

**Finding the Germs:**  
A quest by Abigail Bacon

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# Finding the Germs:

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### Abstract

A search on the transferring properties of germs was conducted on behalf of a mother of two young boys. The user, concerned about different behaviors of her children and their encounters with certain areas of her household, desired to protect her children from harmful pathogens but discontinue unnecessary housecleaning practices. A search for information which would either strongly justify or invalidate cleaning practices retrieved information deemed “helpful” by the user. Materials were collected from commercial websites as well as governmental sites. The searcher learned the value of strategizing a search as well as careful user selection.

**Selection of User**

Deborah, the user, is a young mother of two boys, aged two and four. She has a B.A. in finance and has recently started a rapidly developing portrait photography business. While she does her work in the mornings, she has both children in daycare. She is a very intelligent and well-read person, with an interest in various areas of study, and specifically biology. She is handy with the internet, but does not like to spend large amounts of time “surfing”. I chose this user because I knew she would really appreciate getting the answers to her question without having to spend countless hours behind a computer, when she could be doing her photography work, spending time with her children, or running her household.

**User’s Question**

With Deborah’s two young children in daycare, and with her own propensity to worry about hygiene, Deborah wanted to know about germs. Specifically, she wanted to know about certain areas of the house, which she was always concerned were the most hazardous. The first area was the bathroom. Deborah wanted to know how bacteria and virus laden were the toilet, bathtub, and sink. Along these lines, the user wanted to know if certain bodily fluids were unsanitary, as toilet-training young boys can create a “messy” environment. The next area of concern was laundry. The user wanted to know which washing temperature is necessary to kill the harmful bacteria and viruses. The last household area of concern was the kitchen. Deborah wanted to know how dangerous it is to handle raw poultry and meat, and how to avoid its harmful effects. Deborah also

wanted to know about other child related contamination. Some concerns were; pacifiers, toys, bathtub toys, sneezing,/coughing, and diapers.

Being somewhat of a student of biology, the user was interested in all kinds of information related to this topic. However, due to the issues of time and patience, long drawn out scientific studies with all the microbiological terms were not requested. Rather, Deborah wanted information from sources she could see were reliable, but that she could read through easily and understand their straightforward conclusions. In addition, the user wanted to find information that would not make her more “neurotic” than she already is. In other words, she did not want to see material that would inspire her to fumigate her home on a daily basis.

### **Interview**

When I first started speaking with the user about the topic, it began as a “germ” of an idea (pun intended!). Deborah wanted to know about germs in her household, but she had never qualified what exactly she needed to know. We began talking about public restrooms, since that was in both our minds, the most germ ridden place imaginable. From there, the natural course of inquiry went to diapers and underwear (the laundry issue) then to body parts, and then to toys and pacifiers. As we were talking on the phone, she happened to be at her sink and it occurred to her that one of her major worries surrounded the issue of raw meat contamination, and other kitchen hazards. Discerning the user’s question took on the form of a “stream of consciousness” dialogue. Each topic we addressed spurred panic about another area of the household.

I then asked the user how many answers to aspect of the question she wanted, and what types of sources she would like to see information from. Initially, Deborah wanted

tons of information and from scientific databases as well as commercial websites.

However, as time wore on, and her business became more time consuming, Deborah wanted good information, that she could get through quickly and easily.

The user had no urgency with the information, since it had been concerning her for years without her having done any research of her own, yet she really was excited to see what I would come up with. As mentioned above, Deborah specified in the interview that I should not share information with her that would compel her to overhaul her housekeeping methods, but she did want to know if I came across anything that would protect her family from real dangers.

### **Search Strategy**

I began with a preliminary Google search for “germs worry,” just to get my feet wet. The first article I came up with actually covered a number of the user’s concerns. This included information on bathrooms, laundry, and kitchen items. The source was a popular women’s journal, but the research was attributed to reputable sources. Still, I did not cross these items off my list of “user needs” because I wanted to see if other material concurred with this initial article.

