TOOLS FOR INFORMED SUBSTITUTION

HOW DO YOU FIND SAFER CHEMICALS FOR THE WORKPLACE?

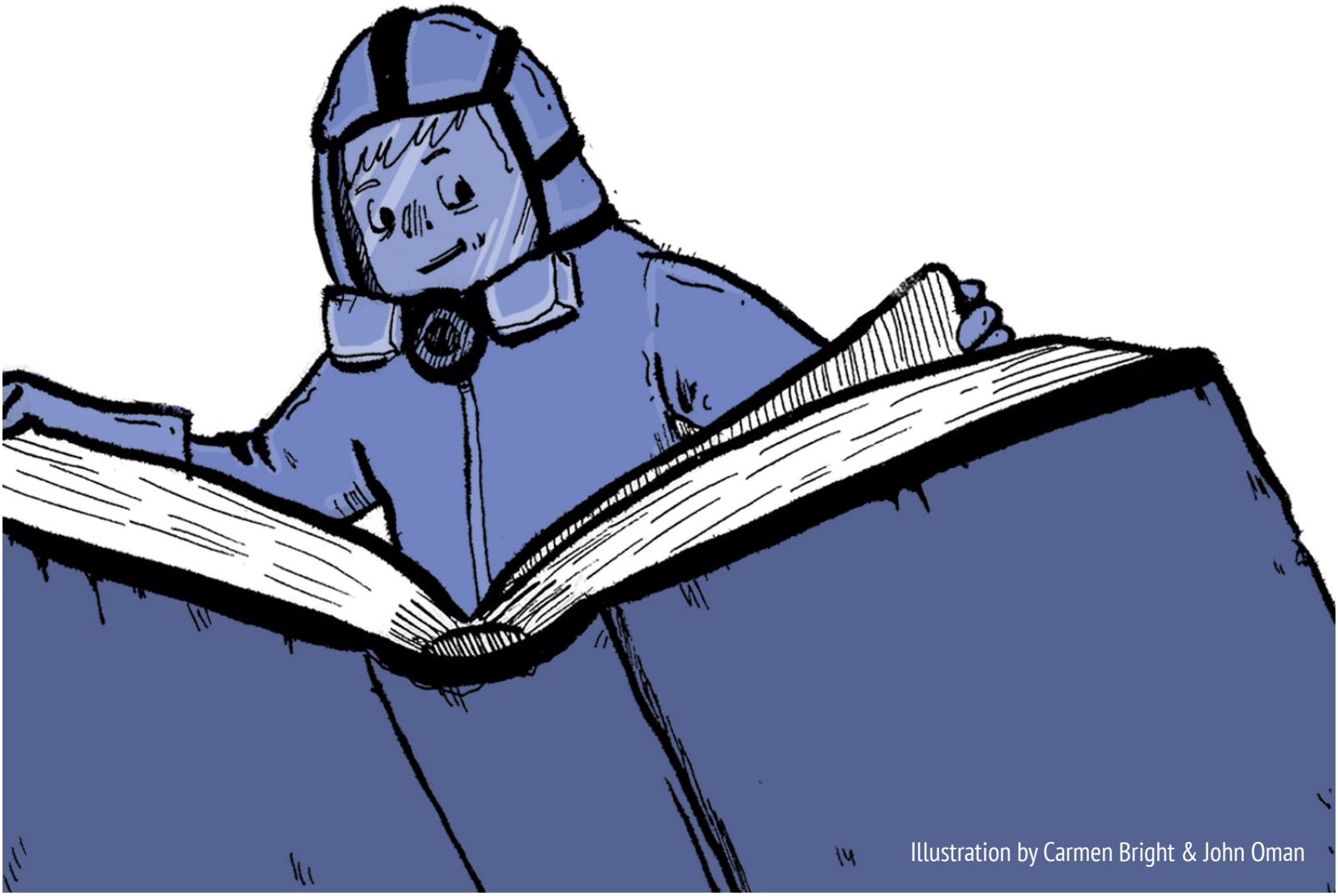

Illustration by Carmen Bright & John Oman

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This research was supported with funds from WorkSafeBC through the *Innovation at Work* research programme.

Why this toolkit?

Cleaning products are common in our lives, at work and home. They're used to get rid of dirt on all kinds of surfaces, disinfect germs, wash our hands and clothes, clean our dishes, make the air smell better, and remove graffiti.

Whatever the purpose, the ingredients can include chemicals that cause harm when poured down the drain or used by or around people.

In workplaces, that possibility is leading to questions about what kinds of products workers are using, or what's used around them. Joint health and safety committees are searching for "green" solutions when workers report health effects they connect to cleaning products. Employers are adapting procurement practices to include environmentally preferable purchasing (EPP) policies and products.

The *Tools for informed substitution* project focused on cleaning products used in British Columbia government buildings. We identified toxic ingredients using on-line tools and recommended products that could or should be replaced with ones certified to less toxic or non-toxic by independent (third-party) organizations.

We also looked at the procurement policy that is supposed to guide buying cleaning products used in BC government buildings. And we used the principles of informed substitution to recommend alternative cleaning products that are consistent with that policy.

Funded by WorksafeBC's Innovation at Work programme, we did this work with the British Columbia Government and Service Employees Union (BCGEU) and the company that manages the province's buildings (WSI, now part of Brookfield Global Integrated Solutions) in 2014 and 2015. We built on earlier work funded by WorksafeBC, and the growing body of materials and studies about the hazards of cleaning products and how to prevent them.

We followed a series of steps that are explained in this toolkit. It includes the results of looking at the products. (There were some quite hazardous ingredients in a few products. Only about 25 percent had the independent certification expected in the government's procurement policy.)

The steps we took in this project can be replicated. Joint health and safety committees and procurement staff can take similar ones to identify informed substitutes for toxic cleaning products in other workplaces.

That's why we organized the toolkit into six sections. Each section provides information and processes to help you learn how to do this chemical detective work yourselves. There are resources at the end of each section, and more at the end of the toolkit. We've also used links within the toolkit so you can go back and forth as you wish.

If you're outside British Columbia, you may be inspired to check your own regulations and procurement policies for tools to get you to informed substitution of cleaning and other products.

For occupational health and safety reps, unions, procurement staff and managers, employer health and safety staff, and joint health and safety committees, the resources and databases are what you need for informed substitution of toxic cleaning products. The lessons can be used for other products too.

Read on!

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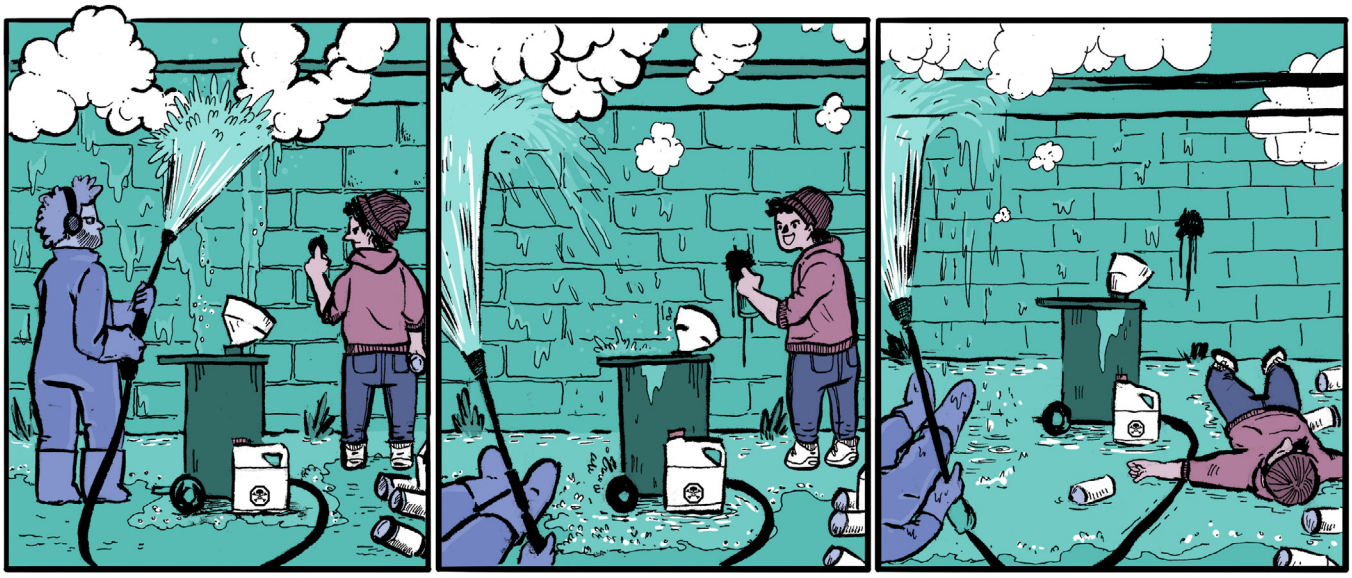
July, 2015

P.S. We also need to thank and credit the marvelous team of John Oman and Carmen Bright from unaluma.com. They did the cartoon graphics for this toolkit and designed the document itself. Please credit them if you borrow or use one of their creations.

Toxics in our cleaning products.

Why do chemicals matter?



The vapours will always get you.

There are tens of thousands of chemicals in almost as many products in North America. They're part of our everyday life at home, work, and in our communities.

Cleaning products have chemical ingredients often with complicated names and technical explanations about why they "work". Most people think that they must be "safe" if they're on the market.

Yet many chemicals have not been tested for toxic effects, especially longer-term ones like reproductive harm, cancer, or effects on different body systems and organs. Too many of them can affect our health—now or down the road. And they also can harm our families, our environments, and the people working or living in the spaces where we use them.

How do cleaning products affect people and the environment?

Studies show that the health of cleaning workers is affected by the products they use. For example, cleaning workers have the highest rates of work-related asthma (almost twice those doing other jobs) and relatively high injury rates from chemical burns. A 2008 study showed that more than 70% of products that domestic and professional cleaners used were respiratory irritants and sensitizers. Other people can get asthma too, or have an asthma attack or respiratory irritation, if they are nearby when the cleaning product is used, or exposed to it afterwards.

Ingredients in common cleaning products have been linked to short-term (acute) effects such as:

- irritating, itchy or burning eyes;
- skin rashes, allergies and burns;
- dizziness and headaches;
- nose bleeds; and
- sore throat, coughing, wheezing, shortness of breath.

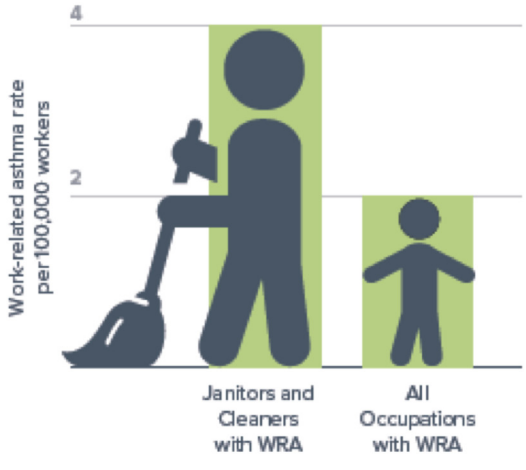
We also know that some ingredients in cleaning products also have longer-term (chronic) effects. Studies show that—depending on the chemical—they can:

- cause new cases of asthma and trigger asthma attacks;
- harm the brain, nervous system, reproductive organs, kidneys and liver;
- cause breathing problems and illnesses;
- disrupt/act like hormones (endocrine disruptors);
- lead to cancer; and
- be linked to cardiovascular (heart) problems.

Cleaning products also can harm aquatic life. That toxic effect to our environment is the result of pouring them down the drain, where they get into water systems.

Figure 1.1

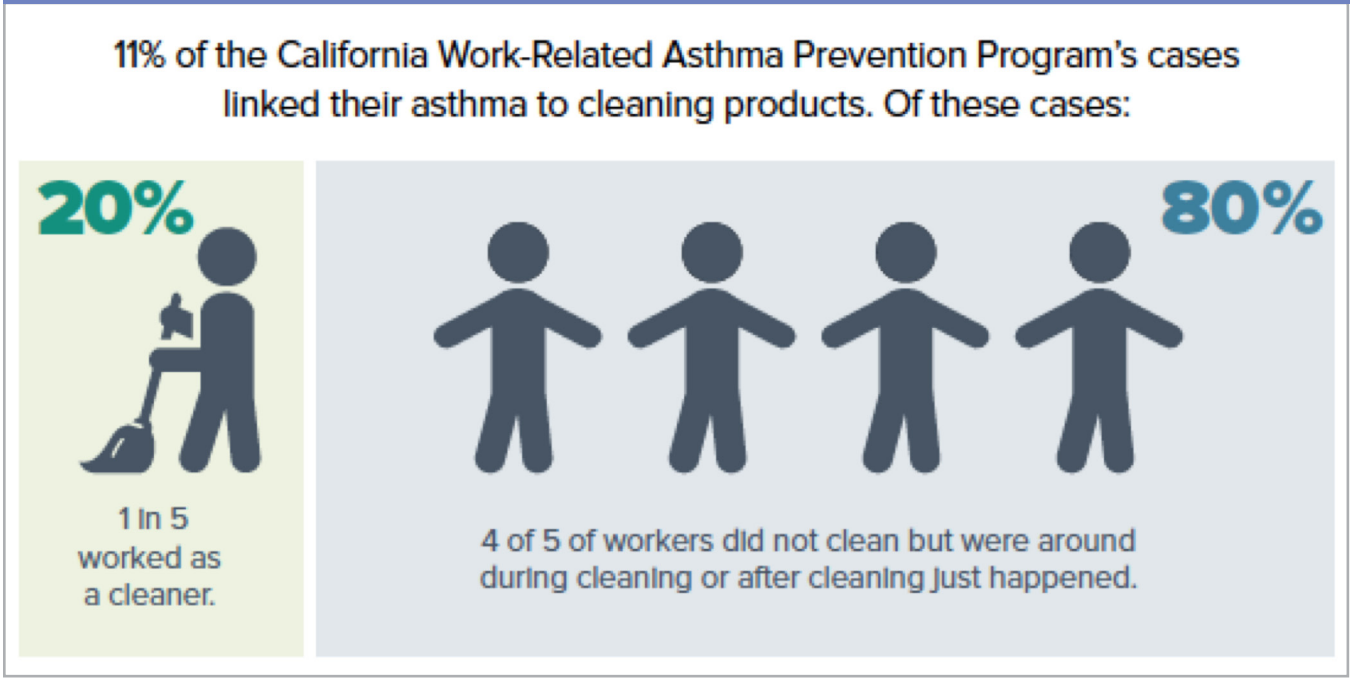
The rate of WRA in California among janitors and cleaners is 4 WRA cases for every 100,000 workers. The rate of WRA in California for all occupations combined is 2 WRA cases for every 100,000 workers.



SOURCE: California WRAPP Surveillance Data, 1993–2012

Source: Healthy cleaning and asthma-safe schools: A how-to guide, 2014.

Figure 1.2



Source: Healthy cleaning and asthma-safe schools: A how-to guide, 2014.

Disinfectants or anti-microbials are treated as pesticides — so it's understandable they can cause harm. Bleach, quartenary ammonium compounds ("quats" like benzalkonium chloride), and pine oil are common disinfectants.

Fragrances also can cause health effects. They're found in many general cleaning products — that citrus smell for example (often from a chemical called d-limonene) — and specialty ones such as deodorizers, floor waxes and air fresheners. (Studies show that d-limonene combines with natural occurring ozone to produce fine particles and formaldehyde, a carcinogen.)

To reduce this harm, more and more people, organizations, and governments are looking to "green" products.

They are asking questions about what chemicals are in a floor stripper or hand washing soap or disinfectant. And they

No smell is a good smell.

Green cleaning products are often color and fragrance free. Traditional cleaning products have added color and fragrances that can cause throat irritation and breathing difficulty. For this reason, green cleaning products do not always have strong scents.

San Francisco Environment Fact Sheet: Module 1 Introduction. General green cleaning

are asking "Is it necessary?" to have products with chemicals that are known to cause harm, or that have not been tested for toxicity. Some governments and companies are even banning some chemicals used in cleaning products (e.g., triclosan is banned in Minnesota and not used in the Kaiser Permanente health care system).

What resources are out there to help people understand how cleaning products can affect our health and environments?

A starting point for general effects of cleaning products is ***http://www.ewg.org/guides/cleaners/content/cleaners_and_health.***

For general information about the hazards of cleaning products used at work and in the home, see:

- ***Can killing germs be hazardous to your health? Questions about "quats"****;*
- ***Canadians for a Safe Learning Environment*** *(lots of resources about hazards and solutions);*
- ***Hazardous substances in frequently used professional cleaning products*** *(a 2014 study);*
- ***Household chemical products? A spotless record?*** *from Quebec's Option Consommateurs;*
- ***Informed Green Solutions*** *(an on-line source of a lot of information and training materials about cleaning products);*
- ***Protecting workers who use cleaning chemicals****; and*
- ***Safe cleaning products*** *(including "Reproductive harm", "Institutional cleaners" "Household cleaning products: what every woman should know" and "Disinfectant overkill", from Women's Voices for the Earth).*

Avoid using bleach—it can harm

Like many disinfectants, bleach is often used unnecessarily as a daily cleaner. Bleach is an asthmagen (which means it may cause asthma) and can make existing asthma worse. It also is corrosive and can damage eyes and skin. Bleach can be fatal if swallowed, gives off a potent vapor, and if mixed with ammonia or acids, can create gases that cause lung damage and death.

Healthy cleaning and asthma-safe schools: A how-to guide, 2014

Quats may not be getting as much media attention as triclosan, but a growing number of scientific studies conducted over the past ten years link exposure to quats with adverse respiratory effects, particularly for those who use them professionally. ..“There’s a pretty convincing body of evidence that they are asthmagens,” Pechter says of quats.

Can killing germs be hazardous to your health? Questions about “quats”, 2014

A lot of work has been done about asthma and cleaning workers, especially in schools. That can be used in other settings. For information about cleaning products and work-related asthma, see:

- ***Asthma and cleaning products: What workers need to know;***
- ***Asthma related to cleaning agents: a clinical insight*** (a 2013 study about specific cleaning product ingredients that trigger asthma);
- ***Cleaning products and work-related asthma;***
- ***Healthy cleaning & asthma-safer schools. A how-to guide***, including a list of chemicals in cleaning products known to cause asthma, and their other effects (see Appendix F and Appendix G); and
- ***Occupational Lung Disease Bulletin - Case studies of work related asthma and disinfectants*.**

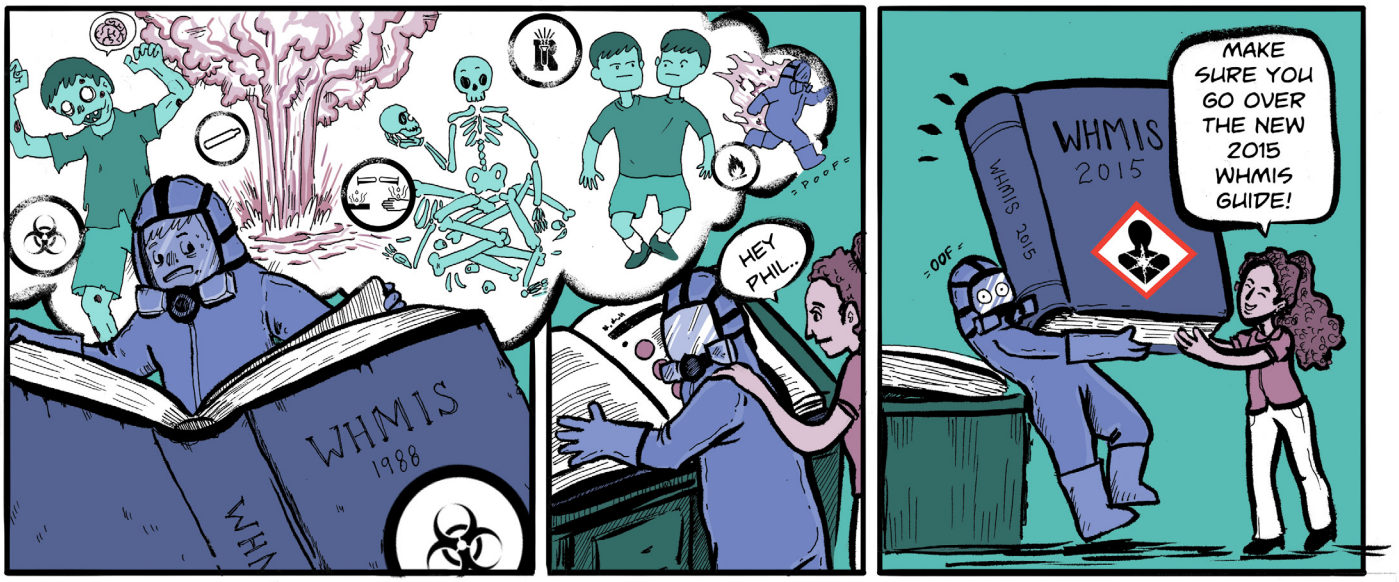
For general information about work-related asthma, see the fact sheet from the Canadian Centre for Occupational Health and Safety (CCOHS).

What’s next? How do we find out what’s a hazardous cleaning product?

Yes, chemicals matter — for our health and that of our families, co-workers, communities and environments. The less toxic products are, the better. We want to be sure they really won’t cause harm, or are the least toxic possible for the task. To do that, we need to know what’s in them. Read about our right-to-know about hazards at work and actions you can take with the information you get, in Section 2, For more, find out how to identify chemicals for substitution in Section 3.

