

The Foundational Public Health Services as a Framework for Estimating Spending



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Introduction: In support of the nation's effort to address rising healthcare costs and improve healthcare outcomes, the National Academy of Medicine called for a minimum package of public health services available in every community to protect and improve population health and identification of the resources needed to make these services universally available. In response, the Foundational Public Health Services (FPHS) framework was developed to outline a basic set of public health programs and capabilities. Although the FPHS is considered a useful public health practice tool, cost estimation for providing the FPHS is in its infancy. This is in part due to inability to estimate total costs of individual public health services and programs. This research begins to address this knowledge gap.

Methods: FPHS formed the basis of a coding framework used in 2013–2016 to code 1.9 million U.S. Census Bureau State Finance non-hospital expenditure records from 49 states from 2000 to 2013. Results were used to develop estimates of state governmental FPHS spending.

Results: FPHS spending constituted 36% of total state governmental non-hospital health spending from 2008 to 2013. The largest proportion of FPHS spending was on maternal/child health and the smallest proportion of spending was on access and linkage to clinical care.

Conclusions: This research is an important step in response to the National Academy of Medicine's call for estimating the resources needed to provide the FPHS. Such estimates allow for spending comparisons across states and may inform future research to assess and evaluate FPHS spending impacts.

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INTRODUCTION

Despite efforts to assure a high-quality public health system, governmental public health service provision across the nation is inconsistent, hampered by insufficient funding, workforce, and technology.^{1–6} To that end, and in response to a 2012 National Academy of Medicine (NAM) report, *For the Public's Health, Investing in a Healthier Future*,² the Foundational Public Health Services (FPHS), a model for defining and costing public health services, was developed.⁴

The NAM's report highlighted the chronic underfunding of public health services and the challenge of presenting a clear picture of public health services needed in all local communities. Thus, a key recommendation in the report was that a minimum package of

“foundational” and “programmatic” public health services should be developed that protect and promote the health of populations, are available and are visible in all communities, and serve as a framework for program and financial management.

In response to this recommendation and in support of national efforts to reduce costs and improve health outcomes, in 2013, the Public Health Leadership Forum

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convened public health leaders to define the “minimum package” of public health services which then formed the basis of the FPHS model (version 1.0).⁴ Additionally, infrastructure capacity to assure the public’s health and to obtain sufficient and sustainable funding was identified.⁴ Building on these efforts, approaches to cost estimation were formulated and a uniform chart of accounts crosswalk was developed for comparison of spending across health departments.^{6,7}

The FPHS model is a conceptual framework describing the capacities and programs that state and local health departments should be able to provide to all communities and for which costs can be estimated.⁸ Additionally, health departments should have the capacity for additional important programs and activities specific to the needs of their individual communities. As such, the FPHS model⁸ (Figure 1) consists of the following components:

- the FPHS, which includes:
 - Foundational Capabilities: cross-cutting skills needed in state/local health departments to support all activities (e.g., human resources, communications)
 - Foundational Areas: substantive areas of expertise or program-specific activities in all state/local health departments necessary to protect the community’s health (e.g., communicable disease control)
- programs/activities specific to a health department or community’s needs: additional services critical to the community’s health (such services are referred to as residing “above the line” in the graphic representation of the model).

As the model was developed to be applicable to all health departments and communities, flexibility was built in to include programs specific to a community’s needs. For example, immunizations may be provided by a health department in one local jurisdiction, but in another local

jurisdiction, immunizations are provided by other entities. Thus, immunization, although an essential public health program, is not specifically included in the national model. Hence, services residing “above the line” are based on the context of the public health system structure and specific needs of the community and are not any less important to the population’s health than the program areas listed as applicable to all health departments.^{4,8}

Furthermore, several states have tailored the FPHS model to help organize their public health system, using it to define state and local health department roles within their state and develop cost estimates to promote sustainable funding.⁸ Additionally, at least one state is working with tribes to tailor the FPHS model for tribal health department use.⁹ The FPHS work is now led by the Public Health National Center for Innovations at the Public Health Accreditation Board.⁸ The model continues to evolve based on learnings from state and local health departments implementing the FPHS.

