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## Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values

### Report at a Glance

- › 4 Page Report in Brief (<http://nas-sites.org/gene-drives/files/2015/08/Gene-Drives-Brief06.pdf>) (PDF)
- › Briefing Slides ([http://nas-sites.org/gene-drives/files/2015/08/Gene-Drive\\_Briefing-Slides\\_Final.pdf](http://nas-sites.org/gene-drives/files/2015/08/Gene-Drive_Briefing-Slides_Final.pdf)) (PDF)
- › Briefing Video (<http://wp.me/p6RKDK-6e>)(HTML)
- › Press Release (<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=23405>) (HTML)

Welcome to the National Academies of Sciences, Engineering, and Medicine study that examined a range of questions about gene drive research. The study was conducted by a **committee of experts** (<http://nas-sites.org/gene-drives/2015/08/04/committee/>) and released June 8, 2016.

Gene drives are systems of biased inheritance that enhance the ability of a genetic element to pass from an organism to its offspring through sexual reproduction. A wide variety of gene drives occur in nature. Researchers have been studying these natural mechanisms throughout the 20th century but, until the advent of CRISPR/Cas9<sup>[1]</sup> for gene editing, have not been able to develop a gene drive.

Since early 2015, laboratory scientists have published four proofs-of-concept showing that a CRISPR/Cas9-based gene drive could spread a targeted gene through nearly 100% of a population of yeast, fruit flies, or mosquitoes. Biologists have proposed using gene drives to address problems where solutions are limited or entirely lacking, such as the eradication of insect-borne infectious



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diseases and the conservation of threatened and endangered species. This study provided an independent, objective examination of what has been learned since the development of gene drives based on current evidence.

The resulting report, ***Gene Drives on the Horizon*** (<http://www.nap.edu/catalog/23405/gene-drives-on-the-horizon-advancing-science-navigating-uncertainty-and>) outlines the state of knowledge relative to the science, ethics, public engagement, and risk assessment as they pertain to gene drive research and the governance of the research process. This report offers principles for responsible practices of gene drive research and related applications for use by investigators, their institutions, the research funders, and regulators.

Follow on Twitter: **#GeneDriveStudy** (<https://twitter.com/hashtag/genedrivesstudy>)

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[1] CRISPR (Clustered regularly-interspaced short palindromic repeats) are segments of bacterial DNA that, when paired with a specific guide protein, such as Cas9 (CRISPR-associated protein 9), can be used to make targeted cuts in an organism's genome

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