From the right -to-know to the need to act.

What's the "new" WHMIS and B.C.'s safer substitution regulation?



So you can be even more prepared.

What's new with WHMIS?

Chemicals do matter. That's why all workers in Canada have a need — and right — to know about the hazards of chemical products used at work. It's been the law across the country since 1988, when the Workplace Hazardous Materials Information System (WHMIS) took effect.

WHMIS says that chemical manufacturers and distributors must supply information about their products using labels and material safety data sheets (MSDSs). Workers must be trained about the hazards and how to use the labels and MSDSs; they also must have access to the data sheets. This applies to all cleaning products used in the workplace.

New rules are on the horizon. Canada is co-ordinating **changes to WHMIS** with the new global worker right-to-know system called the **GHS** (Globally Harmonized System for the Classification and Labelling of Chemicals).

The changes take effect gradually between June, 2015 and December, 2018. In this transition phase, you will see the older WHMIS labels and data sheets and the newer ones. The newer labels and information sheets — now called safety data sheets or SDSs — will look a bit different, partly because some symbols — now called pictograms — will change.

The requirements to disclose hazard information will be basically the same as WHMIS 1988. Improvements include standard hazard statements and information on the labels, which now will be used around the world (since this is an international agreement).

Again, like the original WHMIS, Canadians have slightly different rules than they do in the United States. This means — again — that US data sheets and labels cannot be used in Canadian workplaces — unless they comply with Canadian requirements. This includes having bilingual label information, and classifying some carcinogens at 0.1 percent in the product instead of one percent. The differences between Canada and the States are described at ***http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/ghs-sgh/classification/hazardous-products-produits-dangereux/variances-ecarts-eng.php.***

What are the new hazard symbols? What do they mean?

Workers must be trained about what's new with the WHMIS 2015 labels and data sheets, particularly the changed hazard symbols. This is a start, presenting the basics.

The WHMIS 2015 hazard **pictograms** (see all of them on the following page) must be on the new label and data sheet. (Remember that WHMIS 1988 symbols and MSDSs still can be used until December, 2018.)

In the new system, a manufacturer or distributor decides — classifies — the effects that the product may have on your health or the environment. Each class has several kinds of hazards, and one product can fit in several classes.

Figure 2.1

	**Exploding bomb** (for explosion or reactivity hazards)		**Flame** (for fire hazards)		**Flame over circle** (for oxidizing hazards)
	**Gas cylinder** (for gases under pressure)		**Corrosion** (for corrosive damage to metals, as well as skin, eyes)		**Skull and Crossbones** (can cause death or toxicity with short exposure to small amounts)
	**Health hazard** (may cause or suspected of causing serious health effects)		**Exclamation mark** (may cause less serious health effects or damage the ozone layer*)		**Environment*** (may cause damage to the aquatic environment)
	**Biohazardous Infectious Materials** (for organisms or toxins that can cause diseases in people or animals)				

For example, the ingredients of many cleaning or disinfecting products have possible health effects if inhaled or absorbed through the skin; they all fit in the health hazard pictogram. Some also can burn skin or eyes – represented in the corrosion pictogram.

The **health hazard pictogram** will be seen on many labels and data sheets. The GHS/WHMIS 2015 classes and categories for this pictogram are:

- respiratory sensitizer (Categories 1, 1A, 1B)
- germ cell mutagenicity (Categories 1, 1A, 1B, 2)
- carcinogenicity (Categories 1, 1A, 1B, 2)
- reproductive toxicity (Categories 1, 1A, 1B, 2)
- specific target organ toxicity: one exposure (Categories 1, 2)
- specific target organ toxicity: repeated exposures (Categories 1, 2)
- aspiration (Category 1)

Simply put, these health hazard classes — the effects — are for potential long-term or chronic harm, including cancers, damage to male or female reproductive health or their offspring, respiratory or skin allergies, or damage to internal organs (e.g., liver, kidneys, heart). See the glossary in Appendix 2 for definitions.

The categories describe how strong the effects can be, based on the evidence used. Category 1 (and its sub-divisions) is the strongest and requires the word "Danger" on the label. Category 2 is less so and must be labelled with "Warning". In both cases, these "signal words" tell you exposure to the product **should be avoided.**

So, does whatever is in a product cause all those health problems?

No. It just means that at least one chemical ingredient has the potential to cause at least one of those effects. (Depending on use and exposure, the risk of this effect can range from low to high. See the discussion about the differences between "hazard" and "risk" at ***http://www.ccohs.ca/oshanswers/hsprograms/hazard_risk.html***.) The system is designed to tell you what each possible health effect is; that information's in the hazard statement on the label.

Say you're using a chemical disinfectant, and one ingredient in the SDS can seriously affect your breathing if you become allergic to it, (i.e. the effect is respiratory sensitization.)The label will say: *Warning: may cause breathing difficulties if inhaled*. The SDS also will have this, and more, information.

What other hazard symbols might you see on cleaning products?

The **exclamation mark** pictogram covers classes for **immediate or acute effects.** They are:

- acute toxicity: oral (through the mouth), dermal (skin), inhalation (breathing) (Category 4)
- skin corrosion/irritation: skin irritation (Category 2)
- serious eye damage/eye irritation: eye irritation (Categories 2, 2A)
- skin sensitizer (skin allergy) (Categories 1, 1A, 1B)
- specific large organ toxicity: single exposure (Category 3)

The **corrosion pictogram** covers **burn-type acute or immediate effects**:

- corrosive to metals (Category 1)
- skin corrosion/irritation: skin corrosion (Categories 1, 1A, 1B, 1C)
- serious eye damage/eye irritation: serious eye damage (Category 1)

The familiar **skull and crossbones** is for general **acute or immediate effects:**

- acute toxicity
- oral (Categories 1, 2, 3)
- dermal (Categories 1, 2, 3)
- inhalation (Categories 1, 2, 3)

Finally, effects on the waters around us (the **aquatic environment**) have their pictogram too.

What are the new labels? What are they supposed to say?

CCOHS materials include a sample label (see it at the right).

Notice there is no hatched border, like the old WHIMIS labels. It also has the new hazard symbols and standard hazard warnings.

This theoretical product contains something that irritates skin; it's also very toxic if swallowed. But it doesn't say what ingredients cause these hazards or even what's in the product. Those are on the data sheet.

Product K1 / Produit K1

Danger
Fatal if swallowed.
Causes skin irritation.

Precautions:
Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Store locked up.
Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor.
Rinse mouth.

Danger
Mortel en cas d'ingestion.
Provoque une irritation cutanée.

Conseils :
Porter des gants de protection.
Se laver les mains soigneusement après manipulation.
Ne pas manger, boire ou fumer en manipulant ce produit.

Garder sous clef.
Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.

EN CAS DE CONTACT AVEC LA PEAU : Laver abondamment à l'eau.
En cas d'irritation cutanée : Demander un avis médical/consulter un médecin.
Enlever les vêtements contaminés et les laver avant réutilisation.
EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin.
Rincer la bouche.

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Unfortunately, in making the new WHMIS rules fit with the Canada-US **agreement** to harmonize right-to-know systems, the Canadian government dropped the old rule saying the label must refer you to see the data sheet. So, all workers need access to the SDS where they can look for other important information.

How are data sheets different?

Most products used at work must have data sheets prepared by the manufacturer or distributor, providing detailed information about ingredients, properties and precautions. New **Safety Data Sheets** (SDSs) have 16 sections with required kinds of information in each. The order must be the same too.

(Under the Canada-US harmonization agreement about right-to-know, the environmental information on labels and SDS is optional, even though an ingredient may be a serious environmental hazard. Our *Tools for Informed Substitution* project includes environmental hazards because they are an important reason for choosing less toxic products.)

Workers must be trained about how to read them, and the labels that go with them, before they use a product. With this in mind, CCOHS has **advice** about **what every worker should know about using a SDS:**

*Always be familiar with the hazards of a product **before** you start using it.*

You should look at an SDS, match the name of the product on the container to the one on the SDS, know the hazards, understand safe handling and storage instructions, as well as understand what to do in an emergency.

You can think of the SDS as having four main purposes. It provides information on:

a. ***Identification:*** *for the product and supplier.*
b. ***Hazards:*** *physical (fire and reactivity) and health.*
c. ***Prevention:*** *steps you can take to work safely, reduce or prevent exposure, or in an emergency.*
d. ***Response:*** *appropriate responses in various situations (e.g., first-aid, fire, accidental release).*

For most people who work with hazardous products, you should always:

- *read the name of the product (Section 1),*
- *know the hazards (Section 2)[1],*
- *understand safe handling and storage instructions (Section 7), and*
- *understand what to do in an emergency (Sections 4, 5 and 6)*

Data sheets used to be kept in binders. What if they're kept on a computer now?

You must have "readily available" access to them at all times, wherever they are. British Columbia's health and safety regulations **say** that employers will have to work with the joint health and safety committee to ensure this happens. There also should be at least one worker representative on each shift who can help workers get data sheets if need be.

Does WHMIS apply to every product used at work? At home?

Sometimes a product may not come with a WHMIS data sheet, or WHMIS labels don't appear on a product. Data sheets may not list chemical ingredients, or they may only list some. What's going on?

WHMIS does not require complete information about all chemical products that may be used on the job. There are four ways in which this occurs:

1. WHMIS doesn't cover the type of product;
2. one or more ingredients do not meet the WHMIS definition of hazardous;
3. the ingredient is a "trade secret"; or
4. sections 12 – 15 of the SDS could have additional regulatory information and disposal information but they may be blank because they are "optional" in Canada and the USA.

1. Exclusions from WHMIS 2015

Fragrances and flavours have been included in WHMIS 2015. (Fragrances are common in cleaning products.) Otherwise, excluded products are the same as in the original regulation. (The full **GHS** international agreement does not exclude any kind of ingredients or

[1]Information about ingredients is in Section 2, with more in Section 12. Environmental hazards are spelled out in Section 12, which does not have to be filled in under WHMIS 2015.

products. Both the Canadian and US right-to-know laws continue to exclude some things.)

Often covered by other pieces of federal legislation, the excluded items are:

- explosives (as defined in the **Explosives Act)**;
- cosmetics, devices, drugs or food as defined in the **Food and Drugs Act**.
- pesticides (defined as "pest control products" in the Pest Control Products Act)
- consumer products (defined in the Canada Consumer Product Safety Act);
- wood or products made of the material;
- nuclear substances that are radioactive and come within the meaning of the Nuclear Safety and Control Act;
- hazardous waste (hazardous product sold for recycling or recovery or intended for disposal);
- tobacco and tobacco products (see the Tobacco Act); and
- "manufactured articles".

This means WHMIS 2015 may not cover some chemicals used in your workplace or job. Cleaning products will not have WHMIS 2015 data sheets and labels when they are considered "consumer products" or pesticides.

Fortunately, British Columbia goes beyond WHMIS to require right-to-know **coverage for all chemicals** used by or around workers. Section **5.2** of the Occupational Health and Safety **Regulation** (see box below) is a strong requirement, one of the best in Canada.

Did you know?

Disinfectants are "pesticides"

Some cleaning products — especially disinfectants — are considered pesticides because at least one of their ingredients is designed to kill germs. Therefore, under the WHMIS 2015 rules, the manufacturer or distributor does not have to provide WHMIS 2015 SDSs or labels. That's the law; good practice is that they do, so always ask for them.

This section in the BC regulation applies to employees who are, or may be, exposed to any chemical that could harm them. It says the employer must give the workers information about the chemicals' names, their possible effects and precautions for using them. If data sheets and labels aren't available, they must do it another — equivalent — way. Otherwise, workers should not use the product, without getting

the information, just like they can't use other things without the proper WHMIS labels, SDSs and training.

2. Not all chemicals are considered hazardous under WHMIS

Not all chemicals are hazardous, using the WHMIS criteria. They may not fit in one of the new classes or they may not be considered hazardous if they are present in very low concentrations (under 0.1 percent for carcinogens, germ cell mutagens, and respiratory and skin sensitisers; less than one percent for other kinds of hazards).

Because of this, the data sheets for many less toxic and third-party certified environmentally-friendly products may not list all the chemical ingredients.

3. Trade secrets aren't so secret in Canada

It is illegal to just say "trade secret" in the ingredient disclosure section of a data sheet (Section 2); that's what Canada's Hazardous Materials Information Review Act (**HMIRA**) says. Manufacturers and distributors can apply for a partial exemption under the Act for a product ingredient, saying a chemical name or names are "confidential business information".

5.2 General information requirement from the BC Occupational Health and Safety Regulation

If a worker is or may be exposed to a chemical agent, or biological agent designated as a hazardous substance in section 5.1.1, which could cause an adverse health effect, the employer must ensure that

(a)the identity of the chemical agent or biological agent, its possible effects on worker health and safety and any precautions required to protect the health and safety of the worker are clearly indicated by labels, MSDSs, or other similar means,

(b) the information required by paragraph (a) is clearly communicated to the worker, ...

Figure 2.2
SDS for Goof Off Graffiti Remover VOC spray.

SAFETY DATA SHEET
Goof Off Graffiti Remover VOC Spray

Page: 1
Printed: 01/06/2015
Revision: 12/23/2014
Supersedes Revision: 11/06/2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Goof Off Graffiti Remover VOC Spray	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	**Phone Number:** (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact: **Information:**	3E 24 Hour Emergency Contact W.M. Barr Customer Service	(800)451-8346 (800)398-3892
Intended Use:	Removal of paint, marker, crayon, ink, lipstick, nail and shoe polish, and candle wax.	
Synonyms:	FG670, FG672, FG672W	

2. HAZARDS IDENTIFICATION

Flammable Gases, Category 1
Flammable Aerosols, Category 1
Gas Under Pressure, Compressed gas
Flammable Liquids, Category 2
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Skin Sensitization, Category 1
Germ Cell Mutagenicity, Category 1A
Toxic To Reproduction, Category 1B
Target Organ Systemic Toxicity (single exposure), Category 3
Aspiration Toxicity, Category 1

GHS Signal Word:	**Danger**
GHS Hazard Phrases:	H220: Extremely flammable gas. H229: Pressurized container: may burst if heated. H280: Containers gas under pressure; may explode if heated. H225: Highly flammable liquid and vapor. H315: Causes skin irritation. H318: Causes serious eye damage. H317: May cause an allergic skin reaction. H340: May cause genetic defects. H360: May damage fertility or the unborn child. H336: May cause drowsiness or dizziness. H304: May be fatal if swallowed and enters airways.
GHS Precaution Phrases:	P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P211: Do not spray on an open flame or any other ignition source. P251: Do not pierce or burn, even after use.

Health Canada must check out the claim. If it is legitimate, the company data sheet still must include the ingredient's general chemical identity and a HMIRA registration number. The data sheet also must include all the hazard information about the "confidential" ingredient(s).

Bottom line: if you don't see a HMIRA registration number for a "trade secret" or "confidential business information", don't use the product. Report this to the employer and your health and safety representative.

To answer the question then, WHMIS 2015 doesn't cover consumer products — and some other kinds of products — used in workplaces. BUT, British Columbia's right-to-know law goes further. It says you must get information and training about all chemicals used in the province's workplaces.

If you want information about products for your home, many manufacturers have data sheets on line. You also can look for certified environmentally-responsible or "eco" products for many categories.

How can you use a SDS to get to safer substitutes? Moving from right-to-know to action.

You can go further than CCOHS' basic advice about the right-to-know. Employers, workers, unions, and procurement staff can use the information about ingredients and their hazards to find safer, less toxic substitutes.

This principle of informed substitution ensures that the use of less toxic products have been verified and shown to be actually safer than what it is being replaced. It's used more and more in these days of "greening" workplaces, and reducing the use of toxic substances in our homes, workplaces and environments.

The hazard symbols, (e.g., the exploding chest, dead tree and fish) can be the trigger to start looking for less toxic products or a different way to do the task. If a SDS says that a chemical ingredient has the potential to be a serious hazard to your health and/or the environment, or you screened your chemical using the tools presented in Section 3, B.C. health and safety regulations require that safer substitutes should be used, if they're available.

For example, see the first page of a full **SDS** for a highly toxic graffiti remover in Figure 2.2. The hazard symbols and statements say it contains a

5.55 Type of controls

(1) If there is a risk to a worker from exposure to a hazardous substance by any route of exposure, the employer must eliminate the exposure, or otherwise control it below harmful levels and below the applicable exposure limit established under section 5.48 by

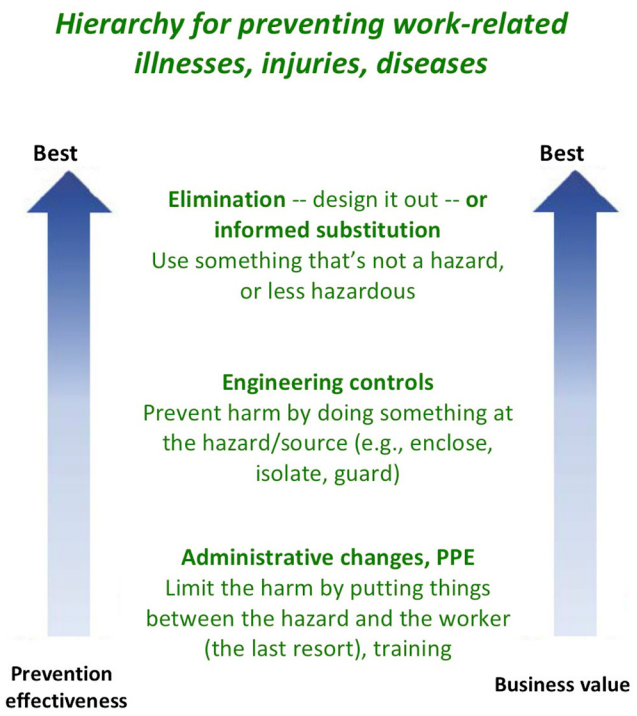
(a) substitution,
(b) engineering control,
(c) administrative control, or
(d) personal protective equipment.

(2) When selecting a suitable substitute, the employer must **ensure that the hazards of the substitute are known**, and that the risk to workers is reduced by its use.

(3) The use of personal protective equipment as the primary means to control exposure is permitted only when

(a) substitution, or engineering or administrative controls are not practicable, or
(b) additional protection is required because engineering or administrative controls are insufficient to reduce exposure below the applicable exposure limits, or
(c) the exposure results from temporary or emergency conditions only.

Figure 2.3 The hierarchy of prevention for work-related illnesses, injuries, diseases



reproductive toxin and a skin sensitizer, and it's highly toxic. Using on-line tools, we found it had lots of hazardous ingredients, making it a priority target for informed substitution.

This isn't just a good idea. It's the law in British Columbia. Regulation 5.55 is one of the best in Canada when it comes to informed substitution (see at left). In clear language, it says:

> *If a hazardous substance can affect a worker — however it gets into their body — the employer must get rid of the hazard or make sure it is not present in a way that will harm workers.*

To make this happen, the first — and most effective — choice is substitution. It can't be just any alternative. A "suitable" substitute must have fewer hazards, and they must be known (i.e., it must be **informed substitution**).

Personal protective equipment is the last resort. It can only be used if substitution is not possible ("practicable"), other measures are not practicable or don't work well enough, or in a temporary or emergency situation.

Regulations 5.55 (and its related regulation, 5.57) use what some call the "hierarchy of controls". Figure 2.3 emphasizes the prevention principles behind informed substitution in what we call a *hierarchy of prevention*.

Where can you get more information?

To implement WHMIS 2015, British Columbia has changes for the Occupational Health and Safety Regulation. They are based on a national model that all provinces are using.

CCOHS has more information about:

- general aspects of WHMIS 2015 and fact sheets about different aspects of the system;
- the GHS;
- hazard classes and categories;
- pictograms;
- safety data sheets (SDSs);
- supplier and workplace labels;
- "trade secrets" or "confidential business information" — described as generic chemical identity; and
- education and training.

Also check:

- information about WHMIS 2015 and the GHS from Health Canada;
- British Columbia's Occupational Health and Safety Regulation as an app; and
- changes to the Regulation, posted on the Worksafe BC website and specific ones about WHMIS 2015 here.