The NAM’s report called for transparency and justification of public health spending.² The variation in service offerings across health departments and differing public health organizational structures has hindered reliable estimates of public health expenditures.^{10–13} The Association of State and Territorial Health Officials has worked since the 1970s to improve comparability of spending across states, yet challenges persist.¹⁴ Additionally, research has found variations in financial practices exacerbate comparability issues, complicate cost estimation, and put the field decades behind other parts of the public and private sectors in the fiscal arena.¹⁵ An additional case for the FPHS put forward by the NAM is budget justification and demonstration of value, which are of particular importance in this era of increased governmental accountability and declining resources. It is difficult to justify the value of the public’s public health dollar if it is not known how that dollar is spent and to what end.

A unified data set of governmental spending on the FPHS is needed to address these challenges. Although the Association of State and Territorial Health Officials and the National Association of County and City Health Officials include financial data in their Profile Reports,^{16,17} these data are generally parsed out by specific programs/services and capture only state and local health department spending, respectively, excluding other government agency spending on areas within the FPHS (e.g., departments of environment and agriculture). The Public Health Uniform National Data System, Uniform Chart of Accounts project, and Public Health Activities and Service Tracking projects capture more granular-level spending information, but also are limited

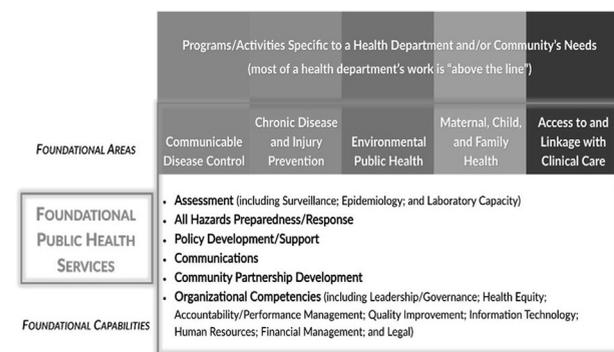


Figure 1. Foundational Public Health Services model.

to health department spending only.^{18–20} Authors of the NAM report emphasized that the FPHS should be delivered in all localities, but recognized that public health services may be provided by a range of agencies.² As such, a data set including all state-level governmental spending likely will provide a better estimate of the resources needed to make such services universally available. The U.S. Census' Division of State Finance maintains a data set of all state government agency spending.²¹ Findings based on these Census data are reported in this manuscript.

METHODS

The State Health Expenditure Dataset (SHED) was created through the project team's manual coding in 2013–2016 of > 60,000 programs and services expenditure data, consisting of 1.9 million unique line item state governmental agency spending records from 49 states from 2000 to 2013.²² Project methods and approaches are detailed at length elsewhere.²³ The U.S. Census provided the data that were collected from 49 state budget offices across the country.²¹ The data set included state records that the Census characterized as functional code 32 (health–other) and code 27 (environmental health).^a The Census codes 32 and 27 categories comprise all public spending on health that is not public insurance/thirty party medical vendor reimbursement (e.g., Medicaid) or hospital care, thus are largely constituted by spending on behavioral health care, community outpatient health care, public health, and disability-related care. The project team recoded the Census spending records in 2013–2016 using the FPHS model as a framework to characterize records into “public health,” “other health/services,” and “maybe public health.” The “maybe” code was used when there was not enough information in the record to make an assignment and then for aggregation purposes was included with the “public health” records. This produced a conservative estimate, as the default assumption was that the Census codes 32 and 27 records were “public health,” unless the project team could definitively determine otherwise. Sensitivity analysis indicated “maybe” public health records were 3% of all records and 2% of all spending. Each program category was independently coded by two teams of researchers using the FPHS coding framework. Coding disagreements were resolved through consensus among the full project team and records were recoded accordingly.

After the initial round of coding, more granular coding for “public health” items occurred in alignment with the FPHS model, distinguishing spending on the Foundational Areas and Foundational Capabilities. For records that were deemed other health/services (e.g., community healthcare clinics or behavioral health care), the project team created a standardized set of “other health/services” activities based on definitions from the Centers for Medicare and Medicaid Services, Association of State and Territorial Health Officials and National Association of County and City Health Officials Profiles, and Organisation for Economic Co-operation and Development framework on categorizing public

expenditures (Figure 2).^{6,16,17,24,25} Environmental health expenditures were coded according to the Organisation for Economic Co-operation and Development and WHO “A System of Health Accounts” framework. Hence, environmental health determinations were based on the Organisation for Economic Co-operation and Development and WHO premise of preventive services, such as permitting education and regulation as a public health (FPHS) activity, whereas remediation and natural resources preservation were categorized as “other services.”²⁶