From this point I began coming up with groups of search terms. The first concept was the germ concept and included “germ, bacteria, viruses” (after more searching I added the term “microbe”). The next concept was the contamination concept and for this I included “contaminate, transfer, infect, harmful, and worry.” Lastly, there were the different areas the user was concerned about (toilets, pacifiers, etc.) and for these the terms, I determined new terms throughout the search process.

Instead of trying to exhaust any one search medium for every aspect of the user's question, I began with each issue and went through the search mediums until I arrived at a satisfactory answer. Therefore, for some questions I was able to stop the search process after one good search on a commercial search engine (ex. sneezing), while for others I tried every search method I knew and still did not come up with an extensive answer (ex. bathtubs).

After the initial basic Google search, I decided to check out the CDC's site (having evaluated it as one of my Avian flu sites and finding it useful). However, using the tiny simple search box on their site was difficult and did not yield good results. I therefore used Google's advanced search to search within the CDC site for information on the spread of illness through sneezing and coughing. I used the terms "germ, sneeze, cough" in the "all of the terms" field and "infect, transfer" in the "at least one of these words" field. This took me to a good page on illness prevention from "droplet spread" illness.

The next question I tried to address was the kitchen area. I did basic searches on both Google and on AltaVista for "germs kitchen". I expected to see a lot of advertisements for kitchen cleaners, but was pleasantly surprised that among the first few results was a site of a M.D. who reported the findings discussed at the annual conference for Microbiology. This site addressed all the kitchen related topics of concern to the user.

The next area I wanted to search was for toys and pacifiers. This proved to be very difficult. When I did an advance search on Google and AltaVista for "toys or pacifiers" and "germs or bacteria or viruses" I only came up with articles about "Microban"- a new chemical being added to the plastic of children's items which kills

germs on contact. Adding in the “contaminate” concept did not help matters. From the commercial search engines I moved to Nexis (easy search), using the same search string. Once again, I came up with the latest breaking news on Microban. The closest I got to good information was a transcript of an interview with a distributor of products infused with Microban as well as a scientist, discussing whether Microban was actually necessary or if it potentially harmful (by over-sterilizing the children’s environment). I decided to try searching through different parenting related websites that I have encountered through my own experience. The one that ultimately lead to the best information about pacifiers was the American Association of Pediatrics. Some other sites came to the same conclusions, but as they did not cite any references, I did not feel that I should trust the editor of “Parenting” magazine, and the like. I was still stuck without material about toys. Searches on AAP for “toys” and “germs” yielded poor results since their search engine does not AND terms together. Some articles looked promising but they required paid subscription. However, this search led me to a new concept- “Dr.’s office waiting rooms.” I went back to Nexis’s power search to see what kinds of articles I could come up with. Searching for “(waiting room w/5 toys) and (germs or bacteria or viruses)” retrieved various newspaper articles reporting a study by a British Pediatric journal which tested samples of toys from doctor’s waiting rooms for bacteria and viruses. This provided ample information on both soft and hard toys.

Throughout my searches I kept coming across one name “Charles Gerba” who seemed to be somewhat of an authority on microbiology. I therefore did a simple search on Google for Charles Gerba and found various articles all reporting a series of studies that compared the germ counts in public bathrooms to other common areas (kitchen,

office, etc.). These were very easy to read, and somewhat conclusive articles. The downside was that one article mentioned that much of his research was sponsored by antibacterial companies (more on this later) so I directed my searching to the scientific databases. I tried advance searching in Medline and ProQuest with the terms “bacteria or viruses or germs or microbes” and “contaminate or transfer or infect”. This yielded a lot of results about experiments with rats etc. so I limited my results to human subjects. The problem here was that I could not even understand the titles, which listed long strings of microbe names with some other microbiological terms I am unfamiliar with. I then tried making the search a little more comprehensible by using the search term “hygiene” and the concept of “home or household”. This search actually yielded an interesting article about diaper hygiene. Unfortunately, this article was a preliminary study, and I found nothing more current by the authors (for this I removed all search terms and just limited the search to articles written by one or more of the authors).

