Lowell Center for Sustainable Production

UNIVERSITY OF MASSACHUSETTS LOWELL

2024 Annual Report

https://www.uml.edu/research/lowell-center/

January 2025

Founded at UMass Lowell in 1994, the Lowell Center for Sustainable Production (LCSP) is a leading academic center for action-oriented research, policy development, and collaborative initiatives focused on eliminating health and environmental hazards in products, workplaces, and communities and promoting safer alternatives. Our team is comprised of faculty, staff and students trained in environmental and occupational health sciences and policy, and experienced in research translation, systems thinking and strategic convening.

The Lowell Center was very active and productive in 2024. The annual budget was approximately $1.0 million, with about 60% coming from government grants and contracts and 40% from private organizations and foundations. Our scientific and policy research yielded eight peer reviewed articles, more than 20 white papers, factsheets, blog posts, etc., and numerous conference presentations, podcasts and webinars. These are summarized at the end of this report.

A major activity this year was the transfer of the Lowell Center's offices from the Wannalancit mill to 820 Broadway. This physical move also represents a strategic one; bringing our activities into closer alignment with the Rist Institute for Sustainability and Energy.

We anticipate that 2025 will be a year of continued productivity and closer collaboration with Rist. We intend to build on our national and international recognition and expertise on systems-level change towards safer and

sustainable systems of production and consumption as we leverage new opportunities for partnerships and funding. These new opportunities are emerging based on continued public attention towards a more sustainable economy based on renewable energy, chemicals and materials.

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Safer and Sustainable Chemicals, Materials and Products

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https://www.sustainablechemistrycatalyst.org/

Program Description
The **Sustainable Chemistry Catalyst** (https://www.sustainablechemistrycatalyst.org/) is a research and strategy initiative, based at the Lowell Center for Sustainable Production, focused on accelerating the transition to safer, more sustainable chemistry through research and analysis, and stakeholder engagement with scientists, policymakers, and commercial actors. The Catalyst works to understand barriers and opportunities to commercialization of safe and sustainable chemistry, identifies model solutions and strategies, develops methods to evaluate safer alternatives, and builds a community of expertise to support the transition to safer, more sustainable chemistries and technologies.

Personnel: Joel Tickner (PI), Molly Jacobs, Jennifer Landry, Sally Edwards

Key 2024 Accomplishments:

1. Our report for the Organization for Economic Cooperation and Development (OECD) A Landscape of Sustainability Attributes Considered by Companies During Chemical and Material Selection was the focus of an OECD workshop in Paris, France on the topic September 23-24 where Molly Jacobs provided the opening keynote presentation.
2. We published several high-profile editorials and journal articles including:
    - **Tickner J** and B Dunham. A Road Map for Sustainable Chemistry. Issues in Science and Technology. Winter 2024
    - **Tickner J**. Making Chemistry Safer is Worth the Pricetag. Scientific American. February 16.
    - The Consortium For Children's Environmental Health, Wirth DA, Cropper M, Axelrad DA, Bald C, Bhatnagar A, Birnbaum LS, Burke TA, Chiles TC, **Geiser K,** Griffin C, Kumar P, Mandrioli D, Park Y, Raps H, Roger A, Smith TR, States JC, Straif K, **Tickner JA,** Wagner W, Wang Z, Whitman EM, Woodruff TJ, Yousuf A, Landrigan PJ. Manufactured Chemicals and Children's Health - The Need for New Law. New England Journal of Medince, January 2025.
    - Hansen SF, Bunde CTH, **Roy MA, Tickner JA**, and Baum A. Late lessons from early warnings on PFAS. Nature Water, 2024.
3. Molly Jacobs was a featured speaker at the White House Office of Science and Technology's PFAS Federal Research and Development Strategic Plan on October 30, 2024.
4. We worked with Change Chemistry and the European policy firm FIPRA to develop 15 factsheets and hosted four webinars to introduce US stakeholders to emerging European chemicals policies (see below for details). The webinars

were attended by more than 500 people and factsheets downloaded thousands of times

5. New York Community Trust awarded LCSP $130,000 to reduce the use of toxic chemicals in consumer products by developing and promoting sustainable chemistry practices throughout the economy.