National estimates were created for available years. Prior to 2008, not all Census records were available digitally. In 2008 and after, all states with the exception of California reported expenditures electronically.²² Additionally, one state (South Carolina) appeared to be missing expenditures from its state health department. Consequently, estimates were most often reported as percentage distribution. For real dollar estimates, missing state data were imputed based on aggregated reported non-hospital health spending from official Census estimates, decremented by calculations based on the research team's estimation of the national average proportion of non-hospital health spending on the FPHS for a given year.

RESULTS

Coding with the FPHS framework for reporting states in 2008–2013 found that 36% of total state non-hospital health spending was for services and activities within the FPHS. The remaining spending (64%) went toward other health/services, the bulk of which was personal health-care services. Figure 3 shows FPHS spending by category. The largest proportion of FPHS spending in the foundational areas was for maternal/child health (36%), followed by environmental health (14%). Conversely, the least was spent on access/linkage (5%). Within the foundational capabilities, the largest proportion of spending was on organizational competencies and the smallest amount on communications. National aggregate estimates of spending by FPHS were found to be relatively stable between 2008 and 2013. Maternal/child Health (largely the Special Supplemental Nutrition Program for Women, Infants, and Children) was the largest area of spending within the FPHS across the 2008–2013 time period. Spending across the Foundational Capabilities was also quite substantial—consisting of about 22% of total FPHS spending across the time period.

Between 2008 and 2013, coding of Census data showed that approximately \$109 billion was spent on state-level governmental FPHS across 48 states—or approximately \$130 billion after imputing missing data for California and South Carolina. This amounted to approximately \$68 per person per year nationally. Spending on FPHS varied considerably by state: The mean was \$93 (median \$75) for public health spending. By comparison, across 48 states for 2008–2013, total non-hospital health spending (funds spent on both the FPHS and other community health care) amounted to \$306

^aFunctional code 27 (available after 2007) rolls up into code 32 for aggregation purposes.

