

Abstract Sifter user guide

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Availability: The Abstract Sifter and documentation is freely available for download at ftp://newftp.epa.gov/COMPTOX/Sustainable_Chemistry_Data/Chemistry_Dashboard/Abstract_Sifter/.

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Abstract Sifter user guide

This user guide describes the functionality of the PubMed Abstract Sifter version 1.0. The reader is invited to download the tool from the freely accessible ftp site and follow along:

ftp://newftp.epa.gov/COMPTOX/Sustainable_Chemistry_Data/Chemistry_Dashboard/Abstract_Sifter/

This document will illustrate the use of the tool through a series of screen shots walking through a few simple tasks. First open the Abstract Sifter file AbstractSifter_v1.xlsm. A security warning may appear. If so, be sure to enable content as shown in Figure 1.

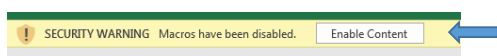


Figure 1. Enable macros upon opening

The Abstract Sifter Excel file consists of seven sheets. We'll start this documentation on the Main sheet. The Main sheet is where the basic functionality takes place, including functions we call "sifting". To use the Abstract Sifter, the end-user clicks on the *Query PubMed* button at the top of the screen. A form is displayed in which the end-user types a PubMed query of interest (Figure 2). In the example, we are showing a very simple query: "chlorpyrifos", but these queries can be more complex. The text that the user enters into the box is sent to PubMed, so all PubMed syntax rules apply.

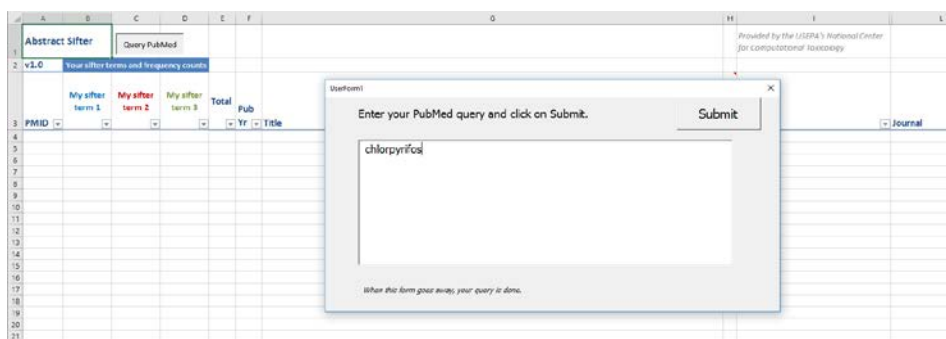


Figure 2. Running a PubMed query

When finished entering the query, the user clicks on *Submit* and the query is packaged by VBA into an e-utility command that is passed to the NCBI (National Center for Biotechnology Information) web services. (Note that using Sifter Query PubMed capability requires internet access.) The first response returned by the utility is the number of articles found. (Figure 3) This number is displayed, and the user is asked if he/she want to continue. If the number of articles is over 5,000, the query will not be run and the user is encouraged to refine the query to return fewer records.

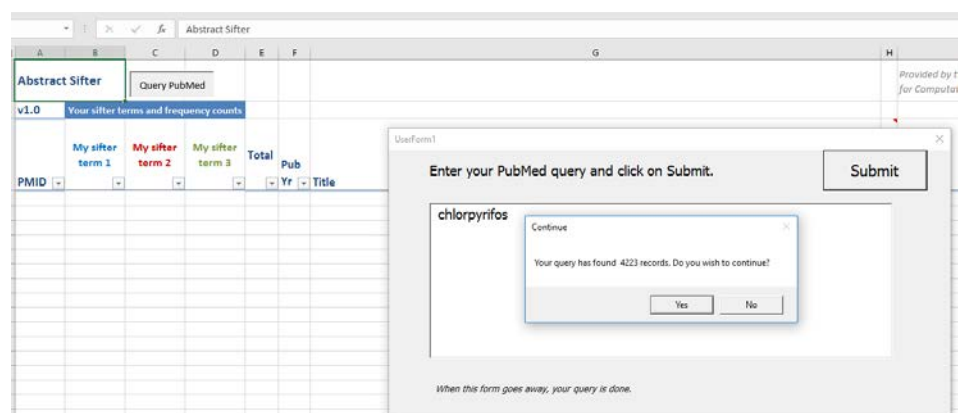


Figure 3. Responding to PubMed

If the returned results are fewer than 5,000 and the user indicates he/she wants to continue, the articles are downloaded from NCBI by Excel, and regular expressions are used to parse the citations for title, abstract, authors, publication year, journal, and PubMed identifier. Each record returned is inserted into a row in the Main sheet. Any rows in the Main sheet from a previous query are deleted.

