



Safer Hand Hygiene

Getting triclosan and triclocarban out of hand soaps, sanitizers, and lotions



“Hand hygiene is the number one way to prevent the spread of infections.”

“Health care providers might need to clean their hands as many as 100 times per 12-hour shift....”

- U.S. Centers for Disease Control and Prevention

Goal

Eliminate triclosan- and triclocarban-containing hand hygiene products throughout the health care facility.

Summary

Infection prevention and control in health care are of primary importance. Antimicrobials remain one of the most important lines of defense in the prevention of infection. However, some commonly used antimicrobials in hand hygiene products found in the health care setting, such as hand soaps, can pose hazards for employees and the environment and may increase antimicrobial resistance.

Definitions

Hand hygiene product: Any product used for hand hygiene, including liquid soap, bar soap, foam soap, hand sanitizer, hand rub, antiseptic, or lotion.

Antimicrobial: An agent that kills microorganisms or stops their growth.

Triclosan (5-chloro-2-(2,4-dichlorophenoxy)-phenol): A chlorinated organic compound found in more than 2,000 consumer products, including hand soap, toothpaste, mouthwash, touch surfaces, lunchboxes, kitchen items, toys, plastics, and clothing, that functions as an antimicrobial agent.

Triclocarban (3,4,4' -trichlorocarbanilide): A chlorinated organic compound with widespread use, primarily in bar soaps, that functions as an antimicrobial agent.

Why Triclosan and Triclocarban?

Triclosan and triclocarban in hand soaps are no more effective in preventing the transmission of microorganisms than other products, including alternative antimicrobial hand soaps and regular soaps; may increase the risk of more generalized

antibiotic resistance; kill a narrower spectrum of organisms; are widespread in the environment; and can have adverse health effects in several animal species, including mammals.

Triclosan: Widespread exposure to triclosan is well-documented in the general human population. Studies show a growing number of potentially adverse health effects in laboratory animals and wildlife after exposure to triclosan, including effects on the thyroid, estrogen, and testosterone systems. Triclosan exposure has also been associated with increased risk of hay fever, allergies, and asthma in humans. Use of triclosan-containing toothpaste or hand soaps significantly increases urinary triclosan levels.

Some triclosan discharged to wastewater passes through wastewater treatment plants and is released in surface water and sludge. Triclosan can persist in the environment and contaminate fish and even food grown in sludge-amended soil. Triclosan and triclocarban have a range of detrimental effects on aquatic organisms, including acute toxicity and reproductive and developmental impacts in some fish at levels already occurring in the environment.

The U.S. Food and Drug Administration has concluded that triclosan's efficacy may be decreasing and that triclosan's antibiotic resistance poses a public health risk.

Triclocarban: Triclocarban is also environmentally persistent, detectable in many rivers and streams, and tends to bioaccumulate in many invertebrates. Triclocarban shares a number of toxic properties with triclosan, including hormonal effects.

In 2016, the U.S. Food and Drug Administration [issued a final rule](#) establishing that over-the-counter consumer antiseptic wash products containing 19 active ingredients, including triclosan and triclocarban, can no longer be marketed. Many hospitals have gone beyond a prohibition of triclosan and triclocarban in their hospitals, removing antimicrobials in all hand soaps outside of surgical and other critical care areas.

The [Florence Statement on Triclosan and Triclocarban](#), published in June 2017 in the peer-reviewed, scientific journal *Environmental Health Perspectives*, concludes that many common antimicrobial products, particularly triclosan and triclocarban, do not provide demonstrated health benefits and can cause health and environmental harm. The scientific statement includes an urgent call to only use triclosan, triclocarban, and other antimicrobial chemicals when they provide an evidence-based health benefit and there

is adequate evidence demonstrating they are safe. When antimicrobials are necessary, the authors recommend using safer alternatives that pose less risk to humans or ecosystems.

When antimicrobials are not required, well-performing hand soaps without antimicrobials are widely available and cost-effective. When antimicrobials are required, hand soaps containing alternative antimicrobial agents are also widely available and cost-effective.

