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The U.S. National Vital Statistics System: Transitioning Into the 21st Century, 1990–2017

Programs and Collection Procedures



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

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Preface

The National Vital Statistics System (NVSS) is a decentralized, cooperative system comprised of 57 registration areas (i.e., the 50 states, the District of Columbia, New York City, and five territories: Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Marianas). Overall coordination and guidance for NVSS is provided by the National Center for Health Statistics (NCHS) and its predecessor agencies. The system is an indispensable component of the U.S. public health system and has been since the beginning of the 20th century. Having detailed data for every one of the nearly 4 million births and 2.5 million deaths annually in the United States makes it possible to track indicators of health status for the population at the national, state, and local levels, including disparities by age, sex, race and ethnicity, and detailed geography. Infant mortality, access to prenatal care, maternal risk factors and pregnancy history, teen birth rates, changes in causes of death and rankings of causes, and life expectancy patterns are among the key indicators available from vital statistics. The data are invaluable for identifying populations at risk, program planning, and developing initiatives to target health disparities, to name a few. Identifying rare causes of death and the disparate impact of health conditions on mothers and decedents is also possible with vital statistics data. These data are also foundational for developing population estimates and projections for the country, for states, and for local areas. NVSS has been described in detail elsewhere (1–4). Uniformity and standardization of national statistics have been achieved through a number of mechanisms, including definitions and reporting requirements, and recommended laws and regulations (e.g., the Model State Vital Statistics Act and Regulations). The standard certificates have been the principal means of achieving uniformity in the information to be collected and on which national statistics are based.

The Vital Statistics Cooperative Program (VSCP) has been the foundation for the federal–state partnership in producing vital statistics since 1973 (1). NCHS has engaged in contracts with the jurisdictions to obtain, through funding support, individual record data for births, deaths (demographic and medical information), and fetal deaths. The contract for the last half of the 1990s was the first to set the stage for automation, improved timeliness, and the innovative data products described in this report.

Until the mid-1990s, records for marriages, divorces, and abortions were also included in VSCP. The reporting areas for these events, however, never included all states and registration areas.

The purpose of this report is to update the previous histories, published first in 1954 and then in 1997 (1,2). The developments and changes over the past two decades have been extraordinary and far-reaching. While some of the broad outlines of these activities were envisioned back in the mid-1990s, the full scope and breadth were not anticipated. The history during this recent period encompassed changes and challenges in a vast array of areas, and many were occurring concurrently on different tracks. Thus, this report is organized more by general topic area and, within topics, chronologically. To aid the reader in reviewing and interpreting the recent history, this report is accompanied by a timeline (Table). The timeline lists important activities and milestones in all aspects of the history of NVSS and related programs chronologically, beginning in the mid-20th century to provide greater context. Readers can refer to significant milestones in the timeline and then to the report for more details. For the early decades, additional information is available elsewhere (1,2). Readers can also use the timeline to gain a greater understanding of how various events and activities intersected and overlapped. Additional background and context are provided in Appendices I–VII and in supporting Appendix Tables I–VI and Appendix Figures I–V.

Although not strictly part of NVSS, two programs, the National Survey of

Family Growth and the natality and mortality followback surveys, are also discussed briefly in this report. Both programs have provided important information that has augmented NVSS.

This report is based on extensive interviews with colleagues in NCHS' Division of Vital Statistics (DVS) (the organizational unit within NCHS where NVSS is housed) and retired DVS and NCHS staff, whose names are listed in the Acknowledgments, as well as published and unpublished materials from NCHS and other sources. These sources are included in the reference section of the report. It is expected that the report will be useful to a wide audience in the public health, public policy, and research communities seeking to understand how the country's vital statistics system has evolved in the last quarter century and how the information collected and disseminated in the system can be interpreted and analyzed. In addition, it is anticipated that the report will provide important context and background for current NVSS program staff and for staff who join the NVSS program in future years, as well as for state colleagues.

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NCHS Director Rothwell and DVS Director Atkinson enthusiastically supported the project and the participation of current and former NCHS staff to share their expertise. Many persons within DVS contributed to the preparation of this report and to documenting the events and decisions made over the years since 1990. The manuscript was based in part on extensive interviews with current and former NCHS staff over several months as well as historical materials that they provided. Specific acknowledgment is made to the following contributors who assisted in various ways, including generously sharing their time and expertise or carefully reviewing the manuscript: Farida Ahmad, Robert Anderson, Elizabeth Arias, Delton Atkinson, Robert Bilgrad, Amy Branum, Anjani Chandra, Mary Anne Freedman, George Gay, Elizabeth Wilson Gregory, Bonita Gross, Brady Hamilton, Donna Hoyert, Lillian Ingster, Robert Israel, Chrissy Jarman, David Johnson, David Justice, Hetty Khan, Karen Knight, Kenneth Kochanek, Julia Kowaleski, Li (Leo) Lu, Jennifer Madans, Joyce Martin, Hanyu Ni, Michelle Osterman, Charles Rothwell, Charles Sirc, Steven Steimel, Paul Sutton, George Tolson,

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Objectives

This report describes the history of the National Vital Statistics System, with a focus on the period 1990–2017. The vital statistics system is the country's most enduring program of data collection on the health of the population. It is based on information reported on the certificates of births and deaths and reports of fetal deaths, collected in each of the states and independent registration areas. Over the last two decades, the vital statistics system has experienced far-reaching changes, and has shifted in important ways to emphasize data quality, timeliness, and analysis. The changes underlying these areas are described.

Methods

This report is based on extensive interviews with current and former staff of the National Center for Health Statistics' (NCHS) Division of Vital Statistics, the organizational unit that houses the National Vital Statistics System. The report also includes information collected in numerous published and unpublished materials from NCHS and other sources. To aid the reader in reviewing and interpreting the recent history, this report is accompanied by a timeline. The timeline lists, chronologically, important activities and milestones in all aspects of the history of the National Vital Statistics System and related programs, beginning mid-20th century, to provide greater context.

Conclusions

The National Vital Statistics System has experienced extraordinary and far-reaching changes since the early- to mid-1990s. Data content, timeliness, and quality have improved significantly and these changes have enhanced the value of vital records for describing and documenting the health of the country's population.

Keywords: birth and death certificates • fetal death reports • reengineering vital statistics • revisions of standard certificates • analysis of vital statistics data • Vital Statistics Cooperative Program

The U.S. National Vital Statistics System: Transitioning Into the 21st Century, 1990–2017

by *Stephanie J. Ventura, M.A.*

Introduction

When the last report on the vital statistics system was published in 1997 (1), the National Center for Health Statistics (NCHS) and the states were on the cusp of revolutionary, though not yet fully understood, changes in the reporting, collection, analysis, and dissemination of vital statistics data. Electronic registration was already underway for births and in the very early stages for deaths. Almost 70% of births from more than one-half of the states that had or were developing and implementing electronic birth registration systems (EBRS) were registered electronically in 1995 (1). Pilot studies were underway for electronic death registration systems (EDRS), which were slower to develop. Death registration is more complicated because data are reported from multiple sources (i.e., funeral directors, physicians, and coroners or medical examiners). The main underlying principle for electronic systems for vital records is that records should be created, edited, coded, queried, and corrected at the source. These standards turned out to be guiding principles for the 2003 revisions of the U.S. Standard Certificates and Reports that were in the early planning stages in the late 1990s.

Concurrent with this transformation though was the realization that the basic vital registration systems still in widespread use were based on outmoded registration practices and structures, so that even with the transition, at least for births to EBRS, the underlying systems and processes were antiquated and were inconsistent with goals of

improved data quality and timeliness, and efforts to facilitate real-time data linkage capabilities. For example, early EBRS had limited capability for interactive edits. Data transmitted were initially submitted from “standalone” systems in hospitals and the data essentially had to be accepted and used “as is.” Hospitals updated their EBRS individually. Thus, the data collected were not necessarily comparable across hospitals. Subsequently, the electronic systems transitioned to being web-based. Within a jurisdiction, then, hospitals were accessing the same version of the EBRS software. Thus, software problems had widespread consequences. The early promise of electronic systems continued to be largely unmet. These underlying challenges were summarized by NCHS Director Charles Rothwell (formerly Director of the Division of Vital Statistics) in his 2004 essay explaining the issues and suggesting strategies to address the problems (5). This essay makes it clear that although nearly a decade had already passed since these issues initially received focused attention, and some progress had been achieved, major challenges in systems, culture, and funding persisted. Examples of progress include the development of functional requirements for reengineered birth and death registration and the growth of collaborations among a number of organizations working on these issues (e.g., Model Vital Events Registration System [MoVERS]; see section later in this report). This situation was the impetus for the National Academies' Committee on National Statistics to convene a workshop on Vital Data for National Needs in 2008 (4). This workshop is discussed in [Appendix VII](#).

As indicated, this period importantly coincided with a shift in focus to data *quality*, with the goal that the data produced be based on nationally comparable collection systems, but concerns about timeliness were ongoing and persistent. Three inextricably linked issues in particular challenged the National Vital Statistics System (NVSS) during this period: a) ensuring that data were nationally comparable, b) focusing on data quality, and c) improving data timeliness. The data quality concerns, initially raised in 1954 (1), were especially prominent for the medical and health data and reflected a strong belief that birth and death registration data are crucial components, even building blocks, of public health information systems and could be used to provide essential health statistics for all levels of government, institutions, and the public. While the system was referred to as a national *vital* statistics system, it was widely understood that vital statistics were essentially *health* statistics.

1989 Revisions of the U.S. Standard Certificates and Reports and Evaluations of the Forms

The 1989 revisions of the birth certificate and fetal death report represented the first serious foray into reporting increased medical and health information (6). The use of checkboxes was promoted as a way to improve the uniformity and comparability, and thus the quality, of the data. Prior revisions of the certificates included items with open-ended response options, making it almost impossible to compile uniform and comparable data. However, soon after the 1989 revisions were implemented, quality concerns abounded: The checkboxes were said to be too vague and imprecise, not well-defined, and not uniformly reported (3,7–14). Further, some items were deemed inappropriate for collection

on the certificates (e.g., alcohol use on the birth certificate and fetal death report were considered problematic because of the stigma associated with this substance) (3). To sum up, the mid-1990s marked a period when NCHS and the registration areas were acknowledging and responding to the inadequacies of their systems to meet the timeliness and quality challenges of these systems; were exploring and developing electronic vital registration systems; and were identifying strategies to meet the demands for high-quality, reliable, consistent, comparable, and timely vital statistics data for important public health and public policy needs. The challenges and the responses developed to address them are detailed in the next sections.

Evaluation of the 1989 Certificates

Consistent with previous revisions, the first steps taken in exploring revisions of the standard certificates for the 1990s and forward were to evaluate the 1989 revisions, including their effectiveness, and from that launching pad, to examine how the certificates and the processes could be improved. These evaluations were inaugurated with a planning phase that began in 1994 and continued through the rest of the 1990s. The overarching activities were facilitated under the Panel to Evaluate the (1989) U.S. Standard Certificates (3). NCHS provided resource support and coordination, and state vital registration executives and medical and health experts provided Panel leadership. The 1989 revision-based evaluations began with surveys of state registrars and vital statistics executives on their views on items to keep and items to discard, and items that their jurisdictions recommended *adding* to the U.S. standard certificates. At the early stages, in 1998, the decision was made to evaluate (i.e., revise) only the birth and death certificates and the fetal death report; it was decided that the marriage and divorce certificates and the induced termination of pregnancy report should *not* be revised (see later sections in this report, [Appendix I](#), and reference 3). It was further agreed that the results of the

revision process would be implemented after *International Classification of Diseases* (ICD–10) coding had begun for deaths (in 1999) (15) and any problems associated with the millennium transition to the year 2000 (known as Y2K) that could affect dates and other legal elements had been addressed (3). Largely because of these factors, although it was initially hoped that the evaluation activity would result in revisions taking effect in the late 1990s, the revision activity actually culminated in standard certificates that were adopted in 2003 as described in this report.

The evaluation objectives and the evaluation criteria are reprinted here from the Panel Report (3):

Evaluation objectives:

- Review the current certificates, prepare a report to assess the usefulness of the existing data items, and determine how the quality of the data can be improved and collected for statistical and legal purposes;
- Identify unmet data needs and determine if the standard certificates are the most appropriate place to collect such data. This included attempting to identify future data needs for the next 15–20 years; and
- Make recommendations for the content, format, and standard definitions of the proposed standard certificates. This task was to be accomplished with the understanding that a “certificate” is no longer represented by the piece of paper on which the data are collected, but by a standard vital statistics database with a strong emphasis on electronic, automated data collection.

Evaluation criteria for review of existing and new items included:

- Is the item needed for legal, research, statistical, or public health programs?
- Is the item collectible with reasonable completeness and accuracy?
- Is the vital statistics system the best source for this information?

The Panel’s work to evaluate the 1989 certificates continued through the 1990s until mid-2000. The Panel’s

deliberations are described in detail elsewhere (3).

Revision Recommendations for the 2003 Certificates

The changes in certificates between 1989 and 2003 were substantial, far exceeding those for previous revisions. Major changes included the addition of a number of items to the birth certificate (16), namely maternal morbidity; mother's height and prepregnancy weight; women, infants, and children (WIC) food program participation; principal source of payment for the delivery; infections present; breastfeeding status; and whether the infant was living at the time of discharge from the birth facility. The Panel also recommended other substantive changes to the existing medical and health information. These included enhancements to the smoking questions, to capture smoking and quitting by trimester, for example, and some item deletions. In addition, the Panel recommended new and modified items along with the addition of specific items to facilitate data linkages (e.g., infant deaths and multiple births) and new sections for "administrative use" to fulfill statutory registration mandates. Further, the Panel recommended for the birth certificate and fetal death report, the development of standardized worksheets for the mother and hospital staff that would include "clear, unambiguous questions, definitions, instructions, and preferred data sources," all designed to improve data quality and completeness and comparability across population groups. For the fetal death report (17), the focus was on significantly revising the cause of fetal death section. Applicable changes from the birth certificate were also integrated into the fetal death report. A new item on place of delivery was added. In addition, the Panel recommended that the standardized worksheets be tested and modified as needed.

For the death certificate (18), the Panel recommended the addition of some items focused on meeting public health information needs, facilitating ICD-10 coding, and improving the quality of

cause-of-death data. These included questions on the relationship between tobacco use, pregnancy, and traffic factors and the cause of death. The instructions for the physician and funeral director were improved, with detachable pages added to the certificate.

For both certificates and the fetal death report, the Panel recommended that the items on parents' or decedent's education and race and Hispanic origin be revised to match the new data collection method adopted for the census for this information (3). These specific recommendations significantly affected the implementation of the revised certificates and report, as will be discussed later in this report.

For the birth and death certificates and fetal death report, the Panel was unequivocal in stating that "States and NCHS must advocate the use of automated, electronic collection of data, which enables detailed instructions, help screens, and real-time edit checking." This would be crucial for the development of the electronic birth and death registration systems. Through contracts with experienced state and national experts, the NVSS program oversaw the production of detailed editing specifications, which are available on the NCHS website (19-21). The conceptual framework and informational bases for these guidelines were the "Specifications for Collecting and Editing the United States Standard Certificates of Birth and Death-2003 Revision" (22), and the "Guide to Completing the Facility Worksheet for the Certificate of Live Birth and Report of Fetal Death" (revised and updated in 2016) (23). A key motivation of the Panel for recommending the development of the specifications was the finding of the "Working Group to Improve the Quality of Birth Data" in 1998, which concluded that vital statistics birth data quality had declined in the 1990s "associated in part with electronic registration of vital events" (22,24).

Concomitant with the Panel's recommendations on the content of the certificates and on the "automated, electronic collection of data," the Panel gave great attention to how to design the

documents. There was still a focus on the documents as paper records, but also on how the documents would be used for electronic registration. During this period, vital statistics advances for births, deaths, and fetal deaths intersected with a growing vision for the development of sophisticated and flexible electronic processes. The Panel envisioned the revised certificates and report as being essential components of the country's public health infrastructure.

Evaluating and Testing the Proposed Revised Certificates and Associated Materials

During the Panel's deliberations, there was broad agreement that the Panel's recommendations should be tested and evaluated to validate the proposed data collection systems and the data themselves. The Panel was recommending sweeping changes in all aspects of vital statistics registration processes, and it was crucial that they meet the identified needs for vital statistics-based health data. As part of the process to ensure the validity of the output from the new electronic systems using these editing specifications, NCHS contracted in 2002 to develop a "test deck" to review the electronic output from the 2003 revised birth registration system and ensure that the systems were operating as intended. A number of states used the test deck to validate their systems. A similar test deck was developed to assess the operation of the 2003 revised death registration system. The instructions for using the test decks and the populated test decks (subsequently updated during the 2000s) are available by request from NCHS' Division of Vital Statistics (DVS) (25,26). The test decks can be a useful tool for registration areas to use when they make further changes in their systems, in order to ensure that the modified systems are still operating as envisioned.

Importantly, the Panel also recommended testing the certificates and worksheets before they were released to

the states. NCHS carried out this testing for the birth data during April 25, 2000 through May 5, 2000, under the auspices of its Questionnaire Design Research Laboratory (QDRL), and the results guided some minor modifications in the documents (3). The QDRL report is also available by request from DVS (27).

Testing of the revised death certificate included two components. For the funeral directors, there were three focus groups conducted at a national funeral directors meeting, with a total of 23 participants. Staff from the Center for Health Policy Studies (CHPS) led the group meetings; NCHS staff also attended. A separate focus group was coordinated by the Maryland State Funeral Directors' Association. Testing the revised death certificate among certifiers (that is, physicians, coroners, etc.) was more challenging because of difficulties in scheduling; a smaller focus group participated. Input was also provided by the Maryland Medical Society's Public Health Council as well as the Council of State and Territorial Epidemiologists (28–30).

NCHS obtained feedback on the draft revised U.S. Standard Report of Fetal Death at the Society for Maternal-Fetal Medicine Annual Meeting in Miami Beach, Fla. in February 2000 (31). A total of 20 physicians participated and shared their viewpoints on the revised fetal death report relative to their experiences in 12 states. CHPS conducted this focus group, and it was also attended by NCHS staff members. The facility worksheet was also tested (32). NCHS staff members also attended a meeting of the Maryland Obstetrics and Gynecology Society's Executive Committee in May 2000 where additional comments were provided by seven physicians (both clinicians and academics) (33). The initiatives described here reflected NCHS' and the jurisdictions' shared interest in pursuing a strong focus on the quality of vital records statistical data.

Implementation of the 2003 Standard Certificates

Background

For the 11 previous revisions of the U.S. standard certificate of live birth, 10 revisions of the death certificate, and 7 revisions of the fetal death report, the revised forms were implemented essentially simultaneously with the effective date of the revised forms. Thus, for example, nearly every state implemented the 1989 revisions in 1989 following the recommendation of NCHS to the state vital statistics executives. The 2003 revisions required additional steps for full implementation. The process involved input, review, and concurrence from more federal officials, including all the component agencies within the Department of Health and Human Services (HHS). When all parties concurred on the content of the reporting forms, the HHS Secretary would be asked to recommend that all jurisdictions adopt the revisions.

The Panel's plans in the final stages of its deliberations had been for the revisions of the U.S. Standard Certificates of Birth and Death and the Report of Fetal Death to take effect at the beginning of 2002. However, the HHS Secretary recommended, after an extensive public comment period, that the revised certificates, report, and the accompanying worksheets; item specifications; and other instructions be submitted to the states for adoption in November 2003 (34). It was clearly too late for most states to manage an effective date of January 2003, even if they had not faced other challenges. Of course, all of the jurisdictions were already familiar with the revision process that was winding up as well as the content of the revised forms. Some health departments acknowledged the need to fundamentally reengineer their registration processes and had been seeking resources within their jurisdictions, so that both certificate implementation and reengineering could proceed simultaneously.

The resource needs, however, were much larger than anticipated, more than available to most jurisdictions. Only two states, Pennsylvania and Washington, implemented the birth certificate revision in January 2003; five jurisdictions implemented the revised death certificate: California, Idaho, Montana, New York, and New York City; and two (Michigan and Washington) implemented the 2003 revised fetal death report (Tables I–III and Figures I and II). Subsequent sections of this report address the significant and unforeseen delays in implementation and the multiple activities undertaken to facilitate the adoption of the standard certificates and report and accompanying documentation by all jurisdictions. These challenges resulted in an unprecedented delay of 13 to 14 years in full implementation of the revised certificates and report by all jurisdictions.

As noted above, concurrent with the initial efforts to implement the revised standard birth and death certificates and report of fetal death, there was a recognition and acceptance that the existing systems within the states' vital records agencies were developed for paper-based processes that were outmoded but that continued to exist through legacy processing systems. There were two major obstacles to modifying these legacy systems. First, system changes were difficult, if not impossible, to make in the existing environment. States and federal partners were not fully fluent in technology issues, reflecting confusion about systems differences, which reflected differences in processing activities across states, as opposed to old business practices, which largely relied on paper-based registration, and some states were resistant and reluctant to give up these practices. Local registration was also a factor; in many jurisdictions, the registration of vital events was led by local registrars who transmitted records to the state authorities. This chain of multiple participants exacerbated the challenges. Even when there was an understanding that changes were needed, some states were trying to develop their new electronic systems to exactly replicate the existing paper-based processes. In other words, the

concept that the recommended revisions represented extensive and extraordinary changes to the essential processes as well as to the content of the vital event registration forms was not fully acknowledged by all of the parties in the process. This was an issue especially for the mortality reporting systems, where EDRS were at the very earliest stages of development. Within the relatively few states where EDRS had been adopted, electronic death registration was not universal. Even for birth registration where there were models of effective electronic birth registration, there was resistance to new technology.

The second equally important major obstacle was lack of funding at both the federal and state levels for the necessary reengineering and implementation of the 2003 revisions. The costs of these activities were not fully understood, but it was widely acknowledged that the costs would be substantial and extensive. Further, the 9/11 terrorism attack had just occurred and in addition to the terrible tragedy of the actual events, federal and state budgets were significantly strained as government authorities struggled to implement specific responses to the terrorism (described later in this report) (35). The next sections of the report deal first with the underlying and overarching budgetary and implementation challenges and their consequences and then with the initiatives that NCHS undertook, usually with partners such as the National Association for Public Health Statistics and Information Systems (NAPHSIS) and the Social Security Administration (SSA), to address the challenges of the revision and the need to reengineer state and federal data collection and processing systems. NAPHSIS is the organization that represents the 57 U.S. vital records jurisdictions (50 states, 5 territories, New York City, and Washington, D.C.).

Budgetary and Implementation Challenges

The resource challenges facing NCHS and the states through most of the 2000s had actually begun in the 1990s. Over many decades, NCHS and the states or jurisdictions were partners in

collecting, compiling, and disseminating vital statistics data. The vital statistics system is state (jurisdiction)-based. It relies on the collection of vital event information at the state level, with states having the legal authority to register vital events. The production of national vital statistics files requires the collaboration of NCHS and the state vital statistics executives. A complex formula that attempted to value the contribution of the jurisdictions to the National Vital Statistics System and to determine the appropriate contribution of NCHS to the states for the statistical data was developed and revised over the years. A “cost formula” committee comprised of NCHS staff and state vital statistics executives negotiated this arrangement over the years, in a sense independently of the NCHS budget. Once agreed upon, the NCHS–state cost-sharing was integrated into the NCHS budget. The challenge here was that NCHS’ budget was flat through much of the decade and, in some years, it was reduced. In practice, this meant that NCHS’ commitment to the states, as managed through the Vital Statistics Cooperative Program (VSCP), was difficult to maintain. Funding was typically not available for a full data year, meaning that NCHS was only able to support the jurisdictional vital statistics activities and data collection for portions of a data year, with the balance of the data year paid for through funds from the following fiscal year’s budget. This funding issue created significant instability both for the jurisdictions and NCHS (4).

First steps taken to address funding shortfalls

By the mid-1990s, it was necessary for NCHS to identify areas to cut in the vital statistics contracts to meet urgent resource shortfalls. As the funding situation worsened, NCHS’ ability to produce and disseminate national data sets for births, deaths, and fetal deaths as well as for marriages, divorces, and induced terminations of pregnancy (abortions) was severely compromised (4,36). The cuts that were made are described in detail in [Appendix I](#) and elsewhere (36) and are summarized here.

Because the formulation for the VSCP contracts was item- and data set-specific, cutting items and entire data sets could and did lead to specific tangible savings, regardless of any judgment on the merit or lack of merit of specific cuts.

Initially, NCHS dropped some items from the birth and death data sets, including for births, the date of the mother’s previous live birth (dropped in 1994) and the 1-minute Apgar score (dropped in 1995). Similarly, NCHS discontinued the collection of the father’s educational attainment in 1995. These items were not reinstated until the content of the 2003 revision of the birth certificate was fully incorporated in NCHS’ birth data sets in 2009 (37). Information on autopsy was dropped from the death certificate but was later restored when the 2003 revision of the death certificate went into effect (4). Further, occupation and industry of the decedent were eliminated as reportable items on the death certificate.

To meet its contractual obligations to states, NCHS discontinued altogether the collection of individual record data on induced terminations of pregnancy (that is, abortions) in 1994 (the last data year collected was 1992, but data sets were not processed for any year after 1988) (4,38). NCHS funding constraints also led to the discontinuation of the collection of individual record data for marriages and divorces after 1995 (39), and the last reports on these data sets published by NCHS were for the 1989 and 1990 data years (40,41). These decisions were made to meet NCHS’ priorities within the National Vital Statistics System for birth, death, and fetal death data. Additionally, at the time of these decisions, the reporting areas for marriages, divorces, and abortions were not national. The decisions and the deliberations behind the cuts in these programs, as well as NCHS’ current reporting of marriage and divorce counts and the availability of other information on abortions, are described in detail in [Appendix I](#) and elsewhere (36,38–50).

Challenges in Implementing the 2003 Revisions

Previous revisions of the U.S. Standard Certificates were implemented with relatively little difficulty and on a timely basis. The state-based systems were paper-based. Until the 1989 revision, the items were relatively straightforward and clear. The systems for collecting the data and producing statistical files were uncomplicated. With the 2003 revision, everything was more complex. Concurrent with the revisions, states were engaged to the extent possible in implementing EBRs and to a much lesser extent, EDRs. The urgency of these efforts reflected the fact that in some states, the (legacy) registration systems they had been using were no longer reliable even for the 1989 certificate revisions. In other words, completely apart from the challenges of adopting the new content of the 2003 revisions, the 2003 revision was the first that required the updates to or a replacement for data collection software, or in some cases the initial implementation of such software. These activities would require substantial resources. Further, disentangling these two issues (i.e., electronic registration systems demands and the enlarged content of the standard certificates) was essentially not possible. NCHS' resource constraints during this period limited its ability to provide tangible support to the states to develop modernized electronic systems, including developing EDRs or completing the EBRs work (Figures IV and V). Further, no support was available from NCHS to the states to implement the 2003 revisions. The states were experiencing their own funding shortfalls as well, thus exacerbating the impact of financial limitations on NVSS. With previous revisions of the standard certificates and reports, NCHS assisted the states in various ways with implementing the certificates, and the adoption of the certificates was almost uniformly carried out in the revision year or within a few years thereafter. The 2003

revision implementation was completely different. NCHS lacked the authority and was therefore not in a position to direct the states to implement immediately or by a fixed date. Instead, states were advised that they should implement the revised certificates as soon as they could. NCHS' Director sent a letter dated December 24, 2003, to the state registration executives, in which he specifically addressed the implementation timing, as follows: "Rather than expecting that all states will implement the revised certificates at the same time, as has been the case with previous revisions, we believe we can be more efficient and effective by focusing our limited resources on a linked reengineering and certificate implementation. Thus, implementation will be phased in state-by-state over the next several years. We expect that this process will be completed within five years" (51). This delayed implementation differed considerably from the typical 1- or 2-year implementation for previous revisions.

Only a handful of states revised in the early years, including a number of states that had anticipated early on the resource requirements and were able to secure funding within their state budgets for both revising their certificates and transitioning to modernized electronic systems. As noted, Pennsylvania and Washington were the first to implement the revised birth certificate in January 2003. After that, implementation proceeded slowly. For example, within 2 years, by January 1, 2005, an additional 10 states revised the birth certificate, with the revised states accounting for 31% of U.S. births (52). The situation was comparable for the death certificate: California and Idaho were the first to revise their death certificates as of January 1, 2003, and by January 1, 2005, an additional 15 states were using the revised death certificate, accounting altogether for 39% of U.S. deaths in that year (53). However, further complicating matters for NVSS was that the states revising their death certificates were not the same as the ones revising their birth certificates. Only Washington revised its fetal death report by January 1, 2003. By January 1, 2005, 11 states were using the

2003 revision of the fetal death report and these states accounted for about 15% of U.S. fetal deaths (54). A final complication in the timing was that for some states the official implementation of their revised certificate occurred during the course of a calendar year (i.e., after January 1). Revised items for these states could not be included in the NCHS data sets until the following calendar year. Details of the revision implementation dates are shown in Tables I–III and are illustrated for births and deaths in Figures I and II.

Consequences of These Challenges

Processing vital statistics data sets since 2003

As just described, the phased implementation of the 2003 revisions of the birth and death certificate and fetal death report had major negative consequences for the production of NCHS' annual statistical files. The files were submitted to NCHS in a variety of formats that were internally inconsistent and incompatible across and, in some cases, within jurisdictions. The reporting of one crucial item changed for births, deaths, and fetal deaths and this impacted file production and analysis of all the data: The race(s) of the mother and father and of the decedent were collected and processed differently on the 1989 and 2003 revisions (see next section). In addition to the varying file formats, there were a number of additional key items on the birth certificate that were reported in different, noncomparable ways on the 1989 and 2003 revisions. These items included timing of prenatal care, educational attainment of the mother (and the father), mother's smoking status during pregnancy, and details of the method of delivery (e.g., primary cesarean). Because the questions on the 1989 and 2003 revisions were substantively different, data from revised and unrevised states were presented in separate file locations during processing; the data could not be combined to produce national estimates for these measures or combined on

the data files (55). Further, some items had different response categories in the 1989 and 2003 revisions, thus requiring separate file locations for the data. Finally, the 2003 revision included some completely new items, presenting data on certain topics for the very first time, including payment source for the delivery, use of infertility treatment, and maternal morbidity.

In the case of fetal death data, the processing of the data sets was complicated from the earliest years of the revision. Files for 2003–2006 were produced with revised and unrevised data items. As was the case for the birth data, questions on prenatal care and mother's educational attainment, among other items, were reported in substantively different ways on the 1989 and 2003 fetal death reports, precluding the production of national estimates for these measures.

The fetal death data files began to be significantly delayed beginning with the 2007 data year because of NCHS' ongoing resource constraints and the decision to focus primarily on improving the production and timeliness of the birth and death statistical files. During this period, the NVSS program decided that in order to produce and release the fetal death data sets, substantial cuts in the data elements would be necessary. All noncomparable data items were removed from the files for 2007–2012, resulting in an approximately 50% reduction in the file sizes. This made it possible to release files for these 6 data years during the period September 2013 through April 2014. The files were essentially comprised of basic demographic elements, including parents' ages, birth order, plurality, sex, and mother's race and Hispanic origin and marital status. Some risk factors comparable across revisions were retained along with method of delivery. The revised items have been included in the internal database, but are not currently reviewed for data quality and they are not included in the "in-house" or public-use files. In mid-2015, NCHS implemented the recommendations of the joint NCHS–NAPHSIS Birth Data Quality Workgroup, which recommended a number of cuts to both the national fetal

death file and the birth file (56). These cuts are described in detail in the section on the Birth Data Quality Workgroup later in this report and in [Appendix V](#).

