Resources for Building the Field and Practice: Professional Development/Higher Education

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Washington State Department of Ecology

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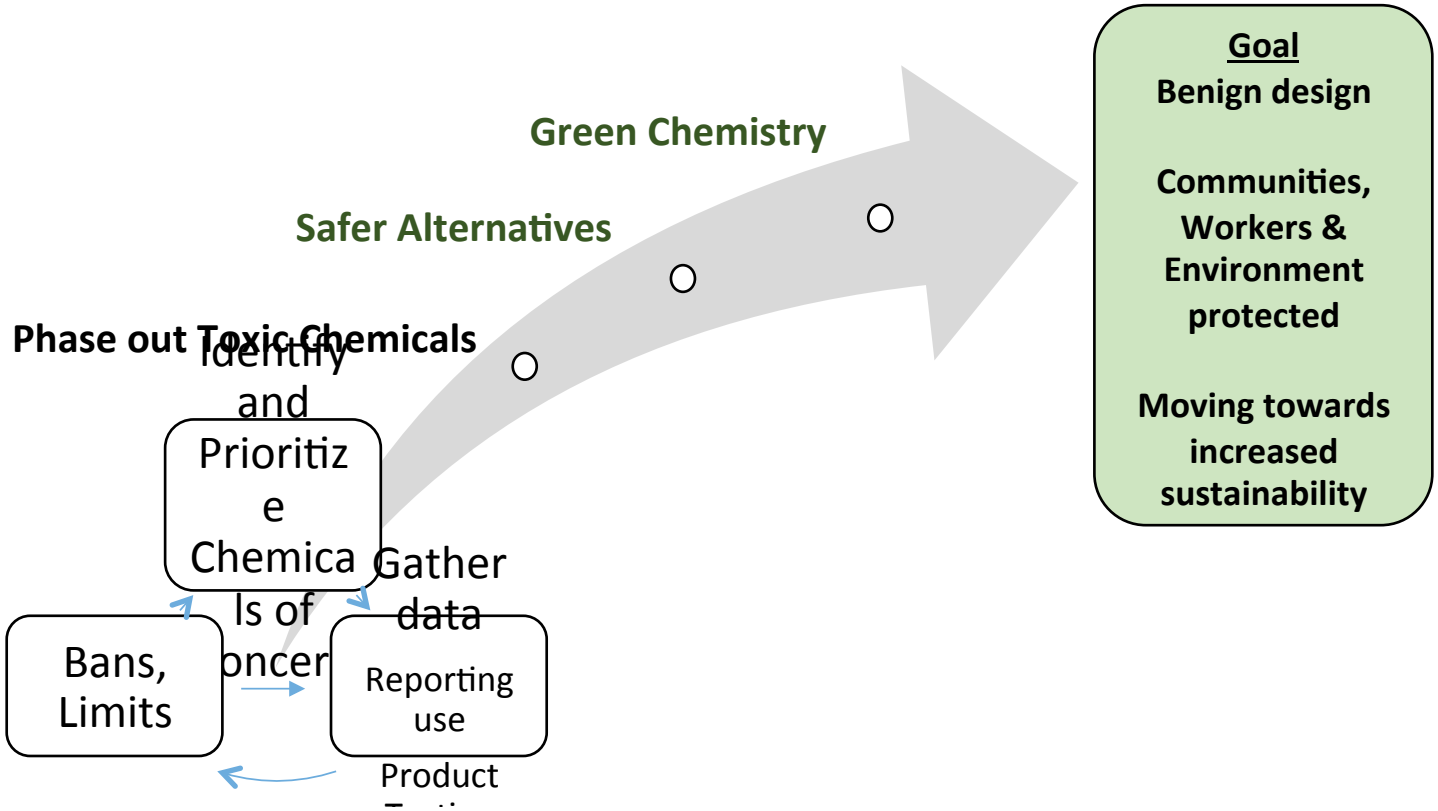
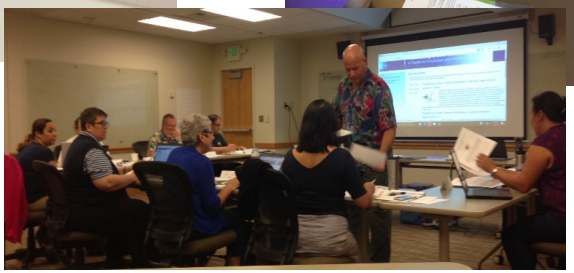
Prevent and Reduce Toxic Threats

