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We stopped malaria in the United States. Why haven't we stopped Lyme disease?

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Mosquitoes and ticks each spread pathogens that cause human diseases. Both malaria (spread by mosquitoes) and Lyme disease (spread by ticks) have historically affected millions of Americans; however, malaria was eradicated in the United States by 1951 while incidence of Lyme disease has increased over 130-fold from 1981 to 2017.

So, why are Lyme disease and other tickborne illnesses so much harder to stop?

Malaria was eradicated through a coordinated government effort focused on mosquito control that included areawide habitat modification and insecticide application. This approach was successful because it was relatively easy to isolate problematic mosquito habitat and because most transmission was from human to mosquito to human (with no animal host involved). Additionally, environmental concerns related to these approaches—which today may be controversial—were not common at the time.

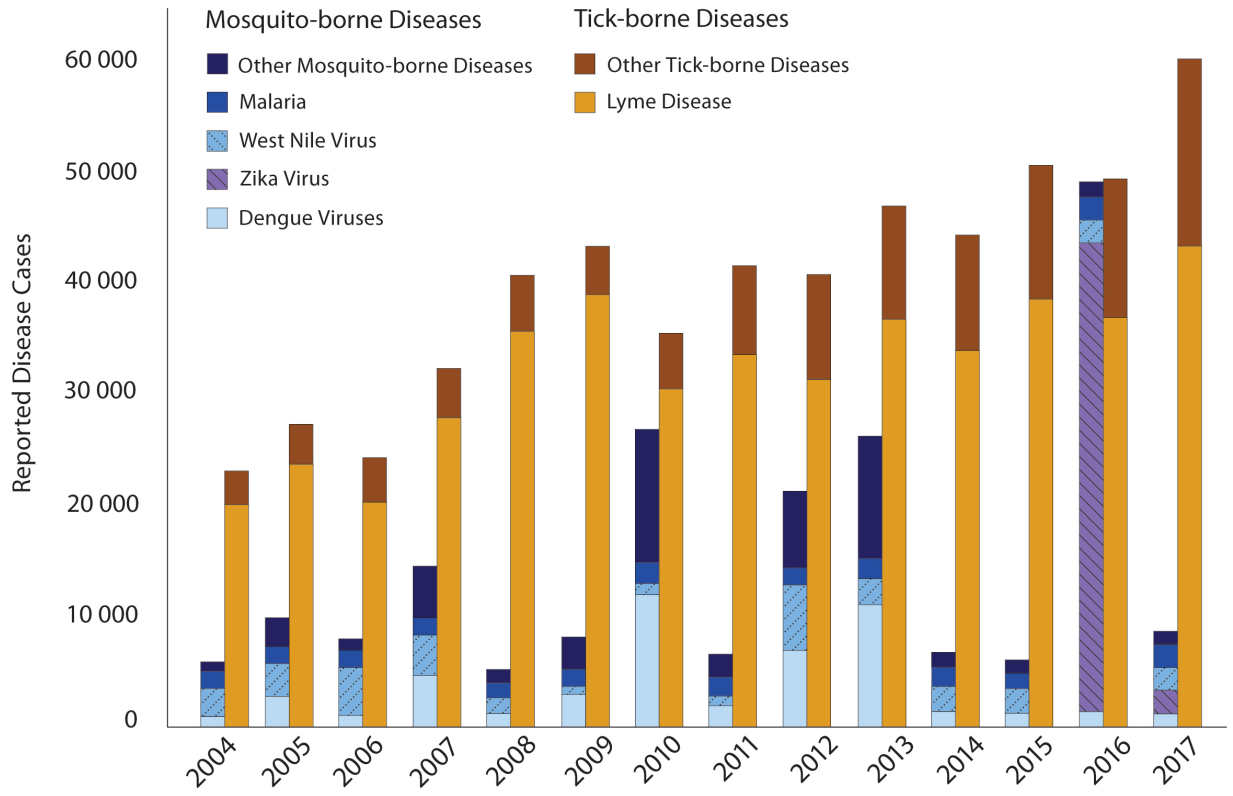
For Lyme disease, however, tick-reduction efforts have never been implemented in a similarly large-scale, coordinated manner. Tick management is also more complicated because tick habitats are hard to access, and because other animals, such as mice and deer, play a key role in the tick life cycle. Mice, in particular, serve as hosts for disease-causing pathogens that ticks carry. Thus, Lyme disease and other tickborne pathogens will continue to increase without a focused effort on tick and host reduction, especially with many tick species expanding their ranges into new geographic areas.

A variety of other factors in the management of mosquitoes and ticks affect our ability (or lack thereof) to eradicate these two diseases:

Differences in mosquitoes and ticks that affect management practices

Mosquitoes	Ticks
Primary control effort via government	Primary control effort via individuals
Managed via areawide insecticide treatment and habitat modification	Managed via treatment of individual yards or animal hosts
Public health agencies have primary responsibility	Many different agencies involved (public health, wildlife services, USDA, and others)
Live in easily accessible locations	Live in hard-to-access locations
Short life cycle (a few weeks)	Long life cycle (two years)
Long history of management (>100 years) with funding focused on vector management	Limited research funding for applied management
Broad, coordinated public education and consumer adoption	Limited public education and consumer acceptance

Vector-borne disease cases reported to National Notifiable Disease Surveillance System
U.S. & territories, 2004-2017



A successful Lyme disease eradication program should follow the steps of other successful programs:

1. Implement large-scale, coordinated tick-control operations.
2. Use integrated pest management to manage tick populations:
    - Monitor areas for ticks and pathogens they carry.
    - Cull deer populations or reduce ticks on deer through other means.
    - Modify habitats to be inhospitable to ticks.
    - Treat tick habitat with pesticides.
    - Use ticks' natural enemies for control.
    - Apply acaricidal (i.e., tick-killing) treatment to mice that serve as hosts for Lyme disease and other pathogens.
3. Prevent tick bites by using personal protective measures such as applying repellent, wearing permethrin-treated clothing, bathing after being outdoors, and performing thorough and frequent tick checks.
4. Increase education of public and health professionals on effective tickborne disease prevention.

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CDC. 2018. The History of Malaria, an Ancient Disease [Accessed 2019 Aug 23]. https://www.cdc.gov/malaria/about/history/index.html

CDC. 2019. Lyme disease: Data and statistics [Accessed 2019 Aug 23]. https://www.cdc.gov/lyme/stats/index.html

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