

# **Research Summaries**

<http://www.ncbi.nlm.nih.gov/pubmed/9282196>

I., B., & AE., G. (1997, July 7). *Bacterial colonization of pacifiers of infants with acute otitis media.*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9282196>

I used this website to learn about a study which determined if there were infection-causing bacteria on pacifiers. Since my project is to see which pacifiers, latex vs. silicone, have more bacteria and what types of bacteria there are, I think that this is a very good source. I learned that the Department of Pediatrics, Georgetown University School of Medicine, Washington, DC, USA did a study about the presence of bacteria on the surface of pacifiers used by children with ear infections (acute otitis media). They took a sample of 40 recently used pacifiers and let them dry for five to six minutes. They processed the swab so that they could count the colonies of bacteria. After they grew the bacteria, they did another study to see if the pacifier material would stop the growth of bacteria. There were 21 (52.5%) pacifiers that had bacteria on them. The number of colonies varied from one to 35 colonies, averaging six. I learned that there were six different types of bacteria growing on the pacifiers. The pacifier material was shown to stop one of the types of bacteria. In the end, this study showed that pacifiers don't contain high numbers of bacteria, so this means that they aren't likely to be a source of the transfer of organisms causing infection.

<http://www.livestrong.com/article/183790-the-difference-between-latex-silicone-pacifiers/>

Carson, E. (2010, July 25). *The difference between latex & silicone pacifiers.* Retrieved from <http://www.livestrong.com/article/183790-the-difference-between-latex-silicone-pacifiers/>

I used this website to find out the difference between latex and silicone pacifiers. The site also talked about why babies use a pacifier. One of the reasons why babies like to use them is because they sometimes crave non-nutritional sucking to calm them when they get tired, bored, and fussy. Before you buy a pacifier, you should determine the type you want, latex or silicone. Silicone and latex pacifiers have a nipple on a shield with ventilation holes. Latex ones are more flexible and softer than the more rigid silicone pacifiers. Both types come in different colors and styles. While the latex pacifiers are soft and flexible, pediatrician Dr. Alan Greene said that their flexibility makes them not as long-lasting as silicone ones. They can also be broken more easily when chewed by older babies. Silicone pacifiers have less odors and are easier to keep clean. This led me to the idea that if latex pacifiers break more easily, that means bacteria can get into them if they crack. This would make them more of a health risk. The reason silicone pacifiers have less odors and are easier to clean is because they don't break as easily, which means it is harder for the bacteria to get in them. I learned that pacifiers can hold tons of bacteria that may cause your baby to get infections more easily. By keeping your pacifier clean and throwing it away when it begins to break may lower the chances of your baby getting sick. I learned that latex may be a health risk for some babies. In conclusion, I think that silicone pacifiers are better for your baby because they are cleaner and more durable for your baby.

<http://www.aafp.org/afp/2009/0415/p681.html>

Natale, R. (2009, April 15). *Risks and benefits of pacifiers*. Retrieved from <http://www.aafp.org/afp/2009/0415/p681.html>

This website provided a lot of information about the risks and benefits of using a pacifier. Some of the benefits include pain killing, shorter hospital stays for preterm infants, and less of the risk of sudden infant death syndrome (SIDS). According to the American Academy of Pediatrics, some of the risks include a negative effect on breast feeding, dental malocclusion, or imperfection, or infection and ear infections. The American Academy of Pediatrics and the American Academy of Family Physicians recommend weaning children from pacifiers in the second six months of life to prevent otitis media, or ear infections. This website also talked about recommendations for pacifier use and went into detail on the benefits and risks of using a pacifier, but I focused on two of the risks, or complications, otitis media and infection because these are what my project relates to. There are two reasons for how pacifier use could cause otitis media: reflux of the middle ear from sucking and eustachian tube dysfunction from altered dental structure. I learned that using a pacifier may raise the risk of recurrent ear infections. Pacifiers can also cause infection. Some studies found that pacifiers are often colonized with *Candida*, a bacteria. I learned that latex pacifiers are more colonized with *Candida* and *Staphylococcus* (types of bacteria) than silicone pacifiers. One study of more than 10,000 infants in the UK evaluated the use of a pacifier and sucking their finger at the age of 15 months and their connection with infection at 18 months of age. The 36% of infants who had used a pacifier had more earaches and colic compared to the 40% of infants who didn't suck and the 21% who sucked their fingers. The 2.7% who suck both a pacifier and fingers had more wheezing, earaches, and poorer health. However, direct link between this illness and this type of sucking habit couldn't be determined from this study. A review of health effecting studies found three studies that showed a connection between the use of pacifiers and infection, but these studies are also too limited to draw conclusions. Even though there is some evidence for pacifier colonization with bacteria, I learned that a direct connection between these organisms and infection has not been proven yet.