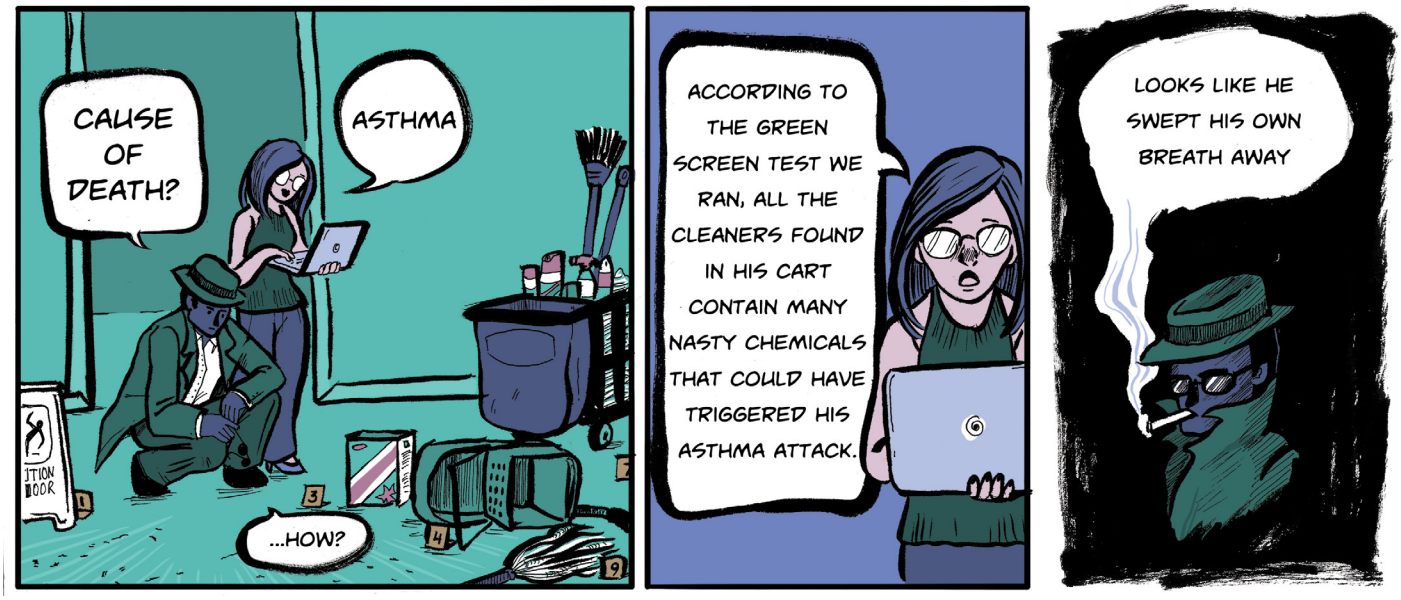
What's next? Prioritizing the most hazardous cleaning products for substitution.

We have a right to know. Data sheets and labels will give us some information, as will training. British Columbia has clear regulations that promote substitution and information about any hazardous chemicals. Are there independent sources that can tell us more about the hazards of chemicals? What about this informed substitution idea?

Section 3 has answers. It focuses on on-line tools to help you identify the most hazardous ingredients and check out less toxic ones for informed substitutes.

Checking on chemicals of high concern

What online tools can help?



Ask and you shall receive.

What information do you need before doing an on-line search?

You don't need to be a chemist to find out about the health effects of products and their ingredients. Easy-to-use on-line resources on line can help you better understand the hazards of chemical ingredients in products you use at home or on the job.

But first you need to find the names of chemicals and/or their Chemical Abstract Services (CAS) number. (The number is like the chemical's fingerprint; it should be unique to the substance.)

There are three basic steps to get information about the hazards of chemicals in cleaning products:

1. Get the **data sheet** for the product.

2. Look at Section 3 of the **WHMIS 2015** version and the ingredients section of the WHMIS 1988 ones. Also check out Section 11 of the new SDSs; sometimes other chemicals are listed there.

3. You could write down the name of each ingredient. But some chemicals have many names or their name is a lot like another chemical. So it is best to use the **CAS number** that must be on the data sheet, with the dashes. That way you're sure you've got the same chemical as is in the product.

If there are a lot of chemicals, it might be good to set up a chart to keep track of which chemicals are in which products, and what their hazards are.

If there isn't a regular WHMIS data sheet for the chemical, or there's not much information (remember the reasons), ask your health and safety rep or supervisor to get you the names and the CAS numbers. (Remind them about Section 5.2 of the *Occupational Health and Safety Regulation*.)

Where does the information in these on-line tools come from?

The tools we describe let you check out (i.e., screen) chemicals using information the organisations have put together from recognised authoritative international lists of different types of hazards. This gives you summarized information about a chemical's hazards. It is a great way to do a quick check.

There are more comprehensive ways to study chemicals, using scientific publications and reports about new research and practices. But these on-line tools, based on scientifically validated databases and sources, provide ways to prioritize action about chemicals of most concern. Plus they are fun to use.

What's the Pharos database?

The Pharos Project is the work of the Healthy Building Network. The HBN's goal is to improve human health and the environment by reducing the use of hazardous chemicals in building products. But anyone can use their database to get information about chemical hazards.

The tool searches for those hazards using 60 internationally-recognized and authoritative (i.e., reliable) lists about the human health and environmental impacts of chemicals. These effects range from a chemical's ability to cause cancer, reproductive system problems, or asthma, to toxic impacts on fish and other things living in water, and more.

The results from all the available lists are presented in a rating system that uses colour codes. The relative hazard levels go from **purple** (highest concern) through **red**, **orange**, and **yellow** to **green** (lowest concern). **Grey** means that the result is ambiguous/unclear and **blue** tells you that the substance is on a restricted list. Each result names the lists behind it so you know the source of information behind the result.

Pharos also uses a resource based on the GreenScreen® for safer chemicals, from the Canadian-US group, Clean Production Action. The GreenScreen is a popular way to understand which chemicals are more hazardous than others by placing a substance in one of four benchmarks or categories. Benchmark 1 is the most hazardous (for which the advice is "Avoid – Chemical of high concern"). Benchmark 4 is the goal of a safe option (where the advice is "Prefer – Safer chemical"). An additional Benchmark U is also used. This means the chemical is 'unspecified' because there is simply not enough information about the human health or environmental impacts of a chemical to know much about it. (This fact sheet has more details.)

This resource was built into the Pharos tool to tell users if a chemical likely is a "Benchmark 1" (BM1). Because the information comes from lists (each of which has its own criteria and process),

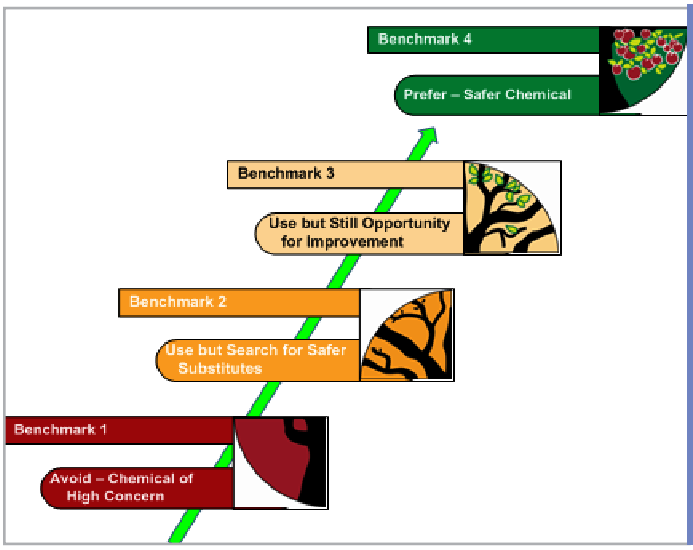


Figure 3.1 The GreenScreen® benchmarks

the scoring is called a GreenScreen® List Translator 1 (LT-1). They are considered likely to be chemicals of high concern.

Pharos has another important category. It says some chemicals are a GreenScreen (GS) LT-P1 — a possible Benchmark 1 chemical. This means they have some characteristics of chemicals of high concern.

Pharos also may use what it calls "LT-U". This means the chemical's hazard is "unspecified" because the lists do not provide enough information about a chemical's human health or environmental hazards. This could be a good sign, since only hazardous chemicals usually are found on hazard lists. *But*, it also could mean that a chemical has not been fully tested (especially for long-term effects), which is quite common.

Therefore, GS LT-1 chemicals are a priority for informed substitution with safer alternatives — the evidence is very clear that they are chemicals to avoid. After dealing with them, GS LT-P1 chemicals should be the next priority. We explain both categories below in more detail.

How do you find a chemical's hazards with Pharos?

Example 1: A chemical that Pharos calls LT-1

Let's use the example of a common chemical in cleaning products, d-limonene. It gives off a citrus smell that many consider "natural". The SDS should give you some information about its hazards but is it something to worry about? Get a clear snapshot by checking it in the Pharos database.

Here's how:

1. Use the Safety Data Sheet to find d-limonene's **CAS number**: 5989-27-5. Make sure you include the dashes between the numbers.

2

Go to www.pharosproject.net. Log in as a BCGEU user (you'll get the password from the union; if you're not a BCGEU member there often are free trial offers). Click on the Chemicals and Materials Library tab in the middle of the top line. Then go to the tab called Search chemicals and materials.

3

Type in the CAS number in the Search Term box on the upper right (to avoid confusion with the wrong chemical). This is what you'll see.

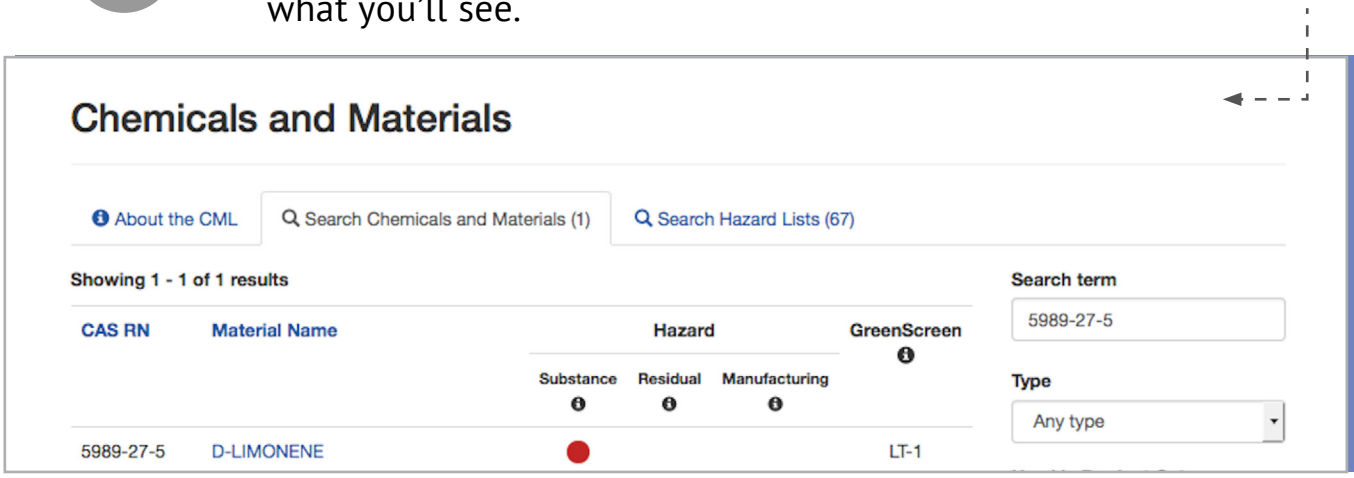


Figure 3.2

The chemical has a red dot under "Substance" in the hazard column. This means it's a high hazard. The GreenScreen column calls it a GS LT-1, i.e., GreenScreen List Translator Benchmark 1. This means it's a chemical of high concern, whose use should be avoided. That's the summary.

4

For details behind the red dot and LT-1 results, click on the actual name — D-LIMONENE. On the new page, you will see the chemical's CAS number (5989-27-5) next to the name, at the top. There are four tabs right underneath it. Clicking on the Hazards tab will take you to the justification for labelling d-limonene a chemical of high concern.

The screen shot on the next page shows part of the web page that comes up. You can see that d-limonene has a variety of hazards of different levels of concern. (These aren't the only ones, as this is not the full set of results.) They are listed in order of priority, according to the colour coding.

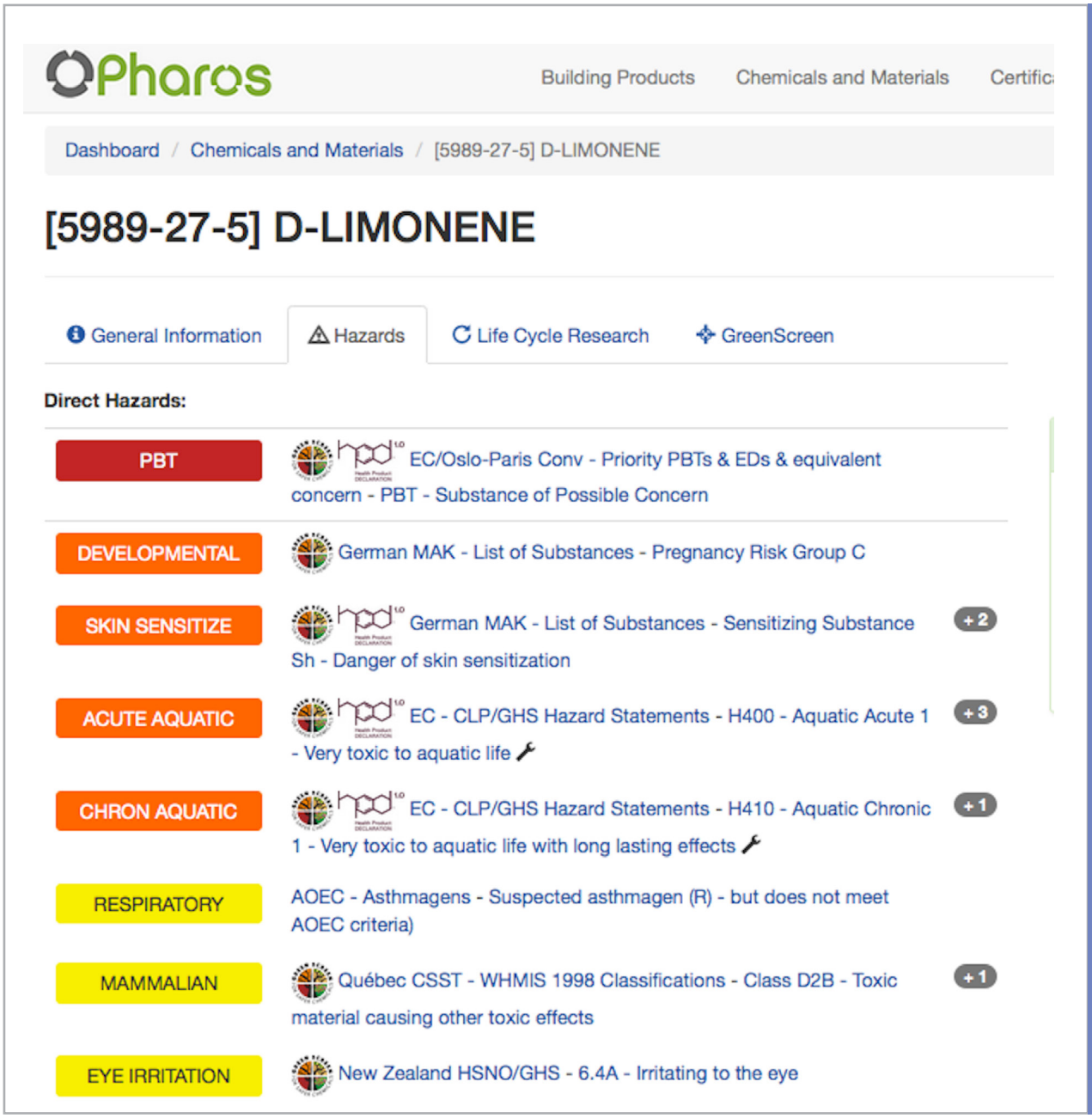


Figure 3.3

The top red bar means d-limonene is a high hazard in the PBT category. "PBT" is highly persistent (P), it bioaccumulates easily in the environment (B), and it's highly toxic (T). (Hover over the bar to see the explanation.)

On its own, this result tells us that d-limonene should not be used in a cleaning product — or any product. (Like many other products, cleaning products get flushed down the drain, and can affect whatever is in the water they reach.)

The other categories in the screen shot show some of the international lists behind each hazard category. (There is more than one list for many of them; click on the grey oblong symbol with the + sign to find out which ones.)

The environmental and human health effects in the "Direct hazards" column are colour coded. Pharos assigns specific meanings to the colours, as explained in the chart below. (Note they use the word "endpoint"; that just means the hazard or effect, such as skin irritation, reproductive effects, breathing allergies).

Colour	Meaning
Purple	Urgent concern to avoid
Red	Very high concern to avoid
Orange	High concern to avoid
Yellow	Moderate concern to avoid
Grey	Uncertain concern. Wide range or ambiguous hazard levels, and/or endpoint not included in GreenScreen
Blue	Potential concern. Included on a Restricted Substances List for avoidance, monitoring, or careful management
Green	Low concern for this endpoint

So, if this is an ingredient in a product you use, or one used in your workplace, it should be a priority to replace with a less toxic or non-toxic alternative. Talk to your supervisor and your health and safety representative about why it should be re-formulated or replaced. (See more about procurement policies in Section 5 of this toolkit, and how to find ecolabel products in Section 4. For more about how to implement these kinds of changes, see the checklist in Section 6.)

Example 2: A chemical that is rated LT-P1

A product with a GS LT-P1 ingredient simply means it may be a GS-LT1. The only way to find out more about why it may be something to avoid is to do a deeper dive into the information. For example, one chemical we investigated is called alkylbenzene sulfonic acid (CAS # 68584-22-5); it's found in Bio Washroom Cleaner and Deodorizer. The MSDS says it is makes up 1 to 5 percent of the product.

When we checked it out with Pharos, we found that the chemical is considered to be a GreenScreen LT-P1 (GreenScreen List Translator Possible Benchmark 1). (See the screen shot below.)

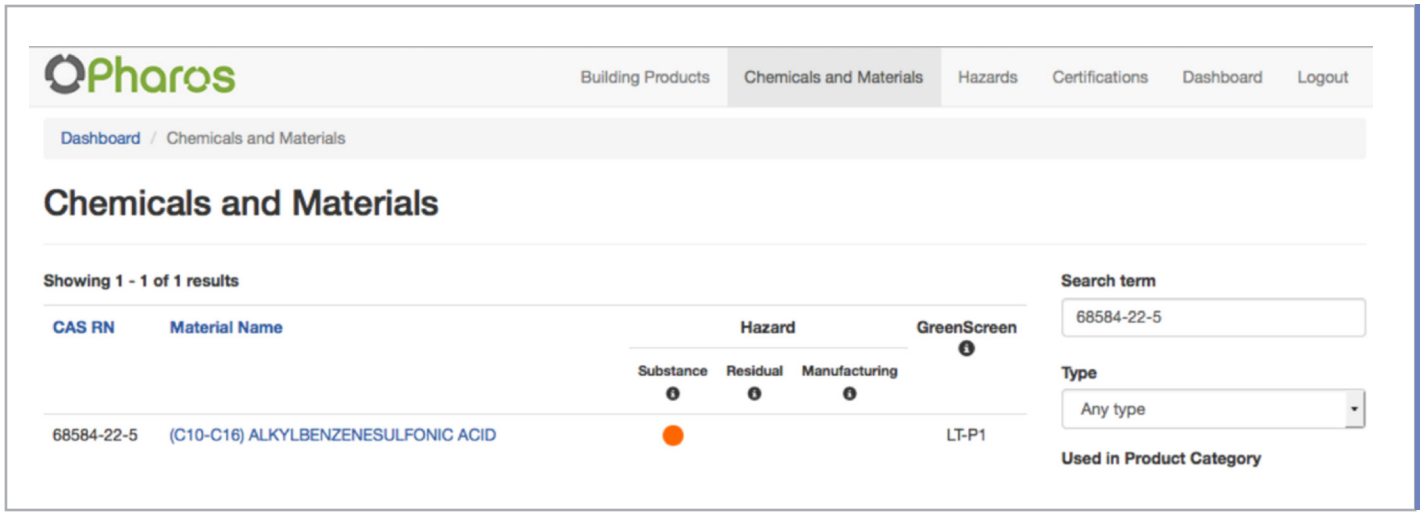


Figure 3.4

Again, click on the name of the chemical and in the new page click on the Hazards tab.

This time, the orange hazard is about eye irritation to people and high hazard to fish (acute aquatic). There are moderate hazards (yellow) to skin and to terrestrial organisms or if consumed. (To find out what phrases in the colour coded bars mean, as well as the colour coding, hover over the bar. In this case, "terrestrial" is about ecotoxicity — harm to land-based plants, animals or micro-organisms.) Click the plus tabs for even more information (as shown below).

