

We know that using soap makes a difference when washing our hands. It removes more germs than when washing with only water. So does washing our hands with hot water make them any cleaner? I chose this article for you because here in Japan we are reminded every day of how hand washing can protect us from various kinds of disease. This interesting and informative talk is by Dr. Karl, from ABC Science (Australian Broadcasting Corporation / Science) on whether water temperature makes any difference in hand washing.

Click on the link below and click the **Audio** button to listen.

<http://www.abc.net.au/science/articles/2010/09/23/3020122.htm>

Hot Water Hand Washing a Tepid Tale

By: Dr. Karl, ABC Science

Last time, I talked about the importance of washing your hands, as related to hygiene, and to avoiding infectious diseases. I also explained why soap made this process so much more efficient, and how soap worked.

But what about the temperature of the water when you wash your hands? Should it be as hot as you can possibly bear, or is cold water perfectly fine?

Well, way back in 1938, Dr PB Price published his summary of 80 studies that he had carried out over a nine-year period.

He studied hand washing with water at temperatures ranging from 24°C up to 56°C. He found that the temperature made no real difference in how well the hands were cleansed of germs.

The most significant factor in removing germs was the vigorousness of scrubbing the hands. But that was just one person's work, and it was done a long time ago.

Over the intervening years, many studies were done on hand washing. They have looked at issues such as the type of soap: plain or antibacterial; liquid or bar soap; and so on.

They studied the quantity of soap used, whether or not a nail brush was used and the use of instant hand sanitising liquids.

They even examined various drying techniques: paper versus cloth towels; air-drying versus towels; and so on.

But very few medical hygiene studies re-examined the effect of temperature on hand cleaning.

This all changed at the US Year 2000 Conference For Food Protection, when this topic was very intensely discussed.

In a 2002 study by Dr Barry Michaels, the volunteers' hands were first deliberately soiled with ground beef contaminated with E. coli bacteria. They were then washed with soap and water at five different temperatures ranging from a chilly 4.4°C, to an uncomfortable 48.9°C.

Now here's the surprising result. Washing their hands at different temperatures made no real difference in the numbers of bacteria left on the skin, whether they were permanent resident bacteria, or transient immigrant bacteria.

You might remember that the permanent resident bacteria are usually the good guys, while the transient immigrant bacteria are usually the bad guys.

The only real difference found was that the more vigorous the scrubbing, the more bacteria were removed. The friction of rubbing is more effective at removing transient bacteria — which are more likely to be nasty — than resident bacteria.

Now this was kind of odd. After all, it's reasonable to think that hot water would provide more energy to both make a lather and to melt and/or dissolve fats and oils on the skin.

But think about it. If warm/hot water is flowing over your hands, it will very rapidly cool down to the skin temperature. (On the other hand, water will tend to keep its temperature if it's in a bowl.)

So hot water does not have any inherent advantage in removing germs. In fact, hot water can make some soaps more irritating to the skin, and can cause contact dermatitis.

One study said, "...temperature of water used for hand washing should not be guided by antibacterial effects but comfort, which is in the tepid to warm temperature range. The usage of tepid water instead of hot water also has economic benefits."

And from a comfort point of view, people find it easier to wash their hands more frequently if the water temperature is comfortable, as opposed to uncomfortably hot.

In the USA, the 2001 food code lowered the recommended hand-wash water temperature to 37.8°C (around 100°F). This works well with soaps, most of which are designed to lather most effectively around 35°C.

Anyhow, it's totally impossible to kill the bacteria on your skin only via the temperature of the hot water you use to wash your hands.

The temperature needed to kill bacteria is over 80°C. If water is hot enough to kill bacteria, it will definitely scald you.

So how did this myth that hot water was necessary for effective hand washing arise?

Well, we humans are very human, and it's fairly easy to measure and regulate water temperature, and it's fairly hard to regulate how effectively you scrub, rub and dry your hands.

Furthermore, on the hot-is-good front, hospital laundries did away with hot water washes of clothes and sheets years ago.

So today, healthcare staff can go ahead and wash their hands with tepid water between each patient and their hands will be just as clean and germ-free, and will also be less likely to be damaged, which is a very handy hint.

The End

© 2010 Karl S. Kruszelnicki Pty Ltd

Published 23 September 2010

And if you are interested in the benefits of hand washing with soap, go to:

Dr. Karl, ABC Science: **Soap's tale comes out in the wash**

<http://www.abc.net.au/science/articles/2010/09/14/3011293.htm>