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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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## Legislation

### ASIA PACIFIC

#### Reminder Notice: Consultation on regulatory impacts of a proposal to adopt the revised Australian and New Zealand Sunscreen Standard (AS/NZS 2604:2012) for cosmetic sunscreen products – closing 25 January 2013

2013-01-21

The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) has issued a reminder to stakeholders that the consultation for the impacts on industry, community, and government of the proposed adoption of the revised Australian and New Zealand Sunscreen Standard (AS/NZS 2604:2012 Sunscreen products – Evaluation and classification) in the Cosmetics Standard 2007, is closing soon. If adopted in the Cosmetics Standard 2007, the revised Sunscreen Standard would be applicable to all cosmetic sunscreen products regulated by NICNAS. The consultation was first announced in the December issue of the Chemical Gazette. Comments should be submitted

by 25 January 2013. The public consultation document provides more information and is published on the consultation section of the NICNAS website at: <http://www.nicnas.gov.au/consultations.asp>.

In addition, a 'Questionnaire' sheet is available on the NICNAS website at: <http://www.nicnas.gov.au/consultations.asp>.

NICNAS Chemical Gazette, 2 January 2013

[http://www.nicnas.gov.au/Publications/Chemical\\_Gazette](http://www.nicnas.gov.au/Publications/Chemical_Gazette)

#### Attorney-General's Department is seeking feedback on draft National Code of Practice for Chemicals of Security Concern

2012-01-21

Many of the chemicals that we use every day have also been used in terrorist attacks around the world. In Australia, individuals have been arrested after attempting to procure chemicals that police believe were going to be used to manufacture homemade explosives. Businesses and Australian governments need to work together to detect and prevent the use of chemicals for terrorist purposes and ensure a safer Australia. Australian businesses play a critical role in achieving that by managing security risks as part of good business practice. It also helps

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**NICNAS has issued a reminder that the consultation for the revised Australian and New Zealand Sunscreen Standard for cosmetic sunscreen products is closing on 25 January 2013.**

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keep Australia a great place to do business. The Australian Government and state and territory governments have decided to pursue a voluntary code of practice for businesses that manage, handle or use products containing 11 chemicals that are precursors to homemade explosives. The voluntary code will seek to make these chemicals more secure, and to ensure the safety of the community. The Attorney-General's Department is seeking feedback on the draft code of practice. Feedback will shape the final version of the code and ensure that it can be easily understood and effectively used by businesses. A copy of the draft code of practice is available at: [www.chemicalsecurity.gov.au/PublicConsultation](http://www.chemicalsecurity.gov.au/PublicConsultation). The consultation closes on 1 March 2013.

NICNAS Chemical Gazette, 2 January 2013

[http://www.nicnas.gov.au/Publications/Chemical\\_Gazette](http://www.nicnas.gov.au/Publications/Chemical_Gazette)

### Codes of Practice and Guidance Material fact sheet

2013-01-21

On 17 December 2012, Safe Work Australia released a new fact sheet titled: Code of Practice and Guidance Material Fact Sheet. This information sheet explains the difference between model codes of practice and other types of guidance material and outlines the development processes. The new document is available at [Code of Practice and Guidance Material Fact Sheet](#)

Safe Work Australia, 17 December 2012

<http://www.safeworkaustralia.gov.au>

### ANZTPA implementation - Release of high level description of a possible joint regulatory scheme

2013-01-21

The Australian Therapeutic Goods Administration recently announced that progress towards a joint Australia New Zealand therapeutic products regulatory scheme continues with the release of an information/discussion paper setting out a high level option for a possible framework for the joint regulatory scheme. The agency is now seeking input from interested parties. The release of this paper was foreshadowed by the ANZTPA Implementation Ministerial Council following their meeting on 29 November 2012 ([ANZTPA Implementation Ministerial Council communique](#)). The paper and full details of the consultation process are

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available on the ANZTPA website at: [ANZTPA: Description of a possible joint regulatory scheme for therapeutic products under ANZTPA](#).

TGA, 8 January 2013

<http://www.tga.gov.au/>

## AMERICA

### EPA Releases First Set of Draft Risk Assessments Under Existing Chemicals Work Plan Effort

2013-01-21

The United States Environmental Protection Agency (EPA) has recently released draft risk assessments, for particular uses, on five chemicals found in common household products. The draft risk assessments were developed as part of the agency's Toxic Substances Control Act (TSCA) Work Plan, which identified common chemicals for review over the coming years to assess any impacts on people's health and the environment. Following public comment, the agency will seek an independent, scientific peer review of the assessments before beginning to finalise them in the fall of 2013. "The draft risk assessments released today for public review and comment highlight the agency's ongoing commitment to ensure the safety of chemicals we encounter in our daily lives," said James J. Jones, acting assistant administrator of EPA's Office of Chemical Safety and Pollution Prevention. "The public and scientific peer review will ensure use of the best science to evaluate any impacts of these substances on people's health and the environment." The five assessments address the following chemical uses: methylene chloride or dichloromethane (DCM) and n-methylpyrrolidone (NMP) in paint stripper products; trichloroethylene (TCE) as a degreaser and a spray-on protective coating; antimony trioxide (ATO) as a synergist in halogenated flame retardants; and 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- $[\gamma]$ -2-benzopyran (HHCB) as a fragrance ingredient in commercial and consumer products. The draft assessments focus either on human health or ecological hazards for specific uses, which are subject to regulation under TSCA. Three of the draft risk assessments— DCM, NMP, and TCE— indicate a potential concern for human health under specific exposure scenarios for particular uses. The preliminary assessments for ATO and HHCB indicate a low concern for ecological health. EPA recommends the public follow product label directions and take precautions that can reduce exposures, such as using the product outside or in an extremely

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well ventilated area and wearing protective equipment to reduce exposure. If EPA concludes in finalising the risk assessments that there is a potential for concern, the agency will take action as appropriate to address possible risks. The draft assessments were undertaken as part of EPA's efforts to identify chemicals for review under the TSCA Work Plan, which EPA released in March 2012. At that time, EPA identified 83 chemicals as candidates for review over the coming years and outlined the data sources and other information the agency would use in the reviews. This initiative is part of EPA's comprehensive approach to enhance the current chemicals management program within the limits of existing TSCA authorities. EPA continues to support updating TSCA to strengthen and modernise the law. Further information on the TSCA Work Plan effort and the specific draft risk assessments can be found at: <http://www.epa.gov/oppt/existingchemicals/pubs/workplans.html>

U.S EPA, 4 January 2013

<http://www.epa.gov>

### **EPA's 2011 Toxics Release Inventory Shows Air Pollutants Continue to Decline/Total toxic chemicals increase as result of mining**

2013-01-21

According to the United States Environmental Protection Agency (EPA) annual Toxics Release Inventory (TRI) report published recently, total toxic air releases in 2011 declined 8 percent from 2010, mostly because of decreases in hazardous air pollutant (HAP) emissions, even while total releases of toxic chemicals increased for the second year in a row. The annual TRI provides citizens with vital information about their communities. The TRI program collects information on certain toxic chemical releases to the air, water and land, as well as information on waste management and pollution prevention activities by facilities across the country. TRI data are submitted annually to EPA, states and tribes by facilities in industry sectors such as manufacturing, metal mining, electric utilities, and commercial hazardous waste facilities. "The Toxics Release Inventory provides widespread access to valuable environmental information. It plays a critical role in EPA's efforts to hold polluters accountable and identify and acknowledge those who take steps to prevent pollution," said EPA Administrator Lisa P. Jackson. "Since 1998, we have recorded a steady decline in the amount of TRI chemicals released into the air, and since 2009 alone, we have seen more than a 100 million

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pound decrease in TRI air pollutants entering our communities. This remarkable success is due in part to the TRI program and concerted efforts by industry, regulators and public interest groups to clean up the air we all depend upon." Among the HAPs showing decline were hydrochloric acid and mercury. Likely reasons for the decreases seen over the past several years include installation of control technologies at coal fired power plants and a shift to other fuel sources. Releases into surface water decreased 3 percent and releases to land increased 19 percent since 2010, with the latter again due primarily to the metal mining sector, as explained below. Many of the releases from TRI facilities are regulated under various EPA programs and requirements designed to limit harm to people's health and the environment. The 2011 TRI data show that 4.09 billion pounds of toxic chemicals were disposed of or released into the environment (i.e., air, water or land), an 8 percent increase from 2010. The difference is mainly due to increases in land disposal at metal mines, which typically involve large facilities handling large volumes of material. In this sector, even a small change in the chemical composition of the ore being mined - which EPA understands is one of the asserted reasons for the increase in total reported releases - can lead to big changes in the amount of toxic chemicals reported nationally. Other industry sectors also saw smaller increases in releases, including the hazardous waste management sector. EPA has improved this year's TRI national analysis report by adding new information about facility efforts to reduce pollution, insights into why air releases are declining, and an enhanced analysis of releases on tribal lands. With this report and EPA's web-based TRI tools, citizens can access information about TRI-listed toxic chemical releases in their communities and across the country. Facilities must report their toxic chemical releases to EPA under the Federal Emergency Planning and Community Right-to-Know Act (EPCRA) by the beginning of July each year. The Pollution Prevention Act of 1990 also requires information on waste management activities related to TRI chemicals. Also, EPA's TRI mobile application, myRTK, geographically displays nearby facilities that report to the TRI program, as well as facilities with EPA air, water or hazardous waste program permits.

- Further information is available on the 2011 TRI analysis and TRI web-based tools at: <http://www.epa.gov/tri/NationalAnalysis>
- More on facility efforts to reduce toxic chemical releases is available at: <http://www.epa.gov/tri/p2>

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- More on EPA's TRI mobile application, myRTK is available at: <http://www.epa.gov/tri/myrtk/>

U.S EPA, 16 January 2013

<http://www.epa.gov>

### EPA Finalises Boiler Rule

2013-01-21

After years of delay, the United States Environmental Protection Agency has finalised tough air pollution standards for large industrial boilers found at oil refineries, chemical plants, and other manufacturing facilities. But the soonest the rules can take effect is 2016. For the first time, the steam-producing systems used to generate heat and power will face strict limits on emissions of mercury, acid gases, and fine particulate matter such as soot. The regulations are expected to reduce mercury emissions by 1.6 tons per year, or about 3% initially, for instance. EPA, however, will give boiler operators three years to meet the standards, with the option to request an additional year. EPA first sought to regulate boiler emissions in 2004. But a federal appeals court in 2007 struck down the agency's original standard, saying it violated the Clean Air Act. The rule was reissued in 2011 but industry groups blasted that version, arguing its emission limits were unachievable. EPA agreed to revise the measure after gathering additional data from industry. "We appreciate EPA's thoughtful consideration of these rules and willingness to make sensible changes," says the American Chemistry Council, a chemical industry trade group. "While we need to review the rules for technical details, it appears that a number of improvements have been made." The changes will require pollution controls at about 2,300 of the largest and highest-emitting boilers nationwide. Another 197,000 smaller boilers will be able to meet the rule by conducting periodic maintenance or routine tune-ups, EPA says. Although the most restrictive emission limits will affect less than 1% of the nation's nearly 1.5 million boilers, they will impose major costs on the U.S. manufacturing sector. Industry will have to spend between \$1.3 billion and \$1.5 billion annually to meet the standards, according to EPA estimates. However, the agency says the emission reductions brought about by the new rule will thwart up to 8,100 premature deaths, prevent 5,100 heart attacks, and avert 52,000 asthma attacks each year. The new standards will encourage U.S. industry to use cleaner-burning fuels and to make improvements in energy efficiency, says James Bradbury, senior associate at the World Resources Institute, a think tank. "This is good news

**After years of delay, the United States Environmental Protection Agency has finalised tough air pollution standards for large industrial boilers found at oil refineries, chemical plants, and other manufacturing facilities.**

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for the manufacturing workforce, for public health, and for the climate," he remarks.