<http://raphaelsharon.com/blog/2011/10/17/pacifiers-the-good-the-bad-and-the-soother-fairy/>

Sharon, R. (2011, October 17). *Pacifiers: the good, the bad and the soother fairy*. Retrieved from <http://raphaelsharon.com/blog/2011/10/17/pacifiers-the-good-the-bad-and-the-soother-fairy/>

I used this website to learn about pacifiers. The reason for why babies use a pacifier is that babies have the urge to suck. This helps sooth and calm the baby. What's better, pacifiers or thumb/fingers? There are pros and cons for both. A pacifier can help prevent future teeth problems, but when the baby develops teeth and still uses a pacifier, this can increase the chances of cavities. There have also been studies on pacifiers decreasing the chance for a babies having sudden infant death syndrome (SIDS).

For babies who suck their thumb/fingers, it isn't really a threat for introducing foreign bacteria since it is their own germs. The con is when they have to stop. It's very easy to throw away a pacifier, but you can't get rid of their thumbs/fingers. This website also talked about when a baby should start using a pacifier. The American Academy of Pediatrics recommend using it after the first month of life so enough time has passed for proper breastfeeding is established. What about pacifiers and teeth? The Canadian Dental Association and American Dental Association prefer pacifiers over finger-sucking because you can take away a pacifier. The use of sweetened pacifiers (dipped in sugar or honey) are big risk-factors for developing cavities. Do NOT dip the pacifier in sugar or honey. Can pacifiers cause ear infections? It is a higher risk of getting an ear infection while using a pacifier in the first two years of life. This is why it is difficult to do a study without finding that babies with ear infections also use pacifiers. One study found micro-organisms on pacifiers. The bacteria that is the cause of most bacterial ear infections (strep A) was not found, but using a pacifier for more than five hours a day was found to be a contributing factor. Most studies agree that pacifiers can be a risk for ear infections, but they aren't the main reason for them. This website also talked about when to stop using a pacifier. Studies with regards to dental problems found that kids who used pacifier until they were one year old had less problems with dental imperfection than those who were still using a pacifier at 2 and 3 years of age. Another study looked at children between 2 and 5 years old and found that the longer they used the pacifier, the higher the risk of overbite and cross bite. There are also strong data to suggest that using a pacifier during the day in kids older than 9 months has a negative impact on speech development. In conclusion, the use of a pacifier is a parental decision, not the decision of a health professional, never dip a pacifier in sugar or honey, using a pacifier for a long time is not recommended, and try to have your child off the pacifier one year of age and the latest t before the two years of age.

<http://www.trejos.com/Pediatrics/Healthy/Pacifier.stm>

Jiménez, E. (n.d.). *The pacifier*. Retrieved from

<http://www.trejos.com/Pediatrics/Healthy/Pacifier.stm>

This website talked about potential problems of a pacifier and when it should be used and taken away. One problem is the risk of contamination. It's hard to keep a pacifier clean, especially when the infant uses it all day. This may increase the risk of the baby getting sick. Another problem is that the use of a pacifier can cause problems with teeth. If the infant already has teeth and uses a pacifier, it is big risk for the child. Another big problem is ear infections. For infants over the age of 10 months, using a pacifier raises the risk of middle ear infections. According to Dr. Jimenez, a pacifier increases salivation which eliminates bacteria. This is a good area for fungi and modifies the type of bacteria in the mouth. Sucking a pacifier a lot enables the transfer of the bacteria into the middle ear. One mistaken concept is that using a pacifier reduces the risk of colic. One reason for colic is gas in the intestines. The pacifier causes the child to swallow more gas, according to Dr. Jimenez, and this is why a child with colic doesn't get better by using a pacifier. In conclusion, I learned that a pacifier should not be used by a

baby until he/she is over a month old and taken away by the age of 10 months.

