

ORIGINAL ARTICLE

The TRIP database showed most acute respiratory infections questions were already addressed by Cochrane reviews

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Abstract

Objectives: Cochrane systematic reviews require more methodological support from Cochrane Review Groups (CRGs) than is customarily received by authors from journals; CRGs must therefore prioritize reviews to conserve resources. The TRIP database provided a data set of questions to guide prioritization for the acute respiratory infections (ARIs) CRG.

Study Design and Setting: We extracted the ARI searches from the TRIP database (2010 to 2017) that contained at least one disease and one clinical management term, (defined as a “search”), and tabulated these by frequency.

Results: There were 314,346 ARI searches from which we inferred 45,497 clinical questions, covering 365 topics. Two-thirds (30,541) of these addressed 20 clinical questions, of which treatment were the most frequent, followed by diagnosis, mortality, and prognosis. The five most frequent clinical questions were “Influenza + Vaccination” 4,989 (12.1%), “acute otitis media + antibiotics” 3,578 (8.7%), “common cold + vitamin C” 3,528 (8.6%), “meningitis + corticosteroids” 1,910 (4.6%), and “pneumonia + general treatment” 1,765 (4.3%). The 20 most frequent clinical questions were addressed by Cochrane reviews or protocols.

Conclusion: ARI questions are common and repeated often. Most may have been addressed by Cochrane reviews. The remainder form the basis of a priority list to assign resources for future Cochrane topics. © 2018 Elsevier Inc. All rights reserved.

Keywords: Research prioritization; Health priorities; Cochrane; Acute respiratory infections; Clinical questions; Database analysis

1. Background

Cochrane is a global organization, which produces high quality, credible, systematic reviews of the literature [1,2] and provides methodological support at several

stages, which is provided by one of several editorial teams. Because editorial support is expensive and limited, Cochrane needs to prioritize review topics [3–5]. Prioritization projects usually solicit the views of patients, their clinicians, and other stakeholders [6–10].

The Cochrane Acute Respiratory Infections (ARI) Group, responsible for synthesizing evidence syntheses about diseases causing ARIs, has also embarked on a priority list of topics [11]. Two projects have been completed: first was the identified gaps between current Cochrane reviews and research that has been undertaken [12]; second was a survey of topics that stakeholders wanted answered [13].

This third project sought to identify topics that stakeholders had asked of the TRIP database (previously known as turning research into practice), a search engine designed to assist clinicians find evidence. There have been > 100 million searches of the TRIP database [14]. The largest group of searchers are medical doctors (45%), then information-specialists (20%), other health

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What is new?**Key findings**

- Analyzing a clinical question-answering databank is a novel way to achieve Cochrane review prioritization.
- Most clinical questions about acute respiratory infections addressed the same 20 topics, all treatment-type questions.
- The 20 most common topics were already addressed by Cochrane reviews or protocols.

What this adds to what is known?

- This research prioritization method provides an alternative to the common methods (Delphi processes with stakeholders; audits of research undertaken and systematically reviewed).

What is the implication, what should change now?

- These prioritization findings need to be implemented to improve transparency of Cochrane editorial decisions.

professional (9%), nurses (8%), pharmacists (8%), and patients or their carers (1%) [14,15]. However, there is some uncertainty about these proportions because the survey that used to collect these data was derived from a subsample of users, (only those registered) [14].

Most searches (67%) aim to answer clinical questions (67%) [15,16]. Critical components of clinical questions can be inferred from the search terms. Accordingly, we could analyze the TRIP database for searches limited to ARIs, to determine the topics most frequently searched, and then rank them.

2. Aims

To estimate the frequency of clinical questions asked about ARIs by users of the TRIP database for three question types (treatment, diagnosis, and prognosis).

3. Methods

We obtained data containing all searches conducted in the TRIP database between 2010 and 2017 and focused on the keyword field, which contained the search terms used, (e.g., “xylitol otitis media”, “tuberculosis”, “transfer patient to the floor” and “eating disorder OR anorexia”, see [Appendix 1](#), for more

examples). Most searches in the TRIP database focused on the population, and few (12%) used Boolean operators [17]. To identify searches that were clinical questions, we selected only those with ≥ 2 different search terms, of which at least one was a disease and other was a treatment, diagnosis, or prognosis. We tested this method on a convenient subsample of 1,543 searches, finding 972 (63%) satisfied this, and could be classified as clinical questions.

We now created two lists derived from search strategies used in Cochrane ARI Group reviews and from our work on a previous prioritization study [12]:

1. ARI diseases and their synonyms.
2. Treatments, diagnoses, and prognoses, and their synonyms.

This enabled us to infer clinical questions being asked (e.g., when common cold and nasal irrigation occurred together, we inferred the clinical question, what is the efficacy of nasal irrigation for the common cold?) ([Appendix Table 2](#) has a full list of search strings).