Chemical & Engineering News, 7 January 2013

<http://pubs.acs.org/cen/news>

### AIHA's Tripler Expects an OSHA Reform Bill in New Congress

2013-01-21

Five or six names are being circulated as possible successors to Hilda Solis as secretary of Labor during President Obama's second term, according to the 16 January "Happenings" e-newsletter written by Aaron Tripler, AIHA's government affairs director and a long-time keen observer of regulatory and legislative activity on Capitol Hill and in statehouses across the country. Tripler reported 300 bills already have been filed in the U.S. House of Representatives for the 113th Congress, while the U.S. Senate has not yet allowed bills to be introduced. As for replacing Solis, Tripler writes it may be fairly low on Obama's list of new cabinet appointees he must appoint; as well, the criticism that he's overlooking female and minority candidates may affect the timing of the Labor secretary nomination. Either way, it could affect the OSHA assistant secretary, but Tripler predicts Dr. David Michaels will remain in that position. He also predicted these bills will be filed and bear watching:

- HR 170, which would require "site-controlling employers" to keep track of all workplace injuries to all workers at the site, including workers employed by subcontractors. Rep. Gene Green, D-Texas, has introduced this bill in the past four sessions of Congress. It is not likely to be enacted, Tripler predicts.
- Sen. Frank Lautenberg, D-N.J., will again introduce a Toxic Substances Control Act reform bill. The goal is to provide EPA with greater authority to limit the use of chemicals if the agency decides they are dangerous to human health or the environment. The bill passed in committee during the 112th Congress but never came to the floor of the Senate for a full vote. "The issue will again be very controversial and difficult to enact," Tripler reports.
- Voluntary Protection Program legislation. "No word yet on whether or not a bipartisan group of Senators will reintroduce legislation that would codify the Voluntary Protection Program, essentially granting this program permanent continuation. A similar bill has been introduced in the last two sessions of Congress but has not

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been enacted. Observers say there is a good chance the bill will be reintroduced," he writes.

- More than a dozen regulatory reform bills will be introduced.
- OSHA reform legislation. "While no one has yet come forward with this legislation we expect an OSHA reform measure to be introduced that will entail several reform measures, including expansion of OSHA coverage, a look at criminal penalties, victims' rights, etc.," he writes.

Occupational Health & Safety News, 17 January 2013

<http://www.ohsonline.com>

## EUROPE

### Commission publishes fact sheets on cosmetic products

2013-01-21

The European Commission has published two consumer fact sheets, called Citizen's Summaries, on allergens in cosmetic fragrances and methylene glycol in hair straightening products. The summary on fragrances is based on the June 2012 opinion, published by the Scientific Committee for Consumer Safety (SCCS). The [information](#) on methylene glycol, which may break down to form formaldehyde under certain conditions, also comes from the SCCS. A copy of the new fact sheets is available at:

- [Fragrance allergens](#)
- [Methylene glycol](#)

Chemical Watch, 17 January 2013

<http://chemicalwatch.com>

### Consultation on three more RoHS exemptions

2013-01-21

Germany-based consultancy, Öko-Institut has released a new consultation on three exemptions from restrictions on the use of hazardous substances in monitoring and control equipment. This consultation has been undertaken on behalf of the European Commission. The exemptions requested by a group of manufacturers under the RoHS directive on hazardous substances in electronic equipment had already been subject to a consultation last year. They were among nearly 20 requests for exemptions made by producers of monitoring instruments and medical devices. The three requests include the use of lead in glass of electronic

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components and fluorescent tubes, or in ceramic parts. The other two are for lead alloys in internal electrical connections and the use of mercury to illuminate liquid crystal displays. The Öko-Institut explained that a new consultation was required because new information regarding these applications was provided last year, at a time when stakeholders could no longer contribute to the evaluation. According to a background document, the exemptions apply to sub-category 9 industrial products only. Under the directive, restrictions on the use of hazardous substances in all uses of monitoring and control equipment will apply from 22 July 2014, except for industrial applications, which will be exempted for three more years until 22 July 2017.

ENDS Europe Daily, 7 January 2013

<http://www.endseuropedaily.com>

### EU food safety body opens public consultation on Aspartame

2013-01-21

On 8 January 2013, the European Food Safety Authority (EFSA) opened a public consultation on the safety of Aspartame after studies in 2010 linked the sweetener to health conditions. In May 2011 the European Commission asked the EU's food safety watchdog (EFSA) to conduct a full re-evaluation of Aspartame, after the publication of new scientific studies revealed its potential negative impact on pregnant women and an increased risk of cancer. Italian oncologist Morando Soffritti published a much-debated study in 2010, which signalled an increased risk of liver and lung cancer in mice exposed to the chemical sweetener over the course of their lives. In addition, an epidemiological study involving 60,000 pregnant women, carried out by Icelandic researcher Thorhallur Halldorsson the same year, made a link between intakes of artificially sweetened soft drinks and increased incidences of premature childbirth. Both studies led to calls by members of the European Parliament to re-assess the product's safety. Aspartame has already been re-assessed five times since it was authorised for use in the EU in 1994. The next review of the chemical sweetener was foreseen for 2020 as part of the systematic re-evaluation of all authorised food additives in the EU. Regulatory bodies around the world have evaluated the safety of aspartame since the 1980s. However, this is the first full evaluation of aspartame that has been requested of EFSA. In its draft opinion on the safety of aspartame, EFSA's scientific experts concluded that it poses no toxicity concern for consumers at normal levels of exposure. The current acceptable daily intake is considered to be safe

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for the general population and consumer exposure to aspartame is below this. The only exception is made for patients suffering from the medical condition phenylketonuria, who are encouraged use less of the sweetener. All interested parties can comment on the draft EFSA opinion online by 15 February 2013. Following the consultation the Authority will hold a meeting with interested parties to discuss the feedback received from the online public consultation.

Euractiv, 9 January 2013

<http://www.euractiv.com/>

### Annual update for 2012 for information to the Norwegian Product Register

2013-01-21

Companies with chemicals registered in the Norwegian Product Register will receive a letter with request to update the chemical information. The received annual update list should be filled in with quantities for 2012 and other missing information and returned to the Climate and Pollution Agency (Klif) by 8 February 2013. The agency has highlighted the following:

- All information on quantities should be given in tons.
- The NANO box should be marked if the chemical contains nano materials.
- Update and complete the List of Customers before returning it to the Product Register.
- You can find a weekly updated list for declaration status at Produktinformasjonsbanken, [www.pib.no](http://www.pib.no).
- Please be aware that chemicals with specific confidential information will not be listed on this website. Klif will provide information about the registration of these chemicals.
- Chemicals marked with BEH indicate that the chemical(s) is/are not completely declared. Please send in additional information.
- The invoice address has to be given if different from the address given on the list.
- Labelling of the chemicals are/is registered in the Product Register as reported but is not included in this year's list.

Physical data that may be of significance when assessing the dangerous properties of chemicals must be declared under section 21 of the

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Norwegian Regulations relating to classification and labelling of dangerous chemicals. Details are given in guidelines on declaration. For all your mandatory declared chemicals, Klif has requested that information be provided that is already known by the producer about substances on nano scale. This means that if your chemical contains a substance/substances in nano form, you should mark this in the appropriate box on the enclosed list. In addition you have to identify which constituent that is in nano form. During 2013 you will have to update the composition for all your minorly declared chemicals that contain substances in nano form.

Klif, 9 January 2013

<http://www.klif.no>

**Companies with chemicals registered in the Norwegian Product Register will receive a letter with request to update the chemical information.**

## REACH Update

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### Candidate List for authorisation updated with fifty-four new substances of very high concern (SVHCs)

2013-01-21

With the addition of 54 new SVHCs to the Candidate List, it now contains a total of 138 substances and the target set by Vice-President Tajani and Commissioner Potočnik to have 136 SVHCs on the Candidate List by the end of 2012 has been reached. "The Agency is very pleased that this ambitious intermediate target has been reached which could not have happened without the consolidated efforts of the Member States, the Commission and the ECHA secretariat", said Geert Dancet, Executive Director of ECHA. "We can now focus our energy on the longer term goal of ensuring that all relevant substances of concern are identified and addressed via the most appropriate risk management route. I believe that through the recent work on respiratory sensitisers, PBTs and endocrine disruptors we have created a solid foundation for the inclusion of all types of substances of concern in the 2020 roadmap that the Commission is currently debating with the Member States and ECHA." 23 substances (#1-23) have been included in the Candidate List following scrutiny by the Member State Committee (MSC) of the comments received and the MSC's unanimous agreement on the identification of these substances as SVHCs. During the public consultation, no comments challenging the identification as SVHC were received for a further 31 substances (#24-54). Therefore, these substances have been added to the Candidate List without the involvement of the MSC. Five substances (#1-5) are identified as PBT substances (persistent, bioaccumulative and toxic) and/or vPvB substances (very persistent and very bioaccumulative). The identification of the vPvB substances (#2-5) is based on the revised criteria introduced to Annex XIII of REACH in 2011. Five further substances are identified as giving rise to an equivalent level of concern. Three of these substances (#6, 7 and 8) are identified because there is scientific evidence of probable serious effects to human health due to their strong respiratory sensitising properties. The other two substances are identified because there is scientific evidence of probable serious effects to the environment. One of these substances (#9) has endocrine disrupting properties and the other one (#10) degrades to an endocrine disruptor already identified as an SVHC (i.e. (1,1,3,3-tetramethylbutyl)phenol). The remaining 44 SVHCs added to the Candidate List are identified as having carcinogenic, mutagenic and/or toxic for reproduction properties (#11-54), thereby fulfilling the criteria outlined in Art. 57 (a, b and/or c) of REACH.

