Measuring Research and Development Expenditures in the U.S. Nonprofit Sector: Conceptual and Design Issues: Summary of a Workshop

DETAILS

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MEASURING RESEARCH AND DEVELOPMENT EXPENDITURES IN THE U.S. NONPROFIT SECTOR

Conceptual and Design Issues

Summary of a Workshop

Carol C. House, Holly G. Rhodes, and Esha Sinha, *Rapporteurs*

Committee on National Statistics

Division of Behavioral and Social Sciences and Education

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Acknowledgments

The workshop summarized in this volume was held June 30-July 1, 2014. The workshop steering committee came together with ideas and their combined expertise to establish a framework for the discussion of research and development activities taking place in nonprofit organizations and how to measure those activities. Several steering committee members also made presentations at the workshop. The committee wishes to acknowledge the excellent leadership provided by the chair, Lester Salamon, and to thank the staff of the National Center for Science and Engineering Statistics at the National Science Foundation for their help and interaction along the way. The committee specifically wishes to acknowledge the National Research Council (NRC) staff for their hard work and dedication to make this workshop and subsequent summary a reality.

The success of the workshop was due primarily to the individuals who gave their time and ideas to make presentations and participate in the discussions. The steering committee wishes to acknowledge the presenters: Paul Arnsberger, Statistics of Income Division of the Internal Revenue Service; Jeffrey Berry, Tufts University; Mark Boroush, National Center for Science and Engineering Statistics; Ronda Britt, National Center for Science and Engineering Statistics; Constance Citro, Committee on National Statistics; Maria Cristalli, Hillside Family of Agencies; Michael Crosby, Mote Marine Laboratory; Nathan Dietz, The Urban Institute; Donald Dillman, Washington State University; Louise Earl, Statistics Canada (presentation materials); Karla Eisen, Prince William Regional

Beekeepers Association; Ronald Fecso; John Gawalt, National Center for Science and Engineering Statistics; Aldo Geuna, University of Turin; Jodi Harpstead, Lutheran Social Service of Minnesota; Michael Larsen, George Washington University; Catherine Mickle and Dan Heist, American Cancer Society; Susan Raymond, Changing Our World; Cleo Redline, National Center for Education Statistics; Lester Salamon, Center for Civil Society Studies; and Robyn Stone, LeadingAge.

This workshop summary was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the NRC. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We thank the following individuals for their review of this report: Jeffrey Alexander, Research and Analytics, Center for Science, Technology and Economic Development, SRI International, Arlington, Virginia; Irwin Feller, Professor Emeritus, Department of Economics, Pennsylvania State University; Barbara J. Robles, Consumer and Community Development Research, Division of Consumer and Community Affairs, Board of Governors of the Federal Reserve System, Washington, DC; and Jolene D. Smyth, Department of Sociology and Bureau of Sociological Research, University of Nebraska–Lincoln.

Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the content of the report nor did they see the final draft of the report before its release. The review of this report was overseen by Colm A. O'Muircheartaigh, Harris School of Public Policy Studies, University of Chicago. Appointed by the NRC, he was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the rapporteurs and the institution.

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1

Introduction

The National Center for Science and Engineering Statistics (NCSES) of the National Science Foundation (NSF) is responsible for national reporting of the research and development (R&D) activities that occur in all sectors of the U.S. economy (National Science Foundation, n.d.-b). For most sectors, including the business and higher education sectors, NCSES collects data on these activities on a regular basis. NCSES has been proactive in seeking systematic independent reviews of its program and improving their surveys based on these reviews. Two of these reviews have been conducted by the National Research Council (NRC): *Measuring Research and Development Expenditures in the U.S. Economy* (National Research Council, 2005), and *National Patterns of R&D Resources: Future Directions for Content and Methods, Summary of a Workshop* (National Research Council, 2013). The surveys on the industrial sector and academic sector were revised in 2008 and 2010, respectively, with an intention to capture information on innovation taking place in business firms and R&D performed by universities and colleges in nonscience and nonengineering fields.

However, data on R&D within the *entire* nonprofit sector have not been collected in 18 years, a time period that has seen the dynamic and rapid growth of the sector (Salamon, 2012). The 2013 NRC workshop summary cited above pointed out issues with NCSES' current modeling approach to estimation of "other nonprofit" R&D. At that workshop, Michael Cohen, NRC, stated that "it is reasonable to conclude that the current method is unlikely to provide high-quality estimates" (National Research Coun-

BOX 1-1
Statement of Task

An ad hoc steering committee will organize a public workshop on issues involved in measuring research and development (R&D) expenditures and related topics, such as employment of science and engineering personnel in R&D, in the nonprofit sector of the U.S. economy. The workshop will have the specific objective of identifying issues for the collection of intramural research and development expenditures by nonprofit organizations, considering the goals, content, statistical methodology, data quality, and data products associated with this data collection. The workshop will also consider data uses and the needs of data users and the relevance and adequacy of the resulting products for meeting current and emerging data needs for information about research and development expenditures for this sector. Following the workshop, a designated rapporteur will prepare an individually authored summary of the presentations and discussion.

cil, 2013, p. 51). Based partly on this 2013 workshop, NCSES decided to design and implement a new survey of nonprofits, hired a contractor (ICF International) to begin planning for it, and commissioned the workshop summarized in this report to provide a forum to discuss conceptual and design issues and methods. Specifically, NCSES sought to benefit from the combined expertise of national and international experts in survey methodology and nonprofit R&D, as well as to listen to and learn from representatives from a number of different nonprofit organizations. The statement of task for this workshop is provided in Box 1-1.

BACKGROUND

NCSES, formerly the Division of Science Resources Statistics of the National Science Foundation, was established by Section 505 of the America COMPETES Reauthorization Act of 2010. This act mandated, among other requirements, that NCSES provide statistical data on U.S. R&D performance and funding. The legislation also required that NCSES focus more attention on U.S. competitiveness relative to other countries. In response, NCSES produces a variety of reports, briefs, and tabular data made available to the research community. The *National Patterns of R&D Resources*, the primary product produced with relevance to R&D in the nonprofit sector, is published annually.

R&D expenditures by nonprofit organizations are an important component of total U.S. R&D spending, with disproportionate impacts in certain fields, such as biomedical research. Nonprofit organizations both

provide and receive R&D funds from other organizations. In its *National Patterns of R&D Resources,* NCSES separates R&D in the academic sector (most of which are not-for-profit institutions) from that in "other nonprofits." While some of the R&D expenditures for "other nonprofits" are measured in collections such as the Survey of Federal Funds for Research and Development, which provides an estimate of funding provided by the federal government to nonprofits, NCSES has only occasionally collected information on the level of intramural and extramural R&D expenditures in the entire U.S. nonprofit sector. The most recent survey of "other nonprofits," the 1996–1997 NSF Nonprofit R&D Survey, released results in 2001 (National Science Foundation, 2001; The Gallup Organization, 2000). The only previous collection was in 1973.

Since the previous survey of R&D in the "other nonprofit" sector, the gap in information has been filled by model-based estimates of nonprofit R&D in the NCSES *National Patterns of R&D Resources* releases (National Science Foundation, n.d.-a), using elasticity ratios derived from the 1996–1997 survey data. However, this model relies on assumptions that various relationships have not changed over time, which are questionable. In addition to the 2013 NRC report cited above, a 2005 study (National Research Council, 2005, p. 8) concluded that

> in reviewing the attempts by NSF to collect data on the nonprofit sector, the panel noted that there were evident problems that were well documented in the methodology report on this survey. Nonetheless, the panel recommends that another attempt should be made to make a survey-based, independent estimate of the amount of R&D performed in the nonprofit sector (Recommendation 3.10). The panel also recommends that NSF evaluate the possibility of collecting for nonprofit institutions the same science and engineering variables that pertain to academia (Recommendation 5.3).

FOCUS OF THE WORKSHOP

At the workshop, John Gawalt, director of NCSES, described the context and importance of the planned new survey, with additional detail provided by Mark Boroush, senior analyst in the R&D Statistics Program at NCSES. *National Patterns of R&D Resources* includes data from separate surveys of various R&D-performing sectors of the U.S. economy (see Box 1-2) and consists of data on R&D expenditures by source of funds, sector of performance, character of work (basic research, applied research, or development), and international comparisons. Data from *National Patterns* feed into various international publications and databases, such as the OECD main science and technology indicators; the science and technology data of the Institute of Statistics of the United Nations Educational,

BOX 1-2
Data Sources Used in *National Patterns of R&D Resources*

- Higher Education Research and Development Survey (HERD)
- Survey of Federal Funds for Research and Development (Federal Funds)
- Survey of Federal Science and Engineering Support to Universities, Colleges and Nonprofit Institutions (Federal Support)
- Business R&D and Innovation Survey (BRDIS)
- Survey of State Government R&D (State R&D)
- Nonprofit Research and Development Survey

SOURCES: Boroush (2014), National Research Council (2013).

Scientific and Cultural Organization (UNESCO); and Eurostat's statistics database.

Although NCSES has been gathering data from the other R&D-performing sectors at regular intervals, extending as far back as the 1950s in some cases, they have recognized that without the broader nonprofit sector they "have a gap, in what's becoming an increasingly important part of the economy and part of the research environment," stated Gawalt. R&D that is performed in academic institutions, a major portion of the R&D in the broader nonprofit sector, is covered annually by the Higher Education Research and Development Survey.[1] However, the lack of recent data on R&D in other parts of the nonprofit sector provided the impetus for the current workshop. Particular emphasis in the survey will be placed on measuring R&D *performance* more so than *funding* activities, according to Gawalt. Overall, the *National Patterns of R&D Resources* is important to U.S. policy, Boroush noted, because "there is a lot of concern about how much money is being spent on R&D in all of the sectors … and it's not just the U.S., but about how the U.S. compares to the other major nations." The new R&D survey on the nonprofit sector is expected to generate estimates for the sector, plus contribute to data requirements of the international science and technology community.

A primary objective of this new survey, from the viewpoint of NCSES, is to fill data gaps in the *National Patterns of R&D Resources*, and to do so

[1]The Higher Education Research and Development Survey, also referred to as HERD, is an annual census of institutions that expended at least $150,000 in separately budgeted R&D in the fiscal year. Available: http://www.nsf.gov/statistics/srvyherd/ [October 2014].

in a way that is compatible with data collected on the other sectors of the U.S. economy and appropriate for international comparisons. Lester Salamon, chair of the workshop steering committee, stated that this survey has implications beyond filling these specific gaps. He emphasized the need to understand the nonprofit sector, given its enormous size and scope as well as its contribution to identifying new forms of R&D beyond physical production processes and new technology. These new forms of R&D involve new social processes that, in his view, can potentially relieve or resolve a variety of social and economic maladies. As such, they have important implications for the broader service economy, which now dominates the U.S. and other advanced economies. He noted, "The nonprofit sector, of course, is at the center of the service world. It therefore not only fills a gap in a bunch of tables, but I think it fills a conceptual gap in the understanding of contemporary R&D." These new understandings have the potential to inform how NSF thinks about R&D across sectors, he added.

There is an inherent tension between the narrower goal of providing improved-quality data for the existing *National Patterns of R&D Resources* release and providing a broader understanding of the nonprofit sector's diverse R&D activities as articulated above by Salamon. Aware of this potential tension, the steering committee made an explicit decision that the workshop should begin with a broader discussion of R&D activities in the nonprofit sector before focusing on the specific methodology for the survey design.

THE WORKSHOP AND THIS SUMMARY REPORT

The purposes of the workshop and this summary were (1) to identify concepts and issues for the design of a survey of R&D expenditures made by (other) nonprofit organizations, considering the goals, content, statistical methodology, data quality, and data products associated with this data collection and (2) to consider the broader usefulness and relevance of the data for meeting current and emerging data needs, including fostering a better understanding of the nature of the nonprofit sector and its R&D activities. Given these dual purposes, the steering committee identified nine topics important to consider through presentations and discussions at the workshop:

1. The nonprofit sector is not well understood, and a discussion of the sector needed to begin with establishing a common understanding of this diverse sector.
2. R&D is occurring in the nonprofit sector, but much of it may differ from traditional forms of R&D. Workshop participants needed to

learn about these activities directly from nonprofit organizations themselves.

3. Because of these potential differences, new language to describe R&D activities to respondents may need to be identified in order to elicit accurate reporting on the survey.
4. Flowing from this notion, workshop discussions should address the design of screening prompts so that they are meaningful to respondents.
5. Improved data sources now exist that may aid in sampling for the survey, and these should be explored in greater detail.
6. Obtaining a good response rate has been historically problematic, and specific strategies to maximize response should be discussed.
7. Specifically included in these strategies should be engaging and collaborating with nonprofit associations to help explain the importance of the survey to their member organizations.
8. Linking this survey of R&D activities to broader themes that resonate within the nonprofit sector, such as social innovation, should be discussed as a strategy to enhance the usefulness of the survey to the nonprofit sector.
9. It may not be possible to field a nonprofit survey annually, so discussions should be included to address ways of moving forward beyond a single implementation of a new survey.

These nine topics informed the workshop agenda and this report. The agenda items are in accord with the issues mentioned in the above statement of task.

The workshop presentations and discussions provided a variety of views and suggested a range of ideas and strategies to the sponsoring agency. The workshop agenda is presented in Appendix A. The workshop presentations are available on the webpage of the Committee on National Statistics at http://sites.nationalacademies.org/dbasse/cnstat/index.htm. This summary report generally follows the workshop structure, summarizing the presentations and the discussions on each topic. It is important to note that a workshop is not a consensus activity—no consensus recommendations or other findings are offered in this report. Individual presenters, steering committee members, and workshop participants were encouraged to offer their own opinions and suggested strategies, and these are reported, with attribution, throughout this report.

Chapter 2 focuses on examining the size, scope, and nature of the U.S. nonprofit sector based on current research. Chapter 3 presents the definition that NCSES currently uses for R&D. It then offers a view of the nonprofit sector and its R&D activities based on presentations from representatives of six different nonprofit organizations. This chapter also

presents seven challenges to designing the survey that participants identified through their discussion. Chapter 4 is devoted to the issues of sample design, including the benefits and drawbacks of various approaches, potential sources of data to facilitate the process, and lessons learned from the previous survey and from international examples. Chapter 5 focuses on the design of the survey instrument, strategies for increasing response rates, and potential outputs and uses of the survey data.

Finally, Chapter 6 offers a summary of the key themes that were identified through the workshop discussions. These themes are consistent with the steering committee's initial outline of issues, and include

- NCSES' need to fill the data gaps in the *National Patterns of R&D Resources* release in a way that is compatible for between-sector and international comparisons;
- the additional need to facilitate a more accurate statistical portrait of the scope and nature of R&D in the nonprofit sector, and the inherent tension between this need and NCSES' primary need for the survey;
- an understanding of the scope of the nonprofit sector, and types of organizations that should be included;
- the unique nature of R&D within the nonprofit sector, and whether these potential R&D activities should be measured in the survey;
- the importance of statistical efficiency[2] for estimating R&D expenditures at the national level, versus designing a sample that is inclusive of the diversity of R&D in the entire sector;
- the complex relationships existing among organizations in the nonprofit sector, and the impact these relationships may have on building a sampling frame and selecting a statistically efficient sample;
- the need to establish and maintain communication between NCSES and the nonprofit sector;
- strategies for achieving the correct respondent within an organization for completing the survey;
- strategies for obtaining a good response rate; and
- a need to move away from the questionnaire format used in the 1996–1997 survey and to develop strategies for "screening in" respondents through a redesign of screening questions.

[2]The statistical efficiency of an estimate from a sample survey refers to the quality of the estimate (such as the size of the variance or mean squared error) for a given cost (or sample size).

This summary is limited to the views expressed either during the activities undertaken in planning the workshop or at the workshop itself. Therefore, all views expressed are those of the workshop presenters and other workshop participants.

2

A Profile of the Nonprofit Sector in the United States

Examining the nature of the nonprofit universe is a natural first step in determining how to proceed with the design of a survey intended to capture the research and development (R&D) activities of this sector. Presenters in this opening session of the workshop shared that much of the existing literature and data sources, including the National Science Foundation (NSF)'s *National Patterns of R&D Resources* (National Science Foundation, n.d.-a), have hidden or distorted the true size and complexity of the sector. Despite these challenges, this session's presenters have developed a picture of the sector through in-depth research that shows the significant impact that the nonprofit sector has in the United States. Their presentations showed that the U.S. nonprofit sector

- is vast in scope and size with the largest workforce (paid plus volunteer) of any sector in the country;
- has a smaller workforce, as a percentage of total workforce, than the nonprofit sector in many other countries;
- consists of a diverse range of public-serving and member-serving organizations;
- has experienced dynamic growth in revenue and employment over an extended period;
- brings in $1.3 trillion in revenue from government sources, fees and charges, and private giving; and
- receives most revenue from fees and government sources but is working with philanthropic donors who are engaging with the sector in new ways.

Lester Salamon, director of the Center for Civil Society Studies at Johns Hopkins University and chair of the workshop steering committee for the workshop, described the nature, size, and scope of the nonprofit sector. He began by offering his views on why the sector has been historically difficult to assess. According to Salamon, "the nonprofit sector has been the lost continent on the social and economic map of modern society," primarily because existing national and international data sources mask or distort the picture of the nonprofit sector.

CHALLENGES WITH EXISTING DATA SOURCES

According to Salamon, existing statistical lenses through which we view the nonprofit sector obscure or hide key facets of its size and shape, and produce a distorted view of its nature. For example, the Exempt Organization Business Master File (EO BMF)[1] maintained by the Internal Revenue Service (IRS) provides the only full listing of nonprofits in the United States; however, this system has historically had no means for purging organizations. Organizations were continually added to the list without regular purging since its creation in 1914. Although the IRS has recently improved this situation, this listing cannot easily be used for understanding the scope of the sector and is highly inefficient for sampling for research purposes.

The international System of National Accounts (SNA), the set of guidelines through which the United States and all other countries around the world generate their estimates of gross domestic product (GDP), are also problematic from the point of view of creating a valid picture of the nonprofit sector. SNA include a categorization of nonprofit institutions, but according to Salamon, "It's not just partly wrong; it is grossly wrong." This is largely due to the fact that most economically significant nonprofits are buried within the corporate sector in national accounts because the SNA categorize any organization that sells goods or services on the market as a corporation. As a result, organizations, such as universities that charge tuition, are counted among other large for-profit corporations, leaving only those organizations that are funded mostly by charity explicitly identified as nonprofit institutions in a Nonprofit Institutions Serving Households (NPISH) sector. As a result, SNA data on Germany suggest that its nonprofit sector constitutes less than 1 percent of its GDP, despite the fact that Germany has several huge free welfare associations

[1]The EO BMF is an extract prepared monthly by the IRS that includes a cumulative listing of all organizations with an active tax exemption. This file is discussed in more detail in Chapter 4.

delivering much of the daycare, hospital care, nursing care, and other services in the country.

Within the United States, he said, the masking of the true scale of the nonprofit sector takes several forms. The U.S. Bureau of Economic Analysis (BEA) has long treated nonprofits as part of the household sector, distorting not only the picture of nonprofits, but also the picture of households. For example, household savings rates include the assets held by foundations. Another national data source, the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW), until very recently failed to differentiate between for-profit and nonprofit places of employment, he said, and, therefore obscured the extent to which the nonprofit sector is contributing to the growth of employment. Finally, the IRS Form 990, which provides virtually all of the available financial data about nonprofits, provides a distorted view of the source of nonprofit revenues. Government support provided in the form of contracts or vouchers, including Medicaid and Medicare funds, is counted as program service fees and merged with private fees because they are funneled through the market. The result is that the accounting of how much funding comes from government, relative to philanthropy and fees, appears smaller than it actually is. Salamon's concern is that this distortion can seriously confuse policy makers about the importance of government support and the ability of the nonprofit sector to make up for potential reductions in government spending.

Salamon said the Center for Civil Society Studies is currently engaged in collaborative action to address some of the problems with these data sources. They have worked with the BLS to help disentangle nonprofit data from employment datasets and are also helping to develop statistical tools to be able to better use data from the U.S. and other nations' national accounts. At the international level, Salamon and his team have worked with the United Nations Statistics Division to create a United Nations handbook on nonprofit institutions (United Nations, 2003) to assist countries in pulling nonprofit data from other sectors in their national accounts. BEA has begun to make some changes based on guidance from this handbook, and BLS is exploring ways to publish wage and employment data for the nonprofit sector.[2]

Looking at NSF's *National Patterns of R&D Resources*, Salamon shared his view that the way that NSF has produced this accounting of U.S. R&D has resulted in "defining the nonprofit sector away." In particular, the R&D carried out by nonprofit hospitals and higher education institutions

[2]BLS' QCEW recently published experimental data that separates employment and wages by the profit and nonprofit sectors. The link to this new product is http://www.bls.gov/bdm/nonprofits/nonprofits.htm [February 2015].

is not included in NSF's reporting of "other nonprofit" R&D. Rather, these institutions are merged with data on for-profit and public hospitals and higher education institutions, obscuring their character as nonprofits and minimizing the estimate of nonprofit R&D. He said this is particularly problematic for the measurement of nonprofit R&D because nonprofit universities and hospitals conduct a large proportion of the R&D among nonprofits. Salamon argued that a key goal of redesigning the NSF Nonprofit R&D Survey should be to make what is happening in this sector visible to the wider community.

A PROFILE OF THE NONPROFIT SECTOR

Despite these data problems, Salamon has conducted research to describe the nonprofit sector. His work is published in a book titled *America's Nonprofit Sector: A Primer, Third Edition* (Salamon, 2012). He presented the results of this work organized into five key areas: size and scope of the sector, diversity of the sector, dynamism of the sector, international position of the U.S. nonprofit sector, and revenue picture of the nonprofit sector.

Size and Scope of the Nonprofit Sector

Salamon's work reveals that the nonprofit sector is significant in size both in terms of contribution to economy as well as workforce. Using data gleaned from the EO BMF, approximately 2 million nonprofits in the United States together account for approximately $2 trillion in revenue. The nonprofit sector also accounts for 13.5 million paid workers. As shown in Figure 2-1, when the estimated 4.5 million volunteer workers (presented as full-time equivalents) are added to the 13.5 million paid workers, the nonprofit sector has the largest workforce in the U.S. economy (of the 18 sectors into which statisticians categorize the workforce), ahead of sectors such as retail and manufacturing. The figure shows that even when ignoring volunteer workers, the nonprofit sector is still the third largest employer in the nation. According to Salamon, the nonprofit sector "is a major actor. It needs to be brought into the picture of R&D as well as into the picture of labor and into the picture of GDP contributions."

Diversity of the Nonprofit Sector

The nonprofit sector is comprised of a highly diverse group of organizations. To help characterize these organizations, Salamon grouped them into two broad categories—public-serving organizations and member-

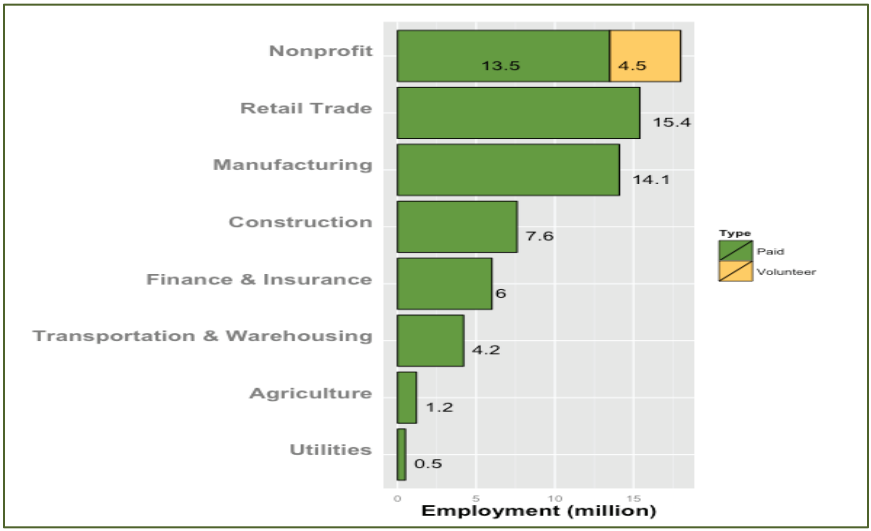

FIGURE 2-1 Employment in the nonprofit sector compared with selected sectors, 2006 (in millions).
SOURCE: Adapted from *America's Nonprofit Sector: A Primer, Third Edition*, published by Foundation Center. Copyright © 2012 Lester M. Salamon. Used by permission.

serving organizations. Public-serving organizations can be thought of as charitable organizations, and they are both tax-exempt and eligible to receive tax-exempt gifts. Member-serving organizations are tax-exempt, but are not eligible for tax-deductible gifts. Because they have a public-serving purpose, Salamon includes 501(c)(4) organizations[3] within the public-serving category, even though they are not eligible to receive tax-exempt contributions. The two types of nonprofit organizations and their subcategories are shown in Box 2-1. Salamon indicated that most research within the nonprofit sector focuses primarily within the public-serving 501(c)(3) and 501(c)(4) organizations. He suggested that NSF will need to make a determination about whether or not to capture the member-serving nonprofits in the nonprofit R&D survey.

The 501(c)(3) organizations, referred to here as public-serving service

[3]501(c)(4) organizations, such as civic leagues, homeowner associations, and volunteer fire companies, as well as organizations that engage in substantial lobbying efforts, are tax-exempt if they meet the requirements but are ineligible to receive tax-exempt gifts.

BOX 2-1
The Nonprofit Sector, Types of Organizations

Public-Serving Organizations	Member-Serving Organizations
Service & Expressive 501(c)(3)	Labor Unions 501(c)(5)
Social Welfare & Action 501(c)(4)	Business Leagues 501(c)(6)
Funding Intermediaries 501(c)(3)	Social & Recreational 501(c)(7) +
Religious Organizations	Fraternal Societies 501(c)(8) +
	Mutual Benefit 501(c)(9) +

SOURCE: Adapted from *America's Nonprofit Sector: A Primer, Third Edition*, published by Foundation Center. Copyright © 2012 Lester M. Salamon. Used by permission.

and expressive organizations, are themselves quite varied. For example, these organizations represent interests ranging from arts, culture, and humanities to the environment. They also include hospitals, schools and daycare centers, and soup kitchens. Using categorizations from the National Taxonomy of Exempt Entities[4] (Urban Institute, n.d.), the human services category of the service and expressive nonprofits, by itself, is broken down into 13 different types. The service and expressive nonprofits "are the action arm of the sector," stated Salamon.

There are three other types of public-serving organizations that deserve some mention, he said. The social welfare and action 501(c)(4) organizations include groups that can lobby substantially on legislation. Funding intermediaries, such as charitable foundations and the United Way, comprise another category of public-serving nonprofit. Because of their role as intermediaries, their work is often difficult to capture accurately because they generally pass funds through to other nonprofits. This can result in double-counting of R&D funds if care is not taken, Salamon warned. These organizations may conduct some research themselves, but much of the money is paid to others, such as nonprofit universities, to do the research. This means that dollars are counted when they come to the intermediaries and the same dollars are counted again when they come into the university. This measurement issue is exacerbated because funds

[4]This taxonomy is discussed in more detail in Chapter 4.

given to a foundation may be counted in one year, but the money may not be all spent or passed to other nonprofits in the same year. Finally, religious congregations are part of the public-serving nonprofit organizations, primarily serving as places of worship and not as public service providers. These entities are automatically tax-exempt and do not have to seek approval from the IRS for this status. Salamon suggested that "if we want to focus on the doers of R&D, we want to focus on the service and expressive organizations—the 501(c)(3)s."

Salamon used Figure 2-2 to show his best estimates of numbers of nonprofit organizations by category and to provide an indication of the relative scale of each within the entire sector. Overall, public-serving organizations account for approximately 1.6 million of the estimated 2 million nonprofits in the United States. The wide variability within the nonprofit sector in terms of purpose, function, and size have important implications for sampling and stratification in order to capture a cross-section of the sector, as discussed in Chapter 4.

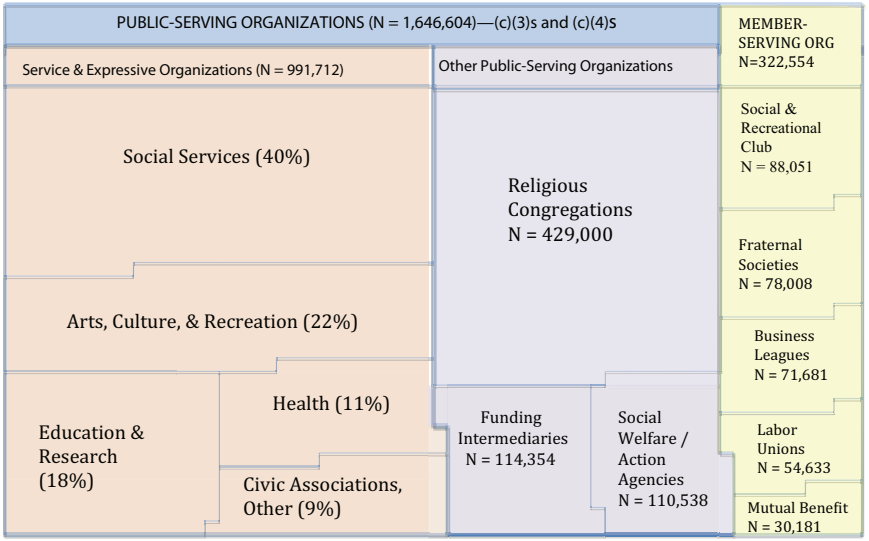

FIGURE 2-2 Profile of U.S. nonprofit organizations, by number of organizations.
SOURCE: Used by permission of Dr. Larry McGill, Foundation Center, who adapted it from data in *America's Nonprofit Sector: A Primer, Third Edition*, published by Foundation Center. Copyright © 2012 Lester M. Salamon.

Dynamism of the Nonprofit Sector

The nonprofit sector sometimes has a reputation for being "laggard and not entrepreneurial," said Salamon, but he noted the data tell a different story. Whereas the U.S. economy has been growing at an average rate of 3 percent per year in real terms, the nonprofit sector has been growing faster at 3.6 percent. Further, nonprofit revenue grew 20 percent faster than overall U.S. GDP during the 1977 to 1996 period and 33 percent faster during the 1997 to 2007 period. This growth pattern was also largely sustained during the recession.

Except for one year in which they were nearly equal, growth in employment in the nonprofit sector (based on BLS data) has exceeded growth in private-sector employment in every year of the past decade, even through the recession. These patterns are shown in Figure 2-3. Salamon said that the nonprofit sector's strong employment growth was helpful to the U.S. economy as for-profit companies experienced losses in employment. The shift in the U.S. economy toward services, the aging of the U.S. population, and the growth of women's participation in the

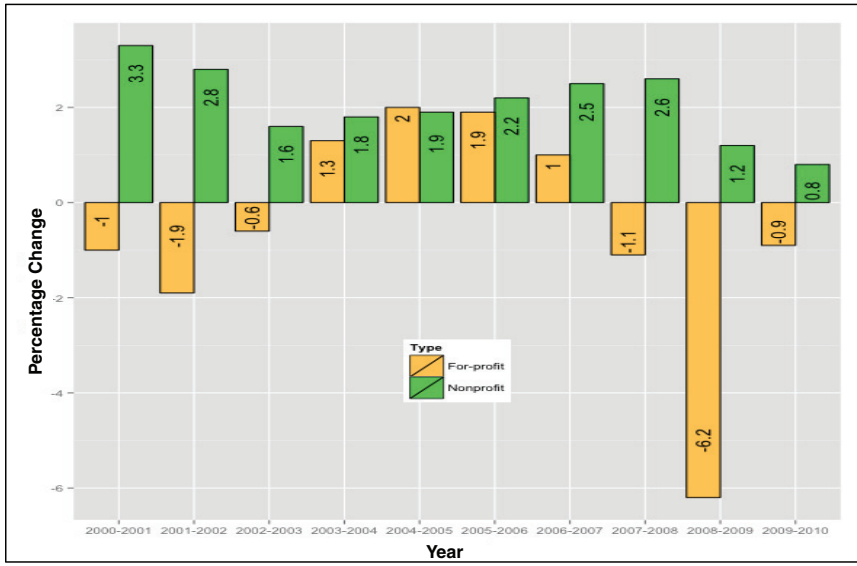

FIGURE 2-3 Annual changes in employment, nonprofit versus for-profit, 2000–2010.
SOURCE: Salamon, Sokolowski, and Geller (2012).

workforce have all contributed to a greater demand for the types of services that nonprofits provide. He added that the for-profit sector in those same areas of service has also experienced growth.

Overall, Salamon's data show that nonprofit revenue grew 53 percent from 1997 to 2007, compared to growth in the private sector of 32 percent during the same period. This represented about $457 billion in growth over the period. Although growth in the health field (53 percent) was important, other fields in the nonprofit sector experienced significant growth as well. Social services revenue grew by 51 percent, and education and research grew by approximately 50 percent. The primary source of growth was in fees (58 percent), while 12 percent came from growth in philanthropy and 30 percent from government sources. In recent years, Salamon pointed out, government support for nonprofits has been decreasing, forcing nonprofits to increase their commercial activities. Social services, in particular, used to be more fully funded by government, but as this support has diminished, these nonprofits are increasingly charging fees for services such as nursing home care or daycare slots.

The International Position of the U.S. Nonprofit Sector

Salamon also presented data to compare the U.S. nonprofit sector to that of other countries around the world. He stated, "I think Americans have taken great pride in asserting that we are unique in the world in having a nonprofit sector. . . . We think of the Europeans somewhat disdainfully as having made a wrong turn somewhere in their history in creating welfare states, whereas we have survived and prospered because we have relied on the nonprofit sector." However, a number of other developed countries' nonprofit sectors exceed the United States in terms of workforce, both paid and volunteer. The Netherlands tops the list with the nonprofit workforce (paid and volunteer) constituting 15.9 percent of the country's economically active population. The United States, by contrast is ninth on the list, behind countries such as Belgium, Canada, Sweden, and the United Kingdom, with approximately 9 to 10 percent of the U.S. workforce in the nonprofit sector.

Salamon indicated that many European countries do not have a "welfare state" but rather have a "welfare partnership." He stated that these nonprofit sectors are quite strong and are also a source of pride. For example, Salamon stated individuals associated with nonprofits in the Netherlands take exception with being characterized as simply "an arm" of the government, which provides 60–70 percent of their funding, and instead hold up their long history and tradition as "private initiative organizations."

