Single-use disposable razors (non-sterile) or reusable straight razors may be used.</p>	<p>Reusable razors may be considered critical instruments and as such may require sterilization</p> <p>Antiseptic should be used to clean any skin that might be touched during tattooing (e.g., back of arm as well as the front).</p> <p>Visibly diseased or damaged skin is not tattooed.</p>
Design is applied to skin, using a pen or a stencil.	<p>Pens reused between clients could transfer pathogens.</p> <p>Neither the stencil nor transfer fluid are sterile; transfer fluids or tools can also transfer pathogens (e.g., reuse of deodorant sticks).</p>	<p>Skin wiped with antiseptic.</p> <p>Sterile, single-use surgical pens may be used.</p> <p>Stencils are single-use disposable, but non-sterile.</p> <p>Disallow the use of deodorant sticks between clients.</p>
Tattooist washes hands and dons gloves.	See above	See above
Tattooing begins; one hand is used to operate the machine, and the other is used to spread the skin; needles are rinsed between colors; blood and excess ink are blotted with paper towel.	<p>Cross-contamination may occur through touching surfaces not previously prepared (e.g., touching the client's skin outside of the prepared area or by reaching each under plastic cover to adjust tattooing machine).</p> <p>Needles may be rinsed in tap water, distilled water or sterile water between pigments.</p> <p>Paper towels are clean, but not sterile.</p>	<p>Paper towels (and all clean materials) should be stored in a way that keeps them clean.</p> <p>During breaks, the artist ungloves, washes hands, and re-gloves to prevent cross-contamination; tattoo should be covered with an appropriate dressing.</p>
After tattooing, excess blood and pigment are wiped away; antibacterial cream, lotion, or other aftercare product may be applied; a dressing is applied; aftercare instructions are provided.	<p>Excess tattoo ink may be rinsed off with non-sterile water, and/or blotted with clean but non-sterile paper towels/wipes.</p> <p>Dressings may be clean (meat-packing pads or plastic food wrap) or sterile, individually packaged dressings intended for human wounds.</p> <p>Aftercare instructions vary widely.</p>	<p>EHO may request that sterile water is used to rinse off excess ink.</p> <p>Aftercare products are applied with single-use applicators to avoid contaminated stock.</p> <p>Clean and sterile dressings must be stored in a way that maintains their integrity.</p>

Clean vs. Sterile Dressings in Wound Care

In order to better understand the infection risk associated with the use of clean vs. sterile dressings, we performed a rapid search and review of the available academic literature (Appendix A). There were no studies specifically related to the use of non-sterile dressings on tattoos. However, a number of papers were found that examined the use of sterile vs. clean technique. In wound care, “sterile technique” refers to the use of hand hygiene and sterile materials (instruments, gloves, irrigation solution, and dressings) to create a sterile (microorganism-free) field.¹⁰ In contrast, “clean technique” refers to the use of hand hygiene and use of clean materials, meaning that they are free of visible dirt or grime. The aim of clean technique is to reduce (but not eliminate) exposure to microorganisms. This rapid review will focus on dressings, rather than other materials.

There is no consensus in the literature as to where and when clean vs. sterile technique should be used. Karch and Karch¹¹ reported a case of an infected surgical incision that was attributed to the use of non-sterile gloves and non-sterile sanitary pads for home wound care, and anecdotal evidence reported within the same study suggested that nurses perceived infections to be more frequent when non-sterile dressings were used. In this case, the patient was able to demonstrate a proper clean wound dressing technique, for which reason the choice of dressing (not the patient’s technique) was identified as the cause of infection.

In contrast, two studies carried out in a hospital setting have found no significant difference between clean vs. sterile materials in caring for surgical incisions. Stotts et al.¹² found no difference in rates of healing among 30 patients with open surgical wounds who had received either clean or sterile dressings from one to nine days after surgery. Similarly, Lawson et al.¹³ found no difference in the rates of infection among 963 patients with open surgical wounds who had received either clean or sterile dressings for up to three months.

The type of surgical wound examined is important to understanding these results. The surgical incisions examined in these studies were the result of procedures with inherently greater risk of wound contamination, and for this reason had been left open to heal on their own.¹⁴ The likelihood of contamination is one of the arguments for using clean rather than sterile technique, as it is argued that the presence of a limited number of microbes does not represent a significant additional challenge to healing. Also, in both studies, nurses received additional training in clean and sterile techniques, and so it is possible that the positive effect of this “refresher course” improved wound dressing skills overall and thus offset any potential new infections due to the use of non-sterile dressings.

