

1980 AHA HOSPITAL AND NATIONAL NATALITY/FETAL MORTALITY SURVEY LINKAGE METHODOLOGY

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Merging the 1980 American Hospital Association(AHA) Annual Survey with the 1980 National Natality Survey and the 1980 National Fetal Mortality Survey (NNS/NFMS) doubled the record length of the NNS/NFMS and greatly expanded their utility. This linkage project can now yield valuable information about the delivery hospital according to mothers' and infants' characteristics.

OVERVIEW - NNS/NFMS

The 1980 NNS and NFMS are nationally representative surveys based on samples of 9,941 live births and 6,386 fetal death vital records. These records have been weighted to reflect United States estimates of 3,612,258 live births and 19,202 fetal deaths of 28 weeks or more gestation. The files of Certificates of Live Births and Reports of Fetal Deaths in the 52 State and independent registration areas of the U.S. constituted the sampling frames for these surveys. Four types of respondents associated with the sampled deliveries (married mothers, hospitals where the deliveries occurred, attendants at delivery, and medical providers of radiation) were mailed eight-page questionnaires. Their responses have greatly expanded our knowledge of the relationship of social and demographic characteristics, maternal health, infant health, and radiation exposure to live births and late fetal deaths(1). A public-use data tape is now available for \$125.00.(2)

OVERVIEW - AHA SURVEY

The American Hospital Association conducts an annual survey of hospitals in the United States. This survey, conducted annually since 1946, collects information related to facilities and services available within the hospitals, inpatient beds and utilization for the whole hospital, for short term and/or nursing home type long-time care units, and for specific service units; bassinets and newborn utilization; surgical operations; outpatient utilization; financial position of the hospital; personnel on hospital payrolls; and type of management control. The 1980 survey response rate was 89.6 percent and the item response rate ranges from 34.6 percent (number of paid person hours of licensed practical nurses) to 100 percent (Primary Ambulatory Care, among other examples.) The detailed survey data tape has been obtained by the National Center for Health Statistics and permission to link this data to the NNS/NFMS was provided by the AHA in March, 1984.

CONFIDENTIALITY

Data produced from this linked file will be for statistical purposes only. The linked file will remain an in-house NCHS data file, will not be released to outside users, and no data items will ever be published which reveal the identity of any hospital. NCHS will consider requests from outside analysts to produce tabulations from this data set through the NCHS Reimbursable Work Program

mechanism. Such tabulations will be inspected for privacy and confidentiality by NCHS Staff.

STEPS IN MERGING THE TWO SURVEYS

When the 1980 NNS/NFMS began, 1978 was the latest published listing of hospitals available with AHA identification numbers. The 1980 NNS/NFMS obtained the names of the hospital of delivery from birth certificates and fetal death certificates. The addresses of these hospitals were looked up in the 1978 AHA directory by NCHS Staff, who assigned 1978 AHA identification numbers to each record. Hospital addresses not in the AHA directory were obtained through telephone directory assistance and calling the hospitals. These latter hospitals were not assigned an AHA ID number. Turnover due to new openings, name changes, and mergers with other hospitals between 1978 and 1980 explain the omissions of these unidentified hospitals(3,4). For this reason, we were unable to assign AHA Hospital ID numbers to 3.2 percent of the hospital records in the NNS/NFMS. The technique we used in 1984 to assign AHA ID numbers to these unidentified hospitals was to link the hospital addresses used in mailing 1980 NNS/NFMS questionnaires with hospital addresses from AHA Hospital Surveys. This linkage allowed us to correct the 1978-1980 AHA discrepancies, and allowed us to check initial coding of hospital identification numbers done several years earlier.

The four charts depict the steps which describe the entire AHA-NNS/NFMS linkage process. Chart 1 shows the address linkage process. The 1980 NNS/NFMS data file (file #1) is linked by case identification number with the NNS/NFMS mailing address file(#2). Only the hospital address records(#3) were selected for matching with the survey. This match was initiated so that all survey records were inspected for correct matches. For handling purposes, the output record of this linkage was short and included only the NNS/NFMS ID#, the AHA Survey ID#, and mailing address used in the NNS/NFMS. Next, the file was sorted on AHA Survey ID# in preparation for linking with the two AHA files.

This file(#5) was then linked with the 1978 AHA Survey(#7). The NNS/NFMS file(#8) then contained the 1978 AHA Hospital mailing address.

Finally, file(#8) was linked with the 1980 AHA hospital mailing addresses.

Chart 2 shows the listing of the final NNS/NFMS linked address file(#11). This listing is selective. It contains only records for which the hospital names from each source did not match exactly. This listing was used during three visual inspection phases.