To find information on bodily fluids and body parts, I did a simple Google search. After entering “private body parts hygiene” I came up with many undesirable articles. I changed the search terms to “body part unsanitary” and came up with a very good article which was a question exactly echoing to the user’s question, posed to “allexperts.com”. The question was fairly satisfactory, so I ended that search.

The concept I had the most difficulty searching for was bathtubs. I tried advance searching for “bath or bathtub” and the germ concept (“germ, bacteria, etc.”) on Google and the only useful thing I retrieved was about bathtub toy bacteria (this was a great accidental find). I tried entering the same search statement in Nexis and Medline (with Nexis I added a proximity operator w/5). This did not yield any useful results. I decided



to try to broaden my understanding of germs by going to the National Science Digital Library and Science.gov. However, these yielded poor results due to their extremely simple search options. From there I went to ask.com where I entered the search question “where do bacteria grow?” This did not yield any useful results, but the engine listed a few related questions like “how do bacteria grow” that contributed some useful microbiology sites. From there I learned some more fundamentals about bacterial growth and was able to apply them to the bathtub idea.

### **Evaluation with Critical Review**

Throughout the search process I found it necessary to constantly evaluate the sites I viewed. It was not very difficult to come up with information on most of the germ areas, but I did find myself doubting much of what I read. In addition, I had in mind the user’s request for material that took a moderate point of view of sanitization. From all the articles I retrieved, about half of them were from commercial news sites which quoted research done by various microbiologists. The other half were not authored, but were found on reputable sites (like the AAP or CDC).

Eysenbach and Kohler (2002) conducted a study of user’s search tactics for health related information on the web, and their evaluation of those sites. They found that the participants evaluated a site as “credible” based on an apparent source, professional design, a scientific or official touch, language, and ease of use. While this study is limited by the smallness of the sample, and by its being in an artificial setting pressured by time yet without a real information need, I found myself evaluating the sites with similar criteria. Very often I would come upon a microbiology site with a black background and neon fonts in various colors. It made me think that I chanced upon a site

designed by a ten year old boy who did his science fair project on germ contamination- in other words, not very professional. One aspect of language which affected my evaluation was crude humor. Unfortunately, quite often the authors would take liberties to use crude humor to emphasize an aspect of germ contamination. Once or twice they were directly quoting from the researchers themselves. Now, I may be “old fashioned” but I do not feel that that kind of crudeness has a place in research.

Another aspect evaluation I had to take into account was the motive of the researcher. As mentioned above, much of the material I found quoted from Charles Gerba’s over 400 articles on microbiology. While his prolific writing may seem impressive, after some investigation I learned that many of his studies were funded by antibacterial companies. This caused me to question whether his conclusions were constructed to promote further purchases of antibacterial products. To deal with this credibility issue, as much as possible, I tried to find other writings that concurred with Gerba.

### **Mode of Presentation**

I created for my user an executive summary which broke up the quest into the different germ areas of concern. For each area, I introduced as few articles as possible to answer all her questions. The conclusion of the research was presented in one line with the researcher’s name (ex. Bath toy bacteria boost immune system (Dr. H. Barton)) while the link was shortened so that the source would be recognizable (ex. [10NEWS](#)). These abbreviations proved to be very useful to my user who has not had time to actually evaluate the sources. At this point, she is happy to have the answers to her questions and knows she can come back to me for further clarification when she has more time. This

situation reminded me of my own experiences at the reference desk. Sometimes I would need the simple answer to a question, but I knew I could go back to the help desk when I had more time to delve further into the subject.

### **User's Evaluation**

Initially, because my user has a love of biology, I had planned to supply her with scientific articles from databases like Medline or ProQuest. After drowning myself for quite some time in the complex terminology, I called up my user to reassess the situation. We concluded that articles from Medline etc. would not be of practical use to her, since she is also not familiar with microbiological terms, nor does she have time to read 20 different and long articles on the topics we discussed. Therefore, we simply made it a priority to find articles that were as authoritative as possible. I had hoped to find the type of articles that are found in Scientific American and other popular science magazines, but they all required paid subscription.