PMID	Title	Authors	Journal
26811129	Exposure to agricultural pesticides impairs visual lateralization in a larval coral reef fish.	Bessor, Geoff, Bortone, Brock, Roux, Ja	Scientific reports
26811202	Determination of residues of Dieldrin and Chlorpyrifos in Lavender and Rosemary leaves by Gas Chromatography.	Reza, Abol, El-Agnaf, Shalini, El-Haggar	Journal of AGAC International
26811203	Inhibition of Endonuclease-Metabolizing Enzymes in Peripheral Tissues Following Developmental Chlorpyrifos Expos	Burley, Alagubelli, Hyatt, Mohamed, International Journal of Toxicol	
26811213	Analysis of neurobehavioural data by chemometric methods in ecotoxicological studies.	Gomez-Canela, Prati, Tauler, Raulo	Ecotoxicology and environment
26811214	Determination of selected neurotoxic insecticides in small amounts of animal tissue utilizing a newly constructed mini-4	Serferlovic, Cechova, Ulanova, Felipo, Vyt	Analytical and bioanalytical che
26811222	Developmental neurotoxicity of the organophosphorus insecticide chlorpyrifos: from clinical findings to preclinical model	Burke, Todd, Lumsden, Mollie, Vignozzi	Journal of neurochemistry
26811232	Exposure Factors for Selected Semivolatile Organic Chemicals from Burning of Tropical Biomass Fuels and Estimation of A	Wang, Meyen, Reisen, Keywood, The, Hau	Environmental science & tech
26811239	Pesticide coagulation and microbial community changes in a bioremediation system: influence of the rhizosphere.	Orell, Elguera, Kullar, Torrella, Schabitz	Ecotoxicology and environment
26811243	The impact of insecticides commonly used in crops on the generalist predator <i>Agrocyba con</i>	Santos, Zuhair, Zuhair, de Abreu, Jairo	Chemosphere
26811252	Exposure of amateur gardeners to pesticides via the non-gloved skin per day.	Beninkov, Ingeborg, Mollie	Food and chemical toxicology
26811253	Transformation from gold nanoclusters to plasmonic nanoparticles: A general strategy towards selective detection of org	Lu, Zhou, Wang, Gong, Liu	Sensors & bioelectronics
26811254	24-Epibrassinolide alleviates organic pollutants-retarded root elongation by promoting redox homeostasis and secondary	Alamoudi, He, Qian, Zhou, Shi, Zhou, Yu	Environmental pollution (Bark)
26811255	Assessing the ecotoxicity of potentially neurotoxic substances - Evaluation of a behavioural parameter in the endoparasit	Wojcik, Piotr, Maza-Krzymus, Kamila	Chemosphere
26811256	The Mechanism by Which Endoplasmic Reticulum Stress Increases the Toxicity of Chlorpyrifos to Spotted	Cui, Yuan, Yang, Rui, Ma	Frontiers in pharmacology
26811257	Cytochrome P450 genes from the aquatic midge <i>Chironomus tentans</i> : Atrazine-induced up-regulation of CYP6B3 enha	Tang, Yao, Li, He, Zhu, Zhang, Zhu	Chemosphere
26811258	Combining Hyperspectral Imaging and Chemometrics to Assess and Interpret the Effects of Environmental Stressors on B	Olivier, Marie, Luce, Avenier, Richard, Pierre	Journal of biospectroscopy
26811259	Monitoring of Pesticide Residues in Commonly Used Fruits and Vegetables in Kuwait.	Jallow, Awech, Alkhalaf, Dewi, Ahmed	International journal of environ
26811260	Evaluation of chlorpyrifos effects, alone and combined with lipopolysaccharide stress, on DNA integrity and immune res	Marchand, Pocher, Funes, Chodit, Malouf	Ecotoxicology and environment
26811261	Effects of Deltamethrin, Cypermethrin, and Chlorpyrifos on Survival and Reproduction of the Colombian <i>Tabanus</i> candid	Jaime-Kahouri, Jorgel, Chacón, Reuier	Integrated environmental assess
26811262	Knockout of <i>At-1g10330</i> gene increases susceptibility to abamectin and emamectin benzoate in <i>Spodoptera exigua</i>	Zuo, Huang, Xiang, Feng, Han, Yu, Yang	Insect molecular biology
26811263	Organophosphorus pesticide mixture removal from environmental matrices by a soil <i>Streptomyces</i> mixed culture.	Briceño, Vergara, Schabitz, Palma, Tuffet	Environmental science and poll
26811264	Identification and characterization of each type acetylcholinesterase in insecticide-resistant and -susceptible <i>Proglyptea</i>	Wang, King, N, Wu	Bulletin of entomological resea
26811265	Multi-class chemical exposure in rats: <i>Per</i> using silicone wristbands.	Bergman, North, Vinograd, Belis, Del Carr	Journal of exposure science &
26811266	Acute toxicity of chlorpyrifos and carbosulfen to <i>Agrocyba</i> of the freshwater mussel <i>Hydrobia ulata</i> Simpson, 1900.	Sangsuang, Anuthach, Chuanwar, Kiat	Environmental science and poll

Figure 4. Results from PubMed query - before sifting

At this point the results of the query are stored in the Main sheet and can be browsed like any other data in a spreadsheet (Figure 4); however, the most effective way to find an articles of interest is to use the innovative sifter functionality. To demonstrate this functionality, we will continue to use our example of chlorpyrifos.

Let us suppose at this point that we are looking for dose studies of chlorpyrifos in rats. We type the term “mg/kg” in cell B3, “rat” in C3, and “brain” in D3. As we finish typing and move to the next cell, the Abstract Sifter will count the occurrences of the terms in the title and abstract combined. The citations can be sorted by these counts, either individually or by the total. Figure 5 shows what the Sifter looks like when these terms have been entered into B3, C3, and D3 and then the entries sorted by occurrence counts of “mg/kg” in descending order. PubMed 16472551 has 12 occurrences of “mg/kg”, 22 of “rat”, and two of “brain”. This article indeed describes a dose-response study in rats.

