

Guidance for sustainable glove purchasing

PROTECTION WITHOUT POLLUTION » GUIDANCE FOR SUSTAINABLE GLOVE PURCHASING

Health and environmental benefits

Reducing glove use where possible eliminates the resources and waste associated with unnecessary use

- Gloves are the highest volume disposable product purchased by healthcare. Glove use has increased dramatically and is expected to nearly double in the next five years. Manufacture and transport of gloves requires resources and energy, and the use of chemicals of concern.
- Glove disposal results in waste that, if handled improperly, can threaten health.
- A pilot project in the United Kingdom's National Health Service system showed glove use could be [dramatically reduced with significant savings](#) and carbon reduction while maintaining infection prevention and improving care.

Some materials used to manufacture gloves can be toxic throughout their life cycle

- [Polyvinyl chloride \(PVC\)](#) is toxic throughout its life cycle. It is derived from vinyl chloride, a known human carcinogen. Every step in the [production of PVC](#) involves the use of [chemicals of high concern](#). Burning PVC gloves can result in the [formation of highly toxic chemicals](#).
- The [manufacture and disposal](#) of gloves can threaten surrounding communities and workers.
- Recycling PVC is challenging and can [hinder the recycling of other kinds of plastic](#).

Some components of gloves can pose a threat to patients and workers

- Ortho-phthalates are added to PVC and other plastics to impart flexibility. They are used in many products so exposure is widespread, and can be cumulative. Adverse effects include hormone disruption, reproductive and developmental impacts, and kidney toxicity. Exposure to some ortho-phthalates is associated with an increased risk of asthma.
- Some biocides used in gloves can be dangerous or toxic to humans and the environment, and can accelerate the development of resistance to bacteria.
- Many gloves are made with accelerants like thiurams, thiazoles and carbamates that are contact allergens and can cause skin irritation and/or sensitization.

Health Care Without Harm recommendations

Health Care Without Harm recommends health care facilities only use gloves where indicated, avoid gloves containing polyvinyl chloride (PVC) and powdered latex, and replace them with more sustainable alternatives that meet labor standards without compromising patient safety or care.

Health Care Without Harm glove target goal

Tier 1: Clinical care gloves must meet mandatory procurement criteria including:

- No PVC (vinyl)-containing gloves.
- No powdered latex gloves.
- Meet ILO labor standards.

Tier 2: All gloves must meet Tier 1 requirements.

Please see table on page 3 for definitions.

Key issues to consider

- Hand hygiene is the most critical intervention to protect against pathogens and healthcare-acquired infections.
- Choose gloves that are appropriate for their intended use. The [Glove Selection and Usage](#) guidance provides [more information](#) on how to select the right glove for the task. For example, the barrier protection required of biologics, radioactive material, or chemicals must be matched with the appropriate glove material.
- Gloves are only one component of hand hygiene. They should be used only where they have been demonstrated to reduce contamination for either the practitioner or the patient.
- Gloves should not be used for routine duties. For example, it is not necessary to wear gloves to administer solid medication. Instead, practitioners should use the aseptic non-touch technique (ANTT).
- Gloves should be removed immediately after a procedure to prevent cross contamination. Hands should then be decontaminated.
- Evidence suggests that gloves can be [used inappropriately](#) in clinical practice. [Improper use of non-sterile gloves](#) can lead to [cross contamination and has been implicated in infection outbreaks](#). Gloves are often used when they aren't needed, put on too early, taken off too late, or not changed at critical points.
- Research shows that [patients often feel uncomfortable](#) with inappropriate use of gloves for personal tasks.

Occupational health and allergy concerns

- [Half of all health care workers](#) may experience dermatitis in any year. Approximately [one in five nurses develop hand dermatitis](#) – a painful, debilitating condition which may require staff to be moved out of clinical areas.
- Allergenic ingredients in gloves can cause Type 1 and Type 3 hypersensitivity reactions, depending on the agent. It is important to diagnose the allergic reaction correctly to choose the appropriate gloves for the practitioner.
 - For latex gloves: Closely monitor allergy concerns including information on protein content in latex gloves, and the extent of powdered content in all gloves.
 - Some practitioners may be allergic to the accelerants used in many gloves.

Labor concerns

- Recent reports have documented worker exploitation around glove manufacture including [forced labor](#), poor working conditions and [debt bondage](#). The [U.S. Customs and Border Protection \(CBP\)](#) agency barred some [products](#) from being distributed in the country after finding “reasonable evidence” that the companies were using forced labor. Allegations of abuse in glove production also include [passport confiscations, illegal withholding of pay](#), and restricted freedom of movement.
- As a result, it is important to:
 - Research glove sourcing.
 - Require suppliers to have effective risk management regarding workers' rights in accordance with the ILO's core conventions in their operations and in the supply chain of subcontractors who directly participate in fulfilling the contract.