The first of three visual inspection phases involved checking each record for similar hospital names and addresses. These records were listed because hospital names from the three sources (1978 AHA Survey address, 1980 AHA Survey address, address used by NCHS to mail NNS/NFMS questionnaires) were misspelled or abbreviated differently. In the second phase, we examined records which had discrepancies in hospital names

or addresses between the three sources. Most of the records with discrepancies were AHA affiliated. For these cases, the identification numbers were not altered. The other frequent nonmatch condition involved cases for which there was no matching 1980 hospital address. Most of these were hospitals that had a name change and we were able to find these cases in the AHA directory listed in the same city under their new name. This name change usually caused an AHA ID# change. For the third phase, we attempted to contact the hospital. This was done to resolve cases lacking a proper match.

After the three previous phases were completed, the correct AHA Hospital ID#'s were entered on the appropriate record in the NNS/NFMS linked address file(#4). We then verified the AHA ID number changes. the last box of chart 2 shows the corrected NNS/NFMS linked address file(#13) linked with the 1980 AHA Hospital Survey(#10). The resulting file contains the hospital addresses from both survey systems. This file(#14), shown in chart 3, is ordered on the NNS/NFMS ID number and matched to the original linked address file(#11). The match was programmed to output only records with an AHA ID number change. Similar to the first linking process, the hospital addresses from the NNS/NFMS and AHA survey were listed and visually checked for compatability. We did not find any errors in the ID number assignment.

Finally, chart 4 shows the creation of the final NNS/NFMS-AHA file(#20). To create it, the NNS/NFMS linked address file(#15) was linked to the 1980 NNS/NFMS file(#1), and then that file(#18) was sorted and linked with the 1980 AHA Hospital Survey(#10).

EXAMPLE OF DATA AVAILABLE FROM LINKED FILE

As an example of the breadth of information available from this newly linked in house NCHS data file, two figures have been prepared depicting the relationship between the availability of neonatal intensive care in hospitals (a variable included in the AHA Survey), and type of delivery (primary and repeat cesarean sections and all other deliveries) a data item collected by the NNS/NFMS. Figure 1 shows a bar chart of the percent of inhospital deliveries having NIC available, 66.8%. The chart indicates that low birthweight deliveries (less than 2500 grams) and repeat cesarean deliveries are more likely to occur in hospitals having NIC available.

Figure 2 shows live births by day of week for repeat cesarean deliveries. The line graphs are plots of utilization index numbers based at

100.(5) These numbers are generated to show the relative relationships of the observed number of deliveries to the expected number for each day of the week. The expected number is assumed to be one seventh of the week's total deliveries. Thus, if there were 70,000 deliveries within one week, the expected number of deliveries for each day within the week would be 10,000. The index numbers shown on the line graphs are the products of 100 times the ratio of observed to expected deliveries. Figure 2 shows two lines. The solid line shows the daily delivery index within hospitals having NIC available, and the broken line shows the index for hospitals not having NIC available. This figure shows a deficit in Sunday and Saturday deliveries and a corresponding surplus during Monday through Friday, particularly on Tuesdays in hospitals with NIC, and Friday in hospitals without NIC.

CONCLUSION

This paper has presented a brief overview of the programming and merging steps used to match the 1980 AHA Hospital Survey to the 1980 NNS/NFMS. We presented sample graphs of data extracted from this linked data set to demonstrate the potential this data has for analysis.

REFERENCES

- 1) For a thorough discussion of NNS/NFMS methodology, see "The 1980 National Natality Survey and National Fetal Mortality Survey - Methods used and PHS agency participation" by Paul J. Placek in Public Health Reports, vol.99, no.2, pp.111-116, March-April 1984. Seven other articles on the NNS/NFMS are in a special section of that same issue.
- 2) Request Public Use Data tape PB84-177310 for the 1980 National Natality Survey and Fetal Mortality Survey from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Phone (703) 487-4650.
- 3) 'The American Hospital Association's Annual Survey of Hospitals: Continuity and Change', by Peter D. Kralovec and Ross Mullner, Health Services Research, vol.16, no.3, pp.351-355, Fall, 1981.
- 4) 'AHA Annual Survey of Hospitals, Quality Improvement Report', Hospital Data Center, AHA, Dec., 1983.
- 5) 'Seasonal Variation of Births', by Harry M. Rosenberg. Vital and Health Statistics. PHS Pub. No. 1000-Series 21-No.9. Public Health Service. Washington. U.S. Government Printing Office, May 1966.