A Washington State Department of Ecology Priority

Averting toxic exposure is the smartest, cheapest, and healthiest approach.



Increasing Awareness and Adoption through Tools, Training and Technical Assistance



Critical Question- Who is your Audience?

- What Sector?
- What is their Role?
- **What is their educa**
- **What is their capac**

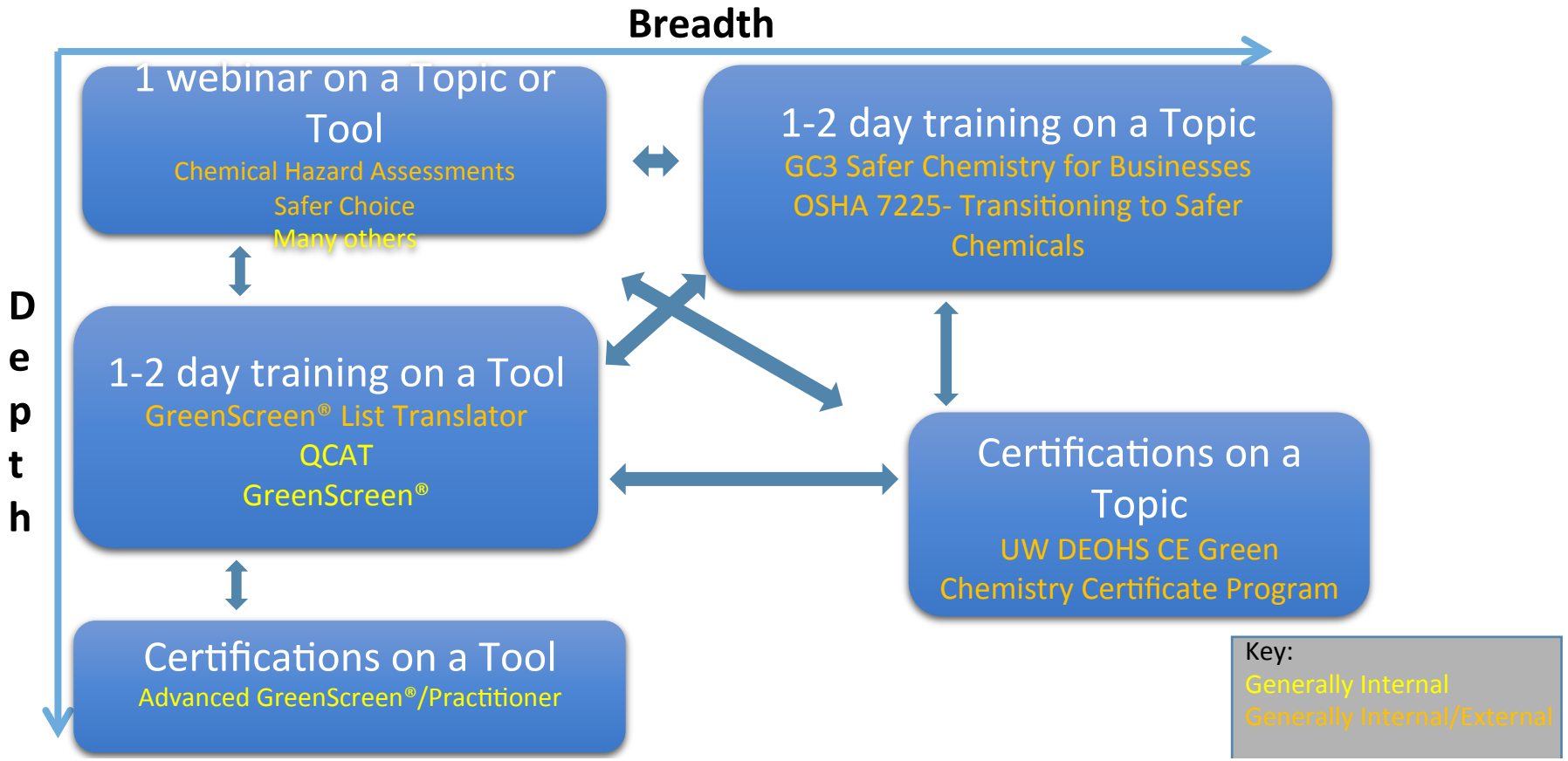
Do You Actually Even Have One?

