



Highlights of [GAO-10-549](#), a report to Chairman, Committee on Environment and Public Works, U.S. Senate

Why GAO Did This Study

Nanotechnology involves the ability to control matter at the scale of a nanometer—one billionth of a meter. The world market for products that contain nanomaterials is expected to reach \$2.6 trillion by 2015. In this context, GAO (1) identified examples of current and potential uses of nanomaterials, (2) determined what is known about the potential human health and environmental risks from nanomaterials, (3) assessed actions EPA has taken to better understand and regulate the risks posed by nanomaterials as well as its authorities to do so, and (4) identified approaches that other selected national authorities and actions U.S. states have taken to address the potential risks associated with nanomaterials. GAO analyzed selected laws and regulations, reviewed information on EPA's Nanoscale Materials Stewardship Program, and consulted with EPA officials and legal experts to obtain their perspectives on EPA's authorities to regulate nanomaterials.

What GAO Recommends

GAO recommends that EPA complete its plans to modify its regulatory framework for nanomaterials as needed. EPA concurred with our recommendations and provided technical comments, which we incorporated as appropriate.

View [GAO-10-549](#) or [key components](#). For more information, contact Anu Mittal at (202) 512-3841 or mittala@gao.gov.

NANOTECHNOLOGY

Nanomaterials Are Widely Used in Commerce, but EPA Faces Challenges in Regulating Risk

What GAO Found

Companies around the world are currently harnessing the properties of nanomaterials for use in products across a number of sectors and are expected to continue to find new uses for these materials. GAO identified a variety of products that currently incorporate nanomaterials already available in commerce across the following eight sectors: automotive; defense and aerospace; electronics and computers; energy and environment; food and agriculture; housing and construction; medical and pharmaceutical; and personal care, cosmetics and other consumer products. Within each of these sectors, GAO also identified a wide variety of other uses that are currently under development and are expected to be available in the future.

The extent to which nanomaterials present a risk to human health and the environment depends on a combination of the toxicity of specific nanomaterials and the route and level of exposure to these materials. Although the body of research related to nanomaterials is growing, the current understanding of the risks posed by these materials is limited. This is because the manner in which some studies have been conducted does not allow for valid comparisons with newer studies or because there has been a greater focus on certain nanomaterials and not others. Moreover, the ability to conduct necessary research on the toxicity and risks of nanomaterials may be further hampered by the lack of tools to conduct such studies and the lack of models to predict the characteristics of nanomaterials.

EPA has undertaken a multipronged approach to understanding and regulating the risks of nanomaterials, including conducting research and implementing a voluntary data collection program. Furthermore, under its existing statutory framework, EPA has regulated some nanomaterials but not others. Although EPA is planning to issue additional regulations later this year, these changes have not yet gone into effect and products may be entering the market without EPA review of all available information on their potential risk. Moreover, EPA faces challenges in effectively regulating nanomaterials that may be released in air, water, and waste because it lacks the technology to monitor and characterize these materials or the statutes include volume based regulatory thresholds that may be too high for effectively regulating the production and disposal of nanomaterials.

Like the United States, Australia, Canada, the United Kingdom, and the European Union have begun collecting data to understand the potential risks associated with nanomaterials and are reviewing their legislative authorities to determine the need for modifications. Australia and the United Kingdom have undertaken a voluntary data collection approach whereas Canada plans to require companies to submit certain types of information. Some U.S. states, like California, have also begun to address the potential risks from nanomaterials by, for example, collecting information from manufacturers on a limited number of nanomaterials in use in those states and making some of this information publicly available.