Revenue of the Nonprofit Sector

U.S. nonprofit revenue comes from three major sources—government support, private giving, and fees and charges. Government support is comprised of grants, fee-for-service contracts, and reimbursements and vouchers, many of which come from Medicaid and Medicare. Private giving includes individual giving, foundations, and corporate giving, as well as federated funders such as the United Way. Finally, fees and charges are payments for services. These also include membership dues and earnings from investments.

Salamon presented his research on the amount of nonprofit revenue for each category. He reported that private giving from all sources constitutes 10 percent of total revenue. Government sources of revenue are approximately 38 percent of the total. Fees and charges are the biggest source of nonprofit revenue at 52 percent of the total. In dollar terms, as of 2007, foundations provided approximately $32 billion out of a total of $1.3 trillion total, a proportion of the total that is far lower than many in the United States and abroad believe, by Salamon's account. Approximately $500 billion in revenue comes from government sources and $681 billion from fees. Salamon noted that his work involved making adjustments to correct IRS Form 990 reporting, for example, to remove Medicaid and Medicare dollars from the fee category and to put them in the government category.

The proportions of revenue source vary across the sector and by type of organization, as shown in Figure 2-4. Education is heavily dependent on fees, whereas health care receives nearly equal amounts from government and fee sources. The revenue source for social services has shifted over the years. Historically, social services received a greater proportion of revenue from the government, but now more revenue comes from fees than government. Civic and other nonprofits are still primarily funded by private giving.

Conceptualization of R&D in the Nonprofit Sector

According to Salamon, data on the full scale and diversity of the nonprofit sector suggest the need for a more complete and robust treatment of the nonprofit sector in NSF's R&D reports and for a broader conceptualization of R&D than has been suggested in official definitions to date. Many nonprofits are engaged in researching and applying new techniques of intervention in the broad area of human services, improving recovery from addictions, finding new ways to promote economic independence, solving significant health issues, and generally improving life chances. In an increasingly service-oriented economy, Salamon said that this human services R&D deserves as much attention as the traditional technology

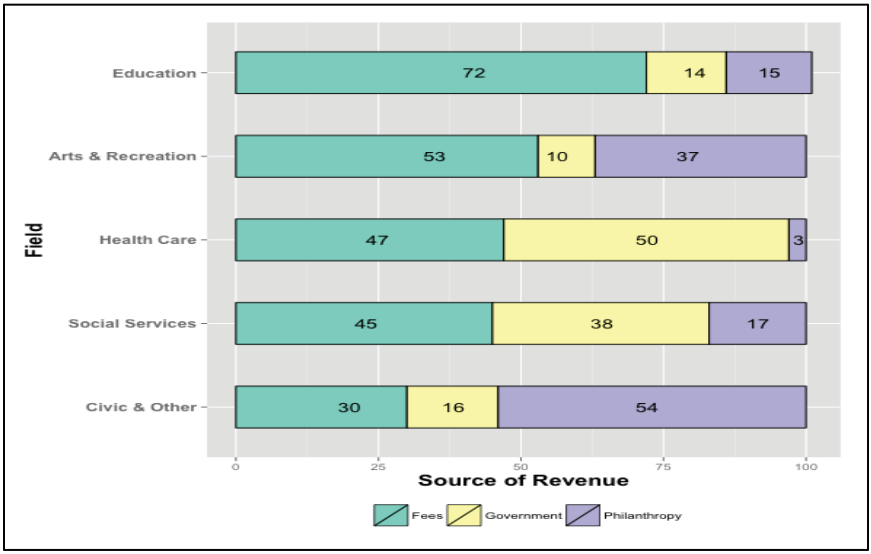

FIGURE 2-4 Nonprofit revenue patterns by field.
SOURCE: Adapted from *America's Nonprofit Sector: A Primer, Third Edition*, published by Foundation Center. Copyright © 2012 Lester M. Salamon. Used by permission.

and hardware R&D. He maintained that the nonprofit sector is a huge generator of human service R&D and deserves to be identified as such.

UNDERSTANDING THE ROLE OF PHILANTHROPIC GIVING IN R&D PERFORMED IN THE NONPROFIT SECTOR

Many believe that private giving, particularly from foundations, constitutes a larger proportion of the revenue in the nonprofit sector than is actually the case, observed Salamon. First, total foundation assets, though important, are relatively small when compared to the assets of other parts of the economy. For example, as of 2007, nonfinancial businesses had a total of $17 trillion in assets, commercial banks had $11 trillion, mutual funds had $7.8 trillion, and foundations had $682 billion. Salamon pointed out that the complexity and fragmented nature of the philanthropic system may limit how much can be financed through that vehicle.

In her presentation, Susan Raymond, executive vice president of

Changing Our World, Inc.,[5] and a member of the workshop steering committee, said she agreed that funding from private philanthropy is significantly less than government or commercial dollars in research and scientific activities. Additionally, she stated that little is known about how funding moves into research activities within nonprofits. This lack of data significantly limits what is known about individual philanthropic giving and its ties to research. Despite this paucity of data, she said, there are some unique aspects to philanthropic support for nonprofits that make it attractive to those who might be interested in funding R&D activities. Flexibility is the key advantage that philanthropic dollars have over traditional sources of revenue. Furthermore, traditionally the philanthropic community has a greater willingness to take risks than other funders, being able to invest in very early stage inquiry. However, Raymond expressed her concern that an increased focus on measurable impact of funding could reduce this risk-taking, adversely affecting the flexibility that private giving affords.

The Landscape of Current Philanthropic Giving

In the second part of this session, Raymond laid out the landscape of current philanthropic giving. Most of this giving comes from individuals, which includes individual bequests. Together individual philanthropic giving constitutes 80 to 85 percent of the money. The remainder of the philanthropic giving comes from two sources, foundations and corporate—both much smaller than the individual giving. Corporate giving is the smallest—only a third of that contributed by foundations. Corporate giving is difficult to track and likely underestimated because corporate commitments now originate not only in company foundations but also in marketing and communications budgets. Those resources are not tracked by traditional giving datasets. Foundations are a third component of the private philanthropic community. The largest portion of increase in the proportion of foundation dollars in recent years is likely a result of the entrance of the Bill & Melinda Gates Foundation and the foundations of several other ultra-high net worth individuals. Overall, Raymond argued, these data show that it is important to understand how and why individuals give, and to learn more about their interest in science or research.

Existing data on foundation funding for R&D has some inconsistencies, Raymond said. Data from the *Foundation Directory* (Foundation Center, 2013) indicate that science and technology foundation giving was approximately $585 million, or about 2 percent of all foundation giving.

[5]Changing Our World, Inc. is a philanthropy consulting group, working with nonprofit clients to strengthen revenue strategies.

However, the Council on Foundations (Council on Foundations, 2013) reports that $1.6 billion is given just in medical research grants alone. Raymond observed that she found it interesting that the Council on Foundations' numbers broke out research funding only for the health sector. She said, "The fact is that even when it comes to foundations, which do have to report and for which we do have reasonable numbers . . . it is very obscure as to how much money we're actually talking about in research." She further added that identifying the actual research activities of foundations would be quite difficult and likely require reviewing every single grant of the major funders as provided on their IRS Form 990s.

The 100 largest foundations have an average grant amount that ranges anywhere from $400,000 to $600,000. This number far exceeds the average grant size of the remaining 1,022 foundations in the Foundation Center sample, which together have average grant sizes ranging between $95,000 and $159,000. However, Raymond noted that a great deal of research comes with a much higher price tag, and hence the costs of research are much higher than the average grant level. Thus, funding such activities may involve philanthropists working together or with nonprofits seeking funding from an array of sources, only one of which might be philanthropic giving.

Overall, however, foundation funding for science and technology activities as a percentage of total foundation funding has decreased between 1998 and 2011. Raymond's work indicates that this decrease is directly related to the recent recession, which prompted a greater focus on services and programs over research. Foundations that had been engaged in more innovation and experimentation were more likely to move away from risk-taking and toward their core missions, she explained. A compounding problem is that the fastest growing sources of philanthropy are donor-advised funds housed within financial houses and other organizations. The sources and areas of interests of these funds are not publicly available.

"The problem is that it is extremely opaque now in the philanthropic sector exactly where the money exists, where it is moving, and how it's moving into research or anything else," Raymond stated. Nevertheless, she said she sees cause for optimism in the passion for giving that she sees in particular areas, such as in associations focused on certain diseases, a sector that recovered more quickly from the recession than other areas.

Although funding from private philanthropy is significantly less than government or commercial dollars in research and scientific activities, Raymond observed that there are some unique aspects to this approach that make it attractive to some nonprofits because of flexibility and the risk-taking nature of philanthropic community.

Changing Philanthropists and Changing Expectations

Over the past 3 to 5 years, Raymond said she has observed tremendous change in the way that high net worth individuals, corporate foundations, and private foundations think about giving. Increasingly, the focus is on investing and not simply on "writing checks." This shift in perspective significantly alters how money moves, what people expect those dollars to do, and how people and institutions in the nonprofit arena relate to each other.

The face of the high net worth individual philanthropist is changing in ways that affect the nature of giving and the expectations that come with it. According to Raymond's accounting, of the top 50 American philanthropists, 11 were under the age of 65, with all of their wealth coming from technology. In 2012, billionaires under the age of 40 made new gifts of $1.1 billion. As recently as 30 years ago, most high net worth individuals under the age of 45 had inherited their wealth; today, 69 percent of those individuals have earned their wealth. Earning this wealth rather than inheriting it and giving at a younger age than in previous generations have changed the expectations that individuals have when they give, according to Raymond.

A recent survey conducted by Changing Our World indicated five themes that characterize the expectations of very high net worth individuals who give, as follows:

1. A majority of high net worth individuals tend to view giving as investing in a long-term gain, rather than as a charitable gift.
2. These individuals are interested in the measurable impact they will have in terms of fixing problems. They want feedback on their giving that includes facts and figures and reporting on key performance indicators that resemble what they receive in their business and investing settings.
3. Individuals who completed this survey also indicated that they wanted to be engaged in the process. They want to bring their skills and expertise to problem solving, not just their money.
4. These individuals are concerned with sustainability of the effort and how the work they support will go on after they stop providing funds to it.
5. Respondents cared about accountability, not only for careful stewardship of dollars given, but also for the organization as a whole.

Raymond observed that greater numbers of donors seem to be sharing these expectations. Even donors at lower levels of giving are now demanding evidence of results.

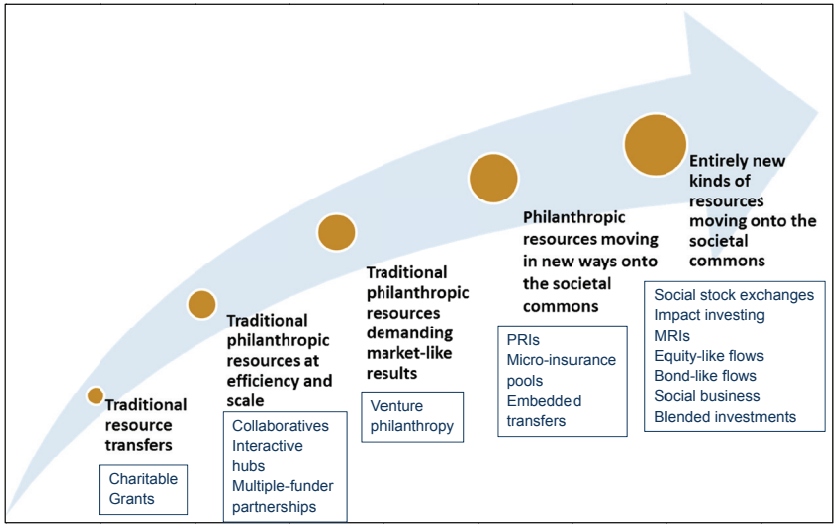

FIGURE 2-5 The arc of innovation in philanthropy.
SOURCE: Raymond (2013).

Complexity of the Philanthropic Market

The philanthropic market is growing in complexity, according to Raymond. Traditional institutions, such as large- and small-staffed foundations and corporate giving, continue to exist but so do entities with an expanded philanthropic focus. They include corporate marketing, high net worth individuals, donor-advised funds, and foundations of associations. Entities that have a social finance focus are also part of the picture and include impact investing groups and specialized funds inside of investment banks, among others. These entities are associated in various ways with innovation in philanthropy as shown in Figure 2-5. In a number of cases, the dollar amounts from these entities are quite large. However, they are hard to identify and survey, and many are new and nontraditional types of organizations. Raymond suggested that using a framework of questions to compare various organizations, their funding, and their work might help identify the involvement of a nonprofit engaged in research.

Raymond noted that although innovation does generate funds that move through these vehicles in interesting ways, it can be problematic to rely on philanthropy for a core of research. Research can have a long timeframe, while the funder engagement wanes over time. In addition, outcomes from research, such as those that result from complexity or fail-

ure, can help the research progress but are not the type of outcomes that engages donors. Finally, research results are difficult to map onto philanthropic dollars. It is rare that a particular research result can be attributed to a particular donor dollar. Despite these challenges, philanthropic giving can involve significant dollars with flexibility. This approach to funding development has the opportunity to increase thinking about innovation and better ways to solve problems, as well as to produce leadership and advocacy.

IMPLICATIONS FOR THE NSF NONPROFIT R&D SURVEY: DISCUSSION AND SUMMARY

Following the presentation of the profile of the size and complexity of the nonprofit sector and its funding sources, workshop participants engaged in discussion regarding the potential implications for the NSF Nonprofit R&D Survey. One discussion topic addressed whether and how NSF plans to focus on particular segments of the nonprofit sector (rather than the entire sector) in its survey. John Gawalt, director of the NSF National Center for Science and Engineering Statistics (NCSES), stated that the sampling decisions have not been made—he and his staff are still gathering information with which to make those decisions. This workshop is part of that process, he said. John Jankowski, program director at NCSES, added that the survey of R&D in higher education will continue, and data from university-affiliated research institutes or hospitals will continue to be collected in that survey. However, he suggested that those institutions could receive multiple codes or be cross-tabbed, so that data could be aggregated differently for different purposes, such as including this research under higher education or as part of the broader nonprofit sector. A similar approach could be used with the Business R&D and Innovation Survey. Salamon strongly encouraged this approach of reporting the nonprofit higher education and hospital data not only as part of hospitals and higher education, but also as part of the nonprofit sector. He also encouraged NSF to broaden the sampling of other types of nonprofits beyond the scientific research laboratories to cover, as well, the broad array of human services R&D taking place elsewhere in the nonprofit sector.

Salamon also suggested that it would be important for NSF to learn about where, and in what form, R&D takes place within the nonprofit sector. R&D may take on different forms than what is typically thought of as R&D. Specifically, nonprofit organizations may be researching and implementing innovative changes in service delivery rather than producing new "widgets," he suggested.

In addition to the source of funding, the administrative control of the

activity is another important dimension for NSF to consider, according to Paul David, Stanford University and a member of the workshop steering committee. For example, hospitals may be administratively controlled by universities rather than business corporations. Another dimension to consider is the character of the activity itself. David cautioned, "Each of these institutions reflects an interest and a view of what is going on beneath the numbers . . . and that their interactions may also be informative about what the nature of the activity is." Choosing a fixed set of boxes or one particular lens through which to view complex organizations is "necessarily going to produce distortions," according to David.

By way of example, David explained that the *Frascati Manual*[6] defines a nonmarket organization as one that is not covering more than 50 percent of its cost with the price of its products or services. He suggested considering producers of digital services that have a high fixed initial cost at start-up. These entities can seem to be nonprofit at the outset and then later in their life cycles no longer meet those criteria as they earn profits. Wojciech Sokolowski, Center for Civil Society Studies at Johns Hopkins University, suggested the definition of nonprofit institutions in national accounts, both in the SNA and National Income and Product Accounts structures, is determined by whether the organization is legally prohibited from distributing its profits to stakeholders rather than by its income structure. He stated, "I think part of the confusion is that if we use the income structure criterion to classify the nonprofit to institutional sectors, that criterion may change from year to year. Basically, it's like a wild goose chase." David clarified that some countries and organizations follow the *Frascati Manual* strictly, while others develop additional criteria to address the anomalies that occur. Overall, he suggested it will be important to try to find a relatively stable "structure of bins into which you can throw things," but added that finding a single perfect system may not prove possible.

The presentations and discussions in this session of the workshop led to a clearer understanding of the nature and complexities of the nonprofit sector and recognition that their R&D activities are both worthwhile and challenging to capture. The presentations provided descriptive data regarding the particular sectors and sources of revenue within the nonprofit domain most involved with R&D. Understanding the scope of nonprofits, their impact on the economy and the pathways through which they are funded provides context for considering the types of activities that constitute R&D in this sector.

[6]The *Frascati Manual* is an internationally recognized methodology for collecting and using R&D statistics developed and published by the OECD. This manual is discussed in more detail in Chapter 4.

3

Understanding R&D within the Nonprofit Sector

This chapter brings together voices from the nonprofit sector to add insight and specifics to the more general portrait of the sector presented in Chapter 2. The great diversity within the sector, and its unique way of thinking about and performing research and development (R&D), became clearer at the workshop through these presentations. The presentations and subsequent discussion among workshop participants identified five key challenges that many participants said the National Science Foundation (NSF) will need to face as it designs the nonprofit R&D survey. These challenges are discussed in detail later in the chapter.

DEFINITION OF RESEARCH AND DEVELOPMENT USED BY NCSES

The National Center for Science and Engineering Statistics (NCSES) of NSF uses a specific definition of research and development in its surveys that produce data for the *National Patterns of R&D Resources*:

> R&D is planned creative work aimed at discovering new knowledge or developing new and significantly improved goods and services. This includes a) activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses (basic research); b) activities aimed at solving a specific problem or meeting a specific commercial objective (applied research); and c) systematic use of research and practical experience to produce new or significantly improved goods, services, or processes (development).

The definition of R&D used by NSF[1] is consistent with the definition provided by the *Frascati Manual 2002*, an internationally recognized methodology for collecting and using R&D statistics.

The steering committee did not give this definition of R&D to the representatives of organizations from the nonprofit sector and then ask whether their activities fit under the definition. Instead the committee approach was less prescriptive, asking the representatives to describe their organizations, the activities that they were engaged in that might be considered R&D, and the language they used to describe these activities.

VOICES FROM THE NONPROFIT SECTOR

Leaders from six different nonprofits—the American Cancer Society (ACS), Lutheran Social Service of Minnesota, LeadingAge, Hillside Family of Agencies, Prince William Regional Beekeepers Association, and Mote Marine Laboratory—presented views of R&D at their organizations. These six exemplars covered the range of organizational sizes, focuses, and structures seen among the diverse nonprofit sector. Susan Raymond began by describing the session's purpose to explore the kinds of activities that constitute R&D in the nonprofit sector and the language used within the sector to describe these activities. The presenters described the types of R&D activities within their organizations, and how these activities are organized, funded, and accounted for. The presenters also described how their organizations think about research, what language they use to describe it, and whether they would be able to answer questions about the resources and staff time allocated to that research. Finally, the presenters offered suggestions for ways to word and improve the survey.

American Cancer Society

ACS is a large nonprofit organization, headquartered in Atlanta, Georgia. Regional and local offices support 11 different divisions. Daniel Heist, volunteer and board member of ACS, along with Catherine Mickle, chief financial officer, presented information about ACS. Heist began his presentation with the ACS mission statement:

> As a nationwide, voluntary community health organization, the American Cancer Society is dedicated to eliminating cancer as a major public

[1]The definitional text provided to respondents on the 1996–1997 NSF Nonprofit R&D Survey is discussed in more detail in Chapter 5 and provided in Box 5-1.

> health problem by preventing cancer, saving lives, and diminishing suffering from cancer through research, education, advocacy, and service.[2]

In Heist's view, the mission statement is particularly important from a fiduciary perspective because it guides their work. By focusing on this mission, the board and staff of ACS have worked together to identify and approve seven priority areas: lung cancer and tobacco control; nutrition and physical activity; colorectal cancer; breast cancer; cancer treatment and patient care; access to care–public policy; and global health. ACS ensures research dollars are directly tied to these priority areas in order to drive the greatest impact.

ACS conducts both an intramural and extramural research program, but research itself is not a priority area; rather, it is a functional area. Catherine Mickle described it as "a tool to drive us to the desired outcomes in these particular areas." However, she also shared that the topic of whether research should be a focus area rather than a means to an end has been debated many times over the years by the ACS board. Its extramural research program (greater than $100 million) funds research housed at universities, hospitals, and other similar facilities. Mickle said ACS additionally engages in activities that could be categorized as research in its "cancer control efforts." The main focus of this presentation, ACS' intramural research program, fits well within the NSF definition of research, she stated.

The ACS intramural research program itself is guided by a set of articulated priorities linked to the overall mission of the organization (stated by Heist above). The research efforts are targeted toward areas where they believe they will have the greatest impact, such as contributing to the science about common cancers and known and emerging risk factors. Some research targets policy, community, and behavioral interventions, where known causes of cancer, such as smoking, exist. ACS conducts research on access to care and quality of care, as well as the psychosocial and support needs of patients and caregivers. Global tobacco control and the international cancer burden are growing areas of research. Finally, ACS also devotes research efforts toward evaluating the effectiveness of its own policies and programs.

These research priorities are housed within five different intramural research program areas or departments: surveillance and health services; economic and health policy; statistics and evaluation; behavioral; and epidemiology. A management team coordinates these departments. Altogether, ACS spent more than $21 million in 2013 on the intramural

[2]The American Cancer Society mission statement: http://www.cancer.org/aboutus/whoweare/acsmissionstatements [December 2014].

research program, including management costs. Approximately $3 million was directed toward surveillance and health services; $1.5 million each toward economic and health policy, statistics and evaluation, and behavioral research; and $6 million on epidemiology research. One-third, or $7 million, of the total amount was spent on an ACS cancer prevention study project. Overall, 86 highly trained staff work to manage and conduct this intramural research program.

Mickle provided two examples of products that have resulted from ACS intramural research. The first, produced by the ACS surveillance and health services research department, has developed current incidence and mortality rates from various forms of cancer by gender. The accompanying publication, *Cancer Facts and Figures* (American Cancer Society, 2014), is widely used across the health care community, according to Mickle. In addition, the surveillance team reports on actual incidence by state and develops projections of future incidence and mortality.

A second example shows cancer deaths averted through known interventions by gender, as shown in Figure 3-1. The graph shows a compari-

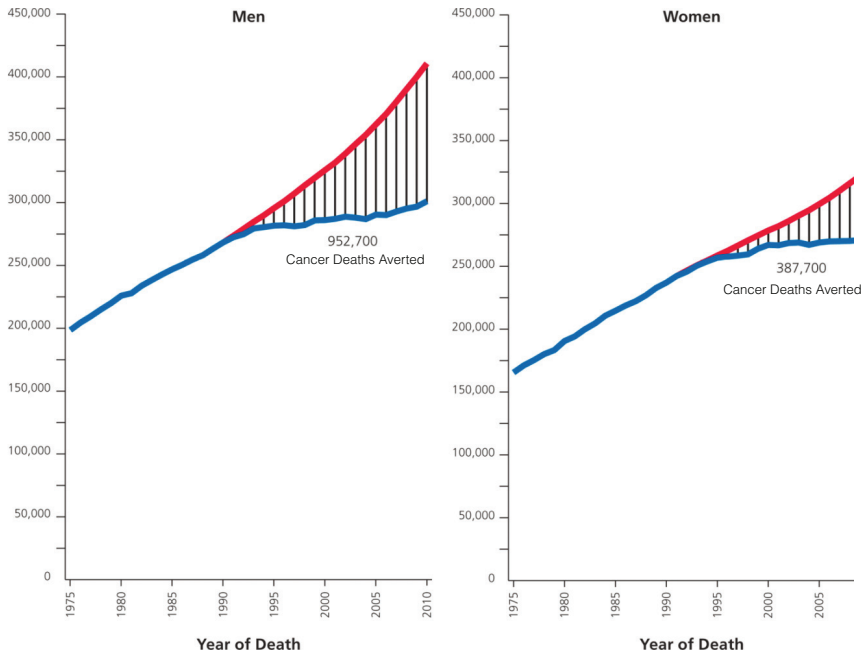

FIGURE 3-1 Total number of cancer deaths averted by declines in cancer death rates from 1991 to 2010 in men and from 1992 to 2010 in women.
SOURCE: Mickle and Heist (2014).

son between actual deaths from cancer and projections of the number of deaths that would have occurred if the cancer community had not intervened with proven ways to prevent cancer. The graph, prepared jointly by the epidemiology and surveillance teams, is "an important example to show how we're using our intramural research efforts to coordinate and drive change, and perhaps in some circumstances our way of delivering our products and service in support of our mission," she said, adding ACS seeks to increase "most lives saved" in the shortest period of time.

Other examples of ACS' intramural research include work on tobacco tax policy, which includes analysis of trade policies, and tobacco control, as well as nutrition and physical activity and their direct linkages with cancer. The statistics and evaluation department serves as the internal analysis group. They assist with planning, as well as study and survey design. The behavioral research group addresses issues around survivorship, quality of life, health equity, and tobacco cessation.

Half of all of ACS' intramural research staff works in the epidemiology department and focuses on cancer prevention. Heist described four significant areas where ACS research has had an impact. The first of these was the Hammond Horn study, which led to the 1964 Surgeon General report on the impact of tobacco. Next were the longitudinal Cancer Prevention Studies (CPS) 1 and 2, in which volunteers were interviewed about a range of factors and behaviors, and followed over time. CPS 1 was conducted from 1959 to 1972 and helped in showing the harmful effects of secondhand smoke and the ineffectiveness of low-tar nicotine cigarettes. CPS 2, initiated in 1982 and still ongoing, has been useful thus far in identifying a link between obesity and cancer, as well as other nutritional and physical activity factors. Finally, the fourth area is CPS 3, which began in 2006. This study, involving more than 300,000 participants, extends beyond interviews to involve the collection of blood samples. Heist estimates that approximately $37 million has been spent on CPS 3 to date, in part because of the costs of adequately controlling collected specimens, and stated that it could cost $125 million or more over the life of the project. Despite these costs, however, Heist stated that ACS feels that this investment is worthwhile for its potential impact. In Heist's words, "saving lives is what drives our program and what we're doing."

Lutheran Social Service of Minnesota

Lutheran Social Service of Minnesota (LSSM) is a nonprofit organization with more than 2,300 employees who provide a broad array of community services across their state. Jodi Harpstead, chief executive officer of LSSM, described their work and how they approach and use research. According to Harpstead, LSSM is one of the oldest and largest

social service providers in the state of Minnesota. Serving 1 of every 65 Minnesotans, LSSM operates 23 different lines of service in every county. The mission statement for LSSM is

> Lutheran Social Service of Minnesota expresses the love of Christ for all people through service that inspires hope, changes lives, and builds community.[3]

The organization is also part of a parent organization, Lutheran Services in America (LSA), which is comprised of more than 300 organizations across all 50 states and the Caribbean. Altogether, LSA accounts for $21 billion in human services across the country and serves 1 in every 50 Americans. State-level organizations within the LSA umbrella vary in size, primary funding source, and breadth of services offered. However, most of the services that LSA offers target older adults and people with disabilities who will need support in their communities for the rest of their lives. Such services address ongoing needs and generally not problems that can be "definitely solved," and thus are often of less interest to, and attract less funding from, social philanthropists, she said.

LSSM receives 84 percent of its revenue from government sources; philanthropy accounts for 9 percent, with the remainder coming from client fees. LSSM takes pride in being a careful steward of its resources, and, according to a study conducted 10 years ago, has a reputation for being trustworthy, Harpstead said. Despite this reputation, Harpstead stated that she is experiencing pressures to demonstrate through research the results of her organization's activities. One barrier to conducting this research, however, is the need for resources to implement it. As CEO, she must consider how to allocate resources in ways that will help both with fulfilling their mission and attracting more resources. For LSSM, reputation and the "politics of social policy" have had a much greater effect on revenue than have the results from research regarding program effectiveness.

Harpstead also shared that measuring the impact of the organization has inherent challenges. In her words, "How do you measure racism? How do we account for the shift of the global economy and factory jobs from Minnesota to China while trying to prove the value of our efforts to provide employment and housing services? How do you measure the effectiveness of our financial counselors when there is a multi-billion dollar for-profit industry devoting itself to convincing people to take out easy payday loans to support their families?" Nevertheless, LSSM con-

[3]The Lutheran Social Service of Minnesota's mission statement: http://www.lssmn.org/About-Us/ [December 2014].

ducts quarterly research to measure client outcomes and key performance indicators.

In addition to the internal research used in evaluating the services provided, LSSM makes use of other research sources, such as research conducted by the University of Minnesota and a local foundation that conducts social services research. In addition, LSA convenes its member organizations annually to network and discuss best practices. Furthermore, LSSM is a member of other national groups and associations that also share important information and research results. The accreditation process involved in maintaining membership in one or more of these groups also serves as a way that LSSM studies and documents its own work. LSSM also makes use of national-level data from organizations, such as the Corporation for National and Community Service, Lutheran Immigration and Refugee Services, and National Adoption Association. Harpstead stated, "I hope this does not leave the impression that because we are not funding millions of dollars of research inside and outside our organization that our work is not informed by research. There is a lot of third-party work . . . and other ways for us to get a hold of good research information that informs our work design and program implementation."

LSSM recently contracted an outside firm to conduct literature reviews, interviews, and analyze state-level data to document how "life is currently" for people with disabilities and then to design how it ought to be. This work was represented in a graphic used by the state to plan for people with disabilities. Similar work has focused on older adults, as well as homeless youth. LSSM also works as part of a coalition to help transform how people with disabilities live in Minnesota. For example, they are working to help people move from group homes into their own apartments, and out of sheltered workshops and into paid employment with good wages and benefits. Harpstead commented, "I emphasize this piece a lot because it may not be what you in the room might have thought of as research or even think of now as research, but it has prompted an amazing social change across the State of Minnesota that is really affecting the lives of how people live and work in the state. It was started with a whole lot of research and now we are transforming our services as a result."

Harpstead shared other ways that research occurs at and for LSSM. LSSM participates in a number of pilot studies, such as helping caregiving spouses use iPads to document isolation and depression. An individual doing a fellowship with LSSM completed a study of accountable care organizations (ACOs) across six states. LSSM plans to measure health care metrics as they create an ACO in Minnesota with multiple disability service providers. Other research activities include data mining of information collected through call centers, peer quality assessments of group

homes, and certain mental health counseling activities. These data are primarily used for program evaluation.

Although LSSM gathers, conducts, and uses research in a variety of ways, Harpstead stated the nonprofit does not have a research department or any line in the general ledger for R&D. Instead, senior directors at LSSM are expected to carry out and/or find the research results they need from other sources in order to ensure continued best practices. Harpstead noted revenue directed toward R&D could be modeled or estimated, and she said LSSM likely devotes 0.5 percent of its revenue to research.

The language that LSSM would use to describe its research efforts includes data-driven design, data mining, and program evaluation. As she said, "We have never called it R&D until we were invited to this conference." Overall, Harpstead stated that her organization is considering how it could do more and "make a difference in our ability to fulfill our mission and improve services for people in Minnesota."

LeadingAge

Robyn Stone, senior vice president for research at LeadingAge and executive director of the LeadingAge Center for Applied Research (CFAR), presented her views on R&D at LeadingAge. LeadingAge, formerly called the American Association of Homes and Services for the Aging, changed its name several years ago to reflect its expanded mission: The mission of LeadingAge is to expand the world of possibilities for aging.[4]

According to Stone, the organization represents an array of services among 6,000 members, including nursing homes, assisted living, adult day home, community-based services, and many low-income senior housing providers. CFAR "brings a breadth of knowledge and experience to a wide variety of research areas. The center has earned a national reputation for its ability to translate research findings into real-world policies and practices that improve the lives of older Americans and their caregivers." (LeadingAge, n.d.)

Stone noted the emphasis on applied research as evident in the mission statement was something she enacted in her role as executive director of CFAR when she came to LeadingAge 15 years ago. The prior LeadingAge executive president valued the personal stories of their members and did not share an interest in data and research, but Stone stated that "evidence-based data is what helps us to move forward in terms of development and best practice . . . CFAR is really about bridging the worlds of policy, practice and research." She added her experience as a trained researcher

[4]The mission statement for LeadingAge: http://www.leadingage.org/About_LeadingAge.aspx [December 2014].

involved in governmental intramural research and research in the private sector informed her commitment to seeing and initiating the opportunity for LeadingAge to serve as a natural laboratory.

Research is conducted at LeadingAge in CFAR, but clinical, applied, and internal research also happen at the provider-level among many members. Some member providers also partner with academic health centers, she noted, which raises the possibility for double-counting these activities through NSF's survey of R&D in higher education.

LeadingAge has 7 to 15 staff members and a $5 million budget. The budget also includes an additional internal source of funds of $500,000. LeadingAge pays salaries for the positions of the executive director, administrative staff, and a portion of some researchers' time. Members have also contributed approximately $500,000 toward an innovation fund. Most of LeadingAge's funding comes from federal contracts and grants with multiple agencies and various private foundations, sources that change over time.

Stone highlighted one project to illustrate what R&D looks like at LeadingAge. Over the past 10 years, LeadingAge has worked to develop a new model of housing and services for low-income seniors. The origin of the project came from a desire among members to measure the impact of whether an enriched service portfolio was making a difference in terms of resident outcomes. They also wanted to know whether they were saving Medicaid and Medicare dollars, and/or whether they were stopping evictions to better maintain properties. The research began with case studies and a literature review. Later, working with the U.S. Department of Health and Human Services (DHHS), they convened expert panels and workshops around the country to identify key issues. Ultimately, LeadingAge partnered with a research-contracting firm to create a database of information regarding low-income seniors, matching administrative data from the DHHS with Medicare and Medicaid claims from DHHS' Centers for Medicare & Medicaid Services (CMS) for 12 jurisdictions around the country. These data enable LeadingAge to report and compare this population to others living in the community.

The data have indicated that this subpopulation—living in low-income, publicly subsidized senior housing—is sicker and has higher needs than many other segments of the population, including peers living in the surrounding communities. This knowledge has led to the focus on housing services, keeping people in their communities as long as possible, preventing evictions, avoiding movement into nursing homes, and avoiding costly hospital admissions—ultimately producing Medicare and Medicaid savings. LeadingAge used the research findings to develop a model of housing that centers on a service coordinator along with a wellness nurse.