<http://community.discovery.com/eve/forums/a/tpc/f/7501919888/m/19019754201>

*Pacifier bacteria test.* (2009, August 18). Retrieved from

<http://community.discovery.com/eve/forums/a/tpc/f/7501919888/m/19019754201>

This website is a Mythbusters blog. Someone posted: "I'd like to see how much truth there is to the myth that there are more germs in the human mouth than on the floor. Say your baby drops his dummy / pacifier onto the supermarket floor. Many mums feel it is safer to suck the dummy themselves before putting it back into baby's mouth.. only to be told that is worse! I struggle to believe that, especially as you don't know how many people have trodden who-knows-what across your path!" Many people posted their opinion on what they think about this question. Some people said it doesn't matter about the amount of bacteria it's the kind. Other people said it isn't dangerous at all, but some say it is. Some people say it doesn't matter because they clean the floor very well. There are many opinions, but which one is correct?

<http://www.findingdulcinea.com/news/health/May-June-08/Link-Found-Between-Pacifiers-and-Recurrent-Ear-Infections.html#4>

Colville, L. (2008, June 20). *Link found between pacifiers and recurrent ear infections.* Retrieved from <http://www.findingdulcinea.com/news/health/May-June-08/Link-Found-Between-Pacifiers-and-Recurrent-Ear-Infections.html#4>

I learned that a cause of recurrent ear infections is that bacteria migrate from the nose to the middle ear, and children who already have a history of ear infections shouldn't be using a pacifier. Researchers at the University Medical Center in Utrecht found that there was a 90% chance of recurrent ear infections in kids who used pacifiers. Acute otitis media (AOM) are one of the most common bacterial infections. Most AOM infections go away on their own, but some are treated with antibiotics. Some studies found that there was a decreased chance of Sudden Infant Death Syndrome when using a pacifier. Another study of 500 Dutch children found that the use of a pacifier almost doubled their risk of getting ear infections. This information will likely add to the ongoing debate about the pros and cons of using a pacifier

<http://www.societyforscience.org/document.doc?id=12>

*Student handbook.* (n.d.). Retrieved from <http://www.societyforscience.org/document.doc?id=12>

This document was a PDF file of the Student Handbook for Science Fair. It talks about the rules and almost everything you need to know about Science Fair. It also explains how to write your

experimental design and the different types of project ideas.

<http://www.cdc.gov/biosafety/publications/bmb15/BMBL.pdf>

Wilson, D., & Chosewood, C. (2009, December). *Biosafety in microbiological and biomedical laboratories*. Retrieved from <http://www.cdc.gov/biosafety/publications/bmb15/BMBL.pdf>

This is a document of the Biosafety in Microbiological and Biomedical Laboratories. This document explains the biological risks and principles, the laboratory biosafety criteria, how to properly use and install biological safety cabinets, how to decontaminate and disinfect objects, how to transport infectious substances, how to work with toxins, and how to work with Human, NHP, and Other Mammalian Cells and Tissues.

<http://www.webmd.com/cold-and-flu/ear-infection/ear-infections-cause>

*Ear infections - cause*. (2011, January 13). Retrieved from <http://www.webmd.com/cold-and-flu/ear-infection/ear-infections-cause>

Middle ear infections are caused by bacteria and viruses. During a cold, sinus infection, or an allergy attack, the tubes inside your ears (the eustachian tubes), can become blocked. When they become blocked, fluid stops from draining from the middle ear. The fluid is a great place for bacteria or viruses to grow into an ear infection. This website also talked about swimmers ear, but I am not going to go into detail on this because it doesn't really relate to my project. I learned that the most common bacteria to cause ear infections are *Streptococcus pneumoniae* (also called pneumococcus), *Haemophilus influenzae*, and *Moraxella catarrhali*. Like I said in the beginning, viruses can also cause ear infections. The respiratory syncytial virus (RSV) and the flu virus (*influenza*) are the most common types found.