**With the addition of 54 new SVHCs to the Candidate List, it now contains a total of 138 substances and the target set by Vice-President Tajani and Commissioner Potočnik to have 136 SVHCs on the Candidate List by the end of 2012 has been reached.**

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The legal obligations that companies may have resulting from the inclusion of substances in the Candidate List apply to the listed substances on their own, in mixtures or in articles. Producers and importers of articles containing any of the 54 substances included in the Candidate List by 19 December 2012 have six months from today to notify ECHA if both of the following conditions apply: (i) the substance is present in those articles in quantities totalling over one tonne per producer or importer per year and (ii) the substance is present in those articles above a concentration of 0.1% weight by weight. There are exemptions from the notification obligation if the substance is already registered for the use or when exposure can be excluded. Information on the notification of substances in articles and related submission tools, as well as a manual with [instructions](#) on how to create and submit a notification dossier are available on ECHA's website. A webform to facilitate the submission of substances in articles notifications is available on ECHA's website. Nevertheless, datasets are also provided for submission of the notifications via REACH-IT. The Candidate List now contains 138 substances. As foreseen by REACH, a specific procedure will be followed to decide whether the substances should also be included in the List of substances subject to authorisation (Annex XIV of the REACH Regulation).

#	Substance name	EC number	CAS Number	SVHC property
1		214-604-9	1163-19-5	PBT (Article 57 d); vPvB (Article 57 e)
2		276-745-2	72629-94-8	vPvB (Article 57 e)
3		206-203-2	307-55-1	vPvB (Article 57 e)
4		218-165-4	2058-94-8	vPvB (Article 57 e)
5		206-803-4	376-06-7	vPvB (Article 57 e)
6	Diazene-1,2-	204-650-8	123-77-3	Equivalent level of concern having probable serious effects to human health (Article 57 f)

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#	Substance name	EC number	CAS Number	SVHC property
7	Cyclohexane-1,2-dicarboxylic anhydride [1] cis-cyclohexane-1,2-dicarboxylic anhydride [2] trans-cyclohexane-1,2-dicarboxylic anhydride [3] [The individual cis-[2] and trans-[3] isomer substances and all possible combinations of the cis- and trans-isomers [1] are covered by this entry].	201-604-9, 236-086-3, 238-009-9	85-42-7, 13149-00-3, 14166-21-3	Equivalent level of concern having probable serious effects to human health (Article 57 f)
8		247-094-1, 243-072-0, 256-356-4, 260-566-1	25550-51-0, 19438-60-9, 48122-14-1, 57110-29-9	Equivalent level of concern having probable serious effects to human health (Article 57 f)
9		-	-	Equivalent level of concern having probable serious effects to the environment (Article 57 f)

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#	Substance name	EC number	CAS Number	SVHC property
10		-	-	Equivalent level of concern having probable serious effects to the environment (Article 57 f)
11		210-894-6	625-45-6	Toxic for reproduction (Article 57 c)
12	N,N-	200-679-5	68-12-2	Toxic for reproduction (Article 57 c)
13	Dibutyltin dichloride (DBTC)	211-670-0	683-18-1	Toxic for reproduction (Article 57 c)
14	Lead monoxide (Lead oxide)	215-267-0	1317-36-8	Toxic for reproduction (Article 57 c)
15	Orange lead (Lead tetroxide)	215-235-6	1314-41-6	Toxic for reproduction (Article 57 c)
16	Lead	237-486-0	13814-96-5	Toxic for reproduction (Article 57 c)
17	Trilead bis(carbonate) dihydroxide	215-290-6	1319-46-6	Toxic for reproduction (Article 57 c)
18	Lead titanium trioxide	235-038-9	12060-00-3	Toxic for reproduction (Article 57 c)
19	Lead titanium zirconium oxide	235-727-4	12626-81-2	Toxic for reproduction (Article 57 c)
20	Silicic acid, lead salt	234-363-3	11120-22-2	Toxic for reproduction (Article 57 c)

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#	Substance name	EC number	CAS Number	SVHC property
21	Silicic acid (H <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> ), barium salt (1:1), lead-doped [with lead (Pb) content above the applicable generic concentration limit for 'toxicity for reproduction' Repr. 1A (CLP) or category 1 (DSD); the substance is a member of the group entry of lead compounds, with index number 082-001-00-6 in Regulation (EC) No 1272/2008]	272-271-5	68784-75-8	Toxic for reproduction (Article 57 c)
22		203-445-0	106-94-5	Toxic for reproduction (Article 57 c)
23	Methyloxirane (Propylene oxide)	200-879-2	75-56-9	Carcinogenic (Article 57a); Mutagenic (Article 57b)
24		284-032-2	84777-06-0	Toxic for reproduction (Article 57 c)
25		210-088-4	605-50-5	Toxic for reproduction (Article 57 c)
26	N-pentyl-	-	776297-69-9	Toxic for reproduction (Article 57 c)

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#	Substance name	EC number	CAS Number	SVHC property
27		211-076-1	629-14-1	Toxic for reproduction (Article 57 c)
28	Acetic acid, lead salt, basic	257-175-3	51404-69-4	Toxic for reproduction (Article 57 c)
29	Lead oxide sulfate	234-853-7	12036-76-9	Toxic for reproduction (Article 57 c)
30	[Phthalato(2-)] dioxotrilead	273-688-5	69011-06-9	Toxic for reproduction (Article 57 c)
31		235-702-8	12578-12-0	Toxic for reproduction (Article 57 c)
32	Fatty acids, C16-18, lead salts	292-966-7	91031-62-8	Toxic for reproduction (Article 57 c)
33	Lead cynamidate	244-073-9	20837-86-9	Toxic for reproduction (Article 57 c)
34	Lead dinitrate	233-245-9	10099-74-8	Toxic for reproduction (Article 57 c)
35	Pentalead tetraoxide sulphate	235-067-7	12065-90-6	Toxic for reproduction (Article 57 c)
36	Pyrochlore, antimony lead yellow	232-382-1	8012-00-8	Toxic for reproduction (Article 57 c)
37	Sulfurous acid, lead salt, dibasic	263-467-1	62229-08-7	Toxic for reproduction (Article 57 c)
38	Tetraethyllead	201-075-4	78-00-2	Toxic for reproduction (Article 57 c)
39	Tetralead trioxide sulphate	235-380-9	12202-17-4	Toxic for reproduction (Article 57 c)
40	Trilead dioxide phosphonate	235-252-2	12141-20-7	Toxic for reproduction (Article 57 c)

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#	Substance name	EC number	CAS Number	SVHC property
41	Furan	203-727-3	110-00-9	Carcinogenic (Article 57a)
42	Diethyl sulphate	200-589-6	64-67-5	Carcinogenic (Article 57a); Mutagenic (Article 57b)
43	Dimethyl sulphate	201-058-1	77-78-1	Carcinogenic (Article 57a)
44	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	421-150-7	143860-04-2	Toxic for reproduction (Article 57 c)
45	Dinoseb (6-sec-butyl-2,4-dinitrophenol)	201-861-7	88-85-7	Toxic for reproduction (Article 57 c)
46		212-658-8	838-88-0	Carcinogenic (Article 57a)
47		202-977-0	101-80-4	Carcinogenic (Article 57a); Mutagenic (Article 57b)
48		200-453-6	60-09-3	Carcinogenic (Article 57a)
49	4-methyl-m-	202-453-1	95-80-7	Carcinogenic (Article 57a)
50	6-methoxy-m-toluidine (p-cresidine)	204-419-1	120-71-8	Carcinogenic (Article 57a)
51	Biphenyl-4-ylamine	202-177-1	92-67-1	Carcinogenic (Article 57a)
52		202-591-2	97-56-3	Carcinogenic (Article 57a)
53	o-toluidine	202-429-0	95-53-4	Carcinogenic (Article 57a)

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#	Substance name	EC number	CAS Number	SVHC property
54		201-182-6	79-16-3	Toxic for reproduction (Article 57 c)

ECHA, 19 December 2012

<http://echa.europa.eu>

### Call for evidence on the use of cadmium in plastics

2013-01-21

Following a request from the European Commission, the European Chemicals Agency is examining the case for expanding the restriction on cadmium in plastics from the current 16 specific plastic materials listed in Annex XVII of REACH to all plastic materials. ECHA is asking for evidence to help identify the impact of this potential expansion. Anyone who could be affected by a widening of this restriction, or who holds information on relevant uses of cadmium and its compounds in plastics, or on possible alternatives, is invited to submit comments before 11 February 2013 via an online [questionnaire](#) available on the ECHA website. In particular, the Agency seeks to identify any additional plastic materials – made in the EU or imported, for example, in consumer articles, and not covered by the current restriction – which might contain cadmium or cadmium compounds. The call for evidence provides an opportunity for interested parties to express their views at this early stage in the restriction process. This information will assist ECHA's development of an Annex XV restriction dossier on the expansion of the restrictions on cadmium in plastics. The call for evidence does not replace the public consultation on restriction proposals prepared by ECHA, which forms a standard part of the restriction process and will take place later. Further information is available at: [Call for evidence description](#)

ECHA, 14 January 2013

<http://echa.europa.eu>

### ECHA recommends 10 SVHCs for authorisation

2013-01-21

On 17 January 2013, the European Chemicals Agency (ECHA) recommended 10 Substances of Very High Concern (SVHC) for authorisation. This is the fourth ECHA recommendation of substances for

The European Chemicals Agency (ECHA) has requested evidence to assess the impact of expanding REACH restriction on cadmium and its compounds in plastic materials.

