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*** While Chemwatch has taken all efforts to ensure the accuracy of information in this publication, it is not intended to be comprehensive or to render advice. Websites rendered are subject to change.**

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Regulatory Update

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ASIA PACIFIC

8 substances designated as specific substances under the Prohibition and Control of Chemical Weapons Act

2020-06-24

On 17 June 2020, the German Ordinance on Facilities Handling Substances That Are Hazardous to Water (AwSV) List of published water hazard class (WGK) classifications was updated. The following substances were newly assigned a WGK:

1. alpha Alkenes, C24-54-branched and linear
WGK nwg (non-hazardous to water)
2. N,N-bis[3-(dimethylamino)propyl]-N',N'-dimethylpropane-1,3-diamine
WGK 1 (slightly hazardous to water)
3. N,N'-Bis(1-methylpropyl)-1,1-dimethylsilanediamine
WGK 2 (obviously hazardous to water)
4. Butyl 3-mercaptopropionate
WGK 3 (highly hazardous to water)
5. Carbamic acid, N-[3-(triethoxysilyl)propyl]-, 2-[ethyl(4-nitrosophenyl)amino]ethyl ester
WGK 2 (obviously hazardous to water)
6. Copolymer of acetonoxime and isophorone diisocyanate (average MW 1200 g/mol), residual acetonoxime < 1 %
WGK 1 (slightly hazardous to water)
7. N'-[3-(dimethylamino)propyl]-N,N-dimethylpropane-1,3-diamine
WGK 2 (obviously hazardous to water)
8. 2-ethylhexyl hydrogen maleate
WGK 3 (highly hazardous to water)
9. 2-ethyl-2-[[[1-oxoallyl]oxy]methyl]-1,3-propanediyl diacrylate
WGK 2 (obviously hazardous to water)
10. Fatty acids, C14-18 and C16-18-unsatd., ammonium salts
WGK 1 (slightly hazardous to water)
11. Fuel oil, No 4
WGK 3 (highly hazardous to water)
12. Guanidinium phosphate (1:1)
WGK 1 (slightly hazardous to water)
13. Hexasodium ,8'-{carbonylbis[imino-3,1-phenylenecarbonylimino(4-methyl-3,1-phenylene) carbonylimino]}di(1,3,5-

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- naphthalenetrisulfonate
WGK 2 (obviously hazardous to water)
14. 2-Methoxyethyl-2-[(3-nitrophenyl)methylene]acetoacetate
WGK 2 (obviously hazardous to water)
 15. 1H,3H,5H-Oxazolo[3,4-c]oxazole, 3,5-diheptyldihydro-7a-methyl-
WGK 1 (slightly hazardous to water)
 16. 2-[[[(5S)-2-Oxo-3-[4-(3-oxomorpholin-4-yl)phenyl]-1,3-oxazolidin-5-yl]methyl]-2,3-dihydro-1H-isoindole-1,3-dione
WGK 2 (obviously hazardous to water)
 17. N-[(2S,3R,4R,5R)-2,3,4,5,6-Pentahydroxyhexyl]formamide
WGK 1 (slightly hazardous to water)
 18. Phosphoric acid, mono C16-20 (branched, even numbered) alkyl esters
WGK 1 (slightly hazardous to water)
 19. Reaction mass of 1-O-alpha-D-glucopyranosyl-D-fructose and 6-O-alpha-D-glucopyranosyl-D-fructose and fructose and glucose and sucrose
WGK 1 (slightly hazardous to water)
 20. Reaction mass of 1-O-alpha-D-Glucopyranosyl-D-mannitol and 6-O-alpha-D-Glucopyranosyl-D-glucitol
WGK 1 (slightly hazardous to water)
 21. N,N,N''-tributyl-1-methylsilanetriamine
WGK 1 (slightly hazardous to water)
 22. Tricopper bis(orthophosphate)
WGK 2 (obviously hazardous to water)
 23. N,N,N''-tricyclohexyl-1-methylsilanetriamine
WGK 1 (slightly hazardous to water)
 24. Zirconium carbide
WGK 1 (slightly hazardous to water)
 25. Zirconium disilicide
WGK 2 (obviously hazardous to water)

Yordas Hive, 24 June 2020

<https://www.yordashive.com/news/article/93922> October 2019

European canola buyers demand Australian farmers stop using legal chemical omethoate

2020-06-26

European canola buyers have ordered Australian farmers to stop using an insecticide on their crops if they want to keep selling into the market.

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Farmers fear it is the first step to banning a range of chemicals, such as glyphosate, which are legal in Australia but not accepted in Europe.

One peak farming body said the move could breach international trade rules.

Last week, WA grain company Cooperative Bulk Handling (CBH) Group wrote to growers telling them to stop using omethoate if they had signed up to a European accreditation scheme that gave canola producers a premium.

It angered local farmers because omethoate, used most commonly to kill red-legged earth mite, is legal and approved for use by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

APVMA reviewed omethoate in 2016 and banned it from being used in home gardens and on some horticulture crops, but allowed its continued use for red-legged earth mite.

"Omethoate is approved for use in Australia and is safe to use according to the updated label instructions," an APVMA spokeswoman said.

Le Mat is the commercial name for omethoate, and its label says it can be used on pastures, cereals such as wheat and oilseeds such as canola.

Scheme created to ensure supply

Europe is the largest buyer of Australian canola, most of which comes from WA and South Australia.

The European Union prefers non-genetically modified (GM) canola, giving Australia an edge over its biggest competitor, Canada, which grows only GM canola.

WA's canola exports are worth about \$800 million a year and almost all sold by CBH group.

ABC News, 26 June 2020

<https://www.abc.net.au/news/2020-06-20/canola-exports-to-europe-at-risk-over-insecticide-omethoate/12373484>

Farmers fear it is the first step to banning a range of chemicals, such as glyphosate, which are legal in Australia but not accepted in Europe.

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AMERICA

'All smoke and mirrors': How Trump's meatpacking order has failed to keep workers safe

2020-06-21

When President Donald Trump signed an executive order April 28 to declare meatpacking plants critical infrastructure, he tapped the secretary of agriculture to keep the plants open amid a wave of coronavirus outbreaks.

The move signaled that the nation's priorities focused more on the continued production of meat than the safety of workers.

Agriculture Secretary Sonny Perdue and the U.S. Department of Agriculture have nothing to do with worker protections. Their mission, as Perdue noted May 5 in a letter to meatpacking companies, "is to inspect meat and poultry products to ensure that they are wholesome and safe."

Worker safety is the purview of the Occupational Safety and Health Administration and the Centers for Disease Control and Prevention. Perdue said the USDA was partnering with OSHA and the CDC to protect meatpacking employees.

Since the executive order, COVID-19 cases tied to meatpacking plants have skyrocketed from fewer than 5,000 to more than 25,000 as of two weeks ago, according to tracking from the Midwest Center for Investigative Reporting.

Deaths have increased fivefold to 91.

Rather than protecting workers, a half-dozen experts and advocates said, the federal government is failing them.

"It's all smoke and mirrors. There was never any expectation by the industry or the government that they would impose any requirements on the industry to change its practices to protect workers," said Debbie Berkowitz, who spent six years as chief of staff and senior policy adviser at OSHA and is director of the National Employment Law Project's worker health and safety program.

In April, major meatpacking companies announced safety measures, such as requiring workers to wear masks, inserting plastic barriers on the cutting line and checking workers' temperatures. They have not slowed the spread of the virus. About a quarter of the workforce at a Tyson plant

Deaths have increased fivefold to 91.

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in Storm Lake, Iowa, tested positive after protections had been in place for about a month.

Throughout the pandemic, workers have reported they're forced to work alongside people with symptoms. One federal meat inspector, who agreed to an interview on the condition of anonymity because she was not authorized to speak to the media, said workers in several plants she visits were not wearing masks and practiced only limited social distancing. Some, she said, had tested positive for COVID-19.

After Trump's orders, red flags appeared almost immediately.

A day after Trump's order, the USDA said meatpacking plants would have to submit to the agency their COVID-19 safety plans. It narrowed the directive later to include only the plants that had closed without a clear timetable for reopening. As a result, no one submitted a plan.

Perdue publicly ordered all plants to follow the meatpacking safety guidelines jointly issued by OSHA and the CDC. Days later, the USDA admitted it had done nothing to confirm that plants were following them, according to a letter members of the Senate Agriculture Committee sent to Perdue on May 15.

The letter details how USDA officials repeatedly said worker safety is OSHA's responsibility – the USDA primarily oversees food safety – but the agency did not consult with OSHA to ensure it inspected any of the closed plants before they reopened.

OSHA is operating with its fewest number of safety inspectors since it was created in the 1970s, according to the National Employment Law Project and based on a compilation of OSHA data and documents. An agency spokesperson said the agency was "actively recruiting" inspectors.

From Feb. 1 to June 16, the agency received 185 complaints about meat and poultry plants related to the coronavirus, according to data OSHA provided. There have been 56 inspections.

At one JBS plant in Greeley, Colorado, the workers' union president asked OSHA to inspect the plant in March.

Kim Cordova, president of the United Food and Commercial Workers Local 7, said a regional OSHA official told her "that they have no direction on how to handle COVID and they simply just didn't have the staff to do it."

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OSHA did not inspect the facility until mid-May. By that point, at least five workers had died. With nearly 300 cases, the plant is the site of the largest outbreak in Colorado. A sixth worker has since died.

"It took workers to die for OSHA to show up," Cordova said. "They failed these workers. Here the president issues an executive order, but it doesn't take into any account worker safety. ... Unless you have verifiable and enforceable laws, the companies will do the bare minimum."

JBS did not respond to requests for comment.

It's unclear how OSHA decides which plants to inspect. The agency opened an investigation into the Rantoul Foods pork plant in Rantoul, Illinois, after health inspectors found no barriers between workers on the line and cold water at sinks. Almost 100 workers have tested positive, though there have been no deaths. OSHA asked the county health department for information it had on the plant, but a Department of Labor spokesman would not say whether OSHA inspectors had actually visited it.

In Joslin, Illinois, the home of a large Tyson Foods plant, nearly 200 workers have tested positive, and two have died. OSHA has not initiated an inquiry into the plant. The local health department has not heard from the agency, spokeswoman Janet Hill said.

An agency spokesperson said OSHA was taking the necessary steps to protect workers from the coronavirus.

"It is important that employers seek to adhere to" the CDC and OSHA guidelines for meatpacking plants, the spokesperson said. "In the event of an investigation, OSHA will take into account good faith attempts to follow the (guidelines). OSHA does not anticipate citing employers that adhere to the (guidelines)."

The CDC has visited plants, but it doesn't enforce worker safety. As of June 9, the agency toured facilities in 17 states, including Nebraska, Pennsylvania and North Carolina, said Jason McDonald, an agency spokesman. It has not sent a team to Iowa, which has several plants with large outbreaks.

The CDC issues only recommendations. It doesn't enforce companies' safety plans. When asked by USA TODAY what the agency was doing to ensure workers were safe, McDonald replied, "Please contact USDA and/or OSHA."

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The USDA did not respond to requests for comments. The White House did not respond to a request for comment about why the USDA was chosen as the lead agency on meatpacking plants during the pandemic.

"There has been much more energy and concern around addressing the concerns of the meatpacking and other food processing business interests than in what needs to happen for workers," Sen. Debbie Stabenow, D-Mich., the ranking minority member of the Agriculture Committee, told USA TODAY. "I have not seen any plan from the USDA on how they are going to ensure that plants are taking the necessary steps to protect workers."

Stabenow was among the 29 committee members who raised concerns about the USDA's handling of meatpacking worker safety in the letter May 15. The senators asked a series of questions related to how the agency planned to keep workers safe and asked for answers by May 25.

The USDA has not provided answers, according to those who signed the letter.

Aberdeen News, 21 June 2020

https://www.aberdeennews.com/farm_forum/all-smoke-and-mirrors-how-trump-s-meatpacking-order-has-failed-to-keep-workers-safe/article_cd1cf5e4-b37d-11ea-9081-838b126f5b94.html

Lack of Perchlorate standard paves way for superfund slowdown

2020-06-26

The EPA's decision not to regulate perchlorate in drinking water will slow Superfund cleanups, especially in the majority of states that lack their own restrictions on the chemical, environmental attorneys said.

The Environmental Protection Agency last week announced that it wouldn't set an enforceable limit for perchlorate, a chemical commonly used in rocket fuel.

Since entities involved in Superfund cleanups often lean on federal drinking water limits to decide how much of a chemical to remove, a lack of federal authority on perchlorate could slow that decision-making process, said Michael Blumenthal, of counsel at McGlinchey Stafford PLLC in Cleveland.

The Environmental Protection Agency last week announced that it wouldn't set an enforceable limit for perchlorate, a chemical commonly used in rocket fuel.

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"It's going to have a profound impact on Superfund sites that are just in the beginning process of determining what's driving the cleanup," he said.

California and Massachusetts regulate the amount of perchlorate in their drinking water. But in other states, "there will be no overarching federal standard that state regulators will have to bear in mind at sites with perchlorate contamination," said Reza Zarghamee, special counsel at Pillsbury Winthrop Shaw Pittman LLP in Washington.

On the other hand, the lack of a federal standard could provide more flexibility in individual Superfund cleanups, said Louise Nelson Dyble, an associate at Troutman Sanders LLP in San Francisco.

There are about 60 Superfund sites where perchlorate is being remediated. Those sites are in Alabama, Arizona, California, Massachusetts, Maryland, North Carolina, Oregon, Texas, and West Virginia, according to the EPA.

Launch Liabilities

A federal standard would have prompted other agencies, such as the National Aeronautics and Space Administration, to test for perchlorate at their properties, attorneys said.

The EPA asked NASA to test for perchlorate at Cape Canaveral Air Force Station in Florida, according to a 2005 Government Accountability Office report. But the Air Force said it wouldn't go beyond its limited sampling until there was a federal standard for the chemical.

Perchlorate can be found in fireworks and fertilizers as well as in rocket fuel, and can cause developmental impairment in fetuses, according to the GAO. Long-term exposure to perchlorate can cause thyroid problems. Short-term exposure may cause eye and skin irritation, as well as nausea and vomiting, according to an EPA fact sheet.

"One could imagine that responsible parties would be hesitant to incur significant expenses to address this contaminant without knowing the 'target' they would have to attain," Zarghamee said.

More Flexibility for Sites?

But Dyble, from Troutman Sanders, said a site-specific approach could also provide a wider range of cleanup options that might better suit a community's unique needs.

"The development of a remediation plan is a collaborative process that brings in all types of stakeholders," she said. "To be successful, to be

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effective, and to protect the public interest, there needs to be some flexibility built into that process."

The EPA is bound by a 2016 consent decree, entered in U.S. District Court in the Southern District of New York, to issue a national drinking water regulation for perchlorate. The agency asked the court last week to terminate the consent decree.

The Natural Resources Defense Council, which brought the initial complaint against the agency in 2016, has until July 9 to explain to the court why the EPA should still be required to regulate perchlorate.

The agency's decision (RIN:2040-AF28) not to regulate the chemical under the Safe Drinking Water Act will become final once it is published in the Federal Register.