This model is being tested in 80 housing properties across Vermont as part of a statewide Medicare coordinated care payment demonstration project. Each housing provider receives a per-person-per-month Medicare payment for service coordination, representing the first time that Medicare has paid for services in housing. LeadingAge and RTI International have partnered to conduct an evaluation of this service coordinator model. Initial results after 1 year of the program show reductions in the rate of growth in Medicare costs when compared with a control group with similar demographic characteristics.

Stone indicated that they also have ongoing development projects, including a learning collaborative of 12 housing providers around the United States, that partner with health care and social services of various sizes and types. Over the past 18 months, this group has engaged in data sharing, problem sharing and solving, and development of resident assessment tools for housing providers to use. In addition, LeadingAge helped this collaborative implement three new evidence-based practices focused on reducing depression, managing chronic disease self-care, and preventing falls.

Another initiative, recently funded by AARP, involves the creation of a toolkit to help housing providers partner with health care providers in their local communities to jointly achieve better health care outcomes and cost savings to the Medicare and Medicaid programs. LeadingAge's Center for Housing Services conducts both qualitative and quantitative research. It publishes its work but also ensures that findings are accessible through trade publications, its website, and conference presentations. Other initiatives focus on CQI (continuous quality improvement) in nursing homes, the future of the geriatric workforce, and the exploration of a model of social investment bonds to support housing and services. For the latter project, LeadingAge is also working to initiate a research evaluation component to determine return on investment and any cost savings to Medicare and Medicaid.

According to Stone, "One of the things that nonprofits can do is to help solve some of these problems. While our association and our members are concerned about the bottom line, we are not as constrained by the profit motive as, for example, are our peers at the American Health Care Association, which represents primarily for-profit nursing homes. We are actually able to stretch out a little bit more and look at more of the innovation out there. I think that is what nonprofits can bring." However, she noted that nonprofits often lack the research expertise, as well as adequate funding to conduct rigorous research, which can be quite costly to do. Adding to this problem is diminishing federal funds for this work, she said, and a desire by foundations to fund programs rather than research.

Stone ended by noting this lack of appetite for research funding means that research work is often couched in program development work.

Prince William Regional Beekeepers Association

Karla Eisen discussed the nature of R&D for the Prince William Regional Beekeepers Association (PWRBA), and how its R&D activities changed their culture and practices. PWRBA has 125 volunteer members and is a member of a state beekeeping association, composed of regional associations. The association strives to

- provide a forum for the exchange of ideas and views of mutual interest to beekeepers;
- provide education on the practical aspects of beekeeping and encourage the use of better and more productive methods in the apiary;
- foster cooperation between members of the association;
- promote understanding and cooperation between the association and the community with regard to beekeeping; and
- promote the use of hive and honey products.[5]

PWRBA operates with a budget of less than $5,000, with the exception of two grants. The grants funded research and the subsequent implementation of beekeeping practices that had become, said Eisen, "a lost art." According to Eisen, over the past 25 years, beekeeping has become dependent on a commercial and agricultural model that produces boxes of packaged bees with which to start new colonies. These bees, including a queen bee, are packaged in the southern United States and shipped north, where the weather may be excessively cold, snowy, or rainy. The ability to develop new colonies has always been integral to the beekeeping process, but has become even more important in recent years with the spread of Colony Collapse Disorder. Eisen described how PWRBA has worked to change the existing model of starting new colonies to something that is more sustainable. The members learned to develop nucleus colonies—miniature hives that they made themselves. The organization also learned how to raise queen bees to distribute to its members. It did research to determine whether this approach was more effective than importing packaged bees from warmer climates.

This project originated at a state regional meeting when concerns were raised about bees dying in large numbers, coupled with the risks

[5]Prince William Regional Beekeepers Association's website: http://pwrbeekeepers.com/ [December 2014].

associated with importing Africanized bees. Research showed that large proportions of the bees coming to the Northern Virginia area were from Africanized bee areas. According to Eisen, "We had a vision. We wanted to develop a locally available and sustainable source of bees. We wanted to learn to make our own bees. We wanted to do education, training, and mentoring. We wanted to promote what is called Integrated Pest Management. We wanted to do outreach and education to the community. And most importantly, we wanted to just change the way we conducted business. We wanted to reduce our dependence on importing these packaged bees."

In 2009, PWRBA applied successfully for a $15,000 Sustainable Agricultural Research and Education (SARE) grant[6] from the U.S. Department of Agriculture (USDA) to conduct research on developing nucleus colonies. The SARE Grant Program targets farmers and producers, and requires that grant recipients conduct research, followed by outreach and education to the community. The research involves developing a hypothesis, and collecting, analyzing, and presenting the data. SARE itself also supports dissemination and outreach through its online database of projects.

In 2012, PWRBA applied for a second grant, this one through the USDA Specialty Crop Block Grant Program. This program is designed to enhance the competitiveness of specialty crops. PWRBA was awarded a grant to study and learn queen bee rearing. In Eisen's view, "Those are development funds. They ask you for performance measures. You have to speak that language. It is not research, but clearly provides funds for development activities. These grants do not go to individual farmers, but only to associations."

These projects targeted production of a product, locally raised nucleus hives or "nucs," to be distributed to the students that PWRBA teaches each year as well as existing beekeepers in the region. In doing so, Eisen and her colleagues focused their efforts toward meeting the distribution and training goal, with the secondary goal of finding out if their methods would produce stronger bees. PWRBA proceeded in several steps:

- Beginning with a year-long pilot project to plan and educate, prior to implementation.
- Conducting an experiment comparing colonies started from packaged bees to those started from nucs.

[6]The Sustainable Agricultural Research and Education (SARE) Program within the U.S. Department of Agriculture awards grants with the mission "to advance—to the whole of American agriculture—innovations that improve profitability, stewardship and quality of life by investing in groundbreaking research and education."

- Raising queens and tracking their performance to identify the best breeders.
- Conducting education and outreach programs.

"Experiment" was the word chosen to communicate about the research to the individuals who would be raising and tracking their colonies. Organizing the experiment into three different groups further facilitated comparing different sources of queen bees.

Data collection involved capturing information about the weather, flower-bloom, indicators of hive health and productivity, and interventions by the beekeepers. The beekeepers reported their data monthly over a year via Survey Monkey. The individual beekeepers also gave summaries and recommendations based on their data and experiences. At the same time, PWRBA conducted numerous trainings and educational programs.

Eisen offered her perspective on the nature of this work in the following manner: "I was always very clear to call it citizen science, and I still call it citizen science. But even in our little baby research project, we did collect data. We did have descriptive statistics. This grant was $15,000. That was like a million dollars to our little beekeeping association. It was a lot of money to spend. I do think that is an issue for small nonprofits." She added she was aware that the research lacked full scientific rigor, and involved many variables and experience levels. For example, weather and location varied among the colonies. Despite these limitations, however, their results are being replicated by other beekeeping organizations doing similar work in many areas of the country.

Results from their work indicated that the colonies started from nucs had a much better survival rate, and following these colonies for an additional year revealed an even larger difference favoring nucs over packaged bees (see Table 3-1). This work also led to increased knowledge and an ability to increase the production of colonies. In 1 year, PWRBA was able to quadruple the number of nucs it produced. Within 3 years they were able to produce enough nucs to support the entire student class and many existing beekeepers as well as to produce queen bees.

This project "has completely changed the way that we operate," stated Eisen. PWRBA has eliminated the use of packaged bees completely and provide locally produced mini-hives to beekeepers instead. It has helped others learn to produce their own queens. It has continued their efforts in education and outreach, seeking additional funding for those efforts. The Southern SARE mobile display now highlights beekeeping with nucleus colonies as part of sustainable agriculture. Eisen herself shared her knowledge of raising queens with the White House beekeeper.

Eisen concluded her remarks by sharing her views on whether the

TABLE 3-1 One- and Two-Year Hive Survival, by Source of Starter Hive

	Package-Started Hives Number Started = 22		Nuc-Started Hives Number Started = 23	
	Number Survived Sept. 2010	Number Survived Oct. 2011	Number Survived Sept. 2010	Number Survived Oct. 2011
A	8	4	7	6
B	4	2	7	6
C	3	0	5	2
Total	15	6	19	14
Survival Rate	68%	40%	83%	74%

SOURCE: Eisen (2014).

term "research and development" would resonate with her organization. "I would have to give a resounding no to that, "she said. As someone who is involved with and works with others in agriculture, they identify with the terms "testing" or "experimenting" much more than with the word "research." Eisen believes that her organization did development work; however, she observed, even in the crop specialty block grant program, the words "development" and "research" are not used. After polling 30 members of her organization on what words they would use to describe this work, only two individuals, the team leaders, responded. They offered that they collected data, had a hypothesis, had results, published a report, created new knowledge, and enabled product delivery. Eisen concluded that there are many other organizations like her own within the agriculture community.

Hillside Family of Agencies

Maria Cristalli, chief strategy and quality officer for Hillside Family of Agencies (HFA), offered her perspective on R&D. She began with HFA's mission statement:

> Hillside Family of Agencies provides individualized health, education, and human services in partnership with children, youth, adults, and their families through an integrated system of care.[7]

[7]The mission statement for Hillside Family of Agencies: http://www.hillside.com/Generic.aspx?id=142 [December 2014].

HFA is known for providing services to children and families over a 177-year history, but Cristalli said significant changes, such as the Affordable Care Act, affect how the organization now operates. Medicaid dollars from New York State constitute approximately 40 percent of the current budget, and by January 2016, HFA and other traditional providers of children's behavioral health services will be embracing epic change as New York State Department of Health intends to have all children's Medicaid services under managed care. These shifts led HFA's executive team to extend the organization's services to adults through an integrated system of care.

HFA operates primarily in central and western New York and Prince George's County, Maryland, offering a wide array of services. Of HFA's total budget of $140 million, Cristalli estimated that approximately 1 percent is spent on "what you would characterize as research activities." HFA has approximately 2,300 staff across various service locations.

HFA's strategic intent statement, adopted in 2007, states: "Hillside Family of Agencies, in partnership with youth, families, and communities, will be the leader in translating research into effective practice solutions that create value (outcomes/cost.)" When this strategic intent was first launched, staff initially expressed concern that HFA would shift from being service-oriented to being research-oriented, moving away from a focus on helping people. This was not the case, however, according to Cristalli. Instead, she said HFA "wants to be specific and intentional about the services we are providing. The application of the most effective treatments and the measurement of outcomes to inform practice is our organizational goal. It is important that we understand outcomes relative to cost." The outcomes of interest to HFA focused on enduring changes in the lives of the people it serves.

Cristalli then described the process that HFA developed to achieve the strategic intent. The process begins with deriving value from the data collected, while targeting very clearly defined outcomes. It identified benchmarking as an important process, using data combined with anecdotal stories to determine "best in class" service provision. Next, for certain programs, it planned to use a higher level of data gathered through research, program evaluation, and predictive analytics.

A key step in enacting this vision was bringing research expertise and leadership into the organization. Hiring a research director proved challenging, and HFA learned that few similar nonprofit organizations had internal research departments. Further, they were unsuccessful in identifying someone who could understand and communicate effectively with researchers and practitioners. Ultimately, Cristalli explained, HFA formalized a contract in 2009 with a department within the School of Social Work at the University of Buffalo to "combine their two strengths—

core competencies of practice at Hillside and research at this academic research institution—to create a strategically focused research function at Hillside."

Since the inception of the partnership, HFA has invested $800,000 in that partnership and continues to renew the arrangement. The model for this research partnership involves staff, parents, and young people, who help to determine projects and research questions. This model of research—the Hillside-UB (HUB) model—was documented, including a journal article published in 2012 in *Research on Social Work Practice* (Dulmus and Cristalli, 2012).

Through the HUB model, researchers examined HFA's organization and management to determine readiness for change and research. This helped HFA determine a baseline of organizational climate and readiness to implement evidence-based practices across 120 different services. Other capacity-building steps included developing a field unit that included interns as research assistants to doctoral students conducting research, and developing an internal, federally registered Institutional Review Board (IRB) to review projects. The HFA IRB complements the IRB at the University of Buffalo and focuses on benefits and risks for the young people served by HFA. Cristalli shared that as HFA has expanded research partnerships with other institutions, they have come to see themselves as "in a transition from being only a service provider to also being a knowledge purveyor. We are now sharing and disseminating what we learn in the literature through invited book chapters and peer-reviewed publications."

Cristalli illustrated HFA's mix of service provision and research by describing the Hillside Work-Scholarship Connection (HW-SC) in Prince George's County, Maryland, and upstate New York. The program, funded by a variety of foundations and public-private partnerships, targets young people in school districts that are at risk of not graduating from high school. The services provided to these young people include academic support, job-readiness training, family engagement, year-round enrichment activities, postsecondary support, and youth advocate mentoring. Research has indicated that participation in the program, along with part-time employment, improves the graduation rate from 50 percent (the rate of comparable students in the school district) to 90 percent for HW-SC students employed by an employment partner. According to Cristalli, this equates to an $11 return to the community and investors for every $1 invested. This program has also brought acclaim to HFA. HFA was recently named to the S&I 100[8] list of organizations by the Social

[8]The S&I 100 is an index of top nonprofits creating social impact, created by the Social Impact Exchange (http://www.socialimpactexchange.org/exchange/si-100 [December 2014]).

Impact Exchange for use of rigorous evaluation and research, and ability to replicate results.

A key element of the HW-SC is the use of predictive analytics to identify the target population. They used factors identified through previous research (such as low socioeconomic status, low standardized tests scores, failing core courses, suspensions from school, poor attendance, and being over age for their grade) to identify students at risk of not graduating from high school. Research first addressed whether these particular risk factors were in fact meaningful in the districts in which the program would be implemented, and then determined whether they could be used effectively to identify students who would most benefit from the HW-SC service. "We are now looking at full population data to make better decisions about selection of the young people in partnership with the school districts where we are serving. There is just so much of a need and we want to be sure that we target the need appropriately," Cristalli stated.

Some of the research at HFA has included quasi-experimental design. To ensure best practices, HFA has hired outside evaluators to evaluate the HW-SC several times over the past 10 years. However, the data analytics work to identify the target population of the program has been done internally by HFA's business intelligence staff, who continue to partner with a researcher at the University of Buffalo. HFA employs five business intelligence staffers and a full-time PhD-level research coordinator. Prior to using this data-driven process to target participants, she said, HFA merely recruited interested young people and checked their qualifications against the list of risk factors. Now, HFA uses district-level data to select participants.

Data indicate that the identified risk factors do in fact predict the likelihood of graduating from high school. Using these data, HFA has been able to develop a model of probability of graduating with 75 percent accuracy, Cristalli explained. The model showed that the HW-SC Program would be most effective for students with between a 15 and 79 percent likelihood of graduating, according to Cristalli. Students above that threshold were predicted not to need the program, and students below that threshold were predicted to need more intensive services than what the program would offer. This data-driven process has changed the practices of HW-SC, Cristalli shared. It uses full population data and works in partnership with schools to recruit students to increase the impact of its program.

Cristalli closed by reflecting on how HFA would respond to questions about R&D. "When you say research and development . . . we think more about program development. It is more about product or service development. We do not use those terms [research and development] together,"

she said. Cristalli added that across the organization, staff are increasing their comfort with and the use of data to make decisions.

Mote Marine Laboratory

Michael Crosby, president and CEO of Mote Marine Laboratory in Florida, presented his perspective on R&D in the nonprofit sector. He began by sharing the history of the organization. According to Crosby, Dr. Genie Clark founded Mote 60 years ago because of her passion for shark research. Partnerships were developed with local shark fishermen. Philanthropy came first from the Vanderbilt Family and later from William Mote.

Mote Marine Laboratory's main campus is located in Sarasota, Florida, with seven campuses around Florida and the Florida Keys. It is a diverse organization but is "first and foremost a research institution, a comprehensive research institution," said Crosby. He added that Mote also conducts significant amounts of public education and outreach. Half of the 200 staff is focused on science, approximately 33 of whom hold doctorates. A cadre of volunteers also support the research efforts. The research began with shark research, but now extends to 24 different research programs, such as coral reef ecology and microbiology, ocean acidification, sea turtle conservation and research, and phytoplankton ecology. The work extends around the world in six continents.

Mote is guided by a strategic plan and a vision statement. The vision statement is as follows:

> Mote Marine Laboratory will expand our leadership in nationally and internationally respected research programs that are relevant to conservation and sustainable use of marine biodiversity, healthy habitats and natural resources. Mote research programs will positively impact a diversity of public policy challenges through strong linkages to public outreach and education.[9]

In addition to this vision for 2020, Mote's strategic plan focuses on four main priorities centered around world-class research, translation and transfer of research and technology, and public service. Mote scientists have produced about 3,500 peer-reviewed publications. In addition to this focus on disseminating scientific findings to the research community, Mote also maintains a commitment to translating and transferring research knowledge through an aquarium, which serves as an informal science education center. More than 350,000 people visit the center each

[9]The strategic vision for Mote Marine Laboratory: http://mote.org/about-us/mission-vision [December 2014].

year, including 29,000 precollegiate students who visit through structured programs.

Crosby emphasized that Mote is a private nonprofit organization that does not operate as a part of any governmental agency or university, although it has many partnerships with such entities. Through these partnerships, it also offers connections for undergraduate and graduate students to be engaged in research with Mote scientists. In the past 5 years, more than 100 graduate students have conducted research for theses or dissertations at Mote, with Mote scientists serving as mentors. Recently, the Florida State Legislature appropriated funds to Mote to provide such research experiences to students from local universities. Furthermore, Mote has developed a postdoctoral program aimed at "recruiting the next generation of scientists," which is funded entirely through philanthropic donations. By 2020, Mote plans to have up to seven of these 2-year fellowships.

Mote has a $20 million annual operating budget, half of which comes from competitive research grants from entities such as the National Institutes of Health, the National Science Foundation, and the U.S. Department of Defense, explained Crosby. The remainder comes from a combination of philanthropy, which includes membership fees, and net positive revenues from the aquarium. Overall, Mote is funded entirely by "soft money," and staff do not have contracts or tenured positions. According to Crosby, that way of operating "makes us very entrepreneurial. Because we are independent, we have research freedom as well, but it comes at a price. The price is we basically eat what we kill if you will. We have to bring the money in or we cannot provide positions there. Philanthropy is a huge piece of what enables Mote to do what it does." Mote maintains very little bureaucracy and prides itself on remaining responsive and nimble. For example, when the BP Deepwater Horizon oil spill occurred in 2010, Mote was one of the first environmental responders, because the president of Mote immediately authorized it.

Crosby noted that Mote's individual proportion of the total R&D budget for "Other nonprofits" in NSF's 2014 Science and Engineering Indicators report, is approximately one-tenth of 1 percent; however, collectively with other large marine research institutions such as the Monterrey Bay Aquarium Research Institute and Woods Hole, these institutions can perform a significant amount of R&D with philanthropy playing an increasing role.

CHALLENGES

The presentations from representatives of the six different nonprofit organizations and the discussions that followed shed light on a number

BOX 3-1
Key Challenges for the Design of the NSF Nonprofit R&D Survey, as Identified Through Workshop Discussions

1. Understanding the diverse and unique nature of R&D in the nonprofit sector.
2. Using the correct language for communication about R&D.
3. Accounting for the interconnections among nonprofits.
4. Identifying the correct respondents.
5. Understanding the financial and labor resources within nonprofits.

of complexities within the nonprofit sector that pose challenges for the design of the NSF Nonprofit R&D Survey, according to Lester Salamon and other participants. They identified five challenge areas, shown in Box 3-1. The remainder of this chapter addresses these challenges in more detail. Chapters 4 and 5 further the discussion by identifying ways, suggested by participants, that NSF could address these challenges in the design of its survey.

Understanding the Diverse and Unique Nature of R&D in the Nonprofit Sector

One of the primary reasons the workshop steering committee set up presentations by individuals from nonprofit organizations was to learn about the types of activities that might constitute R&D in this sector. As their representatives reported, the organizations vary in the extent to which research is a distinct activity versus being embedded within their programmatic activities. Raymond described the important "functional role of research" at many of these organizations, regardless of whether a research department, division, or budget line item exists.

Paul David commented on nonprofit R&D within a broader context. He stated that many economists view R&D "primarily as an indicator of investment in inventive activity, which is in turn an input into a larger stream of processes, which come under the heading of innovation." These innovative processes are key sources of economic growth, and ultimately potential sources for the improvement of human welfare and well-being. David observed that the nonprofit sector is emblematic of the new service sector, an emerging sector of the economy and one that is highly information intensive. As such, its products are not physical, but rather new information services designed to have an impact. Innovations in this sector are placed in a residual category of other products, rather than the

technological, physical, and process innovations that lend themselves to patenting. These issues are growing in importance in an economy increasingly centered around digital products and processes, he noted. In David's view, the present undertaking to produce new baseline measures of R&D in the broader nonprofit sector should be recognized as an important opportunity with valuable long-term "spill-over" benefits of two kinds. It can illuminate the diverse functional roles played by R&D and the modes in which these activities are performed by information-intensive service organizations. Additionally, it can be used to explore and test novel quantitative indicators of aggregate volume, distribution and durability of R&D investments in the growing "new services" sector. The measurement task that NSF is to carry out should be approached with its potential for yielding broader "pilot project" payoffs in mind, said David.

Irwin Feller, professor emeritus of economics at Pennsylvania State University and member of the workshop steering committee, suggested that much of the activities described by the presenters may be included or excluded in the R&D survey depending upon the extent to which NSF is interested in measuring activities around evaluation, applied research, program testing, and data collection. He suggested that data collection in the absence of a hypothesis being tested is not research. Feller stated, "The challenge for NSF, I think, in designing this survey is how tightly they adhere to the existing definition of R&D, or how flexible or accommodating they are in encompassing the multitude of activities that these organizations do." Ron Fecso, a consultant and member of the workshop steering committee, noted that this poses a difficult issue for NSF to consider, but added that in industry, quality control activities are not considered research. Therefore, he argued, to the extent that program evaluation is for the purpose of ensuring the quality of services and conducting market research, it is not necessarily research. He stated that "really clear definitions as to where that line gets drawn may be very important." Stone added excluding program evaluation would result in excluding most nonprofits. Feller indicated his belief that program evaluation should be included because, particularly in social science research, program evaluation constitutes a way to gather data that can be used to test theories.

Stone summarized another issue regarding the nature of R&D, commenting, "I think one of the questions is what you do about translational research. I do not call implementing an evidence-based practice as research, but I do call evaluating the implementation of evidence-based research with good science around it to see whether it worked or did not work as research." Translational research is critical to nonprofits that tend to frame their activities this way, taking what they learn and using it to change practice or policy, she argued. Stone also raised the question about whether using data in feedback loops or conducting market research

would be the type of activities pertinent to the NSF survey of R&D. Finally, she suggested that, from her perspective, the terms "research and development" together constitute a certain type of activity. As she stated, "I think R&D is a specific thing and not research. Development is again something else. R&D is research and development." Several other participants said all research activities should be counted, even those that lacked quality or rigor.

Salamon summarized his views on this topic by stating, "First of all, I was blown away by these presentations because what I think they demonstrated pretty powerfully is that there is something very important happening in the nonprofit world in conducting systematic data-gathering and research. Whether we come up with the right words for it or not, this trend is moving the sector in the direction of evidence-based decision making. And how fully that counts as 'research' in the terms that have been used to define R&D in NSF surveys is worth debating." But Salmon and several others noted the nonprofits are doing important work worth capturing; he urged the group to find new ways to capture these activities. One participant suggested that nonprofits are qualitatively different from many other sectors, and that these qualitative aspects of their activities should be captured and not just quantified. He added that these differences should inform the survey design, noting that in some cases nonprofit institutions spin off technology into for-profit ventures.

Using the Correct Language for Communication about R&D

A second key challenge raised by many participants was identifying the correct terminology to use to ask nonprofit organizations about their R&D activities. They said the discussions at this workshop make clear that the traditional terminology of R&D does not work in many nonprofit organizations, and the way the nonprofits themselves think about their activities and the words they use for those activities can affect how they respond to survey questions. Among the alternative terms that participants suggested were applied research, evidence-based decision making, translational research, data mining, testing, capturing information, or experimenting.

Harpstead and others suggested a clear definition at the beginning of the survey of what is meant by "research" would be necessary for organizations such as hers to answer questions about these activities. She added that some of her colleagues at other organizations might consider documenting their annual outcomes as research, whereas, she observed that the planned survey seems to be targeting research that tests hypotheses. In Harpstead's words, "perhaps you have to start your survey with a clear definition of what you call research and then ask how many of us do

that. You get a very different answer than if you say, 'Do you do research in your nonprofit?'"

Mickle argued that the definition needs to be put in "plain English" for respondents. She added that the breadth of the question and types of activities included could affect how easily she could identify the staff, volunteers, and other resources who do those activities, because they may cut across many areas of her organization. This would require making estimates of what percentage of time various staff members spend on activities that constitute R&D.

One potential way of incorporating language to help communicate the distinctions about the nature of R&D in the nonprofit sector would be to ask respondents a series of questions, suggested Michael Larsen, professor of statistics at George Washington University and member of the workshop steering committee. For example, he noted, the Current Population Survey asks multiple questions, rather than a single question, to determine whether someone is active in the labor force, and if so, unemployed. Similarly, a series of questions may help to tease apart the subtle distinctions between research done for evaluation and research done for other purposes, he stated. Responses to these questions can be used to determine whether particular activities would be counted for the purposes of the survey. According to Larsen, "you might not end up with a single estimate. You might end up with 'This is the estimate if we are strict. This is the estimate if we include a little bit more.'"

Salamon endorsed and expanded upon Larsen's suggestion of using a series of questions. He suggested beginning with a lead question, and then following up with a series of prompts that include terms such as those listed above. Several participants suggested conducting a pilot study to test these terms. Feller reflected this view by noting, "It is such an important but fluid kind of issue that has such important impact, that it might be worthwhile just to test it."

Donald Dillman, Regents Professor of Sociology at Washington State University and member of the workshop steering committee, observed that the way that an organization sees its purpose has an important effect on how it will respond to a question. For example, some organizations are highly rewarded for doing R&D and thus may work to include as many of their activities as possible in the survey; the opposite may be true for another organization whose board focuses on service delivery and does not support such activities. Cristalli agreed with Dillman, stating that this phenomenon occurs both among board members and staff members. Furthermore, she added, many traditional funders of nonprofits, including county and state governments, do not pay for research and want to be assured that such activities are not among those for which they provide funds.

Accounting for the Interconnections Among Nonprofits

A third challenge identified by many participants in surveying nonprofits is that many of these organizations are interconnected. This makes it difficult to identify which of them should be made eligible for sampling and leads to potential double-counting of reported R&D. Raymond drew attention to the range of partnerships that exist between organizations. They include partnerships between two or more nonprofits, or they may exist between a nonprofit and a corporation or an academic institution. Stone agreed and noted that nonprofits are more likely to engage in these types of partnerships than are for-profit entities. Nonprofits are more likely to need to be collaborative to pool resources, she said, whereas for-profit organizations are often more protective of their systems. Stone suggested that the survey might need to be able to detect some of these structural relationships.

As illustration, a number of nonprofit organizations are joined together as umbrella groups, consisting of a "lead" organization and many smaller member organizations. R&D activities may take place within some or all of the individual organizations (e.g., the Lutheran Social Service of Minnesota as a part of Lutheran Social Service of America), and the "lead" organization may or may not be aware of that research activity. Alternatively, the R&D is sometimes directed by the "lead" organization itself (LeadingAge), and the individual member organizations may or may not be participants. Harpstead cautioned that surveying individual organizations that are part of an umbrella group could result in counting a collaborative effort occurring within the umbrella group multiple times.

Salamon agreed with Harpstead and suggested that thinking of individual organizations as potential sampling units may not work for this NSF survey. Rather, he said, "maybe there is a way to short circuit it and to use a kind of wholesale approach. That would be, for example, going out to some of these umbrella groups and essentially subcontracting the surveying to them." In essence, Salamon suggested that the "lead" organization in the umbrella group could survey its members about their research activities and what resources are devoted to them, while adding any research activities carried out by the "lead" organization itself. He argued that this could reduce potential double-counting of research efforts, and data about research efforts could be aggregated across an entire organizational structure (umbrella group).

The interconnections are even broader, several people pointed out. Some nonprofit organizations conduct research in-house through their intramural research programs. Others may provide extramural research funds to other organizations that will conduct the research. Some nonprofits, such as the American Cancer Society, have both types of research

within their portfolio. According to Mickle, this issue could be significant for a number of nonprofit organizations.

Stone elaborated on Mickle's observations, saying that because many nonprofit organizations are funded through grants, donations, and other "soft money," the amount of and ways in which they are engaging in research will be variable, particularly among individual member organizations that are part of umbrella groups. Some of these organizations have their own research institutes, while others do not. She added that some of this research would be through partnerships with academic institutions.

Several workshop participants expressed serious concerns that the interconnected networks and ways of conducting research within the nonprofit sector could exacerbate the likelihood of double-counting research efforts in the NSF survey. Collaborations, partnerships, and networks increase the risk of double-counting, suggested Salamon. One way that this can occur is when the nonprofit is a research funder, but counts funded research as part of its R&D at the same time that the funded entity also reports this same activity. Different members of an umbrella group may report the same research and the same resources applied to that research. The ways in which government agencies and academic institutions report their R&D activities may result in double-counting, as well. According to Stone, this may be an issue for foundations that fund a great deal of research. As she stated, "their output is our input." Salamon reminded the group that the survey was intended to focus on the performers of research, rather than the funders. Dillman said careful wording of the survey was needed to avoid confusion on that point.

Salamon indicated that addressing the challenge of the interconnections among the nonprofit sector begins with recognizing that some research is going on and "throwing the net broadly." Even with this inclusive strategy, he said, a careful sampling plan with weighting is needed. "I do not think the argument that some are doing it intensely and some not so intensely at a particular moment in time is a reason not to go after this broader approach, but rather a reason to be pretty careful about the sampling and data collection strategies," said Salamon.

Identifying the Correct Respondents

Identifying the correct respondent is a fourth key challenge for the survey, according to many participants. Mickle agreed and said that even within a single organization, responses to questions about R&D will vary depending upon who completes the survey. She explained that while the ACS scientific research staff would answer in one way, her market research staff would answer another way because each thinks of research in different ways. Eisen echoed this notion in her presentation; while her

leadership team suggested that the beekeeping organization conducts ongoing research, Eisen disagreed because her standards for research differ from that of her colleagues. Stone expressed similar views.

Raymond emphasized identifying the correct respondent was a critical issue and the correct respondent might vary across organizations. In other words, she said, a person's title may not be the ideal basis by which to select a respondent. Salamon added that a series of questions might be the best approach for this issue as well. As a possible solution, he suggested asking, "'Who in your organization will know most about the following types of activities?' as opposed to pre-selecting the individual that we ask to be a respondent. Let the organization determine within its own situation who the person or persons are that know about the things that we are asking about."

Jeffry Berry, professor of political science at Tufts University, said the challenge of finding the right respondent is both challenging and costly, and would likely involve hiring staff to contact potential respondents on the telephone. He suggested one possibility for implementing the survey would be "drawing the sample randomly and then arranging for specific people to participate. This would involve seeking an agreement with those respondents and providing them with a person they could come back to and ask questions if they run into trouble filling out the survey. The measurement problems are really very difficult here. This is a preferred alternative to just the random sample and throwing the surveys out in the mail."

Further discussion of this topic is included in Chapter 5.

Understanding the Financial and Labor Resources within Nonprofits

Several participants pointed out volunteers are a significant portion of the labor resources used by nonprofit organizations. Although participants did not discuss this topic at great length, determining how to count volunteer hours is a challenge for this survey whose intent is to measure resources spent on R&D within the nonprofit sector. Salamon identified this issue in his summary remarks, stating, "If we leave out the role of volunteers, we are going to significantly undercount the economic value and implicit cost." He added that this is an issue across sectors in terms of measuring labor, with a trend within the statistical community toward including "unpaid work . . . putting a value on it and bringing it into economic accounting." He cited the examples of staff comprised entirely of volunteers, such as the Prince William Regional Beekeepers Association. Similarly, the American Cancer Society uses a large number of volunteers in recruiting participants for a large research study. Mickle said that ACS uses volunteers in many research-related roles, so whether to include this

volunteer labor would affect her estimates of labor devoted to research significantly. She added that the donated services of volunteers are critical to ACS' operations, and it would be important to quantify the value that these volunteers provide.

Counting paid versus unpaid staff is only one of the complexities that relate to how financial and labor resources devoted to R&D are counted in the nonprofit sector. Several participants raised other issues related to funding that may be pertinent to the NSF survey, such as the timing of funding and whether there were internal funds available for research. In cases where the research funding is dependent upon grants, research activities could vary from year to year, noted Raymond. She also noted philanthropists who donate funds often have a shorter timeframe by which they expect to see results than is the case with many research studies.

Crosby offered a different perspective on the role of philanthropy for nonprofits. In his view, philanthropy offers a greater flexibility and risk-taking, often not valued or available through other sources. In addition, philanthropy is increasing and offers valuable resources at a time when government funding for scientific activities has been decreasing. Although some have voiced concern that this type of partnership between philanthropy and research may be a shift away from national priorities, in Crosby's opinion, there is value in challenging existing paradigms and doing innovative research. Nonprofit research institutions are uniquely positioned for "being nimble, being entrepreneurial, for taking risks," stated Crosby. Finally, he indicated he hoped a revamped survey of R&D in the nonprofit sector would allow for greater visibility for philanthropy and for the nonprofit sector.

CHAPTER SUMMARY

Presenters shared their experiences and perspectives on R&D at their nonprofit organizations. Many workshop participants voiced their opinions that nonprofit organizations are conducting research worthy of being captured in the NSF survey. However, as this chapter illustrates, the complexity of this sector presents a number of conceptual and methodological challenges to address in developing the NSF Nonprofit R&D Survey. Chapters 4 and 5 provide some guidelines suggested by presenters for meeting these challenges and designing the survey.