Abstract Sifter										Query Published				Query not chlorpyrifos				Provided by the University Systems Center for Computational Toxicology			
v1.0										Your sifter terms and frequency counts				Take Group Notes				Highlight Needed			
										mg/kg				rat				brain			
										Total				Pub							
										PMID				Yr				Title			
																		Authors			
																		Journal			
1	16472511	13	22	2	26	2006	Effect of chlorpyrifos methyl on steroid and thyroid hormones in rat F0 and F1 generations.	Jeong, Kim, Kang, Ku, Cho	Toxicology												
2	16472511	13	1	1	26	2006	Lack of carcinogenicity of chlorpyrifos insecticide in a high-dose, 2-year dietary toxicity study in Fischer 344 rats.	Yano, Young, Mattsson	Toxicological sciences : an official jour												
3	16472511	13	7	1	17	2013	Temperature influences the toxicity of deltamethrin, chlorpyrifos and dimethoate to the predatory mite hyposeius aculeatus.	Hart, Cerny, Moore, Strong	Australian veterinary journal												
4	16472511	13	6	1	13	2001	Influence of gender on the neurotoxicity of chlorpyrifos in the long-evans rat exposed to diazinon.	Aggadi, Durguti, Rimbhe	Journal of toxicology and environmental health												
5	16472511	13	1	1	5	2001	Structural pharmacokinetic pathways as a target for the insecticides permethrin and chlorpyrifos.	Gordon, Mack	Neurotoxicology												
6	16472511	13	1	1	10	1985	Toxicity of organophosphorus esters to living tissue after oral and dermal administration.	Karen, Li, Harg, Gillette, Blomquist	Journal of environmental science and technology												
7	16472511	13	1	1	10	2007	Differential sensitivity to acetylcholinesterase inhibitors in the juvenile rat: effects on thermoregulation.	Francis, Marston, Newman	Journal of toxicology and environmental health												
8	16472511	13	1	1	13	2003	Rapid multi residue method for the determination of azinphos methyl, bromophos methyl, chlorpyrifos, dimethoate, para	Mack, Gordon	Journal of chromatography. A												
9	16472511	13	1	1	13	1994	Effects of the pesticides carbaryl, chlorpyrifos, demeton-methyl, diazinon, malathion, trifluralin, 2,4-D, and permethrin on the	Uguz, Aydin, Saris, Kiyalidis	Journal of toxicology and environmental health												
10	16472511	13	1	1	9	1991	Promotion of organophosphate-induced delayed polyneuropathy by phenylmethanesulfonyl fluoride.	Savitsky, Cook, Wadding	Toxicology and applied pharmacology												
11	16472511	13	1	1	13	1980	Oral inhibition of dogs with combinations of fertilizers, herbicides, and insecticide chemicals commonly used on lawns.	Letts, Caroldi, Capodanno, Moretto	American journal of veterinary research												
12	16472511	13	1	1	13	2012	Occurrence of Levels of Organochlorine, Organophosphorus, and Pyrethroid Pesticide Residues in Vegetables from Markets in	Yearly	International journal of analytical chemistry												
13	16472511	13	1	1	13	2017	Decreased anxiety in juvenile rats following exposure to low levels of chlorpyrifos during development.	Managala, Khattar, Supriya	Neurotoxicology												
14	16472511	13	1	1	13	2014	Organophosphate pesticide residues in vegetables from farms, markets, and a supermarket around Kuar Iraya Lake in	Car, Armstrong, Buchanan, Ellis, Moham	Archives of environmental contamination												
15	16472511	13	1	1	13	2012	Cholinesterase inhibition and toxicokinetics in immature and adult rats after acute or repeated exposures to chlorpyrifos	Saptharishi, Hongbohong	Regulatory toxicology and pharmacokinetics												
16	16472511	13	1	1	13	2006	Effects of acute chlorpyrifos exposure on in vivo acetylcholine accumulation in rat striatum.	Marty, Archus, Bell, Passage, Peris, Brak	Toxicology and applied pharmacology												
17	16472511	13	1	1	13	1999	Changes in rat brain cholinesterase activity and muscarinic receptor density during and after repeated oral exposure to cl	Karath, Liu, Mengler, Pope	Toxicological sciences : an official journal												
18	16472511	13	1	1	13	2017	Protective properties of 6 gingerol-rich fractions from Zingiber officinale (Ginger) on chlorpyrifos-induced oxidative dam	Tang, Car, Chambers	Chemico-biological interactions												
19	16472511	13	1	1	13	2014	Effects of malathion on changes in enzyme performance and brain malathion levels in rats.	Abdelaziz, Ojo, Alabi, Aremuogun, Nwank	African journal of tropical biomedicine												
20	16472511	13	1	1	13	2014	Taxane mitigates cognitive impairment induced by chronic co-exposure of male Wistar rats to chlorpyrifos and lead acet	Burke, Holmbeck, Mohammed, Musa, Ch	Environmental toxicology and pharmacology												
21	16472511	13	1	1	13	2012	Oxidative damage induced by chlorpyrifos in the hepatic and renal tissue of Kunming mice and the antioxidant role of vit	Akande, Aliu, Anisul, Ayo	Food and chemical toxicology : an international journal												
22	16472511	13	1	1	13	2011	Antinociceptive effect of vitamin C on alterations in myelin sheath thickness and brain malathion levels in rats.	Mu, Wu, Zeng, Guo, Chen, Ye, Tang	Journal of tropical biomedicine												
23	16472511	13	1	1	13	2013	Gene expression changes in forebrain following acute, low-level chlorpyrifos exposure in neonatal rats.	Amal, Ching, Alchabawi, Shimi, Kari	Toxicology and applied pharmacology												
24	16472511	13	1	1	13	2012	Studies on relative toxicity of six insecticides on aquatic invertebrates, Paratanyu aculeatus.	Ray, Liu, Anisul, Pope	Bulletin of environmental contamination and toxicology												
25	16472511	13	1	1	13	2018	Multipesticide residue assessment of agricultural soil and water in major farming areas in Benguet, Philippines.	Das Gupta, Chakravorty, Karmaj	Archives of environmental contamination												
26	16472511	13	1	1	13	2018	Chlorpyrifos induced reproductive toxicity in male mice.	Del Prado, Li	Reproductive toxicology (Oxford, A												

Figure 5. After sifter terms entered into cells B3, C3, D3 and sorting on B3

To see the abstract, we can either click on the PubMed ID hyperlink to be taken to PubMed, or we can double-click on any other cell in the row for this article. This action brings us to the Abstract sheet where the abstract is displayed along with other article meta-data like title (Figure 6).