Summary of 2024 Activities:

Advancing Alternatives Assessment

- We undertook work for the California Department of Toxic Substances Control on integrating environmental justice considerations into their regulatory alternatives analysis. This included two reports, including specific provisions needed and recommended language as well as detailed evaluation and review of environmental justice tools and their applicability to supporting alternative analysis processes. Our reports are being used to update their official guidance.
- A key aspect for the creation of a sustainable support model for advancing informed substitution is the development of a public-private Center of Excellence on alternatives assessment, which was launched in 2024 with initial funding from the Washington State Department of Ecology and the U.S. Department of Defense. Work in 2024 focused on establishing a governance structure for the Center, advancing a Codes of Practice Initiative to establish benchmarks of effective practice, and conducting a roadmap for an alternatives assessment focused on the identification of substitutes for the use of NMP as a photo resist in the semiconductor industry.
- We hosted two webinars for the Association for the Advancement of Alternatives Assessment (A4), both were well attended with more than 50 people at each (see below for links)
- To grow the impact of the Association for the Advancement of Alternatives Assessment (A4) (a professional organization that we launched in 2018), we undertook discussions with the Society for Environmental Toxicology and Chemistry (SETAC) leadership. In September 2024, A4 was integrated into SETAC as an Interest Group. This transition into SETAC offers a crucial opportunity to expand the base of professionals needed to advance the methods and practices for alternatives assessment as well as their use in chemicals management decision making. In addition, SETAC's global reach creates opportunities for greater impact at the scale needed related to informed substitution needs and challenges.
- We published an article announcing the A4/SETAC merger in the SETAC Globe.
- We organized two well-attended special sessions at SETAC international conferences:
    - SETAC Europe (May 5-9, 2024, in Seville, Spain), *Empowering Sustainable Innovations: Leveraging Alternatives Assessment for Safe and Sustainable Design in Practice*
    - and SETAC North America (October 21-25, 2024, in Fort Worth, TX), *Alternatives Assessment: An Evolving Landscape of Methods, Practice*

and Policy Supporting the Informed Substitution of Hazardous Substances

Sustainable Chemicals Policy

- We undertook work for Environment and Climate Change Canada to create a framework for prioritization of uses and applications of chemicals in a class (e.g., phthalates halogenated flame retardants, PFAS, etc.) to support the agency's risk management activities. The framework used PFAS as a case example to test and refine the framework. The project was designed to support future Government of Canada risk management work focused on encouraging the progressive substitution of substances, processes, and technologies with alternatives that are safer for the environment or human health, and which will also support a sustainable economy.
- We were part of a study team that was awarded a contract by the European Commission's Directorate General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) to develop policy options for substitution planning and support within regulatory paradigms for chemicals management in Europe. Extensive research was undertaken to identify current barriers of effective substitution in the EU, which was used to design policy options. Four policy options to advance substitution, especially for complex cases, were discussed with stakeholders and underwent a formal impact analysis. Our report was provided to the Commission in December 2024.
- We began a second phase of work with the California Department of Toxic Substances Control to outline policy options that improve the department's ability to achieve its mandates while also generating revenue to support the added responsibilities. Three policy options are being refined with DTSC leadership, stakeholders and we will be conducting an impact analysis of these options in 2025. The report from the first phase of work for the agency was published in late 2024
- We worked with several non-profits, and state and federal government agencies to provide input and support on efforts to advance safer and more sustainable chemistry. These included: Working with Clean Water Action on revisions to policy proposals to advance safer alternatives to PFAS and chemicals of concern in Children's products, including educating policy makers; working with Coming Clean to understand options to fundamentally transform the chemical industry; and providing input to European and US policy makers on policy innovations in the US and Europe.

Green and Sustainable Chemistry Commercialization Research

- We undertook significant research to advance understanding of whether a more distributed and smaller scale chemical industry could produce necessary goods, albeit with lower impact. We interviewed a number of experts in the field, conducted an analysis of decentralization in other sectors such as steel and pulp and paper, and are in the process of writing our results. We presented interim

results at two conferences and to environmental justice and other organizations. We will finalize the report in 2025.

- In partnership with the Science History Institute, we are planning the *T.T. Chao Symposium: Transitioning to a Sustainable Chemical Industry: Lessons from History* on February 4-5, 2025, in Philadelphia, PA. The workshop will convene about 40 scholars and practitioners to understand the factors that led to a rapid growth and plateau of the chemical industry and the current trends that could shape its future towards sustainability.