4

Approaches to Survey and Sample Design

Chapter 3 summarized five key challenges, identified through the discussions among many presenters and participants, that face the designers of the National Science Foundation (NSF) Nonprofit Research and Development (R&D) Survey: understanding the diverse and unique nature of R&D in the nonprofit sector; using the correct language for communication about R&D; accounting for the interconnections among nonprofits; identifying the correct respondents; and understanding the financial and labor resources within nonprofits. With those challenges in mind, this chapter summarizes presenters' and participants' guidance on design and measurement for the proposed survey of nonprofits from five sources: the *Frascati Manual*, international experiences, the 1996–1997 NSF survey of nonprofits, a discussion with sampling experts, and an overview of data sources available for creating a sample frame. Taken together, this guidance may help identify steps that NSF could take to address these challenges and design a survey that will meet its goals and fit within its budget limitations. Presenters made the following points, as summarized in this chapter:

- The *Frascati Manual* developed by the OECD provides guidance on the definition of R&D, and on a classification system to determine whether an organization should be included in the nonprofit sector.
- That guidance is considerably different from the approach of using tax-exempt status to define a nonprofit, and results in a narrower definition of the sector. Many countries use guidance from

the *Frascati Manual*, but great variation remains in measurement across countries based on institutional differences and historical realities.

- Canada, Italy, and the United Kingdom (UK) all define a fairly narrow population of nonprofits based on the Frascati guidelines and then conduct censuses of their nonprofit sectors to measure R&D.
- Several workshop participants expressed the view that the Frascati guidance was outdated in regard to R&D definitions and/or the classification of the nonprofit sector.
- Based on the experience with the past NSF nonprofit survey, the sample size should be increased for the new survey, and large nonprofit organizations likely to perform R&D should be oversampled, according to several participants.
- A variety of sampling, stratification, and weighting techniques are available to explore for this survey, with several discussed in this chapter.
- The pilot study can be used to study and refine the stratification and sample allocation, study the quality of segment classifications, study response rates and missing data rates, and analyze correlations amongst outcomes and auxiliary variables.
- Three Internal Revenue Service (IRS) data files and various data products from the National Center for Charitable Statistics (NCCS) are available to assist with identifying the nonprofit population and developing a sampling frame.
- Narrative data about program accomplishments from nonprofits' IRS Form 990s may be used to identify key words that nonprofit organizations use to describe R&D activities.

Paul David provided some contextual comments at the beginning of the session. He explained that one reason that R&D is important is because it involves expenditure flows directly relevant to the National Income Accounts, and that looking at the broad importance of R&D across all sectors of the economy has implications for the design of the NSF Nonprofit R&D Survey. The product of research is information, and R&D produces novel information, which in turn feeds future research. He stressed that these innovative processes are key sources of economic growth and ultimately potential sources for the improvement of human welfare and well-being. However, information is only one of a number of inputs that lead to the production of new inventive outputs. Thus, the data from the survey must be able to be integrated with other kinds of information in order to be of use to analysts and those who advise policy makers. "Being aware of the need to try to make things comparable and integrable for subsequent analysis is something that at least a lot of economists think

should guide the collection of data and the tagging of data so that subsequent work could be done with the data," suggested David.

GUIDANCE: *THE FRASCATI MANUAL*

The *Frascati Manual* is a major resource to aid countries in collecting data on R&D so that those data can be consistent across countries. The Frascati R&D definitions and guidance are relied on for the integration of R&D into the System of National Accounts (SNA). Developed by OECD, the manual provides guidance on the "measurement of human and financial resources devoted to research and experimental development (R&D)" (OECD, 2002, p. 14).

Aldo Geuna, professor at the University of Turin in Italy, provided a brief overview of key concepts from the *Frascati Manual*. Originally created in 1963, the manual has undergone many revisions, including a current ongoing effort. It is shaped by public policy, according to Geuna, and reflects a compromise among a growing number of countries.

A key challenge for NSF, identified by several participants and highlighted in Chapter 3, is to better understand both the breadth of the nonprofit sector in the United States and the type of R&D performed by that sector. The manual provides some definitional guidance on this issue, but the guidance is different from the approach of using the tax-exempt status certified by the IRS (discussed in Chapter 2) to identify a nonprofit. Geuna pointed to a key revision in the *Frascati Manual* that occurred in 1993, when the definition of private nonprofits (PNPs) was changed. According to the *Frascati Manual,* the PNP sector includes "non-market, private non-profit institutions serving households (i.e., the general public) and private individuals or households" (OECD, 2002, p. 64). Geuna emphasized that the word "non-market" is the significant element of the definition, referring to the OECD definition of non-market that states: "Non-market services cover those services provided to the community as a whole free of charge, or to individual consumers either free of charge or at a fee which is well below 50 percent of production costs" (OECD, n.d.). The definition does not classify organizations rendering services to enterprises, primarily serving government, or entirely or mainly financed or controlled by the government as PNPs because they are not "serving households." Institutions of higher education and the entities they control (such as medical centers and research laboratories) are also excluded from the nonprofit sector under this definition. Some of those excluded organizations fall into the business sector, government, or education. Geuna stated that these exclusions, and the non-market criteria, help to explain why the number of institutions counted as PNPs in a number of countries seems low.

Several participants discussed their views on the Frascati definition

of nonprofits. Lester Salamon noted he was concerned that those revising the manual were not following the lead of the 2008 SNA revision. The SNA state that "the distinguishing feature that identifies an NPO is that its status does not permit it to be a source of income, profit or other financial gain for the units that establish, control or finance it" (OECD et al., 2008, p. 455). The revision also enabled the creation of subsectors within the major sectors (i.e., government, corporate, education) and thus allowed the break-out of nonprofits that were buried in the major categories. The SNA made a change in this definition, he noted, because "they recognized that nonprofit institutions serving households (NPISH) excludes all of the market-based NPIs and all of what you referred to as the ones serving government. Many of the ones described as serving government are delivering services to citizens—those services are just paid for by government funds. They are not market-based." According to Salamon, a very limited definition of non-market entities produces a limited and distorted view of the nonprofit sector.

John Jankowski, National Center for Science and Engineering Statistics (NCSES) at NSF, has worked on the Frascati revisions. He said those working on revisions are aware of the SNA revisions and the rationale for making them. He added that the revision process considered the tagging and aggregating of various components of R&D across sectors, but did not go in that direction. Geuna added that the current revision group for the *Frascati Manual* is not considering a significant change to the definition of PNP, athough the group's work and discussion are still ongoing as of June 2014.

GUIDANCE: INTERNATIONAL EXPERIENCES

The approaches of other countries to measuring R&D in the nonprofit sector can inform the design phase of the NSF Nonprofit R&D Survey. Thus, the workshop included presentations describing the experiences of Italy and the UK within a European context, as well as a presentation about Canada's approach.

Europe

Geuna discussed the measurement of R&D in the nonprofit sector using Eurostat data from the 28 countries of the European Union (EU).[1] He subsequently discussed both the UK and Italy in more detail.

[1]As explained on its website, Eurostat is the statistical office of the European Union situated in Luxembourg. Its task is to provide the European Union with statistics at the European level that enable comparisons between countries and regions (http://epp.eurostat.ec.europa.eu/portal/page/portal/about_eurostat/introduction [December 2014]).

Looking across all countries in the EU, the nonprofit sector is involved in R&D to a much less extent than are other sectors of the economy: R&D funded by nonprofits is 0.03 percent of gross domestic product (GDP) compared with approximately 2 percent of GDP for all sectors of the economy combined. However, that percentage is growing. Looking across the past decade, the role of the PNP sector is growing as a percentage of GDP, including specifically in R&D as narrowly defined, he said.

Geuna stressed that there is no such thing as the "European experience" in these matters. He explained that great variation in measurement exists across countries and even within countries with respect to R&D in nonprofits based on institutional differences, with historical reasons for many of these differences based on the nonprofit sector's independence from or connection to government ministries. Comparability of the data is weak at best. Table 4-1 shows that the UK and a number of northern European countries have measured R&D in similar amounts as the United States. Italy and Finland are also measuring R&D in their nonprofit sector, but in moderate amounts. Many other countries are measuring very little R&D by that sector. In several countries, such as Germany and France, many PNP organizations are classified under the government sector. Geuna further stated that banking foundations are very important in Italy, health foundations are especially important in France, and energy foundations are most important in Germany.

As of 2011, the main expenditures by private nonprofits in R&D across the EU are by foundations that are funding extramural research in institutes of higher education. However, in Italy and Portugal, the amount of R&D dollars spent at PNPs is higher than the amount spent at universities.

United Kingdom

Geuna turned to the specific experiences of the United Kingdom. PNPs account for 2 percent of gross domestic expenditures on R&D, but they also fund approximately 5 percent of such expenditures. By comparison (as shown in Figure 4-1), the government accounts for 8 percent of R&D, higher education 27 percent, and business 63 percent. Geuna explained that the UK PNP sector consists primarily of charities, trusts, and medical research. Wellcome Trust is the single largest foundation in the UK and is particularly important as a large cancer research charity. The sector that performs R&D also includes such organizations as libraries, zoos, engineering and design activities, and technical testing and analysis.

Geuna indicated that a survey of the nonprofit sector in the UK was conducted in 2005, repeated in 2012, and is now implemented on a biannual basis. The survey design in 2012 included two waves of presurvey

TABLE 4-1 R&D Funded by Nonprofits, in Units of Purchasing Power Standard per Inhabitant at Constant 2005 Prices

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011
European Union (28 countries)	5.4	5.6	5.8	6.5	6.8	7.1	7.0	7.1	7.2
Euro Area (17 countries)	3.1	3.4	3.7	4.7	4.9	5.0	4.8	5.1	5.2
Denmark	18.7		19.3		26.2		26.4	28.0	29.6
Germany (until 1990 former territory of the FRG)	2.1	2.4	1.9	2.5	2.5	2.4	2.0	1.8	2.9
Ireland	0.0	0.0	0.8	6.5	2.4	2.5	2.5	2.3	2.3
Greece	1.3		1.8						1.3
Spain	1.1	1.6	2.2	1.6	1.6	1.8	2.0	2.1	1.7
France	4.7	4.6	4.5	4.5	4.4	5.7	4.4	4.4	4.5
Italy			4.1	8.0	8.3	8.1	8.5	8.8	8.7
Netherlands	11.5		14.4		13.4		15.7		21.0
Austria	2.5	3.0	3.0	3.0	3.5	3.6	4.4	4.5	4.0
Poland	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Portugal	2.4	3.2	4.0	4.5	5.0	4.6	11.0	13.4	5.6
Finland	7.5	8.4	8.6	8.9	9.5	10.7	11.5	11.7	12.9
Sweden	30.8		28.1		22.5		25.3		29.6
United Kingdom	21.5	21.5	22.3	22.7	23.6	24.8	24.6	23.3	23.3
United States							35.7		

SOURCE: Geuna (2014). Data from Eurostat online data portal at http://epp.eurostat.ec.europa.eu/portal/page/portak/statistics/search_database [February 2015].

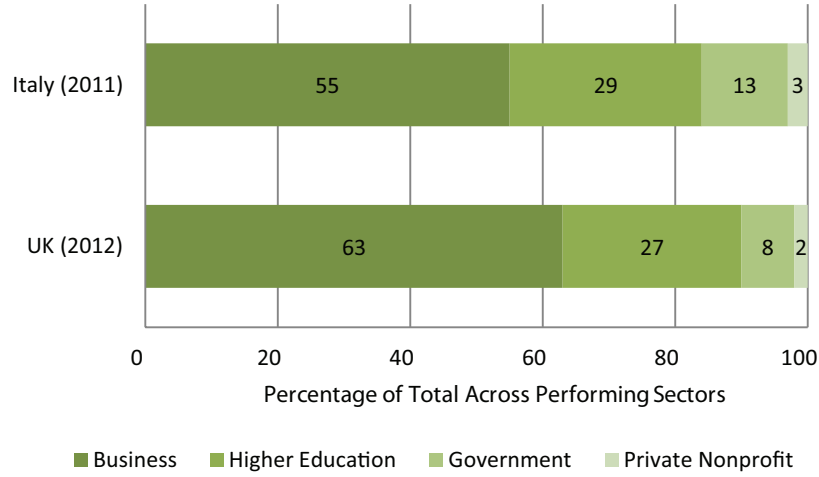

FIGURE 4-1 Percentage of gross expenditures on R&D, by performing sector, two countries.
SOURCE: Geuna (2014). Data from United Kingdom at http://www.ons.gov.uk/ons/rel/rdit1/gross-domestic-expenditure-on-research-and-development/2012/stb-gerd-2012.html. Data from Italy at http://search.istat.it/search?q=research+and+development+expenditures&output=xml_no_dtd&client=istat_fe_en&proxystylesheet=istat_fe_en&sort=date%253AD%253AL%253Ad1&oe=UTF-8&ie=UTF-8&ud=1&exclude_apps=1&site=istat_en&submit.x=23&submit.y=17 [February 2015].

screening of a population of 690 potential performers meeting the Frascati definition of nonprofit organization. The screening resulted in a target population of 200 organizations that performed intramural, extramural, and/or nonmarket research for the main survey. That survey was a census of the entire target population. A response rate of 92 percent was achieved, and data for nonresponders were imputed (Office of National Statistics, 2013).

Italy

As Geuna explained, approximately one-third of the organizations in the nonprofit sector in Italy are classified as mutual assistance organizations, with the remainder classified as public utilities. The majority of nonprofit organizations are focused on culture and sports; however, education, health, research, and social care have the most employees. In

Italy, institutions of higher education are classified within the government sector, as are public research institutions. Primary and secondary education and some research institutions fall within PNP organizations.

PNP organizations account for approximately 3 percent of gross domestic expenditures in R&D in both the categories of funded and performed R&D. In Italy, the PNP organizations perform more R&D than they fund. The business sector accounts for more than half (55 percent) of all performed R&D and 45 percent of funded R&D. Higher education performs 29 percent and the government performs 13 percent of R&D, as shown in Figure 4-1.

In Italy, there are complex relationships among institutions in different sectors, forming cooperatives to create PNP research (and teaching) organizations. Geuna offered a personal example. Compagnia di San Paolo, among the largest foundations in Europe, has joined together with a corporation with the University of Torino, which has 70,000 students, to create a research (and teaching) organization called Collegio Carlo Alberto. Geuna is an employee of the university and is not employed by the Collegio. However, the statistics regarding his research activities are also included under the Collegio in the PNP sector.

In 2012, Italy completed a census of PNP organizations. According to that census, Italy has approximately 300,000 nonprofit organizations, employing 680,000 paid staff, 270,000 external paid workers, and 4.7 million volunteers. Between 2001 and 2011, Geuna reported, the number of nonprofit organizations grew by 28 percent, employment in this sector grew by 38 percent, number of volunteers grew by 43 percent, and external paid workforce grew by 169 percent (Istituto Nazionale di Statistica, 2014).

To measure R&D in this population, Italy conducts an annual census of nonprofit institutions that may potentially conduct intramural or extramural R&D. Geuna noted, "In Italy, building this kind of list of organizations is difficult, but we have a specific income tax law that allows us to identify research-performing nonprofit institutions." Additionally, a census of all institutions was conducted in 2012. An initial population of approximately 600 organizations was identified for a screening survey to help surveyors ascertain whether the institutions were conducting research according to the *Frascati Manual*. Ultimately, 363 organizations were identified. In the last survey administered in 2013, 68.6 percent of the 363 organizations were performing R&D. The remaining organizations may have been doing R&D in the year or two prior to the census, but not during the time period of the actual census (Istituto Nazionale di Statistica, 2013). The census questions were quite detailed with questions regarding biotech, nanotech, energy, research, and personnel, according to Geuna.

Guidance from These European Examples

Service innovation and digitalization are increasing in the public sector in Europe, providing numerous examples of innovation in service provision. Geuna stated, "If you want to look at innovation in services (similar to the nonprofit sector) in Europe, you have to look at the public sector, and the European Public Sector Innovation Scoreboard.[2] And I think if you want to look to innovation in R&D in the nonprofit sector in the U.S., you may want to look at what they did in Europe in the public sector because there is quite some overlap between the two." Geuna provided a number of examples of innovation in the public sector that are related to the discussions that took place during this workshop:

- service innovation (the introduction of a new service or an improvement to the quality of an existing service);
- service delivery innovation (new or altered ways of supplying public services);
- administrative and organizational innovation (changes in organizational structures and routines); and
- communication innovation.

Geuna urged thinking about R&D differently. He stated, "Quality, usability, user experience, etc., are all aspects of inventive and innovative efforts in intangible service industries. Personnel engaged in efforts to plan and realize these improvements are R&D performers. Furthermore, these activities fuse the roles of research scientists, product designers, and production engineers. Now we have computer scientists and engineers collaborating in the production of intangible new digital services."

Geuna said that he believes the definitions of R&D will need to be updated beyond the ways in which they are articulated in the 2002 version of the *Frascati Manual*. The traditional way of identifying what is included in "service" in R&D described in the manual is outdated and

[2]According to the European Public Sector Innovation Scoreboard website, "Following the Europe 2020 Innovation Union flagship initiative, the European Commission launched a pilot European Public Sector Innovation Scoreboard (EPSIS) with a view to improving our ability to benchmark the innovation performance of the public sector in Europe. The ultimate ambition is to capture and present public sector innovation in a similar way to countries' innovation performance in the Innovation Union Scoreboard (IUS) and thereby encourage and facilitate innovation activity across the public sector. The 2013 pilot EPSIS is the first EU wide attempt to better understand and to analyse innovation in the public sector. It was developed based on the experience of earlier national and regional projects, tested widely and discussed with a number of key relevant experts." Available: http://ec.europa.eu/enterprise/policies/innovation/policy/public-sector-innovation/index_en.htm [December 2014].

becoming obsolete as digitization increases, he said. "Frascati was formulated first for application to invention and innovation in manufacturing, then updated for high-tech industries and services, and will need further updating for the new digital service provision in the private nonprofit sector, and also in the public and business sectors," he commented.

Geuna closed his remarks by noting that R&D in the digital realm is going to grow over the next 10 years; thus, efforts to capture R&D in the nonprofit sector should move beyond traditional definitions, as well. He said he hopes that this workshop will influence the ongoing revision of the *Frascati Manual*.

Canada

Canada conducts an annual survey to measure R&D in its nonprofit sector. Carol House, Committee on National Statistics and study director, presented information about the Canadian process on behalf of Louise Earl of Statistics Canada. She said that the results from the survey are published annually and used as a key component in the Canadian series *Gross Domestic Expenditures on Research and Development*.[3]

Although the total nonprofit sector in Canada is sizable and accounts for up to 12 percent of the country's total workforce, Statistics Canada follows the Frascati guidance to define a population of approximately 140 nonprofits with R&D activities[4]—consisting of private philanthropic foundations, voluntary health organizations, associations, societies, and research institutes—and conducts a census of these organizations. Each year, Statistics Canada seeks to determine whether the nonprofit organizations on their frame have retained their nonprofit status or have changed sectors.

The Canadian survey collects information on both intramural and funded research. The definition in Box 4-1 was provided to respondents in the instruction guide attached to the survey questionnaire. The survey is mandatory, resulting in response rates above 90 percent. Surveys are

[3]Results from the 2012 Research and Development of Canadian Private Non-profit Organizations are available on *The Daily* (mobile app), in PDF version at http://www.statcan.gc.ca/daily-quotidien/140122/dq140122b-eng.htm. Additionally, tables (358–0215 to 358–0218) are available for download on CANSIM (Statistics Canada's key socioeconomic database) under survey number 4204. These data are also published in *Gross Domestic Expenditures on Research and Development in Canada*, and the Provinces in PDF version at http://www.statcan.gc.ca/access_acces/alternative_alternatif.action?teng=88-221-x2013001-eng.pdf&tfra=88-221-x2013001-fra.pdf&l=eng&loc=88-221-x2013001-eng.pdf and on CANSIM table 358-0001 [December 2014].

[4]Nonprofits affiliated with higher education institutions or government agencies are excluded from the survey universe of Research and Development of Canadian Private Nonprofit Organizations.

BOX 4-1
Definition of R&D Provided to Respondents on the Canadian Questionnaire

Definitions

"Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications."

(OECD, 2002)

Research and development (R&D) is creative work in the natural sciences and engineering, and social sciences and humanities fields undertaken on a systematic basis to increase the stock of knowledge or discover new applications for existing knowledge. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the re-evaluation of existing observations.

NOTE: Exclude all non-R&D activities *(such as investigative studies, medical care, social services, education and training, dissemination of information, etc.),* **which your organization undertakes or funds.**

To illustrate the distinction between R&D and investigative studies: the developing and testing of new methods for treating a neurosis is research. A study of psychiatric services in a region to suggest changes is an investigative study.

NOTE: The definition provided in presentation at the workshop was worded slightly differently. That definition came from the Statistics Canada website about the survey but was not provided to respondents. It is available at http://www23.statcan.gc.ca/imdb/p3Var.pl?Function=assembleVariable&DECId=128297&RepClass=587&Source=sdds&SourceId=4204&InstaId=140761&SurvId=141387&DFId=180540e.

SOURCE: Research and Development of Canadian Private Non-profit Organizations (2012). Available: http://www23.statcan.gc.ca/imdb-bmdi/instrument/4204_Q1_V14-eng.pdf [February 2015].

mailed out in June and followed up with a phone call to verify receipt. During September and October, nonrespondents are contacted by telephone up to five times, with particular effort devoted to organizations that are believed to perform R&D. The data are received and validated in November, prepared for dissemination through December, and released in January. Among the challenges that Statistics Canada faces in collecting data on R&D from nonprofit organizations are difficulties in frame construction—both identifying private nonprofit organizations with R&D

activity and ensuring that nonprofit organizations affiliated with higher education institutions or government organizations are excluded from the survey frame to prevent data duplication—House reported on behalf of Earl.

In March 2014, Statistics Canada conducted a cognitive experiment to test respondent understanding of specific concepts, questions, and terminology used in the survey. It sought feedback on respondents' overall impressions of and reactions to the survey questions, as well as how well they understood and how accurately they could answer those questions. Finally, it also asked respondents to indicate the effort required to report the requested information. Results from this testing indicate that certain terms are better understood than others. For example, "in-house" and "out-sourced" are more easily understood than the terms "intramural" and "extramural." In addition, respondents preferred to frame their objectives according to the field of science they were engaged in (such as medical and health sciences, or engineering and technology) rather than by socioeconomic objectives (such as defense, or control and care of the environment) as specified in the *Frascati Manual*. Other findings indicate that the term "funded" is preferred to "purchased" with regard to R&D activities.

Workshop Discussion of Guidance from International Experience

House suggested the small number (140) of nonprofits surveyed in Canada appeared to reflect the result of screening decisions. Perhaps, she posited, Statistics Canada includes only those likely to be conducting R&D in the annual census. Salamon emphasized that this number of nonprofit organizations did not constitute the entire number of nonprofits in Canada. He added that the nonprofit sector has 12.5 percent of the labor force in Canada, and the low number of organizations in the survey was due to the Frascati definition, which excludes most of the organizations. The SNA sectoring conventions used by the *Frascati Manual* fail to capture many nonprofits in most countries, argued Salamon. According to Salamon, the SNA acknowledge the existence of a large number of important nonprofit institutions that have been allocated to other economic sectors. He pointed to a United Nations manual (United Nations, 2003) that he helped develop that attempts to move the SNA in the direction of acknowledging more explicitly the nonprofit institutions that do not fall into this NPISH category.

A *Note to Readers* (data users) on the Statistics Canada website is presented in Box 4-2. This note was not presented at the workshop, but it does clarify that Statistics Canada has closely followed the Frascati categorization of the PNP sector. In response to the above discussion, Earl

BOX 4-2
Canadian Private Non-profit Sector

Note to Reader accompanying release of survey information.

Private non-profit organizations do not generate income, profit or other financial gain. For purposes of measuring R&D performance, private non-profit organizations include voluntary health organizations, private philanthropic foundations and private research institutes. Private non-profit organizations that are controlled and financed by government (at least 50%) or affiliated to higher education institutions are excluded from the survey population. R&D expenditures for these excluded private non-profit organizations are included in the R&D expenditures for the government and higher education sectors.

These data are not available for provinces or regions.

The private non-profit estimates as a funding sector in the gross domestic expenditure on research and development (GERD) indicators do not equal payments by private non-profit organizations for R&D performed by other organizations. The GERD source of funds data are identified by the sectors performing R&D. In some instances, organizations in the R&D performing sectors will include funds received from government-controlled private non-profit institutes and higher education affiliated private non-profit organizations and attribute it to private non-profit source of funds data. Other reasons for differences in these estimates can include different reference periods for when the R&D was performed and funded, survey coverage and R&D performing organizations not indicating accurately their sources of funds by funding sector.

NOTE: This explanatory note to data users from the Statistics Canada website addresses the inclusions and exclusions of organizations from the private non-profit classification for the GERD. It was not presented during the workshop.
SOURCE: Statistics Canada. Available: http://www.statcan.gc.ca/daily-quotidien/131015/dq131015a-eng.htm [February 2015].

subsequently commented after the workshop that Statistics Canada uses a decision-tree approach to update and maintain the nonprofit frame. Potential units are identified based on media, responses to related science and technology surveys that identify recipients of R&D funds, other Statistics Canada surveys, associations of nonprofit organizations, tax-filing information, registration of private nonprofits and charities with the Canada Revenue Agency, Internet sources, and other aspects. Subject matter officers in Statistics Canada then review potential candidate organizations based on R&D activity—funding R&D only, performing

R&D only, or funding and performing R&D. Priority is given to profiling potential units with performing R&D activities. This profiling can include contacting potential respondents and going through a sample questionnaire with them. All units are cross-referenced to units on other frames to ensure no duplication.

Jankowski offered his knowledge of the Canadian cognitive experiment based on his ongoing communication with Statistics Canada. Respondents indicated that the terms used to describe personnel on the survey are directly from the *Frascati Manual* and are dated. The terms "technicians" and "technical support," in particular, are pejorative to some respondents. With regard to intramural versus extramural research, he noted that in addition to the preference for alternate terminology, respondents also raised questions, such as whether hiring a consultant constitutes outsourcing if the consultant works alongside an organization's staff or if other parts of the project are done in-house. Similarly, questions arose about how to count partnerships between nonprofits and scientists from universities. Jankowski said these issues regarding various employment arrangements are relevant in the United States, but are not unique to the nonprofit sector.

Jankowski further stated software development is another difficult issue in accounting for R&D. Essentially, he said, the SNA consider software as already capitalized, whereas software is the outcome from many R&D activities. He added that meeting the criteria of "uncertainty and novelty" for R&D is especially tricky in the case of software. Robyn Stone sought clarification about whether science around using a software tool was a necessary criterion to count software development as R&D. This would differ from vendor software products that are sold to nonprofit and for-profit companies, in her view. Geuna commented that software that offers a new type of service to users and represents innovation is an example of software R&D. Stone, Jankowski, and others noted that this discussion indicates a need for clarification of the distinctions between R&D, research, and innovation.

GUIDANCE: THE 1996–1997 NSF NONPROFIT R&D SURVEY

The design phase of the NSF Nonprofit R&D Survey can also be informed by lessons learned from the past implementation of the survey conducted 18 years ago. Ron Fecso, a member of the workshop steering committee, was chief statistician for NCSES when the results from that survey were disseminated. He suggested reflecting on previous iterations is the way that most repetitive surveys improve over time, but typically the iterations are far more frequent than 18 years apart.

During the last survey, NSF screened 9,112 nonprofit organizations to

develop a survey frame for the main survey questionnaire. Based on this screening, they identified a sample of 1,005 nonprofits, of which approximately 700 were performers of R&D and 283 were funders of R&D. NSF mailed surveys to the sample and received usable responses from 352 organizations for a 35 percent response rate.

Fecso indicated that the relatively small number of usable responses created concerns related to quality and usability. He said the survey yielded sufficient data for overall totals with sufficient reliability, despite having a lower response rate than other NSF surveys. However, only 233 organizations that responded were "performers" of R&D, and this small sample significantly limited how the data could be divided into various categories for analysis. He said that substantial weighting was required for all nonrespondents and the standard errors were high for those with revenue below $50 million. This made it inadvisable to compare cells in any cross-tabulation tables. Thus, Fecso concluded that one lesson learned as NSF prepares for the current survey is the sample size will have to at least be double the previous one. Fecso said, "Understanding the data is going to be really important, but understanding which data are important for decision making and how accurate they need to be is really important as well."

Looking for insight into increasing the efficiency of the current survey, Fecso stated that approximately 86 percent of the 233 research-performing respondents to the previous survey were research institutes and university-affiliated hospitals. If the key piece of information to be measured is dollars spent on R&D, then Fecso argued, "If you take that information and think about how we apply it this time, you can get to a lot of the people and get to them very effectively. You can cut standard errors; you can do some things even maybe in the smaller domains if you can get responses from the biggest ones. In this way, you might be able to get information that makes a little more statistical sense."

Accuracy of the data, relevance of measures, timeliness of the information, and cost are all considerations that require tradeoffs to be made and are affected by response rate. In Fecso's view, cost is a significant limiting factor in this case because surveys are expensive and resources are limited. Thus, simply having a larger sample size is insufficient to ensure high-quality usable data. Determining how to allocate those limited resources so that the reliability and usability of the data are maximized involves making decisions about the purposes of the data. Those decisions then inform the ideal sample design for those purposes, he said.

Fecso also offered suggestions for NSF to consider in the planning phase of the new survey, while acknowledging that the design process is already well under way. First, he argued that sufficient funds are critical,

especially to staff the time-consuming work needed to obtain an acceptable response rate. Another costly phase he identified will be designing a good sample frame. However, in Fecso's view, "the time that you put into the frame is invaluable. It cuts down significantly on downstream quality problems."

He continued, "Sometimes you need to trade off things like coverage error to cut down on sampling error. If you cut off small dollar units in the population, you can shrink your universe to the point where your small sample size can be allocated a lot more effectively." Obtaining preliminary information prior to implementing the survey can help to identify those nonprofits with the biggest dollar amounts devoted to R&D, he said, and reduce type I and type II errors[5] in that identification process. For example, in the 1996–1997 survey, teaching hospitals only accounted for 3 percent of total R&D and, when contacted, had particular trouble in identifying a knowledgeable respondent willing to participate. Further, organizations in strata 4 and 5 were unfamiliar with NSF and with R&D, yielding little benefit for the expense of collecting data from them. Fecso recommended devoting effort and funds toward gathering better information about the target sampling frame, oversampling organizations that are likely to have R&D, developing highly efficient stratification, and considering effective cut-offs of the target population. Overall, Fecso emphasized focusing on the top R&D performers rather than simply increasing sample size across all strata, and gathering all the auxiliary information possible ahead of time to increase the response rate among this group.

Fecso closed by noting that the information quality guidelines of NSF, the statistical standards from the Office of Management and Budget, and expertise from survey design experts all will provide NSF with a great deal of instructions and guidance about the basic elements of the design.

GUIDANCE: OVERVIEW FROM SAMPLING EXPERTS

Michael Larsen, associate professor in the department of statistics at George Washington University, and Phillip Kott, senior research statistician at RTI International, discussed five major activities involved in developing an effective and efficient sample for the NSF Nonprofit R&D Survey, as well as issues tied to these activities: identifying the overall population and the target population; establishing a sampling frame and stratifying the sample; considering various sampling ideas to increase the efficiency of the sample; identifying helpful auxiliary information to gather; and making use of pilot study data to develop an adaptive sam-

[5]In statistical testing, type I error is the incorrect rejection of a true null hypothesis. Type II error is the failure to reject a false null hypothesis.

pling plan. Larsen gave the presentation based on the work done by both him and Kott.

Population and Target Population

In planning a survey, Larsen said, one has to look at the population and at refinements that will clarify exactly the part of the population about which inferences are needed. This is the target population. Next one needs a frame, or listing of that target population, from which to sample and make contacts. Generally, one also wants to stratify that frame before sampling. Thus the survey design begins with clearly defining the population—in this case, nonprofit organizations in the United States. Earlier presentations and discussions (see Chapter 3 and the first part of Chapter 4) have pointed out many of the difficulties in determining how to define nonprofits as well as R&D, he noted. These issues will likely continue to pose challenges for NSF, he said, and the decisions that NSF ultimately makes regarding the target population will greatly influence the frame construction and the sampling strategy. Because the target population is yet to be clearly defined, Larsen said that he and Kott could not give concrete recommendations for a specific sampling scheme.

The target population should consist of nonprofits that conducted intramural R&D within a defined reference period. However, he said, it is already clear that some nonprofits should be excluded from the target population. For example, the R&D conducted by institutes of higher education will be measured through a different survey. Furthermore, Larsen pointed out that NSF will need to establish the details of the desired reference period, including whether they are interested in a calendar year or a fiscal year, and how they would like to address accounting differences between different nonprofit organizations.

Sample Frame and Stratification

Given that there does not exist a list of nonprofits that conduct intramural R&D, Larsen said, NSF will need to develop a larger pool or list of nonprofits, which contains the target population. This will be the sampling frame. He said, a key goal is to develop a sampling frame that covers the target population (without omitting too many units) and without using a list that is so large as to be very inefficient. Fecso briefly discussed this issue (see above); the section on "Data Sources Available for Creating a Sampling Frame" later in this chapter provides a detailed discussion of sources of data on nonprofit organizations that could be used to form a sample frame for the survey.

Larsen said he agrees with Fecso that making use of existing datasets

to learn more about these organizations at the outset will be valuable for limiting the size of the sampling frame and for defining strata[6] to improve the sampling efficiency. For example, data from the IRS files (discussed later in this chapter) and from the 1997 survey can be correlated with outcomes of interest, including conducting intramural R&D and the resources devoted to these activities. Larsen suggested preserving the full range of variables covering the multiple financial dimensions of the population for experimentation. The variables with high correlations can then be identified and used in the development of the sampling scheme. First, defunct organizations can be eliminated. Other subsectors might be identified as unlikely to do R&D, such as non-hospital religious organizations. NSF might make a decision to eliminate such subsectors from the frame, or to include them in a stratum that is sampled lightly. Although eliminating subsectors might introduce some error, noted Larsen, it could also greatly aid efficiency. Size of the organization—amount of revenue or number of full-time-equivalent employees—might be obtained from a variety of sources and included on the frame. This information might also be used to truncate the frame. "If there is a minimum size (resources) needed for an organization to engage in R&D, not merely using data during the course of operations, but actually innovating and testing, then this information could be used to effectively truncate the frame," stated Larsen. He suggested that a pilot study would be ideal for testing these types of cut-off procedures to confirm the assumptions.