To contact the reporter on this story: Sylvia Carignan in Washington at scarignan@bloombergindustry.com

Bloomberg Law, 26 June 2020

<https://news.bloomberglaw.com/environment-and-energy/lack-of-perchlorate-standard-paves-way-for-superfund-slowdown>

F.D.A. warns of potentially toxic hand sanitizers

2020-06-22

The warning applies to nine lines of hand sanitizer manufactured in Mexico that contain methanol, or wood alcohol, which can be dangerous, the agency said.

The Food and Drug Administration is warning consumers to avoid nine hand sanitizer products manufactured in Mexico because, it said, they may contain methanol, a substance that can be toxic if absorbed through the skin or ingested.

In an advisory dated Friday, the agency said it had tested samples of two products, Lavar Gel and CleanCare No Germ, and found they had 81 percent and 28 percent methanol, also known as wood alcohol.

"Methanol is not an acceptable ingredient for hand sanitizers and should not be used due to its toxic effects," the agency said.

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The F.D.A. said on June 17 that it had recommended that the manufacturer, Eskbiochem SA de CV of Mexico, remove its products from the market but that so far the company had not responded.

New York Times, 22 June 2020

<https://www.nytimes.com/2020/06/22/health/fda-Eskbiochem-toxic-hand-sanitizer-virus.html>

EUROPE

Germany AwSV list of published WGK classifications updated

2020-06-23

On 17 June 2020, the German Ordinance on Facilities Handling Substances That Are Hazardous to Water (AwSV) List of published water hazard class (WGK) classifications was updated. The following substances were newly assigned a WGK:

alpha Alkenes, C24-54-branched and linear

WGK nwg (non-hazardous to water)

N,N-bis[3-(dimethylamino)propyl]-N,N'-dimethylpropane-1,3-diamine

WGK 1 (slightly hazardous to water)

N,N'-Bis(1-methylpropyl)-1,1-dimethylsilanediamine

WGK 2 (obviously hazardous to water)

Butyl 3-mercaptopropionate

WGK 3 (highly hazardous to water)

Carbamic acid, N-[3-(triethoxysilyl)propyl]-, 2-[ethyl(4-nitrosophenyl)amino]ethyl ester

WGK 2 (obviously hazardous to water)

Copolymer of acetonoxime and isophorone diisocyanate (average MW 1200 g/mol), residual acetonoxime < 1 %

WGK 1 (slightly hazardous to water)

N'-[3-(dimethylamino)propyl]-N,N-dimethylpropane-1,3-diamine

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WGK 2 (obviously hazardous to water)

2-ethylhexyl hydrogen maleate

WGK 3 (highly hazardous to water)

2-ethyl-2-[[1-(1-oxoallyl)oxy]methyl]-1,3-propanediyl diacrylate

WGK 2 (obviously hazardous to water)

Fatty acids, C14-18 and C16-18-unsatd., ammonium salts

WGK 1 (slightly hazardous to water)

Fuel oil, No 4

WGK 3 (highly hazardous to water)

Guanidinium phosphate (1:1)

WGK 1 (slightly hazardous to water)

Hexasodium 8,8'-{carbonylbis[imino-3,1-phenylenecarbonylimino(4-methyl-3,1-phenylene)carbonylimino]}di(1,3,5-naphthalenetrisulfonate

WGK 2 (obviously hazardous to water)

2-Methoxyethyl-2-[(3-nitrophenyl)methylene]acetoacetate

WGK 2 (obviously hazardous to water)

1H,3H,5H-Oxazolo[3,4-c]oxazole, 3,5-diheptyldihydro-7a-methyl-

WGK 1 (slightly hazardous to water)

2-[[5S]-2-Oxo-3-[4-(3-oxomorpholin-4-yl)phenyl]-1,3-oxazolidin-5-yl]methyl]-2,3-dihydro-1H-isoindole-1,3-dione

WGK 2 (obviously hazardous to water)

N-[(2S,3R,4R,5R)-2,3,4,5,6-Pentahydroxyhexyl]formamide

WGK 1 (slightly hazardous to water)

Phosphoric acid, mono C16-20 (branched, even numbered) alkyl esters

WGK 1 (slightly hazardous to water)

Reaction mass of 1-O-alpha-D-glucopyranosyl-D-fructose and 6-O-alpha-D-glucopyranosyl-D-fructose and fructose and glucose and sucrose

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WGK 1 (slightly hazardous to water)

Reaction mass of 1-O-alpha-D-Glucopyranosyl-D-mannitol and 6-O-alpha-D-Glucopyranosyl-D-glucitol

WGK 1 (slightly hazardous to water)

N,N,N''-tributyl-1-methylsilanetriamine

WGK 1 (slightly hazardous to water)

Tricopper bis(orthophosphate)

WGK 2 (obviously hazardous to water)

N,N,N''-tricyclohexyl-1-methylsilanetriamine

WGK 1 (slightly hazardous to water)

Zirconium carbide

WGK 1 (slightly hazardous to water)

Zirconium disilicide

WGK 2 (obviously hazardous to water)

Yordas Hive, 23 June 2020

<https://www.yordashive.com/news/article/938>**Denmark to introduce green taxes on carbon emissions**

2020-06-22

COPENHAGEN, June 22 (Reuters) - A majority coalition of parties in Denmark has agreed to introduce a tax on emissions of carbon dioxide and greenhouse gases, the government said late on Sunday.

Denmark has one of the most ambitious climate change targets in the world, aiming to reduce its emissions by 70% by 2030 and become completely climate neutral no later than in 2050.

As part of a broader climate deal set to reduce Denmark's carbon emissions by 3.4 million tonnes, the government will negotiate a green tax reform later this year, which will see companies pay a levy on the amount of CO2 they emit, the government said.

Denmark has one of the most ambitious climate change targets in the world, aiming to reduce its emissions by 70% by 2030 and become completely climate neutral no later than in 2050.

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In March, the Danish Council on Climate Change, a government advisory group, said Denmark should sharply increase carbon taxes to meet its climate targets.

Reuters, 22 June 2020

<https://news.trust.org/item/20200622062817-rspdz/>**INTERNATIONAL****New sustainability ranking shows best and worst performers in the chemical industry**

2020-06-16

European chemical companies top the new sustainability ranking ChemScore, followed by a mix of US and Asian companies. The main goal of ChemScore – created by the NGO ChemSec – is to drive investors towards chemical industry frontrunners.

Over 70% of all chemicals used and manufactured in Europe are hazardous to human health and/or the environment, according to Eurostat. Despite this, investors and other stakeholders have very little information about the companies involvement in the production and use of these chemicals.

ChemScore is a corporate benchmark tool – released today by the environmental NGO ChemSec – that looks at the level of sustainability in the product portfolio of the 35 biggest players in the chemical industry. ChemScore aims to capture and rank the world's largest chemical companies' efforts to reduce their production of hazardous chemicals, and to boost investments in safer, greener alternatives.

"For investors, a better understanding of companies' involvement in hazardous chemical production is crucial. Many of these chemicals not only pose a threat to human health and the environment, they also threaten the return of an investment", says Anne-Sofie Bäckar, Executive Director at ChemSec.

Persistent chemicals, such as PFAS, are an illustrative example. These chemicals have been building up in humans and nature over decades and the levels are now critical at many places around the world. In the US, several chemical companies producing such substances are now facing litigation with estimated costs ranging from USD 25 billion to USD 40 billion.

"It's not a coincidence that their stock prices have taken a nosedive compared to the industry average", comments Anne-Sofie Bäckar.

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"It's not a coincidence that their stock prices have taken a nosedive compared to the industry average", comments Anne-Sofie Bäckar.

About the ranking

Through ChemScore, investors are shown the best and worst performers in the chemical industry. The 35 largest stock-listed chemical companies (based on their 2018 revenue) are ranked in four different categories.

Hazardous Product Portfolio – each company's total production of hazardous chemicals, weighted on the basis of the company's total revenue. Lower production of hazardous chemicals gives a higher category score.

Development of Safer Chemicals – the strategy towards safer products, including design stage, marketing of safer products, R&D and green chemistry.

Management & Transparency – the companies' transparency with product ingredients, and public commitments to phase out certain substances.

Controversies – the companies' track record of accidents and controversies such as fines and liability cases.

Top performer in this year's ChemScore is Dutch chemical company DSM.

"I'm very proud that DSM has topped the ChemScore ranking. This resonates strongly with DSM Resins & Functional Materials' ambition to phase out all chemicals of high concern from our finished products by 2025. This ranking reflects the importance of chemical safety as one of the many aspects of sustainability. Chemical safety is taken very seriously by our industry and this ranking encourages us to maintain our focus on this topic. Moving forward, we must work together to accelerate the sustainable transformation of our industry and create brighter lives for all!", comments Helen Mets, Executive Vice-President of DSM Materials.

ChemScore has been developed with input from chemical industry representatives. It has also consulted the investment community, including Aviva Investors, a global asset manager with £346 billion in assets under management.

"Understanding which companies are leading on sustainable management of chemicals, or lagging behind their peers, is a very important part of the larger sustainability puzzle and we are proud to take the lead in this issue within the investment community. ChemScore broadens our understanding

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of how companies are managing the risks involved in manufacturing chemicals. These include litigation, lack of preparation for new regulation and reputational risk. ChemScore also gives us valuable insight into how we can encourage companies to improve", says Eugenie Mathieu, Senior ESG Analyst with Aviva Investors.

Facts & figures from the ranking

Dutch chemical companies DSM and AkzoNobel have the highest and third highest scores in the ranking.

In general, European companies perform the best.

None of the 35 companies fully disclose what kind of chemicals they produce in regions outside of the EU and US (where regulation forces them to disclose it).

Only three companies score more than ten points (out of 18) in the category that looks at the hazardous chemicals in the companies' portfolios. These are Linde, Air Liquide (both gas companies) and Indorama Ventures (produces mainly polyester).

Three companies score 0 points in this category, indicating that they have portfolios full of toxic chemicals.

Four companies are ahead of the rest when it comes to green chemistry and development of safer chemicals: DSM, AkzoNobel, Sherwin-Williams and LG Chem.

14 of the companies produce persistent chemicals. While still flying under the regulatory radar in many regions, these chemicals have proven to be problematic as the levels build up in nature and humans over time.

All companies have been given a seven-week window to give feedback on their respective score to potentially raise it. 18 of the 35 companies replied.

Chemsec, 16 June 2020

<https://chemsec.org/new-sustainability-ranking-shows-best-and-worst-performers-in-the-chemical-industry/>

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REACH Update

JUL. 03, 2020

4 substances added to the ECHA Candidate List

2020-06-25

On 25 June 2020, the following 4 substances were added to the ECHA Candidate List:

1. Dibutylbis(pentane-2,4-dionato-O,O')tin
2. Butyl 4-hydroxybenzoate
3. 2-methylimidazole
4. 1-vinylimidazole

The addition of 4 entries brings the number of substances on the ECHA Candidate List to 209.

Yordas Hive, 25 June 2020

<https://www.yordashive.com/news/article/942>

2 CLH consultations launched

2020-06-23

On 22 June 2020, ECHA started a 60 day public commenting period on the Harmonised Classification and Labelling (CLH) proposals for the following substances:

4-Nitrosomorpholine

N,N-dimethyl-p-toluidine

Yordas Hive, 23 June 2020

<https://www.yordashive.com/news/article/937>

ECHA names butylparaben a 'hazardous chemical' and announces phase-out goal

2020-06-25

The European Chemicals Agency (ECHA) has added butylparaben to its Candidate List of substances of very high concern (SVHCs) because of its endocrine-disrupting properties – companies importing or producing products containing the substance now have six months to notify the agency.

From January 2021, use of the chemical at levels above 0.1% weight by weight (w/w) in products on the EU market – and use of any other SVHCs in the Candidate List – also had to be declared in ECHA's upcoming

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SCIP [Substances of Concern in articles as such or in complex objects (Products)] database.

The database, ECHA said, aimed to ensure transparent information on products containing hazardous chemicals throughout the entire lifecycle, for both waste operators and consumers.

Total phase-out goal for butylparaben

ECHA said the end goal would be a total phase-out of butylparaben – a chemical the agency defined an *"endocrine-disrupting substance"*. Butylparaben (chemical name Butyl 4-hydroxybenzoate) was most widely used in cosmetics and personal care formulations as an antimicrobial preservative but also featured in some pharmaceutical formulations. Use of butylparaben in cosmetic and personal care formulations had already been restricted to 0.14% in acid form for some years under an amended Annex of the **Cosmetics Regulation**.

In a press announcement issued today, ECHA said butylparaben was one of *"four new hazardous chemicals to be phased out"*. Butylparaben had been added to the Candidate List of SVHCs alongside three other substances considered toxic to reproduction: 1-vinylimidazole (used as a monomer in the production of polymers), 2-methylimidazole (used as a catalyst and in the production of coating products) and Dibutylbis(pentane-2,4-dionato-O,O')tin (used as a catalyst and additive in the production of plastics).

ECHA's Member State Committee was involved in the decision to include butylparaben and Dibutylbis(pentane-2,4-dionato-O,O')tin on the Candidate List, which now featured 209 substances *"that may have serious effects on people or the environment"*.

Christel Musset, director of hazard assessment at ECHA, said: *"Chemicals on the Candidate List are among the most regulated in the EU, and our aim is to gradually phase them out. In the meanwhile, companies need to ensure their safe use and be transparent towards consumers who have the right to know where these chemicals are used."*

Substitution with 'safer alternatives' suggested

Use of any of the 209 chemical substances on the SVHCs Candidate List at levels above 0.1% w/w had to be accompanied by *"sufficient information"* to customers and consumers to allow safe use, ECHA said.

The addition of 4 entries brings the number of substances on the ECHA Candidate List to 209.

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"Companies are urged to check their legal obligations relating to the safe use of their substance," the agency noted – all of which came under **ECHA's Reach Regulation**.

Musset said companies and formulators, ideally, should start substituting these chemicals with *"safer alternatives"* – a move that would not only boost innovation but also create *"a more sustainable circular economy"*.

On the topic of endocrine disruptors, the European Commission (EC) was currently in the middle of an ongoing EU market analysis – labelled a 'fitness check' – and was soon set to publish a final synopsis report and evaluation following public, stakeholder and SME consultations.

The overall goal of the 'fitness check' was to identify concerns, needs and opportunities that could improve the way endocrine disruptors were assessed, managed and potential risks communicated in the EU. All three consultations had now been completed, with a public summary report and targeted stakeholder summary report published; the summary report for the SME consultation was yet to be published.

Butylparaben in the scientific spotlight

Earlier this year, researchers from the Helmholtz Centre for Environmental Research (UFZ) published a two-part study in *Nature Communications* which reported children born to women who use cosmetics containing butylparaben during pregnancy were at an increased risk of obesity and that butylparaben can lead to epigenetic changes that may interfere with appetite regulation.

Whilst the researchers had not, so far, been able to draw firm conclusions on how stable these epigenetic modifications were – or whether they could be passed on to the next generation – they warned that use of cosmetics containing these parabens during pregnancy was a risk and said the 'unambiguous' recommendation should be not to use such products during pregnancy.

The team said it hoped the study would *"help to focus greater attention on such factors in the future"*.

