SPECIFICATIONS FOR COLLECTING AND EDITING THE UNITED STATES STANDARD CERTIFICATES OF BIRTH AND DEATH -- 2003 REVISION

INTRODUCTION

Since the inception of a national vital statistics system, the states and the federal government have worked together cooperatively to promote standards and consistency among state vital statistics systems. The U. S. Standard Certificates of Birth and Death, and Report of Fetal Death are the principal means of promoting uniformity in the data collected by the states. These documents are reviewed and revised approximately every 10 years through a process that includes broad input from data providers and users. In 1997, the National Center for Health Statistics (NCHS) appointed a panel of vital statistics data providers and users to evaluate the (1989) certificates. That panel completed its work in April 1999, and submitted recommended revisions to NCHS.

NEED FOR SPECIFICATIONS

As one of its findings, the panel recommended that NCHS develop and promulgate standards for vital statistics data collection and processing. One of the reasons for this was that the Working Group to Improve Data Quality found a decline in vital statistics birth data quality associated in part with electronic registration of vital events (1).

Over the past 15 years, automation has had a significant effect on the nations' vital statistics system. Currently, over 95 percent of births are registered electronically and the move toward electronic death registration is accelerating. Unfortunately, these electronic systems were developed in a piecemeal fashion in an environment of constantly changing technology options. As a result, data quality issues not seen prior to the Electronic Birth Registration (EBR) systems began to surface. Many of these quality issues along with issues that appeared to be a problem for both paper and electronic systems are documented in the "Report of the Working Group to Improve the Quality of Birth Data."(1)

With the development of electronic systems for new standard certificates there is an opportunity to prevent some of the problems identified by the "Working Group" and improve data quality. One way to improve data quality as well as to ensure uniformity in the national databases is to include, as part of the implementation package, detailed specifications for electronic as well as paper systems. All vital statistics registration areas as well as software vendors will have the same set of specifications for data submission to NCHS. As a result, differences in data due to software created by different vendors should be minimized.

Our goal is to offer comprehensive instructions/recommendations covering all aspects of the electronic system. The data specifications for electronic birth, death, and fetal death registration systems include:

- Mechanisms for incorporating recommended worksheets into the system
- Item specific edit criteria
- Computational algorithms
- Item code specifications
- Response categories, including drop down menus and "pick lists"
- Requirements for context specific help
- Electronic transmission standards

The overall goal of these specifications is to have the electronic systems identify, and wherever possible, rectify data problems as close to data entry as possible. To that end, we recommend that the systems edit and query at the time the data is entered and that a second level of editing be performed for some items, once the record is filed with the state office. Editing performed close to the time that data are collected should greatly minimize queries from state offices to data providers. In addition, the editing and resolving of problems before data are transmitted to NCHS should reduce queries from NCHS to the states and maximize resolution of data problems before data are transmitted to NCHS when it is often too late for them to be fixed.

At present, most Electronic Birth Registration (EBR) systems are designed for freestanding software in birthing facilities. The software captures the data, carries out limited editing, and transmits data to the state for further processing. State processing is then done either with software developed by the same vendor who developed the facility software, or by software developed by state staff. Although the current specifications are designed to be used with the different types of electronic systems (stand alone facility/provider software, state central processor, or central/ "web based," systems) a system housed and operated centrally at the state office may facilitate system maintenance, version control, security, and uniform processing of data.

We also strongly recommend that each state operated EBR/EDR input system replicate the data input system used by facilities/providers in the field. This helps to ensure that records not filed electronically will be keyed, edited, and processed as similarly as possible to electronically filed records.

States may also wish to integrate the EBR and the Fetal Death Reporting system to minimize facility workload and promote more complete reporting. The new electronic systems may also be integrated with other public health data systems, such as newborn screening, immunization registries, medical examiner reporting systems, or other appropriate disease-specific reporting systems. However, the states should review how

data are collected in these systems and the potential impact of this data on vital statistics information before allowing integration of systems.

These specifications follow as closely as possible the data standards (HISSB standards) promulgated by the Centers for Disease Control and Prevention (CDC).

The specifications include recommendations on the steps that should occur during data collection and processing, but do not specifically (with a few exceptions) mandate how the steps are to be operationalized.

The specifications are meant to be software neutral. Any language that might be construed as mandating a particular software approach is not intentional.

NCHS will review state software for the handling of data elements to ensure that data are collected and recorded as intended. The software will also be tested to ensure that the edits and computational algorithms work as intended, and that instructions and help menus, pick lists, and drop down menus are uniform.