Abstract with highlights										Pub ID				Authors				Journal			
Articles: 16472511																					
Title:										2006				Jeong, Kim, Kang, Ku, Cho				Toxicology			
Title and Abstract:																					
Effect of chlorpyrifos methyl on steroid and thyroid hormones in rat F0 and F1 generations. Abstract: Chlorpyrifos methyl (CPM) suppressed androgenic activity in Hershberger assay using castrated rats. Acute oral lowest-observed-adverse-effect-level (LOAEL) and no-observed-adverse-effect-level (NOAEL) was evaluated as 12 and 0.1 mg/kg bw, respectively, based on its major effect of cholinesterase inhibition. Also, repeated oral NOAEL was 0.1 mg/kg bw/day based on adrenal damage in rats. We investigated one generation reproductive toxicity of CPM focusing on endocrine-disrupting effects by the administration of 2, 10 and 100 mg/kg bw/day CPM to mature 50 rats (F0) through pre-mating, mating, gestation and lactation period and to their offspring (F1) until 13 weeks age via gavage. A group treated with corn oil served as vehicle control. In F0 rats, the most affected organs were adrenal glands as increased in weight at all doses of CPM in males and at 10 and 100 mg/kg CPM in females and adrenal vacuolation at CPM 10 and 100 mg/kg. The relative and absolute ovaries and the absolute seminal vesicle weights were decreased but the weights of liver, spleen or kidneys were increased at 100 mg/kg CPM. Parameters representing reproductive performances as mating ratio, gestation length and delivery index were not affected, except for decreased fertility index and numbers of implantation and born pups and a higher male sex ratio of pups at CPM 100 mg/kg. F1 pups exposed to CPM 100 mg/kg in utero and via maternal milk showed lower body weight with changes of absolute or relative weights of brain, ovary, liver, spleen and epididymis and decreased absolute not relative anogenital distance at weaning time. The time of vaginal patency and preputial separation and estrous cycling pattern of F1 rats were not impacted by CPM. After further 10 weeks oral administration until 13 weeks old, adrenal glands, brain, liver, spleen or kidneys tended to be increased, while thyroid gland, testes and ventral prostate of F1 male rats were decreased at CPM 10 or 100 mg/kg. Histopathologically, necrosis or vacuolation of thyroid follicular epithelial cells and adrenal cortical cells were observed at all doses of CPM. Serum levels of estradiol, testosterone, 14 and 15 were significantly lower while 17SH and cholesterol were higher in both F1 female and male rats treated with CPM though dose responsiveness was not clear in F1 females. Decreased sperms were counted in F1 rats at CPM 100 mg/kg. As a whole, LOAEL and NOAEL was evaluated as 10 and 1 mg/kg bw, respectively, based on decreased estradiol and T4 and increased TSH in serum of F1 male rats, and when considering histopathological alteration of adrenal and thyroid glands, LOAEL assumed to be lower than 1 mg/kg bw. This study elucidates that CPM exhibit weak																					

Figure 6. An abstract with highlighted sifter terms.

There are several aspects of the Abstract sheet that are important to note. First, the sifter terms are highlighted. The font colors reflect the colors of the fonts in cells B3, C3, and D3. This highlighting makes the reading process easier and draws attention to sections of the abstract that might be of most

interest. It is also interesting to note that the counts and highlighting for “rat” also picked up

“administration”. Putting a space before (“ rat”) would eliminate some of these occurrences.

Sifting the results through specifying sifter terms in B3, C3, and D3 can be repeated as many times as the user wishes. Similarly, new PubMed queries can be run, altered, rerun. There are no restrictions on either of these activities other than the 5000 record return limit. Go for it!

Taking notes

Particularly given the dynamic nature of the sifter, many users find it helpful to be able to make notes on articles that they want to keep track of. There are two ways using the Sifter to take notes, one way through the Main page and the other way starting at the Abstract page. To return to our case study, let us say that we have found a set of articles on the Main page that we know we need to read in depth or to ask the library to get. We can select these articles and then click on the *Take Group Notes* button. A form appears where we can enter information into fields called Tag and Notes. These elements are self-defined. We can also click on *yes*, *no*, or *maybe*. This set of a variable is a quick way to associate articles with a note. Notice that these choices each come with a color (yes-green, no-red, and maybe-yellow). Entering any of these fields is optional. (Figures 7 and 8.) When we click on the *OK* button, each article selected will be inserted into the Notes page with the corresponding information. (Figure 9)

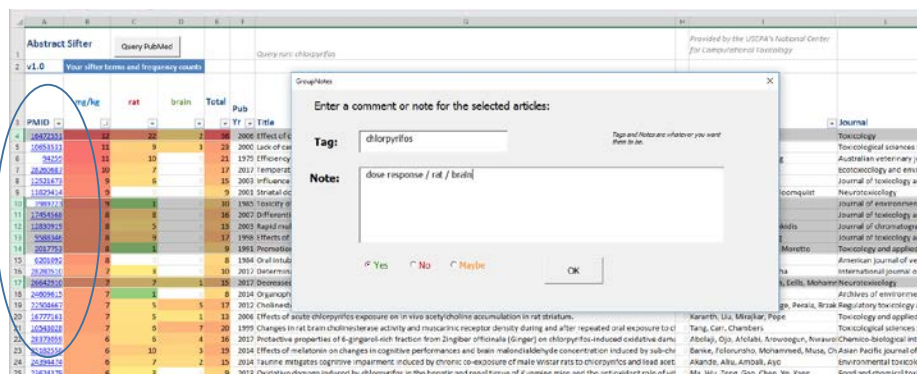


Figure 7. Taking group notes.

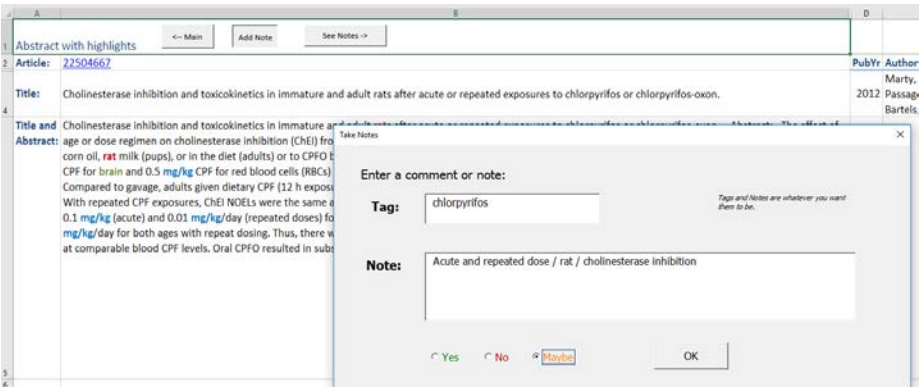


Figure 8. Taking group notes - another example.

