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# NANOTECHNOLOGY

## Improved Performance Information Needed for Environmental, Health, and Safety Research

GAO Accountability * Integrity * Reliability

Highlights

Highlights of GAO-12-427, a report to the Chairman, Committee on Environment and Public Works, U.S. Senate

### Why GAO Did This Study

Nanotechnology involves the ability to control matter at approximately 1 to 100 nanometers. Worldwide trends suggest that products that rely on nanotechnology will be a $3 trillion market by 2020. However, some of the EHS impacts of nanotechnology are unknown. The NSTC coordinates and oversees the NNI, an interagency program that, among other things, develops national strategy documents for federal efforts in nanotechnology.

In this context, GAO examined: (1) changes in federal funding for nanotechnology EHS research from fiscal years 2006 to 2010; (2) the nanomaterials that NNI member agencies' EHS research focused on in fiscal year 2010; (3) the extent to which NNI member agencies collaborate with stakeholders on this research and related strategies; and (4) the extent to which NNI strategy documents address desirable characteristics of national strategies. GAO's review included seven NNI agencies that funded 93 percent of the EHS research dollars in fiscal year 2010. This report is based on analysis of NNI and agency documents and responses to a questionnaire of nonfederal stakeholders.

### What GAO Recommends

GAO recommends that the Director of the Office of Science and Technology Policy (OSTP), which administers the NSTC, (1) coordinate development of performance information for NNI EHS research needs and publicly report this information; and (2) estimate the costs and resources necessary to meet the research needs. OSTP and the seven included agencies neither agreed nor disagreed with the recommendations.

View GAO-12-427. For more information, contact Frank Rusco at (202) 512-3841 or ruscof@gao.gov.

### What GAO Found

From fiscal years 2006 to 2010, the National Science and Technology Council (NSTC) reported more than a doubling of National Nanotechnology Initiative (NNI) member agencies' funding for nanotechnology environmental, health, and safety (EHS) research—from approximately $38 million to $90 million. Reported EHS research funding also rose as a percentage of total nanotechnology funding over the same period, ending at about 5 percent in 2010. However, GAO identified several reporting problems that raise concerns about the quality of EHS funding data reported. For example, for 18 percent of the 2010 projects GAO reviewed that were reported as EHS research, it was not clear that the projects were primarily directed at EHS risks. In addition, NNI member agencies did not always report funding using comparable data. The absence of detailed guidance on how agencies should report funding for their nanotechnology research has contributed to these problems, as GAO also reported in 2008 and made a related recommendation.

In 2010, EHS research at the NNI member agencies GAO reviewed most frequently focused on carbon nanotubes, nanosilver, and nanoscale titanium dioxide. NNI has not prioritized nanomaterials for EHS research, but NNI's 2011 EHS research strategy outlines criteria for NNI member agencies to use in doing so. It is too soon to tell how these criteria will influence NNI member agencies' decisions about which nanomaterials to prioritize, and it is unclear if information needed to use the NNI criteria is available.

The NNI member agencies have collaborated extensively on EHS research and strategies. They have collaborated through the NSTC to develop joint EHS research strategies and have initiated numerous formal collaborative EHS research projects. Nonfederal stakeholders who responded to GAO's web-based questionnaire on nanotechnology EHS research told GAO that they benefited from collaboration with the NNI member agencies but identified some challenges, including a lack of funding and limited awareness of collaboration opportunities, among others. Most respondents rated the 2011 NNI EHS research strategy as somewhat or very effective at addressing nanotechnology EHS research needs.

NNI strategy documents for EHS research issued by the NSTC address two and partially address the other four of the six desirable characteristics of national strategies identified by GAO that offer a management tool to help ensure accountability and more effective results. For example, the NNI strategy documents provide a clear statement of purpose, define key terms, and discuss the quality of currently available data, among others. However, they do not include performance information—such as performance measures, targets, and time frames for meeting those measures—that would allow stakeholders to evaluate progress towards the goals and research needs of the NNI. In addition, the documents do not include, or sufficiently describe, estimates of the costs and resources needed for the strategy. Without this information, it may be difficult for agencies and stakeholders to implement the strategy and report on progress toward achieving the research needs and assess if investments are commensurate with costs of the identified needs.