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authorisation from the Candidate List. The 10 new substances have been prioritised based on their hazard properties, volumes used, and use related potential for exposure to humans. In its recommendation, the Agency took into account the comments received during public consultation last summer and the [opinion](#) of the Member State Committee from December 2012, which is supporting ECHA's recommendation. For each substance recommended for inclusion in Annex XIV, a deadline (the sunset date) is suggested after which companies will only be able to use it within the EU if an authorisation has been granted. The European Commission, in collaboration with Member States and the European Parliament, will take the final decision on the inclusion of the substances in Annex XIV (the authorisation list) and on their sunset dates. The authorisation regime is one of the core mechanisms of REACH for the protection of human health and the environment. Making these 10 substances of very high concern (SVHCs) subject to authorisation ensures that their risks are properly controlled and that the substances are progressively replaced with suitable alternative substances or technologies. The 10 substances, including examples of their uses in the scope of authorisation, are:

#	Substance name and SVHC property	Uses in the scope of authorisation (examples)
1	Formaldehyde, oligomeric reaction products with aniline (technical MDA) (carcinogenic)	Hardener for epoxy resins; curing agent for polymers
2	Arsenic acid (carcinogenic)	Used to modify properties of glass and in the production of printed circuit boards
3	Dichromium tris(chromate) (carcinogenic)	Anti-corrosion surface treatments of steel and aluminium in the construction and the aeronautic sectors
4	Strontium chromate (carcinogenic)	Anti-corrosion coatings in the aeronautic/ aerospace, coil coating and vehicle coating sectors

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#	Substance name and SVHC property	Uses in the scope of authorisation (examples)
5	Potassium hydroxyoctaoxodizincatedichromate (carcinogenic)	Anti-corrosion coatings in the aeronautic/ aerospace and vehicle coating sectors
6	Pentazinc chromate octahydroxide (carcinogenic)	Anti-corrosion coatings in the vehicle coating and the aeronautic/ aerospace sectors
7	Bis(2-methoxyethyl) ether (Diglyme) (toxic for reproduction)	Primarily used as a reaction solvent or process chemical in distillation applications; further in batteries and in the production of plastics
8	N,N-dimethylacetamide (DMAC) (toxic for reproduction)	Solvent in synthesis, the production of synthetic fibres, in industrial coatings, paint strippers, insulation paper, films and membranes
9	1,2-dichloroethane (EDC) (carcinogenic)	Solvent in the manufacture of fine chemicals and pharmaceuticals and in mixtures for biochemical applications
10	2,2'-dichloro-4,4'-methylenedianiline (MOCA) (carcinogenic)	Curing agent in resins and in the production of polymer articles

ECHA, 17 January 2013

<http://echa.europa.eu>

## Janet's Corner

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### Administratium, A New Element!

2012-01-21

The heaviest element known to science was recently discovered by materials researchers at IPRT/ISU. The new element, tentatively named Administratium, has no protons or electrons, and thus has an atomic weight of 0. However, it does have one neuron, 125 assistant neutrons, 75 vice neutrons, and 111 assistant vice neutrons. This gives it an atomic mass of 312. These 312 particles are held together in a nucleus by a force that involves the continuous exchange of particles called morons.

Since it has no electrons, Administratium is totally inert. However, it can be detected chemically, since it impedes every reaction it comes into contact with. According to its discoverers, a tiny amount of Administratium caused on reaction to take over four days to complete; the normal reaction time is less than one second.

Administratium has a normal half life of approximately three years, at which time it does not actually decay, but instead undergoes a reorganisation in which neutrons, vice neutrons, and assistant vice neutrons exchange places. Studies have shown that the atomic mass usually increases after each reorganisation.

Research at other laboratories indicates that Administratium occurs naturally in the atmosphere. It tends to concentrate at certain points, such as governmental agencies, large corporations, and universities. It is always found in the newest, best appointed and best maintained buildings.

Scientists point out that Administratium is known to be toxic at any level of concentration and can easily destroy any productive reactions where it is allowed to accumulate. Attempts are being made to determine how Administratium can be controlled to prevent irreversible damage, but results to date are not promising.

Aha Jokes

<http://www.ahajokes.com>

## Hazard Alert

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### Cadmium

2012-12-04

Cadmium (CAS no. 7440-43-9) is a chemical element with the symbol Cd and atomic number 48. [1] It is found naturally in the earth's crust, where it commonly exists in combinations with other elements. For example, cadmium oxide (a mixture of cadmium and oxygen), cadmium chloride (a combination of cadmium and chlorine), and cadmium sulphide (a mixture of cadmium and sulphur) are commonly found in the environment. [2] Cadmium is a lustrous, silver-white, ductile, very malleable metal. Its surface has a bluish tinge and the metal is soft enough to be cut with a knife, but it tarnishes in air. [3] It is soluble in acids but not in alkalis. Cadmium doesn't have a distinct taste or smell. [2]

#### USES [4]

- Leather tanning agent/pigment in dye (until 1990's)
- Rechargeable Ni-Cd batteries
- Solar cells
- Solder alloys
- Paint and plastic production
- Engraving
- Cadmium vapour lamps
- Parasite treatment in farm animals
- Old television tubes
- Electroplate other metals

#### IN THE ENVIRONMENT [5]

- Cadmium enters soil, water, and air from mining, industry, and burning coal and household wastes.
- Cadmium does not break down in the environment, but can change forms.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- Some forms of cadmium dissolve in water.
- Cadmium binds strongly to soil particles.
- Fish, plants, and animals take up cadmium from the environment.

**Cadmium is a chemical element with the symbol Cd and atomic number 48. It is a lustrous, silver-white, ductile, very malleable metal. It is soluble in acids but not in alkalis and doesn't have a distinct taste or smell.**

## Hazard Alert

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### SOURCES & ROUTES OF EXPOSURE [6,7]

#### Sources of Exposure

- Industry sources: Cadmium is obtained as a by-product from the treatment of zinc, copper, lead, and iron ores, therefore facilities that treat these ores may emit cadmium compounds to the environment (mainly water). Coal and oil burning power plants may emit cadmium compounds to air.
- Diffuse sources: Small industrial domestic use of cadmium products will emit low levels of cadmium to the environment.
- Natural sources: Cadmium is a naturally occurring element in the crust of the earth. Coal and other fossil fuels contain cadmium and their combustion releases the element into the atmosphere. Cadmium is found naturally in various ores: lead and copper containing zinc, some iron ores, and in sulfide ore. These can result in emissions to water. Volcanic emissions contain cadmium-enriched particles.
- Transport sources: The combustion of motor fuels (petrol) in cars, trucks, and planes result in emissions to air, and particles from tire wear may result in emissions to air, land and water.
- Consumer products: Cadmium is found in many domestic products, e.g. tobacco products, phosphate fertilisers, polyvinyl chloride (PVC) products, photocells, petrol, oils, tyres, automobile radiators, some textile dyes and colours, electronic components, heating elements in electric kettles and hot water systems, batteries, and ceramic glazes.

#### Routes of Exposure

The main routes of exposure to cadmium are:

- Inhalation
- Ingestion
- Skin exposure
- Eye exposure

### HEALTH EFFECTS [2,8]

Acute exposure to cadmium fumes may cause flu like symptoms including chills, fever, and muscle ache sometimes referred to as "the cadmium blues." Symptoms may resolve after a week if there is no respiratory damage. More severe exposures can cause tracheo-bronchitis, pneumonitis, and pulmonary oedema. Symptoms of inflammation may start hours after the exposure and include cough, dryness and irritation

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of the nose and throat, headache, dizziness, weakness, fever, chills, and chest pain. Inhaling cadmium-laden dust quickly leads to respiratory tract and kidney problems, which can be fatal (often from renal failure). Ingestion of any significant amount of cadmium causes immediate poisoning and damage to the liver and the kidneys. The bones become soft (osteomalacia), lose bone mineral density (osteoporosis) and become weaker. This causes the pain in the joints and the back, and also increases the risk of fractures. In extreme cases of cadmium poisoning, mere body weight causes a fracture. The kidneys lose their function to remove acids from the blood in proximal renal tubular dysfunction. The kidney damage inflicted by cadmium poisoning is irreversible. The proximal renal tubular dysfunction creates low phosphate levels in the blood (hypophosphatemia), causing muscle weakness and sometimes coma. The dysfunction also causes gout, a form of arthritis due to the accumulation of uric acid crystals in the joints because of high acidity of the blood (hyperuricemia). Another side effect is increased levels of chloride in the blood (hyperchloremia). The kidneys can also shrink up to 30%. Other patients lose their sense of smell (anosmia).

### CARCINOGENICITY

There is evidence that cadmium causes prostate and kidney cancer in humans, it has been shown to cause lung and testicle cancer in animals. [6]

The United States Department of Health and Human Services determined that cadmium and certain cadmium compounds are probable or suspected carcinogens.[2]

### SAFETY

#### First Aid Measures [7]

- Eye exposure: Direct contact may cause redness or pain. Wash eyes immediately with large amounts of water, lifting the upper and lower eyelids. Get medical attention immediately.
- Skin exposure: Direct contact may result in irritation. Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water. Get medical attention immediately.
- Ingestion: Ingestion may result in vomiting, abdominal pain, nausea, diarrhoea, headache and sore throat. Medical personnel must administer treatment for symptoms. Under no circumstances should

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- the employer allow any person whom he retains, employs, supervises or controls to engage in therapeutic chelation. Such treatment is likely to translocate cadmium from pulmonary or other tissue to renal tissue. Get medical attention immediately.
- Inhalation: If large amounts of cadmium are inhaled, the exposed person must be moved to fresh air at once. If breathing has stopped, perform cardiopulmonary resuscitation. Administer oxygen if available. Keep the affected person warm and at rest. Get medical attention immediately.
  - Rescue: Move the affected person from the hazardous exposure. If the exposed person has been overcome, attempt rescue only after notifying at least one other person of the emergency and putting into effect established emergency procedures. Do not become a casualty yourself. Understand your emergency rescue procedures and know the location of the emergency equipment before the need arises.

### Exposure Controls & Personal Protection [9]

#### Engineering Controls

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

#### Personal Protective Equipment

The following personal protective equipment is recommended when handling cadmium:

- Safety glasses;
- Lab coat;
- Dust respirator (be sure to use an approved/certified respirator or equivalent);
- Gloves

Personal Protection in Case of a Large Spill:

- Splash goggles;
- Full suit;
- Dust respirator;
- Boots;
- Gloves;

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- A self-contained breathing apparatus should be used to avoid inhalation of the product.
- Note: Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### REGULATIONS [5,6]

#### Exposure Limits

##### United States

- The Environmental Protection Agency has determined that exposure to cadmium in drinking water at concentrations of 0.04 ppm for up to 10 days is not expected to cause any adverse effects in a child.
- The Environmental Protection Agency has determined that lifetime exposure to 0.005 ppm cadmium is not expected to cause any adverse effects.
- The Food & Drug Administration has determined that the cadmium concentration in bottled drinking water should not exceed 0.005 ppm.
- The Occupational Health and Safety Administration (OSHA) have limited workers' exposure to an average of 5 µg/m<sup>3</sup> for an 8-hour workday, 40-hour workweek.