In the case of death data, the questions on educational attainment on the 1989 and 2003 revisions were substantively different, as noted above, so that data from revised and unrevised states could not be combined to produce national estimates for this measure. Information on new items such as pregnancy status, tobacco use contributing to death, and decedent's role in transport injury events became available in a staggered way. In addition, items that were not new but were newly requested to be sent to NCHS, such as method of disposition, frequently were not sent to NCHS until the state adopted the standard certificate, so that information was not available nationwide. Since additional detail was not consistently available, for example on detailed place of birth, limited values for foreign-born decedents were retained in some geography fields (57).

As indicated above, the challenges created for file production had significant consequences for these data sets, especially for the analysis of national trends and variations in a wide array of crucial public health and reproductive health topics. It was not possible to describe or interpret, for example, current patterns in such traditional items as prenatal care use, gestational age, or tobacco use by such key demographic descriptors as educational attainment or race. The available data were not national and neither the revised nor the unrevised data could be generalized to the United States. The statistical files for births were most severely impacted, with significant consequences on analysis of the data. The difficulties were exacerbated because of large numbers of data fields and records (nearly 4 million annually). Just as problematic, the use of key birth data for evaluating state-specific progress in such areas as reducing preterm birth, maternal tobacco use, and racial disparities was compromised because states were reporting the information in noncomparable ways. By the completion of this report, all jurisdictions except

American Samoa were submitting revised birth data and all but two territories (U.S. Virgin Islands and American Samoa) were submitting revised death certificate data ([Figures I and II](#)). Connecticut, American Samoa, and the Virgin Islands have not yet submitted revised fetal death data.

Race and ethnicity

The reporting of race and Hispanic origin on the birth and death certificates and fetal death report changed significantly between the 1989 and 2003 revisions. In 1997, the Office of Management and Budget (OMB) issued the "Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity," which replaced the 1977 standards then in effect (58). The 1997 standards increased the minimum set of race categories to be used by federal agencies from four to five and also required federal data collection programs to allow respondents to select *one or more race categories* in a question that provided 15 specific checkboxes and 3 write-in lines. The U.S. Census Bureau implemented these changes effective with the 2000 census and continued them, with minor modifications, in the 2010 census (59). In response to the OMB directive, the 2003 standard certificates and report include items on race and ethnicity that match the Census Bureau items based on the 1997 standards.

During the interim period while the revised certificates were being phased in, it was necessary to "bridge" the responses of mothers and fathers who reported more than one race and decedents for whom more than one race was reported, to a single-race category so that data from states with revised and unrevised race data could be combined. In turn, to compute population-based rates, it was necessary to develop a set of "bridged-race" population estimates, which are the denominators for the rates. Race bridging refers to making data collected using one set of race categories consistent with data collected using a different set of race categories, to permit estimation and comparison of race-specific statistics at one point in time or over time. More specifically, race bridging

is a method used to make multiple-race and single-race data collection systems sufficiently comparable to permit estimation and analysis of race-specific statistics.

To produce the numerators for birth and death rates, NCHS developed a computer system to code and edit reported data so that the multiple-race data could be processed uniformly across the jurisdictions. Additionally, the system “bridges” the multiple-race data into the four single-race categories of the previous (1977) OMB standards. Thus, multiple race is imputed to a single race (American Indian or Alaska Native, Asian or Pacific Islander, black, or white) according to the combination of races, Hispanic origin, sex, and age of the mother or father indicated on the birth certificate or the decedent indicated on the death certificate. The imputation procedure is described in detail elsewhere (60). NCHS staff process and impute multiple-race entries, and the NCHS codes are returned to the jurisdictions so that the state-produced data files are compatible with those generated by NCHS (60,61).

As noted, the Census Bureau inaugurated the collection of multiple-race *population* data with the 2000 census. To produce population-based rates during the interim period, the Census Bureau, in collaboration with NCHS analysts, has provided special “bridged-race” population estimates with race categories that are consistent with the 1977 OMB standards to NCHS. Multiple-race population estimates have been bridged to single-race categories for comparability with birth and death data. The population estimates result from bridging the 31 race categories used in Census 2000 and Census 2010, as specified in the 1997 OMB standards for the collection of data on race and ethnicity, to the four race categories specified in the 1977 OMB standards. The bridging procedures are described in detail in a special report (62) and the bridged-race population estimates are available (63). In brief, the estimates were developed by using data from the pooled 1997–2000 National Health Interview Surveys (NHIS) conducted

by NCHS. NHIS has allowed survey respondents to enter one or more races as applicable for themselves, and if more than one race is reported, the respondent is asked to indicate his or her primary race (62). About 1% of the nearly 400,000 respondents in the 1997–2000 NHIS samples reported more than one race and a primary race. These data were used to develop models to bridge the 2000 census multiple-race data to single-race categories. The bridging models included demographic and contextual covariates, some at the individual level and some at the county level. Allocation probabilities were obtained from the regression models and applied to the Census Bureau’s April 1, 2000, Modified Race Data Summary File population counts to assign multiple-race persons to single-race categories (62). NVSS program statisticians have analyzed the impact of these changes on population-based rates for births and deaths as well as the impact of the revisions of all population estimates for the 1990s, after the 2000 census (64–66). It is important to note that the processes for imputing multiple-race data for vital records (that is, birth and death numerator data) and the population denominator data needed for computing population-based rates are very similar. They differ mainly due to the nature of the data. The same probabilities or percentages and algorithms are used for both components.

An additional complication during this period for the data on race and ethnicity was that some states adopted the new guidelines for reporting this information before they implemented the revised certificates. In other words, the “revised” reporting areas for each vital record were different for the states using the full 2003 revisions and the states that incorporated only the revised reporting of race and ethnicity. In addition, some states implemented the revised reporting of race and Hispanic origin after January 1 of a calendar year, thus delaying the availability of their data until the following calendar year.

As of the 2016 data year, all states and the District of Columbia reported multiple race on birth certificates (67). Multiple race was reported on the death

certificates of 49 states and the District of Columbia, representing 99% of U.S. deaths (68). Despite the option to report multiple races, it is still relatively rare for multiple races to be reported on the birth and death certificates. In the states reporting this information in 2016, 2.4% of births were to mothers reporting more than one race and 0.4% of deaths were of decedents for whom more than one race was reported (67–68). For the 2016 data year, NCHS population-based birth and death rates by race will transition to the revised standard reporting categories; rates using bridged-race categories will also be available to enable data users to assess the impact of the transition.

Geographic coding of vital events

One of the most valued attributes of NVSS is that researchers, policy makers, public health officials, and others are able to analyze geographic patterns in health, because individual record data are uniquely available at the state and county level. This makes it possible to track patterns and differences in trends in a wide array of important health measures for specific geographic entities. This can then assist jurisdictions in developing strategies to address particular public health challenges, including, for example, disparities in low birthweight and infant mortality, in deaths due to cardiac conditions or cancer, and deaths associated with environmental issues, to name but a few. All states use the geographic coding manuals prepared by NCHS that are based on information provided by the Census Bureau. It should be noted that data are available as well for cities and towns and comparable geographic entities, but the data at this level of detail are often affected by misreporting and other data quality issues. This issue is discussed in the concluding section of the report. At the time of this writing, the 2014 Geographic Coding Manual is in use. New manuals are typically issued about 4 years after the conclusion of a decennial census. While the geographic coding manuals are revised periodically, sometimes using new geographic coding systems, the updates have typically not affected

the utility and comparability (across states and over time) of the geographic information. More information about the geographic coding of vital events is available elsewhere (69).

Implications of the increase in the size of data files on analytic uses of vital statistics

The need to incorporate separate fields for revised and unrevised data had important implications for producing data files. These requirements included accounting for noncomparable birth, death, and fetal death data items and differences in reporting race and Hispanic ethnicity and educational attainment as well as new data items. The record lengths for the natality and mortality data files increased significantly: The size of the birth file expanded by greater than 4-fold, from a record length of 350 fields or positions before the 2003 revision to a record length of 1,500 fields. The mortality data file was affected as well, although the file size increase was smaller: about 10% for the public-use file, with a much larger increase for the historical (“in-house”) file that includes multiple-race reporting.

The detailed race and ethnicity codes for revised states alone added significantly to the size of the in-house historical files from which the public-use files are created (67,68,70). The complexity of analyzing the files grew exponentially. The resource requirements for producing these statistical files contributed significantly to the deterioration in timeliness of data availability during the first decade of the 2000s, which has reversed only recently. See section below on Micro-data Files: Data Dissemination Tools and Strategies. At the time of this writing, national statistics are available for the 2016 data year for the birth data items mentioned earlier (e.g., prenatal care and educational attainment) and for the new items on the revised birth certificate. Data on cause of death for fetal deaths are still not available for all jurisdictions. As of this writing, American Samoa and the Virgin Islands have not revised their death certificates, and Connecticut, American Samoa, and the Virgin Islands

have not revised their fetal death reports (Tables I–III and Figures I and II).

To sum up, the implementation of the 2003 revisions of the birth and death certificates and the fetal death report extended more than a dozen years beyond the official revision date. Truly national data sets were not available during these years for researchers, public and health policy analysts, and others. The public health and public policy utility of these data will be greatly enhanced when all of the states have adopted the 2003 revisions.

Delay in Approval to Use the New Data Items on Certificates

Further compromising the availability of new data (especially new birth data) during the 2000s when implementation of the revised certificates was being phased in, was the fact that NAPHSIS, the organization of state registration executives, had voted in 2005 to withhold permission from NCHS to include the new data items in their national data sets (71). The new data items are those that are exclusive to the 2003 revision of the U.S. Standard Certificate of Live Birth. They differ from items on the 1989 revision that were modified for 2003 to improve data quality. The view of the executives was that NCHS’ level of support at the time did not include support for collecting new data items. Thus, the NAPHSIS membership voted that NCHS could not release the data in statistical files and that any NCHS use of the new data was restricted to assessing and validating the quality of the new data. A subsequent NAPHSIS motion stipulated that a collaborative research agreement be developed “governing analysis, dissemination and publication of [the] new data items” and that NAPHSIS members would “participate fully in planning for the analysis of the data;... have access to data...to conduct analyses independently or jointly with NCHS;” and “...in conjunction with NCHS will develop plans for dissemination and fully participate in the preparation of all reports and manuscripts” (72).

While the effect of these motions on data availability was most severe for the birth data, there were also negative consequences for mortality data. Examples of new birth data items that NCHS could not publish or disseminate included smoking in the trimester before pregnancy, mother’s height (needed with prepregnancy weight and weight at delivery to calculate body mass index), mother’s receipt of WIC food, source of payment for the delivery, and maternal morbidity, among other items. Death certificate items that NCHS could not publish or disseminate included pregnancy status for female decedents, tobacco use contributing to death, and decedent’s role in transport injury events. While this was clearly not the intent, the decisions incorporated in the resolutions had the effect at the time of diminishing possible interest in and use of the new data items, making it difficult for NCHS to “market” the new certificate content. Further, the states that had not yet revised could see that their delay was not affecting the national data sets, since NCHS could not publish the new data in any case. In 2013, NCHS was given permission to disseminate the new data items beginning retroactively with the 2009 data year (37).

Ongoing Challenges to the Vital Statistics Cooperative Program

During the mid- to late-2000s, additional challenges appeared to slow and complicate the efforts to include the new and revised NCHS data, especially for births, in the NCHS public-use data sets. Funding issues worsened significantly during these years such that funds were not adequate to support the states in collecting either the basic vital statistics data or the new data. The existing VSCP contract through which states’ data were obtained for NVSS included no initiatives to address this longstanding problem. The states were provided cost-of-living adjustments only but no additional funds for the new data items. In an effort to reduce the costs of VSCP through which the states provided data to NCHS, proposals were developed

to trim the size of the data sets. At the time, this appeared to be the only feasible option for retaining the basic NVSS (4). The idea was to identify “core” and “enhanced” data items for births, deaths, and fetal deaths. NCHS would commit to funding the “core” data items in the state VSCP contracts and would seek out alternative funding sources to fund the “enhanced” data items. This plan, which was not implemented, generated a great deal of concern among a wide range of interested parties. State vital statistics offices were concerned about whether they could withstand the cut in VSCP funding. NCHS staff members were concerned that items not included in the “core” data sets would lessen in quality, and there was even concern that these items could be lost indefinitely or even permanently. Further, the reliance on alternative funding sources would jeopardize the availability and stability of the “enhanced” data items as components of crucial public health data. Public policy and research interests were also concerned that the promise of the new and revised data items would not be met, possibly ever. Also in the works at the time was a change in contracting between NCHS and the states, to a system whereby each state would need to negotiate individually. For decades up to the present, NAPHSIS and its predecessor organizations represented the states in contract negotiations with NCHS, so the prospect of each state having to bid and compete for its own contract was quite unsettling to all. How NCHS and the jurisdictions confronted and started to overcome these challenges is described in detail in “Transitioning Vital Statistics From a ‘Good’ to a ‘Great’ System.”

Reengineering the National Vital Statistics System

The Concept of MoVERS

The Model Vital Events Registration System (MoVERS) is the name given to the initiative (2001–2003) to reengineer

the country’s vital statistics system to address the acknowledged needs of supplying accurate and standardized vital event information that is complete, continuous, and easily accessible to government agencies and individuals. The challenges of the vital statistics system include, most importantly, that the registration of vital events, including births, deaths, and fetal deaths, is a state function. The decentralized system, then, is administered by a varying range of jurisdictional laws and rules. While being responsive to underlying state-specific issues, this decentralized system complicates the process for producing national data sets that are timely and of high quality (73,74). Reengineering the country’s vital statistics systems was intended to address these challenges and needs as well as to respond to the growing demands for improved vital statistics data and functions, including all phases of birth and death registration. A crucial underpinning for the MoVERS activity was broad acceptance by all partners that the 2003 revisions of the vital records were the essential core of the data systems being reengineered. The MoVERS project was a collaboration of NCHS, NAPHSIS, and SSA. Its intended products included the development of national standards and protocols, web-based technology, automation at the source, and implementation of the revised Standard Certificates of Live Birth and Death and the Report of Fetal Death and the NCHS edit specifications for electronic systems.

The overall goals of the MoVERS initiative were ambitious. The first phase focused on the development of system functionality requirements for registering vital events. These requirements were attained through multiple Joint Application Development sessions, which showcased how “the deployment of MoVERS can significantly improve data quality, efficiently manage registration methods, preserve documents, and distribute information through automating vital event management, utilizing a web-based system” (73). The MoVERS concept as envisioned at the outset was to be able to define the requirements and use cases

for a typical state organization that would meet about 80% of each state’s needs. NCHS believed that the states and federal sources could develop a generic system. In this scenario, each state’s unique needs could be taken care of by the state.

The underlying concepts for MoVERS were more fully articulated by state vital statistics executives, NCHS, and NAPHSIS in discussions in 2002 proposing a model electronic vital statistics system (75). The model or base system, known as the Model Electronic Vital Statistics System, would incorporate the business functions and requirements that are common to all registration areas, as noted, for about 70%–80% of vital statistics office activities. When completed, the base system would “consist of modular, off-the-shelf components that could be used, in part or as a whole, by any registration area. However, such a system could be modified or customized to meet individual registration area needs.” The system as envisioned would be flexible and easily modified, with no ongoing or periodic needs for future major overhauls (75). These principles were critical and essential for the project to succeed. The development of the generic system did not happen because of lack of funds, but the MoVERS project did develop the functional requirements for births, and SSA funded the development of functional requirements for deaths. The high-level discussions that NCHS facilitated and largely funded at the time helped to inform activities ongoing in the states and among software vendors to reengineer their registration systems. Further, there were some successes in efforts to obtain funding to develop and implement new systems. Over the years, for example, SSA contributed substantially to the development of reengineered systems in a number of jurisdictions for the registration of deaths, starting initially with New York City and the District of Columbia, and continuing to support EDRS now in 48 jurisdictions (Figure IV) (76,77). However, these activities and efforts were not integrated into a unified plan. Unfortunately, the development of a generic system for registering births, deaths, and fetal deaths

did not materialize, and states proceeded to invest, on an individual basis and at higher cost, in the enhancement of their existing systems to meet the requirements of electronic registration systems. This outcome contributed importantly to the ensuing challenges and delays in fully implementing the revised certificates and integrating them with reengineered electronic systems.

Reengineering of Internal Processing Systems

Integrated National Vital Statistics System

Much of the narrative thus far has focused on the 2003 revisions of the U.S. Standard Certificates and on the inadequacies of the existing legacy infrastructure within the state vital registration programs that led to challenges implementing modernized systems and data collection instruments. Concurrent with these ongoing challenges was a growing challenge within NCHS in the collection, evaluation, processing, and production of the national birth, death, and fetal death data sets. These difficulties were embedded in the existing NCHS systems, in particular in the mainframe system for managing files. As CDC moved to close down its mainframe, NCHS needed to reengineer its mainframe systems for processing and analyzing files. This changing computing environment led to substantial automation throughout the NVSS program. Reengineering the National Vital Statistics System, known as the reengineered National Vital Statistics System (reNVSS), was focused on significantly increasing the efficiency and timeliness of vital statistics through improvements in acquisition, evaluation, and analysis of the data. Receipt and control processes were automated at the initial stages, with reports automatically produced for the NVSS staff and the jurisdictions, replacing previous cumbersome manual processes.

The new approach has allowed for more effective and substantive interaction between NCHS and the states as they worked together to improve data quality

and timeliness. Production has been automated through the development of a relational database and “analytic or summary data cubes” that enable analysts to produce tables with frequencies for year-to-year comparisons. The “cubes” are refreshed twice each day, making the data readily available for NVSS program staff to share findings with the states for immediate action. In sum, reengineering of the data receipt and evaluation processes freed up time for NCHS analysts to interact more frequently and effectively with jurisdiction colleagues on substantive data quality and timeliness issues, and to do so on a real-time basis so that issues could be readily resolved. During this period, NCHS assumed responsibility for the coding of cause of death for all deaths registered in the United States and returning the coded information back to the states. This change is discussed in the section below on Coding Cause of Death for Mortality.

Processing and file production also changed substantively within the NVSS program units. The idea was to modernize the systems with new tools and more flexibility, to remove existing bottlenecks, and to eliminate information and processing “silos” that were impeding work at all stages. In addition to improving the efficiency and effectiveness of the work of the NVSS information technology staff, the reengineering effort also included new options for more responsive analytic capability for the subject-matter statistical staff members, including, for example, “analytic cubes” for the birth and death statistical files. This represented an all-new effort previously not a part of the processes in the NVSS program. In developing the new systems, a key element to ensure “best practices” was that the processing and files be fully reproducible and that any differences be readily documented and addressed. In recounting this period, it is important to recall that the reengineering efforts were additionally complicated by the phased implementation of the 2003 revisions of the birth and death certificates and fetal death report. File management efforts were revised for each of the statistical files, including births and fetal deaths

(both revised and unrevised data), deaths (demographic data in both revised and unrevised data, and medical), and the National Death Index (NDI). During this period beginning in 2007 and extending through 2014, important gains were made in file creation, especially in improving the timeliness of the birth and death files, which accompanied improvements in the analytic capabilities of the files.

The changes described here in internal processing systems were accompanied recently by a reorganization within NCHS’ NVSS program that included: improved business practices to take better advantage of technology and maximize efficiency, improved communications within the NVSS program and with state partners, and effective initiatives to improve data timeliness and availability (78). Later sections of this report highlight the impressive array of activities, including descriptive and analytic reports, birth data quality studies, a new automated mortality medical coding system, new IT and communication initiatives, expansion of mortality surveillance activities and many others; these activities are ongoing concurrently with the push toward faster and more efficient file and report releases.

Coding Cause of Death for Mortality

International Classification of Diseases (ICD)

ICD is used to classify causes of death for statistical purposes. ICD is maintained collaboratively by the World Health Organization (WHO) and 21 international collaborating centers, 1 of which is the WHO Collaborating Center for the Classification of Diseases in North America. Currently cause of death is being coded using ICD–10, which was implemented in the United States in 1999 (15). Although ICD had previously been revised about every 10 years, the last two revisions have been in effect much longer. ICD provides the basic ground rules used to code and classify causes of death, to identify the underlying cause

of death, and to compensate for certifier errors in the cause of death statement, all of which are crucial functions. The revision process, concurrent efforts to describe and identify resultant discontinuities in data, and plans for an upcoming revision are described in [Appendix III](#) and elsewhere (79,80).

Mortality Coding System

While efforts to fully implement EDRS for all deaths across all jurisdictions have been underway since 1994, the Mortality Medical Data System (MMDS) has been in development for one-half of a century. MMDS includes several components, all different, which in combination are focused on the development of automated entry, classification, and retrieval of cause-of-death information reported on death certificates (1,81). MMDS was launched in 1968 with the Automated Classification of Medical Entities (ACME), which was designed to select the underlying cause of death according to ICD rules, replacing manual selection by nosologists (mortality medical coders). Other software was subsequently developed to provide automated input to ACME and is described in [Appendix II](#). Use of the Mortality Medical Indexing, Classification, and Retrieval System software, known as MICAR and Super-MICAR, grew quickly in the 1990s, from about 5% of U.S. death records in 1990 using MICAR to 88% in 1993, and to 70% in 1993 using Super-MICAR (82). As of 2003, all death records have been processed using Super-MICAR as well as all components of MMDS. Automated coding has important advantages over manual coding. ICD coding and selection rules can be consistently applied, so data are more comparable both within the United States and internationally. Nevertheless, manual coding remains necessary for about 20% of death records that cannot be coded automatically and are rejected by MMDS because of incomplete information provided for cause of death or other factors.

Beginning with the 2011 data year, NCHS has been coding cause of death for all records. The decision to assume

this responsibility was announced in 2010 at the annual joint meeting of the VSCP project officers and NAPHSIS members (83). This effort was undertaken as the number of trained nosologists diminished and, in some jurisdictions, reached zero. NCHS now receives death records in electronic format where they are processed through the automated coding systems. If records are rejected, NCHS nosologists manually code the information. NCHS returns the coded information to the jurisdictions for their own use. Some jurisdictions still code cause of death as well, but all of the national statistics published by NCHS are based on NCHS-coded information.

Evaluation of Iris Proprietary Software

Iris is a software system for medical coding for death records built on the framework of components of MMDS and developed as an outgrowth of the International Collaborative Effort on Automating Mortality Statistics (84). It was developed by the Iris Institute, which is an international collaboration originally involving Germany, France, Sweden, Hungary, and Italy. The United States, while participating in and advising on development activities for many years, officially joined this collaboration in 2014. Since 2014, the United Kingdom and the Netherlands have also joined the collaboration while Sweden has dropped out. Iris is presently used in several European countries, Australia, Canada, and South Africa. NCHS is currently working on the development of a new automated coding system to replace MMDS. It is expected that Iris (or at least some of its components) will be part of this new system. Comparability testing has shown a 92% match of MMDS- and Iris-based data. For the remaining 8%, Iris coding has been found to be largely correct. Differences are also partly due to the fact that Iris reflects current updates to ICD-10, whereas MMDS has not been updated. An initial review of the software with particular focus on security and on compatibility with NVSS IT systems has shown some deficiencies that will need to be addressed. At the time of

writing this report, a number of technical questions remain to be answered before any decisions are made on whether or not to adopt Iris and how much of the system can be used as is. A less significant drawback is that Iris cannot be used currently to code cause of fetal deaths (85).

Transmitting Vital Statistics Data From the States to NCHS

The transmission of data by states to NCHS has evolved significantly as a result of NCHS' and the states' total reengineering effort. Over the last two decades, states have transitioned from magnetic tape to floppy disks to bulletin board (electronic transmission) to the CDC Secure Data Network, to CDC's Secure Access Management Services (SAMS), and ultimately to the State and Territorial Exchange of Vital Events (STEVE). STEVE 2.0 is most recently underway and is more than 80% complete, with 49 jurisdictions fully certified; 6 jurisdictions are in various stages of implementation or certification of STEVE ([Figure III](#)) (86,87).

STEVE initially was focused on the interstate exchange of records. It is a system used by U.S. vital records jurisdictions first to exchange data with other jurisdictions and then later to provide data to NCHS and other public health partner programs. STEVE is owned by NAPHSIS, which describes STEVE as an "innovative messaging application for the electronic exchange of vital event data across jurisdictions" (86). It provides automated support for the Inter-jurisdictional Exchange of Vital Records (IJE), and replaces the less secure practice of exchanging paper copies, line lists, and printed computer abstracts across jurisdictions. The process for transitioning to STEVE for transmission of records to NCHS involves states' recreating their extract files in the IJE format for distribution. Each event (i.e., birth, death, fetal death) goes through a detailed extract/distribution/receipt test to ensure

comparability with previous files. NCHS certifies the states once they submit three consecutive files with no differences through STEVE. When the states are successfully certified, they can start sending files to NCHS via STEVE. Initially, using STEVE was facilitated by the NCHS/NAPHSIS Cooperative Agreement (see later separate section) (86,88). STEVE was a tool for improving timeliness in the last few years in the states where it has been operational, and it has been successful in that regard.

STEVE has thus been a crucial piece of the new electronic environment and, in fact, its adoption was a fundamental requirement for states to be in full compliance with the 2012–2016 VSCP contracts. However, during the most recent contract period for 2017–2021, NAPHSIS issued a reengineered STEVE 2.0 (89,90). As a result of changes in funding the maintenance of STEVE 2.0, the VSCP contracts have been modified to indicate that states must transmit the data “through STEVE or an alternative approved by NCHS.” States have the option of transmitting the data through the SAMS Network. There is no charge to the states for using this system. It should be noted that the previous VSCP contracts provided a mechanism granting states a period of time for their data sets to be fully certified for STEVE by engaging in a Corrective Action Plan with NCHS (discussed in detail later in this report). One of the primary benefits of using the STEVE system was the requirement that states use the IJE format that required that mortality records be reported in one file. Previously, the demographic and medical portions of the file were reported separately (88,89).

Improving Timeliness of Birth and Death Statistical Data With “Preliminary” Releases

Until this point, this report has focused on the 2003 revisions of the standard certificates, budgetary challenges for NCHS, efforts to

improve data quality, and the content of the statistical data files. There were also significant efforts to address the timeliness issues that had persisted for decades, as described earlier in this report. After all, if the vital statistics data cannot be available on a timely basis, their value is diminished. During the early to mid-1990s, NCHS and the jurisdictions explored initiatives to improve the timeliness of the birth and death data. The discussions occurred during negotiations for the VSCP contract and the time seemed right for this effort. The idea was that the states would submit their data as soon as the data were available on a “current flow” basis, in advance of the completion of quality control and other refinements. Updates and final processed data would follow. In the meantime, NCHS would process a “preliminary” file, with reports released as quickly as possible. In this scenario, preliminary reports could be released within 5–6 months of the end of a data year. To give context for the release timeframes then in existence, the 1994 final birth and death data were published in June and September 1996, respectively, fully 18–21 months after the end of the data year. These timeframes meant that the vital statistics were much less useful than they could be—for public health, health research, and public policy purposes, to name just a few. NCHS staff and state colleagues believed that the preliminary reports could be very useful. The following standards were set for the preliminary files: First, data sets needed to be about 90% complete for inclusion in the preliminary reports. Data for an individual state had to be at least 60% complete. Soon after the series started, the state-specific standard was raised to 75%. Second, the preliminary reports were not accompanied by a data file, because preparing a public-use data file would detract from the goal of getting the final files and reports published.

Initially, preliminary reports included both birth and death data simultaneously. The first report published was for 1995 events (91). The content of the preliminary reports was limited, homing in on the most critical variables and measures that would provide the

most impact for understanding fertility and mortality patterns. Estimates were provided for population-based rates, including birth rates by maternal age and race, death rates from various causes, life expectancy, and infant mortality, as well as estimates for a variety of birth statistics, including low birthweight, preterm birth, cesarean delivery, and nonmarital births. The reports have been eagerly awaited and widely referenced; media coverage of annual birth and death data began to focus almost entirely on the preliminary reports because they were timely. Because the data are based on such large samples, they are reliable, and typically, the estimates reported in the preliminary reports have been validated with the final data. Reports were published for calendar years and 12-month periods ending in June of the year for 1996, 1997, and 1998. Beginning in 1999, preliminary birth and death data were published separately due to the transition from ICD–9 to ICD–10 to code and classify cause of death (92). This shift in coding delayed the availability of the 1999 data; thus, the NVSS program decided to publish the preliminary birth and death data separately thereafter (92,93). The quickest report release was for 2013 preliminary births, which was published in May 2014 (94). Preliminary reports for 2012 and 2013 mortality were not published because the mortality program was concentrating exclusively on processing and producing the final reports and files; the final file for 2013 became available late in 2014 (68) along with a Data Brief and was followed thereafter by the final report. The final file and a Data Brief for 2016 deaths were published in December 2017 (95,96).

The timeliness of data files was improved, initially for the mortality data, by releasing the annual public-use final data files before the final report. Typically, the data files are ready for release before formal publications. At one time, NCHS’ practice based on informal policy within NVSS was to release the two concurrently, but this is no longer the case. In the case of births, the 2014 and 2015 final files were released in September 2015 and September 2016, respectively, 3 to 4 months ahead of the

availability of the final reports. NVSS analysts have prepared NCHS Data Briefs with snapshot highlights of the final birth data, most recently for the 2016 data year, and these accompany the final data files (95,97,98).

An indication of the confidence shown early on in the preliminary report series was the decision made for the 1998 data year to discontinue the Current Mortality Sample (CMS) (99). CMS, a 10% sample of mortality records, had been a product of NVSS since 1943 (1), and was inaugurated in response to the lengthy delays in data availability at the time, which compromised the utility of the mortality data for public health purposes. With the CMS, mortality estimates by cause of death were available within one to just a few months of the occurrence of the deaths. These data were published in the National Vital Statistics Reports in the provisional data series. As demands increased for more detailed data, however, so too did the time lag in releasing the CMS estimates. CMS was discontinued in 1998 because it was felt that the preliminary estimates were providing more useful information, with population-based rates and characteristics available by age, race, and sex.

Using Technology to Improve Timeliness of Vital Statistics Data, Especially Mortality

Throughout the last two decades, NCHS and the states have explored a variety of strategies to improve the timeliness of birth and death data. The timeliness of birth data substantially improved during this period, with important gains arising from the release of the preliminary data reports, as described above. From the initial publication of preliminary birth reports, the gap between the end of a data year and the availability of preliminary statistics shrank to about 5 to 6 months, and, as discussed later in this report, this interval has continued to shrink.

Timeliness has improved for both preliminary and final data reports and files for births.

