

## How to kill a tick on your clothes

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by Daniel J. Cameron, MD MPH

The aspiring young scientist, Jackie Flynn, reported that her informal study found ticks were killed after 5 minutes in the dryer, not one hour. The time difference was significant and caught the attention of researchers at the CDC, who decided to investigate further.

Now, three years later, a new study published in [Ticks and Tick-borne Diseases](#) has, in fact, found that it only takes 6 minutes to kill a tick in the dryer. [1]

The study's lead author, Christina Nelson from the CDC, found the quickest method was to throw clothes directly into the dryer before washing them. Standard-sized, residential washers and dryers were used in the study.

"Placing clothing directly in a dryer and drying for a minimum of 6 minutes on high heat will effectively kill ticks on clothing," reported Nelson. "If clothing is soiled and requires washing first, our results indicate clothing should be washed with water temperature [equal to or greater than] 54°C (?130°F) to kill ticks."

Nelson and colleagues also found that the water temperature of a wash would impact the survival rates of ticks. "Washing with hot water killed all nymphal and adult ticks when the water temperature was [equal to or greater than] 54°C (130°F)." [1]

It was more difficult to kill nymphal and adult ticks at lower temperatures. Nelson reported that half (50%) of the ticks survived hot water washes when the water temperature was less than 54°C (130°F).

And while cold water washes may be more gentler on your clothes, they also allow ticks to live on. "The majority (94%) of ticks survived warm washes [temperature range between 27–46°C (80–115°F)] and all ticks survived cold washes [15–27°C (59–80°F)]."

If a tick survives a wash cycle it's still possible to kill them in the dryer. But, the temperature must be even higher. "When subsequently dried on a high heat setting [54–85°C (129–185°F)], it took 50 minutes to kill all ticks (95% confidence limit, 55 minutes)."

Nelson pointed out the majority of nymphal ticks did not survive beyond 30 minutes of drying time. Only one tick was found to survive at 40 minutes but subsequently died before the bag was rechecked at 50 minutes.

Nelson did not identify additional factors that may have contributed to killing the ticks including the effects of detergents or dryer sheets. Furthermore, killing other types of ticks might be more difficult,

Nelson warned. "For example, *Amblyomma americanum* ticks (also known as lone star ticks) are more resistant to low humidity and would potentially survive longer in dryers." [1]

### How did the authors know the ticks were truly dead?

"Following each wash and dry cycle, tick survival was assessed by observing the ticks for normal behavior and movement," stated Nelson. "If ticks appeared to be moribund and movement was not readily apparent, ticks were lightly probed with forceps, exposed to carbon dioxide through exhalation, and observed for several additional minutes."

"To verify that motionless ticks were in fact dead and not simply stunned, ticks were then placed in petri dishes with a piece of wet paper towel and reassessed 20 to 24 hours later," reported Nelson. [1]

So, how concerned should you be about ticks actually being on your clothes and potentially biting you and causing Lyme disease or other tick-borne infections? What are the odds that a tick has attached itself to your socks, pant legs or shirt while you were enjoying the great outdoors? Nelson and colleagues cited two studies which answer those questions. [1] And the odds are in favor of the tick.

"In one Maryland study, an investigator simulated outdoor activities such as gardening or clearing brush by crawling through leaf litter for 30-second time periods. *I. scapularis* nymphs were acquired in 58% of crawls, and the majority of ticks were found on pant legs and socks." [2]

"In another study, investigators who walked a series of 100 meter transects through a wooded area in New Jersey found an average of nine *I. scapularis* adults on their clothing afterward." [3]

Our takeaway from this long-overdue study by the CDC is to dry first, high heat, wash later. And skip the cold water washes. They may preserve your clothes but not necessarily your health.

### References:

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3. Jordan RA, Schulze TL, Dolan MC. Efficacy of plant-derived and synthetic compounds on clothing as repellents against *Ixodes scapularis* and *Amblyomma americanum* (Acari: Ixodidae). *J Med Entomol*, 49(1), 101-106 (2012).

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