CHART 1
1980 NNS/NFMS AND 1980 AHA LINKAGE

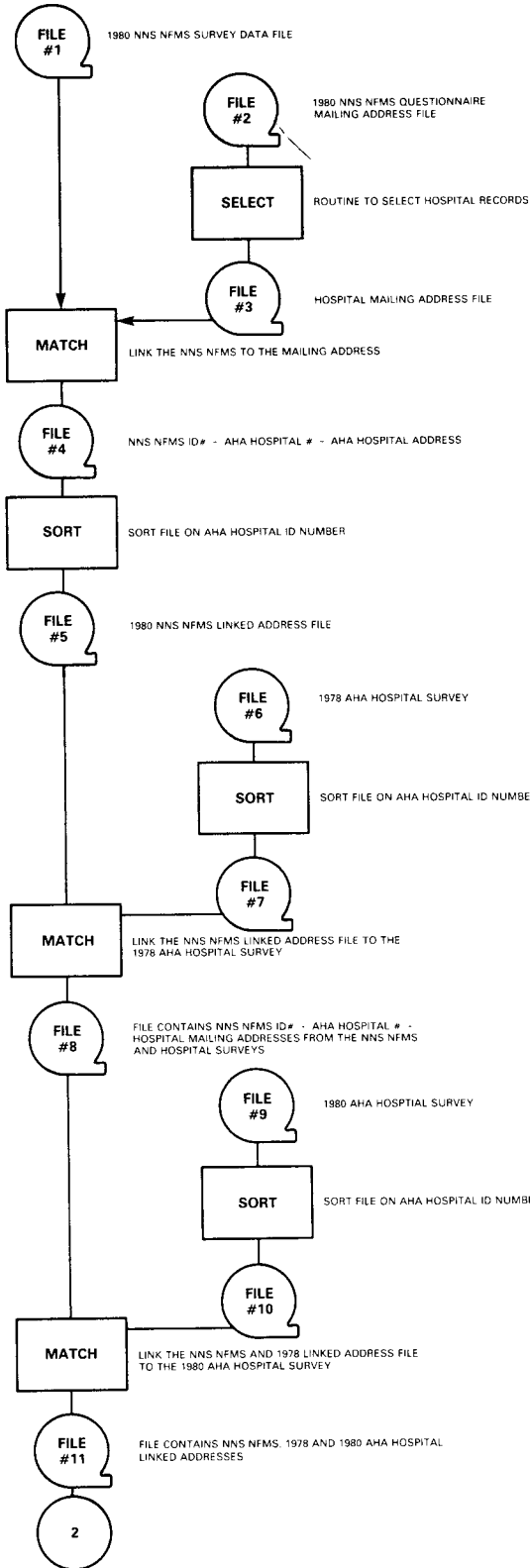


CHART 2
1980 NNS/NFMS AND 1980 AHA LINKAGE

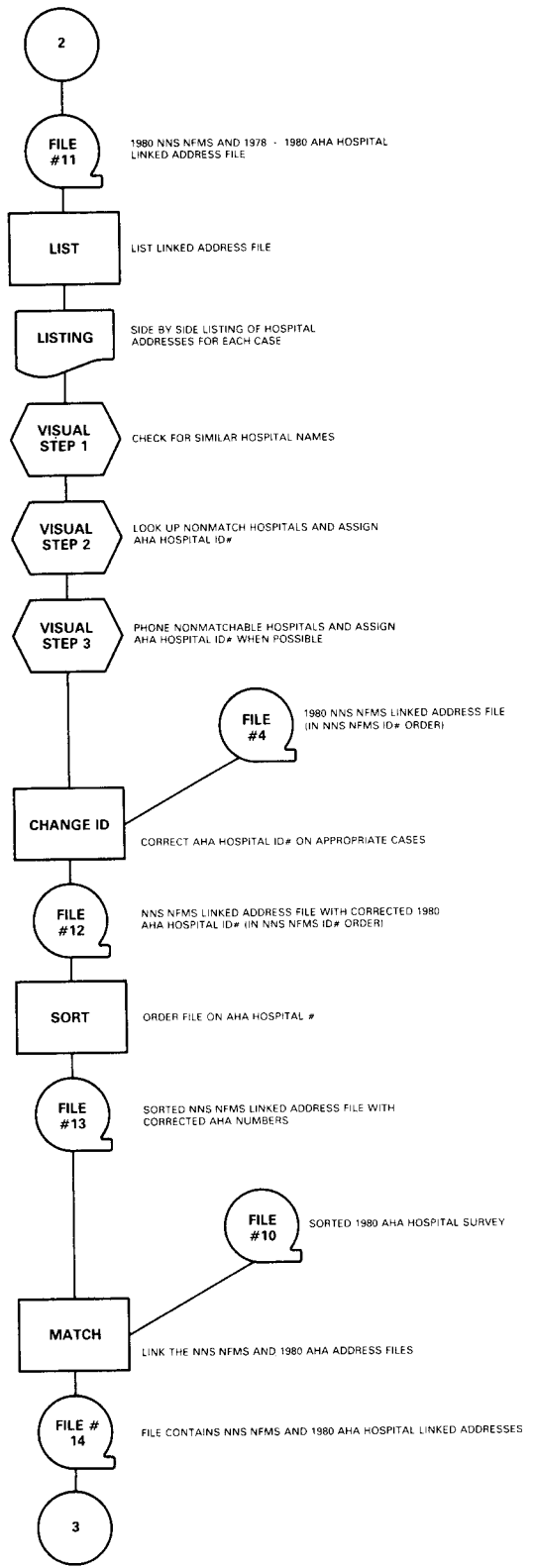


CHART 3
1980 NNH/NFMS AND 1980 AHA LINKAGE

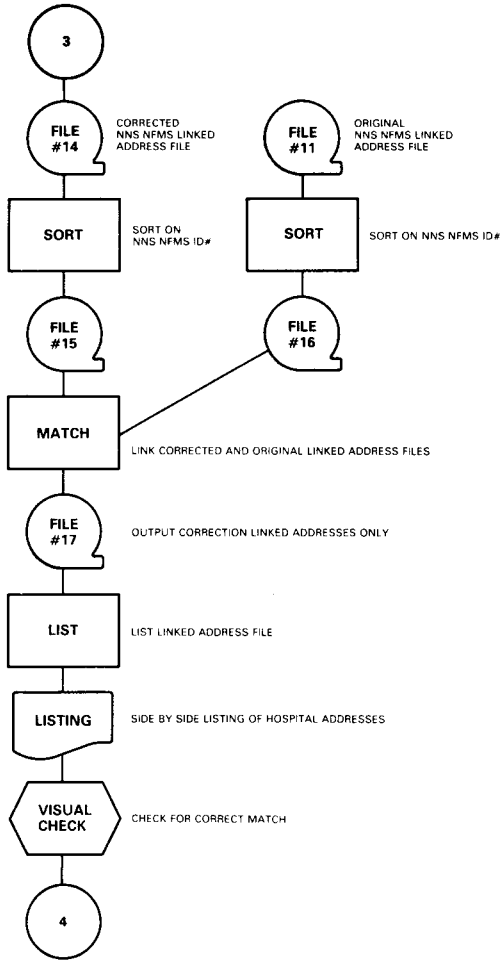


CHART 4
1980 NNH/NFMS AND 1980 AHA LINKAGE