The production of death registration and statistical data has been fundamentally hampered, as noted earlier, by the fact that the process involves several distinct data sources. Typically, although not exclusively, death registration is initiated by the funeral director who collects and reports on the demographic information about the decedent; the funeral director generally relies on family members as informants. Physicians, or in some cases coroners or medical examiners, are the sources for the cause-of-death information. Bringing these two key sources together has long been a challenge, and in some cases, has seemed an insurmountable one. Because of the impact on the timeliness and utility as well as the reliability of the mortality data, efforts to develop an EDRS have been pursued intensively since 1994 when a joint NCHS/NAPHSIS workgroup was formed to focus exclusively on this goal. Representatives from the American Medical Association, the American Hospital Association, and the American Health Information Management Association participated in this effort (1). There was broad consensus that the electronic systems being developed needed to be “capable of adapting to changing technology, information needs, and legal mandates; capable of meeting customer needs for prompt registration and information; capable of providing quality information appropriate for its customers while minimizing reporting burden on (data) suppliers; acceptable to the individuals, organizations, and institutions who participate in the system; and capable of incorporating methods to measure the reliability and validity of the data collected” (1). The essence of these principles has persevered over the last two decades.

The first EDRS dates back to 1999, with the first functional EDRS developed in New Hampshire in 2002. The initial concept for the EDRS dates back to the first automation efforts made in that state in 1990 (100,101). As originally envisioned by NVSS program staff, a

functional EDRS is one whereby a state registers at least 50% of its death events via their EDRS. Anything less meant that the state was not deriving the benefits of an automated system. By today’s standards, a fully functional EDRS is one that registers 80% of the deaths in a state (101).

The idea was for the systems to be Internet-based to speed up the processes for funeral directors and physicians to jointly record their data; this coincided with the maturing of the Internet in about 2000. Funeral directors have adopted the electronic systems very well and effectively. This has not been the case for physicians; at the time of this writing, more than 55% of death records are completely processed electronically (102). Most EDRS in the states, while not fully electronic, are nevertheless functioning and producing data (Figure IV). An EDRS that is not fully electronic is one that likely has the full (electronic) participation of funeral directors but not the participation of the physicians and other medical certifiers; the latter may continue to certify deaths manually. Because of these very different stakeholders involved in registering and certifying a death, with different training requirements and other challenges, fully functional EDRS take time to become established (89,101).

As noted above, SSA contributed significantly to the development of EDRS in a number of jurisdictions for the registration of deaths, starting initially with New York City and Washington, D.C., and continuing to support EDRS in 48 jurisdictions (as of October 2017) (87). At the time that this report was completed, there were still 9 jurisdictions that did not have a functioning EDRS, though 1 is in the process of building or testing a new system (U.S. Virgin Islands) (85,102). Currently a number of efforts are underway to develop functioning EDRS in these states. [See subsequent section on efforts to use special funding strategies, outlined in the current VSCP contract specifications, to stimulate EDRS expansion (88,90).] In the meantime, a few states have been using fax attestation as a way of addressing the ongoing timeliness issues

with death registration. Fax attestation refers to a fax received by an automated document imaging system that attaches an image of the form to the electronic record and is viewable only by authorized EDRS users. For example, California and Arizona have been collecting about 60% of their cause-of-death information in their EDRS by fax (85).

Mortality Surveillance Facilitates Continued Improvements in Timeliness

Most recently, the NVSS program has been engaged in a transformational program to significantly speed up the availability of mortality data. Fueling the initiatives in real-time mortality surveillance are the goals for more timely data combined with improved methods, associated with reengineering in NCHS. Interest in using NCHS mortality data for near real-time surveillance purposes has been longstanding; however, the delays in implementing modernized electronic systems for reporting and registering deaths have been an impediment to its development. With real-time mortality surveillance, it is possible to quickly identify the emerging trends in crucial mortality measures as well as newly recognized mortality indicators. The timely availability of these data enhances their value and utility.

The vision underlying the new initiative is that 80% of deaths will be reported to NCHS within 10 days of the event. This goal reflects a larger effort, supported by others, showcasing substantial increases in the value of mortality information if the data were available on a timely basis. In 2016, nationally 44% of deaths were reported to NCHS within 10 days, a significant increase compared with 17% in 2013. However, the percentages of deaths reported within 10 days vary significantly by state (103). The underlying concept is to show that vital statistics can be used for rapid mortality surveillance and additionally to improve the timeliness of releasing final statistical files. In this sense, linking NCHS' priorities to the

priorities of others can facilitate great gains in timeliness ([Appendix IV](#)). In addition, the benefits are not limited to timeliness. By speeding up data releases, data quality can be enhanced as well: Through more rapid and effective communication with jurisdictional vital statistics offices, data accuracy is improved.

It is important to distinguish between real-time surveillance data and the annual mortality statistical files (104). Surveillance data are available in real-time and are updated and revised on a “current flow” or ongoing basis as new data are reported to NCHS by state vital records offices. The full mortality statistical files are final, annual data files based on all deaths registered in the United States. Once final, these annual files are not revised or updated. It is not currently anticipated that files based on surveillance data will be publicly released because file content changes may introduce discontinuities in the data and other challenges to interpreting the data.

One area where the death certificate data have been used for surveillance for many years is the publication of weekly estimates of “notifiable diseases and mortality in 122 cities” that are issued in CDC’s *Morbidity and Mortality Weekly Report* (105). The data for the 122 cities project are reported by state and local registrars directly to the CDC’s Influenza Division. Consistent with the recent CDC Surveillance Strategy goal to reduce the redundancy of CDC surveillance systems, NCHS and the CDC’s Influenza Division have been piloting the use of NCHS real-time surveillance capabilities as a replacement for the 122 Cities Mortality Reporting System (CMRS) (106). Currently, parallel review of the 122 CMRS data system and vital statistics-based surveillance for influenza deaths is ongoing. The vital statistics-based real-time mortality surveillance effort is building off of the culture change now underway in vital statistics to focus on the production of timely and quality data using electronic registration systems. The reengineering of internal processes within the NVSS program has facilitated this effort through extensive automation linked with robust tools for

analysis, visualization, and dissemination (103,107). Finally, this activity is a strong vehicle for building and enhancing surveillance partnerships, some of which are well underway, to improve public health practice ([Appendix IV](#)).

Evaluating and Improving Birth Data Quality

Evaluation of Worksheets and Comparison of Birth Certificate With Hospital Birth Records Data

Beginning in about 2005, NCHS embarked on a series of efforts to evaluate the quality of data from the revised birth certificate and registration systems, with the objective of improving data collection and systems. These initiatives were carried out together with state partners, with NCHS in some cases working in concert with NAPHSIS on behalf of the jurisdictions. Both NCHS and the states shared the goals of making the new and revised data as useful and reliable as possible.

The first initiative was a study designed to understand how medical and health data items are collected on the facility worksheet for the 2003 revision of the U.S. Standard Certificate of Live Birth and to identify overarching issues with specific data items. As noted earlier, the development of worksheets (for the mother and the birth facility) was one of the significant innovations recommended by the Panel to Evaluate the U.S. Standard Certificates in support of the goal of improving data quality. For pre-2003 revisions of the birth certificate, the source of the birth data reported varied widely, but was often believed to be the mother herself, even when the questions related to very specific medical issues. The 2003 revision was intended to fundamentally change the process of collecting birth data—to collect the data from the most appropriate source. The mother would be the source for the demographic data and would record

that on the mother's worksheet, while the medical and health data would be collected on the hospital or facility worksheet. Data for this worksheet would come from several different sources, including the prenatal care record, the admissions record, the labor and delivery log, and other medical records. The mother's worksheet process had been previously tested, as noted earlier, during April 24, 2000–May 5, 2000, through cognitive testing in NCHS' Questionnaire Design Research Laboratory with recent mothers; the mother's worksheet, available in both English and Spanish, was tested in both languages (108,109).

The interviews with hospital staff primarily responsible for gathering the medical and health data for the birth certificate were carried out in 2009–2010 at 54 hospitals in 4 participating states representing geographically diverse areas of the country; all had implemented the 2003 revision of the birth certificate. To ensure confidentiality, the states are not identified. The study was based on private interviews with the hospital personnel (birth information specialists) responsible for obtaining the facility worksheet information and for transferring the information to the electronic birth certificate. The study found variations across states and across hospitals in the design of the facility worksheets, which contributed to differences in the sources used for certain medical and health items. In most cases, with the exception of the pregnancy history information, however, the clinician directly reported the medical/health items, or the birth information specialist obtained the information from medical records. The major conclusion of the study was that states and hospitals should focus on training their staff members in the collection of the data, especially in the use of the facility guidebook and appropriate sources of information, and ensure that the data sources are separately and clearly identified. The results of the study were shared with the NAPHSIS membership at their annual meeting in 2010, and were used to inform the development of e-learning training (see below), designed for both the birth information specialists and the clinicians (physicians and nurses) (110).

A second important initiative undertaken by NCHS was to engage in a collaborative study with two states to evaluate the quality of selected medical and health data from the 2003 revised birth certificate (111). Birth certificate data were compared with information abstracted from hospital medical records. The study population included a random sample of 600 birth records in 2010–2011 in one state and a convenience sample of 495 births in 2009 in another state. Birth certificate and hospital medical record data were compared for 14 groups of items: pregnancy history, prenatal care, gestational age, birthweight, pregnancy risk factors, obstetric procedures, onset of labor, source of payment, characteristics of labor and delivery, fetal presentation, method of delivery, abnormal conditions of the newborn, infant living, and infant breastfed. The study found wide variation in data quality, by data item and often by state and hospital. Importantly, though, even some items for which overall agreement between sources was “less-than-optimum,” there was often high agreement for one or more hospitals. This suggests that quality improvement efforts could be successful in expanding the number of hospitals with more complete reporting and that there is the potential for high-quality national data for items that currently appear to be incompletely reported. A similar but larger validity study comparing hospital medical records with birth certificate data has recently been completed. Results are available upon request (112). A smaller study in another jurisdiction also helped to inform the recent decisions described later in this report on the content of the birth certificate (112).

Improvements in the Measurement of Gestational Age

Although not a part of the 2003 revision focused efforts to address data quality issues, another significant activity has been ongoing to determine how best to measure gestational age. As a result of extensive evaluation and deliberation with clinicians and other experts, NVSS has recently transitioned, effective with

the 2014 data year, the measurement of gestational age from date of last menstrual period-based calculations to the obstetric estimate item on the birth certificate. The change is expected to result in more accurate measurement of preterm birth and other aspects of gestation, which are key indicators of infant health. Discontinuities in the series on preterm birth estimates, among other measures, were anticipated and are the subject of a recent report (113). The report focused on this change in measurement and the implications for tracking preterm birth indicators and related measures.

Birth Data Quality Workgroup

Later in this report, the development and work of the “Getting From Good to Great: NAPHSIS/NCHS Partnership” is described in some detail. The Partnership, formally established in 2010, has been focused on creating a truly great national vital statistics system by addressing in very specific ways the challenges that NCHS and the state partners were facing in chronic and seemingly intractable data quality and timeliness issues. One of the specific ways that the partners approached the data quality issue was to establish a Birth Data Quality Workgroup.

The Workgroup is a collaboration among NCHS' NVSS staff, NAPHSIS, and individual state vital statistics offices and was established in response to studies that showed wide variation in the quality of birth medical and health data across items, states, and hospitals. The Workgroup members have focused on several priority areas: a) identifying approaches to engaging hospitals on the importance of accurate and complete vital statistics birth and fetal death data; b) developing standard reports for states to use for feedback to hospitals on data issues; c) assessing and improving the quality of prenatal care data; d) identifying items to cut from the national birth data set because of poor data quality and lack of potential for improvement; and e) identifying items to cut from the national fetal death data set.

Working with NAPHSIS, the Workgroup has fielded several surveys of the vital registration reporting areas to better understand these issues. Two reports of the Workgroup's activities present survey recommendations (114,115).

In its first report, the Workgroup recommended improving jurisdictional data evaluation efforts and ensuring data quality practices that would support "greater cooperation between birth registration and birth statistics staff, better adherence to standardized collection instruments, and increased and timelier evaluation of vital records for data quality." The Workgroup made eight recommendations on the prenatal care items, each spelled out in detail in the second report (115). Recommendations for vital records jurisdictions included improving data collection, training, and communication with hospital staff and prenatal care providers; reviewing data quality and taking appropriate action; auditing hospital medical records; and improving guidelines for collecting data and raising awareness.

Most recently, the Birth Data Quality Workgroup (BDQWG) has established a new BDQWG "Tweak" subgroup. This subgroup's mission is to review the 2003 Standard Certificate of Live Birth and develop sound, modest recommendations, if appropriate, for modifications to items collected for the national birth data file in the future. This effort will be building on the Workgroup's previous careful review of 25 standard birth certificate items and a final recommendation to cut 12 items from the national birth file; the recommendations were accepted by NAPHSIS and NCHS leadership (described later in this report) (112,116).

Although not a focus of BDQWG, other efforts have been ongoing to improve birth data quality. Improvements in data elements can potentially be achieved with better definitions in NCHS' "Guide to Completing the Facility Worksheet for the Certificate of Live Birth and Report of Fetal Death" (23) and by the work of the ongoing reVITALize initiative (117) The reVITALize initiative addresses a widely shared goal among clinicians, health services researchers, electronic health records advocates, state

vital statistics agencies, NCHS, health payer representatives, and a variety of other federal agency representatives to develop standardized obstetric definitions to be used for perinatal and women's health records. More information about reVITALize is available elsewhere (117).

Items cut from birth and fetal death data sets

In mid-2014 and then again in June 2015, NCHS announced that several items were being cut from the NCHS minimum data sets based on the work and recommendations of BDQWG (56,78,118). The Workgroup developed several criteria to use as the basis for its recommendations. The Workgroup examined data quality, whether the item title was unambiguous and could be interpreted by the birth information specialist (the person who completes the birth registration process in the birth facility) or clinician without the need for specific clinical expertise or higher-level training, whether the item as reported in the hospital medical records was consistent with the birth certificate, whether there was potential for improvement in data quality, and the potential public health usefulness of an item, assuming reasonably good data quality. Through group consensus, the Workgroup then made recommendations on whether to improve, watch, or eliminate the item. Jurisdictions were advised that NCHS would no longer review the data on the items recommended for deletion for quality or provide suggestions for ways to improve. The states or jurisdictions are continuing to receive full funding for the data sets; funding is not being reduced as a result of fewer items being included in the data sets. The 2014 and 2015 notices followed a similar notice in 2011 related to three other items. To date, the following items have been cut from the NCHS birth data set (56,119–120):

- Mother ever married (this was a "derived" item based on other information on the standard birth certificate, and had been part of national file)
- Date of last prenatal care visit

- Premature rupture of the membranes ≥ 12 hours (Onset of labor)
- Precipitous labor < 3 hours (Onset of labor)
- Prolonged labor ≥ 20 hours (Onset of labor)
- Tocolysis (Obstetric procedure)
- Cervical cerclage (Obstetric procedure)
- Unplanned operating room procedures (Maternal morbidity)
- Significant birth injury (Abnormal condition of the newborn)
- Other previous poor pregnancy outcomes (Risk factors in this pregnancy)
- Moderate/heavy meconium staining of the amniotic fluid (Characteristics of labor and delivery)

The above item deletions and those described below for fetal death data began with the 2014 data year.

Because of longstanding concerns with fetal death data quality, including concerns with data completeness and accuracy of some items, especially the medical and health items, a significantly larger number of items has been cut from the national fetal death data file. The criteria that the Workgroup used to make their recommendations for the fetal death data file were similar to those for the birth file listed above, but they differed in important respects. The Workgroup was to explore the idea of substantially reducing the number of data items collected to a core set of data that could potentially be collected accurately, and to use the revised fetal death report to test whether an electronic data collection system that all states could use could be developed as a model for the next generation of electronic vital records data collection systems. In addition to the criteria used for the birth data items, the Workgroup considered the following in determining whether to recommend that a data item be removed from the standard report: what is known about the completeness and accuracy of the item?; is the information available in hospital medical records at the time that a fetal death occurs, particularly a death that occurs unexpectedly long before the due date?; is the data item potentially useful in understanding why a fetal

death occurred?; and whether there was substantial overlap and redundancy with other items on the fetal death report (i.e., between the cause of death and non-cause of death sections of the report). The items that the Workgroup recommended for cutting are listed in [Appendix V](#) (56,118,120).

It is not anticipated that additional cuts or deletions will be recommended; currently, no further reviews are planned. Rather, the focus will be “to improve the quality of birth data via improved engagements with birthing hospitals and the use of effective e-learning for hospital staff among their efforts” (78,116).

E-learning for birth clerks

A priority effort of BDQWG has been the development of an e-learning training for hospital staff responsible for collecting and documenting the medical and health data for the birth certificate and report of fetal death. The Workgroup developed standardized electronic modules to train hospital staff on a) the importance of accurately and thoroughly reporting birth certificate data, and b) the data collection process for specific medical and health items on the birth certificate. The audience for this training includes birth information specialists, physicians, nurses, and hospital administrators. The training, which includes case studies of potential issues in reporting items, is accessible to hospital staff in all jurisdictions through the web on an ongoing basis and will offer continuing medical education (CME), continuing nursing education (CNE), and continuing education (CE) credits (112). The content is specific to medical and health items in the Facility Guide (23). This training, developed under contract, is now available (121).

BDQWG currently has an ongoing e-learning subgroup tasked with developing ways to promote the new e-learning course and to help jurisdictions reach as many people involved in the documentation and collection of birth certificate data as possible (116).

Other Initiatives to Enhance Vital Statistics Data Quality

Evaluation of the use of electronic health records for quality

Concurrent with the efforts to evaluate, improve, and speed up data on vital records, other NCHS staff, NAPHSIS and member jurisdictions, and individuals and organizations who depend on standardized data being reported on medical and vital records have been exploring potential connections between birth certificates and electronic health records (EHRs). Many of the medical and health data items required on birth and death certificates and fetal death reports are captured in medical records; in the case of birth records, hospital medical records are the source for more than one-half of the data items. Those participating in these ongoing efforts have been debating the use of EHRs to populate data items collected on vital records. The hypothesis is that “interoperability with EHRs may improve the timeliness, accuracy and quality of the information collected for vital records purposes.” The feasibility of this effort continues to be the subject of extensive discussion and deliberation (122).

Implementing a Validations and Edits Web Service (VIEWS) to improve mortality data

As noted, a key objective of the electronic systems in development for vital registration was the capability of editing data at the source. This was an objective for VIEWS, initially developed as an online web service provided by NCHS. VIEWS was intended to provide a comprehensive set of mortality-focused validations and checks that would enable the data provider to correct or clarify the data at the source immediately, without waiting for after-the-fact follow-up efforts, such as queries and cleanup. A workgroup comprised of six states and NCHS staff was formed to define the requirements for an updated version of VIEWS to address issues identified in

the original version. VIEWS II is the realization of these requirements, and is now operational (123).

Micro-data Files: Data Dissemination Tools and Strategies

Content and Availability of Vital Statistics Data

Overview

Micro-data from the National Vital Statistics System are made available in an increasing variety of ways, consistent with NCHS’ goal and practice to make data readily and easily accessible. Initially, public-use data sets of vital statistics data (including all relevant documentation) were available for purchase, beginning with the 1968 data year, in the form of data tapes. NCHS has published birth, death, fetal death, marriage, divorce, and abortion data sets over many decades (1). Subsequently, data were made available through CD-ROMs that were free and available on request. More recently, public-use data have been available at no charge by downloading the data sets from the NCHS website. Natality and mortality public-use files are available for downloading beginning with the 1968 data year, and currently include annual files through 2016 for natality and through 2016 for natality and mortality (95). The linked birth/infant death data sets are available as well. “Period” linked files are currently available from 1995 through 2015. The “cohort” files are available annually for the years 1983–1991 and 1995–2011 (95). No linked files were produced for the years 1992–1994 because of severe budgetary constraints. Data sets for the fetal death files are currently available for the years 1982–2015 (95). More limited data files have also been produced for matched multiple birth data sets. Before describing the individual data sets in the NVSS program, it is important to note some changes in file content in recent years.

Changes in file content due to confidentiality concerns

Over the years, confidentiality standards for the public release of geographic and exact date details on vital statistics micro-data files have changed. These changes are described on the NCHS website (124). During the early 2000s, NAPHSIS informed NCHS of their wish to modify the existing data dissemination policy for vital statistics data collected through the Vital Statistics Cooperative Program. Specifically, some NAPHSIS members were concerned that more detailed data were available in the NCHS data sets than the laws or policies in their states would authorize. The concerns centered largely around two areas: geographic identifiers such as state, county, and city; and exact dates (e.g., date of birth, date of death). As the NCHS data sets have grown considerably in complexity and detail, especially since the 2003 revisions, it was felt that these items could be used inappropriately to identify some individuals, especially in cases with very unusual characteristics (e.g., multiple births, extreme ages of parents, and unusual causes of deaths). Effective with the 2005 data year, data files contain individual-level vital event data at the national level only (i.e., no state, county, or city identifiers). Most other items are included, including the year, month, and day of the week. Exact dates, however, are not included.

With the changes in level of detail available, DVS staff and NAPHSIS colleagues have developed procedures for researchers to request, and if approved, receive data files with all counties identified. Such researchers must complete a project proposal with details of their research plan and assurance of their intent to use the files only for the purposes stated and to refrain from sharing any special files with unauthorized individuals and organizations. Researchers in federal agencies may likewise request and, if approved, receive files with exact dates. In instances where the requests for geographic detail and/or exact dates are denied, researchers may apply for access to the NCHS Research Data Center

(RDC). More information on the special request files and the RDC is available (124–126).

Data Sets

Births

Births (also referred to as live births) are reported as one of the three components of the VSCP using data collected on the U.S. Standard Certificate of Live Birth. Virtually all births in the United States are registered (67). In recent years, nearly 4 million births have been registered annually in the United States. The 2003 revision of the birth certificate included a variety of new items that greatly enhanced the value and utility of the data as a fundamental and crucial resource for reproductive and public health. Changes in the content of the birth certificate (as well as the death certificate and fetal death report) are documented in detail in [Appendix Tables IV–VI](#). In addition to the core demographic items (e.g., age, race and Hispanic origin, marital status, birth order), the revision includes receipt of WIC food, source of payment for the delivery, infertility treatment, maternal morbidity, date of first prenatal care visit (to improve accuracy of prenatal care receipt data), enhanced information on maternal smoking (by trimester) to identify women who quit smoking during pregnancy, and mother's height and weight to calculate the woman's body mass index (3,16). Items on the dates of the mother's previous live birth(s) and previous other pregnancy outcomes are used to calculate birth and pregnancy intervals. Items on gestational age and method of delivery have been modified to improve measurement precision.

The availability of the new data was slowed by a number of factors discussed earlier, but significant progress has been made in recent years in releasing these data, with all new and revised data items for 2009–2012 released in 2013. The public-use file for 2013 births was released in November 2014, and the files for 2014, 2015, and 2016 were each released in September of the following year, the earliest availability of this file ever (95). Preliminary birth data for 2015

were published in June 2016 (127) (See previous section for how the preliminary data reports for births and deaths were launched.). New, more timely methods of releasing statistical data and reports for births as well as deaths were launched effective with the 2016 data year, and are also discussed later in this report.

Deaths

Registration of deaths is virtually universal in the United States (68). In recent years, the data sets for deaths have included about 2.5 million records annually. The 2003 revision of the death certificate includes several items intended to improve the precision and utility of the cause-of-death data. For example, the item asking for the pregnancy status of female decedents is intended to improve the measurement of maternal mortality. The evaluation of this item is underway. Similarly, the item on whether tobacco use contributed to the decedent's death can help identify smoking-related deaths and the item clarifying the decedent's role in transport injury deaths can improve the accuracy of cause data for these deaths. As noted earlier, the registration of deaths typically involves at least two parties: the funeral director and the certifying physician (or medical examiner or coroner). The development and implementation of EDRS across the states (76) have been importantly impacted by this fact, as the registration of a given death requires timely and complete input from each of these parties. Certifier reporting is generally not as timely as reporting by funeral directors. An important complication during the last decade was that the internal systems for processing mortality data experienced significant challenges beginning in the mid-2000s, delaying data availability considerably. During 2014, the challenges were addressed and files for data years 2011 through 2013 were released (68). The final data files and reports for 2014, 2015, and 2016 were published in late fall of 2015, 2016, and 2017, respectively (95). More timely methods of making the latest mortality data available more rapidly have recently been introduced and are described later in this report.

Fetal deaths

Fetal deaths are reported as a component of the VSCP program using data collected on the U.S. Standard Report of Fetal Death as noted above. As of year-end 2017, 49 states, New York City, and the District of Columbia, as well as three of the five territories were using the 2003 revision of the U.S. Standard Report to collect and transmit this information (Table III). In addition to including many of the changes incorporated in the 2003 revision of the birth certificate, the fetal death report also provides for improved data on the cause of fetal death. These cause data have recently been published for the first time from the 2014 data file (128). Staffing and resources are being added to the NVSS program to facilitate timely coding and availability of cause-of-fetal-death data (78). NCHS publishes descriptive reports on fetal deaths of 20 weeks or longer gestation; national data are available only for the events at 20 weeks or longer. In recent years, these files have comprised about 24,000 events annually. The issues outlined earlier that resulted in major delays in file availability for births and deaths also impacted the fetal death file. Prior to September 2013, the most recent fetal death file was the 2006 file, published in 2012 (129). As a result of an intensively focused effort within the NVSS program to bring the fetal death data sets up to date, DVS was able to release the files for data years 2007 through 2012 over a period of about 8 months, beginning in September 2013 through April 2014. The data files and a report for 2006–2012 fetal deaths were published in late 2014 (130). As noted earlier in this report, it was necessary to reduce the number of data elements in the file to meet this schedule. The internal reengineering within the NVSS program was also a major factor in making this achievement possible.

Like the linked birth/infant death data set described below, the fetal mortality file has great potential to promote knowledge and understanding of perinatal loss and possible maternal and infant characteristics that may be implicated. Several studies have examined the files together, in an effort

to explore potential reporting issues to determine if they are playing a role in the trends (129,131,132). For example, if infants who die very soon after birth are misreported as fetal losses, this could affect the trends and variations in both infant and fetal mortality.

Linked data sets produced by the National Vital Statistics System

Linked birth/infant death data set

The collection of data linking infant deaths to their corresponding birth certificates has been included as a component of VSCP contracts since the 1987 birth cohort. The linked file has tremendous value for maternal and infant health research because it combines information on the infant's death, including cause-of-death information from the final mortality statistical file, with the characteristics of the mother and infant at the time the child was born, best available from the birth certificate. States are providing matched birth and infant death certificates as a routine product for the VSCP. If the birth and death occur in different states, NCHS uses the matching birth and death certificate numbers provided by the states to access the final edited data from the NCHS birth and death statistical files and to form a single statistical record. The result is the creation of a national linked record file. NCHS and the states work carefully to identify the correct linkages for every infant death. The most recent published linked birth/infant death data set is for deaths in 2015 (95,133). A review of recent trends in infant mortality has been published (134). Typically, more than 98% of all records are linked. In recent years, the data sets have included the records of about 24,000–25,000 infant deaths annually.

The routine production of the linked files was changed in a significant way beginning with the 1995 data year. Until then, states provided the data as a birth cohort; that is, births of a given year were linked to infant deaths that occurred in the birth year or within 12 months of the birth. Beginning in 1995, the data are provided on a period basis, based

on the year of death of the infant. This change has had an important impact on the timeliness of the linked files, with the period files potentially available soon after release of the main mortality file for a given year. It also means that the files can be produced as both period and cohort files, making the files even more valuable analytically.

Data from the linked birth/infant death data set have been invaluable in exploring a variety of issues that depend on quality data on maternal and infant characteristics to understand infant mortality patterns. One focus, for example, has been changes in reporting of infant and fetal deaths and changes in the risk profile of births. For example, NCHS analysts examined the unanticipated increase in infant mortality in 2002 and the factors behind the persistent international differences in infant mortality (131,132,135).

Matched multiple birth file

In the late 1990s and early 2000s, a unique data file, the Matched Multiple Birth Data Set, was developed. The sets are of all live births, fetal deaths, and infant deaths that are part of a multiple delivery. Because multiple births are relatively rare, accounting for about 2%–3% of births each year, several data years were combined for the sets. The first set was produced for 1995–1998, and the second data set contains 6 combined years of data (1995–2000) and sets of quadruplets (quadruplets were not included in the original release). The Matched Multiple Birth File was developed to allow for analysis of characteristics of sets of births and fetal deaths in multiple deliveries. Such analysis is not possible using the traditional NCHS Live Birth and Fetal Death Files because these files contain records of individual births and deaths in multiple deliveries, but do not identify set members. Thus, characteristics specific to the multiple set (e.g., sex combination of the set, outcome of the set, birth weight differences among set mates) are not available. More than 98% of records were matched in 1995–2000 (136). Included in the file are 325,516 sets of twins, 12,157 sets of triplets, and 760

sets of quadruplets. The data set allows researchers to investigate such topics as the viability of multiples by sex of the set and birthweight discordancy among set mates.

Other data files produced within the National Vital Statistics System Program

National Death Index

NCHS launched the National Death Index (NDI) as a tool for medical and health research in 1981 to make available the fact and location of deaths of individuals who had been participating in research studies (137). NDI was developed in partnership with the states (through NAPHSIS) because such an endeavor requires the approval of the jurisdictions. NDI provides a central source of mortality information, enabling researchers to determine if individuals in their study populations are still alive, and if not, in what state the individual died and the corresponding state death certificate number. The researcher would then use that information to contact the state of death to request a copy of the death certificate (137). Researchers pay fees for the matching service. During the 1980s, researchers expressed growing interest in also obtaining the cause of death for their study participants. NCHS and the states discussed the issues extensively. States had concerns about the confidentiality of cause of death (especially for sensitive causes). Eventually in 1996, the states, at their annual joint NAPHSIS–VSCP meeting, voted to establish NDI Plus, permitting the cause codes to be released to NDI users provided certain requirements were met and provided each state approved this.

In recent years, especially with the demise of SSA's Death Master File (DMF) in 2011, there has been a growing chorus of researchers advocating for more timely release of NCHS' NDI files, which were at the time severely delayed because of delays in processing the main statistical files. NCHS' NDI staff proposed the development of an "early release" NDI file that, while incomplete, would include about 90%

of all deaths from a given year (138). The "early release" file would contain the demographic information, but not the cause of death, and would be available within 6 months of the end of the data year. Moreover, NCHS would deliver a replacement NDI file from the final statistical file, including cause of death, at no additional charge. The "early release" file became a reality in July 2014 with the early release of the 2013 file; the early release file for 2014 became available in early 2015. These efforts were made possible by significant support from several federal agencies, including the National Institutes of Health's National Institute on Aging, National Cancer Institute, and National Heart, Lung, and Blood Institute; HHS' Agency for Healthcare Research and Quality; and CDC's National Center for Chronic Disease Prevention and Health Promotion.

NDI makes it possible to follow large population groups to determine their mortality status. Recently, for example, NDI searches have been carried out for two very large databases of 20 million records each: One is a joint effort of the Department of Veterans Affairs and the Department of Defense and includes records of all military personnel discharged since 1979. The other includes all known decedents in the Medicare database who died during 1979 through 2009.