There is a fast-growing number of hospitals that are moving away from triclosan and triclocarban in hand soaps. Those that have moved away from triclocarban and triclosan experienced cost savings or the change was cost-neutral.

See the scientific summary in [Appendix A](#).

Goal

GOAL		MEASURE	CALCULATION DETAILS
	Eliminate triclosan- and triclocarban-containing hand hygiene products throughout the facility	Percent of total hand hygiene spend on products that do not contain triclosan and triclocarban*	<p>Calculate the percent of hospital spend (in US \$) on hand hygiene products that do not contain triclosan and triclocarban out of total hospital spend (in US \$) on all hand hygiene products*</p> <p>Numerator: Hospital spend (in US \$) on hand hygiene products that do not contain triclosan and triclocarban</p> <p>Denominator: Total hospital spend (in US \$) on all hand hygiene products</p> <p>Step 1. Divide the hospital spend on hand hygiene products on products that do not contain triclosan and triclocarban by the total spend on all hand hygiene products.</p> <p>Step 2. Multiply by 100 to get the percent of hand hygiene spend on products that do not contain triclosan and triclocarban</p> <p>Example: Hospital A spends \$48,500 on hand hygiene products that do not contain triclosan and triclocarban Hospital A spends \$71,300 on all hand hygiene products $\\$48,500 / \\$71,300 = 0.6802$ $0.6802 * 100 = 68.02$ Hospital A's percent of hand hygiene spend on products that do not contain triclosan and triclocarban is 68.02%</p>
LEVEL ONE	Establish baseline and achieve 80% of hand hygiene product spend on products that do not contain triclosan and triclocarban	Percent of total hand hygiene spend on products that do not contain triclosan and triclocarban*	Determine whether the current percent of hand hygiene spend on products that do not contain triclosan and triclocarban equals or exceeds 80%.
LEVEL TWO	Achieve 100% of hand hygiene product spend on products that do not contain triclosan and triclocarban	Percent of total hand hygiene spend on products that do not contain triclosan and triclocarban*	Determine whether the hospital has achieved 100% of total hand hygiene spend on products that do not contain triclosan and triclocarban

* Does not include cost of dispenser.

Case Studies

Case studies on health systems that have transitioned to safer hand hygiene products are available on the [Practice Greenhealth website](#).

Get Started with Safer Hand Hygiene

Step 1: Become informed

To prepare for the goal, become acquainted with the scientific summary in Appendix A, and familiarize the team with the educational tools, including an [antimicrobial webinar](#) for background on the issue and [case studies](#).

Key facts

- The U.S. Centers for Disease Control and Prevention's 2011 [HAI Prevalence Study](#) reported 722,000 health care-acquired infections (HAIs) in U.S. hospitals. 75,000 patients died during their hospital stay.
- Hand hygiene is regarded as the single most important action to prevent HAIs, yet hand hygiene compliance is low: [The national average is about 40 percent](#).
- Although triclosan and triclocarban in hand soap can aid in reducing the presence of some microbes, they are [no more effective at infectious disease prevention](#) than non-antimicrobial soap.
- The 2014 Society for Healthcare Epidemiology of America's (SHEA) [Compendium on Hand Hygiene](#) advises against the use of triclosan-containing soap in health care facilities for the following reasons: the lack of evidence of its superior clinical effectiveness compared to other products; concern about promoting antibiotic resistance; widespread human exposures; and potential adverse health effects.
- In September 2016, the U.S. Food and Drug Administration (FDA) issued a [final rule](#) establishing that over-the-counter consumer antiseptic wash products containing triclosan or triclocarban can no longer be marketed because manufacturers did not demonstrate that the ingredients are both safe for long-term daily use and more effective than plain soap and water in preventing illness and the spread of certain infections. Health care institutions are exempt from the prohibition. As of 2017, the FDA is set to review the use of these products in health care, although no deadline has been established.
- The [Florence Statement on Triclosan and Triclocarban](#), published in June 2017 in *Environmental Health Perspectives*, concludes that most uses of triclosan and triclocarban do not provide health benefits and can increase the risk of certain adverse health outcomes and environmental harm.
- Adverse effects on the thyroid, estrogen, and testosterone systems in animal species, including mammals, have been found after exposure to triclosan. (See Appendix A.)
- [Human epidemiology](#) and [animal studies](#) suggest triclosan exposure can [increase sensitivity to allergens](#) and the likelihood of developing asthma or having more frequent [asthma exacerbations](#).
- [Triclosan is found in more than 75 percent of Americans](#) surveyed by the U.S. Centers for Disease Control and Prevention, and exposure levels are increasing.
- [A 2014 study](#) compared triclosan exposure in a health care facility using triclosan hand soaps to a facility not using triclosan hand soaps, concluding that the use of triclosan-containing hand soaps represents an important source of triclosan exposure for health care workers and the levels measured may be biologically relevant.
- [Triclosan can persist in the environment and contaminate](#) fish and even food grown in soil that has had sludge applied to it as a soil amendment.