Alternatively, strata containing very small organizations could be defined and then either excluded or sampled at a lesser rate; however, he urged, it is best to be flexible and avoid making the sample size too limited. Stratification involves dividing the survey population by key features. Many strata could be used, with the potential to be very efficient and to yield detailed information on different parts of the population. However, no perfect measure of size exists, noted Larsen. He indicated that the pilot study would help refine the full survey sample and make determinations about subsectors to exclude. Although such strategies are unlikely to be 100 percent accurate, he noted, a variety of strategies exist to cope with this issue ranging from simple to complex. One simple strategy is to use simple random sampling, while the use of auxiliary variables from the frame to check response propensities is at the other end of the spectrum. "Not doing a one size fits all approach for every strata or every size category is something that could maximize the benefit of your sample," stated Larsen.

[6]Strata are distinct groups or subpopulations identified on the sampling frame that can be sampled separately for the purpose of efficiency or to ensure that each subpopulation is covered by a minimum sample size.

He said NSF might also want to explore the possibility of using a multiple frame approach. Certain segments of the target population, such as hospitals and large research organizations, may be more effectively covered through a supplemental frame. This approach may assist in ensuring that the largest performers are in the frame and sampled.

Sampling Options

Larsen presented two options for sampling that NSF could employ: systematic sampling and probability proportional to size (PPS) sampling. Systematic sampling involves sorting the file of potential organizations in a certain way, such as to guarantee that some small, medium, and large organizations are represented in the final sample. PPS sampling involves choosing criteria, such as size or revenue, and using that variable to determine the probability an organization is given to be selected in the sample. Thus, bigger organizations would have a greater chance of being in the sample, while the smaller ones would have a smaller, but nonzero, chance of being selected for the sample. According to Larsen, "In a sampling theory sense, it is unbiased. It is representative of the population, but it can be much more efficient. If you want total dollars, total amount of R&D, it is really important to sample the big ones if they are a lot bigger than the smaller ones."

Identifying and Using Auxiliary Information

Larsen argued it would be useful to identify and accumulate auxiliary data on the frame that would yield useful information about small, medium, and large organizations. Identifying a variable that is highly correlated with the outcome (amount of intramural R&D) is key to implementing the main survey efficiently, he said. The pilot study may help to identify these potential correlates, so collecting a fairly wide range of variables in the pilot would be important. If not useful, then they can be dropped from the main survey. Larsen suggested that some creativity is required.

The auxiliary data, he noted, will be important in defining the probabilities of selection for each organization on the sampling frame. This will be the case for defining strata and for sampling from those strata by systematic or PPS-based processes. Thus the measure of size used will affect the survey weights. In selecting a variable as a size measure for defining these strata and probabilities, he said it is important to be cautious and avoid using variables that can vary in an extreme fashion because that can cause problems with estimation. If this happens, he noted, then statistical tools exist to address such problems, such as adjusting or calibrating

survey weights to key control totals. "In these datasets with these hundreds of financial variables, I would encourage NSF to think about doing that kind of post-stratification or adjustment to weights that will help the sample be representative," stated Larsen. Kott shared his concern that the size variable needs to be selected with care, noting that although size and overall revenue could yield predictable numbers of organizations in various strata, the number of volunteers that small organizations have could result in "too many small organizations receiving big weights."

The auxiliary data will also play a role in dealing with missing data from the survey, Larsen explained. The best approach to dealing with missing data in a survey is to try to minimize it from the outset, Larsen argued, by using administrative data as a proxy for survey data that do not have to be collected. NSF is likely to have hundreds of variables from the administrative data it pulls together. Alternatively if the administrative data were highly correlated with survey data but not acceptable as a proxy, they could be used in modeling for imputation. Another way of filling in missing data involves finding a unit that is similar to the one that did not respond and trying to do some matching. The important point here, he commented, is that collecting those auxiliary administrative variables a priori will allow NSF to study some of these options as part of the pilot survey.

Larsen pointed out that missing data do not have to be handled in the same way in every stratum. For example, in strata in which the organizations are doing little R&D, nonresponse might be handled simply through a nonresponse weighting adjustment. But in the strata that include research hospitals or other large nonprofits that are likely doing R&D, a more sophisticated approach might be called for. If a unit totally does not respond, but exists, he explained, then a replacement similar in terms of key characteristics may be used. Larsen suggested some creativity. With the large database that NSF will have, he suggested experimenting with some fairly sophisticated techniques as part of the pilot test to try to find a good replacement for missing data and to rely less on statistical models to do imputation.

Larsen said useful auxiliary information could also be gathered through a two-phase sampling approach. A short screener could be administered to determine whether an organization is doing R&D. If it is conducting R&D, then it could screen in and be sampled further. One drawback to this approach, he said, is that administering such a screener might be so labor-intensive that it may be more cost-effective to administer the full survey. Another possibility is using a screener to determine simply whether the organization is still in existence, in operation, and with the same purpose as previously thought.

Making Use of the Pilot Study

According to Larsen, the pilot survey will be an extremely useful part of developing the NSF main survey. He reiterated the basic uses for the pilot:

- Study and refine stratification and allocation of the sample.
- Study the quality of segment classifications.
- Study response rates and missing data rates.
- Analyze correlations among frame variables' outcomes—adjusting sampling plans, developing potential models for missing data, and developing some estimation techniques (such as ratio estimation).

The two-phase sampling approach can also be done in two different time periods. Larsen stated, "One way that can be done is that in the pilot, if it is engineered correctly, . . . you might be able to roll it into the further data collection later on." With this type of preplanning, he said, the pilot data could ultimately increase the overall sample size and be included in the final analysis in a rigorous way; they would not just be used for adjusting design and verifying various aspects of the survey. Even in the absence of this approach, Larsen stated, the pilot data will be useful for studying the stratification plan, quality of segment classifications, response rates, and missing rates. In addition, the data from the pilot study will be useful for identifying variables correlated with the outcome that can be used to adjust sampling plans, develop models for missing data, and conduct estimations.

Summary and Workshop Discussion of Survey Design

Larsen reiterated that significant challenges exist in designing this survey, noting that forethought and planning are necessary to get an efficient sample design, and planning needs to be done in a way that is safe from big surprises that might arise. With many options for stratification, Larsen stressed flexibility in the use of variables and not treating all the strata the same. Simplicity has its merits because it is fairly safe, he said, but in some of the key strata where a lot of the R&D is being conducted, NSF needs to investigate more sophisticated approaches that will likely pay off. The pilot survey can give NSF some information on critical choices about sampling rates and where the bulk of the nonprofit R&D dollars are likely to be located. Finally, he indicated that designers should take full advantage of the pilot phase of the survey.

Stone noted that the sampling design will need to account for the structure of "parent" and "child" organizations. Many organizations that

fall under her association are large, with their own subsidiary organizations. These relationships will be important to understand to determine the level of analysis and population, she suggested. For example, in some cases, the corporate provider conducts research across multiple provider sites, which would be missed if the separate providers constitute the entities sampled. This question relates to how organizations file their IRS Form 990s. Paul Arnsberger of the IRS agreed that the issue will need to be addressed, adding that very large organizations such as the Red Cross or YMCA are filed as single organizations that represent many others, which in turn have group exemptions. However, in other cases, the various related groups are disaggregated and file separately. Larsen indicated that in instances where a single corporate entity represents many related organizations, determining the correct respondent for the survey within that organization would be very challenging. In addition, from a sampling standpoint, the disaggregated organizations pose a different challenge. In this case, a single organization can end up being selected for the sample while the larger corporate entity is missed.

Salamon noted that these issues around "parent" and "child" organizations exist because the database is organization-based rather than establishment-based. "If we had an organization-based database used for economic statistics, all of the employment of General Motors all across the country would show up in Detroit," he said. "There would be more people working for General Motors in Detroit than live in Detroit or in the entire state of Michigan." The implication for the sampling strategy is that size of the organization, a logical basis for determining a cutoff point, is going to vary depending on the organization's structure, he said. Another participant noted that the parent organizations should have a greater chance of being selected and being represented in the sample, and that avoiding double-counting parent and child organizations can be addressed in the analysis phase. Nathan Dietz, National Center for Charitable Statistics, recommended excluding child organizations in cases where it is possible to establish that the parent organization is responsible for research, particularly if there is interest in obtaining data from smaller nonprofits that are likely not to be huge R&D producers.

GUIDANCE: DATA SOURCES AVAILABLE FOR CREATING A SAMPLING FRAME

Paul Arnsberger, a senior statistician with the Statistics of Income (SOI) Division of the IRS, presented an overview of the IRS and SOI exempt organization data products that NSF could use to help identify the population and sample for the survey of the nonprofit sector. He was followed by Nathan Dietz, the associate director of the National Center

for Charitable Statistics (NCCS) at the Urban Institute. Dietz described the work of NCCS and the data products it produces, adding value to data from SOI. Together their presentations discussed data products that may be of use to NSF in developing a sampling frame.

IRS and SOI Data Products

The SOI division of the IRS is one of 13 federal statistical agencies and produces data primarily used for tax policy research by the Congress and the U.S. Department of the Treasury. Its mission is "to collect, analyze, and disseminate data from a variety of tax and information returns filed with the IRS," stated Arnsberger. He added that SOI is not involved in any compliance research.

Arnsberger focused his remarks on three public micro-datasets that SOI makes available—the Exempt Organizations Business Master File (EO BMF), the Exempt Organizations Financial Extract, and the Exempt Organizations Sample Studies (see Box 4-3). He noted that the EO BMF

BOX 4-3
Data Products Useful in Building a Sampling Frame

IRS data products:

- Exempt Organizations Business Master File (EO BMF)
- Exempt Organizations Financial Extracts
- Exempt Organizations Sample Studies
  - Sample of 501(c)(3) organizations (990)
  - Sample of 501(c)(4) organizations (990)
  - Sample of private foundations from 990-PF forms

Urban Institute's National Center for Charitable Statistics' data products:

- Archives of IRS data: BMF (multiple versions/year) and SOI (annually)
- NCCS Core Files (1989–present)
- NCCS Cumulative Master File (1998–2003)
- NCCS-GuideStar National Nonprofit Research Database (NNRD or "digitized data" (1998–2003)
- Parts 3 and 8 Supplement (1992)
- NCCS Trend Analysis Files
- NCCS NTEE Master File

SOURCE: Arnsberger and Dietz (2014).

is an administrative file that SOI hosts on its website, but it is created by the IRS, and not specifically by SOI. The EO financial extract is created annually based on administrative data transcribed outside of SOI. However, SOI completes the data cleaning on this file so that it can be used as a statistical research file. The EO sample studies are created within SOI and are designed and intended for statistical research purposes.

Exempt Organizations Business Master File

As Arnsberger explained, the EO BMF is a monthly extract that includes a cumulative listing of all organizations with an active exemption with the IRS. All of these organizations are included regardless of their filing requirements, meaning that very small to very large organizations are a part of this data file. All of the exempt subsection code 501(c)(1) through 501(c)(27) organizations are included. Most of the information contained in the EO BMF extract is derived from the "entity portion" of the BMF, which includes static information about the organizations such as their name, address, and exempt subsection code. The EO BMF extract also includes some very limited data from Forms 990, 990-EZ, and 990-PF.[7] However, these data are only included for those organizations that filed a return with the IRS and many do not. As of June 2014, the EO BMF contained 28 fields of data for 1.542 million organizations. Three of the fields contain financial data—assets, revenues, and gross receipts (which is labeled as income on the file). Arnsberger reported that the IRS has begun to purge organizations off the master file, an important step.

Exempt Organizations Financial Extracts

The exempt organizations financial extracts are created annually and include data from those currently active organizations from all subsection codes that file IRS Forms 990, 990-EZ, or 990-PF, Arnsberger explained. Another division in IRS completes the data transcription for the extract for their administrative purposes and provides the file to SOI. SOI then conducts minimal data cleaning to correct any major errors, including transcription or arithmetic errors. The EO financial extracts include data from returns processed by the IRS within a given calendar year. Because

[7]Form 990 is an annual information return that the IRS requires of filing by most organizations exempt from income tax under section 501(c), and certain political organizations and nonexempt charitable trusts. It provides information about the organization's finance, programs, and mission. A copy of the Form 990 is in Appendix C. Form 990-EZ is a two-page version of the Form 990 that may be used by smaller organizations. Private foundations file the Form 990-PF.

TABLE 4-2 Distribution of Records in the Exempt Organizations Financial Extracts by Source Form, 2013

Form	Number of Records	Number of Fields	Financial Fields (%)
990	289,603	245	61
990-EZ	218,981	71	80
990-PF	100,484	179	71
Total	609,068	495	68

SOURCE: Arnsberger and Dietz (2014).

of filing patterns, this means that an extract will contain data from returns from more than one tax year.

Although SOI has prepared the EO financial extracts for many years, 2012 was the first year in which the extracts were made widely publicly available. Table 4-2 shows the distribution of the extracts in 2013 by filing the form along with the number of data fields available. In 2013, SOI significantly expanded the number of fields included in the EO financial extracts. They now include 245 fields from Form 990, 71 fields from Form 990-EZ, and 179 fields from Form 990-PF. The EO financial extracts currently contain just fewer than 610,000 records.

Exempt Organizations Sample Studies

Arnsberger described three files that SOI creates by selecting samples of exempt organizations called the EO sample studies. These files are particularly useful for the purpose of statistical analysis and are publicly available on the SOI website:

- The first sample is of 501(c)(3) public-serving organizations that filed Form 990s.
- The second sample is of 501(c)(4-9) organizations, all of which, with the exception of 501(c)(4)s, are member-serving organizations. This sample is primarily tailored to meet the needs of the Office of Tax Policy and the Treasury Department.
- The third sample is a sample of private foundations and uses data from the Form 990-PF.

These samples are selected from the population of currently active organizations that file IRS returns that are classified in subsections 3 through 9. The resulting population contains approximately 467,000 organizations. This excludes credit unions, cemetery companies, and other

entities of less interest to tax policy researchers. In addition, the EO sample studies include a sample drawn for a 2-year period; therefore, any organizations that file on the third year would not be included. The data file across the three sample studies is made up of 31,634 filers drawn randomly within defined strata from the population. Table 4-3 shows the distribution of this file by filing source.

According to Arnsberger, "the sample is definitely targeted to the larger organizations because it is a financial sample made to study the industry. The movers and shakers are the ones people are interested in." Very large organizations (greater than $50 million in assets) are sampled with certainty. The very small organizations with less than $1 million in assets are sampled at a 3 percent to 14 percent rate. Across the three samples, Arnsberger noted that approximately 63 percent of all of the returns in the sample are in the certainty strata.

SOI staff complete extensive data cleaning on the data files for the EO sample studies. Whereas the EO financial extract data file is examined for more egregious errors, the sample study data files are subjected to many hours of review, he said. SOI staff correct any arithmetic errors and identify any inconsistencies within the return or with the prior year's return. They also engage in "allocating," which consists of determining whether assets that have been lumped in a single category could be more specifically allocated to other categories based on other information submitted with the tax filing. The EO sample studies include many more fields of data than the EO financial extracts—1,400 fields as compared to 600 fields. Ultimately, the sample study data files include approximately 70 percent of the information from the tax forms.

Arnsberger stated that the EO sample studies provide a huge value added to the product line. He said SOI has been partnering with NCCS for a long time, and NCCS has done some remarkable things with the products that SOI creates.

TABLE 4-3 Distribution of Records in Exempt Organizations Sample Studies by Source Form, Tax Year 2010

Form	Number of Records	Number of Fields	Financial Fields (%)
990	19,476	856	70
990-EZ	1,260	202	65
990-PF	10,898	308	69
Total	31,634	1,366	69

SOURCE Arnsberger and Dietz (2014).

National Center for Charitable Statistics Data Products and Systems

Dietz next discussed the data products that NCCS produces using data from SOI (see Box 4-3). First, it provides an archiving function to make IRS/SOI data more readably available for research. NCCS makes multiple versions of the EO BMF available, keeping archives of files for past years. NCCS also archives current and previous years of the EO sample studies.

NCCS Data Products

The NCCS core file is produced annually by NCCS itself. This file contains more variables than does the EO BMF, but fewer variables than do the EO sample studies. Three core files are available for each year: 501(c)(3) public charities, 501(c)(3) private foundations, and other exempt organizations. NCCS has core files going back to 1989. Dietz said, "We treat these as the standard source of financial data that researchers can use." The 2012 core file for 501(c)(3) organizations was released in June 2014.

Dietz described several other products that NCCS has developed. NCCS produces a cumulative master file of all organizations that have ever filed Form 990s. From 1998 to 2003, digitized data were released that included a full complement of financial and other variables on Form 990 filers during those years. In addition, supplementary data files were compiled and released containing data on program service accomplishments (Part 3) and revenue sources (Part 8); however, these data have not been compiled since 1992. NCCS also produces trend files, which contain longitudinal data that researchers use for various projects. Finally, NCCS collects data for the National Taxonomy of Exempt Entities (NTEE), codes that are used to categorize organizations that have filed one of the IRS 990 Forms.

National Taxonomy of Exempt Entities

Dietz presented more background on the NTEE codes and the process of assigning those codes to organizational records. The staff of NCCS led the process of creating the NTEE codes before NCCS came to the Urban Institute, according to Dietz. Now, NCCS oversees the process of revising the codes and keeping them current. This process involves working with stakeholders on an advisory committee and an oversight committee who provide input into how the codes are working and whether they should be revised.

Since 2006, IRS "determination specialists" have been responsible for assigning NTEE codes to tax-exempt organizations after reviewing their applications (IRS Forms 1023 or 1024). The EO NTEE Program of NCSS

has conducted reviews of the quality of the code assignments using narrative data from Form 990s since 2004. It makes its own determination about whether the correct codes have been assigned to the organizations, and assigns confidence ratings to every value of the NTEE codes.

Nonprofit Program Classification System

NCCS has also developed the Nonprofit Program Classification System to code organizations' programmatic activities based on narrative data extracted from Form 990s. Dietz said that the Form 990 contains information about the organization's programs, but this information is generally so broad that it is often difficult to determine what an organization actually does programmatically. He said, "There is information in the narrative section of the 990s that talks about the organization's individual programs. We extract that information, and have developed a nice little database of programs that nonprofit organizations run that we classify using a Nonprofit Program Classification system we developed."

Dietz suggested that the most relevant information for NSF to use in putting together the sampling frame for the NSF Nonprofit R&D Survey is from Part III of IRS Form 990, Program Service Accomplishments. Dietz drew attention to question 4 in this section of the form (see Appendix C). Question 4 asks for more details about the main programmatic accomplishments that the organization has engaged in over the past year. It also asks the organization to list the amount of expenses it devoted to each accomplishment, along with grants paid out and revenues taken in that are associated with each program. This particular field is not currently available on any of the SOI data files. NCCS will make these data available to NSF and its contractors in machine-readable versions to help with developing a sampling frame for the survey.

Dietz described how NCCS plans to use these data to determine sets of keywords that can be used to identify nonprofit organizations that do significant amounts of R&D. Work is ongoing to identify the correct terms, including incorporating the ideas from this workshop. NCCS has identified three tasks that it will complete to assist NSF with designing the sample. First, Dietz said, it will work with a training sample previously used by NSF, which includes 1,800 nonprofit organizations "that we have on pretty good authority . . . have been extensive producers of R&D in the past." Using those forms, NCCS will closely examine the narrative data that those organizations use to describe their R&D activities. Second, it will then use the narrative data from the training sample to identify potential keywords that could be used to identify likely R&D performers. Third, NCCS plans to use a final set of standard keywords to identity organizations that are likely "performers" of R&D in the broader sample.

Dietz pointed out that NCCS plans to limit the organizations it examines to the larger organizations, which are more likely to conduct substantial amounts of R&D. However, he said, using the list of keywords to identify the sample "does not lock us into a strategy of only collecting data from those organizations. . . . We can try to expand the sample so that we collect data from other R&D-producing organizations." He emphasized the importance of ensuring the likeliest producers of R&D are heavily represented in the sample. Using machine-readable versions of all the Forms 990 will facilitate the text analysis that NCCS plans to conduct.

Dietz enumerated several challenges that NCCS anticipates as it moves forward with its work. A key challenge is the risk of false positives associated with the use of virtually any list of keywords chosen. In other words, organizations may use a keyword in their narrative descriptions of their activities, but not really engage in R&D. This problem is likely to require considerable effort in examining descriptions in detail to determine whether they should remain in the sample. A second potential challenge is that the examination of the small sample of 1,800 organizations may not yield a list of words that is adequate for identifying likely R&D producers from the larger sample.

Summary and Workshop Discussion of Existing Data Sources

Discussion among participants followed the presentations about the data files from the IRS, SOI, and NCCS. Kott noted that zero is a valid answer in an establishment survey, and encouraged NSF to not eliminate all organizations that do not do R&D. Salamon expressed concern that by using what an organization lists as its three major purposes may lead to overlooking organizations that actually engage in R&D but do not consider that activity among its top purposes. As he stated, "this is going to miss all the stuff that we have been trying to include. To me, this is a serious problem." He argued for a wider "net" or a two-tiered approach, whereby keywords are used for organizations for which research is one of their top three purposes and then a broader set of organizations is included for whom the keywords are not the constraining factor. Kevin Cecco, IRS, reiterated that assigning certain types of organizations a smaller likelihood of being selected for the sample does not mean that they will be excluded altogether. The numbers of various types of organizations that are included will depend on the allocations assigned to them, he explained.

Jankowski explained that the data mining technique that NCCS plans to conduct is just one potential technique that may be used when the actual sample is drawn. However, a great deal of other work is ongoing to identify other potential ways of selecting the sample. Dietz affirmed

that the keywords approach is only one possible way to identify likely R&D producers but added that it "is primarily a way to identify the main producers of R&D."

Wojciech Sokolowski asked for clarification about whether organizations or establishments were the unit of analysis because the EO BMF contains both, referring to earlier discussions about the structures of certain nonprofit organizations. This can have particular significance when many establishments are part of one parent organization, he asserted. Dietz responded that NCCS intends to take this into account as best as it can during its analysis.

The presentations and discussions summarized in this chapter yielded a number of suggestions for designing the sample for the NSF Nonprofit R&D Survey, while acknowledging that significant challenges remain. Many participants emphasized using the pilot and design phase wisely to maximize the efficiency of the sample and to make preparations for successful implementation.

5

Question Design and Survey Implementation

The design of the questionnaire and the manner in which the Nonprofit Research and Development (R&D) Survey is implemented by the National Center for Science and Engineering Statistics (NCSES) of the National Science Foundation (NSF) are important. As discussed in the next session of the workshop, they can affect response rate and ultimately the usability of the data that NCSES collects. As Donald Dillman, Washington State University and workshop steering committee member shared, the science of survey design has been advancing rapidly, yielding evidence-based approaches that can inform the survey planning stage. In addition to considering issues around measurement, participants also discussed the potential outputs of the survey, including the data needed for the *National Patterns of R&D Resources* (National Science Foundation, n.d.-a), as well as other potential ways to expand the use of the data by stakeholders.

DESIGNING QUESTIONS FOR THE NSF NONPROFIT R&D SURVEY

The workshop featured several presentations addressing questionnaire design for the NSF Nonprofit R&D Survey. The first of these presentations featured a series of experiments focused on how instructions, clarifications and question structure affect survey responses. The second presentation focused on initial results from NSF's ongoing exploratory interviews with nonprofit organizations. As reported at the end of this

chapter, participants then engaged in a discussion around a proposed approach to screening nonprofit organizations for inclusion in the survey population.

Understanding How Instructions and Clarifications Affect Survey Responses

The discussions held during this workshop have made clear that there are complex concepts involved in what the NSF Nonprofit R&D Survey should measure. Much discussion took place about which organizations should be included in the population of nonprofits and eligible for sampling on the survey. An equally important concept has been the definition of R&D, and which of the innovations that are taking place within nonprofits should be considered R&D for the purposes of this survey. NSF has been challenged to clarify its position on these concepts. This section of Chapter 5 addresses the next step—once NSF clarifies the definition of R&D, how can it most effectively explain to potential respondents what they should report? As a benchmark, Box 5-1 shows how these concepts were communicated to respondents on NSF's 1996–1997 *Survey of Nonprofit R&D* (National Science Foundation, n.d.-c). The definitions were placed at the beginning of the questionnaire, and respondents were asked to follow these guidelines in answering the survey questions.

The instructions, definitions, interventions, and examples that questionnaires and interviewers provide, and the placement of such items within a questionnaire, can have an important effect on how respondents answer the questions they are asked, explained Cleo Redline of the National Center for Education Statistics. Redline presented an overview of research in the area of providing definitions and clarification to respondents, including specific work that she has conducted in this area. (Conrad et al., 2006; Conrad, Schober, and Coiner, 2007; Couper, 2008; Redline, 2013; Schober and Conrad, 1997)

Redline pointed to previous research, which shows that allowing interviewers to provide definitions can improve respondents' understanding of researchers' intentions. However, she noted, several factors affect the use of these definitions:

- First, respondents have a tendency to anticipate the end of a question, making them more likely to interrupt any clarifying information that is provided at the end. This suggests that providing clarification at the beginning of a question to minimize interruptions will yield higher quality data; however, research on this phenomenon has been mixed (Houtkoop-Steenstra, 2002; Oksenberg, Cannell, and Kalton, 1991; Van der Zouwen and Dijkstra, 2002).

BOX 5-1
Definitions Provided on 1996–1997 Survey of Nonprofit R&D

General Instructions

About this survey

1. Definition of Research and Development

Research is systematic study directed toward fuller knowledge or understanding of the subject studied. Research is classified as either basic or applied, according to the objectives of the investigator.

Development is systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

Research and development includes the development and use of scientific knowledge through fundamental research in the laboratory, in the field, or through experiments; clinical investigations; clinical trials; epidemiological, engineering, and demographic studies; and controlled pilot projects. Included in this definition is the preparation for publication of books and papers describing the results of the specific research and development, if carried out as an integral part of that research and development. Also included is the administration of research and development. Traineeships, if they are mainly directed to R&D, are also included.

2. Science and Engineering

For this survey, science and engineering (S&E) includes

- *Medical or Health-Related Sciences,* including Biochemistry, Genetics, Physiology, Cell Biology/Molecular Biology, Pharmacology/Toxicology, Epidemiology, Health Care Sciences and Services, Reproduction, Growth and Development, Oncology/Pathology/Hematology, Immunology, Microbiology/Virology, Biomedical Engineering and Instrumentation, Neuroscience, Clinical Medicine, and other medical or health sciences.
- *Natural and Social Sciences,* including Agricultural Sciences, Biological Sciences (non-medical), Computer Sciences, Environmental Sciences, Mathematical Sciences, Physical Sciences, Psychology, and Social Sciences.
- *Engineering,* including Aeronautical and Astronautical, Chemical, Civil, Electrical, Mechanical, Metallurgical and Materials, and other engineering fields.

Science and engineering *do not* include law, business administration/management science, humanities, history (except research in history and philosophy of science and technology), the arts, or education (except educational psychology).

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics Survey of Research and Development Funding and Performance by Nonprofit Organizations, 1996–1997. Available: http://www.nsf.gov/statistics/questionnaires.cfm#14 [February 2015].

- Second, eye movement research indicates that respondents spend more time looking at the beginning of a question than at the end, but there has been little to no research on whether the phenomenon of skipping over clarification provided at the end of a question occurs when the information is visual rather than auditory (Graesser et al., 2006).
- Third, when a definition or clarification is long and complex, a respondent's working memory is taxed in ways that lead to forgetting key elements or ignoring the definition altogether. A preferable approach is asking a series of questions rather than asking one question with a lengthy clarification. "Decomposition is one strategy in which the subcategories of a behavioral frequency report are requested in these individual questions, and decomposing a general category into a set of subcategories is also a technique for conveying a definition and for promoting clarity," stated Redline (Belli et al., 2000; Conrad and Couper, 2004; Conrad and Schober, 2000; Dykema and Schaeffer, 2000; Fowler, 1995; Schaeffer and Presser, 2003; Tourangeau, Rips, and Rasinski, 2000).

Redline further explored the concept of decomposition. She described a web survey experiment that she conducted to examine whether decomposing categories into subcategories and presenting the subcategories as instructions would affect how respondents interpreted the general category. She also tested whether placing the instructions before the question was better than placing them after the question, and whether transforming the instruction into a series of questions yielded answers more consistent with the research objectives than asking one question with instructions.

To test her hypotheses, Redline developed eight questions patterned after particular questions from federal surveys, such as number of residents in the household or the number of shoes that respondents owned. The categories within these general questions were then decomposed.

In this example, Redline asked a survey respondent *how many shoes he or she owned.* The intention was to exclude certain common types of shoes from this total. She added instructions to the questionnaire to *exclude* explicitly certain ineligible types of footwear—such as boots, sneakers, athletic shoes, and bedroom slippers—that people might own and report in error. In other words, people were likely to own these types of shoes, and unless instructed otherwise, would likely report these as part of the total.

Redline tested three main conditions:

1. no instruction;
2. single instruction to exclude certain types of shoes, with the instruction occurring either before or after the question;
3. a series of questions, each asking specifically about a different type of shoe that would be excluded from the total.

An embedded factorial design allowed for testing the effects of placing the instructions at the beginning and at the end of the question. The conditions and questions are shown in Box 5-2. These experiments were included as part of an existing national survey. The cumulative response rate was 38.8 percent.

Redline hypothesized that the mean number of shoes for the control condition (no instructions) would be higher than the mean for the instruction condition, which would in turn be higher than the mean for the multiple-question condition. Results across seven of the eight questions, including number of shoes owned, followed this predicted pattern. An examination of the average percent reduction in numbers reported across questions indicates a 20 percent reduction between no instructions and instructions, and a 33 percent reduction between no instructions and multiple questions.

Redline next focused on the comparisons she made within the instructions condition. She compared the effects of the placement of the instructions, hypothesizing that respondents would report higher numbers when the instructions were placed after the question than when placed before. She identified a significant main effect for position in support of her hypothesis.

Redline explained that she used the follow-up questions she created to determine respondent consistency with researcher intentions: that is, whether respondents excluded the subcategories that they were asked to exclude in the previous questions. Scores of "0" in each subcategory were consistent with following the instructions provided. Results indicated that respondents reported consistent information about the number of shoes they own approximately half of the time with instructions. The position of the instructions had no effect on these findings.

Respondents took more time to answer the multiple-question format than the instructions condition, which took significantly more time than the no-instructions condition. In addition, across all eight questions, respondents took significantly more time to respond when instructions were placed before the question than when they were placed after the question.

Redline identified three main conclusions from her work:

1. Respondents provided lower responses in the presence of instructions designed to lower their answers, suggesting that if a survey's definitions differ from respondents' definitions, then surveys do need to clarify that difference.
2. The position of instructions matters, that is, respondents seemed to adhere to instructions more often when they appeared before a question than when they appeared after the question.
3. Asking multiple questions is more effective than providing clarifying instructions. (In Redline's view, this structure forces respondents to pay even more attention to the subcategories, it requires

BOX 5-2
Redline Decomposition Test: Conditions and Questions

Condition: No Instructions

The next question is about your footwear.

How many pairs of shoes do you own?

Number of pairs of shoes:_____

Condition: Instructions After Question

The next question is about your footwear.

How many pairs of shoes do you own?

For the purposes of this question, do not include boots, sneakers, athletic shoes, or bedroom slippers. Include sandals, other casual shoes, and dress shoes. If you do not own a pair of shoes (as we have defined them), enter "0."

Number of pairs of shoes:_____

Condition: Instructions Before Question

The next question is about your footwear.

How many pairs of shoes do you own?

For the purposes of this question, do not include boots, sneakers, athletic shoes, or bedroom slippers. Include sandals, other casual shoes, and dress shoes. If you do not own a pair of shoes (as we have defined them), enter "0."

Number of pairs of shoes:_____

them to keep less information in memory, and they do not need to do any mental arithmetic with the information when it is broken down into subcategories.)

Redline added that the measurement errors seem to vary depending on the conditions. With instructions, the errors occur depending on whether respondents actually read the instructions, but in the multiple-question format, errors vary because the potential increased ability of respondents to recall the information needed. The multiple-question format also took more time, which is an important tradeoff to consider, Redline suggested. Future work could help to determine whether similar

"Multiple Questions"

The next question is about your footwear.

How many pairs of shoes do you own?

Number of pairs of shoes:_____

When you reported the pairs of shoes that you own, how many pairs of boots, sneakers, athletic shoes, or bedroom slippers, if any, were included?

Number of pairs of shoes:_____

When you reported the pairs of shoes that you own, how many pairs of sandals, other casual shoes, or dress shoes, if any were included?

Number of pairs of shoes:_____

"Follow Up Questions"

Number of pairs: _____

When you reported the shoes that you own, how many were

Boots? _____

Sneakers or athletic shoes? _____

Bedroom slippers? _____

Sandals? _____

Other casual shoes? _____

Dress shoes? _____

SOURCE: Adapted from Redline (2013).

results occur with commonly counted categories as well as commonly omitted categories.

Workshop Discussion on Question Design

Salamon sought clarification on Redline's presentation concerning whether the effects of instructions, clarifications, and using multiple questions are equal with both exclusions and inclusions. "Is it likely that the effects are stronger when you are starting with a concept that you don't understand. . . . It may be that the use of prompts…is even more powerful in that situation than for the data that you presented," he said. Redline indicated the process of understanding what a concept means may be different from measuring a count of a known concept, like number of shoes owned. However, she added that the question about inclusions and exclusions remains unanswered in the research. Salamon shared research that indicates that the more prompts a respondent receives, the more positive answers he or she will ultimately give.

Paul David suggested that, based on his experience, allowing respondents to go back to previous questions might allow them to recalibrate their understanding about the purpose of the survey and to provide better information. Redline indicated she prevented this in her work simply because she was attempting to control the number of variables in her experiment.

Additional discussion centered on whether reading through a questionnaire might prompt individuals to drop out of the survey because it looks long and complex. However, Redline indicated that individuals often do not read through the questionnaire even when instructed to do so.

Results from Exploratory Interviews with Nonprofits

Ronda Britt, NCSES, shared the results of the first wave of exploratory interviews that NSF and their contractor, ICF International, are conducting with research-performing nonprofit organizations. Overall, 20 exploratory interviews are planned in different locations around the United States. To date, four of those interviews have been completed. "By research-performing, I mean they have to have done something that we would consider research, even if they didn't call it research," Britt explained.