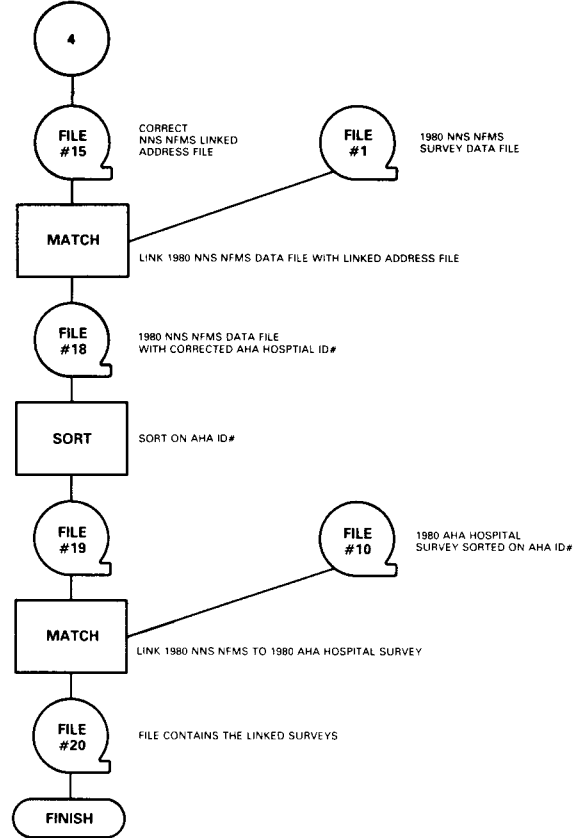


Figure 1
Percent of hospitals with neonatal intensive care according to NNS birthweight and type of delivery: United States, 1980

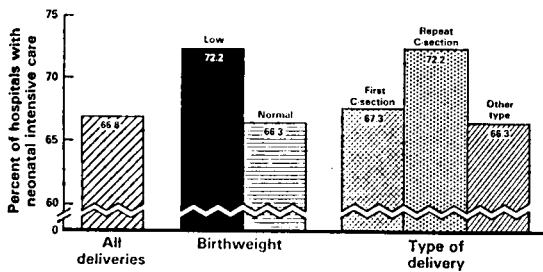


Figure 2
Daily index of repeat cesarean live births by availability of hospital neonatal intensive care: United States, 1980