##### Australia

- Safe Work Australia has established an eight hour time weighted average (TWA) exposure limit of 0.01 mg/m<sup>3</sup>. The agency has also determined that cadmium and its compounds is a 'probable carcinogen'.
- Australian Drinking Water Guidelines (NHMRC and ARMCANZ, 1996): Maximum of 0.002 mg/L (i.e. 0.000002 g/L)

#### References

1. <http://en.wikipedia.org/wiki/Cadmium>
2. <http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/cadmium.pdf>
3. <http://www.lenntech.com/periodic/elements/cd.htm>
4. [http://toxipedia.org/display/toxipedia/Cadmium+\(Cd\)](http://toxipedia.org/display/toxipedia/Cadmium+(Cd))
5. <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=47&tid=15>
6. <http://www.npi.gov.au/substances/cadmium/source.html>
7. [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=10036&p\\_table=STANDARDS](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=10036&p_table=STANDARDS)

## Hazard Alert

8. [http://en.wikipedia.org/wiki/Cadmium\\_poisoning](http://en.wikipedia.org/wiki/Cadmium_poisoning)
9. <http://www.sciencelab.com/msds.php?msdsId=9923223>

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## Gossip

### Brain and Nervous System Damaged by Low-Level Exposure to Organophosphate Pesticides

2012-12-06

In a new study, researchers have discovered that low-level exposure to organophosphates (OPs) produces lasting decrements in neurological and cognitive function. Memory and information processing speed are affected to a greater degree than other cognitive functions such as language. Researchers at UCL and the Open University carried out the systematic review of the literature. It is the first to attempt a quantitative evaluation of the data assimilated from 14 studies and more than 1,600 participants. The researchers used meta-analysis to obtain an overview of the literature and their findings are published in the journal *Critical Reviews in Toxicology*. "Meta-analysis combines the results of several studies and moves the discussion away from individual pieces of research, towards an overview of a body of literature," says lead author Dr Sarah Mackenzie Ross (UCL Clinical, Educational & Health Psychology). "This is considered to be the method of choice in situations where research findings may be used to inform public policy," explains Professor Chris McManus (UCL Clinical, Educational & Health Psychology), co-author of the study. Dr Mackenzie Ross continues: "This is the first time anyone has analysed the literature concerning the neurotoxicity of organophosphate pesticides, using the statistical technique of meta-analysis." The analysis reveals that the majority of well-designed studies undertaken over the last 20 years find a significant association between low-level exposure to organophosphates and impaired cognitive function. "Pesticides prevent millions of people from starving to death and from contracting disease, but they are also harmful to humans under certain circumstances. Derived from World War II nerve gas agents, organophosphate pesticides are the most widely used insecticides in the world. They are used extensively in agriculture, by the military and also for domestic purposes. According to the World Health Organisation (WHO) organophosphate pesticides are one of the most hazardous pesticides to vertebrate animals, responsible for many cases of poisoning worldwide. The toxic effects of high level poisoning are well established but the possibility that long-term low-level exposure to OPs in doses below that causing acute toxicity causes ill health is controversial. "In the UK a number of occupational groups have expressed concern that their health has been affected by exposure to organophosphates," explains Dr Virginia Harrison (Open University), co-author of the study. This includes sheep farmers, who between 1988 and 1991 were required to dip sheep yearly in pesticide formulations containing OPs. Between 1985 and 1998 more than 600 reports of ill

**In a new study, researchers have discovered that low-level exposure to organophosphates (OPs) produces lasting decrements in neurological and cognitive function.**

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health following exposure to sheep dip were received by a government adverse reaction surveillance scheme. Other groups affected include Gulf War Veterans, who were exposed to pesticides on a daily basis during their tour of duty to protect them from pests such as sand flies, mosquitoes and fleas, which carry infectious diseases. Airline pilots and cabin crew can also be exposed to organophosphates in engine oil. The researchers hope their findings will be of interest to Government advisory committees and departments who are currently reviewing the neurotoxicity of low level exposure to OPs; as well as farmers, Gulf War veterans and aviation workers who believe their health has been affected by exposure to OPs.

Science Daily, 2 December 2012

<http://www.sciencedaily.com>

### Chemical “soup” clouds connection between toxins and poor health

2012-12-06

Toxicologist Linda Birnbaum has tried to put sound science at the centre of debates over chemical regulation. From plastics to flame retardants, the ubiquitous chemicals of our daily lives have raised public health concerns like never before. Inside the Beltway, however, data-crunching scientists are often no match for industry lobbyists and corporate lawyers. The exception, no doubt, is Linda Birnbaum, the toxicologist who leads, two little-known scientific agencies, the National Institute of Environmental Health Services (NIEHS) and the National Toxicology Program (NTP). Last April, Birnbaum sat inside a Capitol Hill conference room packed with poker-faced chemical industry executives ready for a showdown. The NTP had recently issued its report on carcinogens—a sort of name-and-shame list of chemicals on which no company wants to find its products. Charles Maresca of the Small Business Administration—taking a stand for the maligned styrene industry—argued that the report was “based on inaccurate scientific information” and faulty peer review. North Carolina congressman Brad Miller (D) was unimpressed. He took the microphone and described Birnbaum’s resume of more than 700 publications in public health, toxicology and environmental science. Removing his black reading glasses, he glanced at Maresca, and delivered the fatal blow with relish: “And you’re a lawyer. Isn’t that right?” If Birnbaum got a kick out of the put-down, she didn’t show it. After 33 years working as a federal scientist at both the U.S. Environmental Protection Agency and the NIEHS, Birnbaum’s career is a study in the way science becomes law and the ways lobbyists subvert science. She has watched her contributions to an EPA report on

**Birnbaum’s career is a study in the way science becomes law and the ways lobbyists subvert science.**

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dioxin sit in limbo for 20 years, she has worked to study the health impacts of types of asbestos that are not legally recognised as asbestos and she has challenged the chemical industry in her pursuit for answers about the controversial chemical bisphenol A (BPA). Through her leadership at NIEHS and NTP over the past three years, she has pursued a broad vision of environmental health that incorporates gene–environment interactions along with the impacts of disease, diet, stress and other factors. She has also tried to make the NIEHS quick on its feet: After the 2010 BP oil spill, she initiated the Gulf Long-Term Follow-Up (GuLF) study, the first extended review of the health effects of an oil spill. Scientific American recently conducted an interview with Birnbaum in Washington, D.C., to learn more about environmental health, toxic chemistry and the politics of chemical regulation. The following is an edited script of the interview.

### How did you become interested in toxicology?

When I was in eighth grade at Benjamin Franklin Junior High School in Teaneck, New Jersey, I had a science teacher who was an attractive, peppy, young blonde woman who was also the cheerleading coach. I was a cheerleader, and that positive reinforcement made it okay to like science. I became interested in thyroid hormones. I can’t tell you exactly why, but I had written to a local pharmaceutical company and asked if they could give me some rats and some chemicals. That’s something that would never happen easily today—but they did it! I got a letter from them that said, “Please come. We’d like to talk to you.” The next thing I knew, I had 40 rats in four cages and feed and bedding and everything else, along with thyroid hormone and chemicals that block thyroid hormone.

### They let you keep the rats at your house?

Yeah. We had them in my basement.

### What did your parents say about that?

My parents were really incredibly supportive—even when one escaped. I eventually found its body and put it in the freezer figuring I’d dissect it at some point. But my grandmother went in thinking it was a package of ground beef. She had a little bit of a fright.

### How much of human disease is due to environmental exposures?

The estimates vary, and it depends on how you define environment. People often say it’s about 30 percent. I think that’s defining environment fairly narrowly, considering only environmental chemical exposures, but your environment includes the food you eat, the drugs you take, the

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psychosocial stress you're exposed to and so forth. After all, what's the difference between a drug and an environmental chemical? One you intentionally take and the other one you don't. Considering all that, I would say then the environment is much more than 30 percent. We also know—especially from studies of identical versus fraternal twins—that for many different diseases, genetics is not the whole story. Actually, I think it's time to stop asking, "Is this caused by genes or is this caused by the environment?" because in almost all cases, it's going to be both.

### **Why has it been so difficult to link environmental exposures to specific health consequences?**

Nobody is exposed to one chemical at a time, right? I mean we live in a soup of chemicals and we live in a soup of exposures. Here, I'm having a lemonade. Well, it's not only lemon in here. I'm sure there's some sugar. There might be a preservative or something. I don't know what's in this. So think of all those things interacting, but when we test chemicals in the lab we tend to test them one at a time.

**I guess we don't consider these other types of exposures.** Right. A high-fat diet, for example, can completely change the way your body handles chemicals. Exposure to a certain chemical may lower your ability to respond to an infection. At EPA we did a lot of studies exposing rats and mice to air pollutants and then to bacterial infections or influenza infections. Those who were exposed to pollution were more likely to die, whereas those in clean air recovered. We see the same thing with individual kinds of chemical exposures as well. One of our NIEHS grantees, Philippe Grandjean of Harvard University, followed women during their pregnancy, and then he followed their children. So he had blood samples before they were born from the mother. He had blood samples at birth, and he continued to follow the kids. What he found is that if those children had elevated exposure to PCBs [polychlorinated biphenyls used in electronics], they were less able to mount a normal response to a vaccination. PCBs are considered likely carcinogens, but they are also endocrine disruptors, like bisphenol A or dioxin, which is something we've heard a lot about in the media lately.

### **What is your definition of an endocrine disruptor?**

An endocrine disruptor is anything that affects the synthesis of a hormone, the breakdown of a hormone or how the hormone functions. We used to think it had to bind with a hormone receptor but endocrine disruptors can perturb hormone action at other stages in the process.

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### **Why are they such a big deal?**

They're all around us, and I think they can affect us at very low levels. Our hormones control our basic homeostasis, our basic physiology. If you alter your hormone levels, you're not going to behave the same way physiologically and that includes mentally and everything else. I think that there's growing evidence that some of the chemicals to which we are exposed are doing that to the population right now. So we have this soup of endocrine disruptors, air pollution and other exposures, which has made epidemiology so difficult.

### **What have you been doing at NIEHS to get to the bottom of these issues?**

There are ways statistically that you can control for some of these factors, but I think we have to go beyond that and say, "Well, wait a minute. That's not real life." Maybe we need to look at whether there are interactions. In animal systems, from work that I did starting in the '80s and have continued ever since, we showed that for chemicals that have the same mechanism of action you can basically add up those chemicals to predict the toxicity. This is the toxic equivalency factor approach. We've been finding with a lot of endocrine disruptors that if they impact the same health effect, such as decreased sperm production, you can just kind of add up chemicals. They may have a different mechanism, but they all affect sperm count. A lot of data show that if chemicals are oestrogenic, you can add up their potency. If chemicals are anti-androgenic, you can add them up. If chemicals affect thyroid, you can add them up, too. Nobody has tried to look even more broadly and say, "Well, I'm gonna take all these chemicals that somehow block male reproduction, and I'm also gonna add that to the chemicals that do something totally different." The way I think we're going to have to eventually get at that is through what we're calling "Tox21," which is this rapid-screening approach being developed with high-throughput screening of in vitro assays. They are cell-based assays looking at many, many, many different kinds of responses. Basically, we can screen up to 10,000 chemicals a year at 15 different dose levels for at least 70 or more different kinds of responses. We can begin now to do this with mixtures where we can make many different kinds of mixtures because we can test so many at a time.