By recombining the words of the clinical questions into a string, we could interrogate TRIP to identify clinical questions, and then the number of diseases (and their synonyms) combined with treatments, diagnoses, or prognoses (and their synonyms). The data were entered onto a spreadsheet, with disease along one axis and treatments, diagnoses, or prognoses along the other, [Table 1](#). The 20 most common ARI clinical questions are displayed, [Figure 1](#). We checked for Cochrane reviews for these 20 most common clinical questions, [Figure 1](#), (also [Appendix Table 3](#)).

4. Results

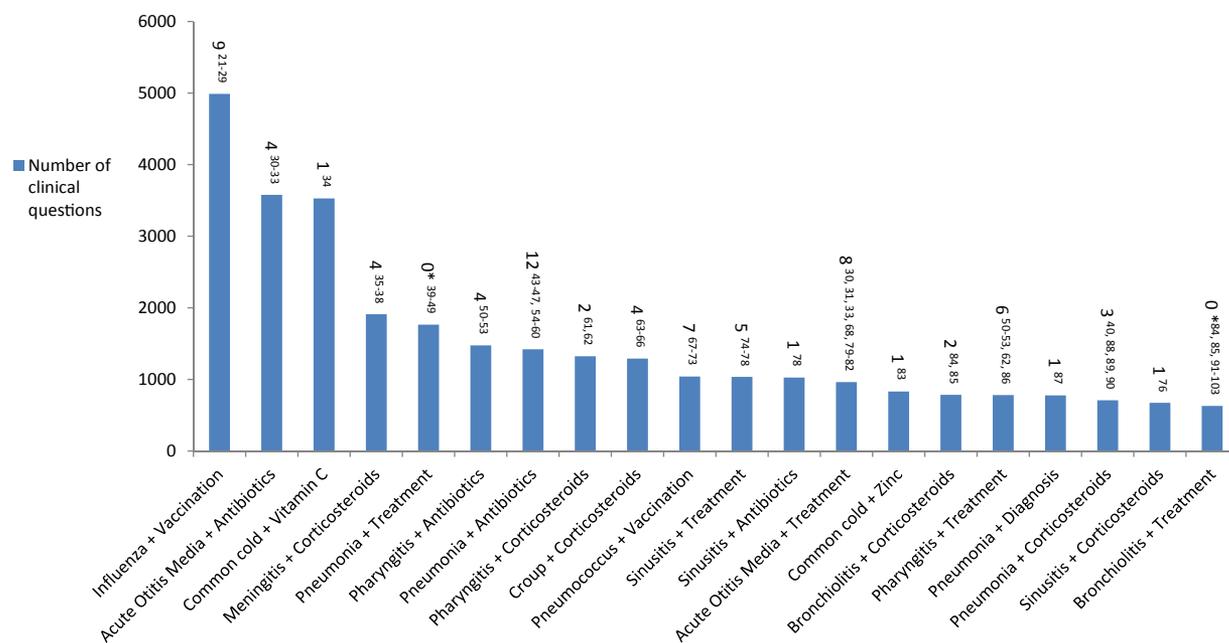
From 314,346 ARI searches conducted in TRIP, we could infer 45,497 questions. These addressed 365 different topics, most addressing the same question, with the 20 most frequent addressing 30,541 (two-thirds, 67%) of the total.

Treatment was the most frequent clinical question type: 41,191 (91%); diagnosis 2,299 (5%); mortality 1,172 (2.6%); and prognosis 834 (1.8%). Pneumonia was the illness asked about most, 6,820 (15%); followed by influenza 6,495 (14%); the common cold 5,539 (12%), and acute otitis media 5,154 (11%), [Table 1](#).

The most frequent full clinical questions were influenza + vaccination 4,989 (12%); acute otitis media + antibiotics 3,578 (9%); common cold + vitamin C 3,528 (9%); meningitis + corticosteroids 1,910 (5%); and pneumonia + general treatment 1,765 (4%), [Figure 1](#), ([Appendix Table 4](#) lists all topics with ≥ 100 clinical questions).

Table 1. Total ARI clinical questions entered into TRIP

Diseases	Diagnosis	Prognosis	Mortality	All treatments	Nonspecific treatment	Xylitol	Antibiotics	Immunotherapy	Antitussive	Vaccination
Pneumonia	778	268	567	5,207	1,765		1,422		2	282
Influenza	221	59	277	5,938	384		54		2	4,989
Common cold	9	56	5	5,469	576		186		39	11
Acute Otitis Media	137	146	9	4,862	963	26	3,578	2	19	46
Pharyngitis	293	64	4	3,702	782		1,476			4
Sinusitis	344	78	3	3,451	1,036		1,026	180	41	3
Meningitis	157	32	202	2,852	477		313			110
Bronchiolitis	52	30	14	2,062	630		103		9	
Croup	31	4		1,755	428		6			
Pneumococcus	8	2	30	1,106	16		33			1,040
Cough	77	24	5	1,033	531		129		63	110
Respiratory tract infection	38	37	15	817	161		298	2	18	1
Pertussis	57	7	20	702	154		28			502
Bronchitis	25	19	3	706	177		409		5	3
Measles	14		9	533	48		29			379
Wheeze	9	5		278	19					
Rubella	6	1	1	230	29					192
Respiratory syncytial virus	16	1	3	168	37					13
Mumps	1		5	148	17					126
Infectious mononucleosis	22	1		68	26		6			2
Laryngitis	1			81	36		7			
SARS	3			13	4					9
Rhinorrhea				9	2		1		2	
Nasopharyngitis				1			1			
Totals	2,299	834	1,172	41,191	8,298	26	9,105	184	200	7,822

**Fig. 1.** Top 20 ARI clinical questions with corresponding Cochrane reviews (CR)[#]. *, protocol and/or other CRs partially answer the questions; #, available in the [Online Supplement \(Appendix 5\)](#).