PMID	Tag	Note	PubYr	Title	Authors	Journal
22504667	chlorpyrifos	Acute and repeated dose / rat	2012	Cholinesterase inhibition and toxicokinetics in immature and adult rats after acute or repeat	Marty, Andrus, Bell, Passage, Peralta, Brzak,	Regulatory toxicology and applied toxicology
2017293	chlorpyrifos	dose response / rat / brain	1991	Promotion of organophosphate-induced delayed polyneuropathy by phenylmethanesulfonyl	Lotti, Caroli, Capodicasa, Moretto	Toxicology and applied toxicology
9588386	chlorpyrifos	dose response / rat / brain	1996	Effects of the pesticides carbofuran, chlorpyrifos, dimethoate, lindane, malathion, trifluralin,	Zhang, Cook, Waldkirch	Journal of toxicology
12838919	chlorpyrifos	dose response / rat / brain	2000	Rapid multi residue method for the determination of organophosphorus, organochlorine,	Liapis, Agalidis, Kynaidis	Journal of chromatography
17545468	chlorpyrifos	dose response / rat / brain	2007	Differential sensitivity to anticholinesterase insecticides in the juvenile rat: effects on them	Mack, Gordon	Journal of toxicology
3989223	chlorpyrifos	dose response / rat / brain	1985	Toxicity of organophosphorus esters to laying hens after oral and dermal administration.	Francis, Messall, Hansen	Journal of environmental toxicology
20642010	chlorpyrifos	dose response / rat / brain	2017	Decreased anxiety in juvenile rats following exposure to low levels of chlorpyrifos during	de Car, Armstrong, Buchanan, Ellis, Moham	Neurotoxicology
16472051	chlorpyrifos	dose response / rat / brain	2006	Effect of chlorpyrifos-methyl on steroid and thyroid hormones in rat F0- and F1-generations.	Jeong, Kim, Kang, Ku, Cho	Toxicology

Figure 9. The Notes page. Remember to save your workbook.

The note-taking process can be used to help keep track of which citations have been read and evaluated and which have not. By clicking on the *Highlight Noted* button on the Main page or on the Notes page, the color of each noted PubMed ID will be modified as shown in Figure 10.

The user is welcome to make changes on the Notes sheet and add or delete rows after Row 2.

Deleted: what

Abstract Sifter									
v1.0 Your sifter terms and frequency counts									
	mg/kg	rat	brain	Total	Pub				
PMID					Yr	Title	Authors		
16472551	12	22	2	36	2006	Effect of chlorpyrifos-methyl on steroid and thyroid hormones in rat F0- and F1-generations.	Jeong, Kim, Kang, Ku, Cho		
3989223	9	1	1	10	1985	Toxicity of organophosphorus esters to laying hens after oral and dermal administration.	Yanos, Metcalf, Hansen		
17454568	8	8		16	2007	Differential sensitivity to anticholinesterase insecticides in the juvenile rat: effects on thermoregulation.	Wick, Gordon		
12830919	8	5		13	2003	Rapid multi-residue method for the determination of azinphos methyl, bromopropylate, chlorpyrifos, dimethoate, parat	Aplada-Sarlis, Kyriakid		
9588346	8	9		17	1998	Effects of the pesticides carbofuran, chlorpyrifos, dimethoate, lindane, triallate, trifluralin, 2,4-D, and pentachloropheno	Rah, Cook, Waldbillig		
2017753	8	1		9	1991	Promotion of organophosphate-induced delayed polyneuropathy by phenylmethanesulfonyl fluoride.	Letto, Caroldi, Capodicasa, M		
26642910	7	7	1	15	2017	Decreased anxiety in juvenile rats following exposure to low levels of chlorpyrifos during development.	Carr, Armstrong, Buchanan, E		
10655311	11	9	3	23	2000	Lack of carcinogenicity of chlorpyrifos insecticide in a high-dose, 2-year dietary toxicity study in Fischer 344 rats.	Yano, Young, Mattsson		
983259	11	10		21	1979	Efficiency and safety of methidathion applied as a pour-on systemic insecticide for control of cattle lice.	Hart, Cawey, Moore, Strong		
28266987	10	7		17	2017	Temperature influences the toxicity of deltamethrin, chlorpyrifos and dimethoate to the predatory mite Hypoaspis acule	Jegade, Owojori, Rombke		
12521673	9	6		15	2003	Influence of gender on thermoregulation and cholinesterase inhibition in the long-evans rat exposed to diazinon.	Gordon, Mack		
11829414	9			9	2001	Striatal dopaminergic pathways as a target for the insecticides permethrin and chlorpyrifos.	Karen, Li, Harp, Gillette, Bloo		
6201092	8			8	1984	Oral intubation of dogs with combinations of fertilizer, herbicide, and insecticide chemicals commonly used on lawns.	Yeary		
28280310	7	3		10	2017	Determination of Levels of Organochlorine, Organophosphorus, and Pyrethroid Pesticide Residues in Vegetables from M	Mahugija, Khamis, Lugwisha		
2650815	7	3		8	2014	Organophosphorus pesticide residues in vegetables from farms, markets, and a supermarket around Kwan Phayao Lake c	Sapbamern, Hongyibong		
22946691	7	5		12	2012	Cholinesterase inhibition and toxicokinetics in immature and adult rats after acute or repeated exposures to chlorpyrifor	Marty, Andrus, Bell, Passage		
18777163	7	5	1	13	2006	Effects of acute chlorpyrifos exposure on in vivo acetylcholine accumulation in rat striatum.	Karanth, Liu, Mirajkar, Pope		
10543028	7	6	7	20	1999	Changes in rat brain cholinesterase activity and muscarinic receptor density during and after repeated oral exposure to cl	Tang, Carr, Chambers		

Figure 10. After clicking on Highlight Notes and then sorting by color

The Log sheet

The Log sheet keeps track of the queries you have run. The Abstract Sifter routines insert a row into the sheet every time you complete a query. These queries can be viewed and rerun. To rerun a query, simply double-click on it. (Figure 11.) Delete rows after Row 2 if you want to clear old entries.

