# Using SWIFT-Review as a New and Robust Tool for Comprehensive Systematic Review

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## ABSTRACT

The systematic review process, while critical to a typical research effort, is highly laborious and time-consuming. The increasing rate at which academic literature is being published only exacerbates this problem. In this paper, we independently and without conflict of interest demonstrate the use of new text-mining software developed by Sciome LLC for conducting swift, efficient, and reproducible systematic reviews.

KEYWORDS: Systematic Review, SWIFT-Review, Comprehensive, Literature Review

### **INTRODUCTION**

Systematic literature reviews are an inextricable part of robust academic research. A systematic review (rather than a non-systematic review) defines a clear question of interest, identifies relevant studies, evaluates their quality, and summarizes their evidence with an explicit and reproducible methodology (Khan et al., 2003). Systematic reviews are particularly relevant to medical and epidemiological disciplines, where the increasing rate at which studies are published can present a daunting challenge to researchers interested in evaluating the current published knowledge on a topic.

This challenge is made even more difficult when the topic of investigation is not highly specialized or niche. For example, a researcher interested in what has been published on breast cancer in the past ten years would have to sift through nearly a quarter of a million studies on PubMed alone. Nevertheless, a systematic review holds tremendous value as the research itself and as a necessary complement to bench or fieldwork. Systematic reviews are essential to the practice of evidence-based medicine by clinicians and researchers who require comprehensive, up-to-date synthesis of current medical findings (Gopalakrishnan & Ganeshkumar, 2013). Systematic reviews and their associated meta-analyses have identified potential risk factors for fatal diseases, allowed public health experts to make significant policy decisions with population-wide effects, and evaluated the efficacy of experimental diagnostic techniques (Dobbins et al., 2001; Eichler et al., 2006; Belbasis et al., 2015).

The aim of this paper is to act as an independent third party in demonstrating the utility of the Sciome Workbench for Interactive computer-Facilitated Text-mining (SWIFT)-Review, a

new text-mining software developed by SCIOME, in conducting PRISMA-compatible systematic reviews within the United States National Library of Medicine's PubMed Central archive (Howard et al., 2016).

### **MATERIALS AND METHODS**

To demonstrate the use of SWIFT-Review for conducting a systematic review, we will refer to the step-by-step procedure of a review conducted by Baccouche & Sevostianov investigating the link between VOC pollution and respiratory health (Baccouche & Sevostianov, 2021). The research question of interest is as follows: "What is currently known about how VOC pollution proximately affects the respiratory system?" Sixteen search terms were developed for use within the United States National Library of Medicine's PubMed database, shown in Figure 1.

K	Known Effects of VOC Pollution on Respiratory Health		
	16 Unique Search Terms for Systematic Review		
1)	"VOC" and "respiratory system"		
2)	"VOC" and "respiratory failure"		
3)	"VOC" and "respiratory dysfunction"		
4)	"VOC" and "respiratory distress"		
5)	"Volatile organic compound" and "respiratory system"		
6)	"Volatile organic compound" and "respiratory failure"		
7)	"Volatile organic compound" and "respiratory dysfunction"		
8)	"Volatile organic compound" and "respiratory distress"		
9)	"VOC pollution" and "respiratory system"		
10)	"VOC pollution" and "respiratory failure"		
11)	"VOC pollution" and "respiratory dysfunction"		
12)	"VOC pollution" and "respiratory distress"		
13)	"VOC pollutant" and "respiratory system"		
14)	"VOC pollutant" and "respiratory failure"		
15)	"VOC pollutant" and "respiratory dysfunction"		
16)	"VOC pollutant" and "respiratory distress"		

Figure 1. Sixteen search terms developed for systematic review.

NIH Na	tional Library of Medi	cine gy Information
Ρ	ub Med.gov	(VOC[Title/Abstract]) AND (respiratory system[Title/Abstract])       X       Search         Advanced Create alert Create RSS       User Guide
		Save  Email Send to Sorted by: Most recent  Display options Display options
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		Selection: All results
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RE: * - 19	SULTS BY YEAR	<ul> <li>The effect of air pollution on the respiratory system in preschool children with contribution of urban heat islands and geographic data - the aim of the study and methodological assumptions.</li> <li>Bobrowska-Korzeniowska M, Jerzyńska J, Polańska K, Kaleta D, Stelmach I, Kunert A, Stelmach W. Int J Occup Med Environ Health. 2021 Jan 8:128971. doi: 10.13075/ijomeh.1896.01651. Online ahead of print.</li> <li>PMID: 33559648 Free article. Review.</li> </ul>

Figure 2: Saving the results of one search to a PMID list. This is done sixteen times, and the results of each search are combined into one master txt file.

The search terms were entered into the PubMed search engine and the results saved to a txt master list containing the PMIDs resulting from all sixteen search terms (Figure 2).

The master list is then imported into SWIFT-Review via the "Load Reference File" command. SWIFT-Review automatically excludes duplicates when importing PMIDs. The resulting SWIFT-Review screen, from which the systematic review can begin, is shown in Figure 3.

SWIFT-Review allows automated sorting of review results, including but not limited to the ability to browse by MeSH term and search for specific terms within your results. Pure manual screening remains possible as SWIFT-Review aggregates article titles and abstracts for chronological review if automated screening is unsuitable to the review at hand. After the conclusion of the SWIFT-Review, articles identified for full-text review can be analyzed and the results documented in a PRISMA-compatible figure, such as the one shown in Figure 4.