The EBR specifications were developed assuming the NCHS Standard Worksheets (see attachments) as the source documents used to populate the EBR. The EBR should always follow the flow of these worksheets. These paper worksheets are also readily adaptable to electronic formats (i.e., electronic worksheets).

GENERAL PRINCIPLES

1. Electronic birth data are to be collected in a manner and format as similar to the recommended worksheets as possible. Death data should closely follow the death certificate.
2. The specifications for electronic systems include instructions that are to appear on the screen to complete each item and instructions to be included for help menus.
3. The specifications for electronic systems include, in many cases, the specific edit screens to be followed at data input and at later stages in the processing.
4. Once a record has been saved once and then reopened, the EDR/EBR should include a window for the record that lists items still pending (incomplete). The keyer should be able to go to any item in the pending list and enter data when information becomes available.
5. Default values are not permissible except for those clearly identified in the specifications.
6. Individual check boxes or item responses may not be dropped, but additional categories may be included. Any additions should be added to the end of the standard list. For exceptions to this recommendation please contact the Director of the Division of Vital Statistics, NCHS.
7. Additional items may also be added to the certificate, but may affect responses to the standard items. Please contact the Director of DVS, NCHS before finalizing new items.

8. The certificates/worksheets generally do not include the response option "unknown." Electronic systems, however, allow a final response of "unknown" for a number of items.
9. Electronic non-check box numeric items such as dates, and "unknown" will require the entry of a character or series of characters as shown in the specifications. The use of "hot keys" for unknown numeric values is recommended.
10. For items where it is only correct to chose one response (e.g. Prepregnancy or Gestational Diabetes, or The Principal Source of Payment for Delivery) systems should be designed so as to accept only one response. Two possible ways to accomplish this are via edit messages or blocking out other response categories after one has been selected.
11. The software must be able to integrate with several external pieces of software, e.g., the state GIS system, occupation and industry coding software, and Supermicar.
12. Although quality control tabulations are not included in the specifications (e.g., the percent of unknown responses by provider), we strongly recommend that these types of tabulations be included as an essential component of the new EBR/EDR systems.
13. Software and table updates should be implemented uniformly across the state.

TRANSMISSION FILE PRINCIPLES

1. State file numbers should be sequential starting with the number one each year.
2. Each shipment of data shall include the state number, date of shipment, number of records in the shipment, the software version used to collect and process the data and all table versions used for table lookups. Each record shall include a variable that indicates it is a new record, a record update or a void. Other variables may be added by NCHS as it further develops the transmission standards.
3. Data will be sent to NCHS as soon as possible after receipt and initial processing by the state. The state shall not wait for the results of queries before transmitting a record.
4. All record updates and changes to variables in the NCHS data set due to query, registrar initiation or interested party initiation should be forwarded to NCHS as soon as the updated record is accepted by the state.

(1) Report of the Working Group to Improve the Quality of Birth Data. U.S. Department of Health and Human Services, PHS, CDC, NCHS. 1998.

TERMS AND DEFINITIONS

Soft Edit: An edit that identifies and queries entries which are outside of the expected range, but which accepts out of range entries.

Hard Edit:	An edit that identifies and queries entries which are outside of the expected range which must be corrected before the record can be filed.
EBR	Electronic Birth Registration System.
EDR	Electronic Death Registration System.
EBR/EDR Edit	Edits (both hard and soft) run before the record is transmitted to the state. Wherever feasible, edits are to be run at data entry.
State Edit	Edits performed by the state after the record has been transmitted to the State.
Help Menu Instructions	Instructions to be included as part of the standard help function.
On Screen Instructions	Instructions to complete or revise an item which should always appear on the EBC/EDC screen.
Final Review Screen	A screen designed to improve data collection by allowing the keyer additional time to gather information, and to remind the keyer to complete missing information before the record can be filed. Also queries rare responses. (See discussion below.)
Bypass Variable	A variable that indicates the results of a query for an entry failing an edit. The results of the query are in the transmitted data. (See discussion below.)
Missing Value Variable	A variable that provides additional information to an "unknown" response, e.g., "sought but unknown," "unobtainable," and "refused." (See discussion below.)
Processing Variables	Variables states will use to collect and process vital statistics data.
Transmission Variables	Variables to be transmitted to NCHS as part of the VSCP contract.

FINAL REVIEW SCREEN: (EBC only)
(Also see section on Final Review Screen)

The final review screen is designed to encourage better reporting of items for which necessary information is not immediately available (primarily prenatal care items). The

keyer is given the option to temporarily skip an item, that is, indicate that data to complete the item are not available at the time the record is initiated. The item is then placed in pending status and, if not called up and completed beforehand, will appear on the final review screen to be completed before the record can be transmitted to the state. At the final review screen, the keyer may enter the item information or enter a response of "unknown."