The NDI program, including its staff, is completely self-financed, in the sense that the user fees mentioned above are assessed for all of the approved searches. These revenues completely support NCHS' NDI programs and processing and other DVS initiatives and activities (described later). Additionally, these fees provide revenue to the states, which compensates for the revenues lost as a result of reduced purchases of certified copies of death certificates.

National Survey of Family Growth

The National Survey of Family Growth (NSFG) has been housed since the late 1960s within the same NCHS organizational unit that is responsible for natality data and has been conducted since 1973. The survey was built on

several privately conducted national fertility surveys, including the Growth of American Families in 1955 and 1960 and the National Fertility Studies in 1965 and 1970. The purpose of NSFG is to collect information that can help to explain trends and group differences in birth rates and in the birth certificate data collected in the National Vital Statistics program (139). Thus, the survey provides reliable national information on family life, marriage, divorce, and cohabitation; pregnancy and pregnancy intentions; infertility and use of infertility services; use of contraception; parenting; use of medical and family planning services; and men's and women's health. These data are used by scholars and public policy experts; by federal agencies to inform program decision-making, in research programs, and in social service programs; and by private-sector research organizations. Data are collected through confidential personal interviews conducted by trained female interviewers in the respondents' homes. The first cycles of the NSFG included female participants only, initially married women aged 15–44 and women who had children of their own living with them. Starting in 1982, NSFG included all women aged 15–44 (139). A major change occurred in the 2002 survey, when men aged 15–44 were included for the first time. Beginning in 2006, NSFG has been conducted continuously with data sets for 2006–2008, 2006–2010, 2011–2013, 2013–2015, and 2011–2015 released. NSFG staff analysts have written a wide variety of analytic reports (140). Downloadable public-use data files are also available (140). The current round of data collection covers 2015–2019, and beginning in 2015, the age range was expanded to 15–49.

Over the years, NCHS analysts have combined birth certificate data and NSFG data to produce information on topics otherwise not measurable from either source alone. An example is the development of an ongoing series of national pregnancy estimates and rates by a variety of maternal characteristics. The pregnancy data include estimates of fetal loss from the NSFG's pregnancy history data collected from all female respondents. These are added to sums

of births from NCHS' vital registration system and abortion estimates from the Guttmacher Institute (based in turn on estimates from CDC's Abortion Surveillance System). The national pregnancy estimates are available annually from 1976 through 2010 (141–143).

Researchers have used data files from NSFG to analyze changes in marriage and divorce patterns, including the length of marriages and intervals between successive marriages, using life-table analytic tools. In this area and others related to family formation, the NSFG has helped to replace for public policy and academic researchers, at least partially, the loss of the marriage and divorce vital statistics data (140). Birth registration and NSFG data have also been combined to explain the changing nature of nonmarital childbearing in the United States, highlighting the increase in cohabitation as a major type of family formation, accounting in recent years for 58% of nonmarital births (144).

New Strategies to Enhance Availability and Utility of Vital Statistics Data Sets

Vital Statistics Rapid Release Program Showcased in New Online Releases

Most recently, NCHS has developed the *Vital Statistics Rapid Release* (VSRR) program. The VSRR program provides access to the timeliest vital statistics for public health surveillance, through: a) releases of Quarterly Provisional Estimates and b) Special Reports based on a current flow of vital statistics data from state vital records offices. Using the provisional data, the NVSS program is producing much more timely estimates of important health indicators for public health practitioners, researchers, and health policy-makers than would be possible using final annual data (107,145–147). The data in these reports

are referred to as provisional, and are not equivalent to the provisional “counts” that were published for decades through 2014 (99).

The new provisional estimates are based on vital statistics data received and processed by NCHS as of a specified cutoff date, and are updated quarterly as new data become available. To adjust for incompleteness of the provisional data, individual records are weighted when necessary to independent counts of vital records received from the states' vital registration systems through VSCP. Some records are imputed if the data available for a specific state and month are less than 50% complete at the time of data closure. Although the adjusted estimates based on provisional data were found to be close to the final estimates in an evaluation conducted by NCHS, they are subject to small changes as new data and updates are received (see Technical Notes in reference 107 for more details). NCHS' VSRR program will continue the evaluation of the accuracy of the provisional estimates.

In the first pilot release of Quarterly Provisional Estimates, issued in the summer of 2015, NCHS presented estimates of death rates for seven selected causes of death for 2013 and 2014 and the first quarter of 2015 (106,107,145). The seven selected causes of death included in the pilot release, influenza/pneumonia, heart disease, human immunodeficiency virus (HIV) disease, falls (for persons aged 65 and over), stroke, Alzheimer's, and diabetes, are all important from a public health perspective. Additional causes of death based on provisional mortality data, such as cancer, suicide, and drug poisoning-related deaths, were added in subsequent quarterly releases; estimates are currently being published for 20 mortality rates (145).

Selected estimates based on provisional birth data have been added since the 2016 data year (103,146). These include estimates for general fertility rates, age-specific birth rates, total and low-risk cesarean delivery rates, preterm birth rates, and other gestational age categories. With the advent of the VSRR program for births, the preliminary

reports for births have been discontinued; the last report in that series was for 2015 births (127).

VSRR estimates are currently presented for: infant mortality (deaths of infants under age 1 year per 1,000 live births), neonatal mortality (deaths of infants aged 0–27 days per 1,000 live births), postneonatal mortality (deaths of infants aged 28 days through 11 months per 1,000 live births), and death rates for the five leading causes of infant death (147). Like the mortality measures, these indicators were selected based on their importance for public health surveillance as well as the feasibility of producing reliable estimates using available provisional data. A standard schedule of releases is a goal and is consistent with a “current flow” approach to data collection, wherein data are released on a regular schedule that is not contingent on a statistical file being finalized.

Data Visualization Gallery

The Data Visualization Gallery, a series of interactive maps and charts to visualize population-based vital statistics rates, has recently been launched (148). Data are illustrated in maps and charts covering the United States and individual states. The latest series of data published included teen birth rates, natality rates and trends, nonmarital birth rates, mortality trends, leading causes of death, drug poisoning mortality, injury mortality, and potentially excess deaths—rural versus urban (148).

Other Data Access Tools

Other CDC-hosted data access tools include WONDER, which stands for Wide-ranging Online Data for Epidemiological Research (149), a crucial tool for a wide variety of data users to not only access mortality data but also natality data. These data collections are available as online databases, which provide public access to *ad hoc* queries, summary statistics, maps, charts, and data extracts. Importantly, subnational natality and mortality data from DVS files can be accessed through WONDER; these data are not available in public-use files.

NCHS funding has allowed WONDER to reengineer the system to use the main mortality file (that is, the full statistical file) rather than the more limited compressed mortality file. Converting WONDER to use the main mortality file allowed for several new variables to be included (e.g., day of the week of death, whether an autopsy was performed, and place of death) and to provide more detailed age information (38). Another data access tool is WISQARS, which stands for Web-based Injury Statistics Query and Reporting System (150). WISQARS is an interactive, online database that provides fatal and nonfatal injury, violent death, and cost of injury data from a variety of sources, including NCHS' mortality data. Researchers, the media, public health professionals, and the public can use WISQARS data to learn more about public health and the economic burden associated with unintentional and violence-related injury in the United States.

Publication of Tabulated and Descriptive Analytic Reports

For decades, NCHS and its predecessor agencies published *Vital Statistics of the United States*, an annual collection of natality and mortality tables (151). Reports were also published for marriages and divorces. The reports, still available in many large public and university libraries, were discontinued as bound volumes after the 1993 data year. Beginning in 1994 and continuing through 2003, a collection of tabulated birth data was published in an electronic version of *Vital Statistics of the United States*, and is available on the Internet (152). The printed volumes for 1890 through 1993 have been scanned and are available electronically on the NCHS website (151).

NCHS analysts have written more than 300 reports on vital statistics for the dedicated report series, the *National Vital Statistics Reports* (and its predecessor

the *Monthly Vital Statistics Report*) from 1995 through Fall 2017. NCHS analysts have also authored dozens of descriptive, analytic, and methodological reports in a number of NCHS report series. The *Vital and Health Statistics Reports*, NCHS' in-depth statistical series, include two components from the NVSS program, one on natality, marriage, and divorce, with 57 reports and one on mortality, with 15 reports. NVSS data sets are also described in several other Vital and Health Statistics series, which cover programs and collection procedures, data evaluation, and analytic and epidemiological studies.

Most recently, NVSS program analysts have prepared a large number of reports on vital statistics in the NCHS report series, *NCHS Data Briefs*. This report series has brought increased public attention to a variety of important health topics, including drug poisoning and overdose deaths, preterm birth trends, nonmarital childbearing, infant mortality, and teen birth rates, among others. Finally, NVSS staff members continue to publish widely in peer-reviewed scientific journals.

Transitioning Vital Statistics From a “Good” to a “Great” System

Implementing a Cooperative Agreement With NAPHSIS

One of the mechanisms recently used to promote the overall effectiveness of the relationship between NCHS and NAPHSIS and to improve the jurisdictions' overall performance is the Cooperative Agreement (153). This agreement, funded through NDI receipts, currently in effect for 2012 through mid-2018, has been a way to draw on the strengths of the state partners in forging stronger and more productive ties. Since 2004, the Cooperative Agreement has been used to improve data quality and timeliness in a number of areas, including

providing training and support for states to reengineer and implement the 2003 revisions of the standard certificates, promoting full adoption of electronic birth and death registration systems, and developing and implementing the 2011 revision to the Model Law. Cooperative Agreement funds have also been used to support the development of a new vital records security manual and to develop and implement web-based training for physicians in completing cause-of-death information on death records. Further, over recent years, NAPHSIS has drawn on Cooperative Agreement funds to host monthly national webinars with VSCP Project Officers to which all jurisdictions are invited. The webinars foster enhanced communication across jurisdictions and facilitate the exchange of ideas and methods.

Implementing a Federal–State Good to Great Partnership

Background and rationale

The difficulty faced by states in modernizing their vital registration and statistical systems and in implementing the 2003 revisions of the birth and death certificates and fetal death report had significant, long-term consequences, which included major delays in data availability, lack of national data for key areas of maternal and infant health, reduced ability to focus on data quality issues, and extended diversion from attaining the goal of a reengineered, responsive, and nimble vital statistics system. These consequences together with the prospect that the situation would worsen led, in late 2009, to the development of a joint NAPHSIS/NCHS committee, known as the “Getting From Good to Great Partnership,” which was formally established in 2010 (83). The partners had ambitious goals. The jurisdictional representatives and NCHS each openly and frankly discussed their longstanding concerns and jointly agreed to establish a formal partnership to address them.

This initiative sparked new hope for a truly great national vital statistics

system. The partners met frequently in person and by phone and brought their ideas to NCHS' Board of Scientific Counselors. There was a laser-like focus on building bridges. Some of the key components of the initiative included recognition that the jurisdictions and NCHS share "ownership" of the data, that the partnership should establish achievable goals, that the jurisdictions should be fairly compensated for their efforts, and that the partners would make themselves available to help jurisdictions that were facing major problems. These principles were reaffirmed in a webinar for NVSS program staff and VSCP Project Officers held October 8, 2014, and a recent annual joint meeting of the VSCP Project Officers and NAPHSIS where continuing the "Getting From Good to Great" committee's activities was endorsed (83,154).

Development of the 2012–2016 Contract for the Vital Statistics Cooperative Program

The 2012–2016 contract between the vital records jurisdictions and NCHS represented a dramatic change in the thinking and strategy underpinning all previous contracts (88). For decades, in accordance with the contracts, NCHS provided support to the states/jurisdictions for their vital statistics registration programs and in turn were provided state statistical files so that NCHS could produce *national* statistical files. The contracts focused on limited milestones (dates for deliverables) and were tied to the provision of specific items in the data sets. The contracts provided for limited query (i.e., quality control) programs, which were linked to NCHS-issued instructional manuals and handbooks that defined the general duties and responsibilities of those involved in the registration process and provided detailed item-by-item instructions on how to complete the birth and death certificates and fetal death report. (Handbooks were also produced for abortion, marriage, and divorce records, but NCHS activity in reporting these

events in detail ended in the mid-1990s, as discussed above and in [Appendix I.](#))

As the electronic registration of births and deaths has grown even while resources have shrunk, there has been increased recognition that the goals and purposes of the contracts for VSCP had to change as well. A fundamental change in the 2012–2016 contract was that it provided specific, measurable, and firm requirements that jurisdictions were expected to meet to be in compliance; these requirements were jointly agreed upon. Jurisdictions agreed to close their files and transmit their data to NCHS by specific dates. Over the course of the contract period, the dates reflected increasingly shorter timeframes after the close of a data year: For data year 2016, for example, the birth files were to be complete and final by March 1, 2017, and death and fetal death files, by May 1, 2017. Jurisdictions also agreed to have implemented the 2003 revisions of the birth and death certificates and fetal death report, and to be preparing the data in accordance with the coding rules, code structures, formats, and instructions that are detailed in the NCHS specifications for collecting and editing the 2003 revisions. The 2012–2016 contract also called for jurisdictions to "...establish and conduct a vital records quality assurance program designed to strengthen methods and procedures used by local registrars, hospital personnel, funeral directors, and other source record providers...designed to monitor the registration system to assure a highly acceptable level of registration and item completeness as well as timeliness and compliance with established procedures" (88).

Validating and matching records were promoted by provisions in the 2012–2016 contract. One specified how states are to match infant death and birth records for those infants on a current receipt basis and use information from the new item on the 2003 revision of the birth certificate asking if the infant is alive at the time of the birth registration. Quality control in this area was to be enhanced by a separate requirement, directing the jurisdictions to follow up and validate the discharge status of

infants weighing less than 750 grams at birth. To enhance NCHS data on multiple births, jurisdictions are required to match multiple birth records to assure that each member of a multiple birth set is registered. In sum, the new contract places exceptional emphasis on data quality and timeliness.

The current VSCP contract covers the years 2017–2021. It essentially continues all of the elements of the 2012–2016 contract. The timeliness requirements noted above for data year 2016 (88), the last year of that contract, have been established as the standards for the entire current contract (2017–2021) (78,88–90,103).

Corrective action plans under the 2012–2016 contract

The 2012–2016 contracts included a provision for the development of corrective action plans (CAPs). As noted, previous VSCP contracts included limited requirements or enforcement mechanisms. Payment for data was generally not withheld from the states, although payment was sometimes delayed when a state's data were incomplete or of questionable quality. During the "Getting From Good to Great" deliberations, NAPHSIS and NCHS agreed that the contract should include specific targets and goals and deadlines, progressive improvements in data timeliness as noted in the previous section, and requirements that jurisdictions conduct a vital records quality assurance program. When jurisdictions did not meet contract specifications, a CAP was required to assist states in meeting contract requirements before leveraging financial penalties. This notion differs fundamentally from the decades-long practice of the VSCP and represents a major culture shift. Many jurisdictions have made significant progress in meeting the goals of the ideal vital statistics system. Still, a number have not met the goals and, in some cases, have had extensive work to do to be in compliance. The CAP process was modified during the 2012–2016 contract period to include more frequent updates and more timely measurement of compliance. Two major

areas of incomplete compliance during the 2012–2016 period were the transition to the 2003 revisions of the standard certificates and report and the transition to STEVE or a similar system for transmitting data to NCHS (89).

Ultimately, as of early Summer 2017, revised birth certificate data have been available for all jurisdictions except American Samoa, while revised death certificate data are now available for all states (West Virginia revised in August 2017), but are not available for two territories (U.S. Virgin Islands and American Samoa); Connecticut, American Samoa, and the Virgin Islands have yet to provide revised fetal death report data (Tables I–III). As noted, 49 jurisdictions are now fully compliant with STEVE and transmit their data in accordance with STEVE or an appropriate substitute, meaning that 9 jurisdictions are not yet fully using STEVE (Figure III). Several jurisdictions still lack a quality assurance plan and struggle with ongoing timeliness issues. It is understood that in some cases, the jurisdictions lack the requisite resources to produce the contract deliverables and the state/NCHS partnership is looking for ways to address these needs.

At the time of writing this report, NCHS and NAPHSIS are engaged in efforts to promote measurable action by the jurisdictions to meet the goals of the 2017–2021 contracts. The 2017–2021 contract retained the use of CAPs for jurisdictions that have not revised, but CAPs were discontinued for addressing other deficiencies. The focus, as noted, is on improvements, not punishment (88–90). However, financial penalties may be imposed in the case of new deficiencies identified in the 2017–2021 contract period (89).

Special projects

The 2012–2016 VSCP contract was also unique in the new provision for “special projects” (78). These are activities that may be funded through special funds to enhance the vital statistics system. This concept was developed as a way to further highlight the joint goals of improving data quality and utility in areas including

systems development, data security, and innovation to enhance vital statistics systems. Projects could also include activities that would enhance the usefulness of vital statistics for emergency response reporting, public health program evaluation, accreditation, epidemiologic surveillance, measurement of health reform outcomes, and use of electronic medical records information. In a sense, this innovation suggests the concept of marketing vital statistics in a way that showcases the strengths of vital statistics for a wide range of activities. Specific examples of potential special projects include: developing and implementing web-based training and Help functions for hospital personnel to facilitate reporting of medical/health birth certificate items; developing strategies to maximize physician enrollment and use of EDRS; and providing real-time data, including cause of death, to NCHS for surveillance purposes. The extent and breadth of these potential projects make it clear that the overarching goal is to transform vital statistics to a “public health data” system where vital statistics data are continually improved and are widely valued as core components of public health infrastructure. The provision for “special projects” continues in the 2017–2021 VSCP contract (89,90).

Workforce Development

Training of new registration officials

During the last two decades, there has been a general reduction in training underwritten by NCHS. Training initiatives declined in the 1990s and in the first decade of the 2000s largely due to funding constraints. Training efforts are increasingly targeted to web-based efforts, a way to significantly reduce costs while making the training more accessible and available to prospective students as well as more responsive to changes in technology and health care practices. The e-learning enterprise described earlier for improving birth data quality is a prime example of the transition in DVS’ training options from in-person classes to web-based offerings (121). In the past, NCHS’ NVSS program

has offered two major in-person courses each year, “Vital Records and Their Administration” and “Vital Statistics Measurement and Statistics.” The Vital Records course, a weeklong activity, was first offered in the late 1960s as a component of NCHS’ Applied Statistics Training Institute (ASTI). The ASTI program was discontinued in 1982 because of budget limitations (1), and since 1982, the Vital Records course has been taught by NCHS staff members who are assisted by state colleagues. This course is intended to provide an introductory background to jurisdictional vital registration personnel. Topics include the history of the vital statistics system; registration issues, including certification and electronic verification procedures; confidentiality; security and fraud prevention; disaster recovery and business continuity; current legislative and regulatory policies, such as the Model Law and Intelligence Reform; and statistical uses of the data. To encourage maximum attendance and diverse geographic representation, the course has been held in 21 different cities since 1983.

Training in statistics and measurement

The Statistics and Measurement course, also a weeklong class, was taught annually by NCHS’ NVSS staff members from the late 1980s to 2001; the course was next offered in 2004, and has not been offered since. Budget constraints played a role in the suspension of the class.

Training on cause-of-death coding

Training for nosologists played a prominent role in NVSS training activities for many years when nosologists were on the staffs of state vital statistics offices (1). It was crucial that their skills be maintained and that these medical coders were current in all the changes ongoing in cause-of-death coding, to ensure that jurisdictions could continue to provide quality, comparable coded data to NCHS. However, with the transfer of responsibility for coding

cause of death from the states to NCHS staff members, recent training activities have focused on these staff members. Staff members from the jurisdictions that continue to code cause of death for their own data sets may occasionally participate in this training. Currently, NCHS offers a 1-day refresher on quality control and underlying cause issues, an example of a targeted training effort that is underway to address special issues (e.g., issues with the data file) (57).

Training for statisticians in ICD–10 issues has been offered periodically. This training was formerly a 4-day activity during the transition to ICD–10 and was offered in geographically diverse locations to encourage as much attendance by state staff members as possible. Currently, the training is offered on demand as a 1 ½–3-day course, with the course design and length reflecting the interests and requests of particular jurisdictions (57).

As noted above, physicians have resisted efforts to record cause of death through electronic systems. The paper recording and lack of systematic and consistent reporting of cause of death on death certificates contributed to significant data quality problems with the statistical file. To begin to address this ongoing issue, the New York City Health Department developed an e-learning tool in March 2008. Subsequently, NVSS program senior staff members collaborated with New York City and NAPHSIS colleagues to develop a generic version of the video to train physicians in correct certification of cause of death. The video, completed in April 2011, is comprised of distinct modules. Since its adoption by New York City, Hawaii and Texas have taken the video and tailored it to be compatible with their systems. It is anticipated that the generic video will be revised soon, allowing those who complete the training to apply for CME credits (85).

Other Initiatives Focused on Improving Vital Statistics Data

Intelligence reform on birth certificate security

In the aftermath of the devastating events of September 11, 2001, Congress and the President created The National Commission on Terrorist Attacks Upon the United States (35). This blue-ribbon bipartisan commission was tasked with recommending changes to an extensive variety of laws and procedures that relate to the security of crucial legal records, including vital records. Among vital records, the birth certificate in particular was deemed the “breeder” document from which those who perpetrated the terrorist attacks were able to obtain passports and other documentation attesting to their legal status. The commission’s final report included this specific recommendation:

“Secure identification should begin in the United States. The federal government should set standards for the issuance of birth certificates and sources of identification, such as drivers’ licenses. Fraud in identification documents is no longer just a problem of theft. At many entry points to vulnerable facilities, including gates for boarding aircraft, sources of identification are the last opportunity to ensure that people are who they say they are and to check whether they are terrorists.” (35)

On December 17, 2004, Congress passed the Intelligence Reform and Terrorism Prevention Act of 2004. The Act included many specific provisions, including Section 7211, “Minimum Standards for Birth Certificates,” which includes setting standards for document security, requirements for proof and verification of identity; and standards for the processing of birth certificate applications to prevent fraud. Because birth registration (like death registration) is a decentralized, state-based activity, the law’s provisions deal extensively with how these requirements are to be met in this setting (155). In response to the

2004 legislation, CDC, working through NCHS, developed a Notice of Proposed Rule Making (NPRM) for improving the security of vital registration practices and systems in the states. The draft NPRM was first sent to HHS in 2007. Discussions and further editing of the NPRM have taken place since 2007 (156). NCHS’ and other colleagues’ work on developing the draft NPRM was crucial in underpinning subsequent activities to revise the Model Vital Statistics Act and Regulations (described below) to focus on improved security and emerging technologies (155,156). The draft NPRM has not been implemented.

Model Vital Statistics Act and Regulations

The Model State Vital Statistics Act and Regulations (known as the Model Law) were developed to serve as models, with a practical focus, for states to use in preparing their own laws and regulations for vital event registration. The Model Law has been revised five times since it was first issued in 1907. The most recent law was issued in 1992 (157). Over the years, the Model Law has been designed to improve the quality and uniformity of state data by establishing standard reporting requirements, definitions, and procedures for registering vital events. This impacts how vital statistics data are collected, reported, and disseminated at the state level, thus affecting national vital statistics data sets produced by NCHS.

The sixth (2011) revision of the Model Law was initiated in 2009 with the establishment by the NCHS Director of an eight-member working group comprised of seven vital statistics experts from seven jurisdictions and an attorney with extensive experience in public health law and the vital statistics system. As was the case for previous revisions of the Model Law, NCHS provided resources for travel and logistics and staff support for the working group’s activities. The working group had several major goals for the 2011 revision, including providing guidance for vital event registration, issuance, security and fraud prevention, data disclosure, and protection of confidential information

in an electronic environment. As noted above, the security and fraud prevention concerns were the aftermath of the tragic events of September 11, 2001. The working group strengthened the wording of the Model Law to improve clarity and specificity, and in some cases to update language, particularly with regard to electronic registration and issuance. The working group also developed approaches to dealing with significant changes in medical technology, health care, and the law that can impact the registration of vital events. These include such developments as civil unions, same-sex marriages, surrogate mothers, and paternity acknowledgments, as well as issues around continuity of operations in an emergency that compromises electronic systems. The states or jurisdictions are using the 2011 Model Law revision to make changes to their procedures, especially to provide guidance on how state laws might be changed to handle security and technology issues (158–160).

Envisioning the Future of Vital Statistics

The National Vital Statistics System has experienced many amazing and remarkable changes and has also confronted some major challenges over the past two decades. The system has evolved in noteworthy ways. Starting out in the mid-1990s was the anticipation of an evolution to a fully automated system incorporating elements of electronic registration for births and deaths and real-time editing data at the source. The existence and even persistence of a paper-based registration system was acknowledged, but it was also recognized that the system had to move forward to incorporate strategies that would improve data quality and timeliness through transforming the legacy registration systems then in existence in the states and the outmoded processing systems ongoing in NCHS. Both state and national systems needed to be fully reengineered. The very culture under which the systems were operating had to

be fundamentally altered to ensure the success of the revolutionary changes that were needed.

Looking forward over the next several decades, current vital statistics leadership and their staff members may wish to explore a number of areas that will impact the success of these efforts. The current revisions of the U.S. Standard Certificates of Live Birth and Death and the Report of Fetal Death were implemented beginning in 2003. Following typical past practice, it would be time now to be exploring another set of revisions. However, an underlying concept for the 2003 revisions was that the systems would be flexible so that items could be added, dropped, or modified to meet new needs. Items have been dropped from the birth and fetal death data sets, as described in the section on the Birth Data Quality Workgroup (56,118–120) and in [Appendix V](#). However, adding and revising items is more complex than originally anticipated. As it turned out, the new registration systems developed in the jurisdictions are not readily adaptable and changes are costly and time-consuming. Would future vital statistics executives want to consider tasking a single vendor with developing (generic) birth and death registration systems that could be easily customized by individual jurisdictions as needed? Would the requirements for such systems include that they be flexible and adaptable to new needs? Recall that the vision of the MoVERS effort at the beginning of the 21st century was exactly this: that a single system could be developed that would accommodate 80% of the needs of all jurisdictions, and that the remaining 20% of unique needs could be taken care of by each jurisdiction.

Extensive efforts were expended to respond to the targeted language in the Intelligence Reform and Terrorism Prevention Act of 2004. The draft Notice of Proposed Rulemaking focused on data security and birth certificate fraud prevention. After all, the terrorists of September 11, 2001, were able to use (fraudulently obtained) birth certificates to establish identities and obtain passports. The 2011 Model State Vital Statistics Act and Regulations expended

significant effort on focusing states' attention on improving the quality and uniformity of state data. These goals would be achieved by establishing standard reporting requirements, definitions, and procedures for registering vital events. These activities impact how vital statistics data are reported and disseminated at the state level, which in turn impacts NCHS' national data sets. Neither of these efforts was ultimately successful, at least not to date. But, can any of the comprehensive work on Intelligence Reform and the Model Law be revisited and used as the basis for changes and improvements in the existing systems and in future systems? Should the Model Law be revisited and reviewed on a regular basis to ensure that it is continually responsive to emerging legal, medical, and societal changes?

The Cooperative Agreement between NCHS and NAPHSIS to support a variety of activities intended to improve data quality and timeliness has been an important ongoing activity. Should NCHS and NAPHSIS take another look at the agreement and see if it should be modified to reflect new needs of the jurisdictions, advances in their ability to meet the new VSCP contract requirements, or new initiatives in training, to mention a few areas? Alternatively, should the agreement be restructured to reflect more of an exchange of mutual support in a variety of areas, including state outreach and technical assistance? Or are there other ways the agreement can be strengthened to improve its usefulness to the jurisdictions and NCHS?

As registration systems and public health needs evolve quickly, it may be that training opportunities need to be expanded accordingly. NCHS has assumed responsibility for coding cause of death for the national statistical files. Yet, some jurisdictions are still interested in retaining this skill by having trained nosologists on staff. Should consideration be given to having NCHS provide this training support on a more routine basis? Along these lines, could NCHS provide useful support to state statisticians in the use of ICD–10 (and revisions) to improve their analytic capabilities?

As the demands for improving data quality and timeliness persist, would it be helpful if quality scores were developed so that states could see how their performance ranks compared with their peers? Quality scores could be developed for births and deaths. Would this be a beneficial effort? One area of quality that has continued to be a concern is that of the geographic data in the vital statistics files. The availability of detailed birth and death data for geographic areas is one of the unique attributes of the data system. The availability of geographic detail for every birth and death and fetal death opens up the data files to in-depth research on factors such as environmental influences on births and deaths, on the role of socioeconomic considerations in exploring disparities, and other areas. The state and county of occurrence and state and county of residence of births and deaths are well reported on vital records, but the same cannot be said with confidence of the city/town of residence information. Data quality varies widely. NCHS and state colleagues have long explored ways to improve these data. One avenue for improvement might be address-based geocoding, performed as data are received, not after the data year has ended, as is often the case now. If the quality of the geographic data for cities and towns could be significantly improved, this would contribute to improved value of the data for health care program efforts and evaluation and surveillance. Concerns about data confidentiality would need to be addressed, but success in this area would expand data value immeasurably.

With the shortened timeframe between the end of a data year and the availability of preliminary files, an important issue has arisen concerning the availability of timely population estimates for population-based birth and death rates. Preliminary and provisional (rapid-release) vital statistics files are becoming timelier and release of these data reports depends on reliably available population data. Another issue to keep in mind is that as all states fully implement the 2003 revisions, NCHS may discontinue the use of bridged-race population estimates and of bridged-race

birth and death data. This means that discontinuities in the population-based rates by race and ethnicity will need to be addressed.

Looking further, what is the potential role for EHRs in vital statistics? Many questions remain and much work is needed to fully assess whether the EHR is compatible with the vital statistics system. Do we see the EHR as a “feeding” system into birth registration or as a component of an electronic birth registration system (161)? In the case of death registration, the EHR is being used as a gateway to the EDRS (i.e., physicians can complete death certification using a screen within the EHR that mirrors the EDRS, using information in the EHR to inform their certification). However, cause-of-death data fields in the EDRS are not being automatically populated using data fields in the EHR (162–163). Two projects have been funded by NCHS to advance the EHR to a vital records system initiative. In one project, Minnesota evaluated the readiness of the Minnesota Department of Health and Minnesota birth hospitals to adopt and implement secure, standards-based exchange of birth record information using the vital records-related electronic standards developed by Health Level Seven International (HL7) and Integrating the Healthcare Enterprise (IHE). HL7 and IHE are standards development and standards-related organizations. Utah provided support for the second project by participating in trial implementation activities with EHR and vital record systems vendors to test the IHE and HL7 birth and death standards. The effort for standardized birth reporting has been limited to the medical and health items collected on the national version of the Facility Worksheet for the Live Birth Certificate, not the demographic items.

If fully exploited, the use of EHRs in this way could reduce errors and redundancy in data collection and reduce costs for hospitals and jurisdictions. To fully engage interested parties, though, it will be necessary to document improvements in these areas, especially, for example, in cost reduction. The potential benefits are being explored

through a variety of activities in collaboration with the standards development and standards-related organizations HL7 and IHE. Wider testing and evaluation will be needed to assess data quality, and revisions to the standards may be needed based on these activities. National certification of systems is being contemplated to ensure that systems are standardized as much as possible and are working properly. Most importantly, additional resources and a strong communications effort will be needed to fully implement this effort (122,161–163).