Tag Browser Search B	rowse MeSH	Tree Heat	swir I - Heview - Lusers, tmap Browser	pasiipaccouc	nerbownioads/vUC.PMIUS.txt] Document Preview Pie Chart Bar Chart	
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Tag			Code(s) Coun	t v	vith lung function decline: The potential m	ediating role
Respiratory				1366		
Endocrine				892	or systematic inflammation estimated by C	reactive
ADME (title + abst)	ract)			776	urotein_	
<ul> <li>Hematological and</li> </ul>	l Immune			737		
Q Developmental				542		
Ocular and Sensor     Ocular and Sensor     Ocular     Sensor     Ocular     Sensor     Ocular     Sensor     Sen	~			492 V	'ang, B; Yang, S; Guo, Y; Wan, Y; Qiu, W; Cheng, M; Wang, X; Yang	M; Yu, Y; Ma, J;
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Musculoskeletal				285 tc	vxicants with the highest priority for human field study. However,	the effect of DMF
Cancer				250 e)	xposure on lung function and the underlying mechanisms remain	unknown. We
Gastrointestinal				233 U ai	med to investigate the exposure-response relationship and poss	ble mechanism
Skin and Connective	ve Tissue			171 _ bt	etween internal DMF exposure and lung function alteration. We s	udied 3701
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Showing 2073 of 2073 load	aed documer	nts (1 selecte	ed; 0 total included; 0 total training docs. )			
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0		32305772	Association of urinary dimethylformamide metabol	ite with lun	2020 Wang, B; Yang, S; Guo, Y; Wan, Y; Qiu, W; Chen The Science of the to	ll environment
0		32531777	Breath analysis for detection of viral infection, the	current posi	. 2020 Gould, O; Ratcliffe, N; Król, E; de Lacy Costello Journal of breath rese	rch
0		32155563	Characterization of the key odorants contributing t	o retronasal	. 2020 Pu, D; Duan, W; Huang, Y; Zhang, Y; Sun, B; Re Food chemistry	
0		31580941	Chemical composition and evaluation of the antino	ciceptive, a	2020 Oliveira de Veras, B; Melo de Oliveira, MB; Gran Journal of ethnopharn	acology
0		31982502	Chloropicrin-induced toxicity in the respiratory sys	tem.	2020 Pesonen, M; Vähäkangas, K Toxicology letters	
0		32022549	Comparative Life-Cycle Assessment of Aquifer The	rmal Energy	. 2020 Ni, Z; Wang, Y; Wang, Y; Chen, S; Xie, M; Grote Environmental science	& technology
0		32771839	Comparative study on gene expression profile in ra	t lung after	. 2020 Lecureur, V; Monteil, C; Jaguin, M; Cazier, F; Pr Environmental polluti	n (Barking, Essex : 1987)
0		32584571	Detection of Volatile Organic Compounds with Secu	ndary Elect	. 2020 Bruderer, T; Gaugg, MT; Cappellin, L; Lopez-Hi Journal of the Americ.	1 Society for Mass Spec
0		32092080	Development of a simple method for differential de	livery of vo	2020 Zhang, P; Li, Y; Xu, T PloS one	
0		32721009	Effect of Intravenous Acetaminophen on Postopera	ive Hypoxe	2020 Turan, A; Essber, H; Saasouh, W; Hovsepyan, K JAMA	
0		32512553	Electronic nose in discrimination of children with u	ncontrolled	2020 Tenero, L; Sandri, M; Piazza, M; Paiola, G; Zaffa Journal of breath rese	rch
0		32171700	Evaluation of endobronchial volatile sulfur compou	nds for rapi	. 2020 Takazono, T; Imamura, Y; Kitamura, M; Furuge Respiratory investigat	on
0		32604089	Indoor Climate and Air Quality in a Neonatal Intens	ive Care Unit.	2020 Wolf, M; Diehl, T; Zanni, S; Singer, D; Deindl, P Neonatology	
0		31419501	I innia alnifolia essential oil induces relaxation on (	uinea-pig	2020 Vilela. DAD: Silva. BAO: Brito. MC: Menezes. P Journal of ethnopharn	acology

Figure 3. SWIFT-Review articles imported and ready for review.

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 3168344
 Lung cell exposure to secondary photochemical aerosols gene...
 2020
 King. BM; Janechek, NJ; Bryngelson, N; Adamc...
 Chemosphere

 32308013
 Magnoliae Flos Essential Oil as an Immunosuppressant in Den...
 2020
 Chen, CH; Chen, HC; Chang, WT; Lee, MS; Liu, ...
 The American journal of Chinese medicine

 31978732
 Modeling the bioaccessibility of inhaled semivolatile organic c...
 2020
 Wei, W; Ramalho, O; Mandin, C
 International journal of hygiene and environm...



Figure 4. A sample PRISMA-compatible diagram representing the results of the VOC pollution review by Baccouche & Sevostianov (2021).

### DISCUSSION

The ability of a modern researcher to centralize and expedite the systematic review process evolves from a convenience to a necessity as the rate at which scientific papers are published continues to rise. The SWIFT-Review technique, created by Howard et al. in 2016 and demonstrated within this paper, has enormous potential to scale up the scope of systematic reviews whilst simultaneously scaling down the amount of time and manual effort involved. The ease with which additional search terms can be added to the review, combined with SWIFT-Review's ability to process tens of thousands of search results, allows the modern researcher to conduct a review of hundreds or even thousands of searches. This becomes particularly useful when a granular search is warranted, such as in the case where a researcher is interested in identifying every vertebrate species in which a particular pathological condition naturally arises and must specify hundreds of genus and species names in order to cast as comprehensive a net as possible. Additionally, the assembly of all search results into one navigable list (rather than manually clicking through search results or employing librarians and research assistants to meticulously centralize the search results) itself is long-due automation of a highly time-intensive and inefficient process. The authors conclude that SWIFT-Review can and should be used to great effect by the modern researcher to conduct efficient, systematic, and fully reproducible reviews of the literature critical to robust academic research.

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