The selected 20 nonprofit organizations will be of various sizes and focus on a range of topics, including social sciences and the humanities, policy, education and economic research organizations, and others that may not regularly use the terms R&D. In June and July 2014, staff plans

to visit four major cities—Atlanta, Boston, San Antonio, and Seattle. Britt explained San Antonio has several major research centers that would likely be selected in a comprehensive sample of R&D performers. In addition, the four cities are from geographically diverse areas of the country. Robyn Stone cautioned that emphasizing research institutes would not be representative of the nonprofit sector, in part because many of them resemble for-profit organizations in many ways. She strongly suggested that NSF also capture nonprofits "that do service delivery and are mission driven."

The interviews in San Antonio were completed just prior to the workshop. There were four interviews conducted with two large research institutes and two smaller organizations with limited research activities. One planned exploratory interview with a smaller organization was canceled. Britt focused the remainder of her remarks on these recent interviews, which addressed the nine major topics shown in Box 5-3.

Britt reported that each organization that staff visited had a different operating model. Furthermore, they each used different language to describe their activities, employees, and project terminology. Even the

BOX 5-3
Preliminary Interview Topics from the National Science Foundation Exploratory Interviews

1. Defining research and development (R&D)—how organization describes its activities, other terms for R&D, examples of projects
2. Funding R&D activities outside the organization—types of recipients and projects
3. R&D activities within the organization—funding sources and types of projects
4. Joint projects with other organizations
5. Recordkeeping on R&D activities:
   - Can the R&D projects be tracked separately from other spending?
   - Do they know how many employees are involved in R&D projects?
   - Can R&D be tracked by funding source and/or field?
6. Would national data on R&D within nonprofit organizatoins be useful to them?
7. Who are peer organizations, and what information would be helpful to know about them?
8. Who should the survey be sent to and how (email/web or mail)?
9. How likely are you to respond to a survey from NSF?

SOURCE: Britt (2014).

two large research institutes differed from one another in these ways. All four organizations expressed interest in participating in a survey to measure R&D in the nonprofit sector and agreed to be interviewed to help in its development. However, one individual from a smaller organization admitted that he would probably not complete the NSF survey if he received it because his time was limited and the topic was not particularly salient to his work.

The exploratory interviews shed light on the types of research activities and projects in which the organizations were involved. Examples included functional magnetic resonance imaging consciousness research and other brain research; genetics research; longitudinal family studies; vaccine development; and fuel and emissions technology. One of the smaller organizations was engaged in evaluating the outcomes of a curriculum targeting the problem of youth obesity and diabetes. It included photographing lunch trays before and after meals to determine what children were actually eating. This work has been "published in peer-reviewed journals, so there was definitely research going on there," explained Britt.

Box 5-4 brings together the various terms for R&D that nonprofit organizations reported using, both in this workshop and during the exploratory interviews that NSF has conducted. During the exploratory interviews, some interviewees were unsure whether their research activities would be included in a survey of R&D, if they considered their work only research or only development. The terms "research, development, testing, and evaluation" appeared to be used more in a U.S. Department of Defense context, and it includes more elements than NSF is interested in for the present survey, according to Britt.

The majority of activities that the four organizations reported were funded through grants and contracts from the U.S. government or from industry. A much smaller proportion of the work was funded internally. One organization funded small research awards to university researchers using endowment income, with the number of grants awarded based on the performance of the endowment fund. This particular organization "prided themselves on identifying the 'up-and-coming' principal investigators at a university that would not be getting mainstream funding, because they're kind of on the edge of this translational neuroscience. That was their mission…to put some seed funding out there to help these projects get started," Britt shared. Two of the organizations interviewed routinely conduct joint projects with universities or other nonprofit organizations doing similar work, using subcontracts and funding moving in both directions between the entities.

Three of the organizations operated fiscally on a calendar year, while the fourth organization was on a federal fiscal year. One of the four

BOX 5-4
Terms Used by Nonprofits to Describe Research and Development Activities

During the exploratory interviews conducted by the National Science Foundation:

- Translational neuroscience
- Basic research
- Research OR development—not R&D
- Science
- Feed and bleed—drug testing on animals
- RDT&E—research, development, testing, and evaluation
- Problem solving
- Curriculum development
- Evaluation

During this workshop:

- Research
- Data-driven design
- Program evaluation
- Data mining
- Evidence-based data
- Experimenting
- Citizen science
- Testing
- Translational research
- Evidence-based practices

organizations indicated that it could easily separate the spending on R&D from all other activities, including salaries. Another organization indicated that it would likely report its entire operating expenses as R&D, despite other activities not considered pure R&D because "it would just be hard for them to break out the R&D. And, because their mission was research, they felt justified in including all of the operating budget as research," Britt reported. The smaller organizations indicated that they could determine the proportion of funds spent on R&D if asked even though they did not track these activities because their total amount of such activities was small. All of the organizations could report their total expenditures by the source of the funding; however, separating research from total expenditures would be more difficult. In addition, interviewees said that they could likely assign their work to a scientific field, but also indicated that the traditional fields that might be well suited to a university department were not always appropriate. Britt suggested that an open-ended category could allow nonprofit organizations to identify the

fields themselves. All four organizations were able to provide the number of personnel involved in research and with what projects they were associated. However, providing this information in terms of full-time equivalent was more challenging.

Michael Larsen asked whether administrative and overhead costs, such as utility costs, would be captured by the NSF survey, given that these costs are necessary for conducting research. Britt clarified that they asked nonprofit organizations for research and related indirect costs. She added that including these costs is consistent with their other surveys. Michael Crosby noted that it could be useful to also capture the name of the agency with which the organization negotiated its indirect rate. He also asked for clarification about whether NSF was capturing external philanthropy as a source of funding in addition to contracts, grants, and internal funding. Britt indicated that NSF was interested in understanding the variability and which organizations had extensive records. She added that the interviewers do ask about external philanthropic funding, but it was not a predominant source of funding for the four organizations interviewed in San Antonio.

The four nonprofits all indicated that they would find data on the nonprofit sector helpful to them. They most often identified universities or university departments that were engaged in similar work as their peers, and only a few could identify small numbers of nonprofits doing similar work. When asked what other types of data would be helpful to them, one interviewee indicated that presenting the data by tax-exempt status and field of research would be helpful. This individual wanted to learn whether other nonprofit organizations faced similar restrictions on annual funding of research. Identifying other nonprofits doing work in the same field would help the organization make budgetary decisions and determine whether they were duplicating any efforts. Others indicated that data on revenue and number of employees to identify similar-sized organizations would be helpful, as would knowing recovered indirect cost allocation, although this information is unlikely to be made publicly available, Britt noted. The interviews indicated that organizations would be interested in knowing the geographic location of peer organizations because location can impact costs, salary ranges for research personnel, and other "side-business" incomes. Crosby also indicated that his nonprofit organization publishes a list of peer organizations, adding it is a source that NSF may consider using to identify other research-performing nonprofits.

Another purpose of the exploratory interviews was to explore finding the correct respondents for the NSF nonprofit survey. Of the three interviewees who indicated that they were likely to complete the survey if they received it, all indicated that they would review it and filter it to

the correct respondent. Britt added, "In all cases I believe we were talking to the person that would end up filling the survey out. And these people were generally either the president, . . . CEO, or a vice president for research, depending on the size of the organization." Most preferred to receive an initial mailing rather than only receiving an email because the email was likely to get lost or be filtered out as "spam." Receiving an envelope addressed from the National Science Foundation would serve as a visual cue and elevate the survey's importance, Britt conveyed. The three organizations on calendar year fiscal years would need to receive the survey in late spring or early summer after their books have been closed for the previous year. This timing is consistent with the planning for upcoming pilot study, according to Britt.

Britt concluded her remarks with some additional timetable information. She indicated that the next exploratory interviews in Atlanta, Boston, and Seattle would be completed by the end of July 2014. The information gathered in the exploratory interviews will be presented in a report and then used to draft a questionnaire. The process of conducting cognitive testing, drafting the questionnaire, and obtaining clearance from the Office of Management and Budget must be completed before pilot testing can begin in summer 2015.

Discussion of Potential Approaches to Screening

Carol House, NRC, led a discussion about a proposed approach to screening potential respondents to the NSF Nonprofit R&D Survey. She began by presenting the instructions included with the 1997 nonprofit survey, adding that "they're very complex instructions, and then they ask the respondent to use that definition when answering the remainder of the questionnaire." As shown above in Box 5-1, these instructions define research, development, and science and engineering. The two survey questions that follow these instructions are presented in Box 5-5. House suggested that this approach "from everything we've heard, is set up to screen organizations out, particularly those organizations with activities in the kind of gray area of R&D that we have discussed in this workshop. It is unlikely that these organizations will see themselves in these definitions."

A different approach would involving asking multiple questions rather than a single question, and may be a preferable approach to consider, stated House. This approach was suggested by Larsen and Salamon during discussions at this workshop, and it is consistent with Redline's findings about decomposition, she added. Shown in Box 5-6, House presented a strawman version of such a multiple-question approach to screening for R&D. She generally used the format and terms that Britt

BOX 5-5
Screening Questions on the 1996 National Science Foundation Survey of Nonprofit Research and Development

1. Your Organization
Is your organization a nonprofit organization? (By nonprofit, we mean an organization classified as 501(c) by the Internal Revenue Service, filing a 990 or a 990-PF tax return form.)
___ Yes ___ No

2. Research Performance
In 1996, did your organization ***conduct*** any research or development in the science, engineering, or technology fields? Science, engineering, and technology fields include

Social Sciences	Psychology	Medical and Health Sciences
Biological Sciences	Engineering	Physical Sciences
Environmental Sciences	Mathematical Sciences	Computer Sciences
Agricultural Sciences		

___ Yes ***(Continue with 2a)*** ___ No ***(Skip to Q.# 3)***

2a. Approximately how much research or development in the science, engineering, or technology fields did your organization ***conduct*** in fiscal year 1996? *(Consider total costs, including both direct and indirect costs in both internally and externally funded research or development.)*

___ Less than $50,000	___ $50,000-$249,999	___ $250,000- $999,999
___ $1,000,000-$4,999,999	___ $5,000,000-$24,999,999	___ $25 million or more

SOURCE: NSF/NCSES Survey of Research and Development Funding and Performance by Nonprofit Organizations, 1996–1997. Available: http://www.nsf.gov/statistics/questionnaires.cfm#14 [February 2015]. The entire questionnaire can be found at this same link.

identified through the exploratory interviews along with other potential terms.

House explained her rationale for including several of the screening questions. First, she included the screening item about "developing new approaches to social service delivery and evaluating their outcomes" because this language arose from her conversations with individuals from several nonprofits prior to the workshop. House emphasized that identifying and using the terms to which various nonprofits might respond, as those shown in Box 5-4, and including these phrases in a multi-question

BOX 5-6
Strawman Proposal for Multiple-Question Screener

Has the staff at <nonprofit name> done any of the following?

- Conducted work that might lead to a patent?
- Produced findings that are published in academic journals or presented at conferences?
- Developed new approaches to social service delivery and formally evaluated the results?
- Created new solutions that can be generalized to other situations?
- Conducted work to discover previously unknown facts, structures, or relationships?
- Conducted work to extend the understanding of facts, relationships, or principles in ways that could be useful to others?
- Conducted research and development in the area of medical or health-related sciences, such as biochemistry, genetics, reproduction, and clinical medicine?
- Conducted research and development in the area of natural sciences, such as agricultural science, environmental science, and physical sciences?
- Conducted research and development in the area of social science, such as psychology and social science?
- Conducted research and development in the area of engineering, such as chemical, civil, metallurgical, and other engineering fields?

Using a web-based instrument, the key terms (research, development, medical or health-related sciences, natural sciences, social science, engineering) can be hot-linked to a definition.

SOURCE: House (2014).

approach to screening, may provide a way of screening organizations with less traditional forms of R&D *in* rather than *out*. Such an approach might still require including some of the previously used questions as "catch-all," House added. House also suggested that a web-based survey could include hotlinks that provide definitions for key terms.

After being screened in, organizations could be asked to think about the activities they identified in the screening process, stating that the activities would subsequently be referred to as R&D activities. House stressed that this approach and the specific screening components to include, remain untested, but could be productive for the group to consider and for NSF to experiment with.

IMPLEMENTATION OF THE NSF NONPROFIT R&D SURVEY

Several presentations at the workshop addressed methods for implementing the survey, considering the unique nature of the nonprofit sector. Together, these presentations focused on concrete steps that NSF can take, particularly during the planning stage, to obtain a response rate that minimizes selection bias and other errors and makes the most efficient use of limited resources.

Guidance from a Successful 1999 Survey of Nonprofits

Jeffrey Berry, professor of political science at Tufts University, presented his experiences successfully conducting a large-scale random sample survey of 501(c)(3) Form 990 filers using data files prepared by the National Center for Charitable Statistics at the Urban Institute. This work led to the publication of two books: *A Voice for Nonprofits* (Berry, 2003b), providing information gathered from the survey, and *Surveying Nonprofits: A Methods Handbook* (Berry, 2003a), a methodology handbook specific to conducting surveys of nonprofits using Form 990. Berry noted that the methodology handbook focuses primarily on the mechanics of conducting this type of survey rather than on methodological theory.

Berry explained the purpose of his 1999 survey of the nonprofit sector: "We heard from an advisory panel of nonprofit leaders . . . that a 501(c)(3) designation inhibited their ability to represent their clients before government. The organizations were mostly social service providers, and their clients were people who are poor or disadvantaged, marginal, had health care problems, and so on. The reason for the constraint is that section 501(c)(3) of the tax law says that public charities can lobby, but they cannot do it substantially, and the IRS refuses to define exactly what substantial means." In addition, other filing options regarding lobbying under the law are contradictory and confusing, noted Berry. Ultimately, the nonprofit leaders came to believe that they could not lobby at all. Berry's survey focused on understanding the impact of these beliefs and found that ignorance of the laws and the ambiguity of the laws about representing clients before the government had a profound effect to the detriment of individuals who do not typically organize themselves and have little or no discretionary income.

During the planning phase of the survey, Berry and his colleagues identified previous survey research focused on the nonprofit sector and determined that low overall response rate was a significant limitation. For example, one study of 5,000 nonprofits had only a 17 percent response rate, raising concern about selection bias. Thus, Berry focused specific attention on improving response rate for the survey he planned, using methods published by Donald Dillman as the *Total Design Method* (Dillman, 1978).

BOX 5-7
Schedule of Mailings—1999 Survey of Nonprofits Conducted by Jeffrey Berry

- Week One: Initial mailing of survey
- Week Two: Postcard reminder
- Week Four: Replacement surveys for bad addresses
- Week Five: Second mailing to all nonrespondents
- Week Nine: Third mailing by certified mail to all nonrespondents

SOURCE: Berry (2014).

Berry said sampling issues were an initial challenge in planning the survey. They sampled four different sets of organizations, oversampling three of them, and ultimately achieved a response rate of 64 percent, which is "about as good as you're going to get, I think, in the nonprofit world," according to Berry. This response rate was primarily attributable to three factors, which he identified as persistence, "grunt work," and hiring sufficient labor needed to do this work.

Berry stated the survey was mailed to respondents, noting that a greater number of feasible options, including web surveys, exist today. Box 5-7 shows how the initial mailing and three follow-up mailings were scheduled to increase response rate. Berry noted that 12 percent of the total overall sample, and 22 to 23 percent of the sample that had not responded to one of the three previous mailings, responded after receiving certified mail. "So, you can do things that juice up the return rate; you just have to make a commitment to doing that," Berry stated. He added additional techniques have been developed to accomplish this goal since 1999, as well. Other subsequent surveys he has conducted have also made use of email prompts.

In addition to persistent follow-up with respondents, Berry indicated that substantial work is needed to gather accurate contact information for respondents. Because the data files contained records that were 2 years old, staff had to locate updated addresses, phone numbers, and, in some cases, names for the organizations themselves. This required extensive phone calls to validate the information and to avoid having a sample with many invalid addresses. When the survey was fielded, of the thousands of organizations, only 150 were returned because of bad addresses, indicating that Berry and his colleagues had achieved a high degree of validation prior to implementing the survey. Berry also stressed, "You don't want to mail just to 'Executive Director.' You want the name of that person."

The effort to obtain the name of the desired respondent, email address, and other valid contact information requires work and can be expensive; however, it is necessary to achieve a high response rate.

Strategies for Improving Survey Response Rates

Berry described his 1999 survey of nonprofits, which he implemented following Dillman's *Total Design Method* (Dillman, 1978). Because much has changed in the world of survey research since his method was first developed, Dillman, Regents Professor of Sociology at Washington State University, updated his method based on his ongoing experiences and research, along with his own perceptions and strategies for the NSF Nonprofit R&D Survey. Many of these ideas are available in a 2014 book (Dillman, Smyth, and Christian, 2014).

Dillman said that designing a survey of the nonprofit sector presents some unique challenges. He identified five issues that may affect how the survey is designed and implemented:

- First, nonprofits are so heterogeneous in terms of size and other factors that the survey may need to be designed from the outset with a range of survey approaches.
- Second, the design should take into account the knowledge that some organizations will clearly understand the meaning of R&D while others will find these ideas unclear or irrelevant.
- Third, nonprofits will differ with regard to their preferred response mode. For example, most organizations may be able to respond via the Internet, but others will be reluctant to use that mode. This variation will require specific attention.
- Fourth, convincing some organizations to respond to the survey will require a significant effort.
- Finally, respondents will vary across various organizations. Some nonprofits will have a single best respondent; however, in others multiple respondents may need to be involved.

All of these issues require forethought and planning at the design phase of the survey, he asserted.

Dillman next presented eight specific ideas to maximize the response rate of the NSF Nonprofit R&D Survey (see Box 5-8) and elaborated on each. First, as Berry described, effort should be devoted to obtaining valid contact information, which should include the name of a specific person to whom the survey should be sent, and also verifying the existence of the organization. Sometimes multiple contacts, such as an initial mailing with follow-ups, can end up with different people in larger organizations;

BOX 5-8
Dillman's Ideas to Maximize Response on the Survey of Nonprofits

1. Make an initial contact with organizations, especially larger ones, to find out the name and contact information for the person to whom request should be sent.
2. Obtain contact information for telephone, email, and postal delivery.
3. Use multiple contacts by different modes in predetermined sequence to encourage contacts.
4. Consider getting statement(s) of support from leaders in the nonprofit sector for possible use in communications.
5. Use initial postal contact with request to respond by web followed by email to "make responding easier for you."
6. Do not offer a choice of response mode unless you make it easy to respond by either mode. Doing so lowers response rates.
7. Do not rely only on email contact. Mail needs to be used to legitimize the study (some nonprofits will not know who the National Science Foundation is; email only surveys get much lower response than when other contact modes are used to amplify effectiveness of email contacts).
8. Use a postal mode response option—effective when no web response has been achieved, but not vice versa.

SOURCE: Dillman (2014).

therefore, making an initial investment in identifying the right person to receive the survey each time is very critical, according to Dillman. Second, he emphasized that NSF should obtain multiple ways of contacting respondents, including telephone, email, and postal address. These contacts then form the basis for an effective implementation system, his third idea. These multiple contact modes should be used in a predetermined sequence in which each contact works in synergistic fashion with the others. Fourth, Dillman suggested that getting a statement of support from leaders in the nonprofit sector for NSF to use in its communications with potential respondents may be helpful in encouraging response. Although this technique is not uniformly effective, it can be helpful if it is integrated well with the other procedures.

Fifth, Dillman suggested using an initial postal contact with request to respond by web, followed by an email to make responding easier for the respondent. "And so, I'm really suggesting doing everything possible, perhaps early on, to be able to get both the email and the mail addresses," stated Dillman. A number of reasons exist for making postal contact

first, along with email augmentation, suggested Dillman, adding more background for this recommendation. He referred to a recent study that he conducted about the extent to which graduate students were writing interdisciplinary dissertations in 2013. They anticipated a low response rate from the population they were sampling. Using only an email contact would have been possible because they had an email contact for each person in the sample. However, using email only to get a web response was likely to yield a 20 to 25 percent response rate based on experience with other surveys of students conducted by the Social and Economic Sciences Research Center at Washington State University. Using mail-only contact to get a web response would likely have resulted in a response rate of 35 percent, and using mail only to get a paper response was likely to result in a response rate in the 35 to 45 percent range. Instead, Dillman said, he and his colleagues "designed a system to push responses to the web by withholding a 'paper-response' option until later but also followed it up with mail while trying to build synergy across the postal and email contacts."

Dillman enumerated the steps they implemented. On the first day, they mailed a postal request to respond over the Internet, while sending a $2 token incentive. Dillman clarified that such an incentive would not be appropriate for an organization. Three days later, they used email augmentation, and again sent another email on Day 8. On Day 16, researchers sent a postal follow-up with a mail questionnaire, using this in anticipation of coverage problems with email alone. For example, some students might not have had access to email because of off-campus fieldwork. Finally, on Day 21, they sent a final email augmentation.

Figure 5-1 shows that the effects of each of these elements on response rate. Dillman indicated the connectivity of the techniques rapidly increased response rates. The response to the initial contact was low, but the first email augmentation resulted in an additional 21 points within 10 hours. Within 5 days, they had achieved 40 points. Once the paper surveys were mailed, although these responses were somewhat delayed, the web response also increased simultaneously. Ultimately half of the additional responses to the mailing were on the web. The final response rate was 77 percent using these methods.

Dillman summarized these effects, stating, "Postal contact had [the] incentive, [and] email had [the] message, 'Here's a link to make responding easier.'" Pairing these methods increases the likelihood of one of the others being opened and read, while making an initial contact over the telephone also increases the anticipation that something important is coming, he said. Further, the use of multiple contacts improves coverage in case one of the contacts is wrong. Connectivity improved the speed of the responses as well. The effects of this synergistic approach are also being seen with the American Community Survey, Dillman noted.

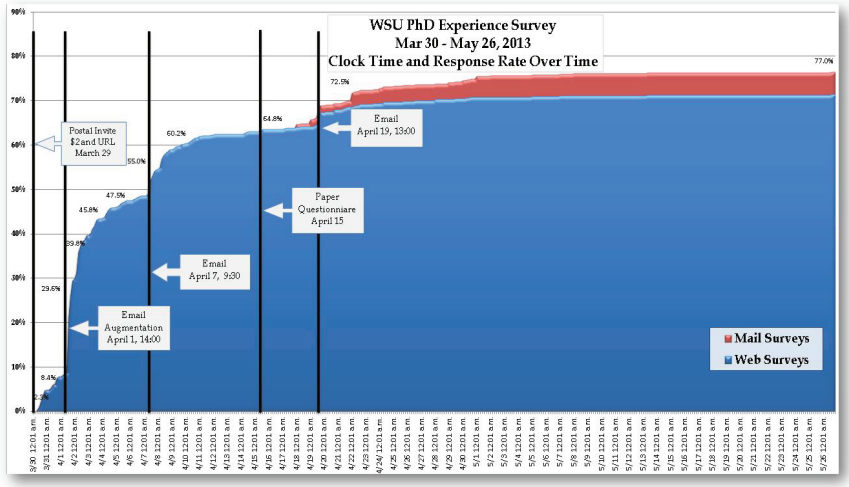

FIGURE 5-1 Email augmentation pushing response rates up.
SOURCE: Millar (2013, Fig. 1).

Dillman's sixth idea is to offer a choice of response mode only if the survey is made easy for respondents to respond by either modes. Response rate is lower when these conditions are not met. However, it can still be effective to emphasize one method over another until later in the process as a means of improving responses, he said. As his seventh idea, Dillman noted it is inadvisable to rely only on email contact because mailings play an important role in legitimizing the study. Finally, he explained in his eighth idea that postal mailings can boost web responses, but the converse does not appear to be the case (Messer and Dillman, 2011; Millar and Dillman, 2011).

The NSF Nonprofit R&D Survey is likely to encounter nonrespondents when the organization does not undertake R&D or is unclear about the meaning of that term, Dillman suggested. One approach to addressing this type of nonresponse could be placing a follow-up telephone call that includes the screener items, so that if the organization was deemed eligible, then additional contact by email and mail could be made.

The science of survey development and implementation has advanced a great deal in Dillman's view. Research supports the use of multiple contacts and multiple response modes, and the need to demonstrate that responding is both easy and important to do. Dillman reiterated this point by providing a draft implementation sequence (see Box 5-9) for what

BOX 5-9
Dillman's Survey Implementation Sequence
Example to Maximize Survey Response

- An initial contact by telephone to obtain contact information.
- An initial postal letter that explains and legitimizes request for research and development information.
- A quick email follow-up to make it easier for person to respond.
- Another postal letter requesting a response.
- Another email augmentation.
- Telephone calls for nonresponse follow-up.
- Additional email and/or postal contacts.

SOURCE: Dillman (2014).

he recommends to be a mixed-mode, multiple-contact survey. Current approaches are increasingly tailored with different contact modes and response modes for different populations and situations. He stressed that applying methods from similar surveys with the business sector to the nonprofit sector may not be effective. The result of these rapid advances is that it is not always possible or desirable to apply methods from the past to current and future studies.

Additional Considerations for Implementing the NSF Nonprofit R&D Survey

Ron Fecso also addressed the design of the questionnaire and approaches to data collection. As Berry and Dillman suggested, Fecso stressed the importance of collecting useful data to enhance the sample frame at the outset, and he also recommended that NSF focus on obtaining a good response rate. Fecso said that obtaining good response from the big R&D-producing nonprofit organizations was particularly important, and that NSF should use screening tools to improve the efficiency of implementation.

Fecso noted that ultimately the data collected are "going to plug some holes in a bigger dataset where the data are collected in a way that's already defined." He additionally stressed the importance of limiting the number of questions on the survey and eliminating any unnecessary items. Fecso said if an item is important, then there needs to be a sample size that is sufficient to analyze that item at the appropriate level. If the sample size will not support the appropriate analysis of a particular item,

he said, then this should be an important consideration in whether the item should be retained or discarded. Ensuring that the questionnaire is no longer than necessary can increase the chances that a respondent will respond. Fecso indicated that effective screener items, tailored depending on how likely the organization is to be an R&D performer, can also help boost response rate. Tailoring can also be used to make the questionnaires more personal, suggested Fecso. For example, knowledge of what an organization does might be useful in developing tailored web questionnaires and more personal initial and follow-up contacts.

Workshop Discussion on Implementing the Survey

Salamon observed that the presentations pointed to two different approaches to the NSF Nonprofit R&D Survey—the methodology-driven strategy and the substance-driven strategy. In his view, the substance-driven strategy starts with the premise that the goal of the survey is to understand R&D in the nonprofit sector; however, the methodology-driven strategy focuses more on understanding R&D in certain parts of the nonprofit sector. In the latter approach, the results may be easier to defend methodologically, but this involves tradeoffs. Ultimately, Salamon indicated that this is a policy decision that NSF will need to make. "Are we attempting to find R&D in its multiple forms in the nonprofit sector, or are we trying to come up with a number that is kind of a shrunken concept of what R&D really constitutes but that will allow us to do it with much greater validity?" he asked. He added that he realized that pursuing a substance-driven approach would be more difficult and would require more observations.

Irwin Feller agreed generally with the characterization that Salamon conveyed but said that there are ways to integrate the two strategies. In particular, he said, the screening approach presented by House is a way to develop a user-based definition of R&D and to understand how nonprofits conceptualize these activities. Starting with an inclusive definition, applying the procedures outlined by Berry and Dillman, and adhering to the appropriate methodological constraints could be a way of blending the two strategies, Feller proposed. In his view, referring to the previous 1997 survey is of little value because it serves as a poor baseline. Instead, he argued that "we just start fresh, go forward, and I think the real approach is to encompass the multitude of diversity of activities that we heard from the nonprofit organizations who presented at the workshop."

Phillip Kott commented that the substance-driven approach is challenged by the need for a larger sample size, while the methodology-driven approach may be flawed if it is overly reliant on estimating sampling needs based on the 1996–1997 survey. In Kott's view, "the problem

is bias, that we may be missing a lot in those small groups that we don't want to miss. . . The problem with the way sampling works is you need the same sample size no matter what you're estimating for. . . and we just don't have that money."

David framed the choice as between two desirable goals: producing a set of numbers that can facilitate international comparisons and exploring the quantitative importance of various forms of research in the nonprofit segment of the service sector. In the former approach, efforts are devoted to eliciting responses from the types of organizations likely to produce 80 to 90 percent of the R&D, using a stratified sampling approach to emphasize those organizations. In the alternative, one would seek responses from the various types of organizations that identified themselves as R&D producers based on preliminary screening questions and devote resources to obtain responses from them with the ultimate purpose of capturing the diversity of the sector. David suggested an approach that targets the larger producers of research activity but then devotes a portion of the resources "essentially to keeping the survey wide open to provide an informatively detailed picture of the diversity of research, research style, and methods. This mixed approach requires careful preliminary attention to the characterization of the activities that are to be described as research or R&D."

Larsen noted three discussion points across the workshop were intersecting. First, the varied interests in the data would require a narrow concept of measurement to produce data applicable to the System of National Accounts, along with a broader concept to capture what research is in the nonprofit sector. Second, sampling design and stratification are necessary for efficiency, allowing for analysis of subgroups. Third, reaching these selected organizations requires planning for multiple contacts.

Stone stated her view that if it were not possible to develop a sampling approach that captures the full nonprofit sector, then the survey ought to be characterized differently and focused on large research institutes. Susan Raymond noted that philanthropies concerned with the health of civil society and the health of the nonprofit sector might be able to supplement the survey through a public-private partnership, if resources are the sole barrier to capturing the full nonprofit sector.

Determining how to obtain a good response rate among people who receive many surveys was a second issue. Catherine Mickle shared her views as a potential respondent to the NSF nonprofit survey. By clearly laying out the factors that would influence her decision to respond to a survey, she provided a blueprint that NSF may follow as they strive for high response. Mickle commented that she receives many surveys about a range of topics, all of which represent competing priorities unrelated to her daily mission. Because of the number and the demands on time, Mickle makes decisions about which surveys to complete. She indicated

she filters out surveys that are very time-consuming with little apparent value in their use; from unknown organizations; veiled press inquiries; likely to encourage solicitation; and from consulting firms that are not working on behalf of a known organization. In contrast, Mickle stated she completes surveys if: they are required or seem to be mandatory; they look official or are from a government entity; someone in the leadership of her organization has a connection to those carrying out the survey; her organization sees the survey as valuable with regard to input or output or to the sector at large; her organization perceives that it has unique perspectives or data to offer; responding would help to strengthen a relationship that might be important in the future; or there is an exchange element, such as receiving the results of the survey in exchange for data.

POTENTIAL OUTPUTS FROM THE SURVEY

The workshop looked at the required outputs from the NSF Nonprofit R&D Survey and considered which additional outputs may be valuable to NSF or to the broader nonprofit community. A summary of that discussion follows.

Outputs Required for NSF Products

Mark Boroush, senior analyst in the R&D Statistics Program at NCSES, presented details about the products that NSF is mandated to produce. NSF annually releases *National Patterns of R&D Resources,* across sectors (National Science Foundation, n.d.-a). The nonprofit sector is part of its mandate, and this survey would be used to estimate the sector's contribution to R&D. In the years without such a survey, NSF has modeled the contribution from the "other nonprofit" sector.

Boroush noted that these estimates generate great interest among those involved with national policy, particularly with regard to the United States' overall level of R&D performance (expenditures) and the ratio of this performance to gross domestic product as compared to other countries. NCSES also dissects R&D by the character of work (i.e., basic research, applied research, or development). Boroush stated, "There's a dialogue right now whether the level of our support for basic research, particularly that provided by the federal government, is enough to keep our innovative edge going or whether in fact we're falling behind what's going on in other countries." These policy implications provide an indication of the importance of gathering data on R&D across all sectors. Boroush presented data on total R&D performance across the major sectors in 2011, the most recent year for which NCES has final numbers. These data are presented in Table 5-1. In 2011, the United States performed

TABLE 5-1 U.S. 2011 Research and Development Expenditures (in millions)

	Funding Source						
Performing Sector	Total	Business	Federal Gov.	Universities & Colleges	Nonfederal Gov.	Other Nonprofits	Performing Sector Percentage of Total
R&D	428,626	267,306	129,256	12,965	3,993	15,106	100.0
Business	294,093	262,784	31,309	*	*	*	68.7
Federal Government	53,493	*	53,493	*	*	*	12.5
Federal Intramural	35,775	*	35,775	*	*	*	8.4
FFRDCs	17,718	*	17,718	*	*	*	4.1
FFRDCs, Industry Administered	6,956	*	6,956	*	*	*	1.6
FFRDCs, U&C Administered	5,246	*	5,246	*	*	*	1.2
FFRDCs, Nonprofit Administered	5,516	*	5,516	*	*	*	1.3
Nonfederal Government	462	*	187	*	275	*	0.1
U&Cs	62,457	3,189	37,714	12,965	3,718	4,872	14.6
Other Nonprofit Organizations	18,120	1,333	6,553	*	*	10,234	4.2
Source of Funds of Total (%)	100.0	62.4	30.1	3.0	0.9	3.5	—

NOTE: * = small to negligible amount; FFRDCs = federally funded research data centers, R&D = research and development, and U&Cs = universities and colleges.

SOURCE: Boroush (2014). Data from National Science Foundation, National Center for Science and Engineering Statistics, *National Patterns of R&D Resources* (annual series). Available: http://www.nsf.gov/statistics/natlpatterns/ [February 2015].

approximately $429 billion of R&D. The estimate for "other nonprofit" (nonacademic and nongovernment) R&D performance was $18 billion, or approximately 4 percent of total R&D performed in the nation. In 1997, the "other nonprofit" sector performed approximately $6 billion in R&D before adjusting for inflation, indicating a significant increase in estimated activity. Federally funded research and development centers (FFRDCs), such as Lawrence Livermore and the Pacific Northwest Laboratory, are also estimated to perform about $18 billion. He added that these numbers do not take into account the contributions of volunteer labor.[1]

Ideally the estimates of R&D in one sector are compatible with the estimates gathered from other sectors, enabling the numbers to be added together. For example, the estimates from the business sector, which are reported on a calendar-year basis, require no adjustment. However, the federal R&D estimates do require adjustment because they use a federal calendar year. Estimates from higher education require other adjustments. Overall the purpose is to "be adding apples to apples and making things as consistent as they can," explained Boroush. The end product of this addition is the U.S. total R&D in performance by the major performing sectors, published annually in *National Patterns of R&D Resources*, including information briefs and statistical tables. These estimates are also a key component of the Science and Engineering Indicators published every two years.