How much experience do they have with safer alternatives?

How much time are they willing to invest in training?

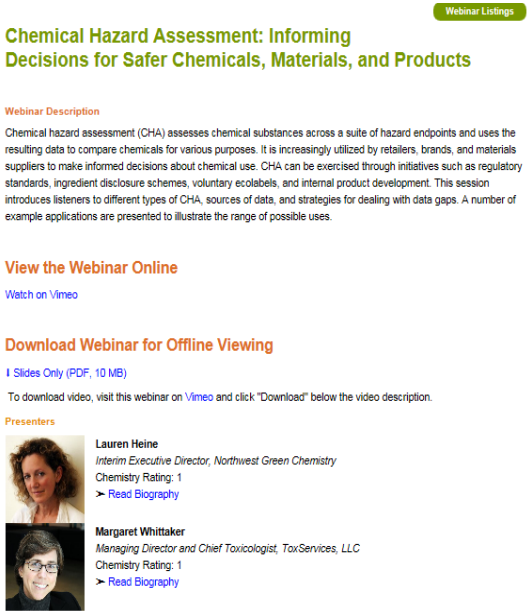
What is of value to your Potential Audience?

Green Chemistry/Safer Alternative Trainings Continuing Education- Broad Audience



GC3 Safer Chemistry Training for Businesses (FREE)

Foundations for Green Chemistry and Green Engineering		
Green Chemistry: Benign by Design One of the fathers of green chemistry, Dr. John Warner, provides an introduction to green chemistry, as well as ideas for how to build this concept into education and practice.	John Warner Warner Babcock Institute for Green Chemistry	1
Introduction to Green Engineering Green engineering applies principles similar to those of green chemistry to process and product design. In this webinar, experts in green engineering introduce principles, tools, and examples of this practice.	Julie Zimmerman Yale University	1
	Matthew Eckelman Northeastern University	1
	Julie Schoenung University of California Davis	1
The Role of Policy in Green Chemistry Research and Adoption This webinar provides an overview of the range of policies that can affect chemical design and product development and adoption, with examples from a major chemical manufacturer.	Robert Giraud DuPont Company	1
	Joel Tickner Green Chemistry & Commerce Council	1
Green Chemistry in Business		
The Value of Green Chemistry Green chemistry leaders in industry discuss their efforts to build awareness and make a case within their firms, supply chains, and customers on the value of green chemistry.	Helen Holder Hewlett-Packard	1
	Tse-Sung Wu Genentech	1
	Andy Shafer Elevance Renewable Sciences	1
Building Market Share for Green Products Is it better to advertise oneself as a green company, or to focus exclusively on product performance? Three companies share their approaches to marketing their sustainable practices.	Steve Davies NatureWorks	1
	Saskia van Gendt Method	1
	Charlie Forslund Steelcase	1



Webinar Listings

Chemical Hazard Assessment: Informing Decisions for Safer Chemicals, Materials, and Products

Webinar Description

Chemical hazard assessment (CHA) assesses chemical substances across a suite of hazard endpoints and uses the resulting data to compare chemicals for various purposes. It is increasingly utilized by retailers, brands, and materials suppliers to make informed decisions about chemical use. CHA can be exercised through initiatives such as regulatory standards, ingredient disclosure schemes, voluntary ecolabels, and internal product development. This session introduces listeners to different types of CHA, sources of data, and strategies for dealing with data gaps. A number of example applications are presented to illustrate the range of possible uses.