Once a record has been closed and reopened, the keyer will also have the option to return and complete pending items. A list of items still pending will appear on the screen at all times after the record is re-opened allowing the keyer to complete the item as information becomes available. For example, assume that the keyer has all information on a given birth except the mother's prenatal care data. When the keyer comes to item 6(a) "Date of first prenatal care visit," one of the first items on the facility worksheet, the keyer may then indicate that the PNC record is "not yet available," the item will be skipped and the keyer can continue to complete other items on the record. Once the record is re-opened, the item "Date of the first prenatal visit" will appear on the pending list to be completed at the keyers discretion. If not completed beforehand, the item will appear on the final review screen.

The "pending list" should be available to the keyer at all times after the first re-opening of the record, but the final review screen will appear only once, prior to the record being sent to the state. The final review screen is also used to query rare item responses such as a response of "no prenatal care."

BYPASS VARIABLE:

Bypass variables are used where edits are performed. This variable indicates the keyer has been queried about an unexpected response, and has had the opportunity to change the response. The use of bypass variables should help reduce queries from the state to data providers, and from NCHS to the states.

MISSING VALUE VARIABLE:

The "Missing Value Variable" (MVR) captures responses such as "refused," "sought but unknown," and "unobtainable," which are intended to expand upon an "unknown" response. While not necessary for most variables in the Vital Statistics System, MVRs can be useful for items when data are collected directly from an informant. These responses can then be reviewed by the state to identify data collection issues. The death specifications include several items for which several MVR responses are recommended.

THE FINAL REVIEW SCREEN

Systems should be designed to allow the keyer to temporarily skip items for which information/records are not immediately available. This is particularly, but not exclusively, applicable to information collected from prenatal care records.

The "Final Review Screen" is to appear prior to the final transmission of the record for those items still "pending." Such items include any that were marked "pending" as above, or those left blank but required to be completed for the record to be filed with the state. It also includes items that have failed a hard edit, and selected items with relatively rare responses (e.g., "no prenatal care").

The following are instructions for the final review screen using "Date of first prenatal care visit" and "Date of last prenatal care visit" (items 29(a)&(b)) as examples:

When items "Date of first prenatal care visit" and "Date of last prenatal care visit" are marked "pending" the following screen should appear:

The following item has been marked "pending." This item must be completed before the record is filed.

Complete ALL PARTS of the dates that are available.
Leave blank any parts of the dates that are not known.

Month of the first visit __ __
Day of the first visit __ __
Year of the first visit __ __ __ __

Month of the last visit __ __
Day of the last visit __ __
Year of the last visit __ __ __ __

- ❑ Check this button if all dates are unknown
- ❑ Check this button is there was no prenatal care

A response of "No prenatal care" on the initial entry screen, also is to be verified at the final review screen. (Verification is not necessary for data entered at the State level.)

Please verify whether or not the mother received prenatal care.

- ❑ Yes, the mother received prenatal care
- ❑ No, the mother did not receive prenatal care

If "no prenatal care" is verified, there is no further query for item 29, and item 30 is skipped.

If the verification response indicates that prenatal care was provided, the following will appear:

Complete ALL PARTS of the dates that are available.
Leave blank any parts of the dates that are not known.

Month of the first visit __ __
Day of the first visit __ __
Year of the first visit __ __ __ __

Month of the last visit __ __
Day of the last visit __ __
Year of the last visit __ __ __ __

- ❑ Check this button if all dates are unknown
- ❑ Check this button is there was no prenatal care

Entry operator must tab through all entry fields.

If a date is entered, the edits for date are run as indicated in the item specification.

If a date is entered or the "unknown" button is checked, item 30 should be completed.

If no parts of a date are entered after tabbing through the last field, all date fields are assigned the "unknown" codes.

DEPARTMENT OF HEALTH & HUMAN SERVICES

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September 10, 2001
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Dear Colleague:

Recent meetings with the States and software vendors have demonstrated the need for us to clarify NCHS's position on the data-capturing components of the electronic birth and death systems being designed for the upcoming revision. This letter briefly summarizes the NCHS guidelines for these systems; more detailed information can be found in the overview of "The Specifications for Collecting and Editing The United States Standard Certificates of Birth and Death -2003 Revision" and in the specifications for the individual items. The overview and the death specifications will be available at our web site soon. We expect to post the finalized birth specifications within the next month.