Log of activity		
Log of activity	-- Main	
Date	Returned	Query Used (double-click on query to rerun)
7/6/2017 16:46	80	(pfos OR pfos) AND caroline
7/6/2017 16:45	24	atrazine AND soybeans
7/6/2017 16:45	231	oecd AND skin
7/6/2017 16:25	4187	chlorpyrifos

Figure 11. View of the Log sheet

The Landscape sheet

The Landscape sheet allows the user to get an overview of the literature for a set of entities like chemicals. Figure 12 shows an example of a Landscape sheet built by a researcher interested in the toxicity of a particular set of chemicals. Let's take a look at that first. Queries designed to find the chemicals of interest are entered into Column C and in this case, a short version of the chemical is

Column A. The queries in Row 3 are typical ones used in searching for articles about different kinds of chemical toxicity. We will refer to these queries as subject matter queries.

The premise behind the design of the Landscape sheet is very simple: PubMed queries will be built by taking the values in Column C (in this example chemical names and corresponding CAS numbers) and appending this query text to the subject matter query text in Row 3 with an “AND” in between the two query parts.

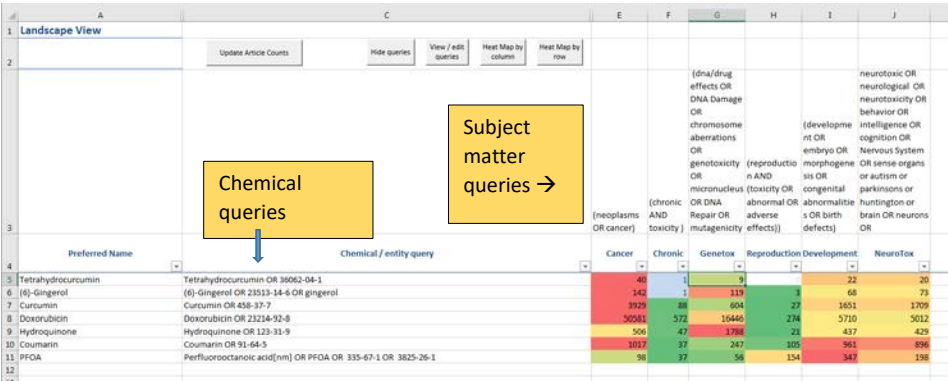


Figure 12. Example of Landscape sheet use

To illustrate, we will double-click on the cell highlighted in Figure 13. When we double-click on this cell this tells the Abstract Sifter to take the query text in Column C about Perfluorooctanoic Acid and append it to (chronic AND toxicity). Figure 14 shows the constructed query. We can then click on *Submit* and the query gets sent to PubMed and we can then see the results on the Main page. The number of articles retrieved from PubMed is 37. That count is placed in the corresponding Landscape cell that we just clicked on.

		(neoplasms OR cancer)	(chronic AND toxicity)	OR gen OR micr OR D Repa muta
Chemical / entity query	Cancer	Chronic	Ge	
Tetrahydrocurcumin OR 36062-04-1	42	1		
(6)-Gingerol OR 23513-14-6 OR gingerol	142	1		
Curcumin OR 458-37-7	3929	89		
Doxorubicin OR 23214-92-8	50581	579		
Hydroquinone OR 123-31-9	511	49		
Coumarin OR 91-64-5	1039	37		
Perfluorooctanoic acid[nm] OR PFOA OR 335-67-1 OR 3825-26-1	100	37		

Figure 13. Double-click on article count cells

UserForm3

chromosome

(develoome...intelligen

on

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use r

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OR n

Modify the PubMed query and click on Submit.

Submit

(Perfluorooctanoic acid[nm] OR PFOA OR 335-67-1 OR 3825-26-1) AND ((chronic AND toxicity))

When this form goes away, your query is done.

Figure 14. Constructed query

Now let's add to the Landscape sheet. Figure 15 shows how we added a new chemical to the list: atrazine. To find out the article counts for atrazine, select empty cells on the same row as atrazine, then click on *Update Article Counts* button. Excel will build each query from the atrazine part and the subject matter part and send each query to PubMed to find out how many citations satisfy the query. The article counts are placed in the corresponding cells. To run the query and retrieve the results, just double-click on any of the article count cells.

Deleted: has been added

1 Landscape View

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Figure 15. Adding rows to the Landscape sheet

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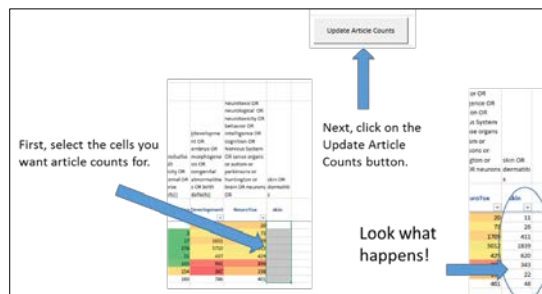


Figure 17. Steps for retrieving counts

Making things look good

The Landscape page has four buttons that make formatting easy (Figure 18). You can choose to hide the query row or show it. These buttons simply automate hiding and unhiding Row 3. The heat map buttons will quickly apply heat map coloring to the cells with article counts either by column or by row. Try them out!