View the Webinar Online

Watch on Vimeo

Download Webinar for Offline Viewing

Slides Only (PDF, 10 MB)

To download video, visit this webinar on Vimeo and click "Download" below the video description.

Presenters

Lauren Heine
Interim Executive Director, Northwest Green Chemistry
Chemistry Rating: 1
➢ Read Biography

Margaret Whittaker
Managing Director and Chief Toxicologist, ToxServices, LLC
Chemistry Rating: 1
➢ Read Biography

- Description
- Slides
- Presentation(s)
- Additional Material

www.greenchemistryandcommerce.org/safer-chemistry-training

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OSHA Training Institute Education Centers
University of Washington

CONTINUING EDUCATION PROGRAMS
NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY

OSHA 7225: Transitioning to Safer Chemicals

- OSHA's seven-step substitution planning process
  - 1: Form a Team to Develop a Plan
  - 2: Examine Current Chemical Use
  - 3: Identify Alternatives
  - 4: Assess & Compare Alternatives
  - 5: Select a Safer Alternative
  - 6: Pilot the Alternative
  - 7: Implement and Evaluate the Alternative
- Hands-on activities connect to:
  - Case Studies
- Tools, related resources and databases

https://osha.washington.edu/osha/course/transitioning-safer-chemicals

FYI- 2019 dates posted!

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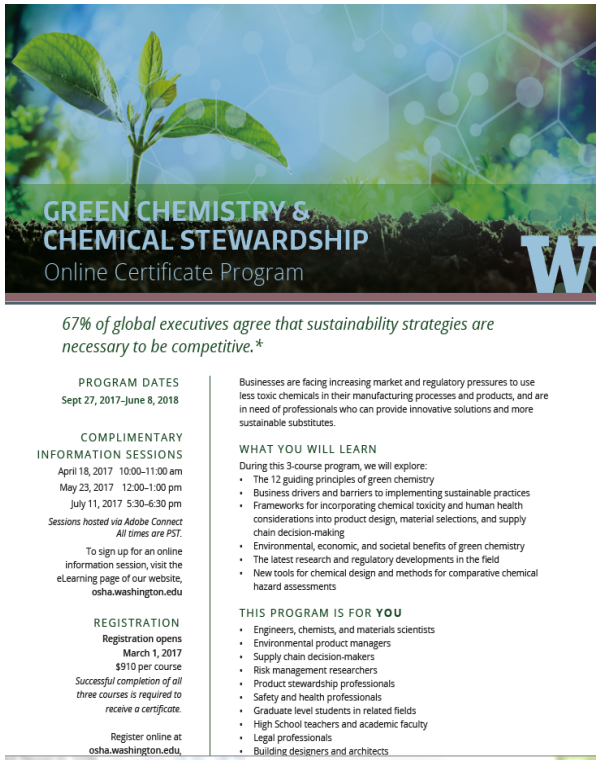
Online Green Chemistry and Chemical Stewardship Certificate Program

CONTINUING EDUCATION PROGRAMS
NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY



Designed for:
Professionals interested in learning and applying the principles of alternative chemistries and green toxicology in their work

First Certificate started in 2015

2019 Enrollment information coming soon.

Three-course online certificate program

1. Sustainability, Toxicology & Human Health
2. Principles of Green Chemistry
3. **Assessment Tools for Safer Chemical Decisions**

https://osha.washington.edu/pages/green-chemistry-chemical-stewardship-online-certificate-