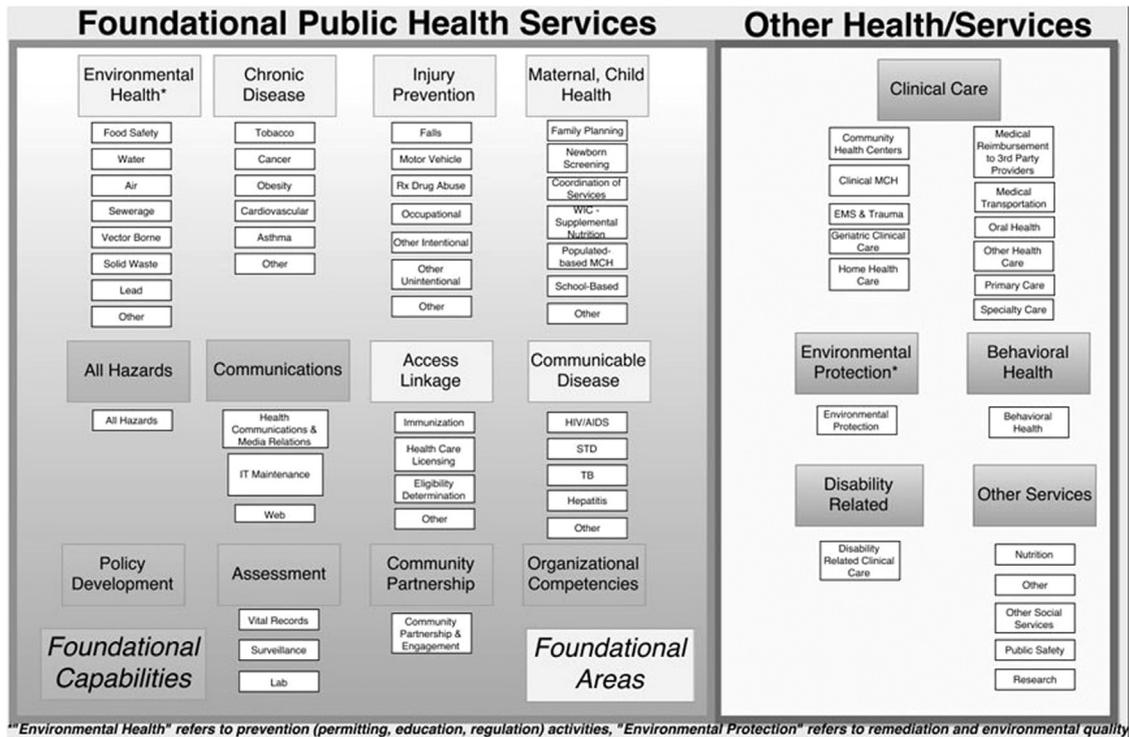


Figure 2. Coding framework.

billion, or approximately \$366 billion with missing data imputed. This amounts to \$192 per person per year.

DISCUSSION

This study is the first to use Census financial data to estimate all governmental state agency spending on total non-hospital spending and specifically on the FPHS. This approach allows tracking of FPHS spending trends over time nationally and within individual states. Additionally, these estimates show other health/services spending at a more granular level and allow for spending

comparisons across states, as well as a baseline from which to assess spending trends over time and evaluate the impacts of such spending at the programmatic and service levels.

Other research on governmental public health spending, including work by Bradley et al.,²² used aggregate data to examine state-level non-hospital spending. However, as the present research indicates, total non-hospital health spending estimates are likely a poor proxy for public health spending. Research by Beitsch et al.⁵ corroborates these study findings that public health funding levels and capacities vary widely across the country, thus underscoring the need for the NAM’s call for a basic set of public health programs and capacities available universally.

To support the nation’s aims to reduce costs and improve health outcomes, a better understanding is needed of what is spent on public health and to what end. These findings and the SHED offer a critical first step to assess and monitor progress toward these national goals.

However, the national data collection system presents challenges in achieving these aims. As each state independently reports spending data to the Census, differences in how state budget offices label an expense can complicate characterizing expenses. Additionally, in state agencies that deliver a range of services (e.g., public health and Medicaid), it is plausible that non-public

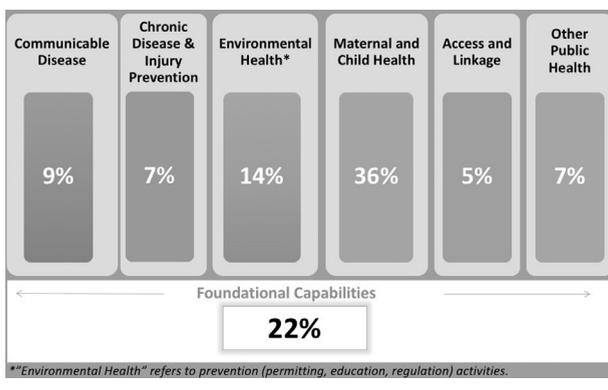


Figure 3. Percent of total state spending on Foundational Public Health Services 2008–2013.

health administrative expenditures can be conflated with public health administrative spending.

An additional data challenge is California's lack of reporting to the Census. Therefore, the Census develops California estimates by extraction from state budget reports that capture spending at the bureau or division level. As such, estimates for California at the programmatic and service level are not available. Given California's large proportion of the nation's non-hospital health spending (estimated at 14%), this is a concern, as any variation within California from the predicted national average would likely affect total national public health spending estimates.

Another key data challenge is the lack of local-level public health spending data. Local spending varies considerably depending on the resources of the local jurisdiction, as well as the local government structure. For example, in some states local health departments are entities of the state health department, whereas in other states local health departments are independent local government entities and some states have a mixture of both types. As a result, there is wide variation in state to local transfer of funds. Furthermore, reporting of state to local transfers varies, with some states reporting transfers to the Census at a more granular spending level than others. This reporting variation prohibits consistent characterization and estimation of state to local transfer expenditures.

The absence of local spending data as well as the lack of granular detail on state to local transfers highlight the need for local-level spending research. The addition of local-level spending to the Census state governmental data would allow for a more comprehensive understanding of the nation's total public health spending.