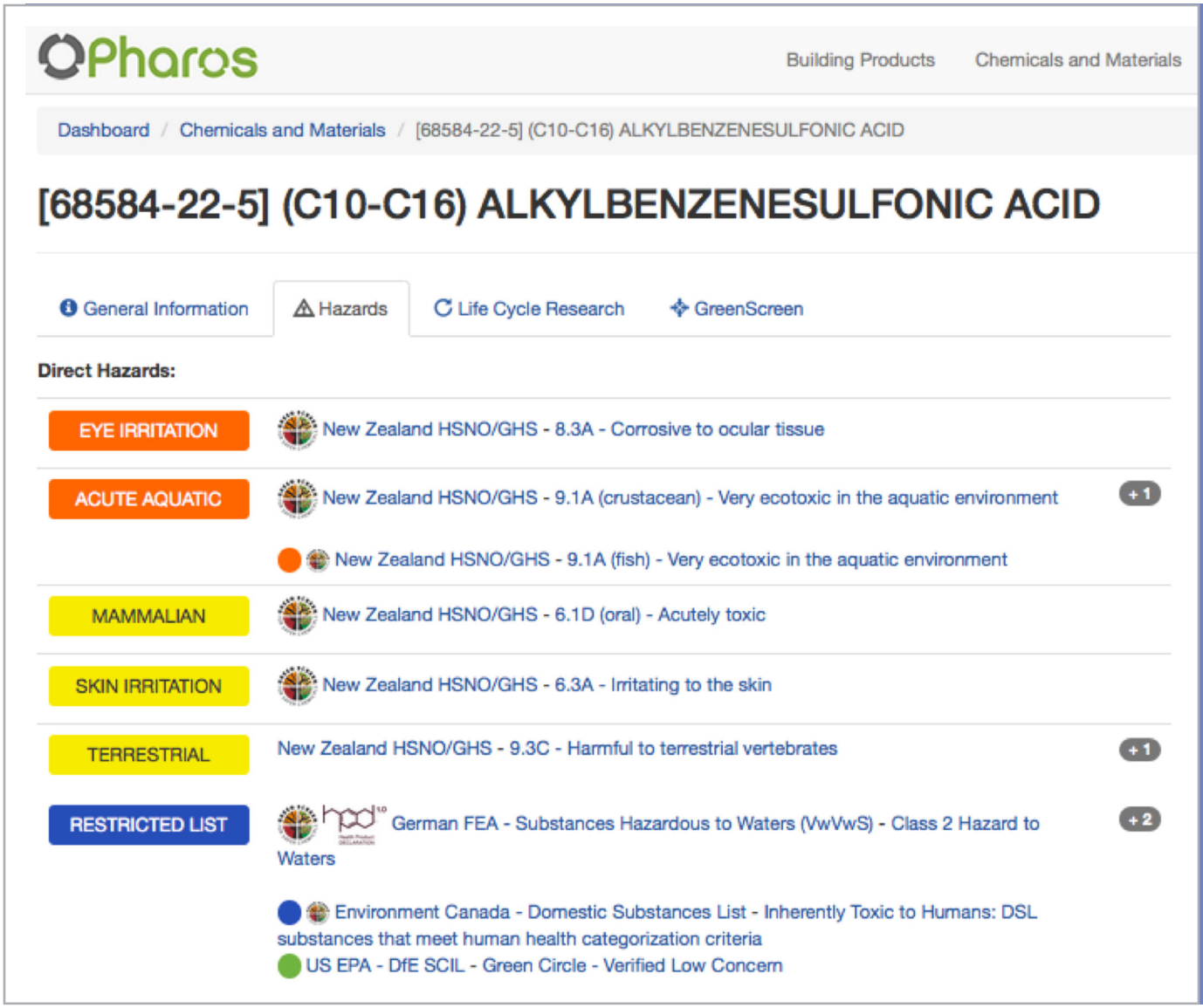


Figure 3.5

This is a good example about why a chemical being on a list doesn't mean a chemical is of high concern. The organisation might consider it a low concern, as EPA does in this example, but still list it. That's why it's important to check the information behind the colour coded bars, and to look at what each list says about the chemical. Pharos lets you do all of this.

In this example, the chemical has a green circle from the U.S. Environmental Protection Agency (EPA). Its Design for Environment (DfE) Safer Chemicals Ingredient List (SCIL) — used in the Safer Choices label products — put alkylbenzene sulfonic acid on its list of preferred chemicals. At the same time,

Checking on chemicals of high concern.
What online tools can help?

Environment Canada considers it to be a possible concern (it's on the Domestic Substances List) and New Zealand says it does affect health and the environment enough to fit into several GHS hazard classes. You can find out more about each one by clicking on the list name, or going to the original website if you want.

This is confusing, but here's what's happening. The chemical does have some toxic properties. However, when the EPA screened it, the DfE reviewers decided alkylbenzene sulfonic acid is of lower concern than other chemicals like it. That makes it "best in class". In other words, it has no red coded (i.e., it's not a priority to replace) health or environmental effects and its corrosive hazards can be controlled.

Given the EPA's information, this chemical is not a high priority for substitution. However, it needs to be used with good prevention measures (e.g., ventilation, avoid spraying, or — as a last resort — personal protection equipment that is appropriate for the chemical and fits the person wearing it). Workers also should report any problems they have using it. And it is worth considering in a second round of informed substitution, after higher priorities are dealt with.

What's the take-away from these examples?

These are two examples of using the Pharos database as an on-line chemical screening tool.

The take-away is: **start the substitution process by figuring out which chemicals are GS LT-1. Since these are ones to avoid (as chemicals of high concern), they should be priorities for informed substitution.**

Then move onto the LT-P1 category chemicals. These "possible Benchmark 1 chemicals" will show only some signs of concern (based on list information) but they do warrant a longer look at the information provided in Pharos. New studies may provide more information in the future, changing the lists scores as a result.

If you want more help or information, talk about screening results with health and safety specialists. It's always important to ask questions and understand the warnings we find.

Ultimately, the Pharos tool allows purchasing staff, workers, health and safety reps, and others to find out more about a chemical's known hazards than may be provided on a SDS. They also can understand why some chemicals should be a priority for informed substitution.

From here, finding safer cleaning products is relatively easy. Section 4 explains how to search for informed substitutions.

What other on-line tools could you use?

You can get information about chemicals and their hazards from other on-line tools that are useful for workplace hazards. Two of them are particularly helpful: the Chemical Hazard and Alternatives Toolbox (ChemHAT) and RISCTOX.

Chemical Hazard and Alternatives Toolbox (ChemHAT)

ChemHat is a free hazard and alternatives tool designed by workers for workers' general use. (They worked with a variety of specialists who are interested in informed substitution.)

Based on the same information sources as the Pharos tool, it uses the same colour coding but different symbols. It does not include the List Translator scores so you won't be able to clearly prioritize chemicals of high concern for substitution the way you can with Pharos. Other than that, the information is basically the same but represented differently visually.

For example, a search for information about d-limonene (one of our earlier examples) starts out like this:

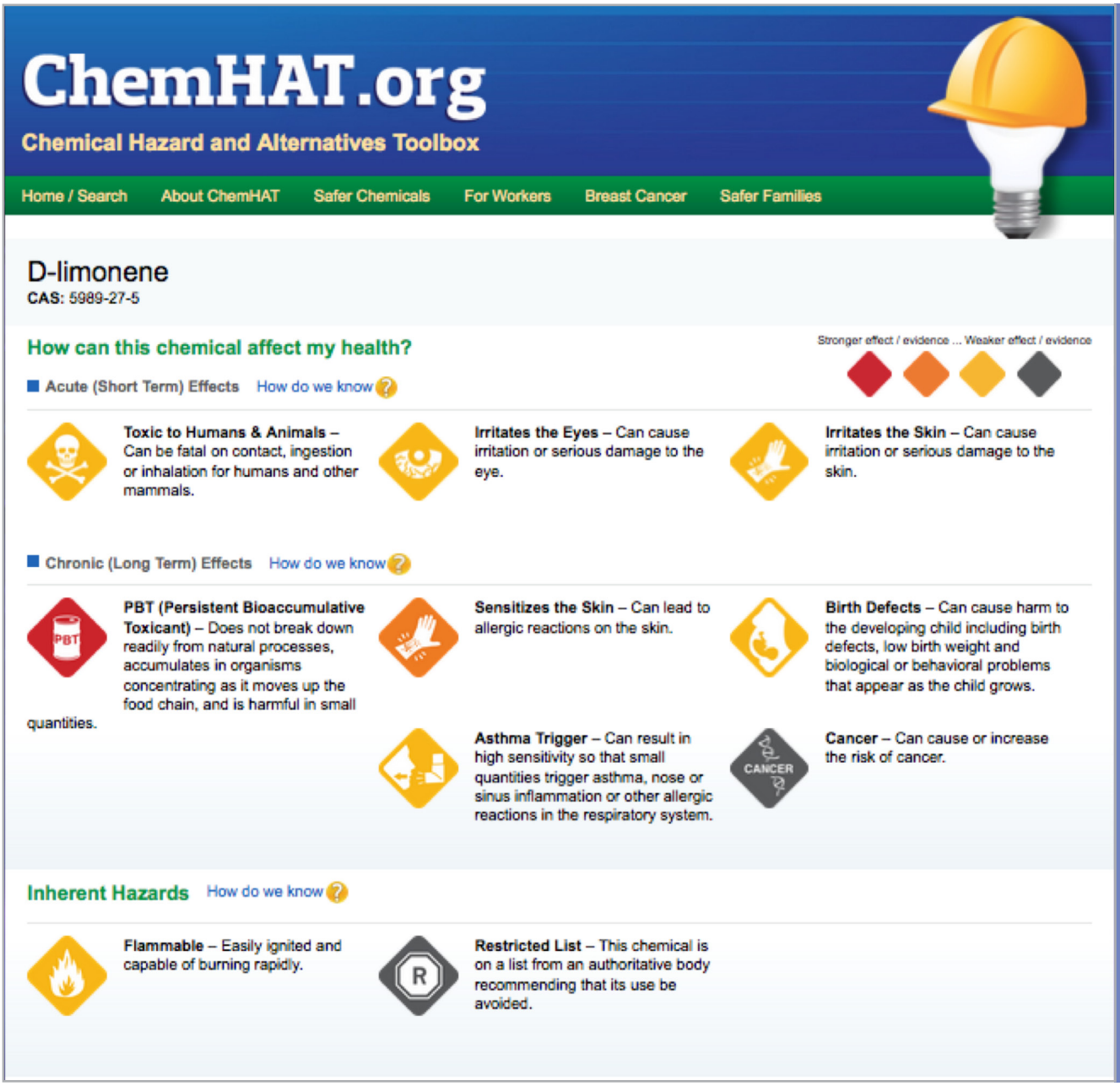


Figure 3.6

There is a "How do we know?" link beside each effect category. Using it takes you to the sources of information for the statements next to the coloured symbols (which are explained here). Scroll down to see more information about routes of exposure and a glossary. There also are training materials about the tool, along with information for workers, information about breast cancer and the *Putting Breast Cancer out of Work* campaign.

There also are links to an offsite website called Subsport; it can provide some information about alternatives, although it's a work in progress that depends on voluntary submissions.

RISCTOX

RISCTOX is a slightly different type of screening tool. Put together by the technical foundation, the Instituto Sindical de Trabajo, Ambiente y Salud (ISTAS) — the Union Institute for Work, Environment and Health — it focuses on chemicals of concern in the European Union (EU), providing information for about 100,000 substances.

See the site's front page for information about the content and definitions.

The results of a search include the new pictograms and other information required by the GHS (WHMIS 2015), when the chemical has been classified. (Find those classifications via the definitions of different effects or when Regulation 1272/2008 — the equivalent to WHMIS 2015 — is named.) It also has a lot of references to EU lists and regulations, which may be useful (e.g., if something's banned or its use is restricted).

Again, we used the example of d-limonene to demonstrate this screening tool. (With this database, it is best to use CAS numbers, rather than chemical names. If you do use the chemical name, be sure to change the box beside "Name" to "part of the name" in case you don't have the full one they use.)

Here's what the top of the page looks like:

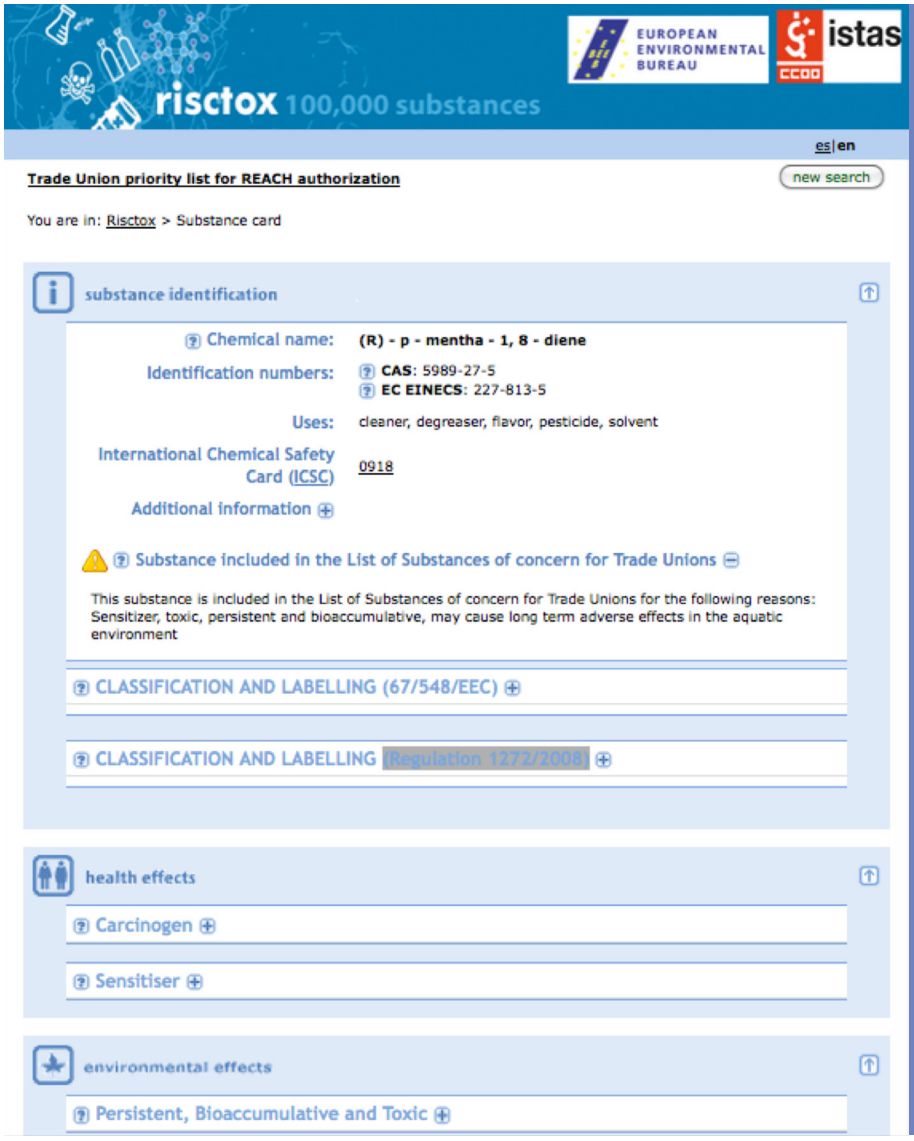


Figure 3.7

The results of this search tell us that d-limonene is on the "List of substances of concern for Trade Unions" because it is considered to be a sensitizer, a PBT chemical, and may cause long-term adverse effects in water.

This also is a time when you need to delve deeper to find out what lists are being used in the screening, and where the chemical is on that list.

In this case, the health effects for d-limonene also uses "Carcinogen". However, you'll notice that ISTAS does not mention this effect.

When you hit the + button for more information, it is in Group 3 from the International Agency for Research on Cancer (IARC). The "?" button beside that explains that IARC cannot classify it yet (usually for lack of information). Only chemicals in IARC categories 1, 2A and 2B are considered carcinogens.

At the same time, if you go to the "Sensitizer" category, you'll see that there's a regulation saying d-limonene fits this category and a document about why it's considered to cause allergies. Similarly, there is more information about its environmental hazards.

What other resources can help us know what to avoid?

For lists of chemicals to avoid, see:

- Disinfectants and asthma and Disinfectants and asthma: Part II from Michigan State University;
- Hazardous substances in frequently used professional cleaning products (a study published in 2014);
- "Ingredients to avoid" in Green cleaning, sanitizing, and disinfecting: A curriculum for early care and education;
- "Keep these substances out of your workplace" and "Try to get substitutes for these substances" in the WorksafeBC funded Cleaners and Toxins Guide;
- "Selecting safer janitorial cleaning products: What to avoid and what to look for" in Cleaning for health: Products and practices for a safer indoor environment;
- "Summary of active ingredients rejected during screening", in San Francisco Environment's Safer products and practices for disinfecting and sanitizing surfaces; and
- The dirt on toxic chemicals in household cleaning products, from the David Suzuki Foundation.

What's next? Finding third-party ecolabel products

Now we know how to prioritize chemicals of high concern for informed substitution, after starting with our right-to-know about the hazards of chemicals used in our workplace and B.C.'s substitution regulation.

The big questions always are: What else could we use? How do we know it's safe for people or the environment? How can we find less toxic alternatives that have been properly tested for their hazards? Section 4 describes how to find certified third-party ecolabel products that should fit the bill.

Finding informed substitutes.

How can you find third party certified ecolabel cleaning products?

You've screened for ingredients of concern and prioritized hazardous cleaning products for informed substitution. Now you need to find those less toxic or non-toxic methods, or ecolabel certified products.

Since that's largely the responsibility of those dealing with purchasing, this section is targeted mostly at procurement staff. Others (e.g., health and safety committee reps) can benefit too.

Nothing shady here folks.

In this section, we describe North American third-party certification programmes, and two other options. They are:

- Ecologo,
- Green Seal,
- the City of San Francisco SF Approved programme,
- the U.S. Environmental Protection Agency's Safer Choice Program,
- the Toxics Use Reduction Institute (TURI) Cleaning Solutions database, and
- microfibre products.

For each one, there are links to help you easily find informed substitutes for currently used hazardous cleaning products and information about the criteria that the organizations use to certify products.

What are third party certified cleaning products?

Several independent organizations and government agencies in North America certify "green" cleaning products. Each has its own criteria for "environmentally friendly" ingredients; occupational health criteria are increasingly common. They are developed with stakeholders including public health professionals, product manufacturers, advocacy groups, and end users.

The requirements for cleaning product ecolabels (i.e., they are ecological, "green", or "environmentally friendly") also improve indoor air quality, the health of people using the products, and the health of those in the areas where the products are used.

The B.C. government's green purchasing (procurement) policy requires the use of third party certified ecolabel cleaning products. In turn, the company managing B.C. government buildings — the WSI subsidiary of Brookfield Global Integrated Solutions (called Brookfield Johnson Controls before May, 2015) — also stipulates that companies with which it contracts for the actual cleaning "will use only environmentally friendly products if available". In this case, the sub-contractor is Bee Clean Building Maintenance.

Ecolabel products rarely contain a GreenScreen List Translator 1 (GS LT-1) chemical ingredient (a chemical of high concern). Many have been rigorously screened to eliminate any chemical with long-term effects on human health or the environment. Some still allow fragrances or enzymes in a few

circumstances, so we highlight the best choices to prevent asthma, and recommend fragrance-free products.

When using ecolabel certified products, **workers still must have** the right kind of tools, equipment, and protective gear and procedures to use the products. They need training about the hazards of cleaning products they use, how to use them (e.g., closed systems, dilution), and time to do their job.

When workers think they got sick or hurt from using a cleaning product, they should report that to supervisors, and the joint health and safety committee. The same applies to those who feel the effects of products used in their work areas, bathrooms, etc. Health and safety reps, supervisors, and procurement staff should investigate these reports, asking questions about the ingredients and their effects. It may be that the product should be replaced or used in a different way. (For more about how to do this, see Section 6.)

What's Ecologo?

Some products we reviewed had Ecologo certificates. Environment Canada started this programme in 1988, to provide information about "environmentally-friendly" products. The U.S.-based for-profit Underwriters Laboratory (now UL) bought it in 2010.

How do you find Ecologo cleaning products?

Anyone can find Ecologo certified cleaning products on line. The process is:

1. go to the UL Sustainable Product Guide database;
2. scroll down under "Search for products";
3. click on the + for "Evaluation Type" and click on "Ecologo certification";
4. then go to "Product Categories" in the same column, go down to "Cleaning Products/Systems" and click on the name.

This will give you a list of Ecologo cleaning products. It's sorted into a range of sub-categories that appear if you click the + sign. They are:

- air fresheners,
- biologically-based cleaners,
- cleaning products,
- general cleaners (floor, general purpose and hard surface),
- hard surface cleaners (degreasers, general cleaners),
- institutional cleaning systems (hand cleaners),
- laundry (bleach, detergent, fabric softener),
- odour control (drain cleaners, carpet and fabric deodorizers, RV and marine additives, enzyme-based products), and
- pool and spa water treatment products.

Sub-categories usually are broken down into different product types (see some in the brackets of the list above). Cleaning products include:

- bathroom cleaners,
- carpet cleaners,
- carpet/upholstery cleaners,
- degreasers,
- dish cleaners,
- disinfectants,
- general hard surface cleaners,
- glass cleaners,
- hand cleanser,
- hard surface cleaners,
- kitchen cleaners,
- toilet cleaners, and
- window and glass cleaners.

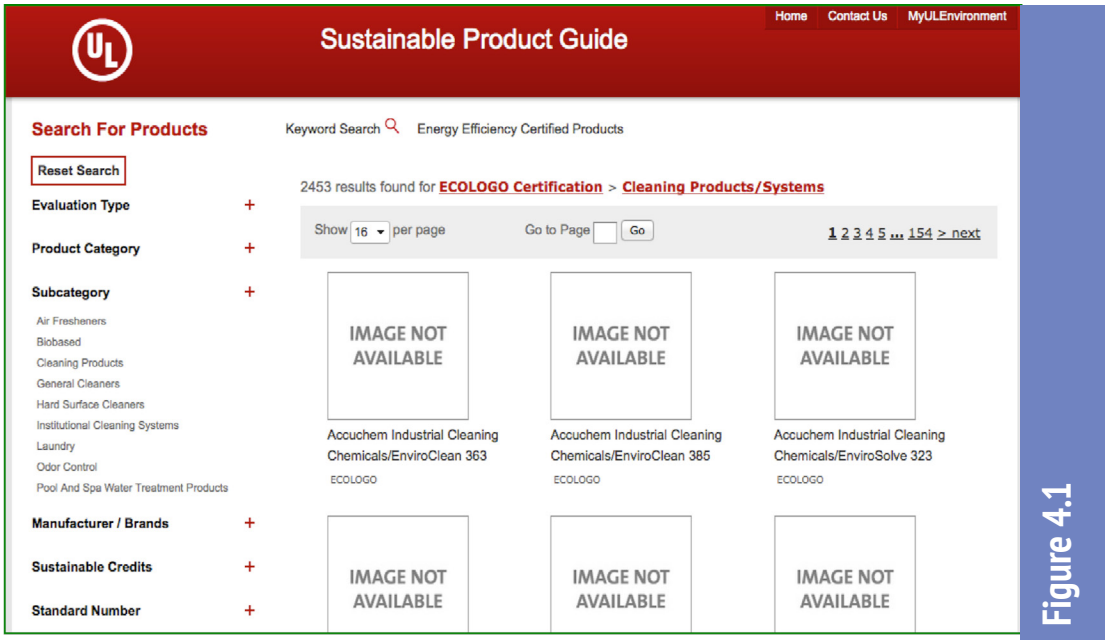


Figure 4.1

If necessary, narrow your search by opening the section called "Manufacturer/Brands" and look for local brands or ones that your supplier carries. Once you've found possibilities that you want to check out for ingredients, go to the manufacturers' websites to get data sheets for the products. (Checking the data sheets is one way to be sure products actually meet your criteria.)