Research has also been done to determine whether sterile products are in fact cleaner than clean products. Alqahtani et al.¹⁵ cultured microorganisms from 85 samples of materials commonly used in home wound care, including sterile gauze (n = 20), panty liners (n = 20), sanitary napkins (n = 20), diapers (n = 20), and medical tape (n = 5). Culture results indicated that two of 20 sterile products were contaminated, whereas 0/20 sanitary napkins, 1/20 panty liners, 15/20 diapers, and 2/5 tape samples were contaminated. These results indicate that some products marketed as sterile may not be so, and that some non-sterile individually wrapped products may be comparable in terms of sterility, whereas others (diapers) may be more problematic. Similarly, plastic food wrap, which is often recommended as first aid for burns before seeking medical treatment,¹⁶ has been shown to be effectively sterile when cultured¹⁷ which is likely due to the high-temperature conditions under which it is manufactured.

Handling of dressing materials is also a critical factor in whether or not they remain clean enough for use. Carter et al.¹⁸ analyzed the level of contamination that occurred in non-sterile dressings left exposed to the environment in an intensive care unit. The study found that clean but non-sterile materials (gauze swabs and cotton-wool balls) stored in such a way became contaminated with multiple organisms, some of which were pathogenic and would have put patients at risk of infection had they been used on a wound. Because this study was carried out in a hospital environment, it is possible that there was a greater probability of environmental contamination than would be encountered in a tattoo studio; however, sanitary procedures may also be more aggressive in hospitals than in tattoo studios.

Expert Consultation

Because the common usage of non-sterile dressings in medical practice has created some confusion over what is appropriate for tattoos, we sought clarification regarding the use of such products from the Vancouver General Hospital Wound Healing Clinic. NCCEH consulted with Dr. Brian Kunimoto, a medical dermatologist and director of the Wound Healing Clinic. Dr. Kunimoto provided clarification regarding the classification of wounds (acute vs. chronic wounds) and how this classification may determine the dressing used in wound care. An acute wound is a new wound that may be contaminated by microorganisms, but has not been extensively colonized and is expected to heal quickly and uneventfully.¹⁹ For these wounds, which include new tattoos, a sterile dressing is recommended. In contrast, a chronic

wound is one that does not follow the typical healing sequence and remains painful and bleeding/exuding after more than four weeks.^{19,20} Chronic wounds have developed their own complex microbiological community.¹⁹ Because of this, the use of non-sterile dressings, such as sanitary napkins and diapers, is equally beneficial and more cost-effective for wound care. Furthermore, Dr. Kunimoto noted that the use of non-individually wrapped products (meat-packing pads) would be at risk of contamination due to incidental contact with unclean hands or leaving packaging open to the environment.

To gain insight into the industry perspective on tattoo dressings, NCCEH consulted with two tattooing experts. Peggy Sucher is a tattoo artist and business owner, and has been active within the National Tattoo Association (NTA) for 30 years. She has served as a security (compliance) officer at the NTA's annual national convention. Ms. Sucher has developed and delivered blood-borne pathogen training courses for tattooists, and has previously worked with the Alliance for Professional Tattooists (APT), a non-profit health promotion organization that promotes best practices for the tattoo industry. Ms. Sucher is a strong advocate against the use of plastic wrap on new tattoos, as plastic film retains heat and moisture and has been shown to promote the proliferation of microorganisms to a greater degree than other occlusive dressings (as reviewed in Hutchinson et al.²¹). However, the greater issue with plastic wrap as a dressing is its non-absorbent nature, which can result in the leakage of body fluids and ink from the margin of the dressing, which may pose a health risk to others through contamination of the environment. This would be of particular concern at tattoo conventions or shows, where tattoo recipients could transfer body fluids to surfaces or other people through accidental contact. Regarding meat-packing pads, Ms. Sucher indicated that the use of these products as dressings is less likely to cause issues as long as they are properly stored and handled.

Mike Martin, president of the APT, stated that his organization has taken a long-term stance against the use of plastic wrap, meat-packing pads or any other non-sterile dressings. The APT considers these non-sterile dressings an unnecessary risk to tattoo recipients given the widespread availability of low-cost, individually packaged sterile products from both tattoo supply and medical supply companies.