Cosmetics Design Europe, 25 June 2020

<https://www.cosmeticsdesign-europe.com/Article/2020/06/25/Butylparaben-added-to-ECHA-Candidate-List-of-substances-of-very-high-concern-SVHCs>

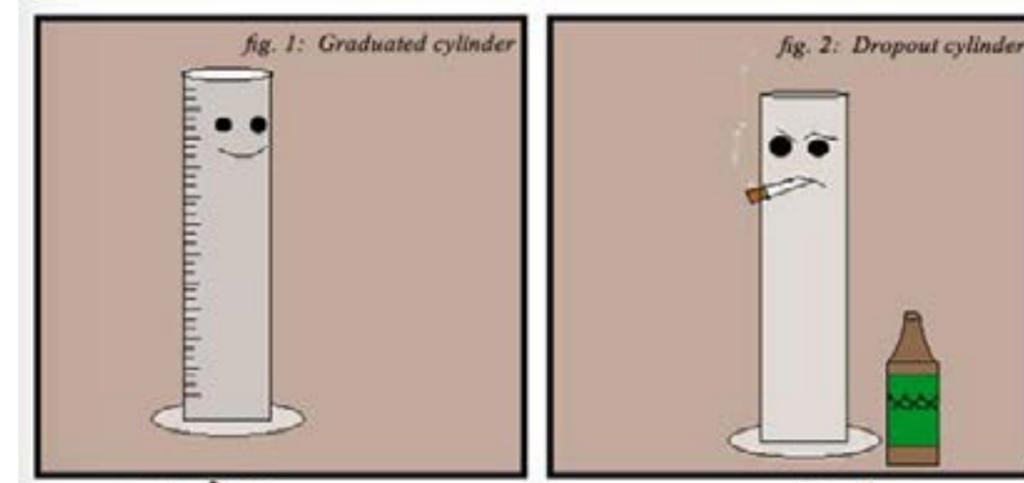
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Janet's Corner

JUL. 03, 2020

Graduated cylinder

2020-07-03



~<https://www.chemistryjokes.com/jokes/graduated-cylinder/>

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Hazard Alert

JUL. 03, 2020

Nickel

2020-06-12

Nickel is a hard, naturally-occurring silver-white metal, with a chemical symbol of Ni and an atomic number of 28. It is the fifth most common element found on Earth, where it is mostly found in the Earth's crust and core. It is highly resistant to corrosion and oxidation and can be fully recycled. Nickel is classed as a Class 1A carcinogen, as it is known to show cancer in humans. [1,2]

USES [1,2,3]

Nickel is used across multiple industries in varying capacities. It is primarily used in the making of alloys—mainly in stainless steel, but also in other metal alloys. Nickel alloys are used in many applications: from toasters and desalination plants, to turbine blades. It is also used in electroplating and in welding and soldering. Nickel is used in batteries and in many of the U.S. coins, including the nickel, dime and quarter. In Australia, all the silver coins (5c, 10c, 20c and 50c) are made from a copper/nickel alloy.

ROUTES OF EXPOSURE [1,4]

- The primary route of exposure to nickel is via inhalation
- Occupational exposure is common in workplaces where are mining, smelting, casting, grinding and welding nickel.
- The general population are exposed to low levels of nickel in their food, water, air and tobacco smoke.
- Nickel-plated materials—such as coins, jewellery and stainless steel utensils and cooking materials—could expose those who are using or wearing them.

HEALTH EFFECTS

Nickel poisoning affects a range of systems including the integumentary and respiratory systems.

Acute Effects [1]

Severity of symptoms depend on the level and type of exposure.

- Skin contact with nickel can result in allergic contact dermatitis.
- Acute exposure to the metal could cause asthma, cancer of the nasopharynx and lung, or bronchitis.

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- Nickel exposure could result in nausea, vomiting, headache, weakness, rash or itching on the hands or forearms, and decreased lung function.

Chronic Effects [1,5]

Nickel is toxic to multiple body systems. Long-term exposure to the metal could result in asthma, nasal septum perforations, rhinitis, sinusitis and chronic bronchitis. It can also cause inflammation and cancers of the lungs, noses and sinuses. The latter most often occurs in people who have breathed in the metal dust, while working in nickel refineries and nickel-processing plants.

SAFETY

First Aid Measures [6]

- Ingestion: DO NOT INDUCE VOMITING. Immediately contact a medical professional.
- Skin contact: Immediately wash affected area with plenty of water for at least 15 minutes. Remove contaminated clothing; do not re-wear until it has been thoroughly de-contaminated. Immediately contact a healthcare professional.
- Eye contact: Check for and remove contact lenses if easy to do so. Rinse eyes for at least 15 minutes; don't forget to wash under the eyelids. Immediate medical attention is required.
- Inhaled: Take victim to the nearest fresh air source and monitor their breathing. If they are not breathing (and you are qualified), perform CPR with the aid of a pocket mask or one-way valve. Contact a medical professional immediately.
- General: Never administer anything by mouth to an unconscious, exposed person.

Exposure Controls/Personal Protection [6]

- Engineering controls: Emergency eyewash fountains and safety showers should be accessible in the immediate area of the potential exposure. Ensure there is adequate ventilation. Whenever possible, material should be handled in a laboratory, underneath a fume hood.
- Personal protection: Safety glasses, protective and dustproof clothing, glove, an apron and an appropriate mask. For specifications on PPE, check regulations in your jurisdiction.

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REGULATION [6]

United States:

The Occupational Safety and Health Administration (OSHA) has set an 8-hour time weighted average (TWA) concentration for nickel of 1mg/m³.

Australia [1]

Safe Work Australia has set an 8-hour time TWA for nickel of 1mg/m³.

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Gossip

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2020 likely to be the warmest year on record globally

2020-06-15

While the public's attention is consumed by concern over the global pandemic and protests against social injustices, the chronic condition of climate change continues to escalate. In fact, it's becoming more and more likely that 2020 will be the hottest year globally since records have been kept, dating back to the late 1800s.

Reviews of temperatures for May 2020 have now been reported by four standard-bearer climate data organizations including NASA, NOAA, Berkeley Earth and the European agency Copernicus. The unanimous conclusion: Last month was the warmest May on record globally, with the caveat from NOAA that it was a virtual tie with May 2016.

According to NOAA, one of the few places on Earth to be cooler than average in May was much of Canada and the eastern United States. But that did little to counteract 2020's overall warmth.

For the year to date, both NASA and Berkeley Earth rank 2020 as the second warmest globally, a shade behind 2016. This is particularly impressive considering in 2016 there was a Super El Niño. In El Niño years the tropical Pacific Ocean releases copious heat into the atmosphere and record warm years are expected. This year there is no El Niño.

In addition, we are currently at the bottom of the 11-year solar minimum, a time when incoming energy from the sun decreases. This is further proof that solar minimums don't have a substantial impact on climate.

To put this into perspective, the world's five warmest years on record have all occurred since 2015, with 2020 highly likely to continue that trend.

Climate scientist Ed Hawkins' now famous #WarmingStripes visualization provides a simple way to grasp the dramatic changes. At the request of CBS News, Hawkins generated this image below showing January through May temperature anomalies, from 1850 to 2020, with 1850 starting on the left. Each line represents one year, with blue for cooler than normal and red for warmer than normal — the reddest of which appear in 2016 and 2020.

The visualization has become a worldwide symbol of climate change, inspiring art installations, the facade of a train station and even the logo for the U.S. House of Representatives' Select Committee on the Climate Crisis. In fact, to mark the summer solstice later this week, hundreds of thousands of social media users are expected to participate in this

In fact, it's becoming more and more likely that 2020 will be the hottest year globally since records have been kept, dating back to the late 1800s.

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year's [ShowYourStripes campaign](#) Thursday, June 18, by displaying their city's local Warming Stripes.

Since [the Arctic is warming](#) at more than twice the rate of the globe overall, the reddest set of stripes are likely to be found in cities in the far north. Global temperatures this May were given a big boost by astonishing warmth in western Siberia, where some locales were [18 degrees Fahrenheit above normal](#) for the month. As a whole, western Siberia averaged 10 degrees above normal for May, obliterating anything previously experienced.

What's perhaps even more impressive is that this relative warmth has persisted since December, with average temperatures in western Siberia also 10 degrees Fahrenheit above normal — doubling the previous departure from average in 2016.

As a postdoc in the Department of Atmospheric Science at Colorado State University, Zack Labe studies [changes in the Arctic](#) for a living. «The [Siberian warmth](#) is truly remarkable. It's not only the magnitude of warmth, but what is more striking is its persistence,» says Labe.

To put the heat into perspective, on May 23 the Siberian town of Khatanga, far north of the Arctic Circle, hit 78 degrees Fahrenheit. This was 46 degrees above normal and shattered the previous record by a virtually unheard-of 22 degrees. Then on June 9, Nizhnyaya Pesh, an area 900 miles northeast of Moscow near the Arctic Ocean's Barents Sea, hit a sweltering 86 degrees Fahrenheit, a staggering 30 degrees above normal.

The average heat across Russia from January to May is so remarkable that it matches what's projected to be normal by the year 2100 if current trends in heat-trapping carbon emissions continue. In the image below, the data point for 2020 is almost off the charts and matches what climate models expect to be typical many decades from now.

This leads to the question, what is causing this extraordinary heat? Climate scientists are always quick to point out that individual events are not caused by climate change, but climate change acts as an amplifier. A good analogy is a subwoofer on a stereo — the sound already exists, but the amplifier magnifies the sound and blasts it out.

“Over the last few years we have observed remarkably extreme events in the Arctic due to warmer than average temperatures,” explains Labe. Reflecting on the Arctic's record-warm May, he said, “While it is difficult

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to attribute this event, especially to understand all of the drivers, it is consistent with climate change within the Arctic.”

While it doesn't explain everything, a commonly accepted explanation for areas in or near the Arctic experiencing these remarkable warm spells is the decline of sea ice, and in some cases snow cover, due to rapidly warming temperatures. The lack of white ice, and corresponding increase in dark ocean and land areas, means less light is reflected and more is absorbed, creating a feedback loop and heating the area disproportionately.

The below image is a month-by-month ranking produced by Labe showing all months since January of 1979 in the Arctic. Blue represents cooler than normal months, and red means warmer than normal. The number ranking for each month and year can be seen in each box, with May 2020 ranking at No. 1.

The dramatic warming in the past few years is rapidly reshaping the Arctic. Over the past four decades, sea ice volume has decreased by 50%. Warming and drying of the landscape is leading to unprecedented Arctic fires, with the summer of 2019 being the [worst fire season on record](#). Right now, what are being called zombie fires — fires that were never quite extinguished over the winter — are flaring back up.

In some cases, the ground is literally giving way as a consequence of permafrost melting. This has resulted in the appearance of several huge craters in Siberia, which [scientists are linking](#) to Arctic amplification from human-caused climate change.

In fact, just weeks ago, in the Siberian city of Norilsk, it appears to have factored into the leak of more than 20,000 tons of [diesel fuel](#) from a reserve fuel tank at a power plant. The fuel accident — one of the biggest in modern Russian history — colored nearby rivers crimson red and prompted Russian President Vladimir Putin to declare a state of emergency. Russian officials have blamed permafrost melt for the accident.

The persistence of the warm air in Siberia and the Arctic as a whole has led scientists at NASA and Berkeley Earth to increase their odds of 2020 being the warmest year on record. Even though 2020 is currently running second to 2016, Berkeley Earth is giving 2020 a 89% chance of ending up as the warmest year. NASA has also increased its estimate of the chances to 72%.

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Gavin Schmidt, the director of NASA Goddard Institute for Space Studies, says the reason confidence is growing that this year will turn out to be the warmest globally has to do with the lack of El Niño. "Normally, record years start out with a big El Niño event [like 2016] and the anomalies decline through the year," he said.

In other words, in El Niño years the relative warmth typically lessens as the year goes on. However, Schmidt explains, "This year is odd because we didn't start off with an El Niño, and so statistically we aren't expecting the anomalies to decline." This means the odds are temperatures will remain warm. Thus Schmidt surmises, "it's possible it will catch up to and outpace 2016 by the time we get to the end."

One added consideration is the recent decline in pollution due to the global pandemic lockdowns. Burning fossil fuels releases particulate matter like aerosols, which typically reflect sunlight back to space, keeping Earth a bit cooler than it would otherwise be. However, the dramatic short-term decrease in air pollutants may allow more sunlight in, warming the climate even more.

Schmidt says this has not yet been factored into forecasts, but it could tip the scales, "This will be a real effect. It's not going to be huge, but it could be the difference between a record or not."

cbsnews.com, 15 June 2020

<https://www.cbsnews.com>

Colombia to resume fumigating its coca fields with glyphosate

2020-06-16

Colombia is about to dust off a controversial weapon from the bloodiest period of the South American nation's decades-long battle against cocaine production: aerial fumigation of coca fields. The raw ingredient used to make cocaine, coca is illegal to cultivate and has long had a destabilizing effect on Colombia. But reactivating the eradication program, environmentalists say, will wreak devastating health and ecological havoc on the vulnerable communities it targets, and on delicate ecosystems across the country.

Colombia is the only coca-producing country in the world that has utilized aerial spraying of glyphosate-based defoliants, which destroy plant life indiscriminately, as part of an anti-drug program. The country's aerial

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fumigation program, which began in the 1990s and continued for 21 years, had a devastating ecological impact and indirectly exacerbated deforestation. The government halted the program in 2014 after a World Health Organization report found that the spray's main ingredient, glyphosate (also the main ingredient in Monsanto's infamous commercial herbicide, Roundup), most likely causes cancer in humans.

But even before the release of the WHO report, use of the chemical in Colombia had a controversial history, with critics claiming the aerial fumigation program was counterproductive, ecologically and economically devastating (small farmers often grow coca alongside food crops, and aerial spraying destroys foliage indiscriminately), and a waste of money. Multiple experts in Colombia told *Sierra* they are particularly worried about the effect of glyphosate on children, whose developing bodies are especially sensitive to caustic chemicals.

So why relaunch the program? In 2019, cocaine production in Colombia reached an all-time high. This past January, partly due to US threats to revoke more than half a billion dollars in foreign aid in the event Colombia failed to address rising cocaine production, President Iván Duque announced plans to resume the controversial program. The decision came on the heels of complaints from President Donald Trump, who last year claimed Colombia had "done nothing for us," and went on to threaten to revoke the country's status as a partner in the War on Drugs—a move that would put America's closest ally in Latin America in the same category as Venezuela, where the US has levied charges of organized narco-trafficking against the federal government.

Much like how the US government has been quietly loosening environmental restrictions in recent months, Colombia's federal government ramped up manual coca eradication efforts under the cover of strict nationwide lockdown measures due to the global coronavirus crisis. Because Colombia's municipal governments, human rights organizations, and environmentalists have challenged the program at the municipal level, implementation has been delayed. Still, the federal government has announced a goal of achieving final approval for aerial spraying by the end of June.

Botanist and ecologist Alberto Gómez worked with the Colombian government on its coca eradication program from 2002 to 2009. After witnessing a fumigation operation in Putamayo, a hot spot for coca production on Colombia's Ecuadorian border, Gómez described being stunned by the ecological devastation he witnessed. "I remember standing

Colombia is the only coca-producing country in the world that has utilized aerial spraying of glyphosate-based defoliants, which destroy plant life indiscriminately, as part of an anti-drug program.