The NVSS surveillance capacity is now being recognized at the federal and state levels. The mortality and, most recently, natality and infant mortality surveillance initiatives have clearly demonstrated the value of NVSS in meeting some of the surveillance needs of federal programs. The results of the NVSS surveillance work will no doubt greatly expand the utility of vital statistics data in ways not yet foreseen. And by focusing resources on improved timeliness, continued improvements in data quality can be expected.

The inauguration of the NVSS Rapid Release data program has coincided with growing attention to and concern about specific causes of death that have increased rapidly in recent years, including external causes such as drug overdoses. These data, now available for the 12-month period ending in March 2017, document the substantial increases in drug overdoses across the United States and in many states (164). The Rapid Release program will continue to make it possible to highlight the most current data that describe trends and patterns in this and other critical public health areas.

The content of the revised birth and death certificates suggests numerous areas where the vital statistics data sets can be very useful in understanding a variety of aspects of health and health care (e.g., to reduce early elective deliveries). For the birth data, there are items on the source of payment (165), receipt of WIC food (166), use of infertility services (167), prepregnancy weight and weight at delivery (used

to compute weight gain) and height to measure body mass index (BMI) (166), gestational age (113), and smoking prevalence and cessation during pregnancy (168). In addition, growing interest in linking vital records data with survey and other health data can enrich the value of NVSS. In all these areas, of course, it is essential that linked data sets be developed with meticulous attention to maintaining confidentiality of the highly sensitive data.

One thing is clear: NVSS is a national treasure, providing the primary data on family formation, maternal and infant health, infant and perinatal mortality, life expectancy, and causes of death, as well as serving as the building blocks for estimating the growth and characteristics of the U.S. population. Vital statistics data are unique because they are available for every one of the approximately 6.5 million vital events that are registered annually. Thus, trends and variations by a wide variety of population characteristics and for detailed geographical units can be studied. Basic reporting completeness is generally high because of strong incentives for individuals to have the facts of births and deaths in their families accurately reported. These data, however, do not “fall from trees.” The systems that underlie the data and the organizations that support the data collection must be continually nurtured to ensure the continuity and steady improvement of this primary source of health information for the country.

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Table

Table. Vital statistics history timeline, 1940–2017

Year(s)	Description
1940–1959	
1946	Federal functions in vital statistics were located in the Federal Security Administration, which established the National Office of Vital Statistics in the Public Health Service.
1950	Federal and state health agencies began focusing increased attention on data quality and enhanced uses of vital records.
1953	The Department of Health, Education, and Welfare, newly formed, was given authority for federal functions in vital statistics.
1955	The first standard records of marriage and divorce or annulment were recommended to the states.
1960–1969	
1960	The National Office of Vital Statistics merged with the National Health Survey to establish the National Center for Health Statistics (NCHS).
1960	The first linked birth/infant death data set was created for the birth cohort of 1960, with 97.4% of the 110,000 infant deaths in that year matched with their birth certificates.
1961–1968	National Mortality Surveys, known as “followback surveys” and anchored to vital records, were conducted annually, and included information on hospitalizations, diagnoses, health insurance, smoking habits, and a variety of demographic characteristics.
1963–1969	National Natality Surveys were conducted annually. These surveys are also referred to as “followback” surveys and are anchored to vital records. They include information on the mother’s medical care, education, marriage, health insurance, household composition, and religion, among other topics.
1964–1966	National Infant Mortality Surveys were conducted annually.
1964–1968	The third nationwide study of birth registration completeness conducted by the Census Bureau with the cooperation of NCHS and state vital registration officials found that birth certificates were on file for more than 99% of children born during 1964–1968.
1967	The Applied Statistics Training Institute, established in NCHS’ Office of State Services, provided leadership in training public health statisticians from 1967 to 1982.
1968	The Automated Classification of Medical Entities was launched, to select underlying cause of death, replacing manual selection by a nosologist.
1968	Revisions of standard certificates of birth and fetal death included items on educational attainment, dates of previous pregnancy outcomes, prenatal care information, and several medical items. Standard certificates were first issued in 1900; multiple revisions have been issued since, about once each decade.
1968	The second volume of <i>Vital Statistics Rates in the United States</i> was issued for 1940–1960. The first volume, covering 1900–1940, was issued in 1947.
1968	The earliest year for which electronic data tapes of natality, fetal death, marriage, and divorce statistics, as well as demographic, underlying-cause, and multiple-cause mortality statistics, were available for purchase. Tapes were initially sold by the National Technical Information Service.
1970–1979	
1970	The Health Services Improvement Act of 1970 authorized the Secretary of the Department of Health, Education, and Welfare to design and implement a cooperative system for producing health information and statistics at the federal, state, and local levels.
1971	NCHS began to accept magnetic tapes of state-coded birth and death certificate data, coded according to NCHS specifications. Florida was the first state to provide the electronic data.
1973	The Vital Statistics Cooperative Program (VSCP) was inaugurated as the first component funded under the Improvement Act of 1970. Six states had contracts with NCHS’ Division of Vital Statistics to provide computerized birth and death data under the VSCP.
1973	The National Survey of Family Growth (NSFG) was launched to provide information explaining trends and variations in birth rates and family formation based on confidential interviews with women of childbearing age.
1978	The Apgar score was added to the birth certificate. The question on infant’s “legitimacy” status was changed to mother’s marital status.
1978	A new form, “U.S. Standard Report of Induced Termination of Pregnancy,” was recommended to states for reporting all induced terminations of pregnancy (abortions), regardless of length of gestation.
1980–1989	
1981	The National Death Index (NDI) was implemented as a centralized database of death record information, with deaths in 1979 from 46 participating registration areas. By the end of 2017, the NDI database included approximately 93 million records.
1983	The linked birth/infant death data file was created for the 1983 birth cohort, inaugurating a series of crucial research files that continues to the present. The file for 1983 included deaths of infants born in 1983 who died before their first birthday in either 1983 or 1984. The linked file data set facilitates analysis of the maternal and infant factors that affect infant survival.
1985	NCHS’ Division of Vital Statistics analysts created and published the first series of estimated pregnancy rates for the United States. The rates combine birth data from the National Vital Statistics System (NVSS), fetal loss estimates from NSFG, and abortion estimates from CDC and the Alan Guttmacher Institute. The series currently extends from 1976 through 2010.

Table. Vital statistics history timeline, 1940–2017—Con.

Year(s)	Description
1980–1989—Con.	
1988	The National Maternal and Infant Health Survey (NMIHS) in 1988 included women with a live birth as well as women with a fetal loss or infant death. NMIHS also featured a Longitudinal Followup in 1991 to capture additional information on the 1988 participants. The 1988 Survey and followup are the last “natality” followback surveys conducted by NCHS.
1989	U.S. Standard Certificates of Live Birth and Death, the Standard Report of Fetal Death, the Standard Reports of Marriage and Divorce (or Annulment), and the Report of Induced Termination of Pregnancy were revised, becoming effective in 1989. An item asking for Hispanic origin (e.g., parents, decedent) was added to the 1989 certificates.
1990–1999	
Early 1990s	The vital statistics system faced major resource challenges. These importantly affected NCHS’ ability to maintain the national data sets through the VSCP, the mechanism NCHS used to support the states for collecting, compiling, and disseminating vital statistics data. Funding during these years was significantly unstable for the jurisdictions and NCHS.
1992	The most recent Model State Vital Statistics Act and Regulations, known as the Model Law, was enacted in 1992 and adopted by the states in 1995.
1992–1994	NCHS suspended the production of the cohort linked birth/infant death data set due to severe resource challenges. The cohort file was resumed in 1995.
1993	NCHS conducted the 1993 National Mortality Followback Survey, the last such survey conducted to date. While there has been periodic interest in reviving followback surveys, especially for deaths, the costs are prohibitive.
1993–1994	NCHS published initial reports from the Mortality Surveillance System (MSS). MSS is based on data from the Current Mortality Sample (CMS), a 10% sample of death records. CMS data, initially dating back to 1943, were published monthly about 4 months after the main month of occurrence of deaths. The CMS data continued to be the basis for more timely mortality data until the preliminary data series was launched in 1996.
1994	The planning phase for review and evaluation of 1989 Standard Certificates was launched with a Panel to Evaluate the Certificates appointed by state registration executives and Division of Vital Statistics leadership. The Panel included medical and health experts and was supported by NCHS staff members. The Panel agreed to review and revise only the birth and death certificates and fetal death report. The marriage, divorce, and induced termination of pregnancy forms were not to be revised.
1994	NCHS discontinued collecting data on induced terminations of pregnancy; the last year of data collection was 1992, but these data were not processed after 1988.
1994–1995	NCHS dropped the date of the mother’s previous live birth from the birth certificate in 1994 and the 1-minute Apgar score in 1995. Education of father was dropped in 1995. Information on autopsy and information on occupation and industry of the decedent were dropped from the death certificate.
1994–1995	NCHS joined with state registrars (the National Association of Public Health Statistics and Information Systems) in an intense effort to improve the timeliness and quality of death registration data through the development of an electronic death registration system (EDRS).
1994–1999	The concept of electronic death registration continued to be a focus of state and federal health officials during 1994–1999, with the first EDRS dating back to 1999.
1995	NCHS discontinued the collection of individual record data for marriages and divorces. NCHS published the last reports for these data sets for the 1989 and 1990 data years. These decisions in the first half of the 1990s were made to meet NCHS’ priorities for the birth, death, and fetal death data.
1995	The period linked birth/infant death data file was launched and became the basis for NCHS’ official infant mortality statistics. The 1995 file includes births and deaths in 1995. The period file can be released more quickly than the cohort-linked file. The cohort file has been produced annually, except for 1992–1994.
1996	A new program of preliminary data releases for births and deaths was inaugurated. The first report, including both births and deaths, was published in October 1996, covering data for 1995. This series was published semiannually and annually for several years. The preliminary reports were not accompanied by a file release. The preliminary series continued for birth data through 2015, with annual releases coming within about 5 months of a data year.
1998	The Current Mortality Sample, launched in 1943, was discontinued in 1998. The preliminary data series is seen as providing more useful, detailed, and timely information on emerging mortality patterns.
1998	The Panel to Evaluate the U.S. Standard Certificates and Reports met to establish evaluation objectives: review current certificates and assess usefulness of existing items and how data quality can be improved; identify unmet data needs to see if standard certificates are the most appropriate place to collect these data; and make recommendations for the content, format, and standard definitions of the proposed certificates that would rely on electronic, automated data collection.
1998	Widespread concerns about birth data quality led to the creation of a Working Group to Improve the Quality of Birth Data. The group concluded that vital statistics birth data quality had declined in the 1990s “associated in part with the electronic registration of vital events.” This was an important factor in the deliberations of the Panel to Evaluate the U.S. Certificates and Reports.
1998–1999	The Panel to Evaluate the U.S. Standard Certificates and Reports met seven times to deliberate and make recommendations. Race, ethnicity, and educational attainment items were revised to match the new data collection methods adopted by the Census Bureau for this information. New items were added to the certificates, reflecting emerging public health information needs, and many items were modified to enhance data quality. The Panel recommended standardized definitions, editing procedures, and instructions, and other initiatives to respond to concerns detailed in the 1998 Working Group report.
1990s to early 2000s	The matched multiple birth file, which includes matched sets of twins, triplets, and quadruplets in live births and fetal deaths and infant death records for babies who died, was developed. Because of confidentiality concerns with respect to small numbers of multiple births, some data fields were suppressed and no geographic identifiers were shown. The currently available file includes events for 1995–2000.

Table. Vital statistics history timeline, 1940–2017—Con.

Year(s)	Description
2000–2009	
2000	The revised birth certificate and fetal death report forms and their associated worksheets were tested in NCHS' Questionnaire Design Research Laboratory with recent mothers. Testing activities for the death certificate included three focus groups with funeral directors and a small focus group with physicians and coroners. The fetal death report was evaluated by a group of physician experts on maternal-fetal medicine.
2001	The Panel to Evaluate U.S. Standard Certificates and Reports issued their final report, which included recommendations for content and format of revised birth and death certificates and the fetal death report.
2001	The 9/11 terrorism attack led to changes in priorities in vital statistics data collection and renewed attention to the security of vital records.
2002	NSFG began including men aged 15–44 in the sample.
2002	The first functional EDRS was developed in New Hampshire in 2002. While funeral directors adopted the electronic systems effectively, physicians and other medical officials were slower to certify deaths electronically.
2002	"Test decks" to review the electronic output from the revised birth and death registration systems were developed. The test decks would be useful for the foreseeable future for registration areas to assess whether modified registration systems were still operating as envisioned.
2002–2003	The Model Vital Events Registration System (MoVERS) initiative was launched to reengineer the country's vital statistics system. NCHS, the Social Security Administration, and the National Association for Public Health Statistics collaborated on the MoVERS project. The intended products were national standards and protocols, web-based technology, automation at the source, implementation of the revised certificates, and the adoption of NCHS' edit specifications for electronic systems. MoVERS focused initially on developing system functionality requirements for registering vital events, with a goal to define requirements for a generic system for a typical jurisdiction that would meet about 80% of its needs. Ultimately, the MoVERS project developed functional requirements for births and deaths.
2003	Following an extended Department-wide comment period, the Secretary of Health and Human Services formally recommended that the registration areas adopt the revised birth and death certificates and fetal death report in November 2003; the revisions are officially referred to as the 2003 revisions.
2003	The revised birth and death certificates and revised fetal death report included significant advances in data content, enhancing their usefulness in maternal and infant health and public health research.
2003	Questions on the revised birth certificate on prenatal care, maternal smoking, and method of delivery facilitate more understanding of the relationships between these factors and maternal and infant health outcomes. New data are also collected on source of payment for the delivery, obstetric procedures, maternal morbidity, pregnancy and birth intervals, and maternal infections.
2003	The revised death certificate asks for more information on injury-related deaths, if tobacco use contributed to the death, and for female decedents, whether she was pregnant within the year up to death. Changes in the revised fetal death report were similar to those in the birth certificate; additionally, the cause of fetal death item was significantly redesigned to improve the quality and specificity of the information collected.
2003	Adoption of the revised certificates was very limited. Only Pennsylvania and Washington implemented the revised birth certificate. Five jurisdictions (California, Idaho, Montana, New York, and New York City) implemented the revised death certificate, and Michigan and Washington implemented the revised fetal death report.
2003	Resource limitations and other challenges precluded universal implementation of the revised certificates by all registration areas on a standard schedule. The protracted implementation of the revised certificates was unprecedented in the history of the adoption of revised standard certificates.
2003	Population-based rates by race for births and deaths are based on bridged-race data, to allow comparisons among states that have and have not revised their certificates to collect multiple races. The intent is to discontinue these rates when all states have transitioned to multiple-race reporting on the birth and death certificates.
2003	Revised trend series for birth and death rates for years beginning with 1990 that incorporate revised bridged-race population estimates for these years through the early 2000s were published; this series continues to the 2016 data year.
2003–2015	Phased implementation of the revised birth and death certificates further complicated file production and data analysis because in some cases, states adopted the revised race (multiple-race) and Hispanic origin questions independently of implementing the remaining content on the certificates. File sizes increased substantially.
2003–2016	The protracted implementation phase for the revised certificates resulted in ongoing negative consequences for producing these data files. Throughout this period, the files had to incorporate data in varying formats, variable response categories, and incompatible data elements. For many key measures, it was not possible to produce national statistics or to interpret national trends because the revised reporting areas changed every year during this period.
2003–2017	Production of complete birth and death data sets was compromised because the 2003 revisions of the birth and death certificates had not been adopted by all states. As of the 2006 data year, just 19 states had implemented the revised birth certificate, rising to 35 states and the District of Columbia (D.C.) in 2010, 49 states and D.C. in 2015, and 50 states and D.C. in 2016. Similarly, implementation of the 2003 revision of the death certificate was significantly delayed, with 21 states and D.C. revising as of 2006, 34 states and D.C. in 2010, 48 states and D.C. in 2015, and all 50 states and D.C. in 2017.
2004	The 9/11 Commission Report included a recommendation that "the federal government set standards for the issuance of birth certificates and sources of identification, such as drivers' licenses." The NVSS program led an interagency and interdepartmental effort to develop a strategy to address this recommendation.
2005	The National Association for Public Health Statistics and Information Systems (NAPHSIS) voted to withhold permission from NCHS to include the new data items in the national data sets, especially impacting the birth data file. NAPHSIS leadership believed that NCHS should materially support the collection of the new items. This restriction challenged NCHS' ability to "market" the new data items and potentially reduced possible interest in these items. This issue was ultimately resolved in 2013, and NCHS was able to disseminate the revised and new data for years 2009 and forward.

Table. Vital statistics history timeline, 1940–2017—Con.

Year(s)	Description
2000–2009—Con.	
2006	NCHS advised registration areas and data users that state-specific data on several key items on the 2003 and 1989 revisions could not be combined to produce national estimates. These items included race of parents and decedent and educational attainment of the parents and decedent. Items on prenatal smoking, prenatal care, and method of delivery on the birth certificate also differed significantly in 2003 compared with 1989. Beginning with the 2004 data year, NCHS reported these measures separately for revised (i.e., based on the 2003 revision) and unrevised states. The lack of national data for these measures significantly compromised the value of the information.
2006	NSFG became a continuous survey, with about 5,000 men and women aged 15–44 interviewed each year. The first data set from continuous interviewing covered 2006–2008 and was released in May 2010. A 4-year file covering 2006–2010 was the largest ever. It included 22,682 men and women and was released in October 2011.
2006–2012	VSCP funding challenges threatened the security and long-term stability of the vital statistics system. Options that were considered to address these challenges included further reductions in the basic or core data sets and reliance on alternative funding sources to support other data collections. These resource and funding challenges exacerbated relations between NCHS and the states.
2007–2012	A “catch-up” program to process and publish fetal death data sets was implemented. Substantial cuts were made in the data elements, including removing all noncomparable data (i.e., not comparable between the 1989 and 2003 revisions). The resulting files for data years 2007–2012 were released from September 2013 through April 2014.
2007 to present	The reNVSS program (reengineered National Vital Statistics System) was launched in 2007. The immediate impetus was CDC’s closing down the legacy “mainframe,” which meant that processing systems for vital statistics data had to be reengineered. Staff members are now able to review and analyze the data on a daily basis, using statistical “cubes.” The reviews include frequent interactions with state colleagues, facilitating more responsive and effective processing and quality assessments.
2009	NAPHSIS began testing the State and Territorial Exchange of Vital Events (STEVE) data transmission system whereby states could submit their vital statistics data to NCHS. NAPHSIS owns STEVE, which is described as an “innovative messaging application for the electronic exchange of vital event data across jurisdictions.”
2010 to present	
2010	NCHS and NAPHSIS joined forces in establishing a “Getting From Good to Great Partnership.” The goals are to address persistent funding and data quality issues as well as the need to acknowledge the distinct and unique roles and responsibilities of the partners.
2011	NVSS staff began to code cause of death for all deaths in the United States. This decision, in large part, reflected the decline in the number of trained nosologists. National statistics are now all based on NCHS-coded information, although some states still do their own coding for their own purposes.
2011	NAPHSIS adopted the 2011 Revision of the Model State Vital Statistics Act and Model State Vital Statistics Regulations on June 8, 2011.
2012	NCHS and the states embarked on a new 5-year contract for VSCP for the years 2012–2016 that included specific, measurable requirements for data quality and timeliness. This contract requires states to use the STEVE data transmission system or a comparable system when submitting their data to NCHS.
2012	A new program of mortality surveillance was launched with twin goals: (a) identify potential data problems as soon as possible and communicate with state and federal colleagues in a position to correct the problem(s), and (b) identify public health concerns and communicate these to appropriate public health partners.
2014	The measurement of gestational age transitioned from the first day of the mother’s last normal menstrual period to the “obstetric estimate,” a new item on the 2003 revised birth certificate.
2014	The first NDI Early Release file became available in July 2014. The file covered deaths for 2013 and contains demographic information but not cause of death. Cause information was added when the final statistical file was released.
2015	The Vital Statistics Rapid Release (VSRR) program, representing an effort to release quarterly data on important health indicators on an accelerated schedule, was inaugurated. Mortality data are the first to be released in this new system. VSRR reports for births were added to the system later in 2016. The launch of this VSRR signals the phasing out of the preliminary birth and death data reports, to be replaced by VSRR data releases.
2015	NCHS’ Division of Vital Statistics and Classifications and Public Health Data Standards staff began working with NAPHSIS, state representatives, and other vital records stakeholders to develop vital records standards to enable interoperable electronic data exchanges among electronic health record systems, U.S. vital records systems, and potentially other public information systems for birth, death, and fetal death events. NCHS supports state pilot testing and trial implementation.
2015	The age range for NSFG was expanded from 15–44 to 15–49 years.
2016	The report of preliminary birth statistics was discontinued, with the last report published on 2015 births (report released in June 2016). The reports of preliminary mortality statistics were discontinued after the 2011 data year; the report for 2011 was published in October 2012. The most timely birth and death data are now published in the VSRR program.
2016	Cause-of-fetal-death data from the revised fetal death report were released for the first time. Data are from the 2014 file, for 37 jurisdictions, and show that 5 causes account for about 90% of fetal deaths in the reporting area.
2016	The e-learning training, “Applying Best Practices for Reporting Medical and Health Information on Birth Certificates,” was developed and disseminated. The training was designed for physicians, nurses, and nonclinical staff at hospitals and other facilities who are responsible for completing the medical and health information on the birth certificate and fetal death report.
2017	As of early 2017, states were required to use STEVE (version 2.0) or an alternative system approved by NCHS to submit their data to NCHS.

Table. Vital statistics history timeline, 1940–2017—Con.

Year(s)	Description
2010 to present—Con.	
2017	Population-based rates by race and Hispanic ethnicity transitioned from bridged race to single race. Vital rates for the years 2000–2015 were initially published for bridged-race categories that were consistent across jurisdictions and time. Rates for single-race groups began with the 2016 data year, published in 2017, and bridged- and single-race rates for 2016 were published in 2017 to facilitate trend analysis.
2017	Quarterly provisional birth and death data from VSRR began to be released within 5 months of the end of a data collection period. Quarterly provisional infant mortality estimates were released within 12 months of the end of a data collection period. Trends in selected “high-profile” measures are informed by very current VSRR data.
2017	NSFG published the first report from 2011–2015 continuous interviewing. The first release highlights data on teen sexual activity and contraceptive use. The trends help explain the ongoing steep decline in U.S. teen birth rates, continuing to showcase the role of NSFG in explaining fertility trends and differentials.

Appendix I. Initial Decisions in the Mid-1990s to Address Resource Limitations in the National Vital Statistics System

Items Dropped From Data Sets

By the mid-1990s, the funding situation for the National Center for Health Statistics (NCHS) had worsened, and the consequences for NCHS' ability to produce and disseminate national data sets for births, deaths, and fetal deaths as well as for marriages, divorces, and induced terminations of pregnancy (abortions) were severe (4,36). Initially, NCHS dropped some items from the birth and death data sets, including for births, the date of the mother's previous live birth (dropped in 1994), information that was useful in tracking trends between successive births, especially for high-risk women; and the 1-minute Apgar score (dropped in 1995). Similarly, NCHS discontinued the collection of the father's educational attainment in 1995. Along with mother's educational attainment, these items are considered among the best measures of socioeconomic status (36,169). These items were not reinstated until the content of the 2003 revision of the birth certificate was fully incorporated in NCHS' birth data sets in 2009, although full adoption of the revisions by all jurisdictions is nearly complete (Tables I–III) (37,67,68). Information on autopsy was dropped from the death certificate, but was later restored when the 2003 revision of the death certificate went into effect (4). Further, information on occupation and industry of the decedent was eliminated as a reportable item on the death certificate.

Collection of Abortion, Marriage, and Divorce Data Ended

To meet its contractual obligations to states, NCHS discontinued altogether the collection of individual record data on induced terminations of pregnancy (i.e., abortions) in 1994 (the last data year collected was 1992 but data sets were not processed for any year after

1988) (4,38). When NCHS decided to end its collection of abortion data, 14 states were providing detailed individual record data on abortions to NCHS. The data collection had begun with five states in 1977 and grew to eight states in 1978, and the findings were published (42). The last NCHS report on this data set was based on abortions in 1988 (43). With this decision, the availability of abortion information in the United States was relegated to two principal sources—the Guttmacher Institute and the CDC Abortion Surveillance System (44–46). While the report of induced termination of pregnancy (ITOP) was not considered for revision when the Panel to Evaluate the (1989) U.S. Standard Certificates (3) was considering revisions to the birth and death certificates and fetal death report, it should be noted that the ITOP reporting form was modified. CDC's Division of Reproductive Health convened a working group of experts who recommended that the form be modified to include an option to report a medical or nonsurgical abortion procedure (170). This change was recommended to the states in December 1997 (3).

NCHS funding constraints also led to the discontinuation of the collection of individual record data for marriages and divorces after 1995 (39). These decisions were made to meet NCHS' priorities within the National Vital Statistics System for birth, death, and fetal death data. NCHS acknowledged the importance of data on marriage and divorce (1,36), but felt that other data sources could be drawn on for this information, including the Current Population Survey (1,36). An important factor behind NCHS' decisions to discontinue the collection of abortion, marriage, and divorce data was that none of the data sets was complete in the mid-1990s. As noted, detailed abortion information was available from 14 states; marriage data were based on 45 registration areas; and divorce information was based on 33 areas. Thus, the data were not national, and

the reported marriage and divorce data suffered from quality concerns that could not be addressed without substantial financial infusions (1,4,36,39). These resources were not available nor could they be anticipated in the foreseeable future. NCHS published the last descriptive reports of marriage and divorce data for 1989 and 1990 (40,41). More recently, the U.S. Department of Health and Human Services' Administration for Children and Families and the Office of the Assistant Secretary for Planning and Evaluation engaged in a contract to revisit potential interest and capacity within the states to restart the marriage and divorce data collection within the vital statistics system. This study found that most states do collect some data on these events, with most data collection still paper-based. The study also found wide variation across the states in the extent of detail collected, the completeness of the data, and interest in compiling statistical data sets (47). Because of its resource constraints, NCHS elected to implement a "counts-based" system for marriages and divorces so that some, albeit limited, marriage and divorce information would be available. Currently, NCHS is producing annual state-specific counts of marriages and divorces (48,49). The counts indicate the number of marriages and divorces occurring in the jurisdictions, and include no information on the characteristics of the persons marrying or divorcing (48–50). It should be noted that some states do not report counts of divorces; in 2015, for example, six states did not provide this information (49).

Appendix II. Mortality Medical Coding System

The mortality medical coding system, known as the the Mortality Medical Data System, is comprised of a suite of software programs, initially inaugurated with the Automated Classification of Medical Entities (ACME). TRANSAX (translation of axes) was developed in the late 1970s to complement ACME. The Mortality Medical Indexing, Classification, and Retrieval System, known as MICAR, was implemented in 1990 and allows for the input of the literal text as reported by the certifier on the death certificate. Data entry is in the form of “sanitized” text descriptions of entity reference numbers [ERN, 6-digit numeric codes assigned sequentially by the National Center for Health Statistics (without regard to any coding scheme)]. MICAR has a number of advantages, including eliminating the use of the *International Classification of Diseases* index, reducing errors in recognizing terms, and eliminating the use of multiple-cause coding rules (171). MICAR also provides more detailed information on the conditions reported on the death certificate. Super-MICAR, an enhancement of MICAR, was implemented in 1993. Whereas the original MICAR system required the coder to know or be able to look up the sanitized text of the ERN, Super-MICAR facilitates the total literal entry of the multiple cause-of-death text as reported by the medical certifier. This information serves as input to MICAR, which in turn is input into ACME (171).

Appendix III. *International Classification of Diseases (ICD)*

The *International Classification of Diseases (ICD)* is used to classify causes of death for statistical purposes. ICD is maintained collaboratively by the World Health Organization (WHO) and 21 international collaborating centers, 1 of which is the WHO Collaborating Center for the Classification of Diseases in North America at the National Center for Health Statistics. Currently, cause of death is being coded using ICD–10, which was implemented in the United States in 1999 (15). Although ICD has generally been revised about every 10 years, the last two revisions have been in effect much longer. ICD provides the basic ground rules used to code and classify causes of death, to identify the underlying cause of death, and to compensate for certifier errors in the cause-of-death statement, all crucial functions. The revision process, concurrent efforts to describe and identify resultant discontinuities in data, and plans for an upcoming revision are described in this Appendix and elsewhere (84,85).

ICD functions are crucial. Major discontinuities in statistical trends typically occur when a new revision of ICD is implemented. These discontinuities are measured using “comparability ratios,” which indicate the impact of a change in ICD on the trends in given causes of deaths. The most recent comparability study was carried out after ICD–10 was introduced (79). Currently, ICD–11 is in development. WHO and colleagues have ambitious goals for the ICD–11 revision, including the development of a “multi-purpose and coherent classification for mortality, morbidity, primary care, clinical care, research, and public health” and a system that is consistent and interoperable across different uses. As envisioned, ICD–11 should “serve as an international and multilingual reference standard for scientific comparability and communication purposes.” The final goal is to ensure that ICD–11 will function in an electronic environment, “that ICD–11 will be a digital product and that it will support electronic health records and information systems” (80).

Implementation of ICD–11 in the United States is likely to take several years after approval by the World Health Assembly, the decision-making body of WHO.

Appendix IV. Collaborative Efforts Based on Real-time Mortality Surveillance

As of the writing of this report, the National Center for Health Statistics (NCHS) has a number of ongoing projects that are based on real-time mortality surveillance. One is to track deaths from influenza, with support from the National Center for Immunization and Respiratory Diseases. Other projects in the mortality surveillance initiative in various stages of development include one on suicide, with support from the National Institute of Mental Health. Another is an effort to create a National Disaster-related Mortality Surveillance System, with support from the CDC's Office of Public Health Preparedness and Response.

The Food and Drug Administration has been collaborating with NCHS on a surveillance project to identify drugs and drug types involved in drug overdoses and poisoning deaths. This activity involves "mining" the "literal" entries reported in the cause-of-death section of the death certificate to maximize the utility of this information in identifying and reducing these deaths. Another activity in the early stages of development is the monitoring of disaster-related deaths. The National Center for Environmental Health is funding the National Association for Public Health Statistics and Information Systems, and NCHS is participating as a collaborating agency in a project to try to develop standard case definitions of disaster-related deaths. Note that in many instances, these surveillance activities are intended to raise situational and public health awareness of the selected health indicators. Another example of the real-time surveillance is the surveillance of Creutzfeldt-Jakob disease, a rare degenerative neurological disorder that is incurable and invariably fatal (106).

One area where the death certificate data have been used for surveillance for many years is the publication of weekly estimates of "notifiable diseases and mortality in 122 cities" that are issued in CDC's *Morbidity and Mortality Weekly Report* (105). The data for the 122 cities

project are reported by state and local registrars directly to CDC's Influenza Division. Consistent with the recent CDC Surveillance Strategy goal to reduce the redundancy of CDC surveillance systems, NCHS and the CDC's Influenza Division have been piloting the use of NCHS real-time surveillance capabilities as a replacement for the 122 Cities Mortality Reporting System (CMRS) (106). Currently, parallel review of the 122 CMRS data system and vital statistics-based surveillance for influenza deaths is ongoing.