Recommendations from public health agencies

A grey literature search (Appendix A) returned numerous documents from public health agencies regarding home wound care, but very few examples of documents that specifically recommended the use of non-sterile clean materials such as sanitary pads or diapers. Typically, these documents dealt with non-sterile wounds in non-sterile places on the human body, and it is therefore not unreasonable that a clean rather than sterile dressing would be permitted. They will not be further discussed or presented here. The search did not return any document in which a public health entity recommended the use of non-sterile products on surgical incisions or other wounds that are expected to be kept as clean as possible. Finally, regarding the specific product in question (UZ-90 Ultra zap pads), no information was available regarding its cleanliness on the manufacturer's website.^c

Additional grey literature searches were conducted for guidance documents from public health entities regarding best practices for tattoo artists. These were reviewed briefly with respect to the type of bandage or dressing used after completing the tattoo. As summarized in Table 2, a number of documents were found that recommended sterile dressings only, whereas others permitted clean or sterile dressings. In Ontario, guidance from the provincial Ministry of Health indicates that dressings may be clean or sterile, but must be individually wrapped and intended for use on human wounds. This requirement to use products intended for human wounds would seem to encourage the use of medical-grade, film-like, transparent tattoo dressings, such as Saniderm or Tegaderm. However, the stipulation that dressings must be individually wrapped may still be an issue as some tattoo film products are sold as a roll, from which the tattoo artist can cut an appropriately sized dressing for the new tattoo.

In Europe, requirements for sterility appear to be much more stringent, based on a rapid scan of regulations and guidelines for tattooists and other personal service providers. Although dressings were not mentioned specifically in the English-language summaries provided for individual European nations, it was frequently stated that *"products shall be sterile and supplied in a container which maintains the sterility of the product until application."* In some cases, this appeared to be related to the tattoo ink only, whereas in other cases it was stipulated that all tattoo equipment or materials that contact the skin or mucous membranes must be sterile.

^c<http://www.eikondevice.com/product/ultra-zap-uz90-pads-black-package-1000>

Table 2. Tattoo aftercare guidance from North American and European public health entities. This list is not comprehensive; rather, guidance documents were selected to show the range of potential approaches taken.

Document	Type of Dressing Suggested
CANADA	
Alberta Health and Wellness ²²	Sterile dressing indicated.
Algoma Public Health ²³	Clean or sterile dressing permitted; however, “Dri-loc” meat-packing pads specifically prohibited.
Manitoba Health ²⁴	Specifies “dry sterile dressing indicated for medical use.”
Ontario ²⁵	“Dry clean dressing” indicated, but also states that the product must be an “individually packaged dressing or bandage intended for covering wounds.”
UNITED STATES²⁶	
New York City ²⁷	Indicates that a “dry clean dressing” should be used to cover the tattoo during breaks, but that a “clean sterile dressing” that is individually wrapped to maintain sterility should be used when the tattoo is complete, and should remain in place for 3-5 hours. The use of a clean dressing for a short break vs. a sterile dressing for a longer period may reflect concern that prolonged contact with non-intact skin carries a greater risk of infection.
EUROPEAN UNION	
European Commission ²⁸	This document provides a brief description of requirements in member states. Sterility requirements for dressing and other materials are not consistently indicated; however, in some cases sterile dressings, gloves, and/or inks are specified. Specific examples follow:
Belgium	Sterile gloves preferred, but also states that “the materials that can penetrate skin or can enter into contact with the client’s skin or mucous [sic] shall be sterile and disposable.”
France	Specifies that “equipment coming into contact with client skin or mucous membrane and their direct supports shall be either disposable and sterile or sterilised before each use.”
Italy	Sterile gloves indicated.
Malta	Sterile dressings indicated.
Spain	States that “All products used in the tattoo shops have to be sterile and disposable.”

Summation

Although past research has examined the use of clean vs. sterile dressings on chronic or contaminated wounds, research evidence is lacking regarding the effect of clean vs. sterile dressings on cleaner acute wounds like tattoos.

In the absence of evidence, the decision on whether or not to use sterile or clean dressings may be framed in one of two ways. Should clean dressings be deemed acceptable, given that many other steps in the tattooing procedure use clean, non-sterile items? Or, should every effort be made to reduce the risk of infection to the highest degree possible at each step of the process? Given the growing concern over antibiotic-resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA),²⁹ mitigating to the greatest extent possible (rather than to the lowest common

denominator) may be preferable given the relatively low cost of a sterile dressing. Because tattoo inks may also be a source of infection, whether due to manufacturing, packaging, or dilution,^{9,30} requiring these products to be sterile may be of greater benefit to public health.