However, local Census financial data are collected differently than at the state level. The Census State Finance Division collects granular administrative data from the state budget office annually, whereas the Census Local Finance Division collects self-reported estimates, at the aggregate level (e.g., total spent on corrections, education, non-hospital health), on a 5-year cycle. Thus, efforts to create a uniform chart of accounts using the FPHS model are more likely to provide useful local-level spending estimates broken out into the Foundational Areas and Capabilities than local-level government spending Census data. To date, these chart of account approaches include only health department spending, thus excluding spending on the FPHS by other state and local governmental agencies.

Limitations

The SHED was created through the project team's manual coding of >60,000 programs and services

expenditure data, consisting of 1.9 million unique line item state governmental agency spending records from 49 states from 2000 to 2013. As such, variations in data completeness and spending characterizations across states, as well as the lack of local level spending data are limitations to this research and the SHED. Additionally, the study team's coding process may have introduced some inconsistencies. However, given the millions of records within the Census data set each year and length of time reported, such coding issues were likely not discrediting to overall findings.

Another SHED limitation is the variation in granularity of the data. Sensitivity analyses showed that some states had \$0 reported spending in some of the Foundational Areas and Foundational Capabilities. This is likely an artifact of how data are captured in an agency's chart of accounts and processed by the Census. It may be the case, for instance, that some states report multiple categories of spending under one line item (e.g., environmental health spending captured under a general header of communicable disease control). Beyond implications for accurate state estimates in a given year, this functionally means that states with "shallower" charts of accounts (i.e., those using only two to three fields instead of four to five fields of detail in their line item spending records) will likely have larger categories of undiscernible spending that can only be captured vaguely under "other spending". Such inconsistencies across states complicate interstate comparisons. Thus, national aggregate estimates from the SHED are likely the most highly reliable over time, with precision and accuracy decreasing marginally as one moves to state-level estimates by FPHS category, and even more questionable when examining spending within the subcategories. These are important limitations; however, the SHED is an important first step at highlighting these challenges and informing the development of enhanced approaches. For example, these study findings suggest prospective efforts, such as those being undertaken in the uniform chart of account crosswalk projects, will yield higher quality data for estimating public health spending.

Even with such limitations, this research and the SHED specifically offer an important first step in the collection and assessment of state public health spending using the FPHS as a framework. It provides evidence of a likely overestimation of public health spending and a sense of the wide variation in FPHS expenditures among states. Such findings have the potential to inform efforts to evaluate the value of public health spending. Additionally, study findings emphasize the need for further research to better estimate and assess FPHS spending and capacities in states and local communities across the nation.

CONCLUSIONS

It is critical to the nation's future to stem healthcare costs and improve health outcomes. A critical component of this goal and reiterated by the NAM is the need for a package of public health services to be available in every community and the identification of the resources needed to achieve this aim. The FPHS was developed in support of these efforts; yet, without the ability to identify what resources are needed to provide the FPHS, the ability to assure that they will be provided is limited.

This work is an important step to enhancing the nation's capacity to develop public health spending estimates and demonstrates the value of the FPHS model as a tool to define and cost public health services. Such efforts are fundamental to answer the NAM's call and the nation's need for a minimum package of public health services universally available to protect and promote the health of all populations.