Step 2: Convene a team

Transitioning to healthier hand hygiene products requires collaboration with a multidisciplinary team. It is important to identify facility champions who will support and help with the transition. Identify key team members from infection prevention and control, environmental services, communications, staff education, appropriate clinical staff, supply chain, and other key members of a green team or quality team. Some team members will be responsible for

the technical review and decision-making process, some for training or communication coordination, and some simply to serve as cheerleaders within the organization. Connect with the sustainability team and community benefits for maximum support, impact, and connection to overall sustainability programming and other strategic priorities. Listen to the antimicrobial webinar and use educational posters to raise awareness of the importance of the work and opportunity for improvement with the team and key staff. Identify key committees and individuals that would benefit from education before going forward to create a space for feedback and collaboration.

Step 3: Engage leadership and develop a policy

Leadership engagement and support are critical to the long-term success of a facility's transition to more sustainable products. Research reports and data can help make the case to leadership regarding the public health and environmental benefits of transitioning to sustainable hand hygiene products. Infection prevention engagement at a senior level is required before moving forward with any change to hand hygiene protocol. Participation and support from senior-level administration may mean less time spent convincing staff to participate and will allow the project to advance faster.

Some health care institutions find it helpful to develop a policy. The policy can be a stand-alone policy or be added to a broader green cleaning, worker health, environmental purchasing, or sustainability policy. The commitment also can be memorialized in a pledge, letter, or statement. This can be an important step because a policy, pledge, or similar act reflects the hospital's commitment to reducing the purchase and use of potentially hazardous chemicals and provides the necessary backing to the hospital staff responsible for implementing the goal. The policy, pledge, or statement should specify the means for implementing the goal.

Step 4: Inventory current products and update regularly

It is important to determine the current inventory of hand hygiene products containing triclosan and triclocarban. First, evaluate all contracts (for products and services) that may include the purchase of triclosan- and triclocarban-containing hand hygiene products. In addition, conduct a facility walk-through/audit to identify these products throughout the facility, including in public, food services, patient care, and other areas to get the complete picture of products in use, including products being purchased outside of central purchasing. Assessments help identify product use disparity and opportunities for standardization. Capture all hand hygiene products — those containing antimicrobials (distinguishing between triclosan/triclocarban and other antimicrobials) and those that do not — in order to determine whether the goal is met, and to assess progress over time.

Use the form below during your walk-through or make your own template to inventory the use of hand hygiene products containing triclosan or triclocarban. This step will be critical to successful implementation and will be helpful in tracking progress over time. By establishing a baseline, it will be easier to track and measure progress.

Hand hygiene products can be found in many different contracts, including office supplies, maintenance repair and operations, janitorial cleaning products, and possibly others, in addition to being purchased off contract.

Consider periodically inventorying hand hygiene products to make sure products containing triclosan or triclocarban do not end up back in the hospital. This is particularly critical with decentralized purchasing.

Note: You might consider using the walk-through to assess the extent of purchasing outside of hospital-approved products or hospital-identified goals at the facility. Consider confiscating all products not approved by the facility at a later date, after the program is implemented.