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near the border, looking at thousands of hectares of Colombian forest burnt to ashes," he told *Sierra*. "And just a few meters away, I saw the pristine, untouched forests of Ecuador. That's when I knew we had to find an alternative solution."

One fact is certain—the aerial fumigation program in Colombia, which began in the 1990s and continued for 21 years, had a devastating ecological impact on vulnerable areas of the country and indirectly exacerbated deforestation in delicate ecosystems.

Gómez explains that 40 species of flora exist only in the forested Putamayo region of Colombia. "We were destroying our greatest national gift, our biodiversity, for a program that wasn't working."

David Restrepo, environmental director for the Center of Security and Drug Studies at the University of the Andes, says the EPA's (highly controversial) health findings on glyphosate fail to account for long-term exposure to children. "What's more, the studies saying glyphosate is relatively safe were done on factory farms in stable conditions in the US, not on families growing yuca in a conflict zone. There is no parallel."

Adds Alvaro Jimenez Millan of CCCM, director of an organization that clears anti-personnel mines left by state forces and armed groups in conflict zones, "We're talking about bombing families and children in conflict zones in Colombia with caustic chemical agents, a program that led to grave human rights violations the last time it was implemented."

But the real damage, says Restrepo, is caused by the secondary effects of fumigation. During the height of the program in the early 2000s, growers often fled into protected areas of the rainforest and national parks to avoid being pursued, or planted smaller coca fields among food crops, cutting down forestlands as they were displaced.

A 2019 [report](#) from WOLA, a human rights advocacy group in Latin America, outlines in detail the damage that glyphosate inflicts on the water table in the regions it is used as well as what WOLA describes as «triple deforestation.» Here's how it works: Forests are cleared to adapt the land for the illicit crops. Then, aerial fumigation directly causes indiscriminate deforestation and damage to food crops before, finally, growers flee to new regions to plant again, launching new cycles of deforestation all over again.

Official [figures](#) from the Institute of Hydrology, Meteorology, and Environmental Studies in Colombia indicate that deforestation reached

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124,035 hectares (over 300,000 acres) in 2015 as a direct result of this program. And a great deal of coca is grown in the Amazon region of the country, where delicate rainforest ecosystems are particularly vulnerable to the damage caused to the water table and to indiscriminate defoliation.

"Aerial fumigation is not effective," reiterates Gómez. "During my time in the program, coca fields eradicated by the government had a 70 percent replantation rate. But worse, growers developed countermeasures to the spraying, such as coating the leaves with nonbinding substances when they heard the planes coming, harvesting immediately after a spray, and replanting or simply moving to jungle areas where they are harder to detect."

Gómez proposed a program to the Colombian government in 2015 that would use one of coca's natural predators, a [moth](#) known by locals in the Amazon as "the gringo" due to its insatiable appetite for coca, as a natural and sustainable method to battle production in Colombia. (The study involving the moth, *Eloria noyesi*, was ultimately abandoned, due to the moth's inability to survive in the cold climate of the Andes mountains, which cover nearly half the country.)

In a country that only recently signed a peace accord in 2017 after a 50-year civil war, the decision to fumigate coca fields won't only risk disastrous environmental effects—it may also threaten an increasingly shaky peace accord, as armed groups in the large regions of the country known for coca cultivation are using the [situation](#) to their advantage.

Recruitment among rebels has nearly [doubled](#) as residents in conflict zones increasingly perceive the Colombian government as either unable or unwilling to provide peace or fulfill its promises from the 2017 agreement.

"The peace is in a critical position, and this is likely to make it worse," says Sergio Guzman, director of [Colombia Risk Analysis](#). "When farmers are being bombed as part of this program, [armed groups] are likely to say to these communities, 'Do you know who *isn't* burning down your crops? The guerillas.'"

[sierraclub.org](#), 16 June 2020

<https://www.sierraclub.org>

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Pandemics result from destruction of nature, say UN and WHO

2020-06-18

Pandemics such as coronavirus are the result of humanity's destruction of nature, according to leaders at the UN, WHO and WWF International, and the world has been ignoring this stark reality for decades.

The illegal and unsustainable wildlife trade as well as the devastation of forests and other wild places were still the driving forces behind the increasing number of diseases leaping from wildlife to humans, the leaders told the Guardian.

They are calling for a green and healthy recovery from the Covid-19 pandemic, in particular by reforming destructive farming and unsustainable diets.

A [WWF report](#), also published on Wednesday, warns: "The risk of a new [wildlife-to-human] disease emerging in the future is higher than ever, with the potential to wreak havoc on health, economies and global security."

WWF's head in the UK said post-Brexit trade deals that fail to protect nature would leave Britain "complicit in increasing the risk of the next pandemic".

High-level figures have issued a series of [warnings](#) since March, with the [world's leading biodiversity experts](#) saying even more deadly disease outbreaks are likely in future unless the rampant destruction of the natural world is rapidly halted.

Earlier in June, the UN environment chief and a leading economist said Covid-19 was an "[SOS signal for the human enterprise](#)" and that current economic thinking did not recognise that human wealth depends on nature's health.

"We have seen many diseases emerge over the years, such as Zika, Aids, Sars and Ebola and they all originated from animal populations under conditions of severe environmental pressures," said Elizabeth Maruma Mrema, head of the UN convention on biological diversity, Maria Neira, the World Health Organization director for environment and health, and Marco Lambertini, head of WWF International, [in the Guardian article](#).

With coronavirus, "these outbreaks are manifestations of our dangerously unbalanced relationship with nature", they said. "They all illustrate that

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our own destructive behaviour towards nature is endangering our own health – a stark reality we've been collectively ignoring for decades.

"Worryingly, while Covid-19 has given us yet another reason to protect and preserve nature, we have seen the reverse take place. From the Greater Mekong, to the Amazon and Madagascar, alarming reports have emerged of increased poaching, illegal logging and forest fires, while many countries are engaging in hasty environmental rollbacks and cuts in funding for conservation. This all comes at a time when we need it most.

"We must embrace a just, healthy and green recovery and kickstart a wider transformation towards a model that values nature as the foundation for a healthy society. Not doing so, and instead attempting to save money by neglecting environmental protection, health systems, and social safety nets, has already proven to be a false economy. The bill will be paid many times over."

The WWF report concludes the key drivers for diseases that move from wild animals to humans are the destruction of nature, the intensification of agriculture and livestock production, as well as the trading and consumption of high-risk wildlife.

The report urges all governments to introduce and enforce laws to eliminate the destruction of nature from supply chains of goods and on the public to make their diets more sustainable.

Beef, palm oil and soy are among the commodities frequently linked to deforestation and scientists have said avoiding meat and dairy products is the [single biggest way for people to reduce their environmental impact on the planet](#).

Tanya Steele, the head of WWF UK, said the post-Brexit trade deals must protect nature: "We cannot be complicit in increasing the risk of the next pandemic. We need strong legislation and trade deals that stop us importing food that is the result of rampant deforestation or whose production ignores poor welfare and environmental standards in producer countries. The government has a golden opportunity to make transformative, world-leading change happen."

The WWF report said 60-70% of the new diseases that have emerged in humans since 1990 came from wildlife. Over the same period, 178m

They are calling for a green and healthy recovery from the Covid-19 pandemic, in particular by reforming destructive farming and unsustainable diets.

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hectares of forest have been cleared, equivalent to more than seven times the area of the UK.

theguardian.com, 17 June 2020

<https://www.theguardian.com>

Arctic records its hottest temperature ever

2020-06-23

Alarming heat scorched Siberia on Saturday as the small town of Verkhoyansk (67.5°N latitude) reached 100.4 degrees Fahrenheit, 32 degrees above the normal high temperature. If verified, this is likely the hottest temperature ever recorded in Siberia and also the hottest temperature ever recorded north of the Arctic Circle, which begins at 66.5°N.

The town is 3,000 miles east of Moscow and further north than even Fairbanks, Alaska. On Friday, the city of Caribou, Maine, tied an all-time record at 96 degrees Fahrenheit and was once again well into the 90s on Saturday. To put this into perspective, the city of Miami, Florida, has only reached 100 degrees one time since the city began keeping temperature records in 1896.

Verkhoyansk is typically one of the coldest spots on Earth. This past November, the area reached nearly 60 degrees Fahrenheit below zero, one of the first spots to drop that low in the winter of 2019-2020. The scene below is certainly more characteristic of eastern Siberia.

Reaching 100 degrees in or near the Arctic is almost unheard of. Although the reading is questionable, back in 1915 the town of Fort Yukon, Alaska, not quite as far north as Verkhoyansk, is reported to have reached near 100 degrees. And in 2010 a town a few miles south of the Arctic circle in Russia reached 100.

As a result of the hot-dry conditions right now, numerous fires rage nearby, and smoke is visible for thousands of miles on satellite images.

This heat is not an isolated occurrence. Parts of Siberia have been sizzling for weeks and running remarkably above normal since January. May featured astonishing warmth in western Siberia, where some locales were 18 degrees Fahrenheit above normal, not just for a day, but for the month. As a whole, western Siberia averaged 10 degrees above normal for May, obliterating anything previously experienced.

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On May 23, the Siberian town of Khatanga, far north of the Arctic Circle, hit 78 degrees Fahrenheit. This was 46 degrees above normal and shattered the previous record by a virtually unheard-of 22 degrees. On June 9, Nizhnyaya Pesha, an area 900 miles northeast of Moscow, near the Arctic Ocean's Barents Sea, hit a sweltering 86 degrees Fahrenheit, a staggering 30 degrees above normal.

What's perhaps even more impressive is that this relative warmth has persisted since December, with average temperatures in western Siberia 10 degrees Fahrenheit above normal — doubling the previous departure from average in 2016.

The average heat across Russia from January to May is so remarkable that it matches what's projected to be normal by the year 2100 if current trends in heat-trapping carbon emissions continue. In the image below, the data point for 2020 is almost off the charts, and matches what climate models expect to be typical many decades from now.

The extreme events of recent years are due to a combination of natural weather patterns and human-caused climate change. The weather pattern giving rise to this heat wave is an incredibly stubborn ridge of high pressure; a dome of heat which extends vertically upward through the atmosphere. The sweltering heat is forecast to remain in place for at least the next week, catapulting temperatures easily into the 90s in eastern Siberia.

But this heat wave can not be viewed as an isolated weather pattern. Last summer, the town of Markusvinsa, a village in northern Sweden on the southern edge of the Arctic Circle, hit 94.6°F. Warming and drying of the landscape is leading to unprecedented Arctic fires, with the summer of 2019 being the worst fire season on record.

Due to heat trapping greenhouse gases that result from the burning of fossil fuels and feedback loops, the Arctic is warming at more than two times the average rate of the globe. This phenomenon is known as Arctic Amplification, which is leading to the decline of sea ice, and in some cases snow cover, due to rapidly warming temperatures.

Over the past four decades, sea ice volume has decreased by 50%. The lack of white ice, and corresponding increase in dark ocean and land areas, means less light is reflected and more is absorbed, creating a feedback loop and heating the area disproportionately.

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As the average climate continues to heat up, extremes like the current heat wave will become more frequent and intensify. Scientists say there is only one way to dampen the impact of climate change and that is to stop burning fossil fuels.

cbsnews.com, 23 June 2020

<https://www.cbsnews.com>

Low-cost solar-to-hydrogen cell achieves breakthrough 17.6% efficiency

2020-06-18

Hydrogen's impressive energy density offers some compelling advantages that could see it make a huge difference in the electric aviation and eVTOL sectors, as well as in renewable energy, where it's a lightweight and transportable, if not particularly efficient, way to store clean energy that's not necessarily generated where or when you need it. It's also being pushed as a means of exporting green energy, and Japan and Korea in particular are investing heavily in the idea of a hydrogen energy economy powering everything from vehicles to homes and industry.

For this to come about in a globally positive way, it's imperative that clean, green hydrogen production becomes cheaper, because right now, the easiest and cheapest ways to get yourself a tank full of hydrogen are things like steam reforming, which produces up to 12 times as much carbon dioxide as it does hydrogen by weight.

Green, renewable production methods are thus hot topics for researchers and industry, and a new breakthrough from scientists at the Australian National University (ANU) could make a significant contribution.

It's a photoelectrochemical (PEC) solar-to-hydrogen (STH) cell – a cell that takes in solar energy and water, and directly outputs hydrogen instead of powering an external electrolysis system. In this case, it puts a cutting-edge perovskite photovoltaic cell in tandem with a photoelectrode, and it works better than any similar devices that have been built, using relatively inexpensive semiconductors.

"The voltage generated by a semiconductor material under sunlight is proportional to its bandgap," said project lead Dr. Siva Karuturi, PhD, lead researcher at ANU's College of Engineering and Computer Sciences. "Silicon (Si), the most popular PV material in the market now, can only produce a third of the voltage needed to split water directly. If we use a

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semiconductor with a bandgap twice that of Si, it can provide sufficient voltage, but there is a trade-off. The higher the bandgap, the lower the sunlight capturing ability of a semiconductor. To break this trade-off, we use two semiconductors with smaller bandgaps in tandem that not only capture the sunlight light efficiently, but together produce the necessary voltage to spontaneously generate hydrogen."

One key metric here is solar-to-hydrogen efficiency, and the ultimate target, as laid out by the US Department of Energy nearly a decade ago, is 25 percent, with a 2020 milestone of 20 percent. And while cells have been designed previously that hit 19 percent, these have used prohibitively expensive semiconductor materials. Nothing that could be called affordable has managed to break the 10 percent mark until this design, which lab simulations under accepted conditions have pegged at an impressive 17.6 percent efficiency using a silicon/titanium/platinum photoelectrode.

The team says its results suggest "immense opportunities" for further optimization. The design can be made more efficient by fine-tuning the individual component designs, and it can be made even cheaper by replacing the precious catalytic metals with more abundant materials.

The end game in this space is to get truly clean, renewable hydrogen production down to prices around US\$2.00 per kilogram, where it can compete head to head with dirty hydrogen and indeed fossil fuels. "Significant cost benefits could be achieved through the use of the solar-to-hydrogen approach," says Dr. Karuturi, "as it avoids the need for added power and network infrastructure necessary when hydrogen is instead produced using an electrolyser. And by avoiding the need to convert solar power from DC to AC power and back again, in addition to avoiding power transmission losses, the direct conversion of solar energy into hydrogen can achieve a higher overall efficiency for the total process."

newsatlas.com, 18 June 2020

<https://www.newsatlas.com>

Ban on toxic mercury looms in sugar cane farming, but Australia still has a way to go

2020-06-22

This month, federal authorities finally announced an upcoming ban on mercury-containing pesticide in Australia. We are one of the last countries

The ban will prevent about 5,280 kilograms of mercury entering the Australian environment each year.

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in the world to do so, despite overwhelming evidence over more than 60 years that mercury use as fungicide in agriculture is dangerous.

Mercury is a toxic element that damages human health and the environment, even in low concentrations. In humans, mercury exposure is associated with problems such as kidney damage, neurological impairment and delayed cognitive development in children.