### **How has spending 33 years studying toxic chemicals affected your outlook on the environment?**

We do know that there are many chronic health conditions, non-communicable health conditions, which have increased too rapidly in

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the last 20 to 40 years. These are things like autism, ADHD and, of course, obesity and diabetes. We have identified chemicals clearly at play in the obesity epidemic. I am not in any way saying to people you can stop exercising and you don't have to watch what you eat, but the question I have is: Are we setting people up to fail because they're exposed to something that alters their ability to metabolise fats or sugars? Overall, I'd say I'm a pragmatist. I think our air in this country is cleaner than it was, but it's not as clean as it needs to be. Our water is cleaner, but again not as clean as it needs to be. We've taken care of the really blatant environmental problems. We're concerned now about low levels of lead, not the very high levels that there used to be in our environment. That's a good thing.

Scientific American, 23 November 2012

<http://www.sciam.com>

### California's urban, transportation policies contribute to children's asthma

2012-12-06

California's effort to reverse urban sprawl and encourage denser development may mean more children will live closer to polluted high-traffic areas. A new study estimates that near-road air pollution is at least partially responsible for 8 percent of childhood asthma cases in Los Angeles County. The authors reported that their findings "suggest that there are large and previously unappreciated public health consequences of air pollution" in metropolitan areas and that "compact urban development strategies should be coupled with policies to reduce near-roadway pollution exposure." In California, urban planning policies designed to reduce vehicle emissions and limit urban sprawl encourage people to build and live closer to transit centres. That way, they can use their cars less and public transportation more. But people then live closer to major roads and higher air pollution levels, which can be unhealthy. Now, a study of children's asthma in Los Angeles County finds that may be true. The results suggest the number and severity of health impacts from living less than a football field away from high-traffic roads have been underestimated. By comparing health data with how far residents live from heavy-traffic roads, the researchers figure around 27,000 – or about 8 percent – of the total childhood asthma cases in the county are at least partly due to exposures from living near busy streets. In addition, a larger percentage of the children experience symptoms serious enough to send them to the hospital. Lowering traffic-related air pollution in

**California's effort to reverse urban sprawl and encourage denser development may mean more children will live closer to polluted high-traffic areas.**

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these transportation-centric areas could reduce the children's respiratory problems, the study's authors suggest. This is the first study to examine the impact of what is called compact urban development from the perspective of reducing health burdens of roadway air pollution. The state-mandated policies attempt to integrate land use and transportation planning in order to reduce urban sprawl and slow vehicle emissions. The policies do not consider health effects of near-roadway air pollution. Traffic on roads has significantly increased in the United States during the past 20 years. In many cities, vehicle emissions have become one of the dominant sources of air pollutants, including carbon monoxide, carbon dioxide, volatile organic compounds, hydrocarbons, nitrogen oxides and particulate matter (PM). Traffic-related air pollution is associated with respiratory, cardiovascular and other chronic health problems in adults and children. While air pollution can trigger asthma attacks, the underlying mechanism is not well understood. People with asthma have a hard time breathing. Allergens, pollution, cigarette smoke and general poor air quality can trigger mild to severe asthma symptoms, including wheezing, shortness of breath and coughing. The disease – which can affect quality of life – has increased in the United States by 75 percent since 1980, according to the California Environmental Protection Agency.

Living close to busy roads poses a significant public health threat because concentrations of traffic-related pollutants are higher near high-traffic areas. The levels fall off sharply away from the highways. An estimated 11 percent of U.S. households are within 100 meters (about 110 yards) of a four-lane highway. During the new study, the researchers compared the number of asthma cases and asthma exacerbations in children younger than 18 in Los Angeles County during 2007. They looked at three scenarios linked to exposures to near-road air pollution and regional urban air pollution. Exposures to near-road pollution were estimated with dispersion models of residential proximity to a major road while exposures to the regional air pollutants nitrogen dioxide and ozone were estimated using data from the U.S. Environmental Protection Agency. Data from the Children's Health Study were used to link population data to pollution data and find the associations between children's asthma and air pollution. The researchers estimated, among 2.5 million children in Los Angeles County, about 17.8 percent of those lived within 75 meters – about 82 yards – of busy roads. When looking at childhood asthma, the researchers found that around 27,100 cases of childhood asthma – about 8 percent of the total number of kids with asthma – were caused by near-road pollution within 75 meters (about 80 yards) of a busy highway. If the number of children living within 75 meters of a major road rose by 3.6

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percent, an additional 5,900 asthma cases would be attributable to near-roadway pollution. Furthermore, the researchers discovered that near-road pollution disproportionately had a greater impact on the more severe asthma symptoms. These often lead to more serious health problems that need more medical care, for example, emergency room visits and hospital admissions. The study suggests that near-road air pollution is a factor in children's asthma and should be considered in urban planning policies meant to reduce urban sprawl and traffic-related air pollution. Smarter strategies will be needed to limit urban sprawl and reduce health burdens of near-road air pollution at the same time.

Environmental Health News, 30 November 2012

<http://www.environmentalhealthnews.org/>

### Hormone disorder and the Pill tied to blood clots

2012-12-06

The findings from a new study have revealed that women who have a hormone disorder called polycystic ovary syndrome (PCOS) and who take the birth control pill have twice the risk of blood clots than do other women on the Pill. "For many women with PCOS, (the risks) will be small," said Dr. Christopher McCartney, an associate professor at the University of Virginia School of Medicine in Charlottesville, who was not involved in the new work. "For some women, they might be high enough to say we really shouldn't use the Pill, such as for women over 35 who smoke." The three to five percent of women in the U.S. with PCOS have a hormone imbalance, which can lead to irregular periods, extra hair growth and higher risks for being overweight and developing hypertension and diabetes. They are often treated with oral contraceptives, many of whose labels already include warnings about blood clots. A blood clot, also called venous thromboembolism, can be deadly if it spreads to the lungs, although none of the cases of blood clots in the study were fatal. Because women with PCOS already tend to have more heart disease risk factors, researchers wanted to see if the Pill adds any additional risk. During the study, they used medical and pharmacy information from a large health insurance database, including 43,500 women with PCOS. On average, over the course of a particular year, about 24 out of every 10,000 women with PCOS taking the Pill were diagnosed with a blood clot, compared to about 11 out of every 10,000 women without the disorder using the contraceptive. "Am I particularly surprised by the findings? No," said Dr. Shahla Nader-Eftekhari, a professor at the University of Texas Medical School at Houston, who treats women with PCOS but was not involved in the current study.

**The findings from a new study have revealed that women who have a hormone disorder called polycystic ovary syndrome (PCOS) and who take the birth control pill have twice the risk of blood clots than do other women on the Pill.**

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The study, published in the Canadian Medical Association Journal, could not say for sure why women with PCOS are more likely to have a blood clot. McCartney said he suspects that obesity has something to do with it. At the beginning of the study in 2001 the percent of women with and without PCOS who were obese was the same - about 13 percent - but by the end of the study in 2009, 33 percent of women with PCOS and 21 percent of women without the disorder were obese. "I really think that could be something that's contributing to the risk," McCartney told Reuters Health. "Weight not only contributes to the risks associated with the Pill, it also contributes to some of the symptoms of PCOS and some of the metabolic problems associated with PCOS," he added. McCartney pointed out that the risk of developing a blood clot, even among women with PCOS, is still considered small, and shouldn't necessarily discourage women from taking the Pill. Steven Bird, the lead author of the study and an epidemiologist with the U.S. Food and Drug Administration, said that the importance of the findings is to raise awareness among women and their doctors that there is an increased risk for them if they take the Pill. "Although the risk is small, prescribers should consider the increased risk for blood clots in women with PCOS who are prescribed contraceptive therapy," Bird said. McCartney agreed, and added that it's also a good reminder for doctors of women with PCOS to discuss the importance of maintaining a healthy weight.

Reuters Health, 3 December 2012

<http://www.reuters.com/news/health>

### Food Allergies May be Caused from Pesticides in Tap Water

2012-12-06

According to a new study, pesticides currently used in treatment processes for tap water could be to blame for food allergies that afflict 15 million Americans. The results of the new study, published in the American College of Allergy, Asthma, and Immunology (ACAAI), indicated that high levels of dichlorophenol, a chemical that is used to chlorinate water and in pesticides, created food allergies when found in the human body. "Our research shows that high levels of dichlorophenol-containing pesticides can possibly weaken food tolerance in some people, causing food allergy," said allergist Elina Jerschow, M.D., M.Sc., ACAAI fellow and lead study author. "This chemical is commonly found in pesticides used by farmers and consumer insect and weed control products, as well as tap water." During the study, 10,348 participants in the U.S. National Health and

**According to a new study, pesticides currently used in treatment processes for tap water could be to blame for food allergies that afflict 15 million Americans.**

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Nutrition Survey, 2,211 allowed their dichlorophenol levels to be measured from their urine. Of those tested, 411 participants had some form of food allergy and 1,016 had an environmental allergy. "Other dichlorophenol sources, such as pesticide-treated fruits and vegetables, may play a greater role in causing food allergy," said Dr. Jerschow. Food allergy symptoms can range from a mild rash to a life-threatening reaction known as anaphylaxis. The ACAAI advises everyone with a known food allergy to always carry two doses of allergist prescribed epinephrine. A delay in using epinephrine is common in severe food allergic reaction deaths.

Environmental Protection News, 3 December 2012

<http://www.eponline.com>

### Diabetes may be linked to hearing loss: study

2012-12-06

Diabetes has already been tied to an increased risk of kidney and cardiovascular troubles, nerve damage and vision loss, and now a Japanese study finds diabetics to be more than twice as likely as those without the disease to have hearing impairment. In a review of past research on the issue, published in the Journal of Clinical Endocrinology and Metabolism, scientists found that younger diabetics were at even higher risk than older adults, though they could not explain why. "Current meta-analysis suggests that the higher prevalence of hearing impairment in diabetic patients compared with nondiabetic patients was consistent regardless of age," wrote lead researcher Chika Horikawa, at Niigata University Faculty of Medicine, and colleagues. It's not the first time researchers have found a link between diabetes and hearing loss. In 2008, researchers from the U.S. National Institutes of Health (NIH) saw similar patterns in a sample of more than 11,000 people, with people with diabetes twice as likely to have hearing loss as those without. It's thought that high blood sugar levels brought on by diabetes may lead to hearing loss by damaging blood vessels in the ears, said Horikawa. During the recent study, Horikawa and colleagues collected information from 13 previous studies examining the link between diabetes and hearing loss and published between 1977 and 2011. Together, the data covered 7,377 diabetics and 12,817 people without the condition. Overall, Horikawa's team found that diabetics were 2.15 times as likely as people without the disease to have hearing loss. But when the results were broken down by age, people under 60 had 2.61 times the risk while people over 60 had 1.58 times higher risk. Some experts caution that this kind of study does not prove that diabetes is directly responsible for the greater hearing

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loss rates. "It doesn't definitively answer the question, but it continues to raise an important point that patients might ask about," said Steven Smith, a diabetes specialist at the Mayo Clinic in Rochester, Minnesota. The researchers note that future studies that take more factors into account, such as age and noisy environment, are needed to clarify the link between diabetes and hearing loss. Still, Horikawa said, people should recognize that diabetics may be at risk for hearing loss based on their results. "Furthermore, these results propose that diabetic patients are screened for hearing impairment from (an) earlier age compared with non-diabetics," said Horikawa, adding that hearing loss has also been linked to an increased risk of depression and dementia.