What criteria does Ecologo use to certify cleaning products?

UL chemical ingredient and packaging criteria are set out in its standards. Companies must meet the criteria there to get a certificate for a specific product group. They also get a label saying the product is certified to a specific standard.

For example the 2012 version of the *Standard for Sustainability for Disinfectants and Disinfectant Cleaners* (UL 2794) has 14 pages of detailed testing rules that manufacturers must meet. It also prohibits a variety of chemicals, including those that are:

- skin irritants;
- on specific lists of hazardous solvents or chemical groups (e.g., carcinogens on the IARC's groups 1 and 2 lists, some ethylene glycol ethers — one of which was in a product on our results chart in Appendix 2);
- highly toxic to aquatic life or animals (and they must be biodegradable);
- linked to occupational asthma; and
- made with fragrances.

If Health and safety representatives and procurement staff want to check criteria like this in more detail, the standards can be downloaded for free (once you register on line).

To find specific criteria, including which chemicals are restricted, use the links below. Categories in the cleaning products and personal care group are:

- **UL 2759 hard surface cleaners** (formerly CCD 146)
- **UL 2776 liquid laundry detergent and fabric softeners** (formerly CCD 105)

- **UL 2777 hard floor care products** (formerly CCD 147)
- **UL 2780 urinal blocks** (formerly CCD 165)
- **UL 2781 pool and spa water treatment products** (formerly CCD 171)
- **UL 2783 instant hand antiseptics** (formerly CCD 170)
- **UL 2784 hand cleaners** (formerly CCD 104)
- **UL 2792 biologically-based cleaning and degreasing compounds** (formerly CCD 110)
- **UL 2794 disinfectants and disinfectant cleaners** (formerly CCD 166)
- **UL 2795 carpet and upholstery cleaners** (formerly CCD 148)
- **UL 2796 odor control additives** (formerly CCD 115/107)
- **UL 2797 RV and marine holding tank treatment** (formerly CCD 114)
- **UL 2829 laundry bleach** (formerly CCD 106)
- **UL 2845 personal care** (formerly CCD103)

What's the upside of Ecologo's website and its certified products?

- There are thousands of product choices under the Ecologo label (which is why they are a popular labelling requirement in green procurement specifications).
- Ecologo offers certified products for homes and workplaces.
- Ecologo screens for most key human and environmental hazards[1].
- If a product has "safety-related" problems, you can report it on line.

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[1]Ecologo criteria do not specifically prohibit the use of all quats (quaternary ammonium compounds) in disinfectants. Once thought to be good biocidal agents, these chemicals increasingly are considered to be asthmagens. We expect Ecologo and other third party certified ecolabels to revise their standards to drop the use of all quats in cleaning products. Meanwhile, it's best to avoid using any quats in cleaning products. The City of San Francisco took that kind of precautionary action; it eliminated all quats from its list of SF Approved disinfectants. The California Department of Public Health has a similar recommendation; see the chart in Appendix 3 for more information.

What's the downside of Ecologo's website and its certified products?

- You must know what type of product you're looking for (e.g., floor cleaners, in the general cleaners sub-category).
- Finding the Safety Data Sheets (SDSs) for each product depends on the ease of navigating the manufacturer's website. Ecologo includes the manufacturer's and product website (sometimes the same). Follow that trail to find the data sheet for the product.
- If you want to find out more about the product's ingredients, check the SDS (sections 3 and 11) and use Pharos or another tool in Section 3.

What's Green Seal?

Green Seal is an American non-profit organization that started its work in 1989. Amongst other things, it provides third-party certification and the related ecolabel for a large range of institutional and household cleaning product standards.

How do you find Green Seal products?

To find Green Seal products and services, go to the home page and click on find green products & services at the top right. This takes you to a search function. There you can:

1. type in key words;
2. search by standard, manufacturer or category; or
3. click on the images to go directly to a product group.

Within "category" or the images, choose Institutional Cleaning Products. That takes you to a wide range of products that can be searched by the manufacturer's name or the kind of product. Then you can search for the kind of cleaner you want (e.g., for floors, glass) by typing that into the "Search results" space on the right (under "Filter results") and hit the "Search" button below it.

For example, if you were looking for floor cleaners, and typed in "floors", you see (box below) that four products meet the GS-37 criteria and one that meets GS-40 rules.

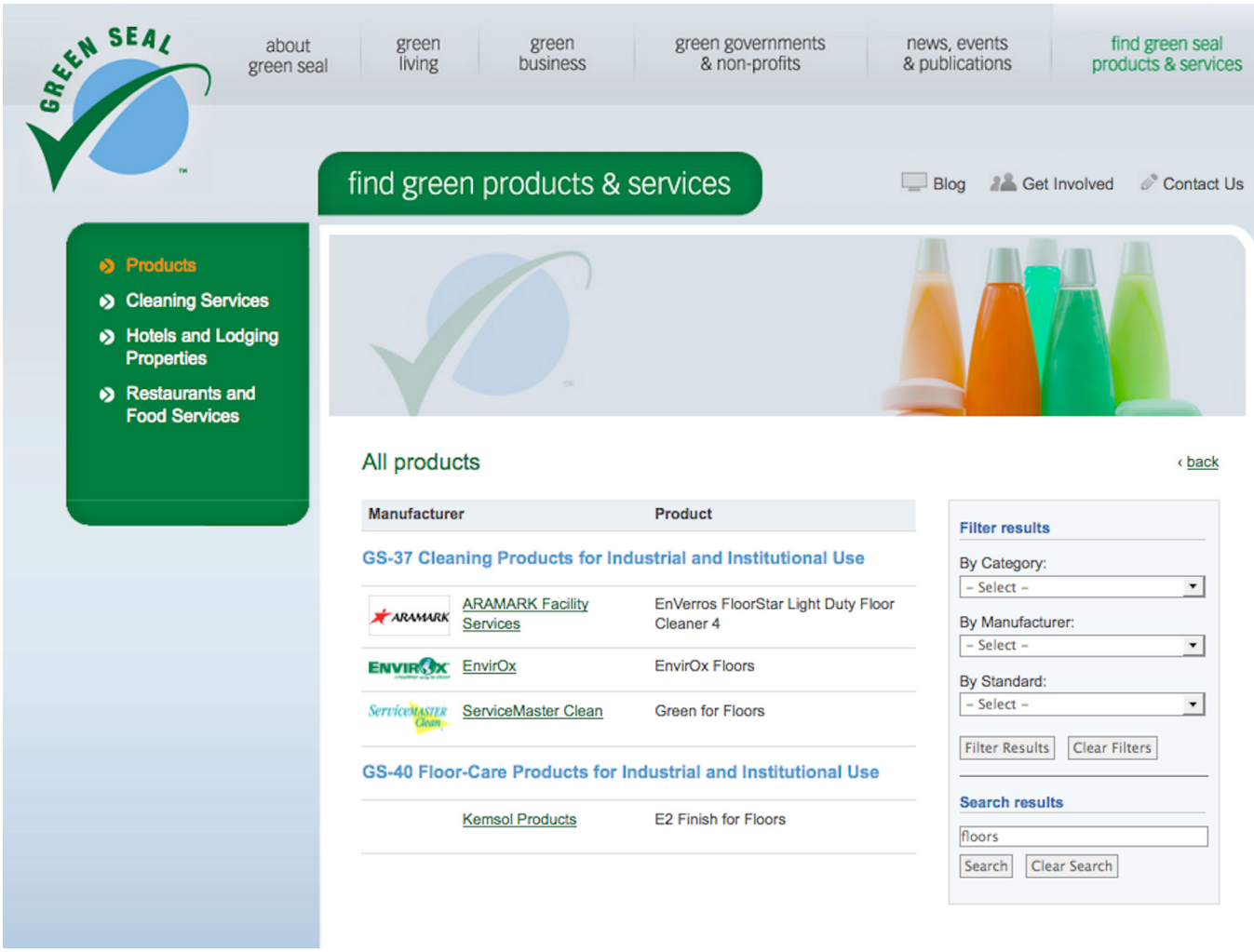


Figure 4.2

What criteria does Green Seal use to certify cleaning products?

Its criteria for institutional cleaning products are found in GS-37 Green Seal *Standard for Cleaning Products for Industrial and Institutional Use*. The requirements are very similar to Ecologo's. Chemical ingredients must not be:

- carcinogens, mutagens and reproductive toxins,
- most ingredients that cause asthma or set it off (asthmagens)[2] ,

[2]See the California Department of Public Health chart in Appendix 3 of this toolkit for more information.

- skin sensitisers (i.e., can cause skin allergies),
- absorbed through the skin,
- acutely toxic,
- skin and eye irritants,
- toxic to aquatic life,
- bioaccumulating compounds,
- ozone depleting compounds,
- toxic by chronic (long-term) inhalation, or
- prohibited ingredients (heavy metals, 2-butoxyethanol; alkylphenol ethoxylates, phthalates).

There are other standards for the more general category of cleaning products and services. They are organised into:

- cleaning and degreasing agents (GS-34),
- cleaning products for household use (GS-08),
- commercial and institutional cleaning services (GS-42),
- floor-care products for industrial and institutional use (GS-40),
- hand cleaners for industrial and institutional use (GS-41),
- laundry care products for household use (GS-48),
- laundry care products for industrial and institutional use (GS-51),
- powdered laundry bleach (GS-21),
- residential cleaning services (GS-49),
- specialty cleaning products for household use (GS-52), and
- specialty cleaning products for industrial and institutional use (GS-53).

At the left side of the search page, Cleaning Services (i.e., companies) lists four certified to Green Seal's GS-42 Standard. The requirements they must meet include:

- standardized green cleaning procedures;
- using energy-efficient cleaning equipment and certified products;
- staff training; and
- effective internal and external communications.

The standard also emphasizes procedures to reduce toxicity, waste, and hazards to cleaning workers and building occupants. Companies are monitored to ensure they are keeping up with the standard.

What's the upside of Green Seal's website and its certified products?

- Green Seal includes household cleaning products, as well as ones for "institutional" or "industrial" use.
- There are thousands of product choices under the Green Seal label, which is why they are a popular labelling requirement in green procurement specifications.
- Green Seal screens for most key human and environmental endpoints of concern. (See footnote 1 in this section.)

What's the downside of Green Seal's website and its certified products?

- Disinfectants do not have their own group, making it hard to search for these products.
- Finding the Safety Data Sheets (SDSs) for each product depends on the ease of navigating the manufacturer's website.
- To get an SDS, you need to look at the details about the product. Green Seal takes you to the manufacturer's website. Follow that trail to find the data sheet for the product. If you want to find out more about the product's ingredients, check the SDS (sections 3 and 11) and use Pharos or another tool in Section 3 of this toolkit.

What's Safer Choice?

For many years, the United States Environmental Protection Agency (EPA) has promoted less toxic products through their Design for Environment (DfE) programme.

The Safer Choice label (until 2015, called the DfE label) covers a wide range of household and institutional cleaning products. More than 2,000 products qualified for the label fit into a variety of categories. Cleaning products include these uses:

- boat and car care,
- carpet cleaners,
- drain cleaners,
- floor care,
- general purpose cleaners,
- glass cleaners,
- graffiti removers,
- laundry detergents,
- other industrial products,
- personal care, and
- washroom cleaners.

What criteria does EPA use to certify cleaning products?

The EPA considers products with the Safer Choice labels to be "best in class within that functional group." A technical committee screens all the ingredients to choose the ones that pose the least concern among chemicals in their category (class). Functional groups refer to the role a chemical plays in the product such as giving it a smell (fragrance), its ability to mix (solvents), preservatives, and making it easier for two liquids to blend in the same product (surfactants).

With a "best in class" chemical approach, a product still could contain some hazardous ingredients, but very hazardous ones (e.g., carcinogens or many GreenScreen LT-1 chemicals) usually are prohibited. Safer Choice's standard has a lot of details about the rules for a chemical's hazards and exceptions. Clear criteria restrict harmful substances such as:

- allergens and sensitizers (chemicals causing or setting off allergic reactions);
- aquatic toxins;
- carcinogens, mutagens, reproductive or developmental toxicants (CMRs);
- chemicals suspected of being endocrine disruptors;
- chemicals that are persistent, bioaccumulative and toxic (PBT);
- chemicals that release, degrade to, or form by-products that are CMRs or PBTs;
- hazardous air pollutants (which meet a set of legal criteria);
- skin irritants; and
- volatile organic compounds (VOCs).

This programme provides the Safer Chemicals Ingredient List (SCIL) to help manufacturers choose less toxic ingredients. It also offers fragrance-free products to avoid chemicals that can cause allergic and other reactions. (It's often difficult to get information about the human health and environmental effects of fragrances, partly because they may not have been tested — especially for long-term effects — and partly because manufacturers or suppliers often claim the ingredients are "trade secrets".)

The Safer Choice website features a product search function that provides names of products and links to where the product can be bought. The results can be organised by column (i.e., product name, company name, sector covered, and type).

Here's an example of a search for floor cleaners for use in workplaces.

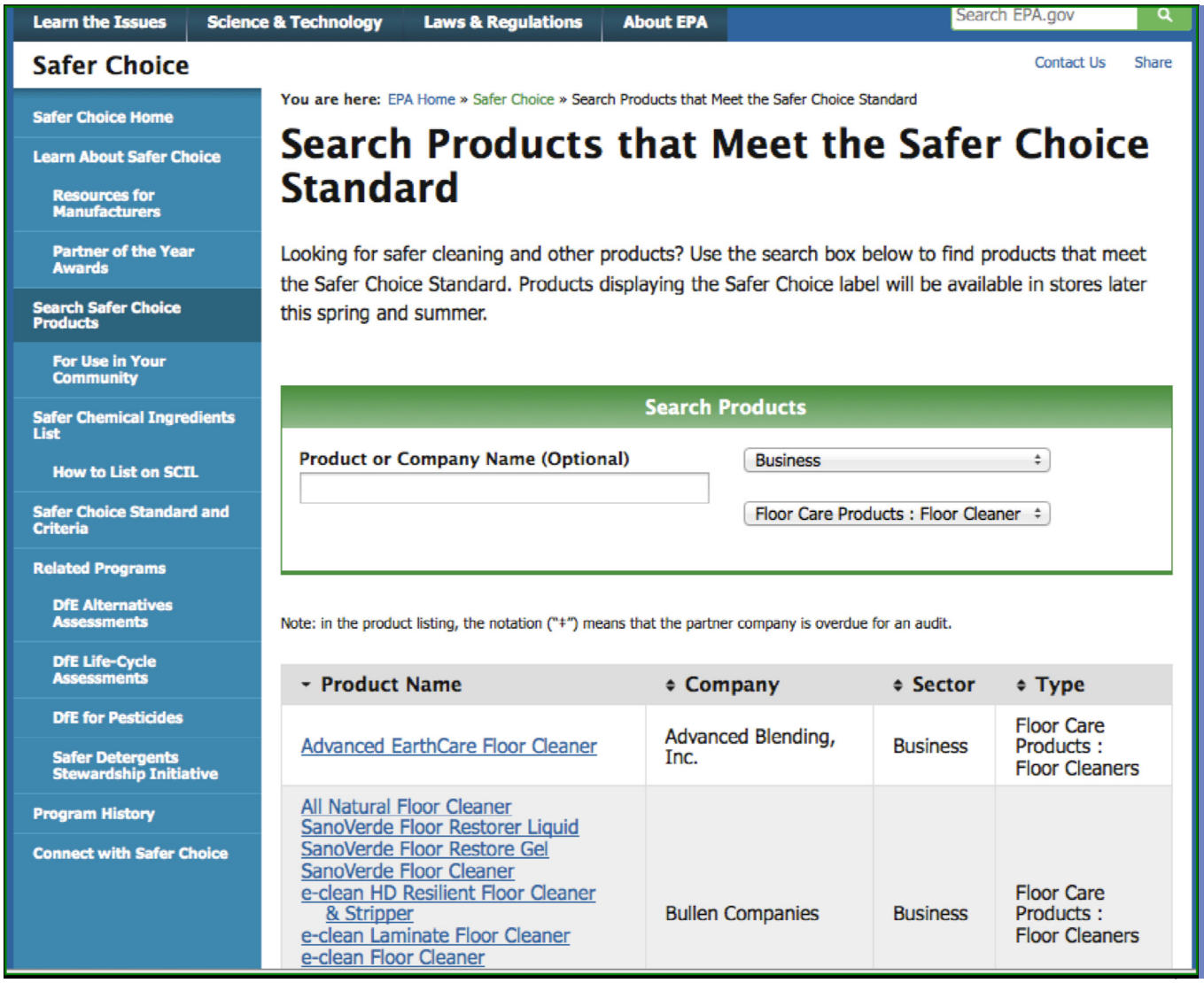


Figure 4.3

What's the upside of the Safer Choice label and website?

- This ecolabel now offers specific fragrance-free products.
- It covers a wide range of home as well as institutional products.
- The website is easy to navigate.

What's the downside of Safer Choice label and website?

- The Safer Choice's "best in class" approach can recommend a product with some hazardous ingredients, if it is the best available at the moment. This means that manufacturers still need to find safer ingredients.
- Disinfectant products do not have their own sub-group, making it difficult to search for these products.
- To get an SDS, you need to look at the details about a product and where a product is available. Look for the manufacturer's website, or do a separate search using the product name. Follow that trail to find the data sheet for the product. If you want to find out more about the product's ingredients, check the SDS (sections 3 and 11) and use Pharos or another tool in Section 3 of this toolkit.

What is SF approved?

SF APPROVED
Use less, buy the right thing

The City of San Francisco has a long history of progressive and innovative actions about environmental issues. It was the first city in North America to adopt the precautionary principle in an ordinance in 2003.

The Department has lots of information about safer products and practices at work and for residents. Within this, there is an extensive programme called SF Approved, which includes guides for city staff, small businesses and homes, large organizations and manufacturers and vendors.

The programme's website takes you to green products that have certificates from Ecologo, Green Seal and others.

You can find products in several ways: browse by categories (see the top right and click on the arrow), do an advanced search for product/service category pages to get a list of cleaning products, or check the bottom of website for Products & Services. There is an example of doing this for disinfectants in Figure 4.4, and Figure 4.5 shows what other information is available.

Figure 4.4

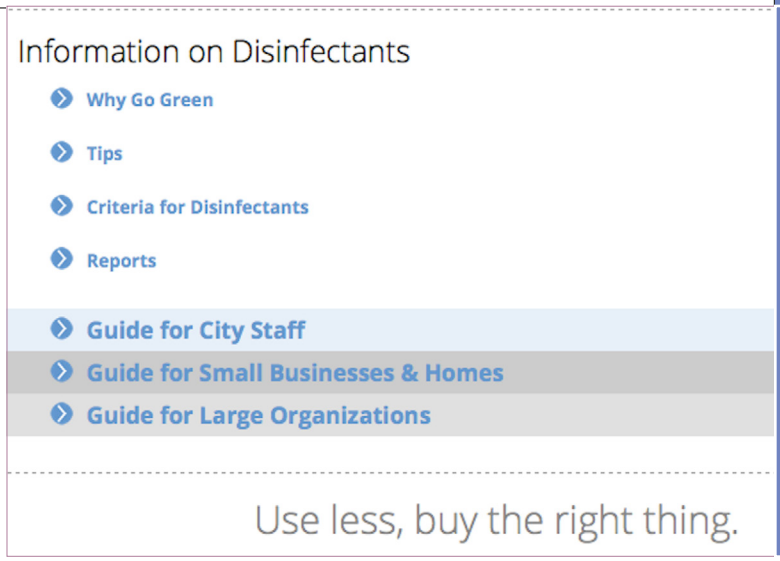


Figure 4.5

Cleaning products are available in the following sub-categories:

- abrasive cleaners
- bathroom cleaners
- carpet cleaners
- cleaner degreasers
- dish soaps
- disinfectants
- drain openers
- floor cleaners
- floor finishes and strippers
- furniture polish
- general purpose cleaners
- glass cleaners
- graffiti control
- hand soaps
- odor control
- toilet cleaners (acid)
- toilet cleaners (non-acid)
- toilet deodorizers (hangers, pucks)

SF Approved also provides background information about products, explaining different strategies depending on the materials involved. Each category of cleaning product has a section called:

- "Why go green", specific to the type of product;
- "Tips" about how to use the product;
- criteria behind the recommendations, and
- reports related to the product category.

For example, the graffiti remover report is *Safer Alternative Graffiti Management Methods for California*. The Institute for Research and Technical Assistance 2014 document is an alternatives analysis of various graffiti control methods and products.

What criteria does SF Approved use to certify cleaning products?