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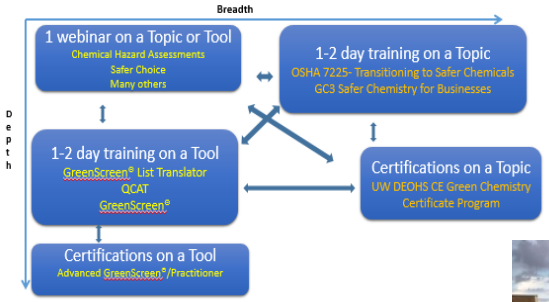
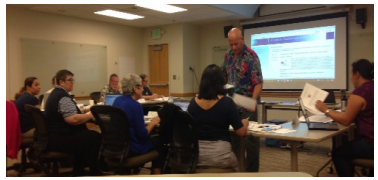
Continuing Education: Needs



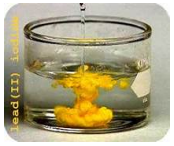


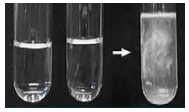
Practice/Gather Information/Identify needs

What worked? What didn't?

Higher Education:
Toxicology Resources for Chemistry Faculty

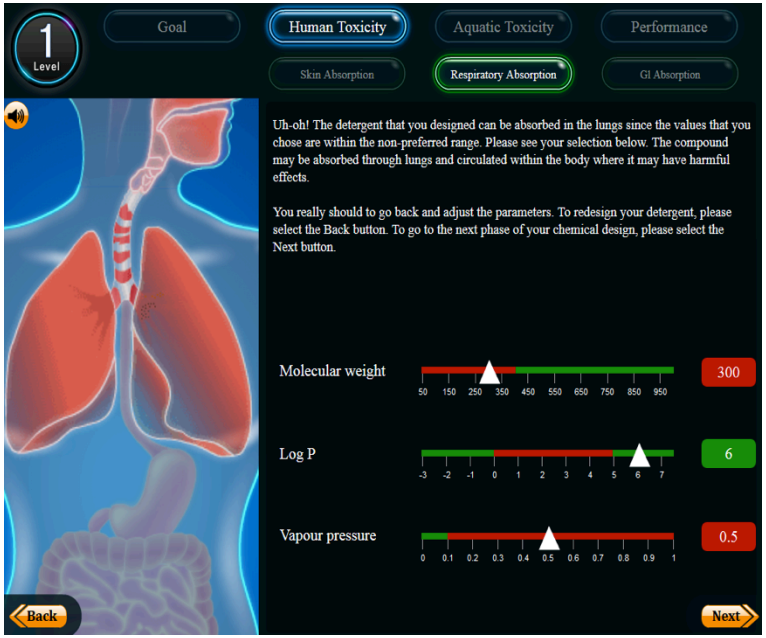
Rxn #:	Chemical name:	Data Source:	Physical Hazard:	Health Hazard:	Environmental Hazard:	Hazard Level:
1	Lead (II) Nitrate	SDS Data & H-Statements	H272	H302 (Medium), H332 (Medium), H350 (High), H360 (High), IARC Group 2A: Probably carcinogenic to humans (High) H318, H373, LD50 (intravenous, rat) – 93 mg/kg; LD50 (intraperitoneal, mouse) – 74 mg/kg	H400 (High), H410 (High), LC50 (fish, 96 hr) – 1.5 mg/l (High), LC50 (fish, 96 hr) – 0.4-1.3 mg/l (High), EC50 (daphnia, 48 hr) – 0.5-2.0 mg/l (High)	High
	Potassium Iodide	SDS Data & H-Statements		H302 (Medium), LD50 (oral, mouse) 1,000 mg/kg (Medium) H315, H319	LC50 (fish, 96 hr) 2,190 mg/l (Low), EC50 (daphnia, 24 hr) 2.7 mg/l (High- based on 48 hr criteria)	High
2	Copper (II) Sulfate	SDS Data & H-Statements		H302 (Medium), LD50 (oral, rat) – 482 mg/kg (Medium) H315, H319, LD50 (intraperitoneal, rat) – 20 mg/kg; LD50 (subc, rat) – 43 mg/kg; LD50 (intravenous, rat) – 48.9 mg/kg	H410 (High), LC50 (fish, 96 hr) – 1-2.5 mg/l (High), EC50 (daphnia, 48 hr) – 0.024 mg/l (High)	High
	Potassium Carbonate	SDS Data & H-Statements		H302 (Medium), LD50 (oral, rat) – 1,870 mg/kg (Medium) H315, H319, H335	LC50 (fish, 96 hr) < 510 mg/l (Low)	Medium
3	Calcium chloride	SDS Data & H-Statements		LD50 (oral, rat) – 2,301 mg/kg (Low) H319	LC50 (fish, 96 hr) – 10,650 mg/l (Low), EC50 (daphnia, 48 hr) – 2,400 mg/l (Low)	Low
	Sodium carbonate	SDS Data & H-Statements		LD50 (oral, rat) – 4,090 mg/kg (Low), LC50 (inh, rat, 2 hr) – 5,750 mg/l (Low) H319	LC50 (fish, 96 hr) – 300 mg/l (Low), EC50 (daphnia, 48 hr) – 265 mg/l (Low)	Low