Appendix V. Items Deleted From the National Fetal Death Data Set

As part of the initiative to review the item content of the birth and fetal death data sets, the fetal death data quality workgroup, comprised of the National Center for Health Statistics' (NCHS) National Vital Statistics System staff members and members of the National Association for Public Health Statistics and Information Systems (NAPHSIS), met over a 2-year period to assess the quality of the data items on the fetal death report and to make recommendations for item deletions. The workgroup presented its recommendations to the annual joint meeting of the Vital Statistics Cooperative Program (VSCP) project officers and NAPHSIS in Pittsburgh, Pa. in June 2015 (120). The recommendations were affirmed at the meeting and NCHS transmitted a formal notification of the item deletions in an e-mail sent to the VSCP project officers on June 16, 2015 (56). The items deleted from the national fetal death data set, effective with the 2014 data year include the following:

- Mother ever married (This was a “derived” item based on other information on the standard fetal death report, and had been part of the national file.)
- Mother married? (At delivery, conception or anytime between)
- Total number of prenatal visits for this pregnancy
 - Edit flag—Total number of prenatal visits for this pregnancy
- Date of last prenatal care visit*
- Mother’s weight at delivery
 - Edit flag—Mother’s weight at delivery
- Number of other pregnancy outcomes
- Date of last other pregnancy outcome
- Mother/patient transferred for maternal medical or fetal indications for delivery?
- Previous preterm birth (Risk factors for this pregnancy)
- Other previous poor pregnancy outcomes (Risk factors for this pregnancy)*
- Gonorrhea (Infections present and/or treated during this pregnancy**)
- Syphilis (Infections present and/or treated during this pregnancy**)
- Chlamydia (Infections present and/or treated during this pregnancy**)
- Listeria (Infections present and/or treated during this pregnancy**)
- Group B strep (Infections present and/or treated during this pregnancy**)
 - Edit flag—Group B strep present and/or treated during this pregnancy**
- Cytomegalovirus (Infections present and/or treated during this pregnancy**)
 - Edit flag—Cytomegalovirus present and/or treated during this pregnancy**
- Parvovirus (Infections present and/or treated during this pregnancy**)
 - Edit flag—Parvovirus present and/or treated during this pregnancy**
- Toxoplasmosis (Infections present and/or treated during this pregnancy**)
 - Edit flag—Toxoplasmosis present and/or treated during this pregnancy**
- Other (Specify) (Infections present and/or treated during this pregnancy**)
 - Edit flag—Other (Specify) present and/or treated during this pregnancy**
- Hysterotomy/hysterectomy (Method of delivery)
- Maternal transfusion (Maternal morbidity)
- Third or fourth degree perineal laceration (Maternal morbidity)
- Unplanned hysterectomy (Maternal morbidity)
- Unplanned operating room procedure (Maternal morbidity)
- Anencephaly (Congenital anomalies of the fetus**)
- Meningomyelocele/Spina bifida (Congenital anomalies of the fetus**)
- Cyanotic congenital heart disease (Congenital anomalies of the fetus**)
- Congenital diaphragmatic hernia (Congenital anomalies of the fetus**)
- Omphalocele (Congenital anomalies of the fetus**)
- Gastroschisis (Congenital anomalies of the fetus**)
- Limb reduction defect (Congenital anomalies of the fetus**)
- Cleft lip with or without cleft palate (Congenital anomalies of the fetus**)
- Cleft palate alone (Congenital anomalies of the fetus**)
- Down syndrome—karyotype confirmed/pending (Congenital anomalies of the fetus**)
- Suspected Chromosomal disorder—karyotype confirmed/pending (Congenital anomalies of the fetus**)
- Hypospadias (Congenital anomalies of the fetus**)

*Item previously announced as dropped from the national birth file.

**All checkboxes on the national standard under this category have been dropped.

Appendix VI. Followback Surveys

Followback surveys were conducted periodically by the National Center for Health Statistics (NCHS) from the early 1960s until the early 1990s (172,173). These surveys were housed organizationally within NCHS' National Vital Statistics System program. In these surveys, the birth or death record is the basic sampling unit, with the total file of births or deaths representing the sampling frame. The purpose of followback surveys is to collect additional information about each event from sources identified on the vital record. Because the vital records are the sampling frame, followback surveys must be conducted with the cooperation and support of the vital registration jurisdictions. These organizations make it possible for researchers to gain access to the full vital record in order to identify and contact additional sources of information that may include physicians, hospital personnel, and family members, among others. The 1988 National Maternal and Infant Health Survey (NMIHS) included women with a live birth as well as women who had experienced a fetal loss or infant death. A 1991 longitudinal follow-up to the 1988 NMIHS was conducted to obtain additional information about respondents from the 1988 survey (172).

The last mortality followback survey conducted by NCHS was the 1993 National Mortality Followback Survey (173). The survey included, for the first time, an emphasis on deaths due to homicide, suicide, and unintentional injury and included information from medical examiners and coroners. There has been periodic interest in reviving the followback surveys in the research community, especially for deaths, as noted in an Institute of Medicine report issued in 2003 (174). However, the costs associated with these surveys would be prohibitive if conducted under previous procedures; it is possible that with the expansion of electronic health records, such followback surveys may once again be feasible.

Appendix VII. Effort by National Academies to Generate Attention to Current and Emerging Uses of Vital Statistics Data

Over the last decade, the National Center for Health Statistics' (NCHS) ongoing challenges, especially in the timeliness of vital statistics data, led the Committee on National Statistics of the National Academies to convene a Workshop on Vital Data for National Needs on April 30, 2008. The Workshop was organized by the National Academies along with the U.S. Census Bureau; the Social Security Administration's Office of Research, Evaluation, and Statistics; and NCHS, with a focus on assessing current and emerging uses of vital statistics data, and methodological and organizational features of the data. A premise of the Workshop organizers was that despite their critical importance, vital statistics had simply been taken for granted for too long, and that it was time to consider "the critical importance of adequate vital statistics for the statistical, research, and policy communities" and to identify "improvements that are needed at NCHS' vital statistics programs" (4). Workshop presenters described the uses of vital statistics data, including, for example, to understand social inequalities in health, health policy, and research; for maternal and child health research; to develop population estimates and projections; and for potential emerging uses in biosurveillance. The federal–state cooperative relationship was reviewed, focusing on the challenges facing the vital statistics system and methodological issues, and challenges of the 2003 revision of the U.S. Standard Certificates and Report were discussed. The latter included issues around bridged-race data, the measurement of perinatal mortality, and causes of death. Workshop discussions also highlighted the need for investment in infrastructure at the federal and state levels, geared in particular to the development of faster, more efficient, and responsive systems. The need for periodic review of the content of the certificates to ensure that data needs are being met and the need to improve timeliness and quality for the data to have real value were also discussed.

The Workshop report concluded: "The vital statistics system needs to be understood as a critical part of the nation's scientific infrastructure, and building awareness of the system's strengths and limitations is essential to continuing to provide vital data for national needs" (4).

Appendix Tables

Table I. Revision status of each jurisdiction according to when they implemented the revised birth certificate

State or jurisdiction	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alabama	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Alaska	-	-	-	-	-	-	-	-	-	-	X	X	X	X
American Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arizona	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Arkansas	-	-	-	-	-	-	-	-	-	-	-	X	X	X
California	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Colorado	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Delaware	-	-	-	X	X	X	X	X	X	X	X	X	X	X
District of Columbia	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Florida	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Georgia	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Guam	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Hawaii	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Idaho	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Illinois	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Indiana	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Iowa	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Kansas	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Kentucky	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Louisiana	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Maine	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Maryland	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Massachusetts	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Michigan	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Minnesota	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Mississippi	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Missouri	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Montana	-	-	-	-	-	X	X	X	X	X	X	X	X	X
Nebraska	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Nevada	-	-	-	-	-	-	X	X	X	X	X	X	X	X
New Hampshire	-	X	X	X	X	X	X	X	X	X	X	X	X	X
New Jersey	-	-	-	-	-	-	-	-	-	-	-	X	X	X
New Mexico	-	-	-	-	-	X	X	X	X	X	X	X	X	X
New York City	-	-	-	-	-	X	X	X	X	X	X	X	X	X
New York State	-	X	X	X	X	X	X	X	X	X	X	X	X	X
North Carolina	-	-	-	-	-	-	-	X	X	X	X	X	X	X
North Dakota	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Northern Mariana Islands	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Ohio	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Oklahoma	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Oregon	-	-	-	-	-	X	X	X	X	X	X	X	X	X
Pennsylvania	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Puerto Rico	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	X	X
South Carolina	-	X	X	X	X	X	X	X	X	X	X	X	X	X
South Dakota	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Tennessee	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Texas	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Utah	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Vermont	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Virginia	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Washington	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Virginia	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Wisconsin	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Wyoming	-	-	-	X	X	X	X	X	X	X	X	X	X	X

X Indicates state or jurisdiction implemented the revised birth certificate.

- Indicates state or jurisdiction did not implement the revised birth certificate.

Table II. Revision status of each jurisdiction according to when they implemented the revised death certificate

State or jurisdiction	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alabama	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
Alaska	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
American Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arizona	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Arkansas	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
California	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Colorado	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Connecticut	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Delaware	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X
District of Columbia	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Florida	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Georgia	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Guam	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Hawaii	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Idaho	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Illinois	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Indiana	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Iowa	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Kansas	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Kentucky	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Louisiana	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Maine	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Maryland	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Michigan	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Minnesota	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Mississippi	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Missouri	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Montana	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nebraska	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Nevada	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
New Hampshire	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New Jersey	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New Mexico	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
New York City	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New York State	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
North Carolina	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
North Dakota	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Northern Mariana Islands	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Ohio	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Oklahoma	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Oregon	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Pennsylvania	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Puerto Rico	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Rhode Island	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
South Carolina	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
South Dakota	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tennessee	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Texas	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Utah	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Vermont	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Virginia	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Virginia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Wisconsin	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Wyoming	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X Indicates state or jurisdiction implemented the revised death certificate.

- Indicates state or jurisdiction did not implement the revised death certificate.

Table III. Revision status of each jurisdiction according to when they implemented the revised fetal death report

State or jurisdiction	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alabama	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Alaska	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
American Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arizona	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Arkansas	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
California	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Colorado	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Connecticut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Delaware	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
District of Columbia	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Florida	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Georgia	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X
Guam	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Hawaii	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Idaho	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Illinois	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Indiana	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Iowa	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Kansas	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Kentucky	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Louisiana	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Maine	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Maryland	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Massachusetts	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Michigan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Minnesota	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Mississippi	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
Missouri	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Montana	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Nebraska	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Nevada	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X
New Hampshire	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
New Jersey	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
New Mexico	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
New York City	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
New York State	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
North Carolina	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
North Dakota	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Northern Mariana Islands	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Ohio	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Oklahoma	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Oregon	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
Pennsylvania	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Puerto Rico	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
South Carolina	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X
South Dakota	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Tennessee	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X
Texas	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X
Utah	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vermont	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Virginia	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Virginia	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
Wisconsin	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
Wyoming	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X

X Indicates state or jurisdiction implemented the revised fetal death report.

- Indicates state or jurisdiction did not implement the revised fetal death report.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Birth information												
Name of child	X	X	X	X	X	X	X	X	X	X	X	X
Sex	X	X	X	X	X	X	X	X	X	X	X	X
Date of birth	X	X	X	X	X	X	X	X	X	X	X	X
Time of birth	X	X	X	X	X	X	-	-	-	X	X	X
Place of birth:	X	X	X	X	X	X	X	X	X	X	X	X
Place of delivery	-	-	-	-	-	-	X	X	X	X	X	-
Name of facility	-	-	-	-	-	-	-	-	-	-	-	X
Street and number	X	X	X	-	-	-	-	-	-	-	-	-
If birth occurred in hospital or institution, give its name instead of street number	-	-	-	X	X	-	-	-	-	-	-	-
Place where birth occurred (check one)												
Checkbox for "Hospital"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Freestanding birthing center"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Clinic/doctor's office"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Residence"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Home birth"	-	-	-	-	-	-	-	-	-	-	-	X
Planned to deliver at home? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	-	X
Street and number if not in hospital	-	-	-	-	-	-	X	X	X	X	X	X
Township of, or	X	X	X	X	X	X	-	-	-	-	-	-
Village of, or	X	X	X	X	X	X	-	-	-	-	-	-
City	X	X	X	X	X	X	-	-	-	-	-	-
City, town, or location of birth	-	-	-	-	-	-	X	X	X	X	X	X
Inside city limits	-	-	-	-	-	-	-	-	X	X	-	-
If outside city or town limits, write rural	-	-	-	-	-	X	X	-	-	-	-	-
County	X	X	X	X	X	X	X	X	X	X	X	X
Ward	X	X	X	X	X	X	-	-	-	-	-	-
Birth weight	-	-	-	-	-	-	-	X	X	X	X	X
Birth weight, checkbox for "grams" and "lb./oz."	-	-	-	-	-	-	-	-	-	-	-	X
Single, twin, triplet, etc.	X	X	X	X	X	X	X	X	X	X	X	X
Plurality—Single, twin, triplet, etc. (specify)	-	-	-	-	-	-	-	-	-	-	-	X
Birth order if not single birth	X	X	X	X	X	X	X	X	X	X	X	X
If not single birth—Born first, second, third, etc. (specify)	-	-	-	-	-	-	-	-	-	-	-	X
Apgar Score:												
1 minute	-	-	-	-	-	-	-	-	-	-	X	-
5 minutes	-	-	-	-	-	-	-	-	-	-	-	X
If 5-minute score is less than 6, score at 10 minutes	-	-	-	-	-	-	-	-	-	-	-	X
Mother transferred prior to delivery	-	-	-	-	-	-	-	-	-	-	X	X
Mother transferred for maternal medical or fetal indications for delivery? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
If yes, enter name of facility mother transferred from:	-	-	-	-	-	-	-	-	-	-	-	X
Infant transferred	-	-	-	-	-	-	-	-	-	-	X	-
Was infant transferred within 24 hours of delivery? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
If yes, name of facility infant transferred to:	-	-	-	-	-	-	-	-	-	-	-	X
Is infant living at time of report? Checkbox for "yes," "no," and "infant transferred, status unknown"	-	-	-	-	-	-	-	-	-	-	-	X
Is the infant being breastfed at discharge? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Newborn medical record number	-	-	-	-	-	-	-	-	-	-	-	X
Mother information												
Maiden name	-	X	X	X	X	X	X	X	X	X	-	-
Maiden surname	-	-	-	-	-	-	-	-	-	-	X	-
Full name	X	-	-	-	-	-	-	-	-	-	X	-
Mother's name prior to first marriage	-	-	-	-	-	-	-	-	-	-	-	X
Mother's current legal name	-	-	-	-	-	-	-	-	-	-	-	X
Age	X	X	X	X	X	X	X	X	X	X	-	-
Date of birth	-	-	-	-	-	-	-	-	-	-	X	X
Birthplace	X	X	X	-	-	-	-	-	-	-	-	-
Birthplace (state or country)	-	-	-	X	X	X	X	X	X	X	X	X
Birthplace (city or place)	-	-	-	X	X	X	-	-	-	-	-	-
Mother's stay before delivery: In hospital or institution	-	-	-	X	-	-	-	-	-	-	-	-
In this community	-	-	-	-	-	X	-	-	-	-	-	-
Residence	X	X	X	X	X	-	-	-	-	-	-	-
State	-	-	-	-	-	X	X	X	X	X	X	X
County	-	-	-	X	X	X	X	X	X	X	X	X
City, town, or location	-	-	-	-	-	X	X	X	X	X	X	X

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Mother information—Con.												
Street and number	-	-	-	-	-	X	X	X	X	X	X	X
Inside city limits	-	-	-	-	-	-	-	X	X	X	X	X
If rural, give location	-	-	-	-	-	X	X	-	-	-	-	-
Is residence on a farm?	-	-	-	-	-	-	-	X	-	-	-	-
Apartment No.	-	-	-	-	-	-	-	-	-	-	-	X
Mother's mailing address	-	-	-	-	-	X	-	X	-	X	X	X
Mother's mailing address—checkbox for "Same as residence" or state, city, town, or location, street and number, apartment, zip code	-	-	-	-	-	-	-	-	-	-	-	X
Education—Specify highest grade completed	-	-	-	-	-	-	-	-	X	X	X	-
Elementary (0,1,2,3,4,...or 8)	-	-	-	-	-	-	-	-	X	-	-	-
Elementary/secondary (0–12)	-	-	-	-	-	-	-	-	-	X	X	-
High school (1,2,3, or 4)	-	-	-	-	-	-	-	-	X	-	-	-
College (1,2,3,4, or 5+)	-	-	-	-	-	-	-	-	X	-	-	-
College (1–4 or 5+)	-	-	-	-	-	-	-	-	-	X	X	-
Education (Check the box that best describes the highest degree or level of school completed at the time of delivery):	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "8th grade or less"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "9th–12th grade, no diploma"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "High school graduate or GED completed"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Some college credit but no degree"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Associate degree (e.g., AA, AS)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Bachelor's degree (e.g., BA, AB, BS)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)"	-	-	-	-	-	-	-	-	-	-	-	X
Of Hispanic origin? (Specify "no" or "yes"—If yes, specify Cuban, Mexican, Puerto Rican, etc.) Checkbox for "yes" or "no" (specify)___	-	-	-	-	-	-	-	-	-	-	X	-
Mother of Hispanic origin (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "no" box if mother is not Spanish/Hispanic/Latina.)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "No, not Spanish/Hispanic/Latina"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Mexican, Mexican American, Chicana"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Puerto Rican"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Cuban"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, other Spanish/Hispanic/Latina (specify)"	-	-	-	-	-	-	-	-	-	-	-	X
Race—American Indian, black, white, etc. (specify below)	X	X	X	X	X	X	X	X	X	X	X	-
Race (Check one or more races to indicate what the mother considers herself to be)												
Checkbox for "White"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Black or African American"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "American Indian or Alaska Native (Name of the enrolled or principal tribe)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Asian Indian"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Chinese"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Filipino"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Japanese"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Korean"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Vietnamese"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other Asian (specify)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Native Hawaiian"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Guamanian or Chamorro"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Samoan"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other Pacific Islander (specify)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	-	X
Legitimate	X	X	X	X	X	-	X	X	X	-	-	-
Mother married?	-	-	-	-	-	X	-	-	-	X	X	-
Mother married? (At birth, conception, or any time between)												
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
If no, has paternity acknowledgement been signed in the hospital? (Checkbox for "yes" or "no")	-	-	-	-	-	-	-	-	-	-	-	X
Facility ID (National Provider Identifier)	-	-	-	-	-	-	-	-	-	-	-	X
Social security number (mother)	-	-	-	-	-	-	-	-	-	-	-	X
Social security number requested for child? Checkbox for "yes" and "no"	-	-	-	-	-	-	-	-	-	-	-	X
Occupation	X	X	X	X	X	-	-	-	-	-	-	-
Usual occupation	-	-	-	-	-	X	-	-	-	-	-	-

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Mother information—Con.												
Nature of industry	-	-	-	X	X	X	-	-	-	-	-	-
Date (month and year) last engaged in this work	-	-	-	-	X	-	-	-	-	-	-	-
Total time (years) spent in this work	-	-	-	-	X	-	-	-	-	-	-	-
Father information												
Name	X	X	X	X	X	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X	X	X	X	-	-
Date of birth	-	-	-	-	-	-	-	-	-	-	X	X
Birthplace	X	X	X	-	-	-	-	-	-	-	-	-
Birthplace (state or country)	-	-	-	X	X	X	X	X	X	X	X	X
Birthplace (city or place)	-	-	-	X	X	X	X	X	X	X	X	X
Education—Specify highest grade completed	-	-	-	-	-	-	-	-	X	X	X	-
Elementary (0,1,2,3,4,...or 8)	-	-	-	-	-	-	-	-	X	-	-	-
Elementary/secondary (0–12)	-	-	-	-	-	-	-	-	-	X	X	-
High school (1,2,3, or 4)	-	-	-	-	-	-	-	-	X	-	-	-
College (1,2,3,4, or 5+)	-	-	-	-	-	-	-	-	X	-	-	-
College (1–4 or 5+)	-	-	-	-	-	-	-	-	-	X	X	-
Education (Check the box that best describes the highest degree or level of school completed at the time of delivery):	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “8th grade or less”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “9th–12th grade, no diploma”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “High school graduate or GED completed”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Some college credit but no degree”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Associate degree (e.g., AA, AS)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Bachelor’s degree (e.g., BA, AB, BS)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Master’s degree (e.g., MA, MS, MEng, MEd, MSW, MBA)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)”	-	-	-	-	-	-	-	-	-	-	-	X
Of Hispanic origin? (Specify no or yes—If yes, specify Cuban, Mexican, Puerto Rican, etc.) Checkbox for “yes” or “no” (specify)___	-	-	-	-	-	-	-	-	-	-	X	-
Father of Hispanic origin (Check the box that best describes whether the father is Spanish/Hispanic/Latino. Check the “no” box if father is not Spanish/Hispanic/Latino.)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “No, not Spanish/Hispanic/Latino”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Yes, Mexican, Mexican American, Chicano”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Yes, Puerto Rican”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Yes, Cuban”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Yes, other Spanish/Hispanic/Latino (specify)”	-	-	-	-	-	-	-	-	-	-	-	X
Race	X	X	X	X	X	X	X	X	X	X	X	-
Race (Check one or more races to indicate what the father considers himself to be)	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for “White”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Black or African American”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “American Indian or Alaska Native (Name of the enrolled or principal tribe)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Asian Indian”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Chinese”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Filipino”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Japanese”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Korean”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Vietnamese”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Other Asian (specify)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Native Hawaiian”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Guamanian or Chamorro”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Samoan”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Other Pacific Islander (specify)”	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for “Other (specify)”	-	-	-	-	-	-	-	-	-	-	-	X
Residence	X	X	X	X	X	-	-	-	-	-	-	-
Social security number (father)	-	-	-	-	-	-	-	-	-	-	-	X
Occupation	X	X	X	X	X	-	-	-	-	-	-	-
Usual occupation	-	-	-	-	-	X	X	X	-	-	-	-
Nature of industry	-	-	-	X	X	X	X	X	-	-	-	-
Date (month and year) last engaged in this work	-	-	-	-	X	-	-	-	-	-	-	-
Total time (years) spent in this work	-	-	-	-	X	-	-	-	-	-	-	-

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical and health information												
Did mother get Women, Infants, and Children (WIC) food for herself during this pregnancy? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Children born to this mother	-	-	-	-	-	X	-	-	-	-	-	-
Children previously born to this mother (Do not include this child.)	-	-	-	-	-	-	X	-	-	-	-	-
How many other children of this mother are now living?	-	-	-	-	-	X	X	X	-	-	-	-
How many other children were born alive but are now dead?	-	-	-	-	-	X	X	X	-	-	-	-
How many children were born dead?	-	-	-	-	-	X	-	-	-	-	-	-
Previous deliveries to mother (Do not include this birth.)	-	-	-	-	-	-	-	X	-	-	-	-
Previous deliveries—How many other children...	-	-	-	-	-	-	-	-	X	-	-	-
Are now living	-	-	-	-	-	-	X	X	-	-	-	-
Were born alive—Now dead	-	-	-	-	-	-	X	X	-	-	-	-
Were born dead (fetal death at any time after conception)	-	-	-	-	-	-	-	-	X	-	-	-
How many children were stillborn (born dead after 20 weeks of pregnancy)?	-	-	-	-	-	-	X	-	-	-	-	-
How many fetal deaths (fetuses born dead at any time after conception)?	-	-	-	-	-	-	-	X	-	-	-	-
Pregnancy history (complete each section)	-	-	-	-	-	-	-	-	-	X	X	-
Live births (Do not include this child.)	-	-	-	-	-	-	-	-	-	X	X	-
Live births, Number____, checkbox for "None"	-	-	-	-	-	-	-	-	-	-	-	X
Live births, now dead	-	-	-	X	X	X	X	X	X	X	X	X
Born dead (stillborn, fetal death)	-	-	-	X	X	X	-	X	X	-	-	-
Born dead after 20 weeks of pregnancy	-	-	-	-	-	-	X	-	-	-	-	-
Other terminations (spontaneous and induced):	-	-	-	-	-	-	-	-	-	-	-	-
Under 20 weeks	-	-	-	-	-	-	-	-	-	X	-	-
Over 20 weeks	-	-	-	-	-	-	-	-	-	X	-	-
Other terminations (spontaneous and induced at any time after conception):	-	-	-	-	-	-	-	-	-	-	X	X
Number of other pregnancy outcomes (spontaneous or induced losses or ectopic pregnancies)	-	-	-	-	-	-	-	-	-	-	-	X
Other outcomes—Number____, checkbox for "none"	-	-	-	-	-	-	-	-	-	-	-	X
Date of last other pregnancy outcome	-	-	-	-	-	-	-	-	-	-	-	X
Date of last live birth	-	-	-	-	-	-	-	-	X	X	X	X
Date of last fetal death	-	-	-	-	-	-	-	-	X	-	-	-
Date of last other termination	-	-	-	-	-	-	-	-	-	X	X	X
Whether born alive or stillborn	X	X	X	X	X	-	-	-	-	-	-	-
Cause of stillbirth	-	-	-	-	X	-	-	-	-	-	-	-
Stillbirth—Before labor or during labor	-	-	-	-	X	-	-	-	-	-	-	-
If stillborn, period of gestation	-	-	-	-	X	-	-	-	-	-	-	-
Clinical estimate of gestation	-	-	-	-	-	-	-	-	-	-	X	-
Obstetric estimate of gestation	-	-	-	-	-	-	-	-	-	-	-	X
Date last normal menses began	-	-	-	-	-	-	-	-	X	X	X	X
Mother's medical record number	-	-	-	-	-	-	-	-	-	-	-	X
Length of pregnancy (completed weeks)	-	-	-	-	-	-	X	X	-	-	-	-
Months of pregnancy	-	-	-	-	-	X	-	-	-	-	-	-
Premature or full term	-	-	-	-	X	-	-	-	-	-	-	-
Month of pregnancy prenatal care began	-	-	-	-	-	-	-	-	X	X	X	X
Number of prenatal visits	-	-	-	-	-	-	-	-	X	X	X	X
Date of first prenatal care visit	-	-	-	-	-	-	-	-	-	-	-	X
Date of last prenatal care visit	-	-	-	-	-	-	-	-	-	-	-	X
Total number of prenatal visits for this pregnancy	-	-	-	-	-	-	-	-	-	-	-	X
Other risk factors for this pregnancy	-	-	-	-	-	-	-	-	-	-	X	-
Tobacco use during pregnancy—Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	X	-
Average number of cigarettes per day	-	-	-	-	-	-	-	-	-	-	X	-
Alcohol use during pregnancy—Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	X	-
Average number drinks per week	-	-	-	-	-	-	-	-	-	-	X	-
Weight gained during pregnancy: ____lbs.	-	-	-	-	-	-	-	-	-	-	X	-
Mother's height	-	-	-	-	-	-	-	-	-	-	-	X
Mother's prepregnancy weight	-	-	-	-	-	-	-	-	-	-	-	X
Mother's weight at delivery	-	-	-	-	-	-	-	-	-	-	-	X
Cigarette smoking before and during pregnancy. For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. If none, enter "0."	-	-	-	-	-	-	-	-	-	-	-	X
Average number of cigarettes or packs of cigarettes smoked per day	-	-	-	-	-	-	-	-	-	-	-	X
Three months before pregnancy: ____# of cigarettes or ____# of packs	-	-	-	-	-	-	-	-	-	-	-	X
First three months of pregnancy: ____# of cigarettes or ____# of packs	-	-	-	-	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical and health information—Con.												
Second three months of pregnancy: ____# of cigarettes or ____# of packs	-	-	-	-	-	-	-	-	-	-	-	X
Third trimester of pregnancy: ____# of cigarettes or ____# of packs	-	-	-	-	-	-	-	-	-	-	-	X
Medical risk factors for this pregnancy (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Anemia (Hct. < 30/Hgb. < 10)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Cardiac disease"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Acute or chronic lung disease"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Diabetes"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Genital herpes"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Hydramnios/oligohydramnios"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Hemoglobinopathy"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Hypertension, chronic"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Hypertension, pregnancy-associated"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Eclampsia"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Incompetent cervix"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Previous infant 4,000+ grams"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Previous preterm or small-for-gestational age infant"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Renal disease"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Rh sensitization"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Uterine bleeding"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Risk factors in this pregnancy (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	X
Diabetes:	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Prepregnancy (diagnosis prior to this pregnancy)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Gestational (diagnosis in this pregnancy)"	-	-	-	-	-	-	-	-	-	-	-	X
Hypertension:	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Prepregnancy (chronic)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Gestational (Pregnancy-induced hypertension, preeclampsia)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Eclampsia"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Previous preterm birth"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Other previous poor pregnancy outcome (includes perinatal death, small-for-gestational age/ intrauterine growth restricted birth)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Pregnancy resulted from infertility treatment— If yes, check all that apply"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Fertility-enhancing drugs, artificial insemination, or intrauterine insemination"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Assisted reproductive technology [e.g., in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT)]"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Mother had a previous cesarean delivery" If yes, how many? ____	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	-	X
Infections present and/or treated during this pregnancy (check all that apply)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Gonorrhea"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Syphilis"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Chlamydia"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Hepatitis B"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Hepatitis C"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	-	X
Principal source of payment for this delivery	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Private Insurance"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Medicaid"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Self-pay"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other (specify) ____"	-	-	-	-	-	-	-	-	-	-	-	X
Concurrent illnesses or conditions affecting the pregnancy	-	-	-	-	-	-	-	-	-	X	-	-
Complications not related to pregnancy	-	-	-	-	-	-	-	-	X	-	-	-
Complications of pregnancy	-	-	-	-	-	-	-	-	-	X	-	-
Complications related to pregnancy	-	-	-	-	-	-	-	-	X	-	-	-
Complications of labor	-	-	-	-	-	-	-	-	X	-	-	-
Complications of labor and/or delivery (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Febrile (>100°F or 38°C)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Meconium, moderate/heavy"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Premature rupture of membranes (>12 hours)"	-	-	-	-	-	-	-	-	-	-	X	-

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical and health information—Con.												
Checkbox for "Abruptio placenta"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Placenta previa"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other excessive bleeding"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Seizures during labor"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Precipitous labor (<3 hours)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Prolonged labor (>20 hours)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Dysfunctional labor"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Breech/malpresentation"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Cephalopelvic disproportion"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Cord prolapsed"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Anesthetic complications"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Fetal distress"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other, specify"	-	-	-	-	-	-	-	-	-	-	X	-
Onset of labor (check all that apply)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Premature rupture of the membranes (prolonged, ≥12 hrs.)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Precipitous labor (<3 hrs.)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Prolonged labor (≥20 hrs.)"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	X	X
Characteristics of labor and delivery (check all that apply)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Induction of labor"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Augmentation of labor"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Non-vertex presentation"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Steroids (glucocorticoids) for fetal lung maturation received by the mother prior to delivery"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Antibiotics received by the mother during labor"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Clinical chorioamnionitis diagnosed during labor or maternal temperature > 38°C (100.4°F)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Moderate/heavy meconium staining of the amniotic fluid"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Fetal intolerance of labor such that one or more of the following actions were taken: In-utero resuscitative measures, further fetal assessment, or operative delivery"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Epidural or spinal anesthesia during labor"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	-	X
Obstetric procedures (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Amniocentesis"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Electronic fetal monitoring"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Induction of labor"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Stimulation of labor"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Tocolysis"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Ultrasound"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Cervical cerclage"	-	-	-	-	-	-	-	-	-	-	-	X
External cephalic version	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Successful"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Failed"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	-	X
Method of delivery (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Vaginal"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Vaginal birth after previous C-section"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Primary C-section"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Repeat C-section"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Forceps"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Vacuum"	-	-	-	-	-	-	-	-	-	-	X	-
Method of delivery	-	-	-	-	-	-	-	-	-	-	-	X
Was delivery with forceps attempted but unsuccessful?	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Was delivery with vacuum extraction attempted but unsuccessful? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Fetal presentation at birth	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Cephalic"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Breech"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other"	-	-	-	-	-	-	-	-	-	-	-	X
Final route and method of delivery (check one)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Vaginal/spontaneous"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Vaginal/forceps"	-	-	-	-	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical and health information—Con.												
Checkbox for "Vaginal/vacuum"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Cesarean"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "If cesarean, was a trial of labor attempted?"	-	-	-	-	-	-	-	-	-	-	-	-
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	-	X
Maternal morbidity (check all that apply) (complications associated with labor and delivery)	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Maternal transfusion"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Third or fourth degree perineal laceration"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Ruptured uterus"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Unplanned hysterectomy"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Admission to intensive care unit"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Unplanned operating room procedure following delivery"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	X	X
Abnormal conditions of the newborn (check all that apply)	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Anemia (Hct. < 38/Hgb. < 13)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Birth injury"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Fetal alcohol syndrome"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Hyaline membrane distress/respiratory distress syndrome"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Meconium aspiration syndrome"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Assisted ventilation ≤ 30 min"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Assisted ventilation ≥ 30 min"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Seizures"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Assisted ventilation required immediately following delivery"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Assisted ventilation required for more than six hours"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "NICU admission"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Newborn given surfactant replacement therapy"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Antibiotics received by the newborn for suspected neonatal sepsis"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Seizure or serious neurologic dysfunction"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Significant birth injury (skeletal fracture(s), peripheral nerve injury, and/or soft tissue/solid organ hemorrhage which requires intervention)"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	-	-	-	X	X
Congenital malformations or anomalies of child												
Congenital anomalies of child (check all that apply)												
Checkbox for "Hydrocephalus"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Microcephalus"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other central nervous system anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Heart malformations"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other circulatory/respiratory anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Rectal atresia/stenosis"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Tracheo-esophageal fistula/esophageal atresia"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other gastrointestinal anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Malformed genitalia"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Renal agenesis"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other urogenital anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Cleft lip/palate"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Polydactyly/syndactyly/adactyly"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Club foot"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other musculoskeletal/integumental anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other chromosomal anomalies (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	X	-
Checkbox for "Anencephaly"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Meningocele/spina bifida"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Cyanotic congenital heart disease"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Congenital diaphragmatic hernia"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Omphalocele"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Gastroschisis"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Limb reduction defect (excluding congenital amputation and dwarfing syndromes)"	-	-	-	-	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table IV. Items included on the U.S. Standard Certificate of Live Birth, by year revised—Con.