The criteria are similar to the Green Seal, Ecologo and Safer Choice approaches to chemicals hazards. At the same time, San Francisco made the elimination of any suspected asthmagens a priority. To accomplish this, they prohibited all quats (quaternary ammonium compounds) in all disinfectant products, as their criteria for disinfectants explains:

Information about disinfectants

Tips

1. Use disinfectants sparingly.
2. Disinfectants are good for surfaces that are touched frequently, like doorknobs and keyboards.
3. A surface is not disinfected if the disinfectant is wiped away too soon. Disinfectants must sit/dwell on a surface for the number of minutes listed on the bottle.
4. Confused about ingredients? If the ingredient has the words "ammonium chloride" somewhere in a long chemical name, it is probably a quaternary ammonium compound, or "quat." These are to be avoided.
5. Looking for products certified by an ecolabel organization (such as Green Seal)? You probably won't find any. Federal regulations prohibit ecolabels on pesticides, and disinfectants are considered pesticides.

SF Approved: *Disinfectants*

> *Products must be EPA registered as disinfectants or hard surface sanitizers, and contain only the following active ingredients: Hydrogen peroxide, citric acid, lactic acid, or caprylic acid. Products must not contain quaternary ammonium compounds or alkylphenol ethoxylates. Concentrated products must be adapted for use in a closed-loop dilution system.*

The latest full set of criteria is in Required Environmental Purchasing Specifications: Regulation #SFE- 1 3-04-PPO (from March 8, 2014). It:

- ✓ includes extra limits on what can be in a toilet deodorizer (no para-dichlorobenzene, found in one product in our results chart);
- ✓ bans triclosan in hand sanitizers and hand dishwashing detergents (found in one product in our results chart); and
- ✓ says floor polish cannot contain a variety of things, including carcinogens on the California Proposition 65 list.

What's the upside of SF Approved and its website?

- This is one of the most precautionary approaches to choosing chemical cleaning products.
- It includes non-chemical solutions (i.e., microfiber mops, dusters, cloths).
- The website is very easy to navigate, with related reports and guidance to procurement officers under each product listing.
- It has products for households, and small and large businesses/ institutions.
- Sometimes, there are direct links to an SDS in the "information about …" section for a product.

What's the downside of SF Approved products and website?

- Like Ecologo, Green Seal and Safer Choice, if you want a Safety Data Sheet to check out a product, you might have to go to the manufacturer's website to find one.

What else is available to help find informed substitutes?

1. A Cleaning Solutions database

The Massachusetts Toxics Use Reduction Institute (TURI) is a leader in helping companies to reduce their use of toxic chemicals, and finding less toxic alternatives for a variety of products.

TURI's cleaning laboratory has worked on green cleaning since 1994. It tests industrial and janitorial cleaning products to encourage companies, other organizations, and product formulators to choose and develop less toxic substitutes. It recently started focusing on "green disinfectants".

One result of this important and practical work is a database about what kinds of chemicals work best for different kinds of cleaning, wherever it's done. A search for third party certified cleaning products is available through the Cleaner Solutions database.

There are two ways to use it.
One is to:

1. go to the database;
2. on the left side, click on Find a cleaner;
3. in the "Contaminant" column (which must be used), choose one or more possibilities;
4. near the bottom, in the middle, use the optional search filter of "Product cleaning type" and choose "Janitorial cleaning"; and
5. check for "Return only effective results" before hitting "Submit".

TURI Cleaning Laboratory

Who We Serve

Manufacturers: Parts Cleaning >>

Institutions: Janitorial Products and Equipment >>

Formulators, Manufacturers, Vendors: Cleaning Supplies and Equipment >>

Households: Safer Cleaning Alternatives >>

If you do this for "Dirt", for example, you'll get 120 results. If you choose one, you get a direct link to data sheets along with test results for using the product on that kind of problem. And there's more information available about their "Safety Score".

A second way is to look via the link for vendors — on the left of the home page (although it doesn't let you check for effective cleaners). Once you're there:

1. choose "Janitorial Cleaning" in product type;
2. leave all the other options at "Any";
3. hit "submit".

Once you get the results, you can organise them by "Product Name", "Classification" or "Safety Score". 385 products are listed; the first few results are in Figure 4.6 below, organised by Safety Score.

CleanerSolutions Database

Toxics Use Reduction Institute - Surface Solutions Laboratory

Vendor Search Results | Search Again

Current Search Information

Search Criteria	Results	Help
Cleaning_type: Janitorial Cleaning	Found 385 records Showing records 1 - 50	Search Results Field Definitions Contact the lab

<< < Showing records 1 - 50 of 385 | Field Definitions > >>

Vendor Name	Product Name	Classification	Safety Score
United Organics Corp	Tigmar 521 [compare]	Terpene-Semi-Aqueous	ND
Brazilian Womens Group	Maravilhoso Limpa Vidro [compare]	Alkaline Aqueous	ND
Garden Guys	Degreaser (Organic Product) [compare]	Biobased	ND
Mrs Myers Clean Day	Window Spray [compare]	Alcohol	ND
Don Garland Inc	Super Blue Non Ammoniated Stripper [compare]	Semi-Aqueous	ND
Mrs Myers Clean Day	Liquid Dish Soap [compare]	Alkaline Aqueous	ND
Brazilian Womens Group	Sabao Magico [compare]	Alkaline Aqueous	ND
Mrs Myers Clean Day	All Purpose Cleaner [compare]	Alkaline Aqueous	ND
Oxford Micelles	5009 [compare]	Alkaline Aqueous	ND
Brazilian Womens Group	Fantastico Multi-Uso [compare]	Alkaline Aqueous	ND
Don Garland Inc	Zap Ammoniated Stripper [compare]	Semi-Aqueous	ND
Mrs Myers Clean Day	Shower Cleaner [compare]	Alkaline Aqueous	ND
Brazilian Womens Group	Sensacional Limpa Piso [compare]	Alkaline Aqueous	ND
Mrs Myers Clean Day	Countertop Spray [compare]	Alkaline Aqueous	ND
New Dawn Manufacturing Company	White Pearl Hand Soap [compare]	Neutral Aqueous	50
Warren Chemical Company	Sea Wash 77 [compare]	Neutral Aqueous	50
EnviroSafe Services Inc	Neutral Rust Remover 232 [compare]	Neutral Aqueous	50
Scout Systems	Scout Heavy Duty [compare]	Neutral Aqueous	50
Water	Water [compare]	Neutral Aqueous	50
Activeion Cleaning Solutions LLC	Activeion Pro [compare]	Other	50
Ortec Ltd Co	Eco Clean [compare]	Neutral Aqueous	50
Warren Chemical Company	Sea Wash Neutral [compare]	Neutral Aqueous	50

Figure 4.6

Clicking on a product name leads you to comprehensive product information, including:

- data sheets,
- recommendations about what problems the product tackles best (recommended contaminants),
- what kind of surface it works on (substrate),
- the equipment needed to use it, and
- if it is effective based on TURI's own laboratory tests.

If you need help to understand terms, how to search, etc, there are a variety of help topics.

TURI also includes a comprehensive list of household cleaning products, with an emphasis on do-it-yourself (DIY) products with recipes.

What's the upside of the TURI database and website?

- The database and website provide information about both household and janitorial cleaning products.
- Product information is very comprehensive.
- There are direct links to safety data sheets (although you should check to make sure they're the most up-to-date ones, since changes are being made with the GHS coming into effect).
- It points users of cleaning products to the state's Environmentally Preferable Products (EPP) Procurement Program.
- The Institute tests cleaners to figure out what works best in particular situations, and is still "green".

What's the downside of the TURI database and website?

- It is less user-friendly than others, such as SF Approved.
- Only 385 janitorial products are listed if you search for vendors, although more may be there if you use the first search strategy above.

2. Microfibre mops and cloths

There is one other option for workplaces looking for informed substitutes to toxic cleaning products: microfiber mops, dusters, and cloths.

The material is a synthetic (polyester and nylon) microfibre which get into spaces that cotton cloths or paper towels cannot reach. (The smaller the "denier" measurement, the finer and more effective the microfiber is; superior ones are 0.13 denier.)

At the same time, the fibres have a greater surface area, so they can absorb up to seven or eight times their weight in liquids. Scrubbing increases this capacity and makes microfibers better at picking up grease and oil. The fibres have a static electric charge so they are much like a dust magnet and hold dust much better than string mops (95 percent versus 68 percent in a U.S. EPA case study[3]).

This adds up to many benefits, according to San Francisco's SF Approved programme. Microfibre materials:

- can get rid of 99% of bacteria with plain water, so they're great for disinfecting and sanitizing;

Microfibre mops = fewer injuries

Microfiber mops are often not used with the traditional, large mop buckets. Instead, they are wet once in a small bucket, used for one or two rooms, and then can be replaced with a clean mop. This means that custodians do not have to lift heavy mop buckets, and are less likely to suffer back injuries. One case study from the University of California Medical Center documented a reduction in workers compensation claims where microfiber mops were used.

SF Approved: Microfiber cleaning products.

[3] This information comes from a detailed booklet available from Informed Green Solutions: ***Cleaning for healthy schools — Infection control handbook***, published in 2010.

- *require 95 percent less water and cleaning chemicals (especially if the chemical is sprayed directly onto the cloth);*
- *clean 10 percent more in the same time;*
- *used dry, they are very effective for dusting;*
- *last five to 10 times longer and cost less; and*
- *cause fewer worker injuries than traditional methods (see box).*

What resources are out there to help choose informed substitutes?

Try these resources as a starter:

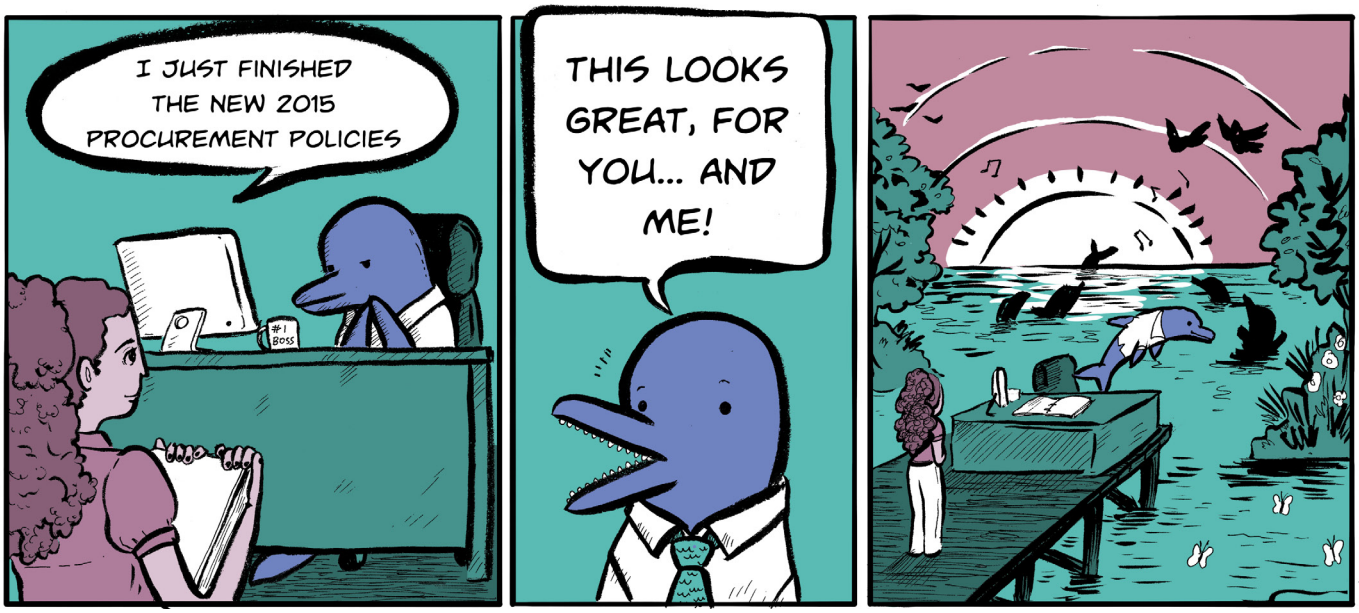
- The California Department of Public Health's Occupational Health Branch has helpful information about which specific ecolabels certifications are best to prevent asthma. (see Appendix 3);
- Informed Green Solutions: Carol Westinghouse has lots of practical materials with tools, checklists and more, including Cleaning for healthy schools — Infection control handbook.
- Institute for Research and Technical Assistance (Dr. Katy Wolf) identifies develops, tests and demonstrates less toxic alternatives for different applications (with an emphasis on solvents), and demonstrates and evaluates new and emerging technologies/processes. She has recommendations for graffiti removers, floor strippers, and more. Check the newsletters and reports for details.
- San Francisco Department of Environment's 2014 report: Comprehensive Report on Safer Disinfectant Products. (In particular, check out Appendix C, "Best practices for cleaning, sanitizing and disinfecting surfaces".)

What's next? Preparing a good procurement policy

You have good ideas about what products would be informed substitutes. You know the law requires them for some kinds of chemicals. Now you need a procurement policy that requires them, and is clear and enforced. Section 5 explains what's in a good one, and Section 6 provides ideas and tools about how to implement the policy.

Buying safer cleaning products.

How do you set good procurement policies for informed substitution?



Everyone's happy. You, the environment, especially your boss.

We know there are cleaning products that are certified as "green" or "best in class". How do we get them? It comes down to the policies about what's bought and what's brought into the workplace — the procurement "rules".

This section lays out what should be in those policies, including recommendations about using ecolabel products and having enforcement and evaluation processes.

The B.C. government has very good procurement policies that recommend ecolabel products. Their specifications for cleaning supplies state that buyers:

> *Shop at Product Distribution Centre first for EcoLogo certified biodegradable cleaning products. If you can't find it there, use the Corporate Supply Arrangement for Cleaning Equipment and Supplies, and ask for EcoLogo or Green Seal certified products.*
> *.. Cleaning products must be:*
>
> - *EcoLogo or Green Seal certified where certification exists in product type ..*

BCGEU members are affected by Shared Services BC's decisions about purchasing cleaning products. The agency sets criteria for buying cleaning products as part of managing the buildings for which it is responsible.

It has a property management contract with the Workplace Solutions Inc. subsidiary of Brookfield Johnson Controls (now called Brookfield Global Integrated Solutions). Section 10.3 of the terms and conditions for suppliers specifies that "Suppliers will use only environmentally friendly products if available ..". This applies to Bee Clean, the cleaning sub-contractor. (It's the first Canadian company to be certified by the Cleaning Industry Management Standard for green building cleaning.)

Despite the requirements, our *Tools for Informed Substitution* project found that Bee Clean workers are given products that don't meet the procurement specifications. So how can we make sure that these good policies get implemented and that everyone participates in making that happen?

What are the best practices for green procurement policies?

Best practices for a green cleaning procurement policy are to:

- ✓ reference third-party ecolabel standards,
- ✓ designate staff to manage the program,
- ✓ allocate a budget,
- ✓ link to the health and safety committee,
- ✓ include the policy in the health and safety programme, and
- ✓ include benchmarks and reporting requirements (including regular checks for compliance).

The process is continuous, as shown in the commonly-used "Plan, Do Check, Act" process (see Figure 5.1). As such, it will include enforcement and evaluation in each cycle.

Figure 5.1
The continuous process

The Responsible Purchasing Network (RPN) lays out best practices to structure and implement a comprehensive "green" cleaning program designed for long-term success. It recommends a series of steps, that we summarise (see all the steps in Figure 5.2) and apply to the British Columbia situation.

Step one

Form a strong team with representatives of all the stakeholders. They should include health and safety committee members, middle and top management and come from departments involved with, or affected by, the use of cleaning products. The representatives need to be committed to green purchasing and trained about what it means.

Step two

Establish a baseline inventory of all cleaning products currently used, and their ingredients. Note how many are ecolabel certified.

Review the results of the Tools for informed substitution screening of cleaning products that Bee Clean uses in B.C. government buildings. A fair number of the products reviewed contained hazardous chemicals and almost three-quarters were not ecolabel certified.

Step three

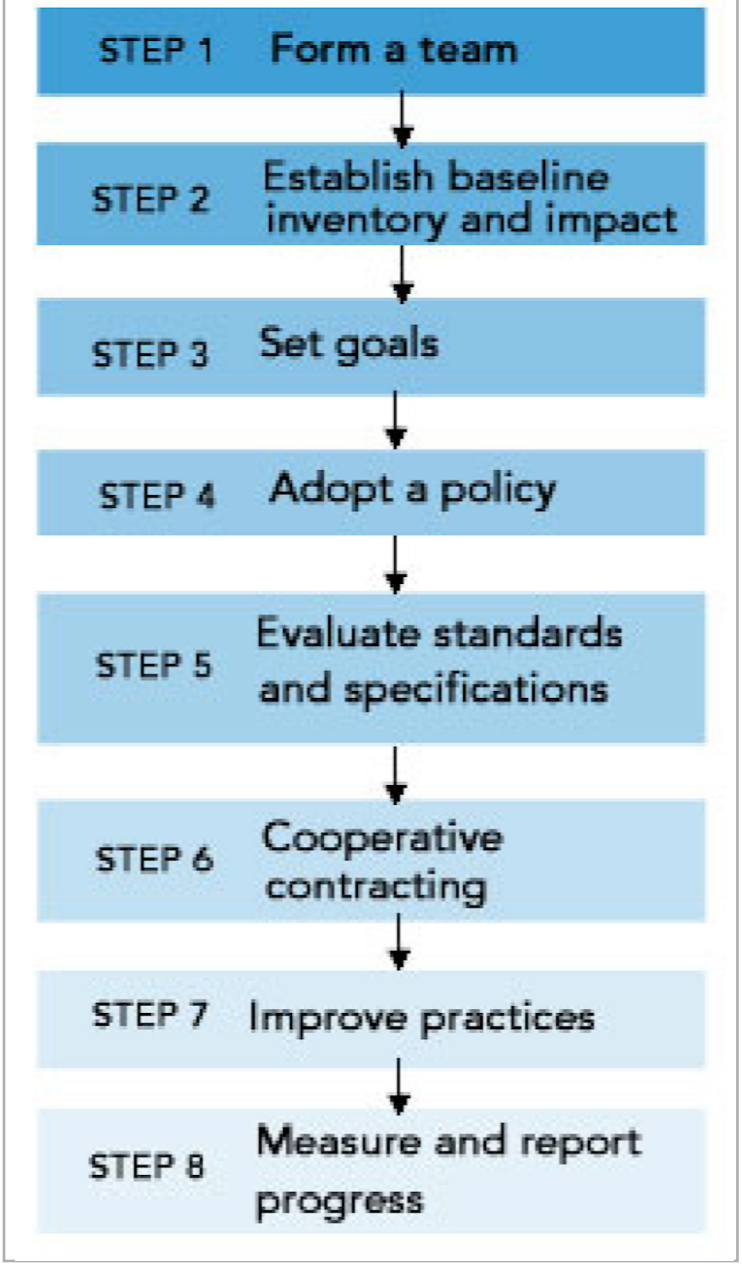
Review the procurement policies, comparing them to the best practices listed above; for more details, see the resources. Ensure the policies are part of the health and safety programme and make adjustments to synchronise them.

In this project, there are two procurement documents: one from Shared Services BC, and the other from Brookfield's WSI. Check that they are clear, up-to-date, have a compliance process, and meet other best practices.

Step four

Improve practices in the continuous improvement model of plan, do, check, act.

Figure 5.2
Best practices flow chart from Responsible Purchasing Network.



Set a goal to screen out all cleaning product ingredients that are GreenScreen LT-1, replacing them with products that are ecolabel certified, as required in the Shared Services' procurement specifications. To ensure compliance, ask that third party ecolabel certification be attached to the product bid.

(For example, the Illinois *Specifications for Green Janitorial Products* requires that, for each product they will use, the bidder must provide two copies of the third party certificate or documentation and a copy of the SDS.)

Step five

Measure and report progress, including the cost savings of using third party certified products, and reported illnesses, etc. Survey workers (formally or informally) to find out what they like and don't like about the products/methods and if any new hazards have been introduced with their use. Check on training about using the new products or methods.
Ensure someone is specifically responsible for checking compliance and reporting back to the stakeholder team.

Make sure that any key performance indicators in the annual review of suppliers' performance include the use of third party certified ecolabel products, the decrease in the use of cleaning products (through alternative methods), and the money saved.

Green products do not necessarily cost more

Considering the popular impression that "it takes green to go green," we were surprised by the relative affordability of green cleaning products. Even without considering potential cost savings from other elements of a green cleaning program, such as automatic dilution systems or microfiber mops, the prices of green and conventional products were substantially the same. This finding should prove useful for green cleaning advocates seeking buy-in from skeptical managers.

City of San Francisco: The Real Costs of Institutional "Green" Cleaning.

What about the costs?

Studies show that green certified products are no more expensive than traditional ones.

For example, a review by the City of San Francisco's Department of the Environment details the cost competitive value of green cleaning products. In 2010, another study of New York's Green Cleaning Program found that green cleaning products cost the same or less, and work as effectively as traditional cleaning products. (See the RPN's webinar Advancing safer chemistry in government procurement - April 4, 2013 and other RPN webinars.) The RPN also supports these findings about costs.

Where can you get more information?

The RPN is an excellent source of information about good procurement practices, including Canadian networks. See the many examples in their web page about model specifications for cleaning products.