The ban will prevent about 5,280 kilograms of mercury entering the Australian environment each year.

But Australia is yet to ratify an international treaty to reduce mercury emissions from other sources, such as the dental industry and coal-fired power stations. This is our next challenge.

A mercury disaster

Mercury became a popular pesticide ingredient for agriculture in the early 1900s, and a number of poisoning events ensued throughout the world.

They include the Iraq grain disaster in 1971-72, when grain seed treated with mercury was imported from Mexico and the United States. The seed was not meant for human consumption, but rural communities used it to make bread, and 459 people died.

In the decades since, most countries have banned the production and/or use of mercury-based pesticides on crops. In 1995 Australia discontinued their use in most applications, such as turf farming.

Despite this, authorities exempted a fungicide containing mercury known as Shirtan. They restricted its use to sugar cane farming in Queensland, New South Wales, Western Australia and the Northern Territory.

According to the sugar cane industry, about 80% of growers use Shirtan to treat pineapple sett rot disease.

But this month, the Australian Pesticides and Veterinary Medicines Authority cancelled the approval of the mercury-containing active ingredient in Shirtan, methoxyethylmercuric chloride. The decision was made at the request of the ingredient's manufacturer, Alpha Chemicals.

Shirtan's registration was cancelled last week. It will no longer be produced in Australia, but existing supplies can be sold to, and used by, sugar cane farmers for the next year until it is fully banned.

Workers and nature at risk

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Over the past 25 years, Australia's continued use of Shirtan allowed about 50,000 kilograms of mercury into the environment. The effect on river and reef ecosystems is largely unknown.

What is known is that mercury can be toxic even at very low concentrations, and research is needed to understand its ecological impacts.

The use of mercury-based pesticide has also created a high risk of exposure for sugar cane workers. At most risk are those not familiar with safety procedures for handling toxic materials, and who may have been poorly supervised. This risk has been exacerbated by the use itinerant workers, particularly those from a non-English speaking background.

Further, in the hot and humid conditions of Northern Australia, it has been reported that workers may have removed protective gloves to avoid sweating. Again, research is needed to determine the implication of these practices for human health.

To this end, Mercury Australia, a multi-disciplinary network of researchers, has formed to address the environmental, health and other issues surrounding mercury use, both contemporary and historical.

Australia is yet to ratify

The Minamata Convention on Mercury is a global treaty to control mercury use and release into the environment. Australia signed onto the convention in 2013 but is yet to ratify it.

Until the treaty is ratified, Australia is not legally bound to its obligations. It also places us at odds with more than 100 countries that have ratified it, including many of Australia's developed-nation counterparts.

Australia's outlier status in this area is shown in the below table:

Mercury-based pesticide use was one of Australia's largest sources of mercury emissions. But if Australia ratifies the convention, it would be required to control other sources of mercury emissions, such as dental amalgam and the burning of coal in power stations.

The three active power stations in the Latrobe Valley, for example, together emit about 1,200 kilograms of mercury each year.

Time to look at coal

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If Australia ratified the Minamata Convention, it would provide impetus for a timely review and, if necessary, update of mercury regulations across Australia.

Emissions from coal-fired power stations in Australia are regulated by the states through pollution control licences. Some states would likely have to amend these licences if Australia ratified the convention. For example, Victorian licences for coal-fired power stations currently do not include [limits on mercury emissions](#).

Pollution control technologies were introduced at Australian coal plants in the early 1990s. But they [do not match state-of-the-art technologies applied to coal plants in North America and Europe](#).

Australian environment authorities have been [examining the implications](#) of ratifying the convention. But progress is slow.

The issue of mercury emissions does not attract significant public or political attention. But there is a [global scientific consensus](#) that coordinated international action is needed.

The [pesticide phase-out](#) and ban is an important step. But Australia still has a way to go.

theconversation.com, 22 June 2020

<https://www.theconversation.com>

FDA warns of potentially toxic hand sanitisers

2020-06-22

The Food and Drug Administration is warning consumers to avoid nine hand sanitizer products manufactured in Mexico because, it said, they may contain methanol, a substance that can be toxic if absorbed through the skin or ingested.

[In an advisory dated Friday](#), the agency said it had tested samples of two products, Lavar Gel and CleanCare No Germ, and found they had 81 percent and 28 percent methanol, also known as wood alcohol.

“Methanol is not an acceptable ingredient for hand sanitizers and should not be used due to its toxic effects,” the agency said.

The F.D.A. said on June 17 that it had recommended that the manufacturer, [Eskbiochem SA de CV of Mexico](#), remove its products from the market but that so far the company had not responded.

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An Eskbiochem representative, Alexander Escamillo, said the manufacturer learned of the agency warning only on Monday.

Mr. Escamillo said another person who “had access to our company” registered it with the F.D.A. “He registered our labels and shipped sanitizers,” he said. “We did not register ourselves.”

He did not identify the person and said the company could not even log into its F.D.A. profile “because we don’t know how to.”

“We would never do that, send a toxic chemical maliciously,” Mr. Escamillo said, adding that the company would take action against the person, whom he referred to as a broker.

The F.D.A. recommended that anyone exposed to the hand sanitizers with methanol seek immediate treatment. Substantial methanol exposure can lead to nausea, vomiting, headaches, permanent blindness and seizures, among other harmful effects.

The agency said that it was unaware of any reports of “adverse events” associated with these products. It said consumers should dispose of sanitizers listed in the warning in appropriate hazardous waste containers and not flush them or pour them down the drain.

Among the other Eskbiochem products the agency flagged were CleanCare NoGerm Advanced Hand Sanitizer, with 75 or 80 percent alcohol; Saniderm Advanced Hand Sanitizer; and Good Gel Antibacterial Gel Hand Sanitizer.

It was not immediately clear when they were released for sale in the United States.

Dr. Robert Glatter, an emergency physician at Lenox Hill Hospital in Manhattan, said methanol itself was not significantly toxic. Rather, he said, it was formaldehyde and formic acid — the metabolites produced by the breakdown of methanol in the body — that could prove deadly.

Exposure to the metabolites can lead to a condition known as “metabolic acidosis, a dangerous accumulation of acid in the bloodstream, which is toxic to the organs and tissues in the body, leading to seizures, kidney failure, blindness, low blood pressure and fatal cardiac arrhythmias,” Dr. Glatter said.

Children are most at risk if they ingest methanol, but it can also be harmful if they rub it on their skin or inhale it, he added.

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Sales of hand sanitizer have boomed during the coronavirus pandemic as consumers have heeded the calls of health officials to wash or sanitize their hands to keep from contracting the virus.

Historically, methanol was once manufactured by the distillation of wood. Wood alcohol was a hidden danger for unwary drinkers during Prohibition. In New York in 1926, about 750 people died after drinking wood alcohol-laced bootlegged liquor, according to an account at the Mob Museum.

nytimes.com, 22 June 2020

<https://www.nytimes.com>

New bio-ink has promise to create 3D printed bone structures

2020-05-20

Bioprinting is an additive manufacturing approach using biomaterials with cell and growth factors to create tissue-like structures that imitate natural tissues. This has potential for many medical uses, including designing patient-specific bone grafts. Traditional treatments for bone defects or injuries are slow and expensive. Creating replacement bone tissues with bioprinting could create new treatments for arthritis, bone fractures, dental infections and craniofacial defects.

Bioprinting requires cell-laden biomaterials that can flow through the nozzle like a liquid and solidify almost immediately after being deposited. The bio-ink acts as cell carriers and structural components that are printable and create robust and cell-friendly microenvironment. Current bioinks lack sufficient biocompatibility, printability, structural stability and tissues specific functions required for clinical use.

The new bio-ink is called Nano Iconic-Covalent Entanglement (NICE) bioinks. The team combined two reinforcement techniques, nanoreinforcement and iconic-covalent networks, to create better reinforcement and stronger structures. After bioprinting cell-laden NICE networks, they cross-linked the networks to create strong scaffolds. This allowed the team to create full scale and cell-friendly reconstructions of human body parts.

After bioprinting, the enclosed cells start depositing new proteins that are rich in a cartilage-like extracellular matrix that calcifies and forms mineralized bone over three months. Five percent of the printed scaffolds created calcium that was similar to cancellous bone.

Creating replacement bone tissues with bioprinting could create new treatments for arthritis, bone fractures, dental infections and craniofacial defects.

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Researchers used a next-generation genomics technique called whole transcriptome sequencing (RNA-seq) to understand how the bioprinted structures create stem cell differentiation. RNA-seq takes a snapshot of all genetic communication inside a cell at a given moment.

The team plans to demonstrate in vivo functionality of 3D bioprinted bone tissue.

A paper on this research was published in Applied Materials and Interfaces.

insights.globalspec.com, 5 May 2020

<https://www.insights.globalspec.com>

Advertising for sugary drinks increase to \$1 billion from 2013 to 2018

2020-06-24

Despite rampant diet-related disease in the U.S., a new report finds that soft-drink companies—led by corporate giants PepsiCo and Coca-Cola—are ramping up efforts to promote sugary drinks to the tune of \$1 billion per year.

That advertising, according to researchers at the UConn Rudd Center for Food Policy & Obesity, increasingly targets communities of color.

The regular consumption of sugary beverages such as soda is associated with increased risk of heart disease, type 2 diabetes, and even premature death. Soft drink companies have resisted policy measures to reduce consumption and mitigate harm, such as New York City's attempt to ban extra-large sodas in 2012, and Philadelphia's soft drink tax that took effect in 2017.

Companies such as PepsiCo and Coca-Cola instead advocate for consumer choice based solutions and point toward the companies' no-and low-calorie drink options as evidence for their commitment to public health.

The current COVID-19 pandemic has intensified the spotlight on diet-related disease as the U.S. Centers for Disease Control and Prevention (CDC) has cited high levels of obesity and diabetes in victims of the virus.

The new report, which evaluated the advertising behavior of 48 beverage companies, found that they had collectively increased advertising for sugary, sport, and energy drinks by 26 percent between 2013 and 2018.

The researchers also found that advertising on Spanish-language TV had increased 8 percent between 2013 and 2018, and 80 percent since 2010, resulting in a 10-fold increase in exposure for Hispanic youth.

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“Beverage companies have heard loud and clear from the public health community that sugary drinks are a major contributor to...diet-related diseases, and so they’ve promised that they will help [reduce sugary] beverage calories consumed by Americans,” Rudd Center senior research advisor and lead author on the study, Jennifer L. Harris told EHN. “We felt it was...an important time to go in and look at exactly what they’re doing in terms of their advertising.”

In addition to overall increases in advertising spending, the report found that even though there was a 52 percent decline in the amount of time teens spent watching TV over the study period due to the popularity of streaming services, teen exposure to sugary drink advertising on TV had not declined at the same rate.

The researchers also found that advertising on Spanish-language TV had increased 8 percent between 2013 and 2018, and 80 percent since 2010, resulting in a 10-fold increase in exposure for Hispanic youth.

Further, Black children and teens were exposed to more sugary drink ads than White children and teens, even when controlling for the amount of TV hours watched, said Harris.

The researchers expressed concern about high rates of soft drink ad exposure in Hispanic and Black communities, particularly children and teens, because those communities are already disproportionately impacted by diet-related health issues, a concern echoed by Gary Ruskin, co-founder of US Right to Know, a non-profit investigative research group focused on the food industry.

“What we see is [beverage companies] generate a great deal of PR, suggesting that they’re friends of Black and Latino people and culture and at the same time they turn childhood into a free fire zone for advertising... sugary drinks, with the predictable results,” Ruskin, who was not involved with the study, told EHN.

The CDC notes that rates of diabetes in the United States are increasing, sickening 34.2 million people, or 10.5 percent, of the U.S. population, as of 2018. The vast majority of these cases (90-95 percent) represent diet-related type 2 diabetes. Heart disease, also linked to sugary beverage consumption, is the leading cause of death in the United States killing about 647,000 Americans each year.

The study found that Coca-Cola and PepsiCo were responsible for a combined total of 61 percent of the advertising expenditures evaluated in

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the report. Coca-Cola, who has pledged to work “with all sectors of society to find solutions to obesity” was found to have increased sugary drink advertising by 81 percent over the study period.

The report recommends taxes on sugary drinks and investing the revenue in community programs and services, prohibiting the sale of energy drinks to minors, and corporate responsibility initiatives that address sugary drink marketing to communities of color.

“It’s well past time for the industry to stop putting profits ahead of our kids’ health and put their advertising dollars behind products that contribute to good health rather than undermine it,” said researcher Fran Fleming-Milici, in a statement.

ehn.org, 24 June 2020

<https://www.ehn.org>

Study finds a one-time treatment eliminates Parkinson’s disease in mice

2020-06-24

Researchers say they have discovered a technique that can reverse symptoms of Parkinson’s disease in a mouse model of the disease.

They say the technique may represent a new approach to explore for the treatment of neurodegenerative conditions.

A major goal of regenerative medicine is to replace neurons lost during neurodegenerative disorders and promote the integration of new neurons into brain circuits.

For example, Parkinson’s disease is characterised by a loss of dopaminergic neurons in a region of the brain responsible for reward and movement.

Xiang-Dong Fu and his team at University of California San Diego School of Medicine, say their findings suggest certain brain cells called astrocytes can be turned into functional dopaminergic neurons using a single-step method.

The study published in Nature was conducted in isolated human cells and in mice.

Dr Fu said: “Researchers around the world have tried many ways to generate neurons in the lab, using stem cells and other means, so we

“The fact that we could produce so many neurons in such a relatively easy way came as a big surprise.”

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can study them better, as well as to use them to replace lost neurons in neurodegenerative diseases.

“The fact that we could produce so many neurons in such a relatively easy way came as a big surprise.”

Astrocytes produce a protein which prevents them from becoming neurons.

Researchers say removing this protein converts them to fully functional neurons that repopulate the lost neuronal circuits, restore dopamine levels and rescue motor deficits in mouse models of Parkinson’s disease.

But they caution that further research is needed before the approach can be applied to humans.

The researchers administered the treatment directly to a part of the mouse’s brain, which is responsible for regulating motor control and reward behaviours, and the part of the brain that typically loses dopamine-producing neurons in Parkinson’s disease.

A control group of mice received mock treatment.

In the treated mice, a small subset of astrocytes converted to neurons, increasing the number of neurons by approximately 30%, the study suggests.

Dopamine levels were restored to a level comparable to that in normal mice.

By two different measures of limb movement and response, the treated mice returned to normal within three months after a single treatment.

They remained completely free from symptoms of Parkinson’s disease for the rest of their lives.

In contrast, the control mice showed no improvement.

Professor Tara Spire-Jones of the UK Dementia Research Institute at the University of Edinburgh and deputy director of the Centre for Discovery Brain Sciences, University of Edinburgh, said: “While the principle of this study is remarkable and promising, it is important to note that it was conducted in mice with group sizes from three to eight and there is a long way to go to translate this into a treatment for people.”

Robert Howard, professor of old age psychiatry, at University College London, said the findings were an “extraordinary scientific discovery”.

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He added: “This opens up a completely novel avenue for development of treatments to ‘rebuild’ damaged brains in Alzheimer’s and Parkinson’s diseases.”

newschain.uk, 24 June 2020

<https://www.newschain.uk>

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Could a global of 'observatory' of blood help stop the next pandemic?