<http://news.consumerreports.org/baby/2008/01/pacifier-pointe.html>

*Pacifier pointers*. (2008, January 10). Retrieved from <http://news.consumerreports.org/baby/2008/01/pacifier-pointe.html>

This website is a great one for new mothers trying to find the right pacifier for their baby and how to take care of the pacifier. This website recommends not to use a necklace for the pacifier because it can hurt the baby. They also don't recommend clip on ribbons either because they can still get wrapped around the baby's neck or other objects. In order to clean the pacifier, they recommend to boil it for five minutes and then wash it with warm soapy water by hand or in the dishwasher. Then you squeeze the bulb to remove the excess water. Washing it is very important. If it falls on the floor, microorganisms can get on it so it is very important to wash it. I learned the pacifiers are required to have two ventilation holes in the shield so that a baby cannot suck in the pacifier in their mouth, so be sure to check that they are there. Over time pacifiers can break, tear, or become grainy instead of

smooth. If they become this way, be sure to get a new one.

<http://www.mansfield.ohio-state.edu/~sabedon/biol3010.htm>

Abedon, S. T. (1998, April 14). *Supplemental lecture*. Retrieved from <http://www.mansfield.ohio-state.edu/~sabedon/biol3010.htm>

This website is about the identification of bacteria. It defines and describes bacterial species, Bergey's manual, strain, type strain, serovar (serotype), biovar (biotype), morphovar (morphotype), isolate, classification and identification of an organism, morphological identification of an organism, flow cytometry, phage typing, protein analysis, and the comparison of nucleotide sequences. I mainly used this website to research about how to classify and identify types of organisms.

[http://www.ehow.com/facts\\_5868983\\_microbiology-bacteria-identification.html](http://www.ehow.com/facts_5868983_microbiology-bacteria-identification.html)

Herriman, R. (n.d.). *Microbiology bacteria identification*. Retrieved from [http://www.ehow.com/facts\\_5868983\\_microbiology-bacteria-identification.html](http://www.ehow.com/facts_5868983_microbiology-bacteria-identification.html)

This website is also about the identification of bacteria. It describes microscopic examination of organisms, media selection, colony morphology, biochemical and enzymatic tests, and molecular and serological methods for identifying bacteria.

[http://www.ehow.com/how\\_5748876\\_identify-growing-nutrient-agar-plates.html](http://www.ehow.com/how_5748876_identify-growing-nutrient-agar-plates.html)

Moseley, E. (n.d.). *How to identify bacteria growing on nutrient agar plates*. Retrieved from [http://www.ehow.com/how\\_5748876\\_identify-growing-nutrient-agar-plates.html](http://www.ehow.com/how_5748876_identify-growing-nutrient-agar-plates.html)

This website was a step by step tutorial about how to identify bacteria growing on petri dishes (nutrient agar plates).

[http://www.ehow.com/how\\_10012514\\_identify-bacteria-agar.html](http://www.ehow.com/how_10012514_identify-bacteria-agar.html)

Malysa, S. (n.d.). *How to identify bacteria on agar*. Retrieved from [http://www.ehow.com/how\\_10012514\\_identify-bacteria-agar.html](http://www.ehow.com/how_10012514_identify-bacteria-agar.html)

This was another website about how to identify bacteria on agar petri dishes. It was a step by step tutorial on how to do this process. This was a big help when I was doing my experiment.

<http://en.wikipedia.org/wiki/Saliva>

Rjwilmsi. (2012, December 5). *Saliva*. Retrieved from <http://en.wikipedia.org/wiki/Saliva>

This website is about saliva. It describes the functions of it, including digestion, disinfectants, hormonal

functions, Iodine in salivary glands and oral health, and how it is used to construct a bird's nest. The site is also about stimulation, daily salivary output, and spitting. I mainly used this website to learn about the disinfectants in saliva. It is not proven yet, but saliva could be able to heal wounds. Researchers at the University of Florida have found that some properties in saliva helped heal a wound twice as fast that just leaving it alone.