Figure 18. Buttons on the Landscape page include formatting actions

Using Sample Queries

The SampleQueries sheet contains a number of sample subject matter queries that the end user can use as a starting point for building a Landscape view of a set of entities. Let's see how. First, we will clean

	A	B	C
1	Sample Queries	Note: these are starting points -- please expand and customize	Send queries to Landscape
2	Category	Heading	Query (double click to see how the query looks to PubMed)
3	Ecological	HAB	"harmful algal bloom" OR eutrophication OR (marine toxins AND algae)
4	Epidemiology	Epi	epidemiology
5	Exposure	Dust exposure	environmental exposure AND dust
6	Exposure	Food exposure	environmental exposure AND food
7	Exposure	Water exposure	environmental exposure AND (water OR groundwater OR drinking water)
8	Mechanism	Oxidative stress	"oxidative stress" OR "free radicals" OR "reactive oxygen species" OR peroxides
9	Methods	Analytical chemistry	"Chemistry Techniques, Analytical" OR analytical chemistry
10	Methods	Statistical	Statistics as Topic[mh] OR statistics OR statistical
11	Methods	In vitro	In Vitro Techniques[mh] OR cell culture or "in vitro"
12	Methods	Mixtures	(Drug synergism[mh] OR cocarcinogenesis OR pesticide synergism[mh] OR mixture[tab] OR mixture[tab] OR clinical[tab] OR clinical[tab] AND trial[tab] OR clinical trial[Publication Type])
13	Pharmacology/medicine	Clinical trials	(clinical[tab] OR clinical[tab] AND trial[tab] OR clinical trial[Publication Type])
14	Pharmacology/medicine	Clinical trials in children	(children OR child OR infants AND human) AND (clinical[tab] OR clinical[tab] AND trial[tab] OR clinical[tab] OR clinical[tab] AND drug effects OR DNA damage OR chromosome aberrations OR genotoxicity OR micronucleus OR DNA Rep neoplasms or cancer
15	Toxicity	Cancer	"allergic" AND "contact" AND dermatitis OR dermatitis, Allergic Contact[mh]
16	Toxicity	Skin sensitization	reproduction AND (toxicity OR abnormal OR adverse effects)
17	Toxicity	ReproTox	"therapeutic use" OR "therapeutic use"[subheading] OR pharmacologic actions[mh]
18	Use	Pharmaceutical	pesticide OR insecticide OR rodenticide OR fungicide
19	Use	Pesticide	cosmetics OR beauty
20	Use	Cosmetics	Explosive Agents OR explosive OR explosives
21	Use	Explosive Agents	food OR diet OR beverage OR nutrition
22	Use	Food	Anti-fading OR Anti-fading OR detergent OR detergents OR soap OR detergent
23	Use	Surface-acting	dye OR "coloring agent" OR pigment OR pigments
24	Use	Dye/coloring	fertilizer OR fertilize
25	Use	Fertilizer	solvents OR solvent
26	Use	Solvents	

Our Landscape sheet then looks like Figure 20.

Figure 20. New queries on Landscape sheet

Next, we select the article count area and then click on *Update Article Counts*.

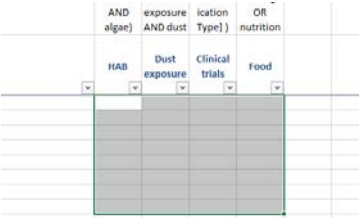


Figure 21. Selecting the cells for article counts

Once the article counts are populated, we click on Heat Map by Row and then on Hide queries. Our resulting Landscape view looks like Figure 22. To run the query and retrieve the results, just double-click on any of the article count cells.

Landscape View		Chemical / entity query				HAB	Dust exposure	Clinical trials	Food
1									
2									
3									
4									
5	Tetrahydrocurcumin	Tetrahydrocurcumin OR 36062-04-1				1	1	2	41
6	(6)-Gingerol	(6)-Gingerol OR 23513-14-6 OR gingerol				1	1	9	183
7	Curcumin	Curcumin OR 458-37-7				2	1	251	2038
8	Doxorubicin	Doxorubicin OR 23214-92-8				1	1	5146	1063
9	Hydroquinone	Hydroquinone OR 123-31-9				1	1	128	344
10	Coumarin	Coumarin OR 91-64-5				1	1	162	588
11	PFOA	Perfluorooctanoic acid[nm] OR PFOA OR 335-67-1 OR 3825-26-1				1	51	3	486
12	Atrazine	atrazine				6	14	3	549
13									
14									

Figure 22. New Landscape view

Exporting to other applications from the Notes sheet

The Abstract Sifter allows the user to export articles from the Notes sheet to outside applications. On the Notes sheet there are two buttons labeled *Get References* and *For HAWC*. By clicking on the *Get References* button, the form in Figure 23 appears. The box on the left contains the PMIDs for each of the rows in the Notes sheet. Clicking on Send to PubMed will send the PMIDs to PubMed for retrieval. In PubMed, the citation records will be displayed. At the top of the screen, the user can click on *Send to*

(Figure 25). This starts a dialog leading the user through the steps of downloading the citations to a reference management software. (Figure 26). The user can download all the PubMed IDs on the Notes page, or a selected set of rows through the All or Selected radio buttons shown in Figure 24.