2020-06-13

Michael Mina is out for blood—millions of samples, which a nascent effort dubbed the Global Immunological Observatory (GIO), would monitor for signs of pathogens spreading through the population. Instead of a telescope, it will rely on technology that can measure hundreds of thousands of distinct antibodies in a microliter of blood. If the GIO can overcome technical and logistical hurdles and find sustained funding, he says, it could provide a powerful tool for monitoring and responding to disease outbreaks.

For now, the idea is just a pilot project to track the spread of COVID-19. The stealthy spread of that disease through the population underscored the need for such a monitoring system, says Mina, an immunologist and epidemiologist at Brigham and Women's Hospital and the Harvard School of Public Health, who with colleagues **outlines the GIO concept** this week in *eLife*. (The co-authors include Jeremy Farrar, an infectious disease specialist and director of the Wellcome Trust, as well as vaccine and immunology specialists Adrian McDermott and Daniel Douek of the National Institutes of Health.)

Disease surveillance in the United States now relies on a patchwork of hospitals, clinics, and doctors to report unusual events to state health departments, which pass the information on to the Centers for Disease Control and Prevention (CDC). The need for faster, more comprehensive surveillance, Mina says, "was starkly clear with the inability to identify and model local circulation of COVID-19 in a timely fashion."

Mina wants to watch for outbreaks by looking for antibodies to infectious agents in regularly collected, anonymized blood samples from every possible source—blood banks, plasma collection centers, even the heel needle sticks of newborns, which are taken in most states from every baby in order to identify genetic diseases. The samples would be identified only by geographical area. Chip-based platforms that can identify hundreds of thousands of antibodies are already produced commercially by companies including **VirScan** and **Luminex**. Mina says these could easily be scaled up to look at huge numbers of samples, either individually or in batches.

"This is an extraordinary and exciting concept," says infectious disease specialist William Schaffner of the Vanderbilt University Medical Center. "It is an example of the kind of fresh new thinking we need in public health."

Disease surveillance in the United States now relies on a patchwork of hospitals, clinics, and doctors to report unusual events to state health departments, which pass the information on to the Centers for Disease Control and Prevention (CDC).

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But, Schaffner adds, "The logistical challenges for such an endeavor could be daunting."

Mina and his co-authors envision initially testing about 10,000 samples per day and later, if they secure funding to build up the project, some 100,000 per day for the United States alone. Even the smaller number would detect—far faster than the current reporting system—an outbreak of Zika virus in rural Louisiana, for example, or an eruption of West Nile virus in Colorado. The GIO could also accelerate the monitoring of seasonal influenza, allowing hospitals to prepare for possible surges and for public health officials to be sure vaccine is distributed as efficiently as possible.

When a new infectious disease such as COVID-19 appears, the GIO could track its spread. The antibody-detecting chips wouldn't necessarily have to be updated to spot a new pathogen, such as SARS-CoV-2, the virus that causes COVID-19. Researchers might see a rise in antibodies that nonspecifically target known pathogens—and might flag their unknown relatives. For example, a burst of antibodies that cross-react various coronaviruses would likely have been seen in people in Wuhan, China, who were infected with the novel coronavirus.

Top of Form

Bottom of Form

Antibodies, which typically appear 1 to 2 weeks after an infection starts, can signal not just people who are currently infected, but also those who had the disease and recovered. The GIO would also identify the particular strains of a bacteria or virus infecting people because each produces a unique antibody signature.

The idea of regularly monitoring entire populations for antibodies arose in the lab of evolutionary biologist Bryan Grenfell at Princeton University, where Mina worked as a postdoctoral fellow. Now, Mina has joined Grenfell and Jessica Metcalf, also an evolutionary biologist at Princeton, in expanding the concept.

The GIO team is already building a pilot laboratory in Massachusetts, while it looks to secure financial support. "Given the importance we believe this could have, we are beginning to look for funding from some of the major philanthropic donors of public health work," Mina says. "We are currently exploring and open to all options."

Meanwhile, the team's pilot project, supported by the Open Philanthropy foundation, is gathering many thousands of anonymous blood samples

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from a plasma-collecting company Octapharma. By screening them for antibodies to SARS-CoV-2, Mina and his colleagues hope to learn how useful widespread antibody testing can be in tracing the spread of the new coronavirus and possibly predicting future “hot spots” or localized outbreaks.

People often do not develop antibodies until well after infections; for SARS-CoV-2 it takes 1 or 2 weeks. But Mina says the antibody testing still provides valuable information. “A week into an outbreak isn’t huge,” he said. “For example, if we were doing this with [blood from] just a small fraction of New York, we would have detected that [SARS-CoV-2] was there in February and could have given [Governor Andrew] Cuomo plenty of ammunition to close down the city March 1 instead of March 19.”

sciencemag.org, 13 June 2020

<https://www.sciencemag.org>

‘It’s only important if you eat food’: inside a film on the honeybee crisis

2020-06-18

Every February, Brett Adee joins a caravan of semi-trucks, bound for California’s Central Valley, loaded with millions upon millions of fragile, precious cargo: honeybees. In order for the state’s almond trees to bear fruit – and thus generate an \$11bn industry supplying 80% of the world’s almonds – they must be pollinated during the brief window in which the trees flower, from late February through March. And that requires an army of pollinators: some 1.8m hives of honeybees, almost the entire commercial supply in the US, drafted into big agriculture and trucked into central California from as far as the Great Plains and the east coast.

The almond enterprise is cutthroat and risky, reliant on honeybees sent not so much to work as to war, which makes the European honeybee “a keystone species for us in the United States, even though they’re not native to the US, because of the way that they’re used in agriculture”, Peter Nelson, a 30-year beekeeper, told the Guardian. Which is why Adee monitors his hives so closely – the bees are the difference between an almond crop and a bust year. And the bees face increasing risks of disaster; in Nelson’s film *The Pollinators*, a 90-minute documentary on commercial beekeeping and its linchpin role in the American food supply, Adee assesses a field in Kern county, California, which appears hazy and idyllic –

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rows of white-bursting almond trees, dotted every couple of lines or so by palettes of Adee’s hives. But up close, it’s a scene of carnage.

Piles of dead honeybees pool around each hive like splotchy puddles; Adee reports a “mass die-off”, probably from acute pesticide or fungicide poisoning. It could have been a neighbor who sprayed their trees too soon, or used a legal chemical toxic to bees without knowing. Adee’s team inspects, collects samples, runs tests – for the bees, and because hundreds of thousands of dollars are on the line. “If we put the same economic value on a honeybee as cattle, we wouldn’t have a pesticide investigator out there for these kind of losses,” he says. “We’d have the FBI out there.”

The precarious state of the honeybee is not a new phenomenon, nor an understudied one, but its implication for American agriculture – and therefore America’s supply of produce in its bountiful supermarkets – is vast and undervalued by the general public. “Most of us are three or four generations off of the farm ... for many people there’s not a real connection to who grows their food and how food is grown,” said Nelson. Disconnected from the massive farms which supply produce, most Americans are unaware of the honeybee’s essential role. “The farmers are using these bees essentially as an insurance policy to make sure that they have pollination,” Nelson said, “because if there isn’t pollination of something, you have no crop. It’s a necessity.”

The Pollinators follows the frenzied, relentless work of the commercial honeybees, whose biological stability is threatened by a host of interlocking factors, and the workers who ferry them across America’s ravenous agricultural expanse. These beekeepers, the “last of the cowboys” as Adee calls them, crisscross the country from bloom to bloom, lugging a cumulative 2m hives from the almond groves in California to blueberry patches in Maine to apple orchards in Virginia – some 22 moves a year, according to keeper Davey Hackenberg.

As numerous beekeepers, scientists and farmers explain, such harried movement – along with the pesticide use demanded by the market and American consumers, bee immune systems weakened from monocultural habitats, invasive mite species, and of course the exacerbating effect of climate change – has cultivated a beekeeping crisis. Between 2007 and 2013, more than 10m hives were lost worldwide – twice the normal rate – many from Colony Collapse Disorder (CCD), a mysterious phenomenon with no known single cause in which a hive’s worker bees disappear. Where beekeepers used to expect about 5% hive losses a year, they now routinely see upwards of 30%. One survey found that commercial bee

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farmers lost 40% of their hives – some 50 billion bees – during the winter of 2018-2019. “People talk about the financial viability of the bee industry,” says Adele in *The Pollinators*. “But I think what I’m more concerned with is the biological viability of the bee industry.”

The Pollinators argues that CCD as a term masks a network of threats to the honeybee exacerbated by several interconnecting, preventable factors. “It would be nice if there was a tidy answer, like ‘bees are dying because of X,’” Sally Roy, Nelson’s wife and a producer on the film, told the Guardian. “But it’s more than one thing that’s causing the losses for bees.” Individual factors such as Varroa mites or overwork in monocultural fields would be more manageable in isolation but are compounded by a staple of American agriculture: pesticides. From the Central Valley’s toxic soup of chemicals to apple orchards’ crop-beautifying sprays, America’s agricultural industry runs on chemicals. Since 1996, farmers have shifted from a class of chemicals called organophosphates, which were dangerous for humans, to neonicotinoids, which take years to decay naturally and ravage bee health. And in a cruel irony, the chemicals stick around best in fatty substances, such as honeycombs.

America’s current pesticide model – spray everything preventively – is “kind of like taking an aspirin in the morning because you might have a headache in the afternoon,” said Nelson, “whereas a much better approach would be integrated pest management,” a more labor-intensive method that targets certain pests in limited populations as they appear. “I don’t think it’s realistic to think we can live in a world without pesticides,” he said. “But it’s how we use them and the type that we use that really makes a difference.”

While it may seem daunting to think of taking on entrenched and, as farmers testify in the film, economically necessary pesticide use, much of beekeeping and apiculture science and improvement is “completely actionable,” said Nelson. “There are some global issues that we’re facing that can sometimes seem overwhelming ... but with this problem, we can all do something.” He proposed a “scale of actionable things that people can do, from supporting your local beekeeper and buying local honey, support local CFAs, farmers’ markets”, to political action, such as advocating ending pesticide use on local roadsides. Even growing a pollinator garden, with a window box in cities, or not using herbicides or pesticides on your lawn – “lawns in America are essentially a giant monoculture that is everywhere,” said Nelson – can improve a local ecosystem, itself a smaller web of America’s food ecosystem dependent on strained populations of pollinators.

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“You can really participate in making a change, through education, through action, through becoming a beekeeper, through gardening – all of those things are super important to this issue and really can make a difference,” said Nelson. After all, Roy added: “this film,” and the health of the honeybee, “is only important if you eat food.”

theguardian.com, 18 June 2020

<https://www.theguardian.com>

Baby planets are born exceptionally fast, study suggests

2020-06-16

Planets are forming around young stars far faster than scientists expected, arising in a cosmic eye blink of less than half a million years, according to a new study. That finding could inform models of planet formation and help resolve a problem plaguing astronomers since 2018, when data indicated that planetary nurseries contained far too little material to actually create planets.

Planets coalesce from massive disks of gas and dust that surround newborn stars. But detecting these embryonic worlds is difficult because both the star and the disk shine far brighter than any tiny planet.

To find out how much material is available for planet formation, researchers have used the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile to weigh the disks around young stars between 1 million and 3 million years old. Past studies found that some lacked the mass to form even a single Jupiter-size world. The results suggested astronomers were either overlooking some hidden reservoir of material or they were looking too late in the planet-forging process, after growing protoplanets had already vacuumed up much of the material.

Top of Form

Bottom of Form

The answer, says Łukasz Tychoniec, a graduate student at Leiden Observatory and lead author of the new paper, is that “we need to look earlier instead of [looking] for missing mass.”

Along with his colleagues, Tychoniec used images from ALMA and the Very Large Array (VLA) in New Mexico to study 77 protostars in the Perseus molecular cloud, a giant star-forming region roughly 1000 light-years

These infant star systems are thought to be between 100,000 and 500,000 years old.

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away. These infant star systems are thought to be between 100,000 and 500,000 years old.

The dishes at the ALMA and VLA can gather far-infrared light, emitted by dust grains about 1 millimeter in wavelength, that can pass through obscuring gas clouds and reach Earth. Measuring the total amount of infrared light given off by the disks provides an estimate of their dust content and therefore their mass. The team found the young disks contained about an order of magnitude more material than disks observed just 1 or 2 million years later in their development, they report in a paper published on the preprint server arXiv, and accepted for publication at *Astronomy & Astrophysics*. That amount is more than enough to account for planet formation.

The large sample size and the use of two observatories, which see in slightly different wavelengths and tally up different dust populations, make the findings an important contribution, says astrophysicist Megan Ansdell at NASA headquarters. "But there are a lot of caveats," she adds.

In particular, she says, it would be better to draw conclusions from star-forming regions across multiple molecular clouds, rather than just the Perseus cloud, which might have unique environmental conditions. Tychoniec says his team plans to look at more young stars in greater detail to see whether the result holds.

sciencemag.org, 16 June 2020

<https://www.sciencemag.org>

How can international travel resume during the coronavirus pandemic?

2020-06-13

Much of the world is starting to open up again, with many countries easing or planning to ease coronavirus travel restrictions. But would-be travellers face a confusing, uncertain and fast-changing situation.

As the coronavirus spread around the world, a lot of countries – but not all – closed their borders to varying extents. Some require all travellers to self-isolate or to be quarantined in special facilities for 14 days after entry. Others allow only their own citizens to enter.

These measures have helped control the spread of the coronavirus. "Travel bans actually do work, as we see with China and New Zealand," says Julian Tang at the University of Leicester in the UK.

But the economic and social costs are enormous, especially for places that are heavily reliant on tourism.

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But the economic and social costs are enormous, especially for places that are heavily reliant on tourism. Many countries are now trying ease travel restrictions without triggering a resurgence in infections. They are taking a variety of approaches, even inside the European Union.

Cyprus unilaterally opened up to a small number of specified European countries – not including the UK – from 9 June. This means travellers from these countries will no longer have to self-isolate after entry.

Similarly, France, Germany and a few others will open to most European countries from 15 June, with France asking visitors from some countries to voluntarily self-isolate.

Quarantine upon return

Greece will allow visitors to enter without self-isolating from 15 June provided their flight comes from an airport that isn't on a list of airports deemed to be high risk by the European Aviation Safety Agency – though the list is intended only as a guide to what disinfection procedures are needed. A few UK airports aren't on this list.

Spain will begin reopening from 1 July. It plans to trial a system under which tourists will be tested on arrival and will have to remain isolated in their hotels for 6 hours as they await the results.

The problem with unilaterally reopening, however, is that would-be visitors may still face self-isolation or quarantine on their return home. The UK, for instance, belatedly introduced 14 days of self-isolation for travellers, including returning residents, on 8 June. For some, such as those able to work from home, self-isolation on return may not be a major issue, but it will deter many others.

One way to avoid this is to set up travel bubbles – groups of countries with similar levels of coronavirus infections that allow people to travel between them without having to self-isolate or quarantine, though they may have to undergo testing.

Researchers say the idea makes sense. "Our model would support the creation of bubbles from a pure spreading point of view," says Ellen Kuhl of Stanford University. "Easing travel restrictions between two countries that are equally affected should not produce an added risk."