	Product 1	Product 2	Product 3	Product 4
Storage location				
Name of building				
Product type				
Product name and manufacturer				
Amount in stock (in units)				
Amount in each container (i.e. 8 oz.)				
Price per unit size				
Location where product is used				
Liquid, foam, aerosol?				
Purchasing source? (specific contract, PO, service agreement, etc.)				

Step 5: Establish product specifications and work with vendors and key stakeholders

Once products containing triclosan or triclocarban have been identified, work with the team, including supply chain, infection prevention and control, and environmental services, to identify acceptable alternatives and department(s) responsible for purchasing these products. Many systems will need to work within the GPO contract review process to implement this goal. Often, vendors already offer green options that can be selected mid-contract. If the organization's environmental services is outsourced, discuss opportunities for changing products with the vendor. In addition, some environmental services contracts allow the facility to supply the products. Alternatives to consider are provided below.

Alternatives to triclosan- or triclocarban-containing hand hygiene products

Hand soaps containing an antimicrobial are only necessary for some uses within the health care setting. For many clinical uses, soap and water and alcohol-based rubs are sufficient. For those uses requiring an antimicrobial, some alternatives to triclosan and triclocarban include alcohol-based hand rubs (ABHR) greater than or equal to 60 percent, chlorhexidine gluconate (CHG), benzalkonium chloride, chloroxylenol (PCMX), and povidone-iodine.

Examples of alternative products being used by some Practice Greenhealth health systems can be found in the chart below. Practice Greenhealth does not endorse these products.

Non-antimicrobial products

Non-antimicrobial handwash products

Ecolab Foam Hand Soap (Green Seal-certified)
Ecolab Endure Sensitive Skin Foam Hand Soap (fragrance-free)
GOJO Green Certified Foam Hand Cleaner (fragrance-free option, UL ECOLOGO Certified)
Steris Kindest Kare Foaming Handwash (formulation without triclosan)
Green Seal-certified products: GS-41
UL ECOLOGO-certified products: UL 2784

Lotions

Ecolab Revitalizing Skin Lotion (fragrance-free)

Antimicrobial products

Antimicrobial handwash products

Ecolab Equi-Soft Foam (0.55 percent benzalkonium chloride)
Ecolab Medi-Stat (0.5 percent chloroxylenol (PCMX) formula)

Antimicrobial waterless alcohol hand degerming products

Ecolab Quik-Care Foam Hand Sanitizer (fragrance-free)
Ecolab Quik-Care Nourishing Foam Hand Sanitizer (fragrance-free)

Step 6: Implementation

Before the rollout, make sure any special issues are considered in a variety of care areas and staff types, including critical care and non-critical care. For some hospitals, a pilot phase will be important to work out any kinks before a full-scale rollout. In such cases, start by removing triclosan- and triclocarban-containing hand hygiene products in one area, hospital, or clinic.

Education, training, and communications: A change in hand hygiene products can require adjustments, and the switch may be more difficult than necessary without an effective training and education program. The more people understand, the more leadership support is established, and the easier the shift in culture. Ask infection prevention and control staff to review educational materials. Vendors also should be able to assist with communications by helping staff develop materials that might be helpful to describe the switch. During the initial phase of the transition to healthier hand hygiene products, ensure a designated member of the team maintains regular communication with key staff affected by the change. The team should survey areas regularly and respond to any complaints or questions, immediately, before staff become frustrated by a lack of assistance. Keep in touch with the manufacturer's representative(s) and seek guidance with diagnosing and remedying any issues that arise. Revise procedures and training materials as needed.

Track and evaluate data: Consider administering surveys to obtain information about staff, patient, and visitor reactions (if any) to the new products. Survey nursing staff and others involved with the transition to see if they have any concerns about using the new products.

Solicit feedback from those who initially expressed reservations about the transition to ensure they feel heard and respected. Perhaps their concerns have been allayed by the process, or perhaps they still have doubts that need to be integrated with more positive feedback to develop a fair assessment. Use a survey and evaluation results to identify highly successful products and to flag those that did not work as well and either need to be readdressed or dropped. Track the cost of transition to identify any cost savings through product exchange or standardization. Take lessons learned from one site and expand to other sites.