Funding:

Funder	**AMOUNT**
Broad Reach Foundation	$100,000
Jacob and Hilda Blaustein Foundation	$50,000
California Department of Toxic Substances Control (DTSC)	$230,000
New York Community Trust	$120,000
Association for the Advancement of Alternatives Assessment (A4)	$25,000
Subcontracts from the Institute for Safer Chemical Alternatives - US Department of Defense - Washington State Department of Ecology - Environment and Climate Change Canada - European Commission DG Grow	$150,000
TOTAL	**$675,000**

Plans for 2025:

- Expand the work of the Center of Excellence for Chemical Alternatives Assessment including beginning an 18-month process with a technical committee to outline codes of practice for the field.
- Work with the Commission on Environmental Cooperation to develop a strategy for a North American Informed Substitution Center.
- Continue work with CA DTSC to finalize sustainable chemical policy strategy options assessment for the state of California.
- Conduct a landscape assessment of policy, market, and investor actions supporting alternatives to EDCs for the Pew Research Center. The landscape will help to prioritize potential programs and opportunities to accelerate identification, innovation, evaluation, adoption, and scaling of safer and more sustainable alternatives to endocrine disrupting chemicals.
- Develop an assessment of policy incentives to advance commercialization and adoption of sustainable chemistry
- Continue work to develop a roadmap to transition the chemical industry and grow green chemistry including criteria and metrics, as well as research on distributed chemical production and transition roadmaps.
- Undertake an assessment of progress, needs, and opportunities to advance growth of safer and more sustainable chemicals in the marketplace over the past 20 years.
- Develop a set of metrics for evaluating progress towards sustainable chemistry.

Cancer Prevention

https://www.uml.edu/Research/Lowell-Center/Cancer-Free-Economy/

Program Description

The Lowell Center conducts and synthesizes research on the contributions of environmental and occupational exposures in the cancer epidemic, and develops tools and strategies for reducing the use of toxic chemicals that contribute to the disease. We publish journal articles, reports and fact sheets that translate studies on links between industrial chemicals and pesticides and various types of cancer, and trends in exposure and disease. We continue to support the Cancer and Environment Network of Southwestern Pennsylvania, established by the Lowell Center and regional partners in 2019.

Reducing Environmental Carcinogens via Cancer Prevention

www.censwpa.org

Personnel: Molly Jacobs

Key Accomplishments and Summary of 2024 Activities:

1. Developed and launched a toolkit on preventing environmental and occupational cancers for the National Association of Chronic Disease Directors. Only a few states include environmental and occupational cancer risk reduction strategies in their state-wide cancer control strategic plans. The toolkit was designed to support state chronic disease directors and their cancer coalitions as they update their strategic plans to be more inclusive of environmental and occupational risks. The tool kit includes 5 modules designed to respond to current barriers that have limited addressing such risk factors in current strategic plans.
2. Working on behalf of CENSWPA, we wrote a "Year in Review" brief on themes from the 2023 published literature on environmental cancer risks to support the network's understanding of the science and opportunities for risk reduction actions.

Plans for 2025

- We will continue to provide scientific expertise and strategic guidance to CENSWPA. A project for us to conduct a review of the literature on air pollution and cancers other than lung has been incorporated into CENSWPA's proposal to the Heniz Foundation.

Funding:

- NACDD: $25,000
- CENSWPA: $15,000

Environmental Causes of Tobacco-related Cancers

The Lowell Center continues to collaborate in an epidemiologic research project that began in 2017 quantifying the relative contributions of smoking and environmental exposures for cancers that are commonly considered to be "tobacco-related".

This work is aimed at providing scientific evidence for cancer prevention efforts in cities where the burden of environmental carcinogens is more substantial than in rural areas; thus shifting the relative importance of anti-smoking initiatives versus anti-pollution efforts.

Summary of 2024 Accomplishments:
Using detailed spatial data on air pollution from the US EPA, we assessed variability across the US in the county-level contributions of carcinogenic air pollutants to lung cancer. We presented a national webinar on this work sponsored by the Collaborative for Health & Environment.
https://www.healthandenvironment.org/che-webinars/96801
We also presented the work to a meeting of the Cancer Environment Network of Southwest Pennsylvania in Pittsburgh.

Plans for 2025:
Two peer-reviewed articles are being prepared for publication in 2025. The first identifies the principal carcinogenic air pollutants responsible for the high lung cancer burden in urban counties. The second is a methodologic report on the novel analytical approach we are using to "remove" the effect of smoking on lung cancer incidence, enabling us to quantify the impacts of environmental carcinogens.

Personnel: David Kriebel, Doug Myers (Boise State University)

Funding:
Heinz Endowments provided funding to our collaborators at Boise State University, UT.