Because my user did not have time to read through the articles I had selected, I synopsisized for her on the phone the gist of each source and its conclusion. My user was very happy to see all of her questions answered and that she now had a resource on germ information (me). While some facts I shared with her were surprising, she was satisfied with credibility of the sources. And very importantly, the user found that the moderate view of sanitization I presented was appropriate for her lifestyle.

### **My Experience as the Searcher**

The first thing I will say I should have done differently for this search task, would have been to actually write down a search strategy. I had imagined in my mind that I would see what I could come up with using a preliminary Google search on “germs

worry” and build more good search terms from there and even citation search, if possible. I regret now that I did not keep a list of my useful terms (and there were many which were not reported above in the strategy section) which I could have made into better concept groups. This would have made searching in the different forums much more efficient.

The problem was that I shared the information need with the user. I quickly became very interested in the search task – and getting the answers. I jumped right into the search and got addicted to finding new useful information. Thankfully, I have learned many search skills and tactics over the last few months, and I enjoyed seeing the fruits of my learning as I came up with new creative ways of searching on our topic. While I am sure I found that information the user never would have, I am not so sure I found it efficiently. Sitting down with a paper and pencil and actually designing a search strategy and extensively documenting it along the way, would have been very useful.

I think that if I would have done this all over again, I also would have chosen a student as my user. While I know that the information I provided to this harried young mother was very useful, I think the process would have been a bit more dynamic if my user had had more time to thoroughly evaluate the sources and suggest new areas of exploration.

## Summary

The user presented a complex information need with many different aspects to the question. As the searcher, it was initially somewhat difficult to find productive search terms and search statements. Over the course of the search process, I was able to find as much information as the user needed from commercial and governmental sources, though with a significant cost of time.

## References

Eysenbach, G., & Kohler, C. (2002, March 9). How do consumers search for and appraise health information on the world wide web? *British Medical Journal*, **324** (7337), 573-577.

## Executive Summary

### Bathroom Germs

- \*This one is a bit graphic. Bodily fluids are not unsanitary  
[AllExperts](#)
- More on bathroom surfaces. Faucets and sinks are worst.  
[MSN news](#)

### Laundry Germs

- Wash laundry at 140 degrees to kill harmful fecal bacteria (Gerba).  
[Netscape News](#)

### Germs with Children

- After 6 mo. Children are not likely to be harmed by fallen pacifiers.  
[American Academy of Pediatrics](#)
- Hand-washing as best for of prevention for transmitting diaper originating germs (Maggie Edgar RN and MSW).  
[ARCH Respite and Crisis Care Services](#)
- Bath Toys bacteria boost immune system (Dr. H. Barton).  
[10NEWS](#)
- Toys in Dr.'s offices- the soft toys are worse than the hard- but they're both bad.  
[Scottish Paper](#)
- Diaper Hygiene- this is a non-conclusive study- though interesting to see the experimentation methods.  
[Social Science and Medicine](#)
- Sneezing/Coughing- transfer best inhibited by hand-washing and sneezing/coughing into upper arm.  
[CDC.gov](#)

### Kitchen Germs

- Kitchen faucets and telephones carry more germs than most bathroom surfaces (Annual Meeting of the American Society for Microbiology).  
[DR.Mercola](#)

- List of germy kitchen items and how to deal with them- worst by far are sponges and dishrags (Annual Meeting of the American Society for Microbiology).  
[DR.Mercola2](#)
- Watch out for raw foods and “cross-contaminations”.  
[Safety](#)

#### MISC

- **Tips on different areas of the household which could be problematic (Kent County).**  
[Michigan Health Dept.](#)
- **Germs-not as bad as you think.**  
[NYTimes](#)