On 14 May, Estonia, Lithuania and Latvia allowed free travel to resume between them, creating what may have been the world's first "travel bubble", and some other countries are considering similar arrangements.

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“Easing restrictions has not resulted in an increase in infections,” says a spokesperson for the Estonian Ministry of Foreign Affairs. On 1 June, the Baltic states effectively dissolved the bubble by reopening their borders to other European countries.

Now only people arriving from a country with an infection rate that exceeds 15 infections per 100,000 inhabitants for the previous two weeks – including the UK, Sweden and Ireland – must remain in quarantine in Estonia for 14 days. This approach means travellers might unexpectedly find themselves quarantined if there is a second wave in their home country while they are away.

More travel bubbles

Australia and New Zealand, meanwhile, are discussing setting up a “Trans-Tasman bubble” that may also include nations such as Fiji. Australia is also in talks with Singapore, which is setting up a limited travel bubble with China based on testing travellers before and after arrival.

On 1 May, China set up a “travel corridor” with South Korea, allowing shortened quarantines for business travellers flying between specific destinations.

In theory, all the countries in the Asia Pacific region that are successfully controlling the coronavirus could form a “mega-bubble”, but there are many obstacles.

One is that several states within Australia have closed their borders to people from other parts of the country, with Queensland saying it may not reopen them until September. It is hard to see how the country could join international bubbles while its internal borders are closed.

Relaxing restrictions is risky. But infected travellers won’t necessarily spark local outbreaks, says Moritz Kraemer of the University of Oxford. This can be prevented by rapid isolation of cases, effective contact tracing and extensive testing, he says.

[newscientist.com](https://www.newscientist.com), 13 June 2020

<https://www.newscientist.com>

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Drone-delivered soap bubbles could help pollinate flowers

2020-06-17

As pollinators, bees are hard to beat. Still, that hasn’t prevented researchers from working on a high-tech alternative: drones that blow soap bubbles to transport pollen to a flower.

It’s a “really cool” approach, says Henry Williams, a roboticist at the University of Auckland, who was not involved in the work. But some biologists are skeptical that drones will ever be an effective replacement for bees.

Several groups have devised devices that mimic pollinating honey bees. In 2017, Eijiro Miyako, a materials chemist at the Japan Advanced Institute of Science and Technology, adapted a 4-centimeter-long toy drone to pollinate flowers. He and colleagues glued horsehairs to the underside of the drone and coated the hairs with a gel to make them stickier and more flexible. The idea was that, just as on a bee, the hairs would pick up pollen from one flower and deposit it on another. Steered by remote control, the drone pollinated lilies, but it damaged the flowers with its propellers.

Miyako visualized a way to fix that problem while blowing bubbles in a park with his 3-year-old son. The child had cried when Miyako used up the last of the bubble solution. To soothe his son, Miyako bought a toy bubble gun. Watching the stream of bubbles—and seeing one bump his son’s forehead—Miyako thought it might be a way to gently deliver pollen to flowers.

He and a colleague tested various surfactants—detergents that create the soapy film that form bubbles—and picked the one with the least effect on germination (the ability of the pollen grains to grow the tubes that deliver their sperm cells to the ovaries). Then, in lab tests, they bombarded pear flowers with pollen-laden bubbles. When the bubbles popped, the pollen landed on the pistil, the female reproductive part, and the grains grew pollen tubes. But the tubes were shorter than normal if more than 10 bubbles hit the flower, perhaps because of some adverse effect caused by the soap solution, Miyako says.

In a pear orchard, the researchers used a toy bubble gun to blow pollen-laden bubbles on flowers in three trees. After 16 days, the resulting fruit was just as good as that of flowers that had been pollinated by hand, they report today in *iScience*. The farmers in this orchard, and elsewhere in Japan, traditionally pollinate their pear and apple trees by hand with

Miyako visualized a way to fix that problem while blowing bubbles in a park with his 3-year-old son.

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a feather brush. Miyako says that's because bees don't pollinate in low temperatures, and because they sometimes damage the flowers in a way that results in malformed fruits.

One advantage of using bubbles rather than feather brushes is that the bubbles require a lot less pollen. A feather brush, the researchers found, applies about 1800 milligrams of pollen to each flower, whereas the bubbles needed only 0.06 milligrams. That means farmers would have to gather far less pollen before manually pollinating their flowers, if they're adding it to a soap solution.

Williams says those savings could be important in some situations. With economy in mind, he helped develop a pollinating robot the size of a golf cart. It can drive through a kiwi orchard with a moveable boom that identifies individual kiwi flowers and pollinates them with a liquid sprayer. "Pollen was a substantial cost during the pollination season, and minimizing pollen usage was the primary motivation for the project," he says. Because the robot precisely targeted the spray onto flowers, it used less pollen than hand-held sprayers or air blowers. Bubbles might have promise for further savings, he says.

Miyako is also working with robots, although much simpler. His team attached a bubble sprayer to an aerial drone and programmed the drone to fly a route around a row of fake lily flowers (see video, above). After trying various speeds and heights, they found that the drone could hit 90% of the flowers with bubbles.

The problem was that a lot of bubbles missed their targets, wasting pollen. Better targeting—by having a drone that could identify flowers, for example—might improve the results, Miyako says. He's also working on concocting an environmentally safe soap bubble solution that would biodegrade faster.

Yu Gu, a roboticist at West Virginia University, is skeptical about the use of drones to deliver bubbles, however. The wind from the rotors will make it hard to precisely aim the bubbles, he points out. They could be more efficiently delivered from a ground-based robot, such as a wheeled unit with a manipulator arm. Gu and colleagues have just this kind of robot, originally designed for collecting samples on space missions. And they've tested it by pollinating raspberries in a greenhouse. It uses a fine brush to both collect and distribute pollen, saving the step of having to gather a supply of pollen.

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Simon Potts, an agro-ecologist at the University of Reading, worries such efforts will distract from conserving bees, which are declining in many places. The bubble approach adds the risk of chemically interfering with pollination and polluting soil, he notes. "This is yet another piece of smart engineering being shoehorned to solve a problem which can be solved in many much more effective and sustainable ways."

sciencemag.org, 17 June 2020

<https://www.sciencemag.org>

Paris speeds up its pursuit of a slower beltway

2020-06-19

Like so many cities, Paris is girdled by beltways — several of them, in fact. The innermost and most notorious one is known as the Boulevard Périphérique, a 22-mile-long ring road completed in 1973 and built in part upon the footprint of the city's historic walls. The traffic-clogged urban highway plays a major role in Parisian mobility, but it's also a prime contributor of pollution, both atmospheric and aural, as well as an all-but-impassable barrier severing the historic city from its inner suburbs. Last year, Paris deputies proposed downsizing the Périphérique, removing vehicle lanes and dropping speed limits to transform the road from a smog-spewing limited-access highway into a tree-lined "metropolitan avenue."

Now, as Mayor Anne Hidalgo seeks reelection, she has adopted and doubled down on that plan and is giving it some extra post-pandemic flourishes. Preparing for the delayed second round of Paris' municipal elections on June 28 — in which she is the front-runner — Hidalgo released a "Manifesto for Paris" on Tuesday, detailing a vision for the city co-written with her newly-allied running partner, David Belliard of the Green Party. Promising to place ecology "at the heart" of city policy, the manifesto proposes several policies to boost environmental and social sustainability, including a 30 kilometer-per-hour (18.6 mph) speed limit for all of Paris Proper and means-tested benefits to help families pay for childcare. Parking spaces would be cut in half, and the city's new temporary cycle lanes and pedestrian streets — introduced to help manage the coronavirus crisis — would be made permanent. In keeping with Hidalgo's well-known pursuit of progressive car-mitigation policies, she's now proposing to slash speed limits on the Périphérique to a mere 50 k/ph (31 mph) — extremely low for a fully

A road that has long functioned as a rampart separating Paris from its suburbs will thus be transformed into something calmer, slower, greener, narrower, and altogether less hostile to people without cars.

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segregated highway — and setting a lane aside for public transit, zero-emission vehicles, and car-poolers.

Further into the future, Hidalgo's current deputy, Jean-Louis Missika, also announced that 100,000 newly planted trees will flank the beltway, and pedestrian crossings and traffic lights will ultimately be introduced in sections of the road that aren't tunneled or elevated. A road that has long functioned as a rampart separating Paris from its suburbs will thus be transformed into something calmer, slower, greener, narrower, and altogether less hostile to people without cars.

A similar [proposal](#) was released in February (albeit with higher proposed speed limits). That plan outlines in more detail what will happen and when. By January 2021, the beltway will face the same restrictions on more polluting cars as Paris Proper does. By 2023 the lane for clean, public and car-pooled vehicles will be in place, supervised by sensors that can detect the number of occupants a vehicle has and dispatch fines to lone drivers. Diesel vehicles will be barred from the beltway by 2024, while access will be granted to low-emission vehicles only by 2030.

Meanwhile, the road will be ringed by a new screen of trees. Of 170,000 plantings proposed for all of Paris by Hidalgo and Belliard, 100,000 are destined for the Périphérique. Planted to help screen surrounding areas from noise, some of these trees will be concentrated in mini-forests around exits, a few of which will be buried and thus provide a further fresh area for planting. Crossings for pedestrians will be installed and complemented by new footbridges, which will also ferry bikes across the road [on a series of new long-distance suburban bike tracks](#). This network is now being referred to, in a term combining the French words for bicycle and metro, as the "Vélopolitain." Once all these changes in place, the beltway will no longer resemble a highway at all.

Mayor Hidalgo's ongoing pursuit of bike, pedestrian, and transit-friendly policies has helped make Paris something of a standard-bearer in the global war on cars, but that hasn't prevented her latest proposals from stoking local controversy. Newspaper Le Figaro's video channel has wondered aloud if Hidalgo is [an extremist](#), while Pierre Chasseray of the French Automobile Association told online magazine [Autonews](#) that the plan "has no other objective than to please a very small minority of fundamentalist environmentalists who would like to put Paris in a glass case." The director of France's National Scientific Research Centre noted that, unlike banning cars altogether, the speed limit reductions would not actually [improve Parisians' health](#).

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For a mayor who has made a public commitment to increasing equity, the plans do pose questions over who stands to benefit most from them. Suburban commuters are particularly likely to object to a slower Périphérique. While the suburbs surrounding Paris have a very broad class mix, some of Greater Paris' poorest citizens — including those who commute by car — live beyond the beltway and use that artery daily. As the city continues to cautiously reopen from coronavirus restrictions, Parisians can expect increased anxiety about using trains and subways, making driving more appealing to those who have cars. With suburban rail systems extremely busy, their needs are being placed second to the green aspirations of a niche group of wealthier people living in the central city, some critics insist. Joelle Dago Serry, a businesswoman appearing on a panel for BFM radio, said that with Hidalgo, she saw "a contempt for the suburbs from this mayor that I've never seen before," showing herself happy to leave suburbanites on packed [RER](#) trains "like animals."

At the same time, these very same systems linking the city with the suburbs are undergoing major expansion, and poorer citizens are also more likely to suffer from the beltway's pollution, because they are more likely to live in the lower-income neighborhoods that flank it.

Both the beltway and the entirety of the Parisian electorate responsible for choosing the mayor lie within the borders of Paris Proper, so the controversy may not affect her reelection chances. Hidalgo and Belliard's Socialist/Green Alliance is currently polling [40.1% of all votes](#) (ahead of nearest rival, Rachida Dati of the right-wing Republican Party, at 22.7%); should that lead hold, the reduced speeds and green priority lane could be city policy by the beginning of July. Some of the more sweeping changes could take more time. Talking to BFM, Jean-Louis Missika sketched the schedule for introducing crossing and traffic lights as "not tomorrow, but soon." So far, Hidalgo looks set to soon receive the mandate that will set these proposals in motion; pushing them through may still require spending some serious political capital.

[bloomberg.com](#), 19 June 2020

<https://www.bloomberg.com>

Beetle inspires self-cooling film

2020-06-16

Inspired by a beetle that can regulate its body temperature in even the hottest climates, researchers from the Cockrell School of Engineering at

During testing, the film reduced the temperatures of items it encased that were held in direct sunlight by roughly 5.1° C (around 9° F).

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the University of Texas at Austin, Shanghai Jiao Tong University in China and KTH Royal Institute of Technology in Sweden have developed a self-cooling material with potential applications for cooling buildings and electronics, among others.

The photonic film, which is composed of a flexible polymer called PDMS, passively cools itself, without expending energy, just like the Longicorn (or Longhorn) Beetle, which can cool itself even under volcanic temperatures.

According to its developers, the film can be used to coat objects such as windows in buildings, reflecting sunlight and reducing energy bills; solar panels, protecting them from prolonged exposure to sunlight; and even electronics.

During testing, the film reduced the temperatures of items it encased that were held in direct sunlight by roughly 5.1° C (around 9° F).

In addition to cooling buildings and electronics, the researchers believe that the film could be incorporated into the fabric of wearables and used to cool cars.

[insights.globalspec.com](https://www.insights.globalspec.com), 16 June 2020

<https://www.insights.globalspec.com>

There is no perfect diet that works for every metabolism or body type

2020-06-15

There is no such thing as a healthy diet that will work for everyone. People respond to food in such idiosyncratic ways that everybody needs a personalised eating plan, according to results from a study that looked at the effects of genetics, the microbiome and lifestyle factors on metabolism.

The study fed 1102 healthy people identical meals for two weeks and measured their metabolic responses. These varied wildly, with up to tenfold differences, meaning that a healthy diet for one person could be unhealthy for another. "Everyone reacts differently to identical foods," says Tim Spector at King's College London.

He and his colleagues measured levels of glucose, insulin and triglyceride fats in the volunteers' blood. High levels of all three after eating are a risk factor for obesity, while people who show glucose and triglyceride

"Everyone reacts differently to identical foods," says Tim Spector at King's College London.

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spikes after eating are more likely to develop cardiovascular disease and diabetes.

The team also tracked the volunteers' sleep, exercise and hunger levels, and took stool samples to assay their gut microbes. Spector, a geneticist, says he expected to find a strong genetic component to the metabolic responses, but actually saw very little. The volunteers included several pairs of identical twins and even they showed very different responses to the same meal.

"That told us straight away that genes don't play a major part," says Spector. "How we respond to a fatty meal has virtually no genetic component at all, for example." His team found that only about 30 per cent of glucose response is genetic.

Other factors such as gut microbes, circadian rhythms and sleep and exercise are more important, says Spector. The timing of meals also matters. Some people metabolise food better in the morning while others saw no difference in their ability to metabolise food throughout the day.

This suggests that it would be more effective to design a tailored healthy-eating programme for individuals rather than recommending a one-size-fits-all diet.

The results can be surprising, says Spector. He says he ate tuna and sweetcorn sandwiches for years thinking they were good for him, but recently found out that his metabolism responds very badly to them.

Spector and his team have also developed an AI tool to predict people's responses to food, based on their genes, gut microbes, exercise and sleep patterns and metabolic responses to food. A UK-based company called Zoe has turned this into a consumer test and smartphone app that will be rolled out in the US next month and the UK later this year.