Boroush reiterated that the 1996–1997 survey was the last time that empirical data were gathered to measure R&D in the "other nonprofit" sector, and that since that time they have modeled "elasticity relationships" to look at proportional changes in the numbers to estimate R&D in the "other nonprofit" sector. Because of this, he stated, "This definitely represents a hole, I guess, in the dataset that we've got, and it's something that we need to fill and have needed to fill for some time." Currently, NCSES estimates "other nonprofit" R&D performance resources by adding together estimates of funding for "other nonprofit" R&D from the three primary sources of those funds, as shown in Table 5-2. The first source of funding for nonprofit R&D is from the federal government. NCSES has current, annual data on the amount of federal R&D dollars going to nonprofits through its annual Federal Funds survey. The table shows an estimated $6.56 billion in R&D performance in the "other nonprofit" sector funding by this source. A second source of funding is from the business/industry sector. As noted in the 2013 National Research Council report, "NCSES assumes that the annual growth in funding from industry to nonprofit organizations changes in constant proportion to

[1]Organizations reporting on these surveys are unlikely to convert and report the value of volunteer labor as an R&D expenditure.

TABLE 5-2 Estimating Research and Development (R&D) Performance by Other Nonprofit Organizations (billions of dollars)

Source of Estimate	Estimated Total Other Nonprofit R&D	(A) Federal Funding for Other Nonprofit R&D	(B) Business Funding for Other Nonprofit R&D	(C) Nonprofit Funding of R&D in Other Nonprofits
	Total = (A) + (B) + (C)	Annual Survey of Federal Funds for R&D	Estimated[a]	Estimated[b]
1997	6.62	3.01	0.81	2.80
2000	9.73	4.51	1.02	4.20
2005	14.45	6.55	1.11	6.80
2010	18.40	7.09	1.27	10.04
2011	18.12	6.56	1.33	10.23

[a]Based on elasticity ratios from the 1996–1997 *Survey of R&D Funding and Performance by Nonprofit Organizations.* Current-year business funding of R&D in other nonprofits based on current-year business funding of R&D in other businesses.

[b]Based on elasticity ratios from the 1996–1997 *Survey of R&D Funding and Performance by Nonprofit Organizations.* Current-year nonprofit funding of R&D in other nonprofits based on current-year nonprofit funding of R&D in academic institutions.

SOURCE: Boroush (2014). Data from National Science Foundation, National Center for Science and Engineering Statistics, *National Patterns of R&D Resources* (annual series). Available: http://www.nsf.gov/statistics/natlpatterns/ [February 2015].

the annual growth in industry-to-industry funding" (National Research Council, 2013, p. 51). NCSES conducts an annual survey of R&D within the business sector and estimates the funds transferred to the "other nonprofit" sector based primarily on what was learned during the 1996–1997 survey, Boroush noted. In 2011, NCSES estimated this funding to be $1.33 billion. The third source of "other nonprofit" funding is derived in a similar fashion, using the observed relationships between academic institutions' funding of other nonprofit R&D in 1996–1997. The 2011 estimate for this component was $10.23 billion. The total estimated R&D performance for 2011 is the sum of those three estimates, $18.12 billion.

Boroush commented, "What we're looking for out of this survey, one of the things we've not been able to do is to track the up and down of the economy and corresponding up and down changes in funding trends in the nonprofit sector, because we're relying on statistical relationships that date back to the late 1990s." Further, changes in the nonprofit sector, such as increased use of evidence-based program management or shifts in the extent to which philanthropy versus fees or government funding

are playing roles in driving certain activities or R&D spending, cannot be tracked through current methodologies. Finally, according to Boroush, NCSES also needs to identify effective ways to estimate the R&D that is happening in the "other nonprofit" sector between surveys, because the new nonprofit R&D survey is unlikely to occur annually.

Boroush concluded his remarks, wrapping up a summary of the key data needs for the *National Patterns of R&D Resources*. "Clearly the primary need in all this is for a complete and comprehensive new round of numbers that provide total U.S. domestic R&D performance by the other nonprofit sector, and by source of funding," said Boroush. First and foremost, he stressed, data are needed about who is performing R&D in the nonprofit sector and how much they are performing. Second, NCSES needs clarity on what comprises R&D in the nonprofit sector, including determining how the OECD's Frascati definitions will be implemented and what portions of this R&D are relevant for including in the U.S. total R&D estimates. Third, Boroush pointed to two breakouts needed of the total R&D performance in nonprofits. First, NCSES needs to know the sources of the R&D funding and how much funding is coming from each source: from the nonprofits themselves, from the federal government, and from the business sector. Boroush said that NCSES also needs to know what other sources may be providing significant levels of funding, such as nonfederal government or international sources. The second breakout is to understand the character of work performed—whether basic research, applied research, or development.

Boroush said he would prefer data from a new survey of "other nonprofit" R&D each year, which would supply the information described above. However because of resource constraints, he thought it unlikely that the survey could be conducted regularly on an annual basis. Thus, NCSES would like to improve the way that it estimates R&D in the nonprofit sector for the years in which it will not be conducting the survey.

Other Potential Outputs

Feller initiated a discussion of the ways in which the data from the NSF Nonprofit R&D Survey could be used beyond the *National Patterns of R&D Resources*. He asked the participants to assume that definitions of R&D in the nonprofit sector were clarified and that the challenges of population, sample frame, questionnaire design, implementation strategy, and statistical rigor had all been addressed. If these challenges were overcome, then participants could consider how these data could be useful to the varied stakeholders with differing interests and needs. These needs are not mutually exclusive, Feller added. However, he pointed

out, nonprofits are more likely to respond when they perceive a mutually beneficial exchange and they can benefit from the data being collected.

House referred to comments that several participants had made over the course of the workshop. The standard tables that NSF publishes in the *National Patterns of R&D Resources* release display the nonprofit sector broken into subsectors based on how NSF collects the data: other nonprofits, universities and colleges, university and college FFRDCs, and nonprofit FFRDCs. Many attending this workshop, she noted, consider all of these components as part of the broader nonprofit sector. A useful additional product would be for NSF to produce some additional but similar tables that combine these components together, she suggested. Thus there would be estimates of R&D performance and funding for the entire sector. In her view, this appears to be a simple, no-cost product that could be very valuable to stakeholders.

David suggested that the NSF nonprofit survey could serve as "just an opening, which would make possible the organization of a much larger and much more comprehensive survey of the not-for-profit sector." He added that NCSES is a small part of NSF, and other agencies, such as the U.S. Department of Commerce, the Labor Department, and environmental agencies, all gather data. He suggested an exploratory aspect of the NSF nonprofit survey could serve as a catalyst toward a partnership of resources and expertise among various agencies to properly survey the nonprofit sector. Such a survey could be designed to capture not only their R&D activities but also the ways in which the sector contributes to the welfare of the American people. David also noted that the techniques that NSF is developing to learn about R&D in the nonprofit sector will have implications relevant to measuring the activities of the service sector beyond the nonprofit arena, increasing their overall impact.

Salamon expressed his interest in expanding the scope of the NSF nonprofit survey by exploring ways to marshal external funding for NSF to enable expanding the pool of organizations surveyed, or by conducting a broader survey with a research team outside of NSF following parallel methods so that the data could be used together for NSF's purposes, as well the purposes of other stakeholders. He stated that a broader survey would "begin to create a baseline of information on who's using evidence-based decision making and track that over time," adding that he saw this as "an enormous trend, and an area of enormous interest in the philanthropic arena." David suggested that the National Academies could also potentially play an important and independent role in planning such an effort, identifying sponsors of the work, and bringing together a range of experts. Foundations are another potential resource that might be "mobilized" for examining the possibilities that exist across the statistical agencies of the government to focus on the nonprofit sector, he noted. Thus, he

agreed that NSF is not the only agency that could address broader goals. Kott added that the Urban Institute and other groups outside government might be able to play important roles in such efforts.

Feller asked the participants from the nonprofit organizations to share their views on the survey and future uses of the data, emphasizing a need for re-conceptualizing definitions of the sector and their activities. Maria Cristalli indicated that she would value gaining more understanding of the types of activities such as those shared by the nonprofit organizations at the workshop because little information currently exists. Enormous changes in the way nonprofits are funded are driving a need for a body of knowledge of how the work is done across the nonprofit sector she observed, and this information could facilitate knowledge sharing and demonstrate the positive impact that the sector can have collectively.

Cristalli's comments echoed suggestions that Britt received during the exploratory interviews (discussed earlier in this chapter). Those respondents said that they would be interested in

- seeing the data presented by tax exempt status and field of research;
- learning whether other nonprofit organizations faced similar restrictions on annual funding of research;
- identifying other nonprofits doing work in the same field, and those of the same size, to determine whether they were duplicating any efforts;
- learning about recovered indirect cost allocation; and
- knowing the geographic location of peer organizations.

Cristalli expressed her view that the NSF Nonprofit R&D Survey will require engagement with survey recipients and clear communication about how the survey will help the sector move forward.

Stone shared her views as a former survey researcher outside of the nonprofit sector and as a current leader within the nonprofit sector. She noted NSF and the nonprofit sector currently have very different goals and needs. "The nonprofit sector has the need for knowledge because we are increasingly being asked to show our value . . . that if we don't demonstrate it, we're going to lose our tax-exempt status," she said. In her view, NSF seems to have insufficient funds to truly capture the diverse range of R&D activities in which the nonprofit sector is engaging, and instead must focus primarily on gathering data for national reporting purposes consistent with data gathered in other sectors. The *National Patterns of R&D Resources* is of little interest to most organizations in the nonprofit sector, she said. Therefore, NSF will need to attend to how to frame the survey in a way that is of value to the nonprofit sector so that organiza-

tions are motivated to respond to the survey. Further,more she indicated that she supported the notion of looking to outside sources to broaden the scope of the survey, and she believed other organizations might be interested in such work.

Feller indicated that rather than seeing the methodology-driven strategy and the substance-driven strategy as an either/or proposition, a phased approach might be an alternative view. He proposed that while recognizing the present planned survey has resource constraints and limitations, NSF could build in exploratory modules that serve as springboards to the nonprofit sector itself, other government agencies, or outside research groups to initiate a larger study of the sector, which he said seems necessary. In addition, Feller indicated that the National Academies could play a role in bringing together "a national forum on this type of issue, which serves the primary purpose of bringing visibility to an area and an issue that really is not on anybody's main agenda."

CHAPTER SUMMARY

Overall, participants discussed ways to design the questionnaire, plan for successful implementation, and achieve good response rates. Many participants expressed support for the use of a screening tool that could be useful in identifying ways that respondents understand their R&D activities, in addition to helping NSF to allocate resources effectively. Discussion revealed that underlying conceptual issues remain challenging. In particular, determining to what extent to capture the diverse nature of the nonprofit sector and how much focus should go to the largest producers of R&D remains an open policy question. Several participants offered potential ideas for accomplishing multiple uses of the data.

6

Summary of Key Themes from the Workshop

The nonprofit sector is an important and growing sector in the U.S. economy, as many participants noted during the workshop. Yet, many widely used existing datasets, such as the System of National Accounts and the *National Patterns of R&D Resources*, capture data in ways that mask the true scope and nature of the sector. Moreover, the research and development (R&D) activities in a portion of this dynamic sector have not been directly measured in 18 years.

This workshop brought together experts in economics, survey methodology, and nonprofit sector research, as well as representatives from different nonprofit organizations and the National Science Foundation (NSF), to discuss the design of a new survey of R&D in the nonprofit sector. Through presentations and moderated discussions, participants considered the nature of the nonprofit sector and the funding landscape, the ways in which R&D can vary in this sector, and the challenges these differences pose. They also examined in some detail approaches to designing the sample with available sources of data, as well as strategies for measuring, implementing, and developing outputs from the survey.

Framing these broad topics was the need that NSF expressed to provide data on the "other nonprofit" sector for national reporting on R&D across all sectors. These data are published annually in the *National Patterns of R&D Resources* and are ultimately used for international comparisons. For this reason, decisions and definitions that facilitate "apples to apples" comparisons are an important consideration.

Over the course of the workshop, the topic of definitions was a theme that infused each session. Multiple participants raised the issue of the narrow way that the *Frascati Manual* defines the nonprofit sector, and they suggested that NSF weigh the benefits and drawbacks of adhering strictly to that approach. The definitions and terminology associated with research, development, and R&D as a unified concept were addressed multiple times. The definition of work itself was raised as another issue by several participants. Ultimately, they said, decisions on these definitions will have significant implications for sampling, measurement, analysis, and reporting.

A related theme that many participants discussed at length was the unique nature of R&D in the nonprofit sector. Representatives from six nonprofit organizations who presented at the workshop described a wide range of activities ranging from basic and applied research to educational and social service innovations, among others, using various terms. Many indicated these types of activities differ from the traditional definitions of R&D, but are important to capture. Discussion also revealed the complex relationships that exist between umbrella organizations and their subsidiaries and the partnerships that exist between nonprofits and other organizations such as universities. These relationships not only raise the risk of double-counting an organization's activities, participants noted, but also make it challenging to identify a single respondent knowledgeable about the organization's R&D activities, particularly at the larger institutions.

Methodological considerations flow from the conceptual choices that NSF will make about the survey, several presenters pointed out. With a priority placed on gathering data for national reporting, a number of speakers addressed ways to maximize the efficiency of the sample given budgetary limitations. Several panelists suggested not only increasing the overall sample size from the 1996–1997 sample size, but also using stratification and weighting techniques to yield a sample with greater numbers of large producers of R&D than of smaller organizations less likely to produce R&D. However, others also suggested a variety of flexible techniques for ensuring the representation of smaller organizations and more variable uses of the data in the future. Some data to inform these approaches are available from the Internal Revenue Service and the National Center for Charitable Statistics. Screening approaches and the use of auxiliary data are other ways to maximize efficiency, boost response rate, and aid later analysis of the data, according to several presenters.

Many presenters and participants repeatedly voiced a need to move away from the questionnaire format of the previous survey from 1996–1997, noting its lengthy and complex definitions and outdated categories. Instead, they suggested ways to develop screening tools that deconstruct complex concepts into multiple-question formats, informed by recent

research on this subject. The rapidly advancing science of survey design also provides specific steps that survey implementers could take to obtain good response rates. In particular, survey methodologists who spoke during the workshop emphasized gathering extensive contact information and planning a synergistic series of contacts during implementation.

The need for data that are compatible with those of other existing surveys and international standards creates a set of statistical and methodological demands that may be at odds with capturing data that represent the full diversity of the nonprofit sector given limited resources, according to a number of participants. However, presentations and discussions addressed ways in which NSF could build in flexibility for future data needs and/or establish partnerships to enable broader research goals to accompany NSF's specific goals for the survey. Suggestions included collaborating with other government agencies to provide a clearer view of the nonprofit sector or developing partnerships with external researchers or foundations that can conduct complementary research on a wider range of nonprofit organizations.

Finally, establishing ongoing communication with nonprofit organizations emerged as a theme expressed by many. These communications, including the ongoing exploratory interviews that NSF is conducting and highlighted during a session, can yield important information about how the nonprofit sector describes its own R&D activities, providing valuable insight for survey design. However, fostering this dialogue can also facilitate shared understandings about the value of the sector and the survey for NSF, the nonprofit sector, and for the nation as a whole.

Lester Salamon suggested some themes from the workshop on behalf of the steering committee. He offered support for moving forward with a two-track approach. The first track would involve meeting NSF's need for accurate data on the nonprofit sector to satisfy its aggregate reporting needs, and the second track would involve taking steps "to understand the underlying reality" of the nonprofit sector. Salamon expanded on what he sees as key issues for each of these tracks.

MEETING NSF'S NEED FOR DATA

Pursuing the first track begins with clarifying the types of R&D activities that NSF is planning to capture. In Salamon's view, NSF's need to gather current data about R&D in the nonprofit sector to improve its reporting across sectors has opened an opportunity to clarify and expand the existing definition of R&D. He commended NSF for its willingness to think in new ways about these activities, as well as the ways in which the nonprofit sector itself has been evolving. In particular, service and expressive organizations are increasingly using evidence-based decision-making

processes that entail engaging in data collection and research. This type of activity "needs to be reflected in any conception of R&D going forward," stated Salamon. In summary, he said, older conceptions of R&D need to be broadened.

The complex relationships among organizations in the nonprofit sector will also have to be addressed to ensure that NSF obtains useful data, Salamon stated. Research in the nonprofit sector can be intramural or extramural, undertaken by multiple entities and/or their larger umbrella groups, and/or be a shared enterprise by various types of organizations. Because of these relationships, NSF will need to take steps to avoid double-counting nonprofit organizations.

Volunteers are an important segment of labor among nonprofit organizations, and NSF will need to determine how to measure the value of their work, Salamon indicated. He added international groups of labor statisticians have considered changes to the definition of work to include volunteer labor as a form of work, ultimately including it in the system of national accounts, signaling a major shift in thinking about work. These shifts would redefine gross domestic product, and he suggested that future measurement of work, including R&D, be informed by these decisions.

The terminology that the survey uses to elicit participation and to identify R&D producers is another central issue that surfaced in the discussion, according to Salamon. He suggested that the term "research" should probably not be used at all on the survey because it can lead to a circular definition. Instead, he said, terms such as "data gathering," "systematically analyzing the data," or "applying the results of data analysis to practice" are potential ways of describing research. Salamon noted, "I'm sure we can't in this version drop the term 'research' altogether, but at least NSF may need to formulate a set of words that it would use to explain what it means by 'research' in the survey."

Identifying the correct respondent within a nonprofit organization able to respond to questions about R&D is another issue that Salamon spoke about. Presentations from Donald Dillman, Jeffrey Berry, and others provided particular concrete steps that could facilitate this process and increase the likelihood of a response to the survey, he added. Salamon also encouraged NSF to include organizations similar to the Hillside Family of Agencies in ongoing exploratory interviews. Contacting umbrella groups associated with various social service sectors is one way to identify such representative organizations, followed by asking leaders in these umbrella groups to identify their members who may be engaging in R&D or evidence-based decision making. Salamon stated, "I couldn't agree more with the notion of getting a good [sample] frame, but I think the good frame has to be driven by the definition, by the concept."

Finally, for NSF to achieve its goals for the survey with a satisfactory response rate, the survey must have a good value proposition for respondents. Salamon indicated that NSF will need to put the survey in context for organizations in terms that will resonate for the organizations that devote time to responding.

UNDERSTANDING THE NATURE OF R&D IN THE FULL NONPROFIT SECTOR

Salamon described a second track devoted to developing a greater understanding of the full range of R&D activities in the nonprofit sector, including the full breadth of various types of organizations and the nature of their R&D activities. To begin to accomplish this larger goal, he suggested conducting in-depth, qualitative case studies of 30 to 40 exemplary organizations engaging in some form of research or development. The case studies would serve as a means to analyze the range of activities and the words being used to describe them. They would also help in determining which of these R&D activities would be desirable to include or exclude for various future purposes.

This qualitative research would facilitate future research efforts that build on the NSF survey that will already have been implemented. In Salamon's view, this additional research would expand the sample and add a broader body of data on the nonprofit sector that is a more accurate reflection of its diversity. He added this work could be external to NSF with data sharing or in partnership with NSF, but argued that NSF should "not let this drop and assume that whatever it is that NSF can do and will do will be sufficient to really allow us to capture the full reality of nonprofit research and development activity." Based on discussions at this workshop, nonprofit and philanthropic communities appear to be in the midst of a significant new appreciation of the importance of evidence-based decision making. Salamon stated that in his opinion it would be unfortunate if a major study of R&D in the nonprofit sector failed to acknowledge this important trend.

NSF SUMMARY OF WORKSHOP

In closing the workshop, John Gawalt, director of NCSES at NSF, offered his perspective on the origin of the survey and the lessons learned from the workshop. Despite the challenge of initiating a new survey that must be used in conjunction with other surveys with specific needs and an existing history, he said NCSES found support and recognition of the need to conduct a new survey of R&D in the "other nonprofit" sector. Thus, NCSES received funding to address this recognized gap in the

data; however, the nature of the funding cycle is responsible for the rapid timeline for preparing the survey for implementation. He noted that steps that would typically be done sequentially are being completed in parallel.

NSF sought to conduct the present workshop to gain insight and advice on the design and implementation of the survey. Gawalt added that although NSF will not be able to follow through with all suggestions made at the workshop, it has gained information to inform its current choices and to explore potential future partnerships. He indicated that the immediate next steps will involve engaging in a process of discernment and discussion, taking a reasoned approach to making the necessary policy and methodological decisions. No decisions have been reached on the frequency with which the survey of R&D in the nonprofit sector will be conducted going forward.

Gawalt noted that the expertise marshaled by the Committee on National Statistics and the passion and engagement of the workshop participants has benefitted the process and furthered his understanding of the diversity of the nonprofit sector. Furthermore, direct engagement with representatives of the sector, the potential respondents, was also valuable as NCSES considers the design of the survey. In particular, Gawalt said he will focus on balancing the needs of NCSES and the broader sector, communicating about the importance of the sector to various constituencies and improving outreach to the nonprofit sector. He asked the representatives of nonprofit organizations for their help in developing messages and outreach approaches that will resonate with organizations and demonstrate the value proposition of the survey.

Gawalt expressed interest in pursuing paths to facilitate a true understanding of the sector. One reason is that the nonprofit sector is growing at a time when other sectors are contracting. Building in flexibility to add contextual information, future phases, and new ideas would be desirable, he said. In addition, he expressed interest in learning how other larger government statistical agencies, such as the Census Bureau and the Bureau of Labor Statistics, are engaging with the nonprofit sector and what they have learned. Gawalt stated that the workshop had "achieved one thing, which is to take my thinking from 'I need a survey with a set of numbers' to 'I need to be able to explain or describe the nonprofit sector and how research fits in and how that sector contributes.'" He said the workshop has broadened his thinking about the sector, future analyses, and ways to highlight the nonprofit sector on a national stage.

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Acronyms and Abbreviations

ACS	American Cancer Society
ACO	accountable care organization
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BRDIS	Business Research and Development and Innovation Survey (successor to SIRD (Survey of Industrial R&D))
CFAR	Center for Applied Research, LeadingAge
CMS	Centers for Medicare & Medicaid Services
CPS	Cancer Prevention Studies
CQI	continuous quality improvement
DHHS	U.S. Department of Health and Human Services
EO BMF	Exempt Organization Business Master File
EU	European Union
FFRDC	federally funded research and development center
GDP	gross domestic product
GERD	gross domestic expenditure on R&D

HERD	Higher Education Research and Development Survey (successor to Survey of Research and Development Expenditures at Universities and Colleges)
HFA	Hillside Family of Agencies
HUB	model of research developed by Hillside Family of Agencies and the University of Buffalo
HW-SC	Hillside Work-Scholarship Connection, Hillside Family of Agencies
IRB	institutional review board
IRS	Internal Revenue Service
LSSM	Lutheran Social Service of Minnesota
LSA	Lutheran Services in America
NCCS	National Center for Charitable Statistics, Urban Institute
NCSES	National Center for Science and Engineering Statistics, the statistical unit within the National Science Foundation
NPISH	nonprofit institutions serving households
NPO	nonprofit organization
NRC	National Research Council of the National Academies
NSF	National Science Foundation
NTEE	National Taxonomy of Exempt Entities
PWRBA	Prince William Regional Beekeepers Association
PNP	private nonprofit organization
PPS	probability proportional to size sampling
QCEW	Quarterly Census of Employment and Wages
R&D	research and development
S&E	science and engineering
SARE	Sustainable Agricultural Research and Education Program, USDA
SNA	System of National Accounts
SOI	Statistics of Income Division of the Internal Revenue Service
UK	United Kingdom
USDA	U.S. Department of Agriculture

Appendix A

Workshop Agenda

Workshop on
Measuring Research and Development Expenditures in
the U.S. Nonprofit Sector: Conceptual and Design Issues

June 30–July 1, 2014
National Research Council
Keck Center, Room 100
500 Fifth Street, NW
Washington, DC

Monday, June 30

Moderator: Susan Raymond, Changing Our World

8:15–9:00 am **Networking Continental Breakfast**
Lobby outside of Keck 100

9:00–9:45 am **Setting the Stage**

Welcome from the National Academies and Introductions
Constance Citro, Director, Committee on National Statistics, National Research Council of the National Academy of Sciences

Expectations of the Workshop from the National Science Foundation
John Gawalt, Director, National Center for Science and Engineering Statistics, National Science Foundation

Observations from the Steering Committee
Lester Salamon, Chair, Workshop Steering Committee

IDENTIFYING WHAT SHOULD BE MEASURED

9:45–10:30 am	**Profile of the Nonprofit Sector** *Lester Salamon, Center for Civil Society Studies, Johns Hopkins University* Floor Discussion
10:30–11:00 am	**Break**
11:00–11:15 am	**Overview of Changing Philanthropic Structures Supporting R&D** *Susan Raymond, Changing Our World, Inc.* Floor Discussion
11:15–11:45 am	**Research and Development Activities in Nonprofit Sector: A View from That Sector** *Dan Heist and Catherine Mickle, American Cancer Society* Floor Discussion
11:45–12:30 pm	**Networking Lunch—Continued discussion of the nonprofit sector**
12:30–2:15 pm	**Research and Development Activities in Nonprofit Sector—A View from That Sector (Continued)** *Jodi Harpstead, Lutheran Social Service of Minnesota* *Robyn Stone, Leading Age* *Karla Eisen, Prince William Regional Beekeepers Association* *Maria Cristalli, Hillside Family of Agencies* Floor Discussion
2:15–2:30 pm	**Summary: What Was Presented and Implications for Methodological Approaches** *Lester Salamon, Chair, Workshop Steering Committee*
2:30–3:00 pm	**Break** *Lobby outside of Keck 100*

IDENTIFYING BEST APPROACHES TO MEASUREMENT

Moderator: Kevin Cecco, Internal Revenue Service

3:00–4:00 pm **International Experiences**

Introduction of speakers: Paul David, Stanford University

The Canadian Experience
Speaker: Carol House will provide highlights of presentation. Louise Earl, Statistics Canada, is unable to attend.

The European Experience
Speaker: Aldo Geuna, University of Turin

Discussant
Paul David, Stanford University

Floor Discussion

4:00–4:30 pm **Research and Development Activities in Nonprofit Sector: A View from That Sector (continued)**

Michael Crosby, Mote Marine Laboratory
Floor Discussion

4:30–5:30 pm **Identifying and Sampling Nonprofits**

Exploration of Exempt Organization Data Files as Sampling Frames for the U.S. Nonprofit Sector
Speakers:
Paul Arnsberger, Statistics of Income, Internal Revenue Service
Nathan Dietz, National Center for Charitable Statistics, Urban Institute

Exploration of Efficient and Effective Sampling Options for Nonprofits
Speakers:
Phillip S. Kott, RTI International
Michael D. Larsen, George Washington University
Floor Discussion

5:30 pm	**Adjourn Day 1 of the Main Workshop**
6:30 pm	**Working Dinner for Workshop Steering Committee and Presenters** *Nopa Restaurant* *800 F Street, NW* *Washington, DC*

Tuesday, July 1

Moderator: Kevin Cecco, Internal Revenue Service

8:30–9:00 am	**Networking and Informal Discussion of Yesterday's Presentations with Continental Breakfast** *Lobby outside of Keck 100*
9:00–10:00 am	**Approaches to Question Design** Clarifying Categorical Concepts in a Web Survey *Speaker: Cleo Redline, National Center for Education Statistics* Results from Exploratory Interviewing of Nonprofits by NSF and Their Contractor ICF *Speaker: Ronda Britt, National Center for Science and Engineering Statistics, National Science Foundation* Discussion of Ideas for Screening and Question Design *Discussion leader: Carol House, Committee on National Statistics*
10:00–11:15 am	**Implementing the Survey** Approaches to Data Collection: Survey Modes, Gatekeepers, Identifying the Best Respondent(s), and Maximizing Response *Panel:* *Jeffrey Berry, Tufts University* *Don Dillman, Washington State University* *Ron Fecso, Consultant*

11:15–11:45 am	**Break**
11:45 am–12:30 pm	**Outputs and Dissemination**
	Required Outputs as Part of the *National Patterns of R&D Resources* *Speaker: Mark Boroush, National Center for Science and Engineering Statistics, National Science Foundation*
	Discussion of Potential Satellite Outputs *Discussion leader: Irwin Feller, Pennsylvania State University*
12:30–1:00 pm	**Workshop Wrap**
	Steering Committee Summary *Speaker: Lester Salamon*
	NCSES/NSF Summary *Speaker: John Gawalt*
1:00–2:00 pm	**Networking Lunch to Continue Discussion of Outputs and Dissemination** *Lobby outside of Keck 100*
2:00 pm	**Workshop Adjourned**

Appendix B

Workshop Participants

STEERING COMMITTEE

Cecco	Kevin	Internal Revenue Service
David	Paul	Stanford University
Dillman	Donald	Washington State University
Fecso	Ronald	Consultant
Feller	Irwin	Pennsylvania State University
Kott	Phillip	RTI International
Larsen	Michael	George Washington University
Raymond	Susan	Changing Our World, Inc.
Salamon	Lester	Center for Civil Society Studies, Johns Hopkins University

PRESENTERS

Arnsberger	Paul	Statistics of Income, IRS
Berry	Jeffrey	Tufts University
Boroush	Mark	NCSES, NSF
Britt	Ronda	NCSES, NSF
Citro	Constance	Committee on National Statistics
Cristalli	Maria	Hillside Family of Agencies
Crosby	Michael	Mote Marine Laboratory
Dietz	Nathan	Center for Nonprofits and Philanthropy, Urban Institute

Eisen	Karla	Prince William Regional Beekeepers Association
Gawalt	John	NCSES, NSF
Geuna	Aldo	University of Torino
Harpstead	Jodi	Lutheran Social Service of Minnesota
Heist	Dan	American Cancer Society, Pennsylvania State University
House	Carol	Committee on National Statistics
Mickle	Catherine	American Cancer Society
Redline	Cleo	National Center for Education Statistics
Stone	Robyn	LeadingAge

REGISTERED PARTICIPANTS

Alexander	Jeffrey	SRI
Alwarith	Mariam	George Mason University
Belmonte	Cynthia	Statistic of Income Division, IRS
Benatti	Sylvia	University of the District of Columbia
Black	Jock	NCSES, NSF
Cannon	Jonathan	Hanover Research
Clayton	Richard	Bureau of Labor Statistics
Lim	Mark David	FasterCures–A Center of the Milken Institute
Dotter	Rachel	Hanover Research
French	Rick	West Virginia University
Gembecki	Matthew	Changing Our World, Inc.
Gibbons	Mike	NCSES, NSF
Hale	Kathy	NCSES, NSF
Harper	Kathryn	ICF International
Jankowski	John	NCSES, NSF
Kennedy	Terry	Self-employed
Merry	Ellen	Federal Reserve Board
Milton	Julia	Consortium of Social Science Associations
Mindel	Stuart C.	Cleveland State University
Morrison	Rebecca	NCSES, NSF
Moss	Sharon	ASAE Foundation
Mulrow	Jeri	NCSES, NSF
Noble	Samantha	James Madison University
Ommaya	Alex	AAMC
Rhodes	Holly	NSF/DBASSE
Richey	Maureen	Alliance for Children and Families
Robles	Barbara	Board of Governors of the Federal Reserve

Sokolowski	Wojciech	Center for Civil Society Studies, Johns Hopkins University
Taylor	Jennifer	James Madison University
Wilson	Elizabeth	James Madison University
Yamaner	Mike	NCSES, NSF

Appendix C

IRS Form 990

Form **990**

Department of the Treasury
Internal Revenue Service

Return of Organization Exempt From Income Tax

Under section 501(c), 527, or 4947(a)(1) of the Internal Revenue Code (except private foundations)

► **Do not enter social security numbers on this form as it may be made public.**

► **Information about Form 990 and its instructions is at *www.irs.gov/form990*.**

OMB No. 1545-0047

2014

Open to Public Inspection

A For the 2014 calendar year, or tax year beginning , 2014, and ending , 20

B Check if applicable:
- ☐ Address change
- ☐ Name change
- ☐ Initial return
- ☐ Final return/terminated
- ☐ Amended return
- ☐ Application pending

C Name of organization
Doing business as
Number and street (or P.O. box if mail is not delivered to street address) | Room/suite
City or town, state or province, country, and ZIP or foreign postal code

D Employer identification number

E Telephone number

G Gross receipts $

F Name and address of principal officer:

H(a) Is this a group return for subordinates? ☐ Yes ☐ No
H(b) Are all subordinates included? ☐ Yes ☐ No
If "No," attach a list. (see instructions)
H(c) Group exemption number ►

I Tax-exempt status: ☐ 501(c)(3) ☐ 501(c) ( ) ◄ (insert no.) ☐ 4947(a)(1) or ☐ 527

J Website: ►

K Form of organization: ☐ Corporation ☐ Trust ☐ Association ☐ Other ► **L** Year of formation: **M** State of legal domicile:

Part I Summary

Activities & Governance

1 Briefly describe the organization's mission or most significant activities:

2 Check this box ► ☐ if the organization discontinued its operations or disposed of more than 25% of its net assets.

3	Number of voting members of the governing body (Part VI, line 1a)	3	
4	Number of independent voting members of the governing body (Part VI, line 1b)	4	
5	Total number of individuals employed in calendar year 2014 (Part V, line 2a)	5	
6	Total number of volunteers (estimate if necessary)	6	
7a	Total unrelated business revenue from Part VIII, column (C), line 12	7a	
b	Net unrelated business taxable income from Form 990-T, line 34	7b	

		Prior Year	Current Year
Revenue	8 Contributions and grants (Part VIII, line 1h)		
	9 Program service revenue (Part VIII, line 2g)		
	10 Investment income (Part VIII, column (A), lines 3, 4, and 7d)		
	11 Other revenue (Part VIII, column (A), lines 5, 6d, 8c, 9c, 10c, and 11e)		
	12 Total revenue—add lines 8 through 11 (must equal Part VIII, column (A), line 12)		
Expenses	13 Grants and similar amounts paid (Part IX, column (A), lines 1–3)		
	14 Benefits paid to or for members (Part IX, column (A), line 4)		
	15 Salaries, other compensation, employee benefits (Part IX, column (A), lines 5–10)		
	16a Professional fundraising fees (Part IX, column (A), line 11e)		
	b Total fundraising expenses (Part IX, column (D), line 25) ►		
	17 Other expenses (Part IX, column (A), lines 11a–11d, 11f–24e)		
	18 Total expenses. Add lines 13–17 (must equal Part IX, column (A), line 25)		
	19 Revenue less expenses. Subtract line 18 from line 12		

		Beginning of Current Year	End of Year
Net Assets or Fund Balances	20 Total assets (Part X, line 16)		
	21 Total liabilities (Part X, line 26)		
	22 Net assets or fund balances. Subtract line 21 from line 20		

Part II Signature Block

Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. Declaration of preparer (other than officer) is based on all information of which preparer has any knowledge.