The Network also has model city and state procurement frameworks that could easily be replicated by B.C. or municipal governments. For example:

- the City and County of San Francisco has 18 mandatory specifications for the procurement of janitorial products; and

- New Jersey's RFP for Environmentally Preferable Cleaning Products details *how Request for Proposals cover all aspects of an environmentally preferable cleaning programme. They specify standards including Green Seal GS-37 and GS-40, EcoLogo, or recognition from the U.S. EPA's Safer Choices program, which provides resources for manufacturers.*

What's next? Implementing informed substitution in your workplace

We've come a long way. This toolkit started with recognising the hazards of cleaning products and our right-to-know. We've gone through screening chemical ingredients for hazards to finding ecolabel products, and the ingredients of good procurement policies. Now it's a question of how all this gets implemented.

Section 6 includes a useful checklist for health and safety committees and resources to ensure you have informed substitution of cleaning products at work.

Keeping the workplace healthy and safe.

How do you implement informed substitution?

Better safe than sorry.

It *can* be done. Less toxic cleaning products can be used on the job. It's an important step towards the goal of a healthy workplace.

Informed substitution is a best practice to work towards the prevention goal. It protects people and our environments more effectively than just controlling the use of toxic substances and products (e.g., with dilution, ventilation, protective gear).

British Columbia requires many employers to have occupational health and safety programmes. Employers go beyond these "rules" with best practices that evolve over time. Cleaning products offer an opportunity to do this.

As we've shown, those best practices for cleaning products require a purchasing/procurement policy that has informed substitution goals, is used and reviewed, and is changed based on lessons learned. It also should be integrated with the occupational health and safety programme and joint health and safety committee activities.

Informed substitution is our goal

Informed substitution means replacing chemicals of concern with safer, less toxic chemicals, processes or methods. At the same time, those using the approach consider unintended consequences and keep the odds of them happening to a minimum (and hopefully none).

To find informed substitutes, start by asking "Is it necessary?" If not, remove the chemical or product.

If it is needed, compare the hazards of the chemicals of concern with those of the alternatives. The goal is to ensure the intrinsic health and environmental characteristics of substitutes are safer, i.e., that they are less hazardous to people and our environments.

What are the steps?

As a project, *Tools for Informed Substitution* focused on cleaning products used in B.C. government buildings. We followed some of the same steps that joint health and safety committees and procurement/ purchasing staff can take to find less toxic cleaning products.

The principles to implement informed substitution are:

- **prevent** people getting sick or hurt by hazards
- prefer **precaution** (i.e., better safe than sorry) rather than waiting for something to happen
- when we find hazards, look for solutions that **eliminate** the problem, not ones that just limit the harm.

The graphic below lays out the steps we used. They are part of the "plan, do, check, and act" process used in many workplaces. With a bit more detail, our steps were:

- ✓ We got the data sheets for the products used to clean the government buildings.
- ✓ We checked what the SDSs said about the hazards of the ingredients, and what others had to say about them, using the screening tools (Pharos, RISCTOX, ChemHAT).
- ✓ We found there were some quite hazardous ingredients in a few products and only about 25 percent had an ecolabel.

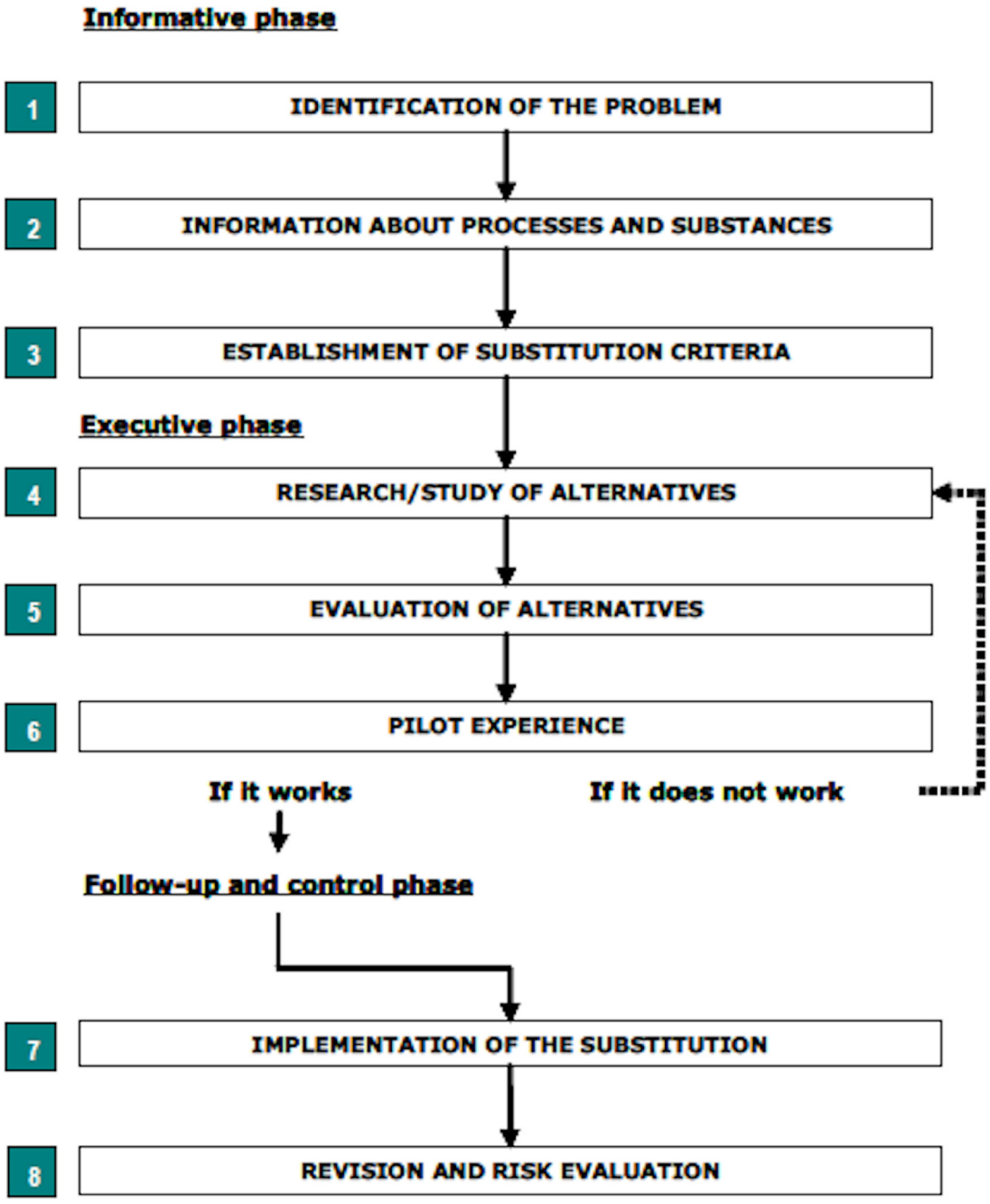
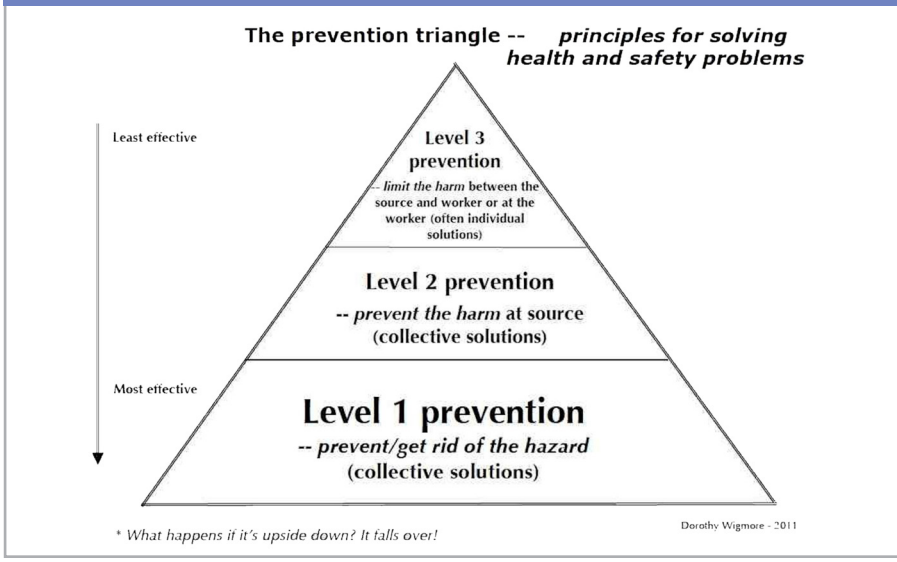


Figure 6.1
From Safe chemicals - safe products. Guidelines to enforce the "substitution principle". Based on ISTAS's Guía para la sustitución de sustancias peligrosas en la empresa. Manual práctico para la intervención (Guide for the substitution of dangerous substances in the workplace. Practical guidelines for intervention). The Guide is available in Spanish.

- ✓ After setting priorities for products that required substitution, we looked for less hazardous or non-toxic options among the ecolabels.
- ✓ Using randomly-chosen examples from the ecolabel results, we checked out their data sheets and information, again using the screening tools.
- ✓ We recommended substitutes for pilot testing (i.e., use, feedback).

Figure 6.2
"The prevention triangle" by Dorothy Wigmore. From *Seeing the workplace with new eyes.* Available at https://www.dropbox.com/s/17x41sjs30uqmym/Prevention triangle 11 with precaution.pdf?dl=0.



In addition, the steps should be done in a context that includes:

- a health and safety programme that includes a good procurement policy and evaluation of activities related to it; and
- processes to involve all those using and affected by hazardous products (workers, their representatives/unions, employers, affected community) present in the workplace.

What are the benefits of informed substitution?

Informed substitution has many benefits. They include:

- ✓ fewer occupational health hazards for workers, unions and employers to deal with;
- ✓ less harm to workers, their families, and others in the workplace (i.e., fewer illnesses, diseases, incidents);
- ✓ healthier workers, which can show up as less sick time or absenteeism;
- ✓ fewer hazards to the outside environment and communities;
- ✓ fewer costs for workers compensation, replacing absent workers, re-training new workers, accommodating injured ones, or responding to environmental issues; and
- ✓ improved practices within the organization/company.

British Columbia was the first jurisdiction in Canada to mandate substitution as a key part of its occupational health and safety regulations. It does this with prevention of hazards as the goal, and limiting harm (controlling hazards) as the least effective methods.

Too often we are discouraged from pursuing this objective. We're told or think that alternatives are too expensive, or they're too hard to find.

That's not true. We just need the right tools to find them. This toolkit has some of the best ones available to do that. As for the cost, "green" informed substitute products and methods can save employers money, especially if they consider all the costs of using harmful products (e.g., the *Health and Safety Smart Planner* from the Institute for Work & Health).

What can you do to get informed substitution of cleaning products?

What can health and safety reps and staff do?

Workers and their joint health and safety committee representatives can work with supervisors and employers to implement best practices around informed substitution. Audits are useful, as are using inspections (required of joint committees) to get on-the-ground feedback and information.

We have a two-part checklist for health and safety committees and staff to use to audit informed substitution for cleaning products. The first part deals with the documents that should be reviewed, while the second part is for the follow-up inspection. It's at the end of this section.

What if you're a worker?

Workers can do things on their own, or with others (e.g., co-workers, health and safety representatives, union). For those who do any cleaning work (including at home), questions might include:

- What cleaning tasks am I (asked) to do?
- What products or tools am I using for each one?
- What are they supposed to do (e.g., clean, disinfect)?

- What are their hazards? How could they affect my health?
- How do I find out about those hazards? Who's supposed to tell me?
- What training do I get about the hazards and how to do the work?
- Are these products necessary? If I could use less toxic products or methods, how would I do this work differently? With what?

Information to pull together (for doctors, health and safety reps, joint committees) includes:

- a list of all the products and tools you use, by task;
- information about how you use the product (e.g., spray, dilute);
- what products seem to affect you and how;
- what you know about how others are affected; and
- your questions.

What about supervisors, employers, and procurement staff?

Employer representatives can work with the joint committee, workers, and their representatives/union(s) to contribute to best practices for informed substitution of cleaning (and other) products.

Here are a few essentials:

- Prepare an inventory of all the cleaning products used in the workplace or organization (of the products and their ingredients). (The joint committee and health and safety staff can use this in their audits.)
- Cross-reference the inventory with up-to-date data sheets and a list of ingredients by product and task.
- Ensure each product label is up-to-date. Indicate which ones have an ecolabel, and when it expires.
- With input from the joint committee and health and safety staff, prepare a procurement/purchasing policy that:
  1. sets goals of preventing workers getting sick or hurt from cleaning products, and informed substitution of toxic substances to achieve that;

2. uses third-party certification standards (ecolabels);
3. is part of the occupational health and safety programme;
4. includes a system to report hazards and symptoms that may be linked to cleaning products;
5. is fragrance-free;
6. prohibits outside cleaning products coming into the workplace; and
7. assigns responsibilities for implementation, recognising the need to link health and safety reps and procurement staff.

- Establish effective lines of communication amongst the joint health and safety committee, health and safety staff, and those responsible for buying cleaning products.
- Regularly evaluate the procurement policy, the communications process, and the system for reporting symptoms or hazards. Make changes as needed.
- Ensure the policy is included in sub-contractors' health and safety programmes. Make periodic checks of how well they are implementing the policy.
- Every year, check that the procurement policy (especially requirements to purchase third-party ecolabel products or use less toxic methods) is enforced. Check for new standards and products with those labels. Add them to the inventory as soon as possible.

What does all this add up to?

Whenever possible, we recommend that you use microfibre products or third party certified products from Ecologo or Green Seal. You also can consider products in the U.S. EPA's Safer Choice program. Avoid products that have fragrances, and check the California recommendations to avoid those linked to asthma.

These kinds of third party certifications, and the products that qualify for them, are considered to be the best available on the market today. There's always room for improvement as certification criteria account for new information about hazards and alternatives. Therefore, it's good practice to check regularly to see if products still have their certification or if there are new products for new criteria.

Some resources for screening chemicals (especially in cleaning products)

It's important to use reliable sources to get information about the hazards of chemicals. We recommend these as a starting point; some are discussed or used in this toolkit.

- **CAREX Canada** (for information about work and environment cancer-causing hazards);
- **California Safer Consumer Products program's list of chemicals of concern** (candidate chemicals);
- **ChemHAT** (also has some information about alternatives);
- **Environmental Working Group** for databases such as **Skin Deep** (about personal care products) and the **Guide to Healthy Cleaning**;
- **GHS chemical hazard classifications** (e.g., from the European Union, Japan);
- **GreenScreen** for safer chemicals;
- New Jersey Department of Health **chemical information sheets;**
- **Pharos** database from the **Healthy Building Network;**
- **RISCTOX** database about hazardous chemicals;
- Substitute It Now (SIN) list and Sinimilarity tool from **Chemsec**; and
- **The Endocrine Disruption Exchange** (TEDX)

There also are materials about the hazards facing cleaning workers, which include information about the chemicals and ergonomic hazards that may be related to how they are applied. For example, the European Agency for Safety and Health at Work has three resources:

- *Preventing harm to cleaning workers.*
- *The occupational safety and health of cleaning workers, and*
- *Cleaners -The situation of cleaners and ways for improvement.*

CCOHS also has a booklet, ***Health and Safety Guide for Custodial Workers***, which can be purchased from its website.

Some resources for informed substitution for workplaces

There are a variety of resources to help with programmes, joint health and safety committee activities, and more. We recommend the following for informed substitution (especially for cleaning products):

- **Canadians for a Safe Learning Environment** (CASLE);
- **Clean Production Action** (including BizNGO and the Chemical Footprint project);
- **Ecologo *UL Sustainable Product Guide*** (for third-party certified products);
- **Green Clean Schools** (with lots of materials that can be used in other sectors);
- **Green Chemistry Initiative,** California Department of Toxic Substances Control;
- *Green Seal* **products and services** (for third-party certified products);
- **Healthy Building Network** (for building materials, Pharos database to check substitutes);
- **Informed Green Solutions** (for cleaning products, with lots of workplace materials);
- **Institute for Research and Technical Assistance** (Katy Wolf);
- **Lowell Center for Sustainable Production;**
- Ontario Toxics Reduction Act and related reports via a map of **toxics reduction;**
- **Responsible Purchasing Network** (especially for procurement issues);
- **Safer consumer products program** (California Department of Toxic Substances Control);
- San Francisco Department of Environment's **SF Approved** programme;
- **Transitioning to safer chemicals** (U.S. Occupational Safety and Health Administration/OSHA);
- Toxics Use Reduction Institute **CleanerSolutions database;** and

- **Warner Babcock Institute for Green Chemistry** *(headed by John Warner, one of the "fathers" of green chemistry, designing less toxic chemicals.*

Also see *Making the substitution principle the cornerstone of sustainable chemical policies and moving towards clean production and innovation* by one of this toolkit's authors, Bev Thorpe.

Some specific documents are:

- Clean Production Action resources such as ***The guide to safer chemicals, Commons principles for alternatives assessment,*** and ***Triclosan and Triclocarban GreenScreen Assessments;***
- **Healthy cleaning for asthma-safer schools website** (California Department of Public Health's Occupational Health Branch) has useful materials such as forms (for doing an **inventory,** choosing **products to test** in the workplace, and **evaluation** of tested products), lists of resources, a sample **policy**, and a short **video;**
- Lowell Center for Sustainable Production teamed up with others to produce ***Advancing safer chemicals in products. The key role of purchasing*;**
- Occupational Health Branch, California Department of Public Health's ***Certification standards help employers and cleaners buy safer cleaning products***
- Responsible Purchasing Network's **webinar** series and purchasing guide for **cleaners***;*
- ***Seeing the workplace with new eyes*** (A guide for committees and reps): Prepared for Manitoba workplaces, there are many tools for committee processes (e.g., setting priorities, making decisions), inspections (especially ergonomics), making body and workplace maps, and applying general health and safety principles (e.g., the prevention triangle);
- San Francisco's report, ***Safer products and practices for disinfecting and sanitizing surfaces;*** and
- toolkits focussed on schools, that can be used more broadly, at **http://www.cleaningforhealthyschools.org/,** CASLE's ***Choosing "Healthy" Alternatives for Cleaning and Maintenance,*** and the Coalition for Healthier Schools' ***Healthy purchasing for healthy schools. A guidance memo. Green cleaning + five more product categories to help make schools healthier.***

Also see individual sections for relevant resources.

Some resources for informed substitution for consumers

We all are consumers. In that role, we can choose cleaning products, tools and equipment we use. We also can advocate for non-toxic and safe products being used in our children's schools, community centres, etc. To keep up to date about what's best, check out:

- Canadians for a Safe Learning Environment *(**CASLE**)*'s many materials, guides, etc. for schools;
- Environmental Defence (Canada) has a 2015 report, ***The Dirty Truth: How toxic cleaning products are putting Canadians at risk.***
- Environmental Working Group's ***Guide to healthy cleaning;***
- Informed Green Solutions' variety of **materials**, especially if you're concerned about child care facilities;
- San Francisco Department of Environment's information about **cleaning products** for homes; and
- Women's Voices for the Earth's **materials** about cleaning products.

An audit checklist for health and safety committees

This checklist is one way to audit how well your workplace occupational health and safety (OHS) programme deals with informed substitution for cleaning products (and other chemicals too).

Designed for health and safety committees and health and safety staff, it has two parts. The first asks questions about the documentation you should have, and what it tells you. The second is for checking on implementation and communication.
People may have questions, so there is a space at the end to keep track of them.

For each question, there are three possible answers: **(Y)** for "Yes", it's fine now; **(NI)** says the situation needs improvement, and there is an opportunity for informed substitution) ; and **(N)** for "no", this not a satisfactory situation, it may be harmful so it's a priority for substitution and/or other action.

1. Documentation

What information do you need? Be sure you have:

- the inventory of products used, and their ingredients;
- information about which products are ecolabel certified;
- the most recent product data sheets (WHMIS 2015 versions could be available);
- by task, a list of all the products used (with name, ingredients, methods used to apply them);
- recorded or reported incidents (i.e., first aid, workers comp reports of illnesses, injuries);

- complaints reported (e.g., bad smell, problems with using the product, time issues); and
- a copy of the procurement policy.

2. Implementation and communication

Aside from the questions, it also might help to have hand-outs about the new labels and pictograms. That could make it easier to check on what is supposed to be on containers used in the workplace and what the pictograms mean. You could use the ones here for labels and the ones here for pictograms.

The checklist has rows to add your own questions too. These could change depending on the area you're inspecting, the shift, or your experiences with inspections.