https://www.beyondbenign.org/lessons/module-chemical-hazard-awareness/

Safer Chemical Design Game



Design a detergent with optimal cleaning performance that is also safer for humans and the environment.

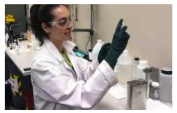
http://greenchemistry.yale.edu/education/undergraduate-graduate

Opportunities:

Project based classes/Capstone projects/Internships

Greener Solutions

The Greener Solutions program is a project based class that partners students with companies, non-profits, and/or government agencies interested in promoting the adoption of more sustainable chemistry. Every year we recruit teams of graduate students and advanced undergraduates to work closely with our partner organizations on interdisciplinary projects that leverage students' knowledge in a real-world context.



Grant: remooble

MPCA awarded the 2018 Green Chemistry & Engineering Summer Internship Grant to remooble, a 2017 start-up company based in Maple Grove that develops safe and effective paint, ink and adhesive removers for retail sale.

Grant: Ecolab

MPCA awarded a $9,500 grant to Ecolab to support a green chemistry and engineering intern project at the company's Eagan facility in 2017.

Grant: Connect Ecology

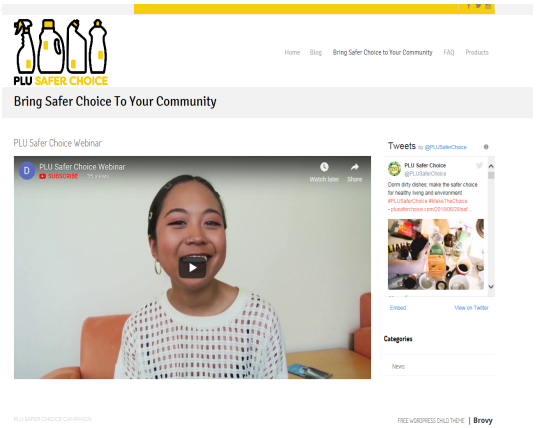
Connect Ecology received a 2016 grant to support an intern for a Minnesota project in green chemistry.

Northwest Green Chemistry

Integrating Design Principles and Alternatives Assessment
A Case Study on Food Clamshell Take-Out Containers

Engineering students at Gonzaga University applied a combination of sustainability assessment tools to evaluate how four different food take-out containers aligned with green chemistry & engineering (GC&E) design principles. This project is part of a larger effort to develop a framework for sustainable product design & procurement. Users will be empowered to evaluate multiple, interrelated sustainability attributes and identify where design improvements would have the greatest benefit. The students identified which of the four containers were the most sustainable, using three GC&E principles to define "sustainable materials."

GC&E Design Principles



1-https://bcgc.berkeley.edu/greener-solutions/
2-https://northwestgreenchemistry.app.box.com/s/gvcrxzpg4taei36accf3p20gzmse37q0
3- https://www.pca.state.mn.us/waste/green-and-safer-product-chemistry-grants
4- http://plusaferchoice.com/bring-safer-choice-to-your-community/

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Thank you!