Safe Home Care

https://www.uml.edu/Research/SHCH/

Program Description
The UMass Lowell Safe Home Care Program was founded in 2004. We partner with home care (HC) industry stakeholders, such as home care agencies, home care industry associations, labor unions, social services and government agencies. Home health and home care aide jobs are among the fastest growing in the US and home care provides an important alternative to facility-based care for older adults. At-home care services became especially important during the COVID-19 pandemic as congregate care became high risk. The earliest SHC research focused on sharps injuries and other blood exposures in home healthcare and expanded to investigate a broad range of occupational hazards and good practices. The next phase was undertaken to develop guidance for the HC industry on effective and safe cleaning & disinfection products and practices. Beginning in 2019, we began developing an intervention study with the aim of improving the safety of HC workers and their clients in the client home. In Spring 2020, we began adding technical assistance and research to address the COVID-19 pandemic. We were among the first research groups in the US to publish the COVID-19 impacts and needs of the home care industry in order to build infection prevention capacity and resilience in the provision of home care services.

Personnel: Margaret Quinn (PI), Catherine Galligan, Pia Markkanen, Susan Sama, John Lindberg, Rebecca Gore, David Kriebel

Summary of 2024 Accomplishments:
This was the final year of funding for the program from the National Institute for Occupational Safety and Health (NIOSH). The work of this year focused on translating the research into policies at the state and national levels, and completing the publication of program findings in peer reviewed journals.

The results of the intervention study designed to evaluate the effectiveness of an intervention to improve health and safety for home care aides and their clients, were published in two peer-reviewed articles.

- In the Journal of Applied Gerontology, the overall study design and quantitative results were published; and

- A second article, in the International Journal of Environmental Research and Public Health, reported mixed-method findings on the effectiveness of the intervention to coach home care clients in how to prepare their homes for safe home care.

The materials developed during the intervention study continue to be used by home care personnel and agencies improve working conditions. These are available on the website:

- A 31-page safety handbook designed to guide home care clients/consumers through the process of preparing their homes and understanding their role in creating the good working relationships that make it possible to get the most out of their home care visits.
  Preparing Your Home for Safe Home Care (pdf)

- A video prepared in partnership with the Betsy Lehman Center for Patient Safety to accompany the safety handbook.
  Preparing Your Home for Safe Home Care (4 minute video)
  This video features animated illustrations from the safety handbook as well as interviews with home care aides who share reasons why they are committed to the field of care work and the well-being of their clients, and some features of the home care visit that help them do their best.

- An online training course for Care Managers introducing the concepts of Motivational Interviewing and its application in coaching clients so they can take steps to improve safety when receiving care at home. This course provides a certificate for 1 CEU in professional development training for nurses.
  Motivational Interviewing to Improve Safety in Home Care (45 minute online course)

- An online training course introducing the concepts of managing occupational safety and health in home care to identify and eliminate or reduce or hazards in the client home environment. Improving the safety of the aide will often improve client safety. This training is designed for home care agency managers and their employees, unions and the workforce they represent.
  Practicing Occupational Safety and Health in Home Care (20 minute online course)

- A brochure summarizing the findings of the most recent phase of our Safe Home Care Intervention study using figures and non-technical language. This brochure, in a printable center-folding format, provides the most impactful initial study findings to guide practice improvements for home care providers.
  Safety Coaching for Home Care Clients: Preliminary Findings of Our Intervention Field Study (pdf)

Findings of a separate, laboratory-based study, reported on the airborne chemical exposures of home care aides engaged in a common task – cleaning bathrooms. This paper appears in the Annals of Work Exposures and Health.

We also continued to be engaged nationally in efforts to improve health and safety of home care aides and to increase awareness of the many links between the health and safety of home care clients and aides.

Margaret Quinn participated in a Technical Advisory Panel of The Joint Commission, the major accrediting body for hospitals and other healthcare services in the U.S. The committee developed a standard providing guidance to hospitals for preventing violence among home care workers (R3 Report Issue 45: Workplace Violence Prevention in Home Care Settings). The standard came into force on 1/1/2025. This work was informed by the research conducted by the Lowell Center Safe Home Care team over the past 20 years.

Funding:
U.S. Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (grant number R01OH008229)
Project Period: 9/1/2019 – 8/31/2024 Annual awards: $623,000

Plans for 2025:
The 20-year funding from NIOSH has now ended, and dissemination of findings and collaboration with government and industry stakeholders continues.