Regardless of whether clean or sterile dressings are used, frequent handling, being left exposed to the environment, and the application of dressings in an unhygienic manner increase the risk of contamination and ultimately the risk of infection. Because meat pads and other materials used as “clean” dressings are not individually wrapped, additional precautions may be required and should be specified in guidance documents. For example, precautions might include re-packaging meat pads into smaller

clean packages, or ensuring that meat pads are not kept in open trays, tool boxes, or dusty drawers. Furthermore, given the variation in the cleanliness of certain commonly used clean dressings,¹⁵ it may be important to confirm that these products in fact fit the definition of “clean.” This could be achieved by collecting samples of meat-packing pads from various locations in the tattoo studio (i.e., from an unopened package, from an open package, from the workstation, from a tool box at a show, etc.) and culturing these samples to determine their degree of contamination.

Cost was also cited as a consideration in selecting sterile vs. clean dressings.^{12,15} However, it should be noted that these studies examined chronic wound patients who required daily dressing changes for weeks or potentially months. As a result, the overall cost of wound dressing is much greater to these patients than to a new tattoo recipient, who may need only one or several dressing changes for less than a week.

Finally, it should be noted that dressings serve both to protect the wounded individual from infection, and prevent others from coming into contact with seeping body fluids. Although the use of plastic food wrap as a tattoo dressing is widespread, this practice poses a risk to others as body fluids may seep out from beneath the plastic and contaminate the environment, particularly in crowded environments such as tattoo shows and conventions. Thus, the ability to contain seepage and lessen risk to others may be a factor in selecting dressing types.



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Acknowledgements

The authors would like to acknowledge Kat Hansen for her input on tattooing practices. We also thank Dr. Brian Kunimoto, Peggy Sucher, Mike Martin, and Shelley Beaudet (Vancouver Coastal Health) for their input.

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Appendix A: Search Strategy

SEARCH CONTEXT:

Rapid review of scientific literature related to tattoo infection risks and dressings used for tattoo aftercare, supplemented with grey literature searches for public health recommendations.

SPECIFIC TASKS:

- Perform rapid academic literature searches for the use of clean vs. sterile dressings in tattoos (and in other types of wounds), and whether non-sterile bandages or dressings have been identified as risk factors for tattoo infections, or other types of wounds.
- Perform grey literature searches for advice or instructions for home wound care from medical institutions, specifically with regard to the use of sterile vs. non-sterile dressings (sanitary pads, diapers), as well as recommendations from public health agencies regarding clean/sterile articles used in tattooing.

LITERATURE SEARCH OBJECTIVE:

Articles will be scoped using Ebscohost databases (includes Medline, Cinahl, Academic Search Complete, ERIC, etc), Web of Science, and Google Scholar. Google was used to identify documents from public health agencies; limiting hits by file type (pdf) was effective in isolating documents from public health agencies. Citation chaining was used to further expand the resource lists. The complete list of resources is available upon request.

Date parameter: No date limit set (however, more recent articles were sought during manual review of select bibliographies); English article focus.

SEARCH TERMS:

Variants and Boolean operator combinations of:

(tattoo OR "body art" OR "body modification") AND (infection OR rash OR allergy OR pain OR redness)

sterile (clean OR sterile/non-sterile) comparison dressing

sterile (dressing OR bandage OR wrap OR pad OR dri-loc OR absorben*) (tattoo OR "body art" OR "body modification" OR "skin abrasion" OR "dermatological abrasion")

(tattoo OR "body art" OR "body modification" OR "skin abrasion" OR "dermatological abrasion" OR wound) AND (intitle:dressing OR intitle:bandage OR intitle:wrap OR intitle:pad)

alternative AND (tattoo OR "body art" OR "body modification" OR "skin abrasion" OR "dermatological abrasion" OR wound) AND (intitle:dressing OR intitle:bandage OR intitle:wrap) –surgical

(Dri-loc OR dry lock OR meat tray pad OR absorbent pad) AND (tattoo OR "body art" OR "body modification" OR "skin abrasion" OR "dermatological abrasion" OR wound)

(tattoo OR "body art" OR "body modification") AND ("wound care" OR "after care") AND ("public health" OR "health unit") AND type:pdf ("home wound care") AND (dressing OR bandage OR wrap OR pad) and (sterile OR non-sterile OR clean).