Figure 23. Buttons on Notes sheet that allow export

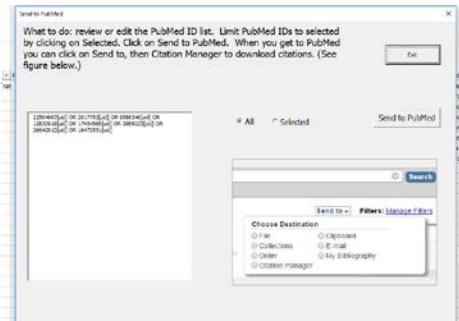


Figure 24. Form that appears after clicking on Get references button

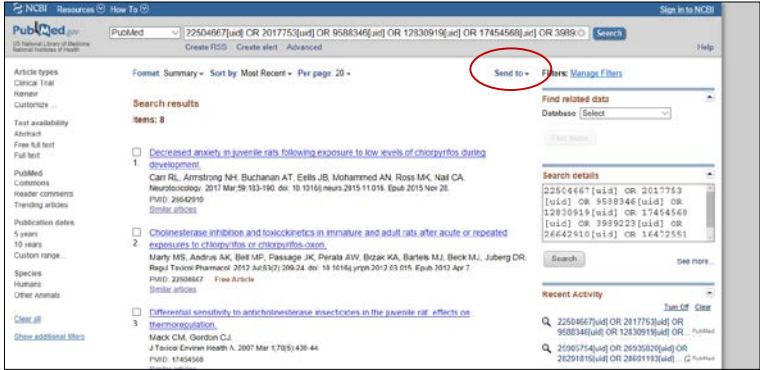


Figure 25. In PubMed, click on Send to

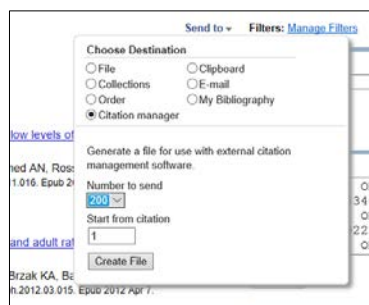


Figure 26. Dialog box for exporting to citation manager

When the user clicks on the Create File button, a file is created and downloaded in nbib format and can be imported into any reference manager software.

Similarly, the PMIDs can be formatted for input into Health Assessment Workspace Collaborative, also known as HAWC (Figure 27). HAWC tutorials are available to demonstrate the import process so it will not be covered here.

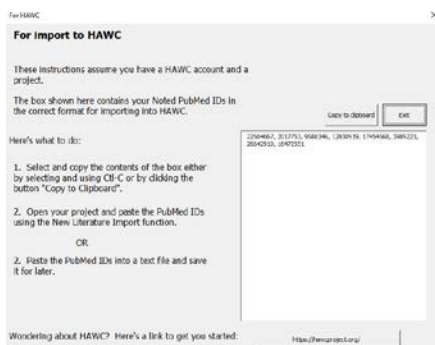


Figure 27. Form to send PMIDs to HAWC

Helpful Tips

Tip 1

The Landscape sheet is a great way to explore a set of chemicals but some chemical names are long, complex, and a challenge to PubMed. If you get unexpected results from a chemical query, it's a good idea to check it in PubMed. You can take any query generated by the Abstract Sifter and copy and paste it into PubMed using Ctl-C to copy and Ctl-V to paste. For example, the query in the box shown in Figure 28 is selected and copied (with Ctl-C). Then in PubMed the query is pasted into the query line at the top as shown in Figure 29. After we click on search we see that PubMed brings back 51 records. On the right side of the page is a box entitled *Search Details*. Click on the *See More ...* link to expand this box. (Figure 30) Figure 31 shows the information provided by PubMed about how it expands the query. If you need to learn more about PubMed queries, click on *Help* on the PubMed home page.

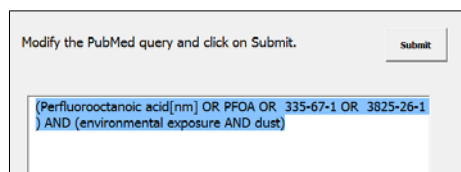


Figure 28. Select and Ctl-C to copy

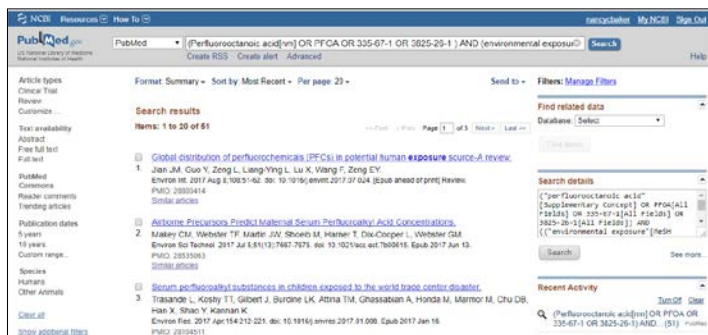


Figure 29. Ctl-V to paste in PubMed then search

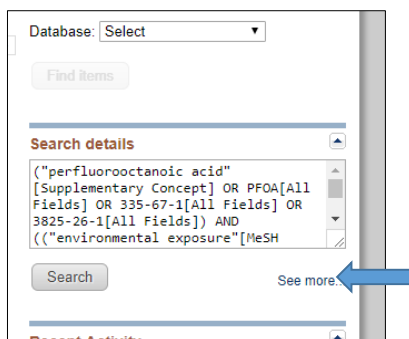


Figure 30. See what PubMed does to expand your search

NCBI Resources How To nancycbaker

PubMed.gov US National Library of Medicine National Institutes of Health

PubMed (Perfluorooctanoic acid[nm] OR PFOA OR 335-67-1 OR 3825-26-1) AND (environmental exposure AND dust) Search

Advanced

Search Details

Query Translation:

```
(("perfluorooctanoic acid"[Supplementary Concept] OR PFOA[All Fields] OR 335-67-1[All Fields] OR 3825-26-1[All Fields]) AND ((("environmental exposure"[MeSH Terms] OR ("environmental"[All Fields] AND "exposure"[All Fields]) OR "environmental exposure"[All Fields]) AND ("dust"[MeSH Terms] OR "dust"[All Fields])))
```

Search URL

Result:

51

Translations:

Perfluorooctanoic acid[nm]	"perfluorooctanoic acid"[Supplementary Concept]
environmental exposure	"environmental exposure"[MeSH Terms] OR ("environmental"[All Fields] AND "exposure"[All Fields]) OR "environmental exposure"[All Fields]
dust	"dust"[MeSH Terms] OR "dust"[All Fields]

Database:

PubMed

User query:

(Perfluorooctanoic acid[nm] OR PFOA OR 335-67-1 OR 3825-26-1) AND (environmental exposure AND dust)

Figure 31. PubMed query breakdown and expansion

Tip 2

It can also be very helpful in chemical research to include the chemical name in the sifting process. This is because a chemical can be mentioned in an abstract even in cases where the article is not really about the chemical and will be retrieved in the PubMed query (depending on how the query is worded). Counting the occurrences of the chemical name in the abstract through the sifting process can help the user discriminate between articles mentioning a chemical or those actually about a chemical.