Artificial Turf – Hazards and Alternatives

https://www.uml.edu/research/lowell-center/athletic-playing-fields/

Program Description

We have continued our work to identify and address hazards associated with artificial turf and certain playground surfacing materials, and to translate research results for use by municipalities and schools. Our work has included research on chemicals and materials; creating written educational materials; and working directly with communities and schools to answer their questions about chemicals in artificial turf and synthetic playground surfacing as well as safer alternatives.

Personnel: Rachel Massey (PI), Lindsey Pollard

Summary of 2024 Activities:

- **Assistance to communities.** Fielded 50 individual queries from municipal decision-making bodies, state agencies, and legislators, as well as from individual community members and local grassroots organizations. We have provided information to state entities including the Massachusetts Department of Environmental Protection, the California Department of Toxic Substances Control, the California Coastal Commission, and the Connecticut Department of Energy and Environmental Protection, among others. Municipal and regional entities that we assisted included the Public Health Department in Amherst, MA, the City Council in Westfield, MA, the Office of Legislative Oversight for Montgomery County, MD, and the Bangor Area Stormwater Group in Maine.
- **Assistance to childcare facilities.** We have continued our work with Women for a Healthy Environment, Pittsburgh PA, to assist individual childcare facilities in assessment and improvement of their outdoor play surfacing. (https://womenforahealthyenvironment.org/)
- **Press coverage.** We contributed expert opinion and scientific background to local and national stories on artificial turf and natural grass athletic fields (see examples at the end of this report).
- **Extended fact sheets and blog post on PFAS testing.** We published two new resources on PFAS testing: "PFAS in Artificial Turf: Test Methods" and "PFAS in Artificial Turf: Academic, Municipal & Other Testing Efforts." Both are available on our landing page on PFAS in artificial turf: https://www.uml.edu/research/lowell-center/athletic-playing-fields/pfas-in-artificial-turf.aspx. We also published a blog post on this topic via the Collaborative for Health and Environment (see list of publications below).
- **Webinars.** We presented information on webinars hosted by the Collaborative for Health and Environment/Alaska Community Action on Toxics and by the Santa Clara County Medical Association. (See details below.)
- **Research collaborations.** On an on-going basis, we are providing input on the community-engaged research activities of collaborators at the Icahn School of Medicine at Mt. Sinai and at Northeastern University. We have continued to work in collaboration with researchers at the Icahn School of Medicine at Mt. Sinai and at Northeastern University. We participated in, and helped to plan, a community

summit at Mt. Sinai, bringing together individuals and organizations working on this issue in several states.

Funding: Heinz Endowments, $50,000/year; Icahn School of Medicine at Mt. Sinai, $15,000/year

Plans for 2025:

- Publish an article in a peer-reviewed journal, focusing on the gaps in existing risk assessments considering health effects of waste tire materials used in artificial turf.
- Continue collaborative work with the Institute for Exposomic Research at the Icahn School of Medicine at Mt. Sinai to characterize the human environmental exposures to users of artificial turf playing fields and provide community-facing assistance.
- Continue to respond to requests for assistance from municipalities installing artificial turf surfaces or natural grass alternatives and/or dealing with community concerns about potential health and environmental impacts of playing fields.
- Continue to build capacity at partner organizations and help support the network of academic experts providing assistance to communities.
- Finally, we will create content geared towards supporting community decision-makers, including an inventory of athletic field and playground surfacing policies
- Continue to expand the resources on our web page, including links to information generated by municipal decision-making boards and committees.

Precautionary Principle in Environmental Health Policy

Program Description
Beginning in the late 1990s, the Lowell Center conducted policy research and organized meetings and reports on the application of the Precautionary Principle (PP) in environmental health. This work had mostly ended by about 2010, but in January 2021 we were asked by the World Health Organization (WHO) to write a report on how the PP could be used by WHO in future health emergencies to make their methods for developing public health guidance more responsive and agile. In 2021 and 2022, we wrote and delivered to WHO the report on precaution in normative policy development.

Personnel: David Kriebel

Summary of 2024 Activities:
The Lowell Center's report to WHO was edited and formatted for inclusion in the WHO Handbook for Guideline Development: "Incorporating consideration of the Precautionary Principle into the WHO guideline development process."

Plans for 2025: We are preparing an article on the Precautionary Principle for submission to The Lancet Global Health.