Step 7: Celebrate success

Take advantage of opportunities within the facility to promote work in helping to create a healthier healing environment for staff, patients, and visitors. Write articles for facility newsletters about the hand hygiene products effort, and nominate one or more members of the team for staff recognition. Develop a case study on the transition to greener hand hygiene products, including information on why the switch was important to the environment and to building occupants' health; information on the new products selected for use; and a narrative of how the transition proceeded, with quotes from facility staff, patients, and visitors about their reaction to the new products. In collaboration with the public affairs department, develop materials to inform local or regional press about the successful implementation of green hand hygiene products in the facility, and highlight how it reduces toxic releases to the local wastewater stream and increases patient and staff comfort and safety. Apply for a Practice Greenhealth award.

Going beyond the goal

Some health systems have gone beyond the elimination of triclosan and triclocarban by avoiding fragrances in hand hygiene products. Hospitals also are considering these additional ingredients for elimination in their purchase of hand hygiene products because of their negative environmental impacts: microbeads, silver, parabens, and formaldehyde or formaldehyde-releasing preservatives. Other health systems are avoiding all antimicrobials in hand hygiene products used in non-critical care areas. And others are purchasing hand hygiene products certified by Green Seal or UL ECOLOGO.

Tools and resources

Hand hygiene resources

[Guideline for Hand Hygiene in Health Care Settings:](#)

Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force (2002)

[Hand Hygiene in Health Care Settings](#), Centers for Disease Control and Prevention

[A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals: 2014 Updates](#), National Library of Medicine

SHEA, IDSA, AHA, APIC, and The Joint Commission issued a [press release](#) offering *Expert Guidance on Hand Hygiene in Healthcare Settings* (July 2014) in response to the Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals. The release included the following statement:

“A review of current literature found triclosan to be no more effective in preventing transmission of micro-organisms in healthcare settings than products currently recommended (e.g., ABHR and soap). Further, triclosan kills a narrower spectrum of organisms compared to ABHR and soap, which can lead to contamination and resistance.”

U.S. Food and Drug Administration [final rule](#) establishing over-the-counter (OTC) consumer antiseptic wash products containing 19 active ingredients, including triclosan and triclocarban, can no longer be marketed.

Triclosan and triclocarban resources

[European Chemicals Agency triclosan webpage](#)

[Environmental Protection Agency triclosan webpage](#)

[Environmental Protection Agency triclosan pesticide registration page](#)

[Healthcare Worker Exposures to the Antibacterial Agent Triclosan](#), National Library of Medicine

[Where is Triclosan Still Approved for Use?](#), Environmental Working Group

Other supporting resources

[Antimicrobials in Hospital Furnishings: Do They Help Reduce Healthcare-Associated Infections?](#), Health Care Without Harm

[The Florence Statement on Triclosan and Triclocarban](#)

[Minnesota triclosan prohibition law](#)

Appendix A: Rationale for prohibiting triclosan/triclocarban in hand hygiene products in health care

Triclosan

For many years, triclosan (5-chloro-2-(2,4-dichlorophenoxy)-phenol) has been added to various kinds of hand soap, toothpaste, mouthwashes, touch surfaces, lunchboxes, kitchen items, toys, plastics, and clothing [from which it is released](#) and functions as an antimicrobial agent. Triclosan is generally [more effective](#) against gram-positive than gram-negative bacteria. Triclosan acts by [inhibiting an enzyme necessary](#) for synthesizing fatty acids, which are necessary for building cell membranes and for cell division.

The safety of triclosan exposure is increasingly questionable as studies show a growing number of potentially adverse effects in [laboratory animals](#), wildlife, and to some extent humans. Triclosan has effects on the [thyroid](#), [estrogen](#), and testosterone systems in several animal species, including [mammals](#). These effects are of particular concern when exposures occur during developmental windows of susceptibility. Impacts on brain and [reproductive system development](#) have not been adequately evaluated in humans, although laboratory animal evidence is increasingly strong. [Triclosan exposure](#) has also been associated with increased risk of hay fever, [allergies](#), and [asthma](#) in humans.