In order to improve the quality of both State and national vital statistics and to promote standardization and comparability among the States, we believe it is essential that all areas incorporate certain features into their electronic systems. Data from systems which do not include these elements may not be considered comparable to that from systems which do, and ultimately may not be included in the national file or in national tabulations. We strongly encourage all States which are considering data collection or editing methods which deviate from the specifications to consult with us prior to implementation.

We hope to work closely with the software vendors to enhance understanding on both sides of data needs and system capabilities and are open to suggestions for ways to improve on these elements. We invite all vendors to meet with us within the next few months for more in-depth demonstrations and discussion.

Features integral to the electronic systems:

- **Automatic edits at time of data entry** - automatic messages which appear immediately after data is entered for a given item. The message alerts the user of data problems (i.e., data out of range or inconsistent with other information) and allows the user to immediately modify the data. The user should not have discretion as to whether the edits are run. There are two types of edits - soft edits which identify and query entries but accept the entry upon the users approval, and hard edits which identify and query entries which must be corrected before the record can be filed.

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- **Ability to edit related items together** - the user should be able to readily modify data entered for all related items when an edit has identified a problem. For example, if birthweight is found to be within the allowable range, but is inconsistent with the (derived) length of gestation, the user should be able to readily correct both items since either could be inaccurate.

- **Capture of soft-edit query** - the system should track when a soft edit has been performed. This will allow States to tract frequent edit failures and take corrective action. For selected variables, when a soft edit fails a second time, a by-pass variable will be set to alert States and NCHS that the out of range value has been verified as correct.

- **On screen messages** - the individual item specifications include a number of reminders/instructions. A well-designed system should be able to incorporate these messages without unduly burdening the user. Not all messages should require action on the part of the user. For example, some messages can just be flashed on the screen quickly enough to read.

- **On-line help** - definitions and more detailed instructions included in the specifications for both the EBC and the EDC, and "The Guide to Completing the Facility Worksheet" for the EBC should be available on-line to the user. NCHS expects to make an electronic version of the guide available soon.

- **Item order or flow** - systems should flow in the same order as the worksheets which were designed to encourage information to be gathered from the best sources. (Not applicable to death.)

- **Final review/query screen** - Systems should be designed to allow the user to temporarily skip certain items to allow the user additional time to gather information, especially from the medical records. The final query screen reminds the user to complete all missing information and gives them the opportunity to do so before the record can be filed or released to the State data file. It also queries rare responses, such as a response of "no prenatal care." Once a record is released to the State data file and is accepted by the State, providers should no longer have the ability to modify the record. (Not applicable to death.)

- **List of pending items** - systems should allow the user to easily access a list of incomplete items and go to the incomplete items once a record has been worked on and saved once. Prior to sending or finalizing a record, it should be mandatory that the user be presented with a list of all incomplete items.

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- For items where it is only correct to chose one response (e.g. Prepregnancy or Gestational Diabetes, or The Principal Source of Payment for Delivery) systems should be designed so as to accept only one response. Two possible ways to accomplish this are via edit messages or blocking out other response categories after one has been selected.

- **Version control** - systems should include methods to track changes in software versions and notify NCHS of version change. Version changes considered necessary to track are ones which include changes to items, edits or more substantive changes to tables and format. Each record transmitted to NCHS should have a version number. This notice should greatly improve our ability to identify and fix data problems.

- **Cause of death**

  - Consistent look for cause of death- On medical examiner, coroner, and physician entry screens, it is imperative that the physician viewing the screen be able to see, at minimum, the same prompts and formatting as those physicians using the paper version of the death certificate. (Not applicable to birth).

  - Additional lines for cause- Additional lines may be added as needed in the cause-of-death statement. (Not applicable to birth).

  - Prohibition of pick lists- Physicians completing cause of death must enter medical conditions using their own terminology (e.g., pick lists or other mechanisms limiting the choice for cause are not allowed). (Not applicable to birth).

- **Electronic death registration system guidelines**- The National Association for Public Health Statistics and Information Systems' (NAPHSIS) Electronic Death Registration project has created guidelines and associated standards (see guidelines and standards at http://www.naphsis.org) for use in developing and implementing an electronic death registration system. The NAPHSIS document deals with broad issues while the NCHS specifications document deals with individual fields.

This list is intended to address the major issues we have encountered thus far. As we all gain more experience with the new systems new issues may arise that will also need to be

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addressed. We look forward to an ongoing dialogue with all parties to work towards the development of the best systems possible.

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Sincerely yours,

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