The Henderson Trust International Sustainability Fellows Program

Program Description
The Lucy Gregory Henderson Trust Fund provides support for International Fellows whose work is consistent with the mission of the Lowell Center for Sustainable Production. The funding contributes to the research and advocacy work of the Fellows and can be used for research, training or travel that contribute to the Fellows' projects.

The fellowship has been awarded most years since the inception of the program in 2013. The amount of funds available has varied depending on the endowment's interest.

Funding: From an endowment established at UML by the Lucy Henderson Trust: $20,000.

Summary of 2024 Activities:
The 2023-24 Fellow was Jean Arnaud whose project was based in Haiti and entitled: "Building capacity for improved rapid diagnostics and promoting engagement in exposome research". This project had the objectives to:
1. Improve access to rapid, low cost and low toxicity diagnostic methods in developing nations in the Caribbean; and
2. Promote integrated -omics approaches to the study of diseases and environmental risk factors.

In January 2024, Mr. Arnaud traveled to Haiti to train personnel and set up a laboratory to support the molecular biology program at the University of Notre Dame Hinche (UNDH). This work is intended to enable the university to move their molecular biology program from a theory-only teaching style to one that emphasizes practical experiential learning.

Upon arrival, Mr. Arnaud learned that many of the original staff that he had worked with previously were no longer at the University. These key personnel had migrated to the U.S. under the Biden parole program. Despite this, the determination to advance scientific education remained strong among the remaining staff and the university rector. Engaging junior and senior year undergraduate students proved fruitful, with discussions on incorporating molecular biology into their research projects. The trip highlighted the importance of adapting teaching methods to suit local contexts and resource limitations. Future work will include developing a theoretical framework based on best practices for sustainable molecular biology education in low-resource settings.

Despite challenges, the trip yielded valuable insights and progress toward advancing molecular biology education at UNDH, Haiti. By addressing barriers to learning and fostering collaboration, the project aims to empower future generations of scientists and contribute to scientific advancement in the region.

Health Hazards of Tattooing

Program Description
Tattoo inks are an essentially unregulated source of toxic chemical exposure to an increasingly large proportion of the population. Very little is known about chronic disease risk from the long-term exposure to thousands of chemicals in tattoo inks, many of them never evaluated for their effects on human health. The Lowell Center has been raising awareness about the need for health studies of tattoo inks and working on several strategies to establish large-scale human health studies.

Personnel: David Kriebel (PI) and Susan Sama

Summary of 2024 Activities:
Two webinars on the need for health studies of tattoo inks were presented in 2024 by David Kriebel. One sponsored by the Collaborative for Health and the Environment, and the other by the podcast host Dr. Aly Cohen.

We coauthored one peer-reviewed paper and one pre-print that will be published in 2025, both reporting on epidemiologic studies conducted in Utah using data from the state cancer registry and the Behavioral Risk Factor Surveillance System (BRFSS) of the U.S. Centers for Disease Control and Prevention.

Plans for 2025

We will continue to seek funding for epidemiologic research with partners including the Veterans' Administration, the University of Utah and the International Agency for Research on Cancer in Lyon, France.

LCSP Publications, 2024

UMass Lowell contributors **in bold.**

Peer reviewed:

1**. Bechu AM, Roy MA, Jacobs M, Tickner JA**. Alternatives assessment: An analysis on progress and future needs for research and practice. Integr Environ Assess Manag. 2024 Sep;20(5):1337-1354. doi: 10.1002/ieam.4882.PMID: 38124425

2. Hansen, S.F., Bunde, C.T.H., Roy, M.A. **Monika Roy, Joel Tickner** et al. Late lessons from early warnings on PFAS. Nature Water 2, 1157–1165 (2024). https://doi.org/10.1038/s44221-023-00168-4

3. Markkanen PK, Gore RJ**, Sama SR, Lindberg JE, Galligan CJ, Quinn MM**. Coaching Home Care Clients to Prepare Their Homes for Safe Care Visits: A Mixed-Methods Study to Evaluate a Nurse-Led Educational Intervention Process. Int J Environ Res Public Health. 2024 Mar 18;21(3):360. doi: 10.3390/ijerph21030360. PMID: 38541359

4. McCarty RD, Trabert B, **Kriebel D**, Millar MM, Birmann BM, Grieshober L, Barnard ME, Collin LJ, Lawson-Michod KA, Gibson B, Sawatzki J, Carter M, Yoder V, Gilreath JA, Shami PJ, Doherty JA. Tattoos and Risk of Hematologic Cancer: A Population-Based Case-Control Study in Utah. Cancer Med. 2024 Oct;13(20):e70260. doi: 10.1002/cam4.70260. PMID: 39444249