Informed substitution of cleaning products

An audit checklist for health and safety committees

DATE: _____ **TIME:** _____ **(AM/PM)**

WORK AREA: _____

WHO DID THIS AUDIT? _____

_____

THE SYMBOLS

(Y) = Yes: the situation is fine now

(NI) = Needs Improvement: the situation is average so take action to improve it; second level priority for informed substitution

(No) = No: this is an unsatisfactory situation, and may be harmful; priority for substitution and/or other action

A. Documentation (review all the documents with information, including all reports of injuries/illnesses)

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
Are the labels and SDSs up-to-date?	**(Y) (NI) (N)**				
Is there a process to make sure that happens?	**(Y) (NI) (N)**				
Is the inventory up-to-date?	**(Y) (NI) (N)**				
Is there a process to make sure that happens?	**(Y) (NI) (N)**				
Is the procurement policy included in the health and safety programme?	**(Y) (NI) (N)**				

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
What is the process to make sure it's implemented and kept up-to-date?	(Y) (NI) (N)				
How many products have ecolabels?	(Y) (NI) (N)				
Are microfiber products used?	(Y) (NI) (N)				
Are workers using any hazardous cleaning products (according to the SDSs and labels)?	(Y) (NI) (N)				
Are workers getting sick from, or reporting problems with using, any products? (see Section B too)	(Y) (NI) (N)				
Do any workers have/need accommodation (e.g., for reproductive health, allergic or sensitivity reactions)?	(Y) (NI) (N)				
Have all the products been screened with Pharos or other on-line tools?	(Y) (NI) (N)				
If so, were any results LT-1 or LT-P1 or chemicals of high concern?	(Y) (NI) (N)				

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
If products are hazardous or workers are getting sick, can the products or methods be replaced with ecolabel products or less harmful methods?	**(Y) (NI) (N)**				
Are the toxic substances or methods necessary? If so, why?	**(Y) (NI) (N)**				

B: Implementation and communication (based on conversations and inspections)

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
What do the workers know about the health and environmental hazards of each product they use?	**(Y) (NI) (N)**				
What do the supervisors know about the health and environmental hazards of each product used?	**(Y) (NI) (N)**				
How do workers tell supervisors about chemical hazards or their effects? How well is it working?	**(Y) (NI) (N)**				

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
How do workers tell health and safety reps about chemical hazards or their effects? How well is it working?	**(Y) (NI) (N)**				
How well do workers know how to use the new WHMIS 2015 SDSs? (Ask for an explanation.)	**(Y) (NI) (N)**				
Where are SDSs kept? Is access easy and unrestricted?	**(Y) (NI) (N)**				
Do workers know how to get them, at any time?	**(Y) (NI) (N)**				
Do workers understand the new WHMIS 2015 labels? (Ask for an explanation.)	**(Y) (NI) (N)**				
Do workers know how to report hazards or symptoms that may be linked to cleaning products?	**(Y) (NI) (N)**				
Do workers know they should not use any product if it creates a hazard to themselves or others?	**(Y) (NI) (N)**				
Have they used this responsibility?	**(Y) (NI) (N)**				

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
Have workers seen the procurement policy? Do they know where it is?	**(Y) (NI) (N)**				
What do they know about it (especially what it says about using ecolabels and microfibre products)?	**(Y) (NI) (N)**				
Are workers consulted about choosing less toxic products or methods? How is it done?	**(Y) (NI) (N)**				
Do workers know what an ecolabel is?	**(Y) (NI) (N)**				
Are workers trained about the right way to use each product for each cleaning task?	**(Y) (NI) (N)**				
Do the workers have the right tools and equipment to use the product?	**(Y) (NI) (N)**				
Do they use them correctly? If not, why not?	**(Y) (NI) (N)**				
If required, do workers have the right protective gear?	**(Y) (NI) (N)**				

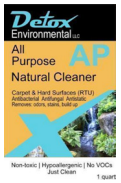
TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
Does what's provided fit each worker? Is it right for each product and task?	**(Y)** **(NI)** **(N)**				
Do any workers need accommodation (e.g., for reproductive health, allergic or sensitivity reactions)?	**(Y)** **(NI)** **(N)**				
Are there ergonomic design or other hazards from using the cleaning products or methods?	**(Y)** **(NI)** **(N)**				

TOPIC	IS THE SITUATION GOOD?	IF THE SITUATION IS NOT GOOD (Y), WHAT CAN BE DONE TO IMPROVE IT RIGHT AWAY?	BY WHOM?	BY WHEN?	FOLLOW-UP: WHAT'S BEEN DONE?
	(Y) (NI) (N)				
	(Y) (NI) (N)				
	(Y) (NI) (N)				
	(Y) (NI) (N)				
	(Y) (NI) (N)				

What questions do workers or supervisors have about the cleaning products or methods they're using?

More resources about hazardous chemicals and informed substitution

What are informed substitutes for the toxic products we found?[1]

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
0026-PS Scrub'n Shine Creme Cleanser	Armstrong Manufacturing Inc.	LT-1 (probable GreenScreen Benchmark 1) plus LT-P1	One ingredient — lauric acid diethanolamide, a.k.a. cocamide diethanolamine — is a possible carcinogen (on the IARC and Prop 65/ California EPA lists)	EcoPure   Detox Environ-mental LLC/ Detox Natural Cleaner: All Purpose (AP) Other options are available.	 Evolve All Purpose Cleaner More Green Seal certified products are available.	

[1]The Tools for Informed Substitution final report has the complete list of all products screened during the project. The list includes chemical ingredients, hazards found, screening results and related notes.

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
CaviWipes	Metrex Research	LT-P1	A "quat" in this is an eye and skin irritant, may cause asthma and is an aquatic toxicant.	Diversey Oxivir® TB Disinfectant Cleaner Wipes 		See the asthma-safe disinfectants from Green Schools and Green Purchasing Institute.
Block & Screen XL urinal screens	Fresh Products	Unknown. "Trade secret" claimed. Not registered so do **not** use.	Unknown. "Trade secret" claimed. Not registered so do **not** use.	Avmor EP74 bowl urinal porcelain cleaner  Prism Care Biological Urinal Blocks (already on Bee-Clean list)  Other Ecologo urinal cleaners and screens are available.	 CoreCraft Ready to Use Urinal Cleaner Other Green Seal urinal cleaners and screens are available	

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
Debonaire Anti-bacterial foaming skin cleanser	Deb Canada	GreenScreen Benchmark 1 (which means avoid as this is a chemical of high concern)	One ingredient — triclosan — is very toxic in water, bioaccumulates, and is endocrine active. **NOTE:** Anti-bacterial hand soaps are not necessary. All-purpose hand cleansers are just as effective — and without toxic ingredients.	GreenEarth® Foaming Skin Cleanser  Chemotec Foam Soap fragrance free 	LHS 77 Liquid Hand Soap  More Green Seal hand cleaners are available.	
Gelcon (floor cleaner/ restorer)	Gelcon	LT-1	Contains d-limonene (by another name), which is a persistent, bioaccumulative toxicant in the environment, and can have sensitising effects on people.	Enviro- Solutions ES95  More Ecologo floor cleaners are available	Eco Floor Cleaner E32/ S32 More Green Seal floor cleaners are available	

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
Graffiti Remover	Dissan Maintenance Products	GreenScreen Benchmark 1 (means avoid, as this is a chemical of high concern). Five other ingredients are LT-1 (likely GreenScreen Benchmark 1)	Five are on the IARC lists of carcinogens (Groups 2A, 2B, 3). Other effects are reproductive and developmental, neurotoxicity, skin irritation, water toxicity.	 CG310 Green Graffiti Remover Ecologo has other graffiti removers.	 Ecologic E49 Graffiti Remover (and it's also a DfE Safer Choice)	SF Approved has useful information about choosing graffiti removers.
KaiBOSH (disinfectant, sanitizer)	Kalvac, Inc.	LT-P (one ingredient)	Skin and respiratory sensitiser, asthmagen.	Oxivir Ready to use Spray  Oxivir All purpose  (both made by Diversey)		SF Approved: Try microfiber mops and cloths, which can get rid of 99% of bacteria with plain water. Also see asthma-safe disinfectants from Green Schools and Green Purchas-ing Institute.

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
Ultra General Care/ Ultraseptic 885	Ultra Chem USA Inc.	LT-P1 (four ingredients)	One ingredient— a "quat" — can cause respiratory sensitisation/asthma. Also high acute aquatic toxicity.	Diversey Care Oxivir Plus 		See the asthma-safe disinfectants from Green Schools and Green Purchasing Institute.
Ultra General Cleaning/ Q128	Ultra Chem USA Inc.	LT-P1 (two ingredients)	One ingredient — a "quat" — can cause respiratory sensitization/ asthma.	ECO Neutral Disinfectant (Buckeye)		See the asthma-safe disinfectants from Green Schools and Green Purchasing Institute.

Precautionary List

These products contain ingredients that can be contaminated with more toxic chemicals, or are close to concentrations that would require them to be classified as potentially hazardous. To be consistent with the principles of informed substitution and good practice, we recommend finding substitutes for these products too.

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
Carpet Spot and Stain Remover	Wood Wyant		**Note:** Contains isobutane, which is classified as a carcinogen when it contains more than 0.1% 1,3-butadiene or benzene. This may occur in some batches as a by-product of the production process.	Enviro-Solutions / ES92 H2O2 Carpet Stain & Spot Remover  More Ecologo substitutes are available.	Dyna Force 77 with Biosolv  Other Green Seal carpet cleaners are available.	
Chewing Gum Remover	Dustbane		**Note:** Contains isobutane, which is classified as a carcinogen when it contains more than 0.1% 1,3-butadiene or benzene. This may occur in some batches as a by-product of the production process.	No Ecologo option found.		Remove physically until a less toxic substitute is found.

PRODUCT	MANUFACTURER/ SUPPLIER	SCREENING RESULT (PHAROS)	HAZARD(S)	SAFER SUBSTITUTES/ALTERNATIVES		
				ECOLOGO	GREEN SEAL	OTHERS
INO 100 Aero Glass Cleaner	INO Solutions		Two ingredients of concern, if batch concentrations increase slightly. At their declared concentrations, they don't trigger the product for high priority substitution.		 3-M Glass Cleaner and Protector Ready-to-use (Product No. 17, Chemical Management Systems)	As SF Approved says, a microfibre cloth and plain water are enough for many glass surfaces.
INO Dust mop treatment	INO Solutions		**Note:** Contains "mineral spirits", which are on the IARC lists of carcinogens (Group 1). The EU restricts use. However, odour-less mineral spirits are refined and do not contain the classified components. The SDS has the same CAS # as the unrefined chemical, so it needs to be changed. CAS # 68551-17-7 is used for odourless mineral spirits. They are flammable hazards but not classified as carcinogens.)			No need for chemical additives. Use micro-fiber mops like Bona Hardwood Floor Mop Curve® 
INO Furniture polish	INO Solutions		**Note:** Contains butane, which is classified as a carcinogen when it contains more than 0.1% 1,3-butadiene or benzene. This may occur in some batches as a by-product of the production process.	 Bona Wood Furniture Polish (Note: this is GreenGuard Gold certified, another UL certification)	None listed.	

A glossary of terms related to cleaning products[1]

Accelerated hydrogen peroxide: hydrogen peroxide in synergy with a blend of commonly-used ingredients that accelerate the disinfectant activity.

Acute: health conditions characterised by sudden onset and of finite duration. In addition, they tend to severely restrict the subject's usual daily activities. The sudden-onset health effects — such as rashes, breathing problems, or headaches — are felt or noticed almost immediately, often within minutes or hours after exposure to a product or environment.

Antibiotic: a medicine designed to kill or slow the growth of bacteria and some fungi. Antibiotics are commonly used to fight bacterial infections but cannot fight infections caused by viruses.

Anti-bacterial: a term used to describe substances that kill or slow the growth of bacteria when treating human and environmental surfaces, including those that aid in proper hygiene. Examples of anti-bacterial-containing commercial products include hand soaps, gels, and foams, and dishwashing detergents.

[1]Thanks to Carol Westinghouse of Informed Green Solutions for permission to adapt the "Handbook definitions" from Cleaning for Healthier Schools: Infection Control Handbook 2010. Not all these terms are used in the toolkit. Those that aren't appear often in materials about cleaning products.

Anti-microbial: a general term used to describe substances (including medicines) that kill or slow the growth of microbes. Examples of anti-microbial agents include the following:

- Tetracycline (an antibiotic that treats urinary tract infections)
- Oseltamivir or Tamiflu® (an anti-viral that treats the flu)
- Terbinafine or Lamisil® (an anti-fungal that treats athlete's foot)

Anti-microbial pesticide: any chemical substance that can be used to kill microorganisms. These products are used to disinfect and sanitise, and to reduce the growth or development of microbiological organisms

Antiseptics and germicides: substances used to prevent infection on living tissue by inhibiting the growth of microorganisms. Because these products are used in or on living humans or animals, they are considered drugs and therefore regulated by the Health Canada and the US Food and Drug Administration.

Asthma: a chronic inflammatory disease that results from a complex interplay between environmental and genetic factors. The disease causes inflammation, with recurrent episodes of wheezing, chest tightness, cough, shortness of breath, and/or difficulty breathing. After asthma develops, the airways of the lungs become more responsive to a variety of stimuli. If left untreated, the resulting inflammation may lead to irreversible changes in the structure of the lung.

Asthmagens: substances capable of causing new-onset asthma. The Association of Occupational and Environmental Clinics (AOEC) has established criteria for determining whether a substance is an asthmagen.

Bacteria: micro-organisms that are found on our skin, in our digestive tract, in the air, and in the soil. Most are harmless (non-pathogenic). Many are helpful because they occupy ecological niches (both within our bodies and in the external environment) that could be occupied by harmful bacteria. These helpful strains keep harmful micro-organisms in check. They also help our digestive system to function effectively and stimulate the development of a healthy immune system. Beneficial bacteria are also used in the fermentation process that creates bread, wine, cheese, yogurt, and other foods and beverages.

Bactericide: a pesticide used to control or destroy bacteria, typically in the home, in schools, or on hospital equipment.

Chronic: health conditions in which the onset may not be noticed and characterised by a gradual progression of symptoms or by problems of a more permanent nature resulting from a series of acute conditions. Daily activities may or may not be restricted during any given period, although there is usually a more general series of activity limitations.

Cleaning: the removal of foreign material (e.g., soil and organic material) from surfaces and objects, normally accomplished with detergents or soaps. Cleaning is required prior to disinfection processes, so they can be most effective.

Corrosive: a corrosive material is a highly reactive substance that causes obvious damage to living tissue. Corrosives act directly by chemically destroying the tissue (oxidation) or indirectly by causing inflammation. Acids and bases are common corrosive materials and are sometimes referred to as caustics. Typical examples of acidic corrosives are hydrochloric (muriatic) acid and sulfuric acid. Typical examples of basic corrosives are sodium hydroxide (lye) and ammonia.

Detergent: a substance that aids in the removal of dirt. Detergents act mainly on the oily films that trap dirt particles. Detergent molecules have a hydrocarbon portion that is soluble in oil and an ionic portion that is soluble in water. Bridging the water and oil phases, the detergent acts as an emulsifier, breaking the oil into tiny droplets and suspending them in water. The disruption of the oil film allows the dirt particles to be washed away.

Disinfectant: a chemical or physical agent used on hard inanimate surfaces and objects to destroy or irreversibly inactivate vegetative micro-organisms, viruses, and infectious fungi and bacteria, but not necessarily their spores.

Disinfection: a process that is used to reduce the number of viable micro-organisms on a surface but that may not necessarily inactivate all microbial agents (e.g., spores and prions).

Efficacy: a measure of the ability to achieve desired results. Disinfectants are registered for their ability to kill certain microbes, and efficacy in this case relates to the percentage of target microbe(s) that are killed or removed.

Endocrine disruptor: an external agent that interferes in some way with the role of natural hormones in the body. Such an agent might disrupt the endocrine system by affecting any of the various stages of hormone production and activity; for example, by preventing the synthesis of hormones, by directly binding to hormone receptors, or by interfering with the natural breakdown of hormones. (For more about endocrine disruptors, see the Endocrine Disruption Exchange.)

Fecal coliform bacteria: bacteria found in the intestinal tracts of mammals. When present in water or sludge, it is an indicator of pollution and possible contamination by pathogens.

Fungus: a plant that has no leaves, flowers, or roots. Examples of fungi (or funguses) are mushrooms, molds, mildews, and yeasts.

Microbe: a collective name for microscopic organisms including bacteria (e.g., Staphylococcus aureus), viruses (e.g., influenza A and B, which cause the flu), fungi (e.g., Candida albicans, which causes some yeast infections), and some parasites (e.g., Toxoplasma species, which cause toxoplasmosis).

Microbial pesticides: micro-organisms that are used to kill or inhibit pests such as insects or other micro-organisms. Sometimes these microbes are effective simply by increasing in number, using the pests' food supply, and invading their environment.

Micro-organisms: bacteria, yeasts, simple fungi, algae, protozoans, and a number of other organisms that are microscopic in size. Most are beneficial, but some produce disease. Others are involved in composting and sewage treatment.

Pathogen: any organism or infectious agent capable of causing disease or infection.

Pesticide: a substance intended to repel, kill, or control any species designated a "pest," including weeds, insects, rodents, fungi, bacteria, or other organisms. The family of pesticides includes herbicides, insecticides, rodenticides, fungicides, and bactericides.

Pesticide residue: pesticides that may remain on or in the plant, food crop, soil, container, equipment, handler, and so forth, after application of the pesticide.

Quaternary ammonium compounds (QACs or quats): chemicals that have a similar chemical structure and are known for their disinfectant and detergent properties. Quats are the active ingredients in many disinfectant products used in schools. They are effective against some bacteria, viruses, fungi, and algae. Product labels specify the microbes they target. One example of a QAC is benzalkonium chloride.

Registrant: a pesticide manufacturer that has registered a pesticide product.

Registration: a formal listing with the EPA (in the USA) or Health Canada of a new pesticide before its sale or distribution. Both are responsible for pre-market licensing of pesticides on the basis of data that demonstrate that there are no unreasonable adverse health or environmental effects when applied according to approved label directions.

Respiratory sensitiser: a substance that induces hypersensitivity of the airways following inhalation of the substance.

Sanitiser: a product used to reduce (but not necessarily eliminate) microorganisms (usually bacteria) in the inanimate environment to levels considered safe, as determined by public health codes or regulations. Sanitisers include food-contact and non-food-contact products.

Sensitiser: a substance that can produce an allergic reaction in the skin or respiratory tract in some individuals. Skin sensitisation is called allergic dermatitis. Respiratory sensitization can include rhinitis (hay fever) and/or asthma. These reactions occur after re-exposure to the same substance after initial sensitisation exposure has occurred.

Sterilisation: a validated process used to render a surface or instrument free from all viable microorganisms.

Viruses: micro-organisms that are smaller than bacteria and cannot grow or reproduce apart from a living cell. They invade living cells and use the cell's chemical machinery to stay alive and to replicate themselves. Thus, to survive and reproduce, they must invade a host cell (animal, human, plant, or bacteria). Virus infections may be spread by way of the air, by contact with surfaces, and by the exchange of body fluids.

Recommended labeling programs

Source: *Healthy Cleaning &Asthma-Safer SchoolsA How-To Guide*
OCTOBER 2014

Debbie Shrem, Justine Weinberg, Jennifer Flattery
Cleaning for Asthma-Safe Schools Project Work-Related Asthma Prevention Program, Occupational Health Branch, California Department of Public Health
http://www.cdph.ca.gov/programs/ohsep/Pages/Asthma.aspx

*Level 1: Prohibits the most asthma-causing chemicals (safest and healthiest options)**

Recommended third-party certified cleaning products

UL ECOLOGO UL 2759: Hardsurface Cleaners
(General purpose/bathroom cleaners, dish detergents, degreasers, and other cleaning products for household, institutional, and industrial use)

UL ECOLOGO UL 2795: Carpet and Upholstery Cleaners
(carpet cleaners, carpet spot and stain removers, and upholstery care products)

Green Seal GS-37: Cleaning Products for Industrial and Institutional use
(General purpose, restroom, glass, and carpet cleaning products)

Green Seal GS-53: Specialty Cleaning Products for Industrial and Institutional use
(Dish soaps, graffiti removers, car cleansers, deck/outdoor cleaners, odor removers, polishes, and waxes)

*UL ECOLOGO prohibits asthmagens that cause allergic-type asthma . Green Seal allows the use of enzymes, which can cause allergic-type asthma . WRAPP recommends only Green Seal certified products that do not contain enzymes .

*Level 2: Prohibits some asthma-causing chemicals***

Design for the Environment (DfE)

DfE's criteria prohibit chemicals that may cause cancer or have developmental, reproductive, or neurotoxicity issues and limit some asthma-causing agents. For a list of products, visit: http://www.epa.gov/dfe/products

Design for the Environment Antimicrobial Pesticide Pilot Project

Labels environmentally preferred disinfectants. DfE's criteria prohibit chemicals that may cause cancer, endocrine disruption, and are unlikely to cause developmental, reproductive, mutagenic, or neurotoxicity issues. Prohibits sodium hypochlorite (bleach) and quaternary ammonium compounds. This is the only labeling program available for disinfectants.

**Prohibits some asthmagens that can cause allergic-type asthma

Level 3: Do not prohibit asthma-causing chemicals . May still be a healthier choice than uncertified products .

Carpet and Rug Institute products help limit or get rid of asthma triggers

Green Label Plus

Tests VOC emission levels for carpet and adhesive products for a variety of chemicals. Does NOT prohibit ingredients that cause asthma. This is the only labeling program for carpets and adhesives.

Seal of Approval for Residential Use Vacuums

Measures soil removal, dust containment, and surface appearance change. This is the only labeling program for vacuums.

These third-party certified products may contain ingredients that cause asthma . However, they do not contain ingredients that are known to cause cancer or reproductive harm, and they contain fewer VOCs and cause less pollution .

Green Seal GS-8: Cleaning Products for Household Use

Green Seal GS-34: Cleaning and Degreasing Agents

Green Seal GS-40: Floor-Care Products for Industrial and Institutional Use

UL ECOLOGO UL 2767: Paint and Varnish Removers

UL ECOLOGO UL 2792: Biologically-Based Cleaning and Degreasing Compounds

UL ECOLOGO UL 2777: Hard Floor Care Products

UL ECOLOGO UL 2780: Urinal Blocks