Item	1900	1910	1915	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical and health information—Con.												
Checkbox for "Cleft lip with or without cleft palate"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Cleft palate alone"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Down syndrome"	-	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Karyotype confirmed"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Karyotype pending"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Suspected chromosomal disorder"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Karyotype confirmed"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Karyotype pending"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Hypospadias"	-	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "None of the anomalies listed above"	-	-	-	-	-	-	-	-	-	-	X	X
Birth injuries to child	-	-	-	-	-	-	-	-	X	-	-	-
Certification information												
Signature of certifier	-	-	-	-	-	-	-	-	-	-	X	X
Type of attendant	-	-	-	-	-	-	-	-	-	-	X	X
Date signed	-	-	-	-	-	-	-	-	-	-	X	X
Date on which given name was added	X	X	X	X	X	X	X	X	-	-	-	-
Certificate of attending physician or midwife	-	-	-	-	-	-	-	-	-	-	-	-
I hereby certify that I attended the birth of this child, and that it occurred on____, 190_, at ___m.	-	-	-	-	-	-	-	-	-	-	-	-
When there was no attending physician or midwife, then the father, householder, etc., should make this return	X	X	-	-	-	-	-	-	-	-	-	-
Signature	X	X	-	-	-	-	-	-	-	-	-	-
Address	X	X	-	-	-	-	-	-	-	-	-	-
Filed____190_.	X	X	-	-	-	-	-	-	-	-	-	-
Registrar	X	X	-	-	-	-	-	-	-	-	-	-
Christian name added from supplemental report, 190_	X	-	-	-	-	-	-	-	-	-	-	-
Given name added from supplemental report, (date of)_	X	X	X	X	X	-	-	-	-	-	-	-
Name of registrar adding given name	X	X	X	X	X	X	X	X	-	-	-	-
Name and title of attendant at birth if other than certifier	-	-	-	-	-	-	-	-	-	X	-	-
Name and title of attendant if other than certifier (checkboxes)	-	-	-	-	-	-	-	-	-	-	X	X
Mailing address of attendant	-	-	-	-	-	-	-	-	-	-	X	X
Name and title of certifier	-	-	-	-	-	-	-	-	-	X	-	-
Name and title of certifier (checkboxes)	-	-	-	-	-	-	-	-	-	-	X	X
Name of certifier	-	-	-	-	-	-	-	-	X	-	-	-
Mailing address of certifier	-	-	-	-	-	-	-	-	X	X	-	-
Address of certifier	X	X	X	X	X	X	X	X	-	-	-	-
Signature of registrar	X	-	-	-	-	X	X	X	X	X	X	X
Registrar	X	X	X	X	X	-	-	-	-	-	-	-
Date received by registrar	X	-	-	-	-	-	-	-	-	X	-	-
Date received by local registrar	X	-	-	-	-	X	X	X	X	-	-	-
Date filed	X	X	X	X	X	-	-	-	-	-	X	X
Signature of parent or other informant	-	-	-	-	-	-	-	-	-	X	X	-
Informant	-	-	-	-	-	X	X	X	X	-	-	-
Relation to child	-	-	-	-	-	X	-	-	X	X	-	-
Information for Administrative Use Section	-	-	-	-	-	-	-	-	-	-	-	X
Information for Medical and Health Purposes Only Section	-	-	-	-	-	-	-	-	-	-	-	X
Newborn Information Section	-	-	-	-	-	-	-	-	-	-	-	X

X Indicates item included on standard certificate.

- Indicates item not included on standard certificate.

Table V. Items included on the U.S. Standard Certificate of Death, by year revised

Item	1900	1910	1918	1930	1939	1949	1956	1968	1978	1989	2003
Decedent information											
Name	X	X	X	X	X	X	X	X	X	X	X
Name of decedent (in margin)	-	-	-	-	-	-	-	-	-	X	X
Sex	X	X	X	X	X	X	X	X	X	X	X
Race	X	X	X	X	X	X	X	X	X	X	X
Race (Check one or more races to indicate what mother considered herself to be)											
Checkbox for "White"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Black or African American"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "American Indian or Alaska Native (Name of the enrolled or principal tribe)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Asian Indian"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Chinese"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Filipino"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Japanese"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Korean"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Vietnamese"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other Asian (specify)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Native Hawaiian"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Guamanian or Chamorro"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Samoan"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other Pacific Islander (specify)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	X
Education (specify highest grade completed)	-	-	-	-	-	-	-	-	X	X	-
Education (Check the box that best describes the highest degree or level of school completed at the time of delivery):											
Checkbox for "8th grade or less"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "9th–12th grade, no diploma"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "High school graduate or GED completed"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Some college credit but no degree"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Associate degree (e.g., AA, AS)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Bachelor's degree (e.g., BA, AB, BS)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)"	-	-	-	-	-	-	-	-	-	-	X
Was decedent of Hispanic origin? (specify "no" or "yes"—If yes, specify Cuban, Mexican, Puerto Rican, etc.)											
Checkbox for "no" and "yes" (specify)___	-	-	-	-	-	-	-	-	-	X	-
Decedent of Hispanic origin? Check the box that best describes whether the decedent is Spanish/Hispanic/Latino. Check the "no" box if decedent is not Spanish/Hispanic/Latino.											
Checkbox for "No, not Spanish/Hispanic/Latino"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Mexican, Mexican American, Chicano"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Puerto Rican"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, Cuban"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes, other Spanish/Hispanic/Latino (specify)"	-	-	-	-	-	-	-	-	-	-	X
Age:											
Years	X	X	X	X	X	X	X	X	X	X	X
Months/days	X	X	X	X	X	X	X	X	X	X	X
Hours/minutes	-	X	X	X	X	X	X	X	X	X	X
Date of birth	X	X	X	X	X	X	X	X	X	X	X
Birthplace:											
State or country	X	X	X	X	X	X	X	X	X	X	-
City, town, or county	-	-	-	-	-	-	-	-	-	-	-
City or town	-	-	X	X	-	-	-	-	-	-	-
City and state or country	-	-	-	-	-	-	-	-	-	X	X
Citizen of what country	-	-	-	-	-	X	X	X	X	-	-
How long in U.S., if of foreign birth	-	-	X	X	X	-	-	-	-	-	-
Marital status	X	X	X	X	X	X	X	X	X	X	-
Marital status at time of death											
Checkbox for "Married"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Married, but separated"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Widowed"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Divorced"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Never married"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Unknown"	-	-	-	-	-	-	-	-	-	-	X
Surviving spouse (if wife, give maiden name)	-	-	-	-	-	-	-	X	X	X	-

See footnotes at end of table.

Table V. Items included on the U.S. Standard Certificate of Death, by year revised—Con.

Item	1900	1910	1918	1930	1939	1949	1956	1968	1978	1989	2003
Decedent information—Con.											
Surviving spouse (if wife, give name prior to first marriage)	—	—	—	—	—	—	—	—	—	—	X
Name of husband or wife	—	—	X	X	X	—	—	—	—	—	—
Age of husband or wife, if alive	—	—	—	—	X	—	—	—	—	—	—
Was decedent ever in U.S. armed forces?	—	—	—	—	—	X	X	—	X	X	X
If yes, give war or dates of service	—	—	—	—	—	X	X	—	—	—	—
If veteran, name war	—	—	—	X	—	—	—	—	—	—	—
Social security number	—	—	—	—	X	X	X	X	X	X	X
Occupation	X	X	X	X	—	—	—	—	—	—	—
Usual occupation	—	—	—	—	X	X	X	X	X	X	X
Name of employer	—	—	X	—	—	—	—	—	—	—	—
Business or industry	—	X	X	X	X	X	X	X	X	X	X
Date deceased last worked at this occupation	—	—	—	X	—	—	—	—	—	—	—
Total time (years) spent in this occupation	—	—	—	X	—	—	—	—	—	—	—
Residence: Former or usual residence	X	X	—	—	—	—	—	—	—	—	—
State	—	—	—	—	X	X	X	X	X	X	X
Length of residence in the state (years, months, and days)	—	X	—	—	—	—	—	—	—	—	—
County	—	—	—	—	X	X	X	X	X	X	X
City, town, or location	—	—	—	—	X	X	X	X	X	X	X
If nonresident, give city or town and state	—	—	X	X	—	—	—	—	—	—	—
Ward	—	—	X	X	—	—	—	—	—	—	—
Street and number	—	—	X	X	X	X	X	X	X	X	X
Inside city limits	—	—	—	—	—	—	X	X	X	—	—
Is residence on a farm?	—	—	—	—	—	—	X	—	—	—	—
Apt. No.	—	—	—	—	—	—	—	—	—	—	X
Zip code	—	—	—	—	—	—	—	—	—	X	X
Father's name	X	X	X	X	X	X	X	X	X	X	X
Birthplace of father:											
State or country	X	X	X	X	X	—	—	—	—	—	—
City or town	—	—	X	X	—	—	—	—	—	—	—
City, town, or county	—	—	—	—	X	—	—	—	—	—	—
Mother's maiden name	X	X	X	X	X	X	X	X	X	X	—
Mother's name prior to first marriage (first, middle, last)	—	—	—	—	—	—	—	—	—	—	X
Birthplace of mother:											
State or country	X	X	X	X	X	—	—	—	—	—	—
City or town	—	—	X	X	—	—	—	—	—	—	—
City, town, or county	—	—	—	—	X	—	—	—	—	—	—
Place of death information											
County	X	X	X	X	X	X	X	X	X	X	X
City, town, or location	—	—	—	—	X	X	X	X	X	X	X
Inside city limits	—	—	—	—	—	—	X	X	—	—	—
Township of, or	X	X	X	X	—	—	—	—	—	—	—
Village of, or	X	X	X	X	—	—	—	—	—	—	—
City of	X	X	X	X	—	—	—	—	—	—	—
Ward	X	X	X	X	—	—	—	—	—	—	—
Street and number	X	X	X	X	—	—	—	—	—	—	—
Name of hospital or other institution	—	—	—	—	X	X	X	X	X	—	—
Name of facility	—	—	—	—	—	—	—	—	—	X	X
If hospital or institution indicate whether dead on arrival, outpatient/emergency room, or inpatient	—	—	—	—	—	—	—	—	X	—	—
If death occurred in a hospital or institution, give its name instead of street and number	X	X	X	X	—	—	—	—	—	—	—
If not in hospital or institution, give street address or location	—	—	—	—	X	X	X	X	X	X	X
Type of place of death (if hospital)											
Checkbox for "Inpatient"	—	—	—	—	—	—	—	—	—	—	X
Checkbox for "Emergency room/outpatient"	—	—	—	—	—	—	—	—	—	—	X
Checkbox for "Dead on arrival"	—	—	—	—	—	—	—	—	—	—	X
Type of place of death (if other)											
Checkbox for "Hospice facility"	—	—	—	—	—	—	—	—	—	—	X
Checkbox for "Nursing home"	—	—	—	—	—	—	—	—	—	X	—
Checkbox for "Nursing home/long-term care facility"	—	—	—	—	—	—	—	—	—	—	X
Checkbox for "Residence"	—	—	—	—	—	—	—	—	—	X	—
Checkbox for "Decedent's home"	—	—	—	—	—	—	—	—	—	—	X
Checkbox for "Other (specify)"	—	—	—	—	—	—	—	—	—	—	X
Length of stay in hospital	—	—	—	—	X	—	—	—	—	—	—
Length of stay in this community	—	—	—	—	X	—	—	—	—	—	—
Length of stay where death occurred	X	X	X	X	—	X	X	—	—	—	—
Length of residence in the state	—	X	—	—	—	—	—	—	—	—	—

See footnotes at end of table.

Table V. Items included on the U.S. Standard Certificate of Death, by year revised—Con.

Item	1900	1910	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical certification											
Cause of death	X	X	X	X	-	-	-	-	-	-	X
Duration	X	X	X	-	-	-	-	-	-	-	-
Date of onset	-	-	-	X	-	-	-	-	-	-	-
Immediate cause of death	-	-	-	-	X	X	X	X	X	X	X
Interval between onset and death	-	-	-	-	X	X	X	X	X	X	X
Due to	-	-	-	-	X	X	X	X	X	X	X
Interval between onset and death	-	-	-	-	X	X	X	X	X	X	X
Due to	-	-	-	-	-	-	X	X	X	X	X
Interval between onset and death	-	-	-	-	X	X	X	X	X	X	X
Due to	-	-	-	-	-	-	-	-	-	X	X
Interval between onset and death	-	-	-	-	-	-	-	-	-	X	X
Contributory cause	X	X	X	X	-	-	-	-	-	-	-
Duration	X	X	X	-	-	-	-	-	-	-	-
Date of onset	-	-	-	X	-	-	-	-	-	-	-
Other significant conditions	-	-	-	-	X	X	X	X	X	X	X
Duration	-	-	-	-	X	-	-	-	-	-	-
Interval between onset and death	-	-	-	-	-	X	-	-	-	-	-
Was autopsy performed?	-	-	X	X	-	X	X	X	X	X	-
Was an autopsy performed? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	X
Were autopsy findings considered in determining cause of death?	-	-	-	-	-	-	-	-	-	-	-
Were autopsy findings available prior to completion of cause of death?	-	-	-	-	-	-	-	-	X	X	-
Were autopsy findings available to complete the cause of death? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	-	-	-	X
What test confirmed diagnosis?	-	-	X	X	-	-	-	-	-	-	-
Major findings of autopsy	-	-	-	-	X	-	-	-	-	-	-
Did tobacco use contribute to death?	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Yes"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "No"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Probably"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Unknown"	-	-	-	-	-	-	-	-	-	-	X
If female:											
Checkbox for "Not pregnant within past year"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Pregnant at time of death"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Not pregnant, but pregnant within 42 days of death"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Not pregnant, pregnant 43 days to 1 year before death"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Unknown if pregnant within the past year"	-	-	-	-	-	-	-	-	-	-	X
Did an operation precede death?	-	X	-	-	-	-	-	-	-	-	-
Dates of operation	-	-	X	X	-	X	-	-	-	-	-
Name of operation	-	-	-	X	-	-	-	-	-	-	-
Major findings of operation	-	-	-	-	X	X	-	-	-	-	-
Where was disease contracted if not place of death?	X	X	X	-	-	-	-	-	-	-	-
For deaths from external causes:											
Accident, suicide, homicide, undetermined, or pending investigation	-	-	-	-	-	-	-	-	X	-	-
Accident, suicide, homicide, or undetermined	-	-	-	-	-	-	-	X	-	-	-
Accident, suicide, or homicide	-	X	X	X	X	X	X	-	-	-	-
Manner of death:											
Checkbox for "Natural"	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Accident"	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Suicide"	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Homicide"	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Pending investigation"	-	-	-	-	-	-	-	-	-	X	X
Checkbox for "Could not be determined"	-	-	-	-	-	-	-	-	-	X	X
Date of injury	-	-	-	X	X	X	X	X	X	X	X
Time of injury	-	-	-	-	-	X	X	X	X	X	X
How injury occurred	-	-	-	-	-	X	X	X	X	X	X
If transportation injury, specify:											
Checkbox for "Driver/operator"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Passenger"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Pedestrian"	-	-	-	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	-	-	-	X
Injury at work?	-	-	-	-	X	X	X	X	X	X	X
Place of injury	-	-	-	X	X	X	X	X	X	X	X
Location of injury	-	-	-	X	X	X	X	X	X	X	X
Means of injury	-	-	-	-	X	-	-	-	-	-	-
Manner of injury	-	-	-	X	-	-	-	-	-	-	-
Nature of injury	-	-	-	X	-	-	-	-	-	-	-

See footnotes at end of table.

Table V. Items included on the U.S. Standard Certificate of Death, by year revised—Con.

Item	1900	1910	1918	1930	1939	1949	1956	1968	1978	1989	2003
Medical certification—Con.											
Was disease or injury related to occupation?	–	–	–	X	–	–	–	–	–	–	–
If so, specify	–	–	–	X	–	–	–	–	–	–	–
Certifier:											
Signature and title of certifier	X	X	X	X	X	X	X	X	X	–	–
Checkbox for “Certifying physician”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Pronouncing & certifying physician”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Medical examiner/coroner”	–	–	–	–	–	–	–	–	–	X	X
License number	–	–	–	–	–	–	–	–	–	X	X
Separate medical examiner or coroner certification	–	–	–	–	–	–	–	X	X	X	X
Date signed	X	X	X	–	X	X	X	X	X	X	X
Date of death	X	X	X	X	X	X	X	X	X	X	–
Actual or presumed date of death	–	–	–	–	–	–	–	–	–	–	X
Time of death	X	X	X	X	X	X	X	X	X	X	–
Actual or presumed time of death	–	–	–	–	–	–	–	–	–	–	X
Time pronounced dead	–	–	–	–	–	–	–	–	–	–	X
Date pronounced dead	–	–	–	–	–	–	–	X	X	X	X
Hour pronounced dead	–	–	–	–	–	–	–	X	X	–	–
Name of attending physician, if other than certifier	–	–	–	–	–	–	–	–	X	–	–
Name of certifier	–	–	–	–	–	–	–	X	X	X	X
Address of certifier	X	X	X	X	X	X	X	X	X	X	X
Dates physician attended decedent	X	X	X	X	X	X	X	X	–	–	–
Date last seen alive	X	X	X	X	X	X	X	X	–	–	–
Did physician view body after death?	–	–	–	–	–	–	–	–	X	–	–
Was case referred to medical examiner or coroner?	–	–	–	–	–	–	–	X	X	X	–
Was medical examiner or coroner contacted?	–	–	–	–	–	–	–	–	–	–	X
Checkbox for “yes” or “no”	–	–	–	–	–	–	–	–	–	–	X
Pronouncing physician:											
Signature and title	–	–	–	–	–	–	–	–	–	X	X
License number	–	–	–	–	–	–	–	–	–	X	X
Date signed	–	–	–	–	–	–	–	–	–	X	X
Disposition information											
Burial, cremation, or removal	–	–	–	–	X	X	X	X	X	–	–
Method of disposition:											
Checkbox for “Burial”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Cremation”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Donation”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Entombment”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Removal from state”	–	–	–	–	–	–	–	–	–	X	X
Checkbox for “Other (specify)”	–	–	–	–	–	–	–	–	–	X	X
Date of burial	X	X	X	X	X	X	X	X	–	–	–
Place of burial or removal	X	X	–	–	–	–	–	–	–	–	–
Place of burial, cremation, or removal	–	–	X	X	X	–	–	–	–	–	–
Name of cemetery or crematory	–	–	–	–	–	X	X	X	X	–	–
Location (city, town, or county)	–	–	–	–	–	X	X	X	X	X	X
Place of disposition (name of cemetery, crematory, or other place)	–	–	–	–	–	–	–	–	X	X	X
Signature of funeral director	–	–	–	–	X	–	–	X	–	–	–
Signature of funeral service licensee or person acting as such	–	–	–	–	–	–	–	–	X	X	X
License number	–	–	–	–	–	–	–	–	–	X	X
Name of funeral director (or person acting as such)	X	X	X	X	–	X	X	–	–	–	–
Address	X	X	X	X	X	X	X	–	–	–	–
Name of facility (funeral home)	–	–	–	–	–	–	–	X	X	X	X
Address of facility (funeral home)	–	–	–	–	–	–	–	X	X	X	X
Other information											
Informant's signature	–	–	–	–	X	–	–	–	–	–	–
Informant's name	X	X	X	X	–	X	X	X	X	X	X
Mailing address	X	X	X	X	X	–	X	X	X	X	X
Registrar's signature	–	–	–	–	X	X	X	X	X	X	–
Registrar	X	X	X	X	–	–	–	–	–	–	–
Date received by local registrar	–	–	–	–	X	X	X	X	–	–	–
Date received by registrar	–	–	–	–	–	X	X	X	X	–	–
Date filed	X	X	X	X	–	–	–	–	X	X	X

X Indicates item included on standard certificate.

– Indicates item not included on standard certificate.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised

Item	1930	1939	1949	1956	1968	1978	1989	2003
Fetal death information								
Name of fetus	X	X	X	X	X	-	-	-
Name of fetus (optional—at the discretion of the parents)	-	-	-	-	-	-	-	X
Sex of fetus	X	X	X	X	X	X	X	X
Sex of fetus (m/f/unk)	-	-	-	-	-	-	-	X
Date of delivery	X	X	X	X	X	X	X	X
Hour of delivery	-	-	-	-	X	X	-	-
Place of delivery:								
Name of hospital	-	X	X	X	X	X	-	-
Name of facility	-	-	-	-	-	X	-	-
Facility ID (National Provider Identifier)	-	-	-	-	-	-	-	X
State	X	-	-	-	-	-	-	-
If birth occurred in hospital or institution, give its name instead of street number	X	-	-	-	-	-	-	-
Street and number if not in hospital	X	X	X	X	X	X	X	X
Township	X	-	-	-	-	-	-	-
Village	X	-	-	-	-	-	-	-
City	X	-	-	-	-	-	-	-
City, town, or location of delivery	-	X	X	X	X	X	X	X
Inside city limits	-	-	-	X	X	-	-	-
If outside city or town limits, write rural	-	-	X	X	-	-	-	-
County of delivery	X	X	X	X	X	X	X	X
Ward	X	-	-	-	-	-	-	-
Place where birth occurred (check one)								
Checkbox for "Hospital"	-	-	-	-	-	-	X	X
Checkbox for "Freestanding birthing center"	-	-	-	-	-	-	X	X
Checkbox for "Clinic/doctor's office"	-	-	-	-	-	-	X	X
Checkbox for "Residence"	-	-	-	-	-	-	X	X
Checkbox for "Home delivery" Planned to deliver at home? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	X	X
Weight of fetus	-	-	X	X	X	X	X	X
Weight of fetus (grams preferred, specify unit) Checkbox for "grams" or "lb./oz."	-	-	-	-	-	-	-	X
Single, twin, triplet, etc.	X	X	X	X	X	X	X	-
Plurality—Single, twin, triplet, etc. (specify)...	-	-	-	-	-	-	X	X
Order if not single delivery	X	X	X	X	X	X	X	-
If not single birth—Born first, second, third, etc. (specify)	-	-	-	-	-	-	-	X
Mother information								
Mother's name (first, middle, last)	-	-	-	-	-	-	X	-
Mother's current legal name (first, middle, last, suffix)	-	-	-	-	-	-	-	X
Maiden name	X	X	X	X	X	-	-	-
Maiden surname	-	-	-	-	-	-	X	X
Mother's name prior to first marriage	-	-	-	-	-	-	-	X
Age	X	X	X	X	X	X	-	-
Date of birth	-	-	-	-	-	-	-	X
Birthplace (state or country)	X	X	X	X	X	-	-	-
Birthplace (city or place)	X	X	-	-	-	-	-	-
Birthplace (state, territory, or foreign country)	-	-	-	-	-	-	X	X
Length of stay in hospital or institution before delivery	-	X	-	-	-	-	-	-
Residence	X	-	-	-	-	-	-	-
State	-	X	X	X	X	X	X	X
County	-	X	X	X	X	X	X	X
City, town, or location	-	X	X	X	X	X	X	X
Street and number	-	X	X	X	X	X	X	X
Apt. no.	-	-	-	-	-	-	-	X
Inside city limits	-	-	-	X	X	X	X	-
Inside city limits? Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
If rural, give location	-	X	X	-	-	-	-	-
Is residence on a farm?	-	-	-	X	-	-	-	-
Zip code	-	-	-	-	-	-	X	X
Mother's mailing address	-	X	-	-	-	-	-	-
Education (Specify only highest grade completed)	-	-	-	-	-	-	X	-
Elementary/secondary (0–12)	-	-	-	-	-	-	X	-
College (1–4 or 5+)	-	-	-	-	-	-	X	-
Education (Check the box that best describes the highest degree or level of school completed at the time of delivery):								
Checkbox for "8th grade or less"	-	-	-	-	-	-	-	X
Checkbox for "9th–12th grade, no diploma"	-	-	-	-	-	-	-	X
Checkbox for "High school graduate or GED completed"	-	-	-	-	-	-	-	X
Checkbox for "Some college credit but no degree"	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised—Con.

Item	1930	1939	1949	1956	1968	1978	1989	2003
Mother information—Con.								
Checkbox for "Associate degree (e.g., AA, AS)"	-	-	-	-	-	-	-	X
Checkbox for "Bachelor's degree (e.g., BA, AB, BS)"	-	-	-	-	-	-	-	X
Checkbox for "Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)"	-	-	-	-	-	-	-	X
Checkbox for "Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)"	-	-	-	-	-	-	-	X
Of Hispanic origin (Specify "no" or "yes"—If yes, specify Cuban, Mexican, Puerto Rican, etc.)	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no" (specify)	-	-	-	-	-	-	X	-
Mother of Hispanic origin (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "no" box if mother is not Spanish/Hispanic/Latina)	-	-	-	-	-	-	-	X
Checkbox for "No, not Spanish/Hispanic/Latina"	-	-	-	-	-	-	-	X
Checkbox for "Yes, Mexican, Mexican American, Chicana"	-	-	-	-	-	-	-	X
Checkbox for "Yes, Puerto Rican"	-	-	-	-	-	-	-	X
Checkbox for "Yes, Cuban"	-	-	-	-	-	-	-	X
Checkbox for "Yes, other Spanish/Hispanic/Latina (specify)"	-	-	-	-	-	-	-	X
Race—American Indian, black, white, etc. (specify below)	X	X	X	X	X	X	X	-
Race (Check one or more races to indicate what the mother considers herself to be)	-	-	-	-	-	-	-	X
Checkbox for "White"	-	-	-	-	-	-	-	X
Checkbox for "Black or African American"	-	-	-	-	-	-	-	X
Checkbox for "American Indian or Alaska Native (Name of the enrolled or principal tribe)"	-	-	-	-	-	-	-	X
Checkbox for "Asian Indian"	-	-	-	-	-	-	-	X
Checkbox for "Chinese"	-	-	-	-	-	-	-	X
Checkbox for "Filipino"	-	-	-	-	-	-	-	X
Checkbox for "Japanese"	-	-	-	-	-	-	-	X
Checkbox for "Korean"	-	-	-	-	-	-	-	X
Checkbox for "Vietnamese"	-	-	-	-	-	-	-	X
Did mother get Women, Infants, and Children (WIC) food for herself during this pregnancy?	-	-	-	-	-	-	-	X
Legitimate	X	-	X	X	X	-	-	-
Mother married?	-	X	-	-	-	X	X	-
Mother married? (At delivery, conception, or any time between)	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
If no, has paternity acknowledgement been signed in the hospital?	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
Trade, profession, or particular type of work done	X	-	-	-	-	-	-	-
Usual occupation	-	X	-	-	X	X	-	-
Occupation worked during last year	-	-	-	-	-	-	X	X
Kind of business or industry	X	X	-	-	-	-	X	X
Date (month and year) last engaged in this work	X	-	-	-	-	-	-	-
Total time (years) spent in this work	X	-	-	-	-	-	-	-
Residence	X	-	-	-	-	-	-	-
Trade, profession, or particular type of work done	X	-	-	-	-	-	-	-
Usual occupation	-	X	X	X	-	-	-	-
Occupation worked during last year	-	-	-	-	-	X	X	X
Kind of business or industry	X	X	X	X	-	-	X	X
Date (month and year) last engaged in this work	X	-	-	-	-	-	-	-
Total time (years) spent in this work	X	-	-	-	-	-	-	-
Pregnancy information								
Pregnancy history:								
Live births, now living	X	X	X	X	X	X	X	X
Live births, now dead	X	X	X	X	X	X	X	X
Born dead (stillborn, fetal death)	X	X	-	X	-	-	-	-
Born dead after 20 weeks of pregnancy	-	-	X	-	-	-	-	-
Under 20 weeks	-	-	-	-	-	X	-	-
Over 20 weeks	-	-	-	-	-	X	-	-
Other terminations at any time after conception	-	-	-	-	-	-	X	X
Number of other pregnancy outcomes (spontaneous or induced losses or ectopic pregnancies)	-	-	-	-	-	-	-	X
Whether born alive or stillborn	-	X	X	X	X	-	-	-
Date of last live birth	-	-	-	-	X	X	X	X
Date of last fetal death	-	-	-	-	X	-	-	-
Date of last other termination	-	-	-	-	-	X	X	-
Date of last other pregnancy outcome	-	-	-	-	-	-	-	X
Month of pregnancy prenatal care began	-	-	-	-	X	X	X	-
Date of first prenatal care visit	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised—Con.