Paracetamol	Corticosteroid	Nasal irrigation	Probiotic	Zinc	CAM	NSAID	Antihistamine	Surgery	Acupuncture	Positioning	CPAP	Oxygen therapy	Fluid therapy
3	710		133	82	4			55	2	52	8	16	3
32	22		8	28	2	3	2	5					
53	22	7	60	832	7	18	24	24	7	15			
18	149	4	14	6	6	7	10	8	5	1			
34	1,324			4		36		20	2	1			
4	674	92	23	1	3	1	114	56	132	7	1		
	1,910							7	1				3
	786	1		5					1		167	53	1
	1,292							1					
	10												1
	115	1		2	4	9	10	8	2	5			
5	28	23	79	25		1	15	2	2	3		1	1
	16				1								
	63				1			1	1			3	
10				7		5		2					
1	247		1										
	2							6					
	29										3	4	
	2								1				
1	28												
	36						2						
	2	2											
161	7,467	130	318	992	28	80	177	195	156	84	179	77	9

There was at least one associated Cochrane review for each of 18 of the 20 most frequent clinical questions; the two outstanding clinical questions, one (pneumonia + nonspecific treatment) had nine completed Cochrane reviews (of specific treatments) that at least partly address it, and two Cochrane protocols that will answer it. The other (bronchiolitis + nonspecific treatment) had 15 completed Cochrane reviews (of specific treatments) partly addressing it, Figure 1. (Appendix Table 3 lists top 20 topics with associated Cochrane reviews).

5. Discussion

We found a wide spectrum of clinical questions. Some were much more frequent. Treatment clinical questions were much more frequent than diagnosis or prognosis ones. The questions were already addressed by existing Cochrane reviews or protocols.

Our study has some limitations. There is some uncertainty about who asks questions of the TRIP database. Our method of analyzing the searches of the TRIP

database made assumptions, particularly about what was being asked from the keywords that may not have been valid.

However, our approach has some strengths. The enormous size of the data set means sampling errors are very unlikely. Rather than relying on volunteers to nominate topics (diseases and clinical managements) to prioritize in surveys, which may not represent what participants themselves, let alone what others want to know, our method, which analyzed what people actually did ask, is clearly more direct.

Our findings are largely concordant with other data on the most frequent type of clinical questions asked by doctors—mostly treatment (76%), although somewhat less than we found [18], perhaps because that study was of doctors only (we estimate 45% of TRIP users are doctors). Similarly, other studies of question types asked have also found treatment questions of primary care physicians to be the most frequent [19,20].

This information can be used for transparently prioritizing proposed Cochrane ARI reviews and their updates in a climate of competing resources. It can be used in

Table 1. Continued

Diseases	Physiotherapy	Heliox	Surfactant	Bronchodilator	Immunoglobulin	Leukotriene	Humidification	Radiography	Procalcitonin	Education
Pneumonia	176		3	2	6		59	109	177	16
Influenza					10					34
Common cold	1						12			
Acute Otitis Media										
Pharyngitis							3			
Sinusitis					7		22	15		
Meningitis	2								12	6
Bronchiolitis	109	36	4	92	46	5	3	4	5	2
Croup		13					15			
Pneumococcus										6
Cough	2			4			7	5		4
Respiratory tract infection	2				1		3		48	23
Pertussis										
Bronchitis	9			8	1		1			2
Measles					7					5
Wheeze	2					5				
Rubella					1					
Respiratory syncytial virus	4		1		74					
Mumps					2					
Infectious mononucleosis										
Laryngitis										
SARS										
Rhinorrhoea										
Nasopharyngitis										
Totals	307	49	8	106	148	17	125	133	242	98

conjunction with our previous prioritization projects (a list of systematic review research gaps [12], and opinions from representatives of ARI experts and consumers [13]).

Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jclinepi.2018.11.002>.

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Antiviral	Exercise	Vitamin C	Masks	Hand washing	Infection control	Public health	Statins	Vitamin A	Glycerol	Immunostimulant	Anticholinergic	Totals
	11	65	6	9	18		6	4			1	6,820
127	3	103	96	11	18	3	2					6,495
16	24	3,528	1	6								5,539
												5,154
4		7	1	2				1		1		4,063
	6	6		1								3,876
3	3				1				4			3,243
												2,158
												1,790
												1,146
	19	2	1									1,139
4		43	8	11	8			1				907
					1							786
2	20											753
8						3		30				556
											3	292
												238
					3							188
												154
3	2											91
												82
												16
												9
												1
167	88	3,754	113	40	49	6	8	36	4	1	4	45,496

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