Case studies

- [‘Gloves are off’ campaign case study](#), Great Ormond Street Hospital, National Health Service, England, 2018.
- [Vienna Hospital Association](#), Stockholm County Council, page 16.
- [Na Homolce Hospital](#), Czech Republic, page 17.
- Kaiser Permanente [moves away from PVC gloves](#).
- [Single-use healthcare products in Region Skåne](#), Sweden, glove packaging page 8.

Glove material	Advantages and disadvantages Source: adapted from Joint Commission Environment of Care and OSHA PPE Guidance
Butyl (synthetic rubber)	Excellent barrier protection and strength; resistance to ketones, acids, caustics, isocyanate and gases. Good for ketones and esters. Poor for gasoline and aliphatic, aromatic, and halogenated hydrocarbons.
Latex (natural rubber)	Excellent barrier protection and strength; excellent elasticity; excellent comfort. Used for biological & water-based materials; poor for organic solvents; little chemical protection; hard to detect puncture holes; can cause or trigger latex allergies.
Nitrile	Excellent barrier protection and general use glove; excellent strength; high level of tactile sensitivity for users when conducting tasks; elasticity and fit and comfort are very good; shows clear indication of tears and breaks; good alternative for those with latex allergies; superior resistant to punctures & abrasion; resistant to several chemicals like glutaraldehyde; good for use with solvents, oils, greases, and some acids & bases; oxygen, UV light, and ozone can deteriorate; may contain curing agents.
Neoprene (polychloroprene)	Excellent barrier protection; excellent strength but tears easily once punctured. Newer products have excellent elasticity and very good fit & comfort. Used for many hazardous chemicals.
Polyethylene	Not suitable for clinical applications. Used for light duty tasks that require frequent glove changes like in food service lines, deli counters, & other high volume applications.
Polyisoprene	Excellent puncture, tear & abrasion resistance. Excellent elasticity and good comfort and tactile sensitivity; excellent barrier protection; may also be a suitable glove for chemotherapy; contains accelerators.
Polyurethane	High tensile strength; vulnerable to alcohol breakdown; slippery; embrittles & hardens at low temperatures; resistant to oil & abrasion.
Polyvinyl alcohol (PVA)	Resistant to snags, punctures, abrasions and cuts. Not suitable for environments where they may be exposed to water or light alcohols. Very high resistance to aliphatics, aromatics, chlorinated solvents, esters and most ketones.
Polyvinyl chloride (PVC)	Poor barrier protection; weakest film for strength & durability; very limited elasticity, fit and comfort. Used for acids, bases, oils, fats, peroxides, & amines; poor for most organic solvents, glutaraldehyde, & chemotherapy agents; vulnerable to breakdown from alcohol; vinyl gloves may rupture more often during use when compared to other gloves.

Procurement criteria

Required

- Include contract clause to monitor contract adherence to social and environmental requirements and address non-compliance with contract requirements.
- Performance requirements specific to regulatory requirements, region, and use.
- Gloves that are sterilized should use gamma radiation for sterilization.

Product content

- Product does not contain polyvinyl chloride (PVC).
- Product does not contain di (2-ethylhexyl phthalate) (DEHP). The total concentration must not exceed 0.1% by weight (1000 mg / kg) in any separate part of the offered equipment.
- Product does not contain phthalates, esters of orthophthalic acid, at concentrations above 50 ppm (50 mg/kg) per substance.
- Product is not treated with or intentionally contain biocidal chemicals.
- All gloves offered are free of powder residue and the powder level in the gloves should not exceed [2 mg / glove](#).
- Substances intended to moisturize or soften the hands should not be added or found in the offered products.
- Product is free of substances of high concern. The products offered shall not contain [substances listed on the current candidate list](#) (Article 59 of Regulation [EC] No 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals [REACH] in concentrations above 0.1% by weight (1000 mg / kg) per substance).
- The product does not contain added [Bisphenol A \(CAS No. 80-05-7\) and its structural analogs](#). Impurities/residues shall not be present in amounts over 0.01% by weight (100 mg / kg) in any individual part of the product.
- Supplier will provide list of accelerants and other allergens contained in the product (e.g. thiurams, dithiocarbamates, thiazoles).