"It's a very exciting study," says Bernadette Moore at the University of Leeds, UK. "The really significant factor for me is that they did it in twins, so they had a really powerful design to examine the genetics." However, there is still more work to be done to fully understand individual responses to food, she says.

He added, "As young people spend less of their lives in natural surroundings, their senses narrow, both physiologically and psychologically."

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“The study findings are impressive,” says Yiannis Mavrommatis at St Mary’s University, London. “Its initial findings will shape the future of nutrition science.”

newscientist.com, 15 June 2020

<https://www.newscientist.com>

‘Nature deficit disorder’ is really a thing

2020-06-23

LaToya Jordan and her family have no green space by their Brooklyn apartment. So she, like many other New Yorkers, relies on the city’s playgrounds and parks to give her two children, ages 2 and 8, some exposure to nature.

The outbreak of the coronavirus in New York City took away that access to green space when playgrounds closed across the city, and the city’s parks, like Prospect Park in Brooklyn, became too crowded for her children to properly social distance.

Jordan, 42, has observed a distinct change in her children’s well-being after having little to no access to green space. “Both of them are more moody and cranky,” she said. “My 8-year-old is so jealous of her friends who have backyards right now.”

The change in behavior has been so noticeable that she and her husband are considering renting a house with a yard in Brooklyn for a week.

Jordan found that despite the cancellation of all in-person activities — from Girl Scouts to piano lessons to gymnastics — what her children missed the most was just the freedom of playing outside with friends.

Numerous studies have shown the mental and physical benefits of spending time in nature, but for some people, it took a pandemic and stay-at-home orders for that desire to spend more time outdoors to feel like a necessity. Experts hope that desire for nature will remain once people physically return to their busy schedules.

“Ironically, the 2020 coronavirus pandemic, as tragic as it is, has dramatically increased public awareness of the deep human need for nature connection, and is adding a greater sense of urgency to the movement to connect children, families and communities to nature,” said Richard Louv, a journalist and the author of “Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder.”

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Before the pandemic, more children were spending their lives mostly indoors, and the spread of the coronavirus has likely accelerated that, and, in turn, deeply affected them, Louv said.

He added, “As young people spend less of their lives in natural surroundings, their senses narrow, both physiologically and psychologically.”

Kiona Gardner, 41, suspects her two boys, ages 9 and 12, are showing symptoms of what Louv has coined nature-deficit disorder, a nonmedical condition that suggests that spending less time outdoors can contribute to behavioral changes in children. Their townhouse in Wilmington, Calif., has no yard, and any park within driving distance is too crowded to allow social distancing. The family anticipates a long summer ahead without any travel. Both boys are asthmatic and will be most likely be confined to their home.

“They are stressed and anxious,” Gardner said. “I had to buy them an anxiety chew necklace because they have both been putting everything in their mouth.”

Gardner said that when her family feels safe enough to resume a normal life again, she plans to prioritize unstructured outdoor play for her boys. “I really want to find a balance,” she said. “My oldest needs to get back to playing basketball, but I also would like for them both to have time for free play and not have to worry about getting sick.”

Research has shown access to green space is linked to a child’s well-being. For example, adding greenery to school play yards has been shown to increase prosocial behavior in kids. They help, cooperate, comfort and share more; the loss of access to this greenery has the opposite effect. A 2013 study found that even viewing nature scenes can reduce stress and regulate heart rates.

Louise Chawla, Ph.D., a professor emerita at the University of Colorado Boulder, studies the effects of nature and urban spaces on children. She explained how one of the greatest needs of young children is autonomy, and free play in nature is one way to satisfy that need.

“If you explore a woody area in the park, there is something for every age there,” Dr. Chawla said. “There are rocks of different weights, stumps of different sizes, lighter and heavier sticks. Whatever a child’s current skill level is, they can work toward their next level of challenge. They are learning about their own capabilities.”

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Kim Shore of Chicago said she felt comfortable purchasing her condo with zero personal green space because there is a park across the street. “We would have everything we needed for nature access if the world were open,” she said. But access to their park has been curtailed because of the crowds during the coronavirus outbreak.

Early on in the pandemic, she noticed short tempers and anxiety in her 6- and 8-year old children that she attributed to a lack of time outdoors. Shore decided to take her family to a friend’s home with a large yard in a Chicago suburb for several weeks. Once her children had space to move outdoors, she said they seemed calmer, more regulated, and happier. When they returned to their condo, they seemed to regress, she said. They plan to stay with friends who have a yard in a St. Louis suburb for the summer. “I started to worry about the long-term impact on them,” she said. “In the city, they hold their breath when anyone walks by us. In the suburbs, they were able to relax. They were completely different human beings with a yard.”

Ming Kuo, Ph.D., an associate professor at the University of Illinois who studies urban greening, said parents, like Shore, have described how their children are “completely different” when they have access to green space. Dr. Kuo’s research has shown that access to green space decreases aggression and attention deficit hyperactivity disorder symptoms, and boosts the immune system. But she also was quick to point out an unequal access to green spaces across socioeconomic and racial lines.

“Overall, wealthier areas are much greener with more street trees, more lawns and gardens, and more parks. It also varies by race because of segregationist housing policies,” Dr. Kuo said.

Rebecca Hershberg, Ph.D., a psychologist who specializes in early childhood social-emotional development and mental health, hopes parents will hold on to some of the lessons they’ve learned during the pandemic about the need for unstructured time and nature as states begin to lift restrictions.

“We now know, not just intellectually but based on recent lived experience, that not all activities are created equal when it comes to enhancing our children’s mood and behavior. Prioritizing time in nature, exercise, and even some unstructured downtime is analogous to prioritizing our children’s mental health, which is more important now than ever.”

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In the meantime, Louv, the journalist and author who conceived of the concept nature-deficit disorder, created a list of ways that families could connect with the natural world, including some that don’t require having green space, like setting up a “world-watching window.”

In an interview, he recalled the excitement that many people experienced when they saw nature through windows in cities with shelter-in-place orders. “As we sequestered at home, many of us were fascinated by the apparent return of wild animals to our cities and neighborhoods. Some wildlife did come deeper into cities. But many of these animals were already there, hiding in plain sight.”

For families without their own green space, Dr. Chawla suggested taking some books or art supplies to any little patch of green outside.

“Children are moving all the time, but they also show sustained fascination,” Dr. Chawla said. “Even a tiny bit of green space can be a place to slow down, watch an insect, move some dirt around.”

In reconnecting with nature, Dr. Kuo said activities could take “a variety of forms — a hike in a forest preserve, or fishing or gardening, obviously, but also smaller doses we might not think of: walking in a tree-lined neighborhood, a glimpse of a green view through the window, the scent of roses. Every bit helps.”

[nytimes.com](https://www.nytimes.com), 23 June 2020

<https://www.nytimes.com>

Why COVID-19 will end up harming the environment

2020-06-18

The popular notion that the COVID-19 pandemic has been “good for the environment”—that nature is recovering while humanity stays at home—appeals to many people grasping for some upside to the global tragedy. Reality, though, may not cooperate with such hopes.

The benefits many found heartening early on—from cleaner air to birdsong newly audible as cars and planes went quiet—were always likely to be temporary. And with lockdowns easing, they have already begun to dissipate. Now, some experts fear that the world risks a future with more traffic, more pollution, and climate change that worsens faster than ever. It’s too soon to know whether that gloomy scenario will play out, but concerning signs seem to be growing all around the world.

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In early April, with shutdowns widespread, daily global carbon emissions were down by 17 percent compared to last year. But as of June 11, new data show that they are only about 5 percent lower than at the same point in 2019, even though normal activity has not yet fully restarted.

“We still have the same cars, the same roads, the same industries, same houses,” says Corinne Le Quéré, professor of climate change at the University of East Anglia in Britain and lead author of the original study and subsequent update. “So as soon as the restrictions are released, we go right back to where we were.”

Now, “the risk is very high” that carbon output could surge past pre-pandemic levels, she says, “especially since we’ve done it in the past, not very long ago.” During the 2007-08 financial crisis, emissions dropped but then bounced back.

Hints of a dirty recovery in China

As the first country to shut down when the virus hit, and one of the earliest to start reopening, China’s experience offers a preview of what could be in store elsewhere. The dramatic air quality improvements seen as manufacturing and transportation largely came to a halt in February and March have now vanished.

As factories pushed to make up for lost time, pollution returned in early May to pre-coronavirus levels, and in some places surpassed them for a short time, although it’s fallen back a bit since. Meanwhile, provincial officials desperate for the economic boost that comes with any construction are giving the go-ahead to a raft of new coal-fired power plants, says Lauri Myllyvirta, lead analyst at the Helsinki-based Center for Research on Energy and Clean Air, which reported the pollution data from China. That will lock in big future health and climate problems if the new plants go forward, since such infrastructure tends to be used for many years, experts warn.

“Suddenly a lot more permits are being handed out,” says Myllyvirta. If the world is to avoid the most catastrophic climate scenarios, China must ramp up its investment in clean energy, not coal, he says. “So that is very alarming.” (See how your location’s climate could change by 2070.)

Polluters ‘bolder than ever’

In the midst of the pandemic and resulting economic implosion, industries such as fossil fuels, plastics, airlines, and automobiles have been scrambling for advantage. Some governments—particularly the United

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States’—are acceding to companies’ pleas for cash, regulatory rollbacks, and other special favors.

“There’s a serious risk that polluters could emerge from this crisis bolder and potentially more profitable than ever,” says Lukas Ross, a senior policy analyst at Friends of the Earth, an advocacy group.

One industry raking in a great deal of cash is oil and gas. Companies’ aggressive lobbying is winning them billions of dollars in public funds intended to ease the pandemic’s economic damage, says Ross, who’s written two reports on those efforts.

The aid has included tax changes that benefit the industry, breaks on the royalties companies pay to drill or mine on public lands, and access to the Federal Reserve’s \$600-billion Main Street Lending program. That program “has already been modified specifically along the lines the oil and gas industry requested,” Ross says.

The fracking industry, which has been bleeding cash for years, is among those pleading for help. “Which means not just a risk to the climate in propping up these failing companies, but also to taxpayers who are being asked to bear the risk of bailing them out,” he says.

The American Petroleum Institute says the oil and gas companies it represents have not sought special favors, but are drawing on programs designed to help all sectors weather the economic storm. Tax changes and lending initiatives “apply to all businesses—from manufacturers and retailers to restaurants and energy producers—experiencing financial hardship,” says Scott Lauermann, a spokesperson for the group.

But the financial support comes on top of the aggressive regulatory rollbacks the Trump Administration has continued to push forward during the pandemic. Among many other moves, the administration has effectively suspended enforcement of air and water pollution regulations, curtailed states’ ability to block energy projects, and suspended a requirement for environmental review and public input on new mines, pipelines, highways, and other projects.

“Throughout April, honestly, it became almost a full-time job” to keep up with all the giveaways to industry, says Amy Westervelt, a journalist and host of the podcast Drilled, who has been tracking them.

The administration might have sought many of the changes anyway, but “what we’re seeing is just way less pushback than they would have gotten” had the pandemic not been absorbing most attention, she says.

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Another worry is traffic. With social distancing hard to maintain on public transportation, and many travelers likely to avoid it out of fear of contracting the virus, cities could be headed for a post-shutdown “carpocalypse,” as one transportation news site [warns](#).

In China, traffic is back to pre-pandemic levels, even though many people have yet to resume commuting and traveling, Myllyvirta says. And while [cities around the world are rushing to expand bike lanes](#) to manage the shift away from subways, trains, and buses, “whether those are going to be anywhere near enough is a big question mark,” he says.

Free-for-all in the Amazon

In Brazil, illegal loggers have accelerated their destruction of the Amazon rainforest while the coronavirus ravages the nation. According to [satellite data](#) from the space research agency INPE, 64 percent more land was cleared in April 2020 than in the same month last year—even though 2019 was the biggest year for deforestation in more than a decade

President Jair Bolsonaro has long advocated more commercial exploitation of the Amazon. In recent months illegal loggers, miners, and ranchers have faced little hindrance from law enforcement as they grab public land.

“You can do whatever you want in the Amazon and you won’t be punished,” says [Ane Alencar](#), director of science at [IPAM Amazônia](#), a scientific nonprofit. Officials are using the pandemic “as a smokescreen, a distraction,” to allow the destruction to go ahead.

The Amazon, including its indigenous population, is among the worst hit by COVID-19 in a country that has become a global epicenter for the disease. Now, its two crises are threatening to converge. Cleared vegetation is typically set alight starting in July, after it has dried, and [the resulting thick smoke causes heart and lung problems to spike](#).

[Last year’s fires were devastating](#), but this time around—with so much vegetation already cut and waiting to be burned, and a respiratory illness running rampant—the perils are greater still. On top of the [climate impacts of rainforest loss](#), the smoke could aggravate COVID-19 patients’ suffering, and further increase pressure on hospitals already struggling to cope with the pandemic, Alencar says.

‘What will their priorities be?’

Even in places such as Europe, where leaders are not pushing wholesale repeal of environmental rules, the still-unfolding health and economic

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crises could pull leaders’ attention away from the slower-moving disaster of climate change, which had finally been moving up the political agenda last year as youth strikes drove home its urgency, says [Åsa Persson](#), research director at the Stockholm Environment Institute.

“What will their priorities be?” she asks: Will governments seek to shore up the economy by bolstering old, polluting industries, or embrace calls for a “green stimulus” and use recovery funds to create jobs in sectors such as clean power and energy efficiency?

Allocating those vast sums in a way that moves the world toward a low-carbon future—and also addresses the racial and economic inequalities the pandemic has laid bare—would yield far more than a few months of reduced emissions, Ross argues.

“We’re not going to get another shot at this,” he says. “We cannot afford to rebuild into the old status quo.”

[nationalgeographic.com](#), 18 June 2020

<https://www.nationalgeographic.com>

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Technical Notes

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(NOTE: OPEN YOUR WEB BROWSER AND CLICK ON HEADING TO LINK TO SECTION)

CHEMICAL EFFECTS

Changes in syntrophic microbial communities, EPS matrix, and gene-expression patterns in biofilm anode in response to silver nanoparticles exposure

A novel In-Situ Toxicity Identification Evaluation (iTIE) system for determining which chemicals drive impairments at contaminated sites

ENVIRONMENTAL RESEARCH

Applicability of conventional and non-conventional parameters for municipal landfill leachate characterization

Selected antibodies and current-use pesticides in riverine runoff of an urbanized river system in association with anthropogenic stresses

Screening-level estimates of environmental release rates, predicted exposures and toxic pressures of currently used chemicals

PHARMACEUTICAL/TOXICOLOGY

Curation of cancer hallmark-based genes and pathways for in silico characterization of chemical carcinogenesis

Human exposure to Synthetic Endocrine Disrupting Chemicals (S-EDCs) is generally negligible as compared to natural compounds with higher or comparable endocrine activity. How to evaluate the risk of the S-EDCs?

Exposure to low doses of Dechlorane Plus promotes adipose tissue dysfunction and glucose intolerance in male mice

OCCUPATIONAL

Occupational exposure to metals and solvents: allergy and airways diseases

Liver fibrosis associated with potential vinyl chloride and ethylene dichloride exposure from the petrochemical industry