Reuters Health, 2 December 2012

<http://www.reuters.com/news/health>

### Airborne Particles Transport Pollutants Around the World

2012-12-06

The symbiotic relationship between airborne particles and pollutants demonstrate how city pollution ends up in faraway places such as the Arctic. Pollution from fossil fuel burning and forest fires reaches all the way to the Arctic, but the pollution should decay long before it travels that far. A new study can now explain how pollution can travel such great distances. According to the research, the pollutants get inside of the airborne particles and are then protected from the elements as the particles travel. The results from the study will help scientists improve atmospheric air-quality and pollution transport models. In addition, the results demonstrate that the particles holding pollutants inside benefit from this arrangement; the airborne particles, made from natural molecules mostly given off by live or burning plants, last longer with a touch of pollutant packed inside. The pollutants are known as polycyclic aromatic hydrocarbons (PAHs), and are regulated by environmental agencies due to their toxicity. "What we've learned through fundamental studies on model systems in the lab has very important implications for long-range transport of pollutants in the real world," said physical chemist Alla Zelenyuk of the Department of Energy's Pacific Northwest National Laboratory. "In this study, we propose a new explanation for how PAHs get transported so far, by demonstrating that airborne particles become a protective vessel for PAH transport." For decades, atmospheric scientists have been trying to explain how atmospheric particles manage to transport harmful pollutants to pristine environments thousands of

**The symbiotic relationship between airborne particles and pollutants demonstrate how city pollution ends up in faraway places such as the Arctic.**

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miles away. The particles collected in areas such as the Arctic also pack higher concentrations of pollutants than scientists' computer models predict. The predictions are based on the assumption that the particles are like liquid spheres that allow PAHs to escape, but they don't escape. One recent advance has helped pin down why PAHs are remaining stuck in their particle lairs. Zelenyuk and her colleagues developed an ultra-sensitive instrument that can determine the size, composition, and shape of individual particles. Called SPLAT II, the instrument can analyse millions of tiny particles one by one, and characterise the individual particles providing unique insight into their property and evolution. Using SPLAT II to evaluate laboratory-generated SOA particles from alpha-pinene, Zelenyuk has already discovered that SOA particles aren't liquid at all. Her team's recent work revealed they are more like tar -- thick, viscous blobs that are too solid to be liquid and too liquid to be solid. These results showed the team that PAHs become trapped within the highly viscous SOA particles, where they remain protected from the environment. The symbiotic relationship between the atmospheric particles and pollutants surprised Zelenyuk: SOAs help PAHs travel the world, and the PAHs help SOAs survive longer. Zelenyuk and her colleagues performed comparable experiments with other PAHs and SOAs and found similar results. In the real world, Zelenyuk said, the evaporation will be even slower than what was shown in their study. These results will help modellers better simulate atmospheric SOA particles and transport of pollutants over long distances.

Environmental Protection News, 27 November 2012

<http://www.eponline.com>

### Study finds herbalists at higher urinary cancer risk

2012-12-06

A small new study from Taiwan has linked a widely banned substance traditionally used in Chinese medicine to an elevated risk for kidney and bladder cancers among professional herbalists. Herbs, such as fang chi, that contain the plant-derived aristolochic acid, are known to cause cancer as well as kidney failure, and the current study suggests that working with these herbs raised urinary cancer rates among Taiwanese herbalists who handled fang chi before its ban in 2003. "This is the first study that looks at an occupational group that has been heavily exposed to aristolochic acid," said the study's lead author Dr. Hsiao-Yu Yang, an occupational medicine professor at Tzu Chi University in Taiwan. Previous research has found that Chinese herbalists have three times higher risk for urinary system cancers compared with the general population, but those reports didn't

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connect the pattern to a specific work-related factor. To see whether fang chi exposure could be involved, Yang's team used national databases to track 6,564 Chinese herbalists working in Taiwan between 1985 and 1998. In 2002, the herbalists completed surveys regarding their recollections of processing medicines such as fang chi in their practices. The occupational researchers honed in on 24 herbalists who had contracted cancer of the urinary system, including the kidneys, bladder and urethra, and compared that group with 140 herbalists who were healthy at the time of the 2002 survey.

About two-thirds of the herbalists in both groups were women. Herbalists who packed or sold fang chi had 2.6 times the risk of urinary cancer compared with herbalists who avoided fang chi in their practice, Yang's team reports in the *Journal of Urology*. Those who ground the herb had 2.2 times higher risk. The results took into account other potentially cancer-causing factors such as cigarette smoking, use of hair dyes or exposure to arsenic from deep-water wells. In 2001, the U.S. Food and Drug Administration warned consumers of the dangers of aristolochic acid-containing herbs, and regulations established in the Europe Union in 2004 effectively banned the substance. However, Internet sites still sell the processed drug or source plant, which remains legal in China and several other countries. For Yang, the study also highlights the fact that little-regulated Chinese herbal medicines in many cases still contain aristolochic acid. "We want to push our government to prohibit all drugs that contain aristolochic acid," Yang said. One example, xi xin, a common cold medicine still in use in Taiwan, contains aristolochic acid, he pointed out. Yang and colleagues also found that 19 percent of Taiwanese herbalists had traces of aristolochic acid in their blood three years after the ban, indicating that the drug was probably still in use. That possibility is among the reasons at least one expert dismissed the new study as flawed. "It's a low quality study, and I wouldn't rely on it at all," said Mikel Aickin, methodology editor at BMC Complementary and Alternative Medicine, who was not involved in the research.

The report's main weakness, Aickin told Reuters Health, was that many of the herbalists personally used fang chi outside of the clinic, making it impossible for researchers to determine whether the increases in urinary system cancer came from a work hazard or personal consumption. The claim that handling fang chi is an occupational danger to herbalists isn't true, Aickin said. "It's really just a very clumsy study that's rediscovered what's already known about the carcinogenesis of taking it as a treatment. They're producing nonsense," he added. Yang agreed that the study

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could not determine whether the Chinese herbalists put themselves at additional risk by personally consuming fang chi. "This occupational group may also take fang chi - I cannot say that it is not impossible that the disease comes from taking the herbs - but their occupation contributes to the aetiology greatly," Yang said. "Now that this paper is out, I suspect and hope that there will be more interest in worker safety in this industry," said Steven Given, dean of clinical education at the American College of Traditional Chinese Medicine in San Francisco. "I think this is a very good sign." Beyond herbalists, and despite near-worldwide bans, cases of aristolochic acid-linked cancers and other illnesses continue to crop up from the Balkans to Beijing. Fang chi was traditionally used to treat arthritis and swelling, but aristolochic acid has been found in a wide variety of dietary supplements and alternative medicines. "This is a potential global disease," said Graham Lord, a nephrologist at King's College London who worked on the first case of kidney failure from aristolochic acid reported in the U.K. "It may be under-recognised, but in the last two or three years, there has been an increasing number of epidemiological studies coming out showing that there could be potentially tens of thousands of patients out there that have been exposed," Lord told Reuters Health. Doctors may not immediately associate kidney diseases with the ingredient that contaminates some herbal preparations and can be easily bought over the Internet, experts said. "It's quite hard to diagnose, there is no simple test that you can perform, it's a fairly specialised form of testing," Lord said. To help in the diagnosis, Lord and colleagues in Belgium are currently working on a checklist for doctors to help determine if aristolochic acid is at the root of a patient's kidney failure or urinary system cancer.

Reuters Health, 29 November 2012

<http://www.reuters.com/news/health>

### USDA Develops Clothing to Protect U.S. Troops from Insects

2012-12-06

Scientists from the United States Department of Agriculture are helping out military personnel deployed overseas by outfitting soldiers with clothing that repels or kills disease-transmitting mosquitos and sand flies. As part of the Deployed War-Fighter Protection Research Program, scientists at the Agricultural Research Service (ARS) in Gainesville, Fla., and other ARS laboratories are collaborating with U.S. Department of Defence personnel to improve personal protection for troops. In addition, the researchers are developing public health insecticides and devising

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improved application technologies to kill insects. ARS is USDA's principal intramural scientific research agency. ARS chemist Ulrich "Uli" Bernier, and other researchers at the Gainesville centre work with military personnel on several projects, including evaluating the effectiveness and assessing the quality of combat uniforms that have been factory-treated with permethrin in order to see how the chemical repels or kills insects. Bernier developed a bite protection test, which involves placing a permethrin-treated uniform sleeve into a cage of mosquitos in order to determine how well those uniforms will help protect the soldiers against insects. Currently, 65 percent of the uniform constructions and compositions that have already been created have been tested. The treated fabrics are tested directly after the factory treatment and after being laundered between 20 and 50 times. Bernier recently verified bite protection testing on Army combat uniforms constructed of a more durable fire-resistant fabric. Alternative fabrics were needed because the original fire-resistant uniform material tore too easily, reducing its ability to protect against insects. For additional and longer protection, scientists are designing new products to augment uniforms. ARS chemist Kamal Chauhan at the Henry A. Wallace Beltsville Agricultural Research Centre in Beltsville, Md., and Bernier have created an attachable repellent-treated band that can be worn on a sleeve or collar to help protect exposed skin. Preliminary evaluations indicate that the band comprising novel-high vapour pressure compounds may also be used against pyrethroid-resistant mosquitos and bed bugs. Furthermore, Chauhan has filed a patent for his latest invention—a disposable, reversible band-aid that offers short-term protection against biting insects. This new product may potentially be used in applications for recreational activities and to ward off insects that pester pets and livestock.

Environmental Protection News, 3 December 2012

<http://www.eponline.com>

### More exercise, healthier brain

2012-12-06

As we age, stem cell numbers decline. New research conducted in mice, which present a similar cognitive decline as humans, suggest that exercise reverses the process, stimulating the activation of new neural stem cells, which could slow down age-related cognitive decline. Physical exercise is just as important as cognitive exercise when it comes to maintaining a healthy brain, according to a new University of Queensland study released recently. A study conducted by scientists in the Bartlett laboratory at UQ's Queensland Brain Institute found the mechanism by which exercise

**Physical exercise is just as important as cognitive exercise when it comes to maintaining a healthy brain, according to a new study by researchers at the University of Queensland.**

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increases the number of stem cells that are actively generating new nerve cells in the brain and reverses the decline normally observed as animals age. "We have found that Growth Hormone (GH) originally discovered as a potent stimulator of animal growth is increased in the brain of running animals and this stimulates the activation of new neural stem cells," says QBI scientist Dr Daniel Blackmore. The study was carried out in older mice, which show the same cognitive decline as humans. "In this model of ageing we found that the number of active neural stem cells dramatically declines with age, but exercise dramatically reversed this, increasing stem cell numbers," Professor Perry Bartlett, the Director of QBI, and team leader, said. "If we blocked the action of GH in the brains of these running animals, however, no such increase occurred, indicating GH was the primary regulator of this process. "We are currently determining whether this grow GH-dependent increase in stem cell activity is able to reverse the cognitive decline seen in old animals by increasing production of new nerve cells."