5**. Quinn MM, Lindberg JE**, Gore RJ, **Sama SR, Galligan CJ, Kriebel D, Markkanen PK**, LeBouf RF, Virji MA.
Respiratory quaternary ammonium and volatile organic compound exposures experienced by home care aides during residential bathroom cleaning using conventional and green products. Ann Work Expo Health. 2024 Dec 9:wxae092. doi: 10.1093/annweh/wxae092. PMID: 39657952

6. Rudisill C, **Jacobs M, Roy M**, Brown L, Eaton R, Malloy T, Davies H, **Tickner J.** The use of alternatives assessment in chemicals management policies: Needs for greater impact. Integr Environ Assess Manag. 2024 Jul;20(4):1035-1045. doi: 10.1002/ieam.4826. Epub 2023 Oct 3. PMID: 37658263

7**. Sama SR, Quinn MM,** Gore RJ**, Galligan CJ, Kriebel D, Markkanen PK, Lindberg JE**, Fallon PJ. The Safe Home Care Intervention Study: Implementation Methods and Effectiveness Evaluation. J Appl Gerontol. 2024 Nov;43(11):1595-1604. doi: 10.1177/07334648241246472. PMID: 38652665

8. The Consortium for Children's Environmental Health, including LCSP members **Ken Geiser** and **Joel Tickner**. Manufactured Chemicals and Children's Health — The Need

for New Law. New England Journal of Medicine 2025;392:299-305. doi:10.1056/NEJMms2409092

Reports, pre-prints, white papers, etc.:

Pollard L and **Massey R**. "PFAS in Artificial Turf: Test Methods" July 2024. Available at: https://www.uml.edu/research/lowell-center/athletic-playing-fields/pfas-in-artificial-turf.aspx.

Pollard L and **Massey R**. "PFAS in Artificial Turf: Academic, Municipal & Other Testing Efforts." August 2024. Available at: https://www.uml.edu/research/lowell-center/athletic-playing-fields/pfas-in-artificial-turf.aspx.

Cancer and Environment Network of Southwestern Pennsylvania. 2024. Year in Review: Reflections on 2023 Peer-Reviewed Research on Cancer and Environment.

McCarty RD, Trabert B, Millar MM, **Kriebel D**, Grieshober L, Barnard ME, Collin LJ, Lawson-Michod KA, Gibson B, Gilreath JA, Shami PJ, Doherty JA. Associations of demographic, health, and risk-taking behaviors with tattooing in a population-based cross-sectional study of ~18,000 US adults. Res Sq [Preprint]. 2024 Aug 28:rs.3.rs-4838597. doi: 10.21203/rs.3.rs-4838597/v1.

Factsheets on EU Chemicals Policy Translation - A joint project by UMass Lowell's Sustainable Chemistry Catalyst, Change Chemistry, and FIPRA:

- The European Green Deal: Overview from a Chemicals Perspective
- EU Chemicals Strategy for Sustainability
- The EU Policy Making Process
- One Substance One Assessment (OSOA)
- Revision of the CLP Regulation
- Proposal to Revise the REACH Authorization and Restriction Processes

- Circular Economy Action Plan
- Safe and Sustainable-by-Design Framework
- Ecodesign for Sustainable Products Regulation
- EU Sustainable Finance Framework
- REACH Restrictions Roadmap
- Generic Risk Management Approach (GRA)
- Essential Use Concept (EUC)
- 2022 Science, Research and Innovation Performance (SRIP) Report
- The Transition Pathway for the Chemical Industry

Webinars, Podcasts.

Artificial Turf: Research on Plastic Pollution, PFAS, and Health Concerns. Collaborative for Health and Environment/Alaska Community Action on Toxics Webinar September 18, 2024. Dr. **Rachel Massey** briefly summarized human health concerns and explained efforts to test artificial turf for the presence of per- and polyfluoroalkyl substances (PFAS), one category of chemicals of concern found in artificial turf. https://www.healthandenvironment.org/che-webinars/96789

Tattoo Inks, Cancer and Other Chronic Diseases: Gaps in research and regulation. Collaborative for Health and Environment Webinar, February 22, 2024.
Dr. **David Kriebel** discussed the existing evidence on possible health effects of tattoos, including cancers and autoimmune diseases, and the need for additional research to understand possible hazards. The webinar was co-moderated by Dr. **Rachel Massey**, Senior Science and Policy Advisor, CHE and Andre Green, Network Coordinator, Cancer and Environment Network of Southwest Pennsylvania.
https://www.healthandenvironment.org/che-webinars/96733

Artificial Turf on Sports Fields: Promise or Peril? Santa Clara County (CA) Medical Association, Environment and Health 2024 Webinar 2. Speakers included **Rachel Massey**. https://www.sccma.org/news-events/upcoming-events/event-info.aspx?sessionaltcd=SCCMA_ENVI_100124

Driving Safer Chemicals through Alternatives Assessment. A4 Webinar Series https://vimeo.com/setac/review/932476855/a9983f66a9 April 9, 2024.