Procurement criteria

Required

Product content

- Packaging does not contain PVC.
- Non-sterile glove packaging does not contain any plastic polymers.
- Packaging shall be reduced to the extent possible, made of recycled material and recyclable, and Forest Service Certified (FSC) or equivalent for paper products.

Supply chain management

- The supplier shall provide the addresses of all manufacturing sites involved in the manufacturing.
- The buyer has the right to conduct audits, scheduled or unscheduled.
- The contract must be performed in accordance with the International Labour Organization's (ILO) eight core conventions (forced labor, child labor, discrimination, freedom of association and the right to organize - Nos. 29, 87, 98, 100, 105, 111, 138 and 182). Supplier shall ensure that the conditions are met by subcontractors.

Key issues to consider

Sterile and non-sterile (exam) gloves each have a distinct purpose:

- **Sterile gloves** are used to protect the patient from the practitioner.
- **Non-sterile gloves** are used to protect the patient, practitioner, or other user, when there is direct contact with hazardous chemicals, body fluids, non-intact skin or where contact with mucous membranes is anticipated.

Procurement criteria

Desired / Award criteria

- Consider a contract clause that sets goals and timelines and requires reports on progress toward achievement of additional desired environmental and social criteria.
- Reduce unnecessary waste of gloves through packaging improvement (i.e. when taking a glove out of the package, others should not fall out). A study in Sweden showed that 6% of gloves were lost due to poor packaging, increasing costs & waste.
- The bidder should report the results of completed Code of Conduct audits of factories that manufacture gloves. The audit should be no more than 2 years old and be performed according to established methods such as SA8000, SMETA IV pillar, BSCI etc.
 - The tenderer should report which risks have been identified in the audit and how these risks have been assessed in the supply chain for offered gloves.
- For surgical gloves: Product must not include the accelerant [diphenylguanidine \(DPG\)](#) (CAS 102-06-7).
- At the start of the contract, the manufacturer must specify the constituent substances that have either been added during manufacture or are already known to be included in the product; as accelerators or antioxidants that are known to cause health effects based on available data, see appendix [Chemicals and allergens in the manufacture of disposable gloves](#).
- Product must not include chemicals that have a [harmonized classification as skin sensitizers](#) under the Classification, Labelling and Packaging (CLP) Regulation such as chromium VI, nickel and cobalt compounds. See this [ECHA announcement](#). See [Annex XV proposing restrictions on skin sensitizing substances](#), Table 19 (pages 108-128).
- Weight of gloves should be standardized and disclosed. Products with the lowest unit weight value should be preferred while meeting quality standards.
- Information should be provided on the availability of environmental management systems (its scope should include the manufacturing process of the product), for example ISO 14001.
- Documentation should be provided regarding greenhouse gas emissions (carbon footprint must include scope 1, 2 and 3 emissions and 3rd party verification). The bidder should specify the methods used (scope includes the manufacturing process of the product), for example disclosure through the Carbon Disclosure Project (CDP) or others using the Greenhouse Gas Protocol.

Areas of needed innovation

- Develop new non-fossil fuel based materials.
- Eliminate accelerants in the final products.
- Optimize manufacturing to reduce material used (for example reduce weight and thickness) while maintaining high performance standards.
- Create circular systems to recover and recycle gloves and to manufacture gloves that are easily recyclable (observe circular economy and extended producer responsibility principles)
- Create high performing gloves that can be reused.
- Life cycle methodologies and quality differ from manufacturer to manufacturer. Innovation is needed to improve, standardize and strengthen LCA's.

Alternative products databases

- Health Care Without Harm US [lists of target products](#) that do not contain PVC and DEHP.
- Health Care Without Harm Europe's [Safer Medical Devices Database](#) covers a range of products and lists alternatives that do not contain PVC, phthalates, and BPA.
- The U.S. General Services Administration's Sustainable Facilities database [contains lists of gloves that do not contain](#) PVC, DEHP., other phthalates and latex.

Additional information

- Health Care Without Harm: [“Polyvinyl chloride in health care: A rationale for choosing alternatives”](#).
- Health Care Without Harm Europe [Safer Procurement resources](#).
- Health Care Without Harm Europe: [Non-Toxic Healthcare](#) - Alternatives to Hazardous Chemicals in Medical Devices: Phthalates and Bisphenol A (Second edition, 2019).
- Health Care Without Harm Latin America [Chemical Substances resources](#) (in Spanish).
- Health Care Without Harm US [Safer Medical Products](#) resources.
- NIOSH Alert [Preventing Allergic Reactions to Natural Latex Rubber](#) in the Workplace (June 1997).
- NIOSH's Latex [Allergy Prevention Guide](#).

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