Science Alert, 29 November 2012

<http://www.sciencealert.com.au>

### **Mercury Released Into Air Contaminates Ocean Fish**

2012-12-06

Over the past century, mercury pollution in the surface ocean has more than doubled, as a result of past and present human activities such as coal burning, mining, and other industrial processes. The research findings by C-MERC published 3 December also examine the effects of local mercury inputs that dominate some near-shore coastal waters. C-MERC's research is presented through nine scientific papers in Environmental Health Perspectives and is the culmination of two years of work by approximately 70 mercury and marine scientists from multiple disciplines including biology, ecotoxicology, engineering, environmental geochemistry, and epidemiology. The research provides a synthesis of the science on the sources, fate, and human exposure to mercury in marine systems by tracing the pathways and transformation of mercury to methylmercury from sources to seafood to consumers. Two other papers focusing on the health effects of methylmercury were published earlier this year in Environmental Health Perspectives. Methylmercury has long been known as a potent neurotoxicant, particularly as a result of acute and high level human exposures primarily through seafood consumption, but more recent research has revealed health effects at increasingly lower levels of exposure. The companion report, "Sources to Seafood: Mercury Pollution

**In new research published in a special issue of the journal Environmental Health Perspectives and in "Sources to Seafood: Mercury Pollution in the Marine Environment" -- a companion report by the Dartmouth-led Coastal and Marine Mercury Ecosystem Research Collaborative (C-MERC), scientists report that mercury released into the air and then deposited into oceans contaminates seafood commonly eaten by people in the U.S. and globally.**

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in the Marine Environment," looks at the pathways and consequences of mercury pollution across marine systems by drawing on findings from the C-MERC papers, scientific literature, and data from a range of marine systems and coastal basins. Specifically, the report examines mercury sources, pathways, and inputs for the Hudson River Estuary, San Francisco Bay, Gulf of Mexico, Long Island Sound, Chesapeake Bay, Gulf of Maine, Arctic Ocean, and the open ocean. C-MERC's research findings are especially timely, as the U.S. and other nations prepare for the fifth session of the United Nations Environment Programme's Intergovernmental Negotiating Committee (INC5) on January 13-18, 2013 in Geneva, Switzerland, which is working to prepare a legally binding instrument to control mercury releases to the environment. "Despite the fact that most people's mercury exposure is through the consumption of marine fish, this is the first time that scientists have worked together to synthesise what is known about how mercury moves from its various sources to different areas of the ocean and then up the food chain to the seafood most people eat," said Celia Y. Chen, Ph.D., Research Professor of Biological Sciences at Dartmouth. She is a co-author of the new Environmental Health Perspectives papers on nutrient supply and mercury dynamics, and mercury sources in the Gulf of Maine, and authored an editorial on the subject in the journal, and is also a lead author of "Sources to Seafood." Chen will represent Dartmouth as an accredited non-governmental organisation at INC5 in an observer status. Copies of C-MERC's Sources to Seafood report will be made available to INC5 attendees. C-MERC research suggests that mercury deposited from the atmosphere ranges from 56% of the mercury loading to several large gulfs to approximately 90% in the open ocean. "Oceans are home to large tuna and swordfish, which together account for more than half of the mercury intake from seafood for the overall U.S. population," said Elsie M. Sunderland, Assistant Professor of Aquatic Science at Harvard University. She is a lead author of an Environmental Health Perspectives paper on mercury sources in the Gulf of Maine and a lead author of "Sources to Seafood."

Model estimates from the report indicate that methylmercury concentrations in marine fish will decline roughly in proportion to decreases in mercury inputs, though the timing of the response will vary. "Our model estimates show that for the North Atlantic Ocean, a 20% cut in the amount of mercury deposited to the ocean from the atmosphere would lead to about a 16% decline in mercury levels in fish... But it is important to realise that achieving a 20% decrease in mercury deposition will require substantial cuts in current anthropogenic emissions, given the already very sizeable build-up of mercury in terrestrial environments

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and ocean waters," said Robert P. Mason, Ph.D., Professor of Marine Sciences at the University of Connecticut. Mason is a lead author of the Environmental Health Perspectives paper on mercury biogeochemical cycling in the ocean and a lead author of "Sources to Seafood." The C-MERC team also evaluated the fate of mercury in nearshore coastal waters and found a contrasting pattern to the oceans. "For some nearshore coastal waterbodies, like San Francisco Bay and the Hudson River Estuary, where there are large mercury sources such as historically contaminated sites, ongoing releases from wastewater or industrial waste and atmospheric mercury deposition in the watershed, mercury loading can be dominated by river inputs," said Charles T. Driscoll, Ph.D., University Professor of Environmental Systems Engineering at Syracuse University. He is a lead author on an Environmental Health Perspectives paper on nutrient supply and mercury dynamics, and a lead author of "Sources to Seafood." The C-MERC team estimates that river inputs can be as much as 80% of the total mercury inputs to some estuaries. "The impact of mercury released to coastal waters from watersheds via rivers has been a somewhat under appreciated aspect of the problem. Yet, these bays and estuaries can be important sources of fish for local anglers, thus controls on these sources can have substantial local benefits," explained Driscoll. "C-MERC's synthesis of research identifies the most important drivers of mercury pollution to different oceans and coastal waters, and can help policymakers understand the links between environmental processes, methylmercury levels in marine ecosystems, human exposure, and the human health effects -- all of which are critical to the discussion of how local, regional and global mercury pollution affects the world's supply of seafood," said Chen. Approximately one-third of all mercury emissions are associated with current industrial sources and other human activities that can be controlled. "The good news is that the science suggests that if mercury inputs are curtailed, mercury levels in ocean fish will decline and decrease the need for warnings to limit consumption of this globally important food source," added Chen.

Science Daily, 3 December 2012

<http://www.sciencedaily.com>

### Study Shows BPA Exposure in Foetal Livers

2012-12-06

New research from the University of Michigan School of Public Health found BPA, or bisphenol A, in foetal liver tissue, demonstrating that there is considerable exposure to the chemical during pregnancy. In addition, the

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researchers found a proportionately higher concentration of free BPA -- as opposed to the conjugated forms modified by the body for elimination -- further showing that in foetuses the ability to eliminate the chemical from the body is not the same as in adults. "The general message from our research is that people have to be cognisant of the fact that the adult body may be able to deal with a particular exposure but a developing foetus may not," said Muna Nahar, doctoral student in the School of Public Health's Department of Environmental Health Sciences and first author on the paper. Previous animal studies have associated BPA with breast and prostate cancer, and reproductive and behavioural abnormalities. Some research on effects to human health has tied BPA to cardiovascular disease, miscarriage, decreased semen quality and childhood behavioural issues. The chemical also may impact metabolism, diabetes and obesity, although more studies are required to determine its effects. Prior research on BPA -- a chemical used in many consumer products, including plastic bottles and metal food and beverage cans -- has measured concentrations of the chemical in urine. About 95 percent of those who have been tested in a nationally representative health survey study show some level of BPA, but the research to date had yet to firmly establish the presence of the chemical in tissues. Understanding the internal dose is essential to determine adverse effects on health, the researchers say. BPA can reach the body through ingestion, inhalation and by contact with the skin. Nahar and colleagues Dana Dolinoy of the U-M School of Public Health and Chunyang Liao and Kurunthachalam Kannan of the Wadsworth Centre at the New York State Department of Health studied the livers of 50 first- and second-trimester foetuses, using high-performance liquid chromatography and mass spectrometry. They found wide variances in how much BPA was present in livers, with some foetuses showing high levels of exposure. "The finding of free BPA in foetuses is significant," said Dana Dolinoy, the John G. Searle Assistant Professor of Environmental Health Sciences and senior/corresponding author of the study. After measuring a three-times-higher concentration of free BPA than the conjugated forms in the foetal livers, the researchers then examined the enzymes responsible for metabolising the chemical and compared them with those at work in adult male and female livers. "Our research shows that the argument that it's so rapidly metabolised is not true in foetuses," Dolinoy said.

Science Daily, 3 December 2012

<http://www.sciencedaily.com>

## Technical Notes

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(Note: Open your Web Browser and click on Heading to link to section)

### ENVIRONMENTAL

[Rapid magnetic biomonitoring and differentiation of atmospheric particulate pollutants at the roadside and around two major industrial sites, U.K.](#)

[Clinicopathological features associated with acute toxicity of Lambda-cyhalothrin pesticide in adult toads \(\*Buffo perreti\*\)](#)

### MEDICAL

[Effects of Cobalt Nanoparticles on Human T Cells In Vitro](#)

[Earthworms and humans in vitro: Characterising evolutionarily conserved stress and immune responses to silver nanoparticles](#)

[Comparative in vitro study of the inhibition of human and hen esterases by methamidophos enantiomers](#)

[Human hepatic cytochrome P450-specific metabolism of the organophosphorus pesticides methyl parathion and diazinon](#)

[An extracellular signal-regulated kinase 2 survival pathway mediates resistance of human mesothelioma cells to asbestos-induced injury.](#)

### OCCUPATIONAL

[Application of patch clamp technique in occupational health and occupational medicine](#)

[1-Methyl-2-pyrrolidone. Documentation of permissible occupational exposure values](#)

[Hydrogen sulphide. Documentation of permissible occupational exposure values](#)

[Carbon tetrachloride. Documentation of permissible occupational exposure values](#)

[Tetramethyl succinonitrile. Documentation of permissible occupational exposure values](#)

## Technical Notes

CHEMWATCH

### PUBLIC HEALTH

[Residential exposure to outdoor air pollution from livestock operations and perceived annoyance among citizens](#)

[Outdoor radioactivity and health risks in Balikesir, northwestern Turkey](#)

[Performance of a microenvironmental model for estimating personal NO<sub>2</sub> exposure in children](#)

[From particles to patients: oxidative stress and the cardiovascular effects of air pollution](#)

[Effects of a catalytic converter on PCDD/F, chlorophenol and PAH emissions in residential wood combustion](#)

### SAFETY

[Effect of variable air volume exhaust system on vehicle fire evacuation safety in underground garage](#)

[Prediction of the toxic and harmful gas along the Sichuan-Tibet Railway](#)

[Review of the knowledge available to date on the effects of tritium exposure on health and the environment in Canada - a tool to guide regulatory compliance monitoring](#)