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REFERENCES

- Levi J, Segal L, St. Laurent R. *Investing in America's Health: A State-by-State Look at Public Health Funding and Key Health Facts*. Trust for America's Health; 2011.
- Committee on Public Health Strategies to Improve Health. *For the Public's Health: Investing in a Healthier Future*. National Academy Press; 2012.
- Frieden TR. Asleep at the switch: local public health and chronic disease. *Am J Public Health*. 2004;94(12):2059–2061. <https://doi.org/10.2105/AJPH.94.12.2059>.
- Public Health Leadership Forum. *Defining and Constituting Foundational "Capabilities" and "Areas" Version 1*. Washington, DC: RESOLVE, 2014. www.resolve.org/site-healthleadershipforum/files/2014/03/Articulation-of-Foundational-Capabilities-and-Foundational-Areas-v1.pdf. Accessed May 8, 2017.
- Beitsch LM, Castrucci BC, Dilley A, et al. From patchwork to package: implementing foundational capabilities for state and local health departments. *Am J Public Health*. 2015;105(2):e7–e10. <https://doi.org/10.2105/AJPH.2014.302369>.
- Honore PA, Leider JP, Singletary V, Ross DA. Taking a step forward in public health finance: establishing standards for a uniform chart of accounts crosswalk. *J Public Health Manag Pract*. 2015;21(5):509–513. <https://doi.org/10.1097/PHH.0000000000000283>.
- Mays GP, Public Health Cost Estimation Workgroup. *Estimating the Costs of Foundational Public Health Capabilities: A Recommended Methodology*. Lexington, KY: University of Kentucky; 2014.
- Public Health National Center for Innovations. Foundational Public Health Services. 2016. www.phaboard.org/phnci/fphs.html. Accessed November 28, 2016.
- Washington Department of Health. *Foundational Public Health Services*. 2016; www.doh.wa.gov/fphs. Accessed November 28, 2016.
- Leider JP. The problem with estimating public health spending. *J Public Health Manag Pract*. 2016;22(2):E1–E11. <https://doi.org/10.1097/PHH.0b013e3182941a7b>.
- Singh SR. Public health spending and population health: a systematic review. *Am J Prev Med*. 2014;47(5):634–640. <https://doi.org/10.1016/j.amepre.2014.05.017>.
- Ingram RC, Bernet PM, Costich JF. Public health services and systems research: current state of finance research. *J Public Health Manag Pract*. 2012;18(6):515–519. <https://doi.org/10.1097/PHH.0b013e31825fbb40>.
- Sensenig AL. Refining estimates of public health spending as measured in national health expenditures accounts: the United States experience. *J Public Health Manag Pract*. 2007;13(2):103–114. <https://doi.org/10.1097/00124784-200703000-00005>.
- Barry M, Bialek R. Tracking our investments in public health: what have we learned? *J Public Health Manag Pract*. 2004;10(5):383–392. <https://doi.org/10.1097/00124784-200409000-00003>.
- Honore P, Gapenski LC, Morris ME, Fos PJ, Leon J. Advancing public health finance: closing 100-year gaps in education, training, and financial assessment methodologies. *Public Health Finance Research and Planning*. 2010. www.publichealthfinance.org/media/file/RWJ_Closing_100_year_Gaps.pdf. Accessed May 8, 2017.
- Association of State and Territorial Health Officials. *ASTHO Profile of State Public Health*. Volume 3. 2014. www.astho.org/Profile/Volume-Three/. Accessed May 8, 2017.
- National Association of County and City Health Officials. *National Profile of Local Health Departments*. 2014. nacchoprofilestudy.org/wp-content/uploads/2014/02/2013_National_Profile021014.pdf. Accessed May 8, 2017.
- National Association of County and City Health Officials. Welcome to PHUND\$. 2016. <http://phunds.naccho.org/>. Accessed November 28, 2016.
- Bekemeier B. The Public Health Activities and Services Tracking study. 2016. <http://phastdata.org/>. Accessed November 28, 2016.
- Bekemeier B. Chart of Accounts. 2016. www.rwjf.org/en/library/grants/2015/12/developing-and-evaluating-strategies-for-a-nationwide-uniform-ch.html. Accessed February 23, 2017.
- U.S. Bureau of the Census. *Government Finance and Employment Classification Manual*. 2006. www2.census.gov/govs/pubs/classification/2006_classification_manual.pdf. Accessed May 8, 2017.
- Resnick B, Leider J, Le J, et al. State-level spending on public health by all governmental agencies: Using Census of Government data to create a new finance dataset for the field. 143rd APHA Annual Meeting and Exposition: Chicago, IL, October 31–November 4, 2015.
- Leider JP, Resnick BA, Sensenig AL, Alfonso N, Brady E, Bishai DM. Assessing the public health activity estimate from the National Health Expenditure Accounts: why public health expenditure definitions matter. *J Health Care Finance*. 2016;43(2):225–240.
- Morgan D, Henderson J. *Expenditure on Prevention Activities under SHA 2011: Supplementary Guidance*. www.oecd.org/els/health-systems/Expenditure-on-prevention-activities-under-SHA-2011_Supplementary-guidance.pdf. Accessed May 8, 2017.
- Centers for Medicare and Medicaid Services. National Health Expenditure Accounts: methodology paper. 2014. www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/national-healthexpenddata/downloads/dsm-14.pdf. Accessed May 8, 2017.
- WHO. *A System of Health Accounts, 2011 Edition*. 2011. www.who.int/health-accounts/methodology/sha2011.pdf. Accessed May 8, 2017.