Item	1930	1939	1949	1956	1968	1978	1989	2003
Pregnancy information—Con.								
Date of last prenatal care visit	-	-	-	-	-	-	-	X
Number of prenatal visits	-	-	-	-	X	X	X	X
Physician's estimate of gestation	-	-	-	-	-	X	-	-
Clinical estimate of gestation	-	-	-	-	-	-	X	-
Obstetric estimate of gestation at delivery	-	-	-	-	-	-	-	X
If stillborn, period of gestation	X	-	-	-	-	-	-	-
Length of pregnancy (completed weeks)	-	-	X	X	-	-	-	-
Date last normal menses began	-	-	-	-	X	X	X	X
Months of pregnancy	-	X	-	-	-	-	-	-
Premature or full term	X	-	-	-	-	-	-	-
Concurrent illnesses or conditions affecting the pregnancy	-	-	-	-	-	X	-	-
Complications not related to pregnancy	-	-	-	-	X	-	-	-
Complications of pregnancy	-	X	-	-	-	X	-	-
Complications related to pregnancy	-	-	-	-	X	-	-	-
Complications of pregnancy and labor	-	-	X	-	-	-	-	-
Tobacco use during pregnancy—Checkbox for "yes" or "no"	-	-	-	-	-	-	X	-
Average number cigarettes per day	-	-	-	-	-	-	X	-
Alcohol use during pregnancy—Checkbox for "yes" or "no"	-	-	-	-	-	-	X	-
Average number of drinks per week	-	-	-	-	-	-	X	-
Weight gained during pregnancy ___lbs.	-	-	-	-	-	-	X	-
Mother's height	-	-	-	-	-	-	-	X
Mother's prepregnancy weight	-	-	-	-	-	-	-	X
Cigarette smoking before and during pregnancy. For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. If none, enter "0."	-	-	-	-	-	-	-	X
Average number of cigarettes or packs of cigarettes smoked per day	-	-	-	-	-	-	-	X
Three months before pregnancy ___# of cigarettes or ___# of packs	-	-	-	-	-	-	-	X
First three months of pregnancy ___# of cigarettes or ___# of packs	-	-	-	-	-	-	-	X
Second three months of pregnancy ___# of cigarettes or ___# of packs	-	-	-	-	-	-	-	X
Third trimester of pregnancy ___# of cigarettes or ___# of packs	-	-	-	-	-	-	-	X
Medical risk factors for this pregnancy (check all that apply)								
Checkbox for "Anemia (Hct.<30/Hgb.<10)"	-	-	-	-	-	-	X	-
Checkbox for "Cardiac disease"	-	-	-	-	-	-	X	-
Checkbox for "Acute or chronic lung disease"	-	-	-	-	-	-	X	-
Checkbox for "Diabetes"	-	-	-	-	-	-	X	-
Checkbox for "Genital herpes"	-	-	-	-	-	-	X	-
Checkbox for "Hydramnios/oligohydramnios"	-	-	-	-	-	-	X	-
Checkbox for "Hemoglobinopathy"	-	-	-	-	-	-	X	-
Checkbox for "Hypertension, chronic"	-	-	-	-	-	-	X	-
Checkbox for "Hypertension, pregnancy-associated"	-	-	-	-	-	-	X	-
Checkbox for "Eclampsia"	-	-	-	-	-	-	X	-
Checkbox for "Incompetent cervix"	-	-	-	-	-	-	X	-
Checkbox for "Previous infant 4,000+ grams"	-	-	-	-	-	-	X	-
Checkbox for "Previous preterm or small-for-gestational age infant"	-	-	-	-	-	-	X	-
Checkbox for "Renal disease"	-	-	-	-	-	-	X	-
Checkbox for "Rh sensitization"	-	-	-	-	-	-	X	-
Checkbox for "Uterine bleeding"	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	X	-
Checkbox for "Other (specify)"	-	-	-	-	-	-	X	-
Risk factors in this pregnancy (check all that apply)								
Diabetes								
Checkbox for "Prepregnancy (diagnosis prior to this pregnancy)"	-	-	-	-	-	-	-	X
Checkbox for "Gestational (diagnosis in this pregnancy)"	-	-	-	-	-	-	-	X
Hypertension								
Checkbox for "Prepregnancy (chronic)"	-	-	-	-	-	-	-	X
Checkbox for "Gestational (pregnancy-induced hypertension, preeclampsia)"	-	-	-	-	-	-	-	X
Checkbox for "Eclampsia"	-	-	-	-	-	-	-	X
Checkbox for "Previous preterm birth"	-	-	-	-	-	-	-	X
Checkbox for "Other previous poor pregnancy outcome (includes perinatal death, small-for-gestational age/intrauterine growth restricted birth)"	-	-	-	-	-	-	-	X
Checkbox for "Pregnancy resulted from infertility treatment—If yes, check all that apply"	-	-	-	-	-	-	-	X
Checkbox for "Fertility-enhancing drugs, artificial insemination, or intrauterine insemination"	-	-	-	-	-	-	-	X
Checkbox for "Assisted reproductive technology [e.g., in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT)]"	-	-	-	-	-	-	-	X
Checkbox for "Mother had a previous cesarean delivery"	-	-	-	-	-	-	-	X
If yes, how many _____	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised—Con.

Item	1930	1939	1949	1956	1968	1978	1989	2003
Pregnancy information—Con.								
Infections present and/or treated during this pregnancy (check all that apply)	-	-	-	-	-	-	-	X
Checkbox for "Gonorrhea"	-	-	-	-	-	-	-	X
Checkbox for "Syphilis"	-	-	-	-	-	-	-	X
Checkbox for "Chlamydia"	-	-	-	-	-	-	-	X
Checkbox for "Hepatitis B"	-	-	-	-	-	-	-	X
Checkbox for "Hepatitis C"	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	X
Method of delivery (check all that apply)	-	-	-	-	-	-	X	-
Checkbox for "Vaginal"	-	-	-	-	-	-	X	-
Checkbox for "Vaginal birth after previous C-section"	-	-	-	-	-	-	X	-
Checkbox for "Primary C-section"	-	-	-	-	-	-	X	-
Checkbox for "Repeat C-section"	-	-	-	-	-	-	X	-
Checkbox for "Forceps"	-	-	-	-	-	-	X	-
Checkbox for "Vacuum"	-	-	-	-	-	-	X	-
Checkbox for "Hysterotomy/hysterectomy"	-	-	-	-	-	-	X	-
Method of delivery	-	-	-	-	-	-	-	X
Was delivery with forceps attempted but unsuccessful?	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
Was delivery with vacuum extraction attempted but unsuccessful?	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
Fetal presentation at birth	-	-	-	-	-	-	-	X
Checkbox for "Cephalic"	-	-	-	-	-	-	-	X
Checkbox for "Breech"	-	-	-	-	-	-	-	X
Checkbox for "Other"	-	-	-	-	-	-	-	X
Final route and method of delivery (check one)	-	-	-	-	-	-	-	X
Checkbox for "Vaginal/spontaneous"	-	-	-	-	-	-	-	X
Checkbox for "Vaginal/forceps"	-	-	-	-	-	-	-	X
Checkbox for "Vaginal/vacuum"	-	-	-	-	-	-	-	X
Checkbox for "Cesarean"	-	-	-	-	-	-	-	X
Checkbox for "If cesarean, was a trial of labor attempted?"	-	-	-	-	-	-	-	X
Checkbox for "yes" or "no"	-	-	-	-	-	-	-	X
Hysterotomy/hysterectomy—Checkbox for "yes" or "no"	-	-	-	-	-	-	X	X
Maternal morbidity (check all that apply) (complications associated with labor and delivery)	-	-	-	-	-	-	-	X
Checkbox for "Maternal transfusion"	-	-	-	-	-	-	-	X
Checkbox for "Third or fourth degree perineal laceration"	-	-	-	-	-	-	-	X
Checkbox for "Ruptured uterus"	-	-	-	-	-	-	-	X
Checkbox for "Unplanned hysterectomy"	-	-	-	-	-	-	-	X
Checkbox for "Admission to intensive care unit"	-	-	-	-	-	-	-	X
Checkbox for "Unplanned operating room procedure following delivery"	-	-	-	-	-	-	-	X
Checkbox for "None of the above"	-	-	-	-	-	-	-	X
Complications of labor	-	X	-	-	-	-	-	-
Complications of labor and/or delivery (check all that apply)	-	-	-	-	-	-	X	-
Checkbox for "Febrile (> 100°F or 38°C)"	-	-	-	-	-	-	X	-
Checkbox for "Meconium, moderate/heavy"	-	-	-	-	-	-	X	-
Checkbox for "Premature rupture of membranes (> 12 hours)"	-	-	-	-	-	-	X	-
Checkbox for "Abruptio placenta"	-	-	-	-	-	-	X	-
Checkbox for "Placenta Previa"	-	-	-	-	-	-	X	-
Checkbox for "Other excessive bleeding"	-	-	-	-	-	-	X	-
Checkbox for "Seizures during labor"	-	-	-	-	-	-	X	-
Checkbox for "Precipitous labor (< 3 hours)"	-	-	-	-	-	-	X	-
Checkbox for "Prolonged labor (> 20 hours)"	-	-	-	-	-	-	X	-
Checkbox for "Dysfunctional labor"	-	-	-	-	-	-	X	-
Checkbox for "Breech/malpresentation"	-	-	-	-	-	-	X	-
Checkbox for "Cephalopelvic disproportion"	-	-	-	-	-	-	X	-
Checkbox for "Cord prolapsed"	-	-	-	-	-	-	X	-
Checkbox for "Anesthetic complications"	-	-	-	-	-	-	X	-
Checkbox for "Fetal distress"	-	-	-	-	-	-	X	-
Checkbox for "None"	-	-	-	-	-	-	X	-
Checkbox for "Other, specify"	-	-	-	-	-	-	X	-
Was labor induced?	-	X	-	-	-	-	-	-
Congenital malformations or anomalies of fetus	-	-	-	-	X	X	X	-
Congenital anomalies of fetus (checkboxes)	-	-	-	-	-	-	X	X
Checkbox for "Anencephaly"	-	-	-	-	-	-	-	X
Checkbox for "Meningocele/spina bifida"	-	-	-	-	-	-	-	X
Checkbox for "Cyanotic congenital heart disease"	-	-	-	-	-	-	-	X
Checkbox for "Congenital diaphragmatic hernia"	-	-	-	-	-	-	-	X
Checkbox for "Omphalocele"	-	-	-	-	-	-	-	X
Checkbox for "Gastroschisis"	-	-	-	-	-	-	-	X

See footnotes at end of table.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised—Con.

Item	1930	1939	1949	1956	1968	1978	1989	2003
Pregnancy information—Con.								
Checkbox for "Limb reduction defect (excluding congenital amputation and dwarfing syndromes)"	-	-	-	-	-	-	-	X
Checkbox for "Cleft lip with or without cleft palate"	-	-	-	-	-	-	-	X
Checkbox for "Cleft palate alone"	-	-	-	-	-	-	-	X
Checkbox for "Down syndrome"	-	-	-	-	-	-	-	X
Checkbox for "Karyotype confirmed"	-	-	-	-	-	-	-	X
Checkbox for "Karyotype pending"	-	-	-	-	-	-	-	X
Checkbox for "Suspected chromosomal disorder"	-	-	-	-	-	-	-	X
Checkbox for "Karyotype confirmed"	-	-	-	-	-	-	-	X
Checkbox for "Karyotype pending"	-	-	-	-	-	-	-	X
Checkbox for "Hypospadias"	-	-	-	-	-	-	-	X
Checkbox for "None of the anomalies listed above"	-	-	-	-	-	-	-	X
Cause of fetal death information								
Cause of stillbirth	X	X	X	-	-	-	-	-
Before labor	X	-	-	-	-	-	-	-
During labor	X	-	-	-	-	-	-	-
Fetal causes	-	X	X	-	-	-	-	-
Maternal causes	-	X	X	-	-	-	-	-
Cause of fetal death:	-	-	-	X	X	X	X	X
Immediate cause	-	-	-	X	X	X	X	-
Whether fetal or maternal	-	-	-	-	X	X	X	-
Due to	-	-	-	X	X	X	X	-
Whether fetal or maternal	-	-	-	-	X	X	X	-
Due to	-	-	-	X	X	X	X	-
Whether fetal or maternal	-	-	-	-	X	X	X	-
Other significant conditions of fetus or mother contributing to fetal death but not resulting in the underlying cause given in Part 1	-	-	-	X	X	X	X	-
Cause/conditions contributing to fetal death initiating cause/condition (Among the choices below, please select the one which most likely began the sequence of events resulting in the death of the fetus)	-	-	-	-	-	-	-	X
Maternal conditions/diseases (specify)	-	-	-	-	-	-	-	X
Complications of placenta, cord, or membranes:	-	-	-	-	-	-	-	-
Checkbox for "Rupture of membranes prior to onset of labor"	-	-	-	-	-	-	-	X
Checkbox for "Abruptio placenta"	-	-	-	-	-	-	-	X
Checkbox for "Placenta insufficiency"	-	-	-	-	-	-	-	X
Checkbox for "Prolapsed cord"	-	-	-	-	-	-	-	X
Checkbox for "True knot in cord"	-	-	-	-	-	-	-	X
Checkbox for "Chorioamnionitis"	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	X
Other obstetrical or pregnancy complications (specify)	-	-	-	-	-	-	-	X
Fetal anomaly (specify)	-	-	-	-	-	-	-	X
Fetal injury (specify)	-	-	-	-	-	-	-	X
Fetal infection (specify)	-	-	-	-	-	-	-	X
Other fetal conditions/disorders (specify)	-	-	-	-	-	-	-	X
Checkbox for "Unknown"	-	-	-	-	-	-	-	X
Other significant causes or conditions (select or specify all other conditions contributing to death)	-	-	-	-	-	-	-	X
Maternal conditions/diseases (specify)	-	-	-	-	-	-	-	X
Complications of placenta, cord, or membranes:	-	-	-	-	-	-	-	-
Checkbox for "Rupture of membranes prior to onset of labor"	-	-	-	-	-	-	-	X
Checkbox for "Abruptio placenta"	-	-	-	-	-	-	-	X
Checkbox for "Placenta insufficiency"	-	-	-	-	-	-	-	X
Checkbox for "Prolapsed cord"	-	-	-	-	-	-	-	X
Checkbox for "True knot in cord"	-	-	-	-	-	-	-	X
Checkbox for "Chorioamnionitis"	-	-	-	-	-	-	-	X
Checkbox for "Other (specify)"	-	-	-	-	-	-	-	X
Other obstetrical or pregnancy complications (specify)	-	-	-	-	-	-	-	X
Fetal anomaly (specify)	-	-	-	-	-	-	-	X
Fetal injury (specify)	-	-	-	-	-	-	-	X
Fetal infection (specify)	-	-	-	-	-	-	-	X
Other fetal conditions/disorders (specify)	-	-	-	-	-	-	-	X
Checkbox for "Unknown"	-	-	-	-	-	-	-	X
When did fetus die?	-	-	-	X	-	-	-	-
Checkbox for "Before labor"	-	-	-	X	-	-	-	-
Checkbox for "During labor or delivery"	-	-	-	X	-	-	-	-
Checkbox for "Unknown"	-	-	-	X	-	-	-	-
Fetus died before labor, during labor or delivery, unknown (specify)	-	-	-	-	X	X	X	-
Did child die before labor? _____ During labor? _____	X	-	-	-	-	-	-	-

See footnotes at end of table.

Table VI. Items included on the U.S. Standard Report of Fetal Death, by year revised—Con.

Item	1930	1939	1949	1956	1968	1978	1989	2003
Cause of fetal death information—Con.								
Estimated time of fetal death								
Checkbox for "Dead at time of assessment, no labor ongoing"	–	–	X	X	X	X	–	–
Checkbox for "Dead at time of assessment, labor ongoing"	–	–	–	–	–	–	–	X
Checkbox for "Died during labor, after first assessment"	–	–	–	–	–	–	–	X
Checkbox for "Unknown time of fetal death"	–	–	–	–	–	–	–	X
Was autopsy performed?	–	–	–	X	X	X	–	–
If yes, were autopsy findings considered?	–	–	–	–	X	–	–	–
Was an autopsy performed? Checkbox for "yes," "no," or "planned"	–	–	–	–	–	–	–	X
Was histological placental examination performed? Checkbox for "yes," "no," or "planned"	–	–	–	–	–	–	–	X
Were autopsy or histological placental examination results used in determining cause of fetal death? Checkbox for "yes" or "no"	–	–	–	–	–	–	–	X
Was there an operation for delivery?	–	X	–	–	–	–	–	–
State all operations, if any	–	X	X	–	–	–	–	–
Did the child die before operation?	–	X	–	–	–	–	–	–
During operation?	–	X	–	–	–	–	–	–
Medical certification information								
Signature of certifier	X	X	–	–	X	–	–	–
Date signed	–	–	–	–	X	–	–	–
Title of certifier	X	X	–	–	–	–	–	–
Address of certifier	X	X	–	–	X	–	–	–
Signature of attendant	–	–	X	X	–	–	–	–
Date signed	–	–	X	X	–	–	–	–
Title of attendant	–	–	X	X	X	–	–	X
Address of attendant	–	–	X	X	–	–	–	–
Name and title of attendant (checkboxes)	–	–	–	–	–	–	X	–
Attendant's name, title, and National Provider Identifier	–	–	–	–	–	–	–	X
Checkbox for "MD, DO, CNM/CM, other midwife, and other (specify)"	–	–	–	–	–	–	–	X
Name of physician or attendant	–	–	–	–	–	X	–	–
Name of person completing report	–	–	–	–	–	X	X	–
Title	–	–	–	–	–	–	X	X
Name and title of person completing report	–	–	–	–	–	–	X	X
Date report completed	–	–	–	–	–	–	–	X
Title	–	X	–	–	–	–	–	–
Date received by registrar	–	–	–	–	–	–	–	X
Signature of authorized official, if not attended by physician	–	–	X	X	X	–	–	–
Statement of local registrar or coroner if physician not present	–	X	–	–	–	–	–	X
Signature	–	X	–	–	–	–	–	–
Signature of registrar	X	X	X	X	X	–	–	–
Date received by local registrar	–	–	X	X	X	–	–	–
Date filed with local registrar	X	X	–	–	–	–	–	–
Date given name added	X	–	–	–	–	–	–	–
Signature of registrar	X	–	–	–	–	–	–	–
Disposition information								
Burial, cremation, or removal	–	X	X	X	X	–	–	–
Method of disposition								
Checkbox for "Burial"	–	–	–	–	–	–	–	X
Checkbox for "Cremation"	–	–	–	–	–	–	–	X
Checkbox for "Hospital disposition"	–	–	–	–	–	–	–	X
Checkbox for "Donation"	–	–	–	–	–	–	–	X
Checkbox for "Removal from state"	–	–	–	–	–	–	–	X
Checkbox for "Other (specify)"	–	–	–	–	–	–	–	X
Date of burial	–	X	X	X	X	–	–	–
Place of burial or cremation	–	X	–	–	–	–	–	–
Name of cemetery or crematory	–	–	X	X	X	–	–	–
Location	–	–	X	X	X	–	–	–
Signature of funeral director	–	X	–	–	X	–	–	–
Name of funeral director	–	–	X	X	–	–	–	–
Address	–	X	X	X	–	–	–	–
Name of funeral home	–	–	–	–	X	–	–	–
Address	–	–	–	–	X	–	–	–
Informant information								
Informant	–	X	X	X	–	–	–	–
Address	–	X	–	–	–	–	–	–

X Indicates item included on standard report.

– Indicates item not included on standard report.

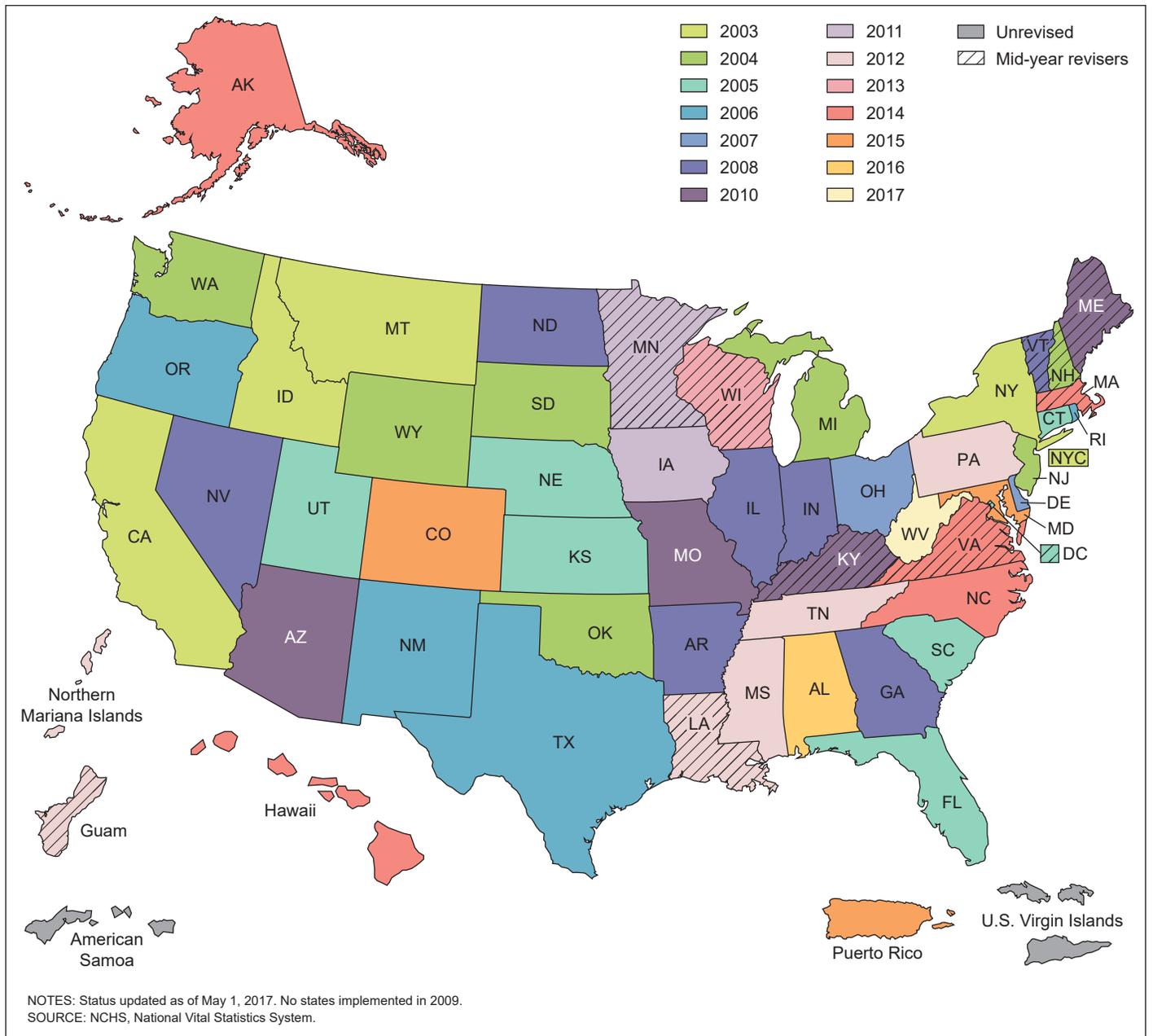


Figure II. Implementation of the 2003 revised death certificate

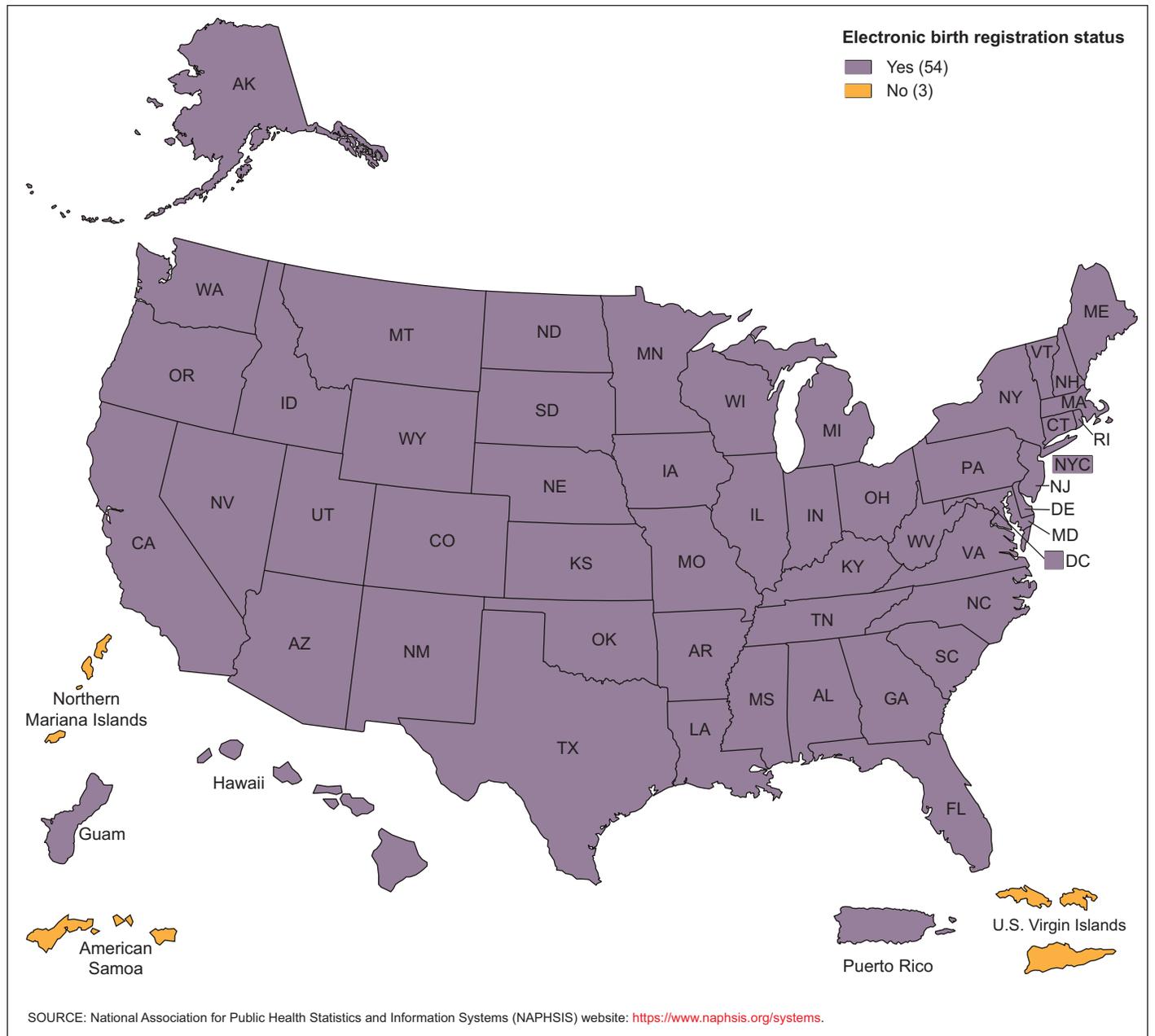


Figure V. Electronic birth registration status, updated February 2018

Vital and Health Statistics Series Descriptions

Active Series

- Series 1. Programs and Collection Procedures**
Reports describe the programs and data systems of the National Center for Health Statistics, and the data collection and survey methods used. Series 1 reports also include definitions, survey design, estimation, and other material necessary for understanding and analyzing the data.
- Series 2. Data Evaluation and Methods Research**
Reports present new statistical methodology including experimental tests of new survey methods, studies of vital and health statistics collection methods, new analytical techniques, objective evaluations of reliability of collected data, and contributions to statistical theory. Reports also include comparison of U.S. methodology with those of other countries.
- Series 3. Analytical and Epidemiological Studies**
Reports present data analyses, epidemiological studies, and descriptive statistics based on national surveys and data systems. As of 2015, Series 3 includes reports that would have previously been published in Series 5, 10–15, and 20–23.

Discontinued Series

- Series 4. Documents and Committee Reports**
Reports contain findings of major committees concerned with vital and health statistics and documents. The last Series 4 report was published in 2002; these are now included in Series 2 or another appropriate series.
- Series 5. International Vital and Health Statistics Reports**
Reports present analytical and descriptive comparisons of U.S. vital and health statistics with those of other countries. The last Series 5 report was published in 2003; these are now included in Series 3 or another appropriate series.
- Series 6. Cognition and Survey Measurement**
Reports use methods of cognitive science to design, evaluate, and test survey instruments. The last Series 6 report was published in 1999; these are now included in Series 2.
- Series 10. Data From the National Health Interview Survey**
Reports present statistics on illness; accidental injuries; disability; use of hospital, medical, dental, and other services; and other health-related topics. As of 2015, these are included in Series 3.
- Series 11. Data From the National Health Examination Survey, the National Health and Nutrition Examination Surveys, and the Hispanic Health and Nutrition Examination Survey**
Reports present 1) estimates of the medically defined prevalence of specific diseases in the United States and the distribution of the population with respect to physical, physiological, and psychological characteristics and 2) analysis of relationships among the various measurements. As of 2015, these are included in Series 3.
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The last Series 12 report was published in 1974; these reports were included in Series 13, and as of 2015 are in Series 3.
- Series 13. Data From the National Health Care Survey**
Reports present statistics on health resources and use of health care resources based on data collected from health care providers and provider records. As of 2015, these reports are included in Series 3.

- Series 14. Data on Health Resources: Manpower and Facilities**
The last Series 14 report was published in 1989; these reports were included in Series 13, and are now included in Series 3.
- Series 15. Data From Special Surveys**
Reports contain statistics on health and health-related topics from surveys that are not a part of the continuing data systems of the National Center for Health Statistics. The last Series 15 report was published in 2002; these reports are now included in Series 3.
- Series 16. Compilations of Advance Data From Vital and Health Statistics**
The last Series 16 report was published in 1996. All reports are available online; compilations are no longer needed.
- Series 20. Data on Mortality**
Reports include analyses by cause of death and demographic variables, and geographic and trend analyses. The last Series 20 report was published in 2007; these reports are now included in Series 3.
- Series 21. Data on Natality, Marriage, and Divorce**
Reports include analyses by health and demographic variables, and geographic and trend analyses. The last Series 21 report was published in 2006; these reports are now included in Series 3.
- Series 22. Data From the National Mortality and Natality Surveys**
The last Series 22 report was published in 1973. Reports from sample surveys of vital records were included in Series 20 or 21, and are now included in Series 3.
- Series 23. Data From the National Survey of Family Growth**
Reports contain statistics on factors that affect birth rates, factors affecting the formation and dissolution of families, and behavior related to the risk of HIV and other sexually transmitted diseases. The last Series 23 report was published in 2011; these reports are now included in Series 3.
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For answers to questions about this report or for a list of reports published in these series, contact:

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