Sign Here

► Signature of officer — Date

► Type or print name and title

Paid Preparer Use Only

Print/Type preparer's name	Preparer's signature	Date	Check ☐ if self-employed	PTIN
Firm's name ►			Firm's EIN ►	
Firm's address ►			Phone no.	

May the IRS discuss this return with the preparer shown above? (see instructions) ☐ Yes ☐ No

For Paperwork Reduction Act Notice, see the separate instructions. Cat. No. 11282Y Form **990** (2014)

Form 990 (2014) Page **2**

Part III **Statement of Program Service Accomplishments**

Check if Schedule O contains a response or note to any line in this Part III . . . . . ☐

1 Briefly describe the organization's mission:

2 Did the organization undertake any significant program services during the year which were not listed on the prior Form 990 or 990-EZ? . . . . . ☐ **Yes** ☐ **No**

If "Yes," describe these new services on Schedule O.

3 Did the organization cease conducting, or make significant changes in how it conducts, any program services? . . . . . ☐ **Yes** ☐ **No**

If "Yes," describe these changes on Schedule O.

4 Describe the organization's program service accomplishments for each of its three largest program services, as measured by expenses. Section 501(c)(3) and 501(c)(4) organizations are required to report the amount of grants and allocations to others, the total expenses, and revenue, if any, for each program service reported.

4a (Code:) (Expenses $ including grants of $) (Revenue $)

4b (Code:) (Expenses $ including grants of $) (Revenue $)

4c (Code:) (Expenses $ including grants of $) (Revenue $)

4d Other program services (Describe in Schedule O.)
(Expenses $ including grants of $) (Revenue $)

4e Total program service expenses ►

Form **990** (2014)

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Part IV Checklist of Required Schedules

			Yes	No
1	Is the organization described in section 501(c)(3) or 4947(a)(1) (other than a private foundation)? *If "Yes," complete Schedule A*	1		
2	Is the organization required to complete *Schedule B, Schedule of Contributors* (see instructions)?	2		
3	Did the organization engage in direct or indirect political campaign activities on behalf of or in opposition to candidates for public office? *If "Yes," complete Schedule C, Part I*	3		
4	**Section 501(c)(3) organizations.** Did the organization engage in lobbying activities, or have a section 501(h) election in effect during the tax year? *If "Yes," complete Schedule C, Part II*	4		
5	Is the organization a section 501(c)(4), 501(c)(5), or 501(c)(6) organization that receives membership dues, assessments, or similar amounts as defined in Revenue Procedure 98-19? *If "Yes," complete Schedule C, Part III*	5		
6	Did the organization maintain any donor advised funds or any similar funds or accounts for which donors have the right to provide advice on the distribution or investment of amounts in such funds or accounts? *If "Yes," complete Schedule D, Part I*	6		
7	Did the organization receive or hold a conservation easement, including easements to preserve open space, the environment, historic land areas, or historic structures? *If "Yes," complete Schedule D, Part II*	7		
8	Did the organization maintain collections of works of art, historical treasures, or other similar assets? *If "Yes," complete Schedule D, Part III*	8		
9	Did the organization report an amount in Part X, line 21, for escrow or custodial account liability; serve as a custodian for amounts not listed in Part X; or provide credit counseling, debt management, credit repair, or debt negotiation services? *If "Yes," complete Schedule D, Part IV*	9		
10	Did the organization, directly or through a related organization, hold assets in temporarily restricted endowments, permanent endowments, or quasi-endowments? *If "Yes," complete Schedule D, Part V*	10		
11	If the organization's answer to any of the following questions is "Yes," then complete Schedule D, Parts VI, VII, VIII, IX, or X as applicable.			
a	Did the organization report an amount for land, buildings, and equipment in Part X, line 10? *If "Yes," complete Schedule D, Part VI*	11a		
b	Did the organization report an amount for investments—other securities in Part X, line 12 that is 5% or more of its total assets reported in Part X, line 16? *If "Yes," complete Schedule D, Part VII*	11b		
c	Did the organization report an amount for investments—program related in Part X, line 13 that is 5% or more of its total assets reported in Part X, line 16? *If "Yes," complete Schedule D, Part VIII*	11c		
d	Did the organization report an amount for other assets in Part X, line 15 that is 5% or more of its total assets reported in Part X, line 16? *If "Yes," complete Schedule D, Part IX*	11d		
e	Did the organization report an amount for other liabilities in Part X, line 25? *If "Yes," complete Schedule D, Part X*	11e		
f	Did the organization's separate or consolidated financial statements for the tax year include a footnote that addresses the organization's liability for uncertain tax positions under FIN 48 (ASC 740)? *If "Yes," complete Schedule D, Part X*	11f		
12 a	Did the organization obtain separate, independent audited financial statements for the tax year? *If "Yes," complete Schedule D, Parts XI and XII*	12a		
b	Was the organization included in consolidated, independent audited financial statements for the tax year? *If "Yes," and if the organization answered "No" to line 12a, then completing Schedule D, Parts XI and XII is optional*	12b		
13	Is the organization a school described in section 170(b)(1)(A)(ii)? *If "Yes," complete Schedule E*	13		
14 a	Did the organization maintain an office, employees, or agents outside of the United States?	14a		
b	Did the organization have aggregate revenues or expenses of more than $10,000 from grantmaking, fundraising, business, investment, and program service activities outside the United States, or aggregate foreign investments valued at $100,000 or more? *If "Yes," complete Schedule F, Parts I and IV*	14b		
15	Did the organization report on Part IX, column (A), line 3, more than $5,000 of grants or other assistance to or for any foreign organization? *If "Yes," complete Schedule F, Parts II and IV*	15		
16	Did the organization report on Part IX, column (A), line 3, more than $5,000 of aggregate grants or other assistance to or for foreign individuals? *If "Yes," complete Schedule F, Parts III and IV*	16		
17	Did the organization report a total of more than $15,000 of expenses for professional fundraising services on Part IX, column (A), lines 6 and 11e? *If "Yes," complete Schedule G, Part I* (see instructions)	17		
18	Did the organization report more than $15,000 total of fundraising event gross income and contributions on Part VIII, lines 1c and 8a? *If "Yes," complete Schedule G, Part II*	18		
19	Did the organization report more than $15,000 of gross income from gaming activities on Part VIII, line 9a? *If "Yes," complete Schedule G, Part III*	19		
20 a	Did the organization operate one or more hospital facilities? *If "Yes," complete Schedule H*	20a		
b	If "Yes" to line 20a, did the organization attach a copy of its audited financial statements to this return?	20b		

Form **990** (2014)

Form 990 (2014) Page **4**

Part IV **Checklist of Required Schedules** *(continued)*

			Yes	No
21	Did the organization report more than $5,000 of grants or other assistance to any domestic organization or domestic government on Part IX, column (A), line 1? *If "Yes," complete Schedule I, Parts I and II*	**21**		
22	Did the organization report more than $5,000 of grants or other assistance to or for domestic individuals on Part IX, column (A), line 2? *If "Yes," complete Schedule I, Parts I and III*	**22**		
23	Did the organization answer "Yes" to Part VII, Section A, line 3, 4, or 5 about compensation of the organization's current and former officers, directors, trustees, key employees, and highest compensated employees? *If "Yes," complete Schedule J*	**23**		
24a	Did the organization have a tax-exempt bond issue with an outstanding principal amount of more than $100,000 as of the last day of the year, that was issued after December 31, 2002? *If "Yes," answer lines 24b through 24d and complete Schedule K. If "No," go to line 25a*	**24a**		
b	Did the organization invest any proceeds of tax-exempt bonds beyond a temporary period exception?	**24b**		
c	Did the organization maintain an escrow account other than a refunding escrow at any time during the year to defease any tax-exempt bonds?	**24c**		
d	Did the organization act as an "on behalf of" issuer for bonds outstanding at any time during the year?	**24d**		
25a	**Section 501(c)(3), 501(c)(4), and 501(c)(29) organizations.** Did the organization engage in an excess benefit transaction with a disqualified person during the year? *If "Yes," complete Schedule L, Part I*	**25a**		
b	Is the organization aware that it engaged in an excess benefit transaction with a disqualified person in a prior year, and that the transaction has not been reported on any of the organization's prior Forms 990 or 990-EZ? *If "Yes," complete Schedule L, Part I*	**25b**		
26	Did the organization report any amount on Part X, line 5, 6, or 22 for receivables from or payables to any current or former officers, directors, trustees, key employees, highest compensated employees, or disqualified persons? *If "Yes," complete Schedule L, Part II*	**26**		
27	Did the organization provide a grant or other assistance to an officer, director, trustee, key employee, substantial contributor or employee thereof, a grant selection committee member, or to a 35% controlled entity or family member of any of these persons? *If "Yes," complete Schedule L, Part III*	**27**		
28	Was the organization a party to a business transaction with one of the following parties (see Schedule L, Part IV instructions for applicable filing thresholds, conditions, and exceptions):			
a	A current or former officer, director, trustee, or key employee? *If "Yes," complete Schedule L, Part IV*	**28a**		
b	A family member of a current or former officer, director, trustee, or key employee? *If "Yes," complete Schedule L, Part IV*	**28b**		
c	An entity of which a current or former officer, director, trustee, or key employee (or a family member thereof) was an officer, director, trustee, or direct or indirect owner? *If "Yes," complete Schedule L, Part IV*	**28c**		
29	Did the organization receive more than $25,000 in non-cash contributions? *If "Yes," complete Schedule M*	**29**		
30	Did the organization receive contributions of art, historical treasures, or other similar assets, or qualified conservation contributions? *If "Yes," complete Schedule M*	**30**		
31	Did the organization liquidate, terminate, or dissolve and cease operations? *If "Yes," complete Schedule N, Part I*	**31**		
32	Did the organization sell, exchange, dispose of, or transfer more than 25% of its net assets? *If "Yes," complete Schedule N, Part II*	**32**		
33	Did the organization own 100% of an entity disregarded as separate from the organization under Regulations sections 301.7701-2 and 301.7701-3? *If "Yes," complete Schedule R, Part I*	**33**		
34	Was the organization related to any tax-exempt or taxable entity? *If "Yes," complete Schedule R, Part II, III, or IV, and Part V, line 1*	**34**		
35a	Did the organization have a controlled entity within the meaning of section 512(b)(13)?	**35a**		
b	If "Yes" to line 35a, did the organization receive any payment from or engage in any transaction with a controlled entity within the meaning of section 512(b)(13)? *If "Yes," complete Schedule R, Part V, line 2*	**35b**		
36	**Section 501(c)(3) organizations.** Did the organization make any transfers to an exempt non-charitable related organization? *If "Yes," complete Schedule R, Part V, line 2*	**36**		
37	Did the organization conduct more than 5% of its activities through an entity that is not a related organization and that is treated as a partnership for federal income tax purposes? *If "Yes," complete Schedule R, Part VI*	**37**		
38	Did the organization complete Schedule O and provide explanations in Schedule O for Part VI, lines 11b and 19? **Note.** All Form 990 filers are required to complete Schedule O	**38**		

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Part V **Statements Regarding Other IRS Filings and Tax Compliance**

Check if Schedule O contains a response or note to any line in this Part V . . . . . ☐

				Yes	No
1a	Enter the number reported in Box 3 of Form 1096. Enter -0- if not applicable	**1a**			
b	Enter the number of Forms W-2G included in line 1a. Enter -0- if not applicable	**1b**			
c	Did the organization comply with backup withholding rules for reportable payments to vendors and reportable gaming (gambling) winnings to prize winners?		**1c**		
2a	Enter the number of employees reported on Form W-3, Transmittal of Wage and Tax Statements, filed for the calendar year ending with or within the year covered by this return	**2a**			
b	If at least one is reported on line 2a, did the organization file all required federal employment tax returns? .		**2b**		
	Note. If the sum of lines 1a and 2a is greater than 250, you may be required to *e-file* (see instructions) . .				
3a	Did the organization have unrelated business gross income of $1,000 or more during the year?		**3a**		
b	If "Yes," has it filed a Form 990-T for this year? *If "No" to line 3b, provide an explanation in Schedule O* . .		**3b**		
4a	At any time during the calendar year, did the organization have an interest in, or a signature or other authority over, a financial account in a foreign country (such as a bank account, securities account, or other financial account)?		**4a**		
b	If "Yes," enter the name of the foreign country: ► ---------- See instructions for filing requirements for FinCEN Form 114, Report of Foreign Bank and Financial Accounts (FBAR).				
5a	Was the organization a party to a prohibited tax shelter transaction at any time during the tax year? . . .		**5a**		
b	Did any taxable party notify the organization that it was or is a party to a prohibited tax shelter transaction?		**5b**		
c	If "Yes" to line 5a or 5b, did the organization file Form 8886-T?		**5c**		
6a	Does the organization have annual gross receipts that are normally greater than $100,000, and did the organization solicit any contributions that were not tax deductible as charitable contributions?		**6a**		
b	If "Yes," did the organization include with every solicitation an express statement that such contributions or gifts were not tax deductible?		**6b**		
7	**Organizations that may receive deductible contributions under section 170(c).**				
a	Did the organization receive a payment in excess of $75 made partly as a contribution and partly for goods and services provided to the payor?		**7a**		
b	If "Yes," did the organization notify the donor of the value of the goods or services provided?		**7b**		
c	Did the organization sell, exchange, or otherwise dispose of tangible personal property for which it was required to file Form 8282?		**7c**		
d	If "Yes," indicate the number of Forms 8282 filed during the year	**7d**			
e	Did the organization receive any funds, directly or indirectly, to pay premiums on a personal benefit contract?		**7e**		
f	Did the organization, during the year, pay premiums, directly or indirectly, on a personal benefit contract? .		**7f**		
g	If the organization received a contribution of qualified intellectual property, did the organization file Form 8899 as required?		**7g**		
h	If the organization received a contribution of cars, boats, airplanes, or other vehicles, did the organization file a Form 1098-C?		**7h**		
8	**Sponsoring organizations maintaining donor advised funds.** Did a donor advised fund maintained by the sponsoring organization have excess business holdings at any time during the year?		**8**		
9	**Sponsoring organizations maintaining donor advised funds.**				
a	Did the sponsoring organization make any taxable distributions under section 4966?		**9a**		
b	Did the sponsoring organization make a distribution to a donor, donor advisor, or related person? . . .		**9b**		
10	**Section 501(c)(7) organizations.** Enter:				
a	Initiation fees and capital contributions included on Part VIII, line 12	**10a**			
b	Gross receipts, included on Form 990, Part VIII, line 12, for public use of club facilities .	**10b**			
11	**Section 501(c)(12) organizations.** Enter:				
a	Gross income from members or shareholders	**11a**			
b	Gross income from other sources (Do not net amounts due or paid to other sources against amounts due or received from them.)	**11b**			
12a	**Section 4947(a)(1) non-exempt charitable trusts.** Is the organization filing Form 990 in lieu of Form 1041?		**12a**		
b	If "Yes," enter the amount of tax-exempt interest received or accrued during the year . .	**12b**			
13	**Section 501(c)(29) qualified nonprofit health insurance issuers.**				
a	Is the organization licensed to issue qualified health plans in more than one state?		**13a**		
	Note. See the instructions for additional information the organization must report on Schedule O.				
b	Enter the amount of reserves the organization is required to maintain by the states in which the organization is licensed to issue qualified health plans	**13b**			
c	Enter the amount of reserves on hand	**13c**			
14a	Did the organization receive any payments for indoor tanning services during the tax year?		**14a**		
b	If "Yes," has it filed a Form 720 to report these payments? *If "No," provide an explanation in Schedule O* .		**14b**		

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Part VI **Governance, Management, and Disclosure** *For each "Yes" response to lines 2 through 7b below, and for a "No" response to line 8a, 8b, or 10b below, describe the circumstances, processes, or changes in Schedule O. See instructions.*

Check if Schedule O contains a response or note to any line in this Part VI . . . . . ☐

Section A. Governing Body and Management

			Yes	No
1a	Enter the number of voting members of the governing body at the end of the tax year . . **1a**			
	If there are material differences in voting rights among members of the governing body, or if the governing body delegated broad authority to an executive committee or similar committee, explain in Schedule O.			
b	Enter the number of voting members included in line 1a, above, who are independent . **1b**			
2	Did any officer, director, trustee, or key employee have a family relationship or a business relationship with any other officer, director, trustee, or key employee?	**2**		
3	Did the organization delegate control over management duties customarily performed by or under the direct supervision of officers, directors, or trustees, or key employees to a management company or other person? .	**3**		
4	Did the organization make any significant changes to its governing documents since the prior Form 990 was filed?	**4**		
5	Did the organization become aware during the year of a significant diversion of the organization's assets? .	**5**		
6	Did the organization have members or stockholders?	**6**		
7a	Did the organization have members, stockholders, or other persons who had the power to elect or appoint one or more members of the governing body?	**7a**		
b	Are any governance decisions of the organization reserved to (or subject to approval by) members, stockholders, or persons other than the governing body?	**7b**		
8	Did the organization contemporaneously document the meetings held or written actions undertaken during the year by the following:			
a	The governing body?	**8a**		
b	Each committee with authority to act on behalf of the governing body?	**8b**		
9	Is there any officer, director, trustee, or key employee listed in Part VII, Section A, who cannot be reached at the organization's mailing address? *If "Yes," provide the names and addresses in Schedule O*	**9**		

Section B. Policies *(This Section B requests information about policies not required by the Internal Revenue Code.)*

			Yes	No
10a	Did the organization have local chapters, branches, or affiliates?	**10a**		
b	If "Yes," did the organization have written policies and procedures governing the activities of such chapters, affiliates, and branches to ensure their operations are consistent with the organization's exempt purposes?	**10b**		
11a	Has the organization provided a complete copy of this Form 990 to all members of its governing body before filing the form?	**11a**		
b	Describe in Schedule O the process, if any, used by the organization to review this Form 990.			
12a	Did the organization have a written conflict of interest policy? *If "No," go to line 13*	**12a**		
b	Were officers, directors, or trustees, and key employees required to disclose annually interests that could give rise to conflicts?	**12b**		
c	Did the organization regularly and consistently monitor and enforce compliance with the policy? *If "Yes," describe in Schedule O how this was done*	**12c**		
13	Did the organization have a written whistleblower policy?	**13**		
14	Did the organization have a written document retention and destruction policy?	**14**		
15	Did the process for determining compensation of the following persons include a review and approval by independent persons, comparability data, and contemporaneous substantiation of the deliberation and decision?			
a	The organization's CEO, Executive Director, or top management official	**15a**		
b	Other officers or key employees of the organization	**15b**		
	If "Yes" to line 15a or 15b, describe the process in Schedule O (see instructions).			
16a	Did the organization invest in, contribute assets to, or participate in a joint venture or similar arrangement with a taxable entity during the year?	**16a**		
b	If "Yes," did the organization follow a written policy or procedure requiring the organization to evaluate its participation in joint venture arrangements under applicable federal tax law, and take steps to safeguard the organization's exempt status with respect to such arrangements?	**16b**		

Section C. Disclosure

17 List the states with which a copy of this Form 990 is required to be filed ▶

18 Section 6104 requires an organization to make its Forms 1023 (or 1024 if applicable), 990, and 990-T (Section 501(c)(3)s only) available for public inspection. Indicate how you made these available. Check all that apply.

☐ Own website ☐ Another's website ☐ Upon request ☐ Other *(explain in Schedule O)*

19 Describe in Schedule O whether (and if so, how) the organization made its governing documents, conflict of interest policy, and financial statements available to the public during the tax year.

20 State the name, address, and telephone number of the person who possesses the organization's books and records: ▶

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Part VII **Compensation of Officers, Directors, Trustees, Key Employees, Highest Compensated Employees, and Independent Contractors**

Check if Schedule O contains a response or note to any line in this Part VII . . . . . ☐

Section A. Officers, Directors, Trustees, Key Employees, and Highest Compensated Employees

1a Complete this table for all persons required to be listed. Report compensation for the calendar year ending with or within the organization's tax year.

- List all of the organization's **current** officers, directors, trustees (whether individuals or organizations), regardless of amount of compensation. Enter -0- in columns (D), (E), and (F) if no compensation was paid.
- List all of the organization's **current** key employees, if any. See instructions for definition of "key employee."
- List the organization's five **current** highest compensated employees (other than an officer, director, trustee, or key employee) who received reportable compensation (Box 5 of Form W-2 and/or Box 7 of Form 1099-MISC) of more than $100,000 from the organization and any related organizations.
- List all of the organization's **former** officers, key employees, and highest compensated employees who received more than $100,000 of reportable compensation from the organization and any related organizations.
- List all of the organization's **former directors or trustees** that received, in the capacity as a former director or trustee of the organization, more than $10,000 of reportable compensation from the organization and any related organizations.

List persons in the following order: individual trustees or directors; institutional trustees; officers; key employees; highest compensated employees; and former such persons.

☐ Check this box if neither the organization nor any related organization compensated any current officer, director, or trustee.

(A) Name and Title	(B) Average hours per week (list any hours for related organizations below dotted line)	(C) Position (do not check more than one box, unless person is both an officer and a director/trustee)						(D) Reportable compensation from the organization (W-2/1099-MISC)	(E) Reportable compensation from related organizations (W-2/1099-MISC)	(F) Estimated amount of other compensation from the organization and related organizations
		Individual trustee or director	Institutional trustee	Officer	Key employee	Highest compensated employee	Former			
(1)										
(2)										
(3)										
(4)										
(5)										
(6)										
(7)										
(8)										
(9)										
(10)										
(11)										
(12)										
(13)										
(14)										

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Part VII **Section A. Officers, Directors, Trustees, Key Employees, and Highest Compensated Employees** *(continued)*

(A) Name and title	(B) Average hours per week (list any hours for related organizations below dotted line)	(C) Position (do not check more than one box, unless person is both an officer and a director/trustee)						(D) Reportable compensation from the organization (W-2/1099-MISC)	(E) Reportable compensation from related organizations (W-2/1099-MISC)	(F) Estimated amount of other compensation from the organization and related organizations
		Individual trustee or director	Institutional trustee	Officer	Key employee	Highest compensated employee	Former			
(15)										
(16)										
(17)										
(18)										
(19)										
(20)										
(21)										
(22)										
(23)										
(24)										
(25)										
1b **Sub-total** ▶										
c **Total from continuation sheets to Part VII, Section A** ▶										
d **Total (add lines 1b and 1c)** ▶										

2 Total number of individuals (including but not limited to those listed above) who received more than $100,000 of reportable compensation from the organization ▶

		Yes	No
3	Did the organization list any **former** officer, director, or trustee, key employee, or highest compensated employee on line 1a? *If "Yes," complete Schedule J for such individual* **3**		
4	For any individual listed on line 1a, is the sum of reportable compensation and other compensation from the organization and related organizations greater than $150,000? *If "Yes," complete Schedule J for such individual* **4**		
5	Did any person listed on line 1a receive or accrue compensation from any unrelated organization or individual for services rendered to the organization? *If "Yes," complete Schedule J for such person* **5**		

Section B. Independent Contractors

1 Complete this table for your five highest compensated independent contractors that received more than $100,000 of compensation from the organization. Report compensation for the calendar year ending with or within the organization's tax year.

(A) Name and business address	(B) Description of services	(C) Compensation

2 Total number of independent contractors (including but not limited to those listed above) who received more than $100,000 of compensation from the organization ▶

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Appendix D

Biographical Sketches of Steering Committee Members, Presenters, and Staff

STEERING COMMITTEE

Lester Salamon (*Chair*) is the director of the Center for Civil Society Studies, Institute for Policy Studies, and research professor at the School of Advanced International Studies at Johns Hopkins University. He also directs the Johns Hopkins Comparative Nonprofit Sector Project. He organized and oversees the Johns Hopkins Philanthropy Fellows Program, and he conceived and secured support for the Johns Hopkins Certificate in Nonprofit Studies Program. He also conceived, raised funding for, and oversees several other nonprofit initiatives.

Kevin Cecco is a technical advisor for the Research, Analysis, and Statistics (RAS) Division of the Internal Revenue Service (IRS). In this position, he is responsible for leading special cross-functional programs and projects, delegated by either the RAS director or deputy director. In previous positions at the IRS, he has served as an acting director for the Office of Performance Evaluation and Risk Assessment and the branch chief of the Corporation Branch within the Statistics of Income (SOI) Division. He also served as a supervisory mathematical statistician within SOI.

Paul David is senior fellow of the Stanford Institute for Economic Policy Research, and emeritus professor of economics at Stanford University; emeritus fellow of All Souls College, Oxford; and professorial fellow of the United Nations University-MERIT, Maastricht, Netherlands. His international career in teaching, research, and consulting for public agen-

cies and foundations has spanned the domains of the history and modern development of science and technology, institutional evolution, economic demography, and long-term economic growth's determinants.

Donald Dillman is Regents professor in the Department of Sociology at Washington State University. He also serves as deputy director for research and development in the Social and Economic Sciences Research Center at Washington State University. From 1991 to 1995, he served as senior survey methodologist in the Office of the Director at the U.S. Census Bureau. He is recognized internationally as a major contributor to the development of modern mail, telephone, and Internet survey methods. He has been a consultant with the National Center for Science and Engineering Statistics on the Business Research and Development and Innovation Survey redesign.

Ronald Fecso is a self-employed consultant. He was executive director of Ernst & Young, LLP, Quantitative Economics and Statistics practice, where he led the sampling practice. Previously, he also served as the chief statistician at the U.S. Government Accountability Office and at the National Science Foundation.

Irwin Feller is professor emeritus of economics at Pennsylvania State University, where he has been on the faculty since 1963. His research interests include the economics of academic research, the university's role in technology-based economic development, and the evaluation of federal and state technology programs. He has been a consultant to the President's Office of Science and Technology Policy, National Aeronautics and Space Administration, and National Science Foundation, among others.

Phillip Kott is a senior research statistician at RTI International. He is an expert in survey sampling theory and practice, including calibration weighting, multiphase sampling, the analysis of survey data, and variance estimation. Prior to joining RTI, Kott was the chief research statistician at the National Agricultural Statistical Service of the U.S. Department of Agriculture.

Michael Larsen is associate professor in the Department of Statistics and Biostatistics Center at George Washington University. Before joining George Washington, he was on the faculty at four universities, most recently Iowa State University. His interests include survey sampling, missing data, record linkage and administrative records, disclosure limitation and confidentiality, Bayesian statistics, hierarchical and mixture models, and statistical modeling of complex data.

Susan Raymond is executive vice president for research and analytics for Changing Our World, Inc. She is responsible for designing and conducting business operating environment research for both nonprofits and foundations, as well as developing business plans and program evaluations for new and existing institutions. In 2012, the director of the National Science Foundation appointed her to the board of the U.S. Civilian Research and Development Foundation.

PRESENTERS

Paul Arnsberger is a statistician in the Special Projects Branch of the Internal Revenue Service's Statistics of Income Division. He has more than 23 years of experience working with nonprofit and exempt organization data. In addition to his work in the exempt area, he is a member and past chairman of the Division's Disclosure Review Board and is active in the Division's open data efforts.

Jeffrey Berry is the John Richard Skuse professor of political science at Tufts University. His research has focused on policy making in Washington, interest groups, Massachusetts politics, nonprofits, and urban government.

Mark Boroush is a senior analyst in the R&D Statistics Program at the National Center for Science and Engineering Statistics (NCSES) of the National Science Foundation (NSF). At NCSES, he is responsible for national statistics and analysis on the status of the U.S. R&D enterprise and its contributions to the nation's economy. He is also a chapter author of NSF's biennial *Science and Engineering Indicators*.

Ronda Britt has been a survey statistician with the National Center for Science and Engineering Statistics since November 2005. She currently serves as the project officer for the Nonprofit R&D Survey. She also serves as project officer for the Higher Education R&D Survey and the FFRDC R&D Survey, a survey of R&D expenditures at the nation's 39 federally funded R&D centers.

Maria Cristalli is the chief strategy and quality officer for Hillside Family of Agencies. She has more than 20 years of experience in planning and quality assurance in nonprofit social service organizations.

Michael Crosby is president and chief executive office of Mote Marine Laboratory and Aquarium. He previously served for 3 years as Mote's senior vice president for research. During much of his career, he played an

active role in directly leading national and international multidisciplinary research programs, as well as developing national policy and administrative aspects for national science programs.

Nathan Dietz joined the Urban Institute in April 2013 as a senior research associate in the Center on Nonprofits and Philanthropy. He is currently serving as the associate director for the National Center for Charitable Statistics. He is also managing projects related to organizational fundraising, foundation philanthropy, and "fourth sector" organizations.

Louise Earl manages the Private Sector Science and Innovation Section of the Investment, Science and Technology Division, Statistics Canada. She is actively involved with the review by member countries of the *Frascati Manual.* The topics of her research works include determining measurements of impacts of science, technology, and innovation; organizational and technological change in the public and private sectors; and indicators of growth firms. [Provided presentation materials but was unable to present.]

Karla Eisen is a backyard beekeeper affiliated with the Prince William Regional Beekeepers Association in Northern Virginia. She teaches beginning beekeepers, conducts intermediate beekeeping seminars, and has been a leader in the team whose work resulted in beekeeper friendly zoning laws in Prince William County. Since 1999, she has worked as a senior study director for Westat in Rockville, Maryland, focusing on qualitative approaches to data collection, survey research, and program evaluation.

John Gawalt serves as director of the National Center for Science and Engineering Statistics (NCSES) of the National Science Foundation (NSF). Previously, he was deputy director for NCSES and program director for its Information and Technology Services Program. Before joining NSF in 1988, he worked for the Bureau of Labor Statistics on the Consumer and Producer Price Programs in the Office of Prices and Living Conditions.

Aldo Geuna is full professor at the Department of Economics and Statistics Cognetti De Martiis, University of Torino, and fellow of the Collegio Carlo Alberto. He has been a member of many scientific committees, expert groups, and panels in the United Kingdom and Italy, as well as for OECD, the National Academies, and European Union. He has been invited visiting professor in Chile, France, Italy, Spain, and Vietnam.

Jodi Harpstead became the chief executive officer of Lutheran Social Service of Minnesota (LSSM) in 2011. Prior to joining LSSM, she spent 23

years with Medtronic, Inc., where she held several key positions, including president of Global Marketing and U.S. Sales in the Cardiac Rhythm Management Division.

Daniel Heist has served as a volunteer at the local, division, and national levels with the American Cancer Society for more than 25 years. Currently, he is treasurer for the national board of directors. He also serves as the director of internal audit at Pennsylvania State University, with more than 30 years of auditing and accounting experience.

Catherine Mickle is the chief financial officer for the American Cancer Society. She is also the chief financial officer of the American Cancer Society Cancer Action Network, a 501(c)(4) organization and sister organization of the American Cancer Society. Previously, Mickle was the finance director and treasurer for the Turner Foundation, Inc. She also teaches nonprofit financial management at Georgia State University and is a board member of The Giving Kitchen and Side by Side Brain Injury Clubhouse.

Cleo Redline is a senior research scientist at the National Center for Education Statistics, where she provides methodological leadership and direction over complex survey designs, such as the current redesign of the Schools and Staffing Survey. Prior to going back to school, she was the senior survey methodologist at the National Science Foundation. She began her career as a researcher in the Statistical Research Division at the U.S. Census Bureau.

Robyn Stone is senior vice president for research at LeadingAge and executive director of the LeadingAge Center for Applied Research. She has held senior research and policy positions in both the U.S. government and the private sector. She served in the U.S. Department of Health and Human Services as deputy assistant secretary for disability, aging and long-term care policy from 1993 through 1996 and as assistant secretary for aging in 1997. She also held research director positions at Project HOPE's Center for Health Affairs and the National Center for Health Services Research (now the Agency for Healthcare Research and Quality).

STAFF

Constance F. Citro is director of the Committee on National Statistics (CNSTAT), a position she has held since May 2004. She previously served as acting chief of staff (December 2003–April 2004) and as senior study director (1986–2003). Prior to joining CNSTAT, she held positions as vice

president of Mathematica Policy Research, Inc., and Data Use and Access Laboratories, Inc.

Carol House is a senior program officer for CNSTAT. She is study director for this workshop, as well as for a project to review and evaluate the 2014 Survey of Income and Program Participation. She retired from the National Agricultural Statistics Service in 2010 where she was deputy administrator for programs and products and chair of the Agricultural Statistics Board.

Holly Rhodes is a program officer with the Board on Science Education at the National Research Council (NRC). Previously, she served as a program officer and study director in the Board on Children, Youth, and Families. Prior to joining the National Research Council, Rhodes worked as a consultant on the NRC study that produced *Mathematics Learning in Early Childhood* and at RTI International where she served as the deputy project director for the national evaluation of the preschool curriculum evaluation research program.

Esha Sinha joined CNSTAT as an associate program officer in July 2009. She has worked on a variety of CNSTAT panel studies, workshops, and planning meetings.

COMMITTEE ON NATIONAL STATISTICS

The Committee on National Statistics was established in 1972 at the National Academies to improve the statistical methods and information on which public policy decisions are based. The committee carries out studies, workshops, and other activities to foster better measures and fuller understanding of the economy, the environment, public health, crime, education, immigration, poverty, welfare, and other public policy issues. It also evaluates ongoing statistical programs and tracks the statistical policy and coordinating activities of the federal government, serving a unique role at the intersection of statistics and public policy. The committee's work is supported by a consortium of federal agencies through a National Science Foundation grant.