Safer Chemistry in Beauty & Personal Care: Needs and Opportunities. A4 Webinar Series https://youtu.be/GRv891BKx5w June 6, 2024.

EU Chemicals Policy Translation - A joint project by UMass Lowell's Sustainable Chemistry Catalyst, Change Chemistry, and FIPRA:

- Introduction/Overview | Understanding Evolving European Chemicals Policies - Part 1 https://youtu.be/y2qhygdSIiM?si=kOq5Fslc5swC7kip February 28, 2024.

- Regulatory Policies | Understanding Evolving European Chemicals Policies – Part 2. https://www.youtube.com/watch?v=xIy3_Utvroc April 24, 2024.

- Sustainability and Fiscal Policies | Understanding Evolving European Chemicals Policies - Part 3 https://youtu.be/ar_P4p-P0LY May 22, 2024.

- Evolving Regulatory and Science-Policy Proposals | Understanding Evolving European Chemicals Policies - Part 4. https://www.youtube.com/watch?v=7a9XVOx6Lw4 June 27, 2024.

Tattoos with guest Dr. David Kriebel – The Smart Human Podcast Episode #32.
Dr. Aly Cohen interviewed **David Kriebel** on the chronic health risks from tattoo inks.

https://thesmarthuman.com/tattoos-with-guest-dr-david-kriebel-the-smart-human-podcast-episode-32/

Causes of Lung Cancer: Study compares smoking & air pollution. Collaborative for Health and Environment Webinar, October 29, 2024.Dr. Douglas Myers and **Dr. David Kriebel** addressed this cancer prevention question in the context of lung cancer drivers. They presented details of their recent study examining how reducing air pollution could lower lung cancer rates as much as smoking cessation.
https://www.healthandenvironment.org/che-webinars/96801

Blog posts

Massey, R and Pollard, L. Forever Chemicals in Artificial Turf: Understanding PFAS testing. Blog post, July 23, 2024.
https://www.healthandenvironment.org/latest-research/blog/forever-chemicals-in-artificial-turf-understanding-pfas-testing

Press reports on our work

Forever chemicals on turf fields? Studies increase debate over synthetic vs. real grass by Dan Lampariello, CBS13 I-Team, May 16, 2024.
https://wgme.com/news/i-team/forever-chemicals-on-sports-fields-studies-increase-debate-over-grass-vs-artificial-turf-maine-sports-spring-parents-athletes-pfas-msad-51-five-town-csd

Westfield [MA] weighs PFAS concerns in considering a new synthetic field; vote is Tuesday.
https://www.masslive.com/westernmass/2024/04/westfield-weighs-pfas-concerns-in-considering-a-new-astroturf-field-vote-is-tuesday.html

Safer Chemistry Impact Fund Appoints First Fund Director. News Provided By ChemFORWARD, March 12, 2024,
https://www.einnews.com/pr_news/695336658/safer-chemistry-impact-fund-appoints-first-fund-director

SETAC Globe. New SETAC Interest Group Launched: The Advancement and Application of Alternatives Assessment (A4). September 19, 2024.

Washington Post: https://www.washingtonpost.com/climate-environment/2024/04/30/methylene-chloride-epa-ban/

“Does playing soccer on artificial turf increase cancer risk, especially in kids?” by Stephen Howie, February 8, 2024 (article and podcast).

https://www.kuow.org/stories/does-playing-soccer-on-artificial-turf-increase-cancer-risk-especially-in-kids
(Print and audio piece via KUOW, Seattle's NPR station).

Janco, Katrina. 2024. "Township BOE makes progress on turf field." *The Retrospect,* October 24, 2024. https://www.theretrospect.com/news/township-boe-makes-progress-turf-field

Social Media

Starting in January 2025, the Lowell Center has switched its social media activity from X (Twitter) to Bluesky.