[Exposures to triclosan are widespread](#) in the general population through both oral and transdermal pathways. Triclosan residues are [measureable in adult and infant urine](#), breast milk, and meconium. In an analysis of two groups of [health care workers at separate hospitals](#), one of which used triclosan-containing soap in all patient care areas and one which did not, occupational exposures accounted for an incremental triclosan burden of 206 ng/mL of urine, while use of triclosan-containing toothpaste was associated with 146 ng/mL higher urinary levels.

Some triclosan discharged to wastewater passes through wastewater treatment plants and is [released in surface water](#) and sludge. Triclosan can [persist in the environment](#) and contaminate fish and even food grown in sludge-amended soil.

Studies show that [bacteria](#) can have both natural and acquired mechanisms of resistance to triclosan. The primary mechanism of acquired resistance is due to mutations within the coding region of the enzyme necessary for fatty acid synthesis, making triclosan less effective. Other mechanisms include production of an enzyme that degrades triclosan and efflux pumps within bacteria that actively remove the chemical from the cell. Some studies show that [bacteria that become resistant](#) to triclosan can also become [resistant to other antibiotics](#). In its September 2016 [final rule](#) prohibiting triclosan and triclocarban in over-the-counter wash products, the U.S. Food and Drug Administration concluded that, although the available studies do not prove definitively that triclosan/antibiotic resistance currently poses a public health risk, they do suggest that susceptibility to triclosan may be decreasing. Data are not currently available to assess the magnitude of the risk that triclosan poses for the development of resistance.

Triclocarban

Triclocarban (3,4,4'-Trichlorocarbanilide) is another chlorinated antimicrobial organic compound with some structural similarities to triclosan and in widespread use. Like triclosan, triclocarban is also [environmentally persistent](#), detectable in sewage sludge, rivers and streams, and tends to [bioaccumulate](#) in many invertebrates.

Use of [triclocarban-containing soap](#) results in dermal absorption and measurable levels in the urine. Like triclosan, triclocarban crosses the placenta and is present in cord blood. [In a study](#) of an urban population in New York, triclosan was detectable in 45 percent of cord blood samples from 181 mother/infant pairs and triclocarban detectable in 23 percent.

Triclocarban shares a number of [toxic properties](#) with triclosan, including [hormonal effects](#). Both triclosan and triclocarban are toxic to algae, crustaceans, and fish at [environmentally relevant concentrations](#). Human epidemiologic studies of triclocarban toxicity are sparse.

[Data gaps](#) include information on dermal carcinogenicity, hormonal effects, and promotion of antibiotic resistance. [Data addressing triclocarban effectiveness are also missing.](#)

Agency and professional association perspectives

The 2014 Society for Healthcare Epidemiology of America (SHEA) Compendium on Hand Hygiene advises against the use of triclosan-containing soap in health care facilities because of [lack of evidence of superior clinical effectiveness](#) compared to other products, concern about promoting antibiotic resistance, widespread human exposures, and potential adverse health effects.

In September 2016, the U.S. Food and Drug Administration issued a [final rule](#) establishing that over-the-counter consumer antiseptic wash products containing triclosan or triclocarban can no longer be marketed because manufacturers did not demonstrate that the ingredients are both safe for long-term daily use and more effective than plain soap and water in preventing illness and the spread of certain infections. Health care institutions are exempt from that prohibition.

Availability of alternatives

According to the Centers for Disease Control and Prevention's [Guideline for Hand Hygiene in Health Care Settings](#), effective alternatives to triclosan- and triclocarban-containing soaps and hand washes are readily available and widely used. Avoiding soaps containing these two agents poses no increased risk of infectious disease transmission.

Conclusion

Triclosan and triclocarban in hand hygiene products have not been shown to be more effective than alternative products, may increase the risk of more generalized antibiotic resistance, and result in widespread exposures, including in humans and wildlife. Environmentally relevant levels of exposure can have adverse health effects in several animal species, including mammals. In humans, endocrine-disrupting properties are a particular concern. There is also epidemiologic evidence of an association between triclosan exposure and increased risk of allergy, hay fever, and asthma.